PACS Performance Verification Phase Plan

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Change Record

Version	Date	Changes	Remarks
Draft 1 (Issue 0.1)	November 5, 2007	–	New document Incomplete but exemplary lay-out of some sections
Draft 2 (Issue 0.2)	November 14, 2007	1.2	New
		3.1.2	Revised according to latest information
		4.1.1	Information on stars extended
			Information on asteroids added
		4.2.1	New section on LWS wavelength calibrators
		4.2.2	New section on water line stars
		4.2.3	New section on gas planets
		5.2	Slight updates
		5.3.2	1st version of matrix completed
		5.3.3	1st examples added
		5.3.4	1st examples added
Issue 0.25	March 19, 2008	3.2.3	Figure on calibration tools and HSC I/F added
		4.1.1	Update to new fiducial star list, SEDs
			Asteroid flux ranges added
		4.1.2	Extension
		4.1.3	Extension
		4.2.4	New section on line profile/flux calibrators
		4.3.1	New section on pointing calibrators
		4.3.2	New section on spatial scale calibrators
		5.3.3	Trace matrices completed
		5.3.5	Latest version of charts, tables updated
		6	Column sources added, reference to Sect. 4
			One additional test block specified
Issue 0.26	April 1, 2008	4.4	New section on blank/dark sky fields
		6	Photometer set-ups I–III (Commissioning) and
			Chopper PID Optimisation (Commissioning)
			included in Detailed Test Plan
		5.2	Test block adjustment
			New AOT validation structure
		5.3.1	Test block assignment update
		5.3.2	Test block assignment update
		Glossary	Acronym update
Issue 0.27	April 2, 2008	6	Spectrometer set-ups I–IV (Commissioning)
			included in Detailed Test Plan
		5.2	Test block adjustment
		5.3.1	Test block assignment update
		5.3.2	Test block assignment update
Draft 3 (Issue 0.30)	April 4, 2008	6	Spectrometer Calibration I (wavecal),
			AOT check-out I (photometer modes),
			AOT check-out III (SPIRE/PACS parallel mode)
			included in Detailed Test Plan
		5.2	Update of test block duration
Issue 0.31	May 19, 2008	4	Update on visibilities
		4.3	Update on astrometric calibrators source list

Version	Date	Changes	Remarks
Issue 0.32	June 6, 2008		Update of author list
		4.1.3	Update of spectrometer PSF calibrator section
		5.2	CP & PV phases clearly separated
			Identifiers for test blocks added
			Updates of times per test block
		6	Spectrometer Calibration II (spatial cal)
			included in Detailed Test Plan
			CP & PV phases clearly separated
			Identifiers for test blocks added
			Time update in Spectrometer Calibration I
			Imaging of spectrometer PSF candidates added to
			Photometer Calibration I
Issue 0.33	June 11, 2008	5.2	Introduction with time request overview
			Partial renaming of titles/test blocks
			Adoption of proposal labels as IDs
		4	Visibility plots w.r.t. assumed launch date
			of 20-Dec-2008 in preparation of model PV delivery
		4.1	Figures for background fluxes of Uranus
			Neptune with 100 µm ISSA maps
		5.3.1	Partial renaming of test blocks
		5.3.2	Partial renaming of test blocks
			Further completion
		6.1	Partial renaming of test blocks
			Overview table of CP proposal IDs
		6.2	Partial renaming of test blocks
			Overview table of PV proposal IDs
			in preparation of model PV delivery
		7.1	Overview on ODs and dates of model PV
Issue 0.34	June 13, 2008	5.3.5	Revised spectrometer SPG flow charts
			and assignment of cal files
		4.1.3	Planet backgrounds in colour, Jupiter added
		6	Bolometer settings/characterisation IV & V
			included in Detailed Test Plan
		5.2	Re-arrangement of test blocks
		5.3.2	Re-arrangement of test blocks
Issue 0.35	June 20, 2008	1.3.1	Information of Herschel Pointing Calibration Plan
			included
		Glossary	Acronym update
		4.1	Subsection on faint flux standards added
		4	Point source references now in separate section
		6.1.1	Control Loop Optimisation updated
		6	Herschel Pointing Calibration with PACS and
			PACS Focal Plane Geometry
			included in Detailed Test Plan
		6.2.5	Update of measurement times according to AOR
			Overview tables with calibration AOR names
			included

Version	Date	Changes	Remarks
Issue 0.36	June 24, 2008	5.2	Update of test block overview Update of time information
		6	Update/extension of observational details of 1) Bolometer settings/characterisation IV 2) Bolometer settings/characterisation V Bolometer settings/characterisation VI included in Detailed Test Plan
		4.2.1	Visibility plot for blazars included
		3.2.4	Section with link to ICC Operations Manual for relevant procedures added
Issue 0.37	June 26, 2008	6	FOV Characterisation Photometer included in Detailed Test Plan Overview tables with calibration AOR names of proposals CPPhotCooler, CPPhotSetup, PVPhotCooler and PVPhotSetup included Update/extension of observational details of photometer spatial calibration Photometer photometric calibration included in Detailed Test Plan
		5.2	Update of test block overview Update of time information
		6.2.8	Overview tables with calibration AOR names included
		4.1.1 asteroids	Flux and visibility plot of 12 brightest main belt asteroids for 2009 added Plots of all sky positions of 2 Pallas and 9 Metis for 2008 – 2013 added
		5.3.5	Revised spectrometer SPG flow charts
		6.1.3	Overview tables with calibration AOR names included
		6.1.5	Overview tables with calibration AOR names included and Update of measurement times according AOR
		6.1.7	Overview tables with calibration AOR names included and Update of measurement times according AOR
		5.3.2	Update
		6.1.9	Extension of spectrometer FPG measurements
		6.2.3	Addition of explorative spectrometer PSF raster with pointing verification
Issue 0.38	July 9, 2008	6.1.1	Added AORs for CPMechChop
		6.1.5	Update of AOR table
		6.1.7	Update of AOR table
		6.2.2	Added AORs for PVPhotBol
		6.2.10	Updated AORs for PVPhotAOTVal
		5.3.5	Revised spectrometer SPG flow charts and assignment of cal files
		6.2.9	Added AORs for PVPhotFlux
		5.2	Update
		6.2	Overview tables with calibration AOR names of proposal PVSpecSetup included
		6.2.10	Added raster and scan map AORs for PVPhotAOTVal

Version	Date	Changes	Remarks
Issue 0.39	July 22, 2008	6	Spectrometer Photometric Calibration included in Detailed Test Plan
		5.3.5	Revised spectrometer SPG flow charts
		6.2	Update of overview tables of spectrometer set-ups
		6.2.1	Overview tables with calibration AOR names included
		6.2.2	Update of overview table with AOR names
		6.2.5	Overview tables with calibration AOR names included
		6.2.6	Overview tables with calibration AOR names included
		6.2.10	Update of tables
Issue 0.40	July 30, 2008	4.2.2	IRAS 21078+5211 removed from candidate list of spectrometer PSF/FOV distortion targets
		5.3.5	Update of spectrometer SPG Cal File trace matrix
		3.2.4	Section with links to ICC Operations Manual for relevant procedures updated
		6.2	Overview tables with calibration AOR names of proposals PVPhotSetup & PVSpecSetup updated
		6	**Re-ordering of subsections!**
		6	GeGa detector setting/characterisation V (PV) included in Detailed Test Plan
		6.2.10	Overview tables with calibration AOR names included
		6.2.13	Overview tables with calibration AOR names included
		5.3.5	Revised photometer SPG flow charts
		6	Spectrometer FOV characterisation included in Detailed Test Plan
		6.2.12	Overview tables with calibration AOR names included
		6	Spectrometer Photometric Calibration updated in Detailed Test Plan
		6.2.14	Overview tables with calibration AOR names included
		6.2.15	Overview tables with calibration AOR names included
		6.2.5	Overview tables with calibration AOR names included
		6	Photometer scan map AOT Validation updated in Detailed Test Plan
		6	Spectrometer Focal Plane Geometry updated in Detailed Test Plan
		6	FOV characterisation photometer updated in Detailed Test Plan

Version	Date	Changes	Remarks
Issue 0.80	August 4, 2008		**First version with complete lay-out of document following model PV timeline delivery on July 25, 2008**
		5.2	Update and re-ordering of test level descriptions Update of time overview table
		7.2	High Level Plan & Guideline for Model PV included
		7.3	Model PV Time Line as of July 25, 2008 included
		6	Spectrometer AOT Validation included in Detailed Test Plan
		6.2.15	Overview tables with calibration AOR names updated and restructured
Issue 0.81	October 16, 2008		Update of author list
		1.3.1	Update of applicable document list
		4	Preliminary visibility plots for 12-Apr-2009 launch date (final orbit file not yet used)
		4.1.3	Extension of faint star list
		4.3.3	Further references of publications on planet spectra included
		4.3.4	Subsection on galaxy spectra included
		3.2.4	Update of procedure list
		5.3.5	Revised spectrometer SPG flow charts
Issue 0.82	November 10, 2008		Extension of visibility plots to 160 days with new orbit file
		4.1	Updated fluxes for PACS photometric filters
		4.1.2	Extension of secondary photometric flux standards lists
		6	**Subsection on Commissioning Phase contents removed, since there exists now a dedicated CoP Plan**
		6	Subsection on Pointing Calibration and Focal Plane Geometry included as PV item, since it is now to a major part coordinated with the instrument's PV activities
		5.2	CoP items removed from total time requests table CoP overview maintained w.r.t. test matrix reference
		6.13	GeGa detector setting/characterisation V (PV) updated in Detailed Test Plan
		5.2, 6.15	Added proposal PVSpecIP (instrumental profile) in Detailed Test Plan and AOR list
		6.10	Update of AOR list PVPhotFlux
		6.11	Update of AOR list PVPhotAOTVal
		6.18	Update of AOR list PVSpecFlux
		6.19	Update of AOR list PVSpecAotVal
		1.3	Update of Applicable Documents list
		7.1	New PV-2 PACS OD allocation included
		7.2&7.3	PV Iteration 1 high level plan & timeline removed
Issue 0.83	November 28, 2008	6	Update of PV proposal AOR lists
		6	Update of PV proposal AOR lists Update of Detailed test Plan
		6.1	Inclusion of PV pointing calibration proposals PVPhotFPG and PVSpecSPG
		6.3	Pointing Calibration and Focal Plane Geometry updated in Detailed Test Plan

Version	Date	Changes	Remarks
Issue 1.0	February 26, 2009	5 & 6	Update of PV proposal time estimates, Update for new launch date 16 April 2009
		6.3	Update of PVPhotFPG proposal
		6.3	Update of PVSpecFPG proposal
		6.5, 6.6	Update of PVPhotBol proposal
		6.9	Update of PVPhotSpatial proposal
		6.10	Inclusion of calibration blocks for absolute flux conversion and verification of minimum flux detection in PVPhotFlux
		6.11	Update of PVPhotAOTVal proposal
		6.13	Update of PVSpecGeGa proposal
		6.14	Update of PVSpecWave proposal
		6.17	Update of PVSpecSpatial proposal
		6.19	Update of PVSpecAotVal proposal
		7	Added PV Phase Mission Time Line
Issue 1.1	July 23, 2009	1.3	Update
		3.1.1	Update
		3.2.4	Update
		all	Update of visibility plots to final launch date 14-May-2009
			Addition of SAA plots for PV proposal target lists
		4.1.2	Update of target list of secondary standards
		5.2	Addition of high level descriptions PVPhotFPG, PVSpecFPG
		5.3.5	Update of SPEC pipeline flow charts
		6	Update of several proposals
		6	Addition of PVParStray and PVSpecSPU to programme list
		6.2	Update of PVPhotSetup, PVSpecSetup
		6.6	Update of PVPhotBol, residual flux on red detector
		6.11	Replacement of NGC 6949 by M101 in PV PhotAOTVal because of too high cirrus noise,
			Reduction of averaging in 5.1.1 F
			Change of plateau length in 5.1.1 H
			Increase of observation time in 5.1.4 G
			Addition of PVSpecSPU proposal
		6.14	Addition of PVSpecGeGa_123 pilot, PVSpecGeGa_126B
		6.15	Update of PVSpecWave proposal
		6.16/6.17	Renaming of PVSpecFlux_4310 to PVSpecSpatial_416
		6.16/6.17	Move of PVSpecSpatial FOV programme
		6.20	Replacement of PVSpecAOTVal programme with new concept flow charts, addition of 521A
		7	Update of high level plan and mission timeline
Issue 1.2	July 27, 2009	4.4.2, 6.3	Removal of HIP 82526 from target lists
Issue 1.3	August 11, 2009	4.4.1	Renamed HIP 24639 to HIP 24645
		6.2	Update PVPhotSetup, PVSpecSetup
		6.3	Update PVPhotFPG, PVSpecFPG
		6.4, 6.5, 6.6	Update PVPhotBol
		6.7, 6.8, 6.9	Update PVPhotSpatial, added low gain observations
		6.13	Update PVSpecSPU
		6.15	Update PVSpecWave
		6.19	Update PVSpecFlux
		6.20	Update PVSpecAotVal
		7	Update high level plan, PV phase mission timeline

Version	Date	Changes	Remarks
Issue 1.4	August 21, 2009	6.2	Update PVPhotSetup, PVSpecSetup
		6.3	Update PVPhotFPG, PVSpecFPG
		6.14	Update PVSpecGeGa
		6.17	Update PVSpecSpatial
		6.19	Update PVSpecFlux
		6.20	Update PVSpecAOTVal
		7	Implementation of PV observations trace matrix
		7	Update high level plan, PV phase mission timeline
Issue 1.5	September 13, 2009	5.3.5	Update of SPEC pipeline flow charts
		6.2	Definition of PVMechChop
		6.3	Update PVPhotSetup, PVSpecSetup
		6.4	Update PVSpecFPG
		6.5, 6.6, 6.7	Update PVPhotBol
		6.10	Update PVPhotSpatial
		6.11	Update PVPhotFlux
		6.12	Update PVPhotAOTVal, replacement of M 101 by NGC 1365
		6.12	Update PVParAOTVal
		6.15	Update PVSpecGeGa
		6.18	Update PVSpecSpatial
		6.20	Update PVSpecFlux
		6.21	Update PVSpecAOTVal
		7	Update high level plan, PV observations trace matrix, PV phase mission timeline
Issue 1.6	November 24, 2009	all	Addition of HTML links
		4.1	Removal of β And and β UMi from the list of fiducial stars (IR excess)
		6.3	Update PVPhotSetup, PVSpecSetup
		6.7	Update PVPhotBol
		6.8	Creation PVPhotSPU
		6.11	Update PVPhotSpatial
		6.13	Creation PVPhotStray
		6.14	Update PVPhotAOTVal
		6.15	Creation PVParStray
		6.16	Update PVParAOTVal
		6.20	Update PVSpecIP
		6.23	Update PVSpecFlux
		6.24	Update PVSpecAOTVal
		7	Update high level plan, PV observations trace matrix, PV phase mission timeline
Issue 1.7	January 18, 2010	6.4	Update PVPhotFPG
		7	Update high level plan, PV observations trace matrix, PV phase mission timeline

Version	Date	Changes	Remarks
Issue 1.9	December 9, 2013	3.1.3	Update
		5.2	Update, final numbers
		5.3.2	Update
		5.3.3	Update
		5.3.4	Update
		5.3.5	Update
		6.2	Update
		6.3	Update
		6.4	Update
		6.5	Update
		6.6	Update
		6.7	Update
		6.8	Update
		6.9	Update
		6.10	Update
		6.11	Update
		6.12	Update
		6.13	Update
		6.14	Update
		6.15	Update
		6.16	Update
		6.17	Update
		6.18	Update
Issue 2.0 final end-of-mission version	May 7, 2014	1.3.2	Update
		3.1.1	Update
		3.1.2	Update
		5.2	Update
		5.3.3	Update
		5.3.4	Update
		5.3.5	New section: Trace matrix AOTs used for PCD requirements
		6.2	Update
		6.3	Update
		6.4	Update
		6.14	Update
		6.16	Update
		6.17	Update
		6.18	Update
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		6.20	Update
		6.21	Update
		6.22	Update
		6.23	Update
		6.24	Update
		7.2	Update
		7.3	Update
		7.4.28	Update
		7.4.58	Update

Acronyms

ACF	Attitude Control Frame
ACMS	Attitude and Control Measurement System
AOR	Astronomical Observation Request
AOT	Astronomical Observation Template
CAP	Calibration Analysis Procedure
CalU	Calibration Up-Link Tables
CIP	Calibration Implementation Procedure
CUS	Common Up-Link System
DTCP	Daily Tele-Communications Period
HCalSG	Herschel Calibration Steering Group
HK	HouseKeeping (instrument engineering data)
HSC	Herschel Science Centre
HSpot	Herschel Observation Planning Tool
ICC	Instrument Control Centre
ILT	Instrument Level Test
IST	Integrated System Test
LEOP	Launch and Early Orbit Phase
MPS	Scientific Mission Planning System
PACS	Photometric Array Camera and Spectrometer
PCD	PACS Calibration Document (Requirements and high level implementation and analysis procedures)
PCSS	PACS Common Software System
PTA	PACS Trend Analysis
PV	Performance Verification
QLA	Quick Look Analysis
SAA	Solar Aspect Angle
SCOE	Science Centre Operations Engineer
SCOM	Science Centre Operations Manager
SPG	Standard Product Generation (automatic and interactive)
SRPE	Spatial Relative Pointing Error
STR	Star Tracker
SVR	Science Verification Review
TC	Tele-Command
TM	TeleMetry (satellite and instrument housekeeping, satellite pointing and instrument scientific data)

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1 Introduction

1.1 Scope

This document addresses all aspects and compiles all guidelines for the execution of the In-flight Performance Verification of the Herschel-PACS instrument. It is meant as the central reference document, though detailed information on some aspects, like spectral energy distributions of celestial standards, will not be presented here, but at least pointers to this information.

1.2 Structure of the document

The document

- provides the links to other important documents for PV Phase Planning.
- lists the general objectives of and prerequisites for a successful PV Phase.
- outlines the operational framework both from the satellite and the PACS ICC side. This includes boundary conditions set by the transfer of the satellite to L2 during the early mission phases.
- gives an overview on the different types of celestial calibrators, their properties and visibility during the early mission phases.
- outlines the test philosophy behind the structure of the PV Plan.
- establishes the traceability between instrument performance requirements, calibration up-link and calibration processing tables with the calibration articles of the PACS Calibration Document which provides a high level description and ranking of all PACS calibration activities.
- constructs the detailed observations per test/calibration block and estimates the necessary time.
- gives - in a final version - the outline of the detailed PV time line after assignment of dedicated celestial sources and scheduling the observations into a logical line governed by the test/calibration block sequence and the visibility of the sources.

1.3 Documents

1.3.1 Applicable Documents

AD1 PACS Calibration Document (PACS-MA-GS-001),
Issue 1.0, 7-Aug-2008

AD2 Herschel Performance Verification Phase Plan Overview (HERSCHEL-HSC-DOC-1012),
Draft 1.0, 10-Aug-2008

AD3 Herschel H-EPLM Thermal Model and Analysis Report (HP-2-ASED_RP-0011_4)

AD4 Herschel Pointing Calibration Plan – Calibration Plan for the Commissioning and Performance Verification Phases (HERSCHEL-HSC-DOC-1139),
Version 1.0, 05-Aug-2008

AD5 PACS Commissioning Phase Plan (PACS-ME-PL-024)
Issue 2.0, 20-Mar-2009

1.3.2 Reference Documents

RD1 PACS Instrument Test Plan FM (PACS-ME-PL-012),
Issue3/FM, 12-Sep-2006

RD2 The PCSS Common Software System - A high level overview (PICC-ME-DS-003),
Issue 0.2, 06-Nov-2007

RD3 PACS AOT Scripts: description, commissioning and verification (PICC-ME-PL-005),
Issue 0.1, 14-Nov-2007

RD4 PACS OBCPs and DMC Sequences (PACS-ME-LI-005),
Issue 2.2, 14-Apr-2010

RD5 PACS Routine Phase Calibration Plan (PICC-MA-PL-002),
Issue 4.0, 31-May-2013

2 Objectives of PV Phase

2.1 General Objectives

During the Performance Verification Phase a significant fraction of the PACS instrument performance numbers obtained during ground tests will be verified and adjusted and the initial complete in-orbit calibration will be established, which will be monitored, completed and refined along the subsequent Routine Phase.

In detail this includes:

- Establishment of in-flight instrument sensitivity numbers for the update of the observing time calculators.
- Update of all up-link calibration files used by the AOT logic.
- Establishment of all data processing calibration files (as required by current/state-of-the art version of the standard product generation and PACS IA analysis) with initial numbers.
- Identification and generation of additional calibration files reacting to instrumental effects only discovered in-flight.
- Verification of instrument operating modes, mainly via OBCPs.
- Validation of the PACS AOTs and optimisation or adjustment to the space environment, if necessary.

2.2 Prerequisites

- The observatory conditions must be representative for the Routine Phase operations for part of the Performance Verification period in order to accomplish a representative photometric calibration. Since the Herschel telescope is still cooling down during the PV Phase, the PV Phase must extend at least to a time when the telescope has reached its final equilibrium temperature, thus providing the representative telescope radiation background and telescope focus.
- A prerequisite for calibration observations on celestial standards is the successful completion of the PACS Focal Plane Geometry during Satellite and Instrument Commissioning Phase.
- A prerequisite for dedicated spatial calibrations is the achievement of the final pointing accuracy before the PV Phase program can be executed.
- It must be possible to enter non-AOT calibration observations into the system, in order to follow-up special calibration aspects or test non-standard set-ups.
- The possibility of fast re-planning of PV Phase ODs should be given in order to adjust the observations to latest findings. Therefore, the structure of the PV Phase (dedicated periods per instrument) should be optimised for instrument set-up (like cooler cycling) but also for manageable fast re-planning (1 or 2 day blocks). Interfaces and communication structures of the Observatory should be set up accordingly.

3 Operational Framework / Assumptions

3.1 Spacecraft Operations

3.1.1 Overall Time-line

According to AD2, the overall mission time-line for the first half year after launch consists of

1.) Launch and Early Orbit Phase (L−8 hours to L+12 days)

2.) Satellite and Instrument Commissioning Phase (L+3 days to L+1.5 month), with cryo cover opening at ≈L+3 weeks.

3.) Performance Verification Phase (L+1.5 months to L+4.0 month), with a planned duration of 77 days.

4.) Science Demonstration Phase (L+4.0 months to L+5.0 month), followed by the start of Routine Phase.

Note, the actual Satellite and Instrument Commissioning Phase took from L+3 days to L+2.0 month. However, some PV Phase aspects were addressed alreday in CoP as so-called CoP fillers.

3.1.2 Telescope Cool-down

Fig. 1 shows the telescope cool-down curve. For decontamination, the telescope will be heated to 325 K for about 21 days after launch (Note added to final version: The actual temperature used for decontamination was 170 K.). For the cool-down of the telescope below 120 K 20 days are predicted, and 5 more days will be required to cool down below 100 K. This means that at around day L+42 days, approximately at the beginning of PV Phase, the telescope would be 20 K above the expected end temperature of about 80 K which will be slowly approached during the PV Phase when extrapolating the curve in Fig. 1 beyond 60 days. It has been confirmed that the primary mirror temperature will be very close to 80 K. The secondary mirror and the hexapod will be around 2 – 3 K colder than the primary mirror. The predicted temperature gradient on the primary mirror in Z-direction is 0.2 K from the side close to the sunshade to the opposite; there is no temperature gradient in Y-direction (Note added to final version: PV Phase started at L+64 days. At this time the telescope mirror temperatures underwent a minimum - $T_{M1} \approx 83.5$ K - and increased to 88 K until L+200 days, which was steeper than during the remaining mission, cf. http://herschel.esac.esa.int/twiki/bin/view/HSC/SpaceCraftMonitoringPagel.).

Fig. 2 shows in addition to the cool-down curve of the telescope the cool-down rate. The initial cool-down rate is 1 K / h. At the beginning of PV Phase the cool-down rate is 100 mK / h, reducing to 15 mK / h at day 60.

Table 1 illustrates the differences in the telescope background level for a not yet final telescope temperature (assuming that the telescope emissivity is constant over this temperature range). While a temperature of 120 K produces an excess of 78% to 255% of background in the PACS wavelength range (assuming a final temperature of 80 K), an increased telescope temperature by 20 K results in a background excess of 38 to 111%, and an increased telescope temperature by 10 K results in a background excess of 19 to 51%. The latter can be already acceptable for quite a number of measurements, at least at the longer wavelengths. The telescope temperature also affects the focus position.The sensitivity is about 1 mm / 20 K.

The following provisions can be installed to deal most efficiently with this somewhat unknown trend of the telescope background:

- The PACS ICC team will define the temperature criticality of each calibration block and the associated measurements.
- Monitoring of the telescope cool-down versus the prediction and forwarding this information to the instrument teams for PV program adjustment during the regular Commissioning and PV Phase briefings is necessary (cf. PCD req. 7.2.1).

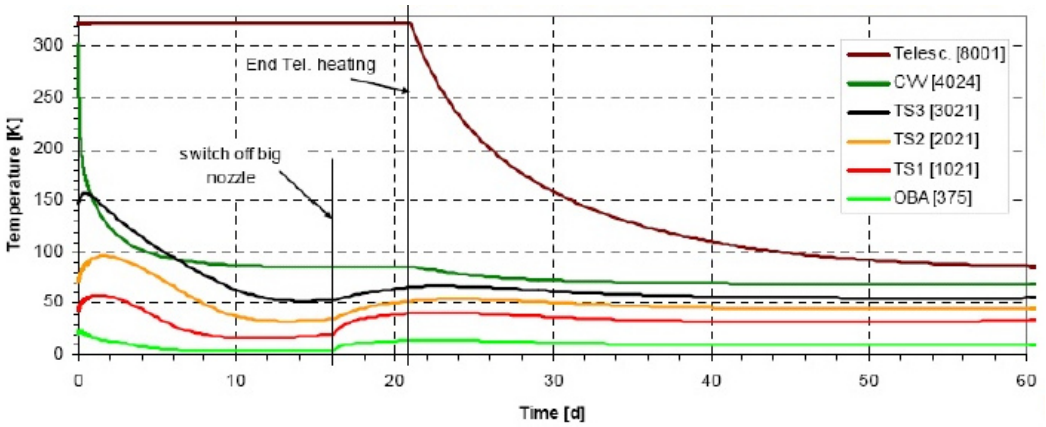


Figure 1: Modelled telescope cool-down, latest update as presented during PACS SVR3 by Herschel Project Scientist Göran Pilbratt. The extrapolated final telescope temperature is around 80 K.

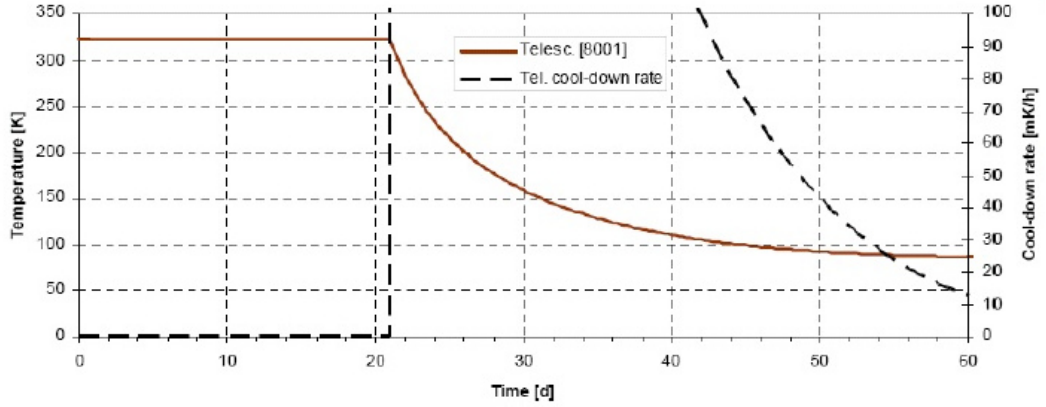


Figure 2: Modelled telescope cool-down and cool-down rate, latest update as presented during PACS SVR3 by Herschel Project Scientist Göran Pilbratt. The extrapolated final telescope temperature is around 80 K.

Table 1: Ratios of blackbody radiation at different wavelengths of the PACS wavelength range, to illustrate the impact of a not yet stabilised telescope background. The assumption is that the telescope emissivity does not change with temperature.

	ratio $T_{\rm tel}$ / 80 K			
$T_{\rm tel}$	$\lambda_1 = 50\,\mu$m	$\lambda_2 = 100\,\mu$m	$\lambda_3 = 150\,\mu$m	$\lambda_4 = 200\,\mu$m
90 K	1.512	1.277	1.217	1.191
100 K	2.116	1.567	1.439	1.384
120 K	3.547	2.175	1.893	1.775

3.1.3 Herschel Radiation Environment

According to AD2, the satellite will be 10^6 km away from the Earth already 15 days after launch. When the PV Phase starts, at around L+45 days, the satellite will be 1.5×10^6 km away from the Earth, very close to L2. Afterwards it will get closer to the Earth and enter the nominal halo orbit at 1.2×10^6 km after 110 days, the nominal end of the PV Phase. Practically the whole PV Phase will take place during the transfer, but in an orbit similar to the final halo one and most of the orbit is outside the solar wind confined by the bow shock,

so that the radiation environment during PV Phase should be representative for the Routine Phase (Fig. 3).

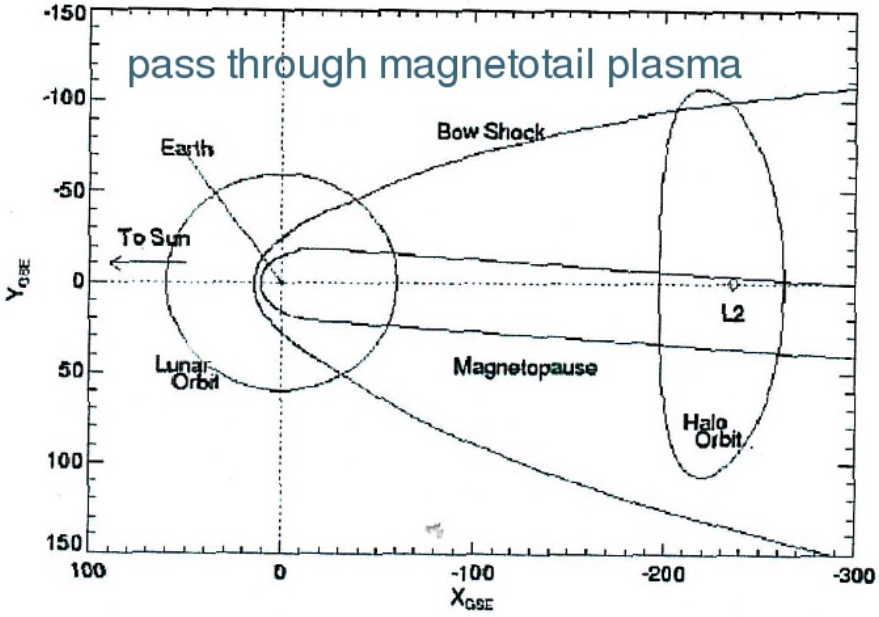


Figure 3: Typical orbit of a satellite in L2 relative to the Earth magnetotail. Most of the orbit is outside the solar wind confined by the bow shock and only small parts may extend into the bow shock regions.

One aspect is, however, the mission duration with regard to the solar activity cycle. The Herschel launch will be in a solar activity minimum, but the nominal end of the mission will be during maximum solar activity with an increased number of solar flares (Fig. 4). This may need adjustment of detector parameters and possible re-calibrations as well as operational adjustments. (Note: It turned out, that the minimum between cycle#23 and the current cycle#24 was quite long and deep and that the expected maximum was considerably lower than the previous one, opposite to initial expectations.)

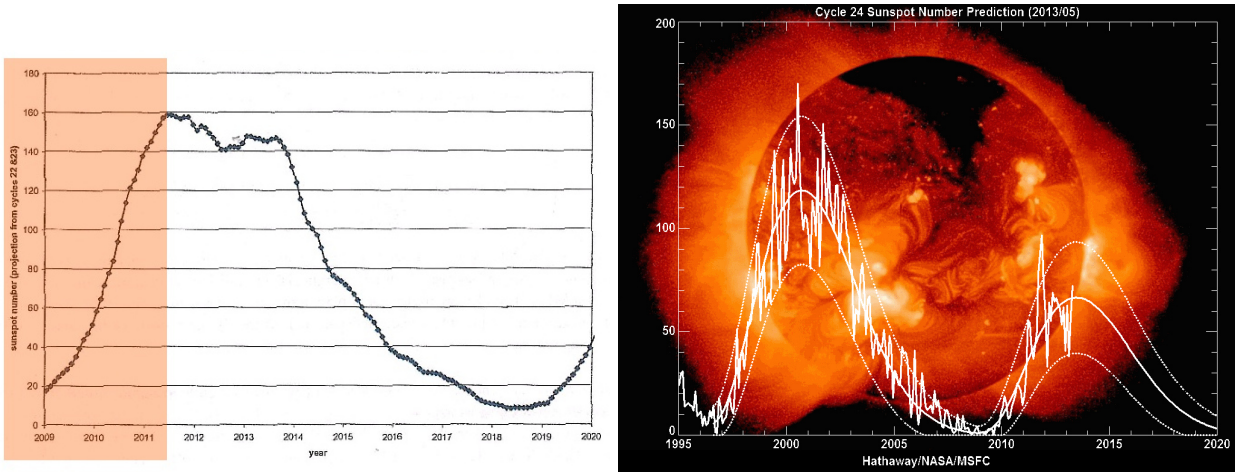


Figure 4: Solar activity cycle with regard to Herschel mission period. The left figure shows the prediction prior to the mission, the right figure the actual numbers at the end of the mission.

3.1.4 Target Visibility

Figure 5 shows the cumulative visibility during 2 months of PV Phase (for a dedicated launch date). Like for ISO, there is unrestricted access to the ecliptic poles, in particular the North Ecliptic Pole at RA = 18^{h}, DEC = 67° and no visibility of the Orion and Galactic Centre areas.

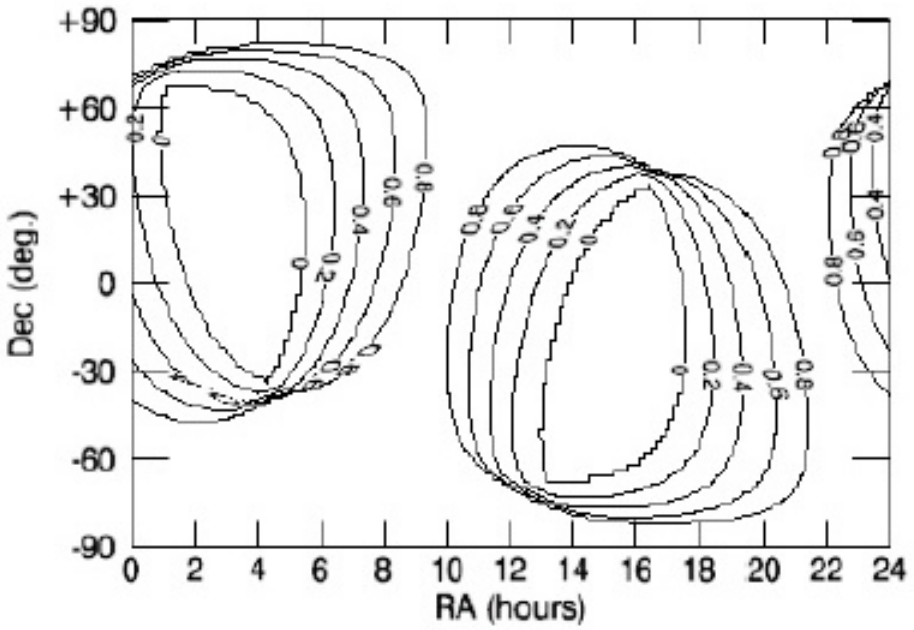


Figure 5: Cumulative visibility of the sky during Performance Verification Phase assuming a launch date on 31 July 2008 and the PV Phase period from 15 September to 15 November [from AD2]. This is valid for non DTCP periods, during ground contacts there are further visibility restrictions due to the satellite/antenna orientation.

3.2 PACS Operation

As the Commissioning and PV phases are the most intensive and manpower requiring Herschel mission phases with regard to the learning curve the majority of the PACS ICC team from all consortium institutes plus instrument hardware specialists will be located at the PACS ICC at MPE. During the Commissioning Phase an operation team will be located at the ICC@MOC for R/T activities.

3.2.1 PACS Team Management

Overall responsibility is held by the PACS PI and PACS ICC Manager. The daily coordination and planning of the PV Phase activities will be the responsibility of the Calibration Working Group and AOT Working Group Leaders with regard to the central calibration program and the AOT verification program, respectively. The instrument engineer will watch health and safety issues and adjust operational procedures of the instrument if necessary.

ICC manager, calibration working group leader, AOT working group leader and instrument engineer will participate in daily video conferences/telecons with the SCOM, SCOE, HSC working group leaders and the representatives of the other two instruments to report the status of an executed PV day, give an outline of the planned program for the next PV day, react to and agree on re-arrangements in case of contingencies.

A short status report on each PACS PV operational day will be compiled containing initial results and listing possible failed observations. The PV wrap-up report will summarise the achievements and be an input to the end-of-PV review. Special attention will be given to the AOT commissioning, prioritised by the AOT request statistics, and for each AOT submode an evaluation report on the verification cases allowing to judge the readiness for release will be compiled.

3.2.2 Staffing

The main PV activities will be distributed among several ICC subgroups:

- The management team consists of the persons addressed in the previous section. It is not excluded and welcome for getting a sound overview that they will support for part of their time the other teams in their tasks.
- The PV observation planning teams, one for the photometer and another one for the spectrometer with $2-3$ persons each, will generate the detailed observation time-line, the AORs and special calibration observations in CUS for a bolometer cooler period and a one to two day operational day period, respectively. They will start from the detailed baseline PV plan and AORs/CUs observations developed before launch and alter them to take into account the learning and optimisations during PV phase, possible changes in source visibility as well as recovery of possibly failed essential observations, or refinement of observations which need deeper integrations or a wider parameter coverage. We support a PACS instrument scheduling allocation every 5 to 6 days with 2 to 3 days observing blocks as outlined in AD2 in order to have time for assessing quality and success of the previous observing block, making a fast re-plan of the upcoming observing block and communicating the time-line and observation data base to HSC and MOC mission planning for building the command schedule to be up-linked to the satellite.

  Parallel working planning teams for photometer and spectrometer offer a higher flexibility in case of re-arrangements in the schedule. There should be permanent manpower in these teams being most familiar with the planning tools and who will liaise with the mission planning team at HSC. As outlined below part of the manpower may be rotated with the data evaluation teams.

  In case of idle time between planning periods, the team members can support the data evaluation. In the same way an individual planning team may be reinforced by manpower from the data evaluation team should the amount of work and time pressure make that necessary.

- A Real-Time assessment team will start immediately after the TM will have been accessed from the MOC - 2 hours after the last bit of this data for the consolidation period has been received by the MOC according to AD2 - to check for event flags and perform a replay of the TM in the PACS RTA and QLA systems in order to check for instrument anomalies and the success of the PACS PV block. Instrument anomalies trigger NCR investigations and failed observations will be communicated to the PV observation planning teams for rescheduling. For a R/T replay of 1 or 2 operational days three shifts are needed, so that the team should comprise 3 – 4 persons. Outside the replaying periods the team will work on PACS Trend Analysis and PV data evaluation. Instrument experts will look into specific aspects of instrument hardware and electronics performance.

  It must be discussed and tested whether the success check of PV observations can be done as efficient and even more comprehensive using the PACS Interactive Analysis, however a trained eye can judge the successful execution of an observation with the available QLA tools. This may also depend on how smooth the instrument operation will be. But certainly during the first part of PV careful monitoring of the instrument behaviour should still be an issue.

- Two data evaluation teams, one for the photometer and one for the spectrometer, respectively will process the PV data interactively according to the Calibration Analysis Procedures or AOT Verification Procedure for the respective observation. Ideally these teams will be staffed according to the expertise and knowledge collected during the ground test campaigns and the priority a certain calibration aspect has in the processing chain. They will judge the success of a PV observation in more detail, but likely on a longer time scale, and feed back their assessment to the PV observation planning teams, too.

  This team will also produce updates of the calibration up-link tables for the AOT logic and the calibration files for the Standard Product Generation processing chain and document this in calibration reports. It will also assist the software development team in scientific validation of new data processing modules with a defined set of scientific test cases.

  With regard to manpower, this team should get all available manpower not needed in the other teams in order to achieve the quickest possible consolidation of PV results. It should be also considered to rotate some members between the PV observation planning teams and the data evaluation teams. Once a specific observation block will have planned with the contribution of the data experts, these can then work on the executed observations. A guideline for this rotation will be provided by the layout of the PV Plan.

- A software maintenance and development team covering the aspects:

  1) CUS and AOT logic maintenance and installation of updated calibration up-link tables
  2) PCSS maintenance with regard to all subsystems from RTA/QLA/PTA to the Standard Product Generation.
  3) PCSS development, mainly in the area of Standard Product Generation including scientific validation of new versions.
  4) contributions in HCSS development.

  This team should comprise 5 – 6 persons with at least one specialist on item 1.

- An on-board software maintenance team is a specialist team of 4 – 5 persons being familiar with the DPU, SPU and DEC/MEC software programming.

- A hardware maintenance team of 2 – 3 persons taking care of central and personal computer hardware and network performance, backups, as well as installation of reserve hardware.

- A contingency team of 3 – 4 persons headed by the instrument engineer will be ready to move to the ICC@MOC for R/T investigations of possible instrument contingencies. This team is likely identical with the R/T assessment team.

3.2.3 Tools

Here we give a short overview on the main tools used by the individual teams:

- Observation Planning Teams
  The tools of these teams and the interface to the Herschel Science Centre are illustrated in Fig. 6.
  1) Expert Herschel Observation Planning Tool (HSpot) for the definition of both standard AOT and non-standard CUS calibration and engineering observations
  2) Scientific Mission Planning System (MPS) for accurate assembling of the observation time-line.
  3) Visibility tables of celestial standards
  4) Celestial calibration source database. An impression of the status of the common data base of all three Herschel instruments coordinated by the HCalSG can be seen on the Wiki page:
     http://www.herschel.be/twiki/bin/view/HCalSG/WebHome
     (please register)
- Real Time Assessment Team
  The tools of this team are functionalities of the PACS Common Software System (PCSS), see RD2 for a concise overview:
  1) Real Time Assessment (RTA) and House-Keeping (HK) Monitoring
  2) Quick Look Analysis (QLA)
  3) PACS Trend Analysis (PTA)
  4) Real Time Commanding and Procedures as described in AD2.
- Data Evaluation Teams
  The tools of these teams are also functionalities of the PACS Common Software System (PCSS), see RD2 for a concise overview:
  1) Standard Product Generation (SPG)
     Part of the data reduction will run in pipeline mode, e.g. the initial decompression of the TM. A soon as certain processing steps will be properly consolidated and calibrated the automatic processing will be extended. Otherwise data reduction is in interactive mode with visualisation of individual processing steps.
  2) Instrument calibration
     Processing along specific Calibration Analysis Procedures and production of calibration files or tables.
  3) Access to the ground calibration reference data base (ILT, IST tests).
  4) Instrument Simulation
     Test data reduction steps on simulated data.
- Software Maintenance and Development Teams
  1) Common Up-Link System scripts and up-link calibration files (CalU)
  2) AOT logic and exposure time estimator
  3) All functionalities of the PACS Common Software System (PCSS), see RD2 for a concise overview.

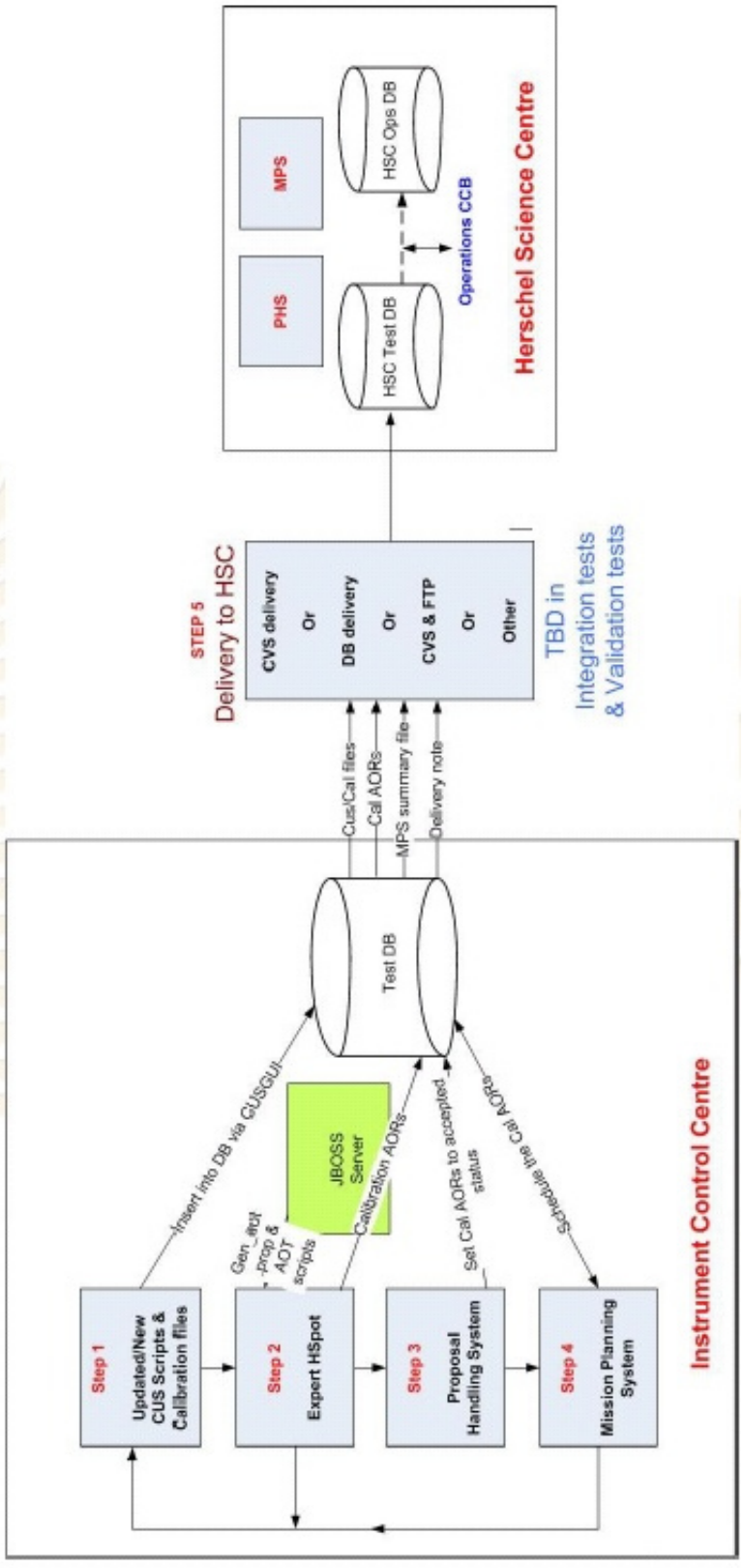


Figure 6: ICC tools for calibration planning and interfaces with the Herschel Science Centre for calibration observation deliveries (from HSC overview at ICC#30).

3.2.4 Procedures

For a proper execution of the individual steps in generating a calibration proposal a number of procedures have been defined which are compiled in the PACS ICC Operations Manual (IOM), cf.
http://www.herschel.be/twiki/bin/view/Pacs/Iom

1) Creating and updating AOT CUS code and up-link tables in the PACS ICC Operational Data Base (PIOD)
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0602CreateGenerateCUSscripts
2) Creating and updating Cal CUS code and up-link tables in the PACS ICC Operational Data Base
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0702CreateUpdateCALCUScode
3) Making AOT CUS code in the PACS ICC Operational Data Base visible to Expert HSpot
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0603GeneratingGenericAOT
4) Making calibration CUS code in the PACS ICC Operational Data Base visible to Expert HSpot
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0703
5) Installation of Expert HSpot
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0902HspotInstallation
6) Creating PACS calibration observations in the PACS ICC Operational Data Base via HSpot
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0802HspotAddingCalMeasurements
7) Retrieve and install mission planning input files
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0803InstallMissionPlanningInputFiles
8) Proposal Handling: enabling calibration observations in the PACS Operational Data Base for scheduling
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0804ProposalHandling
9) Creating a schedule using the Mission Planning System
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0805MissionPlanning
10) Delivery procedure for new Calibration CUS code and up-link tables
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0704DeliveryCalCus
11) ICC delivery procedure for PACS Calibration Observations
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0806CalObsDelivery
12) Proposal Recovery Procedure
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom0807ProposalRecovery
13) ICC delivery procedure for SPIRE-PACS Parallel Mode Calibration Observations
http://www.herschel.be/twiki/bin/view/Pacs/PacsIom08BSpirePacsParallelDelivery

4 Overview on PACS Celestial Standards

The HCSS will offer a Calibration Sources Database implemented with PAL and accessible through IA. How-to's and a tutorial will be provided on a Wiki page http://www.herschel.be/twiki/bin/view/HCalSG/WebHome. It will also contain PACS celestial standards.

4.1 Photometric Standards

Planets, asteroids and stars are foreseen as main FIR photometric calibrators. Planets cover the high (differential) flux range, stars the low flux range, asteroids will provide the largest range from intermediate to low fluxes.

4.1.1 Primary Standards

Definition: Primary standards are used for accurate absolute flux calibration. Hence their spectral flux must be known and modelled with high accuracy for the PACS wavelength range (verification that there is no FIR flux excess due to possible disks – Vega phenomenon) and the sources must not be variable.

Stars

A final list of 6 fiducial prime photometric stars is presented in Table 2. Fig. 9 shows their SEDs and Fig. 7 shows their visibility during the first year of the mission. γ Dra is always visible. 2 additional stars of the original list, β And and β UMi, were excluded, since the model predictions turned out to be less accurate leading to a mismatch in the measured-to-modeled flux ratio.

Table 2: List of fiducial prime photometric stars. The fluxes are taken from the model spectra presented in Fig. 9. The two stars in red italics turned out to have less good flux prediction resulting in an obvious mismatch in the measured-to-modeled flux ratio wrt. the other 6 stars.

HR	HD	ID	Name	Coordinates (J2000)		Sp type	f_{70} (mJy)	f_{100} (mJy)	f_{160} (mJy)
				R. A.	Dec.				
337	*6860*	*β And*	*Mirach*	*01:09:43.9236*	*+35:37:14.008*	*M0III*	*5542*	*2736*	*1059*
911	18884	α Cet	Menkar	03:02:16.8	+04:05:24.0	M1.5IIIa	4831	2389	925
1457	29139	α Tau	Aldebaran	04:35:55.2387	+16:30:33.485	K5III	14005	6898	2670
2491	48915	α CMa	Sirius	06:45:08.92	-16:42:58.0	A1V	2952	1426	545
5340	124897	α Boo	Arcturus	14:15:39.6720	+19:10:56.677	K1.5III	15336	7507	2888
5563	*131871*	*β UMi*	*Kochab*	*14:50:42.2*	*+74:09:20.0*	*K4III*	*2712*	*1332*	*514*
6705	164058	γ Dra	Etamin	17:56:36.3699	+51:29:20.022	K5III	3253	1603	620
8775	217906	β Peg	Scheat	23:03:46.4575	+28:04:58.041	M2.5II-III	8490	4200	1630

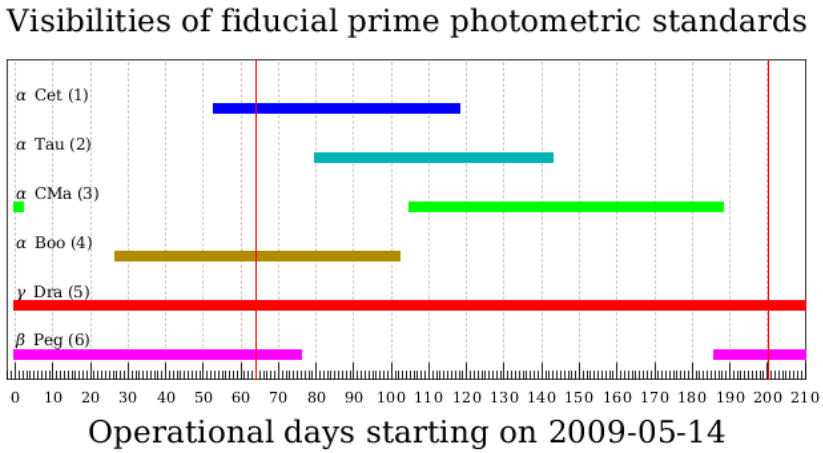


Figure 7: Visibilities of the prime fiducial photometric standard stars.

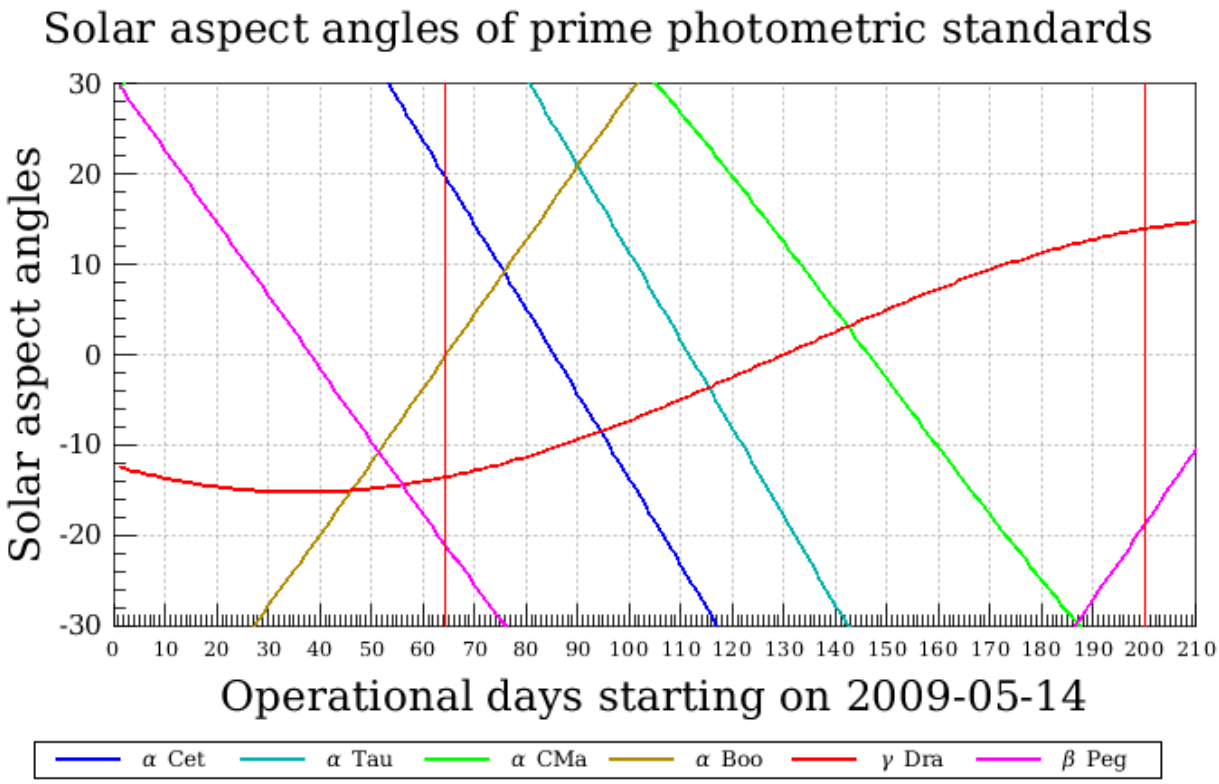


Figure 8: Solar aspect angles of the prime fiducial photometric standard stars.

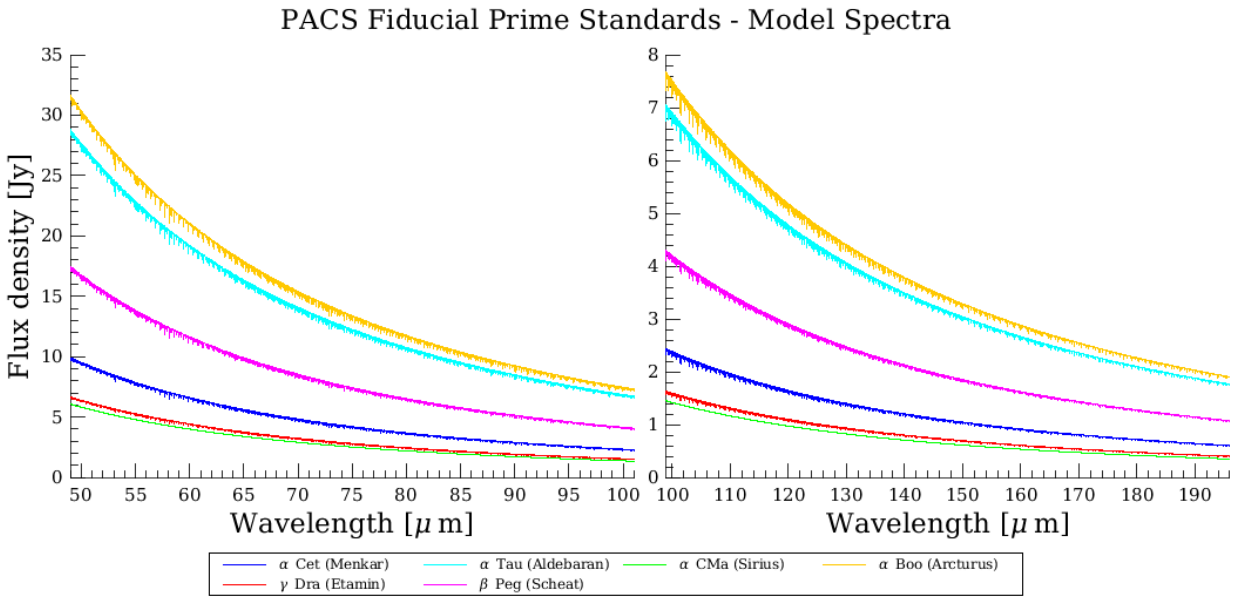


Figure 9: SEDs of the 6 fiducial stars split into short and long wavelength part. The spectra are absolutely calibrated using 'Vega' and Selby K-band photometry. The SEDs are computed at a resolution of $\Delta\lambda = 0.5$ Å and delivered at a resolution of $\frac{\lambda}{\Delta\lambda} = 4000$ (Bauwens et al., 2008, Herschel Calibration Workshop #2).

Asteroids

Tables 3 and 4 show the list of the 55 Herschel calibration asteroids. Flux density estimates, based on the Standard Thermal Model (STM), at the central photometer wavelengths during the visibility periods are provided in form of graphs (file ast_stm.ps), an example is shown in Fig. 11. Fluxes can change by up to a factor of 20 during one visibility period. Tables 3 and 4 list the maximum and minimum fluxes for the central wavelength of each filter band, comparison of both tables allows to judge which flux range is accessible during PV phase with regard to a longer period like the full mission time. Figs. 12 to 16 give an overview on their visibility, problematic periods due to crossing of the galactic plane are indicated, too. Refined and more accurate flux predictions based on the Thermophysical Model (TPM) will be done for the exact observation day. Since asteroids move on the sky, carefulness should be spent on checking the background for the actual observing date to avoid confusion by bright and highly structured backgrounds of the galactic plane. The sky coverage by the calibration asteroids is shown in Fig. 10.

100 µm flux densities with time and visibilities of the 12 brightest main belt asteroids for 2009 are shown in Fig. 17. Slow motion periods as well as times of high background periods are indicated.

Statistics:

- 4 asteroids reach fluxes > 100 Jy at 70 µm (1, 2, 4, 324)
- 151 asteroids reach fluxes > 10 Jy at 70 µm
- 679 asteroids reach fluxes > 1 Jy at 70 µm
- 18 asteroids reach fluxes > 10 Jy at 160 µm

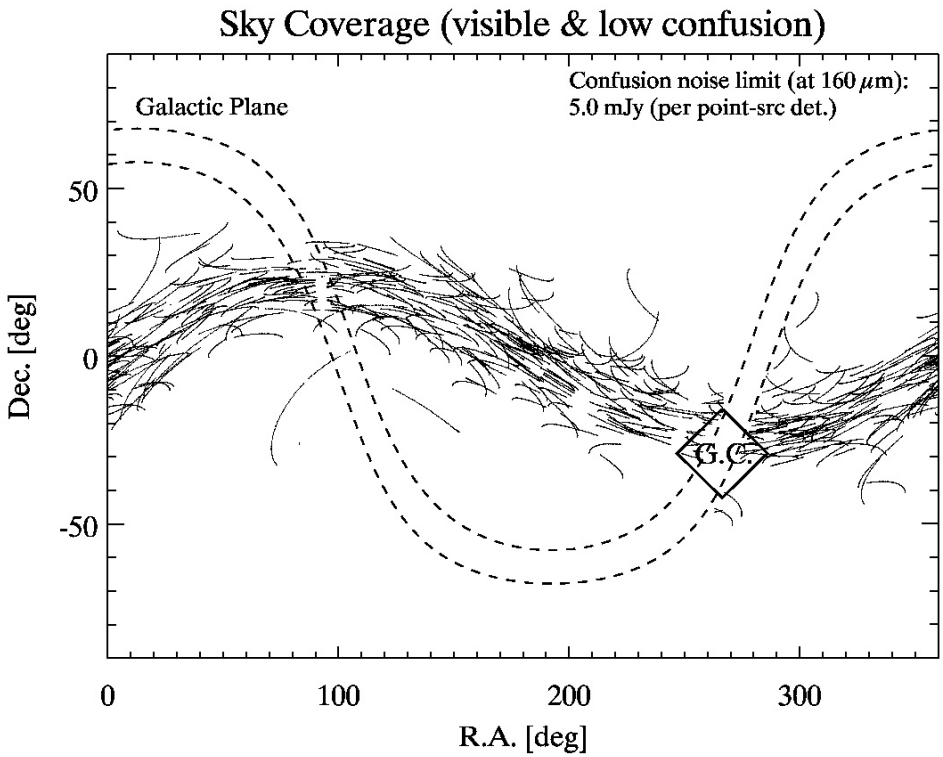


Figure 10: Sky coverage of the 55 calibration asteroids during their visibility and restricted to areas with a confusion noise limit at 160 µm < 5 mJy.

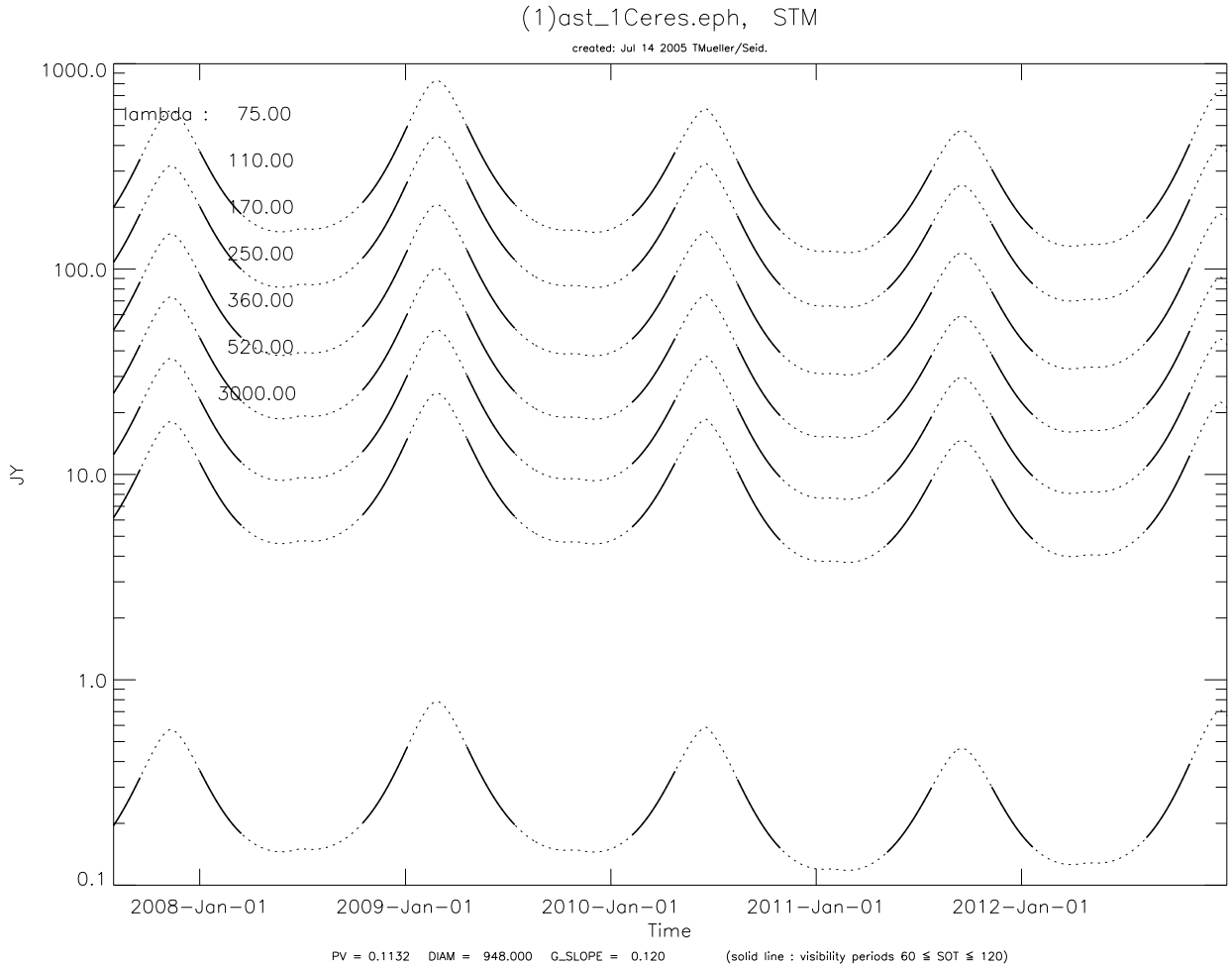


Figure 11: Flux ranges of Ceres over the Herschel mission for different wavelengths. Solid line parts indicate visibility periods.

Table 3: Minimum and maximum fluxes of the Herschel calibration asteroids for the central wavelengths of the three PACS photometric bands during their visibility periods between 01-Jan-2009 and 31-Dec-2009.

Asteroid		flux prediction for year 2009		
		f_{70} (Jy)	f_{100} (Jy)	f_{160} (Jy)
1	Ceres	232.79 – 560.04	131.82 – 316.82	58.19 – 139.75
2	Pallas	79.78 – 270.56	45.08 – 151.63	19.87 – 66.37
3	Juno	13.42 – 65.63	7.63 – 36.71	3.38 – 16.04
4	Vesta	68.38 – 185.03	39.03 – 105.17	17.34 – 46.57
6	Hebe	6.60 – 15.32	3.79 – 8.76	1.69 – 3.90
7	Iris	8.16 – 28.02	4.67 – 15.85	2.08 – 6.99
8	Flora	4.96 – 11.46	2.81 – 6.50	1.24 – 2.87
9	Metis	11.51 – 41.24	6.47 – 23.01	2.84 – 10.03
10	Hygiea	21.24 – 48.02	12.32 – 27.69	5.55 – 12.40
12	Victoria	2.66 – 5.43	1.52 – 3.10	0.67 – 1.38
17	Thetis	1.94 – 3.97	1.10 – 2.26	0.49 – 1.00
18	Melpomene	8.78 – 42.18	4.90 – 23.35	2.13 – 10.12
19	Fortuna	17.83 – 51.28	9.92 – 28.56	4.32 – 12.43
20	Massalia	5.14 – 16.95	2.92 – 9.55	1.29 – 4.20
21	Lutetia	1.88 – 5.81	1.07 – 3.29	0.48 – 1.45
23	Thalia	1.74 – 4.46	1.00 – 2.56	0.45 – 1.14
24	Themis	6.06 – 14.95	3.49 – 8.56	1.57 – 3.81
28	Bellona	2.34 – 5.71	1.35 – 3.27	0.60 – 1.46
29	Amphitrite	10.14 – 25.41	5.78 – 14.42	2.56 – 6.38
31	Euphrosyne	6.39 – 10.97	3.74 – 6.43	1.70 – 2.92
37	Fides	1.99 – 5.08	1.15 – 2.91	0.51 – 1.29
40	Harmonia	3.66 – 9.78	2.06 – 5.51	0.91 – 2.42
41	Daphne	4.85 – 11.86	2.80 – 6.78	1.26 – 3.02
42	Isis	4.80 – 18.83	2.67 – 10.44	1.16 – 4.53
47	Aglaja	3.85 – 7.63	2.19 – 4.34	0.97 – 1.92
48	Doris	6.91 – 14.03	3.99 – 8.09	1.79 – 3.63
52	Europa	15.53 – 40.35	8.92 – 23.00	3.98 – 10.21
54	Alexandra	6.83 – 17.64	3.90 – 9.97	1.73 – 4.39
56	Melete	2.10 – 5.50	1.21 – 3.12	0.54 – 1.38
65	Cybele	7.51 – 15.12	4.36 – 8.74	1.97 – 3.92
69	Hesperia	4.22 – 12.85	2.41 – 7.26	1.07 – 3.20
85	Io	3.98 – 12.13	2.29 – 6.89	1.02 – 3.05
88	Thisbe	17.11 – 48.32	9.65 – 27.11	4.24 – 11.88
93	Minerva	5.16 – 10.32	2.92 – 5.86	1.29 – 2.60
94	Aurora	7.35 – 17.30	4.22 – 9.88	1.88 – 4.39
106	Dione	4.26 – 11.42	2.43 – 6.48	1.08 – 2.87
165	Loreley	4.38 – 9.96	2.51 – 5.69	1.12 – 2.53
173	Ino	7.99 – 25.32	4.49 – 14.15	1.97 – 6.18
196	Philomela	2.82 – 5.45	1.63 – 3.15	0.73 – 1.41
230	Athamantis	3.28 – 8.35	1.85 – 4.72	0.82 – 2.08
241	Germania	3.95 – 7.65	2.29 – 4.42	1.03 – 1.99
283	Emma	5.66 – 12.46	3.20 – 7.06	1.41 – 3.12
313	Chaldaea	3.27 – 11.86	1.83 – 6.60	0.80 – 2.88
334	Chicago	2.26 – 3.77	1.33 – 2.22	0.61 – 1.01
360	Carlova	1.62 – 3.27	0.94 – 1.89	0.42 – 0.85
372	Palma	3.24 – 5.40	1.90 – 3.17	0.87 – 1.45
423	Diotima	7.00 – 13.52	4.03 – 7.78	1.80 – 3.48
451	Patientia	7.22 – 14.26	4.17 – 8.23	1.87 – 3.69
471	Papagena	2.20 – 5.17	1.28 – 2.99	0.58 – 1.34
505	Cava	4.71 – 12.45	2.64 – 6.97	1.15 – 3.05
511	Davida	14.80 – 45.40	8.56 – 25.91	3.85 – 11.51
532	Herculina	10.34 – 31.24	5.90 – 17.58	2.62 – 7.72
690	Wratislavia	3.38 – 9.84	1.93 – 5.58	0.86 – 2.47
704	Interamnia	12.25 – 24.70	7.12 – 14.31	3.21 – 6.43
776	Berbericia	3.53 – 10.68	2.04 – 6.08	0.91 – 2.70

Table 4: Minimum and maximum fluxes of the Herschel calibration asteroids for the central wavelengths of the three PACS photometric bands during their visibility periods between 01-Nov-2008 and 31-Dec-2013.

Asteroid		flux prediction for Herschel mission time		
		f_{70} (Jy)	f_{100} (Jy)	f_{160} (Jy)
1	Ceres	164.84 – 560.04	94.45 – 316.82	42.10 – 139.75
2	Pallas	37.61 – 279.67	21.82 – 156.23	9.82 – 68.20
3	Juno	7.45 – 65.63	4.33 – 36.71	1.95 – 16.04
4	Vesta	68.38 – 276.75	39.03 – 155.98	17.34 – 68.60
6	Hebe	6.42 – 56.42	3.69 – 31.38	1.65 – 13.65
7	Iris	7.71 – 53.64	4.42 – 29.92	1.97 – 13.05
8	Flora	4.79 – 33.81	2.72 – 18.77	1.20 – 8.15
9	Metis	8.70 – 44.95	4.94 – 25.07	2.19 – 10.93
10	Hygiea	21.24 – 78.71	12.32 – 44.82	5.55 – 19.87
12	Victoria	2.59 – 20.28	1.48 – 11.27	0.66 – 4.90
17	Thetis	1.70 – 8.70	0.97 – 4.87	0.43 – 2.13
18	Melpomene	4.07 – 42.18	2.33 – 23.35	1.04 – 10.12
19	Fortuna	8.40 – 51.28	4.79 – 28.56	2.12 – 12.43
20	Massalia	4.77 – 23.06	2.72 – 12.91	1.21 – 5.65
21	Lutetia	1.87 – 11.86	1.07 – 6.62	0.48 – 2.89
23	Thalia	1.67 – 16.20	0.97 – 9.03	0.43 – 3.94
24	Themis	4.71 – 15.51	2.74 – 8.87	1.24 – 3.95
28	Bellona	2.22 – 11.64	1.28 – 6.55	0.58 – 2.88
29	Amphitrite	9.98 – 35.17	5.69 – 19.81	2.53 – 8.71
31	Euphrosyne	6.39 – 40.69	3.74 – 23.00	1.70 – 10.14
37	Fides	1.91 – 12.12	1.10 – 6.79	0.49 – 2.97
40	Harmonia	3.65 – 12.52	2.06 – 7.01	0.91 – 3.07
41	Daphne	3.70 – 33.99	2.15 – 18.99	0.97 – 8.29
42	Isis	1.80 – 18.83	1.03 – 10.44	0.46 – 4.53
47	Aglaja	2.34 – 10.90	1.35 – 6.16	0.61 – 2.71
48	Doris	6.82 – 20.44	3.95 – 11.67	1.77 – 5.19
52	Europa	11.93 – 42.85	6.92 – 24.40	3.11 – 10.82
54	Alexandra	4.07 – 24.90	2.35 – 13.97	1.05 – 6.12
56	Melete	1.97 – 16.28	1.14 – 9.07	0.51 – 3.95
65	Cybele	5.63 – 15.12	3.30 – 8.74	1.50 – 3.92
69	Hesperia	2.38 – 12.85	1.38 – 7.26	0.62 – 3.20
85	Io	3.87 – 25.10	2.22 – 14.04	1.00 – 6.14
88	Thisbe	8.16 – 48.32	4.70 – 27.11	2.11 – 11.88
93	Minerva	3.28 – 15.94	1.88 – 8.97	0.84 – 3.94
94	Aurora	5.39 – 17.30	3.12 – 9.88	1.41 – 4.39
106	Dione	2.29 – 11.42	1.34 – 6.48	0.61 – 2.87
165	Loreley	3.20 – 9.96	1.85 – 5.69	0.83 – 2.53
173	Ino	3.38 – 25.32	1.95 – 14.15	0.88 – 6.18
196	Philomela	2.82 – 6.29	1.63 – 3.62	0.73 – 1.62
230	Athamantis	3.16 – 11.69	1.79 – 6.56	0.79 – 2.87
241	Germania	3.95 – 13.75	2.29 – 7.83	1.03 – 3.47
283	Emma	2.72 – 12.46	1.58 – 7.06	0.71 – 3.12
313	Chaldaea	2.03 – 14.98	1.15 – 8.31	0.51 – 3.61
334	Chicago	2.23 – 4.25	1.32 – 2.49	0.60 – 1.13
360	Carlova	1.62 – 8.47	0.94 – 4.79	0.42 – 2.11
372	Palma	3.24 – 25.47	1.90 – 14.35	0.87 – 6.31
423	Diotima	6.79 – 16.79	3.91 – 9.61	1.75 – 4.28
451	Patientia	7.22 – 21.15	4.17 – 12.07	1.87 – 5.37
471	Papagena	2.06 – 17.18	1.20 – 9.65	0.54 – 4.23
505	Cava	1.83 – 18.54	1.06 – 10.31	0.48 – 4.48
511	Davida	11.02 – 60.13	6.45 – 34.08	2.92 – 15.05
532	Herculina	7.12 – 45.34	4.12 – 25.47	1.85 – 11.17
690	Wratislavia	1.92 – 9.84	1.12 – 5.58	0.51 – 2.47
704	Interamnia	12.25 – 56.98	7.12 – 32.28	3.21 – 14.26
776	Berbericia	3.00 – 13.36	1.74 – 7.57	0.78 – 3.34

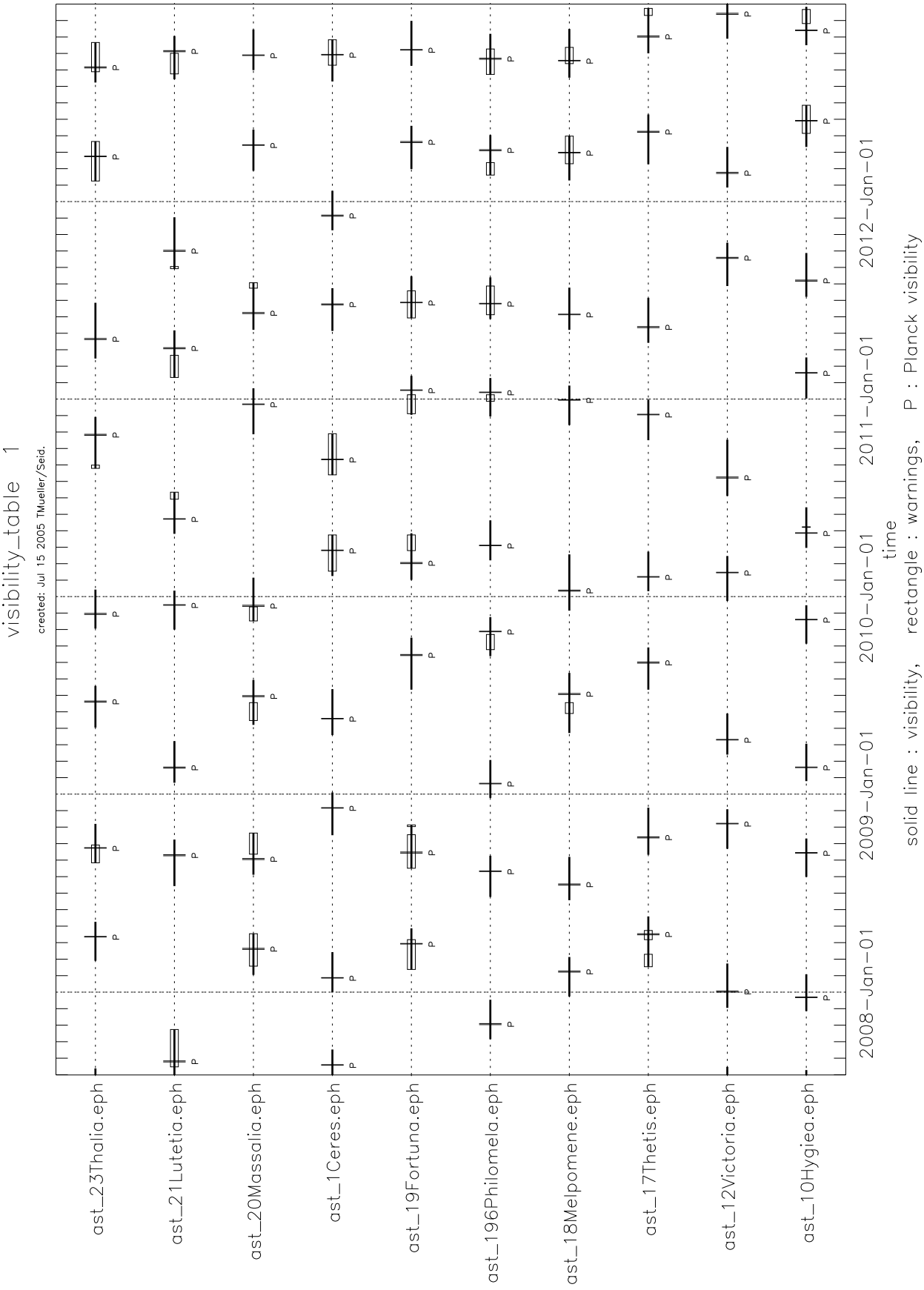


Figure 12: Visibility of calibration asteroids 1.

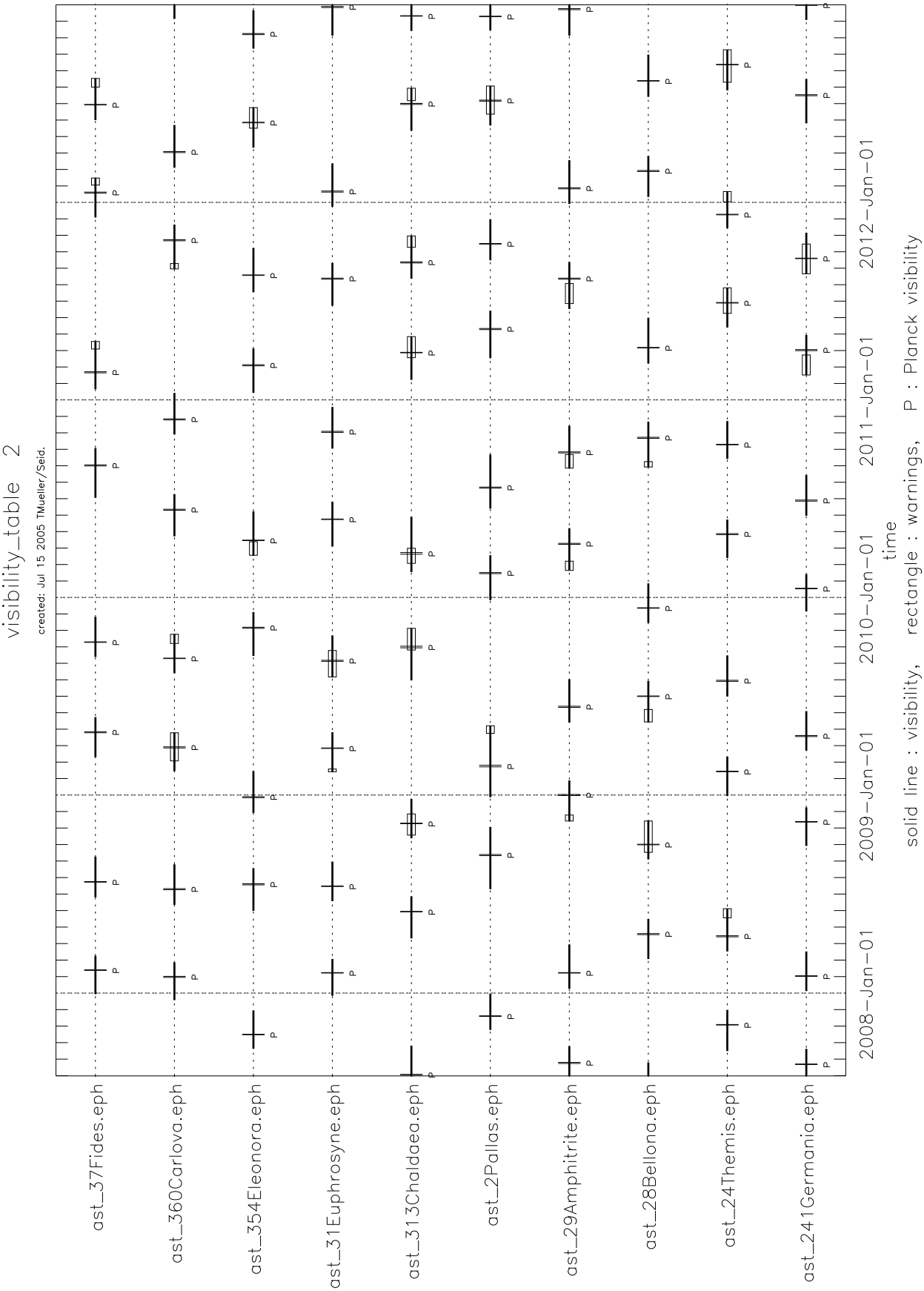


Figure 13: Visibility of calibration asteroids 2.

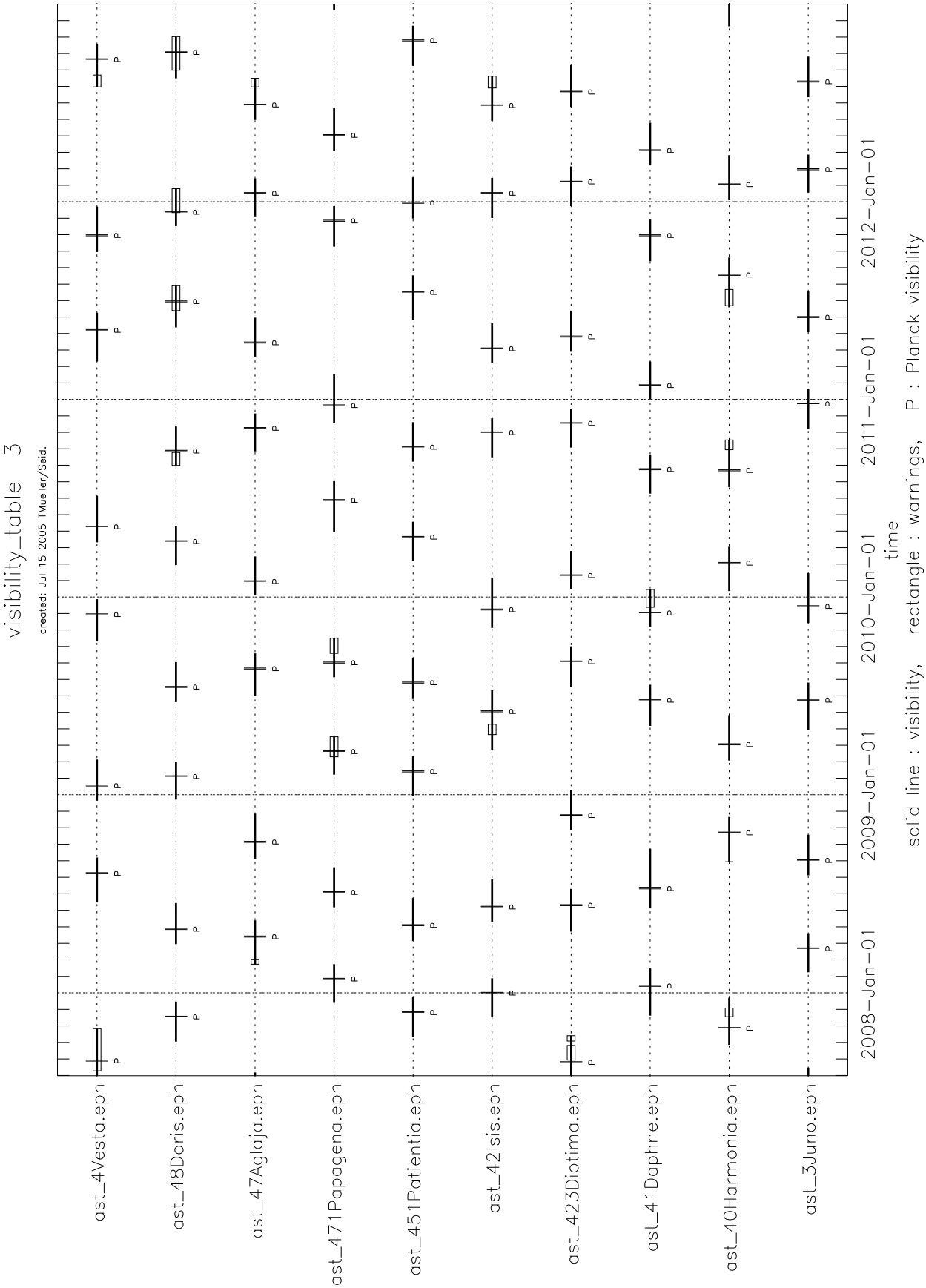


Figure 14: Visibility of calibration asteroids 3.

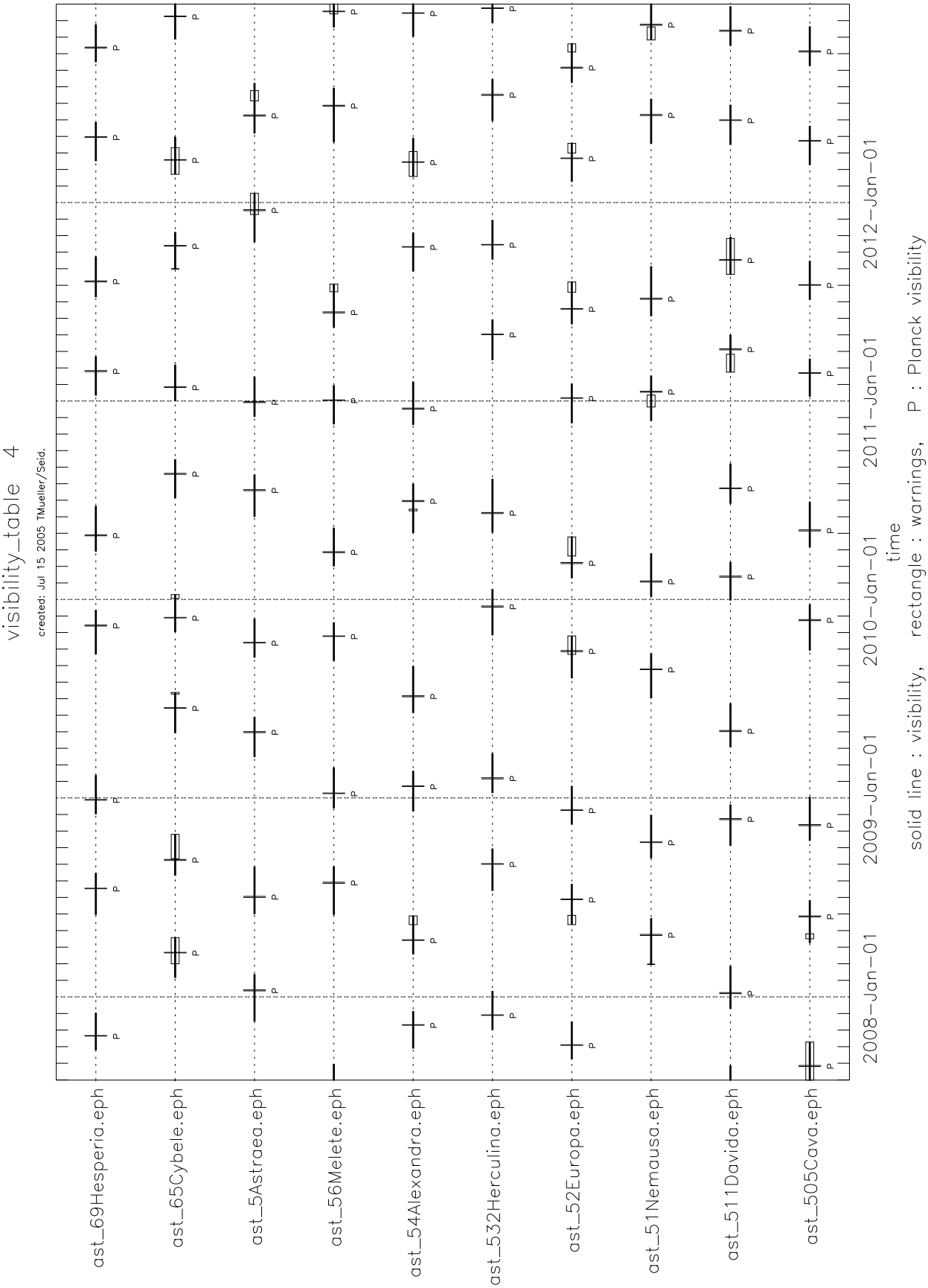


Figure 15: Visibility of calibration asteroids 4.

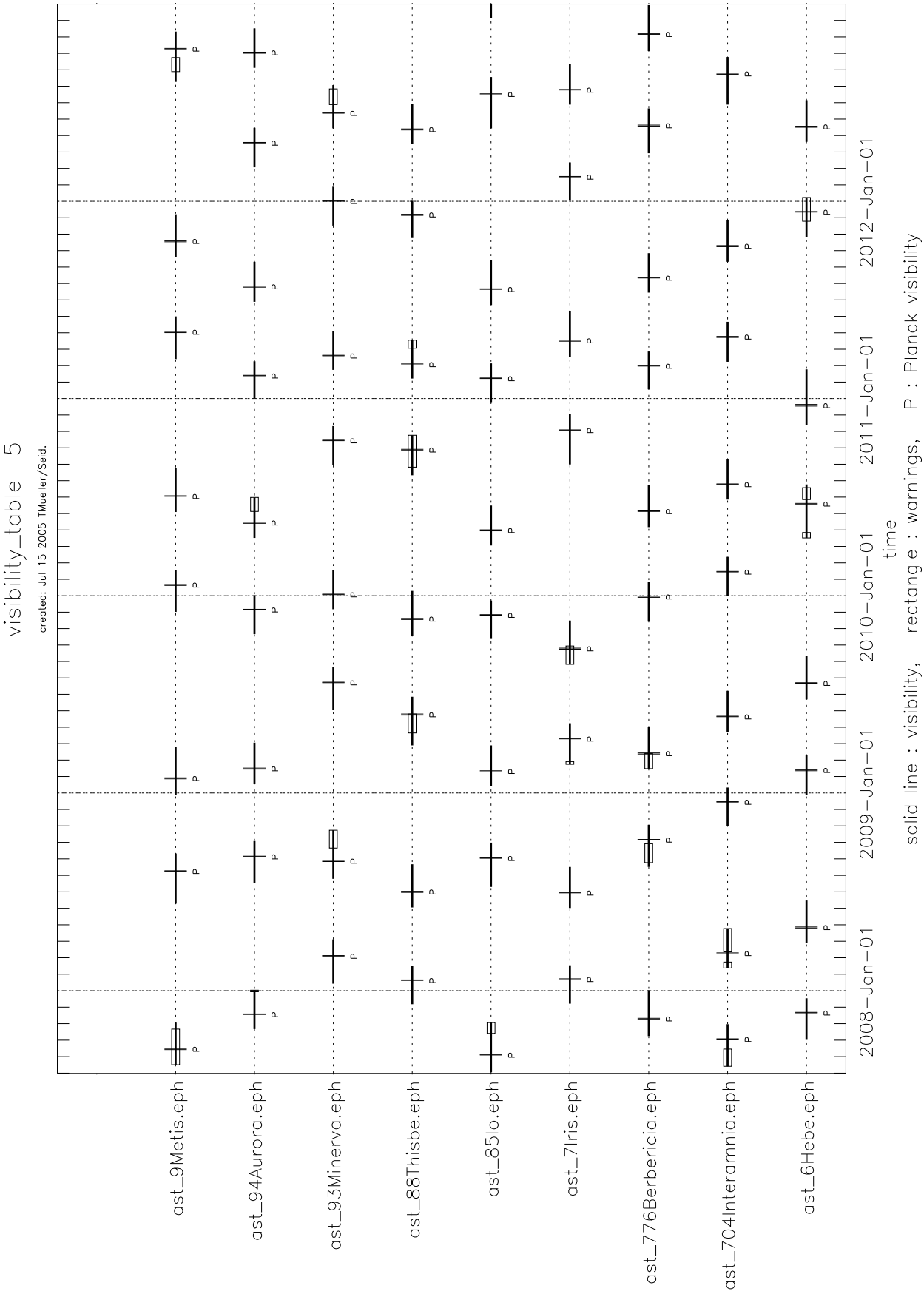


Figure 16: Visibility of calibration asteroids 5.

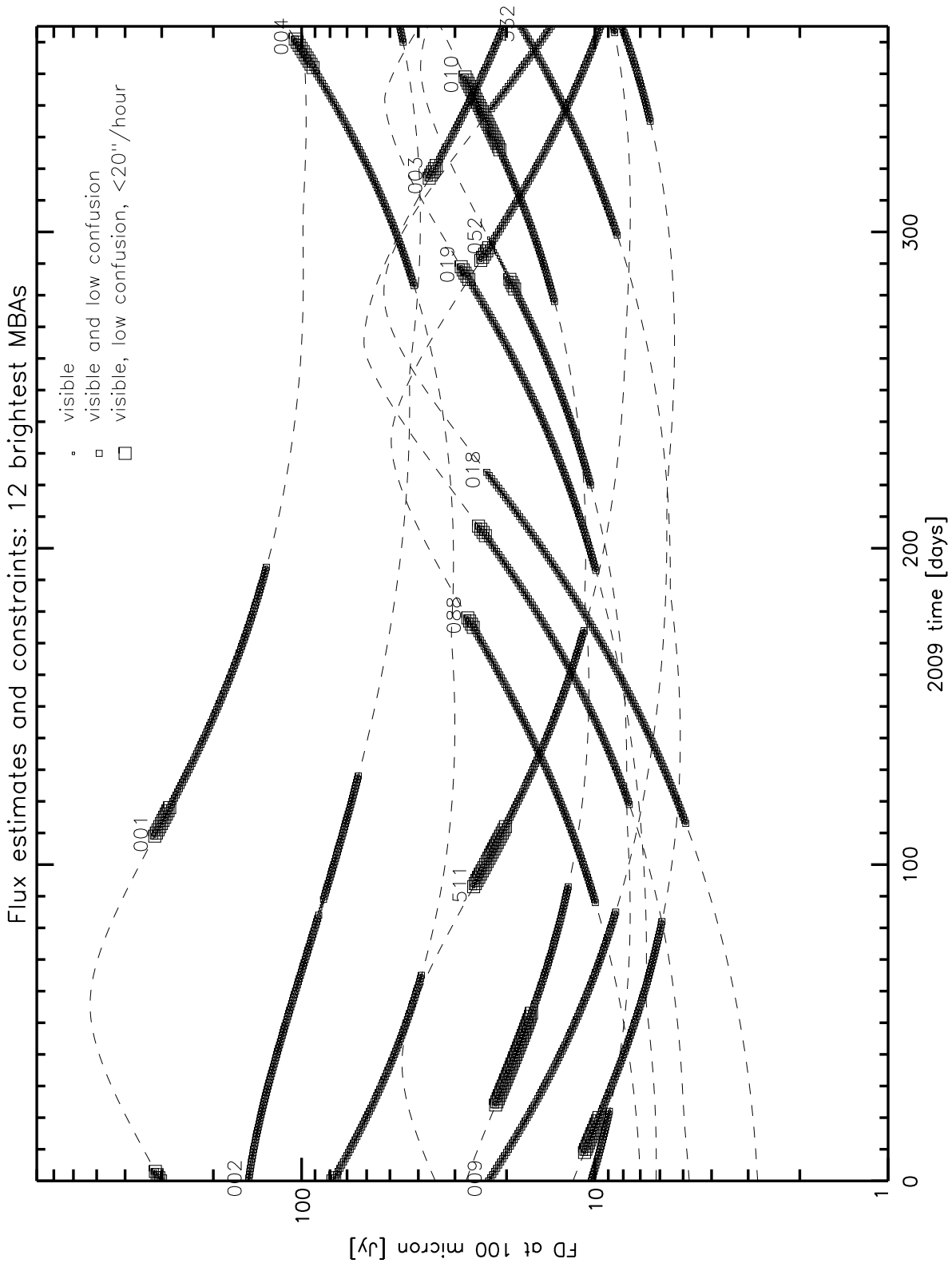


Figure 17: 100 µm flux densities with time and visibilities of the 12 brightest main belt asteroids for 2009. Slow motion periods (thick symbols) as well as times of high background periods (thinnest symbols) are indicated.

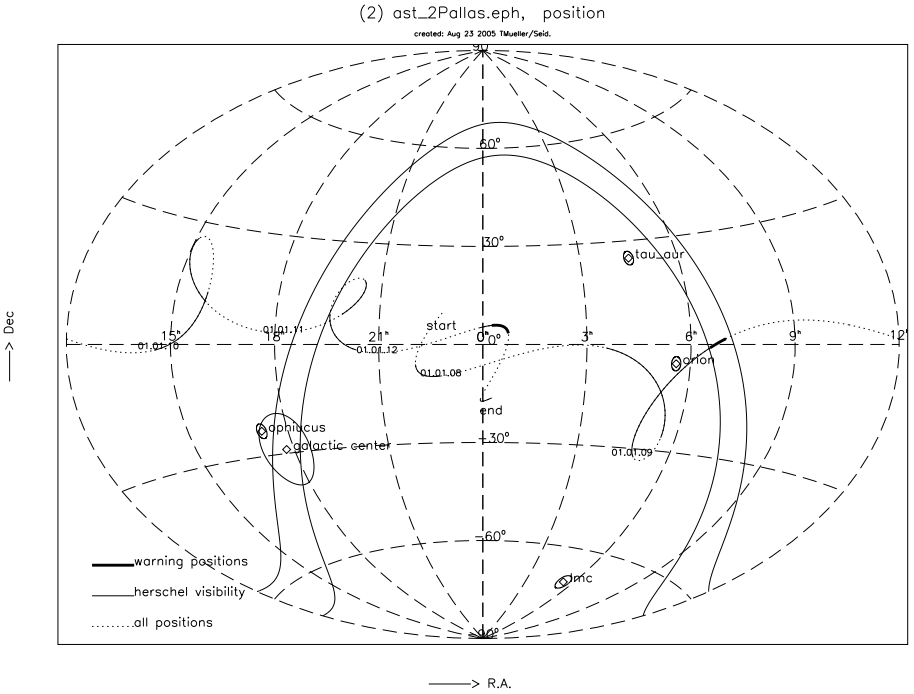


Figure 18: Position of 2 Pallas in equatorial coordinates for the period 2008 to 2013. Visibility periods are indicated as well as passages of critical sky background areas.

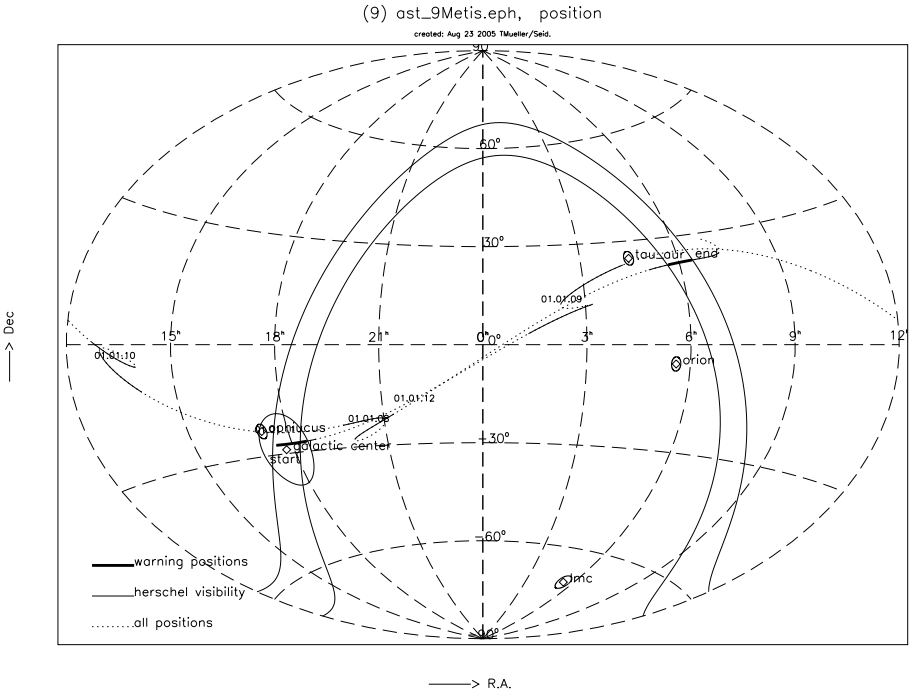


Figure 19: Position of 9 Metis in equatorial coordinates for the period 2008 to 2013. Visibility periods are indicated as well as passages of critical sky background areas.

4.1.2 Secondary Standards

Definition: The absolute flux of secondary standards need not to be known with such high accuracy as that of primary standards. The emphasis to use a secondary standard is on the reproducibility, that means the relative flux calibration. Secondary flux standards must not be variable in the PACS wavelength range. Agreed bright secondary standards with an accuracy of predicted fluxes in the order of 10 – 15% are:

1) the 4 stellar sources (Herbig Ae/Be stars and PPN),
   HD 161796 (always visible), AFGL (CRL) 2688 (possibly extended), HD 100546, MWC 758
2) the 4 ULIRGs
   Mrk 231, Arp 220, IRAS 17208-0014 and IRAS 22491-1808

Table 5: List of secondary photometric standards. The flux values are taken from IRAS, ISO LWS spectra or modelling by G. Sandell.

Name	Coordinates (J2000)		f_{70}	f_{100}	f_{160}
	R. A.	Dec.	(Jy)	(Jy)	(Jy)
HD 161796	17:44:55.4691	+50:02:39.484	150	49	20
AFGL (CRL) 2688	21:02:18.78	+36:41:41.2	1000		600
HD 100546	11:33:25.4408	-70:11:41.239	117	48	20
MWC 758	05:30:27.5296	+25:19:57.083	27	20	19
Mrk 231	12:54:05.0057	+57:08:38.297	38	35	15
Arp 220	15:34:57.116	+23:30:11.47	140	152	75
IRAS 17208-0014	17:23:21.955	-00:17:00.94	43	47	23
IRAS 22491-1808	22:51:49.264	-17:52:23.46	15	10	7

The list of ISO calibration stars of Cohen (1996, AJ, 112, 2274)[1] finally not considered as prime Herschel standards can build the list of secondary stellar calibrators. The visibilities of the targets contained in both these table are shown in Fig. 20. HD 8810, HD 33872, HD 128000, θ UMi, γ Dra, and δ Dra are always visible. Additionally, the stars measured during the ISO Ground Based Preparatory Programme (GBPP)[2] also serve as a potential list of secondary flux standards. Those sources not contained in the list of fiducial prime calibrators are provided in Tab. 7. Their visibilities are given in Fig. 22.

Table 6: List of secondary photometric ISO calibration stars.

HR	HD	ID	Name	Coordinates (J2000)		Sp type	f_{70}	f_{100}	f_{160}
				R. A.	Dec.		(mJy)	(mJy)	(mJy)
420	8810		SAO 248381	01:25:05.3067	-64:22:10.120	K5III	146	713	28
617	12929	α Ari	Hamal	02:07:10.4071	+23:27:44.723	K2III	1707	831	321
1654	32887	ε Lep		05:05:27.6643	-22:22:15.717	K4III	1182	576	223
1699	33872			05:11:35.8375	-37:23:43.012	K5III	119	58	22
2131	41047			06:01:16.2979	-33:54:42.608	K5III	196	95	37
2990	62509	β Gem	Pollux	07:45:18.9503	+28:01:34.315	K0IIIb	2457	1190	456
3748	81797	α Hya	Alphard	09:27:35.2433	-08:39:30.969	K3II-III	2876	1402	542
4763	108903	γ Cru		12:31:09.9593	-57:06:47.562	M3.5III	19780	9634	3720
5442	128000		IRC+60228	14:32:30.9356	+55:23:52.835	K5III	139	68	26
5826	139669	θ Umi		15:31:24.9293	+77:20:57.667	K5III	286	140	54
7310	180711	δ Dra		19:12:33.3000	+67:39:41.549	G9III	429	208	80
7980	198542	ω Cap		20:51:49.2910	-26:55:08.877	M0III	858	418	162
8685	216149			22:51:02.1594	-39:09:24.601	M0III	136	66	26

[1] http://iso.esac.esa.int/users/expl_lib/ISO/wwwcal/isoprep/cohen/
[2] http://iso.esac.esa.int/users/expl_lib/ISO/wwwcal/isoprep/gbpp/

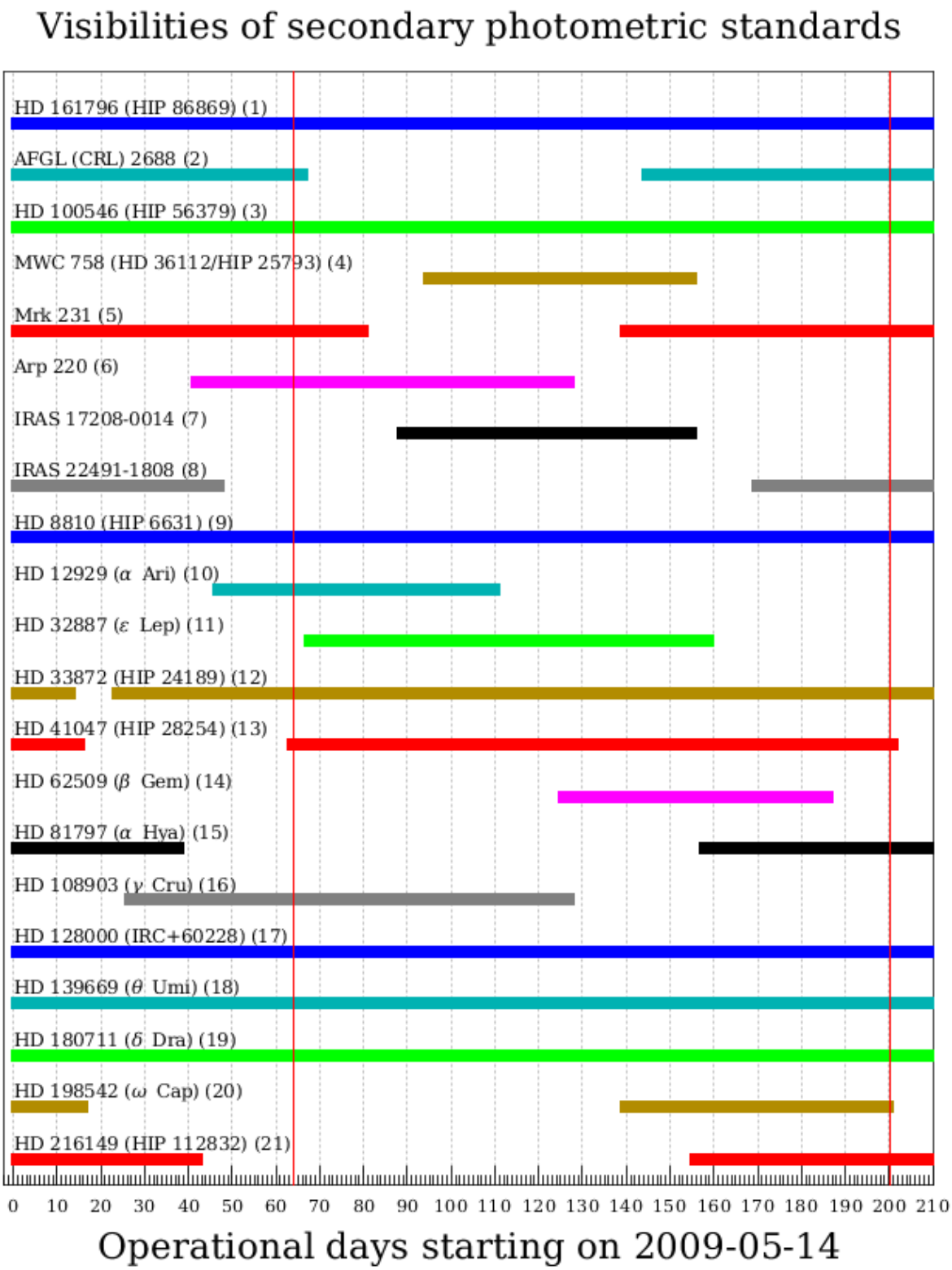


Figure 20: Visibilities of the secondary photometric standards from Tabs. 5 and 6.

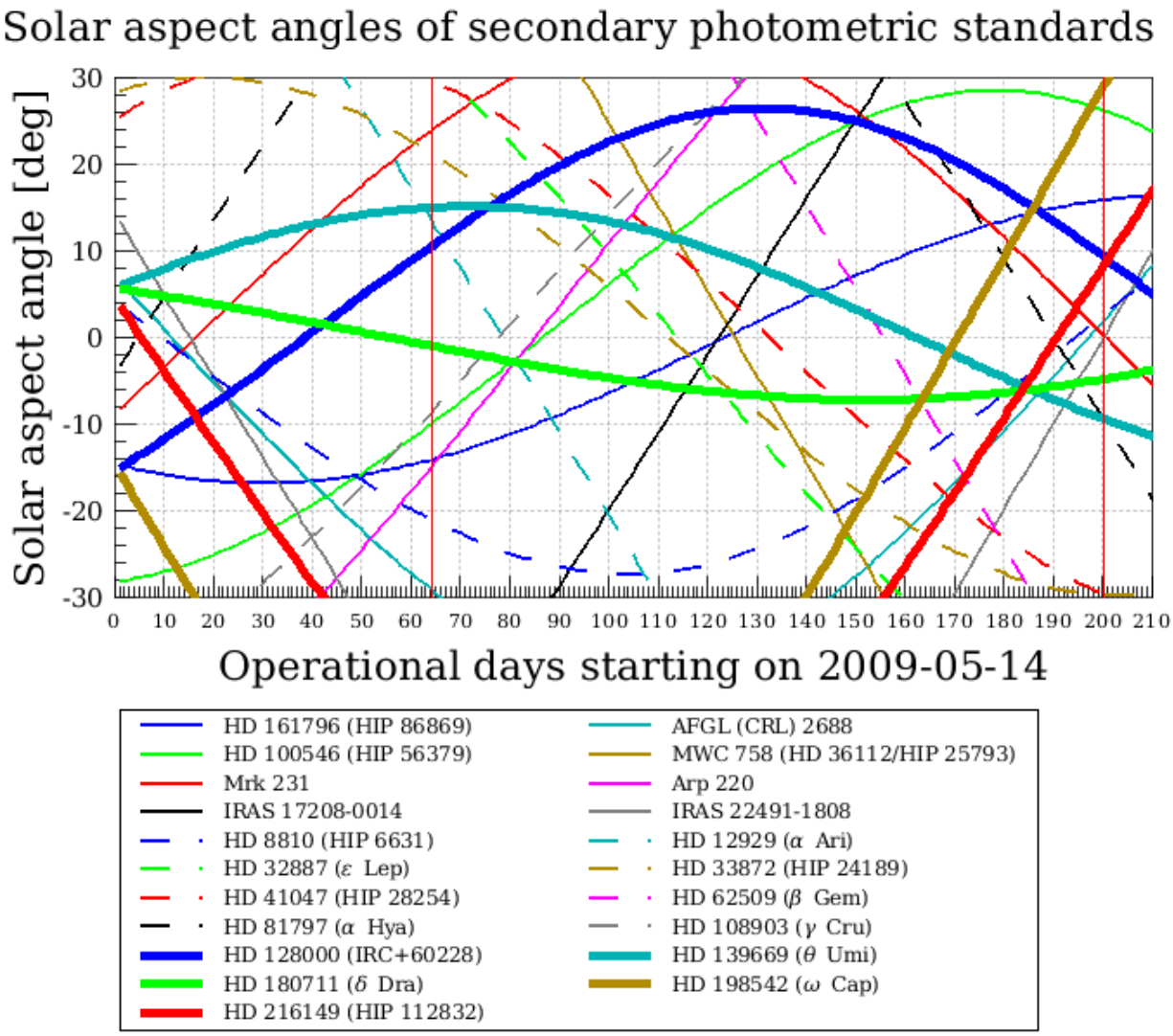


Figure 21: Solar aspect angles of the secondary photometric standards from Tabs. 5 and 6.

Table 7: List of secondary photometric ISO GBPP calibration stars.

HR	HD	ID	Name	Coordinates (J2000)		Sp type	f_{70}	f_{100}	f_{160}
				R. A.	Dec.		(mJy)	(mJy)	(mJy)
HR 1464	HD 029291	υ^2 Eri		04:35:33.0385	-30:33:44.429	G8III	187	85	35
HR 4728	HD 108225			12:25:50.9385	+39:01:07.018	G8III-IV	61	29	11
HR 4883	HD 111812			12:51:41.9216	+27:32:26.565	G0III	38	19	7.2
	HD 111996			12:52:48.5824	+33:44:15.264	K1V	1.6	0.8	0.3
HR 4954	HD 113996			13:07:10.7297	+27:37:29.067	K5III	281	137	53
HR 4983	HD 114710			13:11:52.3935	+27:52:41.459	G0V	57	28	11
	HD 115968		Alcor	13:20:01.5173	+38:09:33.213	G8III	2.5	1.2	0.5
HR 5062	HD 116842			13:25:13.5379	+54:59:16.648	A5V	28	14	5.3
HR 5200	HD 120477	υBoo		13:49:28.6411	+15:47:52.458	K5IIIvar	649	316	122
HR 5213	HD 120787			13:49:45.5050	+61:29:21.527	G3V	28	14	5.2
	HD 121131			13:53:05.3009	+27:48:24.411	K1V	2.4	1.2	0.5
HR 5302	HD 123977			14:08:46.0464	+59:20:15.536	K0III	21	10	3.8
HR 5304	HD 123999			14:10:23.9336	+25:05:30.037	F9IV	31	15	5.8
HR 5350	HD 125161			14:16:09.9294	+51:22:02.033	A9V	15	7.3	2.8
HR 5420	HD 127243			14:28:37.8125	+49:50:41.465	G3IV	37	18	7.0
HR 5423	HD 127334			14:29:36.8085	+41:47:45.280	G5V	10	4.8	1.8
HR 5429	HD 127665	ρ Boo		14:31:49.7899	+30:22:17.174	K3III	508	246	94
HR 5447	HD 128167	σ Boo		14:34:40.8171	+29:44:42.468	F3Vwvar	32	16	6.1
	HD 132142			14:55:11.0437	+53:40:49.250	K1V	4.2	2.0	0.8
HR 5602	HD 133208	β Boo		15:01:56.7623	+40:23:26.036	G8III	248	120	46
HR 5648	HD 134493			15:08:19.5375	+50:03:17.837	K0III	23	11	4.3
*HR 5755	HD 138265			15:27:51.4231	+60:40:12.780	K5III	105	51	20
HR 5763	HD 138481	ν^1 Boo		15:30:55.7593	+40:49:58.968	K5III	313	152	59
HR 5830	HD 139798			15:38:16.2265	+46:47:51.905	F2V	10	4.7	1.8
HR 5886	HD 141653			15:46:40.0053	+62:35:58.405	A2IV	7.2	3.5	1.3
HR 5901	HD 142091			15:51:13.9315	+35:39:26.575	K0III-IV	87	42	16
HR 5914	HD 142373	χ Her		15:52:40.5415	+42:27:05.465	F9V	48	24	9.1
HR 5957	HD 143435			15:58:57.7137	+36:38:37.585	K5III	147	71	28
HR 5981	HD 144204			16:02:05.5584	+52:54:57.302	K5III	104	51	20
HR 5986	HD 144284	θ Dra		16:01:53.3457	+58:33:54.905	F8IV-V	65	32	12
	HD 144579			16:04:56.7932	+39:09:23.433	G8V	10	5.0	1.9
HR 6132	HD 148387			16:23:59.4861	+61:30:51.167	G8III	480	233	89
HR 6436	HD 156729			17:17:40.2545	+37:17:29.394	A2V	12	5.8	2.2
HR 6464	HD 157325			17:20:21.1218	+46:14:26.808	M0III	199	97	37
	HD 158485			17:26:04.8370	+58:39:06.823	A4V	2.7	1.3	0.5
HR 6688	HD 163588			17:53:31.7295	+56:52:21.514	K2III	339	164	63
HR 6695	HD 163770			17:56:15.1805	+37:15:01.941	K1IIvar	336	163	62
HR 6817	HD 167042			18:10:31.6403	+54:17:11.588	K1III	27	13	5.0
HR 6847	HD 168009			18:15:32.4636	+45:12:33.544	G2V	10	4.9	1.9
	HD 172323			18:35:09.3855	+63:41:46.959	F9V	1.9	0.9	0.4
HR 7180	HD 176524			18:54:23.8547	+71:17:49.891	K0III	111	54	21
HR 7310	HD 180711	δ Dra		19:12:33.3000	+67:39:41.549	G9III	429	208	80
HR 7328	HD 181276			19:17:06.1688	+53:22:06.454	K0III	188	91	35
HR 7341	HD 181597			19:18:37.8714	+49:34:10.042	K1III	28	14	5.2
	HD 184467			19:31:07.9736	+58:35:09.637	K1V	13	6.3	2.4
HR 7451	HD 184960			19:34:19.7902	+51:14:11.831	F7V	13	6.1	2.3
HR 7469	HD 185395			19:36:26.533	+50:13:15.97	F4V	31	15	5.8
HR 7504	HD 186427			19:41:51.9720	+50:31:03.083	G5V	11	5.4	2.1
HR 7557	HD 187642	α Aql	Altair	19:50:46.9990	+08:52:05.959	A7IV-V	661	321	123
HR 7633	HD 189276			19:55:55.3781	+58:50:45.489	K5II-III	287	140	54
HR 7701	HD 191277			20:05:32.8790	+61:59:43.511	K3III	72	35	13
HR 7742	HD 192781			20:13:27.6157	+60:38:26.048	K5III	108	53	20
HR 7854	HD 195820			20:31:21.1510	+52:18:34.293	K0III	24	12	4.5
HR 7924	HD 197345	α Cyg	Deneb	20:41:25.9147	+45:16:49.217	A2Ia	363	176	67
HR 7957	HD 198149			20:45:17.3750	+61:50:19.615	K0IV	274	133	51
HR 8684	HD 216131	μ Peg		22:50:00.1928	+24:36:05.685	M2III	247	119	46

*also contained in Tab. 8

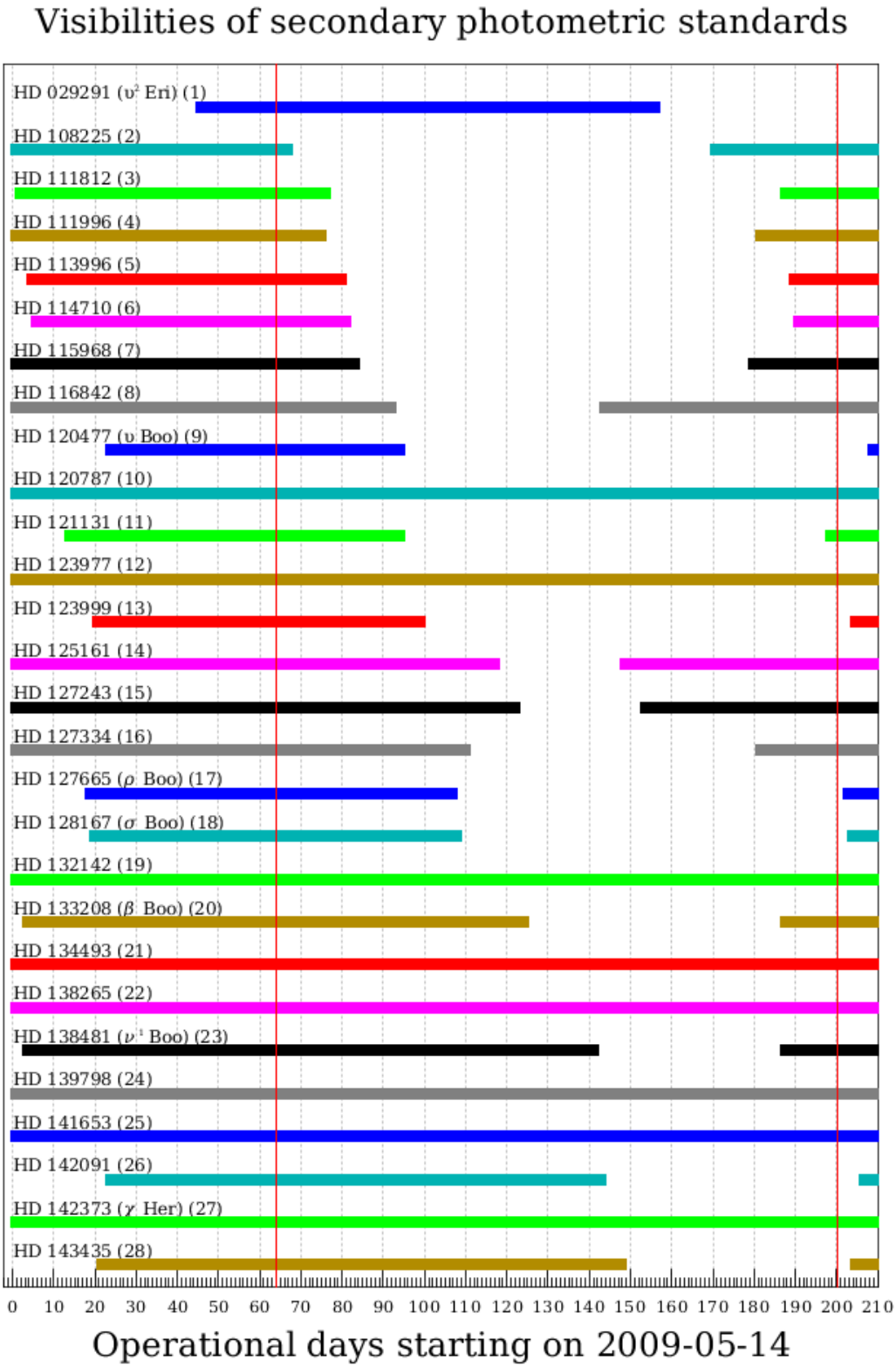


Figure 22: Visibilities of the secondary photometric standards from Tab. 7.

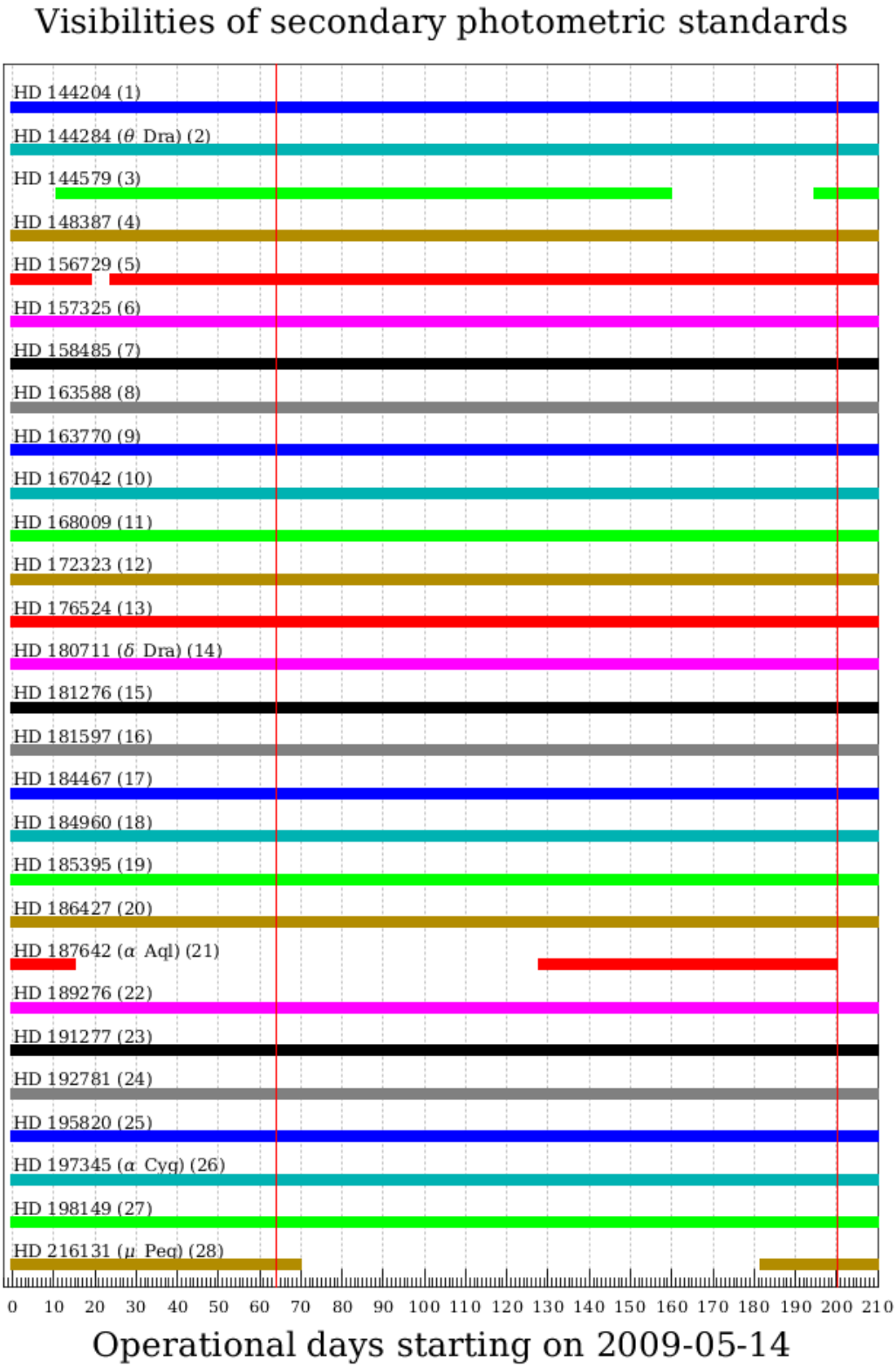


Figure 22: continued. Visibilities of the secondary photometric standards from Tab. 7.

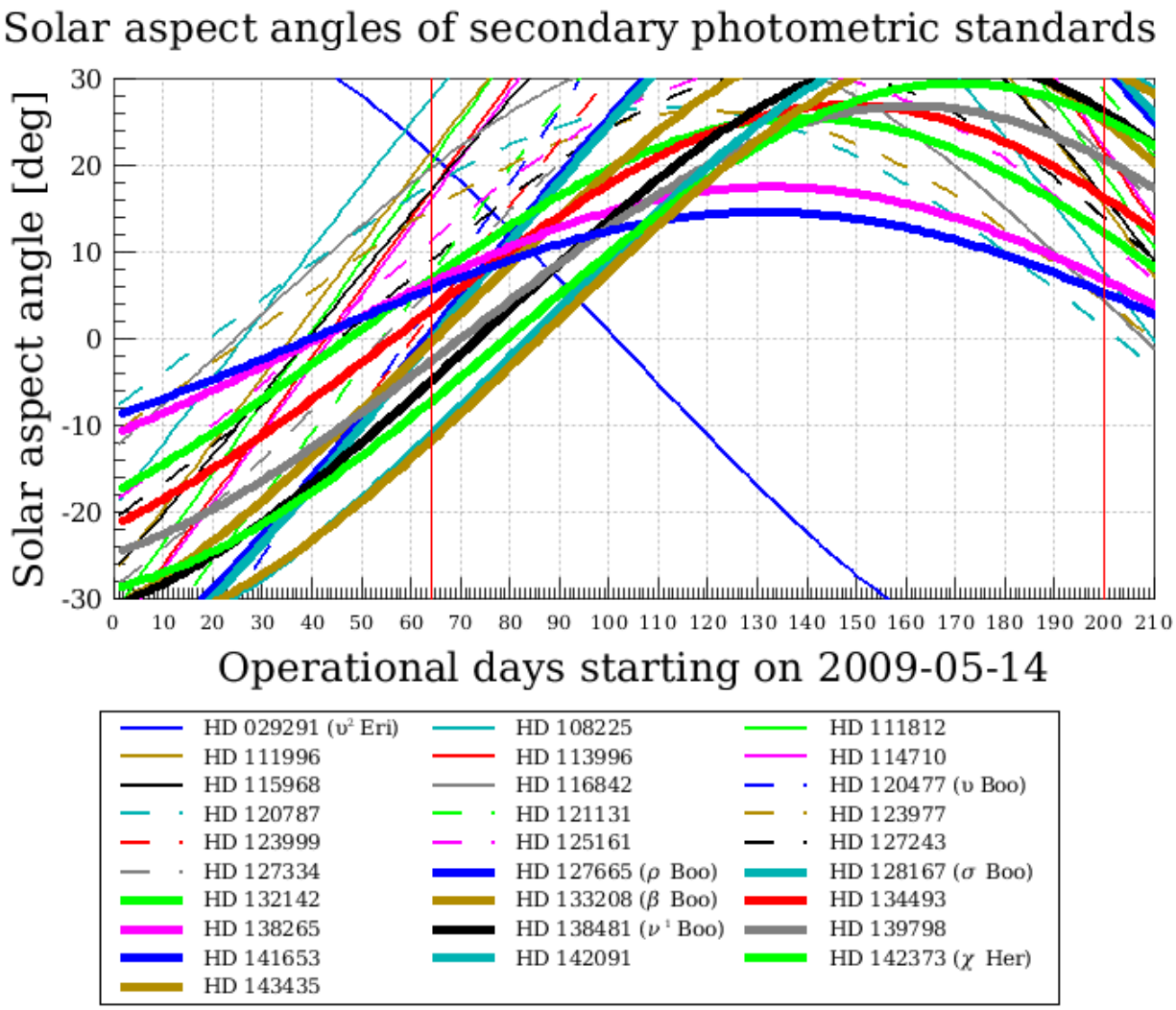


Figure 23: Solar aspect angles of the secondary photometric standards from Tab. 7.

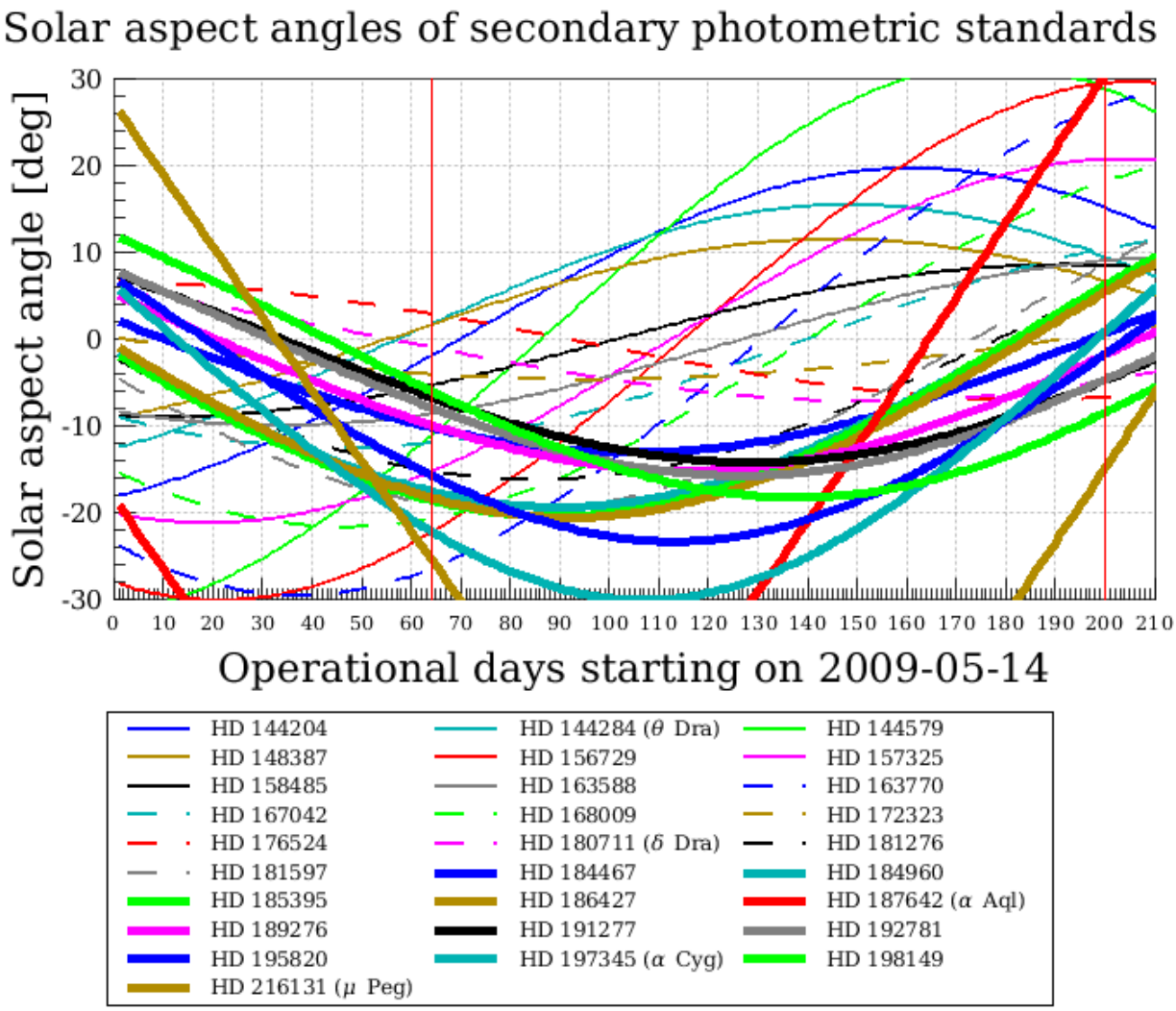


Figure 23: Solar aspect angles of the secondary photometric standards from Tab. 7.

4.1.3 Faint Flux Calibrators

During the AOT validation, faint flux calibrators with flux densities between 10 and 100 mJy are needed to verify the sensitivity achieved by the various photometer AOT modes. Apart from the secondary standard star list in Tab. 7, a reliable reference for faint calibration stars is the publication by Gordon et al. (2007, PASP, 119, 1019) *"Absolute Calibration and Characterisation of the Multiband Imaging Photometer for Spitzer. II. 70 µm Imaging"*. We extracted the 12 faintest stars from this paper and list them in Tab. 8.

In addition, the list of standard stars by Kiss, Moór, & Ábrahám (2006) based on ISOPHOT observations provides a compilation of faint flux standards checked for confusion noise (see Tab. 9).

The visibilities of both samples during the PV phase are shown in Fig. 24.

Table 8: List of faint flux calibration stars.

HD	Coordinates (J2000.0) Epoch 2000.0 R.A.	Dec.	Spectral Type	Proper motion ΔR.A. [mas/yr]	ΔDec. [mas/yr]	expected $F(70\,\mu m)$ [mJy]
15008	02:21:44.9427	-68:39:33.905	A3V	-50.07	2.38	22.0
173398	18:40:56.4096	+62:44:58.078	K0III	9.36	53.87	23.9
159048	17:23:34.5215	+76:03:18.180	K0	-13.12	-27.34	26.9
39608	05:49:36.4578	-60:40:34.648	K5III	9.39	11.88	29.7
152222	16:47:04.6187	+67:16:00.541	K2	9.6	-33.84	37.9
159330	17:30:43.5737	+57:52:36.565	K2III	12.32	-13.83	61.7
102870	11:50:41.7185	+01:45:52.985	F9V	740.95	-271.18	108.1
138265	15:27:51.4231	+60:40:12.780	K5III	-16.9	-3.14	111.4
209952	22:08:13.9855	-46:57:39.512	B6V	127.6	-147.91	112.7
110304	12:41:31.0386	-48:57:35.598	A1IV+	-187.28	-1.2	119.8
53501	06:59:50.5361	-67:54:59.194	K3III	-27	234.21	143.3
170693	18:25:59.1381	+65:33:48.530	K1.5III	106.52	-27.07	147.7

Table 9: List of faint flux calibration stars from ISOPHOT sorted by their flux density at $\lambda = 70\,\mu m$.

HR	HD	ID	Coordinates (J2000.0) Epoch 2000.0 R.A.	Dec.	Spectral Type	expected flux density $F(70\,\mu m)$ [mJy]	$F(100\,\mu m)$ [mJy]	$F(160\,\mu m)$ [mJy]
2261	43834	α Men	06:10:14.4735	-74:45:10.963	G7V	37.42	18.15	7.18
1729	34411	λ Aur	05:19:08.4745	+40:05:56.586	G1.5IV-V	41.33	19.97	7.90
7936	197692	ψ Cap	20:46:05.7330	-25:16:15.231	F5V	46.38	22.51	8.97
7061	173667	110 Her	18:45:39.7254	+20:32:46.708	F6V	48.79	23.72	9.45
9072	224617	ω Psc	23:59:18.6896	+06:51:47.956	F4IV	52.69	25.53	10.17
8181	203608	γ Pav	21:26:26.6056	-65:21:58.314	F9Vfe	53.95	26.14	10.41
8969	222368	ι Psc	23:39:57.0409	+05:37:34.650	F7V	55.68	26.98	10.77
458	9826	υ And	01:36:47.8428	+41:24:19.652	F8V	58.55	28.31	11.25
5404	126660	θ Boo	14:25:11.7964	+51:51:02.677	F7V	59.92	29.04	11.48
7462	185144	σ Dra	19:32:21.5908	+69:39:40.232	K0V	64.74	31.34	12.44
937	19373	ι Per	03:09:04.0197	+49:36:47.799	G0V	71.06	34.49	13.64
5933	142860	γ Ser	15:56:27.1828	+15:39:41.821	F6IV	71.86	34.85	13.88
1983	38393	γ Lep	05:44:27.7904	-22:26:54.176	F6.5V	89.77	43.44	17.23
1325	26965	o^2 Eri	04:15:16.3201	-07:39:10.336	K0.5V	92.87	45.01	17.82
8387	209100	ε Ind	22:03:21.6571	-56:47:09.514	K4Vk	122.14	59.17	23.33
8162	203280	α Cep	21:18:34.7715	+62:35:08.061	A7IV	129.38	62.68	25.00

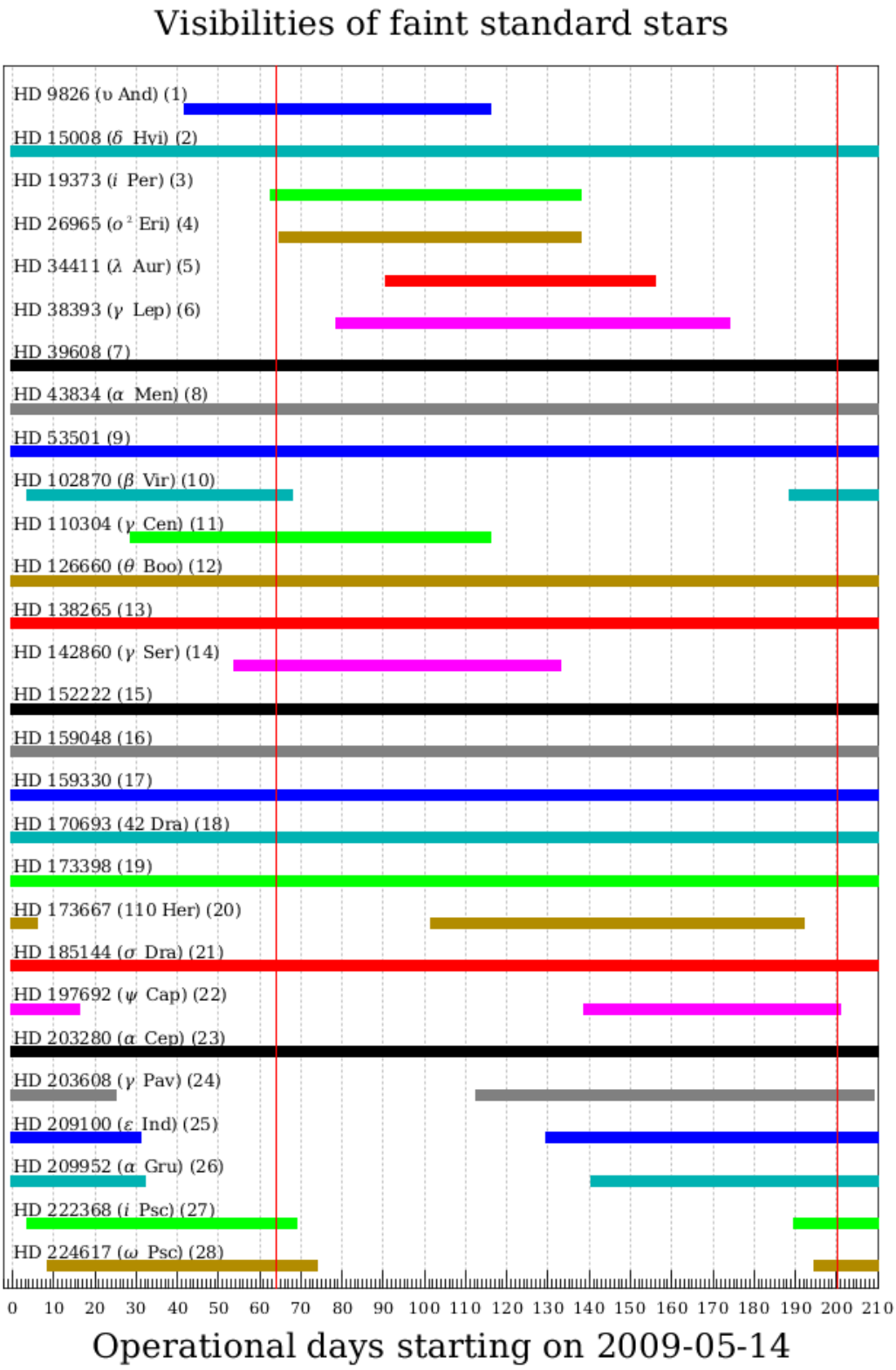


Figure 24: Visibilities of the faint flux calibration stars from Tabs. 8 and 9. They are ordered according to their number in the HD catalogue.

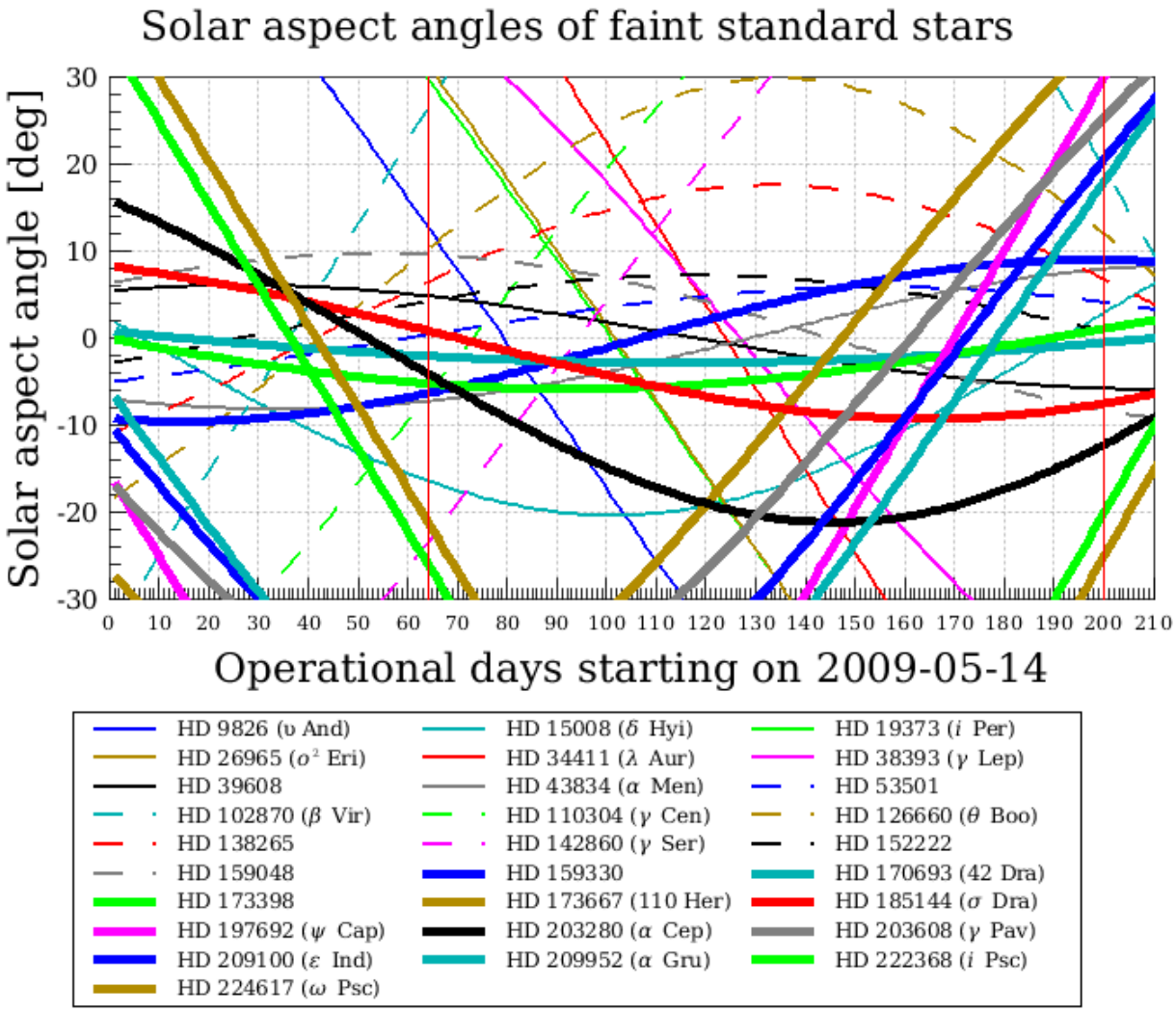


Figure 25: Solar aspect angles of the faint flux calibration stars from Tabs. 8 and 9. They are ordered according to their number in the HD catalogue.

4.2 Point Source References

These can be primary or secondary standards, however they should not be spatially resolved by PACS. They are needed for Point Spread Function (PSF) and optical quality assessment.

4.2.1 PSF sources for Photometer

Sources should have >10 Jy and should not be located in a crowded environment. They should not show shells and haloes down to below the percent level. The flux limit is not only due to the achievable S/N, but also to minimise the impact of random extragalactic sources in the PSF-wings.

In order to check the effect of the broad filter pass-bands on the PSF width it is recommended to measure the PSF with different types of SEDs giving different effective wavelengths. Suitable sources are:

1) fiducial calibration stars (blue, i.e. hot spectrum);

2) asteroids, ideally when in a phase of slow apparent motion in order to minimise the impact by tracking effects;

3) blazars (red, i.e. cold spectrum)

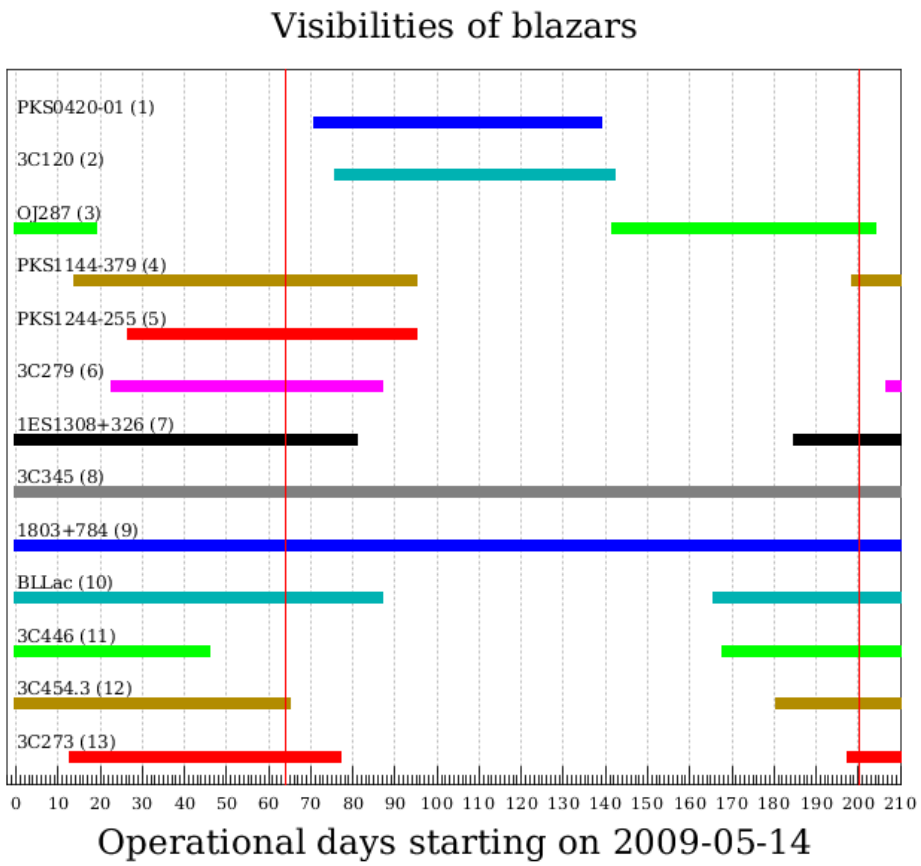


Figure 26: Visibilities of blazars as red/cold photometer PSF calibrators.

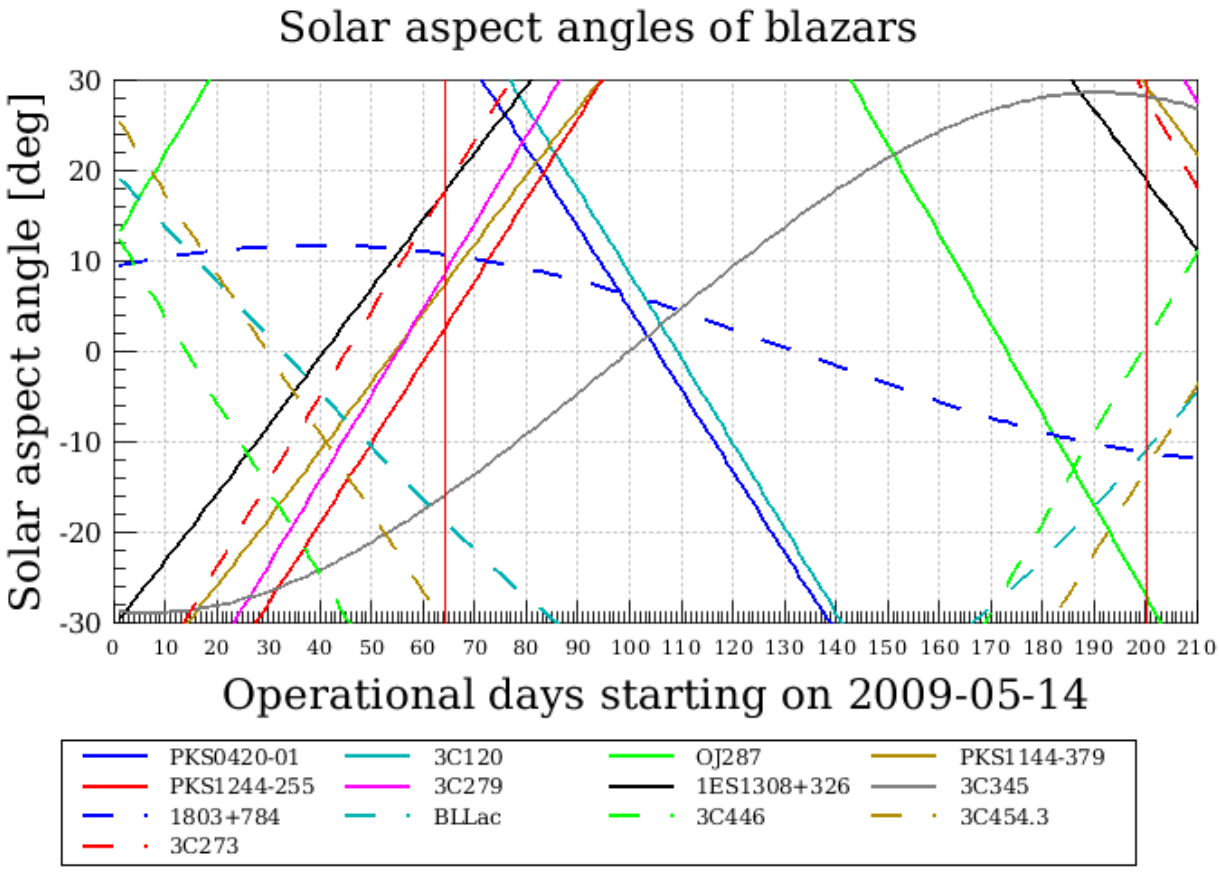


Figure 27: Solar aspect angles of blazars as red/cold photometer PSF calibrators.

4.2.2 PSF sources for Spectrometer

Sources should have >100 Jy, better ∼1000 Jy for feasible raster execution times. This flux requirement is not fulfilled by any fiducial calibration standard, in particular not for the red channel.

Suitable sources appear to be:

1) the planets Neptune (size: 2.″0 – 2.″2) and Uranus (size: 3.″1 – 3.″7). Visibilities are shown in Fig. 33.
2) bright asteroids, ideally when in a phase of slow apparent motion in order to minimise the impact by tracking effects;
3) bright IR sources. AGB stars may be rather compact and symmetric, although already a thin dust shell may cause a slight broadening of the source profile. A list with 5 candidates is given in Table 10. Their visibilities are shown in Fig. 28. These sources should be imaged with the photometer prior to a selection of the best candidate.

For optimum measurements, sources should be located in an area of low and not much structured sky background. The tracks of the planets are shown on ISSA sky maps for the anticipated mission duration in Fig. 30.

Table 10: Source candidates for spectrometer FOV distortion measurements

name	R.A. (J2000)	Dec (J2000)	fluxes in PACS range (Jy)	Notes
CRL 2688	21:02:18.78	+36:41:41.2	f_{70}= 1000, f_{150}= 600	Truch et al. (2008, ApJ, 681, 415) point source at 24μm with MIPS
IRAS 22134+5834	22:15:08.9	+58 49 08	f_{60}= 552.5, f_{100}= 712.90	well known high mass SF cluster weak secondary source and extended pedestal in the submm
IRAS 09452+1330	09:47:7.382	+13:16:43.66	f_{60}= 5652, f_{100}= 922	point-like at IRAC wavelengths IRC+10 216
NML Cyg	20:46:25.46	+40:06:59.6	f_{70}= 900	ISO-SWS calibrator

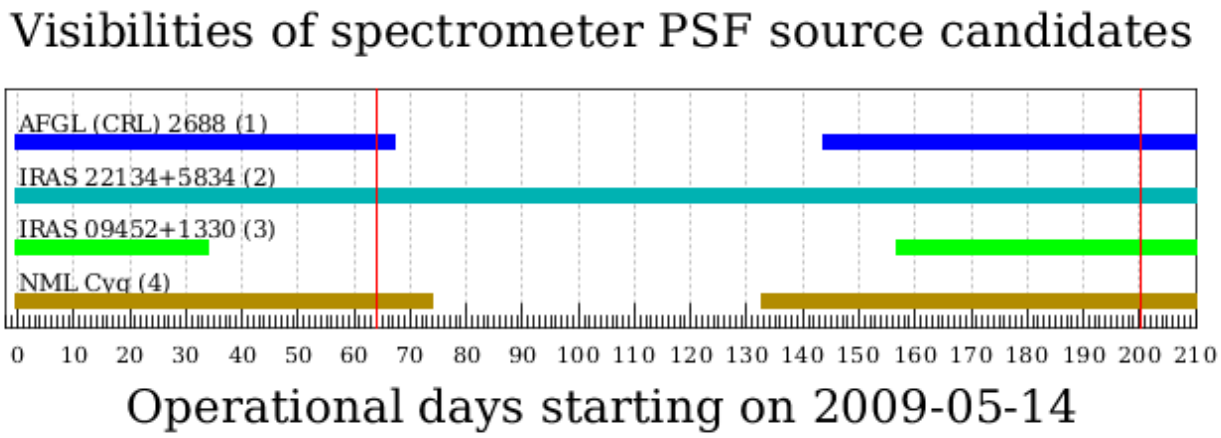


Figure 28: Visibilities of bright IR stars selected as candidates for suitable spectrometer PSF calibrators.

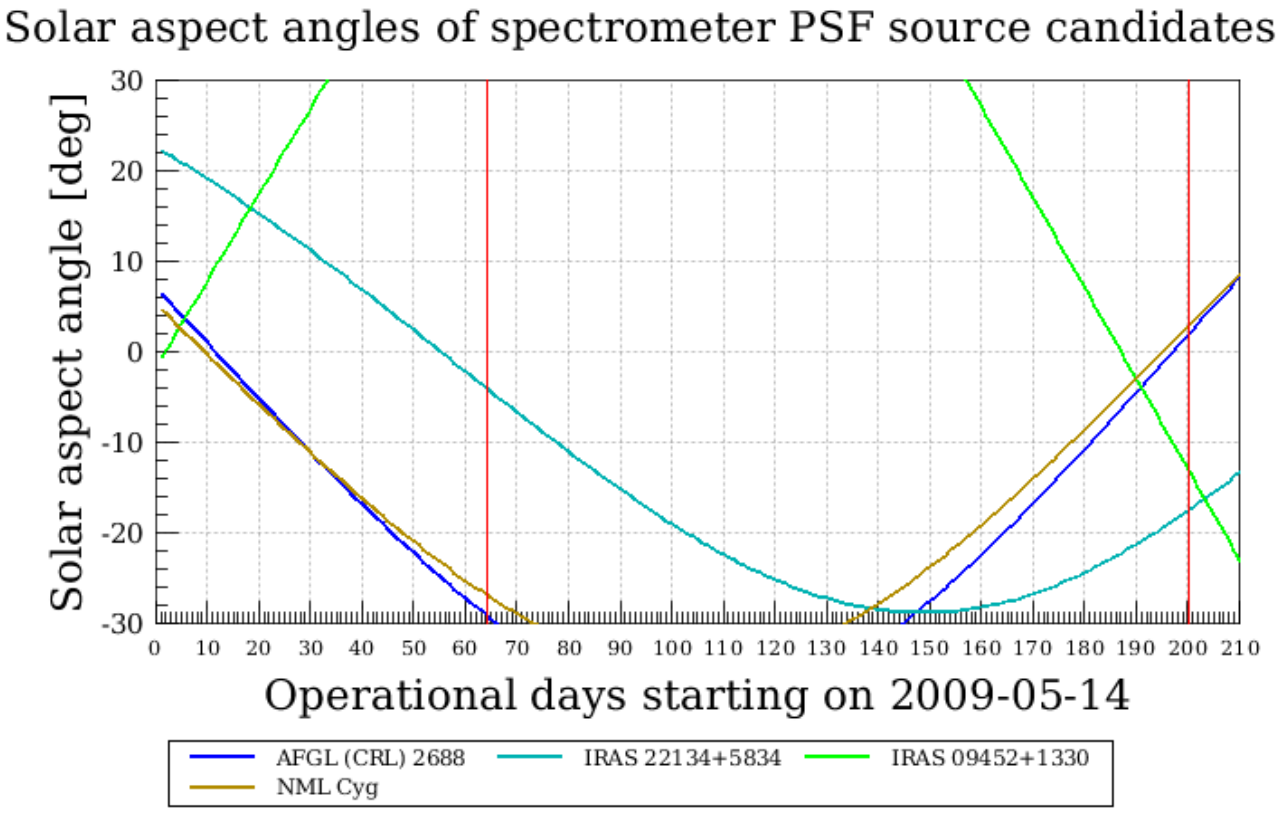


Figure 29: Solar aspect angles of bright IR stars selected as candidates for suitable spectrometer PSF calibrators.

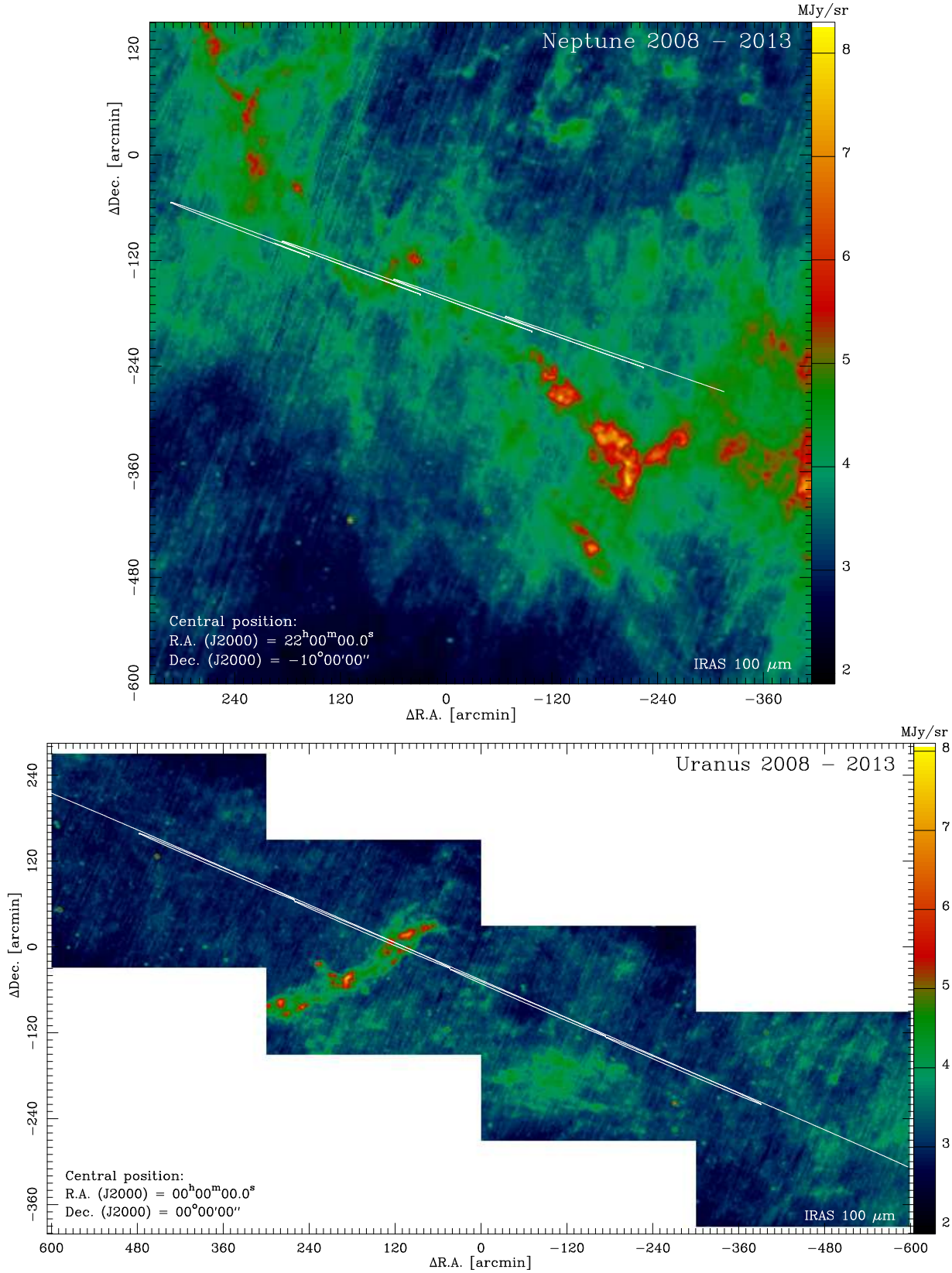


Figure 30: 100μm sky background for the photometric and PSF calibrators Neptune (top) and Uranus (bottom). The white lines indicate the tracks of the planets for the period 2008 – 2013. The background maps are IRAS Sky Atlas Maps with the Zodiacal Light subtracted.

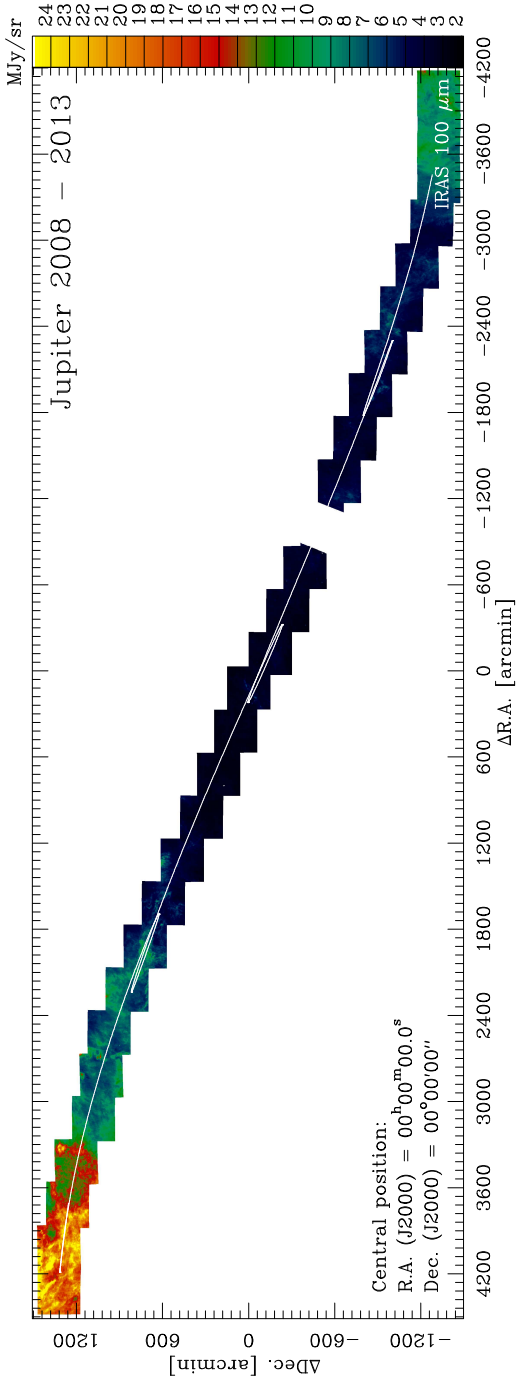


Figure 30: 100μm sky background for the spectral and stray-light calibrator Jupiter. The white line indicates the track of the planet for the period 2008 – 2013. The background maps are IRAS Sky Atlas Maps with the Zodiacal Light subtracted.

4.3 Wavelength Calibration Standards

Wavelength standards must have well identified, preferentially unblended lines (if blended, the relative intensity ratio should be known to calculate the effective central wavelength of the blended line).

As a starter wavelength calibrators used for calibrating the ISO LWS instrument may be used. These are bright PN and HII regions showing several of the strong FIR fine structure lines.

However the number of lines is limited and does not provide sufficient coverage for the various grating orders. A denser spectrum of lines are water emission lines in late type stars.

The gas planets Jupiter, Saturn, Uranus and Neptune provide a rich spectrum of molecular lines.

A special set of wavelength calibration sources are those with well known lines profiles, unresolved or measured with FIR Fabry-Perot instruments.

Spatial extent is an issue. For the PACS IFU we need some sources extended on a 1' scale to calibrate the 'smile and frown'. In addition, given that at short wavelengths we are not fully sampling the spatial PSF, there may be some of the classical spectral resolution differences point/extended. That means, ideally we need a range of source sizes from <2" to >≈1'.

4.3.1 ISO LWS wavelength calibrators

The LWS instrument on-board the ISO satellite covered a similar wavelength range, 43 to 197 µm, as the PACS spectrometer (57 to 210 µm). The spectral resolution $\frac{\lambda}{\Delta\lambda}$ was 150-200, i.e. a factor of 10-20 less than the PACS spectrometer will have.

The LWS wavelength standards were mainly Planetary Nebulae and HII regions (Table 11). They were chosen so as to provide the largest possible sample of lines and so that several of them were visible from ISO as much as possible during the mission (to provide a wavelength calibration stability monitoring). The PN NGC 6543 is located close to the ecliptic North Pole and is such visible during the whole Herschel mission. The lines used had to be strong enough to give good signal-to-noise and to be unresolved by the grating.

Table 11: LWS wavelength calibrators.

#	LWS calibrator name	other name	type (SIMBAD)	SWS obs
1	NGC 6543	IRAS F17584+6638 PN G096.4+29.9	PN	Y
2	NGC 6826	IRAS F19434+5024 PN G083.5+12.7	PN	Y
3	Gal298.2-00.3	IRAS 12073-6233	HII	Y
4	NGC 7023	IRAS F21009+6758	Open Cluster	Y
5	IRAS 15408-5356	GAL 326.65+00.59	HII	Y
6	NGC 7027	PN G084.9-03.4	PN	Y
7	NGC 6302	IRAS 17103-3702 PN G349.5+01.0	PN	Y
8	IRAS 23133+6050	GRS 111.62 +00.37	Emission Line star	Y

The main emission lines are listed in Table 12. For the PACS grating orders this means 3 lines for the 3rd order range, 1(!) line for the 2nd order range and 3 lines for the 1st order range. Target 7 probably also shows the [NII] 205.178 µm line. Intrinsic line shapes may be inferred from SWS observations of the same targets at shorter wavelengths (<45 µm), since SWS had a comparable spectral resolution to PACS. SWS and PACS do not really resolve the lines, typical line widths are ≈50 km s^{-1} meaning partial resolution at some wavelengths. On the other hand, this means that widths cannot be neglected for instrumental profile issues, one may need to specifically pick low linewidth targets for the highest spectral resolution ranges of PACS.

Table 12: Emission lines of LWS wavelength calibrators.

line id.	λ (µm)	sources
[OIII]	51.815	1,2,3,5,6,7
[NIII]	57.330	1,2,3,5,7
[OI]	63.184	3,4,5,6,7,8
[OIII]	88.356	1,2,3,5,6,7
[NII]	121.889	7
[OI]	145.525	3,4,5,6,7,8
[CII]	157.741	3,4,5,6,7,8

Some general properties of the wavelength calibrators like continuum flux levels and sizes are listed in Table 13.

Table 13: General properties of LWS wavelength calibrators.

#	IRAS fluxes f_{60} (Jy)	IRAS fluxes f_{100} (Jy)	LWS fluxes	optical size	FIR size
1	126	61	(2)	25″ diam. (bright core) 300″ diam. (faint halo) 19.″5 (1)	<52″ diam. @60 µm (ISOPHOT multi-aper)
2	47	20		25.″0 (1)	
3					
4	574	1100			X2101+679 (IRAS SSS) 2.3'@60, 4.6'@100 µm
5	10500	16800			IRAS PS CC_60: B
6				14.″0 (1)	
7	850	537		44.″5 (1)	
8	2110	2690			

(1) Strasbourg-ESO Catalogue of Galactic Planetary Nebulae (Acker+, 1992)
(2) A complete FIR SED of the object is presented in Klaas et al. (2006)

Further suitable PNe calibration sources, like NGC 40, IC 2501, NGC 5882, NGC 6572, NGC 7662 and NGC 3918 can be taken from ISO 95-015, Planetary nebulae to be used as ISO-SWS Astronomical Calibration Sources, by H.W.W. Spoon, K.A. van der Hucht, and D. Lutz.

4.3.2 Water line stars

Table 14 includes oxygen rich late type stars with a rich water emission line spectrum (Fig. 31). Preference was given towards objects with low expansion velocity (for more details on the selection criteria see PICC-ME-TN-013 by D. Lutz). The visibility of the water line stars is shown in Fig. 32.

Table 14: Oxygen rich late type stars with a rich water emission line spectrum.

Source	Coordinates (J2000)		$S_{100\,\mu m}$	v_{exp}	v_{LSR}
	R. A.	Dec.	(Jy)	(km/s)	(km/s)
R Leo	09:47:33.44	+11:25:45.8	39	4	-2.5
R Crt	11:00:33.95	-18:19:28.9	20	11	+11
W Hya	13:49:02.00	-28:22:03.5	72	10	+40
R Aql	19:06:22.13	+08:13:51.3	<83	5	+48
R Cas	23:58:24.87	+51:23:19.7	39	12	+25

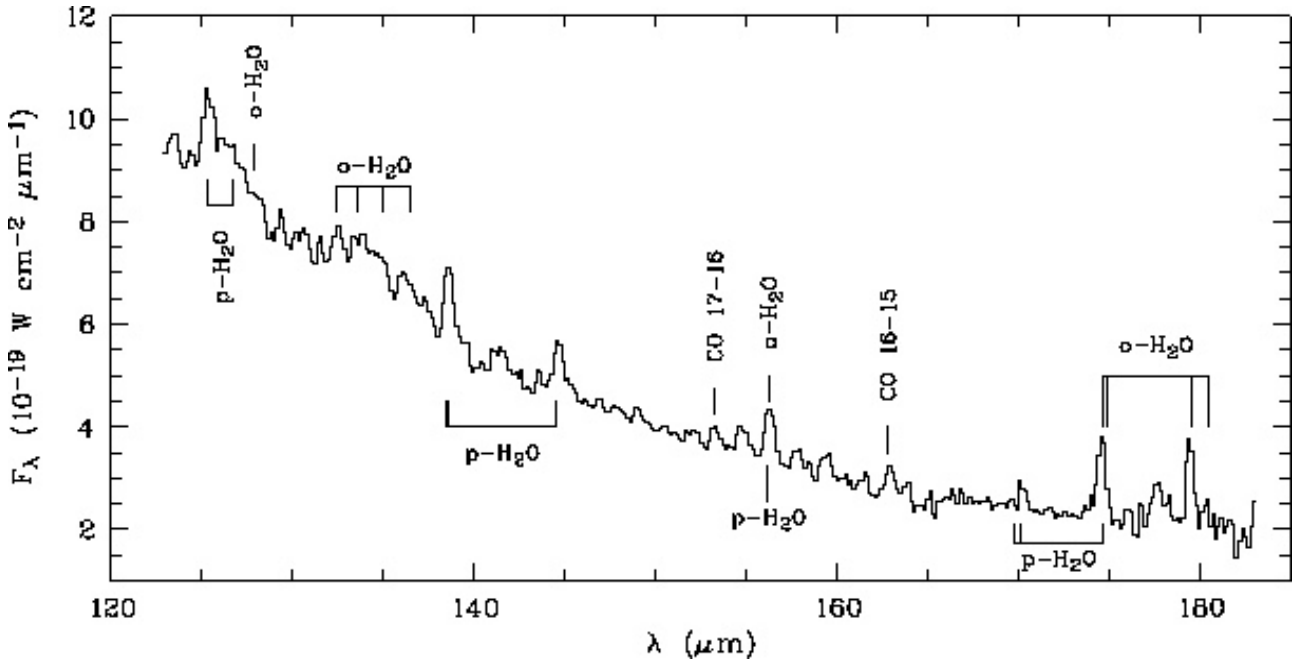


Figure 31: Water line emission spectrum of W Hya obtained with ISO LWS (Barlow et al., 1996).

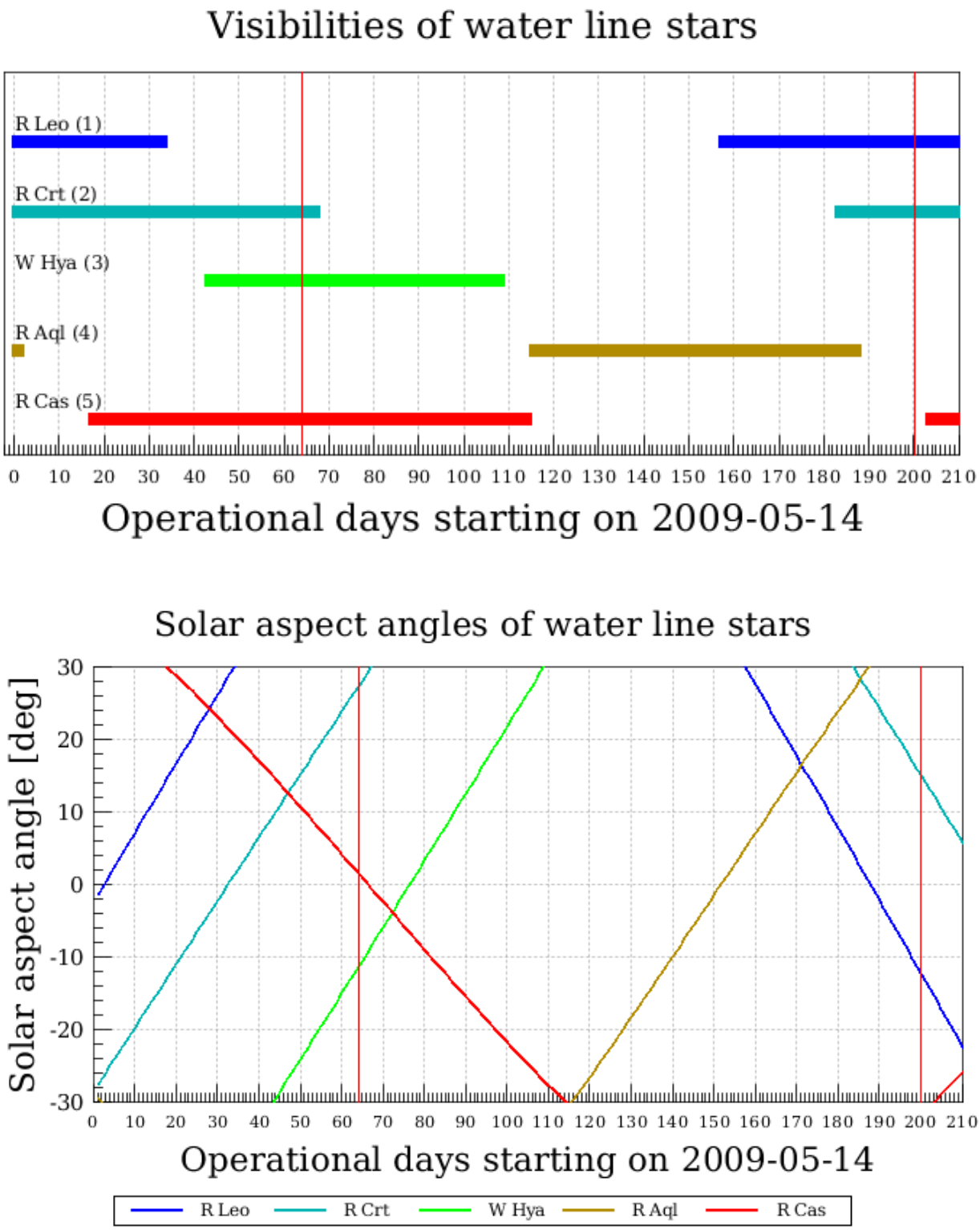


Figure 32: Visibilities and solar aspect angles of the water emission line stars to be used as wavelength calibrators.

4.3.3 Gas planets

Table 15 provides an overview on the molecular line spectra of the gas planets, an example is shown for Saturn in Fig. 35. Jupiter appears to be a very favourable wavelength calibration source, because it fills the full PACS spectrometer beam with its maximum apparent size, such achieving the wavelength calibration for all spatial pixels in one run. The visibility of the planets is shown in Fig. 33.

Table 15: Properties of the gas planets for wavelength calibration.

Planet	absorption type spectrum	size (")(1)	continuum flux (Jy)
Neptune	H_2O	2.0–2.2	
Uranus	H_2O	3.1–3.7	
Saturn	H_2O, NH_3, PH_3	15–21	
Jupiter	H_2O, NH_3, PH_3	30–50	

(1) apparent diameter from Earth

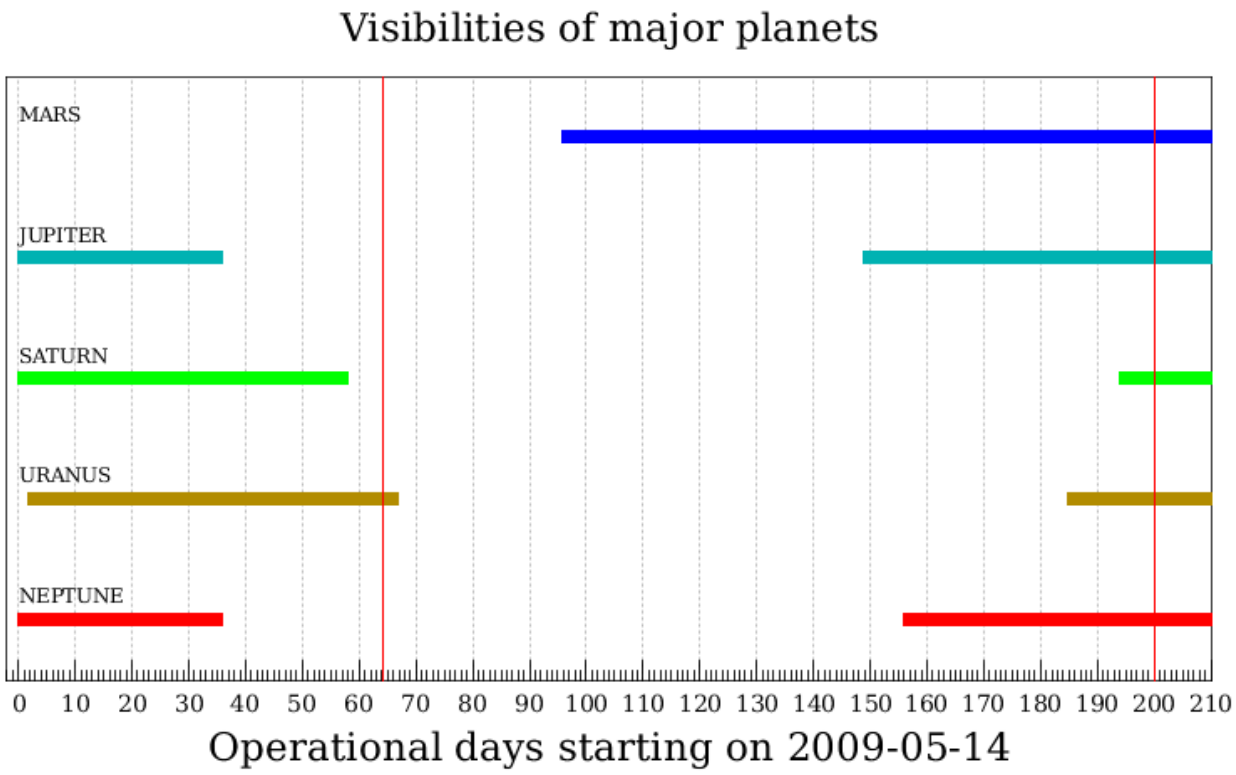


Figure 33: Visibilities of the planets to be used as wavelength calibrators.

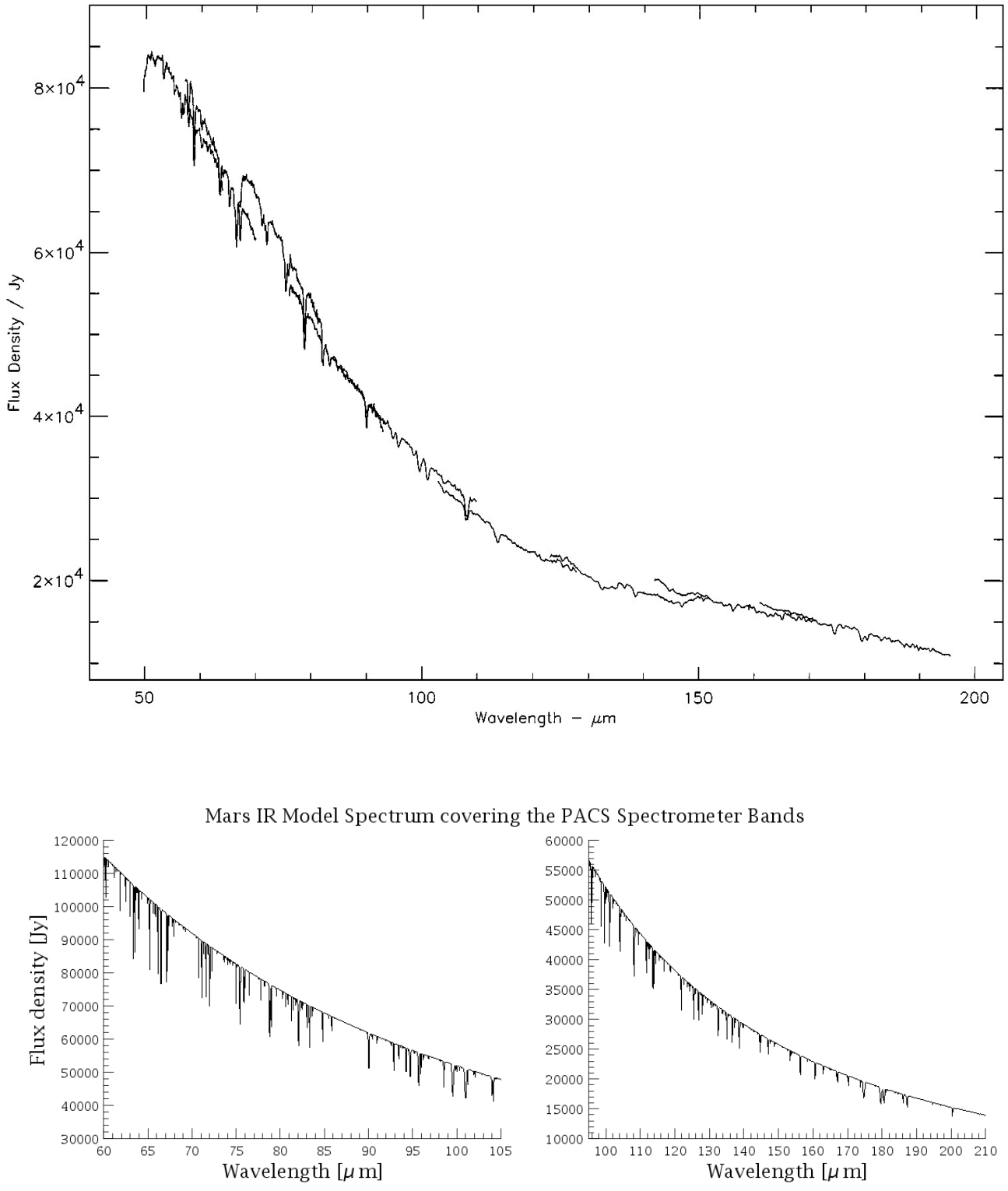


Figure 34: Measured LWS FIR spectrum of Mars (Sidher et al., 2000, upper panel) and synthetic model spectrum (Moreno, 2008, lower panel).

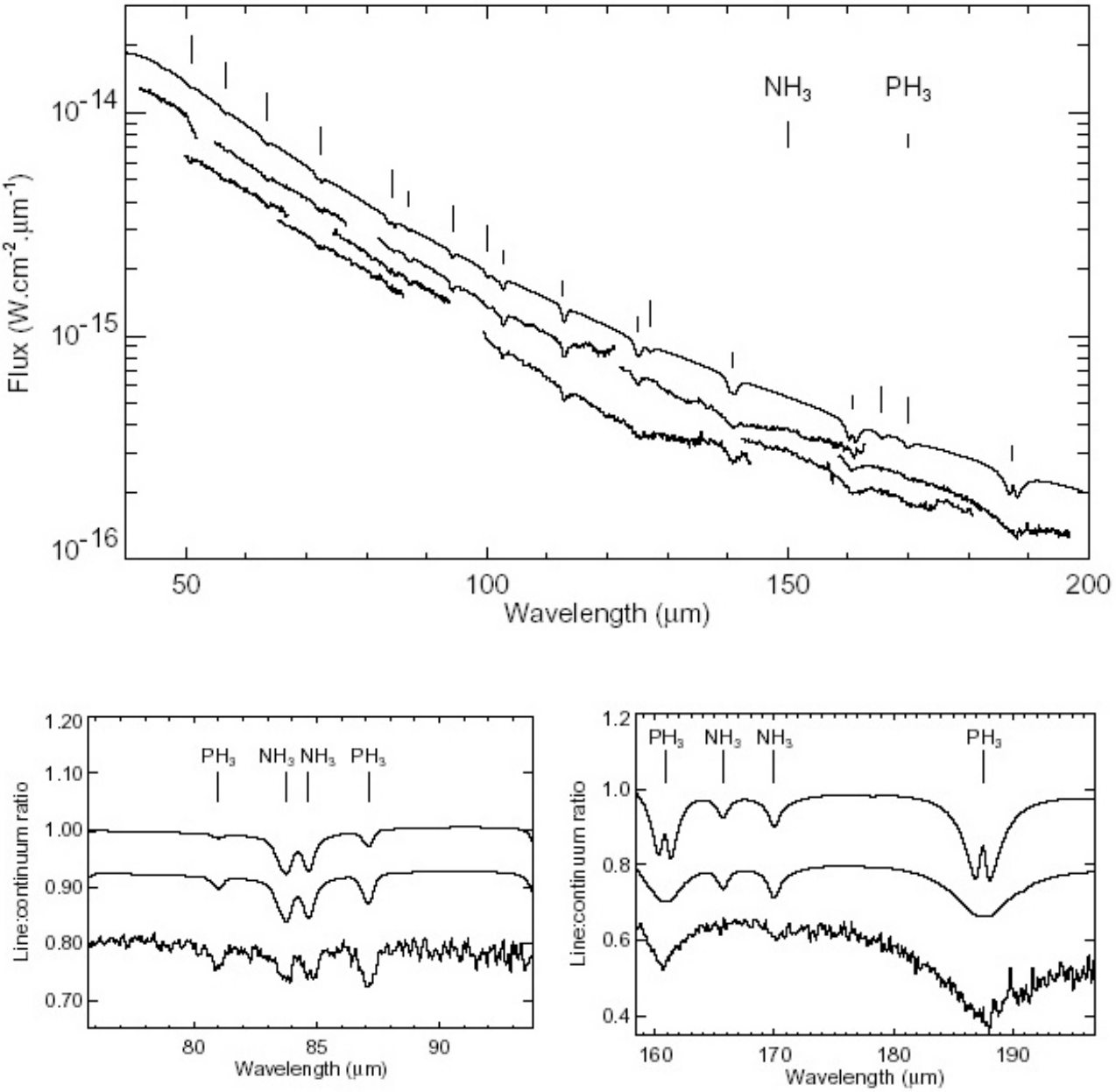


Figure 35: Synthetic and measured LWS FIR spectrum of Saturn (Davis et al., 1996) showing the NH_3 (long dash) and PH_3 (short dash) features. The lower panels show the line-to-continuum ratio in enlargements of certain wavelength areas.

Further references:

- Sidher, S. D., Griffin, M. J., Davis, G. R., et al. 2000, Icarus 147, 35
  "ISO LWS Observations of Mars-Detection of Rotational Modulation in the Far Infrared":
  - Mars spectrum between 43 and 196 µm
- Oldham, P.G., Griffin, M.J., Davis, G.R., et al. 1997, ESA SP-401, 325
  "ISO LWS Far-Infrared Observations of Jupiter and Saturn":
  - Jupiter spectrum between 55 and 90 µm
  - Saturn spectrum in the vicinity of the methane lines at 106, 120, and 137 µm
- Burgdorf, M.J., Orton, G.S., Encrenaz, T., et al. 2004, Advances in Space Research 34, 2247
  "Far-infrared spectroscopy of the giant planets: measurements of ammonia and phosphine at Jupiter and Saturn and the continuum of Neptune"
  - Jupiter ammonia feature at 101 µm and phosphine feature at 141 µm
  - Saturn ammonia features at 94, 96, and 101 µm
  - Brightness temperature continuum spectrum of Neptune
- Burgdorf, M.J., Orton, G.S., Davis, G.R., et al. 2003, Icarus 164, 244
  "Neptune's far-infrared spectrum from the ISO long-wavelength and short-wavelength spectrometers"
  - Brightness temperature spectrum of Neptune's disk

4.3.4 Line profile/flux calibrators

CO line sources

AGB stars and (P)PNe with narrow intrinsic CO line widths (10 – 20 km s^{-1}) are ideal line profile (instrumental profile) and line flux calibrators. Table 16 compiles fluxes measured by Justtanont et al., A&A 360, 1117-1125 (2000) for 3 C-rich targets, their continuum subtracted spectra are shown in Fig. 36.

Table 16: CO transition line fluxes for the two C-rich post-AGB objects AFGL 2688 and AFGL 618 as well as for the C-rich PN NGC 7027 (after Justtanont et al. 2000, A&A 360, 1119).

transition	λ	line flux ($\times 10^{-19}$ W cm^{-2})		
	(μm)	AFGL 2688	AFGL 618	NGC 7027
J=14-13	186.00	4.8±0.2	3.1±0.9	2.0±0.1
J=15-14	173.63	4.7±0.2	3.3±0.6	1.7±0.1
J=16-15	162.81	4.5±0.3	4.2±0.7	1.6±0.1
J=17-16	153.27	4.0±0.3	3.6±0.4	1.1±0.1
J=18-17	144.78	5.0±0.7	3.8±1.2	1.1±0.2
J=19-18	137.20	5.8±0.5	3.8±0.7	1.2±0.1
J=20-19	130.37	5.0±0.8	4.0±0.9	1.0±0.1
J=21-20	124.19	4.8±0.9	3.5±1.0	0.7±0.1
J=22-21	118.58	3.6±0.6	3.6±0.7	0.3±0.1
J=23-22	113.46	2.9±0.5	2.9±0.5	0.5±0.1
J=24-23	108.76	3.1±0.5	3.6±0.5	0.7±0.1
J=25-24	104.44	2.6±0.6	4.6±0.4	0.5±0.1
J=26-25	100.46	2.3±0.7	3.2±0.4	0.7±0.1
J=27-26	96.77	1.8±0.8	4.1±1.0	0.5±0.1
J=28-27	93.35		2.8±1.0	
J=29-28	90.16		3.8±2.0	
J=30-29	87.19		2.4±1.4	
J=31-30	84.41		1.1±1.3	
J=32-31	81.81		6.6±2.6	
J=33-32	79.36		1.9±1.3	
J=34-33	77.06		2.6±1.4	
J=35-34	74.89		2.3±1.3	
J=36-35	72.84		3.2±1.3	
J=37-36	70.91		3.1±2.8	

Fine structure lines of PNe

Fine structure line fluxes of 50 PN and PPN have been compiled by Liu et al. (2001), MNRAS 323, 343–361.

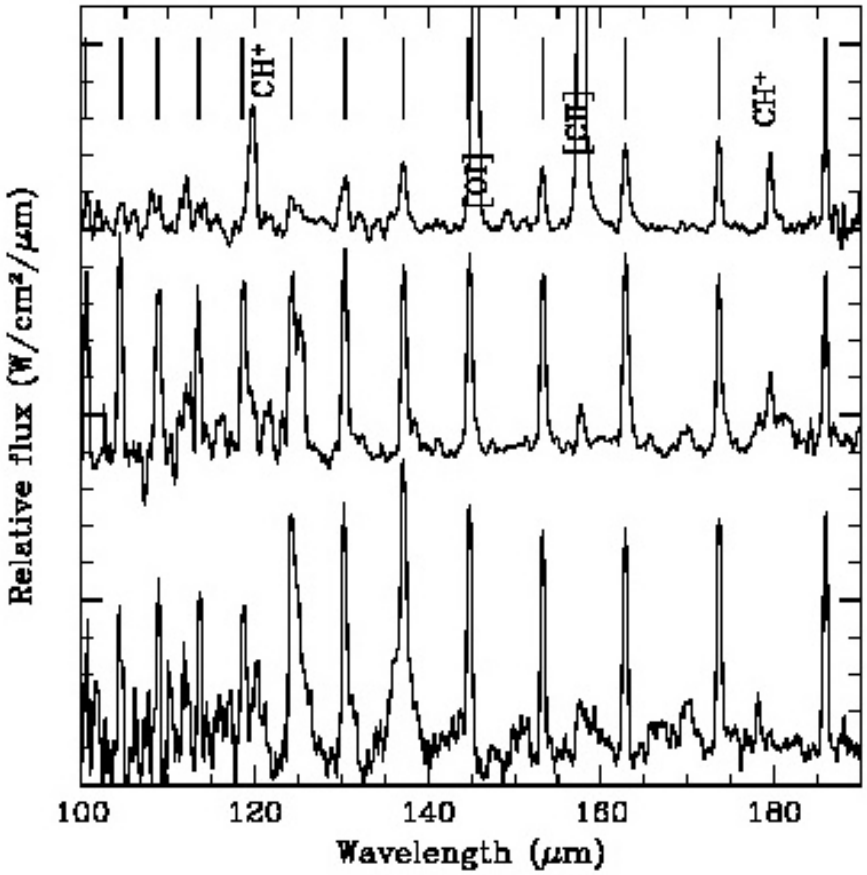


Figure 36: Continuum subtracted spectra of NGC 7027 (top), AFGL 618 (middle) and AFGL 2688 (bottom) with CO positional line positions from J=14-13 to J=26-25 marked as vertical bars (Justtanont et al., 2000).

Galaxies

Galaxies exhibit both emission line spectra, e.g. M 82 (Fig. 37), Arp 299, Cen A, NGC 253, and rich molecular absorption line spectra, e.g. Arp 220 (Fig. 38), Mrk 231, or mixed spectra, like NGC 4945, which can also have considerable line width.

For visibilities of Arp 220 and M 82, see Fig. 39.

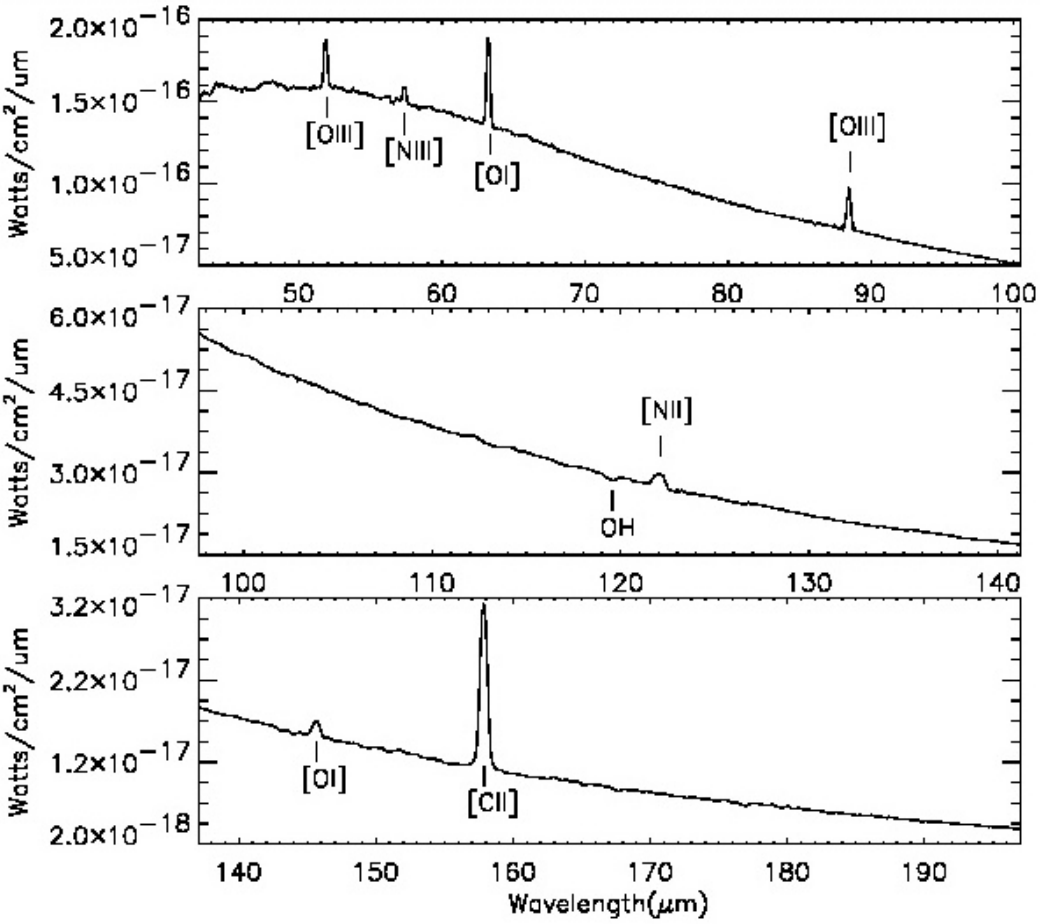


Figure 37: FIR spectrum of M 82 (Colbert et al., 1999, ApJ 511, 721). Fine structure emission lines of [OIII] 52 µm, [NIII] 57 µm, [OI] 63 µm, [OIII] 88 µm, [NII] 122 µm, [OI] 145 µm, and [CII] 158 µm.

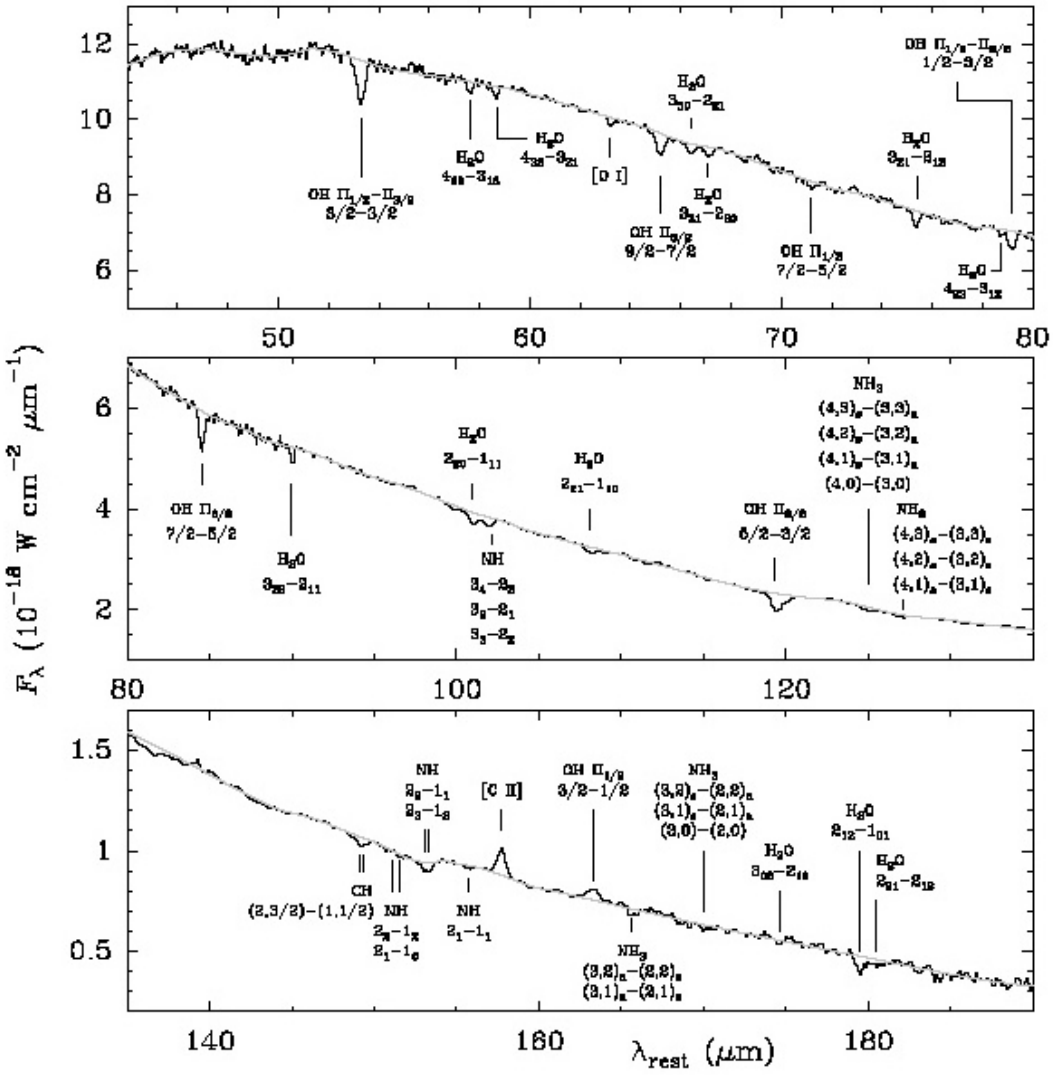


Figure 38: FIR spectrum of Arp 220 (González-Alfonso et al., 2004, ApJ 613, 247). Molecular absorption lines of OH, H_2O, CH, NH, NH_3, absorption in the fine structure line [OI] 63 μm and emission in [CII] 158 μm.

Further references:

- Brauher, J.R., Dale, D.A., and Helou, G., 2008, ApJS 178, 280
  "A compendium of far-infrared line and continuum emission for 227 galaxies observed by the Infrared Space Observatory"
  - [OIII] 52 µm, [NIII] 57 µm, [OI] 63 µm, [OIII] 88 µm, [NII] 122 µm, [OI] 145 µm, and [CII] 158 µm fine structure lines.
  - Molecular lines of OH at 53, 79, 84, 119, and 163 µm.
  - Molecular lines of H_2O at 58, 66, 75, 101, and 108 µm.
  - Continuum fluxes at 52, 57, 63, 88, 122, 145, 158, and 170 µm.
- Fischer, J., Lord, S.D., Unger, S.J., et al. 1999, ESA SP-427, 817
  "An LWS spectroscopic survey of infrared-bright galaxies"
  - Overview on and comparison of different galaxy spectra
- Fischer, J., Luhman, M.L., Satyapal, S., et al. 1999, Ap&SS 266, 91
  "An LWS spectroscopic survey of infrared-bright galaxies"
  - Overview on and comparison of different galaxy spectra w.r.t. ionic/atomic fine structure emission versus atomic/molecular absorption
- Harvey, V.I., Satyapal, S., Luhman, M.L., et al. 1999, ESA SP-427, 889
  "Far-infrared spectroscopy and near-infrared imaging of the ultraluminous Seyfert 1 galaxy Mrk 231"
  - Molecular absorption line spectrum of Mrk 231
- Bradford, C.M., Stacey, G.J., Fischer, J.A., et al. 1999, ESA SP-427, 861
  "ISO spectroscopy of OH in the starburst galaxy NGC 253"
  - FIR OH rotational transitions 79.1 and 163 µm in emission, 119 µm in absorption
  - OH 119 µm doublet
- Stacey, G.J., Swain, M.R., Bradford, C.M., et al. 1999, ESA SP-427, 973
  "Far-infrared spectroscopic images of M 83"
  - Line maps of [OI] 63 µm, [OIII] 88 µm, [NII] 122 µm, [OI] 145 µm, and [CII] 158 µm fine structure lines.

4.4 Astrometric Standards

4.4.1 Pointing Calibrators

Initial Alignment

In order to achieve an initial coarse alignment of the PACS bolometers, a list of bright FIR sources selected from the IRAS faint source catalogue has been compiled as provided in Tab. 17. Their visibilities for a launch date of 1st January 2009 are given in Fig. 39. Fig. 40 provides the evolution of solar aspect angles with time during the commissioning and PV phases.

Table 17: A list of IRAS FSC sources that are suited as "bright isolated" objects for the initial location of the PACS bolometers.

IRAS FSC	Name	Coordinates (J2000)		$S_{60\,\mu m}$	Type
		R.A.	Dec.	(Jy)	
F00450-2533	NGC 253	0:47:33.12	-25:17:17.6	784	Galaxy
F01038+1219	RAFGL 157	1:06:25.98	12:35:53.0	212	OH/IR
F02168-0312	Mira	2:19:20.79	-2:58:39.5	283	Mira
F03419+6756	IC 342	3:46:48.51	68: 5:46.0	84	Galaxy
F03507+1115	IK Tau	3:53:28.84	11:24:22.6	319	Mira
F04361-6210	R Dor	4:36:45.59	-62: 4:37.8	232	Mira
F05251-1244	IC 418	5:27:28.20	-12:41:50.3	100	PN
F06107+7822	NGC 2146	6:18:37.71	78:21:25.3	131	Galaxy
F06176-1036	Red Rectangle	6:19:58.22	-10:38:14.7	168	Post-AGB
F07120-4433	L2 Pup	7:13:32.32	-44:38:23.1	88	semi-regular
F08440+1803	PN G208.5+33.2	8:46:53.51	17:52:45.5	87	PN
F09116-2438	CQ Pyx	9:13:54.09	-24:51:21.1	82	Carbon
F09448+1139	R Leo	9:47:33.49	11:25:43.6	114	MIRA
F09452+1330	IRC+10216	9:47:57.38	13:16:43.7	4810	AGB
F09517+6954	M 82	9:55:52.73	69:40:45.8	1090	Galaxy
F10131+3049	RW LMi	10:16:02.27	30:34:18.6	256	Mira
F10257-4339	NGC 3256	10:27:51.27	-43:54:13.8	88	Galaxy
F10491-2059	V Hya	10:51:37.25	-21:15:00.3	101	Mira
F13025-4912	NGC 4945	13: 5:27.48	-49:28:05.6	359	Galaxy
F13269-2301	R Hya	13:29:42.78	-23:16:52.8	85	Mira
F13340-2937	M 83	13:37:00.95	-29:51:55.5	100	Galaxy
F13461-2807	W Hya	13:49:02.00	-28:22:03.5	190	semi-regular
F15327+2340	Arp 220	15:34:57.12	23:30:11.5	104	Galaxy
F17028-1004	Butterfly	17:05:37.95	-10: 8:34.6	124	PN
F17123+1426	α Her	17:14:38.86	14:23:25.2	81	semi-regular
F17436+5003	V814 Her	17:44:55.47	50: 2:39.5	141	Post-AGB
F17585+6638	NGC 6543	17:58:33.42	66:37:59.5	126	PN
F18096+0652	NGC 6572	18:12:06.36	6:51:13.0	96	PN
F18239+2326	V1076 Her	18:26:05.84	23:28:46.7	89	Carbon
F18595-3947	CGCS 6766	19:03:01.83	-39:42:57.1	120	Carbon
F20077-0625	V1300 Aql	20:10:27.87	-6:16:13.6	203	OH/IR
F21014-1133	NGC 7009	21:04:10.88	-11:21:48.3	87	PN
	NGC 7027	21:07:01.59	42:14:10.2	400	PN
F23167+1655	LL Peg	23:19:12.39	17:11:35.4	244	Mira
F23320+4316	LP And	23:34:27.66	43:33:02.4	105	Variable
F23558+5106	R Cas	23:58:24.87	51:23:19.7	96	Mira

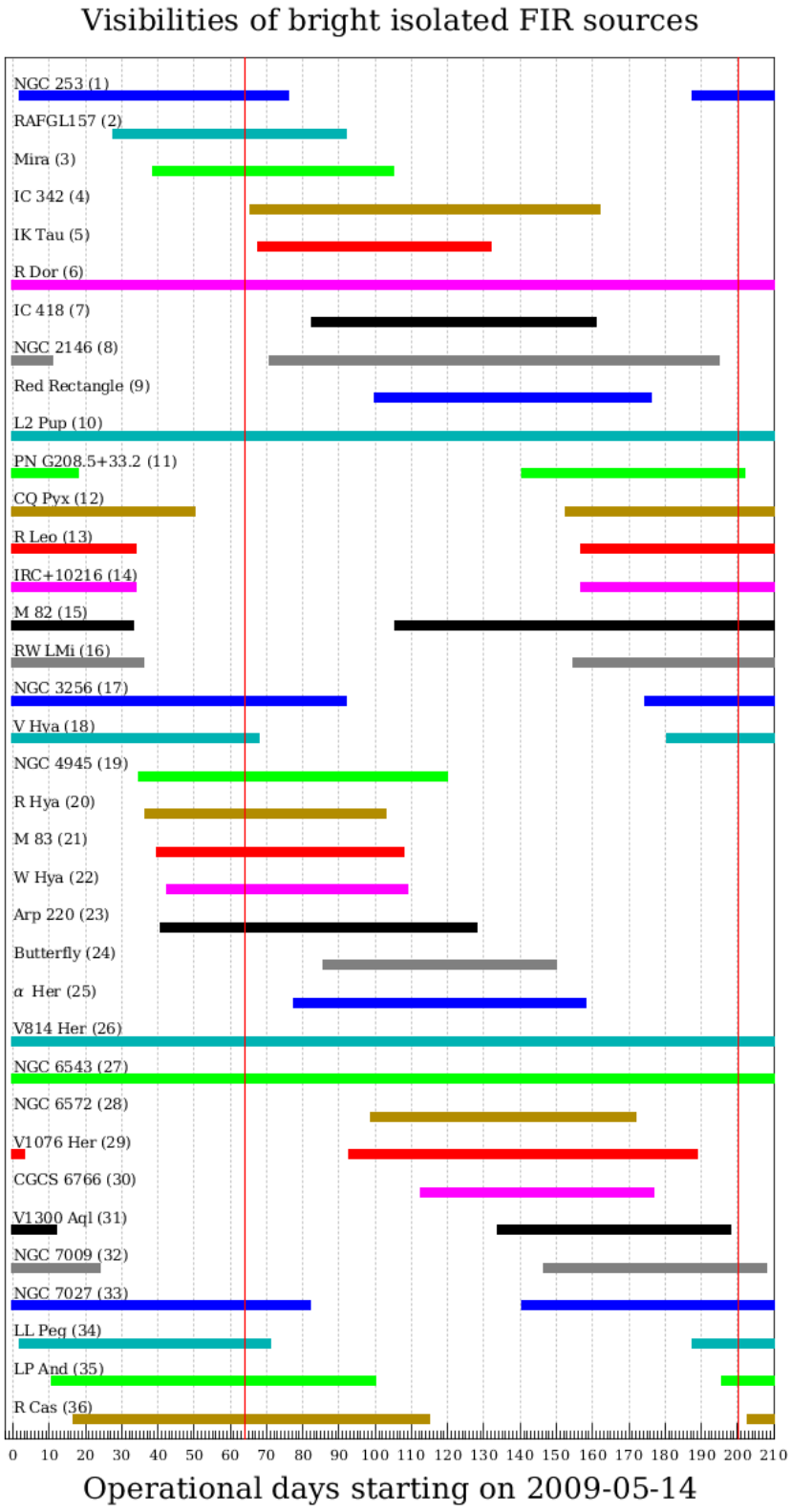


Figure 39: Visibilities of the bright FIR sources to be used as initial astrometric calibrators.

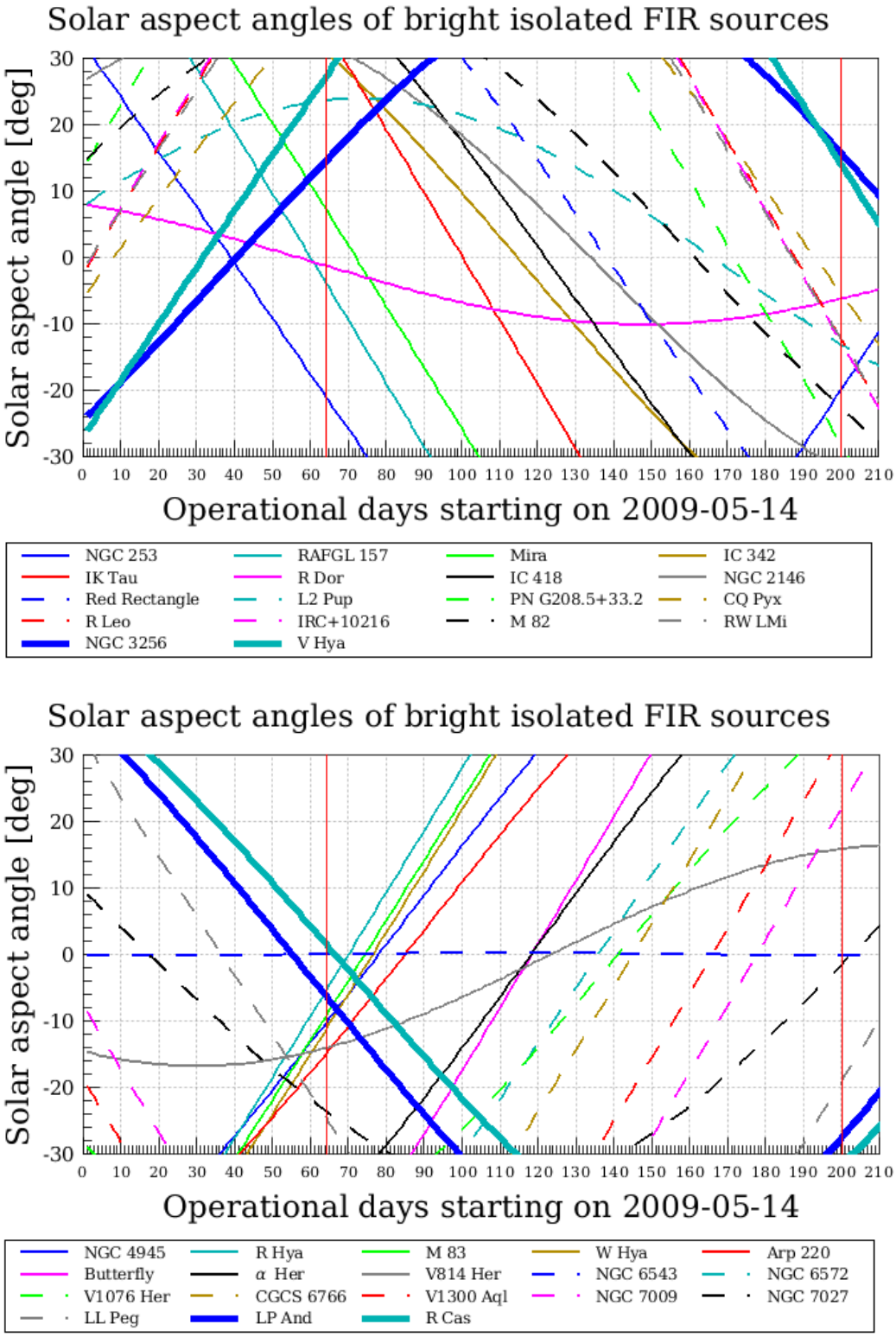


Figure 40: Solar aspect angles of the bright FIR sources.

Pointing Calibration

For verification of the telescope pointing accuracy, a network of compact – but not necessarily point-like – FIR sources with accurate positions is needed allowing to check the S/C pointing for a statistical sample under different solar elongation angles within a short time frame. An elaborated list of $\sim$ 1000 of such objects has been compiled for this purpose comprising 934 stars as well as blazars, QSOs, radio galaxies, and ULIRGs (see PICC-MA-TN-003). A statistical overview on the distribution of the stars is given in Tab. 18.

Table 18: Distribution of expected flux densities at 70 µm of the complete stellar pointing source list.

F(70 µm) [Jy]	≥ 10	]10,5]	]5,1]	]1,0.5]	]0.5,0.16]	Total
single and photospheric only	7	8	90	122	255	482
all stars	59	56	304	186	329	934

The 59 brightest stellar pointing sources with expected flux densities of ≥ 10 Jy at 70 µm are provided in Tab. 19. Their visibilities and solar aspect angles are presented in Fig. 42. The celestial coverage of the complete stellar pointing source list of 934 objects in ecliptic coordinates is shown in Fig. 41.

Table 19: The 59 brightest pointing stars obtained from a cross-check between *HIPPARCOS* and *IRAS PSC* catalogues as listed in PICC-MA-TN-003. The first column of the table contains a name from the *HIPPARCOS* or the *Combined General Catalogue of Variable Stars (CGVS)*. We also provide the *IRAS PSC* designation, the spectral type, equatorial coordinates in the ICRS system, proper motions and an expected flux density at 70 µm. The flags indicate: b (high background), m (multiple), e (FIR excess).

Name	IRAS	Spectral type	Coordinates (J2000.0) Epoch 2000.0 R.A.	Dec.	Proper motion ΔR.A. [mas/yr]	ΔDec. [mas/yr]	expected F(70 µm) [mJy]	Flags		
HIP 1834	00205+5530	M7e	00:23:14.27	+55:47:33.2	20.8	-9.8	14982	b		e
HIP 1901	00213+3817	Se...	00:24:01.95	+38:34:37.3	-16.3	-35.0	14414		m	e
HIP 9234	01556+4511	M7III	01:58:44.33	+45:26:06.9	39.5	1.4	25124			e
HIP 10826	02168-0312	M7	02:19:20.79	-02:58:39.5	10.3	-239.5	187347		m	e
HIP 11093	02192+5821	M4.5Iab:	02:22:51.72	+58:35:11.4	2.3	-3.1	22005	b	m	e
HIP 13502	02522-5005	M7IIIe	02:53:52.77	-49:53:22.7	131.2	35.7	29178			e
HIP 19004	04020-1551	M5/M6IV	04:04:18.80	-15:43:30.5	-3.4	-13.8	14990			e
HIP 19424	04140-8158	M3	04:09:35.89	-81:51:17.6	4.4	15.5	14137		m	e
HIP 21421	04330+1624	K5III	04:35:55.24	+16:30:33.5	62.8	-189.4	14201	b	m	
HIP 21479	04361-6210	M8IIIe	04:36:45.59	-62:04:37.8	-68.5	-71.2	140895		m	
HIP 23203	04573-1452	CIIe...	04:59:36.35	-14:48:22.5	7.0	-2.5	12642			
HIP 24645	05132+5331	M7III	05:17:17.69	+53:35:10.0	2.3	-14.7	14694	b	m	e
HIP 27989	05524+0723	M2Iab:	05:55:10.31	+07:24:25.4	27.3	10.9	162961	b	m	e
HIP 28041	05528+2010	M8III	05:55:49.17	+20:10:30.7	-13.6	-6.2	22780	b		e
HIP 28874	06036-2411	M5III	06:05:45.55	-24:11:44.1	9.1	-21.7	11153			e
HIP 30800	06259-1301	Bpshe	06:28:17.42	-13:03:11.1	2.3	-0.0	13487	b		e
HIP 37677	07418-2850	A3Iab:	07:43:48.47	-28:57:17.4	-4.6	3.9	13898	b		e
HIP 37819	07434-3750	K2.5Ib-II	07:45:15.30	-37:58:06.9	-10.8	6.0	25627	b		e
HIP 40534	08138+1152	M7IIIe	08:16:33.83	+11:43:34.5	5.1	-11.7	10069			e
HIP 45058	09076+3110	M6IIIase	09:10:38.80	+30:57:47.3	-9.4	-33.1	18643			e
HIP 46806	09309-6234	M6.5IIIpev	09:32:14.60	-62:47:19.9	-36.2	19.7	14442	b	m	
HIP 47886	09425+3444	M7e	09:45:34.28	+34:30:42.8	3.7	-7.0	15283			e
HIP 48036	09448+1139	M8IIIe	09:47:33.49	+11:25:43.6	-0.6	-42.7	61984	b		
HIP 53085	10491-2059	C...	10:51:37.25	-21:15:00.3	-14.2	2.7	48661		m	e
HIP 53809	10580-1803	M7III...	11:00:33.85	-18:19:29.6	-27.5	-1.7	27962		m	e
HIP 57607	11461-3542	M7III	11:48:39.22	-35:59:12.9	-9.8	-6.6	17445			e
HIP 61084	12283-5650	M3.5III	12:31:09.96	-57:06:47.6	27.9	-264.3	20181	b	m	
HIP 63642	13001+0527	M8III	13:02:37.98	+05:11:08.4	37.6	-18.0	21289			e
HIP 64569	13114-0232	M7III	13:14:04.38	-02:48:25.1	-34.5	-3.3	29360	b		e
HIP 65835	13269-2301	M7IIIe	13:29:42.78	-23:16:52.8	-60.7	11.0	51964	b	m	e
HIP 67419	13462-2807	M7e	13:49:02.00	-28:22:03.5	-49.1	-59.6	108845	b	m	
HIP 68815	14003-7633	M6.5III:	14:05:19.88	-76:47:48.3	-87.4	-31.2	30511	b		e

Table 19: continued.

Name	IRAS	Spectral type	Coordinates (J2000.0) Epoch 2000.0 R.A.	Dec.	Proper motion ΔR.A. [mas/yr]	ΔDec. [mas/yr]	expected $F(70\,\mu m)$ [mJy]	Flags
HIP 69673	14133+1925	K1.5III	14:15:39.67	+19:10:56.7	-1093.4	-1999.4	14643	m
HIP 70401	14219+2555	M7.5	14:24:11.63	+25:42:13.4	21.7	-49.7	38503	e
HIP 75143	15193+3132	M7e	15:21:23.96	+31:22:02.6	-8.3	-11.6	11121	e
WX Ser	15255+1944	M8.5	15:27:47.04	+19:33:51.7	2.3	9.3	12014	e
HIP 78574	16011+4722	M8	16:02:39.17	+47:14:25.3	-67.8	64.5	22037	e
HIP 80488	16235+1900	M7III	16:25:47.47	+18:53:32.9	-16.8	-9.8	15810	
HIP 80704	16269+4159	M6III	16:28:38.55	+41:52:54.0	29.2	-5.5	13405	
HIP 84071	17080-3215	M4III:	17:11:17.02	-32:19:30.7	-2.8	-4.1	36483	b e
HIP 87668	17513-2313	M5	17:54:26.13	-23:14:09.7	2.0	-0.2	14504	b e
HIP 91389	18359+0847	K1III+...	18:38:21.13	+08:50:02.8	-13.8	27.2	12991	b m
HIP 95413	19232+5008	M7IIIv	19:24:33.07	+50:14:29.1	-6.8	-19.8	13793	e
HIP 97629	19486+3247	S...	19:50:33.92	+32:54:50.6	-23.6	-38.5	43531	b m
HIP 98031	19510-5919	M7IIe	19:55:13.97	-59:11:44.3	16.6	-44.5	17476	e
HIP 99082	20038-2722	M7III...	20:06:55.24	-27:13:29.8	24.1	-45.2	14909	b e
HIP 99512	20075-6005	M6/M7III:p	20:11:45.86	-59:56:12.8	28.5	-9.8	26796	e
HIP 100935	20248-2825	M7III...	20:27:55.19	-28:15:39.8	-4.6	13.3	17885	b e
HIP 102082	20396+4757	N...	20:41:18.27	+48:08:28.8	-6.4	-12.6	24451	b
HIP 104252	21044-1637	M6/M7III	21:07:15.43	-16:25:21.4	2.7	-26.5	10083	b e
HIP 106642	21341+4508	M4III	21:36:02.50	+45:22:28.5	64.4	1.9	12553	b e
HIP 107516	21439-0226	M8IIIv	21:46:31.85	-02:12:45.9	27.0	20.5	27825	e
HIP 108928	22017+2806	M7.5IIIv	22:03:59.51	+28:20:54.2	14.4	-5.4	12979	e
HIP 109070	22035+3506	M7	22:05:42.09	+35:20:54.5	13.9	-8.8	13281	e
HIP 110478	22196-4612	S...	22:22:44.21	-45:56:52.6	27.9	-10.9	41597	m e
HIP 112122	22396-4708	M5III	22:42:40.05	-46:53:04.5	135.7	-4.5	22227	
HD 216692	22525-2952	M7III...	22:55:19.69	-29:36:44.8	27.4	-33.0	10139	e
HIP 117054	23412-1533	M7IIIpev	23:43:49.46	-15:17:04.2	33.0	-32.6	43462	
HIP 118188	23558+5106	M7IIIe	23:58:24.87	+51:23:19.7	84.4	18.1	54091	m e

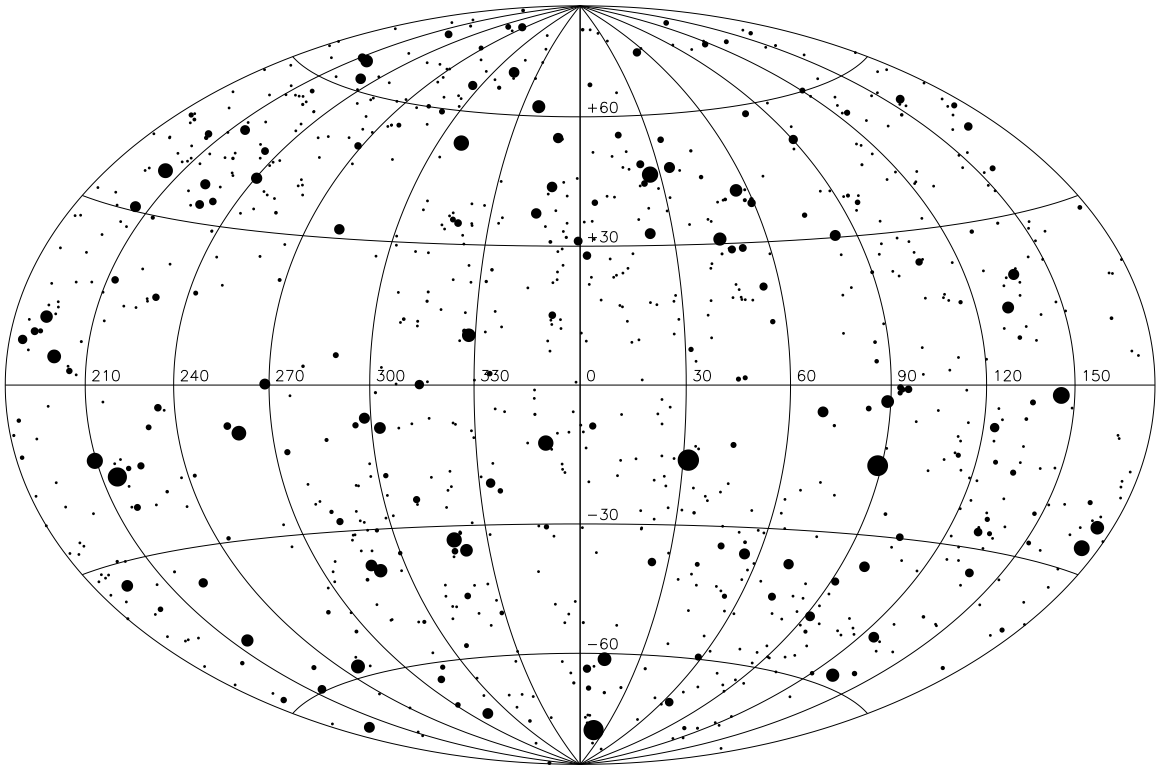


Figure 41: Distribution of the 934 pointing stars across the sky. The coordinates are in ecliptic longitude and latitude. The size of the dots represents the FIR brightness at 70 µm as given in the source list.

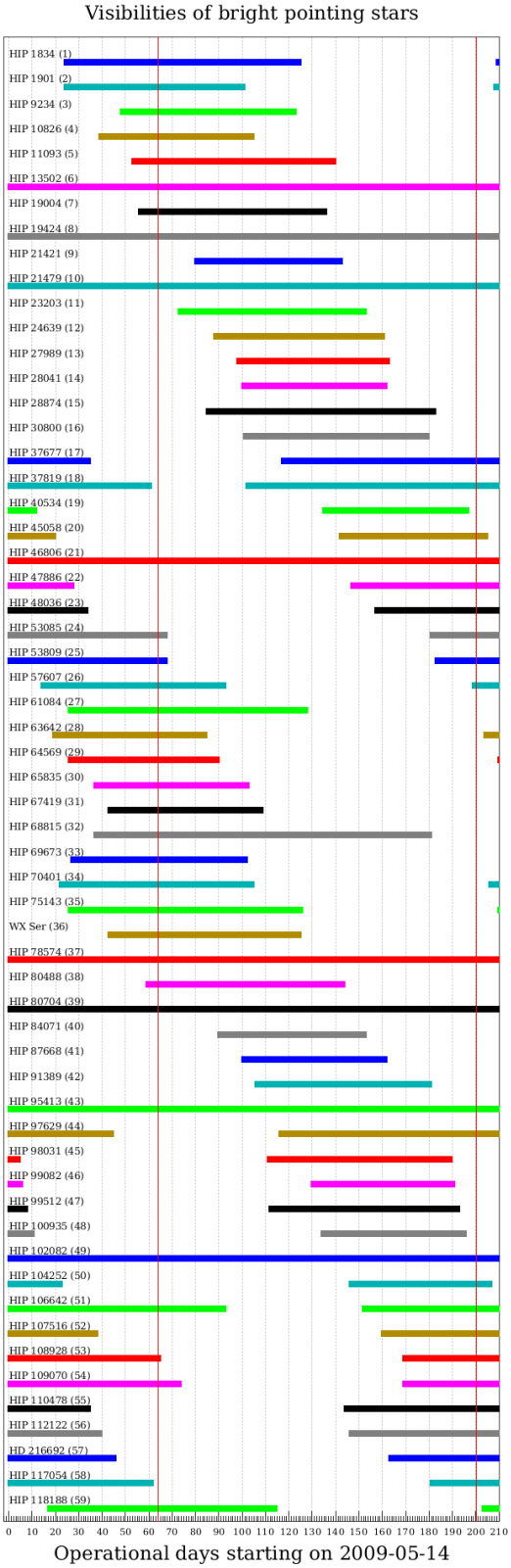
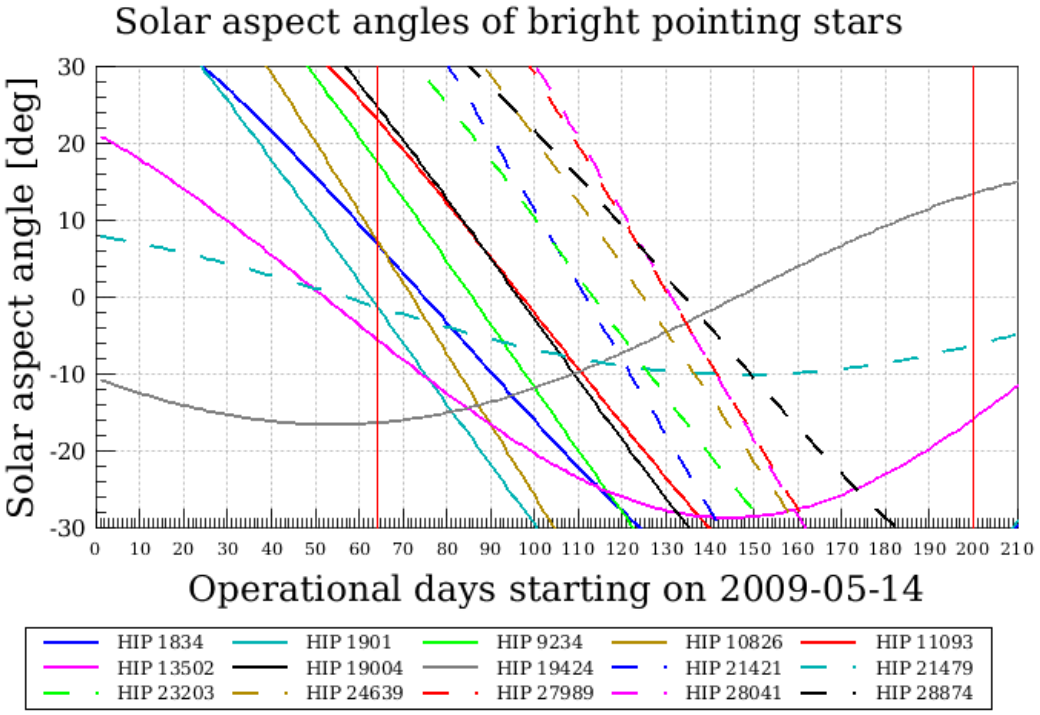


Figure 42: Visibilities of the 59 brightest pointing stars.



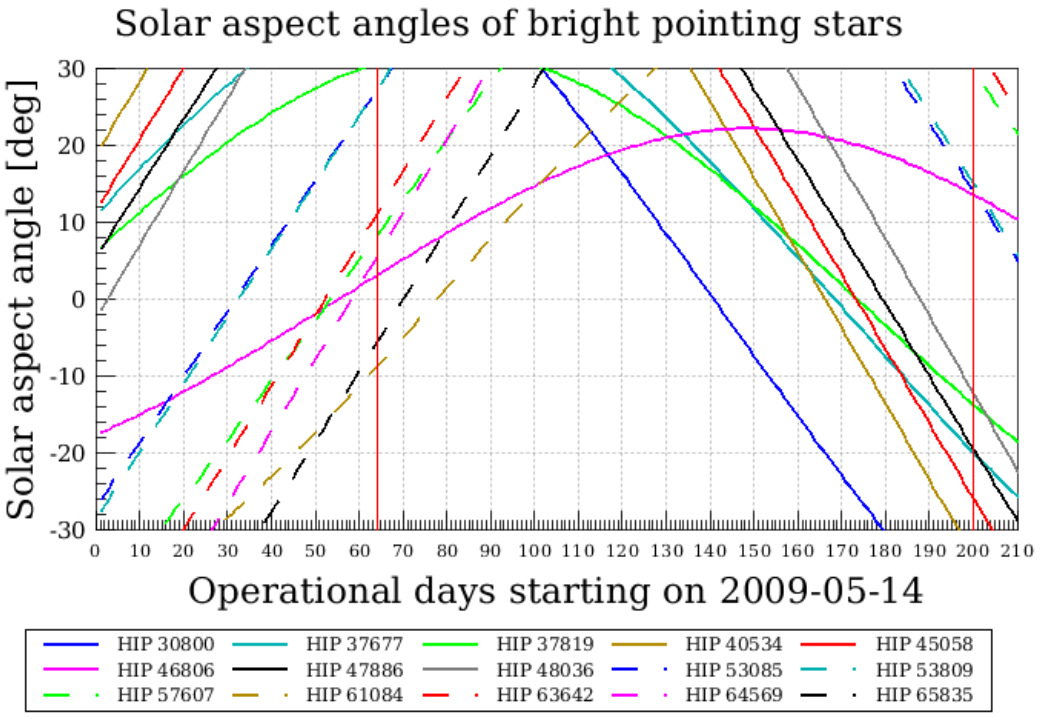
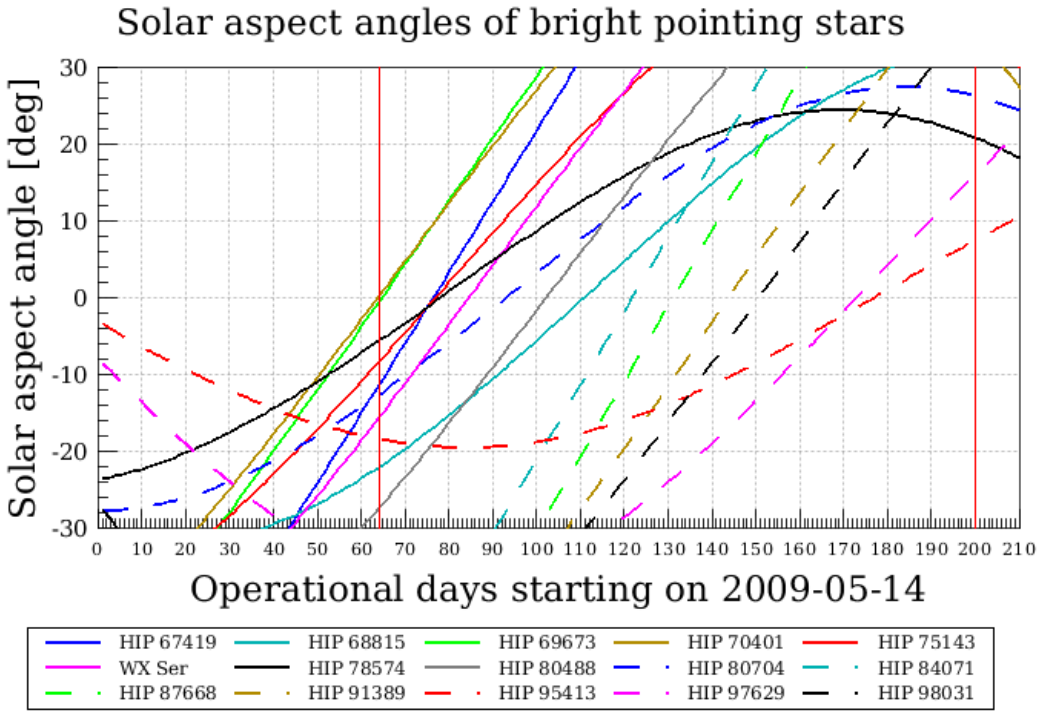


Figure 43: Solar aspect angles of the 59 brightest stellar pointing sources.



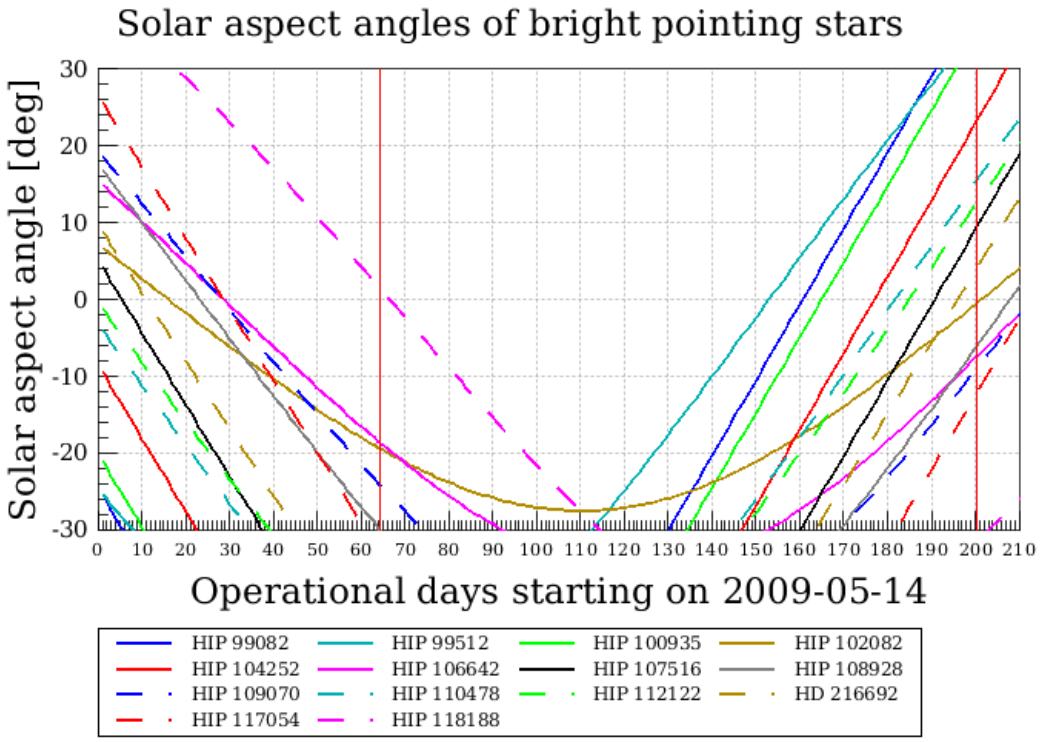


Figure 43: continued. Solar aspect angles of the 59 brightest stellar pointing sources.

4.4.2 Spatial Scale Calibrators

PACS contains the largest ever built FIR array camera. In order to verify the angular calibration of the chopper, the exact focal plane scale and to assess optical distortions over the field-of-views of the cameras for provision of accurate astrometry, spatial calibrators with well defined angular baselines (e.g. double stars), hence high positional accuracy of compact FIR emission areas are needed.

A complete critical review and compilation of sky fields and double sources, comprising double stars, double galaxies, asteroid encounters and planet satellite constellations is given in PACS-ME-TN-035 (issue 2.5 of 24-Nov-2009).

K-band binaries

Double stars have been selected from the 2MASS database using criteria of $Ks < 3$ mag and separations $\theta < 5'$. The list of altogether 32 candidates was reduced to 8 well suited and 7 appropriate sources after inspecting the IRAS HIRES contours toward the binary positions. The final list contains only those double stars with well centred compact IRAS sources. It is given in Tab. 20. HIRES/2MASS overlays for 4 double stars are shown in Fig. 44. The visibility windows of the sources compiled in Table 20 are shown in Fig. 45.

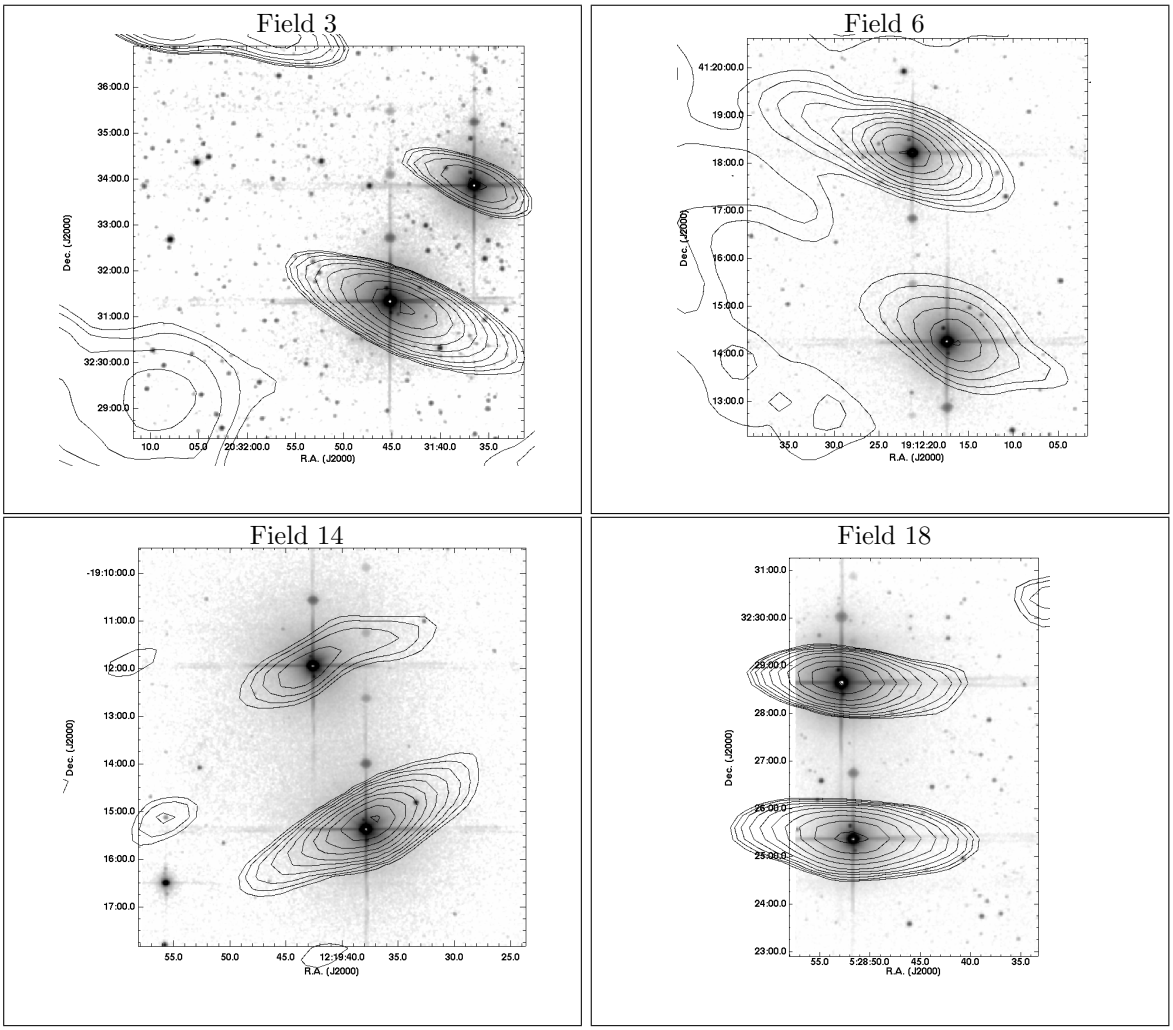


Figure 44: HIRES/2MASS overlays for 4 K-band binaries.

Table 20: Final list of suitable double stars from the K-band search after inspecting the HIRES data. The first eight sources (3 – 32) are considered as a primary choice, while the last seven sources (1 – 31) could be used as backup targets. The visibilities were obtained with HSPOT. The observatory position angle is given relative to the y-axis that is parallel to the chopping direction.

No.	2MASS	Name	Geometry θ ($'$)	Geometry PA (°)	HIRES $F_{60\mu m}$ (Jy)	Double star visibilities (HSO y-axis) Start (Date)	Start PA (°)	End (Date)	End PA (°)
3	20314523+3231213	AI Cyg	3.12	144	2.9	2009 Apr 12	181	2009 Jul 04	117
	20313652+3233524	AD Cyg			1.0	2009 Sep 25	20	2010 Jan 02	298
6	19122126+4118133	RU Lyr	4.03	10	0.6	2009 Apr 12	171	2011 Apr 12	172
	19121741+4114156	V552 Lyr			0.3				
11	06471981+0802143	17 Mon	3.72	69	0.3	2009 Apr 12	8	2009 May 02	13
	06470582+0800535	ST Mon			0.4	2009 Sep 03	176	2009 Nov 05	194
14	12193788-1915218	R Crv	3.61	18	1.1	2009 Jun 01	15	2009 Aug 05	34
	12194260-1911560	UW Crv			0.3	2009 Dec 04	196	2010 Feb 02	213
18	05285171+3225223	V400 Aur	3.29	4	1.1	2009 Aug 16	182	2009 Oct 16	172
	05285288+3228391	V401 Aur			0.9	2010 Feb 12	2	2010 Apr 13	352
21	06451737+1253438	ξ Gem	2.36	143	0.1	2009 Apr 12	7	2009 May 01	10
	06452314+1251504	AT Gem			0.6	2009 Sep 03	179	2009 Nov 03	190
27	17385481-3459283	NSV 23099	2.90	139	2.4	2009 Apr 12	188	2009 Apr 15	189
	17384548-3457177	V492 Sco			3.4	2009 Aug 17	355	2009 Oct 18	9
32	17140992-1459593	IRC -10360	4.23	81	1.3	2009 Aug 11	168	2009 Oct 11	0
	17142723-1459209	IRAS 17116-1455			0.4	2010 Feb 08	189	2010 Apr 08	180
34	18114749+3128199	IRAS 18099+3127	4.26	161	1.9	2009 Apr 12	163	2009 May 25	124
	18115416+3124192	V669 Her			1.3	2009 Jul 26	54	2009 Nov 26	303
1	20012749+5002325	Z Cyg	3.86	166	6.8	2009 Apr 12	182	2011 Apr 12	182
	20012157+5006167	e Cyg			0.2				
5	20473679+3552184		1.96	127	1.6	2009 Apr 12	185	2009 Jul 14	110
	20472904+3553289	V375 Cyg			0.5	2009 Sep 29	21	2010 Jan 11	291
7	22065167+4827557		2.11	67	0.8	2009 Apr 22	196	2009 Aug 22	90
	22063991+4827068	CT Lac			3.0	2009 Oct 25	16	2010 Feb 17	271
8	02232409+5712430	V403 Per	1.92	67	0.9	2009 Jul 07	183	2009 Sep 28	126
	02231106+5711579	V439 Per				2010 Jan 05	4	2010 Mar 25	307
9	01555447+3716400	HD 11727	3.34	118	0.3	2009 Jun 30	172	2009 Sep 05	143
	01560933+3715066	56 And			0.1	2009 Dec 29	352	2010 Mar 03	323
20	04195087+4107417	GM Per	4.50	149	0.6	2009 Aug 01	181	2009 Oct 04	158
	04200316+4103500	IR Per			12.6	2010 Jan 28	2	2010 Apr 01	338
31	07474521-1600519	NSV 3741	2.15	132	0.6	2009 Apr 12	196	2009 Jun 01	38
	07473853-1559263	QY Pup				2009 Sep 17	7	2009 Dec 03	218

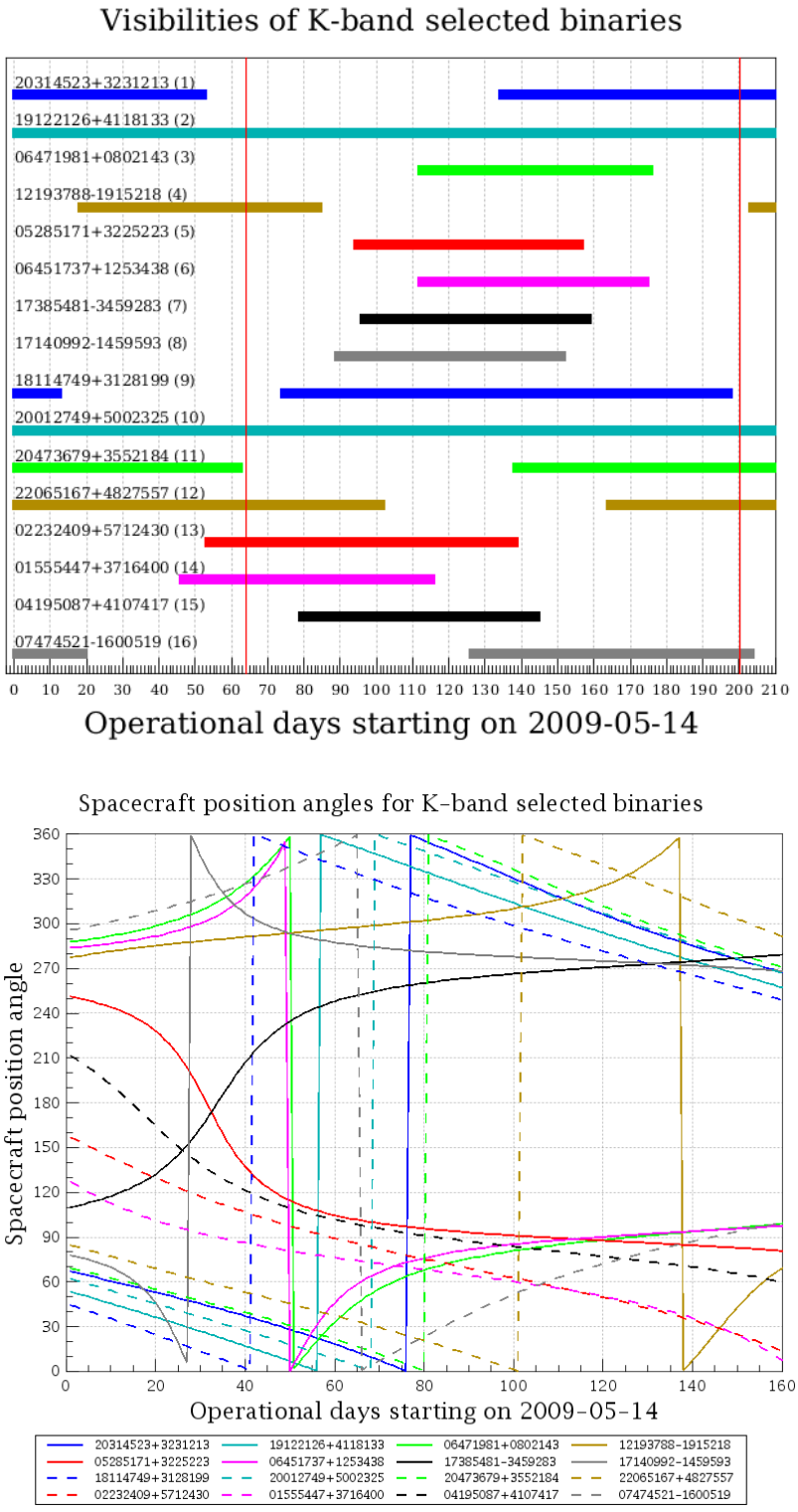


Figure 45: Visibility plot (above) and spacecraft position angles (below) for the best suited K-band selected double stars. They are based on L2 orbits derived for a launch date of 14th May 2009.

Pairs of pointing stars

Scanning observations are an important observing mode to efficiently produce large maps. Therefore, the absolute and relative pointing errors of the satellite pointing during scan map observations must be evaluated (see reqs. 2.6.3 and 2.6.4 in the PCD). This can be achieved by bright enough pointing sources with relatively small separations so that they can be observed with a single scan. The brightness requirements are ≥ 400 mJy for the absolute (PCD req. 2.6.3) and ≥ 20 Jy for the relative pointing evaluation (PCD req. 2.6.4). For this purpose, pairs of pointing sources (cf. PICC-MA-TN-003) with separations of up to 2° were extracted resulting in a list of 92 candidates (Tab. 21). All of them have flux densities of at least 400 mJy at 60 µm and are suitable for fulfilling req. 2.6.3. However, although there are 8 pairs with one source having at least 20 Jy at 60 µm (req. 2.6.4), there is no example where both sources fulfil the specification. Within the two flux bins, the calibrators are sorted according to their separations.

Table 21: List of 91 pairs of pointing sources with separations of up to 2° and flux densities of ≥ 400 mJy. The first four lines contain eight pairs of which at least one source possesses a flux density of ≥ 20 Jy. The separations (θ) are given in arcminutes, the position angles (P.A.) are provided counter-clockwise from North. The flux densities are the values attained at the lowest wavelength (60 µm or 70 µm) measured.

Objects	Source class	Separation θ [′]	P.A. [°]	Flux [mJy]	Objects	Source class	Separation θ [′]	P.A. [°]	Flux [mJy]
HIP 10995	∗	44.4	12	1092	HIP 21252	∗	61.3	21	1081
HIP 11093	∗			22005	HIP 21479	∗			140895
HIP 66738	∗	79.9	25	804	HIP 98608	∗	83.1	114	5512
Mrk 273	•			27450	HIP 99512	∗			26796
PPM 181320	∗	96.4	105	3049	HIP 63642	∗	102.9	111	21289
HIP 107516	∗			27825	3C 279	∞,•			2200
HIP 63642	∗	114.6	10	21289	HIP 48036	∗	117.7	127	61984
PPM 159442	∗			944	HIP 48540	∗			506
2MASS J18114749+3128199	∗	4.3	161	1542	HIP 79072	∗	5.2	24	617
HIP 89172	∗			796	HIP 79086	∗			771
HIP 84329	∗	27.6	16	1026	HIP 23636	∗	29.3	163	7038
HIP 84380	∗			972	HIP 23685	∗			1165
HIP 12086	∗	29.8	149	587	HIP 96399	∗	33.1	74	437
HIP 12193	∗			1870	HD 184956	∗			1030
HIP 74558	∗	34.7	156	831	HIP 71995	∗	38.9	33	925
HIP 74633	∗			516	HIP 72105	∗			913
HIP 9306	∗	39.4	51	1643	HIP 68357	∗	41.6	13	1285
HIP 9582	∗			2480	HIP 68417	∗			2536
HIP 29450	∗	42.8	124	5112	HIP 42975	∗	44.6	126	726
HIP 29655	∗			4293	HIP 43215	∗			1605
HIP 18597	∗	48.0	161	625	HIP 113131	∗	48.5	11	660
HIP 18744	∗			1795	3C 454.3	∞,•			500
HIP 53907	∗	51.0	148	494	HIP 98031	∗	51.1	102	17476
HD 95850	∗			1203	HIP 98608	∗			5512
HIP 7607	∗	52.0	97	470	HIP 57613	∗	52.1	164	1626
HIP 8034	∗			716	HD 102766	∗			1474
HIP 13262	∗	52.5	4	7762	HIP 893	∗	56.5	112	718
HIP 13290	∗			3018	HIP 1170	∗			932
HIP 29416	∗	56.8	48	3573	HIP 12193	∗	57.4	75	1870
HIP 29655	∗			4293	HIP 12557	∗			1847
HIP 114144	∗	57.7	140	573	HIP 66006	∗	58.4	165	820
HIP 114347	∗			1840	HIP 66100	∗			4810
W Aqr	∗	60.0	161	2084	HIP 29416	∗	62.7	6	3573
HIP 102624	∗			1404	HIP 29450	∗			5112
HIP 71644	∗	63.2	157	6268	HIP 76844	∗	63.8	103	711
HIP 71802	∗			2916	HIP 77284	∗			960

∗: pointing star
∞: blazar
•: QSO, RG or ULIRG

Table 21: continued.

Objects	Source class	Separation θ [′]	Separation P.A. [°]	Flux [mJy]	Objects	Source class	Separation θ [′]	Separation P.A. [°]	Flux [mJy]
HIP 64768	∗	64.6	164	608	HIP 106642	∗	68.2	70	12553
HIP 64852	∗			666	HIP 107140	∗			1014
HIP 114114	∗	68.2	176	6437	HIP 11021	∗	70.4	119	483
HIP 114144	∗			573	HIP 11350	∗			2037
HIP 12086	∗	71.5	98	587	HIP 88722	∗	74.8	170	621
HIP 12557	∗			1847	HIP 88832	∗			1617
HIP 36284	∗	76.8	118	444	HIP 76307	∗	77.3	111	411
HIP 36675	∗			3545	HIP 76844	∗			711
HIP 113131	∗	79.7	36	660	PPM 288087	∗	80.8	58	1187
HIP 113390	∗			1014	HIP 53078	∗			2081
CT UMa	∗	80.9	137	1324	HIP 117591	∗	81.4	34	1384
HIP 52546	∗			4462	HD 224126	∗			5106
HIP 101056	∗	81.6	113	1734	HIP 77284	∗	81.7	24	960
AF Del	∗			918	HIP 77501	∗			3227
HIP 76343	∗	82.3	154	477	HIP 29919	∗	84.2	89	1468
HIP 76573	∗			2322	HIP 30945	∗			2703
HIP 71490	∗	84.5	99	723	HIP 53564	∗	87.5	56	774
HIP 71995	∗			925	CS Dra	∗			4263
HIP 104755	∗	88.0	65	603	HIP 106062	∗	88.6	9	1620
HIP 106044	∗			2727	HIP 106140	∗			666
3C 272.1	•	89.4	109	700	HIP 112155	∗	94.0	121	1150
3C 274.0	•			610	HIP 112680	∗			2183
HIP 110146	∗	94.1	137	430	HIP 94162	∗	94.7	9	2385
HIP 110509	∗			441	HIP 94376	∗			468
HIP 65006	∗	96.2	23	4466	HIP 79233	∗	96.5	169	6759
HIP 65309	∗			452	HIP 79349	∗			1039
HIP 1158	∗	96.7	130	688	HIP 114489	∗	97.1	124	1800
HIP 1562	∗			431	3C 459	•			1035
HIP 116264	∗	99.7	176	1459	HIP 12302	∗	99.8	92	2671
HIP 116307	∗			432	HIP 13262	∗			7762
PPM 704303	∗	100.5	148	1921	HIP 98500	∗	101.5	161	504
HIP 41664	∗			3617	HIP 98815	∗			494
HIP 8565	∗	102.7	51	1636	HIP 50230	∗	102.9	70	4826
HIP 9306	∗			1643	HIP 51087	∗			1754
HIP 84833	∗	105.2	131	454					
HIP 85302	∗			703					
HIP 71490	∗	106.2	79	723	HIP 95413	∗	106.3	124	13793
HIP 72105	∗			913	HIP 96198	∗			603
HIP 114724	∗	107.5	160	877	HIP 101810	∗	108.3	96	4233
HIP 114939	∗			1522	HIP 102440	∗			6594
HIP 109070	∗	110.5	179	13281	T Com	∗	111.3	106	1920
HIP 109089	∗			730	HIP 63950	∗			1566
HIP 89172	∗	111.9	79	796	HIP 29655	∗	112.0	90	4293
HD 168829	∗			3315	HIP 30343	∗			6445
HIP 8	∗	112.0	50	1961	HIP 76844	∗	112.1	57	711
HIP 536	∗			621	HIP 77501	∗			3227
2MASS J18114749+3128199	∗	112.6	81	1542	HIP 12302	∗	113.0	65	2671
HD 168829	∗			3315	HIP 13290	∗			3018
HIP 32768	∗	113.4	115	690	HIP 114930	∗	115.0	151	1205
HIP 33779	∗			500	HIP 115242	∗			1285
HIP 114757	∗	117.0	65	642	PPM 30600	∗	117.5	54	3934
HIP 115530	∗			412	HIP 33100	∗			686
HIP 13092	∗	117.6	65	3490	HIP 49950	∗	118.1	74	887
HIP 13654	∗			3452	HIP 50697	∗			3539
HIP 114114	∗	119.8	159	6437	HIP 98337	∗	120.0	171	1226
HIP 114347	∗			1840	HIP 98438	∗			1102

∗: pointing star
∞: blazar
•: QSO, RG or ULIRG

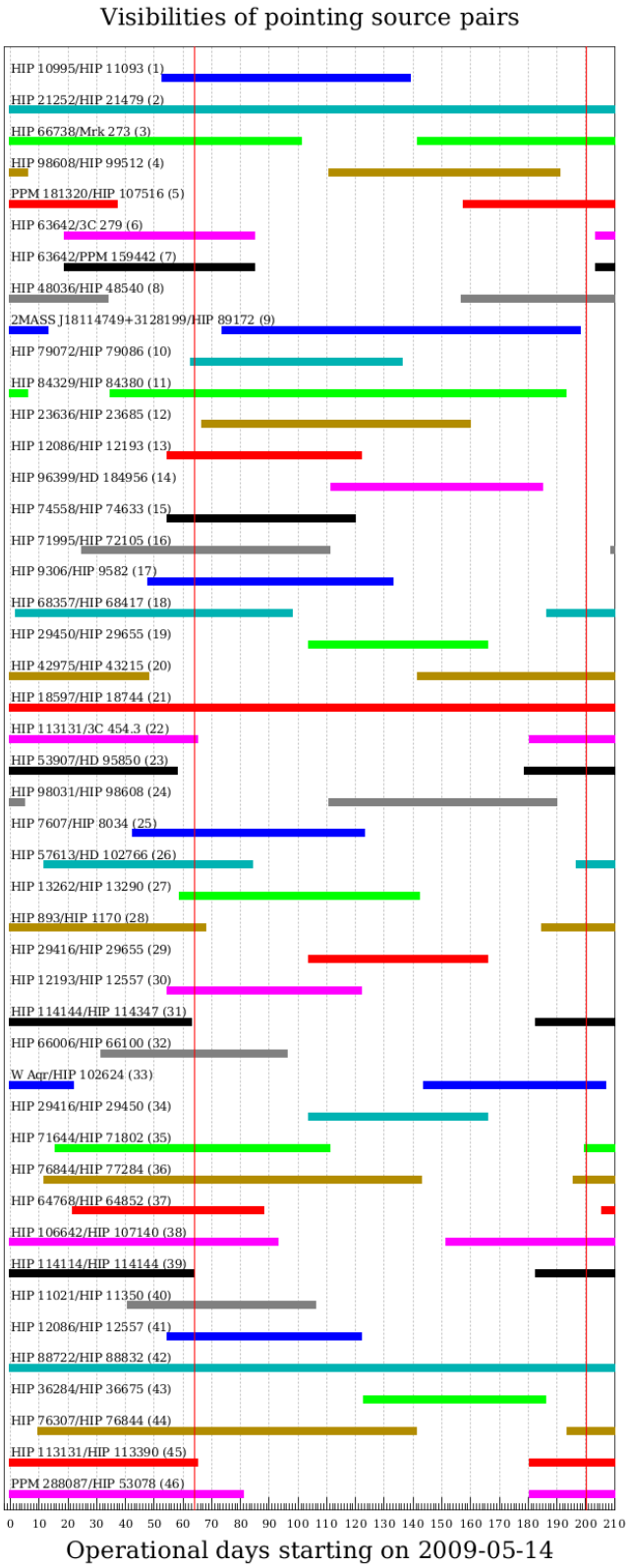


Figure 46: Visibilities of the first 46 out of 91 pairs of pointing sources.

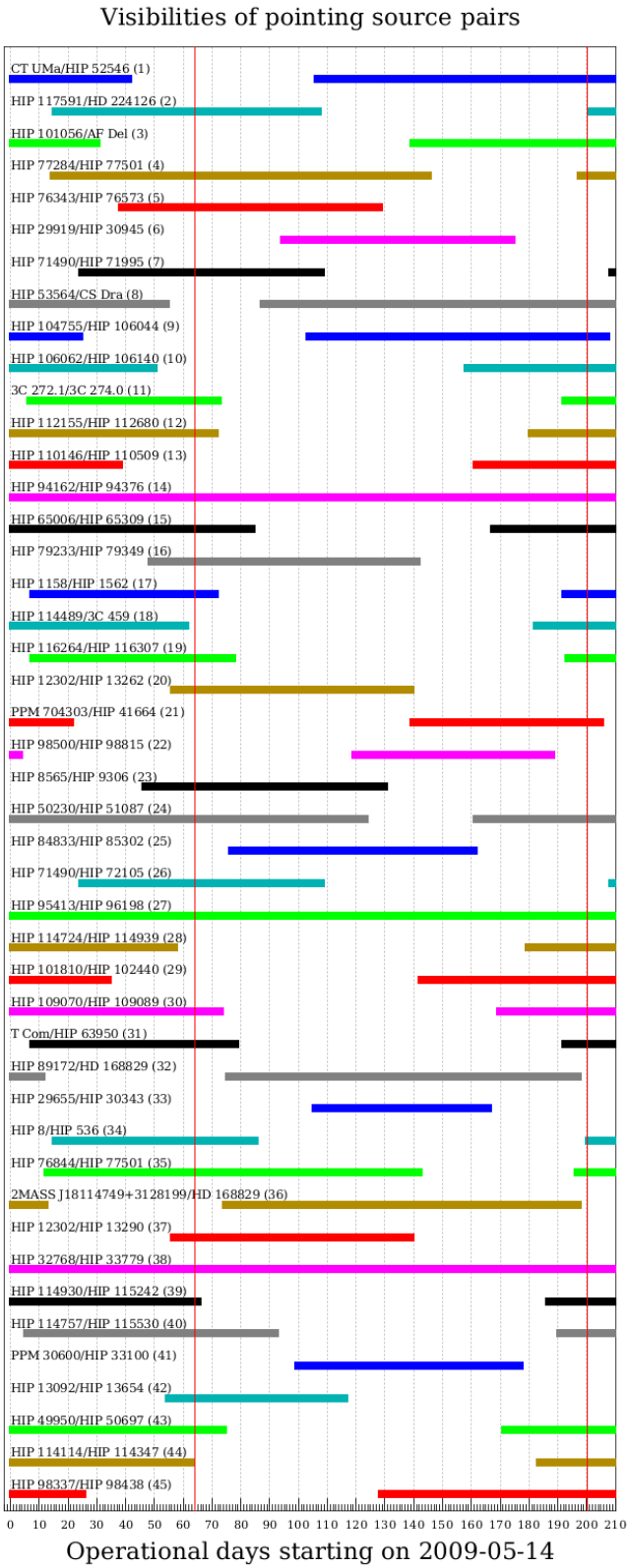


Figure 46: continued. Visibilities of the second 45 out of 91 pairs of pointing sources.

IR bright galaxy pairs

A candidate list of suitable galaxy pairs has been compiled in Table 22. MIPS 70 µm/2MASS overlays for 4 galaxy pairs are shown in Fig. 47. The visibility windows of the sources compiled in Table 22 are shown in Fig. 48.

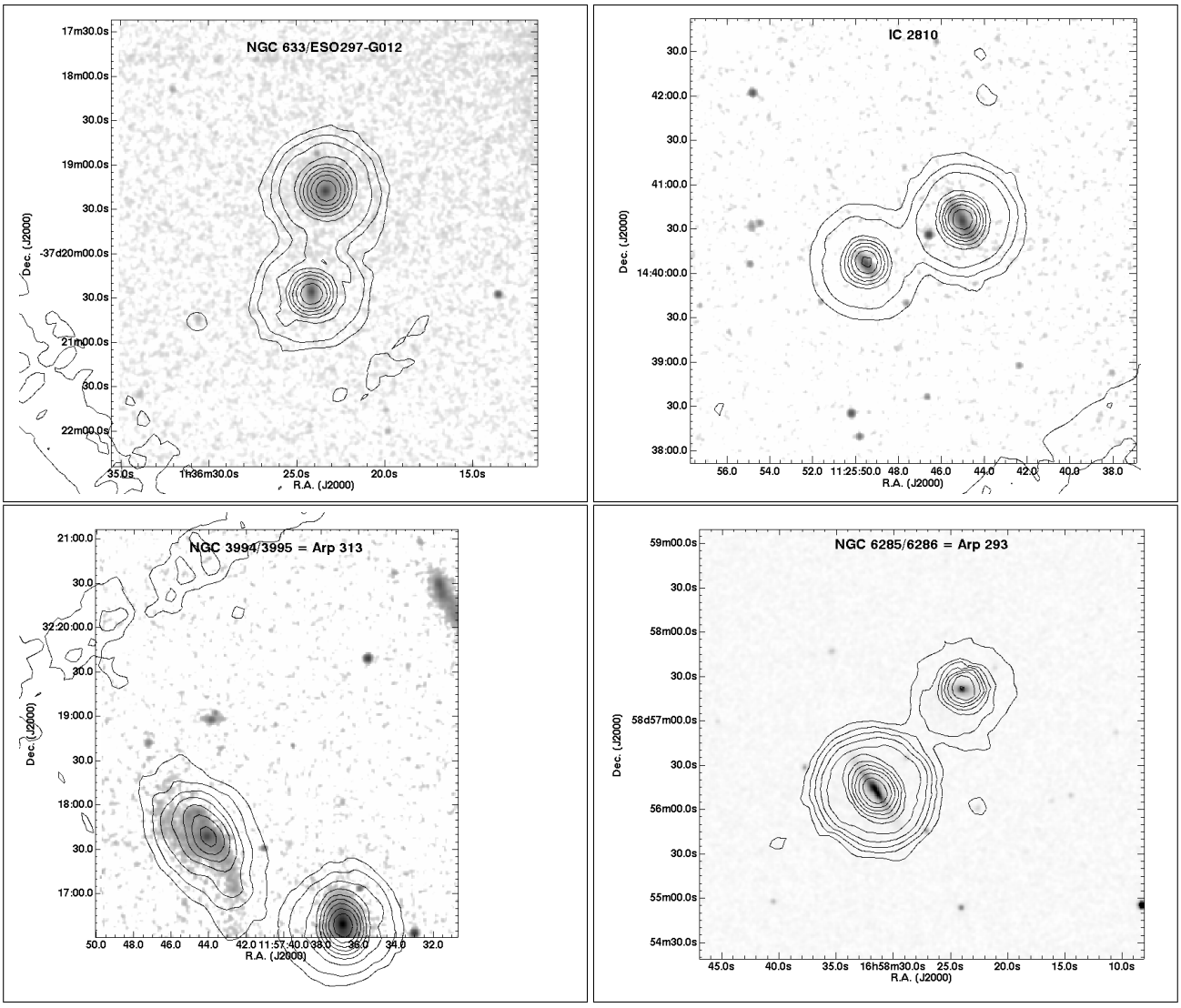


Figure 47: MIPS 70 µm/2MASS overlays for 4 double galaxies.

Table 22: List of IR-bright galaxy pairs suitable for the astrometric calibration. If not mentioned otherwise, the coordinates have been obtained from Gaussian fitting of the emission peaks in the MIPS 70 µm maps. The HIRES data were taken from Surace et al. (2004), except for NGC 7463/7465, for which they were retrieved from the IPAC data archive. Both target separations (θ) and position angles (counter-clockwise from North) are based on the coordinates quoted in the list. The visibility periods were obtained with the HSPOT tool. The observatory position angles are counted counter-clockwise with respect to the HSO y-axis (chopper axis).

Names	Coordinates (J 2000.0) Epoch 2000.0 R.A.	Dec.	HIRES 60 µm (Jy)	MIPS 70 µm (Jy)	Target θ (′)	Target PA (°)	Galaxy visibilities (HSO y-axis) Start (Date)	PA (°)	End (Date)	PA (°)
NGC 633	01:36:23.32	-37:19:17.3	2.0	5.2	1.18	172	2009 May 12	118	2009 Aug 10	183
ESO297-G012	01:36:24.15	-37:20:27.3	6.2	2.6			2009 Nov 13	297	2010 Feb 10	3
MCG+05-06-035 Mrk 1034	02:23:18.87	+32:11:19.3	1.6	2.8	0.79	52	2009 Jul 05	170	2009 Sep 07	150
MCG+05-06-036	02:23:21.82	+32:11:48.7	6.8	5.8			2010 Jan 03	351	2010 Mar 05	330
NGC 2342	07:09:18.14	+20:38:11.8	8.0	8.2	2.44	36	2009 Apr 12	7	2009 May 06	8
NGC 2341	07:09:12.01	+20:36:13.2	7.6	7.7			2009 Sep 09	186	2009 Nov 08	188
IRAS 09111-1007	09:13:36.33	-10:19:28.7	7.4	5.0	0.62	75	2009 Apr 12	5	2009 Jun 18	34
	09:13:38.75	-10:19:19.0		2.1			2009 Oct 14	184	2009 Dec 19	215
NGC 2993 Arp 245	09:45:47.9	-14:22:04*	10.9	–	2.85	153	2009 Apr 20	5	2009 Jun 29	38
NGC 2992	09:45:42.6	-14:19:31*	7.3	–			2009 Oct 24	186	2009 Dec 29	218
IC 2810 UGC 06436	11:25:45.01	+14:40:36.8	5.1	5.1	1.19	115	2009 May 06	29	2009 Jul 08	18
	11:25:49.49	+14:40:06.5	2.1	2.7			2009 Nov 08	210	2010 Jan 07	198
NGC 3994 Arp 313	11:57:36.84	+32:16:38.2	5.0	5.8	1.83	56	2009 May 01	45	2009 Jul 12	9
NGC 3995	11:57:44.04	+32:17:39.0	3.8	4.2			2009 Nov 03	226	2010 Jan 10	189
IC 4518A	14:57:41.12	-43:07:56.8	9.6	5.2	0.70	90	2009 Jul 14	3	2009 Sep 20	34
IC 4518B	14:57:44.97	-43:07:56.6		3.5			2010 Jan 12	183	2010 Mar 18	214
UGC 09618 Arp 302	14:57:00.35	+24:36:26.0	1.5	3.9	0.64	7	2009 Jun 13	50	2009 Sep 04	354
	14:57:00.69	+24:37:04.1	7.1	8.9			2009 Dec 15	229	2010 Mar 03	173
NGC 5953 Arp 091	15:34:32.36	+15:11:39.2	12.0	7.9	0.80	57	2009 Jul 02	38	2009 Sep 15	355
NGC 5954	15:34:35.15	+15:12:05.2		4.9			2010 Jan 01	218	2010 Mar 13	174
NGC 6285 Arp 293	16:58:23.85	+58:57:22.2	2.6	2.9	1.53	139	2009 Apr 12	144	2011 Apr 12	144
NGC 6286	16:58:31.62	+58:56:13.0	8.0	10.1						
NGC 7253A Arp 278	22:19:27.70	+29:23:45.4	6.4	7.4	0.68	131	2009 May 02	178	2009 Jul 20	128
NGC 7253B	22:19:30.06	+29:23:18.5		2.1			2009 Nov 03	359	2010 Jan 17	309
NGC 7465	23:02:01.0	+15:57:48*	7.0	–	2.42	115	2009 May 12	168	2009 Jul 17	144
NGC 7463	23:01:51.9	+15:58:51*	4.0	–			2009 Nov 13	348	2010 Jan 15	324
NGC 7469 Arp 298	23:03:15.52	+08:52:25.3	23.1	20.2	1.35	25	2009 May 10	165	2009 Jul 13	149
IC 5283	23:03:17.82	+08:53:38.9		3.1			2009 Nov 12	344	2010 Jan 11	329
NGC 7674 Arp 182	23:27:56.54	+08:46:44.4	–	5.4	0.52	68	2009 May 17	163	2009 Jul 19	150
NGC 7674A	23:27:58.50	+08:46:56.1	–	2.6			2009 Nov 18	343	2010 Jan 16	330

*IRAS/HIRES

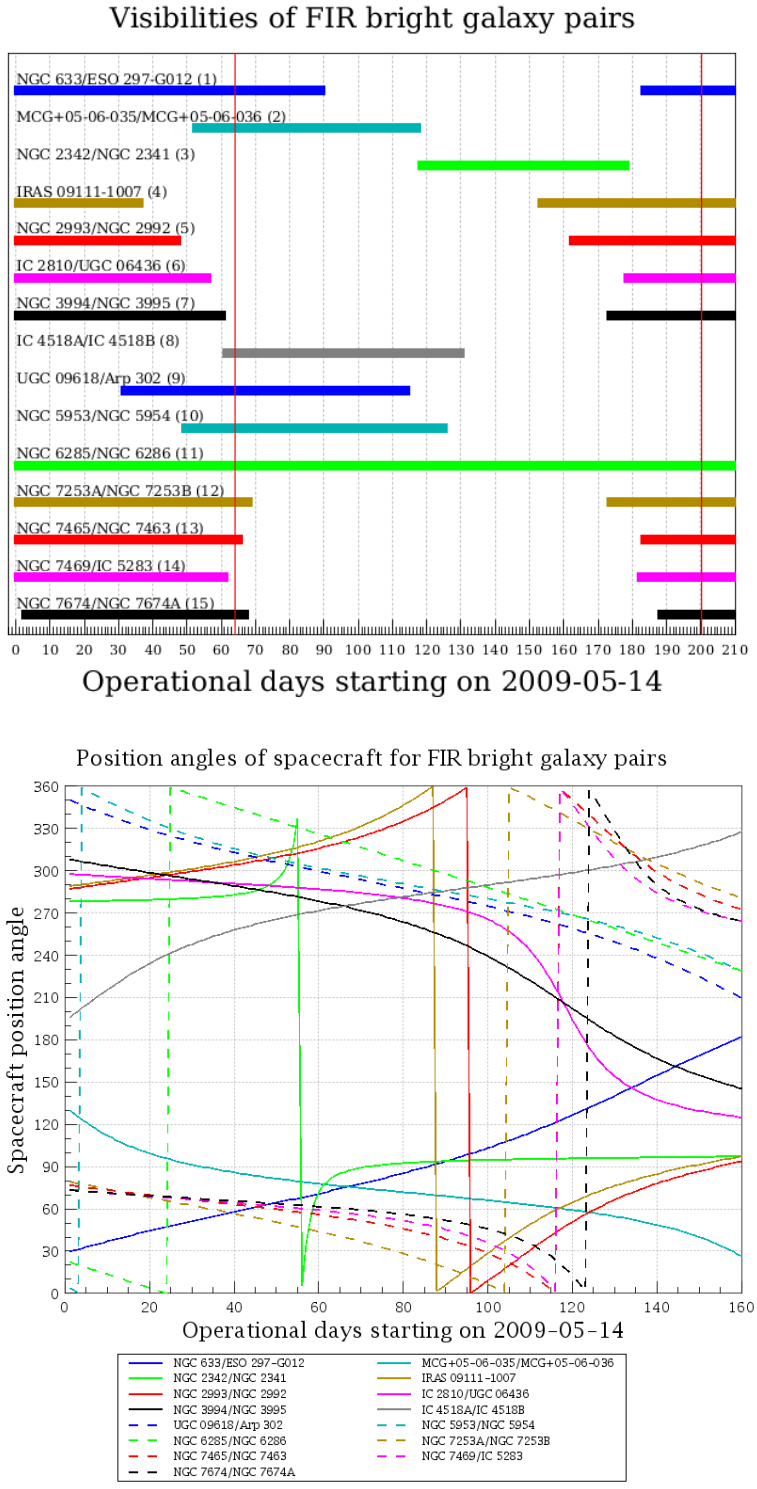


Figure 48: Visibility plot (above) and spacecraft position angles (below) for the galaxy pairs. They are based on L2 orbits derived for a launch date of 14th May 2009.

Asteroid-asteroid and asteroid-planet encounters

An analysis of the orbits of 721 asteroids having an IRAS 60 µm flux of > 1 Jy resulted in finding 2826 encounters within less than 1°, while 80 encounters have separations of up to 3′, and are therefore potential candidates for astrometric calibration purposes. The smallest separation is 1.8″ for a L2-centric calculation that increases to 7.2″ for an HSO-centric point of view. In 3592 cases, these 721 asteroids pass the 5 main planets within less than 1°, some of which are even within a few arcminutes from Jupiter or Saturn.

A more detailed statistical analysis of close encounters of the 721 asteroids was based on the following selection criteria:

- maximum separation in HSO-centric reference frame: 6′
- encounter only during visibility periods, i.e. at solar elongations of $60° - 120°$
- the flux of both asteroids at 70 µm is ≥ 0.5 Jy
- time period: 01-Jan-2009 until 31-Dec-2013
- time resolution: 1 day

and is summarised in Table 23.

Table 23: Statistical analysis of close encounters of 721 asteroids during the Herschel mission within their visibility periods based on the current HSO orbit. The number of encounters for apparent separations of $\leq 6'$ and $\leq 3'$ are calculated for each year.

	Encounters	
Period	$\leq 6'$	$\leq 3'$
Jan-Dec 2009	35	14
Jan-Dec 2010	47	18
Jan-Dec 2011	38	14
Jan-Dec 2012	33	12
Jan-Dec 2013	40	18

One example of a close asteroid encounter is presented in Fig. 49.

Table 24 lists the detailed results of the events with separations $\leq 6'$ in 2009, including apparent smallest distances and the expected FIR flux densities. During close encounters, the asteroids typically stay for hours or even days within the 3′ range. Note that all encounters have been re-calculated based on a launch date of 14th May 2009 and the orbit file `H20090622_0001.LOE`.

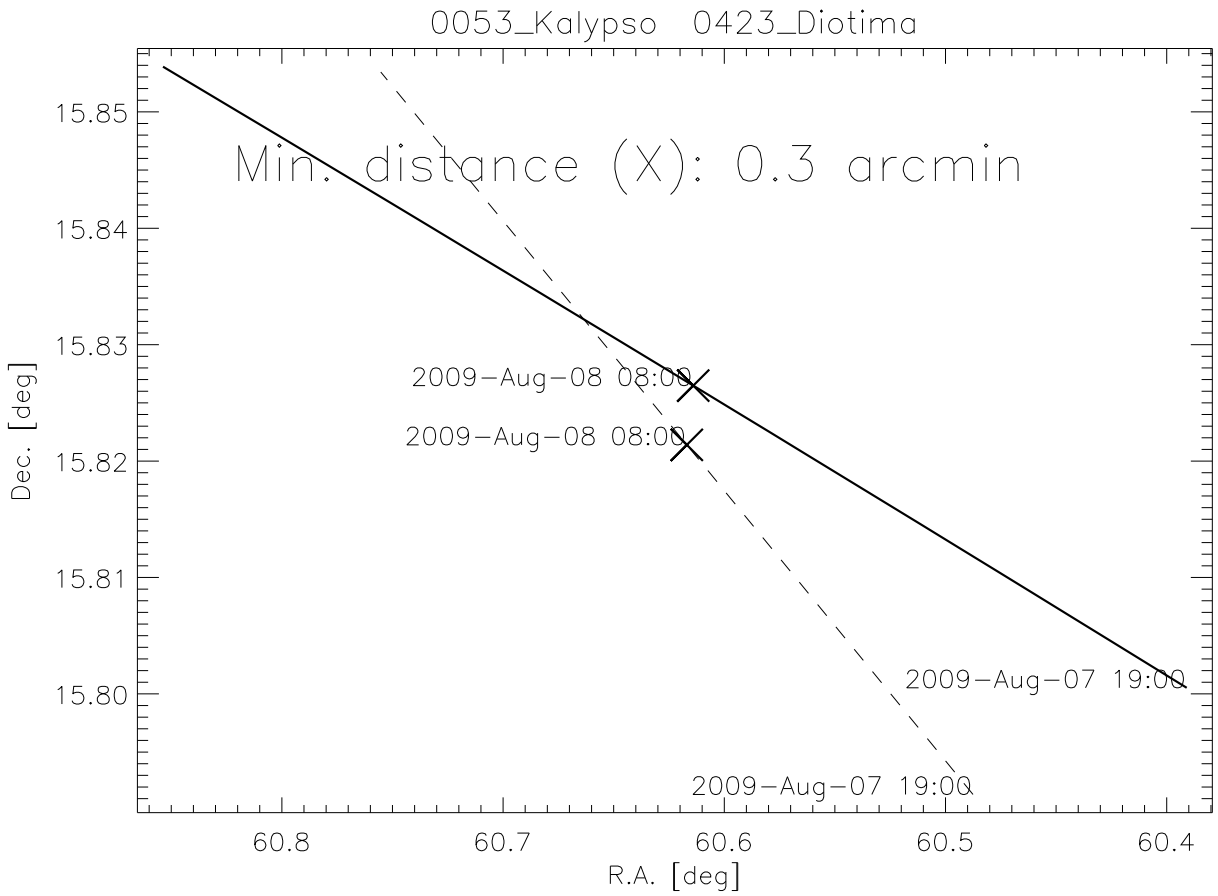


Figure 49: Paths of the asteroids 53 Kalypso and 423 Diotima across the sky during a close encounter in August 2009 in the HSO-centric reference frame assuming the current best HSO orbit with a launch date 12-Apr-2009.

Table 24: Compilation of close asteroid encounters from July to December 2009 with separations of $\leq 6'$ in the HSO-centric reference frame. They will be used as candidates for encounters with separations of $\leq 3'$. They are based on a launch date of 14th May 2009 and the orbit file `H20090622_0001.LOE`.

Date	Asteroids	Smallest separation ($''$)	F(70μm) (Jy)	F(100μm) (Jy)	F(160μm) (Jy)
08/09-Jul-2009	659 Nestor	25	0.7	0.4	0.2
	743 Eugenisis		0.8	0.4	0.2
03/04-Aug-2009	692 Hippodamia	158	0.3	0.2	0.1
	957 Camelia		1.2	0.7	0.3
03/04-Aug-2009	276 Adelheid	57	2.8	1.6	0.7
	971 Alsatia		1.0	0.5	0.2
07/08-Aug-2009	53 Kalypso	12	5.7	3.2	1.4
	423 Diotima		8.0	4.6	2.1
23/24-Aug-2009	283 Emma	164	10.5	6.0	2.6
	712 Boliviana		14.7	8.2	3.6
30/31-Aug-2009	276 Adelheid	295	2.3	1.3	0.6
	2621 Goto		0.3	0.2	0.1
01/02-Sep-2009	26 Proserpina	249	3.5	2.0	0.9
	695 Bella		0.9	0.5	0.2
23/24-Sep-2009	205 Martha	276	2.7	1.5	0.7
	866 Fatme		2.2	1.3	0.6
09/11-Oct-2009	179 Klytaemnestra	73	1.9	1.1	0.5
	417 Suevia		0.4	0.2	0.1
18/19-Oct-2009	10 Hygiea	266	26.1	15.1	6.8
	113 Amalthea		0.7	0.4	0.2
01/03-Nov-2009	37 Fides	287	3.1	1.8	0.8
	213 Lilaea		2.7	1.5	0.7
02/03-Nov-2009	66 Maja	204	2.6	1.5	0.6
	605 Juvisia		2.0	1.1	0.5
28-Nov-2009	877 Walkure	325	1.0	0.5	0.2
	1735 ITA		1.0	0.6	0.3
26/27-Dec-2009	126 Velleda	99	1.3	0.7	0.3
	1143 Odysseus		1.0	0.6	0.3

4.5 Blank/Dark Sky Fields

Some calibration measurements do not require pointing on a specific celestial standard, because they make only use of the internal calibration sources or they use the telescope background as reference. In this case it is preferential to point to a relatively dark sky position which does not impose too much additional and possibly variable flux onto the detectors.

Such a field is shown in Fig. 50 with a 100μm ISM background of ≈1 MJy sr^{-1} (ZL contribution subtracted). The DSS image shows only faint stellar-type objects in this area. Due to its location close to the Ecliptic North Pole it is visible during all time of the mission. The bright point source 20' to the N is IRAS 17499+7009, associated with the galaxy NGC 6503 (UGC 11012, with FSC fluxes: 12μm: 0.446 Jy, 25μm: 0.502 Jy, 60μm: 7.58 Jy, 100μm: 25.9 Jy).

Table 25: List of blank/dark sky reference fields.

#	Name	Coordinates (J2000)		B_{100}
		R. A.	Dec.	(MJy sr^{-1})
1	ISOPHOT dark field	17:49:10.0	+69:48:26	≈1
	(original position)	17:51:03.49	+69:28:22.1	

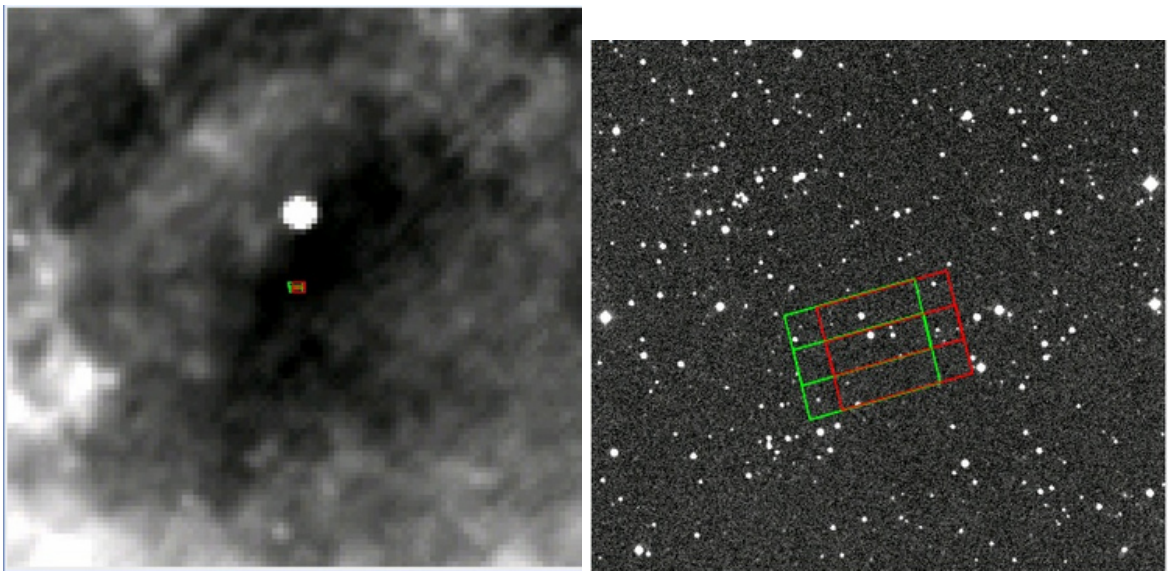


Figure 50: Dark field (at 100μm) close to the Ecliptic North Pole which can serve as reference field with low sky background over the full mission. Left: 100 μm ISSA image with the field-of-view of a photometer point source AOT marked. Right: DSS image of the inner part, again with the field-of-view of a photometer point source AOT marked.

5 PACS PV Test Plan Overview

5.1 Test Philosophy

The test philosophy is to

1) Optimise individual subsystems: achieve optimum control loop parameters of the mechanisms under space conditions; optimise the detector settings to cope with ionising radiation, to adjust them to the telescope background and to find the best frequency response; verify telescope focus and optical scale.

2) Perform the main full system calibrations for both photometer and spectrometer.

3) Optimise the astronomical observing modes with regard to signal stability against drifts and transients, interplay with internal reference calibrations and robustness for background subtraction.

This is reflected in the following test flow which is broken into several major test blocks.

5.2 Test Levels and Descriptions

The following overview shows the sequential order of engineering/calibration blocks with their high level descriptions and an overview of the total time needed. The Commissioning Phase test blocks have been included in this overview, because they complete the calibration with regard to the trace matrices.

The order shows the logical build-up of the calibration and the split of several test entities indicates the need for intermediate data evaluation in order to get better (start) settings for the next test block. Each engineering/calibration block is associated with a proposal identifier which will form the first part of the label of each observation belonging to this block.

The total times needed for the Performance Verification Phase are listed in Table 26. The numbers do not include failed observations. An assessment of failed observations can be done by means of the PV Phase Timeline (Sect. 7.4), where ODs 114, 127, 128, 129 and 166 have been flagged as completely failed.

Table 26: Number and total times of PACS Performance Verification Phase AORs. This does not include failed observations. The last column lists the prelaunch estimates from the model PV Planning.

Proposal	PVP test block/activity	no. AORs	time (h)	model PV time (h)
PVMechChop	Calibration activities chopper	2	0.1	0.0
PVPhotCooler	Photometer cooler recyclings	22	53.2	19.0
PVPhotSetup	Photometer orbit prologues & epilogues	118	29.7	10.2
PVPhotBol	Bolometer (detector) setting & characterisation IV, V, VI	134	161.7	116.4
PVPhotSPU	Bolometer detector readout mode investigation	22	20.5	0.0
PVPhotFPG	Herschel Pointing Calibration & PACS photometer Focal Plane Geometry	449	110.0	24.7
PVPhotSpatial	Angular & spatial calibration, FOV characterisation photometer	117	65.6	67.6
PVPhotFlux	Photometric calibration photometer	95	29.6	28.7
PVPhotStray	Photometer far-field straylight assessment	1	0.5	0.0
PVPhotAOTVal	Photometer AOT validation	170	96.9	97.3
PVParAOTVal	SPIRE/PACS parallel mode AOT validation	28	36.6	22.6
PVParStray	SPIRE/PACS parallel mode straylight assessment	11	34.3	0.0
PVSpecSetup	Spectrometer orbit prologues & epilogues	95	48.9	11.4
PVSpecSPU	Spectrometer SPU modes checkout	18	2.3	0.0
PVSpecGeGa	GeGa (detector) setting/characterisation V	20	14.9	18.6
PVSpecFPG	PACS spectrometer Focal Plane Geometry	35	47.4	7.7
PVSpecWave	Spectral calibration spectrometer	17	20.6	28.8
PVSpecIP	Instrumental profile spectrometer	15	24.0	33.4
PVSpecSpatial	Spatial calibration spectrometer	48	82.3	89.3
PVSpecFlux	Photometric calibration spectrometer	187	106.9	46.3
PVSpecAOTVal	Spectrometer AOT validation	416	202.4	>93.8
PV total		2020	1188.4	715.8

```
================================================================================

Commissioning Phase Calibration Blocks
(for complete overview of all calibration blocks)

================================================================================

--------------------------------------------------------------------------------
Control loop optimisation mechanics, ID: CPMechChop & CPMechGrat
--------------------------------------------------------------------------------
contents: chopper control verification and possible optimisation
          grating control verification and possible optimisation
calibration sources: n/a, only HK of mechanical subsystem required
telescope condition: part of Commissioning Phase, cryo-cover still closed

--------------------------------------------------------------------------------
GeGa settings/characterisation I, ID: CPSpecGeGa
--------------------------------------------------------------------------------
contents: level and settling time to ‘‘stabilized’’ responsivity level (the
          plateau) resulting from an equilibrium between a responsivity increase
          due to ionizing radiation impact and some self-relaxation and
          self-curing due to a thermal background
          operational feasibility on plateau
          optimisation of bias voltage, reset interval and integration capacity
          curing efficiency
calibration sources: n/a
telescope condition: cryo-cover closed

--------------------------------------------------------------------------------
Bolometer settings/characterisation I, ID: CPPhotBol
--------------------------------------------------------------------------------
contents: VRL-VH_BLIND exploration
          assessment of bolometer electronics gain
calibration sources: n/a
telescope condition: cryo-cover closed

--------------------------------------------------------------------------------
GeGa settings/characterisation II, ID: CPSpecGeGa
--------------------------------------------------------------------------------
contents: settling time to the ‘‘stabilized’’ responsivity level (the plateau)
          after switch-on of detectors
          optimisation of detector settings for bias voltage, reset interval
          and integration capacity
          Settings and times for flash curing
          Concept of stimulating flashes
          First field-of-view characterisation
calibration sources: internal calibration sources
telescope condition: cryo-cover open
                     final telescope temperature not necessary

--------------------------------------------------------------------------------
Bolometer settings/characterisation II, ID: CPPhotBol
--------------------------------------------------------------------------------
contents: basic bias settings for low gain mode for FPG set-ups
```

```
          telescope background check
calibration sources: internal calibration sources (bias optimisation)
                     dark sky field (telescope background check)
telescope condition: cryo-cover open,
                     T < 140 K

-------------------------------------------------------------------------------
GeGa settings/characterisation III, ID: CPSpecGeGa
-------------------------------------------------------------------------------
contents: settling time to the ‘‘stabilized’’ responsivity level (the plateau)
          after switch-on of detectors
          settling time to the ‘‘stabilized’’ responsivity level (the plateau)
          depending on curing strength
          optimisation of detector settings for bias voltage, reset interval
          and integration capacity
calibration sources: dark sky field
telescope condition: cryo-cover open
                     final telescope temperature not necessary

-------------------------------------------------------------------------------
Bolometer settings/characterisation III, ID:CPPhotBol
-------------------------------------------------------------------------------
contents: basic bias settings for low gain mode for FPG set-ups
          telescope background check
          field-of-view characterisation by full field-of-view scan
          glitch statistics
          check-out of observing modes for pointing calibration
          sensitivity assessment for pointing calibration, SIAM dry-run
calibration sources: telescope background plus dark sky field (bias optimisation)
                     crowded field
                     bright fiducial calibration star
telescope condition: cryo-cover open,
                     T close to operational conditions for pointing calibration

-------------------------------------------------------------------------------
GeGa settings/characterisation IV, ID: CPSpecGeGa
-------------------------------------------------------------------------------
contents: fastest stabilisation method to achieve operation on the responsivity
          plateau.
          raw data in different CRE settings for reference with ground tests
          addressing ramp shapes, glitch detection and despiking and selection
          of the optimum on-board data compression algorithm.
          further curing improvement (optional)
calibration sources: dark sky field
telescope condition: cryo-cover open
                     T close to operational conditions for pointing calibration

-------------------------------------------------------------------------------
Focal Plane Geometry & Star Tracker versus Line-of-Sight Calibration,
IDs: CPPhotFPG & CPSpecFPG
-------------------------------------------------------------------------------
contents: star tracker versus PACS field-of-view offset calibration
          central pointing position on photometer
          relative pointing offset photometer - spectrometer
```

```
calibration sources: bright compact IR sources
                     pointing calibrators (stars, blazars, QSO/ULIRGs with
                     accurate pointing information)
                     spatial scale calibrators (double stars, double galaxies,
                     asteroid -- asteroid encounters, asteroid -- star
                     encounters with accurate distances
                     asteroids, Jovian satellites for tracking
                     LOS calibration needs to cover the range of possible
                     solar elongations
telescope condition: part of Commissioning Phase, cryo-cover open
                     telescope still cooling down

================================================================================

Performance Verification Phase Calibration Blocks

================================================================================

--------------------------------------------------------------------------------
Bolometer cooler recycling, ID: PVPhotCooler
--------------------------------------------------------------------------------
contents: cooler recycling to acquire bolometer operational temperatre
          coooler hold time
duration: 2.4 h per recycling, total time depends on hold time duration and
          scheduling strategy
calibration sources: none
telescope condition: any T, when cooling down

--------------------------------------------------------------------------------
Photometer setup, ID: PVPhotSetup
--------------------------------------------------------------------------------
contents: photometer orbit prologues (preparation of the instrument and
          internal calibration sources CSs for observation)
          photometer orbit epilogues (switch to safe mode)
          non-standard settings (no heating and heating to higher T of CSs)
duration: <0.6 h per set-up, total time depends on the scheduling strategy
calibration sources: only internal
telescope condition: any T, when cooling down

--------------------------------------------------------------------------------
Bolometer settings/characterisation IV, ID: PVPhotBol
--------------------------------------------------------------------------------
contents: optimum bias settings low gain
duration: 10.5 h
calibration sources: sky background
                     internal calibration sources
telescope condition: T < 90 K, close to final temperature

--------------------------------------------------------------------------------
Bolometer settings/characterisation V, ID: PVPhotBol
--------------------------------------------------------------------------------
contents: optimum bias settings high gain
          responsivities/NEP "direct mode"
duration: 60.1 h
```

```
calibration sources: photometric standards (planets, asteroids, stars)
                     internal calibration sources
telescope condition: T < 90 K, close to final temperature

-------------------------------------------------------------------------------
Bolometer settings/characterisation VI, ID: PVPhotBol
-------------------------------------------------------------------------------
contents: responsivities/NEP "DDCS"
          time/frequency & temperature dependencies
duration: 65.4 h
calibration sources: dark sky field
                     internal calibration sources
telescope condition: T < 90 K, close to final temperature

-------------------------------------------------------------------------------
Telescope pointing and photometer focal plane geometry, ID: PVPhotFPG
-------------------------------------------------------------------------------
contents: verification of telescope pointing, dependence on SAA
          verification of PHOT focal plane geometry
duration: 101.5 h
calibration sources: astrometric calibrators (stars, asteroids,
                                              unresolved PNe + AGN)
telescope condition: close to final temperature

-------------------------------------------------------------------------------
Verification of chopper angular calibration, ID: PVPhotSpatial
-------------------------------------------------------------------------------
contents: verification of focal plane scale
          verification of commanded chopper throw
duration: 4.6 h
calibration sources: spatial calibrators (double galaxies, planets/moons,
                                          asteroid constellations)
telescope condition: close to final temperature

-------------------------------------------------------------------------------
FOV characterisation photometer, ID: PVPhotSpatial
-------------------------------------------------------------------------------
contents: background structure of the spectrometer FOV over the full chopper
          angular deflection range
          adjustment of internal calibration sources to telescope background
          straylight
duration: 3.6 h
calibration sources: "blank" sky field
                     internal calibration sources
telescope condition: at various temperatures, 1 close to final temperature

-------------------------------------------------------------------------------
Photometer spatial calibration, ID: PVPhotSpatial
-------------------------------------------------------------------------------
contents: spatial calibration (PSF & distortion)
          near-field straylight by bright sources
          telescope focus verification
duration: 64.1 h
calibration sources: bright sources (planets, stars)
```

```
                     spatial calibrators (double galaxies, double stars,
                     planets/moons, asteroid constellations)
telescope condition: at final temperature

-------------------------------------------------------------------------------
Photometer photometric calibration, ID: PVPhotFlux
-------------------------------------------------------------------------------
contents: photometric calibration including system linearity,
          colour correction, minimum flux verification
duration: 33.8 h
calibration sources: photometric standards from bright to faint, with
                     different SED shapes
                     (planets, asteroids, stars)
                     internal calibration sources
telescope condition: at final temperature

-------------------------------------------------------------------------------
AOT validation photometer, ID: PVPhotAOTVal
-------------------------------------------------------------------------------
contents: check-out of most common photometer AOT modes before entering
          Science Verification
          exploration of some parameters for optimised performance
duration: 116.3 h
calibration sources: photometric standards (planets, asteroids, stars)
                     spatial calibrators (double galaxies, planets/moons,
                                          asteroid constellations)
                     faint sources with known fluxes for sensitivity
                     verification
                     internal cal sources
telescope condition: at final temperature


Further AOT tests are assumed to be part of the Science Verification period.

-------------------------------------------------------------------------------
AOT validation parallel mode, ID: PVParAOTVal
-------------------------------------------------------------------------------
contents: check-out of SPIRE/PACS parallel AOT modes before entering
          Science Verification
          exploration of some parameters for optimised performance
duration: 42.6 h
calibration sources: photometric standards (planets, asteroids, stars)
                     spatial calibrators (double galaxies, planets/moons,
                                          asteroid constellations)
                     faint sources with known fluxes for sensitivity
                     verification
                     internal cal sources
telescope condition: at final temperature


Further AOT tests are assumed to be part of the Science Verification period.


-------------------------------------------------------------------------------
```

```
Spectrometer setup, ID: PVSpecSetup
-------------------------------------------------------------------------------
contents: photometer orbit prologues (preparation of the instrument and
          internal calibration sources CSs for observation)
          photometer orbit epilogues (switch to safe mode)
          non-standard settings (no heating and heating to higher T of CSs)
duration: <0.6 h per set-up, total time depends on the scheduling strategy
calibration sources: only internal
telescope condition: any T, when cooling down

-------------------------------------------------------------------------------
GeGa settings/characterisation V, ID: PVSpecGeGa
-------------------------------------------------------------------------------
contents: dark current
          spectrometer detector performance assessment (NEP)
          frequency dependence
          linearity
duration: 23.0 h
calibration sources: photometric standards (planets, asteroids, stars)
                     internal calibration sources
telescope condition: T < 100 K, final temperature not required

-------------------------------------------------------------------------------
Spectrometer spectral calibration, ID: PVSpecWave
-------------------------------------------------------------------------------
contents: wavelength calibration/verification
duration: 24.6 h
calibration sources: wavelength standards (HII regions, water stars, planets)
                     sources with well known line profiles for line profile
                     verification
telescope condition: T < 100 K, final temperature not required

-------------------------------------------------------------------------------
Spectrometer instrumental profile calibration, ID: PVSpecIP
-------------------------------------------------------------------------------
contents: spectral instrumental profile calibration/verification
duration: 32.8 h
calibration sources: wavelength standards (HII regions, water stars, planets)
                     sources with well known line profiles for line profile
                     verification
telescope condition: T < 100 K, final temperature not required

-------------------------------------------------------------------------------
FOV characterisation spectrometer, ID: PVSpecSpatial
-------------------------------------------------------------------------------
contents: background structure of the spectrometer FOV over the full chopper
          angular deflection range
          adjustment of internal calibration sources to telescope background
          straylight
duration: 3.8 h
calibration sources: "blank" sky field
                     internal calibration sources
telescope condition: close to final temperature
```

```
--------------------------------------------------------------------------------
Spectrometer spatial calibration, ID: PVSpecSpatial
--------------------------------------------------------------------------------
contents: spatial calibration (PSF & distortion)
          near-field straylight by bright sources
duration: 87.8 h (6.0 h for straylight around very bright sources)
calibration sources: bright sources (planets, IR stars)
telescope condition: at final temperature

--------------------------------------------------------------------------------
Spectrometer focal plane geometry, ID: PVSpecFPG
--------------------------------------------------------------------------------
contents: verification of SPEC focal plane geometry
duration: 49.1 h
calibration sources: astrometric calibrators (stars, asteroids,
                                              unresolved PNe + AGN)
telescope condition: close to final temperature

--------------------------------------------------------------------------------
Spectrometer photometric calibration, ID: PVSpecFlux
--------------------------------------------------------------------------------
contents: RSRF, flux reproducibility, flat-field, linearity,
          absolute flux calibration, telescope background stability,
          stray-light into CS
duration: 116.2 h
calibration sources: photometric standards from bright to faint
                     with diffedrent SED shapes
                     (planets, asteroids, stars)
                     internal calibration sources
telescope condition: at final temperature

--------------------------------------------------------------------------------
AOT validation spectrometer, ID: PVSpecAOTVal
--------------------------------------------------------------------------------
contents: check-out of most common spectrometer AOT modes before entering
          Science Verification
          exploration of some parameters for optimised performance
duration: 130 h (estimate)
calibration sources: photometric standards (planets, asteroids, stars)
                     wavelength standards (HII regions, water stars)
                     spatial calibrators (double galaxies, planets/moons,
                                          asteroid constellations)
                     faint sources with known fluxes for sensitivity
                     verification
                     internal cal sources
telescope condition: at final temperature


Further AOT tests are assumed to be part of the Science Demonstration period.

--------------------------------------------------------------------------------
```

5.3 Verification Matrices

5.3.1 PACS Performance Requirements Verification Matrix

The following matrix provides a cross-check for coverage of the instrument performance items, as specified in the Instrument Requirements Document PACS-ME-RS-005, by Performance Verification (PV) Phase and Commissioning (Co) Phase items.

For better visibility the cross matrix is split into two parts. In the first part the instrument performance items are related to the test blocks/levels of the PVP and CoP as outlined above (Table 27). In the second part the test blocks/levels are related to the IDs of the PACS Calibration Document [AD1].

Table 27: Matrix PACS performance requirements coverage by Performance Verification Phase and Commissioning Phase test blocks.

Instrument Performance Requirement category	Verification by execution of PV Phase test blocks
2 System Level Requirements	
2.1 Basic Instrument Mode	mutual requirement fulfilled by alternating photometry and spectroscopy test blocks
2.2 Photometry requirements	
2.2.1 Wavelength range and filter bands	filter transmission and detector absorptivity measurements on module level (module level on ground)
2.2.2 Field-of-view and pixel scale	FOV characterisation photometer
2.2.3 Image quality	FOV characterisation photometer Photometer Spatial Calibration
2.2.4 Straylight	Bolometer Settings/Characterisation III Photometer Calibration Tests
2.2.5 Dynamic Range	Bolometer Settings I, II, III &IV
2.2.6 Observing Modes	AOT Validation Photometer
2.2.7 Post Detection Bandwidth	Bolometer Settings/Characterisation VI
2.2.8 Sensitivity	Bolometer Settings/Characterisation V
2.2.9 Calibration and photometric accuracy	Photometer Calibration Tests
2.3 Spectroscopy Requirements	
2.3.1 Wavelength coverage and spectral resolution	Spectrometer Spectral Calibration
2.3.2 Field-of-view, pixel scale, and spectrometer implementation	FOV characterisation spectrometer
2.3.3 Image quality	FOV characterisation spectrometer GeGa Settings/Characterisation II
2.3.4 Stray Light	Spectrometer Spatial Calibration
2.3.5 Dynamic range	GeGa Settings/Characterisation I-IV
2.3.6 Observing modes	AOT Validation Spectrometer
2.3.7 Post-Detection Bandwidth	GeGa Settings/Characterisation V AOT Validation Spectrometer
2.3.8 Sensitivity	GeGa Settings/Characterisation V AOT Validation Spectrometer
2.3.9 Calibration and spectroscopic accuracy	Spectrometer Photometric Calibration
2.4 Operational Requirements	
2.4.1 Maximum Uninterrupted Operating Interval	Cooler Recycling Photometer during all test blocks
2.4.2 Availability of and switching between instrument modes	AOT Validation Photometer AOT Validation Spectrometer switch between photometer and spectrometer test blocks
3. Subsystem Level Requirements	
3.1 Sensitivity Related Subsystem Requirements	PACS instrument model
3.1.1 Photometry	optical transmission measurements on subsystem level Bolometer Settings/Characterisation II
3.1.2 Spectroscopy	optical transmission measurements on subsystem level GeGa Settings/Characterisation
3.2 Chopper	Control Loop Optimisation Verification of Chopper Angular Calibration
3.3 Timing/Synchronisation Requirements	Bolometer Settings/Characterisation VI Spectrometer Settings/Characterisation IV

5.3.2 Matrix PV Phase test blocks to individual PCD test items

Table 28: Relation of PV and Co Phase test blocks with individual test items. Test IDs labelled PCDn.n.n refer to the PACS Calibration Document (PACS-MA-GS-001). Test IDs labelled PTD refer to PACS Test Descriptions of Functional and Performance Tests.

	Control Loop Optimisation
PTD 0.7.8	Grating functional check-out
PTD 0.7.12	Cal sources performance check-out
PCD 2.3.1	Angular calibration of the focal plane chopper
PCD 2.3.2	Duty cycle of (chopper) waveforms
PCD 2.5.3	Time constants: heat-up and cool down times of PACS calibration sources
	GeGa settings/characterisation I
PCD 1.2.7	Nominal responsivity spectrometer
PCD 1.2.12	Ionising radiation: Reset time, spectrometer
PCD 1.2.13	Ionising radiation: Responsivity, spectrometer
PCD 1.2.14	Ionising radiation: Noise, spectrometer
PCD 1.2.17	Time constant: Bias change spectrometer
PCD 1.2.20	Time variation responsivity spectrometer
PCD 1.2.23	Curing, spectrometer
	Bolometer settings/characterisation I
PCD 1.1.0	VRL-VHBLIND exploration
PCD 1.1.7	Monitor cooler recycling frequency
	GeGa settings/characterisation II
PCD 1.2.1	Optimum detector bias settings
PCD 1.2.2	Optimum detector temperature settings
PCD 1.2.7	Nominal responsivity spectrometer
PCD 1.2.13	Ionising radiation: Responsivity, spectrometer
PCD 1.2.16	Time constant: Switch-on spectrometer
PCD 1.2.20	Time variation responsivity spectrometer
PCD 1.2.23	Curing, spectrometer
PCD 4.1.6	Field-of-view characterisation
	Bolometer settings/characterisation II
PCD 1.1.1	Control optimum pixel bias settings: Determination of basic bias settings to get signal within dynamic range (low gain)
PCD 1.1.7	Monitor cooler recycling frequency
PCD 7.1.1	Herschel telescope focus verification (sneak preview)
	GeGa settings/characterisation III
PCD 1.2.7	Nominal responsivity spectrometer
PCD 1.2.13	Ionising radiation: Responsivity, spectrometer
PCD 1.2.16	Time constant: Switch-on spectrometer
PCD 1.2.20	Time variation responsivity spectrometer
PCD 1.2.23	Curing, spectrometer

Table 28: Relation of PV Phase test blocks with individual test items, continued.

	Bolometer settings/characterisation III
PCD 1.1.1	Control optimum pixel bias settings: Determination of basic bias settings to get signal within dynamic range (low gain)
PCD 1.1.7	Monitor cooler recycling frequency
PCD 1.1.9	Measure time constants after cosmic ray impact
PCD 3.1.1	Photometer central pointing position
PCD 3.1.7	Field-of-view characterisation
PCD 7.2.1	Monitor the Herschel telescope background
PCD 7.4.1	Relative location of PACS photometer & spectrometer field-of-views in Herschel focal plane
	GeGa settings/characterisation IV
PCD 1.2.3	Dynamic range per selected integration capacitor
PCD 1.2.4	CRE check-out voltage
PCD 1.2.11	Linearity of CRE read-out
PCD 1.2.16	Time constant: Switch-on spectrometer
PCD 1.2.19	Time constant: Cosmic ray hits spectrometer
PCD 1.2.21	On-board software processing, spectrometer
PCD 1.2.22	Cross-talk, electrical, spectrometer
PCD 1.2.23	Curing, spectrometer
	Focal Plane Geometry
PCD 7.4.1	Relative location of PACS photometer and spectrometer field-of-views in the Herschel Focal Plane
PCD 3.1.1	Photometer central pointing position
PCD 4.1.1	Spectrometer central pointing position and grating alignment
	GeGa settings/characterisation V
PCD 1.2.6	Detector dark current
PCD 1.2.8	Signal dependence on chopper frequency
PCD 1.2.10	Noise equivalent power
PCD 1.2.15	Ionising radiation, dark current, spectrometer
PCD 1.2.18	Time constant: Flux changes spectrometer
	Spectrometer SPU modes check-out
PCD 1.2.21	On-board software processing spectrometer
	Spectrometer spectral calibration
PCD 4.2.1	Grating wavelength calibration
PCD 4.2.3	Spectral purity
PCD 4.2.4	Spectral ghosts
PCD 4.2.5	Grating wavelength calibration, dependence on source position in slit
	Spectrometer instrumental profile
PCD 4.2.2	Grating instrumental profile
	Bolometer settings/characterisation IV
PCD 1.1.1	Control optimum pixel bias settings: Determination of basic bias settings to get signal within dynamic range (low gain)

Table 28: Relation of PV Phase test blocks with individual test items, continued.

	FOV characterisation spectrometer
PCD 2.3.3	Optimal positioning of chopper on internal reference sources
PCD 2.5.2	Spatial stability (isotropy and homogeneity) of PACS calibration sources
PCD 4.1.1	Spectrometer central pointing position and grating alignment
PCD 4.1.6	Full field-of-view maps
PCD 4.3.10	Flat-field spectrometer external sources
	Spectrometer spatial calibration
PCD 4.1.2	Spectrometer field of view distortion
PCD 4.1.3	Spectrometer point spread function
PCD 4.1.4	Spectrometer ghosts
PCD 4.1.5	Spectrometer straylight
	Bolometer settings/characterisation V
PCD 1.1.1b	Control optimum pixel bias settings: Determination of optimum bias settings for R/NEP
PCD 1.1.2	Nominal responsivity
PCD 1.1.5	Monitor detector temperature variations with time
PCD 1.1.12	Measure the bolometers noise equivalent power (NEP)
PCD 3.2.3	Calibrate the photometer's non-linearity
	Bolometer settings/characterisation VI
PCD 1.1.6	Calibrate the variation of pixel offset with detector temperature
PCD 1.1.8	Measure bolometer time constants after switch-on
PCD 1.1.11	Measure the low frequency noise
PCD 1.1.16	Measure the signal dependence on chopping frequency
PCD 1.1.18	Measure the level of electrical cross-talk
	Verification of chopper angular calibration
PCD 3.1.2	Relation between chopper position and angular displacement on sky
	FOV characterisation photometer
PCD 2.3.3	Optimal positioning of chopper on internal reference sources
PCD 2.5.4	Emissivity of PACS calibration sources
PCD 3.1.1	Photometer central pointing position
PCD 3.1.7	Full field-of-view maps
PCD 3.1.8	Investigation of photometer extra red "light"
PCD 3.2.8	Measure the photometer full system flat-field
	Photometer spatial calibration
PCD 3.1.3	Photometer field-of-view distortion
PCD 3.1.4	Photometer point spread function
PCD 3.1.5	Photometer ghosts
PCD 3.1.6	Photometer straylight
	Photometer photometric calibration
PCD 3.2.1	Derive photometr nominal responsivity
PCD 3.2.2	Monitor nominal responsivity variations with time
PCD 3.2.3	Calibrate the photometer's non-linearity
PCD 3.2.4	Establish the linearity of the full system
PCD 3.2.6	Noise and minimum detectable flux
PCD 3.2.8	Measure the photometer full system flat-field

Table 28: Relation of PV Phase test blocks with individual test items, continued.

	Spectrometer photometric calibration
PCD 2.5.4	Emissivity of PACS calibration sources
PCD 4.3.1	Absolute flux calibration internal sources, spectrometer
PCD 4.3.2	Reproducibility internal sources
PCD 4.3.3	Absolute flux calibration external sources, spectrometer
PCD 4.3.4	Flux reproducibility external sources
PCD 4.3.5	Linearity with flux
PCD 4.3.8	Relative spectral response function
PCD 4.3.11	Stability telescope background for spectrometer
PCD 4.3.12	Instrumental polarization spectrometer
PCD 7.2.1	Monitor the Herschel telescope background
	AOT validation photometer
PCD 5.1.1	Optimised observing strategy for point source photometry mode
PCD 5.1.2	Optimised observing strategy for small source photometry mode
PCD 5.1.3	Optimised observing strategy for raster map photometry mode
PCD 5.1.4	Optimised observing strategy for scan map photometry mode
	AOT validation spectrometer
PCD 5.2.1	Optimised observing strategy for chopping/nodding line spectroscopy mode
PCD 5.2.2	Optimised observing strategy for line spectroscopy in wavelength-switching mode
PCD 5.2.3	Optimised observing strategy for range scan spectroscopy mode
PCD 5.2.4	Optimised observing strategy for SED mode
	AOT validation parallel mode
PCD 5.1.5	Optimised observing strategy for SPIRE/PACS parallel mode
	Cross calibration
PCD 6.1.1	Compare point source fluxes between spectrometer and photometer
PCD 6.2.1	Herschel internal cross-calibration photometers
PCD 6.2.2	Herschel internal cross-calibration spectrometers
	Telescope pointing quality
PCD 2.6.1	Absolute pointing error
PCD 2.6.2	Relative pointing error
PCD 2.6.3	Absolute pointing error - scan mode
PCD 2.6.4	Relative pointing error - scan mode
	Out-of-field straylight verification
PCD 7.3.3	Verification of Moon straylight rejection
PCD 7.3.4	Sensitivity to bright out-of-field sources

5.3.3 Traceability Matrix PACS Calibration Up-Link Tables to PACS Calibration Requirements

Table 29: Traceability Matrix PACS Calibration up-link tables (in alphabetical order) to PACS Calibration Document items (AD1). The tables reflect the status of Astronomer Mission Configuration 35, the last one for PV Phase (PACS_MC_ASTR_CoP_PV_2009-11-12A).

CalU table	PCD (AD1) item	Purpose
BOLObias_firstTelescBack	1.1.0, 1.1.1	bolometer bias
BOLObias_ILT_dark_high	1.1.0, 1.1.1	voltage settings
BOLObias_ILT_standard_low	1.1.0, 1.1.1	
BOLObias_ILT_low_OD38	1.1.0, 1.1.1	
BOLObias_ILT_low_OD40	1.1.0, 1.1.1	
BOLObias_ILT_low_OD46	1.1.0, 1.1.1	
BOLObias_ILT_low_OD53	1.1.0, 1.1.1	
BOLObias_ILT_lowCSs	1.1.0, 1.1.1	
BOLObias_ILT_highCSs	1.1.0, 1.1.1	
BOLObias_ILT_preview_blu1	1.1.0, 1.1.1	
BOLObias_ILT_preview_blu2	1.1.0, 1.1.1	
BOLObias_ILT_preview_blu3	1.1.0, 1.1.1	
BOLObias_ILT_preview_blu4	1.1.0, 1.1.1	
BOLObias_ILT_preview_grn1	1.1.0, 1.1.1	
BOLObias_ILT_preview_grn2	1.1.0, 1.1.1	
BOLObias_ILT_preview_grn3	1.1.0, 1.1.1	
BOLObias_ILT_preview_grn4	1.1.0, 1.1.1	
BOLObias_orbit_standard	1.1.0, 1.1.1	
BOLObias_CSsTempTestOD84	1.1.0, 1.1.1	
BOLObias_nomiBias_high	1.1.0, 1.1.1	
BOLObias_lowBias_high	1.1.0, 1.1.1	
BOLObias_highBias_high	1.1.0, 1.1.1	
BOLObias_standard_low	1.1.0, 1.1.1	
BOLObias_standard_high	1.1.0, 1.1.1	
CHOPPERCSparams	2.3.3	chopper mid-position on internal cal sources
CONFChopper	2.3.2	chopper controller parameters
CONFChopper_auto	2.3.2	
CONFFWPHOT	–	photometer filter wheel controller parameters
CONFFWSPEC	–	spectrometer filter wheel controller parameters
CONFGrat	–	grating controller parameters
CONF_PHOT_params	5.1.1, 5.1.4, 5.1.5	photometer read-out settings
CONF_PHOT_params_halfcomp	5.1.1, 5.1.4, 5.1.5	
CONF_PHOT_params_doublecomp	5.1.1, 5.1.4, 5.1.5	
CONF_PHOT_params_LowGain	5.1.1, 5.1.4, 5.1.5	
CONF_SPEC_param	1.2.21	signal processing unit (SPU) parameters
CONF_SPEC_params	1.2.1, 1.2.3, 1.2.4, 1.2.21	spectrometer default detector, read-out & on-board data processing settings

Table 29: Traceability Matrix PACS Calibration up-link tables (in alphabetical order) to PACS Calibration Document items (AD1) continued.

CalU table	PCD (AD1) item	Purpose
FPGA_params	–	phase increment parameter Field Programmable Gate Arrays
isBrightPacsTrigger	1.1.1, 3.1.4, 3.2.3, 3.2.4 5.1.1, 5.1.4	switch photometer high gain to low gain
KEY_WAVES	4.3.8	spectrometer key wavelengths
OBCP3params OBCP3params_8rdouts OBCP3params_12rdouts OBCP3params_20rdouts OBCP3params_24rdouts OBCP3params_28rdouts OBCP3params_32rdouts OBCP3params_36rdouts OBCP3params_40rdouts OBCP3params_30secNod OBCP3params_01minNod OBCP3params_02minNod OBCP3params_04minNod OBCP3params_08minNod OBCP3params_nhold1	5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1 5.1.1	parameter settings for OnBoard Control Procedure #3 (fixed-fixed chopping photometry)
OBCP4params OBCP4params_8rdouts OBCP4params_32rdouts OBCP4params_6cycles OBCP4params_19cycles OBCP4params_nhold7	5.1.2 5.1.2 5.1.2 5.1.2 5.1.2 5.1.2	parameter settings for OnBoard Control Procedure #4 (two or three position chopping)
OBCP13params	5.2.1, 5.2.2, 5.2.3, 5.2.4	parameter settings for OnBoard Control Procedure #13 (internal calibration spectroscopy during slews)
OBCP27params	5.2.1	parameter settings for OnBoard Control Procedure #27 (grating line scan chopped)
OBCP32params OBCP32params_unChop	5.2.2 5.2.2 (⇒5.2.5)	parameter settings for OnBoard Control Procedure #32 (wavelength switch grating) parameter settings for unchopped grating line scan making use of OnBoard Control Procedure #32
OBCP35params	5.2.1, 5.2.3, 5.2.4	parameter settings for OnBoard Control Procedure #35 (grating scan with ABBA chopping)
PACSparams	–	parameter database for time duration computation

Table 29: Traceability Matrix PACS Calibration up-link tables (in alphabetical order) to PACS Calibration Document items (AD1) continued.

CalU table	PCD (AD1) item	Purpose
PacsTable_Spec_YZPixOffsets	4.1.2	spectrometer spatial pixel offsets
PACSyzoffsets	3.1.1, 3.1.2, 4.1.1, 4.1.2	virtual aperture calculation
PHOT	5.1.1, 5.1.2, 5.1.3	chop offsets &
SPEC	5.2.1, 5.2.3, 5.2.4	skew correction
PHOT_CHOP_params	5.1.1, 5.1.2, 5.1.3	chopper throw parameters for chopped photometer AOT modes
PHOT_CHOP_sky	3.1.2, 2.3.1	chopper angle calibration
PHOT_CHOP_sky_preOD84	3.1.2, 2.3.1	values essential for photometer
SMALL_SRC_params	5.1.2, 5.2.3	raster parameters
SMALL_SRC_params_17_17		small source observations photometer & spectrometer
SPEC_BAND_params	2.1.3, 4.3.8 5.2.1, 5.2.2, 5.2.3, 5.2.4	band limits for spectroscopy
SPEC_BCKG_FRAC	7.2.1, 4.1.3	telescope background per spaxel & PSF fraction for central pixel
SPEC_CHOP_params	4.1.1, 4.1.2	chopper throws for spectrometer science modes corrected for FP distortion/rotation effects
SPEC_NOD_params	4.1.1, 4.1.2 5.2.1, 5.2.3, 5.2.4	nod throws for spectrometer science modes corrected for FP distortion/rotation effects
SPEC_SKY_chop	3.1.2, 2.3.1, 3.1.1	chopper angle calibration
SPEC_CHOP_sky	4.1.1, 7.4.1	values essential for spectrometer
SPEC_MEC_Defaults	2.3.1, 4.2.1, 2.5.4	default mechanism settings for photometry & spectroscopy also including maxima of SPEC_MEC_Limits
SPEC_MEC_Limits	2.3.1, 4.2.1 3.1.7, 4.1.6	maximum allowed positions for chopper & grating mechanisms
		relation wavelength - grating position
SPEC_RSRF_Blue_SW	4.2.1	blue band, order 3, 33.6826 - 73.5131 µm
SPEC_RSRF_Blue_LW	4.2.1	blue band, order 2, 50.5823 - 110.3233 µm
SPEC_RSRF_Red	4.2.1	red band, order 1, 101.3209 - 220.4721 µm
0032_003.SIAM – 0078_001.SIAM	2.6.1, 3.1.1, 4.1.1, 7.4.1	spacecraft/instrument alignment matrix Focal Plane Geometry (FPG)

5.3.4 Traceability Matrix PACS Observing Time Estimator to PACS Calibration Requirements

Table 30: Traceability Matrix PACS Calibration up-link tables for sensitivity and observing time calculation to PACS Calibration Document items (AD1). The tables reflect the status of Astronomer Mission Configuration 35, the last one for PV Phase (PACS_MC_ASTR_CoP_PV_2009-11-12A).

CalU table	PCD (AD1) item	Purpose
PHOTnoise	1.1.12, 3.2.6	1σ rms noise for 1 s integration time per resolution element point/extended for blue, green and red filter
		continuum & line 1σ rms noise for 1 s integration time
SPECContLine1	1.2.10, 4.3.6	for grating 1st order (102 - 221 µm)
SPECContLine2	1.2.10, 4.3.6	for grating 2nd order (69 - 105 µm)
SPECContLine23	1.2.10, 4.3.6	for grating extended 2nd order (60 - 73.4 µm)
SPECContLine3	1.2.10, 4.3.6	for grating 3rd order (51 - 74 µm)
SPEC_resolution	4.2.2	spectral resolution per order and wavelength

5.3.5 Traceability Matrix Astronomical Observation Templates (AOTs) to PACS Calibration Requirements

Here we provide a summary overview of the PACS and parallel mode AOTs used for instrument commanding during the PV Phase. For identification of the AOT mode used for individual observations, we refer to the mission planning scheduling pages http://herschel.esac.esa.int/twiki/bin/view/HSC/WebHome#Mission_Planning, where the listings provide a 1-to-1 correspondence between the AOT name on the one hand, as listed here in the detailed plan, and the AOT mode and OBSID on the other hand.

In Table 31, we distinguish between 3 types of AOTs, namely engineering mode, calibration mode and science mode AOTs.

Table 31: Traceability Matrix PACS Astronomical Observtaion Templates (AOTs) to PACS Calibration Document items (AD1). The traceability matrix provides also a link to the different Proposals containing the instantiated Astronomical Observation Requests (AORs), see Sect. 6.1, and the corresponding sections of the detailed contents descriptions in Sect. 6.

Engineering AOTs	PCD (AD1) item	Proposal	Description in
PacsEng_BOLO_cooler	1.1.7	PVPhotCooler	Sect. 6.3
SpireEngParallelCoolerRecycle	1.1.7	PVParAOTVal	Sect. 6.3
PacsEng_PHOT_orbit_prologue		PVPhotSetup	Sect. 6.3
SpirePacsEng_Parallel_PacsPrologue		PVParAOTVal	Sect. 6.3
PacsEng_SPEC_orbit_prologue		PVSpecSetup	Sect. 6.3
PacsEng_Spec_setup_Flex		PVSpecSetup	Sect. 6.3
PacsEng_Spec_spu_setup_wait_reset		PVSpecSetup	Sect. 6.3
PacsEng_orbit_epilogue		PVPhotSetup, PVSpecSetup	Sect. 6.3
PacsEng_orbit_epilogue_CSon		PVPhotSetup, PVSpecSetup	Sect. 6.3
SpirePacsEng_Parallel_PacsEpilogue		PVParAOTVal	Sect. 6.3
PacsEng_setCSsTemp	related to 3.1.7	PVPhotSetup	Sect. 6.3
PacsEng_AF15_Test_Setup		PVPhotSetup	Sect. 6.3
PacsEng_Chopper_AutoOpt	2.3.2	PVMechChop	Sect. 6.2
PacsEng_Burstmode_Setup	related to 4.2.1	PVSpecWave	Sect. 6.19
PacsEng_Burstmode_Reset	related to 4.2.1	PVSpecWave	Sect. 6.19
PacsEng_Spec_dark_current_pv	1.2.6	PVSpecGeGa	Sect. 6.18

Table 31: Traceability Matrix PACS Astronomical Observtaion Templates (AOTs) to PACS Calibration Document items (AD1) continued.

Calibration AOTs	PCD (AD1) item	Proposal	Description in
PacsEng_Phot_VrlVhBlind	1.1.0	PVPhotBol	Sect. 6.5
PacsCal_Phot_highGainBiasDirect_Fix	1.1.1bis	PVPhotBol	Sect. 6.6
PacsCal_Phot_highGainBiasDDCS_Fix	1.1.1bis	PVPhotBol	Sect. 6.7
PacsCal_Phot_PVph_lowFreq	1.1.11	PVPhotBol	Sect. 6.7
PacsCal_Phot_bandpassDirect	1.1.16	PVPhotBol	Sect. 6.7
PacsCal_Phot_bandpassDDCS	1.1.16	PVPhotBol	Sect. 6.7
PacsCal_Phot_crossTalk	1.1.18	PVPhotBol	Sect. 6.7
PacsCal_Phot_TranspScan	transparent mode test	PVPhotSPU	Sect. 6.8
PacsCal_Phot_PSF_FieldDistort	2.6.2	PVPhotFPG	Sect. 6.4
	3.1.2	PVPhotSpatial	Sect. 6.9
	3.1.3, 3.1.4, 3.1.5	PVPhotSpatial	Sect. 6.11
PacsCal_OBCP_chop_scan_phot	3.1.7	PVPhotBol, PVPhotSpatial	Sect. 6.7; Sect. 6.10
	3.1.8	PVPhotBol	Sect. 6.7
PacsCal_OBCP_chopped_photometry	3.1.7, 3.1.8	PVPhotBol	Sect. 6.7
PacsCal_PacsPhotoDAC	2.6.2, 2.6.4	PVPhotFPG	Sect. 6.4
PacsCal_PacsPhoto	5.1.1	PVPhotAOTVal	Sect. 6.14
PacsCal_Spec_Star_Lin_Source	1.2.3	PVSpecGeGa	Sect. 6.18
PacsCal_Spec_Dark-CS_SimultaneousWarmUp	1.2.6	PVSpecGeGa	Sect. 6.18
PacsCal_Spec_Chopped_Raster	4.1.1, 4.1.2, 4.1.3	PVSpecSpatial	Sect. 6.21
PacsCal_Spec_Fov_Scan	4.1.6	PVSpecSpatial	Sect. 6.22
PacsCal_PacsSpecSlewCal_Flex	4.3.1, 4.3.8	PVSpecFlux	Sect. 6.23
PacsCal_PacsSpecSlewCal35_Flex	4.3.1	PVSpecFlux	Sect. 6.23
PacsCal_PacsSpecSlewCal35_Flex_Raster	4.3.12	PVSpecFlux	Sect. 6.23
PacsCal_Spec_QuickFullSpectrum	4.3.8	PVSpecFlux	Sect. 6.23
PacsCal_Spec_Rsrf	4.3.8	PVSpecFlux	Sect. 6.23
PacsCal_WaveCalNoChop	4.2.1	PVSpecWave	Sect. 6.19
	4.3.8	PVSpecFlux	Sect. 6.23
	5.2.1	PVSpecAOTVal	Sect. 6.24
PacsCal_WaveCalNoChop_Burst	4.2.1	PVSpecWave	Sect. 6.19
PacsCal_WaveCalChop	4.1.1	PVSpecSpatial	Sect. 6.21
	4.2.2	PVSpecIP	Sect. 6.20
	4.3.8	PVSpecFlux	Sect. 6.23
	5.2.1, 5.2.4	PVSpecAOTVal	Sect. 6.24
PacsCal_WaveCalRaster	4.2.5	PVSpecWave	Sect. 6.19
PacsCal_PacsLineSpec_FPG	4.1.1	PVSpecSpatial	Sect. 6.21

Table 31: Traceability Matrix PACS Astronomical Observtaion Templates (AOTs) to PACS Calibration Document items (AD1) continued.

Calibration AOTs	PCD (AD1) item	Proposal	Description in
PacsCal_PacsLineSpec_PV	1.2.21	PVSpecSPU	Sect. 6.17
	4.1.1	PVSpecSpatial	Sect. 6.21
	4.2.2	PVSpecIP	Sect. 6.20
	4.3.11	PVSpecFlux	Sect. 6.23
	5.2.1, 5.2.2	PVSpecAOTVal	Sect. 6.24
PacsCal_PacsLineSpec_unChop	5.2.1, 5.2.2 (unchopped line scan)	PVSpecAOTVal	Sect. 6.24
PacsCal_PacsRangeSpec_PV	4.2.2	PVSpecIP	Sect. 6.20
	4.3.3, 4.3.4, 4.3.5, 4.3.8	PVSpecFlux	Sect. 6.23
	5.2.3, 5.2.4	PVSpecAOTVal	Sect. 6.24
Science AOTs	PCD (AD1) item	Proposal	Description in
PacsPhoto (chop/nod)	2.6.1	PVPhotFPG	Sect. 6.4
	3.1.4	PVPhotSpatial	Sect. 6.11
	3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.6	PVPhotFlux	Sect. 6.12
	5.1.1	PVPhotAOTVal	Sect. 6.14
PacsPhoto (smallsrc)	3.1.4	PVPhotSpatial	Sect. 6.11
	5.1.2	PVPhotAOTVal	Sect. 6.14
PacsPhoto (raster)	2.6.2	PVPhotFPG	Sect. 6.4
	3.2.1	PVPhotFlux	Sect. 6.12
	5.1.3	PVPhotAOTVal	Sect. 6.14
PacsPhoto (scan)	2.6.4	PVPhotFPG	Sect. 6.4
	3.1.3, 3.1.4, 3.1.5	PVPhotSpatial	Sect. 6.11
	3.2.1, 3.2.6, 3.2.8	PVPhotFlux	Sect. 6.12
	3.1.6	PVPhotSpatial	Sect. 6.11
	7.3.3	PVPhotStray	Sect. 6.13
	5.1.1 (minimap), 5.1.4	PVPhotAOTVal	Sect. 6.14
SpirePacsParallel	3.1.6, 7.3.4	PVParStray	Sect. 6.15
	5.1.5	PVParAOTVal	Sect. 6.16
PacsLineSpec	4.2.1	PVSpecWave	Sect. 6.19
	5.2.1, 5.2.2	PVSpecAOTVal	Sect. 6.24
PacsRangeSpec	4.3.3	PVSpecFlux	Sect. 6.23

5.3.6 Traceability Matrix Standard Product Generation Calibration Files to PACS Calibration Requirements

Note that the following tables and flow diagrams represent the status of the PACS data reduction by the end of PV Phase. No attempt is made to present the final data reduction and product generation flow.

Photometer

Fig. 51 shows the flow chart for the photometer Standard Product Generation (SPG) including application of calibration files. The following Table 32 gives the relation between the SPG Cal File and the calibration requirement in the PCD (AD1) or another reference.

Table 32: Traceability Matrix PACS Photometer Standard Product Generation Cal Files (in alphabetical order) to PACS Calibration Document items (AD1).

Photometer SPG Cal File	Flow Chart #	PCD (AD1) item
ChopJitterThreshold	Fig. 51 part 1	2.3.1
ChopperAngle	Fig. 51 part 1	2.3.1
ChopperAngleredundant	Fig. 51 part 1	2.3.1
ChopperSkyAngle	Fig. 51 part 1	3.1.2
FlatField	Fig. 51 part 2	3.2.8
	Fig. 51 part 3	
PhotArrayInstrument	Fig. 51 part 3	3.1.3
	Fig. 51 part 4	
	Fig. 51 part 5	
	Fig. 51 part 6	
PhotBadPixelMask	Fig. 51 part 1	1.1.1
PhotCrosstalkMatrix	Fig. 51 part 1	1.1.17, 1.1.18
PhotGain	Fig. 51 part 1	1.1.0
PhotSatLimits	Fig. 51 part 1	1.1.1
SubarrayArray	Fig. 51 part 3	3.1.3
	Fig. 51 part 4	
	Fig. 51 part 5	
	Fig. 51 part 6	

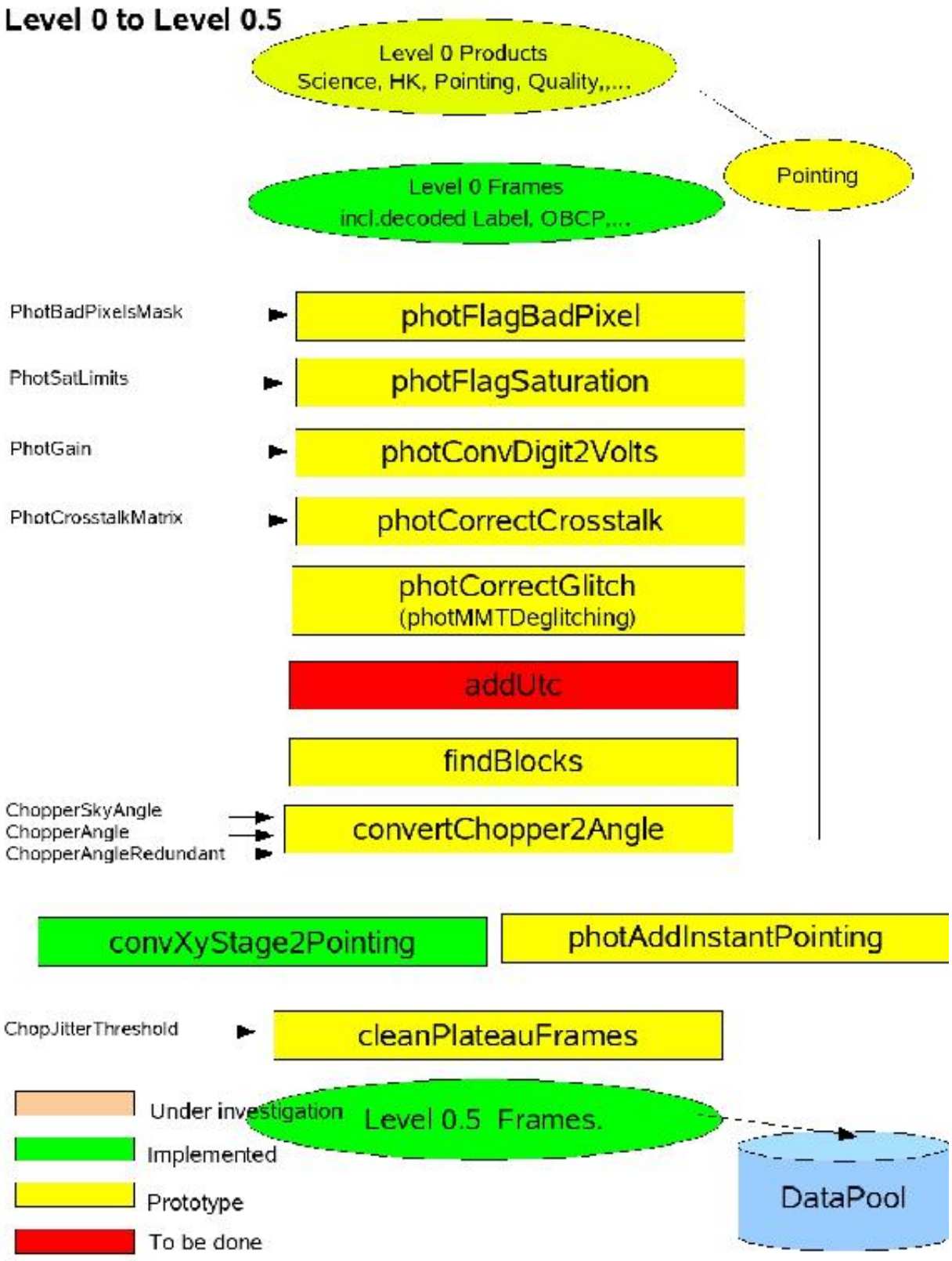


Figure 51: Part 1: Photometer Standard Product Generation from Level 0 to Level 0.5.

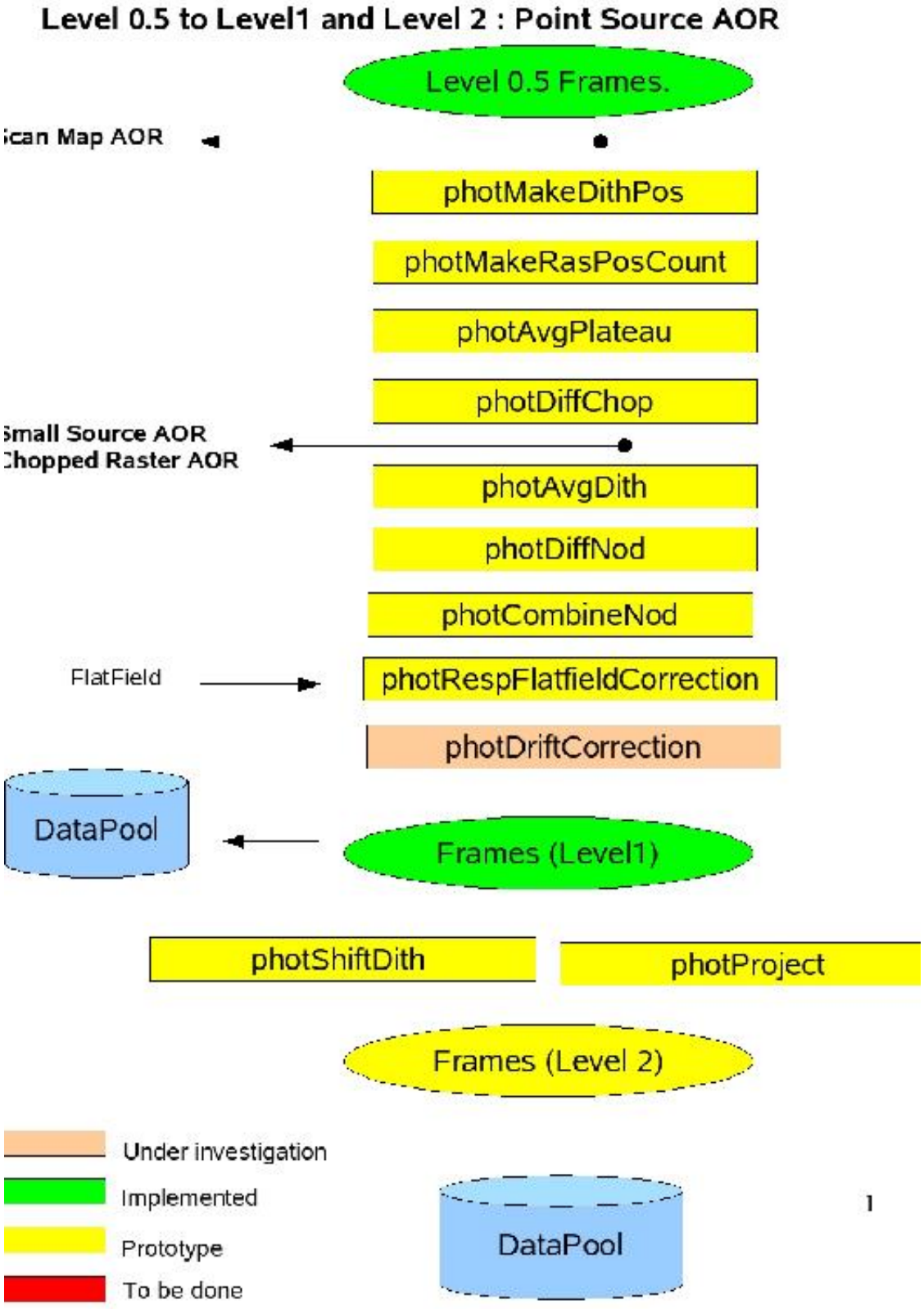


Figure 51: Part 2: Photometer Standard Product Generation from Level 0.5 to Level 2 for the Point Source AOR.

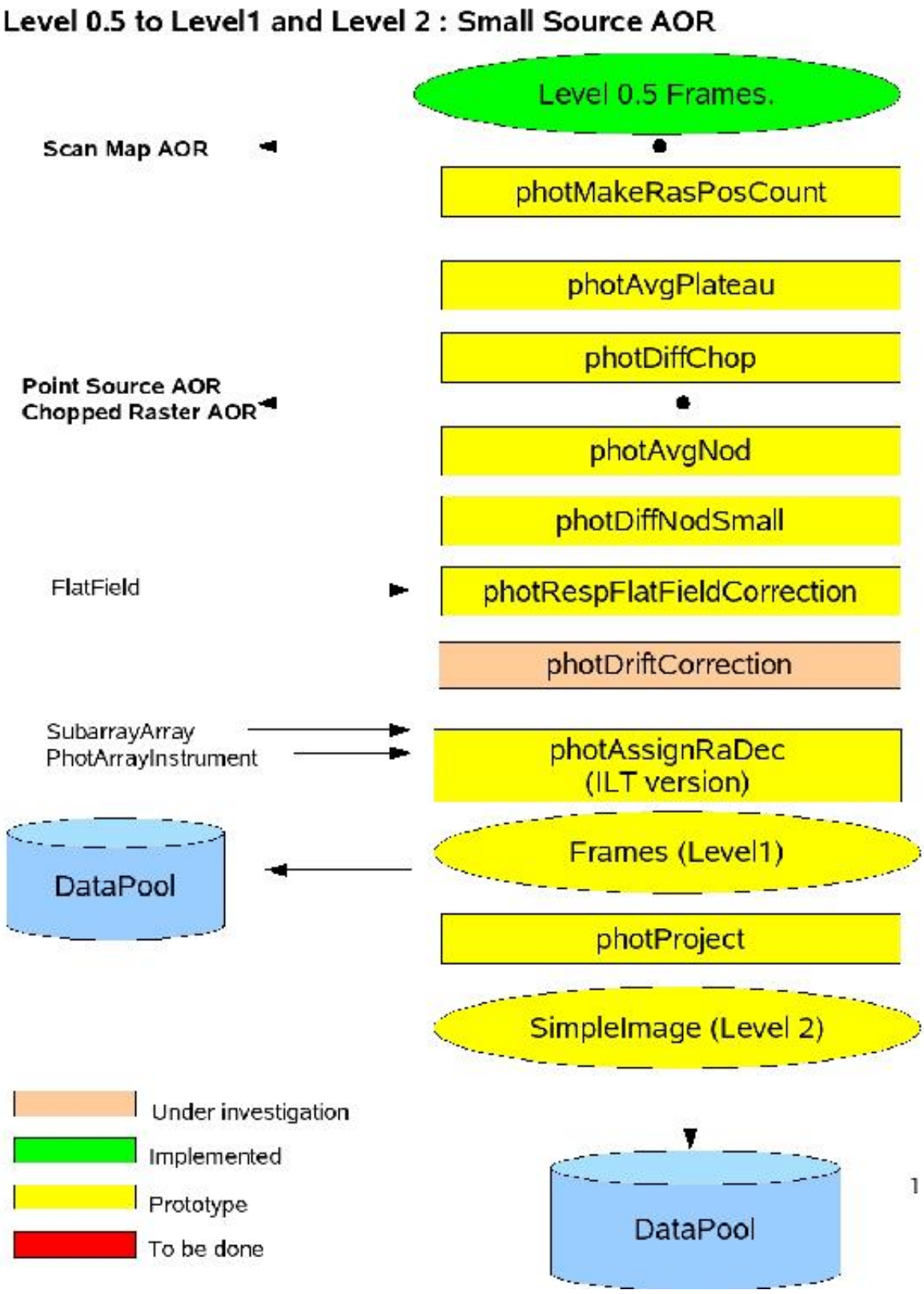


Figure 51: Part 3: Photometer Standard Product Generation from Level 0.5 to Level 2 for the Small Source AOR.

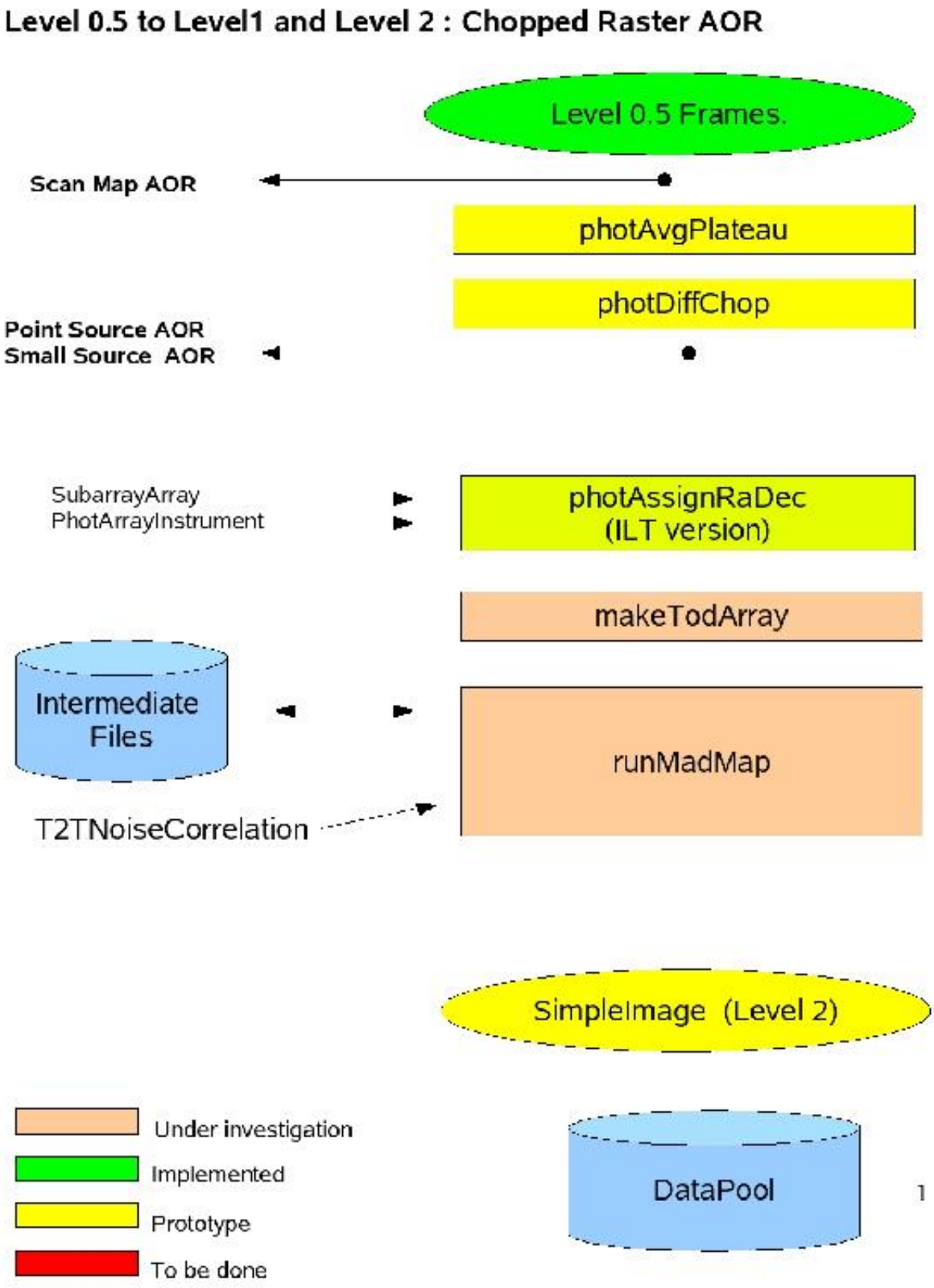


Figure 51: Part 4: Photometer Standard Product Generation from Level 0.5 to Level 2 for the Chopped Raster AOR.

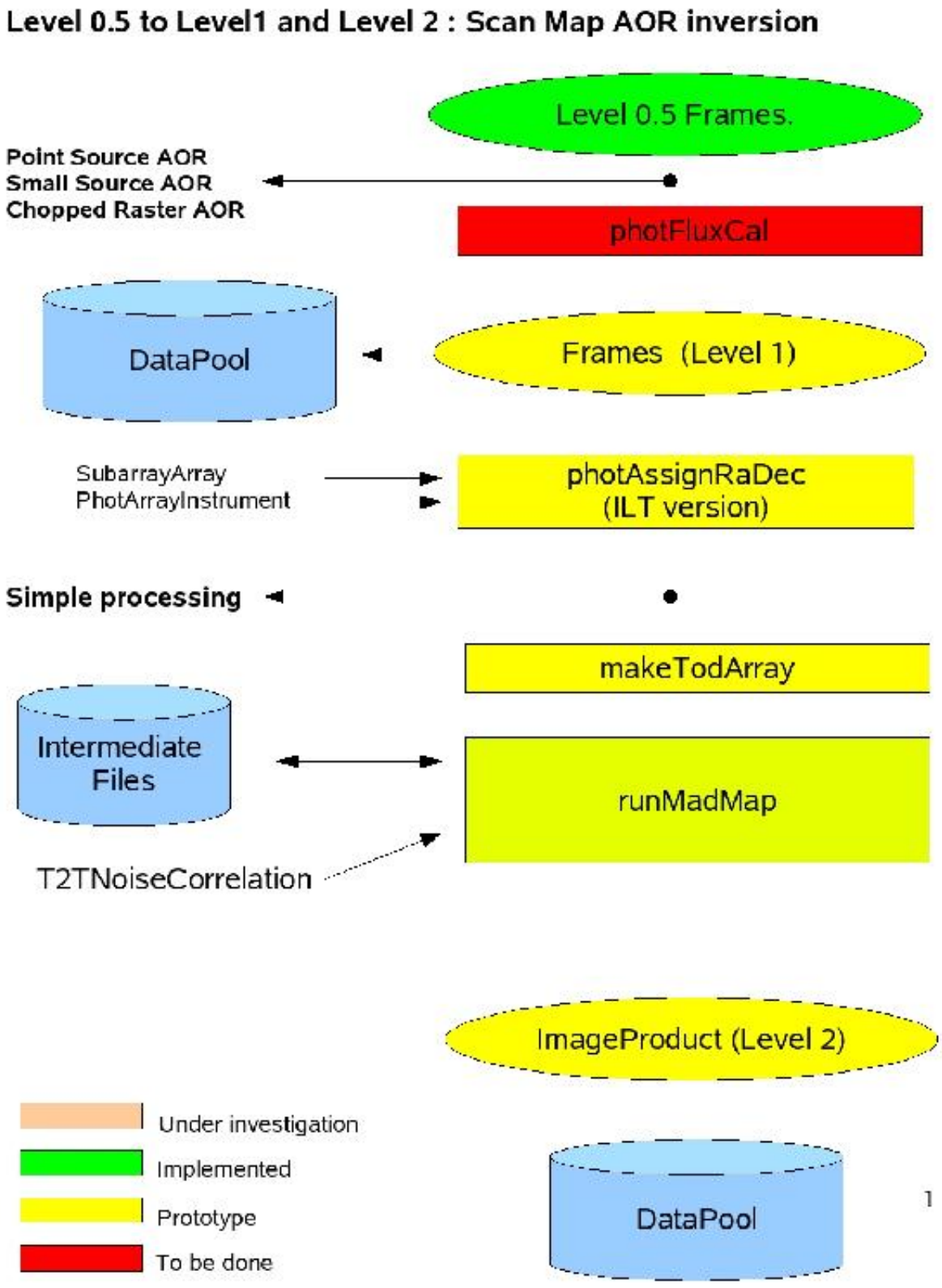


Figure 51: Part 5: Photometer Standard Product Generation from Level 0.5 to Level 2 for the Scan Map AOR inversion.

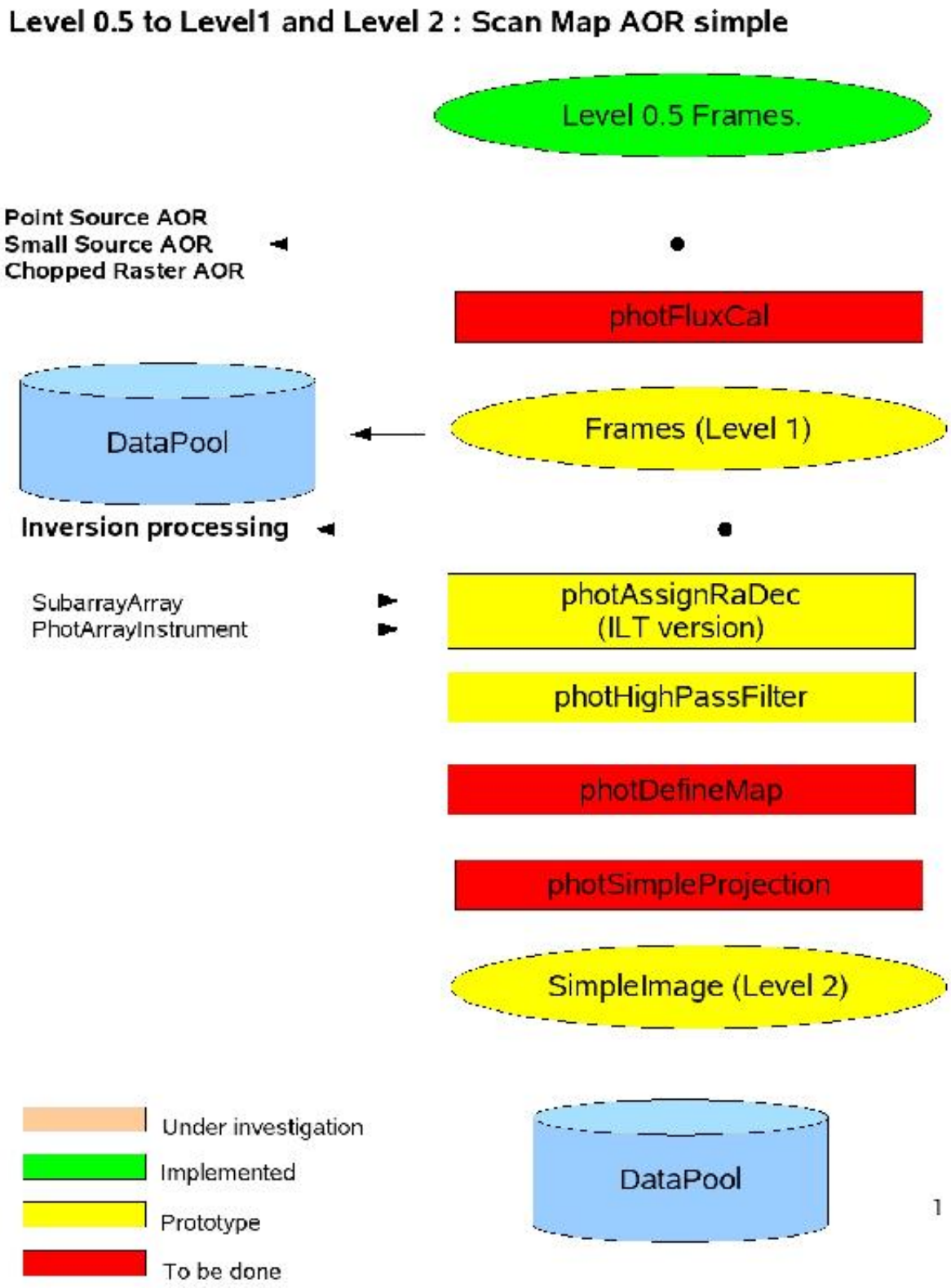


Figure 51: Part 6: Photometer Standard Product Generation from Level 0.5 to Level 2 for the Scan Map AOR simple.

Spectrometer

Fig. 52 shows the flow chart for the spectrometer Standard Product Generation (SPG) including application of calibration files. The following Table 33 gives the relation between the SPG Cal File and the calibration requirement in the PCD (AD1) or another reference.

Table 33: Traceability Matrix PACS Spectrometer Standard Product Generation Cal Files (in alphabetical order) to PACS Calibration Document items (AD1).

Spectrometer SPG Cal File	Flow Chart #	PCD (AD1) item
ArrayInstrument	Fig. 52 part 4	4.1.2
BadPixelMask	Fig. 52 part 3	1.2.1
CalSourceFlux	Fig. 52 part 5	4.3.1
CapacitanceRatios	Fig. 52 part 5	1.2.3, 1.2.4
ChopJitterThreshold	Fig. 52 part 3	2.3.1
ChopperAngle	Fig. 52 part 4	2.3.1
ChopperSkyAngle	Fig. 52 part 4	3.1.2
ChopperThrowDescription	Fig. 52 part 4	5.2.1 - 5.2.4
CrossTalkMatrix	Fig. 52 part 5	1.2.22
DummyNoiseLimits	Fig. 52 part 3	1.2.4
GlitchThreshold	Fig. 52 part 3	1.2.14
	Fig. 52 part 4	
GratingJitterThrehold	Fig. 52 part 3	
LittrowPolynomes	Fig. 52 part 5	4.2.1
ModuleArray	Fig. 52 part 4	4.1.2
NonLinearity	Fig. 52 part 5	1.2.11
OpenNoiseLimits	Fig. 52 part 3	
RampSatLimits	Fig. 52 part 3	1.2.3
Readouts2Volts	Fig. 52 part 3	DECMEC UM
RsrfX	Fig. 52 part 6	4.3.8
SignalSatLimits	Fig. 52 part 3	1.2.3

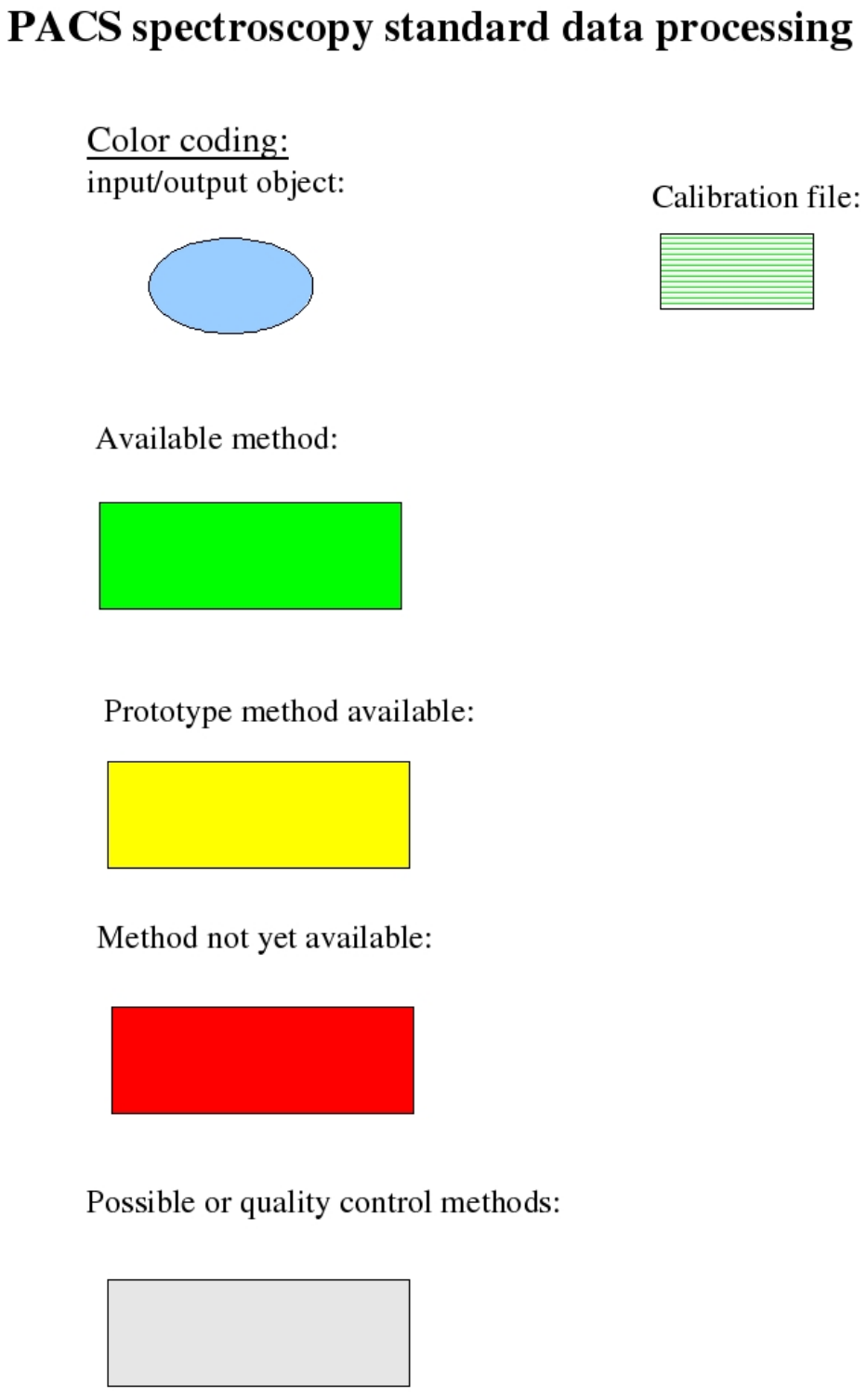


Figure 52: Part 0: Spectrometer Standard Product Generation Legend.

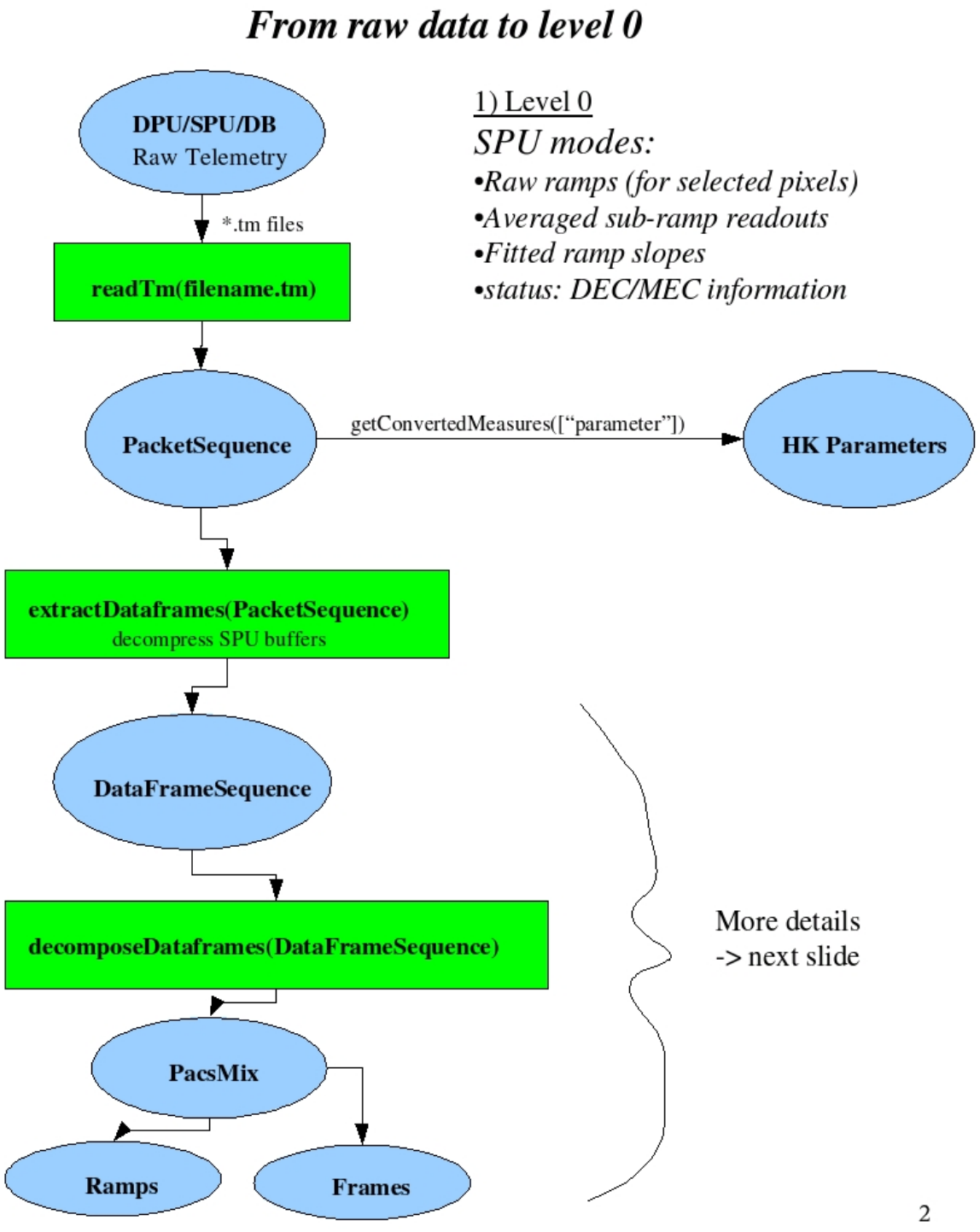


Figure 52: Part 1: Spectrometer Standard Product Generation from raw data to Level 0.

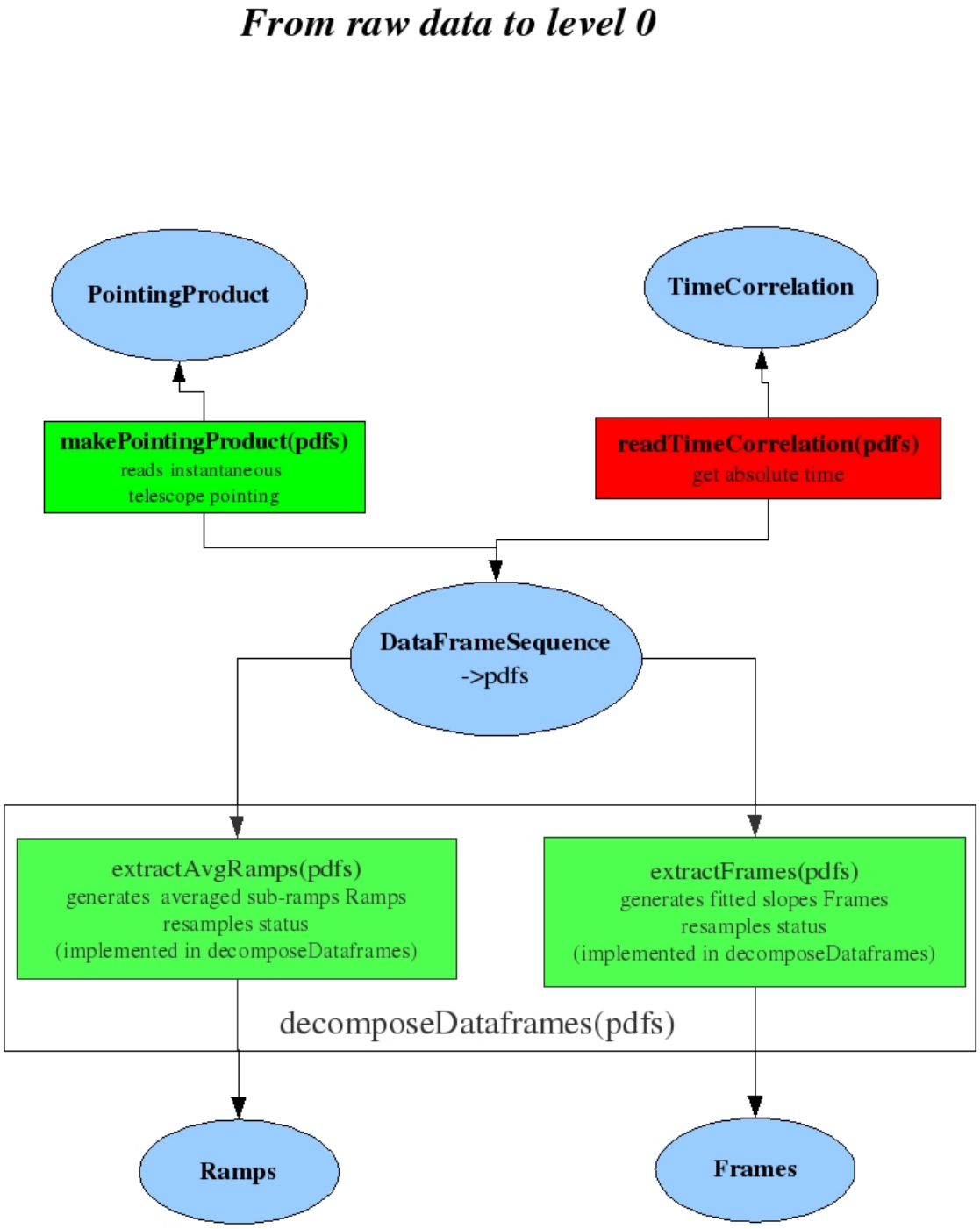


Figure 52: Part 2: Spectrometer Standard Product Generation from raw data to Level 0 details.

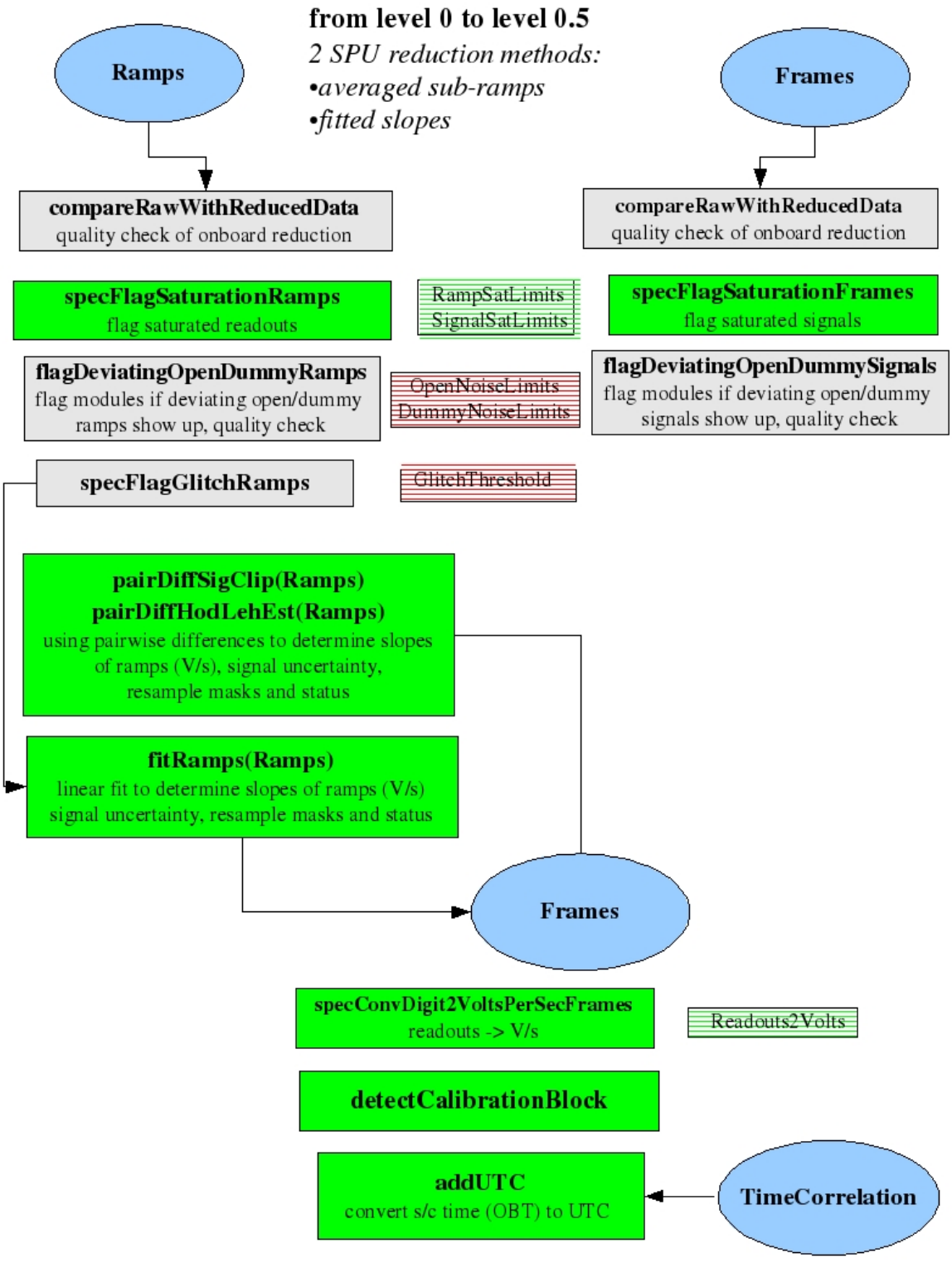


Figure 52: Part 3: Spectrometer Standard Product Generation from Level 0 to Level 0.5. SPU reduction modes.

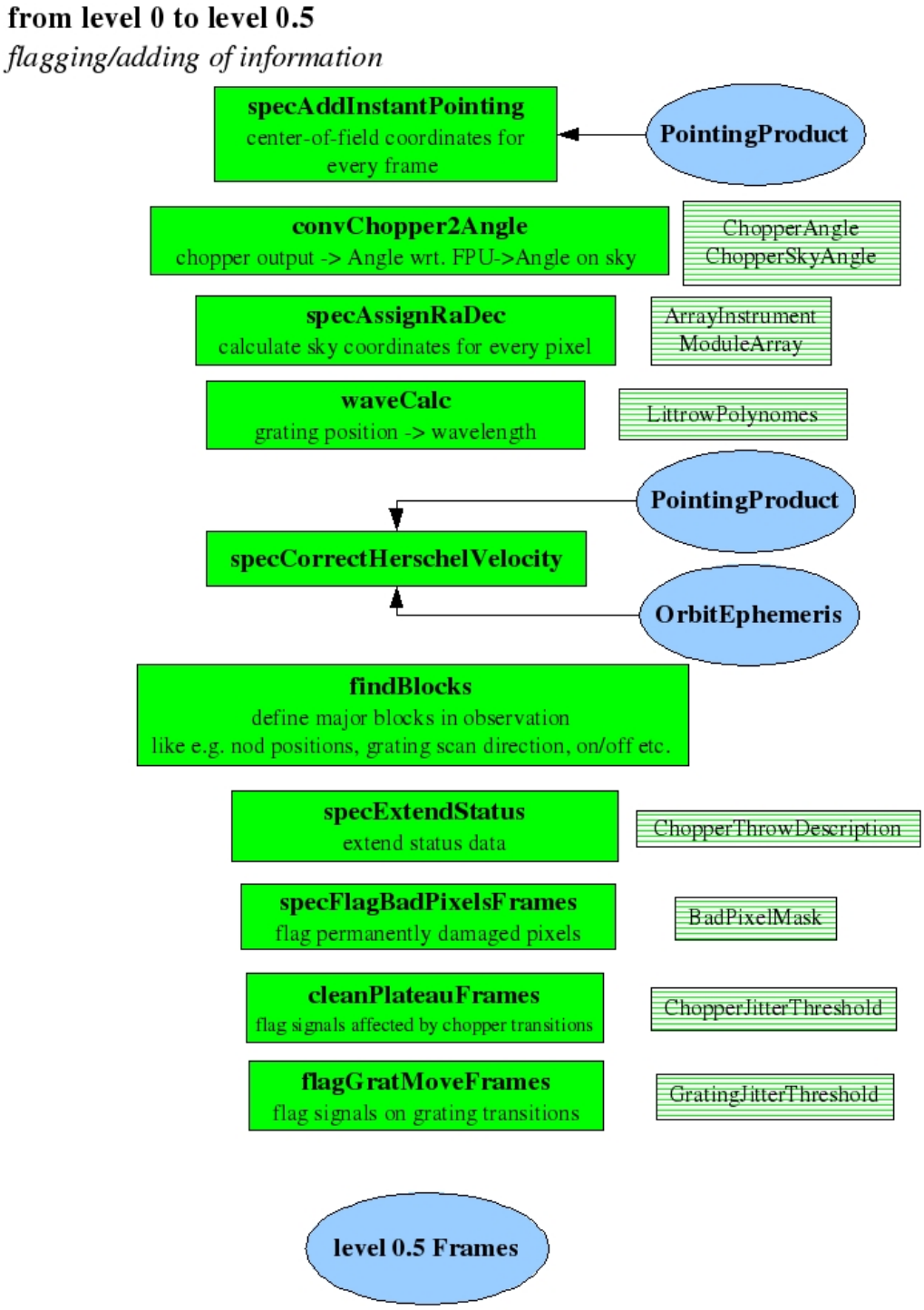


Figure 52: Part 4: Spectrometer Standard Product Generation from Level 0 to Level 0.5. Flagging and adding of information and chunking of data.

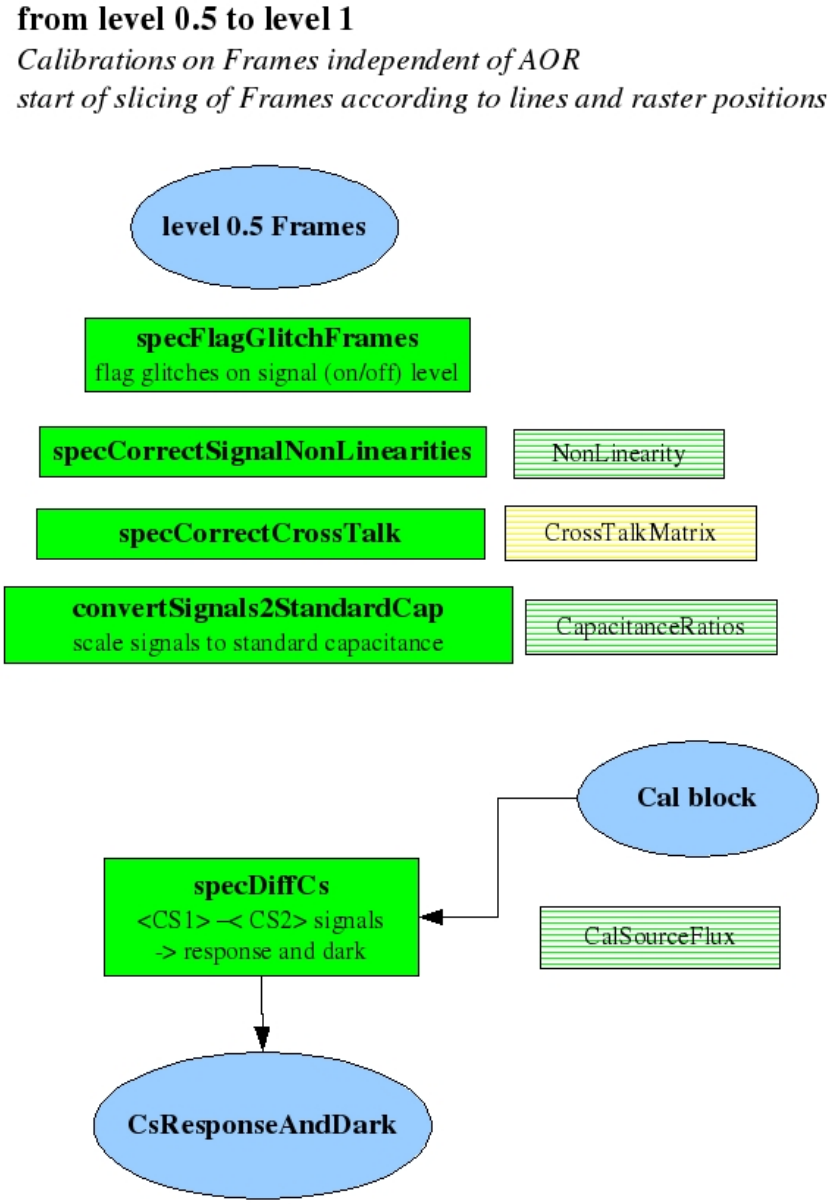


Figure 52: Part 5: Spectrometer Standard Product Generation from Level 0.5 to Level 1. Calibration of frames independent of AOT mode.

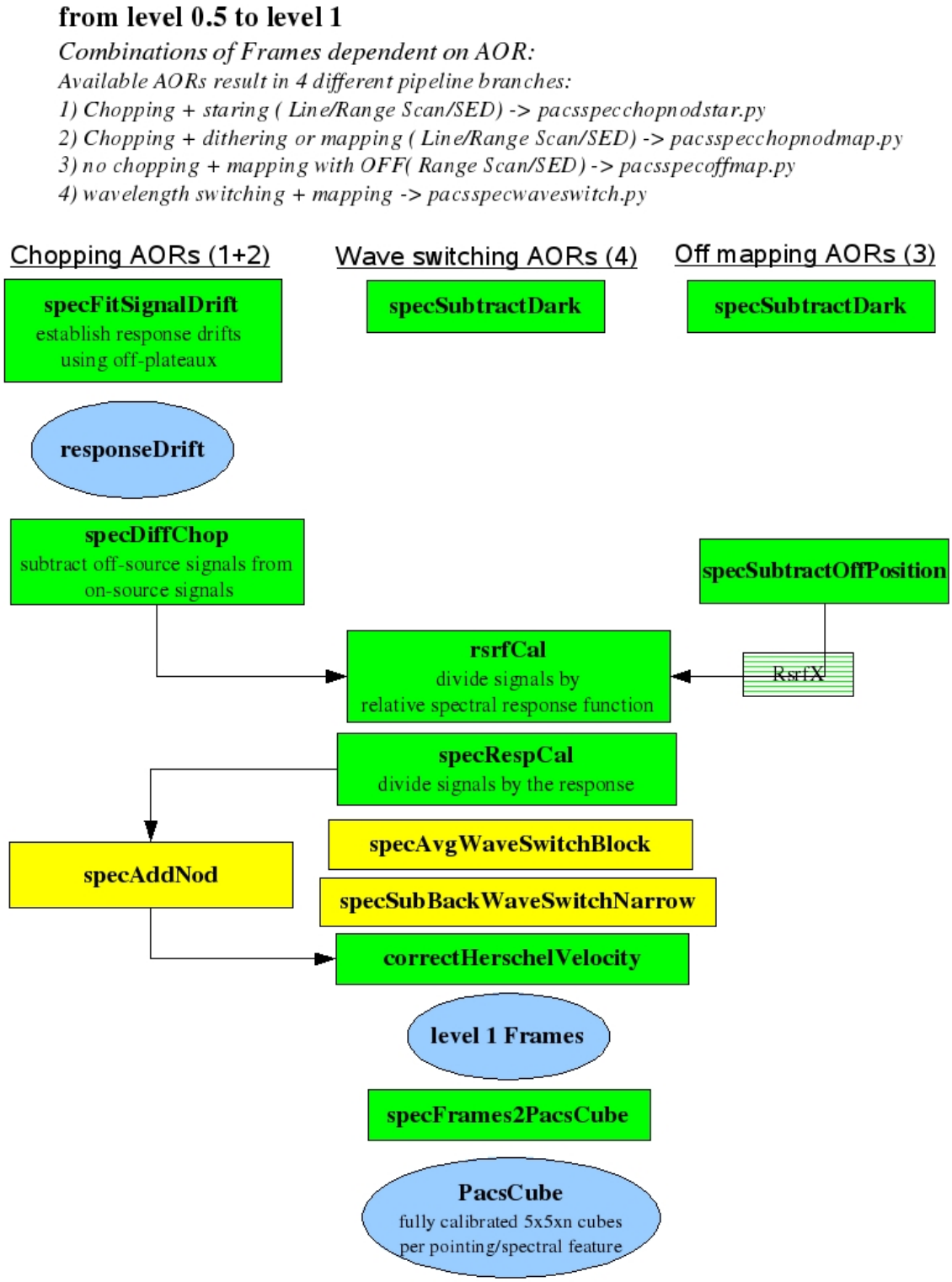


Figure 52: Part 6: Spectrometer Standard Product Generation from Level 0.5 to Level 1. Calibrations/combinations of frames dependent on AOT mode.

Figure 52: Part 7: Spectrometer Standard Product Generation from Level 1 to Level 2. Cube Builder.

6 PACS PVP Test Plan Detailed Contents

In this section the individual test blocks are associated with detailed measurement descriptions as outlined in AD1. This provides a total time estimate per test block and is a preparative step for the time-line construction, where dedicated celestial targets with their visibility restrictions will be assigned.

From Issue 0.82 onward the Commissioning Phase is no longer included in this overview, since a dedicated PACS Commissioning Phase Plan exists since November 2008 [AD5]. One should keep in mind that the initial detector optimisations and characterisations in-orbit are performed during the Commissioning Phase, with 3 test blocks for the bolometer and 4 test blocks for the Ge:Ga detectors. These are complemented by further test blocks during the PV Phase.

In addition, the Herschel Pointing Calibration performed with the PACS photometer and the Focal Plane Geometry assessment of the PACS spectrometer are described in the Pointing Calibration Plan [AD4]. The pointing calibration period has been implemented into the PV Phase.

Photometer operation needs to take into account regular cooler recyclings. The duration of the individual recyclings, 3 h each, will be added to the various test blocks.

6.1 Overview

The observations of the various test blocks and general purpose activities like orbit prologues (preparing the photometer and spectrometer for observations), epilogues (switching to safe mode) and cooler recyclings are associated with and organised in proposals, for an overview see Table 34. These proposal names are the first part of the identifier of each observation belonging to this proposal. Scheduled and executed observations are coloured in green. Failed observations are coloured in red. Test blocks that were deleted from the plan are kept and highlighted in blue colour as a reminder. Orange ones have not or only partially been implemented as AORs.

Table 34: Proposal names overview for PV observations.

Proposal	PVP test block/activity
PVMechChop	Calibration activities chopper
PVPhotCooler	Photometer cooler recyclings
PVPhotSetup	Photometer orbit prologues & epilogues
PVPhotBol	Bolometer (detector) setting/characterisation IV, V, VI
PVPhotSPU	Investigation of bolometer detector readout modes
PVPhotFPG	Herschel Pointing Calibration and PACS photometer Focal Plane Geometry
PVPhotSpatial	Angular and spatial calibration photometer, FOV characterisation photometer
PVPhotFlux	Photometric calibration photometer
PVPhotStray	Photometer far-field straylight assessment
PVPhotAOTVal	Photometer AOT validation
PVParAOTVal	SPIRE/PACS parallel mode AOT validation
PVParStray	SPIRE/PACS parallel mode straylight assessment
PVSpecSetup	Spectrometer orbit prologues & epilogues
PVSpecSPU	Spectrometer SPU modes checkout (to be defigned)
PVSpecGeGa	GeGa (detector) setting/characterisation V
PVSpecFPG	PACS spectrometer Focal Plane Geometry
PVSpecWave	Spectral calibration spectrometer
PVSpecIP	Instrumental profile spectrometer
PVSpecSpatial	Spatial calibration spectrometer
PVSpecFlux	Photometric calibration spectrometer
PVSpecAOTVal	Spectrometer AOT validation

6.2 Mechanism Performance

This test block covers performance tests of the PACS mechanics.

A performance dependence of the PACS chopper control loop parameters on the DECMEC temperature was noticed during commissioning phase. The chopper performance tests verify that the heating of the DECMEC electronics above a defined threshold guarantees the expected chopper plateau accuracy.

Table 35: Observational details of the PVP chopper mechanism measurements. The total estimated time of this test block is 0.1 h.

ID: PVMechChop						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
2.3.2 Verify chopper performance and PID parameters						
A	verification of the chopper performance depending on the DMC temperature, default PID parameters	CUS	0.025	default PID parameters, at start of OD after active DMC heating and a PACS OD	0.1	none

Table 36: Available AORs for the PVP chopper mechanism measurements. The total scheduled time is 0.0494 h.

ID: PVMechChop				
	Measurement description	AOR labels	duration (h)	observing constraints
2.3.2 Verify chopper performance and PID parameters				
A	verification of chopper performance using the default PID parameters	PVMechChop_232A_nStd_PidVeriDefault_DmcTemp_na_0001	0.0247	OD 126
		PVMechChop_232A_nStd_PidVeriDefault_DmcTemp_na_0002	0.0247	OD 154
		PVMechChop_232A_nStd_PidVeriDefault_DmcTemp_na_0003	0.0247	

6.3 General Purpose and Set-up Modes

The AORs of the general purpose proposals are listed in Table 37, Table 38 and Table 39. A sufficient number of photometer cooler recyclings and set-ups as well as spectrometer set-ups have been prepared for the PV Phase planning (note: not all of them may be scheduled eventually). A cooler recycling at the beginning of a photometer OD takes 2.3728 h, the set-up of the photometer including the heat-up of the calibration sources takes 2272 s, the set-up of the spectrometer including the heat-up of the calibration sources takes 2458 s, and a switch-off of both sub-instruments to safe mode 13 s.

For special observing conditions, which require e.g. switched-off internal calibration sources, like e.g. in Sect. 6.10 modified set-up AORs have been created.

Table 37: Available AORs for the PVP photometer cooler recyclings. The total scheduled time is 47.4560 h plus 5.7512 h for parallel mode cooler recycling.

ID: PVPhotCooler				
	Measurement description	AOR labels	duration (h)	observing constraints
		1.1.7 Monitor cooler recycling frequency		
A	standard cooler recycling	PVPhotCooler_117_nStd_na_na_0001	2.3728	OD 64
		PVPhotCooler_117_nStd_na_na_0002	2.3728	OD 67
		PVPhotCooler_117_nStd_na_na_0003	2.3728	OD 72
		PVPhotCooler_117_nStd_na_na_0004	2.3728	OD 84
		PVPhotCooler_117_nStd_na_na_0005	2.3728	OD 92
		PVPhotCooler_117_nStd_na_na_0006	2.3728	OD 96
		PVPhotCooler_117_nStd_na_na_0007	2.3728	OD 101
		PVPhotCooler_117_nStd_na_na_0008	2.3728	OD 104
		PVPhotCooler_117_nStd_na_na_0009	2.3728	OD 107
		PVPhotCooler_117_nStd_na_na_0010	2.3728	OD 109
		PVPhotCooler_117_nStd_na_na_0011	2.3728	OD 118
		PVPhotCooler_117_nStd_na_na_0012	2.3728	OD 120
		PVPhotCooler_117_nStd_na_na_0013	2.3728	OD 124
		PVPhotCooler_117_nStd_na_na_0014	2.3728	OD 127
		PVPhotCooler_117_nStd_na_na_0015	2.3728	OD 132
		PVPhotCooler_117_nStd_na_na_0016	2.3728	OD 138
		PVPhotCooler_117_nStd_na_na_0017	2.3728	OD 146
		PVPhotCooler_117_nStd_na_na_0018	2.3728	OD 148
		PVPhotCooler_117_nStd_na_na_0019	2.3728	OD 150
		PVPhotCooler_117_nStd_na_na_0020	2.3728	OD 156
		PVPhotCooler_117_nStd_na_na_0021	2.3728	OD 160
		PVPhotCooler_117_nStd_na_na_0022	2.3728	
		PVPhotCooler_117_nStd_na_na_0023	2.3728	
		PVPhotCooler_117_nStd_na_na_0024	2.3728	
		PVPhotCooler_117_nStd_na_na_0025	2.3728	
ID: PVParAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
		Parallel mode cooler recyclings		
	standard parallel mode cooler recycling	PVParAOTVal_Cooler_na_nStd_na_na_0001	2.8756	OD 111
		PVParAOTVal_Cooler_na_nStd_na_na_0002	2.8756	OD 136

Table 38: Available AORs for the PVP photometer orbit prologue and epilogue set-ups. The total scheduled time is 27.0008 h. plus 2.6550 h for parallel mode set-up.

ID: PVPhotSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
		Photometer orbit prologues and epilogues		
A	standard photometer orbit prologue	PVPhotSetup_na_nStd_orbitpro_na_0001	0.6497	OD 64
		PVPhotSetup_na_nStd_orbitpro_na_0002	0.6497	OD 65
		PVPhotSetup_na_nStd_orbitpro_na_0003	0.6497	OD 67
		PVPhotSetup_na_nStd_orbitpro_na_0004	0.6497	OD 72
		PVPhotSetup_na_nStd_orbitpro_na_0005	0.6497	OD 73
		PVPhotSetup_na_nStd_orbitpro_na_0006	0.6497	OD 85
		PVPhotSetup_na_nStd_orbitpro_na_0007	0.6497	OD 86
		PVPhotSetup_na_nStd_orbitpro_na_0008	0.6497	OD 92
		PVPhotSetup_na_nStd_orbitpro_na_0010	0.6497	OD 93
		PVPhotSetup_na_nStd_orbitpro_na_0011	0.6497	OD 96
		PVPhotSetup_na_nStd_orbitpro_na_0012	0.6497	OD 101
		PVPhotSetup_na_nStd_orbitpro_na_0013	0.6497	OD 104
B	photometer orbit prologue for PVPhotBol internal calibration source temperature tuning	PVPhotSetup_na_nStd_orbitproCS40_45_0001	0.0453	OD 84
		PVPhotSetup_na_nStd_orbitproCS45_50_0001	0.0453	OD 84
		PVPhotSetup_na_nStd_orbitproCS50_55_0001	0.0453	OD 84
		no CS stabilisation!		
		PVPhotSetup_na_nStd_orbitproCS55_60_0001	0.6286	OD 84
		orbit prologue of normal length		
C	photometer orbit prologue for PVPhotBol analysis of red detector dark signal	PVPhotSetup_na_nStd_orbitpro_Red00_na_0001	0.0369	OD 85
		PVPhotSetup_na_nStd_orbitpro_Red00_na_0002	0.0369	OD 97
		PVPhotSetup_na_nStd_orbitpro_Red00_na_0003	0.5369	OD 108
		PVPhotSetup_na_nStd_orbitpro_Red01_na_0001	0.0417	OD 85
		PVPhotSetup_na_nStd_orbitpro_Red01_na_0002	0.0417	OD 97
		PVPhotSetup_na_nStd_orbitpro_Red01_na_0003	0.5417	OD 108
		PVPhotSetup_na_nStd_orbitpro_Red10_na_0001	0.0417	OD 85
		PVPhotSetup_na_nStd_orbitpro_Red10_na_0002	0.0417	OD 97
		PVPhotSetup_na_nStd_orbitpro_Red10_na_0003	0.5417	OD 108
		PVPhotSetup_na_nStd_orbitpro_Red11_na_0001	0.0464	OD 85
		PVPhotSetup_na_nStd_orbitpro_Red11_na_0002	0.0464	OD 97
		PVPhotSetup_na_nStd_orbitpro_Red11_na_0003	0.5464	OD 108
D	special photometer orbit prologue	PVPhotSetup_na_nStd_orbitproCSoff_na_0001	0.5453	OD 64
		CSs remain off!		
E	special photometer orbit prologue	PVPhotSetup_na_nStd_orbitproCSon_na_0001	0.1008	OD 97
		PVPhotSetup_na_nStd_orbitproCSon_na_0002	0.1008	OD 105
		when CSs are kept on!		

Table 38: continued. Available AORs for the PVP photometer orbit prologue and epilogue set-ups.

ID: PVPhotSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
F	photometer orbit prologue with special activites during cal block	PVPhotSetup_na_nStd_orbitpro40Hz_na_0001	0.6383	OD 93
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0002	0.6383	OD 127
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0003	0.6383	OD 138
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0004	0.6383	OD 146
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0005	0.6383	OD 149
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0006	0.6383	OD 156
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0007	0.6383	OD 161
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0008	0.6383	
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0009	0.6383	
		PVPhotSetup_na_nStd_orbitpro40Hz_na_0010	0.6383	
		PVPhotSetup_na_nStd_orbitpro40Hz_OD108_0001	0.5550	OD 108
		PVPhotSetup_na_nStd_orbitpro40HzCSon_OD118_0001	0.6383	OD 118
		PVPhotSetup_na_nStd_orbitproVRL_na_0001	0.6497	OD 120
		PVPhotSetup_na_nStd_orbitproVRL_na_0002	0.6497	OD 124
		PVPhotSetup_na_nStd_orbitproVRL_na_0003	0.6497	OD 128
		PVPhotSetup_na_nStd_orbitproVRL_na_0004	0.6497	OD 132
		PVPhotSetup_na_nStd_orbitproVRL_na_0005	0.6497	OD 139
		PVPhotSetup_na_nStd_orbitproVRL_na_0006	0.6497	OD 148
		PVPhotSetup_na_nStd_orbitproVRL_na_0007	0.6497	OD 150
		PVPhotSetup_na_nStd_orbitproVRL_na_0008	0.6497	OD 157
		PVPhotSetup_na_nStd_orbitproVRL_na_0009	0.6497	OD 160
		PVPhotSetup_na_nStd_orbitproVRL_na_0010	0.6497	
		PVPhotSetup_na_nStd_orbitproVRL_OD107_0001	0.6497	OD 107
		PVPhotSetup_na_nStd_orbitproVRL_OD110_0001	0.5664	OD 110
		PVPhotSetup_na_nStd_orbitproVRL_OD124_0001	0.6497	
		PVPhotSetup_na_nStd_orbitproWait_na_0001	0.6286	OD 173
		PVPhotSetup_na_nStd_orbitproWait_na_0002	0.6286	
		PVPhotSetup_na_nStd_orbitproWait_na_0003	0.6286	
		PVPhotSetup_na_nStd_orbitproWait_na_0004	0.6286	
		PVPhotSetup_na_nStd_orbitproWait_na_0005	0.6286	
		PVPhotSetup_na_nStd_orbitproWait_OD109_0001	0.5453	OD 109
		PVPhotSetup_na_nStd_orbitproWaitCSoff_OD118_0001	0.5453	OD 118

Table 38: continued. Available AORs for the PVP photometer orbit prologue and epilogue set-ups.

ID: PVPhotSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
F		PVPhotSetup_na_nStd_orbitproWaitCSon_na_0001	0.6286	
		PVPhotSetup_na_nStd_orbitproWaitCSon_na_0002	0.6286	
		PVPhotSetup_na_nStd_orbitproWaitCSon_na_0003	0.6286	
		PVPhotSetup_na_nStd_orbitproWaitCSon_na_0004	0.6286	
		PVPhotSetup_na_nStd_orbitproWaitCSon_OD119_0001	0.6286	OD 119
		PVPhotSetup_na_nStd_orbitproWaitCSon_OD125_0001	0.6286	OD 125
G	heat CSs to increased temperatures	PVPhotSetup_na_nStd_setCSs70_na_0001	0.5011	OD 119
		PVPhotSetup_na_nStd_setCSs70_na_0002	0.5011	
CSs on non-standard T! Heat-up from nominal T				
H	heat CSs to selected temperatures	PVPhotSetup_na_nStd_setCSsTemp_na_0001	0.5844	
		PVPhotSetup_na_nStd_setCSsTemp_na_0002	0.5844	
CS T selectable; default values are 48 and 58 Ω				
I	heat CSs to nominal temperatures	PVPhotSetup_na_nStd_setCSsNominal_OD118_0001	0.5844	
CS default values				
J	standard photometer orbit epilogue	PVPhotSetup_na_nStd_orbitepi_na_0001	0.0036	OD 64
		PVPhotSetup_na_nStd_orbitepi_na_0002	0.0036	OD 65
		PVPhotSetup_na_nStd_orbitepi_na_0003	0.0036	OD 67
		PVPhotSetup_na_nStd_orbitepi_na_0004	0.0036	OD 72
		PVPhotSetup_na_nStd_orbitepi_na_0005	0.0036	OD 73
		PVPhotSetup_na_nStd_orbitepi_na_0006	0.0036	OD 84
		PVPhotSetup_na_nStd_orbitepi_na_0007	0.0036	OD 85
		PVPhotSetup_na_nStd_orbitepi_na_0008	0.0036	OD 86
		PVPhotSetup_na_nStd_orbitepi_na_0009	0.0036	OD 92
		PVPhotSetup_na_nStd_orbitepi_na_0010	0.0036	OD 93
		PVPhotSetup_na_nStd_orbitepi_na_0011	0.0036	OD 97
		PVPhotSetup_na_nStd_orbitepi_na_0012	0.0036	OD 101
		PVPhotSetup_na_nStd_orbitepi_na_0013	0.0036	OD 105
		PVPhotSetup_na_nStd_orbitepi_na_0015	0.0036	OD 119
		PVPhotSetup_na_nStd_orbitepi_na_0016	0.0036	OD 120
		PVPhotSetup_na_nStd_orbitepi_na_0017	0.0036	OD 125
		PVPhotSetup_na_nStd_orbitepi_na_0018	0.0036	OD 127
		PVPhotSetup_na_nStd_orbitepi_na_0019	0.0036	OD 128
		PVPhotSetup_na_nStd_orbitepi_na_0020	0.0036	OD 132
		PVPhotSetup_na_nStd_orbitepi_na_0021	0.0036	OD 138
		PVPhotSetup_na_nStd_orbitepi_na_0022	0.0036	OD 139

Table 38: continued. Available AORs for the PVP photometer orbit prologue and epilogue set-ups.

ID: PVPhotSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
J		PVPhotSetup_na_nStd_orbitepi_na_0023	0.0036	OD 148
		PVPhotSetup_na_nStd_orbitepi_na_0024	0.0036	OD 149
		PVPhotSetup_na_nStd_orbitepi_na_0025	0.0036	OD 150
		PVPhotSetup_na_nStd_orbitepi_na_0026	0.0036	OD 156
		PVPhotSetup_na_nStd_orbitepi_na_0027	0.0036	OD 157
		PVPhotSetup_na_nStd_orbitepi_na_0028	0.0036	OD 160
		PVPhotSetup_na_nStd_orbitepi_na_0029	0.0036	OD 161
		PVPhotSetup_na_nStd_orbitepi_na_0030	0.0036	
		PVPhotSetup_na_nStd_orbitepi_OD110_0001	0.0036	OD 110
K	orbit epilogue with CSs kept on	PVPhotSetup_na_nStd_orbitepiCSon_na_0001	0.0036	OD 64
		PVPhotSetup_na_nStd_orbitepiCSon_na_0002	0.0036	OD 96
		PVPhotSetup_na_nStd_orbitepiCSon_na_0003	0.0036	OD 104
		PVPhotSetup_na_nStd_orbitepiCSon_na_0004	0.0036	OD 118
		PVPhotSetup_na_nStd_orbitepiCSon_na_0005	0.0036	OD 118
		PVPhotSetup_na_nStd_orbitepiCSon_na_0006	0.0036	OD 124
		PVPhotSetup_na_nStd_orbitepiCSon_na_0007	0.0036	OD 146
		PVPhotSetup_na_nStd_orbitepiCSon_na_0008	0.0036	OD 173
		PVPhotSetup_na_nStd_orbitepiCSon_na_0009	0.0036	
		PVPhotSetup_na_nStd_orbitepiCSon_na_0010	0.0036	
		PVPhotSetup_na_nStd_orbitepiCSon_OD107_0001	0.0036	OD 107
		PVPhotSetup_na_nStd_orbitepiCSon_OD108_0001	0.0036	OD 108
		PVPhotSetup_na_nStd_orbitepiCSon_OD109_0001	0.0036	OD 109
	CSs are kept on!			
L	orbit epilogue for PVPhotBol internal calibration source temperature tuning	PVPhotSetup_na_nStd_orbitepiCS40_45_on_0001	0.0036	OD 84
		PVPhotSetup_na_nStd_orbitepiCS45_50_on_0001	0.0036	OD 84
		PVPhotSetup_na_nStd_orbitepiCS50_55_on_0001	0.0036	OD 84
	CSs are kept on!			

Table 38: continued. Available AORs for the PVP photometer orbit prologue and epilogue set-ups.

ID: PVPhotSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
M	orbit epilogue for PVPhotBol analysis of red detector dark signal	PVPhotSetup_na_nStd_orbitepiCSon_red00_0001	0.0036	OD 85
		PVPhotSetup_na_nStd_orbitepiCSon_red00_0002	0.0036	OD 97
		PVPhotSetup_na_nStd_orbitepiCSon_red00_0003	0.0036	OD 108
		PVPhotSetup_na_nStd_orbitepiCSon_red01_0001	0.0036	OD 85
		PVPhotSetup_na_nStd_orbitepiCSon_red01_0002	0.0036	OD 97
		PVPhotSetup_na_nStd_orbitepiCSon_red01_0003	0.0036	OD 108
		PVPhotSetup_na_nStd_orbitepiCSon_red10_0001	0.0036	OD 85
		PVPhotSetup_na_nStd_orbitepiCSon_red10_0002	0.0036	OD 97
		PVPhotSetup_na_nStd_orbitepiCSon_red10_0003	0.0036	OD 108
		PVPhotSetup_na_nStd_orbitepiCSon_red11_0001	0.0036	OD 85
		PVPhotSetup_na_nStd_orbitepiCSon_red11_0002	0.0036	OD 108
		PVPhotSetup_na_nStd_orbitepiCSon_red11_0003	0.0036	
		PVPhotSetup_na_nStd_orbitepiCSonForRed_na_0001	0.0036	OD 97
CSs are kept on!				
N	orbit epilogue for 40 Hz readout check	PVPhotSetup_na_nStd_orbitepi40Hz_na_0001	0.0036	OD 93
O	Test autonomy function 15	PVPhotSetup_na_nStd_AF15_Test_Setup_0001	0.0842	OD 73
ID: PVParAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
Parallel mode set-up AORs				
	orbit prologue parallel mode	PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0001	0.6497	OD 111
	"VRL" mode on ODs 111/112	PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0002	0.6497	OD 112
	"Wait" mode on ODs 136/137	PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0003	0.6286	OD 136
		PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0004	0.6286	OD 137
	orbit epilogue parallel mode	PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0001	0.0456	OD 111
		PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0002	0.0456	OD 112
		PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0003	0.0036	OD 136
		PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0004	0.0036	OD 137
	SPIRE set-up AORs	SpireEngREDYtoPHOT_STBYGen-PtcOff_OD136	*0.1061*	OD 136
		SpireEngREDYtoPHOT_STBYGen-PtcOff_OD137	*0.1061*	OD 137
		SpireEngPHOT_STBYtoREDYGen-0000_OD136	*0.0361*	OD 136
		SpireEngPHOT_STBYtoREDYGen-0000_OD137	*0.0361*	OD 137

Table 39: Available AORs for the PVP spectrometer orbit prologue and epilogue set-ups. The total scheduled time is 48.8677 h.

ID: PVSpecSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
		Spectrometer orbit prologues and epilogues		
A	standard spectrometer orbit prologue	PVSpecSetup_na_nStd_orbitpro_na_0001	0.6831	OD 64
		PVSpecSetup_na_nStd_orbitpro_na_0002	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0003	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0004	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0005	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0006	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0007	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0008	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0009	0.6806	
		PVSpecSetup_na_nStd_orbitpro_na_0010	0.6806	
B	spectrometer orbit prologue with CSs switched off	PVSpecSetup_na_nStd_orbitpro_CSoff_na_0001	0.0972	
		PVSpecSetup_na_nStd_orbitpro_CSoff_na_0002	0.0972	
		CSs remain off!		
C	heat CSs to other than default or increased temperatures	PVSpecSetup_na_nStd_setCSsTemp_na_0001	0.2511	OD 154
		PVSpecSetup_na_nStd_setCSsTemp_na_0002	0.2511	
		PVSpecSetup_na_nStd_setCSs70_na_0001	0.2511	OD 110
		PVSpecSetup_na_nStd_setCSs70_na_0002	0.2511	
		PVSpecSetup_na_nStd_setCSs_80_58_na_0001	0.7511	OD 142
		PVSpecSetup_na_nStd_setCSs_80_92_na_0001	0.0039	
		CSs on non-standard T!		
D	spectrometer orbit prologue with shorter initial stabilisation	PVSpecSetup_na_nStd_orbitpro_short_0001	0.3472	
		PVSpecSetup_na_nStd_orbitpro_short_0002	0.3472	
		for mixed photometer/spectrometer ops with CSs still hot but switched-off		
E	special spectrometer orbit prologue with separate CRE and SPU setting = final orbit prologue set-up	PVSpecSetup_na_nStd_SetupFlexClassic_na_0001	0.1019	OD 90
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0002	0.1019	OD 93
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0003	0.1019	OD 102
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0004	0.1019	OD 114
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0005	0.1019	OD 120
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0006	0.1019	OD 126
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0007	0.1019	OD 129
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0008	0.1019	OD 133

Table 39: continued. Available AORs for the PVP spectrometer orbit prologue and epilogue set-ups.

ID: PVSpecSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
E		PVSpecSetup_na_nStd_SetupFlexClassic_na_0009	0.1019	OD 140
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0010	0.1019	OD 141
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0011	0.1019	OD 142
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0012	0.1019	OD 147
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0013	0.1019	OD 155
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0014	0.1019	OD 165
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0015	0.1019	OD 169
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0016	0.1019	OD 174
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0017	0.1019	OD 175
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0018	0.1019	OD 182
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0019	0.1019	OD 183
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0020	0.1019	OD 194
		PVSpecSetup_na_nStd_SetupFlexClassic_na_0021	0.1019	OD 195
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0001	0.8636	OD 90
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0002	0.5858	OD 93
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0003	2.3914	OD 102
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0004	0.8636	OD 114
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0005	2.3914	OD 120
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0006	2.2525	OD 126
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0007	1.1692	OD 129
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0008	0.8358	OD 133
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0009	0.8358	OD 140
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0010	2.2525	OD 141
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0011	0.8358	OD 142
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0012	2.2525	OD 147
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0013	0.8081	OD 155
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0014	2.2525	OD 165
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0015	2.2525	OD 169
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0016	2.2581	OD 174
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0017	2.2525	OD 175
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0018	2.2525	OD 182
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0019	2.2525	OD 183
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0020	0.8358	OD 194
		PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0021	0.8358	OD 195
Combination of SetupFlex & SpuSetupAndReset = final standard orbit prologue				

Table 39: continued. Available AORs for the PVP spectrometer orbit prologue and epilogue set-ups.

ID: PVSpecSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
F	special spectrometer orbit prologue with separate CRE and SPU setting	PVSpecSetup_na_nStd_SetupFlexDark_na_0001	0.1069	OD 78
		PVSpecSetup_na_nStd_SetupFlexDark_na_0002	0.1019	OD 154
		PVSpecSetup_na_nStd_SpuSetupAndResetDark_na_0001	1.9192	OD 78
		PVSpecSetup_na_nStd_SpuSetupAndResetDark_na_0002	0.5858	OD 154
Combination of SetupFlex & SpuSetupAndReset = orbit prologue **CSs remain off!**				
G	special spectrometer orbit prologue with separate CRE and SPU setting	PVSpecSetup_na_nStd_SetupFlexCSOn_na_0001	0.1069	OD 79
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0002	0.1019	OD 91
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0003	0.1019	OD 103
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0004	0.1019	OD 115
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0005	0.1019	OD 146
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0006	0.1019	OD 166
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0007	0.1019	OD 170
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0008	0.1019	OD 173
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0009	0.1019	
		PVSpecSetup_na_nStd_SetupFlexCSOn_na_0010	0.1019	
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0001	1.8914	OD 79
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0002	0.8636	OD 91
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0003	2.2581	OD 103
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0004	0.8636	OD 115
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0005	0.7525	OD 146
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0006	0.7525	OD 166
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0007	0.7525	OD 170
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0008	0.7525	OD 173
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0009	0.7525	
		PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0010	0.7525	
Combination of SetupFlex & SpuSetupAndReset = orbit prologue **if CSs are already on!**				

Table 39: continued. Available AORs for the PVP spectrometer orbit prologue and epilogue set-ups.

ID: PVSpecSetup				
	Measurement description	AOR labels	duration (h)	observing constraints
H	standard spectrometer orbit epilogue	PVSpecSetup_na_nStd_orbitepi_na_0001	0.0036	OD 64
		PVSpecSetup_na_nStd_orbitepi_na_0002	0.0036	OD 79
		PVSpecSetup_na_nStd_orbitepi_na_0003	0.0036	OD 91
		PVSpecSetup_na_nStd_orbitepi_na_0004	0.0036	OD 93
		PVSpecSetup_na_nStd_orbitepi_na_0005	0.0036	OD 103
		PVSpecSetup_na_nStd_orbitepi_na_0006	0.0036	OD 115
		PVSpecSetup_na_nStd_orbitepi_na_0007	0.0036	OD 120
		PVSpecSetup_na_nStd_orbitepi_na_0008	0.0036	OD 126
		PVSpecSetup_na_nStd_orbitepi_na_0009	0.0036	OD 129
		PVSpecSetup_na_nStd_orbitepi_na_0010	0.0036	OD 133
		PVSpecSetup_na_nStd_orbitepi_na_0011	0.0036	OD 140
		PVSpecSetup_na_nStd_orbitepi_na_0012	0.0036	OD 141
		PVSpecSetup_na_nStd_orbitepi_na_0013	0.0036	OD 142
		PVSpecSetup_na_nStd_orbitepi_na_0014	0.0036	OD 146
		PVSpecSetup_na_nStd_orbitepi_na_0015	0.0036	OD 147
		PVSpecSetup_na_nStd_orbitepi_na_0016	0.0036	OD 154
		PVSpecSetup_na_nStd_orbitepi_na_0017	0.0036	OD 155
		PVSpecSetup_na_nStd_orbitepi_na_0018	0.0036	OD 166
		PVSpecSetup_na_nStd_orbitepi_na_0019	0.0036	OD 170
		PVSpecSetup_na_nStd_orbitepi_na_0020	0.0036	OD 173
		PVSpecSetup_na_nStd_orbitepi_na_0021	0.0036	OD 174
		PVSpecSetup_na_nStd_orbitepi_na_0022	0.0036	OD 175
		PVSpecSetup_na_nStd_orbitepi_na_0023	0.0036	OD 182
		PVSpecSetup_na_nStd_orbitepi_na_0024	0.0036	OD 183
		PVSpecSetup_na_nStd_orbitepi_na_0025	0.0036	OD 194
		PVSpecSetup_na_nStd_orbitepi_na_0026	0.0036	OD 195
I	special spectrometer intermediate reconfiguration step in between switched-off ⇒ switched-on CSs	PVSpecSetup_na_nStd_enterSAFE_na_0001	0.0036	**like orbit epilogue, but placed in middle of OD**
		PVSpecSetup_na_nStd_enterSAFE_na_0002	0.0036	
J	spectrometer orbit epilogue leaving the CSs on	PVSpecSetup_na_nStd_orbitepiCSOn_na_0001	0.0036	OD 78
		PVSpecSetup_na_nStd_orbitepiCSOn_na_0002	0.0036	OD 90
		PVSpecSetup_na_nStd_orbitepiCSOn_na_0003	0.0036	OD 102
		PVSpecSetup_na_nStd_orbitepiCSOn_na_0004	0.0036	OD 114
		PVSpecSetup_na_nStd_orbitepiCSOn_na_0005	0.0036	OD 165
		PVSpecSetup_na_nStd_orbitepiCSOn_na_0006	0.0036	OD 169
CSs remain on!				

6.4 Herschel Pointing Calibration with PACS and PACS Focal Plane Geometry

This test block establishes the Herschel pointing performance numbers including the dependence on the solar aspect angle. It also determines the orientation of the instrument aperture w.r.t. the Attitude Control Frame which is expressed via the Spacecraft Instrument Alignment Matrix (SIAM). While the PACS blue photometer is an integral part of the Herschel pointing calibration, the PACS spectrometer aperture position relative to the blue photometer reference pixel is determined in the Focal Plane Geometry assessment like the positions of the apertures of the other two Herschel instruments.

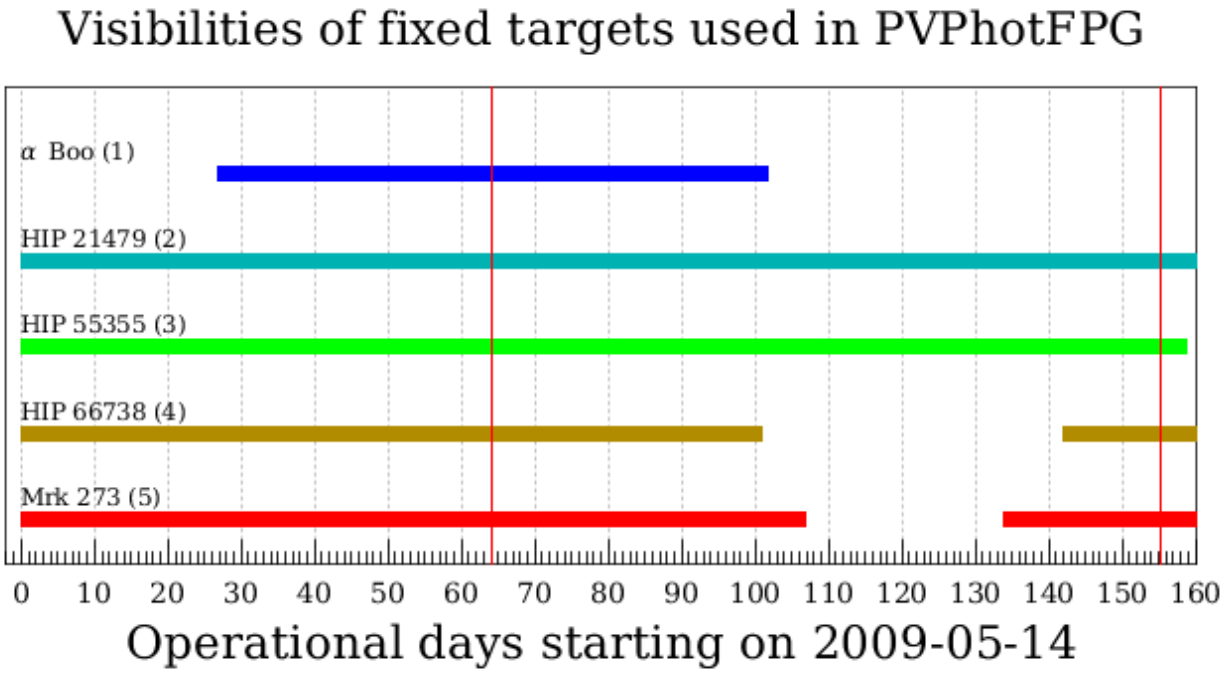
The pointing calibration has become part of the Performance Verification Phase to a large fraction and is executed per instrument as part of this instrument's performance verification period, though the time budget is counted separately. For this reason it is listed here as an early item of the PACS PV program.

The Herschel Pointing Calibration and the Focal Plane Geometry assessment are described in detail in the Herschel Pointing Calibration Plan - Calibration Plan for Commissioning and PV Phases (HERSCHEL-HSC-DOC-1139) [AD4]. The PV pointing calibration activities will be preceded by a commissioning of the Herschel Attitude and Control Measurement System during the Commissioning Phase. Also the initial PACS search scan and the check of the first in-orbit PACS photometer SIAM update are part of the Commissioning Phase and are assumed to be completed successfully.

The detailed test procedure for the spectrometer is outlined in the Commissioning Plan for the PACS Spectrometer Focal Plane Geometry (PICC-MA-TN-076).

Table 40: Visibilities of targets of the PVPhotFPG proposal, PCD req. 2.6.1/2.6.2 for a solar aspect angle range of SAA =[-30,+30].

Target	Start	End
α Boo	10-Jun-2009	23-Aug-2009
HIP 21479	always visible	
HIP 55355	14-May-2009	19-Oct-2009
Mrk 273/HIP 66738	14-May-2009	22-Aug-2009
	03-Oct-2009	19-Dec-2009
3 Juno	14-May-2009	26-Jul-2009
8 Flora	11-Jun-2009	01-Sep-2009
18 Melpomene	14-May-2009	13-Aug-2009
19 Fortuna	13-Jul-2009	16-Oct-2009



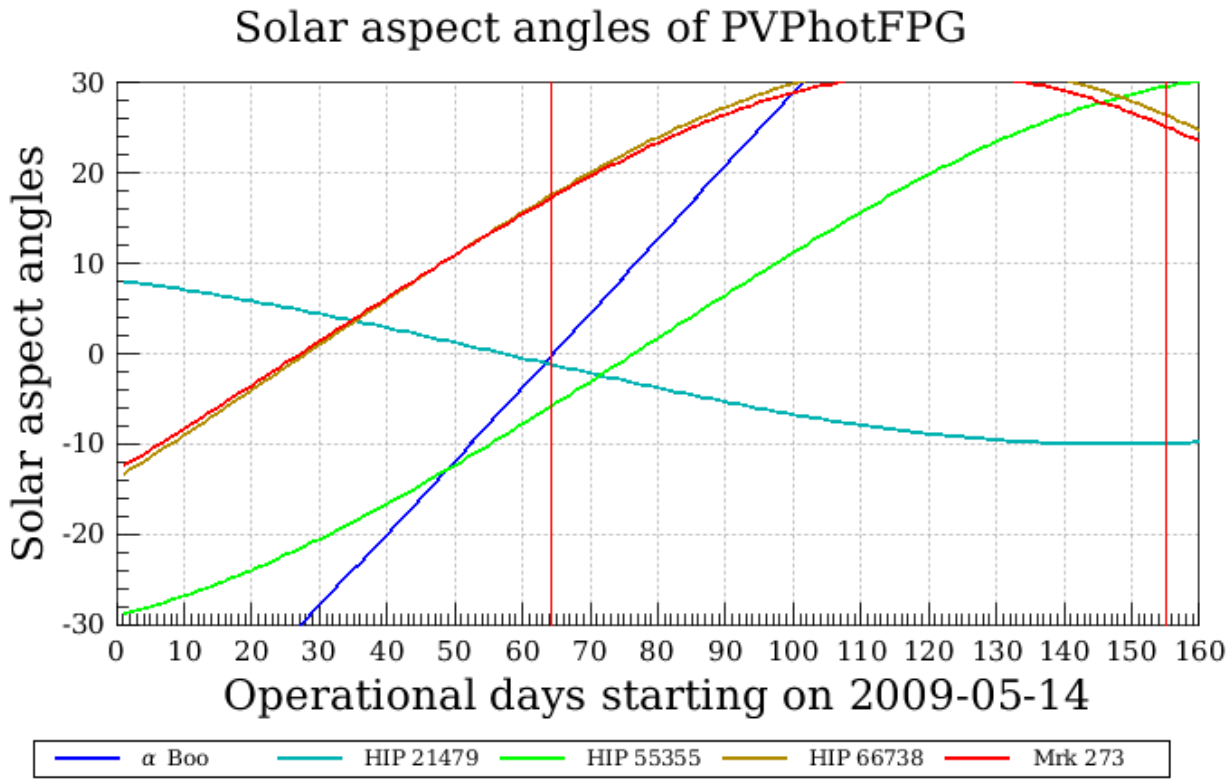


Figure 53: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA range of [-30,+30].

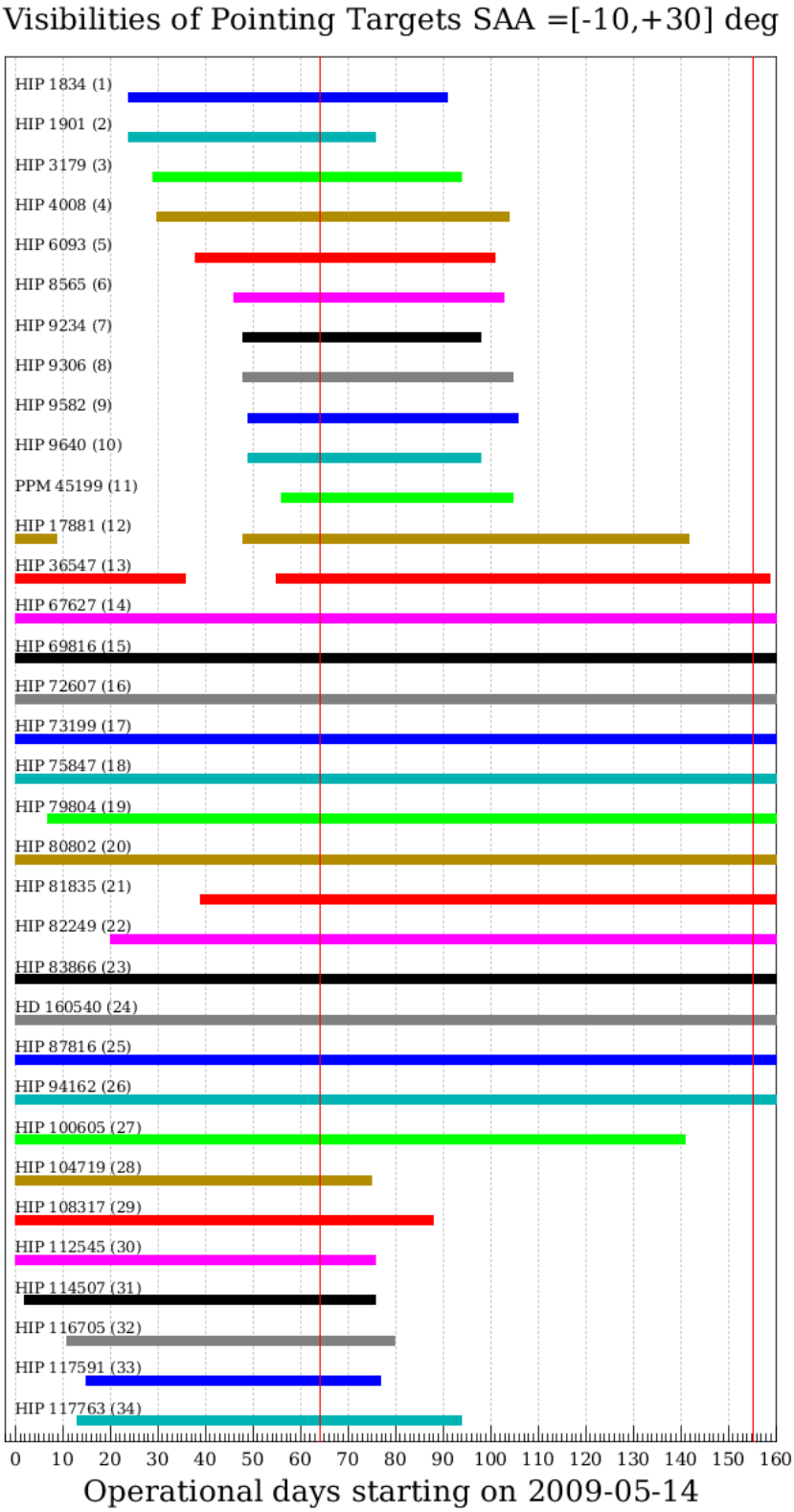


Figure 54: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA range of [-10,+30].

Table 41: Visibilities of 34 targets ordered according to their RA and observed for the PVPhotFPG proposal, PCD req. 2.6.1 during calibration block A for a solar aspect angle range of SAA =[-10,+30].

Star	Start	End
HIP 1834	07-Jun-2009	12-Aug-2009
HIP 1901	07-Jun-2009	28-Jul-2009
HIP 3179	12-Jun-2009	15-Aug-2009
HIP 4008	13-Jun-2009	25-Aug-2009
HIP 6093	21-Jun-2009	22-Aug-2009
HIP 8565	29-Jun-2009	24-Aug-2009
HIP 9234	01-Jul-2009	19-Aug-2009
HIP 9306	01-Jul-2009	26-Aug-2009
HIP 9582	02-Jul-2009	27-Aug-2009
HIP 9640	02-Jul-2009	19-Aug-2009
PPM 45199	09-Jul-2009	26-Aug-2009
HIP 17881	01-Jul-2009	02-Oct-2009
HIP 36547	08-Jul-2009	19-Oct-2009
HIP 67627	14-May-2009	21-Dec-2009
HIP 69816	14-May-2009	24-Dec-2009
HIP 72607	14-May-2009	11-Dec-2009
HIP 73199	14-May-2009	06-Jan-2010
HIP 75847	14-May-2009	27-Nov-2009
HIP 79804	21-May-2009	27-Feb-2010
HIP 80802	always visible	
HIP 81835	22-Jun-2009	16-Mar-2010
HIP 82249	03-Jun-2009	26-Mar-2010
HIP 83866	always visible	
HD 160540	always visible	
HIP 87816	always visible	
HIP 94162	always visible	
HIP 100605	14-May-2009	01-Oct-2009
HIP 104719	14-May-2009	27-Jul-2009
HIP 108317	14-May-2009	09-Aug-2009
HIP 112545	14-May-2009	28-Jul-2009
HIP 114507	16-May-2009	28-Jul-2009
HIP 116705	25-May-2009	01-Aug-2009
HIP 117591	29-May-2009	29-Jul-2009
HIP 117763	27-May-2009	15-Aug-2009

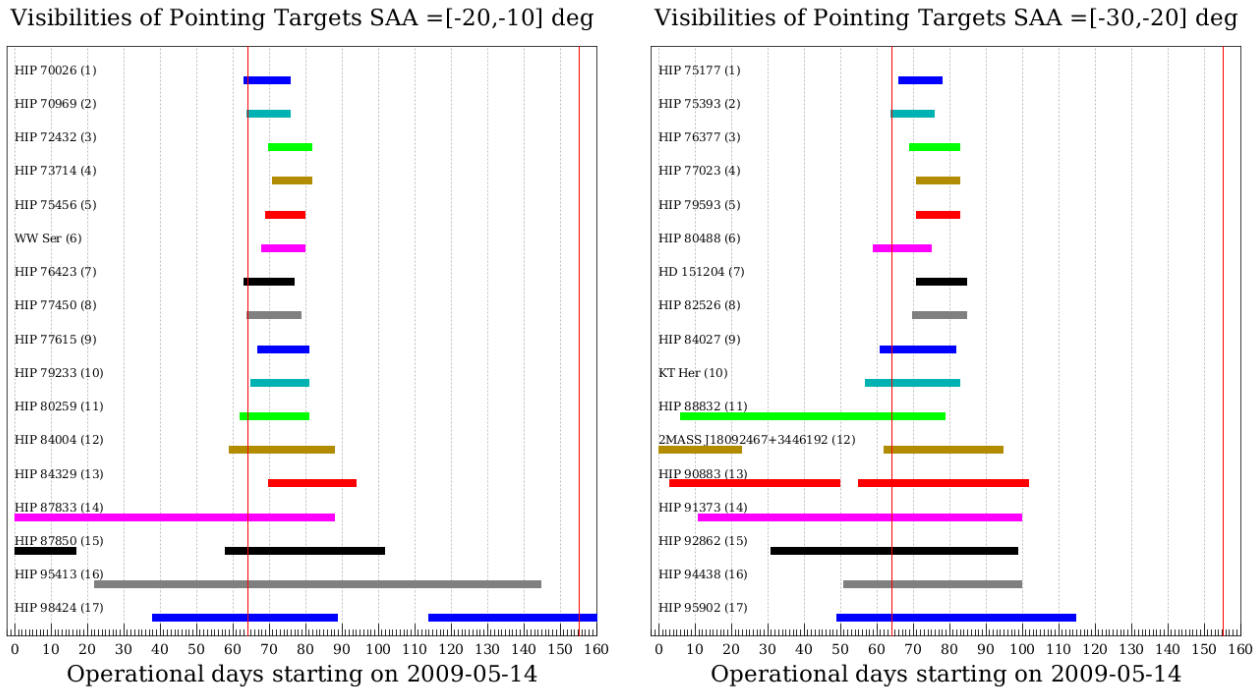


Figure 55: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [-30,-20] and [-20,-10].

Table 42: Visibilities of the 34 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration block C and D for solar aspect angle ranges of SAA =[-20,-10] and [-20,-30].

SAA = [-20,-10]			SAA = [-30,-20]		
Star	Start	End	Star	Start	End
HIP 70026	16-Jul-2009	28-Jul-2009	HIP 75177	19-Jul-2009	30-Jul-2009
HIP 70969	17-Jul-2009	28-Jul-2009	HIP 75393	17-Jul-2009	28-Jul-2009
HIP 72432	23-Jul-2009	03-Aug-2009	HIP 76377	22-Jul-2009	04-Aug-2009
HIP 73714	24-Jul-2009	03-Aug-2009	HIP 77023	24-Jul-2009	04-Aug-2009
HIP 75456	22-Jul-2009	01-Aug-2009	HIP 79593	24-Jul-2009	04-Aug-2009
WW Ser	21-Jul-2009	01-Aug-2009	HIP 80488	12-Jul-2009	27-Jul-2009
HIP 76423	16-Jul-2009	29-Jul-2009	HD 151204	24-Jul-2009	06-Aug-2009
HIP 77450	17-Jul-2009	31-Jul-2009	HIP 82526	23-Jul-2009	06-Aug-2009
HIP 77615	20-Jul-2009	02-Aug-2009	HIP 84027	14-Jul-2009	03-Aug-2009
HIP 79233	18-Jul-2009	02-Aug-2009	KT Her	10-Jul-2009	04-Aug-2009
HIP 80259	15-Jul-2009	02-Aug-2009	HIP 88832	20-May-2009	31-Jul-2009
HIP 84004	12-Jul-2009	09-Aug-2009	2MASS J18092467+3446192	15-Jul-2009	16-Aug-2009
HIP 84329	23-Jul-2009	15-Aug-2009	HIP 90883	08-Jul-2009	23-Aug-2009
HIP 87833	14-May-2009	09-Aug-2009	HIP 91373	25-May-2009	21-Aug-2009
HIP 87850	11-Jul-2009	23-Aug-2009	HIP 92862	14-Jun-2009	20-Aug-2009
HIP 95413	05-Jun-2009	05-Oct-2009	HIP 94438	04-Jul-2009	21-Aug-2009
HIP 98424	21-Jun-2009	10-Aug-2009	HIP 95902	02-Jul-2009	05-Sep-2009

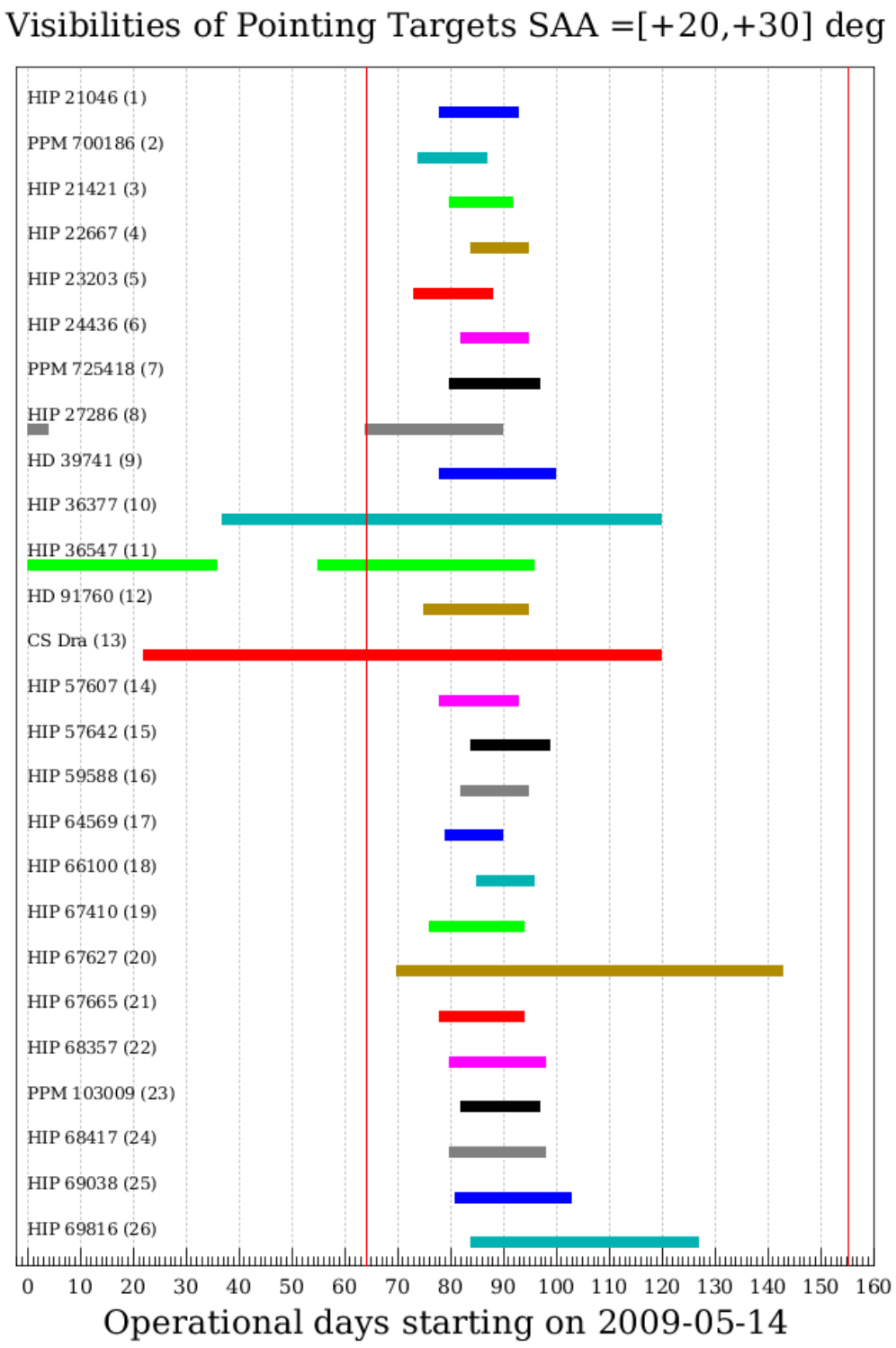


Figure 56: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [+20,+30] provided for calibration block 2.6.1 F to be executed on OD 86.

Table 43: Visibilities of the 26 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration block F on OD 86 and for a solar aspect angle range of SAA =[+20,+30].

Star	Start	End
HIP 21046	31-Jul-2009	14-Aug-2009
PPM 700186	27-Jul-2009	08-Aug-2009
HIP 21421	02-Aug-2009	13-Aug-2009
HIP 22667	06-Aug-2009	16-Aug-2009
HIP 23203	26-Jul-2009	09-Aug-2009
HIP 24436	04-Aug-2009	16-Aug-2009
PPM 725418	02-Aug-2009	18-Aug-2009
HIP 27286	17-Jul-2009	11-Aug-2009
HD 39741	31-Jul-2009	21-Aug-2009
HIP 36377	20-Jun-2009	10-Sep-2009
HIP 36547	08-Jul-2009	17-Aug-2009
HD 91760	28-Jul-2009	16-Aug-2009
CS Dra	05-Jun-2009	10-Sep-2009
HIP 57607	31-Jul-2009	14-Aug-2009
HIP 57642	06-Aug-2009	20-Aug-2009
HIP 59588	04-Aug-2009	16-Aug-2009
HIP 64569	01-Aug-2009	11-Aug-2009
HIP 66100	07-Aug-2009	17-Aug-2009
HIP 67410	29-Jul-2009	15-Aug-2009
HIP 67627	23-Jul-2009	03-Oct-2009
HIP 67665	31-Jul-2009	15-Aug-2009
HIP 68357	02-Aug-2009	19-Aug-2009
PPM 103009	04-Aug-2009	18-Aug-2009
HIP 68417	02-Aug-2009	19-Aug-2009
HIP 69038	03-Aug-2009	24-Aug-2009
HIP 69816	06-Aug-2009	17-Sep-2009

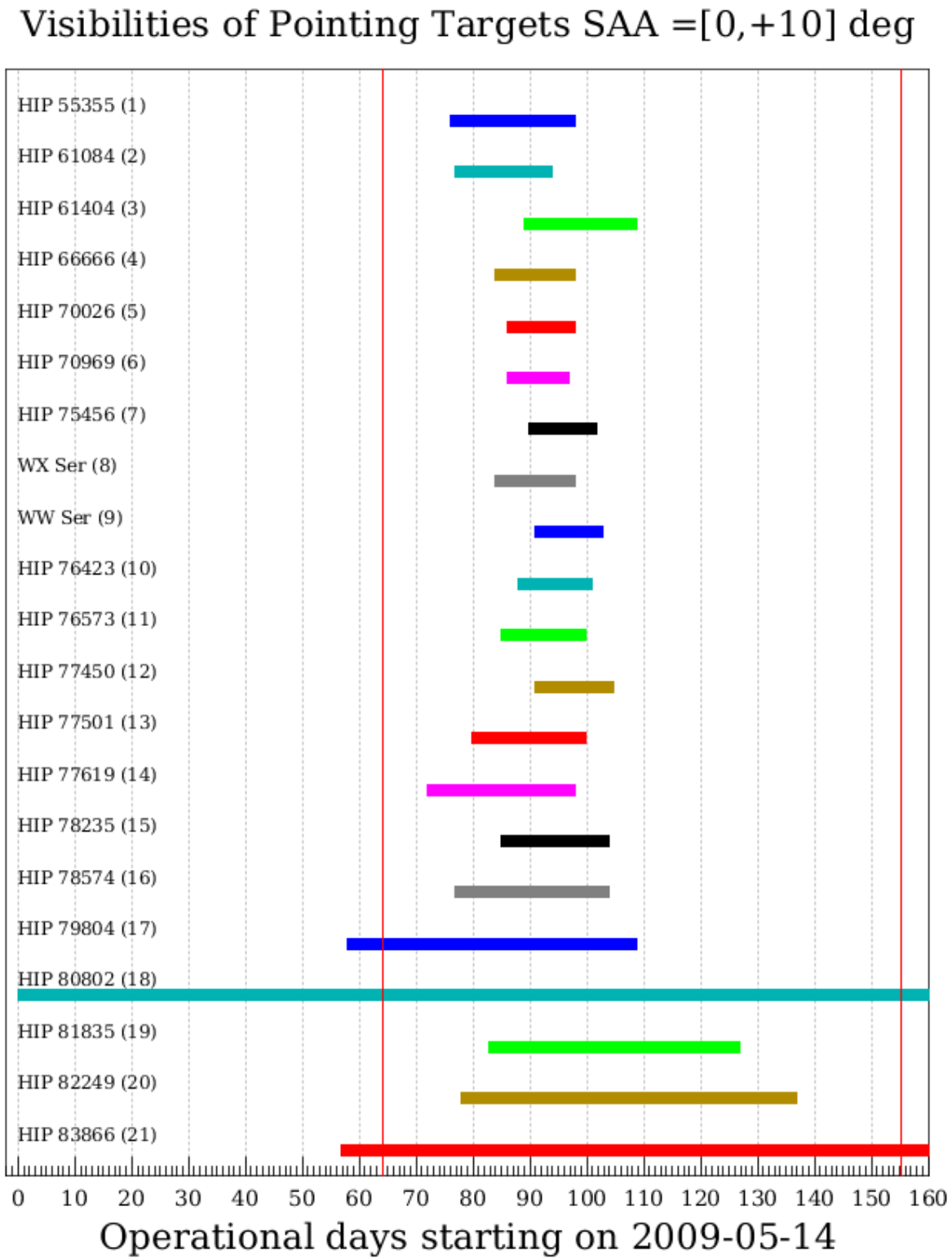


Figure 57: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [0,+10] provided for calibration blocks 2.6.1 G and H to be executed on OD 92.

Table 44: Visibilities of the 21 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks G and H on OD 92 and for a solar aspect angle range of SAA =[0,+10].

Star	Start	End
HIP 55355	29-Jul-2009	19-Aug-2009
HIP 61084	30-Jul-2009	15-Aug-2009
HIP 61404	11-Aug-2009	30-Aug-2009
HIP 66666	06-Aug-2009	19-Aug-2009
HIP 70026	08-Aug-2009	19-Aug-2009
HIP 70969	08-Aug-2009	18-Aug-2009
HIP 75456	12-Aug-2009	23-Aug-2009
WX Ser	06-Aug-2009	19-Aug-2009
WW Ser	13-Aug-2009	24-Aug-2009
HIP 76423	10-Aug-2009	22-Aug-2009
HIP 76573	07-Aug-2009	21-Aug-2009
HIP 77450	13-Aug-2009	26-Aug-2009
HIP 77501	02-Aug-2009	21-Aug-2009
HIP 77619	25-Jul-2009	19-Aug-2009
HIP 78235	07-Aug-2009	25-Aug-2009
HIP 78574	30-Jul-2009	25-Aug-2009
HIP 79804	11-Jul-2009	30-Aug-2009
HIP 80802	14-May-2009	05-Nov-2009
HIP 81835	05-Aug-2009	17-Sep-2009
HIP 82249	31-Jul-2009	27-Sep-2009
HIP 83866	10-Jul-2009	07-Jan-2010

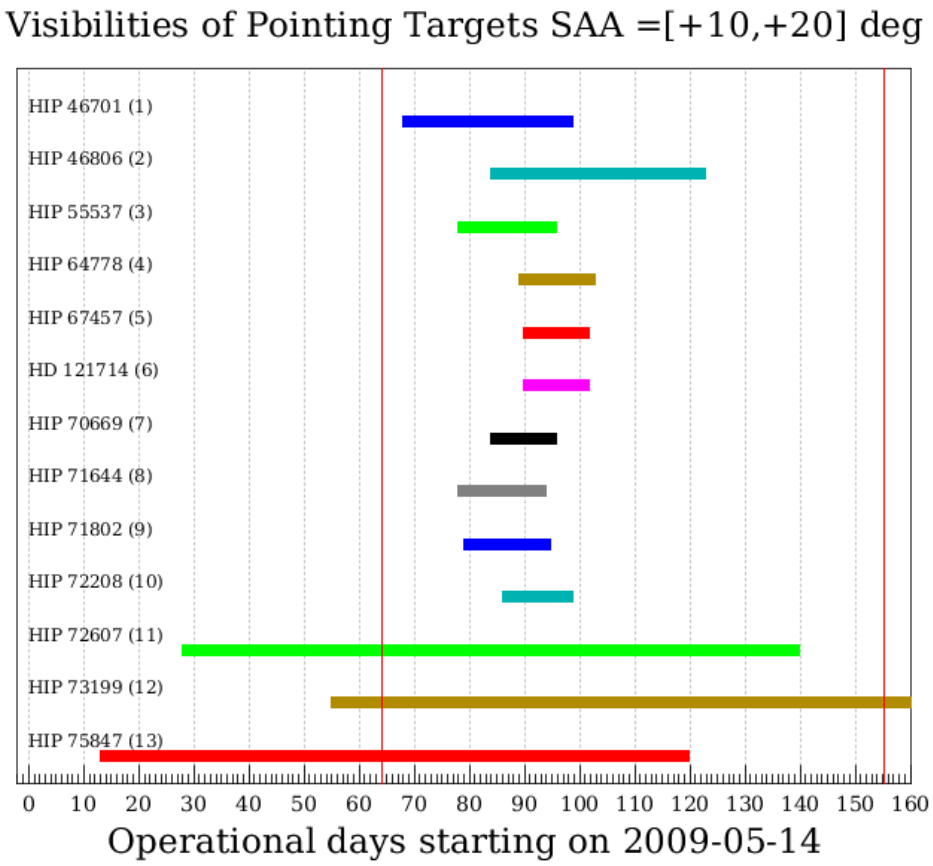


Figure 58: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [+10,+20] provided for calibration blocks 2.6.1 G and H to be executed on OD 92.

Table 45: Visibilities of the 13 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks G and H on OD 92 and for a solar aspect angle range of SAA =[+10,+20].

Star	Start	End
HIP 46701	21-Jul-2009	20-Aug-2009
HIP 46806	06-Aug-2009	13-Sep-2009
HIP 55537	31-Jul-2009	17-Aug-2009
HIP 64778	11-Aug-2009	24-Aug-2009
HIP 67457	12-Aug-2009	23-Aug-2009
HD 121714	12-Aug-2009	23-Aug-2009
HIP 70669	06-Aug-2009	17-Aug-2009
HIP 71644	31-Jul-2009	15-Aug-2009
HIP 71802	01-Aug-2009	16-Aug-2009
HIP 72208	08-Aug-2009	20-Aug-2009
HIP 72607	11-Jun-2009	30-Sep-2009
HIP 73199	08-Jul-2009	29-Oct-2009
HIP 75847	27-May-2009	10-Sep-2009

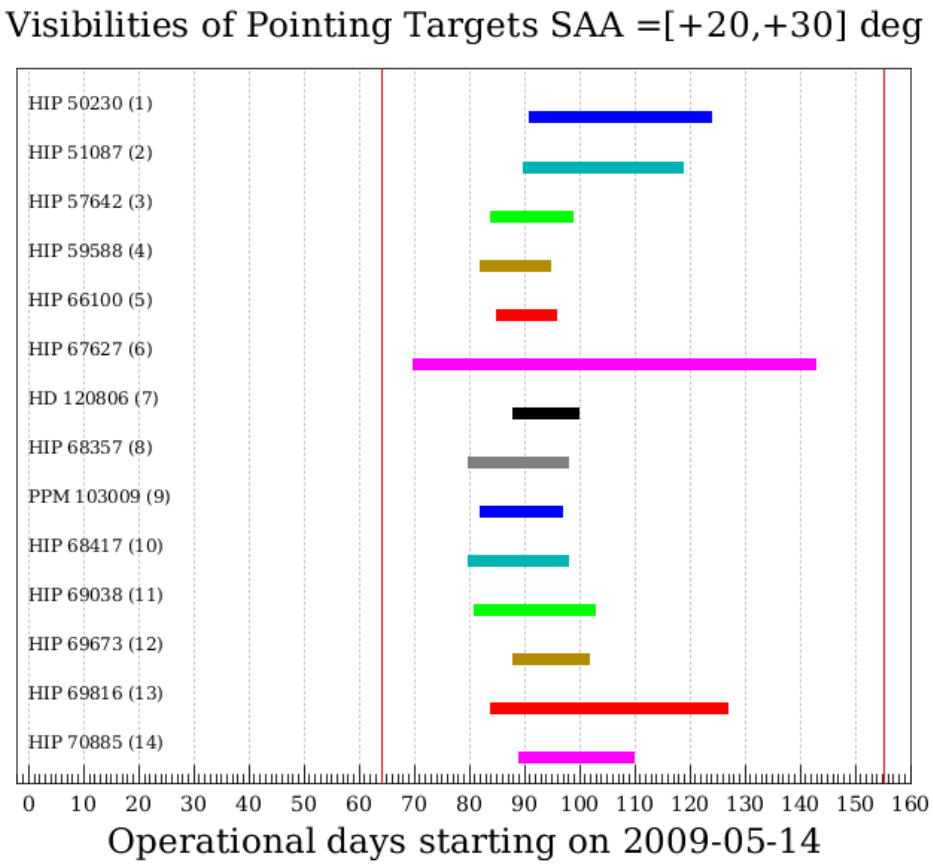


Figure 59: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [+20,+30] provided for calibration blocks 2.6.1 D, G and H to be executed on ODs 92 and 93.

Table 46: Visibilities of the 14 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks D, G and H on ODs 92 and 93 and for a solar aspect angle range of SAA =[+20,+30].

Star	Start	End
HIP 50230	13-Aug-2009	14-Sep-2009
HIP 51087	12-Aug-2009	09-Sep-2009
HIP 57642	06-Aug-2009	20-Aug-2009
HIP 59588	04-Aug-2009	16-Aug-2009
HIP 66100	07-Aug-2009	17-Aug-2009
HIP 67627	23-Jul-2009	03-Oct-2009
HD 120806	10-Aug-2009	21-Aug-2009
HIP 68357	02-Aug-2009	19-Aug-2009
PPM 103009	04-Aug-2009	18-Aug-2009
HIP 68417	02-Aug-2009	19-Aug-2009
HIP 69038	03-Aug-2009	24-Aug-2009
HIP 69673	10-Aug-2009	23-Aug-2009
HIP 69816	06-Aug-2009	17-Sep-2009
HIP 70885	11-Aug-2009	31-Aug-2009

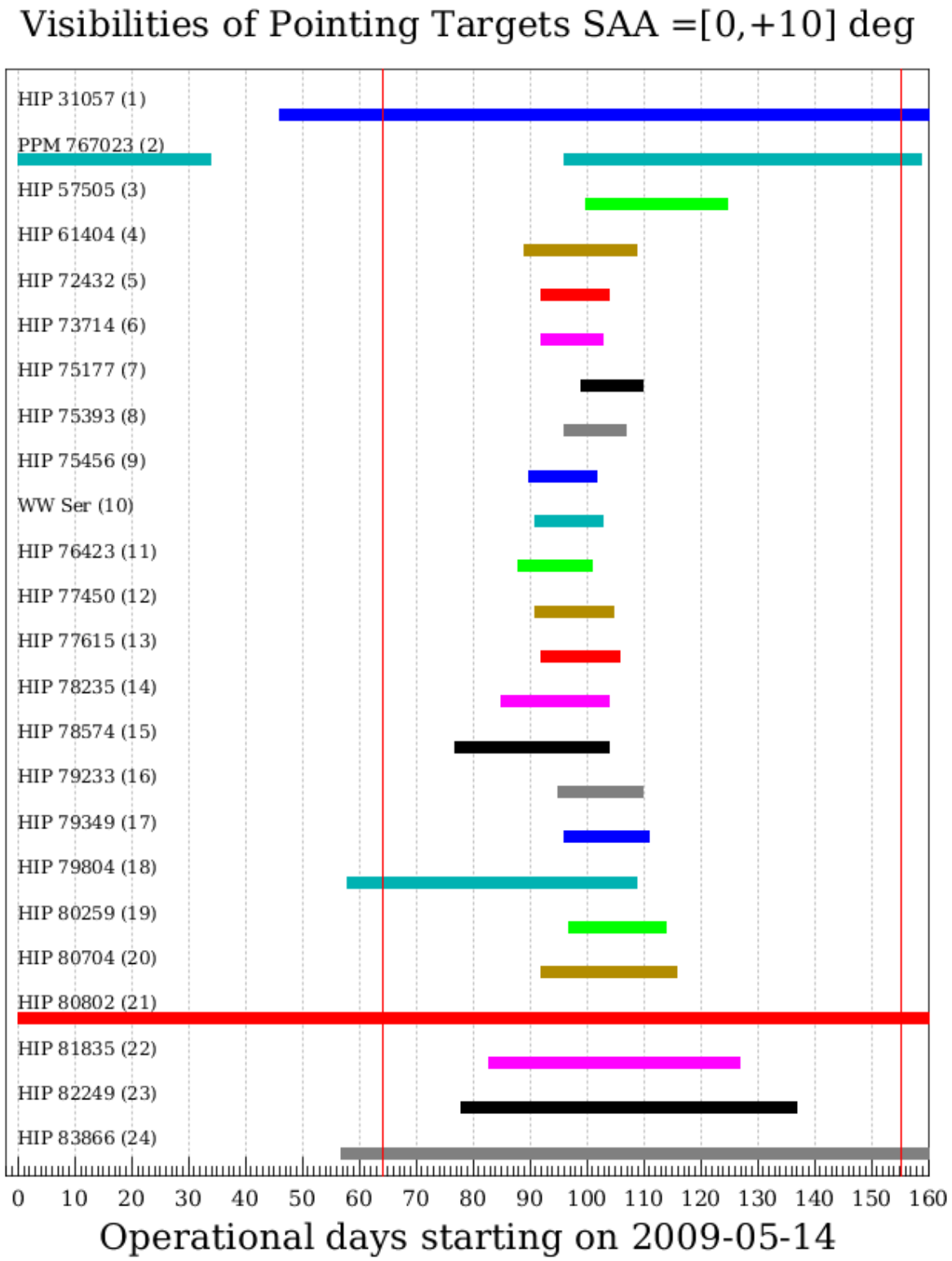


Figure 60: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [0,+10] provided for calibration blocks 2.6.1 G and H to be executed on OD 101.

Table 47: Visibilities of the 24 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks G and H on OD 101 and for a solar aspect angle range of SAA =[0,+10].

Star	Start	End
HIP 31057	29-Jun-2009	02-Jan-2010
PPM 767023	18-Aug-2009	19-Oct-2009
HIP 57505	22-Aug-2009	15-Sep-2009
HIP 61404	11-Aug-2009	30-Aug-2009
HIP 72432	14-Aug-2009	25-Aug-2009
HIP 73714	14-Aug-2009	24-Aug-2009
HIP 75177	21-Aug-2009	31-Aug-2009
HIP 75393	18-Aug-2009	28-Aug-2009
HIP 75456	12-Aug-2009	23-Aug-2009
WW Ser	13-Aug-2009	24-Aug-2009
HIP 76423	10-Aug-2009	22-Aug-2009
HIP 77450	13-Aug-2009	26-Aug-2009
HIP 77615	14-Aug-2009	27-Aug-2009
HIP 78235	07-Aug-2009	25-Aug-2009
HIP 78574	30-Jul-2009	25-Aug-2009
HIP 79233	17-Aug-2009	31-Aug-2009
HIP 79349	18-Aug-2009	01-Sep-2009
HIP 79804	11-Jul-2009	30-Aug-2009
HIP 80259	19-Aug-2009	04-Sep-2009
HIP 80704	14-Aug-2009	06-Sep-2009
HIP 80802	14-May-2009	05-Nov-2009
HIP 81835	05-Aug-2009	17-Sep-2009
HIP 82249	31-Jul-2009	27-Sep-2009
HIP 83866	10-Jul-2009	07-Jan-2010

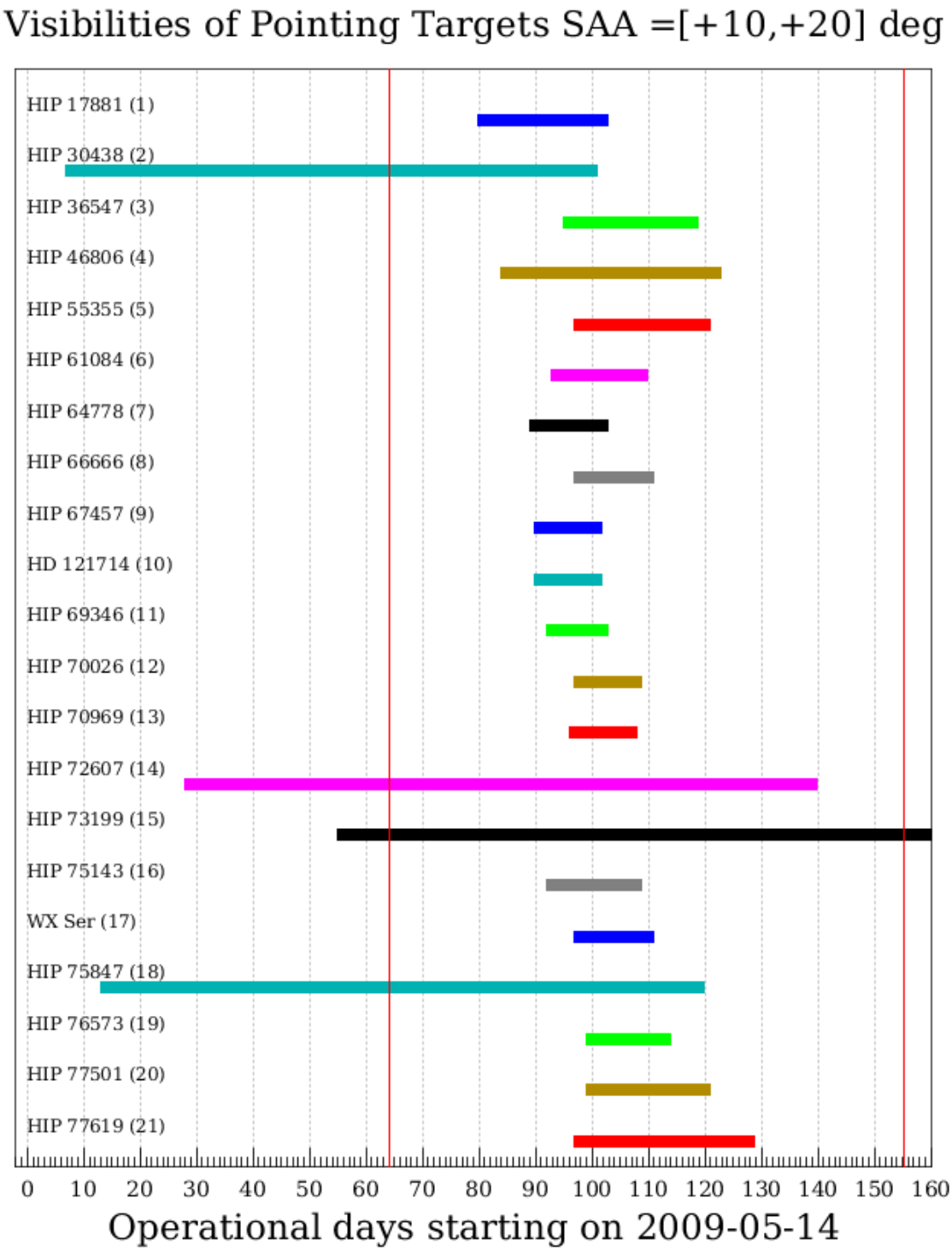


Figure 61: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [+10,+20] provided for calibration blocks 2.6.1 G and H to be executed on OD 101.

Table 48: Visibilities of the 30 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks G and H on OD 101 and for a solar aspect angle range of SAA =[+10,+20].

Star	Start	End
HIP 17881	02-Aug-2009	24-Aug-2009
HIP 30438	21-May-2009	22-Aug-2009
HIP 36547	17-Aug-2009	09-Sep-2009
HIP 46806	06-Aug-2009	13-Sep-2009
HIP 55355	19-Aug-2009	11-Sep-2009
HIP 61084	15-Aug-2009	31-Aug-2009
HIP 64778	11-Aug-2009	24-Aug-2009
HIP 66666	19-Aug-2009	01-Sep-2009
HIP 67457	12-Aug-2009	23-Aug-2009
HD 121714	12-Aug-2009	23-Aug-2009
HIP 69346	14-Aug-2009	24-Aug-2009
HIP 70026	19-Aug-2009	30-Aug-2009
HIP 70969	18-Aug-2009	29-Aug-2009
HIP 72607	11-Jun-2009	30-Sep-2009
HIP 73199	08-Jul-2009	29-Oct-2009
HIP 75143	14-Aug-2009	30-Aug-2009
WX Ser	19-Aug-2009	01-Sep-2009
HIP 75847	27-May-2009	10-Sep-2009
HIP 76573	21-Aug-2009	04-Sep-2009
HIP 77501	21-Aug-2009	11-Sep-2009
HIP 77619	19-Aug-2009	19-Sep-2009

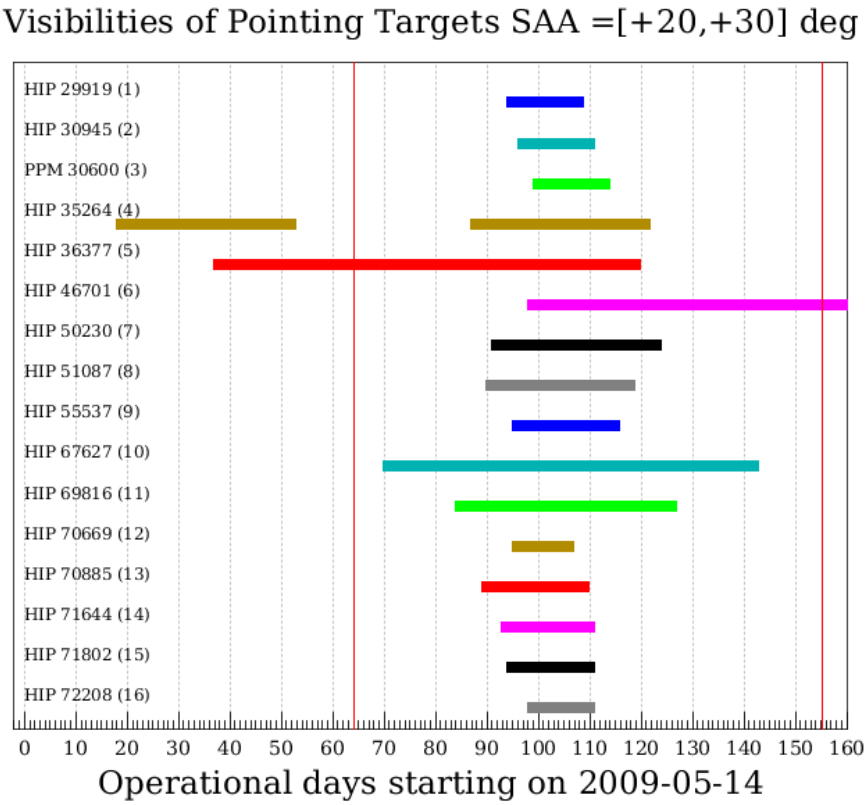


Figure 62: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [+20,+30] provided for calibration blocks 2.6.1 G and H to be executed on OD 101.

Table 49: Visibilities of the 30 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration blocks G and H on OD 101 and for a solar aspect angle range of SAA =[+20,+30].

Star	Start	End
HIP 29919	16-Aug-2009	30-Aug-2009
HIP 30945	18-Aug-2009	01-Sep-2009
PPM 30600	21-Aug-2009	04-Sep-2009
HIP 35264	09-Aug-2009	12-Sep-2009
HIP 36377	20-Jun-2009	10-Sep-2009
HIP 46701	20-Aug-2009	05-Nov-2009
HIP 50230	13-Aug-2009	14-Sep-2009
HIP 51087	12-Aug-2009	09-Sep-2009
HIP 55537	17-Aug-2009	06-Sep-2009
HIP 67627	23-Jul-2009	03-Oct-2009
HIP 69816	06-Aug-2009	17-Sep-2009
HIP 70669	17-Aug-2009	28-Aug-2009
HIP 70885	11-Aug-2009	31-Aug-2009
HIP 71644	15-Aug-2009	01-Sep-2009
HIP 71802	16-Aug-2009	01-Sep-2009
HIP 72208	20-Aug-2009	01-Sep-2009

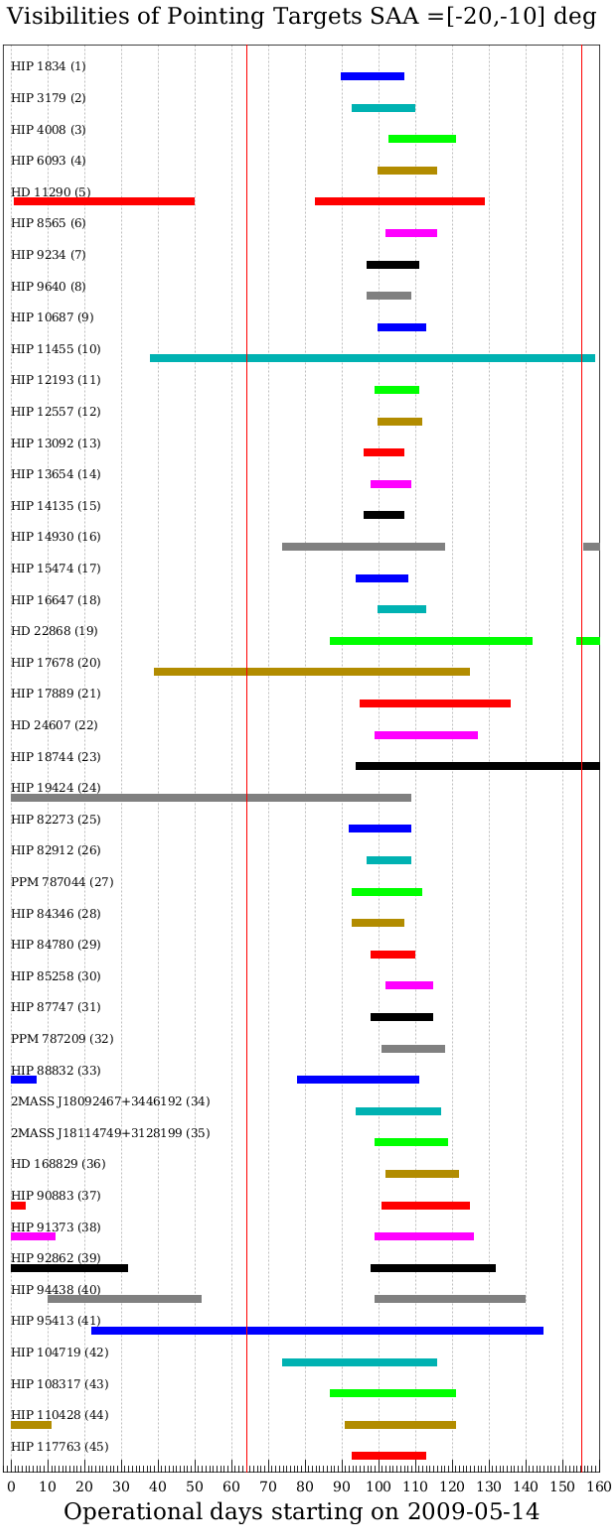


Figure 63: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [-20,-10] provided for calibration block 2.6.1 C to be executed on OD 104.

Table 50: Visibilities of the 45 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration block C on OD 104 and for a solar aspect angle range of SAA =[-20,-10].

Star	Start	End	Star	Start	End
HIP 1834	12-Aug-2009	28-Aug-2009	HIP 19424	14-May-2009	30-Aug-2009
HIP 3179	15-Aug-2009	31-Aug-2009	HIP 82273	14-Aug-2009	30-Aug-2009
HIP 4008	25-Aug-2009	11-Sep-2009	HIP 82912	19-Aug-2009	30-Aug-2009
HIP 6093	22-Aug-2009	06-Sep-2009	PPM 787044	15-Aug-2009	02-Sep-2009
HD 11290	05-Aug-2009	19-Sep-2009	HIP 84346	15-Aug-2009	28-Aug-2009
HIP 8565	24-Aug-2009	06-Sep-2009	HIP 84780	20-Aug-2009	31-Aug-2009
HIP 9234	19-Aug-2009	01-Sep-2009	HIP 85258	24-Aug-2009	05-Sep-2009
HIP 9640	19-Aug-2009	30-Aug-2009	HIP 87747	20-Aug-2009	05-Sep-2009
HIP 10687	22-Aug-2009	03-Sep-2009	PPM 787209	23-Aug-2009	08-Sep-2009
HIP 11455	21-Jun-2009	19-Oct-2009	HIP 88832	31-Jul-2009	01-Sep-2009
HIP 12193	21-Aug-2009	01-Sep-2009	2MASS J18092467+3446192	16-Aug-2009	07-Sep-2009
HIP 12557	22-Aug-2009	02-Sep-2009	2MASS J18114749+3128199	21-Aug-2009	09-Sep-2009
HIP 13092	18-Aug-2009	28-Aug-2009	HD 168829	24-Aug-2009	12-Sep-2009
HIP 13654	20-Aug-2009	30-Aug-2009	HIP 90883	23-Aug-2009	15-Sep-2009
HIP 14135	18-Aug-2009	28-Aug-2009	HIP 91373	21-Aug-2009	16-Sep-2009
HIP 14930	27-Jul-2009	08-Sep-2009	HIP 92862	20-Aug-2009	22-Sep-2009
HIP 15474	16-Aug-2009	29-Aug-2009	HIP 94438	21-Aug-2009	30-Sep-2009
HIP 16647	22-Aug-2009	03-Sep-2009	HIP 95413	05-Jun-2009	05-Oct-2009
HD 22868	09-Aug-2009	02-Oct-2009	HIP 104719	27-Jul-2009	06-Sep-2009
HIP 17678	22-Jun-2009	15-Sep-2009	HIP 108317	09-Aug-2009	11-Sep-2009
HIP 17889	17-Aug-2009	26-Sep-2009	HIP 110428	13-Aug-2009	11-Sep-2009
HD 24607	21-Aug-2009	17-Sep-2009	HIP 117763	15-Aug-2009	03-Sep-2009
HIP 18744	16-Aug-2009	08-Nov-2009			

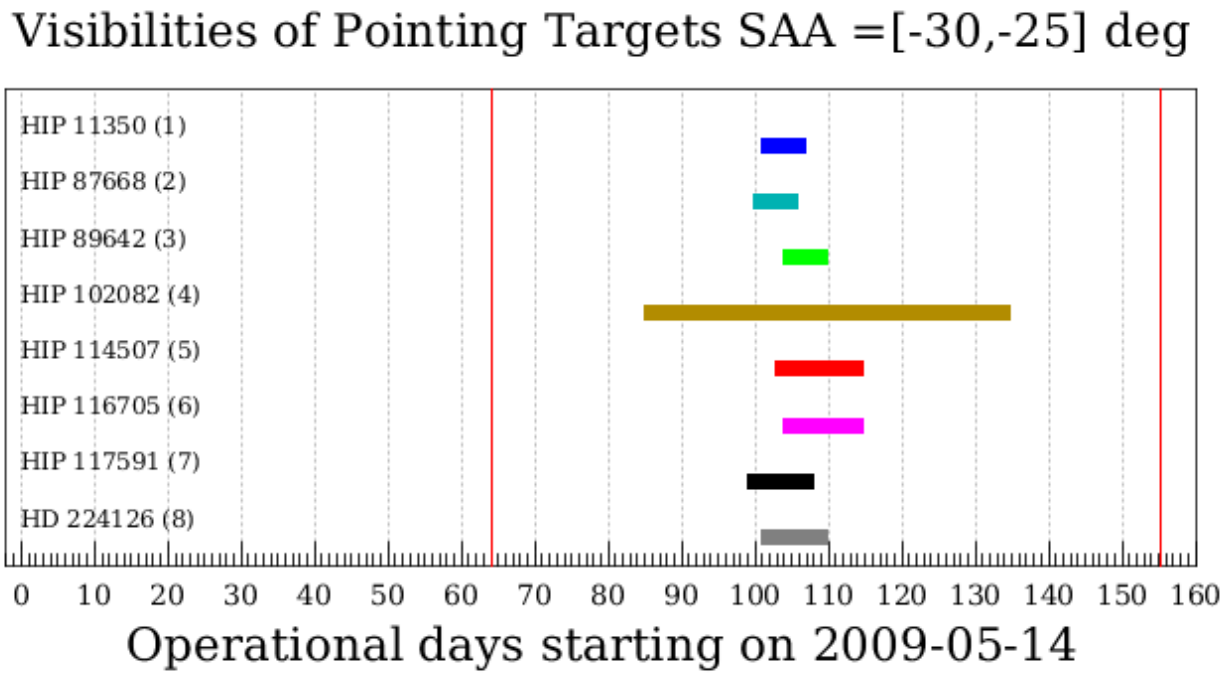


Figure 64: Visibilities of the fixed targets used for the AORs of the PVPhotFPG proposal in the restricted SAA ranges of [-30,-25] provided for calibration block 2.6.1 C to be executed on OD 105.

Table 51: Visibilities of the 8 targets of the PVPhotFPG proposal, PCD req. 2.6.1, to be observed during calibration block C on OD 105 and for a solar aspect angle range of SAA =[-30,-25].

Star	Start	End
HIP 11350	23-Aug-2009	28-Aug-2009
HIP 87668	22-Aug-2009	27-Aug-2009
HIP 89642	26-Aug-2009	31-Aug-2009
HIP 102082	07-Aug-2009	25-Sep-2009
HIP 114507	25-Aug-2009	05-Sep-2009
HIP 116705	26-Aug-2009	05-Sep-2009
HIP 117591	21-Aug-2009	29-Aug-2009
HD 224126	23-Aug-2009	31-Aug-2009

Table 52: Observational details of the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry. The total estimated time of this test block is 101.5 h. The assumption is that the initial PACS search scan and first in-orbit PACS photometer SIAM update have been successfully completed.

ID: PVPhotFPG						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
2.6.1 Absolute Pointing Error *3.1.1 Photometer Central Pointing Position* *7.4.1 Relative location of PACS Photometer and Spectrometer FOVs in the Herschel Focal Plane*						
Spacecraft APE measurement						
A	standard point source photometry blue filter low gain! bias setting from CoP	AOT	0.095	40 stars in SAA range for STR1	3.8	Pointing Calibrator Sect 4.4.1 SAA range [-10,+30]
	select stars in a sequence to have gradual change in SAA *start SAA determined by SAA of S/C at beginning of OD*					
B	standard point source photometry blue filter low gain! bias setting from CoP long dwell on target during STR stabilisation after switch-on to characterise thermal effects	AOT	3.0	STR1	30.0	Pointing Calibrator Sect 4.4.1 SAA range [-10,+30]
Pointing accuracy dependence on SAA						
C	standard point source photometry blue filter low gain! bias setting from CoP	AOT	0.095	20 stars each in SAA range [-20,-10] in SAA range [-30,-20]	3.8	Pointing Calibrator Sect 4.4.1
D	standard point source photometry blue filter long dwell on target after entering SAA ranges [-20,-10] and [-30,-20] low gain! bias setting from CoP	AOT	3.6	1 star @SAA ∼-15 – -20 deg 1 star @SAA ∼-25 – -30 deg	28.8	Pointing Calibrator Sect 4.4.1 SAA range [-20,-10] SAA range [-30,-20]
D	one small source photometry	AOT	0.3		0.3	

Table 52: continued. Observational details of the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
2.6.1 Absolute Pointing Error						
SSO Tracking performance						
E	standard point source photometry blue filter low gain! bias setting from CoP	AOT	~1.0	1 slow (10"/hour) 1 fast (60"/hour) moving asteroid 1 Jovian planet satellite	2.3	prime calibrator asteroids Sect 4.1 Titan (TBC)
Confirmation of APE (after restart of star tracker)						
F	standard point source photometry blue filter, low gain! SAA range [+20,+30]	AOT	0.095	26 sources on OD86	2.5	Pointing Calibrator Sect 4.4.1 SAA range [+20,+30]
G	standard point source photometry blue filter, low gain! statistical sample in SAA range [0,+30]	AOT	0.095	100 sources on OD92	9.5	Pointing Calibrator Sect 4.4.1 SAA range [0,+30]
H	standard point source photometry blue filter, low gain! SAA ranges [0,+10], [+10,+20], [+20,+30]	AOT	0.095	100 sources on OD92	9.5	Pointing Calibrator Sect 4.4.1
I	standard point source photometry blue filter, STR interlacing check SAA range [-10,+30]	AOT	0.095	27 sources on OD200	2.6	Pointing Calibrator Sect 4.4.1 SAA range [-10,+30]
2.6.2 Relative Pointing Error						
SRPE measurement						
A	(non-)standard raster map photometry 10×5 (y,z), 20" step blue filter low gain! bias setting from CoP	AOT/CUS	~1.3	w/o gyro propagation with gyro propagation	2.6	Very bright pointing star Sect 4.4.1
RPE measurement						
B	non-standard chopped/nodded in ABBA pattern (4×5 min), no dither chop/nod throws as in point source AOR low gain! bias setting from CoP	CUS	0.6	1 stellar source 2 SSOs	1.8	Very bright pointing star stellar Sect 4.4.1 and SSO

Table 52: continued. Observational details of the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
2.6.4 Relative Pointing Error – Scan Mode						
SRPE measurement						
A	(non-)standard scan map photometry 5' leg, 20 legs, 10" separation 45 deg map scan angle blue filter low gain! bias setting from CoP	AOT/CUS	1.0	w/o gyro propagation with gyro propagation	2.0	Very bright pointing star Sect 4.4.1
Pointing accuracy along a scan leg (up to 1 degree)						
B	standard scan map photometry scan speed 20"/s scan leg has to include two calibrators with known separation and angle 100' leg, 8 legs, 25" separation sky reference with calibrator orientation blue filter low gain bias setting from CoP	AOT	1.0	double pointing calibrators with separation of 20' & 60'	2.0	Spatial scale calibrator Sect 4.4.2

Table 53: Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry. The total scheduled time is 109.9999 h.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
A	standard point source photometry SAA-10+30 range [-10,+30] blue filter low gain!	PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP1834	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP1901	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP3179	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP4008	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP6093	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP8565	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9203	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9234	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9306	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9582	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9640	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_PPM45199	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP17881	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP36547	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP67627	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP69816	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP72607	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP73199	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP75847	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP79804	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP80802	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP81835	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP82249	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP83866	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HD160540	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP87816	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP94162	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP100605	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP104719	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP108317	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP112545	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP114507	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP116705	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP117591	0.0942	OD 64
		PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP117763	0.0942	OD 64

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
B	standard point source photometry long dwell on target during STR stabilisation after switch-on to characterise thermal effects	PVPhotFPG_261B_StdPS_blu_SAA-10+30_HIP21479_0001	3.7150	OD 72
		PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_01	2.7983	OD 104
		PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_02	2.7983	OD 104
		PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_03	2.7983	OD 104
		PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_04	2.7983	OD 104
		PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_05	2.7983	OD 104
		PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_01	2.7983	OD 105
		PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_02	2.7983	OD 105
		PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_03	2.7983	OD 105
		PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_01	2.6678	OD 161
		PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_02	2.6678	OD 161
		PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_03	2.6678	OD 161
		PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_04	2.6678	OD 161
C	standard point source photometry blue filter long dwell on target after entering SAA range [-20,-10] low gain!	PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP70026	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP70969	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP72432	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP73714	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP75456	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP76423	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP77450	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP77615	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP79233	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP80259	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP84004	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP84329	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP87833	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP87850	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP95413	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP98424	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-20-10_WWSer	0.0942	OD 72
		PVPhotFPG_261C_PS_blu_SAA-20-10_2M1809_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_2M1811_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HD11290_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HD168829_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HD22868_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HD24607_OD104_01	0.0942	OD 104

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
C	SAA range [-20,-10]	PVPhotFPG_261C_PS_blu_SAA-20-10_HIP1834_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP3179_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP4008_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP6093_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP8565_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP9234_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP9640_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP10687_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP11455_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP12193_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP12557_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP13092_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP13654_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP14135_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP14930_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP15474_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP16647_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP17678_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP17889_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP18744_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP19424_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP82273_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP82912_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP84346_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP84780_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP85258_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP87747_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP88832_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP90883_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP91373_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP92862_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP94438_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP95413_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP104719_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP108317_OD104_01	0.0942	OD 104

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
2.6.1 Absolute Pointing Error				
C	SAA range [-30,-20]	PVPhotFPG_261C_PS_blu_SAA-20-10_HIP110428_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_HIP117763_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_PPM787044_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_PS_blu_SAA-20-10_PPM787209_OD104_01	0.0942	OD 104
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_2MASSJ1809	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP75177	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP75393	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP76377	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP77023	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP79593	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP80488	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP82526	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP84027	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP88832	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP90883	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP91373	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP92862	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP94438	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP95902	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_HD151204	0.0942	OD 72
		PVPhotFPG_261C_StdPS_blu_SAA-30-20_KTHer	0.0942	OD 72
		PVPhotFPG_261C_PS_blu_SAA-30-25_HD224126_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HD224126_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP11350_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP11350_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP87668_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP87668_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP89642_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP89642_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP102082_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP102082_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_03	0.0942	OD 105

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
C	SAA range [-30,-20]	PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_02	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_03	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP117591_OD105_01	0.0942	OD 105
		PVPhotFPG_261C_PS_blu_SAA-30-25_HIP117591_OD105_02	0.0942	OD 105
D	standard point source photometry	PVPhotFPG_261D_StdPS_blu_SAA-30-20_HIP82526_0001	3.7150	OD 72
	long dwell on target after entering	PVPhotFPG_261D_StdPS_blu_SAA-20-10_HIP79349_0001	3.7150	OD 72
	SAA ranges [-20,-10], [-30,-20]	PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_01	2.7983	OD 93
	and [+20,+30]	PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_02	2.7983	OD 93
		PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_03	2.7983	OD 93
		PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_01	2.7983	OD 105
		PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_02	2.7983	OD 105
		PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_03	2.7983	OD 105
	small source photometry	PVPhotFPG_261D_StdSS_blu_SAA-10+30_HIP55355_0001	0.2725	OD 73
E	standard point source photometry	PVPhotFPG_261E_StdPS_blu_8-Flora	1.3778	
	SSO tracking performance	PVPhotFPG_261E_StsPS_blu_18-Melpomene	0.9678	OD 41 (COP)
	low gain!	PVPhotFPG_261E_StdScani45_blu_18-Melpomene	0.6406	OD 41 (COP)
F	SAA range [+20,+30]	PVPhotFPG_261F_StdPS_blu_SAA+20+30_CS_Dra_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HD39741_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HD91760_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP21046_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP21421_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP22667_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP23203_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP24436_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP27286_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP36377_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP36547_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP57607_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP57642_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP59588_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP64569_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP66100_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67410_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67627_0001	0.0942	OD 86

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
F	SAA range [+20,+30]	PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67665_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP68357_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP68417_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP69038_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP69816_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM103009_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM700186_0001	0.0942	OD 86
		PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM725418_0001	0.0942	OD 86
G	SAA range [0,+30]	PVPhotFPG_261G_StdPS_blu_SAA_0+30_HD120806_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HD121714_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP46701_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP46806_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP50230_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP51087_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP55355_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP55537_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP57642_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP59588_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP61084_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP61404_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP64778_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP66100_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP66666_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP67457_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP67627_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP68357_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP68417_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69038_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69673_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69816_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70026_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70669_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70885_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70969_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP71644_OD92_01	0.0942	OD 92

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
G	SAA range [0,+30]	PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP71802_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP72208_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP72607_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP73199_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP75456_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP75847_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP76423_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP76573_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77450_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77501_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77619_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP78235_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP78574_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP79804_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP80802_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP81835_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP82249_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP83866_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_StdPS_blu_SAA_0+30_PPM103009_OD92_01	0.0942	OD 92
		PVPhotFPG_261G_PS_blu_SAA_0+30_HD48505_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HD121714_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP17881_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP29919_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP30438_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP30945_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP31057_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP35264_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP36377_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP36547_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP46701_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP46806_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP50230_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP51087_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP55355_OD101_01	0.0942	OD 101

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
	2.6.1 Absolute Pointing Error			
G	SAA range [0,+30]	PVPhotFPG_261G_PS_blu_SAA_0+30_HIP55537_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP57505_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP61084_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP61404_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP64778_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP66666_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP67457_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP67627_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP69346_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP69816_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70026_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70669_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70885_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70969_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP71644_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP71802_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72208_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72432_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72607_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP73199_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP73714_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75143_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75177_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75393_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75456_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75847_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP76423_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP76573_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77450_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77501_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77615_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77619_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP78235_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP78574_OD101_01	0.0942	OD 101

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
G	SAA range [0,+30]	PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79233_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79349_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79804_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80259_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80704_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80802_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP81835_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP82249_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_HIP83866_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_PPM30600_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_PPM767023_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_WWSer_OD101_01	0.0942	OD 101
		PVPhotFPG_261G_PS_blu_SAA_0+30_WXSer_OD101_01	0.0942	OD 101
H	SAA ranges [0,+10], [+10,+20], [+20,+30]	PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP55355_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP61084_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP61404_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP66666_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP70026_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP70969_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP75456_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP76423_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP76573_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77450_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77501_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77619_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP78235_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP78574_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP79804_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP80802_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP81835_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP82249_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP83866_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_WWSer_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA_0+10_WXSer_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HD121714_OD92_01	0.0942	OD 92

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
H	SAA ranges [0,+10], [+10,+20], [+20,+30]	PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP46701_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP46806_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP55537_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP64778_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP67457_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP70669_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP71644_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP71802_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP72208_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP72607_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP73199_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP75847_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HD120806_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP50230_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP51087_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP57642_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP59588_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP66100_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP67627_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP68357_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP68417_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69038_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69673_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69816_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP70885_OD92_01	0.0942	OD 92
		PVPhotFPG_261H_StdPS_blu_SAA+20+30_PPM103009_OD92_1	0.0942	OD 92
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP31057_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP57505_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP61404_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP72432_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP73714_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75177_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75393_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75456_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP76423_OD101_01	0.0942	OD 101

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
H	SAA ranges [0,+10], [+10,+20], [+20,+30]	PVPhotFPG_261H_PS_blu_SAA_0+10_HIP77450_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP77615_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP78235_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP78574_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79233_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79349_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79804_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80259_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80704_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80802_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP81835_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP82249_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_HIP83866_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_PPM767023_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA_0+10_WWSer_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HD48505_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HD121714_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP17881_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP30438_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP36547_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP46806_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP55355_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP61084_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP64778_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP66666_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP67457_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP69346_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP70026_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP70969_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP72607_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP73199_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP75143_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP75847_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP76573_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_HIP77501_OD101_01	0.0942	OD 101

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
H	SAA ranges [0,+10], [+10,+20], [+20,+30]	PVPhotFPG_261H_PS_blu_SAA+10+20_HIP77619_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+10+20_WXSer_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP29919_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP30945_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP35264_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP36377_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP46701_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP50230_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP51087_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP55537_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP67627_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP69816_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP70669_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP70885_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP71644_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP71802_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_HIP72208_OD101_01	0.0942	OD 101
		PVPhotFPG_261H_PS_blu_SAA+20+30_PPM30600_OD101_01	0.0942	OD 101
I	standard point source photometry blue filter, STR interlacing check SAA range [-10,+30]	PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD91760_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD99635_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD160540_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP50230_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP51087_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP55355_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP55537_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP56779_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP57380_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP58854_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP83866_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP87816_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP90883_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP94438_0001	0.3128	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP95413_0001	0.0947	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP95902_0001	0.3128	OD 200
		PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP96919_0001	0.0947	OD 200

Table 53: continued. Available AORs for the Herschel Pointing Calibration with PACS photometer and PACS photometer Focal Plane Geometry.

ID: PVPhotFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
		2.6.1 Absolute Pointing Error		
I	STR interlacing check SAA range [-10,+30]	PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP97629_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98337_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98424_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98438_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP102082_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP106044_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP106642_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP107140_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP110130_0001 PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP111310_0001	0.0947 0.0947 0.3128 0.0947 0.0947 0.0947 0.0947 0.0947 0.0947 0.0947	OD 200 OD 200 OD 200 OD 200 OD 200 OD 200 OD 200 OD 200 OD 200 OD 200
		2.6.2 Relative Pointing Error		
A	(non-)standard scan map photometry 5′ scan length, 10″ step, 45° bias V setting (non-)standard with and without gyro propagation	PVPhotFPG_262A_NStd_blu_19Fortuna_0001 PVPhotFPG_262A_NStd_blu_19Fortuna_0002 PVPhotFPG_262A_NStd_blu_3Juno_0001 PVPhotFPG_262A_NStd_blu_AlfBoo_0001	0.6069 0.6069 0.6069 0.6042	OD 93 OD 101 OD 85
B	(non-)standard raster map photometry 10×5, 20” step (y,z) bias V setting (non-)standard with and without gyro propagation	PVPhotFPG_262B_StdRaster_blu_HIP21479 PVPhotFPG_262B_nStdRaster_blu_gypro_HIP21479_0001	1.2125 1.3914	OD 101 OD 101
		2.6.4 Relative Pointing Error - Scan Mode		
		SRPE measurement		
A	(non-)standard scan map photometry 5’ leg, 20 legs, 10” separation 45 deg map scan angle low gain!	PVPhotFPG_264A_StdScani45_blu_HIP67419_0001 PVPhotFPG_264A_StdScani45_blu_HIP67419_0002 PVPhotFPG_264A_nStdScani45_blu_gypro_HIP67419_0001 PVPhotFPG_264A_nStdScani45_blu_gypro_HIP67419_0002	0.3328 0.3328 0.5322 0.5322	OD 93 OD 101 OD 93 OD 101
		Pointing accuracy along a scan leg (up to 1 degree)		
B	standard scan map photometry scan speed 20”/s scan leg has to include two calibrators with known separation and angle 100’ leg, 8 legs, 25” separation sky reference with calibrator orientation	PVPhotFPG_264B_StdScani45_blu_Mrk273_HIP66738_0001	0.7781	OD 41 (COP)
		Pointing Mode Change Test - switch from raster to fine pointing mode		
	standard point source AOT test of MPS feature changing PMODE	PVPhotFPG_StdPS_PModeTest_OD96_blu_HIP55355_0001 PVPhotFPG_StdPS_PModeTest_OD97_blu_HIP55355_0001	0.0942 0.0942	OD 96 OD 97

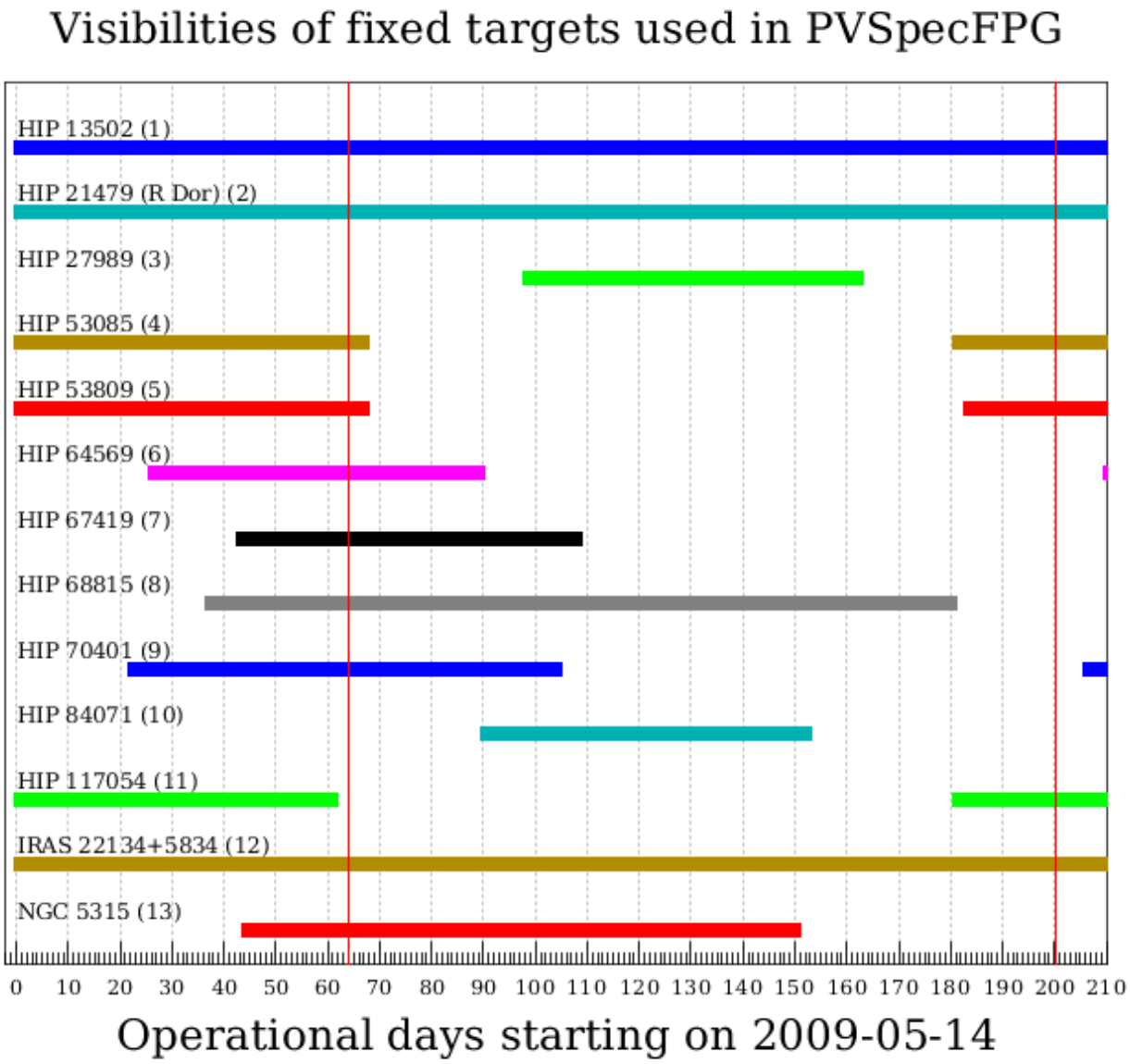


Figure 65: Visibilities of the fixed targets used for the AORs of the PVSpecFPG proposal.

Table 54: Visibilities of the targets used in the PVSpecFPG proposal.

Star	Start	End
HIP 13502	always visible	
HIP 21479 (R Dor)	always visible	
HIP 27989	20-Aug-2009	23-Oct-2009
HIP 53085	14-May-2009	20-Jul-2009
	11-Nov-2009	18-Jan-2010
HIP 53809	14-May-2009	20-Jul-2009
	13-Nov-2009	17-Jan-2010
HIP 64569	09-Jun-2009	11-Aug-2009
	10-Dec-2009	07-Feb-2010
HIP 67419	26-Jun-2009	30-Aug-2009
	26-Dec-2009	26-Feb-2010
HIP 68815	20-Jun-2009	10-Nov-2009
	21-Dec-2009	09-May-2010
HIP 70401	05-Jun-2009	26-Aug-2009
	06-Dec-2009	21-Feb-2010
HIP 84071	12-Aug-2009	13-Oct-2009
HIP 117054	14-May-2009	14-Jul-2009
	11-Nov-2009	12-Jan-2010
IRAS 22134+5834	always visible	
NGC 5315	27-Jun-2009	11-Oct-2009

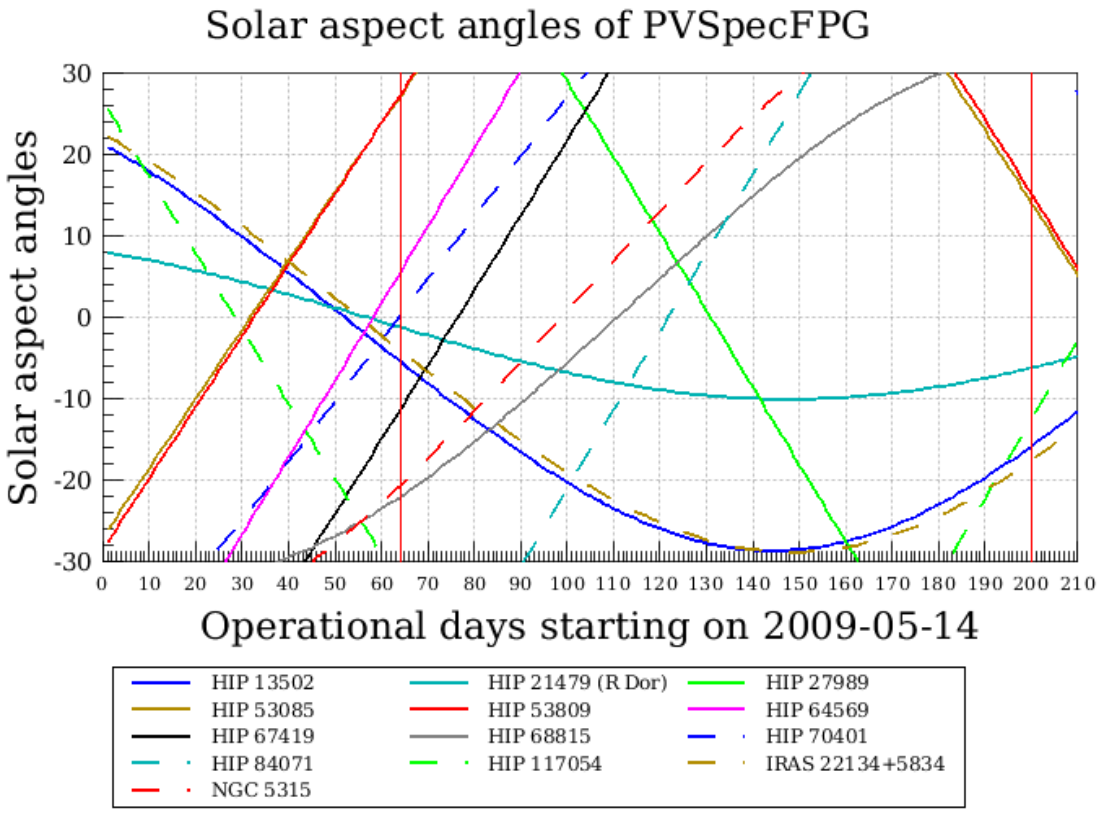


Figure 66: Solar aspect angles of the fixed targets used for the AORs of the PVSpecFPG proposal.

Table 55: Observational details of the PACS spectrometer Focal Plane Geometry. The total estimated time of this test block is 49.1 h. The test has to be executed with cryo-cover open.

ID: PVSpecFPG						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.1.1 Spectrometer Central Pointing Position and Grating Alignment *2.6.1 Absolute Pointing Error* *7.4.1 Relative location of PACS Photometer and Spectrometer FOVs in the Herschel Focal Plane*						
Initial search						
A	11×11 staring raster, 2.5″ step chopper at 7 deflections 12 s dwell time per raster point fixed grating at 77/154 µm	CUS	0.8	seven chopper positions optical zero, ±0.5′, ±1.5′, ±3.0′	5.6	Very bright pointing star >100 Jy Sect 4.4.1
SIAM update verification						
B	11×11 staring raster, 2.5″ step chopper at optical zero 12 s dwell time per raster point fixed grating at 77/154 µm	CUS	0.8	same source as in A	0.8	Very bright pointing star >100 Jy Sect 4.4.1
Further verification						
C	11×11 staring raster, 2.5″ step chopper at optical zero 12 s dwell time per raster point fixed grating at 77/154 µm	CUS	0.8	7 sources	5.6	Very bright pointing star >100 Jy Sect 4.4.1
Alignment check nod pattern with chopper direction						
E	non-standard chop/nod sequence nod angle selectable	CUS	0.55	L, M, & S chopper throws 2 corrections for L	2.2	Bright extended source
Skew angle and nod throw verification						
F	non-standard line spectroscopy 9×9 chopped raster, 3″ step at 77 µm	CUS	3.2	large chopper throw	3.2	Very bright pointing star >100 Jy
G	non-standard line spectroscopy 7×7 chopped raster, 2.5” step at 66 and 77 µm	CUS	1.9-4.2	chopper throws: L(3’), M & S	14.3	Very bright pointing star >100 Jy
H	non-standard line spectroscopy 7×7 chopped raster, 2.5” step H_2O line at 66 µm	CUS	1.9-2.3	chopper throws L, M & S variation of y/z-offsets given in calU table	12.4	Very bright pointing star >100 Jy
J	standard line spectroscopy 7×7 chopped raster, 2.5” step H_2O line at 66 µm	AOT	2.5	large chopper throw fine-tuning of skew angle	5.0	Very bright pointing star >100 Jy

Table 56: Available AORs for the PACS spectrometer Focal Plane Geometry. The total scheduled time is 47.4366 h.

ID: PVSpecFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
4.1.1 Spectrometer Central Pointing Position and Grating Alignment				
Initial search *SIAM update verification*				
A	11×11 staring raster, 2.5″ step chopper at 7 deflections 12 s dwell time per raster point fixed grating at 77/154 µm	PVSpecFPG_411A_nStd_11x11RCp_00_w77_HIP21479_01	0.7633	OD 64
		PVSpecFPG_411A_nStd_11x11RCp_00_w77_HIP21479_02	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_m05_w77_HIP21479_01	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_m15_w77_HIP21479_01	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_m3_w77_HIP21479_01	0.7633	OD 64
		PVSpecFPG_411A_nStd_11x11RCp_m3_w77_HIP21479_02	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_p05_w77_HIP21479_01	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_p15_w77_HIP21479_01	0.7633	OD 78
		PVSpecFPG_411A_nStd_11x11RCp_p3_w77_HIP21479_01	0.7633	OD 64
		PVSpecFPG_411A_nStd_11x11RCp_p3_w77_HIP21479_02	0.7633	OD 78
Further verification				
C	11×11 staring raster, 2.5″ step chopper at optical zero 12 s dwell time per raster point fixed grating at 77/154 µm	PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP13502_01	0.7633	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP21479_01	0.7633	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP27989_01	0.7633	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP67419_01	0.7633	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP68815_01	1.0322	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP84071_01	1.0322	OD 102
		PVSpecFPG_411C_nStd_11x11RCp_00_w77_IRAS22134_01	0.7633	OD 102
Alignment check nod pattern with chopper direction				
E	non-standard chop/nod sequence nod angle selectable L, M, & S chopper throws 2 corrections for L	PVSpecFPG_411E_nStd_patnodcheckLNegCor_NGC5315_01	0.5336	OD 91
		PVSpecFPG_411E_nStd_patnodcheckLPosCor_NGC5315_01	0.5336	OD 91
		PVSpecFPG_411E_nStd_patnodcheckMNegCor_NGC5315_01	0.5319	OD 91
		PVSpecFPG_411E_nStd_patnodcheckSNegCor_NGC5315_01	0.5289	OD 91
Skew angle and nod throw verification				
F	non-standard line spectroscopy 9×9 chopped raster, 3″ step large chopper throw, @ 77 µm	PVSpecFPG_411F_nStdLinespec_9x9_pm3_w77_HIP27989_01	3.1217	OD 103
G	non-standard line spectroscopy 7×7 chopped raster, 2.5″ step chopper throws L(3'), M, & S @ 66 & 77 µm	PVSpecFPG_411G_nStdLinespec_7x7_pm3_w77_HIP21479_01	1.8269	OD 126
		PVSpecFPG_411G_nStdLinespec_7x7_pm3_w66_HIP21479_01	4.1408	OD 126
		PVSpecFPG_411G_nStdLinespec_7x7_pm3_w77_HIP21479_02	1.8769	OD 141
		PVSpecFPG_411G_nStdLinespec_7x7_pmL_w66_HIP21479_01	2.2308	OD 141
		PVSpecFPG_411G_nStdLinespec_7x7_pmM_w66_HIP21479_01	2.0961	OD 141
		PVSpecFPG_411G_nStdLinespec_7x7_pmS_w66_HIP21479_01	1.8806	OD 141

Table 57: continued. Available AORs for the PACS spectrometer Focal Plane Geometry.

ID: PVSpecFPG				
	Measurement description	AOR labels	duration (h)	observing constraints
4.1.1 Spectrometer Central Pointing Position and Grating Alignment *Skew angle and nod throw verification*				
H	non-standard line spectroscopy 7×7 chopped raster, 2.5″ step chopper throws L, M, & S variation of y/z-offsets given in calU table H_2O line at 66 µm	PVSpecFPG_411H_nStdLineSpec_L7x7_180m6_11_RDor_01	2.2308	OD 155
		PVSpecFPG_411H_nStdLineSpec_L7x7_180m6_12_RDor_01	2.2308	OD 155
		PVSpecFPG_411H_nStdLineSpec_L7x7_265m35_12_RDor_01	1.8806	OD 155
		PVSpecFPG_411H_nStdLineSpec_L7x7_315m35_12_RDor_01	1.8806	OD 155
		PVSpecFPG_411H_nStdLineSpec_L7x7_315p15_12_RDor_01	1.8806	OD 155
		PVSpecFPG_411H_nStdLineSpec_L7x7_905m35_12_RDor_01	2.0961	OD 155
J	standard line spectroscopy 7×7 chopped raster, 2.5” step H_2O line at 66 µm	PVSpecFPG_411J_stdLineSpec_L7x7_RDor_01	2.4214	OD 166
		PVSpecFPG_411J_stdLineSpec_L7x7_RDor_02	2.4214	OD 173

6.5 Bolometer Settings/Characterisation IV

This test block is another iteration in order to adjust the bolometer dynamic range optimally to the telescope background during the cool-down phase. The loops on pairs of VRL and VH_BLIND are a verification of the assessment done during CP.

The results of CoP test block Bolometer Settings/Characterisation III will be used.

A comprehensive VRL and VH_BLIND characterization during PV was finally omitted due to sufficient results achieved during CoP (ID 110A on OD 41 and ID 111A on OD 40). The tests during the PV Phase complemented the investigation of the photometer extra red "light" (cf. Sect. 6.7).

Table 58: Observational details of bolometer settings/characterisation IV. The total estimated time of this test block is 10.5 h.

ID: PVPhotBol						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.1.0 VRL-VH_BLIND exploration						
A	loops on pairs of VRL and VH_BLIND	CUS	0.5 - 0.8	3 (VH_BLIND) × 7 (VRL) low gain	2.7	dark sky field Sect. 4.5
1.1.1 Control optimum pixel bias settings to get signal within dynamic range related req.: *7.2.1 Monitor the Herschel telescope background during the cool-down phase*						
A	low gain bias optimisation part 3 staring mode	CUS	7.8	12 triplets (VH_BLIND, VH, VL) 2 blue filters 2CSs + telescope background	7.8	dark sky field Sect. 4.5

Table 59: Summary of AORs for the bolometer setting/characterisation IV. The total scheduled time is 1.6224 h.

ID: PVPhotBol				
	Measurement description	AOR labels	duration (h)	observing constraints
1.1.0 VRL-VH_BLIND exploration				
A	non standard engineering cycling through red sub-arrays off/off (00), on/off (10), off/on (01), on/on (11)	PVPhotBol_110A_nStd_VrlVhBlind_na_0001	0.7878	
		PVPhotBol_110A_nStd_VrlVhBlind_Red00_0001	0.4056	OD 97
		PVPhotBol_110A_nStd_VrlVhBlind_Red01_0001	0.4056	OD 97
		PVPhotBol_110A_nStd_VrlVhBlind_Red10_0001	0.4056	OD 97
		PVPhotBol_110A_nStd_VrlVhBlind_Red11_0001	0.4056	OD 97
		PVPhotBol_110A_nStd_VrlVhBlind_Red00_0002	0.4056	
		PVPhotBol_110A_nStd_VrlVhBlind_Red01_0002	0.4056	
		PVPhotBol_110A_nStd_VrlVhBlind_Red10_0002	0.4056	
		PVPhotBol_110A_nStd_VrlVhBlind_Red11_0002	0.4056	
1.1.1 Control optimum pixel bias settings to get signal within dynamic range				
A	non standard engineering	PVPhotBol_111A_nStd_lowGain3src_DarkField_0001	7.6997	

6.6 Bolometer Settings/Characterisation V

This test block is to find the optimum setting for the nominal operation mode of the photometer with the bolometer in high gain. Only then a good sampling of the noise is guaranteed. The loop over a reasonably dense grid of polarisation values is only done in direct mode. Once the optimum polarisation has been found for direct mode, a test with three polarisation values (the optimum one plus two around) will be performed in DDCS mode, which has been included in Bolometer Settings/Characterisation VI.

The results of test block Bolometer Settings/Characterisation IV are mandatory. The decision on telescope background constancy or variation, hence on the chopper throw for the responsivity optimisation measurement has to be an outcome from the FOV scan of the Bolometer Settings/Characterisation III (in Commissioning Phase) and the scan maps from the Herschel pointing calibration with PACS.

Table 60: Visibilities of the targets used in the PVPhotBol proposal.

Star	Start	End
ISOPHOT Dark Field	always visible	
Arp 220	24-Jun-2009	18-Sep-2009
NGC 6946	always visible	
NGC 7027	14-May-2009	03-Aug-2009
	02-Oct-2009	31-Jan-2010
IRAS 17208-0014	10-Aug-2009	16-Oct-2009
1 Ceres	14-May-2009	14-Jul-2009
	08-Feb-2010	24-Apr-2010
2 Pallas	27-Dec-2009	19-Mar-2010

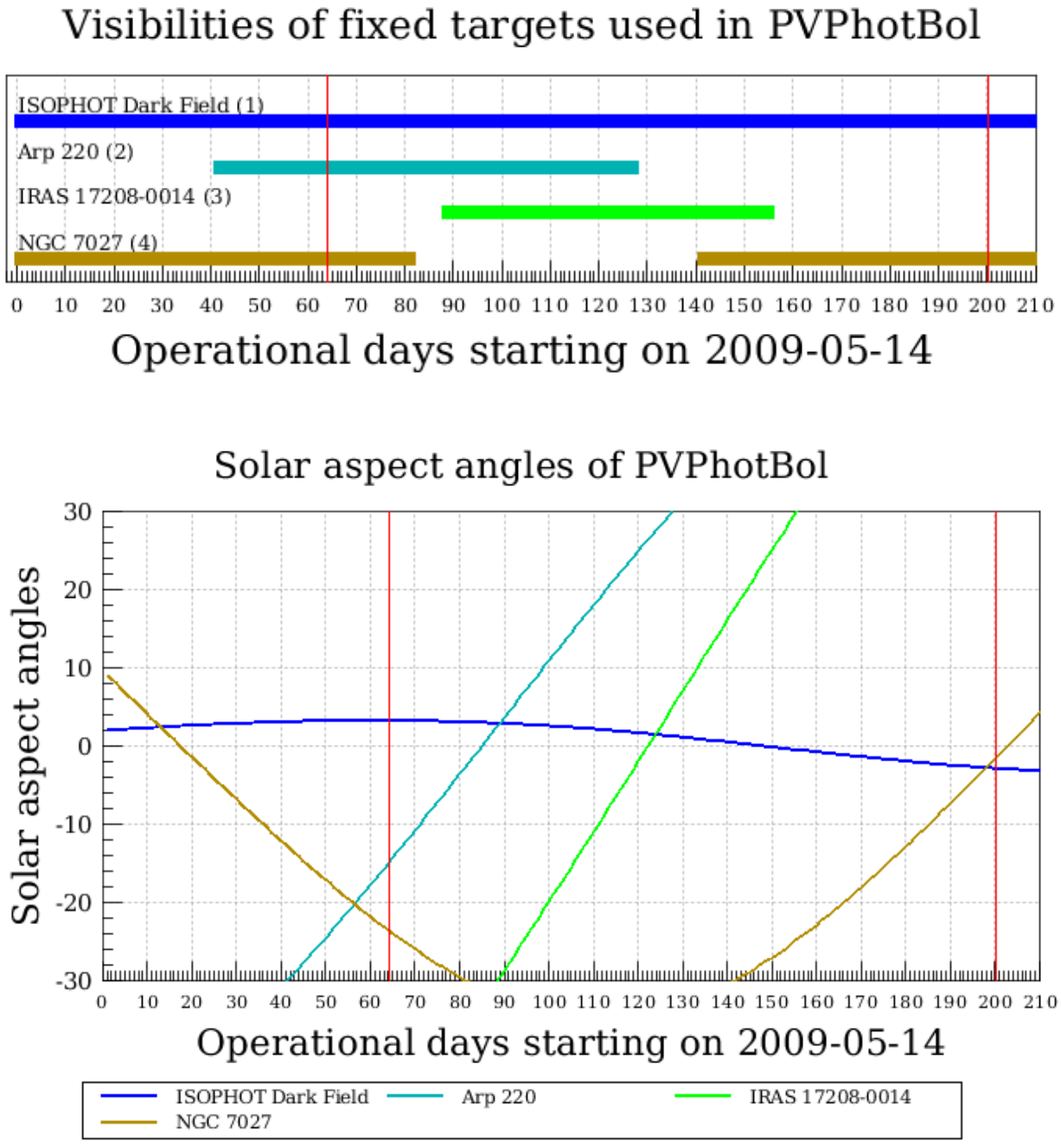


Figure 67: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVPhotBol proposal.

Table 61: Observational details of bolometer settings/characterisation V. The total estimated time of this test block is 60.1 h.

ID: PVPhotBol						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP						
A	high gain bias optimisation Responsivity 8 × 4 raster (9 × 4 for SSOs) 13”(y), 13”(z) chopper throw = 3.5’,if B_{Tel} ∼ const. chopper throw = 0, if B_{Tel} varies	CUS	1.5	20 polarisation bias values 2 blue filters direct mode only	60.1	Flux calibrator Sect. 4.1.1 Sect. 4.1.2 >80 Jy for all filters
	high gain bias optimisation Noise staring (off-position of raster)	CUS	0.1			off-position of flux calibrator
for each polarisation the raster and the off-position staring measurement should be executed one after the other *the final selection of the 20 polarisation values will be according to preceding in-flight experience*						

Table 62: Summary of AORs for the bolometer setting/characterisation V. The total scheduled time is 91.8299 h. The measurements in the green filter had to be repeated due to wrong filter setting in the first instance.

ID: PVPhotBol				
	Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP				
A	high gain bias optimisation Resp.:	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Ceres_0001	0.0533	
	8×4 raster	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Ceres_0002	0.0533	
	$13''$(y), $13''$(z)	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Ceres_0003	0.0533	
	chopper throw = $3.5'$,if $B_{\rm Tel} \sim$ const.	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Pallas_0001	0.0533	
	chopper throw = 0, if $B_{\rm Tel}$ varies	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Pallas_0002	0.0533	
	high gain bias optimisation NEP:	PVPhotBol_111bisA_nStdRaster_bluInitDrct_Pallas_0003	0.0533	
	staring	PVPhotBol_111bisA_nStdRaster_bluInitDrct_n7027_0001	0.0506	
		PVPhotBol_111bisA_nStdRaster_bluInitDrct_n7027_0002	0.0506	
		PVPhotBol_111bisA_nStdRaster_bluInitDrct_n7027_0003	0.0506	
		PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0001	0.0506	OD 67
		PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0002	0.0506	OD 73
		PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0003	0.0506	OD 96
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Ceres_0001	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Ceres_0002	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Ceres_0003	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Pallas_0001	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Pallas_0002	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Pallas_0003	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_n7027_0001	0.0506	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_n7027_0002	0.0506	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_n7027_0003	0.0506	
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_0001	0.0506	OD 65
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_0002	0.0506	OD 67
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_003	0.0506	OD 84
		PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_004	0.0506	OD 85

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_blu10Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu13Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu16Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu17Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu18Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu19Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu20Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu21Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu22Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu23Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu24Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu25Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu26Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu27Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu28Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu29Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu30Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu31Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu33Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu35Drct_Ceres_0001	1.4944	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_grn10Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn13Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn16Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn17Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn18Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn19Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn20Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn21Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn22Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn23Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn24Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn25Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn26Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn27Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn28Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn29Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn30Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn31Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn33Drct_Ceres_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn35Drct_Ceres_0001	1.4944	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_blu10Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu13Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu16Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu17Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu18Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu19Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu20Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu21Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu22Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu23Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu24Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu25Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu26Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu27Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu28Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu29Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu30Drct_Pallas_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu31Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu33Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_blu35Drct_Pallas_0001	1.4944	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_grn10Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn13Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn16Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn17Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn18Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn19Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn20Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn21Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn22Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn23Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn24Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn25Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn26Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn27Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn28Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn29Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn30Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn31Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn33Drct_Pallas_0001	1.4944	
	PVPhotBol_111bisA_nStdRaster_grn35Drct_Pallas_0001	1.4944	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_blu10Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu13Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu16Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu17Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu18Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu19Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu20Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu21Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu22Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu23Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu24Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu25Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu26Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu27Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu28Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu29Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu30Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu31Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu33Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_blu35Drct_n7027_0001	1.4964	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_grn10Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn13Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn16Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn17Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn18Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn19Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn20Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn21Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn22Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn23Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn24Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn25Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn26Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn27Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn28Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn29Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn30Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn31Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn33Drct_n7027_0001	1.4964	
	PVPhotBol_111bisA_nStdRaster_grn35Drct_n7027_0001	1.4964	
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_blu10Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu13Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu16Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu17Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu18Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu19Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu20Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu20Drct_Arp220_0002	1.5003	OD 96
	PVPhotBol_111bisA_nStdRaster_blu21Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_blu22Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu23Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu24Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu25Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu26Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu26Drct_Arp220_0002	1.5003	
	PVPhotBol_111bisA_nStdRaster_blu27Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu28Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu29Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu30Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu30Drct_Arp220_0002	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu31Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu33Drct_Arp220_0001	1.5003	OD 73
	PVPhotBol_111bisA_nStdRaster_blu35Drct_Arp220_0001	1.5003	OD 73
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting staring measurement has been implemented as an off-position of the raster			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_grn10Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn13Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn16Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn17Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn18Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn19Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn20Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn21Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn22Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn23Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn24Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn25Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn26Drct_Arp220_0001	1.5003	OD 65
	PVPhotBol_111bisA_nStdRaster_grn27Drct_Arp220_0001	1.5003	OD 67
	PVPhotBol_111bisA_nStdRaster_grn28Drct_Arp220_0001	1.4964	OD 67
	PVPhotBol_111bisA_nStdRaster_grn29Drct_Arp220_0001	1.4964	OD 67
	PVPhotBol_111bisA_nStdRaster_grn30Drct_Arp220_0001	1.4964	OD 67
	PVPhotBol_111bisA_nStdRaster_grn31Drct_Arp220_0001	1.4964	OD 67
	PVPhotBol_111bisA_nStdRaster_grn33Drct_Arp220_0001	1.4964	OD 67
	PVPhotBol_111bisA_nStdRaster_grn35Drct_Arp220_0001	1.4964	OD 67
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting staring measurement has been implemented as an off-position of the raster			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_grn10Drct_Arp220_0002	1.5003	
	PVPhotBol_111bisA_nStdRaster_grn13Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn16Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn17Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn18Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn19Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn20Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn21Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn22Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn23Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn24Drct_Arp220_0002	1.5003	OD 84
	PVPhotBol_111bisA_nStdRaster_grn25Drct_Arp220_0002	1.5003	OD 85
	PVPhotBol_111bisA_nStdRaster_grn26Drct_Arp220_0002	1.5003	OD 85
	PVPhotBol_111bisA_nStdRaster_grn27Drct_Arp220_0002	1.5003	OD 85
	PVPhotBol_111bisA_nStdRaster_grn28Drct_Arp220_0002	1.4964	OD 85
	PVPhotBol_111bisA_nStdRaster_grn29Drct_Arp220_0002	1.4964	OD 85
	PVPhotBol_111bisA_nStdRaster_grn30Drct_Arp220_0002	1.4964	OD 85
	PVPhotBol_111bisA_nStdRaster_grn31Drct_Arp220_0002	1.4964	OD 85
	PVPhotBol_111bisA_nStdRaster_grn33Drct_Arp220_0002	1.4964	OD 85
	PVPhotBol_111bisA_nStdRaster_grn35Drct_Arp220_0002	1.4964	OD 85
Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting staring measurement has been implemented as an off-position of the raster			

Table 62: continued. Summary of AORs for the bolometer setting/characterisation V.

ID: PVPhotBol			
Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0001	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0002	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0003	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0004	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0005	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0006	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0007	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Ceres_0008	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0001	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0002	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0003	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0004	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0005	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Pallas_0006	0.0033	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0001	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0002	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0003	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0004	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0005	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_n7027_0006	0.0006	OD 65
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0001	0.0006	OD 67
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0002	0.0006	OD 67
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0003	0.0006	OD 73
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0004	0.0006	OD 84
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0005	0.0006	OD 85
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0006	0.0006	OD 96
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0007	0.0006	
	PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0008	0.0006	

6.7 Bolometer Settings/Characterization VI

This test block is to determine the low frequency noise and to assess the detector bandwidth in high gain mode. It also provides a comparison direct-to-DDCS mode responsivity/NEP performance for the optimum high gain bias setting found for direct mode in the previous test block Bolometer Settings/Characterization V.

Additional aspects are:

1) Finding settings to minimize the electrical cross-talk.
2) Tuning of the temperatures of the internal calibration sources CS1/CS2 to provide the most compatible illumination and contrast with the telescope background illumination.
3) Investigation of the photometer extra red "light".

The results of test block Bolometer Settings/Characterization V are mandatory.

From this test block onwards, no more waiting times in scheduling, to allow for data analysis providing feedback to the observations, has to be taken into account.

Table 63: Observational details of bolometer settings/characterisation VI. The total estimated time of this test block is 65.4 h.

ID: PVPhotBol						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP						
A	high gain bias optimisation Responsivity 8 × 4 raster (9 × 4 for SSOs) 13"(y), 13"(z) chopper throw = 3.5',if B_{Tel} ∼ const. chopper throw = 0, B_{Tel} varies high gain bias optimisation Noise staring (off-position of raster)	CUS CUS	1.5 0.1	3 polarisation bias values 2 blue filters DDCS mode	9.1	Flux calibrator Sect. 4.1.1 Sect. 4.1.2 >80 Jy for all filters off-position of flux calibrator
for each polarisation the raster and the off-position staring measurement should be executed one after the other						
1.1.11 Low frequency noise						
A	sky: staring internal: chopping CS1/CS2	CUS CUS	3.3 0.1	3 polarisations direct mode & DDCS 2 blue filters	39.5	dark sky field Sect. 4.5
for each polarisation one internal calibration CS1/CS2 before and after sky measurement						
1.1.16 Measure the signal dependence on chopper frequency						
A	chop between CS and sky off-centre chopper throw 21196 – 7134 buffer transmission mode (24 min per setting) 1 blue and red filter	CUS	3.2	8 chopper frequencies 40, 2, 3, 4, 6, 8, 10, 16 read-outs per chopper plateau (40 Hz sampling) direct mode & DDCS	6.3	dark sky field Sect. 4.5
1.1.18 Electric Detector Crosstalk						
A	non-standard scan map direct mode	CUS	0.6	3 settings of IVSS current	1.8	IRAS 17208-0014
3.1.7 Tuning of internal calibration source temperatures						
A	FOV scans 163 steps, chopper pos. step size 287 between −23500 and +22994	CUS	0.4	4 observations with different temperatures for CS1 and CS2 off, 40/45 K, 45/50 K, 50/55 K	1.6	dark sky field Sect. 4.5
B	3 position chopping chopper positions on −21350, +664, +21200	CUS	0.7	3 observations with different temperatures for CS1 and CS2 40/45 K, 45/50 K, 50/55 K	2.0	dark sky field Sect. 4.5
selection of blue filter and CS temperature depends on actual flux contrast found in-orbit						

Table 63: continued. Observational details of bolometer settings/characterisation VI.

ID: PVPhotBol						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.1.xx Investigation of photometer extra red "light"						
A	FOV scans between CSs 81 steps, chopper pos. step size 574 between −23500 and +22994	CUS	0.43	4 observations cycling through sub-arrays off/off, on/off, off/on, on/on 2 repetitions	3.4	dark sky field Sect. 4.5
B	3 position chopping chopper positions: −21350, +664, +21200	CUS	0.42	cycling through sub-arrays off/off, on/off, off/on, on/on	1.7	dark sky field Sect. 4.5

Table 64: Summary of AORs for the bolometer setting/characterisation VI. The total scheduled time is 65.3256 h.

ID: PVPhotBol				
	Measurement description	AOR labels	duration (h)	observing constraints
1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP				
A	high gain bias optimisation Resp.:	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_Ceres_0001	0.0533	
	8×4 raster	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_Pallas_0001	0.0533	
	$13''$(y), $13''$(z)	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_n7027_0001	0.0506	
	chopper throw = $3.5'$,if $B_{\rm Tel} \sim$ const.	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_n7027_0002	0.0506	
	chopper throw = 0, $B_{\rm Tel}$ varies	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_Arp220_0001	0.0506	OD 96
	high gain bias optimisation NEP:	PVPhotBol_111bisA_nStdRaster_bluInitDDCS_Arp220_0002	0.0506	
	staring	PVPhotBol_111bisA_nStdRaster_grnInitDDCS_Ceres_0001	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDDCS_Pallas_0001	0.0533	
		PVPhotBol_111bisA_nStdRaster_grnInitDDCS_n7027_0001	0.0506	
		PVPhotBol_111bisA_nStdRaster_grnInitDDCS_n7027_0002	0.0506	
		PVPhotBol_111bisA_nStdRaster_grnInitDDCS_Arp220_0001	0.0506	OD 96
		PVPhotBol_111bisA_nStdRaster_grnInitDDCS_Arp220_0002	0.0506	
		PVPhotBol_111bisA_nStdRaster_blu20DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu26DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu30DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn20DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn26DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn30DDCS_Ceres_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu20DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu26DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu30DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn20DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn26DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_grn30DDCS_Pallas_0001	1.4958	
		PVPhotBol_111bisA_nStdRaster_blu20DDCS_n7027_0001	1.5017	
		PVPhotBol_111bisA_nStdRaster_blu26DDCS_n7027_0001	1.5017	
		PVPhotBol_111bisA_nStdRaster_blu30DDCS_n7027_0001	1.5017	
		PVPhotBol_111bisA_nStdRaster_grn20DDCS_n7027_0001	1.5017	
		PVPhotBol_111bisA_nStdRaster_grn26DDCS_n7027_0001	1.5017	
		PVPhotBol_111bisA_nStdRaster_grn30DDCS_n7027_0001	1.5017	
staring measurement has been implemented as an off-position of the raster				

Table 64: continued. Summary of AORs for the bolometer setting/characterisation VI

ID: PVPhotBol				
	Measurement description	AOR labels	duration (h)	observing constraints
	1.1.1b Control optimum pixel bias settings; Determination of optimum settings for responsivity/NEP			
A		PVPhotBol_111bisA_nStdRaster_blu20DDCS_Arp220_0001	1.5003	OD 96
		PVPhotBol_111bisA_nStdRaster_blu26DDCS_Arp220_0001	1.5003	OD 96
		PVPhotBol_111bisA_nStdRaster_blu30DDCS_Arp220_0001	1.5003	OD 96
		PVPhotBol_111bisA_nStdRaster_grn20DDCS_Arp220_0001	1.5003	OD 96
		PVPhotBol_111bisA_nStdRaster_grn26DDCS_Arp220_0001	1.5003	OD 96
		PVPhotBol_111bisA_nStdRaster_grn30DDCS_Arp220_0001	1.5003	OD 96
	Bracket each set of observation with the referring initialisation and finalisation AORs of the same filter setting staring measurement has been implemented as an off-position of the raster			
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Ceres_0001	0.0033	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Pallas_0001	0.0033	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_n7027_0001	0.0006	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_n7027_0002	0.0006	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_n7027_0003	0.0006	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_n7027_0004	0.0006	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0001	0.0006	OD 96
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0002	0.0006	OD 96
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0003	0.0006	
		PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0004	0.0006	
	1.1.11 Low frequency noise			
A	sky: staring internal: chopping CS1/CS2	PVPhotBol_1111A_nStd_bluDrctHighBias_DarkField_0001	3.2786	OD 97
		PVPhotBol_1111A_nStd_bluDrctLowBias_DarkField_0001	3.2786	OD 96
		PVPhotBol_1111A_nStd_bluDrctNomi_DarkField_0001	3.2786	OD 97
		PVPhotBol_1111A_nStd_grnDrctHighBias_DarkField_0001	3.2786	OD 97
		PVPhotBol_1111A_nStd_grnDrctLowBias_DarkField_0001	3.2786	OD 97
		PVPhotBol_1111A_nStd_grnDrctNomi_DarkField_0001	3.2786	OD 97
		PVPhotBol_1111A_nStd_bluDdcsHighBias_DarkField_0001	3.2783	OD 107
		PVPhotBol_1111A_nStd_bluDdcsLowBias_DarkField_0001	3.2783	OD 107
		PVPhotBol_1111A_nStd_bluDdcsNomi_DarkField_0001	3.2783	OD 107
		PVPhotBol_1111A_nStd_grnDdcsHighBias_DarkField_0001	3.2783	OD 107
		PVPhotBol_1111A_nStd_grnDdcsLowBias_DarkField_0001	3.2783	OD 107
		PVPhotBol_1111A_nStd_grnDdcsNomi_DarkField_0001	3.2783	OD 107

Table 64: continued. Summary of AORs for the bolometer setting/characterisation VI

ID: PVPhotBol				
	Measurement description	AOR labels	duration (h)	observing constraints
1.1.16 Measure the signal dependence on chopper frequency				
A	chop between CS and sky off-centre chopper throw 21196 – 7134 buffer transmission mode direct mode & DDCS	PVPhotBol_1116A_nStd_timeConstDdcs_DarkField_0001 PVPhotBol_1116A_nStd_timeConstDrct_DarkField_0001	3.1750 3.1722	OD 96 OD 85
1.1.18 Electric Detector Crosstalk				
A	non-standard scan map direct mode 3 settings of IVSS current special set-up bracketing test block	PVPhotBol_1118A_nStd_xtalkBlueInit_IRAS_0001 PVPhotBol_1118A_nStd_xtalkHighIVSS_IRAS_0001 PVPhotBol_1118A_nStd_xtalkLowIVSS_IRAS_0001 PVPhotBol_1118A_nStd_xtalkNomiIVSS_IRAS_0001 PVPhotBol_1118A_nStd_xtalkFinal_IRAS_0001	0.0006 0.5847 0.5847 0.5847 0.0006	OD 139 OD 139 OD 139 OD 139 OD 139
3.1.7 Tuning of internal calibration source temperatures				
A	FOV scans CS temperatures on 0 K, 40/45 K, 45/50 K, 50/55 K 163 steps, chopper pos. step size 287 between −23500 and +22994	PVPhotBol_317A_nStd_FOV_CS4045_DarkField_0001 PVPhotBol_317A_nStd_FOV_CS4550_DarkField_0001 PVPhotBol_317A_nStd_FOV_CS5055_DarkField_0001 PVPhotBol_317A_nStd_FOV_CSoff_DarkField_0001	0.4261 0.4261 0.4261 0.4261	OD 84 OD 84 OD 84
B	3 position chopping CS temperatures on 40/45 K, 45/50 K, 50/55 K chopper positions: −21350, +664, +21200	PVPhotBol_na_nStd_3posChop_CS4045_DarkField_0001 PVPhotBol_na_nStd_3posChop_CS4550_DarkField_0001 PVPhotBol_na_nStd_3posChop_CS5055_DarkField_0001	0.6669 0.6669 0.6669	OD 84 OD 84 OD 84
3.1.8 Investigation of photometer extra red "light"				
A	FOV scans between CSs 81 steps, chopper pos. step size 574 between −23500 and +22994 cycling through sub-arrays off/off (00), on/off (10), off/on (01), on/on (11)	PVPhotBol_na_nStd_FOV_Red00_DarkField_0001 PVPhotBol_na_nStd_FOV_Red01_DarkField_0001 PVPhotBol_na_nStd_FOV_Red10_DarkField_0001 PVPhotBol_na_nStd_FOV_Red11_DarkField_0001 PVPhotBol_na_nStd_FOV_Red00_DarkField_0002 PVPhotBol_na_nStd_FOV_Red01_DarkField_0002 PVPhotBol_na_nStd_FOV_Red10_DarkField_0002 PVPhotBol_na_nStd_FOV_Red11_DarkField_0002	0.4250 0.4250 0.4250 0.4250 0.4250 0.4250 0.4250 0.4250	OD 85 OD 85 OD 85 OD 85 OD 108 OD 108 OD 108 OD 108
B	3 position chopping chopper positions: −21350, +664, +21200 cycling through sub-arrays as for A	PVPhotBol_na_nStd_3posChop_Red00_DarkField_0001 PVPhotBol_na_nStd_3posChop_Red01_DarkField_0001 PVPhotBol_na_nStd_3posChop_Red10_DarkField_0001 PVPhotBol_na_nStd_3posChop_Red11_DarkField_0001	0.4181 0.4181 0.4181 0.4181	OD 97 OD 97 OD 97 OD 97

6.8 Investigation of Bolometer Detector Readout Modes

The tests of bolometer detector read-out modes were confined to an alternative read-out and sampling scheme able to deal with the required data compression, the so-called transparent mode. Data are read-out and transmitted with the full 40 Hz sampling of the bolometers, but only for a subset of detector pixels. This is a compressed sensing stratetgy for highly redundant data sets, as described e.g. in Bobin, Starck, & Ottensamer, IEEE JOURNAL OF SELECTED TOPICS IN SIGNAL PROCESSING, VOL. 2, NO. 5, OCTOBER 2008. It may provide improved spatial resolution due to the full time resolution of the data sets instead of onboard averaging. The subset of detector pixels is defined by a detector selection table (e.g. only matrix 6 for the blue array). An example of the processing method is given in Barbey et al., 2011, A&A 527, A102.

Table 65: Visibilities of the targets used in the PVPhotSPU proposal.

Target	Start	End
Abell 2218	always visible	
Galactic plane	30-Aug-2009	31-Oct-2009
NGC 6946	always visible	

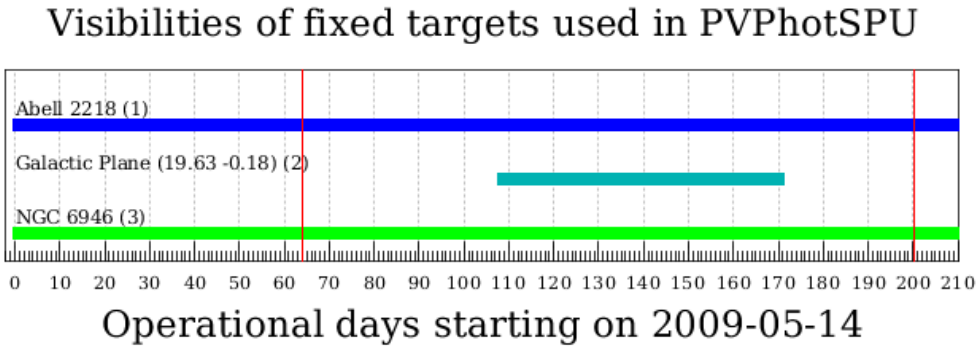


Figure 68: Visibilities of the fixed targets used for the AORs of the PVPhotSPU proposal for the bolometer detector readout modes investigation.

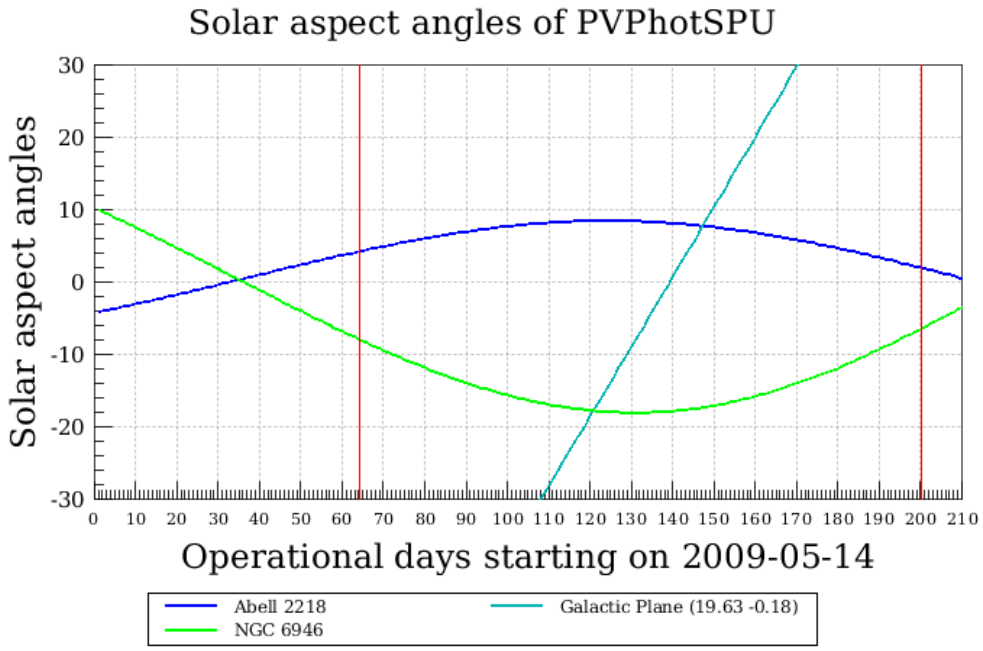


Figure 69: Solar aspect angles of the fixed targets used for the AORs of the PVPhotSPU proposal for the bolometer detector readout modes investigation.

Table 66: Summary of AORs for the bolometer detector readout modes investigation. The total scheduled time is 20.4660 h.

ID: PVPhotSPU			
Measurement description	AOR labels	duration (h)	observing constraints
Transparent Readout Mode			
non-standard scan maps in-scan (32.4^o) & cross scan (132.4^o) 36" cross-scan step size 25 scan legs of 15' length, blue filter (A2218 & NGC6946) 41 scan legs of 25' length, blue & green (Galactic Plane) low, medium & high scan speeds transparent read-out mode, i.e. 40 Hz with detector selection table PACSDetSel_20090909	PVPhotSPU_TranspScan_nStd_A2218_blueHigCrScan_0001	0.4889	OD 139
	PVPhotSPU_TranspScan_nStd_A2218_blueHigInScan_0001	0.4889	OD 139
	PVPhotSPU_TranspScan_nStd_A2218_blueLowCrScan_0001	0.8647	OD 139
	PVPhotSPU_TranspScan_nStd_A2218_blueLowInScan_0001	0.8647	OD 139
	PVPhotSPU_TranspScan_nStd_A2218_blueMedCrScan_0001	0.5867	OD 138
	PVPhotSPU_TranspScan_nStd_A2218_blueMedInScan_0001	0.5867	OD 138
	PVPhotSPU_TranspScan_nStd_GP_blueHigCrScan_0001	0.8783	OD 161
	PVPhotSPU_TranspScan_nStd_GP_blueHigInScan_0001	0.8783	OD 161
	PVPhotSPU_TranspScan_nStd_GP_blueMedCrScan_0001	1.2661	OD 161
	PVPhotSPU_TranspScan_nStd_GP_blueMedInScan_0001	1.2661	OD 161
	PVPhotSPU_TranspScan_nStd_GP_greenHigCrScan_0001	0.8783	OD 139
	PVPhotSPU_TranspScan_nStd_GP_greenHigInScan_0001	0.8783	OD 139
	PVPhotSPU_TranspScan_nStd_GP_greenLowCrScan_0001	2.0636	OD 139
	PVPhotSPU_TranspScan_nStd_GP_greenLowInScan_0001	2.0636	OD 139
	PVPhotSPU_TranspScan_nStd_GP_greenMedCrScan_0001	1.2661	OD 139
	PVPhotSPU_TranspScan_nStd_GP_greenMedInScan_0001	1.2661	OD 139
	PVPhotSPU_TranspScan_nStd_N6946_blueHigCrScan_0001	0.4889	OD 146
	PVPhotSPU_TranspScan_nStd_N6946_blueHigInScan_0001	0.4889	OD 146
	PVPhotSPU_TranspScan_nStd_N6946_blueLowCrScan_0001	0.8647	OD 146
	PVPhotSPU_TranspScan_nStd_N6946_blueLowInScan_0001	0.8647	OD 146
	PVPhotSPU_TranspScan_nStd_N6946_blueMedCrScan_0001	0.5867	OD 138
	PVPhotSPU_TranspScan_nStd_N6946_blueMedInScan_0001	0.5867	OD 138

6.9 Verification of Chopper Angular Calibration

This test block comprises the verification of the on-ground calibration of the chopper angle versus position sensor read-out as well as of the spatial scale of the instrument by means of well calibrated distances on the sky for FIR targets. The overview of the foreseen measurements is given in Table 67.

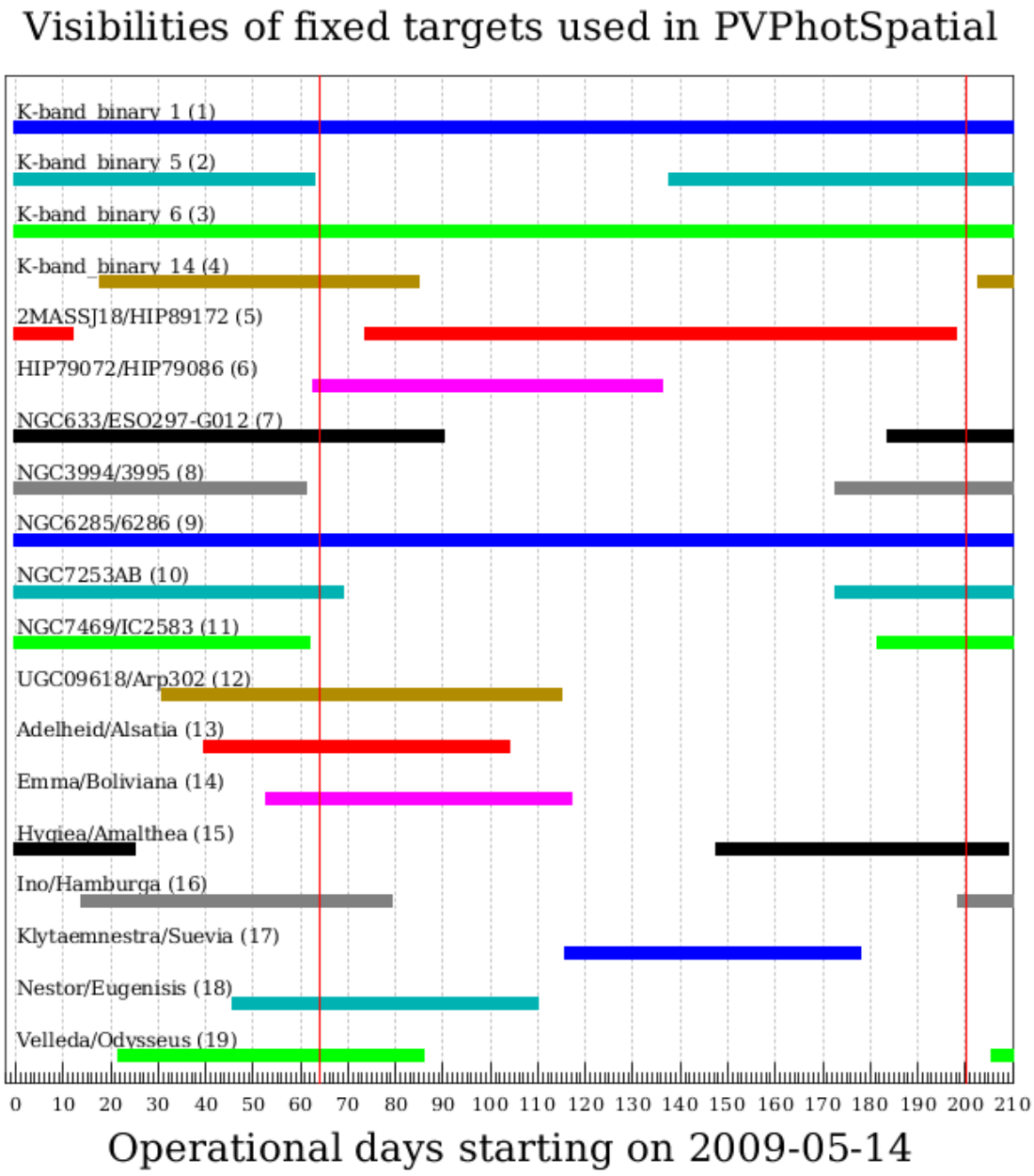


Figure 70: Visibilities of the fixed targets used for the AORs of the PVPhotSpatial proposal for the chopper angular calibration.

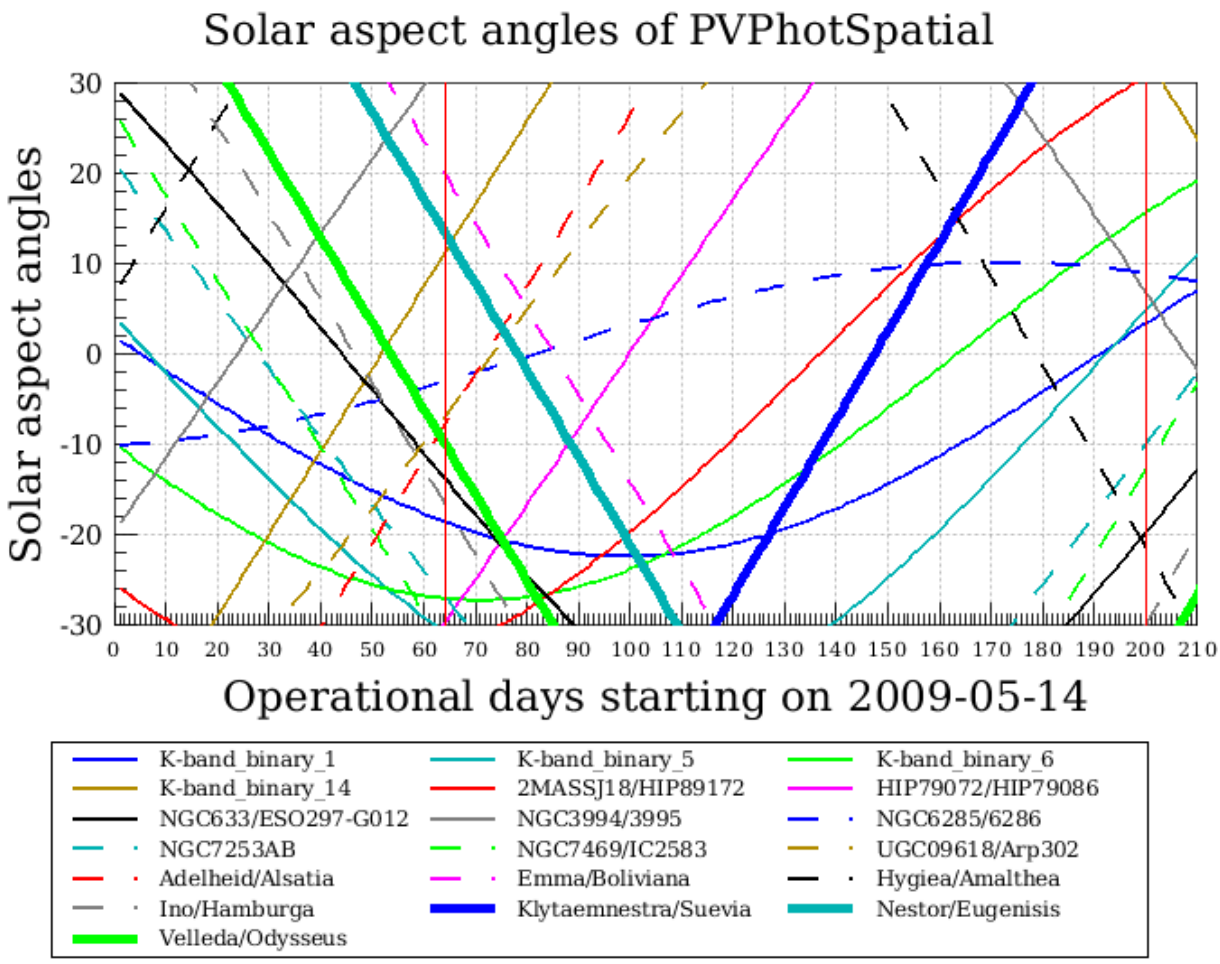


Figure 71: Solar aspect angles of the fixed targets used for the AORs of the PVPhotSpatial proposal for the chopper angular calibration.

Table 67: Observational details of the chopper angle calibration. Methods A and B are alternative. The total estimated time of this test block is 4.6 h.

ID: PVPhotSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.1.2 Relation between Chopper Position and Angular Displacement on Sky						
A	chopped measurement throw adjusted to source distance 15 different distances	CUS	0.13	up to 15 sources	2.0	double point sources Sect. 4.4.2 orientation of connecting line close to parallel to chop-direction
B	symmetric triple chop half distance throw to central reference position 15 different distances	CUS	0.13		2.6	double point sources Sect. 4.4.2 orientation of connecting line close to parallel to chop-direction

Table 68: Summary of AORs for the chopper angle calibration. The total scheduled time is 1.0390 h. Timing constraints have been set for the AORs to ensure the right sky orientation for the chopper elongation.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
3.1.2 Relation between Chopper Position and Angular Displacement on Sky				
A	chopped measurement throw adjusted to source distance 15 different distances	PVPhotSpatial_312A_NStd_blu_Kbin1_0001	0.1364	
		timing constraints set for Kbin1: 23-Oct-2009 - 08-Nov-2009		
		PVPhotSpatial_312A_NStd_blu_Kbin5_0001	0.1364	
		timing constraints set for Kbin5: 13-Jun-2009 - 07-Jul-2009		
		PVPhotSpatial_312A_NStd_blu_Kbin6_0001	0.1364	OD 138
		timing constraints set for Kbin6: 18-Sep-2009 - 01-Oct-2009		
		PVPhotSpatial_312A_NStd_blu_Kbin14_0001	0.1364	
		timing constraints set for Kbin14: 01-Jun-2009 - 11-Jul-2009		
B	symmetric triple chop half distance throw to central reference position 15 different distances	PVPhotSpatial_312B_NStd_blu_2MASSJ18_0001	0.1264	OD 161
		timing constraints set for 2MASSJ18: 10-Oct-2009 - 25-Oct-2009		
		PVPhotSpatial_312B_NStd_blu_AdelheidMeetsAlsat_0001	0.1264	
		timing constraints set for Adelheid/Alsatia: 13-Aug-2009		
		PVPhotSpatial_312B_NStd_blu_EmmaMeetsBoliviana_0001	0.1264	
		timing constraints set for Emma/Boliviana: 24-Aug-2009		
		PVPhotSpatial_312B_NStd_blu_HIP79072_0001 PVPhotSpatial_312B_NStd_blu_HIP79072lowgain_0001	0.1264 0.1353	 OD 72
		timing constraints set for HIP79072: 17-Jul-2009 - 08-Aug-2009		
		PVPhotSpatial_312B_NStd_blu_HygieaMeetsAmalthe_0001	0.1264	
		timing constraints set for Hygiea/Amalthea: 18-Oct-2009		
		PVPhotSpatial_312B_NStd_blu_InoMeetsHamburga_0001	0.1264	
		timing constraints set for Ino/Hamburga: 26-Jun-2009		
		PVPhotSpatial_312B_NStd_blu_Kbin14_0001	0.1264	
		timing constraints set for Kbin14: 01-Jun-2009 - 11-Jul-2009		

Table 69: continued. Summary of AORs for the chopper angle calibration.

ID: PVPhotSpatial			
Measurement description	AOR labels	duration (h)	observing constraints
3.1.2 Relation between Chopper Position and Angular Displacement on Sky			
B	PVPhotSpatial_312B_NStd_blu_Kbin1_0001	0.1264	
	timing constraints set for Kbin1: 23-Oct-2009 - 08-Nov-2009		
	PVPhotSpatial_312B_NStd_blu_Kbin5_0001	0.1264	
	timing constraints set for Kbin5: 13-Jun-2009 - 07-Jul-2009		
	PVPhotSpatial_312B_NStd_blu_Kbin6_0001	0.1286	OD 138
	timing constraints set for Kbin6: 18-Sep-2009 - 01-Oct-2009		
	PVPhotSpatial_312B_NStd_blu_KlytaemnestrSuevia_0001	0.1264	
	timing constraints set for Klytemnestra/Suevia: 11-Oct-2009		
	PVPhotSpatial_312B_NStd_blu_N3994_0001	0.1264	
	timing constraints set for N3994: 01-May-2009 - 09-May-2009		
	PVPhotSpatial_312B_NStd_blu_N6285_0001	0.1264	OD 161
	timing constraints set for N6285: 06-Oct-2009 - 04-Nov-2009		
	PVPhotSpatial_312B_NStd_blu_N633_0001	0.1264	
	PVPhotSpatial_312B_NStd_blu_N633lowgain_0001	0.1292	OD 72
	timing constraints set for N633: 06-Jul-2009 - 10-Aug-2009		
	PVPhotSpatial_312B_NStd_blu_N7253lowgain_0001	0.1281	OD 64
	timing constraints set for N7253: 23-Jun-2009 - 20-Jul-2009		
	PVPhotSpatial_312B_NStd_blu_NestorMeetsEugenis_0001	0.1264	
	timing constraints set for Nestor/Eugenis: 08-Jul-2009		
	PVPhotSpatial_312B_NStd_blu_U09618_0001	0.1286	OD 108
	timing constraints set for U09618: 25-Jul-2009 - 04-Sep-2009		
	PVPhotSpatial_312B_NStd_blu_VelledaMeetsOdysse_0001	0.1264	
	timing constraints set for Velleda/Odysse: 27-Dec-2009		

6.10 FOV Characterization Photometer

This test block comprises the characterization of the full photometer field-of-view under different illumination conditions. This serves to assess the impact of straylight from the sky field-of-view into the internal calibration source field-of-view and vice versa. It will be checked repeatedly during the cool-down of the telescope (at least twice, firstly around the mid of PV phase and secondly towards the end of PV phase).

The overview of the foreseen measurements is given in Table 70.

The first observation type requires switched-off internal calibration sources! Therefore, provisions have to be made to schedule these measurements before a general switch-on of the internal calibration sources (i.e. modified orbit prologue).

The third observation type requires internal calibration sources on a higher temperature level than the nominal one. Therefore, these measurements should be scheduled preferentially towards the end of PACS operations in order to let them cool down to the nominal level afterwards.

Table 70: Observational details of the photometer field-of-view characterization. The total estimated time of this test block is 3.6 h.

ID: PVPhotSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.1.7 Field-of-View characterization						
A	FOV scan, both CSs off 225 steps up & down between chopper pos. ±23000 80 read-outs per chopper pos. both blue filters	CUS	0.6	mid and end of PV	1.2	dark sky field Sect. 4.5 **internal CSs off!** covered by PVPhotBol_317A cf. Sect. 6.7
B	FOV scan, both CSs on nominal T CS1/CS2 @ 50 K/55 K 225 steps up & down between chopper pos. ±23000 80 read-outs per chopper pos. both blue filters	CUS	0.6	mid and end of PV	1.2	dark sky field Sect. 4.5
C	FOV scan, both CSs > $T_{nominal}$ CS1/CS2 @ 70 K/76 K 225 steps up & down between chopper pos. ±23000 80 read-outs per chopper pos. both blue filters include heat-up to required T	CUS	0.6	mid and end of PV	1.2	dark sky field Sect. 4.5 **T internal CSs non-nominal!**

Table 71: Available AORs for the PV photometer FOV characterisation observations. The total scheduled time is 2.2556 h.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.7 Field-of-View characterization			
A	FOV scans CSs off	PVPhotSpatial_317A_nStdFOV_CSoff_DarkField_0001	0.5639	
		PVPhotSpatial_317A_nStdFOV_CSoff_DarkField_0002	0.5639	
B	FOV scans CSs at nominal temp	PVPhotSpatial_317B_nStdFOV_CSnom_DarkField_0001	0.5639	OD 110
		PVPhotSpatial_317B_nStdFOV_CSnom_DarkField_0002	0.5639	OD 119
C	FOV scans CSs at increased temp	PVPhotSpatial_317C_nStdFOV_CShigh_DarkField_0001	0.5639	OD 110
		PVPhotSpatial_317C_nStdFOV_CShigh_DarkField_0002	0.5639	OD 119
	Measurement has to be preceded by PVPhotSetup_na_nStd_setCSs70_na_000n, cf. Sect. 6.3			

6.11 Photometer Spatial Calibration

This test block comprises the spatial characterisation and calibration of the photometer camera. The overview of the foreseen measurements is given in Table 73.

The characterisation of IR bright sources considered for spectrometer PSF and FOV distortion assessment is included, whose properties are not yet known in detail. Depending on the outcome of the FIR imaging (0.4 h) the most suitable source will be selected for Spectrometer Spatial Calibration.

Table 72: Visibilities of the targets used in the PVPhotSpatial proposal.

Target	Start	End
Mira	23-Jun-2009	26-Aug-2009
α Boo	10-Jun-2009	23-Aug-2009
α Her A	31-Jul-2009	18-Oct-2009
α Tau	02-Aug-2009	03-Oct-2009
IK Tau	21-Jul-2009	22-Sep-2009
V814 Her	always visible	
NML Cyg	14-May-2009	26-Jul-2009
	24-Sep-2009	23-Jan-2010
HIP 21479	always visible	
HIP 27989	20-Aug-2009	23-Oct-2009
HIP 67419	26-Jun-2009	30-Aug-2009
CRL 2688	14-May-2009	19-Jul-2009
NGC 3256	14-May-2009	10-Aug-2009
3C345	always visible	
Red Rectangle	22-Aug-2009	05-Nov-2009
IRAS 09452+1330	18-Oct-2009	17-Dec-2009
IRAS 21078+5211	always visible	
IRAS 22134+5834	always visible	
ISOPHOT Dark Field	always visible	
Uranus	15-Nov-2009	14-Jan-2010
2 Pallas	27-Dec-2009	19-Mar-2010
3 Juno	14-May-2009	27-Jul-2009
	13-Nov-2009	13-Feb-2010
4 Vesta	10-Oct-2009	28-Dec-2009
9 Metis	02-Dec-2009	17-Feb-2010
19 Fortuna	13-Jul-2009	16-Oct-2009

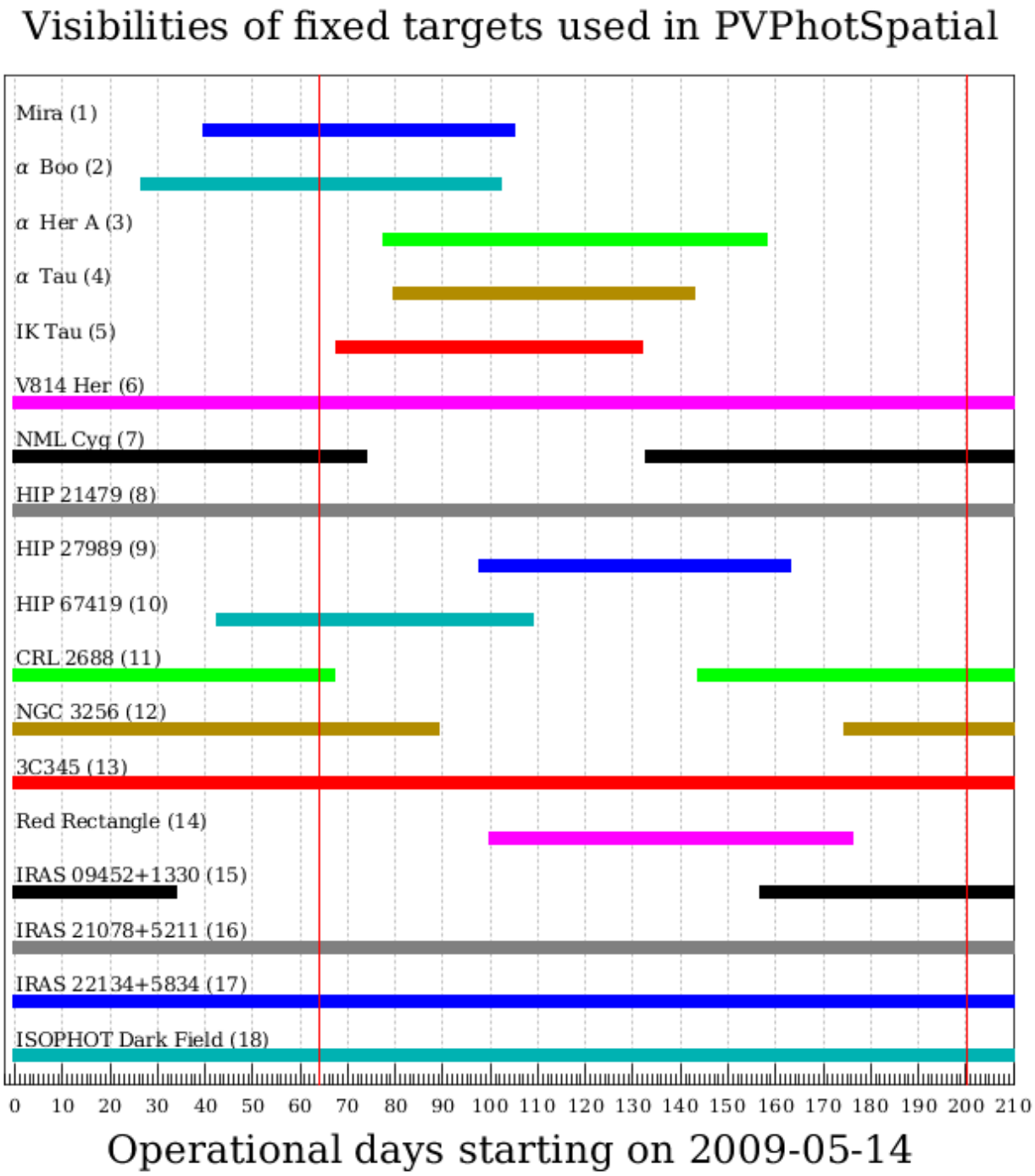


Figure 72: Visibilities of the fixed targets used for the AORs of the PVPhotSpatial proposal.

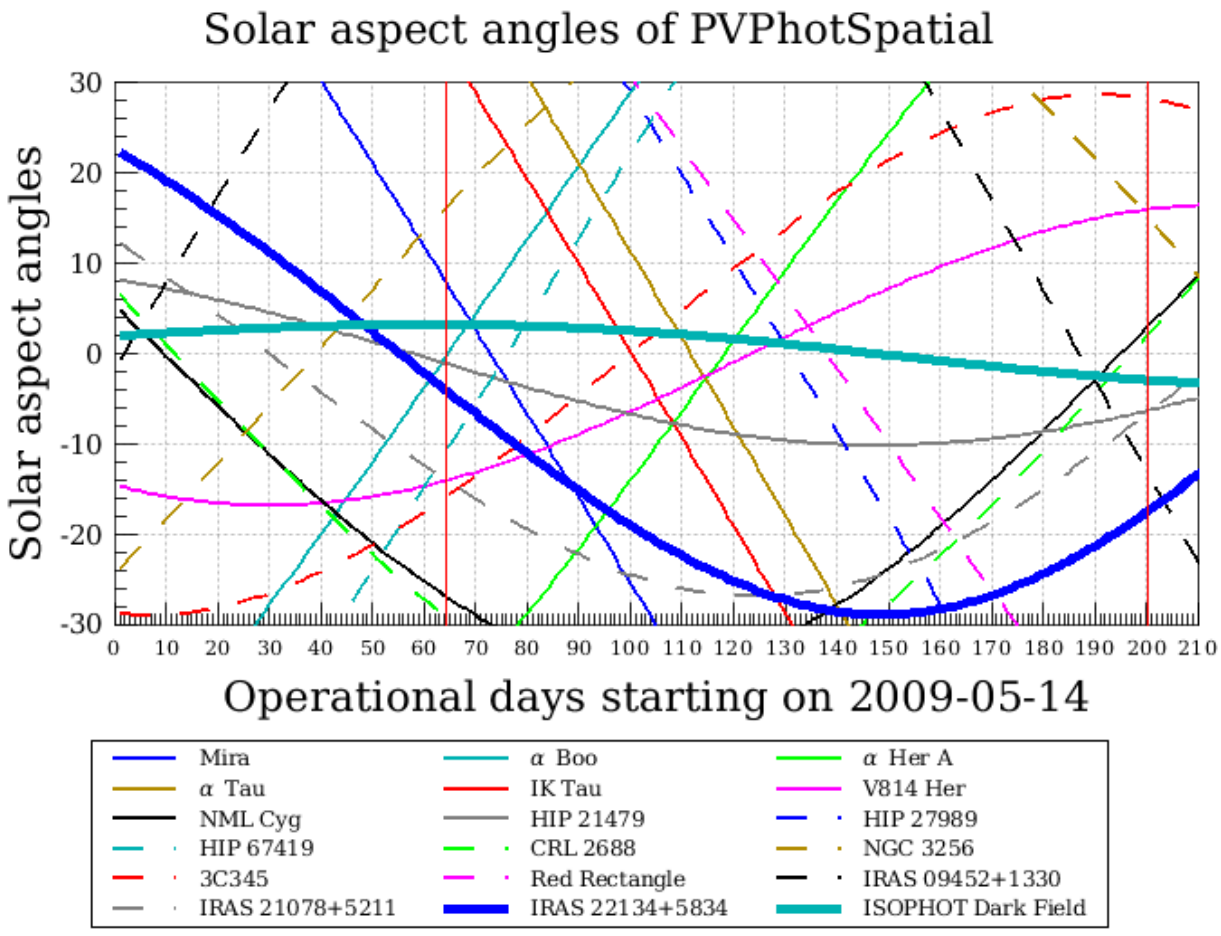


Figure 73: Solar aspect angles of the fixed targets used for the AORs of the PVPhotSpatial proposal.

Table 73: Observational details of spatial photometer calibration. The total estimated time of this test block is 64.1 h.

ID: PVPhotSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.1.3 Photometer Field of View Distortion						
A	scan map 10' leg, 60 legs, 4" cross-step	AOT/CUS	1.4/0.8	2 scan directions chopper position 0 for 2 sources 6 chopper positions [−6700,+8000] for 1 source	17.6 (4.4) (13.2)	Bright isolated FIR source Sect 4.4.1
B	staring raster map 31×61, 3.5" step chopper at optical zero	CUS	6.6	blue filter	6.6	
C	chopped scan map varying chopper throw	CUS	2.0/1.2	blue filter chopper position opt. 0 2 chopper throws: 40″ and 200″	3.2	
3.1.4 Photometer Point Spread Function						
A	small map chop/nod at centres of all 8 matrices all filters, red parallel to blue & green 2 sources (hot & cold)	CUS	0.19	8 matrices blue and green filter 3 sources	9.2	PSF sources (hot & cold) Sect. 4.2
B	point source mode all filters, red parallel to blue & green star, asteroid, blazar	AOT	0.1	blue and green filter 3 sources	0.6	PSF sources (hot & cold) Sect. 4.2
C	small map chop/nod all filters, red different step size 4×4 sub-pixel 2 sources (hot & cold)	CUS	1.36	3 filters 2 sources	8.2	PSF sources (hot & cold) Sect. 4.2
D	scan map low, medium, high speed 2 sources (hot & cold) 1 asteroid	AOT	0.28–0.39	blue and green filter 3 scan speeds 3 sources	6.0	PSF sources (hot & cold) Sect. 4.2
E	small source mode all filters, red parallel to blue & green shape & extent verification	AOT	0.28	up to 5 sources, if visible blue and green filter	2.8	spectrometer PSF sources Sect. 4.2 (Post) AGB, HII

Table 73: continued. Observational details of spatial photometer calibration.

ID: PVPhotSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
	3.1.5 Photometer Ghosts					
A	scan map, medium speed 5' leg, 76 legs, 4" cross-step blue filter, chopper @opt. zero blue filter, chopper @2 extreme pos. green filter, chopper @opt. zero	AOT/CUS	~ 1.05	1 filter, 1 chopper pos. 1 filter, 2 chopper pos. 1 filter, 1 chopper pos.	4.2	Bright isolated FIR source Sect 4.4.1
B	scan map, high speed 20' leg, 201 legs, 6" cross-step blue filter, chopper @opt. zero	AOT	3.8		3.8	
	3.1.6 Photometer Straylight					
A	scan map, low speed 30' leg, 25 legs, 70" cross-step blue filter, chopper @opt. zero very bright source	AOT	1.85		1.85	

Table 74: Summary of AORs for the photometer spatial calibration. The total scheduled time is 63.3410 h. Some observations listed serve as backup in case of visibility limits.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.3 Photometer Field of View Distortion			
A	standard scan map photometry chopper at optical zero and varying chopper positions	PVPhotSpatial_313A_StdScan_bluPA0_V814Her_0001	1.4353	OD 119
		PVPhotSpatial_313A_StdScan_bluPA90_V814Her_0001	0.7519	OD 119
		PVPhotSpatial_313A_NStd_bluPA0cp-6700_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_NStd_bluPA0cp-4250_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_NStd_bluPA0cp-1800_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_StdScan_bluPA0_AlfHer_0001	1.4353	OD 119
		PVPhotSpatial_313A_NStd_bluPA0cp3100_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_NStd_bluPA0cp5550_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_NStd_bluPA0cp8000_AlfHer_0001	1.4350	OD 125
		PVPhotSpatial_313A_NStd_bluPA90cp-6700_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_NStd_bluPA90cp-4250_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_NStd_bluPA90cp-1800_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_StdScan_bluPA90_AlfHer_0001	0.7519	OD 119
		PVPhotSpatial_313A_NStd_bluPA90cp3100_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_NStd_bluPA90cp5550_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_NStd_bluPA90cp8000_AlfHer_0001	0.7517	OD 125
		PVPhotSpatial_313A_NStd_bluPA0cp-6700_Mira_0001	1.4350	
		PVPhotSpatial_313A_NStd_bluPA0cp-4250_Mira_0001	1.4350	
		PVPhotSpatial_313A_NStd_bluPA0cp-1800_Mira_0001	1.4350	
		PVPhotSpatial_313A_StdScan_bluPA0_Mira_0001	1.4353	
		PVPhotSpatial_313A_NStd_bluPA0cp3100_Mira_0001	1.4350	
		PVPhotSpatial_313A_NStd_bluPA0cp5550_Mira_0001	1.4350	
		PVPhotSpatial_313A_NStd_bluPA0cp8000_Mira_0001	1.4350	
		PVPhotSpatial_313A_NStd_bluPA90cp-6700_Mira_0001	0.7517	
		PVPhotSpatial_313A_NStd_bluPA90cp-4250_Mira_0001	0.7517	
		PVPhotSpatial_313A_NStd_bluPA90cp-1800_Mira_0001	0.7517	
		PVPhotSpatial_313A_StdScan_bluPA90_Mira_0001	0.7519	
		PVPhotSpatial_313A_NStd_bluPA90cp3100_Mira_0001	0.7517	
		PVPhotSpatial_313A_NStd_bluPA90cp5550_Mira_0001	0.7517	
		PVPhotSpatial_313A_NStd_bluPA90cp8000_Mira_0001	0.7517	

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.3 Photometer Field of View Distortion			
B	non-standard raster map photometry blue filter, chopper at opt. zero	PVPhotSpatial_313B_Nstd_blu raster_AlfHer_0001 PVPhotSpatial_313B_Nstd_blu raster_Mira_0001	6.5631 6.5631	OD 119
C	chopped scan map varying chopper throw	PVPhotSpatial_313C_NStd_blu_N6285c200_0001 PVPhotSpatial_313C_NStd_blu_N6285c40_0001 PVPhotSpatial_313C_NStd_blu_N633c200_0001 PVPhotSpatial_313C_NStd_blu_N633c40_0001 PVPhotSpatial_313C_NStd_blu_N7469c200_0001 PVPhotSpatial_313C_NStd_blu_N7469c40_0001	1.9547 1.1947 2.2389 1.3589 1.9547 1.1947	OD 160 OD 160
	3.1.4 Photometer Point Spread Function			
A	small map chop/nod at centres of all 8 matrices all filters, red parallel to blue & green 2 sources (hot & cold)	PVPhotSpatial_314A_NStd_bluM1_3C345_0001 PVPhotSpatial_314A_NStd_bluM2_3C345_0001 PVPhotSpatial_314A_NStd_bluM3_3C345_0001 PVPhotSpatial_314A_NStd_bluM4_3C345_0001 PVPhotSpatial_314A_NStd_bluM5_3C345_0001 PVPhotSpatial_314A_NStd_bluM6_3C345_0001 PVPhotSpatial_314A_NStd_bluM7_3C345_0001 PVPhotSpatial_314A_NStd_bluM8_3C345_0001 PVPhotSpatial_314A_NStd_grnM1_3C345_0001 PVPhotSpatial_314A_NStd_grnM2_3C345_0001 PVPhotSpatial_314A_NStd_grnM3_3C345_0001 PVPhotSpatial_314A_NStd_grnM4_3C345_0001 PVPhotSpatial_314A_NStd_grnM5_3C345_0001 PVPhotSpatial_314A_NStd_grnM6_3C345_0001 PVPhotSpatial_314A_NStd_grnM7_3C345_0001 PVPhotSpatial_314A_NStd_grnM8_3C345_0001 PVPhotSpatial_314A_NStd_bluM1_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM2_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM3_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM4_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM5_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM6_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM7_AlfBoo_0001 PVPhotSpatial_314A_NStd_bluM8_AlfBoo_0001	0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894 0.1894	OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125 OD 125

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.4 Photometer Point Spread Function			
A		PVPhotSpatial_314A_NStd_grnM1_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM2_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM3_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM4_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM5_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM6_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM7_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_grnM8_AlfBoo_0001	0.1894	
		PVPhotSpatial_314A_NStd_bluM1_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM2_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM3_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM4_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM5_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM6_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM7_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM8_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM1_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM2_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM3_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM4_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM5_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM6_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM7_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_grnM8_Fortuna_0001	0.1922	OD 124
		PVPhotSpatial_314A_NStd_bluM1_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM2_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM3_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM4_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM5_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM6_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM7_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM8_Juno_0001	0.1922	

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.4 Photometer Point Spread Function			
A		PVPhotSpatial_314A_NStd_grnM1_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM2_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM3_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM4_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM5_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM6_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM7_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_grnM8_Juno_0001	0.1922	
		PVPhotSpatial_314A_NStd_bluM1_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM2_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM3_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM4_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM5_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM6_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM7_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_bluM8_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM1_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM2_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM3_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM4_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM5_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM6_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM7_AlfTau_0001	0.1894	OD 128
		PVPhotSpatial_314A_NStd_grnM8_AlfTau_0001	0.1894	OD 128

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.4 Photometer Point Spread Function			
A		PVPhotSpatial_314A_NStd_bluM1_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM2_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM3_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM4_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM5_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM6_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM7_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_bluM8_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM1_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM2_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM3_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM4_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM5_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM6_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM7_AlfTau_0002	0.1894	OD 132
		PVPhotSpatial_314A_NStd_grnM8_AlfTau_0002	0.1894	OD 132

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.4 Photometer Point Spread Function			
B	standard point source photometry	PVPhotSpatial_314B_StdPSdith_blu_3C345_0001	0.0942	OD 124
		PVPhotSpatial_314B_StdPSdith_grn_3C345_0001	0.0942	OD 124
		PVPhotSpatial_314B_StdPSdith_blu_AlfBoo_0001	0.0942	
		PVPhotSpatial_314B_StdPSdith_grn_AlfBoo_0001	0.0942	
		PVPhotSpatial_314B_StdPSdith_blu_AlfTau_0001	0.0942	OD 118
		PVPhotSpatial_314B_StdPSdith_grn_AlfTau_0001	0.0942	OD 118
		PVPhotSpatial_314B_StdPSdith_blu_Fortuna_0001	0.0969	OD 124
		PVPhotSpatial_314B_StdPSdith_grn_Fortuna_0001	0.0969	OD 124
		PVPhotSpatial_314B_StdPSdith_blu_Juno_0001	0.0969	
		PVPhotSpatial_314B_StdPSdith_grn_Juno_0001	0.0969	
		PVPhotSpatial_314B_StdPSdith_blu_Metis_0001	0.0969	
		PVPhotSpatial_314B_StdPSdith_grn_Metis_0001	0.0969	
	9 Metis, see Fig. 17, backup for Pallas			
		PVPhotSpatial_314B_StdPSdith_blu_Pallas_0001	0.0969	
		PVPhotSpatial_314B_StdPSdith_grn_Pallas_0001	0.0969	
	2 Pallas, see Fig. 17, **passage of Orion!**			
C	small map photometry	PVPhotSpatial_314C_NStd_blu_3C345_0001	1.3581	OD 125
		PVPhotSpatial_314C_NStd_grn_3C345_0001	1.3581	OD 125
		PVPhotSpatial_314C_NStd_red_3C345_0001	1.3847	OD 125
		PVPhotSpatial_314C_NStd_blu_AlfBoo_0001	1.3581	
		PVPhotSpatial_314C_NStd_grn_AlfBoo_0001	1.3581	
		PVPhotSpatial_314C_NStd_red_AlfBoo_0001	1.3847	
		PVPhotSpatial_314C_NStd_blu_alphaTau_0001	1.3581	OD 125
		PVPhotSpatial_314C_NStd_grn_alphaTau_0001	1.3581	OD 125
		PVPhotSpatial_314C_NStd_red_alphaTau_0001	1.3847	OD 125

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.4 Photometer Point Spread Function			
D	standard scan map photometry different scan speeds	PVPhotSpatial_314D_StdScan_bluhigh_AlfTau_0001	0.2775	OD 118
		PVPhotSpatial_314D_StdScan_blumed_AlfTau_0001	0.2869	OD 118
		PVPhotSpatial_314D_StdScan_blulow_AlfTau_0001	0.3875	OD 118
		PVPhotSpatial_314D_StdScan_grnhigh_AlfTau_0001	0.2775	OD 118
		PVPhotSpatial_314D_StdScan_grnmed_AlfTau_0001	0.2869	OD 118
		PVPhotSpatial_314D_StdScan_grnlow_AlfTau_0001	0.3875	OD 118
		PVPhotSpatial_314D_StdScan_bluhigh_3C345_0001	0.2775	OD 124
		PVPhotSpatial_314D_StdScan_blumed_3C345_0001	0.2869	OD 124
		PVPhotSpatial_314D_StdScan_blulow_3C345_0001	0.3875	OD 124
		PVPhotSpatial_314D_StdScan_grnhigh_3C345_0001	0.2775	OD 124
		PVPhotSpatial_314D_StdScan_grnmed_3C345_0001	0.2869	OD 124
		PVPhotSpatial_314D_StdScan_grnlow_3C345_0001	0.3875	OD 124
		PVPhotSpatial_314D_StdScan_bluhigh_AlfBoo_0001	0.2775	
		PVPhotSpatial_314D_StdScan_blumed_AlfBoo_0001	0.2869	
		PVPhotSpatial_314D_StdScan_blulow_AlfBoo_0001	0.3875	
		PVPhotSpatial_314D_StdScan_grnhigh_AlfBoo_0001	0.2775	
		PVPhotSpatial_314D_StdScan_grnmed_AlfBoo_0001	0.2869	
		PVPhotSpatial_314D_StdScan_grnlow_AlfBoo_0001	0.3875	
		PVPhotSpatial_314D_StdScan_bluhigh_Vesta_0001	0.2803	OD 160
		PVPhotSpatial_314D_StdScan_blulow_Vesta_0001	0.3903	OD 160
		PVPhotSpatial_314D_StdScan_blumed_Vesta_0001	0.2897	OD 160
		PVPhotSpatial_314D_StdScan_grnhigh_Vesta_0001	0.2803	OD 160
		PVPhotSpatial_314D_StdScan_grnlow_Vesta_0001	0.3903	OD 160
		PVPhotSpatial_314D_StdScan_grnmed_Vesta_0001	0.2897	OD 160

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
		3.1.4 Photometer Point Spread Function		
E	standard small source photometry spectrometer PSF calibrator selection	PVPhotSpatial_314E_StdSmall_blu_NMLCyg_0001	0.2725	OD 161
		PVPhotSpatial_314E_StdSmall_grn_NMLCyg_0001	0.2725	OD 161
		PVPhotSpatial_314E_StdSmall_blu_CRL2688_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_grn_CRL2688_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_blu_I09452_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_grn_I09452_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_blu_I22134_0001	0.2725	OD 119
		PVPhotSpatial_314E_StdSmall_grn_I22134_0001	0.2725	OD 119
		PVPhotSpatial_314E_StdSmall_blu_HIP21479_0001	0.2725	OD 108
		PVPhotSpatial_314E_StdSmall_grn_HIP21479_0001	0.2725	OD 108
		PVPhotSpatial_314E_StdSmall_blu_HIP27989_0001	0.2725	OD 124
		PVPhotSpatial_314E_StdSmall_grn_HIP27989_0001	0.2725	OD 124
		PVPhotSpatial_314E_StdSmall_blu_HIP67419_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_grn_HIP67419_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_blu_Mira_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_grn_Mira_0001	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_blu_HIP21479_01	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_blu_HIP67419_01	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_blu_I22134_01	0.2725	OD 84
		PVPhotSpatial_314E_StdSmall_lowgain_blu_Mira_01	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_grn_HIP21479_01	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_grn_HIP67419_01	0.2725	
		PVPhotSpatial_314E_StdSmall_lowgain_grn_I22134_01	0.2725	OD 84
		PVPhotSpatial_314E_StdSmall_lowgain_grn_Mira_01	0.2725	

Table 74: continued. Summary of AORs for the photometer spatial calibration.

ID: PVPhotSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.1.5 Photometer Ghosts			
A	standard scan map photometry chopper at optical zero	PVPhotSpatial_315A_NStd_blucp-6700_AlfHer_0001	1.1433	OD 138
		PVPhotSpatial_315A_StdScan_blu_AlfHer_0001	0.9531	OD 138
		PVPhotSpatial_315A_NStd_blucp8000_AlfHer_0001	1.1433	OD 138
		PVPhotSpatial_315A_NStd_blucp-6700_Mira_0001	1.1433	
		PVPhotSpatial_315A_StdScan_blu_Mira_0001	0.9531	
		PVPhotSpatial_315A_NStd_blucp8000_Mira_0001	1.1433	
		PVPhotSpatial_315A_StdScan_grn_AlfHer_0001	0.9531	OD 138
		PVPhotSpatial_315A_StdScan_grn_Mira_0001	0.9531	
B	standard scan map photometry	PVPhotSpatial_315B_StdScan_blu_RedRect_0001	3.7292	OD 119
		PVPhotSpatial_315B_StdScan_blu_N3256_0001	3.7292	
		PVPhotSpatial_315B_StdScan_blu_Uranus_0001	3.7319	
		PVPhotSpatial_315B_StdScan_blu_Mira_0001	3.7292	
	select one of these sources			
	3.1.6 Photometer Straylight			
A	standard scan map photometry	PVPhotSpatial_316A_StdPara_blu_Mira_0001	3.1164	
		PVPhotSpatial_316A_StdScan_blu_Mira_0001	1.8503	
		PVPhotSpatial_316A_StdScan_blu_IKTau_0001	1.8503	OD 119
		PVPhotSpatial_316A_StdScan_blu_Uranus_0001	1.8531	
	select one of these sources			

6.12 Photometer Photometric Calibration

This test block comprises the photometric characterisation and flux calibration of the photometer camera. The overview of the foreseen measurements is given in Table 76.

For the linearity/non-linearity assessment a grid of fluxes covering the respective flux range has been defined. Since celestial standards do not have a flat spectrum, it is assumed that for each filter a dedicated set of standards is selected. For the other filters measured in parallel it means that measurements at fluxes intermediate to the grid are obtained in addition.

The photometry of the faint stars verifies the theoretically derived minimum reachable flux density.

The scan map on a bright star is thought as a complement to flat-field assessment via the internal CSs. There are also complementary scan map measurements in the photometer spatial calibration test block useful for flat-field assessment.

Table 75: Visibilities of the targets used in the PVPhotFlux proposal.

Target	Start	End	Target	Start	End
α Ari	29-Jun-2009	01-Sep-2009	HD 132142	always visible	
α Boo	10-Jun-2009	23-Aug-2009	HD 134493	always visible	
α Cet	06-Jul-2009	08-Sep-2009	HD 138265	always visible	
α CMa	27-Aug-2009	17-Nov-2009	HD 139798	always visible	
α Ori	20-Aug-2009	23-Oct-2009	HD 141653	always visible	
α Per	20-Jul-2009	30-Sep-2009	HD 156729	07-Jun-2009	31-May-2010
α Tau	02-Aug-2009	03-Oct-2009	HD 159330	always visible	
β And	18-Jun-2009	28-Aug-2009	HD 161796	always visible	
β Hyi	always visible		HD 168009	always visible	
β Peg	16-Nov-2009	26-Jan-2010	HD 181597	always visible	
β UMi	always visible		HD 184960	always visible	
γ Cru	09-Jun-2009	18-Sep-2009	HD 185395	always visible	
γ Dra	always visible		AFGL 230	24-Jun-2009	02-Oct-2009
δ Dra	always visible		AFGL 618	06-Aug-2009	08-Oct-2009
ϵ Car	always visible		AFGL 811	04-Aug-2009	07-Nov-2009
ϵ Lep	20-Jul-2009	20-Oct-2009	CRL 2688	05-Oct-2009	17-Jan-2010
υ Boo	06-Jun-2009	16-Aug-2009	Arp 220	24-Jun-2009	18-Sep-2009
LL Peg	18-Nov-2009	20-Jan-2010	Mrk 231	14-May-2009	02-Aug-2009
NML Cyg	24-Sep-2009	23-Jan-2010		30-Sep-2009	30-Jan-2010
R CrA	04-Sep-2009	06-Nov-2009	NGC 1068	29-Jun-2009	02-Sep-2009
TV Hor	always visible		NGC 6543	always visible	
HD 15008	always visible		NGC 7027	14-May-2009	03-Aug-2009
HD 32887	20-Jul-2009	20-Oct-2009	Uranus	15-Nov-2009	14-Jan-2010
HD 115968	14-May-2009	05-Aug-2009	Neptune	17-Oct-2009	15-Dec-2009
	09-Nov-2009	02-Feb-2010	1 Ceres	08-Feb-2010	24-Apr-2010
HD 127243	14-May-2009	13-Sep-2009	18 Melpomene	14-May-2009	13-Aug-2009
	14-Oct-2009	13-Mar-2010	88 Thisbe	05-Dec-2009	20-Mar-2010

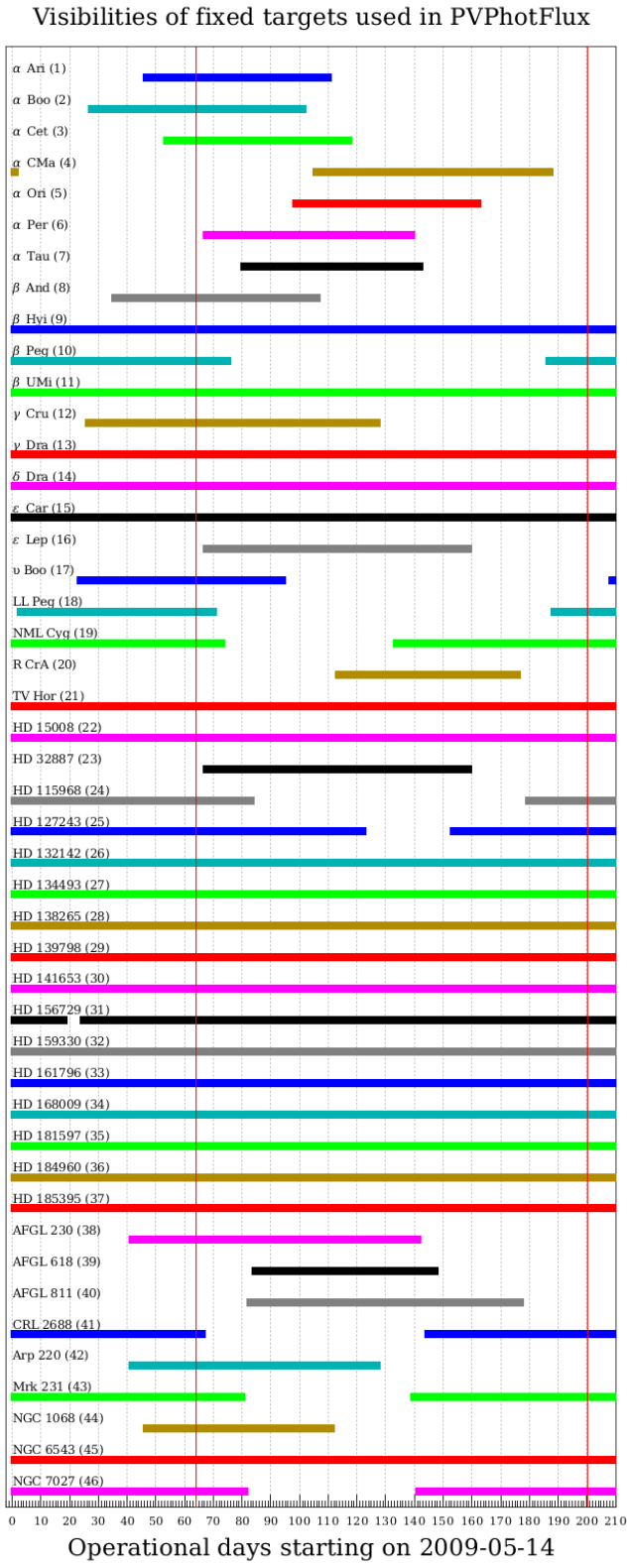


Figure 74: Visibilities of the fixed targets used for the AORs of the PVPhotFlux proposal.

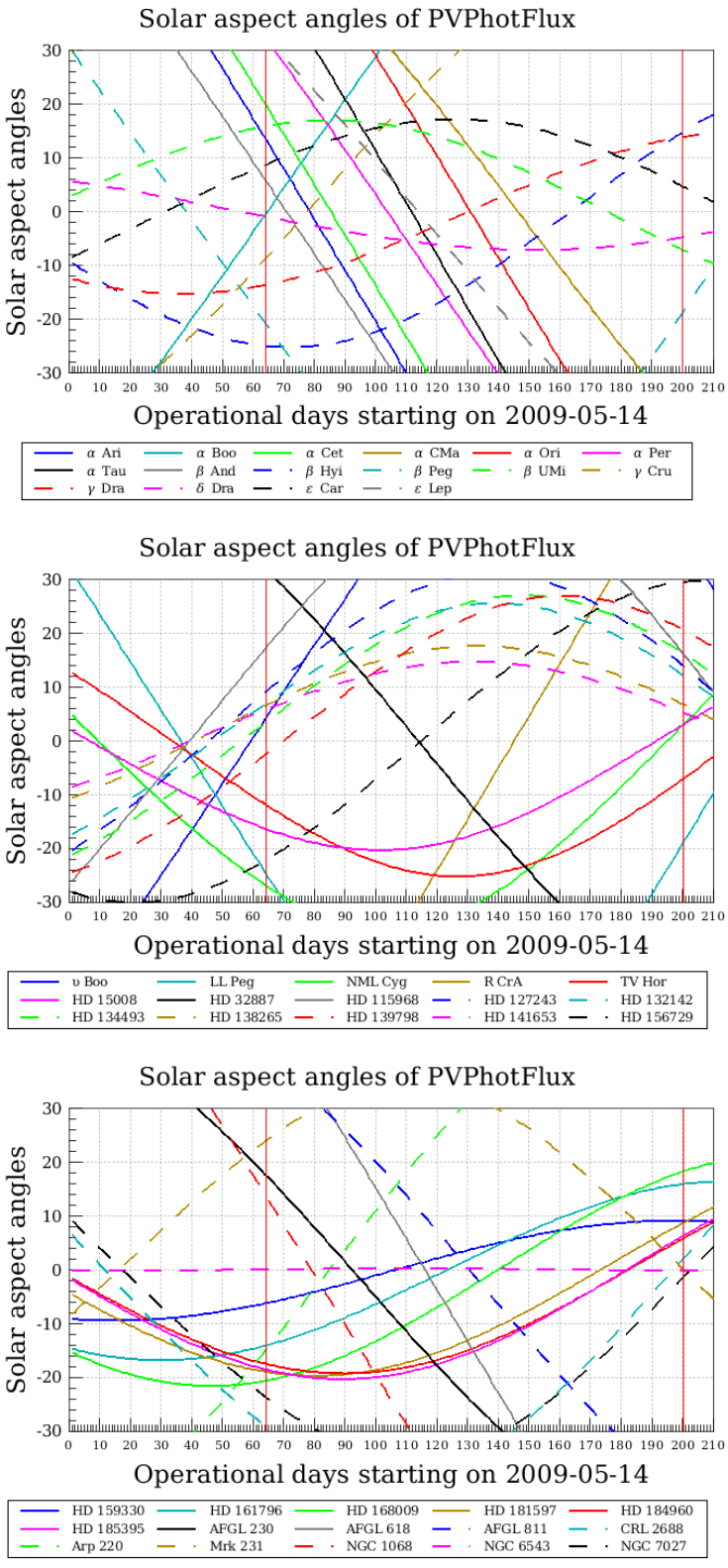


Figure 75: Solar aspect angles of the fixed targets used for the AORs of the PVPhotFlux proposal.

Table 76: Observational details of photometer flux calibration. The total estimated time of this test block is 33.8 h.

ID: PVPhotFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.2.1 Absolute flux calibration						
A	photometer response checkout 8×4 raster 2×2 on each detector matrix step size $26''$, leg sep. $26.5''$ default bias setting, high gain	AOT	0.8	two prime standards and one SSO all filters	4.8	fiducial prime stars Sect. 4.1.1 Neptune
B	standard point source photometry on flux standard, dithered	AOT	0.094	repeated on every PHOT OD (i.e. 20 AORs), one blue filter	1.9	one fiducial prime star Sect. 4.1.1
C	standard point source photometry on flux standards, dithered	AOT	0.094	all fiducial prime standards plus Neptune for cross calibration all photometric filters	1.7	fiducial prime stars Sect. 4.1.1 Neptune
D	standard scan map photometry on flux standards two small maps 45/135 deg instr. $5'$ scan leg, $51''$ separation 4 scan legs	AOT	0.096	all fiducial prime standards plus Neptune for cross calibration all photometric filters	3.5	fiducial prime stars Sect. 4.1.1 Neptune
3.2.2 Monitor nominal responsivity variations with time						
A	standard point source photometry on bright source, dithered	AOT	0.094	5 repetitions over 1 to 2 ODs to check for variations with celestial standard parallel to internal CSs	0.5	fiducial stars Sect. 4.1.1

Table 76: continued. Observational details of photometer flux calibration.

ID: PVPhotFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.2.3 Calibrate the photometer's non-linearity						
A	standard point source photometry	AOT		different standards on flux grid	1.3	fiducial stars
	low gain!, dithered					asteroids
	≈2 Jy standard, blue, S/N > 30		0.094			Sect. 4.1.1
	≈2 Jy standard, green, S/N > 30		0.094			
	≈2 Jy standard, red, S/N > 30		0.094			
	≈10 Jy standard, blue, S/N > 30		0.094			
	≈10 Jy standard, green, S/N > 30		0.094			
	≈10 Jy standard, red, S/N > 30		0.094			
	≈50 Jy standard, blue, S/N > 30		0.094			
	≈50 Jy standard, green, S/N > 30		0.094			
	≈50 Jy standard, red, S/N > 30		0.094			
	≈200 Jy standard, blue, S/N > 30		0.094			
	≈200 Jy standard, green, S/N > 30		0.094			
	≈200 Jy standard, red, S/N > 30		0.094			
	≈500 Jy standard, blue, S/N > 30		0.094			Neptune
	≈500 Jy standard, green, S/N > 30		0.094			
	≈500 Jy standard, red, S/N > 30		0.094			
	≈1000 Jy standard, blue, S/N > 30		0.094			Uranus
	≈1000 Jy standard, green, S/N > 30		0.094			
	≈1000 Jy standard, red, S/N > 30		0.094			
select low gain by specifying a flux of 10000 Jy!						

Table 76: continued. Observational details of photometer flux calibration.

ID: PVPhotFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
	3.2.4 Establish the linearity of the full system					
A	standard point source photometry	AOT		different standards on flux grid	5.3	fiducial stars
	high gain, dithered					asteroids
	≈20 mJy standard, blue, S/N = 30		0.8			Sect. 4.1.1
	≈20 mJy standard, green, S/N = 30		1.0			faint flux calibrators
	≈20 mJy standard, red, S/N = 30		2.0			Sect. 4.1.3
	≈100 mJy standard, blue, S/N > 30		0.138			planets
	≈100 mJy standard, green, S/N = 30		0.138			Sect. 4.3.3
	≈100 mJy standard, red, S/N = 30		0.094			
	≈500 mJy standard, blue, S/N > 30		0.094			
	≈500 mJy standard, green, S/N > 30		0.094			
	≈500 mJy standard, red, S/N > 30		0.094			
	≈2 Jy standard, blue, S/N > 30		0.094			
	≈2 Jy standard, green, S/N > 30		0.094			
	≈2 Jy standard, red, S/N > 30		0.094			
	≈10 Jy standard, blue, S/N > 30		0.094			
	≈10 Jy standard, green, S/N > 30		0.094			
	≈10 Jy standard, red, S/N > 30		0.094			
	≈50 Jy standard, blue, S/N > 30		0.094			
	≈50 Jy standard, green, S/N > 30		0.094			
	≈50 Jy standard, red, S/N > 30		0.094			
	≈200 Jy standard, blue, S/N > 30		0.094			
	≈200 Jy standard, green, S/N > 30		0.094			
	≈200 Jy standard, red, S/N > 30		0.094			

Table 76: continued. Observational details of photometer flux calibration.

ID: PVPhotFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
3.2.6 Verify the minimum achievable flux density						
A	standard point-source photometry dithered, $S/N \geq 5$	AOT	0.58 – 1.55	blue, green, and red filters	7.2	up to three faint stars per filter from ISO GBPP between 4 and 7 mJy Tab. 7
B	standard scan map photometry $S/N \geq 5$ scan speeds $10''/s$ (low) & $20''/s$ (medium) $3.5'$ leg, 20 legs, $4''$ separation inst. ref. with 90° orientation 10 repetitions	AOT	2.3	red filter + cross scan	4.7	one faint star Tab. 7
3.2.8 Measure the photometer full system flat-field						
A	standard scan map photometry scan speed $10''/s$ (low) $10'$ leg, 40 legs, $3''$ separation inst. ref. with 0° orientation $6'$ leg, 40 legs, $3''$ separation inst. ref. with 90° orientation	AOT	1.0	blue, green and red filter	2.9	stars, PNe, asteroids between 50 - 100 Jy Sect. 4.1.1

Table 77: Summary of AORs for the photometer flux calibration. The total scheduled time is 29.7094 h.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.2.1 Absolute flux calibration			
A	photometer response checkout 8 × 4 raster 2 × 2 on each detector matrix step size 26″, leg sep. 26.5″ default bias setting, high gain	PVPhotFlux_321A_StdRaster_pcal_blu_Neptune_0001	0.8044	
		PVPhotFlux_321A_StdRaster_pcal_grn_Neptune_0001	0.8044	
		PVPhotFlux_321A_StdRaster_pcal_blu_betUMi_0001	0.8011	OD 108
		PVPhotFlux_321A_StdRaster_pcal_grn_betUMi_0001	0.8011	OD 108
		PVPhotFlux_321A_StdRaster_pcal_blu_gamDra_0001	0.8011	OD 108
		PVPhotFlux_321A_StdRaster_pcal_grn_gamDra_0001	0.8011	OD 108
B	standard point source photometry on flux standard, dithered	PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0001	0.0942	OD 109
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0002	0.0942	OD 110
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0003	0.0942	OD 118
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0004	0.0942	OD 119
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0005	0.0942	OD 124
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0006	0.0942	OD 125
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0007	0.0942	OD 128
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0008	0.0942	OD 132
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0009	0.0947	OD 138
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0010	0.0947	OD 139
		PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0011	0.0947	OD 146
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0001	0.0947	OD 160
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0002	0.0947	OD 161
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0003	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0004	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0005	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0006	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0007	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0008	0.0947	
		PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0009	0.0947	
C	standard point source photometry on flux standards, dithered	PVPhotFlux_321C_StdPS_photcal_blu_Neptune_0001	0.0975	OD 173
		PVPhotFlux_321C_StdPS_photcal_grn_Neptune_0001	0.0975	OD 173
		PVPhotFlux_321C_StdPS_photcal_blu_alfBoo_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_grn_alfBoo_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_blu_alfCMa_0001	0.0942	OD 118
		PVPhotFlux_321C_StdPS_photcal_grn_alfCMa_0001	0.0942	OD 118
		PVPhotFlux_321C_StdPS_photcal_blu_alfCet_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_grn_alfCet_0001	0.0947	

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
C		PVPhotFlux_321C_StdPS_photcal_blu_alfTau_0001	0.0942	OD 118
		PVPhotFlux_321C_StdPS_photcal_grn_alfTau_0001	0.0942	OD 118
		PVPhotFlux_321C_StdPS_photcal_blu_betAnd_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_grn_betAnd_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_blu_betPeg_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_grn_betPeg_0001	0.0947	
		PVPhotFlux_321C_StdPS_photcal_blu_betUMi_0001	0.0942	OD 108
		PVPhotFlux_321C_StdPS_photcal_grn_betUMi_0001	0.0942	OD 108
		PVPhotFlux_321C_StdPS_photcal_blu_gammaDra_0001	0.0942	OD 108
		PVPhotFlux_321C_StdPS_photcal_grn_gammaDra_0001	0.0942	OD 108
D	standard scan map photometry on flux standards two small maps 45/135 deg instr. 5′ scan leg, 51″ separation 4 scan legs	PVPhotFlux_321D_StdScan_045_pcal_blu_Neptune_0001	0.0997	OD 173
		PVPhotFlux_321D_StdScan_135_pcal_blu_Neptune_0001	0.0997	OD 173
		PVPhotFlux_321D_StdScan_045_pcal_grn_Neptune_0001	0.0997	OD 173
		PVPhotFlux_321D_StdScan_135_pcal_grn_Neptune_0001	0.0997	OD 173
		PVPhotFlux_321D_StdScan_045_pcal_blu_alfBoo_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_blu_alfBoo_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_grn_alfBoo_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_grn_alfBoo_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_blu_alfCMa_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_135_pcal_blu_alfCMa_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_045_pcal_grn_alfCMa_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_135_pcal_grn_alfCMa_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_045_pcal_blu_alfCet_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_blu_alfCet_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_grn_alfCet_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_grn_alfCet_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_blu_alfTau_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_135_pcal_blu_alfTau_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_045_pcal_grn_alfTau_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_135_pcal_grn_alfTau_0001	0.0964	OD 118
		PVPhotFlux_321D_StdScan_045_pcal_blu_betAnd_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_blu_betAnd_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_grn_betAnd_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_grn_betAnd_0001	0.0969	

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
D		PVPhotFlux_321D_StdScan_045_pcal_blu_betPeg_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_blu_betPeg_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_grn_betPeg_0001	0.0969	
		PVPhotFlux_321D_StdScan_135_pcal_grn_betPeg_0001	0.0969	
		PVPhotFlux_321D_StdScan_045_pcal_blu_betUMi_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_135_pcal_blu_betUMi_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_045_pcal_grn_betUMi_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_135_pcal_grn_betUMi_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_045_pcal_blu_gamDra_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_135_pcal_blu_gamDra_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_045_pcal_grn_gamDra_0001	0.0964	OD 108
		PVPhotFlux_321D_StdScan_135_pcal_grn_gamDra_0001	0.0964	OD 108
	3.2.2 Monitor normal responsivity variations in time			
A	standard point source photometry on bright source, dithered	PVPhotFlux_322A_StdPS_stability_blu_epsCar_0001	0.0942	OD 125
		PVPhotFlux_322A_StdPS_stability_blu_epsCar_0002	0.0942	OD 125
		PVPhotFlux_322A_StdPS_stability_blu_epsCar_0003	0.0942	OD 125
		PVPhotFlux_322A_StdPS_stability_blu_epsCar_0004	0.0942	OD 125
		PVPhotFlux_322A_StdPS_stability_blu_epsCar_0005	0.0942	

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	3.2.3 Calibrate the photometer's non-linearity			
A	standard point source photometry **low gain!**, dithered			
	$\approx$ 2 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo2Jy_blu_HD32887_0001	0.0942	OD 128
		PVPhotFlux_323A_StdPS_lo2Jy_blu_HD32887_0002	0.0942	OD 132
		PVPhotFlux_323A_StdPS_lo2Jy_blu_alfAri_0001	0.0942	
	$\approx$ 2 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo2Jy_grn_epsCar_0001	0.0942	OD 125
	$\approx$ 2 Jy standard, red, $S/N = 30$	covered by 10 Jy, green		
	$\approx$ 10 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo10Jy_blu_betPeg_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo10Jy_blu_epsCar_0001	0.0969	OD 125
	$\approx$ 10 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo10Jy_grn_alfBoo_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo10Jy_grn_alfTau_0001	0.0969	OD 128
		PVPhotFlux_323A_StdPS_lo10Jy_grn_alfTau_0002	0.0969	OD 132
		PVPhotFlux_323A_StdPS_lo10Jy_grn_gamCru_0001	0.0969	
	$\approx$ 10 Jy standard, red, $S/N = 30$	PVPhotFlux_323A_StdPS_lo10Jy_red_Mrk231_0001	0.0969	OD 146
	$\approx$ 50 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo50Jy_blu_18Melpomene_0001	0.0942	
		PVPhotFlux_323A_StdPS_lo50Jy_blu_88Thisbe_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo50Jy_blu_AFGL811_0001	0.0969	OD 138
	$\approx$ 50 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo50Jy_grn_AFGL230_0001	0.0942	
		PVPhotFlux_323A_StdPS_lo50Jy_grn_HD161796_0001	0.0969	OD 138
	$\approx$ 50 Jy standard, red, $S/N = 30$	covered by 50 Jy, green and 200 Jy, green		
	$\approx$ 200 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo200Jy_blu_LLPeg_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo200Jy_blu_NGC1068_0001	0.0942	
		PVPhotFlux_323A_StdPS_lo200Jy_blu_alfOri_0001	0.0942	OD 128
		PVPhotFlux_323A_StdPS_lo200Jy_blu_alfOri_0002	0.0942	OD 132
	$\approx$ 200 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo200Jy_grn_1Ceres_0001	0.0942	
		PVPhotFlux_323A_StdPS_lo200Jy_grn_Arp220_0001	0.0942	
	$\approx$ 200 Jy standard, red, $S/N = 30$	PVPhotFlux_323A_StdPS_lo200Jy_red_Neptune_0001	0.0942	OD 173
		also covered by 500 Jy and 1000 Jy, green		

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		3.2.3 Calibrate the photometer's non-linearity		
A	$\approx$ 500 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo500Jy_blu_NGC7027_0001	0.0942	OD 161
	$\approx$ 500 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo500Jy_grn_NGC7027_0001	0.0969	OD 161
		PVPhotFlux_323A_StdPS_lo500Jy_grn_AFGL618_0001	0.0969	OD 128
		PVPhotFlux_323A_StdPS_lo500Jy_grn_AFGL618_0002	0.0969	OD 132
		PVPhotFlux_323A_StdPS_lo500Jy_grn_NMLCyg_0001	0.0969	OD 161
	$\approx$ 500 Jy standard, red, $S/N = 30$	covered by 1000 Jy, blue and green		
	$\approx$ 1000 Jy standard, blue, $S/N = 30$	PVPhotFlux_323A_StdPS_lo1000Jy_blu_Uranus_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo1000Jy_blu_AFGL618_0001	0.0969	OD 128
		PVPhotFlux_323A_StdPS_lo1000Jy_blu_AFGL618_0002	0.0969	OD 132
		PVPhotFlux_323A_StdPS_lo1000Jy_blu_CRL2688_0001	0.0969	OD 161
		PVPhotFlux_323A_StdPS_lo1000Jy_blu_NMLCyg_0001	0.0969	OD 161
		PVPhotFlux_323A_StdPS_lo1000Jy_blu_RCrA_0001	0.0969	OD 138
	$\approx$ 1000 Jy standard, green, $S/N = 30$	PVPhotFlux_323A_StdPS_lo1000Jy_grn_Uranus_0001	0.0969	
		PVPhotFlux_323A_StdPS_lo1000Jy_grn_CRL2688_0001	0.0969	OD 161
		PVPhotFlux_323A_StdPS_lo1000Jy_grn_RCrA_0001	0.0969	OD 138
	$\approx$ 1000 Jy standard, red, $S/N = 30$	covered by 1000 Jy, green		
		3.2.4 Establish the linearity of the full system		
A	standard point source photometry high gain, dithered			
	$\approx$ 20 mJy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi20mJy_blu_HD15008_0001	0.7817	OD 125
	$\approx$ 20 mJy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi20mJy_grn_HD159330_0001	1.0108	OD 132
	$\approx$ 20 mJy standard, red, $S/N = 30$	covered by 100 mJy, blue		
	$\approx$ 100 mJy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi100mJy_blu_HD138265_0001	2.0192	OD 128
		PVPhotFlux_324A_StdPS_hi100mJy_blu_HD138265_0002	2.0192	OD 132
	$\approx$ 100 mJy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi100mJy_grn_betHyi_0001	0.0942	OD 138
	$\approx$ 100 mJy standard, red, $S/N = 30$	PVPhotFlux_324A_StdPS_hi100mJy_red_alfPer_0001	0.0942	OD 128
		PVPhotFlux_324A_StdPS_hi100mJy_red_alfPer_0002	0.0942	OD 132
		also covered by 500 mJy, green		
	$\approx$ 500 mJy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi500mJy_blu_TVHor_0001	0.1400	
		PVPhotFlux_324A_StdPS_hi500mJy_blu_delDra_0001	0.1400	OD 138

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		3.2.4 Establish the linearity of the full system		
A	$\approx$ 500 mJy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi500mJy_grn_epsLep_0001	0.0942	OD 128
		PVPhotFlux_324A_StdPS_hi500mJy_grn_epsLep_0002	0.0942	OD 132
		PVPhotFlux_324A_StdPS_hi500mJy_grn_upsBoo_0001	0.0942	
	$\approx$ 500 mJy standard, red, $S/N = 30$	PVPhotFlux_324A_StdPS_hi500mJy_red_betUMi_0001	0.0942	
	$\approx$ 2 Jy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi2Jy_blu_HD32887_0001	0.0942	OD 128
		PVPhotFlux_324A_StdPS_hi2Jy_blu_HD32887_0002	0.0942	OD 132
		PVPhotFlux_324A_StdPS_hi2Jy_blu_alfAri_0001	0.0942	
	$\approx$ 2 Jy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi2Jy_grn_epsCar_0001	0.0942	OD 125
	$\approx$ 2 Jy standard, red, $S/N = 30$	covered by 10 Jy, green		
	$\approx$ 10 Jy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi10Jy_blu_betPeg_0001	0.0969	
		PVPhotFlux_324A_StdPS_hi10Jy_blu_epsCar_0001	0.0969	OD 125
	$\approx$ 10 Jy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi10Jy_grn_alfBoo_0001	0.0969	
		PVPhotFlux_324A_StdPS_hi10Jy_grn_alfTau_0001	0.0969	OD 128
		PVPhotFlux_324A_StdPS_hi10Jy_grn_alfTau_0002	0.0969	OD 132
		PVPhotFlux_324A_StdPS_hi10Jy_grn_gamCru_0001	0.0969	
	$\approx$ 10 Jy standard, red, $S/N = 30$	PVPhotFlux_324A_StdPS_hi10Jy_red_Mrk231_0001	0.0969	OD 146
	$\approx$ 50 Jy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi50Jy_blu_18Melpomene_0001	0.0942	
		PVPhotFlux_324A_StdPS_hi50Jy_blu_88Thisbe_0001	0.0969	
		PVPhotFlux_324A_StdPS_hi50Jy_blu_AFGL811_0001	0.0969	OD 138
	$\approx$ 50 Jy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi50Jy_grn_AFGL230_0001	0.0942	
		PVPhotFlux_324A_StdPS_hi50Jy_grn_HD161796_0001	0.0969	OD 138
	$\approx$ 50 Jy standard, red, $S/N = 30$	covered by 50 Jy, green and 200 Jy, green		
	$\approx$ 200 Jy standard, blue, $S/N = 30$	PVPhotFlux_324A_StdPS_hi200Jy_blu_LLPeg_0001	0.0969	
		PVPhotFlux_324A_StdPS_hi200Jy_blu_NGC1068_0001	0.0942	
		PVPhotFlux_324A_StdPS_hi200Jy_blu_alfOri_0001	0.0942	OD 128
		PVPhotFlux_324A_StdPS_hi200Jy_blu_alfOri_0002	0.0942	OD 132
	$\approx$ 200 Jy standard, green, $S/N = 30$	PVPhotFlux_324A_StdPS_hi200Jy_grn_1Ceres_0001	0.0942	
		PVPhotFlux_324A_StdPS_hi200Jy_grn_Arp220_0001	0.0942	
	$\approx$ 200 Jy standard, red, $S/N = 30$	PVPhotFlux_324A_StdPS_hi200Jy_red_AFGL618_0001	0.0942	OD 128
		PVPhotFlux_324A_StdPS_hi200Jy_red_AFGL618_0002	0.0942	OD 132
		PVPhotFlux_324A_StdPS_hi200Jy_red_Neptune_0001	0.0942	
		PVPhotFlux_324A_StdPS_hi200Jy_red_CRL2688_0001	0.0942	OD 161

Table 77: continued. Summary of AORs for the photometer flux calibration.

ID: PVPhotFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
3.2.6 Verify the minimum achievable flux density				
A	standard point-source photometry dithered, $S/N \geq 5$	PVPhotFlux_326A_StdPS_minflux_blu_HD115968_0001 PVPhotFlux_326A_StdPS_minflux_blu_HD132142_0001 PVPhotFlux_326A_StdPS_minflux_blu_HD141653_0001 PVPhotFlux_326A_StdPS_minflux_grn_HD139798_0001 PVPhotFlux_326A_StdPS_minflux_grn_HD156729_0001 PVPhotFlux_326A_StdPS_minflux_grn_HD168009_0001 PVPhotFlux_326A_StdPS_minflux_grn_HD184960_0001 PVPhotFlux_326A_StdPS_minflux_red_HD127243_0001 PVPhotFlux_326A_StdPS_minflux_red_HD134493_0001 PVPhotFlux_326A_StdPS_minflux_red_HD181597_0001 PVPhotFlux_326A_StdPS_minflux_red_HD181597_0002 PVPhotFlux_326A_StdPS_minflux_red_HD185395_0001	3.7150 2.3400 2.3400 2.3400 2.3400 2.3400 2.3400 2.3400 3.7150 2.3400 2.3400 2.3400	 OD 138 OD 138 OD 128 OD 138
B	standard scan map photometry scan speeds $10''/s$ (low) & $20''/s$ (medium) $3.5'$ leg, 20 legs, $4''$ separation inst. ref. with 90° orientation 10 repetitions	PVPhotFlux_326B_Scanmap_minflux_red_HD181597 PVPhotFlux_326B_Scanmap_slow_minflux_red_HD181597	2.3392 2.3147	OD 146 OD 146
3.2.8 Measure the photometer full system flat-field				
A	standard scan map photometry scan speed $10''/s$ (low) $10'$ leg, 40 legs, $3''$ separation inst. ref. with 0° orientation $6'$ leg, 40 legs, $3''$ separation inst. ref. with 90° orientation	 PVPhotFlux_328A_StdScan_FlatField_blu_NGC6543_0001 PVPhotFlux_328A_StdScan_FlatField_grn_NGC6543_0001 PVPhotFlux_328A_StdScan_FlatField_blu_NGC6543_0002 PVPhotFlux_328A_StdScan_FlatField_grn_NGC6543_0002 PVPhotFlux_328A_StdScan_FlatField_red_Arp220_0001	 0.9692 0.9692 0.6908 0.6908 0.6908	 OD 138 OD 138 OD 173 OD 173

6.13 Photometer Out-of-Field Straylight Assessment

Most out-of-field straylight assessment was done in parallel mode to allow simultaneous assessment for both PACS and SPIRE instruments and therefore details of the strategy are given in Sect. 6.15. However, on OD 139 one of the rare coincidences of the Moon entering straylight spot F relative to a visible sky position close to the Sun constraint at 60.6^o occurred (cf. Fig. 76) and this was not poosible to fit with a PV parallel mode period, so that the straylight verification measurement was restricted to PACS. Normally, 2° × 2° large maps were obtained for the out-of-field straylight measurements. Due to the close location of the target position to the hard Sun constraint, the map size had to be adjusted not to violate this constraint for any part of the map. Finally, a 50′ large map could be matched onto this OD.

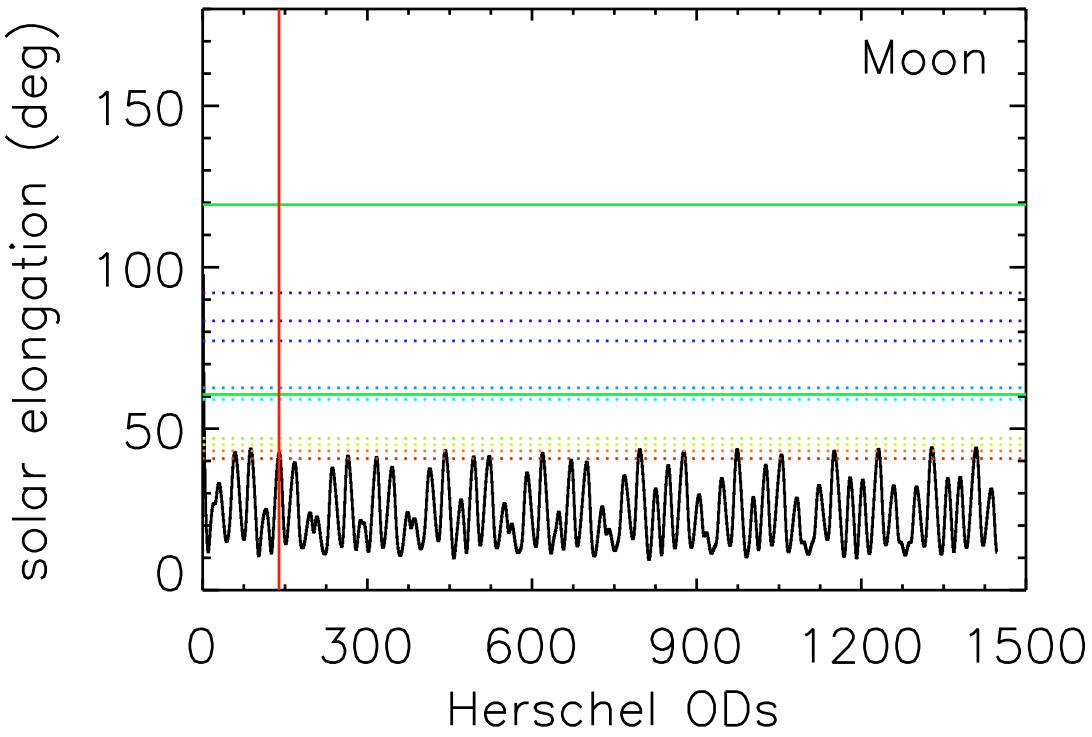


Figure 76: Check for matching conditions of the Moon hitting one of the stray-light spots A...R (cf. Sect. 6.13) during the Herschel mission. The solar elongation of the Moon is shown as the black solid line. Horizontal solid green lines indicate Herschel's solar angle visibility range between 60.6^o and 119.4^o. The multi-colour horizontal dashed lines correspond to the solar angle of the stray-light spots A...R. wrt. to a target pointing at a minimum solar aspect angle of 61°. The Moon's solar elongation matches stray-light spots F&G (red) and E&H (orange) for this extreme solar aspect angle only in the very peaks of its elongation a few times during the mission. OD 139 is indicated by the vertical red solid line.

Table 78: Observational details of photometer out-of-field straylight assessment. The maximum estimated time is 0.63 h.

ID: PVPhotStray						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
7.3.3 Moon out-of-field straylight						
A	standard scan map photometry scan speed 60″/*s* (high) leg length: 60'/50'/45' 18/15/13 legs, 210″ separation inst. ref. with 45° orientation	AOT	0.41…0.63	leg length: 60'/50'/45' has to be matched not violate Sun constraint only blue+red filter	≤0.63	Moon indirectly by placement in a stray-light spot
Target position has to be calculated with spherical geometry so that stray-light source is located in one of the offset stray-light spots						

Table 79: Summary of AORs for the photometer out-of-field straylight assessment. The total scheduled time is 0.4836 h.

ID: PVPhotStray				
	Measurement description	AOR labels	duration (h)	observing constraints
7.3.3 Moon out-of-field straylight				
A	standard scan map photometry scan speed 60″/*s* (high) leg length: 60'/50'/45' 18/15/13 legs, 210″ separation inst. ref. with 45° orientation blue filter	PVPhotStray_733A_FHpt_blu1dx1d_MoonOD139_0001 PVPhotStray_733A_FHpt_blu50amn_MoonOD139_0001 PVPhotStray_733A_FHpt_blu45amn_MoonOD139_0001	0.6219 0.4836 0.4067	OD 139

6.14 AOT Validation Photometer

This test block comprises the check-out and scientific validation of the photometer AOT modes. It also addresses optimisation of certain AOT parameters which could not be completely optimised on ground and it investigates the best internal calibration strategy with regard to the stability of the measurement conditions. The overview of the foreseen measurements is given in Table 81.

Note, that small source and raster map AOT modes were deprecated in the course of the PV tests and never applied for science observations, because of inferior performance wrt. large and mini scan maps. Also the chop/nod mode point source mode was finally deprecated and replaced by mini scan maps, but it was still applied for a number of science observations. Furthermore, it was maintained for calibration observations both for pointing quality checks and for flux checks of celestial standards with an observing mode independent of the standard scan map observing mode.

Table 80: Visibilities of the targets used in the PVPhotAOTVal proposal.

Target	Start	End
δ Dra	always visible	
γ Dra	always visible	
β Pic	always visible	
HD 15008	always visible	
HD 138265	always visible	
HD 139669 (θ UMi)	always visible	
HIP 21479 (R Dor)	always visible	
HR 7001	always visible	
Cas A	18-May-2009	21-Sep-2009
M 1	17-Aug-2009	17-Oct-2009
M 101	14-May-2009	09-Sep-2009
	25-Sep-2009	11-Mar-2010
NGC 1365	01-Jun-2009	26-Sep-2009
NGC 6286	always visible	
NGC 6543	always visible	
NGC 6618	28-Aug-2009	28-Oct-2009
PG 1100+772	always visible	
Arp 55	26-Sep-2009	03-Dec-2009
Arp 155	03-Oct-2009	01-Jan-2010
Arp 275	17-Oct-2009	24-Dec-2009
VV 777	27-Jul-2009	26-Sep-2009
Draco Cloud	always visible	
GOODS S	17-Jun-2009	19-Sep-2009
Lockman hole	25-Sep-2009	24-Dec-2009
Abell 2218	always visible	
19 Fortuna	13-Jul-2009	16-Oct-2009
20 Massalia	14-May-2009	31-Jul-2009
360 Carlova	14-Aug-2009	24-Oct-2009

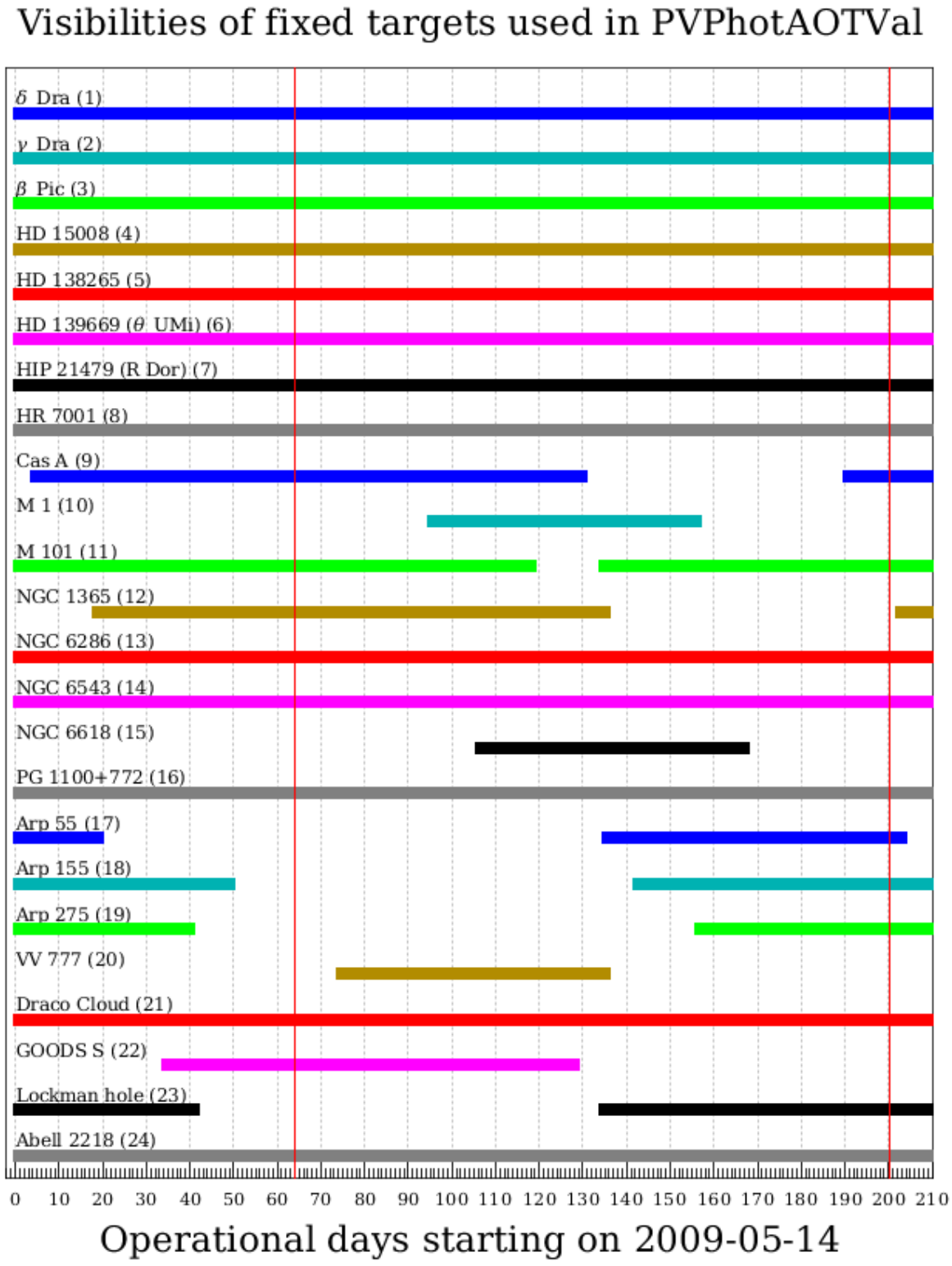
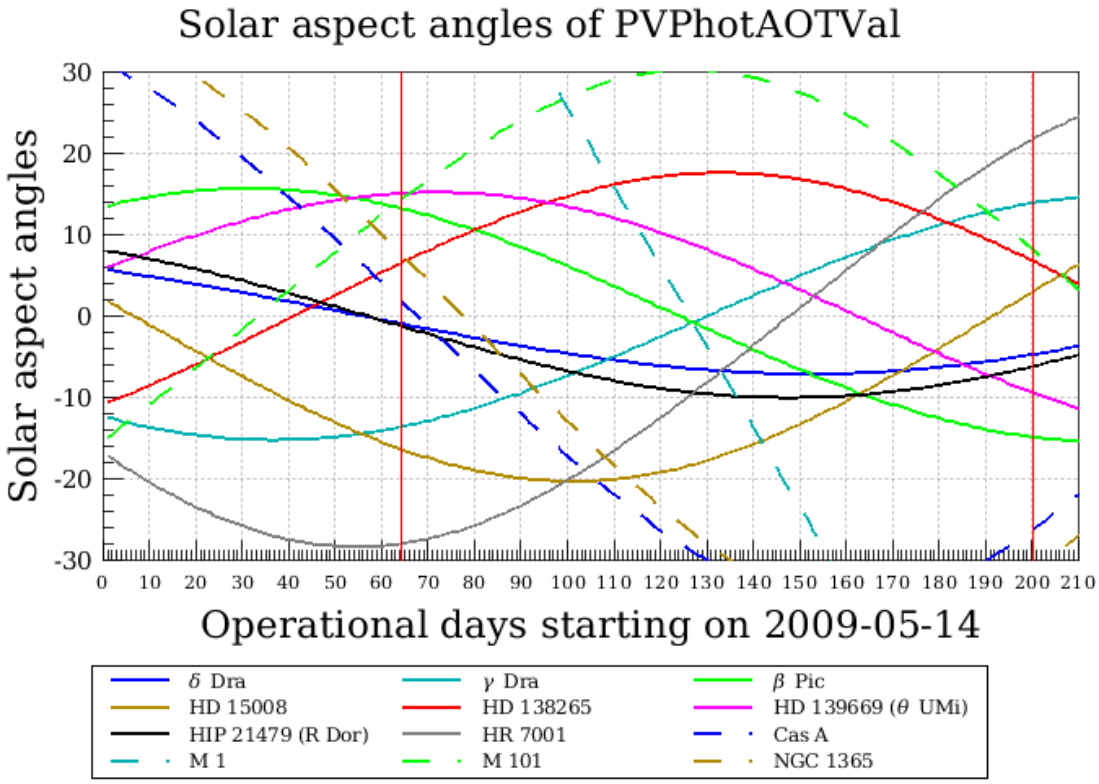


Figure 77: Visibilities of the fixed targets used for the AORs of the PVPhotAOTVal proposal.



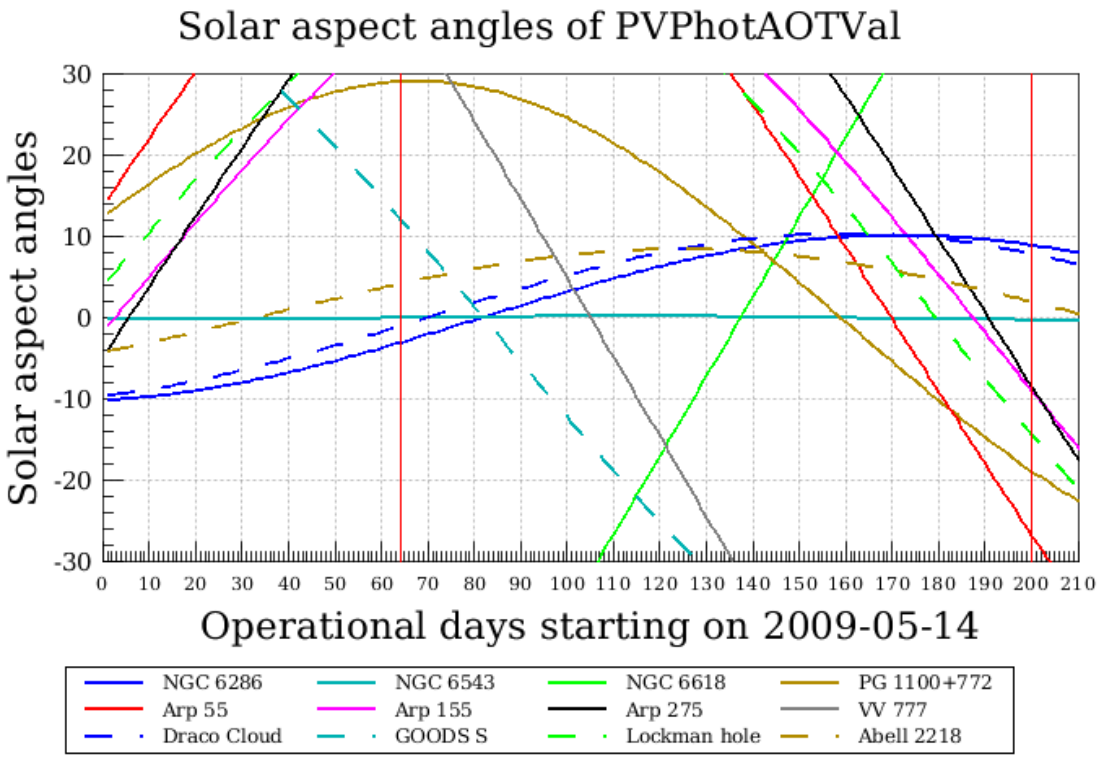


Figure 78: Solar aspect angles of the fixed targets used for the AORs of the PVPhotAOTVal proposal.

Table 81: Observational details of photometer AOT validation. Default settings in non-standard observations are high-lighted in bold face. The total estimated time of the whole test block is 116.3 h. The total estimated time for chop/nod point source photometry and mini-map photometry proto-typing is 17.8 h.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT						
A	standard point source photometry chop/nod	AOT	0.1	2 blue filters dithering/non-dithering	0.4	high flux (several Jy) asteroid Sect. 4.1.1 planet Sect. 4.3.3
B	standard point source photometry chop/nod	AOT	0.14	2 blue filters dithering/non-dithering 2 sources with diff. SEDs	1.1	intermediate flux (100 mJy...1 Jy) fiducial stars/asteroids Sect. 4.1.1
C	standard point source photometry chop/nod	AOT	0.51	2 blue filters dithering/non-dithering 2 sources with diff. SEDs	4.1	low flux (10 mJy...100 mJy) faint 70 µm MIPS standards faint secondary calibrators
D	non-standard point source photom. chopper frequency optimisation (OBCP3 parameters)	CUS	0.19 0.1	2 blue filters dithered 3 chopper frequencies 0.625, **1.25**, 2.5 Hz 8 chopper frequencies f_{chop} 12,**16**,20,24,28,32,36,40 read-outs @40 Hz per chopper plateau i.e. f_{chop} = 1.67 - 0.5 Hz	1.6	low/intermediate flux secondary standards/asteroids Sect. 4.1.2
	standard point source photometry	AOT	0.1	16 read-outs @40 Hz per chopper plateau 2 blue filters dithered	0.2	
E	standard point source photom. low gain vs. high gain performance (comparison with B	AOT	0.14	2 blue filters dithered low gain setting (via flux specification)	0.3	intermediate flux fiducial stars/asteroids Sect. 4.1.1
F	non-standard point source photom. on-board frame averaging selection of subarray (sa) blue filter (**low priority**)	CUS	0.19	2 blue filters dithered average of 2 frames (sa), **4 frames**	0.4	low flux faint 70 µm MIPS standards faint secondary calibrators

Table 81: continued. Observational details of photometer AOT validation. Default settings in non-standard observations are high-lighted in bold face.

ID: PVPhotAOTVal						
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
G	non-standard point source photom. internal calibration frequency hold time concept (**low priority**)	CUS	0.51 0.61	2 blue filters dithered **default cal concept** 10 additional internal cals.	2.3	low flux faint 70 µm MIPS standards faint secondary calibrators
H	non-standard point source photom. with internal calibration and varying chopper frequency (**low priority**)	CUS	0.1	chopping between both CSs and point source at varying chopper frequencies: 16, 32, 48, 64 readouts per plateau	1.5	intermediate flux fiducial/seconday stars
I	non-standard point source photom. nod frequency optimization (OBCP3 parameters)	CUS	0.33-0.36	blue filter green filter 5 nod frequencies (observing time per nod A/B): 30 s (12 nod cycles), **1 min** (7 nod cycles) 2 min (4 nod cycles) 4 min (2 nod cycles) 8 min (1 nod cycle)	1.8	faint flux standard star Sect. 4.1.3
	standard scan map photometry inst. ref. w 90° orientation 20 legs, 3.5' length, 4" sep.	AOT	0.26-0.29	2 blue filters scan speeds: 10, 20″	1.1	
J	standard point source photometry repetition >1 comparison with point source mini-map photometry prototype & mini-map angle & map geometry optimization scan speeds: 10 or 20″	AOT	0.14-0.49 0.13-0.25	2 blue filters combination of map angles: 85 + 95° 9 legs, 2.5' length, 4" sep. 60 +120° 9 legs, 1.5' length, 5" sep. 80 + 100° 9 legs, 2' length, 5" sep. 70 + 110° 9 legs, 1.5' length, 5" sep. 80 + 100° 21 legs, 2' length, 3" sep.	1.3 3.2	low/intermediate flux secondary standards Sect. 4.1.2 faint flux standard star Sect. 4.1.3

Table 81: continued. Observational details of photometer AOT validation. Default settings in non-standard observations are high-lighted in bold face. The total estimated time for small source photometry is 2.5 h.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.2 Optimised Observing Strategy for Small Source Photometry AOT						
A	standard small source photometry consistency with ps mode	AOT	0.27	2 blue filters	0.5	fiducial stars Sect. 4.1.1
B	standard small source photometry bright small extended target	AOT	0.27	2 blue filters	0.5	NGC 6543
C	standard small source photometry IRAS Total Flux Photometric Reference double galaxy	AOT	0.27	2 blue filters	0.5	NGC 6286 TPFR
D	standard small source photometry resolution check extended structure around compact & bright central source	AOT	0.27	2 blue filters	0.5	β Pic
E	standard small source photometry resolution check compact structures	AOT	0.27	2 blue filters	0.5	double source Sect. 4.4.2 Arp 55,Arp 155, Arp 275, VV 777
F	non-standard small source photometry chopper frequency optimisation	CUS	1.20	2 blue filters 2 chopper frequencies 1.25, 2.5 Hz	4.8	NGC 6543
G	non-standard small source photometry nodding frequency optimisation	CUS	0.27 – 0.53	1 blue filter 3 nodding frequencies **60**, 30, 10 s nodding period	1.1	NGC 6543
H	non-standard small source photometry modified raster step size along z-axis	CUS	0.25	1 blue filter 17”	0.25	fiducial stars Sect. 4.1.1
I	non-standard small source photometry different pointing mode	CUS	0.25	1 blue filter 2 pointing modes **nodding-in-raster**, nodding-of-raster	0.5	NGC 6543
J	non-standard small source photometry different pointing sequence repetition of nod cycles on raster point vs. sequential repetition of rasters	CUS	1.0	1 blue filter 2 sequences (n=4) **repetition nod cyc. on rp** rep. raster with simple nod	2.0	NGC 6286

Table 81: continued. Observational details of photometer AOT validation. ps = point source; ss = small source. The total estimated time for raster map photometry is 13.1 h.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.3 Optimised Observing Strategy for Raster Map Photometry AOT						
A	standard raster map photometry 7×7, 2" step consistency with ps photometry PSF reconstruction	AOT	1.07	1 blue filter	1.1	bright fiducial stars Sect. 4.1.1 **offset source to place it in one matrix as for ps mode**
B	standard raster map photometry consistency with ss photometry 2×2, 17"(y), 8.5"(z)	AOT	0.23	2 blue filters 2 sources	0.9	NGC 6543 NGC 6286
C	standard raster map photometry exploration of raster step size range 3×3, 3'(y), 1.5'(z) 5×5, 27"(y,z) 7×7, 17"(y,z)	AOT	 1.00 0.64 1.18	2 blue filters	5.6	NGC 6543
D	standard raster map photometry large raster map 15×15, 51"(y,z) (**low priority**)	AOT	5.54	1 blue filter	5.5	Cas A / M1
E	non-standard raster map photometry internal calibration frequency hold time concept 15×15, 51"(y,z)	CUS	5.7+0.2	2 blue filters 15 additional internal cals.	11.8	Cas A / M1
F	non-standard raster map photometry application of gyro propagation mode 3×3, 3'(y), 1.5'(z) 5×5, 27"(y,z) 7×7, 17"(y,z)	CUS	 1.03+0.075 0.70+0.05 1.25+0.088	1 blue filter position verification every 600 s for 45 s	3.2	NGC 6543

Table 81: continued. Observational details of photometer AOT validation. ps = point source. The total estimated time for scan map photometry is 82.9 h.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT						
A	standard scan map photometry consistency with ps photometry scan speeds 10"/s, 20"/s, 60"/s 30' leg, 15 legs, 4" separation inst. ref. w 45° orientation	AOT	 0.89 (10) 0.54 (20) 0.36 (60)	2 blue filters	3.6	fiducial stars Sect. 4.1.1
B	standard scan map photometry consistency with raster map scan speed 10"/s 15' leg, 19 legs, 51" separation inst. ref. w 45/135° orientation and sky coordinates	AOT	0.67	2 blue filters 2 map orientations 2 map reference frames	5.3	Cas A / M1 **check that orientation of both map types is not absolutely identical**
C	standard scan map photometry structure resolution/dynamic range scan leg density 25' leg, 60 legs, 25" separation 25' leg, homogeneous cover., square scan speed 10"/s inst. ref. w 45/135° orientation	AOT	 2.96 2.33 (4 reps)	2 blue filters 2 map orientations 2 map coverages	21.1	M101/ NGC 1365
D	standard scan map photometry structure resolution/dynamic range scan leg density 12' leg, 28 legs, 25" separation 12' leg, homogeneous cover., square scan speed 10"/s inst. ref. w 45/135° orientation	AOT	 1.56 (2 reps) 1.26 (8 reps)	2 blue filters 2 map orientations 2 map coverages	11.3	M101/ NGC 1365
	comparison high gain vs. low gain scan speed: $20''/s$ inst. ref. w 45/135° orientation	AOT	0.56	2 blue filters low+high gain setting	4.5	NGC 6618

Table 81: continued. Observational details of photometer AOT validation.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT						
E	standard scan map photometry structure resolution/dynamic range optimum array orientation inst. ref. w 15/105° orientation 12' leg, 28 legs, 25" separation scan speed 10"/s	AOT	1.56 (2 reps)	1 blue filter 2 map orientations	3.1	NGC 7293 = Helix Nebula /M101
F	standard scan map photometry very large scan map on extended galactic structure scan speed 20"/s 120' leg, 44 legs, 51" separation sky ref. w 125° orientation	AOT	4.8	1 blue filter	4.8	Draco Cloud map centre: RA = 16:45:00 DEC = +60:12:00
G	standard scan map photometry noise behaviour in empty fields scan speed 10"/s short axis: 11' leg, 41 legs, 25" separation sky ref. w 78.7/258.7° orientation long axis: 17' leg, 27 legs, 25" separation sky ref. w 168.7/348.7° orientation	AOT	1.1 1.0	1 blue (green) filter forward/backward scan by 180° sky ori. two AORs each w/ −5° tilt	16.6	GOODS-S or Lockman hole
H	standard scan map photometry small maps scan speed 10"/s 4' leg, 13 legs, 20" separation inst. ref. w 45/135° orientation	AOT	1.1	1 blue (green) filter 2 map orientations	2.2	Abell 2218
I	non-standard scan map photometry structure resolution/dynamic range internal calibration frequency hold time concept inst. ref. w 45/135° orientation 12' leg, 28 legs, 25" separation scan speed 10"/s	CUS	1.70 (2 reps)	1 blue filter 2 map orientations 7 additional internal cals. every 4th leg	3.4	NGC 7293 = Helix Nebula /M101

Table 81: continued. Observational details of photometer AOT validation.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT						
J	non-standard scan map photometry very large scan map on extended galactic structure internal calibration frequency hold time concept scan speed 20"/s 120' leg, 44 legs, 51" separation sky ref. w 125° orientation	CUS	9.7+0.2	1 blue filter 11 additional internal cals. every 4th leg	9.9	Draco Cloud map centre: RA = 16:45:00 DEC = +60:12:00
K	non-standard scan map photometry noise behaviour in empty fields internal calibration frequency hold time concept scan speed 10"/s 17' leg, 75 legs, 4" separation inst. ref. w 45° orientation	CUS	2.7+0.2	1 blue filter 15 additional internal cals. every 5th leg	2.9	GOODS-S
L	standard scan map photometry check on SSO two orientations (inst. 45,135°)	AOT	0.36 0.72	1 blue filter blue and green filter	0.7 2.9	asteroid comet 217/P Linear
M	standard point source and (non) standard scan map photometry scan speeds: 10, 20″ inst. ref. w 90° orientation 25 legs, 3.5' length, 4" sep. 3 repetitions S/N comparison on faint point source	CUS/AOT	ps: 1.06 scan: 0.9		2.9	faint flux standard star Sect. 4.1.3

Table 81: continued. Observational details of photometer AOT validation. ss = small source. SDP = Science Demonstration Phase.

ID: PVPhotAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT						
N	standard scan map photometry inst. ref. w 90° orientation 4 legs, 3.5' length, 15" sep. comparison with point source photometry performance (5.1.1.D) map size wrt. very bright sources	AOT	0.1	2 blue filters scan speeds: 10, 20″/s (only faint source)	0.6	low/intermediate flux secondary standards Sect. 4.1.2 very bright compact source Sect. 4.4.1
O	standard scan map photometry inst. ref. w 90° orientation performance comparison with ss photometry: resolution check extended structure around compact & bright central source bright small extended target scan speed 20″/s inst. ref. w 45/135° orientation	AOT	 0.28 0.48 0.48	2 blue filters 4 legs, 4' length, 15" sep. 4 repetitions 20 legs, 15' length, 51" sep. 1 repetition 20 legs, 15' length, 51" sep. 1 repetition	 0.6 1.0 2.0	 β Pic NGC 6543 NGC 5315
P	minimap point source photometry prototype standard scan map inst. ref. w 63/117° orientation optimized for point source observations scan speed 20″/s comparison with SDP chopped observations: optimization of map parameters:	AOT	 0.23-0.58 0.13-0.23	 green filter green filter 6(8) legs, 3.9' length, 5" sep. 8 legs, 3.9' length, 4" sep. 8 legs, 3' length, 4" sep. 16 legs, 3.9' length, 2" sep. 16 legs, 3' length, 2" sep.	 2.5 1.7	 HIP 7978, HIP 15371, SDSS J1148+5251 fiducial stars (γ Dra) Sect. 4.1.1

Table 82: Summary of AORs for the photometer AOT validation. The total scheduled time is 96.8378 h. The scheduled time for chopped point source photometry AOT and mini-map point source AOT prototype validation is 16.9596 h.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT				
A	standard point source photometry	PVPhotAOTVal_511A_StdPSdith_blu_gammaDra_0001	0.0942	OD 108
	(bright source)	PVPhotAOTVal_511A_StdPSdith_grn_gammaDra_0001	0.0942	OD 108
	chop/nod	PVPhotAOTVal_511A_StdPSndith_blu_gammaDra_0001	0.0942	OD 108
	dithering & non-dithering	PVPhotAOTVal_511A_StdPSndith_grn_gammaDra_0001	0.0942	OD 108
B	standard point source photometry	PVPhotAOTVal_511B_StdPSdith_blu_cld_Carlova_0001	0.1428	OD 108
	(intermediate bright source)	PVPhotAOTVal_511B_StdPSdith_grn_cld_Carlova_0001	0.1428	OD 108
	chop/nod	PVPhotAOTVal_511B_StdPSndith_blu_cld_Carlova_0001	0.1428	OD 108
	dithering & non-dithering	PVPhotAOTVal_511B_StdPSndith_grn_cld_Carlova_0001	0.1428	OD 108
		PVPhotAOTVal_511B_StdPSdith_blu_hot_delDra_0001	0.1400	OD 108
		PVPhotAOTVal_511B_StdPSdith_grn_hot_delDra_0001	0.1400	OD 108
		PVPhotAOTVal_511B_StdPSndith_blu_hot_delDra_0001	0.1400	OD 108
		PVPhotAOTVal_511B_StdPSndith_grn_hot_delDra_0001	0.1400	OD 108
C	standard point source photometry	PVPhotAOTVal_511C_StdPSdith_blu_cld_PG1100+772_0001	0.5067	OD 108
	(faint source)	PVPhotAOTVal_511C_StdPSdith_grn_cld_PG1100+772_0001	0.5067	OD 108
	chop/nod	PVPhotAOTVal_511C_StdPSndith_blu_cld_PG1100+772_0001	0.5067	OD 108
	dithering & non-dithering	PVPhotAOTVal_511C_StdPSndith_grn_cld_PG1100+772_0001	0.5067	OD 108
		PVPhotAOTVal_511C_StdPSdith_blu_hot_HD15008_0001	0.5067	OD 108
		PVPhotAOTVal_511C_StdPSdith_grn_hot_HD15008_0001	0.5067	OD 108
		PVPhotAOTVal_511C_StdPSndith_blu_hot_HD15008_0001	0.5067	OD 108
		PVPhotAOTVal_511C_StdPSndith_grn_hot_HD15008_0001	0.5067	OD 108
D	non-standard point source photometry	PVPhotAOTVal_511D_nStdPS_hiHz_blu_delDra_0001	0.1842	
	chopper frequency optimisation	PVPhotAOTVal_511D_nStdPS_hiHz_grn_delDra_0001	0.1842	
	CALU tables used:	PVPhotAOTVal_511D_nStdPS_lowHz_blu_delDra_0001	0.1908	
	0.625 Hz: OBCP3params_32rdouts	PVPhotAOTVal_511D_nStdPS_lowHz_grn_delDra_0001	0.1908	
	1.25 Hz: OBCP3params	PVPhotAOTVal_511D_nStdPS_normHz_blu_delDra_0001	0.1858	
	2.5 Hz: OBCP3params_8rdouts	PVPhotAOTVal_511D_nStdPS_normHz_grn_delDra_0001	0.1858	

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT				
D	standard point source photometry	PVPhotAOTVal_511D_StdPS_blu_HD139669_0001	0.0947	OD 139
	2 blue filters dithered	PVPhotAOTVal_511D_StdPS_grn_HD139669_0001	0.0947	OD 139
	non-standard point source photometry			
	2 blue filters dithered			
	chopper frequency optimization			
	CAL U tables used:			
	OBCP3params_12rdouts	PVPhotAOTVal_511D_nStdPS12_blu_HD139669_0001	0.0947	OD 139
	1.67 Hz, 34 chopper plateaux	PVPhotAOTVal_511D_nStdPS12_grn_HD139669_0001	0.0947	OD 139
	OBCP3params	PVPhotAOTVal_511D_nStdPS16_blu_HD139669_0001	0.0942	OD 139
	1.25 Hz, 25 plateaux = default	PVPhotAOTVal_511D_nStdPS16_grn_HD139669_0001	0.0942	OD 139
	OBCP3params_20rdouts	PVPhotAOTVal_511D_nStdPS20_blu_HD139669_0001	0.0942	OD 139
	1.00 Hz, 20 chopper plateaux	PVPhotAOTVal_511D_nStdPS20_grn_HD139669_0001	0.0942	OD 139
	OBCP3params_24rdouts	PVPhotAOTVal_511D_nStdPS24_blu_HD139669_0001	0.0947	OD 139
	0.83 Hz, 17 chopper plateaux	PVPhotAOTVal_511D_nStdPS24_grn_HD139669_0001	0.0947	OD 139
	OBCP3params_28rdouts	PVPhotAOTVal_511D_nStdPS28_blu_HD139669_0001	0.0936	OD 139
	0.71 Hz, 14 chopper plateaux	PVPhotAOTVal_511D_nStdPS28_grn_HD139669_0001	0.0936	OD 139
	OBCP3params_32rdouts	PVPhotAOTVal_511D_nStdPS32_blu_HD139669_0001	0.0958	OD 139
	0.63 Hz, 13 chopper plateaux	PVPhotAOTVal_511D_nStdPS32_grn_HD139669_0001	0.0958	OD 139
	OBCP3params_36rdouts	PVPhotAOTVal_511D_nStdPS36_blu_HD139669_0001	0.0947	OD 139
	0.56 Hz, 11 chopper plateaux	PVPhotAOTVal_511D_nStdPS36_grn_HD139669_0001	0.0947	OD 139
	OBCP3params_40rdouts	PVPhotAOTVal_511D_nStdPS40_blu_HD139669_0001	0.0947	OD 139
	0.50 Hz, 10 chopper plateaux	PVPhotAOTVal_511D_nStdPS40_grn_HD139669_0001	0.0947	OD 139
E	standard point source photometry	PVPhotAOTVal_511E_StdPSdith_blu_lowgain_delDra_0001	0.1400	OD 128
	low gain setting	PVPhotAOTVal_511E_StdPSdith_grn_lowgain_delDra_0001	0.1400	OD 128
	comparison with B (high gain)	PVPhotAOTVal_511E_StdPSdith_blu_lowgain_delDra_0002	0.1400	OD 132
		PVPhotAOTVal_511E_StdPSdith_grn_lowgain_delDra_0002	0.1400	OD 132
F	non-standard point source photometry	PVPhotAOTVal_511F_nStdPS_doublecomp_blu_delDra_0001	0.1825	
	on-board frame averaging	PVPhotAOTVal_511F_nStdPS_halfcomp_blu_delDra_0001	0.1825	
	selection of subarray (sa)			

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT				
G	non-standard point source photometry internal calibration frequency hold time concept 0 vs. 10 additional internal calibration measurements	PVPhotAOTVal_511G_nStdPS_intcal0_blu_HD15008_0001	0.5067	
		PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD15008_0001	0.5067	
		PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD15008_0001	0.6233	
		PVPhotAOTVal_511G_nStdPS_intcal10_grn_HD15008_0001	0.6233	
		PVPhotAOTVal_511G_nStdPS_intcal0_blu_HD138265_0001	0.5067	OD 128
		PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD138265_0001	0.5067	OD 128
		PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD138265_0001	0.6233	OD 128
		PVPhotAOTVal_511G_nStdPS_intcal10_grn_HD138265_0001	0.6233	OD 128
		PVPhotAOTVal_511G_nStdPS_intcal0_blu_HD138265_0002	0.5067	OD 132
		PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD138265_0002	0.5067	OD 132
		PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD138265_0002	0.6233	OD 132
		PVPhotAOTVal_511G_nStdPS_intcal10_grn_HD138265_0002	0.6233	OD 132
H	non-standard point source photometry with internal calibration and varying chopper frequency	PVPhotAOTVal_511H_nStdCalB_16rds_HR7001_001	0.0872	
		PVPhotAOTVal_511H_nStdCalB_16rds_HR7001_002	0.0872	
		PVPhotAOTVal_511H_nStdCalB_16rds_HR7001_003	0.0872	
		PVPhotAOTVal_511H_nStdCalB_32rds_HR7001_001	0.1156	
		PVPhotAOTVal_511H_nStdCalB_32rds_HR7001_002	0.1156	
		PVPhotAOTVal_511H_nStdCalB_32rds_HR7001_003	0.1156	
		PVPhotAOTVal_511H_nStdCalB_48rds_HR7001_001	0.1717	
		PVPhotAOTVal_511H_nStdCalB_48rds_HR7001_002	0.1717	
		PVPhotAOTVal_511H_nStdCalB_48rds_HR7001_003	0.1717	
		PVPhotAOTVal_511H_nStdCalB_64rds_HR7001_001	0.1256	
		PVPhotAOTVal_511H_nStdCalB_64rds_HR7001_002	0.1256	
		PVPhotAOTVal_511H_nStdCalB_64rds_HR7001_003	0.1256	

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT				
I	standard scan map photometry	PVPhotAOTVal_511I_minimap_blu_HD138265	0.2625	OD 146
	inst. ref. w 90° orientation	PVPhotAOTVal_511I_minimap_gre_HD138265	0.2625	OD 146
	20 legs, 3.5' length, 4" sep.	PVPhotAOTVal_511I_minimap_slow_blu_HD138265	0.2853	OD 146
	scan speeds: 10, 20″	PVPhotAOTVal_511I_minimap_slow_gre_HD138265	0.2853	OD 146
	blue & green filter			
	non-standard point source photom.	PVPhotAOTVal_511I_nStdPS_01minNod_blu_HD138265_0001	0.3558	OD 146
	nod frequency optimization	PVPhotAOTVal_511I_nStdPS_01minNod_grn_HD138265_0001	0.3558	
	nod frequencies	PVPhotAOTVal_511I_nStdPS_02minNod_blu_HD138265_0001	0.3583	OD 146
	(observing time per nod A/B):	PVPhotAOTVal_511I_nStdPS_02minNod_grn_HD138265_0001	0.3583	
	30 s (12 nod cycles),	PVPhotAOTVal_511I_nStdPS_04minNod_blu_HD138265_0001	0.3378	OD 146
	1 min (7 nod cycles)	PVPhotAOTVal_511I_nStdPS_04minNod_grn_HD138265_0001	0.3378	
	2 min (4 nod cycles)	PVPhotAOTVal_511I_nStdPS_08minNod_blu_HD138265_0001	0.3275	OD 146
	4 min (2 nod cycles)	PVPhotAOTVal_511I_nStdPS_08minNod_grn_HD138265_0001	0.3275	
	8 min (1 nod cycle)	PVPhotAOTVal_511I_nStdPS_30secNod_blu_HD138265_0001	0.3606	OD 146
	blue & green filter	PVPhotAOTVal_511I_nStdPS_30secNod_grn_HD138265_0001	0.3606	

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.1 Optimised Observing Strategy for Point Source Photometry AOT				
J	standard point source photometry	PVPhotAOTVal_511J_StdPS_2rep_blu_HD148387_001	0.1383	OD 160
	blue & green filter	PVPhotAOTVal_511J_StdPS_2rep_grn_HD148387_001	0.1383	OD 160
	dithered, repetition >1 (2/10)	PVPhotAOTVal_511J_StdPS_10rep_blu_HD159330_001	0.4872	OD 160
	comparison with point source mini-map	PVPhotAOTVal_511J_StdPS_10rep_grn_HD159330_001	0.4872	OD 160
	photometry prototype			
	optimization of mini-map angles			
	& mini-map geometry			
	85 + 95°	PVPhotAOTVal_511J_PSscan_low_85deg_blu_HD148387_001	0.1389	OD 160
	9 legs, 2.5' length, 4" sep.	PVPhotAOTVal_511J_PSscan_low_85deg_grn_HD148387_001	0.1389	OD 160
	scan speeds 10″/s	PVPhotAOTVal_511J_PSscan_low_95deg_blu_HD148387_001	0.1389	OD 160
		PVPhotAOTVal_511J_PSscan_low_95deg_grn_HD148387_001	0.1389	OD 160
	70 + 110°	PVPhotAOTVal_511J_PSscan_medium_70deg_blu_HD148387_001	0.1283	OD 160
	9 legs, 1.5' length, 5" sep.	PVPhotAOTVal_511J_PSscan_medium_70deg_grn_HD148387_001	0.1283	OD 160
	scan speed 20″/s	PVPhotAOTVal_511J_PSscan_medium_110deg_blu_HD148387_001	0.1283	OD 160
		PVPhotAOTVal_511J_PSscan_medium_110deg_grn_HD148387_001	0.1283	OD 160
	60 +120°	PVPhotAOTVal_511J_PSscan_slow_60deg_blu_HD148387_001	0.1239	OD 160
	9 legs, 1.5' length, 5" sep.	PVPhotAOTVal_511J_PSscan_slow_60deg_grn_HD148387_001	0.1239	OD 160
	scan speed 10″/s	PVPhotAOTVal_511J_PSscan_slow_120deg_blu_HD148387_001	0.1239	OD 160
		PVPhotAOTVal_511J_PSscan_slow_120deg_grn_HD148387_001	0.1239	OD 160
	80 + 100°	PVPhotAOTVal_511J_PSscan_slow_80deg_blu_HD148387_001	0.1314	OD 160
	9 legs, 2' length, 5" sep.	PVPhotAOTVal_511J_PSscan_slow_80deg_grn_HD148387_001	0.1314	OD 160
	scan speed 10″/s	PVPhotAOTVal_511J_PSscan_slow_100deg_blu_HD148387_001	0.1314	OD 160
		PVPhotAOTVal_511J_PSscan_slow_100deg_grn_HD148387_001	0.1314	OD 160
	80 + 100°	PVPhotAOTVal_511J_PSscan_slow_80deg_blu_HD159330_001	0.2447	OD 160
	21 legs, 2' length, 3" sep.	PVPhotAOTVal_511J_PSscan_slow_80deg_grn_HD159330_001	0.2447	OD 160
	scan speed 10″/s	PVPhotAOTVal_511J_PSscan_slow_100deg_blu_HD159330_001	0.2447	OD 160
		PVPhotAOTVal_511J_PSscan_slow_100deg_grn_HD159330_001	0.2447	OD 160

Table 82: continued. Summary of AORs for the photometer AOT validation. The scheduled time for small source photometry AOT validation is 2.1800 h.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.2 Optimised Observing Strategy for Small Source Photometry AOT				
A	standard small source photometry consistency with ps mode	PVPhotAOTVal_512A_StdSmall_blu_gammaDra_0001 PVPhotAOTVal_512A_StdSmall_grn_gammaDra_0001	0.2725 0.2725	OD 108 OD 108
B	standard small source photometry bright small extended target	PVPhotAOTVal_512B_StdSmall_blu_NGC6543_0001 PVPhotAOTVal_512B_StdSmall_grn_NGC6543_0001	0.2725 0.2725	OD 110 OD 119
C	standard small source photometry IRAS Total Flux Photometric Reference double galaxy	PVPhotAOTVal_512C_StdSmall_blu_NGC6286_0001 PVPhotAOTVal_512C_StdSmall_grn_NGC6286_0001 PVPhotAOTVal_512C_StdSmall_blu_NGC6286_0002 PVPhotAOTVal_512C_StdSmall_blu_NGC6286_0002	0.2725 0.2725 0.2725 0.2725	OD 128 OD 128
D	standard small source photometry resolution check extended structure around compact & bright central source	PVPhotAOTVal_512D_StdSmall_blu_betPic_0001 PVPhotAOTVal_512D_StdSmall_grn_betPic_0001 PVPhotAOTVal_512D_StdSmall_blu_betPic_0002 PVPhotAOTVal_512D_StdSmall_grn_betPic_0002	0.2725 0.2725 0.2725 0.2725	OD 128 OD 138 OD 132 OD 132
E	standard small source photometry resolution check compact structures	PVPhotAOTVal_512E_StdSmall_blu_Arp55_0001 PVPhotAOTVal_512E_StdSmall_grn_Arp55_0001 PVPhotAOTVal_512E_StdSmall_blu_Arp155_0001 PVPhotAOTVal_512E_StdSmall_grn_Arp155_0001 PVPhotAOTVal_512E_StdSmall_blu_Arp275_0001 PVPhotAOTVal_512E_StdSmall_grn_Arp275_0001 PVPhotAOTVal_512E_StdSmall_blu_VV777_0001 PVPhotAOTVal_512E_StdSmall_grn_VV777_0001	0.2725 0.2725 0.2725 0.2725 0.2725 0.2725 0.2725 0.2725	OD 146 OD 146
F	non-standard small source photometry chopper frequency optimisation	PVPhotAOTVal_512F_nStdSmall_highHz_blu_NGC6543_0001 PVPhotAOTVal_512F_nStdSmall_highHz_grn_NGC6543_0001 PVPhotAOTVal_512F_nStdSmall_lowHz_blu_NGC6543_0001 PVPhotAOTVal_512F_nStdSmall_lowHz_grn_NGC6543_0001	1.2078 1.2078 1.2078 1.2078	
G	non-standard small source photometry nodding frequency optimisation CALU tables used: 60 s: OBCP4params 30 s: OBCP4params_19cycles 10 s: OBCP4params_6cycles	PVPhotAOTVal_512G_nStdSmall_10s_NGC6543_0001 PVPhotAOTVal_512G_nStdSmall_30s_NGC6543_0001 PVPhotAOTVal_512G_nStdSmall_60s_NGC6543_0001	0.5278 0.3056 0.2725	

Table 82: continued. Summary of AORs for the photometer AOT validation. The scheduled time for raster map photometry AOT validation is 4.7928 h.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.3 Optimised Observing Strategy for Raster Map Photometry AOT				
A	standard raster map photometry 7×7, 2" step consistency with ps photometry PSF reconstruction	PVPhotAOTVal_513A_StdRaster_7x7_blu_gammaDra_0001 PVPhotAOTVal_513A_StdRaster_7x7_grn_gammaDra_0001	1.0692 1.0692	OD 139
B	standard raster map photometry consistency with ss photometry 2×2, 17"(y), 8.5"(z)	PVPhotAOTVal_513B_StdRaster_2x2_blu_NGC6286_0001 PVPhotAOTVal_513B_StdRaster_2x2_blu_NGC6543_0001 PVPhotAOTVal_513B_StdRaster_2x2_grn_NGC6286_0001 PVPhotAOTVal_513B_StdRaster_2x2_grn_NGC6543_0001	0.2289 0.2289 0.2289 0.2289	OD 138 OD 138 OD 138 OD 138
C	standard raster map photometry exploration of raster step size range 3×3, 3'(y), 1.5'(z) 5×5, 27"(y,z) 7×7, 17"(y,z)	PVPhotAOTVal_513C_StdRaster_3x3_blu_NGC6543_0001 PVPhotAOTVal_513C_StdRaster_3x3_grn_NGC6543_0001 PVPhotAOTVal_513C_StdRaster_5x5_blu_NGC6543_0001 PVPhotAOTVal_513C_StdRaster_5x5_grn_NGC6543_0001 PVPhotAOTVal_513C_StdRaster_7x7_blu_NGC6543_0001 PVPhotAOTVal_513C_StdRaster_7x7_grn_NGC6543_0001	0.9964 0.9964 0.6358 0.6358 1.1758 1.1758	OD 139 OD 139 OD 139
D	standard raster map photometry large raster map 15×15, 51"(y,z)	PVPhotAOTVal_513D_StdRaster_15x15_blu_CasA_0001 PVPhotAOTVal_513D_StdRaster_15x15_blu_M1_0001 PVPhotAOTVal_513D_StdRaster_15x15_grn_CasA_0001 PVPhotAOTVal_513D_StdRaster_15x15_grn_M1_0001	5.5447 5.5447 5.5447 5.5447	

Table 82: continued. Summary of AORs for the photometer AOT validation. The scheduled time for scan map photometry AOT validation is 72.9054 h.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT				
A	standard scan map photometry consistency with ps photometry scan speeds $10''/s$, $20''/s$, $60''/s$ $30'$ leg, 15 legs, $4''$ separation inst. ref. w 45° orientation	PVPhotAOTVal_514A_StdScan_10_blu_gammaDra_0001	0.8875	OD 108
		PVPhotAOTVal_514A_StdScan_10_grn_gammaDra_0001	0.8875	OD 108
		PVPhotAOTVal_514A_StdScan_20_blu_gammaDra_0001	0.5369	OD 108
		PVPhotAOTVal_514A_StdScan_20_grn_gammaDra_0001	0.5369	OD 108
		PVPhotAOTVal_514A_StdScan_60_blu_gammaDra_0001	0.3608	OD 108
		PVPhotAOTVal_514A_StdScan_60_grn_gammaDra_0001	0.3608	OD 108
B	standard scan map photometry consistency with raster map scan speed $10''/s$ $15'$ leg, 19 legs, $51''$ separation inst. ref. w 45/135° orientation and sky coordinates	PVPhotAOTVal_514B_StdScan_ins45_blu_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_ins45_grn_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_ins135_blu_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_ins135_grn_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_sky45_blu_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_sky45_grn_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_sky135_blu_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_sky135_grn_CasA_0001	0.6669	
		PVPhotAOTVal_514B_StdScan_ins45_blu_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_ins45_grn_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_ins135_blu_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_ins135_grn_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_sky45_blu_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_sky45_grn_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_sky135_blu_M1_0001	0.6669	OD 124
		PVPhotAOTVal_514B_StdScan_sky135_grn_M1_0001	0.6669	OD 124

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT				
C	standard scan map photometry structure resolution/dynamic range scan leg density $25'$ leg, 60 legs, $25''$ separation $25'$ leg, homogeneous cover., square scan speed $10''/s$ inst. ref. w $45/135°$ orientation	PVPhotAOTVal_514C_StdScan_60-ins45_blu_M101_0001	2.9617	
		PVPhotAOTVal_514C_StdScan_60-ins45_grn_M101_0001	2.9617	
		PVPhotAOTVal_514C_StdScan_60-ins135_blu_M101_0001	2.9617	
		PVPhotAOTVal_514C_StdScan_60-ins135_grn_M101_00 01	2.9617	
		PVPhotAOTVal_514C_StdScan_hom-ins45_blu_M101_0001	2.3258	
		PVPhotAOTVal_514C_StdScan_hom-ins45_grn_M101_0001	2.3258	
		PVPhotAOTVal_514C_StdScan_hom-ins135_blu_M101_0001	2.3258	
		PVPhotAOTVal_514C_StdScan_hom-ins135_grn_M101_0001	2.3258	
		PVPhotAOTVal_514C_StdScan_60-ins45_blu_N1365_0001	2.9617	OD 109
		PVPhotAOTVal_514C_StdScan_60-ins45_grn_N1365_0001	2.9617	OD 109
		PVPhotAOTVal_514C_StdScan_60-ins135_blu_N1365_0001	2.9617	OD 109
		PVPhotAOTVal_514C_StdScan_60-ins135_grn_N1365_0001	2.9617	OD 109
		PVPhotAOTVal_514C_StdScan_hom-ins45_blu_N1365_0001	2.3258	OD 110
		PVPhotAOTVal_514C_StdScan_hom-ins45_grn_N1365_0001	2.3258	OD 110
		PVPhotAOTVal_514C_StdScan_hom-ins135_blu_N1365_0001	2.3258	OD 110
		PVPhotAOTVal_514C_StdScan_hom-ins135_grn_N1365_0001	2.3258	OD 110

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
		5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT		
D	standard scan map photometry	PVPhotAOTVal_514D_StdScan_28-ins45_blu_M101_0001	1.5594	
	structure resolution/dynamic range	PVPhotAOTVal_514D_StdScan_28-ins45_grn_M101_0001	1.5594	
	scan leg density	PVPhotAOTVal_514D_StdScan_28-ins135_blu_M101_0001	1.5594	
	$12'$ leg, 28 legs, $25''$ separation	PVPhotAOTVal_514D_StdScan_28-ins135_grn_M101_0001	1.5594	
	$12'$ leg, homogeneous cover., square	PVPhotAOTVal_514D_StdScan_hom-ins45_blu_M101_0001	1.2603	
	scan speed $10''/s$	PVPhotAOTVal_514D_StdScan_hom-ins45_grn_M101_0001	1.2603	
	inst. ref. w $45/135°$ orientation	PVPhotAOTVal_514D_StdScan_hom-ins135_blu_M101_0001	1.2603	
		PVPhotAOTVal_514D_StdScan_hom-ins135_grn_M101_0001	1.2603	
		PVPhotAOTVal_514D_StdScan_28-ins45_blu_N1365_0001	1.5594	OD 118
		PVPhotAOTVal_514D_StdScan_28-ins45_grn_N1365_0001	1.5594	OD 118
		PVPhotAOTVal_514D_StdScan_28-ins135_blu_N1365_0001	1.5594	OD 118
		PVPhotAOTVal_514D_StdScan_28-ins135_grn_N1365_0001	1.5594	OD 118
		PVPhotAOTVal_514D_StdScan_hom-ins45_blu_N1365_0001	1.2603	OD 110
		PVPhotAOTVal_514D_StdScan_hom-ins45_grn_N1365_0001	1.2603	OD 119
		PVPhotAOTVal_514D_StdScan_hom-ins135_blu_N1365_0001	1.2603	OD 110
		PVPhotAOTVal_514D_StdScan_hom-ins135_grn_N1365_0001	1.2603	OD 119
	comparison high gain vs. low gain	PVPhotAOTVal_514D_StdScan_lo_i45_blu_NGC6618_01	0.5581	
	scan speed: $20''/s$	PVPhotAOTVal_514D_StdScan_lo_i45_grn_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_lo_i135_blu_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_lo_i135_grn_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_hi_i45_blu_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_hi_i45_grn_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_hi_i135_blu_NGC6618_01	0.5581	
		PVPhotAOTVal_514D_StdScan_hi_i135_grn_NGC6618_01	0.5581	

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT				
E	standard scan map photometry structure resolution/dynamic range optimum array orientation inst. ref. w 15/105° orientation 12′ leg, 28 legs, 25″ separation scan speed 10″/*s*	PVPhotAOTVal_514E_StdScan_ins15_blu_M101_0001 PVPhotAOTVal_514E_StdScan_ins15_blu_M101_0002 PVPhotAOTVal_514E_StdScan_ins105_blu_M101_0001 PVPhotAOTVal_514E_StdScan_ins15_blu_NGC1365_0001 PVPhotAOTVal_514E_StdScan_ins105_blu_NGC1365_0001	1.5594 1.5594 1.5594 1.5594 1.5594	OD 108 OD 125 OD 125
F	standard scan map photometry very large scan map on extended galactic structure scan speed 20″/*s* 120′ leg, 44 legs, 51″ separation sky ref. w 125° orientation	PVPhotAOTVal_514F_StdScan_largemap_blu_Draco_0001 PVPhotAOTVal_514F_StdScan_largemap_blu_Draco_0002	4.8353 4.8353	OD 128 OD 132
G	standard scan map photometry noise behaviour in empty fields scan speed 10”/s short axis: 11’ leg, 41 legs, 25” separation sky ref. w 78.7/258.7° orientation long axis: 17’ leg, 27 legs, 25” separation sky ref. w 168.7/348.7° orientation two AORs each w/ −5° tilt	PVPhotAOTVal_514G_StdScanLO_noise_grn_GOODS-S_0001 PVPhotAOTVal_514G_StdScanLO_noise_grn_GOODS-S_0002 PVPhotAOTVal_514G_StdScanLP_noise_grn_GOODS-S_0001 PVPhotAOTVal_514G_StdScanLP_noise_grn_GOODS-S_0002 PVPhotAOTVal_514G_StdScanSO_noise_grn_GOODS-S_0001 PVPhotAOTVal_514G_StdScanSO_noise_grn_GOODS-S_0002 PVPhotAOTVal_514G_StdScanSP_noise_grn_GOODS-S_0001 PVPhotAOTVal_514G_StdScanSP_noise_grn_GOODS-S_0002 PVPhotAOTVal_514G_StdScanLO_noise_grn_Lockman_0001 PVPhotAOTVal_514G_StdScanLO_noise_grn_Lockman_0002 PVPhotAOTVal_514G_StdScanLP_noise_grn_Lockman_0001 PVPhotAOTVal_514G_StdScanLP_noise_grn_Lockman_0002 PVPhotAOTVal_514G_StdScanSO_noise_grn_Lockman_0001 PVPhotAOTVal_514G_StdScanSO_noise_grn_Lockman_0002 PVPhotAOTVal_514G_StdScanSP_noise_grn_Lockman_0001 PVPhotAOTVal_514G_StdScanSP_noise_grn_Lockman_0002	0.9975 0.9975 0.9975 0.9975 1.0814 1.0814 1.0814 1.0814 0.9975 0.9975 0.9975 0.9975 1.0814 1.0814 1.0814 1.0814	OD 109 OD 109 OD 110 OD 110 OD 109 OD 109 OD 110 OD 110

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT				
H	standard scan map photometry small maps scan speed 10"/s 4' leg, 13 legs, 20" separation inst. ref. w 45/135° orientation	PVPhotAOTVal_514H_StdScan_smallPA45_grn_A2218_0001 PVPhotAOTVal_514H_StdScan_smallPA135_grn_A2218_0001	1.1075 1.1075	OD 110 OD 110
I	non standard scan map photometry structure resolution/dynamic range internal calibration frequency hold time concept 7 additional internal cals. every 4th leg inst. ref. w 45/135° orientation 12' leg, 28 legs, 25" separation scan speed 10"/s	PVPhotAOTVal_514I_nStdScan_28-ins135_grn_M101_0001 PVPhotAOTVal_514I_nStdScan_28-ins45_grn_M101_0001 PVPhotAOTVal_514I_nStdScan_20-ins135_grn_M1_000 PVPhotAOTVal_514I_nStdScan_20-ins45_grn_M1_0001	1.7033 1.7033 0.7581 0.7581	
L	standard scan map photometry check on SSO two orientations (inst. 45,135°)	PVPhotAOTVal_514L_StdScan_ins135_blu_Massalia_0001 PVPhotAOTVal_514L_StdScan_ins45_blu_Massalia_0001 PVPhotAOTVal_514L_StdScan_ins135_blu_Fortuna_0001 PVPhotAOTVal_514L_StdScan_ins45_blu_Fortuna_0001 PVPhotAOTVal_514L_StdScan_ins135_blu_Fortuna_0002 PVPhotAOTVal_514L_StdScan_ins45_blu_Fortuna_0002 PVPhotAOTVal_514L_StdScan_blu_nom_LINEAR_0001 PVPhotAOTVal_514L_StdScan_blu_ortho_LINEAR_0001 PVPhotAOTVal_514L_StdScan_grn_nom_LINEAR_0001 PVPhotAOTVal_514L_StdScan_grn_ortho_LINEAR_0001	0.3567 0.3567 0.3567 0.3567 0.3567 0.3567 0.7119 0.7119 0.7119 0.7119	 OD 128 OD 128 OD 132 OD 132 OD 146 OD 146 OD 146 OD 146
M	standard point source and (non) standard scan map photometry scan speeds: 10, 20″ inst. ref. w 90° orientation 25 legs, 3.5' length, 4" sep. 3 repetitions S/N comparison on faint point source	PVPhotAOTVal_514M_StdPS_grn_HD138265_0001 PVPhotAOTVal_514M_StdPS_grn_HD138265_0002 PVPhotAOTVal_514M_StdScan_ins90_lv_grn_HD138265_01 PVPhotAOTVal_514M_StdScan_ins90_lv_grn_HD138265_02 PVPhotAOTVal_514M_StdScan_ins90_mv_grn_HD138265_01 PVPhotAOTVal_514M_StdScan_ins90_mv_grn_HD138265_02 PVPhotAOTVal_514M_StdPS_grn_HD15008_0001 PVPhotAOTVal_514M_StdScan_ins90_lv_grn_HD15008_01 PVPhotAOTVal_514M_StdScan_ins90_mv_grn_HD15008_01 PVPhotAOTVal_514M_nStdScan_ins90_05_grn_HD15008_01	0.9650 0.9650 0.9500 0.9500 0.8661 0.8661 1.0106 0.9506 1.6917 0.8211	OD 128 OD 132 OD 128 OD 132 OD 128 OD 132

Table 82: continued. Summary of AORs for the photometer AOT validation.

ID: PVPhotAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.4 Optimised Observing Strategy for Scan Map Photometry AOT				
N	standard scan map photometry	PVPhotAOTVal_514N_StdScanSlow_blu_HD139669_0001	0.0958	OD 139
	inst. ref. w 90° orientation	PVPhotAOTVal_514N_StdScanMed_blu_HD139669_0001	0.0900	OD 139
	4 legs, 3.5' length, 15" sep.	PVPhotAOTVal_514N_StdScanSlow_grn_HD139669_0001	0.0958	OD 139
	scan speeds: 10 and 20″	PVPhotAOTVal_514N_StdScanMed_grn_HD139669_0001	0.0900	OD 139
		PVPhotAOTVal_514N_StdScan_blu_HIP21479_0001	0.0958	OD 139
		PVPhotAOTVal_514N_StdScan_grn_HIP21479_0001	0.0958	OD 139
O	standard scan map photometry			
	inst. ref. w 90° orientation	PVPhotAOTVal_514O_StdScan_blu_BetaPic_0001	0.2744	OD 146
	4 legs, 4' length, 15" sep., 4 reps.	PVPhotAOTVal_514O_StdScan_grn_BetaPic_0001	0.2744	OD 146
	inst. ref. w 90° orientation	PVPhotAOTVal_514O_StdScan_blu_NGC6543_0001	0.4725	
	20 legs, 15' length, 51" sep., 1 rep.	PVPhotAOTVal_514O_StdScan_grn_NGC6543_0001	0.4725	
	inst. ref. w 45/135° orientation	PVPhotAOTVal_514O_StdScan_blu_NGC5315_0001	0.4725	
	20 legs, 15' length, 51" sep., 1 rep	PVPhotAOTVal_514O_StdScan_blu_NGC5315_ortho_0001	0.4725	
		PVPhotAOTVal_514O_StdScan_grn_NGC5315_0001	0.4725	
	blue & green filter	PVPhotAOTVal_514O_StdScan_grn_NGC5315_ortho_0001	0.4725	
P	minimap point source photometry prototype	PVPhotAOTVal_514P_StdScan63_grn_HIP7978_0001	0.4022	OD 191
	comparison with SDP chopped observations	PVPhotAOTVal_514P_StdScan117_grn_HIP7978_0001	0.4022	OD 191
	standard scan map, green filter	PVPhotAOTVal_514P_StdScan63_grn_J1148_0001	0.5792	OD 191
	inst. ref. w 63/117° orientation	PVPhotAOTVal_514P_StdScan63_8legs_grn_HIP15371_01	0.2236	OD 191
	optimized for point source observations	PVPhotAOTVal_514P_StdScan117_8legs_grn_HIP15371_01	0.2236	OD 191
	optimization of map parameters:	PVPhotAOTVal_514P_StdScan117_grn_J1148_0001	0.5792	OD 191
	6(8) legs, 3.9' length, 5" separation	PVPhotAOTVal_514P_StdScan63_6legs_grn_gamDra_0001	0.1347	OD 191
		PVPhotAOTVal_514P_StdScan117_6legs_grn_gamDra_0001	0.1347	OD 191
	8 legs, 3.9' length, 4" separation	PVPhotAOTVal_514P_StdScan63_8legs_grn_gamDra_0001	0.1347	OD 191
		PVPhotAOTVal_514P_StdScan117_8legs_grn_gamDra_0001	0.1347	OD 191
	8 legs, 3' length, 4" separation	PVPhotAOTVal_514P_StdScan63_8legs3_grn_gamDra_0001	0.1281	OD 191
		PVPhotAOTVal_514P_StdScan117_8legs3_grn_gamDra_0001	0.1281	OD 191
	16 legs, 3.9' length, 2" separation	PVPhotAOTVal_514P_StdScan63_16legs_grn_gamDra_0001	0.2236	OD 191
		PVPhotAOTVal_514P_StdScan117_16legs_grn_gamDra_0001	0.2236	OD 191
	16 legs, 3' length, 2" separation	PVPhotAOTVal_514P_StdScan63_16legs3_grn_gamDra_001	0.2103	OD 191
		PVPhotAOTVal_514P_StdScan117_16legs3_grn_gamDra_001	0.2103	OD 191

6.15 Straylight Assessment using SPIRE/PACS Parallel Mode

The Herschel Straylight Working Group performed a ray tracing simulation with the Advanced System Analysis Program software (ASAP, by Breault Reserach Organization) to predict the relative intensity of the straylight depending on the relative angular offset of the straylight source. A graphical overview of the results highlighting the brightest straylight features is shown in Fig. 79.

Table 83 provides the angular position of each starylight feature and its relative intensity which has to be scaled with the nominal intensity of the straylight source per beam for an absolute flux estimate.

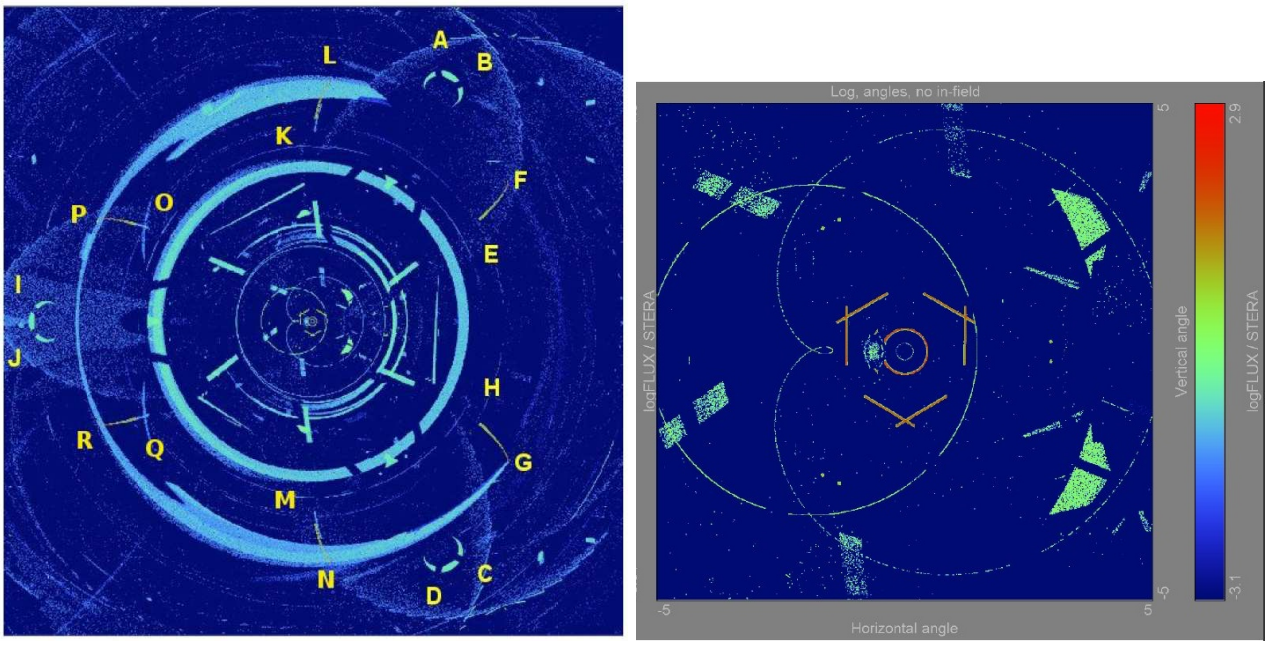


Figure 79: Left: Relative intensity of the Herschel telescope straylight in logarithmic representation. The display is in cosine space out to an angle of 33°. The satellite Z axis (Sun direction) is oriented horizontally (Sun position at 90°, outside the displayed field-of-view to the right), while the Y axis is oriented vertically. The brightest straylight features with relative intensities between 10^{-5} and 10^{-3} are labelled by letters. Detailed locations and expected relative intensities are given in Table 83. Right: Zoomed view of the inner 5° for the central straylight features.

The calibration strategy was to try to verify a few of the brightest straylight spots predicted by the ASAP ray tracing simulation by measurements, if possible in parallel mode to prove the concept both for PACS and SPIRE. Scan maps were designed to have sizes of $2^o \times 2^o$. Since the minimum distance between 2 scan legs in parallel mode is $155''$, several slightly offset scan maps were executed to provide the proper sampling of the stray area. Boresight coordinates with the correct relative angular offset to one of the envisaged straylight areas were calculated by spherical geometry and applying the angular offset values of Table 83. The proper motion of the SSO straylight source during the whole measurement duration was taken into account when calculating the central positions of the map sequence.

A measurement verifying straylight by the Moon in spot F was performed wit PACS only and is described in Sect. 6.13.

Table 83: Angular offset and relative intensity of the stray-light areas as labeled in Fig. 79 relative to the boresight pointing of the PACS and SPIRE instruments. The value b is the component of a unit vector on the Y-axis of the Herschel satellite and the value c that on the Z-axis of the satellite. The latter one is the direction of the Sun vector. b and c are converted into an angle by calculating the arcsin of the value. The last column gives the relative intensity of the stray-light wrt. the source intensity when imaged via the nominal optical path.

Zone	PACS b	PACS c	SPIRE b	SPIRE c	rel. intensity
A	0.462	0.242	0.457	0.245	$\approx 1.5 \times 10^{-3}$
B	0.443	0.275	0.437	0.278	$\approx 1.5 \times 10^{-3}$
C	-0.445	0.275	-0.437	0.278	$\approx 1.5 \times 10^{-3}$
D	-0.463	0.243	-0.457	0.245	$\approx 1.5 \times 10^{-3}$
E	0.147	0.307	0.141	0.309	$\approx 2.6 \times 10^{-4}$
F	0.238	0.346	0.231	0.344	$\approx 1.0 - 1.8 \times 10^{-5}$
G	-0.240	0.346	-0.231	0.344	$\approx 1.0 - 1.8 \times 10^{-5}$
H	-0.150	0.307	-0.141	0.309	$\approx 2.5 \times 10^{-4}$
I	0.017	-0.516	0.016	-0.521	$\approx 1.5 \times 10^{-3}$
J	-0.021	-0.516	-0.021	-0.521	$\approx 1.5 \times 10^{-3}$
K	0.335	-0.029	0.342	-0.027	$\approx 3.0 \times 10^{-4}$
L	0.421	0.033	0.419	0.038	$\approx 1.0 - 1.8 \times 10^{-5}$
M	-0.335	-0.029	-0.342	-0.027	$\approx 3.3 \times 10^{-4}$
N	-0.421	0.033	-0.419	0.038	$\approx 1.0 - 1.8 \times 10^{-5}$
O	0.198	-0.279	0.192	-0.277	$\approx 2.6 \times 10^{-4}$
P	0.177	-0.381	0.181	-0.383	$\approx 1.0 - 1.8 \times 10^{-5}$
Q	-0.198	-0.279	-0.192	-0.277	$\approx 2.5 \times 10^{-4}$
R	-0.177	-0.381	-0.181	-0.383	$\approx 1.0 - 1.8 \times 10^{-5}$

Table 84: Visibilities of the targets used in the PVParStray proposal.

Target	Start	End
Mars telescope boresight (OD 137)	13-Sep-2009	13-Nov-2009
strayZone_I_on_Jupiter_OD136	08-Sep-2009	12-Nov-2009
strayZone_E_on_Jupiter_OD214	13-Dec-2009	13-Dec-2009

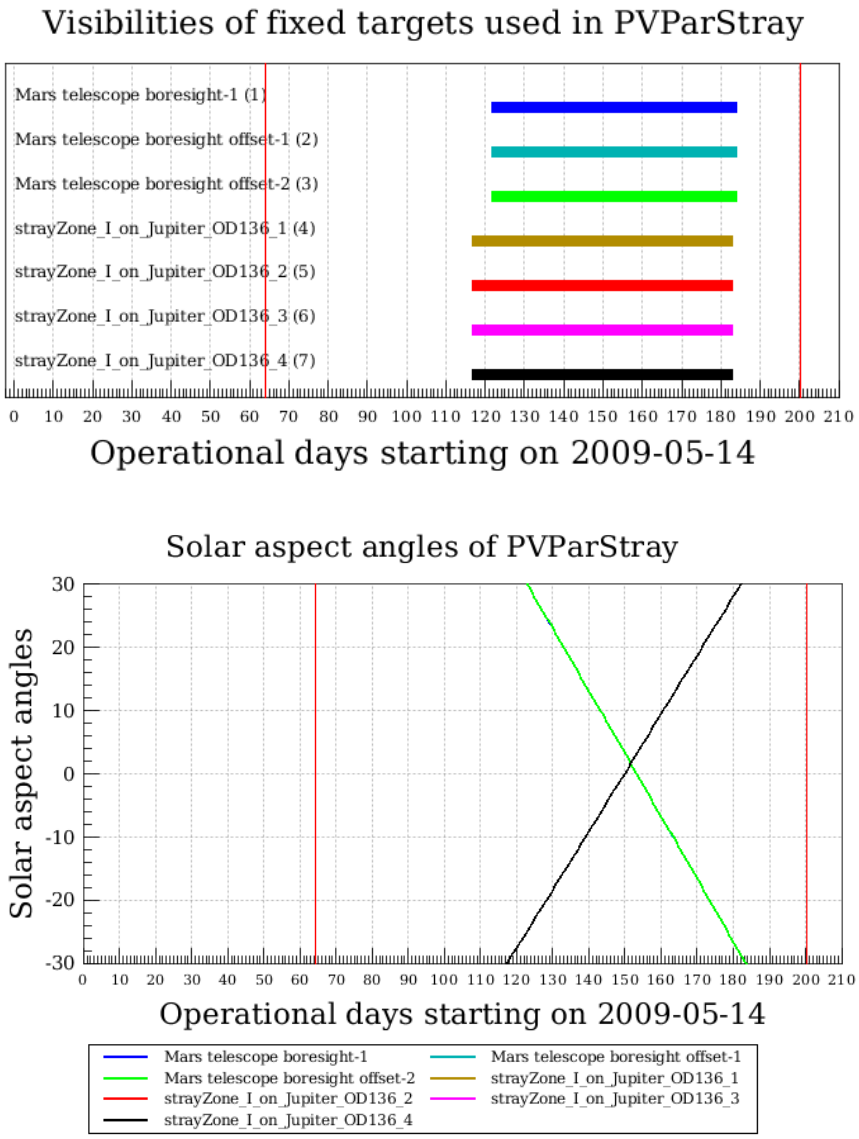


Figure 80: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVParStray proposal.

Table 85: Observational details of the SPIRE/PACS parallel straylight assessment. The total estimated time is 35.2 h.

ID: PVParStray						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
	3.1.6 Photometer straylight					
A	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings	AOT	3.2	central map + 2 offset maps for proper sampling of central $2^o \times 2^o$ around telescope boresight only PACS blue filter	9.6	Mars
	7.3.4 Out-of-field straylight					
A	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings	AOT	3.2	4 maps offset by ≈39″ for proper sampling of straylight zone only PACS blue filter	12.8	Jupiter in straylight spot I relative to pointing position
	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings		3.2	4 maps offset by ≈39″ for proper sampling of straylight zone only PACS blue filter	12.8	Jupiter in straylight spot E relative to pointing position
	Target position has to be calculated with spherical geometry so that stray-light source is located in one of the offset stray-light spots					

Table 86: Summary of AORs for the SPIRE/PACS parallel straylight assessment. The total scheduled time is 34.2958 h.

ID: PVParStray				
	Measurement description	AOR labels	duration (h)	observing constraints
		3.1.6 Photometer straylight		
A	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings PACS blue filter	PVParStray_316A_TFOV_blu2dx2d_centre_Mars_OD137 PVParStray_316A_TFOV_blu2x2d_centre_Mars_off1_OD137 PVParStray_316A_TFOV_blu2x2d_centre_Mars_off2_OD137	3.1178 3.1178 3.1178	OD 137 OD 137 OD 137
		7.3.4 Out-of-field straylight		
A	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings PACS blue filter	PVParStray_734A_FSpot_blu2dx2d_OD136_1_0001 PVParStray_734A_FSpot_blu2dx2d_OD136_2_0001 PVParStray_734A_FSpot_blu2dx2d_OD136_3_0001 PVParStray_734A_FSpot_blu2dx2d_OD136_4_0001	3.1178 3.1178 3.1178 3.1178	OD 136 OD 136 OD 136 OD 136
		Jupiter was located in straylight spot I!		
	standard parallel mode photometry scan speed 60″/*s* (high) 120'×120' bright source settings PACS blue filter	PVParStray_734A_ESpot_blu2dx2d_OD214_1_0001 PVParStray_734A_ESpot_blu2dx2d_OD214_2_0001 PVParStray_734A_ESpot_blu2dx2d_OD214_3_0001 PVParStray_734A_ESpot_blu2dx2d_OD214_4_0001	3.1178 3.1178 3.1178 3.1178	OD 214 OD 214 OD 214 OD 214
Target position has to be calculated with spherical geometry so that stray-light source is located in one of the offset stray-light spots				

6.16 AOT Validation SPIRE/PACS Parallel Mode

This test block comprises the check-out and scientific validation of the SPIRE/PACS parallel AOT mode. It also addresses optimisation of certain AOT parameters which could not be completely optimised on ground. The overview of the foreseen measurements is given in Table 88.

Table 87: Visibilities of the targets used in the PVParAOTVal proposal.

Target	Start	End
β UMi	always visible	
NGC 6946	always visible	
Lockman Hole	25-Sep-2009	24-Dec-2009
Draco Cloud	always visible	
Hi-GAL field (GP field-1/Galactic Centre)	20-Aug-2009	20-Oct-2009
Sgr B2	20-Aug-2009	20-Oct-2009
NEP_PV-1-19 (IRAS 17517+6422)	always visible	
GP field 40Hz-1-2-1 (IRAS 18232-1154)	29-Aug-2009	30-Oct-2009

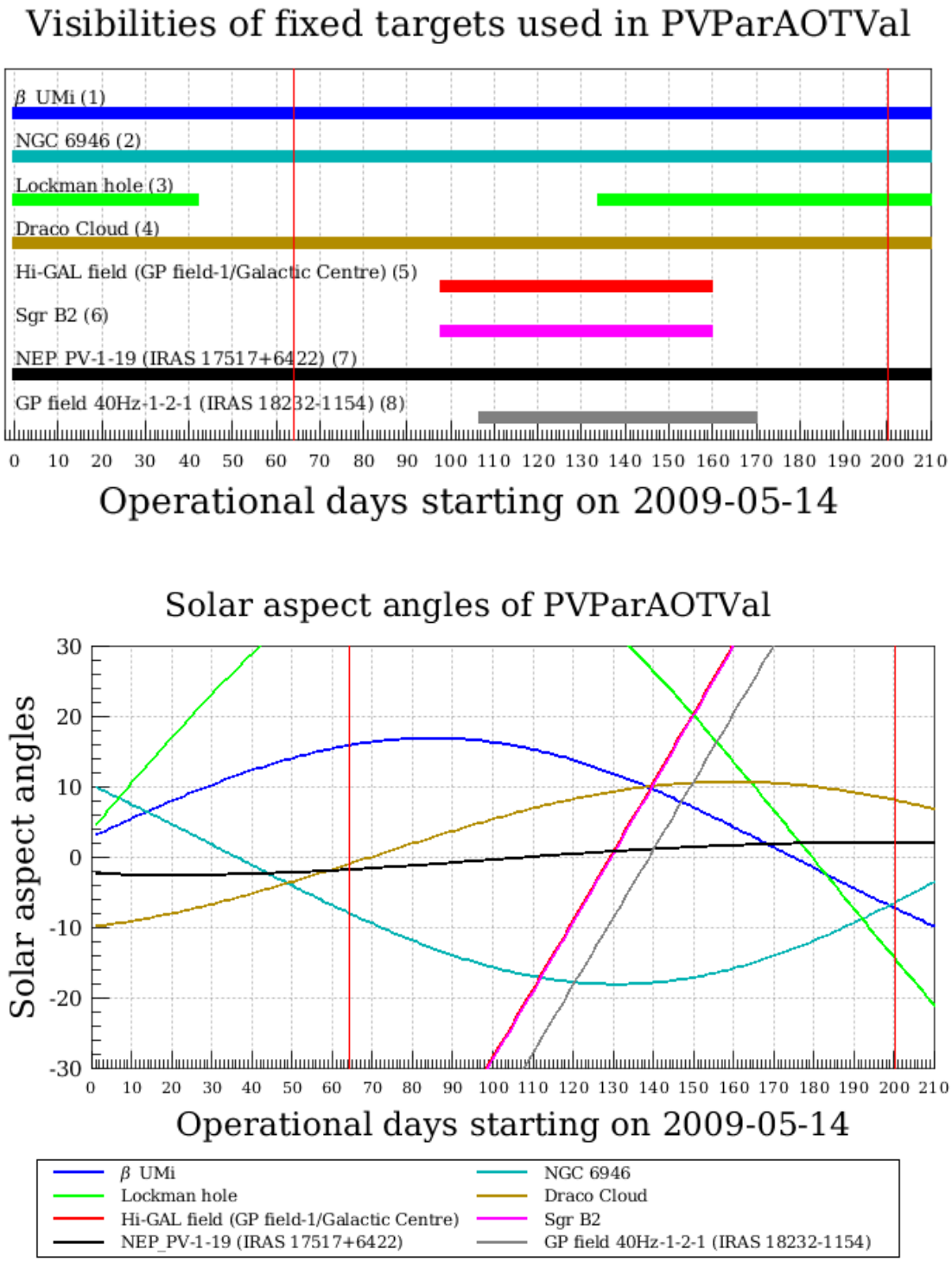


Figure 81: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVParAOTVal proposal.

Table 88: Observational details of parallel mode AOT validation. Default settings in non-standard observations are high-lighted in bold face. The total estimated time for PACS parallel mode exploration is 42.6 h.

ID: PVParAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.5 Optimised Observing Strategy for SPIRE/PACS Parallel Mode						
A	standard parallel mode photometry consistency with ps photometry PSF reconstruction 30'×30' scan speed 20"/s scan speed 60"/s single coverage	AOT	 1.15 0.65	2 blue filters 2 scan speeds 20"/s, 60"/s	3.6	fiducial stars Sect. 4.1.1
B	standard parallel mode photometry structure resolution/dynamic range 30'×30' scan speed 20"/s scan speed 60"/s(3×) orthogonal coverage	AOT	 1.15 0.65	1 blue filter 2 map orientations comparison: slow speed vs. 3× fast speed	6.2	NGC 6946
C	standard parallel mode photometry structure resolution/dynamic range 1° × 1° scan speed 60"/s orthogonal coverage	AOT	1.3	1 blue filter 2 map orientations 2 areas (1 incl. asteroid calibrator 2×)	7.8	Galactic Plane Hi-GAL fields 372 Palma
D	standard parallel mode photometry very large scan map on extended galactic structure 2° × 2° scan speed 60"/s orthogonal coverage 30'×30' scan speeds 20"/s vs. 60"/s only nominal scan direction	AOT	 3.3 1.15/0.65	 1 blue filter 2 map orientations comparison slow vs. fast speed 1 map orientation	8.4	Draco Cloud map centre: RA = 16:45:00 DEC = +60:12:00
E	standard parallel mode photometry noise behaviour in empty fields 1°×1° scan speed 20"/s orthogonal coverage	AOT	1.2	1 blue filter 2 map orientations 2 repetitions	4.8	cosmological field Lockman Hole

Table 88: continued. Observational details of parallel mode AOT validation.

ID: PVParAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.1.5 Optimised Observing Strategy for SPIRE/PACS Parallel Mode						
F	non-standard parallel mode photometry different SPU sampling mode 1°×1° scan speed 60”/s orthogonal coverage	CUS	1.3	1 blue filter e.g. average 1–4 out of 8 frames instead of all 8 2 map orientations	2.6	Hi-GAL field
G	non-standard parallel mode photometry 40 Hz TM transmission 40’×40’ scan speed 60”/s orthogonal coverage	CUS	0.85	1 blue filter 2 map orientations	1.7	Galactic Plane field, same as C
H	standard parallel mode photometry extreme rectangular maps side ratio (20:1) 600’×30’ scan speed 60”/s orthogonal coverage	AOT	3.75	1 blue filter 2 map orientations	7.5	North Ecliptic Pole

Table 89: Summary of AORs for the SPIRE/PACS parallel AOT validation. The total scheduled time (without AORs provided by SPIRE ICC) is 36.5488 h.

ID: PVParAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.5 Optimised Observing Strategy for SPIRE/PACS Parallel Mode				
A	standard parallel mode photometry 30'×30' scan speed 20"/s (slow) scan speed 60"/s (fast)	PVParAOTVal_515A_StdPar_blu_fast_betaUMi_0001 PVParAOTVal_515A_StdPar_grn_fast_betaUMi_0002 PVParAOTVal_515A_StdPar_blu_slow_betaUMi_0003 PVParAOTVal_515A_StdPar_grn_slow_betaUMi_0004	0.6489 0.6489 1.1367 1.1367	OD 111 OD 111 OD 111 OD 111
B	standard parallel mode photometry 30'×30' incl. orthogonal coverage comparison: scan speed 20"/s vs. 3× scan speed 60"/s	PVParAOTVal_515B_StdPar_blu_slow_NGC6946_0001_30x30_nom PVParAOTVal_515B_StdPar_blu_slow_ortho_NGC6946_0002_30x30 PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0001 PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0001 PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0002 PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0002 PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0003 PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0003	1.1367 1.1367 0.6489 0.6489 0.6489 0.6489 0.6489 0.6489	OD 111 OD 111 OD 111 OD 111 OD 111 OD 111 OD 111 OD 111
C	standard parallel mode photometry 1° × 1° scan speed 60"/s orthogonal coverage	PVParAOTVal_515C_StdPar_blu_fast_GP_0001_60x60_nom PVParAOTVal_515C_StdPar_blu_fast_ortho_G_0002_60x60 PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma136_nom PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma136_orth PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma137_nom PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma137_orth	1.2772 1.2772 1.2786 1.2786 1.2786 1.2786	OD 112 OD 112 OD 137 OD 137
D	standard parallel mode photometry 2° × 2° scan speed 60"/s orthogonal coverage 30'×30' scan speeds 20"/s vs. 60"/s only nominal scan direction	PVParAOTVal_515D_StdPar_blu_fast_Draco_0001_120x120_nom PVParAOTVal_515D_StdPar_blu_fast_ortho_Draco_0002_120x120 PVParAOTVal_515D_StdPar_blu_slo_Draco_0001_30x30_nom PVParAOTVal_515D_StdPar_blu_fast_Draco_0001_30x30_nom	3.1136 3.1136 1.1367 0.6489	OD 111 OD 111 OD 111 OD 112
E	standard parallel mode photometry 1°×1° scan speed 20"/s orthogonal coverage	PVParAOTVal_515E_StdPar_30_blu_slow_Lockman_01 PVParAOTVal_515E_StdPar_30_blu_slow_Lockman_02 PVParAOTVal_515E_StdPar_30_blu_slow_orth_Lockman_01 PVParAOTVal_515E_StdPar_30_blu_slow_orth_Lockman_02 PVParAOTVal_515E_StdPar_60_blu_slow_Lockman_01 PVParAOTVal_515E_StdPar_60_blu_slow_orth_Lockman_01	1.1394 1.1394 1.1394 1.1394 2.6003 2.6003	OD 137 OD 137 OD 137 OD 137

Table 90: Summary of AORs for the SPIRE/PACS parallel AOT validation.

ID: PVParAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.1.5 Optimised Observing Strategy for SPIRE/PACS Parallel Mode				
F	non-standard parallel mode photometry different SPU sampling mode $1° \times 1°$ scan speed 60”/s orthogonal coverage	PVParAOTVal_515F_nStdParCmp_blu_fast_GAL_0001 PVParAOTVal_515F_nStdParCmp_blu_fast_ortho_GAL_0002	1.2786 1.2786	
G	non-standard parallel mode photometry 40 Hz TM transmission 40’×40’ scan speed 60”/s orthogonal coverage	PVParAOTVal_515G_StdPar_blu_fast_GP_40Hz_40x40_nom PVParAOTVal_515G_StdPar_blu_fast_GP_40Hz_ort_40x40	0.8361 0.8361	OD 112 OD 112
H	standard parallel mode photometry 600’×30’ scan speed 60”/s orthogonal coverage	PVParAOTVal_515H_StdPar_blu_fast_LongScanVal_ortho_600x30 PVParAOTVal_515H_StdPar_blu_fast_LongScanVal_600x30_nom	3.7283 3.7283	OD 112 OD 112
I	SPIRE ICC AORs comparison slow/fast on dark sky 30’×30’ scan & cross-scan $2° \times 2°$ fast scan & cross-scan	SPParallel-30x30_nom_fast_darksky SPParallel-30x30_ortho_fast_darksky SPParallel-30x30_ortho_slow_darksky SPParallel-30x30_nom_slow_darksky SPPara-Nom-GP-299_0_120x120_fast SPPara-Orth-GP-299_0_120x120_fast SPParallel - Sgr B2 - Nominal SPParallel - Sgr B2 - Ortho SPParallel-Field 180_0 Orth SPParallel-Field_180_0 Nom	*0.6489* *0.6489* *1.1367* *1.1367* *3.1136* *3.1136* *3.1203* *3.1203* *0.8086* *0.8086*	OD 111 OD 111 OD 111 OD 111 OD 112 OD 112 OD 136 OD 136

6.17 Spectrometer SPU Settings

This test block deals with the optimisation and checkout of different settings of the signal processing unit (SPU) of the spectrometer. The SPU was configured according to specified entries in the CALU table CONF_SPEC_param. Table 91 shows an excerpt of this CALU table with the affected rows and columns.

Table 91: SPU parameter variation in CALU table CONF_SPEC_param for spectrometer SPU settings test. nb_rd: number of read-outs per ramp; nb_sub: number of read-outs per subramp; rmp_f: ramp fitting algorithm, 0 = ramp fitting, 1 = average of subramp; rndb: number of bits to round; dpre: number of samples discarded at the beginning of the ramp; dpost: number of samples discarded at the end of the ramp. For all combinations the default compression mode is applied.

RowName	nb_rd	nb_sub	rmp_f	rndb	dpre	dpost
PVSpecSPU_1RED	64	16	1	0	0	0
PVSpecSPU_1BLU	64	16	1	0	0	0
PVSpecSPU_2RED	32	32	0	0	0	0
PVSpecSPU_2BLU	32	32	0	0	0	0
PVSpecSPU_3RED	64	64	0	0	0	0
PVSpecSPU_3BLU	64	64	0	0	0	0
PVSpecSPU_4RED	64	16	1	1	0	0
PVSpecSPU_4BLU	64	16	1	1	0	0
PVSpecSPU_6RED	64	8	1	1	0	0
PVSpecSPU_6BLU	64	8	1	1	0	0
PVSpecSPU_9RED	64	15	1	0	3	1
PVSpecSPU_9BLU	64	15	1	0	3	1

Table 92: Visibilities of the targets used in the PVSpecSPU proposal.

Target	Start	End
NGC 5315	27-Jun-2009	11-Oct-2009

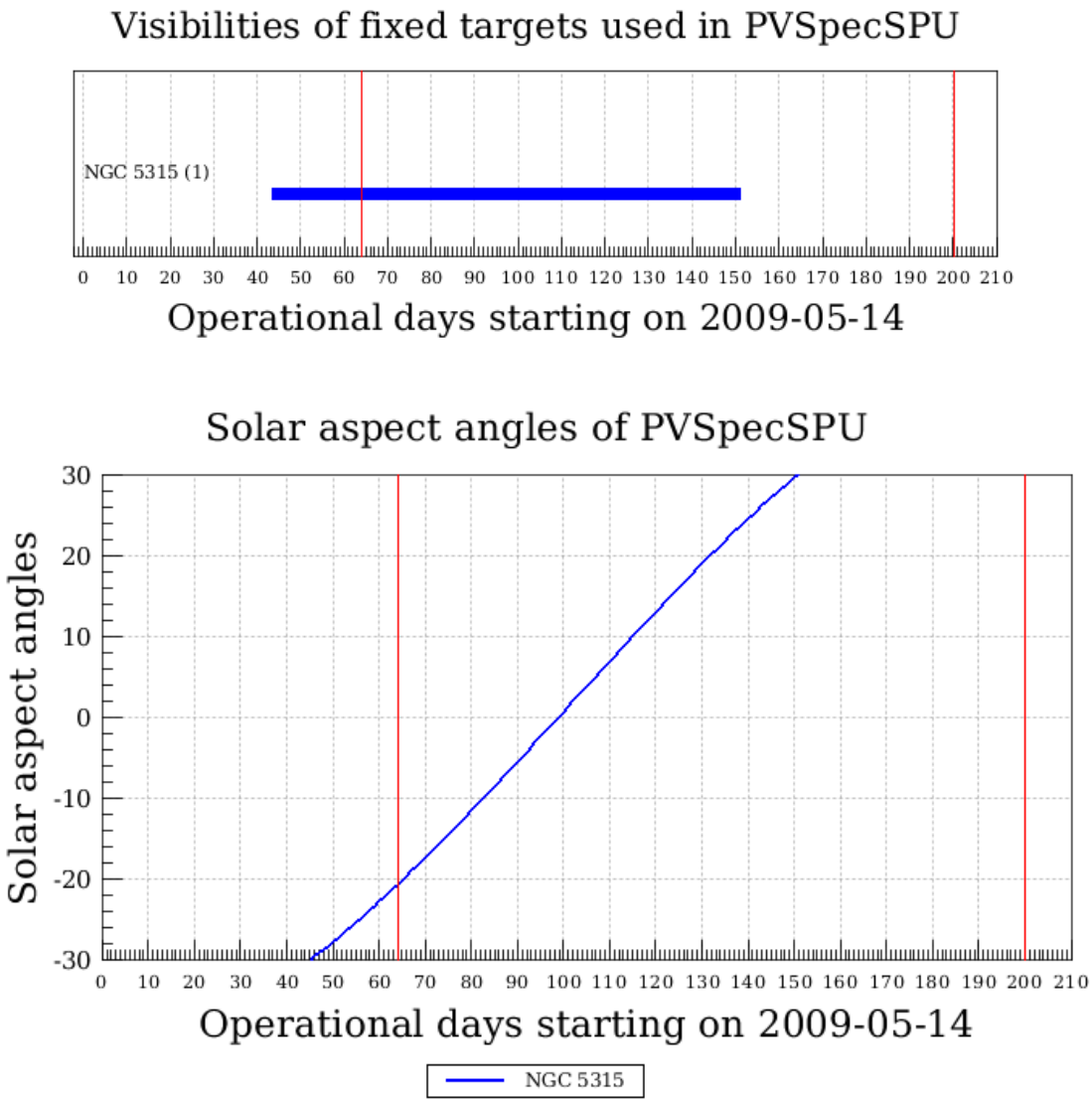


Figure 82: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVSpecSPU proposal.

Table 93: Observational details of spectrometer SPU setting checkout. Default settings in non-standard observations are high-lighted in bold face. The total estimated time for this test block is 2.4 h.

ID: PVSpecSPU						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.2.21 On-board software processing spectrometer						
A	non-standard chop/nodd line spectroscopy faint line mode large chopper throw reduction mode: ramp average	CUS	0.125	2 lines: 2nd ([OIII]88 µm) order and 1st ([CII]157 µm) order 6 SPU parameter sets, according to scenario in Table 91	1.5	PNe
A	non-standard wave switching line spectroscopy, faint line mode 2×1 raster, 4" step size +reference off-position reduction mode: ramp average	CUS	0.15	2 lines: 2nd ([OIII]88 µm) order and 1st ([CII]157 µm) order 3 SPU parameter sets, according to scenario in Table 91	0.9	PNe

Table 94: Summary of AORs for the spectrometer SPU checkout. The total scheduled time is 2.2526 h.

ID: PVSpecSPU				
	Measurement description	AOR labels	duration (h)	observing constraints
	1.2.21 On-board software processing spectrometer			
A	non-standard chop/nod line spectroscopy faint line mode reduction mode: ramp average large chopper throw SPU set-up according to scenario in Table 91			
	PVSpecSPU_1, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_01a1_NGC5315_0001	0.1278	OD 79
	PVSpecSPU_1, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_01a2_NGC5315_0001	0.1242	OD 79
	PVSpecSPU_2, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_02a1_NGC5315_0001	0.0961	OD 79
	PVSpecSPU_2, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_02a2_NGC5315_0001	0.0942	OD 79
	PVSpecSPU_3, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_03a1_NGC5315_0001	0.1278	OD 79
	PVSpecSPU_3, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_03a2_NGC5315_0001	0.1242	OD 79
	PVSpecSPU_4, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_041_NGC5315_0001	0.1278	OD 79
	PVSpecSPU_4, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_042_NGC5315_0001	0.1242	OD 79
	PVSpecSPU_6, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_061_NGC5315_0001	0.1278	OD 79
	PVSpecSPU_6, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_062_NGC5315_0001	0.1242	OD 79
	PVSpecSPU_9, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_091_NGC5315_0001	0.1278	OD 79
	PVSpecSPU_9, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_092_NGC5315_0001	0.1242	OD 79
A	non-standard wave switching line spectroscopy, faint line mode 2×1 raster, 4” step size +reference off-position reduction mode: ramp average SPU set-up according to scenario in Table 91			
	PVSpecSPU_1, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_01b1_NGC5315_0001	0.1469	OD 91
	PVSpecSPU_1, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_01b2_NGC5315_0001	0.1472	OD 91
	PVSpecSPU_2, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_02b1_NGC5315_0001	0.1069	OD 91
	PVSpecSPU_2, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_02b2_NGC5315_0001	0.1072	OD 91
	PVSpecSPU_3, [OIII]88 µm	PVSpecSPU_1221A_NstdLineSpec_03b1_NGC5315_0001	0.1469	OD 91
	PVSpecSPU_3, [CII]157 µm	PVSpecSPU_1221A_NstdLineSpec_03b2_NGC5315_0001	0.1472	OD 91

6.18 GeGa Settings/Characterization V

This test block deals with the further characterization of the GeGa detectors after settling the operational strategy in Commissioning Phase. It addresses dark signal assessment of the detector read-out chain as well as saturation levels and ramp linearity of the CREs.

The overview of the foreseen measurements is given in Table 96.

Table 95: Visibilities of the targets used in the PVSpecGeGa proposal.

Target	Start	End
Arp 220	24-Jun-2009	18-Sep-2009
NGC 7027	14-May-2009	03-Aug-2009
	02-Oct-2009	31-Jan-2010
γ Cru	09-Jun-2009	18-Sep-2009
ISOPHOT Dark Field	always visible	
Saturn	25-Nov-2009	24-Jan-2010
Uranus	15-Nov-2009	14-Jan-2010

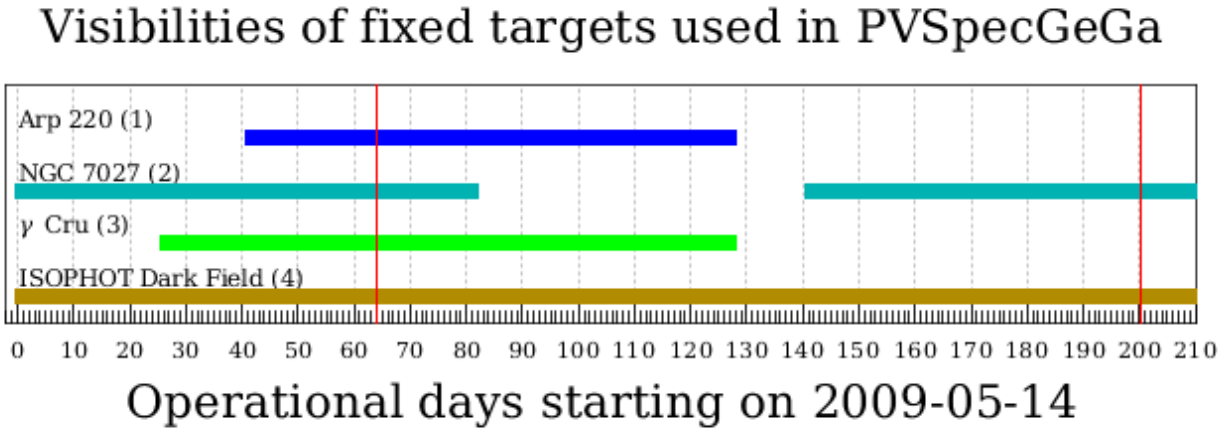


Figure 83: Visibilities of the fixed targets used for the AORs of the PVSpecGeGa proposal.

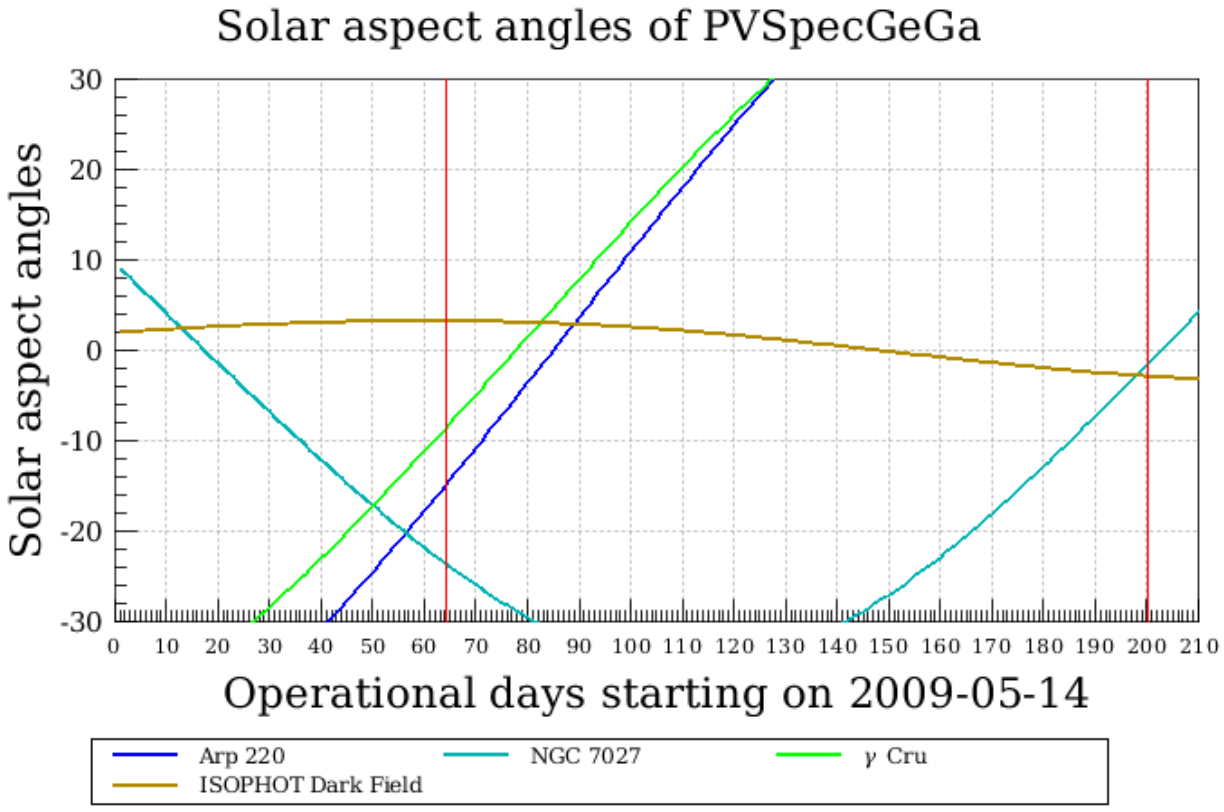


Figure 84: Solar aspect angles of the fixed targets used for the AORs of the PVSpecGeGa proposal.

Table 96: Observational details of the GeGa detector settings and characterization V. The total estimated time of this test block is 23.0 h.

ID: PVSpecGeGa						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
1.2.3 Dynamic range per selected integration capacitor *1.2.11 Linearity of CRE read-out*						
A	staring measurement at 5 grating positions lossless compression mode 16 blue/red pixels, raw ramps 1/4, 1/8 s reset interval 4 C_{int}, 80 ramps per C_{int}	CUS	0.50	pointings for 5 spatial pixels (selection tables: 7, 9, 13, 17, 19) ($\leq$2 per supply group and central) 5 targets (covering dynamic range)	13.0	Saturn Uranus Arp 220 / NGC 7027 HD 108903 (γ Cru)
B	staring measurement at 5 grating positions buffer transmission mode (raw) chopper deflected to CS1 1/4 s reset interval 4 C_{int}, 80 ramps per C_{int}	CUS	2.15	2 CS temperatures (at and above nominal T)	4.3	dark sky field Sect. 4.5
1.2.6 Detector Dark Current *1.2.22 Electrical Cross Talk*						
A	dark measurement on cold CS1 staring on cold CS1 buffer transmission mode (raw) 2 s ramps, 10 ramps in total	CUS	0.5	one CS both blue orders (straylight aspects) 2 repetitions	1.7	dark sky field Sect. 4.5
B	dark measurement on cold CSs staring/chopping on CSs at low and high response of RSRF + measurement on CSs during warm-up for fixed filter/grating position	CUS	 4.0 3.1	both CSs either sequential (staring) or simultaneous (chopping)	4.0	dark sky field

Table 97: Summary of AORs of GeGa setting characterization. The total scheduled time is 14.8271 h.

ID: PVSpecGeGa				
	Measurement description	AOR labels	duration (h)	observing constraints
	1.2.3 Dynamic range per selected integration capacitor *1.2.11 Linearity of CRE read-out*			
A	staring measurement	PVSpecGeGa_123A_nStd_LLC_pilot07_Arp220_0001	0.2400	OD 79
	at five grating positions	PVSpecGeGa_123A_nStd_LLC_pilot07_Arp220off_0001	0.2400	OD 79
	lossless compression mode (raw)	PVSpecGeGa_123A_nStd_BTM_pilot07_Arp220_0001	0.2350	OD 102
	1/4, 1/8 s reset intervals	PVSpecGeGa_123A_nStd_BTM_pilot09_Arp220_0001	0.2350	OD 102
	4 C_{int}, 80 ramps	PVSpecGeGa_123A_nStd_BTM_pilot17_Arp220_0001	0.2350	OD 102
	centering on and read-out of selected pixel	PVSpecGeGa_123A_nStd_BTM_pilot19_Arp220_0001	0.2350	OD 102
	(detector selection tables)	PVSpecGeGa_123A_nStd_BTM_pilot07_Mars_0001	0.2378	OD 142
	pilot measurements in buffer transmission	PVSpecGeGa_123A_nStd_BTM_pilot09_Mars_0001	0.2378	OD 142
		PVSpecGeGa_123A_nStd_BTM_pilot17_Mars_0001	0.2378	OD 142
		PVSpecGeGa_123A_nStd_BTM_pilot19_Mars_0001	0.2378	OD 142
		PVSpecGeGa_123A_nStd_LLC_p07_Arp220_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p09_Arp220_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p13_Arp220_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p17_Arp220_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p19_Arp220_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p07_NGC7027_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p09_NGC7027_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p13_NGC7027_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p17_NGC7027_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p19_NGC7027_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p07_gamCru_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p09_gamCru_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p13_gamCru_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p17_gamCru_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p19_gamCru_0001	0.4956	
		PVSpecGeGa_123A_nStd_LLC_p07_Saturn_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p09_Saturn_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p13_Saturn_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p17_Saturn_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p19_Saturn_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p07_Uranus_0001	0.4983	
		PVSpecGeGa_123A_nStd_LLC_p09_Uranus_0001	0.4983	OD 195
		PVSpecGeGa_123A_nStd_LLC_p13_Uranus_0001	0.4983	OD 195
		PVSpecGeGa_123A_nStd_LLC_p17_Uranus_0001	0.4983	OD 195
		PVSpecGeGa_123A_nStd_LLC_p19_Uranus_0001	0.4983	OD 195

Table 97: continued. Summary of AORs of GeGa setting characterization.

ID: PVSpecGeGa				
	Measurement description	AOR labels	duration (h)	observing constraints
	1.2.3 Dynamic range per selected integration capacitor *1.2.11 Linearity of CRE read-out*			
B	staring measurement	PVSpecGeGa_123B_nStd_BuffTM_highCS1_Dark_0001	2.1511	OD 142
	buffer transmission mode (raw)	PVSpecGeGa_123B_nStd_BuffTM_highCS2_Dark_0001	2.1511	
	chopper deflected to CS1 or CS2	PVSpecGeGa_123B_nStd_BuffTM_lowCS1_Dark_0001	2.1536	OD 64
	1/4 s reset interval	PVSpecGeGa_123B_nStd_BuffTM_lowCS1_Dark_0002	2.1511	
	2 CS1/2 temperatures	PVSpecGeGa_123B_nStd_BuffTM_lowCS2_Dark_0001	2.1511	OD 140
	1.2.6 Detector Dark Current			
A	dark current measurement on cold CS1	PVSpecGeGa_126A_nStd_darkcurrent_blue_na_0001	0.4325	OD 78
	staring on cold CS1	PVSpecGeGa_126A_nStd_darkcurrent_blue_na_0002	0.4300	
	buffer transmission mode (raw)	PVSpecGeGa_126A_nStd_darkcurrent_green_na_0001	0.4325	OD 78
	2 s ramps, 10 ramps in total	PVSpecGeGa_126A_nStd_darkcurrent_green_na_0002	0.4300	
B	dark measurement on cold CSs	PVSpecGeGa_126B_nStd_Dark_CSSequenWarmUp_Dark_0001	4.0047	
	staring/chopping on CSs	PVSpecGeGa_126B_nStd_Dark_CSSimultWarmUp_Dark_0001	3.1419	OD 78
	at low and high response of RSRF			
	+ measurement on CSs			
	during warm-up for fixed			
	filter/grating position			
	both AORs are optional: use only one of them			

6.19 Spectrometer Wavelength Calibration

This test block deals with one aspect of the spectral characterisation and calibration of the spectrometer camera, namely its wavelength calibration.

The goal is the verification and, if necessary, refinement of the wavelength calibration achieved during the ground tests. It should be noted that a wavelength calibration measurement on Jupiter allows the simultaneous calibration of all 25 spatial pixels. This means that the calibration can be achieved 25 times faster than performing it with a point-like calibrator. Observations of Jupiter require a non-standard bias setting of the spectrometer camera in order to reduce the sensitivity for the extremely bright source. This justifies a short exploration measurement to trim the settings, which will still save a considerable amount of time with regard to a raster measurement. If Jupiter were not visible during the PV phase proper, the wavelength verification should be done with another suitable source for the central pixel and the relative calibration of the 25 spatial pixels should be deferred to a visibility window of Jupiter.

The overview of the foreseen measurements is given in Tables 99.

Table 98: Visibilities of the targets used in the PVSpecWave proposal.

Target	Start	End
R Cas	31-May-2009	17-Sep-2009
W Hya	26-Jun-2009	30-Aug-2009
NGC 40	always visible	
NGC 6302	12-Aug-2009	15-Oct-2009
IC 2501	always visible	
Mars	19-Aug-2009	11-Dec-2009
Jupiter	10-Oct-2009	14-Dec-2009
Saturn	25-Nov-2009	24-Jan-2010
Uranus	15-Nov-2009	14-Jan-2010
Neptune	17-Oct-2009	15-Dec-2009

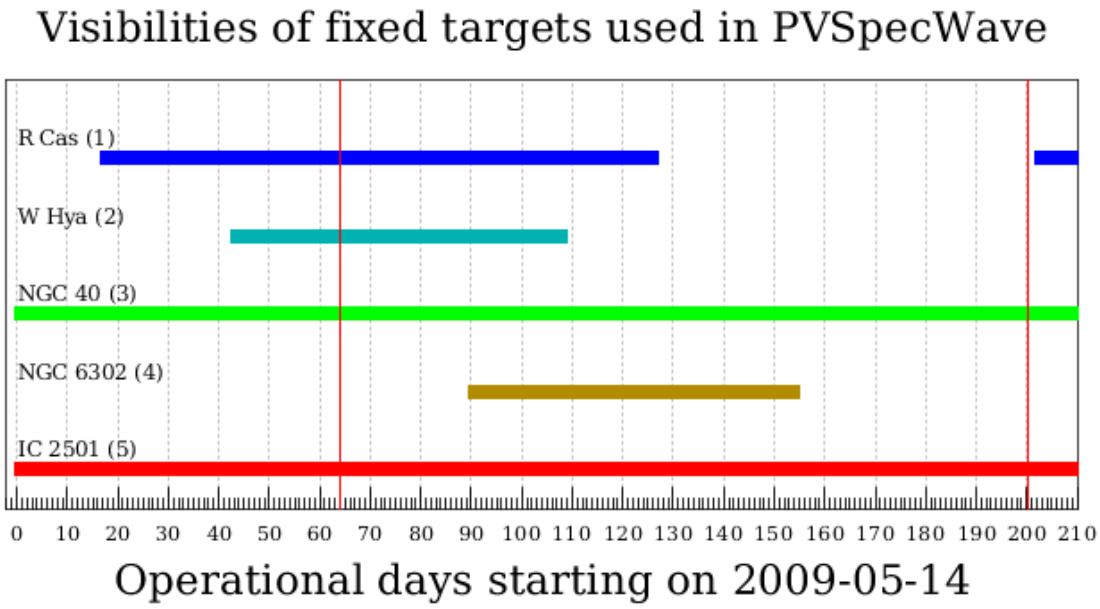


Figure 85: Visibilities of the fixed targets used for the AORs of the PVSpecWave proposal.

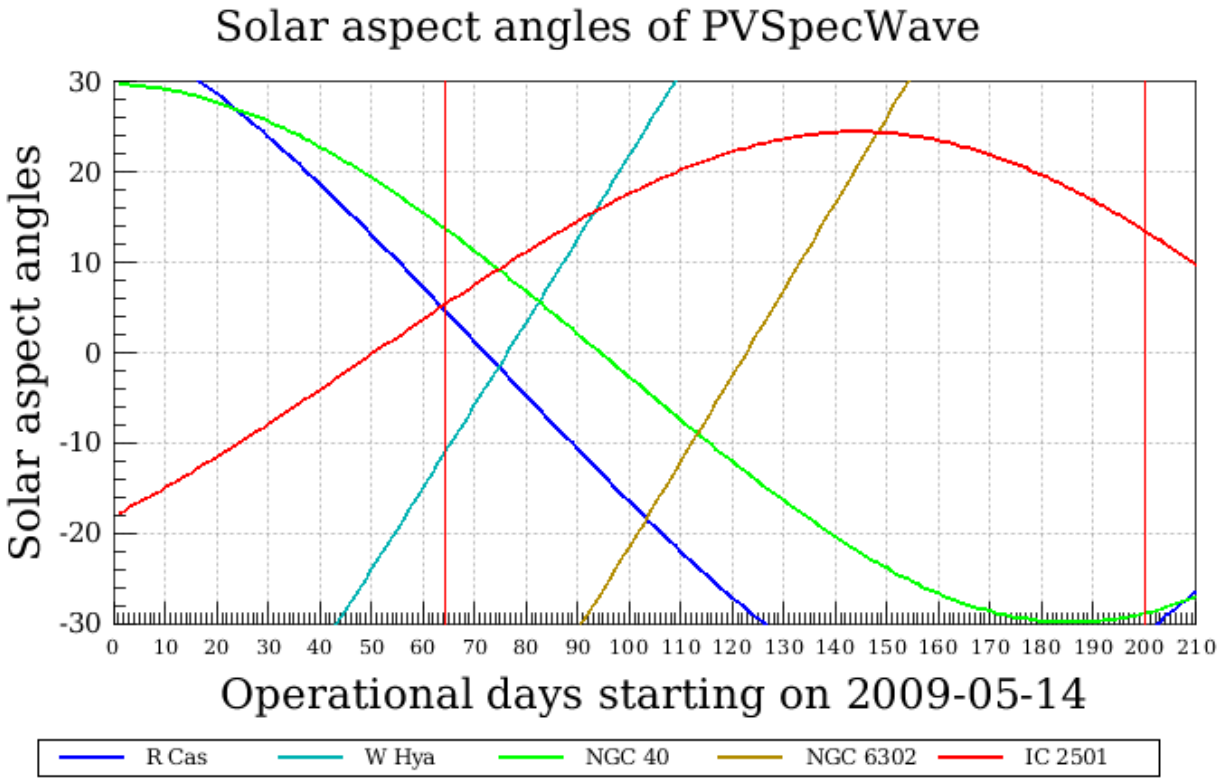


Figure 86: Solar aspect angles of the fixed targets used for the AORs of the PVSpecWave proposal.

Table 99: Observational details of spectral spectrometer calibration. The total estimated time of this test block is 24.6 h.

ID: PVSpecWave						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.2.1 Grating wavelength calibration						
A	check-out of Jupiter procedure unchopped range scan spectral sampling step size 200 up and down scan chopper at 0 bias reduction	CUS	~ 0.25	low and high signal part (2 / 4 repetitions) also on HD line	4.0	Jupiter and other planets if needed Sect. 4.3.3
B	unchopped full range scan spectral sampling step size 200 up and down scan chopper at 0 bias reduction all 25 spatial pixels covered at once	CUS	2.25	order sorting filter A&B	4.3	Jupiter, Mars Sect. 4.3.3
C	chop-nod full range scan spectral sampling step size 200 up and down scan chopper at 0 central pixel only	CUS	4.4	order sorting filter A&B	8.8	water line star Sect. 4.3.2 Neptune Sect. 4.3.3
D	dedicated unchopped range scans spectral sampling step size 200 up and down scans chopper at 0 routine phase calibration strategy standard chopped line scans large chopper throw	CUS	0.2 – 0.4 0.55	order sorting filter A&B 8 fine structure lines between 52 and 205 µm order sorting filter A&B 6 fine structure lines	1.6 1.1	PN Sect. 4.3.1
4.2.5 Grating wavelength calibration, dependence on source position in slit						
A	dedicated chopped/nodded range scans on 4×4 raster, 3" step size up and down scans chopper at 0	CUS	1.6	3 lines	4.8	IC 2501 (compact PN)

Table 100: Summary of AORs of spectral spectrometer calibration. The total scheduled time is 20.6296 h. Each observation of Jupiter must be preceded by a *CRE_setup* and a *SlewCal* observation. It must be followed by another *CRE_setup* observation. Irrespective of the AOR labels containing "421B", these configuration AORs apply to Jupiter observations of all the individual test block items.

ID: PVSpecWave				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.2.1 Grating wavelength calibration		
A	check-out of Jupiter procedure	PVSpecWave_421A_nStdRS_nochoporderA_Jupiter_0001	0.2431	OD 155
	spectral sampling step size 200	PVSpecWave_421A_nStdRS_nochoporderA_Jupiter_0002	0.2431	
	up and down scan	PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0001	0.3294	
	chopper at 0	PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0002	0.1661	OD 155
	bias reduction	PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0003	0.3294	
		PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0004	0.1661	
		PVSpecWave_421A_nStdRS_nochoporderA_RCas_0001	1.3736	
		PVSpecWave_421A_nStdRS_nochoporderA_JupiterHD_0001	0.1403	
		PVSpecWave_421A_nStdRS_nochoporderA_SaturnHD_0001	0.1458	
		PVSpecWave_421A_nStdRS_chopnodorderA_NeptuneHD_0001	0.3931	
		PVSpecWave_421A_nStdRS_chopnodorderA_UranusHD_0001	0.3931	
B	unchopped full range scan	PVSpecWave_421B_nStdCRE_setup_Dummy_0001	0.0525	
	spectral sampling step size 200	PVSpecWave_421B_nStdCRE_setup_Dummy_0002	0.0525	
	up and down scan	PVSpecWave_421B_nStdCRE_setup_Dummy_0003	0.0525	
	chopper at 0	PVSpecWave_421B_nStdCRE_setup_Dummy_0004	0.0525	
	bias reduction	PVSpecWave_421B_nStdCRE_setup_Dummy_0005	0.0525	
	all 25 spatial pixels	PVSpecWave_421B_nStdRS_SlewCalA_Dummy_0001	0.1067	
	covered at once	PVSpecWave_421B_nStdRS_SlewCalA_Dummy_0002	0.1067	
		PVSpecWave_421B_nStdRS_SlewCalA_Dummy_0003	0.1067	
		PVSpecWave_421B_nStdRS_SlewCalB_Dummy_0001	0.1067	
		PVSpecWave_421B_nStdRS_SlewCalB_Dummy_0002	0.1067	
		PVSpecWave_421B_nStdRS_SlewCalB_Dummy_0003	0.1067	
		PVSpecWave_Burstmode_SetupGen_0001	0.0511	OD 170
		PVSpecWave_Burstmode_SetupGen_0002	0.0511	
		PVSpecWave_Burstmode_SetupGen_0003	0.0511	
		PVSpecWave_421B_nStdRS_nochoporderA_Jupiter_0001	2.2236	OD 170
		PVSpecWave_421B_nStdRS_nochoporderA_Mars_0001	2.2236	
		PVSpecWave_421B_nStdRS_nochoporderB_Jupiter_0001	2.2236	OD 170
		PVSpecWave_421B_nStdRS_nochoporderB_Mars_0001	1.6944	
		PVSpecWave_Burstmode_ResetGen_0001	0.0511	OD 170
		PVSpecWave_Burstmode_ResetGen_0002	0.0511	
		PVSpecWave_Burstmode_ResetGen_0003	0.0511	

Table 100: continued. Summary of AORs of spectral spectrometer calibration.

ID: PVSpecWave				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.2.1 Grating wavelength calibration		
C	chopped-nodded full range scan	PVSpecWave_421C_nStdRS_chopnodorderA_Neptune_0001	4.3819	
	spectral sampling step size 200	PVSpecWave_421C_nStdRS_chopnodorderB_Neptune_0001	4.3819	
	up and down scan	PVSpecWave_421C_nStdRS_nochoporderA_WHya_0001	4.3708	OD 90
	chopper at 0	PVSpecWave_421C_nStdRS_nochoporderB_WHya_0001	4.3708	OD 90
	central pixel only			
D	dedicated unchopped range scans	PVSpecWave_421D_nStdLS_nochoporderA_NGC6302_0001	0.1944	OD 133
	for 8 fine structure lines	PVSpecWave_421D_nStdLS_nochoporderA_NGC6302_0002	0.1947	
	between 52 and 205 µm	PVSpecWave_421D_nStdLS_nochoporderB_NGC6302_0001	0.1944	OD 133
	spectral sampling step size 200	PVSpecWave_421D_nStdLS_nochoporderRed_NGC40_0001	0.3453	OD 90
	up and down scans	PVSpecWave_421D_nStdLS_nochoporderRed_NGC6302_0001	0.1956	
	chopper at 0	PVSpecWave_421D_nStdLS_nochoporderRed_NGC6302_0002	0.2786	
		PVSpecWave_421D_nStdLS_nochoporderRed_NGC6302_0003	0.1950	
		PVSpecWave_421D_nStdLS_nochoporderRed_NGC6302_0004	0.3758	OD 102
	final routine phase calib. strategy	PVSpecWave_421D_StdLS_NGC6543_A_0001	0.5550	OD 194
	standard chop/nod line scans	PVSpecWave_421D_StdLS_NGC6543_B_0001	0.5392	OD 194
	6 fine structure lines in total			
	large chopper throw			
		4.2.5 Grating wavelength calibration, dependence on source position in slit		
A	dedicated chopped/nodded range scans	PVSpecWave_425A_nStdRS_rasterorderA_IC2501_0001	1.5750	OD 79
	on 4×4 raster, 3" step size	PVSpecWave_425A_nStdRS_rasterorderA_IC2501_0002	1.5753	OD 79
	covering slit area	PVSpecWave_425A_nStdRS_rasterorderB_IC2501_0001	1.5750	OD 79
	up and down scans on 3 lines			
	chopper at 0			

6.20 Spectrometer Instrumental Profile

This test block deals with the second aspect of the spectral characterisation and calibration of the spectrometer camera, namely its instrumental profile characterisation.

The goal is the verification and assessment of the instrumental profile for different types of sources and various line width over the full wavelength range and for all spatial pixels.

The overview of the foreseen measurements is given in Tables 102.

Table 101: Visibilities of the targets used in the PVSpecIP proposal.

Target	Start	End
AFGL (CRL) 2688	05-Oct-2009	17-Jan-2010
M 51	14-May-2009	10-Aug-2009
	26-Oct-2009	07-Feb-2010
NGC 253	18-Nov-2009	25-Jan-2010
NGC 2146	24-Jul-2009	24-Nov-2009
NGC 7027	14-May-2009	03-Aug-2009
	02-Oct-2009	31-Jan-2010
Arp 220	24-Jun-2009	18-Sep-2009
Saturn	25-Nov-2009	24-Jan-2010
Uranus	15-Nov-2009	14-Jan-2010
Neptune	17-Oct-2009	15-Dec-2009

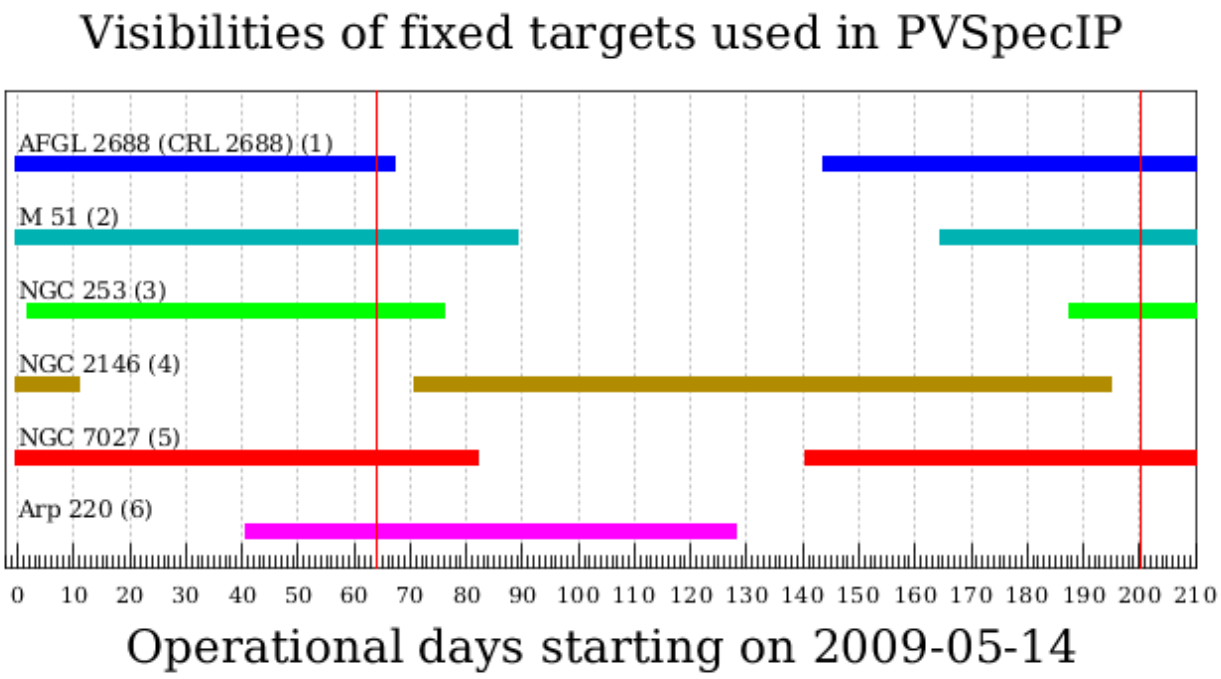


Figure 87: Visibilities of the fixed targets used for the AORs of the PVSpecIP proposal.

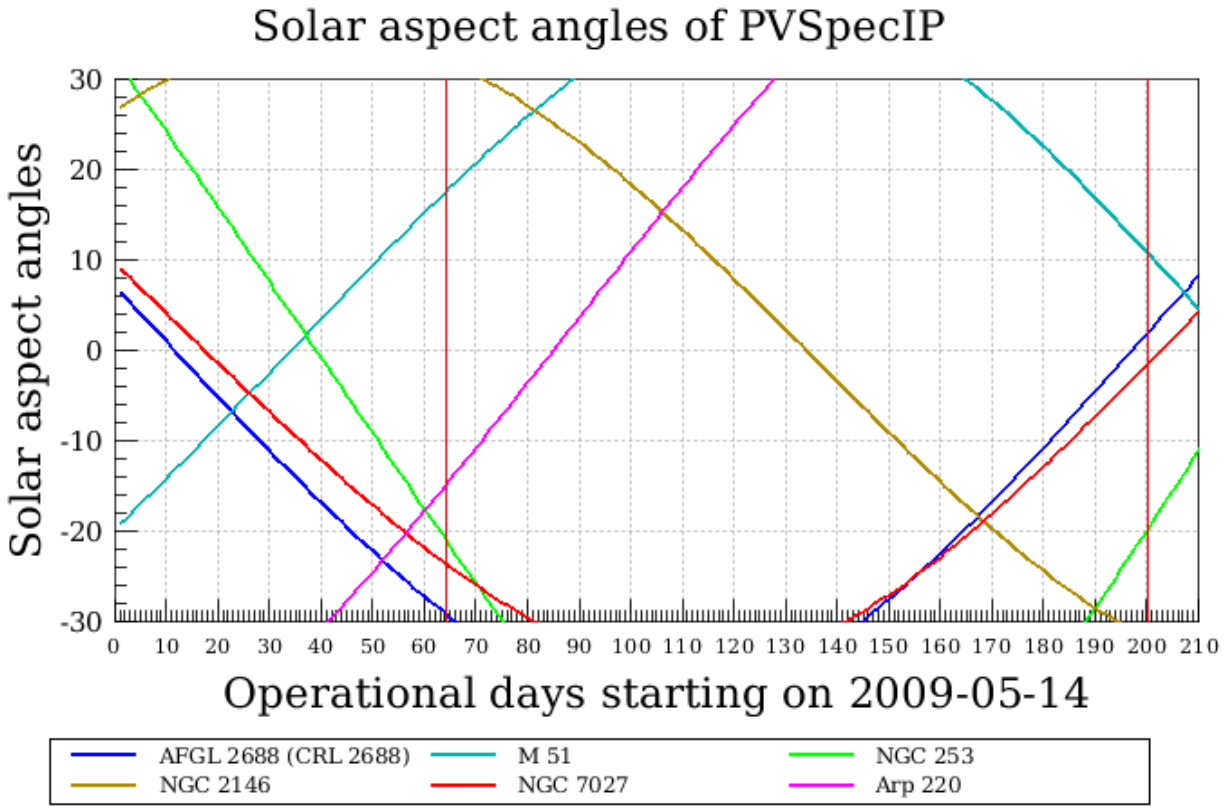


Figure 88: Solar aspect angles of the fixed targets used for the AORs of the PVSpecIP proposal.

Table 102: Observational details of spectrometer instrumental profile calibration. The total estimated time of this test block is 32.8 h.

ID: PVSpecIP						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.2.2 Grating instrumental profile						
A	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) of point sources spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	0.37	3 lines 58.698 µm, 108.07 µm, 108.07 µm in 2nd order at 216.14 µm	1.2	Neptune Sect. 4.3.3
B	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) of extended sources spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	0.37	4 lines 58.698 µm, 66.437 µm, 108.07 µm, 108.07 µm in 2nd order at 216.14 µm	1.5	Saturn Uranus Sect. 4.3.3
C	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) of point sources IP dependence on position in spaxel 3 × 3 raster, 3" step spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	6.38	1 line 66.437 µm	6.4	Neptune Sect. 4.3.3
C should be performed at the same day as A						
D	Non-standard chop/nod range spectroscopy of broad lines (≈400 km/s FWHM) of point sources spectral sampling step size 130 400 steps up and down scan 2 scan repetitions large chop throw	CUS	0.75	4 lines [OI] 63, [OIII] 88, [NII] 122, [CII] 157 [CII] on 2 targets	3.8	NGC 2146 Arp 220

Table 102: continued. Observational details of spectrometer instrumental profile calibration.

ID: PVSpecIP						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.2.2 Grating instrumental profile						
E	Non-standard chop/nod range spectroscopy for verification of line profile on frequently observed lines spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	0.37	6 lines [NIII] 57, [OI] 63, [OIII] 88, [NII] 122, [CII] 157, [NII] 205	2.2	NGC 7027
F	Non-standard chop/nod range spectroscopy for verification of line profile at additional wavelengths spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	0.37	3 lines (CO) 137.2, 173.6, 186.0 µm	1.1	AFGL 2688
G	Non-standard chop/nod range spectroscopy for characterization of profile on extended diffuse background 3×3 raster, 3" step spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	6.37	1 line [CII] 157 µm,	6.4	M 51
H	covered by spectrometer AOT validation, see Section 6.24					

Table 102: continued. Observational details of spectrometer instrumental profile calibration.

ID: PVSpecIP						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
	4.2.2 Grating instrumental profile					
I	Non-standard chop/nod range spectroscopy for verification of absorption line profile spectral sampling step size 130 400 steps up and down scan 2 scan repetitions large chop throw	CUS	0.75	resolution check on the 119 µm doublet of OH	0.8	NGC 253
J	Non-standard chop/nod range spectroscopy for verification of narrow line profile on all 25 spatial pixels 5 × 5 raster, 9.5" step spectral sampling step size 130 170 steps up and down scan 2 scan repetitions large chop throw	CUS	9.41	1 line 66.437 µm	9.4	Neptune Sect. 4.3.3

Table 103: Summary of AORs of spectrometer instrumental profile calibration. The total scheduled time is 23.9393 h.

ID: PVSpecIP				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.2.2 Grating instrumental profile			
A	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) of extended sources large chop throw spectral sampling step size 130 170 steps up and down scan, 2 scan reps.			
	58.698 µm	PVSpecIP_422A_nStd_58_A_chop_Neptune_0001	0.3653	
	108.07 µm	PVSpecIP_422A_nStd_108_A_chop_Neptune_0001	0.3653	
	108.07 µm in 2nd order @ 216.14 µm	PVSpecIP_422A_nStd_108_B_chop_Neptune_0001	0.3653	
	108.07 µm in 2nd order @ 216.14 µm	PVSpecIP_422A_NstdWaveCalChop_216_neptune_01	0.3892	OD 169
A	Non-standard line spectroscopy small chop throw spectral sampling step size 130			
	58.698 µm, 108 grating steps	PVSpecIP_422A_NstdLineSpecChop_58_neptune_01	0.3178	OD 169
	66.437 µm, 124 grating steps	PVSpecIP_422A_NstdLineSpecChop_66_neptune_01	0.3561	OD 169
	108.07 µm, 95 grating steps	PVSpecIP_422A_NstdLineSpecChop_108_neptune_01	0.2886	OD 170
B	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) of extended sources spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw			
	58.698 µm	PVSpecIP_422B_nStd_58_A_chop_Saturn_0001	0.3653	
	66.437 µm	PVSpecIP_422B_nStd_66_A_chop_Saturn_0001	0.3653	
	108.07 µm	PVSpecIP_422B_nStd_108_A_chop_Saturn_0001	0.3653	
	108.07 µm in 2nd order @ 216.14 µm	PVSpecIP_422B_nStd_108_B_chop_Saturn_0001	0.3653	

Table 103: continued. Summary of AORs of spectrometer instrumental profile calibration.

ID: PVSpecIP				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.2.2 Grating instrumental profile			
C	Non-standard chop/nod range spectroscopy of intrinsic narrow lines (≈10 km/s) IP dependence on position in spaxel 3 × 3 raster, 3" step spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw 66.437 µm	PVSpecIP_422C_nStd_66_A_chopraster_Neptune_0001	6.3306	
C	Non-standard chop/nod line spectroscopy large chop throw spectral sampling step size 130 7 × 1 raster line, 2" step			
	66.437 µm, 124 grat. steps, 90° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Rx_66_neptune_01	2.2631	OD 170
	66.437 µm, 124 grat. steps, 0° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Ry_66_neptune_01	2.2631	OD 170
	108.07 µm, 95 grat. steps, 90° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Rx_108_neptune_01	1.7856	OD 170
	108.07 µm, 95 grat. steps, 0° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Ry_108_neptune_01	1.7856	OD 170
	3 × 1 raster line, 2" step			
	66.437 µm, 95 grat. steps, 90° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Rx3_66_uranus_01	0.7958	OD 194
	66.437 µm, 95 grat. steps, 0° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Ry3_66_uranus_01	0.7958	OD 194
	108.07 µm, 95 grat. steps, 90° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Rx3_108_uranus_01	0.7267	
	108.07 µm, 95 grat. steps, 0° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Ry3_108_uranus_01	0.7267	
	25 × 1 raster line, 2" step			
	108.07 µm, 95 grat. steps, 90° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Rx25_108_neptune_01	5.7378	OD 194
	108.07 µm, 95 grat. steps, 0° raster ori.	PVSpecIP_422C_NstdLineSpecChop_Ry25_108_neptune_01	5.7378	OD 194

Table 103: continued. Summary of AORs of spectrometer instrumental profile calibration.

ID: PVSpecIP				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.2.2 Grating instrumental profile		
D	Non-standard chop/nod range spectroscopy of broad lines (≈400 km/s FWHM) of point sources spectral sampling step size 130 400 steps up and down scan, 2 scan reps. large chop throw			
	[OI] 63 µm (3rd order)	PVSpecIP_422D_nStd_63_A_chop_NGC2146_0001	0.7458	
	[OIII] 88 µm (2nd order)	PVSpecIP_422D_nStd_88_B_chop_NGC2146_0001	0.7458	
	[NII] 122 µm (1st order)	PVSpecIP_422D_nStd_122_B_chop_NGC2146_0001	0.7458	
	[CII] 157 µm (1st order)	PVSpecIP_422D_nStd_157_B_chop_NGC2146_0001	0.7458	
	[CII] 157 µm (1st order)	PVSpecIP_422D_nStd_157_B_chop_Arp220_0001	0.7458	
E	Non-standard chop/nod range spectroscopy for verification of line profile on frequently observed lines spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw			
	[NIII] 57 µm (3rd order)	PVSpecIP_422E_nStd_57_A_chop_NGC7027_0001	0.3611	
	[OI] 63 µm (3rd order)	PVSpecIP_422E_nStd_63_A_chop_NGC7027_0001	0.3614	
	[OIII] 88 µm (2nd order)	PVSpecIP_422E_nStd_88_B_chop_NGC7027_0001	0.3611	
	[NII] 122 µm (1st order)	PVSpecIP_422E_nStd_122_B_chop_NGC7027_0001	0.3622	
	[CII] 157 µm (1st order)	PVSpecIP_422E_nStd_157_A_chop_NGC7027_0001	0.3614	
	[NII] 205 µm (1st order)	PVSpecIP_422E_nStd_205_B_chop_NGC7027_0001	0.3619	
F	Non-standard chop/nod range spectroscopy for verification of line profile at additional wavelengths spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw			
	137.2 µm	PVSpecIP_422F_nStd_137.2_B_chop_AFGL2688_0001	0.3625	
	173.6 µm	PVSpecIP_422F_nStd_173.6_B_chop_AFGL2688_0001	0.3625	
	186.0 µm	PVSpecIP_422F_nStd_186.0_B_chop_AFGL2688_0001	0.3625	

Table 103: continued. Summary of AORs of spectrometer instrumental profile calibration.

ID: PVSpecIP				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.2.2 Grating instrumental profile			
G	Non-standard chop/nod range spectroscopy for characterization of profile on extended diffuse background 3 × 3 raster, 3" step spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw [CII] 157 µm	PVSpecIP_422G_nStd_157_B_chopraster_M51_0001	6.3278	
G	Non-standard unchopped range spectroscopy 2 × 2 raster, 4" step +off-position spectral sampling step size 130			
	[OI] 63 µm (3rd order), 116 steps	PVSpecIP_422G_NstdRangeNoChop_OI63_M51_01	0.5250	OD 170
	[OIII] 88 µm (2nd order), 89 steps	PVSpecIP_422G_NstdRangeNoChop_OIII88_M51_01	0.4247	OD 170
	[CII] 157 µm (1st order), 102 steps	PVSpecIP_422G_NstdRangeNoChop_CII158_M51_01	0.4733	OD 170
I	Non-standard chop/nod range spectroscopy for verification of absorption line profile spectral sampling step size 130 400 steps up and down scan, 2 scan reps. large chop throw 119 µm doublet of OH	PVSpecIP_422I_nStd_119doublet_A_chop_NGC253_0001	0.7458	
J	Non-standard chop/nod range spectroscopy for verification of narrow line profile on all 25 spatial pixels 5 × 5 raster, 9.5" step spectral sampling step size 130 170 steps up and down scan, 2 scan reps. large chop throw 66.437 µm (3rd order)	PVSpecIP_422J_nStd_66_A_chopraster_Neptune_0001	9.2844	

6.21 Spectrometer Spatial Calibration

This test block comprises the spatial characterisation and calibration of the spectrometer camera. The overview of the foreseen measurements is given in Table 106.

Measurements for assessing the Field of View Distortion and the Point Spread Function are complementary, if performed on a source as point-like as possible. Neptune is therefore the prime source for this calibration. Both FoV distortion and PSF assessment are done for all chopper deflections used in the astronomical modes, i.e. for the optical zero position (unchopped) as well as small (±0.'5), medium (±1.'5) and large (±3.'0) chopper throws. The combination of selected chopper deflections and their respective chopper off-position deflections is given in Table 104.

The large raster allows assessing the profiles of all spatial pixels, the smaller raster only of the central pixel to check for any other dependence. Depending on the outcome additional characterisation may be necessary.

The bright IR source selected for FOV distortion measurement option B should be mapped with the photometer beforehand to get feedback on its spatial extension (see Section 6.11, ID 4.3.1E).

Before the execution of the comprehensive raster maps it is recommended to perform a pointing verification with the PSF raster observing technique on a pointing calibrator.

This test block also includes straylight measurements close to bright sources. The measurement strategy requires the bright source Jupiter to be (1) in the centre and (2) completely outside of the field of investigation. (2) is optional and only follow-up, should (1) give strong hints on straylight features.

The application of a chopped line scan also tests the performance of this not yet standard measurement mode.

Both for Jupiter and Neptune observations, constellations with low and flat background environment should be selected if possible.

Table 104: Commanded chopper positions for the spectrometer field-of-view distortion and PSF measurements. Chopper optical zero position is at +664 ROUs.

label	selected chopper deflection (arcmin on sky)	chopper on-position (ROUs)	chopper off-position (ROUs)
0	optical zero point	664	6769
p05	+0.5	2724	−5552
p15	+1.5	6769	−5552
p3	+3.0	12444	664
m05	−0.5	−1408	6769
m15	−1.5	−5552	6769
m3	−3.0	−11580	664

Table 105: Visibilities of the targets used in the PVSpecSpatial proposal.

Target	Start	End
HIP 21479	always visible	
ISOPHOT Dark Field	always visible	
Jupiter	10-Oct-2009	14-Dec-2009
Neptune	17-Oct-2009	15-Dec-2009

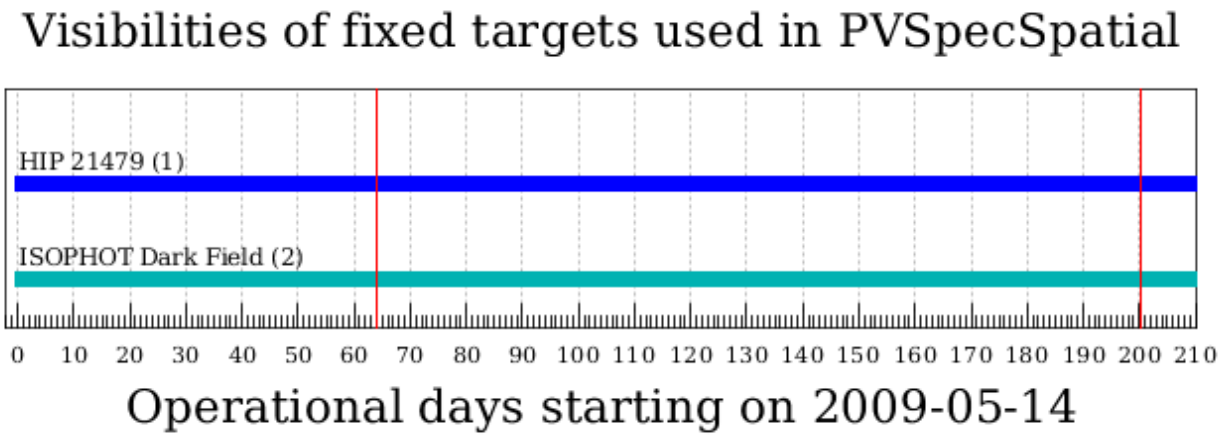


Figure 89: Visibilities of the fixed targets used for the AORs of the PVSpecSpatial proposal.

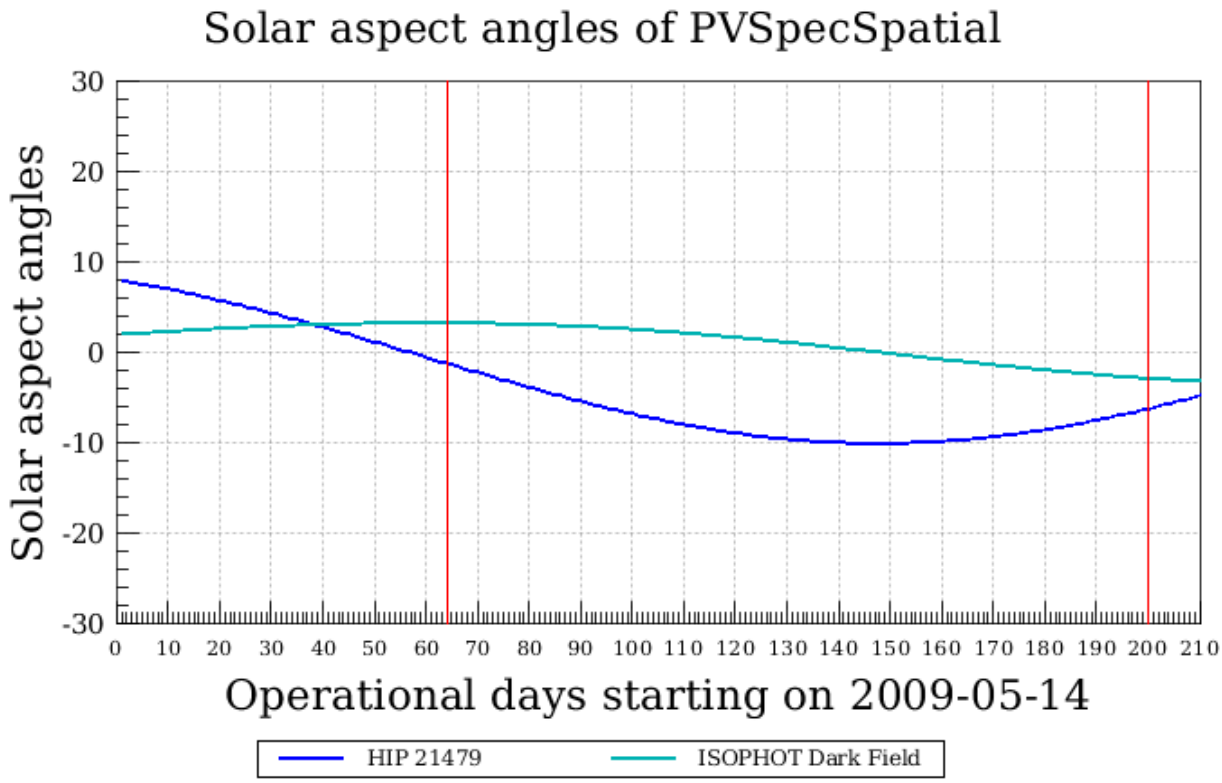


Figure 90: Solar aspect angles of the fixed targets used for the AORs of the PVSpecSpatial proposal.

Table 106: Observational details of spatial spectrometer calibration. The total estimated time of this test block is 87.8 h. 3.0 h under 4.1.5 B are optional depending on the outcome of 4.1.5 A.

ID: PVSpecSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.1.2 Spectrometer Field of View Distortion						
A	chopped raster 27×27, 2.5" (y,z) 12 s dwell time fixed grating at 77 µm chopper off 1.5'-3' in opposite dir.	CUS	4.3	7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104	30.2	HIP 21479 Tab. 19
raster centre will be offset to centre source in selected chopper beam						
B	chopped raster 11×11, 2.5" (y,z) 12 s dwell time fixed grating at 55/110 and 90/180 µm chopper off 1.5'-3' in opposite dir.	CUS	0.8	7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104	10.7	HIP 21479
raster centre will be offset to centre source in selected chopper beam						
4.1.3 Spectrometer Point Spread Function						
A	chopped raster 27×27, 2.5" (y,z) 12 s dwell time fixed grating at 77 µm chopper off 1.5'-3' in opposite dir.	CUS	4.3	7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104	30.2	Neptune Sect. 4.2
raster centre will be offset to centre source in selected chopper beam						
B	chopped raster 11×11, 2.5" (y,z) 12 s dwell time fixed grating at 55/110 and 90/180 µm chopper off 1.5'-3' in opposite dir.	CUS	0.8	7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104	10.7	Neptune Sect. 4.2
raster centre will be offset to centre source in selected chopper beam						

Table 106: Observational details of spatial spectrometer calibration continued.

ID: PVSpecSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.1.5 Spectrometer Straylight						
A	chopped scan map scan speed 3"/s 15' leg, 5 legs, 30" separation with off-pos before & after fixed grating at prominent line 1.5' chopper throw in-scan	CUS	0.6	5 strips around source	3.0	Jupiter Sect. 4.3.3
B	chopped scan map scan speed 3"/s 15' leg, 5 legs, 30" separation with off-pos before & after fixed grating at prominent line 1.5' chopper throw in-scan	CUS	0.6	5 strips around off-position	3.0	same sky field as A, but with Jupiter moved out **select suitable time offset**
chopped scan map mode for spectrometer was not tested						

Table 107: Available AORs for the PV spectrometer spatial calibration. The total scheduled time is 79.2934 h.

ID: PVSpecSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.1.2 Spectrometer Field of View Distortion		
A	chopped raster 27 × 27, 2.5″ (y,z) 12 s dwell time fixed grating at 77/154 µm 7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104 chopper off 1.5'-3' in opposite dir.	PVSpecSpatial_412A_nStd_27x27RCp_00_w77_HIP21479_01	4.3100	OD 115
		PVSpecSpatial_412A_nStd_27x27RCp_m05_w77_HIP21479_01	4.3100	OD 115
		PVSpecSpatial_412A_nStd_27x27RCp_m15_w77_HIP21479_01	4.3100	OD 115
		PVSpecSpatial_412A_nStd_27x27RCp_m3_w77_HIP21479_01	4.3100	OD 115
		PVSpecSpatial_412A_nStd_27x27RCp_p05_w77_HIP21479_01	4.3100	OD 115
		PVSpecSpatial_412A_nStd_27x27RCp_p15_w77_HIP21479_01	4.3100	OD 114
		PVSpecSpatial_412A_nStd_27x27RCp_p3_w77_HIP21479_01	4.3100	OD 114
		PVSpecSpatial_412A_nStd_27x27RCp_p15_w77_HIP21479_2	4.3100	OD 120
		PVSpecSpatial_412A_nStd_27x27RCp_p3_w77_HIP21479_2	4.3100	OD 120
B	chopped raster 11×11, 2.5" (y,z) 12 s dwell time fixed grating at 55/110 and 90/180 µm 7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104 chopper off 1.5'-3' in opposite dir.	PVSpecSpatial_412B_nStd_11x11RCp_00_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_00_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m05_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m05_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m15_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m15_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m3_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_m3_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p05_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p05_w90__HIP2147901	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p15_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p15_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p3_w55_HIP21479_01	0.7631	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_p3_w90_HIP21479_01	0.7628	OD 114
		PVSpecSpatial_412B_nStd_11x11RCp_00_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_00_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m05_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m05_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m15_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m15_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m3_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_m3_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p05_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p05_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p15_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p15_w90_HIP21479_2	0.7628	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p3_w55_HIP21479_2	0.7631	OD 120
		PVSpecSpatial_412B_nStd_11x11RCp_p3_w90_HIP21479_2	0.7628	OD 120

Table 107: continued. Available AORs for the PV spectrometer spatial calibration.

ID: PVSpecSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.1.3 Spectrometer Point Spread Function		
A	chopped raster 25×25, 2.5" (y,z) 40×40 for chopper optical zero 10 s dwell time fixed grating at 62 µm 7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104 chopper off 1.5'-3' in opposite dir.	PVSpecSpatial_413A_nStd_25x25RCp_m05_w62_Neptune_01 PVSpecSpatial_413A_nStd_25x25RCp_m15_w62_Neptune_01 PVSpecSpatial_413A_nStd_25x25RCp_m3_w62_Neptune_01 PVSpecSpatial_413A_nStd_25x25RCp_p05_w62_Neptune_01 PVSpecSpatial_413A_nStd_25x25RCp_p15_w62_Neptune_01 PVSpecSpatial_413A_nStd_25x25RCp_p3_w62_Neptune_01 PVSpecSpatial_413A_nStd_40x40RCp_00_w62_Neptune_01	3.3594 3.3594 3.3594 3.3594 3.3594 3.3594 8.5053	OD 175 OD 175 OD 175 OD 175 OD 175 OD 175 OD 174
B	chopped raster 11×11, 2.5" (y,z) 8 s dwell time fixed grating at 55/110 and 90/180 µm 7 chopper positions 0′, ±0.5′, ±1.5′, ±3.0′ see Table 104 chopper off 1.5'-3' in opposite dir.	PVSpecSpatial_413B_nStd_11x11RCp_00_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_00_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m05_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m05_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m15_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m15_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m3_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_m3_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p05_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p05_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p15_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p15_w90_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p3_w77_Neptune_01 PVSpecSpatial_413B_nStd_11x11RCp_p3_w90_Neptune_01	0.6989 0.6983 0.6989 0.6983 0.6989 0.6983 0.6989 0.6983 0.6989 0.6983 0.6989 0.6983 0.6989 0.6983	OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174 OD 174

Table 107: continued. Available AORs for the PV spectrometer spatial calibration.

ID: PVSpecSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
4.1.5 Spectrometer Straylight				
A	chopped scan map scan speed $3''/s$ $15'$ leg, 5 legs, $30''$ separation with off-pos before & after fixed grating at prominent line $1.5'$ chopper throw in-scan	PVSpecSpatial_415A_nStd_Sca_Jupiter_Stripe1_0001 PVSpecSpatial_415A_nStd_Sca_Jupiter_Stripe2_0001 PVSpecSpatial_415A_nStd_Sca_Jupiter_Stripe3_0001 PVSpecSpatial_415A_nStd_Sca_Jupiter_Stripe4_0001 PVSpecSpatial_415A_nStd_Sca_Jupiter_Stripe5_0001	0.5928 0.5928 0.5928 0.5928 0.5928	
B	chopped scan map scan speed $3''/s$ $15'$ leg, 5 legs, $30''$ separation with off-pos before & after fixed grating at prominent line $1.5'$ chopper throw in-scan	PVSpecSpatial_415B_nStd_Sca_WO_Jupiter_Stripe1_0001 PVSpecSpatial_415B_nStd_Sca_WO_Jupiter_Stripe2_0001 PVSpecSpatial_415B_nStd_Sca_WO_Jupiter_Stripe3_0001 PVSpecSpatial_415B_nStd_Sca_WO_Jupiter_Stripe4_0001 PVSpecSpatial_415B_nStd_Sca_WO_Jupiter_Stripe5_0001	0.5928 0.5928 0.5928 0.5928 0.5928	
chopped scan map mode for spectrometer was not tested				

6.22 FOV Characterization Spectrometer

This test block comprises the characterization of the full spectrometer field-of-view under different illumination conditions. This serves to assess the impact of straylight from the sky field-of-view into the internal calibration source field-of-view and vice versa.

The overview of the foreseen measurements is given in Table 108.

The first observation type requires switched-off internal calibration sources! Therefore, provisions have to be made to schedule these measurements before a general switch-on of the internal calibration sources (i.e. modified orbit prologue).

The third observation type requires internal calibration sources on a higher temperature level than the nominal one. Therefore, these measurements should be scheduled preferentially towards the end of PACS operations in order to let them cool down to the nominal level afterwards.

Table 108: Observational details of the spectrometer field-of-view characterization. The total estimated time of this test block is 3.8 h.

ID: PVSpecSpatial						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.1.6 Field-of-View characterization						
A	FOV chopper scan, both CSs off 145 steps up & down chopper pos. -23255 to 23000 33 ramps (1/4 s) per chopper pos.	CUS	0.74	3 grating positions (494500, 737000, 947000)	2.2	dark sky field Sect. 4.5
internal CSs have to remain off!						
B	FOV chopper scan, both CSs on nominal T CS1/CS2 @ 50 K/55 K 145 steps up & down chopper pos. -23255 to 23000 9 ramps (1/4 s) per chopper pos.	CUS	0.25	3 grating positions (494500, 737000, 947000)	0.8	dark sky field Sect. 4.5
C	FOV chopper scan, both CSs > $T_{nominal}$ CS1/CS2 @ 70 K/76 K 145 steps up & down chopper pos. -23255 to 23000 9 ramps (1/4 s) per chopper pos.	CUS	0.26	3 grating positions (494500, 737000, 947000)	0.8	dark sky field Sect. 4.5
for non-nominal T of internal CSs! Combine with set-up AOT (Sect. 6.3) to heat-up CSs to required T!						

Table 109: Available AORs for the PV spectrometer FOV characterisation observations. The total scheduled time is 2.9568 h.

ID: PVSpecSpatial				
	Measurement description	AOR labels	duration (h)	observing constraints
4.1.6 Field-of-View characterization				
A	FOV chopper scan, CSs off 145 steps up & down chopper pos. -23255 to 23000 33 ramps (1/4 s) per chopper pos. 3 fixed grating positions (key λ)	PVSpecSpatial_416A_nStdFovScan_60-2_DarkField_0001 PVSpecSpatial_416A_nStdFovScan_60-3_DarkField_0001 PVSpecSpatial_416A_nStdFovScan_75_DarkField_0001	0.7353 0.7353 0.7353	OD 78 OD 78 OD 78
internal CSs have to remain off!				
B	FOV chopper scan, CSs at nominal T 145 steps up & down chopper pos. -23255 to 23000 9 ramps (1/4 s) per chopper pos. 3 fixed grating positions (key λ)	PVSpecSpatial_416B_nStdFovScan_60-2_DarkField_0001 PVSpecSpatial_416B_nStdFovScan_60-3_DarkField_0001 PVSpecSpatial_416B_nStdFovScan_75_DarkField_0001	0.2503 0.2503 0.2503	OD 79 OD 79 OD 79
C	FOV chopper scan, CSs at increased T CS1/CS2 @ 70 K/76 K 145 steps up & down chopper pos. -23255 to 23000 9 ramps (1/4 s) per chopper pos. 3 fixed grating positions (key λ)	PVSpecSpatial_416C_nStdFovScan_60-2_DarkField_0001 PVSpecSpatial_416C_nStdFovScan_60-3_DarkField_0001 PVSpecSpatial_416C_nStdFovScan_75_DarkField_0001	0.2478 0.2478 0.2478	
for non-nominal T of internal CSs! Combine with set-up AOT (Sect. 6.3) to heat-up CSs to required T!				

6.23 Spectrometer Photometric Calibration

This test block comprises the photometric characterisation and flux calibration of the spectrometer camera. The overview of the foreseen measurements is given in Table 111.

It comprises aspects of the internal calibration set-up, the absolute flux calibration against celestial standards at key wavelengths as well as the assessment of the detailed spectrometer Relative Spectral Response Function (RSRF).

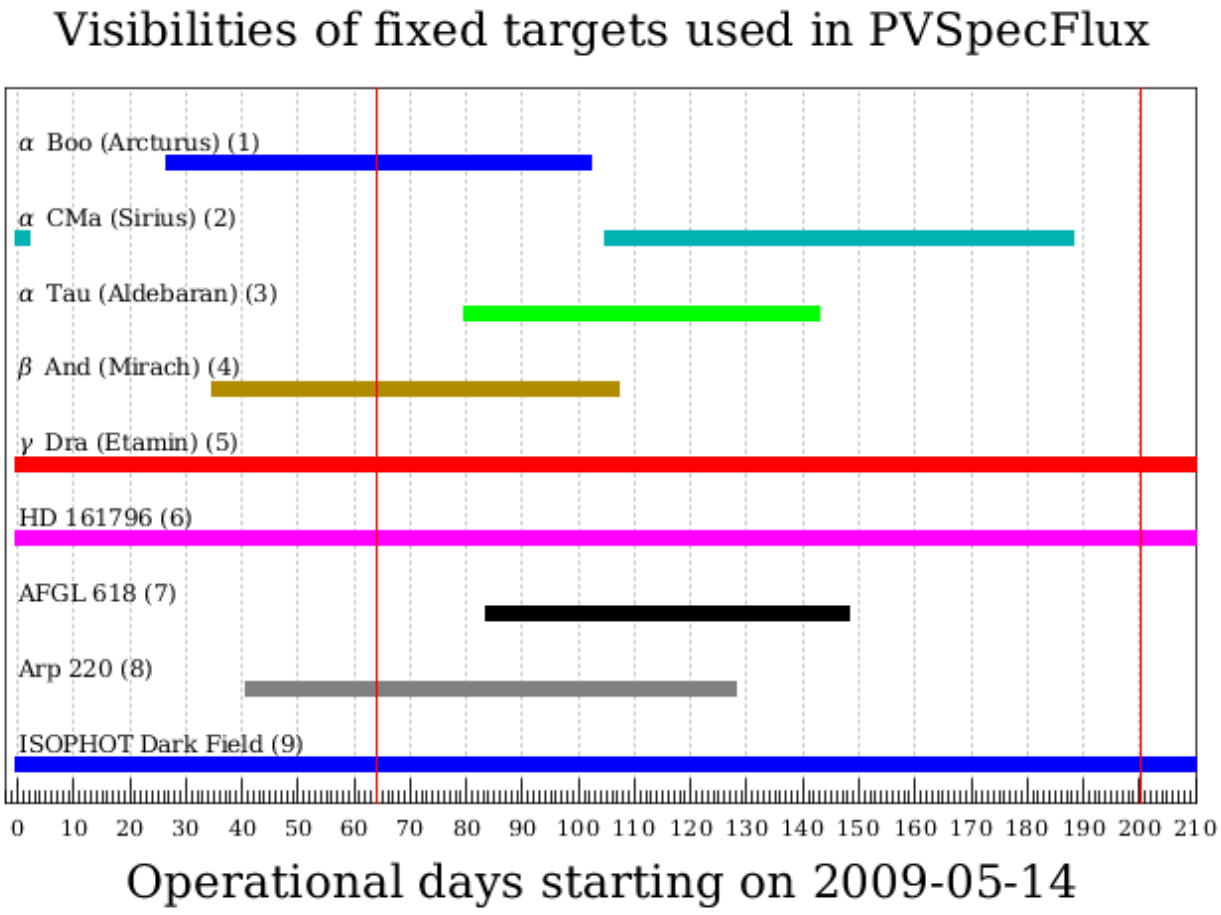


Figure 91: Visibilities of the fixed targets used for the AORs of the PVSpecFlux proposal.

Table 110: Visibilities of the targets used in the PVSpecFlux proposal.

Target	Start	End
α Boo (Arcturus)	10-Jun-2009	23-Aug-2009
α CMa (Sirius)	27-Aug-2009	17-Nov-2009
α Tau (Aldebaran)	02-Aug-2009	03-Oct-2009
β And (Mirach)	18-Jun-2009	28-Aug-2009
γ Dra (Etamin)	always visible	
HD 161796	always visible	
AFGL 618	06-Aug-2009	08-Oct-2009
Arp 220	24-Jun-2009	18-Sep-2009
ISOPHOT Dark Field	always visible	
Mars	19-Aug-2009	11-Dec-2009
1 Ceres	08-Feb-2010	24-Apr-2010
3 Juno	13-Nov-2009	13-Feb-2010
4 Vesta	10-Oct-2009	28-Dec-2009
18 Melpomene	14-May-2009	13-Aug-2009
19 Fortuna	13-Jul-2009	16-Oct-2009
88 Thisbe	19-Oct-2009	10-Jan-2010

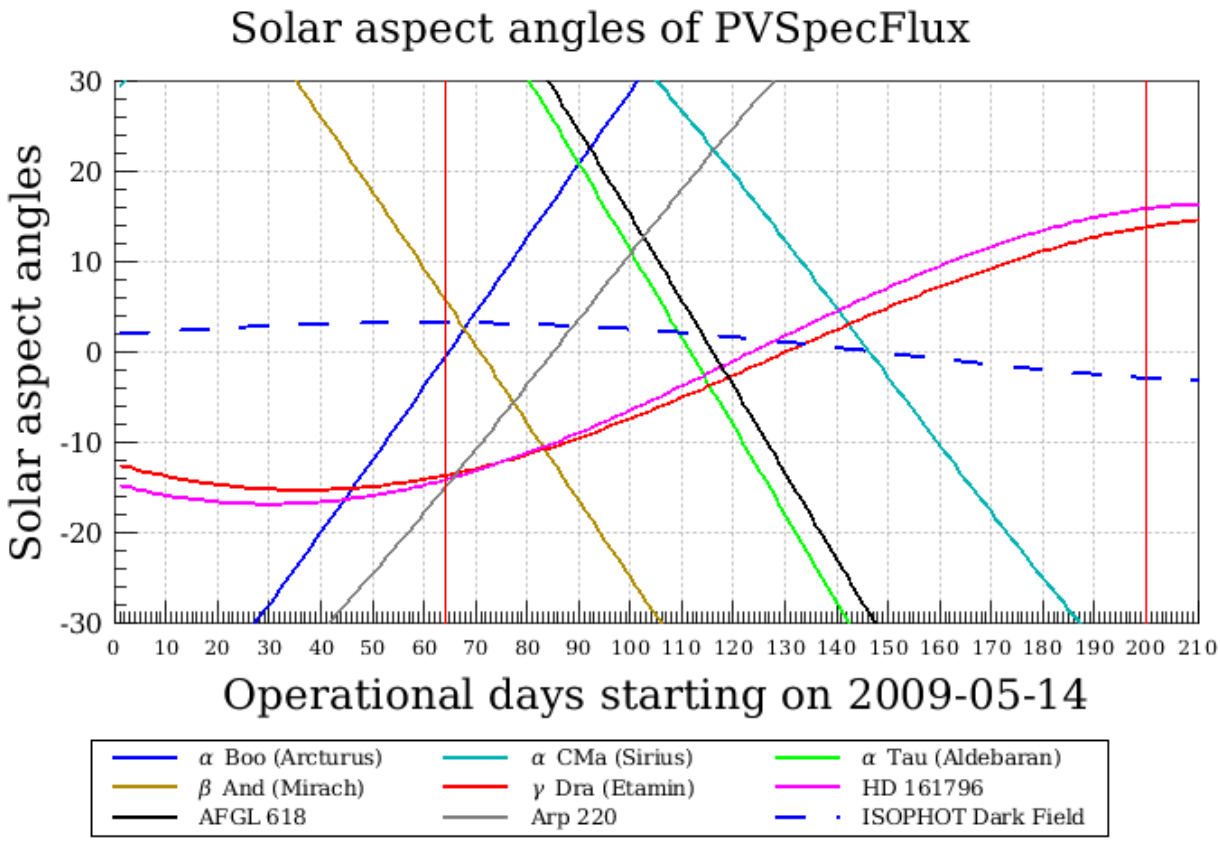


Figure 92: Solar aspect angles of the fixed targets used for the AORs of the PVSpecFlux proposal.

Table 111: Observational details of spectrometer flux calibration. The total estimated time of this test block is 116.2 h.

ID: PVSpecFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
	4.3.1 Absolute flux calibration internal sources, spectrometer					
A	internal calibration block (during slew) optimization ABAB and ABBA chopping key-λ@75µm (2nd order)	CUS	0.07 – 0.08	24 variations, 1 param. each # readouts per ramp: 64,32 # chop cycles/grating step: 1,2,4,32,42,64 # clean ramps/grating step: 1,2,3,4 # grating steps: 16,1 grating step size: calU,0 # up/down scans: 1, 2, 4, 8 for selected parameter combinations see Table 113	7.6	dark sky field Sect. 4.5
	combination of one set 1-16 each of ABAB and ABBA on one OD **combination of two sets 1-16 of ABBA in reverse order on one OD** **combination of two sets 17-24 of ABBA in reverse order on one OD**					
	4.3.3 Absolute flux calibration external sources, spectrometer					
A	non standard chop/nod range scan at key wavelengths large chopper throw high sampling density	CUS	0.42/0.47/0.66	3 key wavelength combinations B2A: 60+120µm(2nd+1st order) B2B: 75+150µm(2nd+1st order) B3A: 60+180µm(3rd+1st order)	3.1	fiducial stars Sect. 4.1.1
	standard chop/nod range scan at key wavelengths small chopper thow high sampling density	AOT	0.5/1.1	2 different stars	1.6	
	4.3.4 Flux reproducibility external sources, spectrometer					
A	non standard range scan range scan at key wavelengths small chopper throw high sampling density	CUS	0.23	3 key wavelength combinations: B2A: 60+120µm(2nd+1st order) B2B: 75+150µm(2nd+1st order) B3A: 60+180µm(3rd+1st order) 5 meas. over 1 OD	3.5	bright secondary standard Sect. 4.1.2
B	non standard chop/nod range scan at key wavelengths small chopper throw high sampling density	CUS	0.23	3 key wavelength combinations like A 1 meas. each on 5 ODs	3.5	bright secondary standard Sect. 4.1.2

Table 111: continued. Observational details of spectrometer flux calibration.

ID: PVSpecFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.3.5 Linearity with flux						
A	(non-)standard chop/nod range scan at key wavelengths high sampling density small chopper throw	AOT/CUS	 10 Jy: 0.5 h >15 Jy: 0.3 h	3 key wavelength combinations: B2A: 60+120µm(2nd+1st order) B2B: 75+150µm(2nd+1st order) B3A: 60+180µm(3rd+1st order) 3 sources 3 sources	7.2	fiducial stars asteroids Sect. 4.1.1 planets Sect. 4.3.3
4.3.8 Relative Spectral Response Function						
A	non-standard unchopped range scan staring on internal CS up and down scan spectral sampling step size: 1005 (quick scan) full wavelength range in order sorting filters A+B 133 (detailed scan) wavelength sub-range according to Table 112	CUS	 1.1 1.1	 on both CSs (2× cold, 1× warm) on CS1 6 subranges each in order sorting filters A+B	19.8	internal CS (cold/warm) telescope pointing on dark field Sect. 4.5
B	non-standard chop/nod range scans high sampling density small chopper throw wavelength sub-range according to Table 112	CUS	 2.0/2.3/3.5 2.6/4.0	3 celestial standards with well known spectral shape 5 subranges in total in order sorting filters A+B	43.2	asteroids Sect. 4.1.1 planets Sect. 4.3.3
C	non-standard chop/nod SED scan different chopper throws for RSRF dependence on chop angle A = B2A-B3A-R1 B = B2B	CUS	 1.1 0.8	l(arge), m(edium) chop throw 2× s(mall) chop throw for RSRF ranges A & B	7.6	bright secondary standard Sect. 4.1.2 planets Sect. 4.3.3
D	non-standard chop/nod range scan large chopper throw spectral sampling step size: 2400 (coarse), 492 steps for	CUS	1.0	order sorting filter positions A+B 2 sources	4.0	bright secondary standard Sect. 4.1.2 asteroids Sect. 4.1.1

Table 111: continued. Observational details of spectrometer flux calibration.

ID: PVSpecFlux						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
4.3.8 Relative Spectral Response Function						
E	non-standard chop/nod range scan large chopper throw Nyquist sampling (coarse) A = B2A-B3A-R1 (51/102–75/150—50/150–70/210µm) B = B2B (71/142–98/196µm	CUS	 1.0 0.5		4.5	bright secondary standard Sect. 4.1.2 asteroids Sect. 4.1.1
F	non-standard unchopped range scan spectral sampling step size: 200 A: 52.9/158.6–73.4/220.2µm B: 51.0/102.0–110.1/220.2µm +internal calibration during slews non-standard chop/nod range scan large chopper throw B: 51.3/102.5–100.0/200.0µm high sampling density	CUS CUS 	 1.2 2.4 4.5		3.6 4.5	very bright flux standard (HIFI) Mars Sect. 4.3.3 flux non-linearity & self-curing effects
4.3.11 Telescope background stability						
A	non-standard chop/nod line scan large chopper throw	CUS	0.33	one line per order [OI] 63 (3rd order) [OIII] 88 (2nd order) [CII] 157 (1st order)	1.0	dark field Sect. 4.5
Note by custodian post mission: *Is the design of 4.3.11 optimal in support of telescope background stability assessment?* *Experiment set-up and frequency of observations does not seem to be adequate* *Check instead for measurements of ID 7.2.1 performed in commissioning and in routine phase*						
4.3.12 CS calibration block straylight assessment						
A	non-standard chop CS1–CS2 grating fixed at key wavelength linear raster scan 3×1 raster, 30” step 7×1 raster, 90” step	CUS	 0.25 0.50	A: 60/120µm (2nd/1st order) B: 75/150µm (2nd/1st order)	1.5	bright FIR source AFGL 618 cf. Sect. 4.3.4

Table 112: Definition of RSRF sub-ranges.

sub-range	$\lambda_{\rm start}$	$\lambda_{\rm end}$	order
A1	102	130	order 1, parallel in order 2': 51 – 65.0
A2	127	153.5	order 1, parallel in order 2': 63.5 – 76.8
A3	50.1	58.1	order 3, parallel in order 1: 150.3 – 174.3
A4	57.3	64.1	order 3, parallel in order 1: 171.9 – 192.4
A5	63.5	68.9	order 3, parallel in order 1: 190.5 – 206.7
A6	68.7	73.4	order 3, parallel in order 1: 206.1 – 220.2
B1	50.9	65.1	order 2, parallel in order 1: 101.8 – 130.2
B2	63.6	76.7	order 2, parallel in order 1: 127.2 – 153.4
B3	75.4	87.1	order 2, parallel in order 1: 150.8 – 174.2
B4	86.0	96.2	order 2, parallel in order 1: 172.0 – 192.4
B5	95.2	103.8	order 2, parallel in order 1: 190.4 – 207.6
B6	103.0	110.2	order 2, parallel in order 1: 206.0 – 220.4
A_1	102.3	145.	order 1, parallel in order 2': 51.1 – 72.5
A_2	150.	186.	order 1, parallel in order 3: 50.0 – 62.0
A_3	180.	210.	order 1, parallel in order 3: 60.0 – 70.0
B_1	120.	170.	order 1, parallel in order 2: 60.0 – 85.0
B_2	165.	210.	order 1, parallel in order 2: 82.5 – 105.0

Table 113: Summary of AORs for the spectrometer flux calibration. The total scheduled time is 106.8741 h.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.3.1 Absolute flux calibration internal sources, spectrometer			
A	internal calibration block (during slew) optimization by parameter variation ABAB and ABBA chop/nod key-λ@75µm (2nd order)			
	ABAB: 64/1/1/16/U/4	PVSpecFlux_431A_nStdSlewCalABAB_01_DarkField_0001	0.1094	OD 64
	ABAB: 64/1/1/16/0/4	PVSpecFlux_431A_nStdSlewCalABAB_02_DarkField_0001	0.1094	OD 64
	ABAB: 64/2/1/16/U/2	PVSpecFlux_431A_nStdSlewCalABAB_03_DarkField_0001	0.1050	OD 64
	ABAB: 64/2/1/16/0/2	PVSpecFlux_431A_nStdSlewCalABAB_04_DarkField_0001	0.1050	OD 64
	ABAB: 64/1/2/16/U/2	PVSpecFlux_431A_nStdSlewCalABAB_05_DarkField_0001	0.0961	OD 64
	ABAB: 64/1/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABAB_06_DarkField_0001	0.0961	OD 64
	ABAB: 64/2/2/16/U/1	PVSpecFlux_431A_nStdSlewCalABAB_07_DarkField_0001	0.0939	OD 64
	ABAB: 64/2/2/16/0/1	PVSpecFlux_431A_nStdSlewCalABAB_08_DarkField_0001	0.0939	OD 64
	ABAB: 32/1/1/16/U/8	PVSpecFlux_431A_nStdSlewCalABAB_09_DarkField_0001	0.1094	OD 64
	ABAB: 32/1/1/16/0/8	PVSpecFlux_431A_nStdSlewCalABAB_10_DarkField_0001	0.1094	OD 64
	ABAB: 32/2/1/16/U/4	PVSpecFlux_431A_nStdSlewCalABAB_11_DarkField_0001	0.1050	OD 64
	ABAB: 32/2/1/16/0/4	PVSpecFlux_431A_nStdSlewCalABAB_12_DarkField_0001	0.1050	OD 64
	ABAB: 32/1/2/16/U/4	PVSpecFlux_431A_nStdSlewCalABAB_13_DarkField_0001	0.0961	OD 64
	ABAB: 32/1/2/16/0/4	PVSpecFlux_431A_nStdSlewCalABAB_14_DarkField_0001	0.0961	OD 64
	ABAB: 32/2/2/16/U/2	PVSpecFlux_431A_nStdSlewCalABAB_15_DarkField_0001	0.0936	OD 64
	ABAB: 32/2/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABAB_16_DarkField_0001	0.0936	OD 64
	ABBA: 64/1/1/16/U/4	PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0001	0.1269	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0002	0.1172	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0003	0.1172	OD 79
	ABBA: 64/1/1/16/0/4	PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0001	0.1269	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0002	0.1172	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0003	0.1172	OD 79
	ABBA: 64/2/1/16/U/2	PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0001	0.1225	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0003	0.1128	OD 79
	ABBA: 64/2/1/16/0/2	PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0001	0.1225	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0003	0.1128	OD 79

Table 113: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.3.1 Absolute flux calibration internal sources, spectrometer			
A	ABBA: 64/1/2/16/U/2	PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0001	0.1136	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0003	0.1128	OD 79
	ABBA: 64/1/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0001	0.1136	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0003	0.1128	OD 79
	ABBA: 64/2/2/16/U/1	PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0001	0.1114	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0002	0.1106	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0003	0.1106	OD 79
	ABBA: 64/2/2/16/0/1	PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0001	0.1114	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0002	0.1106	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0003	0.1106	OD 79
	ABBA: 32/1/1/16/U/8	PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0001	0.1267	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0002	0.1172	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0003	0.1172	OD 79
	ABBA: 32/1/1/16/0/8	PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0001	0.1267	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0002	0.1172	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0003	0.1172	OD 79
	ABBA: 32/2/1/16/U/4	PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0001	0.1222	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0003	0.1128	OD 79
	ABBA: 32/2/1/16/0/4	PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0001	0.1222	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0003	0.1128	OD 79
	ABBA: 32/1/2/16/U/4	PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0001	0.1133	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0003	0.1128	OD 79
	ABBA: 32/1/2/16/0/4	PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0001	0.1133	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0002	0.1128	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0003	0.1128	OD 79
	ABBA: 32/2/2/16/U/2	PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0001	0.1111	OD 64
		PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0002	0.1106	OD 79
		PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0003	0.1106	OD 79

Table 113: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux			
Measurement description	AOR labels	duration (h)	observing constraints
4.3.1 Absolute flux calibration internal sources, spectrometer			
ABBA: 32/2/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0001	0.1111	OD 64
	PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0002	0.1106	OD 79
	PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0003	0.1106	OD 79
combination of one set 1-16 each of ABAB and ABBA on one OD combination of two sets 1-16 of ABBA in reverse order on one OD			
ABBA: 64/2/2/16/0/1	PVSpecFlux_431A_nStdSlewCalABBA_17_DarkField_0001	0.1081	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_17_DarkField_0002	0.1081	OD 90
ABBA: 32/2/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABBA_18_DarkField_0001	0.1081	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_18_DarkField_0002	0.1081	OD 90
ABBA: 32/4/2/16/0/1	PVSpecFlux_431A_nStdSlewCalABBA_19_DarkField_0001	0.1069	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_19_DarkField_0002	0.1069	OD 90
ABBA: 32/64/2/1/0/1	PVSpecFlux_431A_nStdSlewCalABBA_20_DarkField_0001	0.1058	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_20_DarkField_0002	0.1058	OD 90
ABBA: 64/32/2/1/0/1	PVSpecFlux_431A_nStdSlewCalABBA_21_DarkField_0001	0.1061	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_21_DarkField_0002	0.1061	OD 90
ABBA: 32/32/4/1/0/1	PVSpecFlux_431A_nStdSlewCalABBA_22_DarkField_0001	0.1058	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_22_DarkField_0002	0.1058	OD 90
ABBA: 32/42/3/1/0/1	PVSpecFlux_431A_nStdSlewCalABBA_23_DarkField_0001	0.1053	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_23_DarkField_0002	0.1053	OD 90
ABBA: 64/1/2/16/0/2	PVSpecFlux_431A_nStdSlewCalABBA_24_DarkField_0001	0.1103	OD 90
	PVSpecFlux_431A_nStdSlewCalABBA_24_DarkField_0002	0.1103	OD 90
combination of two sets 17-24 of ABBA in reverse order on one OD			

Table 113: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.3.3 Absolute flux calibration external sources, spectrometer			
A	non standard range scan at key wavelengths high sampling density large chopper throw			
	B2A: 60 µm 2nd order	PVSpecFlux_433A_nStdRange_AbsFluxB2A_alphaTau_0001	0.4197	OD 129
	120 µm 1st order	PVSpecFlux_433A_nStdRange_AbsFluxB2A_alphaTau_0002	0.4197	OD 133
		PVSpecFlux_433A_nStdRange_AbsFluxB2A_sirius_0001	0.4197	OD 129
		PVSpecFlux_433A_nStdRange_AbsFluxB2A_sirius_0002	0.4197	OD 141
	B2B: 75 µm 2nd order	PVSpecFlux_433A_nStdRange_AbsFluxB2B_alphaTau_0001	0.4642	OD 129
	150 µm 1st order	PVSpecFlux_433A_nStdRange_AbsFluxB2B_alphaTau_0002	0.4642	OD 133
		PVSpecFlux_433A_nStdRange_AbsFluxB2B_sirius_0001	0.4642	OD 129
		PVSpecFlux_433A_nStdRange_AbsFluxB2B_sirius_0002	0.4642	OD 141
	B3A: 60 µm 3rd order	PVSpecFlux_433A_nStdRange_AbsFluxB3A_alphaTau_0001	0.6586	OD 129
	180 µm 1st order	PVSpecFlux_433A_nStdRange_AbsFluxB3A_alphaTau_0002	0.6586	OD 133
		PVSpecFlux_433A_nStdRange_AbsFluxB3A_sirius_0001	0.6586	OD 129
		PVSpecFlux_433A_nStdRange_AbsFluxB3A_sirius_0002	0.6586	OD 140
A	standard chop/nod range scan at key wavelengths high sampling density small chopper throw			
	A: 60 µm 2nd order	PVSpecFlux_433A_StdRange_AbsFluxA_Gam Dra_0001	1.0472	OD 183
	120 µm 1st order	PVSpecFlux_433A_StdRange_AbsFluxB_Gam Dra_0001	0.5083	OD 183
	and 60 µm 3rd order	PVSpecFlux_433A_StdRange_AbsFluxA_Sirius_0001	1.0472	
	180 µm 1st order	PVSpecFlux_433A_StdRange_AbsFluxB_Sirius_0001	0.5083	
	B: 75 µm 2nd order	PVSpecFlux_433A_StdRange_AbsFluxA_alpBoo_0001	1.0472	
	150 µm 1st order	PVSpecFlux_433A_StdRange_AbsFluxB_alpBoo_0001	0.5083	

Table 113: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.3.4 Flux reproducibility external sources, spectrometer		
A	non-standard chop/nod range scan at key wavelengths small chopper throw high sampling density B2A: 60(2)/120(1) µm B2B: 75(2)/150(1) µm B3A: 60(3)/180(1) µm	PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0001	0.2267	OD 166
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0001	0.2261	OD 166
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0001	0.2256	OD 166
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0002	0.2267	
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0002	0.2261	
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0002	0.2256	OD 166
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0003	0.2267	OD 169
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0003	0.2261	OD 169
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0003	0.2256	OD 169
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0004	0.2267	OD 170
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0004	0.2261	OD 170
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0004	0.2256	OD 170
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0005	0.2267	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0005	0.2261	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0005	0.2256	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0006	0.2267	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0006	0.2261	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0006	0.2256	OD 174
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0007	0.2267	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0007	0.2261	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0007	0.2256	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0008	0.2267	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0008	0.2261	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0008	0.2256	OD 182
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0009	0.2267	OD 183
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0009	0.2261	OD 183
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0009	0.2256	OD 183
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0010	0.2267	OD 194
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0010	0.2261	OD 194
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0010	0.2256	OD 194

Table 113: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
	4.3.4 Flux reproducibility external sources, spectrometer			
A		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0011	0.2267	OD 195
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0011	0.2261	OD 195
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0011	0.2256	OD 195
		PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0012	0.2267	
		PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0012	0.2261	
		PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0012	0.2256	
B	standard chop/nod range scan at key wavelength 75(2)/150(1) µm large chopper throw high sampling density	PVSpecFlux_434B_StdRange_RepFlux_HD161796_0001	0.2889	
		PVSpecFlux_434B_StdRange_RepFlux_HD161796_0002	0.2889	
		PVSpecFlux_434B_StdRange_RepFlux_HD161796_0003	0.2889	
		PVSpecFlux_434B_StdRange_RepFlux_HD161796_0004	0.2889	
		PVSpecFlux_434B_StdRange_RepFlux_HD161796_0005	0.2889	
		PVSpecFlux_434B_StdRange_RepFlux_Arp220_0001	0.2889	

Table 114: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.3.5 Linearity with flux		
A	standard chop/nod range scan at key wavelengths high sampling density large chopper throw			
	A: 60 µm 2nd order	PVSpecFlux_435A_StdRange_LinFluxA_Juno_0001	0.8997	
	120 µm 1st order	PVSpecFlux_435A_StdRange_LinFluxA_Melpomene_0001	0.8997	
	and 60 µm 3rd order	PVSpecFlux_435A_StdRange_LinFluxA_betAnd_0001	1.7208	
	180 µm 1st order	PVSpecFlux_435A_StdRange_LinFluxB_Juno_0001	0.4403	
	B: 75 µm 2nd order	PVSpecFlux_435A_StdRange_LinFluxB_Melpomene_0001	0.4403	
	150 µm 1st order	PVSpecFlux_435A_StdRange_LinFluxB_betAnd_0001	0.8103	
A	non-standard chop/nod range scan at key wavelengths small chopper throw high sampling density			
	B2A: 60(2)/120(1) µm	PVSpecFlux_435A_nStdRange_LinFluxB2A_fortuna_0001	0.4225	OD 129
	B2B: 75(2)/150(1) µm	PVSpecFlux_435A_nStdRange_LinFluxB2B_fortuna_0001	0.4669	OD 129
	B3A: 60(3)/180(1) µm	PVSpecFlux_435A_nStdRange_LinFluxB3A_fortuna_0001	0.6614	OD 129
		PVSpecFlux_435A_nStdRange_LinFluxB2A_Thisbe_0001	0.2294	OD 170
		PVSpecFlux_435A_nStdRange_LinFluxB2B_Thisbe_0001	0.2289	OD 170
		PVSpecFlux_435A_nStdRange_LinFluxB3A_Thisbe_0001	0.2283	OD 170
		PVSpecFlux_435A_nStdRange_LinFluxB2A_Vesta_0001	0.2294	OD 170
		PVSpecFlux_435A_nStdRange_LinFluxB2B_Vesta_0001	0.2289	OD 170
		PVSpecFlux_435A_nStdRange_LinFluxB3A_Vesta_0001	0.2283	OD 170

Table 114: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.3.8 RSRF		
A	non-standard unchopped range scan staring on internal CS spectral sampling step size: 1005 (Quick) / 133 (Rsrf) up and down scan quick: full wavelength range Rsrf: wavelength range according to sub-range ID in Table 112 pilot ≈ A1	PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0001	1.0797	OD 78, cold CS1
		PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0002	1.0797	OD 78, warm CS1
		PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0003	1.0747	OD 154, cold CS1
		PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0001	1.0797	OD 78, cold CS2
		PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0002	1.0797	OD 78, warm CS2
		PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0003	1.0747	OD 154, cold CS2
		PVSpecFlux_438A_nStdSlewCal_A_DarkField_0001	0.0861	OD 64
		PVSpecFlux_438A_nStdRsrf_CS1Pilot_DarkField_0001	0.9014	OD 64
		PVSpecFlux_438A_nStdRsrf_CS1_A1_Darkfield_0001	1.0378	OD 91
		PVSpecFlux_438A_nStdRsrf_CS1_A2_Darkfield_0001	1.0378	OD 90
		PVSpecFlux_438A_nStdRsrf_CS1_A3_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_A4_Darkfield_0001	1.0403	OD 79
		PVSpecFlux_438A_nStdRsrf_CS1_A5_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_A6_Darkfield_0001	1.1072	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_B1_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_B2_Darkfield_0001	1.0378	OD 90
		PVSpecFlux_438A_nStdRsrf_CS1_B3_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_B4_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_B5_Darkfield_0001	1.0378	OD 93
		PVSpecFlux_438A_nStdRsrf_CS1_B6_Darkfield_0001	1.1072	OD 93
B	non-standard chop/nod range scans high sampling density small chopper throw wavelength range according to sub-range ID in Table 112	PVSpecFlux_438B_NstdRange_RsrfA_1_Vesta_0001	1.9803	OD 154
		PVSpecFlux_438B_NstdRange_RsrfA_2_Vesta_0001	2.2733	OD 154
		PVSpecFlux_438B_NstdRange_RsrfA_3_Vesta_0001	2.4078	OD 154
		PVSpecFlux_438B_NstdRange_RsrfB_1_Vesta_0001	1.5858	OD 155
		PVSpecFlux_438B_NstdRange_RsrfB_2_Vesta_0001	2.9992	OD 155
		PVSpecFlux_438B_NstdRange_RsrfA_1_Neptune_0001	1.9781	OD 169
		PVSpecFlux_438B_NstdRange_RsrfA_2_Neptune_0001	2.2711	OD 169
		PVSpecFlux_438B_NstdRange_RsrfA_3_Neptune_0001	3.4378	OD 169
		PVSpecFlux_438B_NstdRange_RsrfB_1_Neptune_0001	2.5639	OD 169
		PVSpecFlux_438B_NstdRange_RsrfB_2_Neptune_0001	3.9881	OD 169
		PVSpecFlux_438B_NstdRange_RsrfA_1_Uranus_0001	1.9781	OD 195
		PVSpecFlux_438B_NstdRange_RsrfA_2_Uranus_0001	2.2711	OD 195
		PVSpecFlux_438B_NstdRange_RsrfA_3_Uranus_0001	3.4378	OD 195
		PVSpecFlux_438B_NstdRange_RsrfB_1_Uranus_0001	2.5639	OD 195
		PVSpecFlux_438B_NstdRange_RsrfB_2_Uranus_0001	3.9881	OD 195

Table 114: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.3.8 RSRF		
C	non-standard chop/nod SED scan different chopper throws l(arge), m(edium), s(mall) for RSRF dependence on chop angle A = B2A-B3A-R1 (51.1/102.3–75/150—50/150–70/210µm) B = B2B (67/134–105/210µm)	PVSpecFlux_438C_NstdSEDChop_l_A_neptune_0001 PVSpecFlux_438C_NstdSEDChop_m_A_neptune_0001 PVSpecFlux_438C_NStdSEDChop_l_B_neptune_0001 PVSpecFlux_438C_NStdSEDChop_m_B_neptune_0001 PVSpecFlux_438C_NStdSEDChop_s_B_HD161796_0001 PVSpecFlux_438C_NstdSEDChop_s_A_HD161796_0001 PVSpecFlux_438C_NstdSEDChop_s_A_Uranus_0001 PVSpecFlux_438C_NStdSEDChop_s_B_Uranus_0001	1.0703 1.0703 0.8228 0.8214 0.8164 1.0653 1.0681 0.8192	OD 169 OD 169 OD 169 OD 169 OD 170 OD 174 OD 195 OD 195
D	non-standard chop/nod range scan large chopper throw spectral sampling step size: 2400 (coarse), 492 steps for order sorting filter positions A+B	PVSpecFlux_438D_NstdCoarseRsrf_A_Arp220_0001 PVSpecFlux_438D_NstdCoarseRsrf_B_Arp220_0001 PVSpecFlux_438D_NstdCoarseRsrf_A_Melpomene_0001 PVSpecFlux_438D_NstdCoarseRsrf_B_Melpomene_0001	0.9186 0.9186 0.9214 0.9214	OD 79 OD 79 OD 78 OD 78
E	non-standard chop/nod range scan large chopper throw Nyquist sampling (coarse) A = B2A-B3A-R1 (51/102–75/150—50/150–70/210µm) B = B2B (71/142–98/196µm)	PVSpecFlux_438E_NstdCoarseRsrf_A_Fortuna_0001 PVSpecFlux_438E_NstdCoarseRsrf_B_Fortuna_0001 PVSpecFlux_438E_NstdCoarseRsrf_A_Fortuna_0002 PVSpecFlux_438E_NstdCoarseRsrf_B_Fortuna_0002 PVSpecFlux_438E_NstdCoarseRsrf_A_HD161796_0001 PVSpecFlux_438E_NstdCoarseRsrf_B_HD161796_0001	0.9775 0.4925 0.9775 0.4925 0.9747 0.4897	OD 103 OD 103 OD 141 OD 141 OD 142 OD 142
F	non-standard unchopped range scan spectral sampling step size: 200 A: 52.9/158.6–73.4/220.2µm B: 51.0/102.0–110.1/220.2µm +internal calibration during slews non-standard chop/nod range scan large chopper throw B: 51.3/102.5–100.0/200.0µm high sampling density	PVSpecFlux_438F_nStdSlewCal_A_Mars_0001 PVSpecFlux_438F_NstdRsrf_A_Mars_0001 PVSpecFlux_438F_nStdSlewCal_B_Mars_0001 PVSpecFlux_438F_NstdRsrf_B_Mars_0001 PVSpecFlux_438F_nStdSlewCal_B_Mars_0002 PVSpecFlux_438F_NstdRange_B_Mars_0001	0.0264 1.1486 0.0286 2.3528 0.0422 4.5111	OD 126 OD 126 OD 126 OD 126 OD 142 OD 142
schedule Mars observations at the end of a spectrometer observation block due to self-curing effects by very bright source				

Table 114: continued. Summary of AORs for the spectrometer flux calibration.

ID: PVSpecFlux				
	Measurement description	AOR labels	duration (h)	observing constraints
		4.3.11 Telescope background stability		
A	non-standard chop/nod line scan large chopper throw [OI] 63 (3rd order) [OIII] 88 (2nd order) [CII] 157 (1st order)	 PVSpecFlux_4311A_NstdLineSpec_01A_DarkField_0001 PVSpecFlux_4311A_NstdLineSpec_01B1_DarkField_0001 PVSpecFlux_4311A_NstdLineSpec_01B2_DarkField_0001	 0.3308 0.3194 0.3031	 OD 90 OD 90 OD 90
	Note by custodian post mission: *Is the design of 4.3.11 optimal in support of telescope background stability assessment?* *Experiment set-up and frequency of observations does not seem to be adequate* *Check instead for measurements of ID 7.2.1 performed in commissioning and in routine phase*			
		4.3.12 CS calibration straylight assessment		
A	non-standard chop CS1–CS2 grating fixed at key wavelength A: 60/120µm (2nd/1st order) B: 75/150µm (2nd/1st order) linear raster scan S: 3×1 raster, 30” step L: 7×1 raster, 90” step	 PVSpecFlux_4312A_FlexRasterGen_SA_AFGL618_0001 PVSpecFlux_4312A_FlexRasterGen_SB_AFGL618_0001 PVSpecFlux_4312A_nStdFlexRasterGen_LA_AFGL618_0001 PVSpecFlux_4312A_nStdFlexRasterGen_LB_AFGL618_0001 PVSpecFlux_4312A_nStdFlexRasterGen_LA_AFGL618_0002 PVSpecFlux_4312A_nStdFlexRasterGen_LB_AFGL618_0002	 0.2306 0.2272 0.4861 0.4783 0.4861 0.4783	 OD 102 OD 102 OD 129 OD 129 OD 133 OD 133

6.24 AOT Validation Spectrometer

This test block comprises the check-out and scientific validation of the spectrometer AOT modes. It also addresses optimisation of certain AOT parameters which could not be completely optimised on ground and it investigates the best internal calibration strategy with regard to the stability of the measurement conditions. A graphical overview of the spectrometer AOT validation strategy is shown in Fig. 94. The overview of the foreseen measurements is given in Table 116.

Note: The aspect of unchopped line and range spectroscopy just started during PV Phase. It was considerably extended during the beginning of Routine Calibration Phase (cf. Routine Phase Calibration Plan, RD5). Unchopped line spectroscopy showed a better performance than the wave switching mode and finally replaced the latter observing mode.

Table 115: Visibilities of the targets used in the PVSpecAOTVal proposal.

Target	Start	End
TX Cam	06-Aug-2009	20-Oct-2009
DG Tau	02-Aug-2009	02-Oct-2009
HD 100546	always visible	
NGC 40	always visible	
NGC 1569	28-Jul-2009	23-Oct-2009
NGC 5315	27-Jun-2009	11-Oct-2009
NGC 6302	12-Aug-2009	15-Oct-2009
NGC 6543	always visible	
Orion Bar	11-Aug-2009	21-Oct-2009
Mrk 231	30-Sep-2009	30-Jan-2010
II Zw40	20-Aug-2009	24-Oct-2009

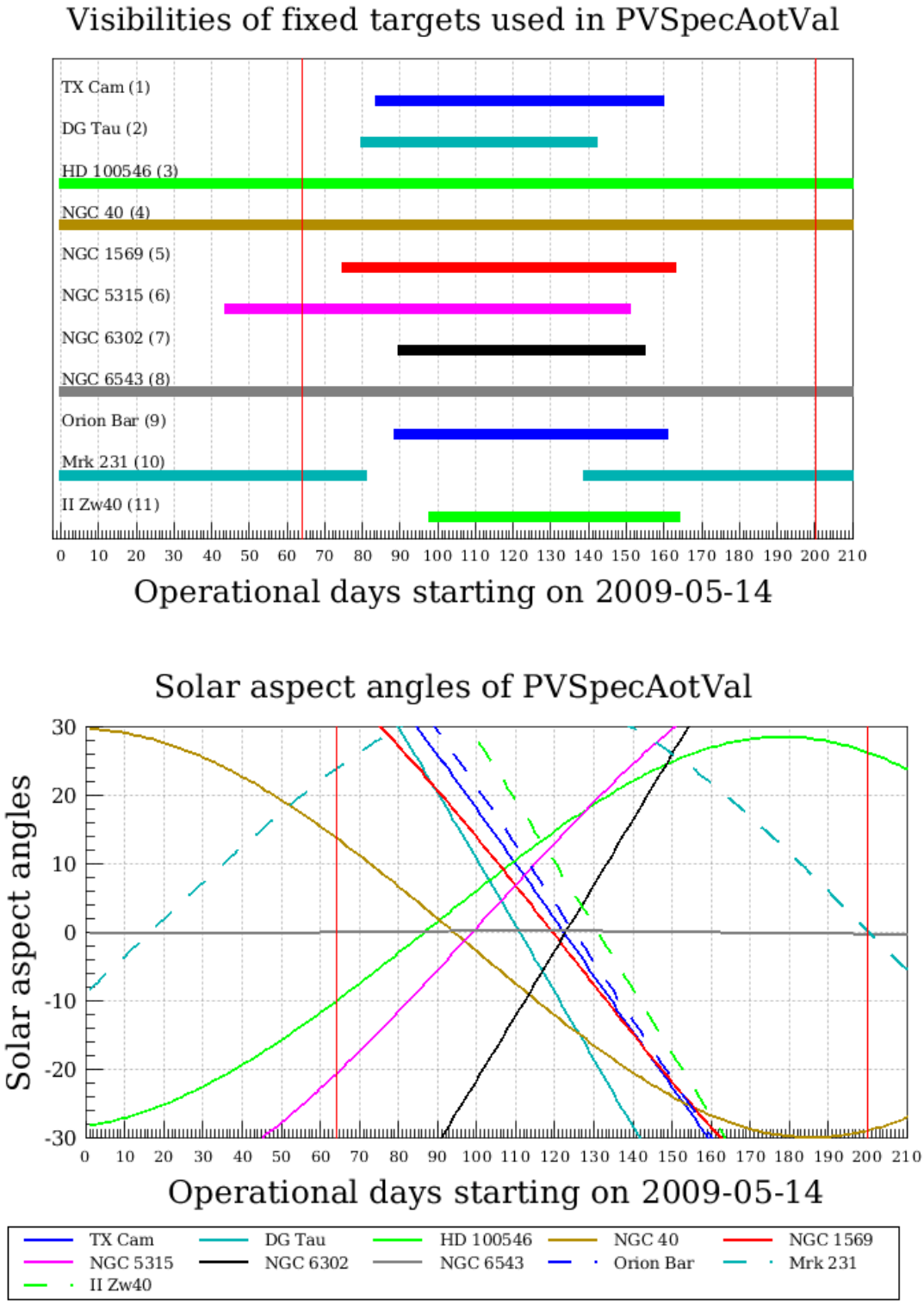


Figure 93: Visibilities and solar aspect angles of the fixed targets used for the AORs of the PVSpecAOTVal proposal.

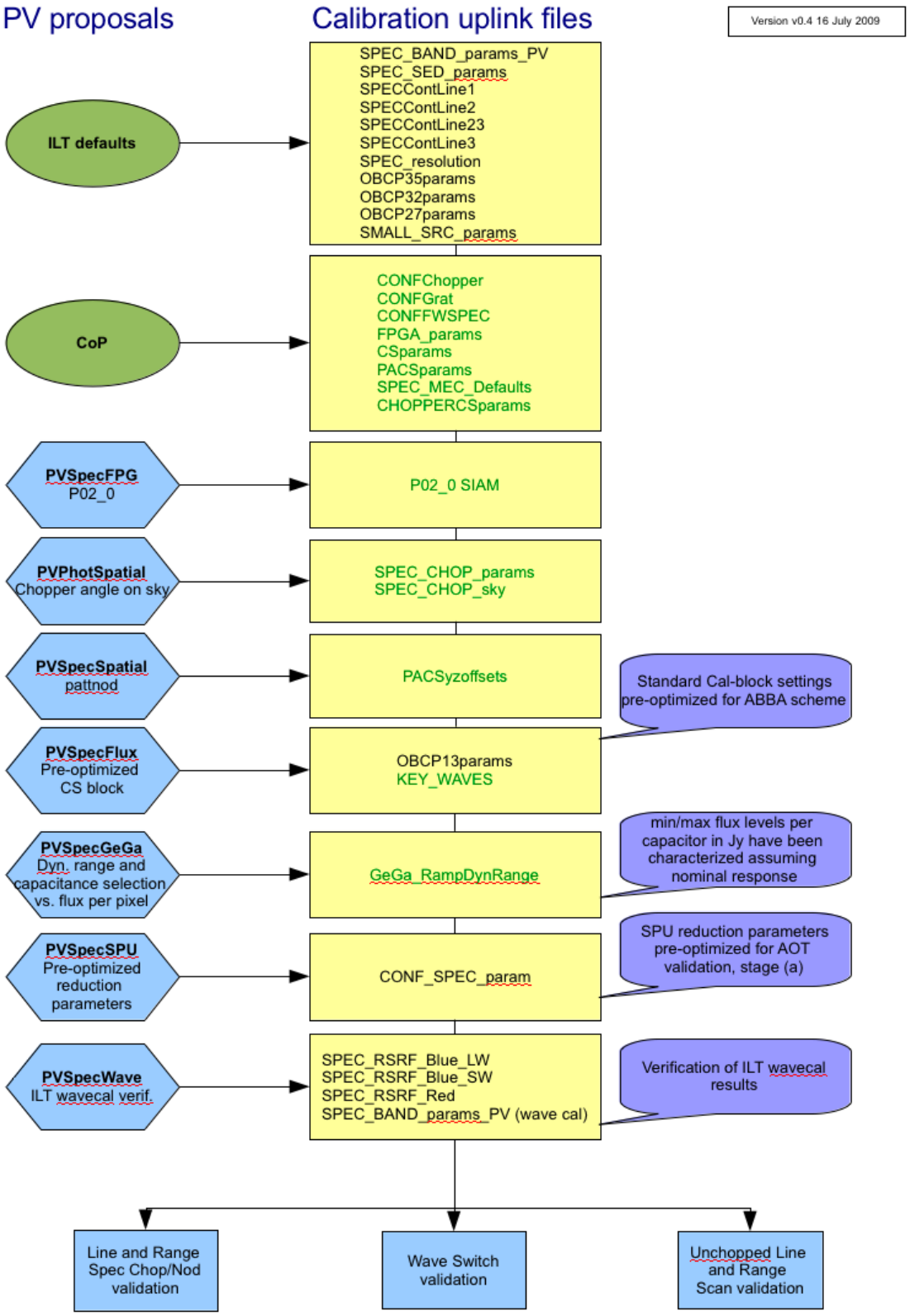


Figure 94: Graphical overview of spectrometer AOT validation strategy: Calibration uplink files.

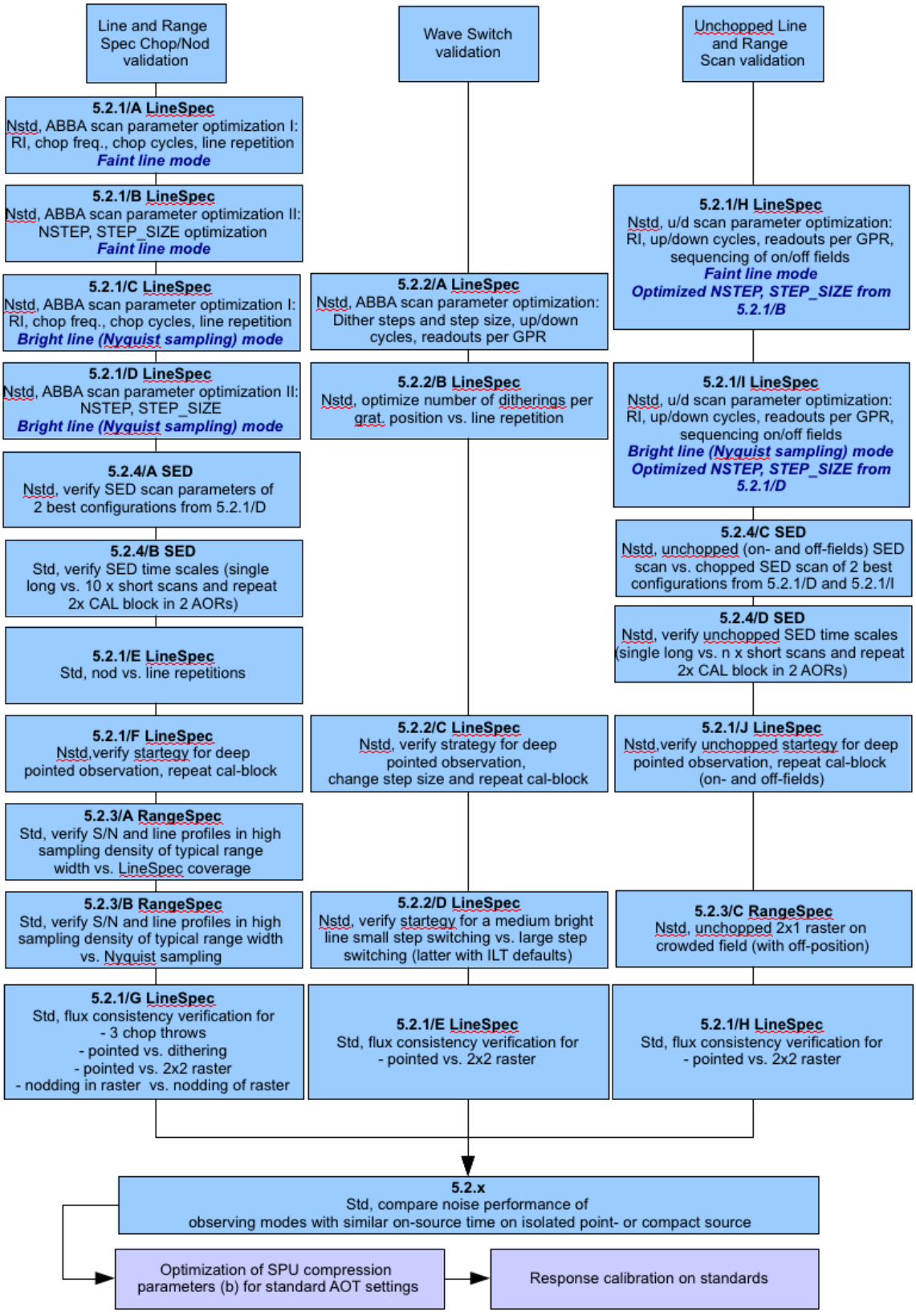


Figure 94: Graphical overview of spectrometer AOT validation strategy: Parameters and aspects to be checked & commonality between the different spectrometer observing modes.

5.2.1/A	PacsCal_PacsLineSpec_PV	Non-standard	Chop/nod (OBCP35)	Goal
ABBA scan parameter optimization I: RI, chop freq., chop cycles, line repetition *Faint line mode*	**Optimize parameters in ABBA scheme:**	- ramps per plateau: - cycles per grating position: - line repetitions: - reset interval:	1, 2, 3, 4 1, 2, 4 1, 2, 4 32, 64	OBCP35params optimized for "faint lines" mode, the atomic scan block parameters are fixed - ramps per plateau: - cycles per grat. pos: - min line repetitions: - reset interval:
Sources: NGC 5315 **Duration:**	**Fixed parameters:**	- nod cycles: - chopper throw: - number of grating steps: - grating step size:	1 Large Default (order dependent) Default (order dependent)	
Lines: O I 3P1-3P2 63.18 O III 3P1-3P0 88.36 C II C+ 157.74	**Planned on ODs:**	TBD	**Comments:**	

Prior	Chop throw	Line rep.	Nod cycles	Cycles/ grat. pos	Ramps/ plateau	Grat step size	Grating steps	Cal blocks	Cap blue	Cap red	Reset interval	Reads./ subrap	SPU comp. scen.	Config.
1	large	2	1	1	2	def	def	1	def	def	64	def	def	1
1	large	1	1	2	2	def	def	1	def	def	64	def	def	2
1	large	2	1	2	1	def	def	1	def	def	64	def	def	3
2	large	4	1	1	1	def	def	1	def	def	64	def	def	4
1	large	1	1	4	1	def	def	1	def	def	64	def	def	5
1	large	1	1	1	4	def	def	1	def	def	64	def	def	6
1	large	2	1	2	2	def	def	1	def	def	32	def	def	7
2	large	4	1	2	1	def	def	1	def	def	32	def	def	8
1	large	2	1	1	4	def	def	1	def	def	32	def	def	9
2	large	2	1	4	1	def	def	1	def	def	32	def	def	10
2	large	4	1	1	2	def	def	1	def	def	32	def	def	11
1	large	1	1	4	2	def	def	1	def	def	32	def	def	12
1	large	1	1	2	4	def	def	1	def	def	32	def	def	13
1	large	1	1	1	1	def	def	1	def	def	64	def	def	14
1	large	1	1	1	3	def	def	1	def	def	32	def	def	15
1	large	1	1	1	2	def	def	1	def	def	32	def	def	16
1	large	1	1	1	1	def	def	1	def	def	32	def	def	17

3 best settings

5.2.1/B	PacsCal_PacsLineSpec_PV	Non-standard	Chop/nod (OBCP35)	Goal
Nstd. ABBA scan parameter optimization II: NSTEP, STEP_SIZE optimization *Faint line mode*	**Optimize parameters in ABBA scheme:**	- number of grating steps - grating step size	Wavelength dependent Wavelength dependent	SPEC_BAND_params_PV optimized for "faint lines", the atomic scan block parameters are fixed - NSTEP (TBC if wave dependent) - STEP_SIZE (TBC if wave dependent)
Sources: NGC 5315 **Duration:**	**Fixed parameters:**	- ramps per plateau: - cycles per grating position: - line repetitions: - reset interval:	From 5.2.1/A	
Lines: O I 3P1-3P2 63.18 O III 3P1-3P0 88.36 C II C+ 157.74	**Planned on ODs:**	TBD	**Comments:**	

Prior	Chop throw	Line repetition	Nod cycles	Cycles/ grat. pos	Ramps/ plateau	Grat step size	Grating steps	Cal blocks	Cap blue	Cap red	Reset interval	Reads./ subrap	SPU comp. scen.	Config
1	large	TBD	1	TBD	TBD	Wave dep.	Wave dep.	1	def	def	TBD	def	def	1
1	large	TBD	1	TBD	TBD	Wave dep.	Wave dep.	1	def	def	TBD	def	def	2
1	large	TBD	1	TBD	TBD	Wave dep.	Wave dep.	1	def	def	TBD	def	def	3

Figure 94: Graphical overview of spectrometer AOT validation strategy: Parameter range optimization 1 for line spectroscopy.

5.2.1/C	PacsCal_PacsLineSpec_PV	Non-standard	Chop/nod (OBCP35)	Goal
Nstd. ABBA scan parameter optimization I: RI, chop freq., chop cycles, line repetition *Bright line (Nyquist sampling) mode*	**Optimize parameters in ABBA scheme:**	- ramps per plateau: - cycles per grating position: - line repetitions: - reset interval:	1, 2, 3, 4 1, 2 1, 2 32, 64	OBCP35params optimized for "bright lines", the atomic scan block parameters are fixed - ramps per plateau: - cycles per grat. pos: - min line repetitions: - reset interval:
Sources: NGC 5315	**Fixed parameters:**	- nod cycles: - chopper throw: - number of grating steps: - grating step size:	1 Large Default (order dependent) Default (order dependent)	
Lines: O I 3P1-3P2 63.18 O III 3P1-3P0 88.36 C II C+ 157.74	**Planned on ODs:**	TBD	**Comments:**	

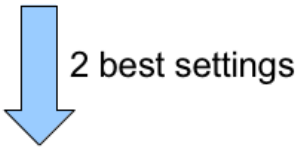
Prior	Chop throw	Line rep.	Nod cycles	Cycles/ grat. pos	Ramps/ plateau	Grat step size	Grating steps	Cal blocks	Cap blue	Cap red	Reset interval	Reads./ subrap	SPU comp. scen.	Config
1	large	2	1	1	2	def	def	1	def	def	32	def	def	1
1	large	1	1	2	2	def	def	1	def	def	32	def	def	2
1	large	1	1	1	4	def	def	1	def	def	32	def	def	3
2	large	1	1	1	3	def	def	1	def	def	32	def	def	4
1	large	1	1	1	2	def	def	1	def	def	32	def	def	5
1	large	1	1	1	2	def	def	1	def	def	64	def	def	6
1	large	2	1	1	1	def	def	1	def	def	64	def	def	7

2 best settings +
2 best settings with short step size (8 pixels instead of 16)

5.2.1/D	PacsCal_PacsLineSpec_PV	Non-standard	Chop/nod (OBCP35)	Goal
Nstd. ABBA scan parameter optimization II: NSTEP, STEP_SIZE *Bright line (Nyquist sampling) mode*	**Optimize parameters in ABBA scheme:**	- number of grating steps - grating step size	Wavelength dependent Wavelength dependent	SPEC_BAND_params_PV optimized for "bright lines", the atomic scan block parameters are fixed - NSTEP (TBC if wave dependent) - STEP_SIZE (TBC if wave dependent)
Sources: NGC 5315 **Duration:**	**Fixed parameters:**	- ramps per plateau: - cycles per grating position: - line repetitions: - reset interval:	From 5.2.1/C	
Lines: O I 3P1-3P2 63.18 O III 3P1-3P0 88.36 C II C+ 157.74	**Planned on ODs:**	TBD	**Comments:**	

Prior	Chop throw	Line rep.	Nod cycles	Cycles/ grat. pos	Ramps/ plateau	Grat step size	Grating steps	Cal blocks	Cap blue	Cap red	Reset interval	Reads./ subrap	SPU comp. scen.	Config
1	large	TBD	1	TBD	TBD	Wave dep. 16 pixels	Wave dep. 16 pixels	1	def	def	TBD	def	def	1
1	large	TBD	1	TBD	TBD	Wave dep. 16 pixels	Wave dep. 16 pixels	1	def	def	TBD	def	def	2
1	large	TBD	1	TBD	TBD	Wave dep. 8 pixels	Wave dep. 8 pixels	1	def	def	TBD	def	def	3
1	large	TBD	1	TBD	TBD	Wave dep. 8 pixels	Wave dep. 8 pixels	1	def	def	TBD	def	def	4

Figure 94: Graphical overview of spectrometer AOT validation strategy: Parameter range optimization 2 for line spectroscopy.



5.2.4/A	PacsCal_PacsRangeSpec_P	Non-standard	Chop/nod (OBCP35)	Goal
Nstd. verify SED scan parameters of 2 best configurations from 5.2.1/D	**Optimize parameters in ABBA scheme:**	N/A		OBCP35params optimized for SED modes, the atomic scan block parameters are fixed
Sources: NGC 5315	**Fixed parameters:**	All inherited from 5.2.1/D	From 5.2.1/D	- ramps per plateau: - cycles per grat. pos: - min line repetitions: - reset interval:
Duration:				
Ranges: SED Red SED Blue SED Blue extended 2nd order	**Planned on ODs:**	TBD	**Comments:**	SPEC_BAND_params_PV optimized for SED modes the atomic scan block parameters are fixed - NSTEP - STEP_SIZE

Prior	Chop throw	Line rep.	Nod cycles	Cycles/ grat. pos	Ramps/ plateau	Grat step size	Grating steps	Cal blocks	Cap blue	Cap red	Reset interval	Reads./ subrap	SPU comp. scen.	Config
1	large	TBD	1	TBD	TBD	TBD	TBD	1	def	def	TBD	def	def	1
1	large	TBD	1	TBD	TBD	TBD	TBD	1	def	def	TBD	def	def	2

Figure 94: Graphical overview of spectrometer AOT validation strategy: Application of best line spectroscopy parameter sets to range spectroscopy.

Table 116: Observational details of spectrometer AOT validation. Default settings in non-standard observations are high-lighted in bold face. The total exstimated time for spectrometer AOT validation is 200.7 h. The total estimated time for chop/nod and unchopped line spectroscopy is 110.1 h.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
A	non-standard chop/nod line scan faint lines large chopper throw 48 grat steps, step size 168 [OI] 46 grat steps, step size 188 [OIII] 43 grat steps, step size 240 [CII] nod cycles: 1 ABBA scan parameter optimisation I chop frequency, chop cycles, grating up-down cycles	CUS	 0.3 0.15	3 lines: [OI]63 µm (3rd order) [OIII]88 µm (2nd order) [CII]157 µm 17 scan parameter combinations: combi 1 - 13 combi 14 - 17 chop cycles per grat pos.: 1, 2, 4 ramps per chop plateau: 1, 2, 3, 4 grating up-down cycles: 1, 2, 4 read-outs per ramp: 32, 64 read-outs per subramp: 32, 16 SPU reduction mode: rf, ra (rf = ramp fitting, ra = ramp average)	13.5	NGC 5315 (PN)
A	standard chop/nod line scan large chopper throw line repetition: 1 nodding/grating scan cycles: 1 performance verification	AOT	 0.15 0.1 0.35 0.2	4 lines: [OI]63 µm (3rd order) [OIII]88 µm (2nd order) [CII]157 µm [NII]205 µm faint line mode, pointed bright line mode, pointed faint line mode, dithered pointing bright line mode, dithered pointing dithering = 3×1 raster, 2” step	3.2	NGC 5315 (PN)

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
A	non-standard chop/nod observations at fixed grating position large chopper throw	CUS	0.18	2 oder sorting filter positions (A/B) 3 key wavelength combinations: 60/120, 75/150, 60,90/180 µm garing pos.: 947386, 737692, 495417 in total: 3 measurement sets (1×A,2×B	1.7	NGC 6543 always visible PN
Note by custodian post mission: *These measurements seem to be rather in support of calibration items:* *4.3.2 Reproducibility internal sources, spectrometer; 1.2.7 Nominal responsivity; 1.2.13 Ionising radiation: Responsivity spectrometer*						
B	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 chop cycles per grating pos.: 1 # up-down grating scans: 2 ABBA scan parameter optimisation II NSTEP, STEP_SIZE	CUS	0.3	3 lines with 3 different sets for # grating steps & step size [OI]63 µm (3rd order) step size: 175, steps: 45, 48, 51 [OIII]88 µm (2nd order) step size: 212, steps: 39, 42, 45 [CII]157 µm step size: 322, steps: 29, 32, 35 2 SPU settings: 2 ramps per chop plateau with 64 read-outs, ramp averaging (ra) 4 ramps per chop plateau with 32 read-outs, ramp fitting (rf)	5.4	NGC 5315 (PN)
B	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 # up-down grating scans: 6(5-7) ABBA scan parameter optimisation II NSTEP, STEP_SIZE	CUS	0.7	3 lines [NIII]57 µm (3rd order) step size: 172, steps: 46, line centered [OIII]88 µm (2nd order) step size: 212, steps: 39, line centered [NII]122 µm step size: 263, steps: 34, line centered 2 SPU settings: 1 chop cycle, 2 ramps per chop plateau with 64 read-outs, ramp averaging (ra) 2 chop cycles, 2 ramps per chop plateau with 32 read-outs, ramp fitting (rf)	4.2	Mrk 231 (galaxy)

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
C	non-standard chop/nod line scan bright lines large chopper throw 10 grat steps, step size: 168 [OI], 188[OIII], 240[CII] nod cycles: 1 ABBA scan parameter optimisation I chop frequency, chop cycles, grating up-down cycles	CUS	0.2	3 lines: [OI]63 µm (3rd order) [OIII]88 µm (2nd order) [CII]157 µm 7 scan parameter combinations: chop cycles per grat pos.: 1, 2 ramps per chop plateau: 1, 2, 3, 4 grating up-down cycles: 1, 2 read-outs per ramp: 32, 64 read-outs per subramp: 32, 16 SPU reduction mode: rf, ra (rf = ramp fitting, ra = ramp average)	4.2	NGC 5315 (PN)
D	non-standard chop/nod line scan bright lines large chopper throw nod cycles: 1 chop cycles per grating pos.: 1 # up-down grating scans: 1 ABBA scan parameter optimisation II NSTEP, STEP_SIZE	CUS	0.1	3 lines with 1 set for # grating steps & step size [OI]63 µm (3rd order) step size: 175, steps: 8 [OIII]88 µm (2nd order) step size: 212, steps: 5 [CII]157 µm step size: 322, steps: 4 2 SPU settings: ramps per chop plateau: 2, 4 with 32 read-outs, ramp fitting (rf)	0.6	NGC 5315 (PN)
E	non-standard chop/nod line scan faint lines large chopper throw 48 grat steps, step size 168 [OI] 43 grat steps, step size 240 [CII] chop cycles per grating pos.: 1 ramps per chopper plateau: 2	CUS	0.5	2 lines: [OI]63 µm (3rd order) [CII]157 µm 3 nod - line rep combis # nod cycles: 1, 2, 4 vs. # up-down grating scans: 8, 4, 2	3.0	DG Tau

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
G	non-standard chop/nod line scan faint lines nod cycles: 1 chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) flux consistence verification for chopper throw variation	CUS	0.12	3 lines with 1 set for # grating steps & step size [OI]63 µm (3rd order) step size: 168, steps: 48 [OIII]88 µm (2nd order) step size: 188, steps: 46 [CII]157 µm step size: 240, steps: 43 each with 3 chopper throws: L(arge), M(edium), S(mall)	1.1	NGC 5315 (PN)
G	non-standard chop/nod line scan bright lines large chopper throw 7×1 nodding raster, 2" step (dither map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) flux consistence verification with pointed observation 5.2.1C	CUS	0.3	3 lines with 1 set for # grating steps & step size [OI]63 µm (3rd order) step size: 168, steps: 10 [OIII]88 µm (2nd order) step size: 188, steps: 10 [CII]157 µm step size: 240, steps: 10	0.9	NGC 5315 (PN)
G	non-standard chop/nod line scan bright lines large chopper throw 3×3 nodding raster, 3" step (raster map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) flux consistence verification with pointed observation 5.2.1C	CUS	0.4	3 lines with 1 set for # grating steps & step size [OI]63 µm (3rd order) step size: 168, steps: 10 [OIII]88 µm (2nd order) step size: 188, steps: 10 [CII]157 µm step size: 240, steps: 10	1.2	NGC 5315 (PN)

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
G	non-standard chop/nod line scan bright lines large chopper throw 9×9 nodding raster, 3" step (raster map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf)	CUS	3.7	3 lines with 1 set for # grating steps & step size [OI]63 µm (3rd order) step size: 168, steps: 10 [OIII]88 µm (2nd order) step size: 188, steps: 10 [CII]157 µm step size: 240, steps: 10	11.1	NGC 40 (PN) (extended emission)
G	standard chop/nod line scan faint lines large chopper throw optimum PSF sampling strategy for large scale maps	AOT	 2.3 3.6 2.1 1.2	H_2O 66.44 µm (3rd order) δy, $\delta z = \frac{5}{3}$ of spaxel even number of raster points (offset) odd number of raster points (centered) H_2O 138.53 µm (1st order) δy, $\delta z = \frac{5}{2}$ of spaxel even number of raster points (offset) odd number of raster points (centered)	9.2	Neptune Sect. 4.3.3
H	non-standard unchopped grating scan faint line scan emulation ramps per grating position: 2 # up-down grating scans: 4 grating scan parameter optimisation NSTEP, STEP_SIZE fine pointing	CUS	0.11	2 lines with 3 different sets for # grating steps, step size fixed [OI]63 µm (3rd order) step size: 175, steps: 45, 48, 51 [OIII]88 µm (2nd order) step size: 212, steps: 39, 42, 45 2 lines with 1 set for # grating steps, step size [CII]157 µm step size: 322, steps: 29 [NII]205 µm step size: 410, steps: 24 on and off-position	1.8	NGC 5315 (PN)
	internal calibration block chopped per AOR block on one line cf. 4.3.1A (Sect. 6.23)	CUS	0.1		0.4	

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
H	non-standard unchopped line scan nodding to 6' off-position faint lines standard # grat. steps & step size grating scan parameter optimization grating up-down cycles ramps per grating step read-outs per ramp	CUS	0.16	5 lines: [NIII]57 µm (3rd order) [OIII]88 µm (2nd order) [NII]121 µm, [CII]157 µm, [NII]205 µm 4 SPU settings: 32 read-outs, ramp fitting (rf) ramps per grating position: 2, 4 # up-down grating scans: 8, 4 64 read-outs, ramp averaging (ra) ramps per grating position: 1, 2 # up-down grating scans: 8, 4	3.2	NGC 1569 galaxy
J	non-standard unchopped grating scan faint line scan emulation ramps per grating position: 2 # up-down grating scans: 3 comparison with wave-switching mode 5.2.2C	CUS	0.2	2 lines: HD 112.1 µm step size: 200, steps: 85 HD 56 µm (3rd order) step size: 200, steps: 75	0.4	Orion OMC-1 (extended bright source)
K	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 ABBA scan parameter optimisation chop frequency, chop cycles, grating up-down cycles measurement repeatability	CUS	0.65	2 objects, 3 lines each [NIII]57 µm (3rd order) step size: 168, steps: 48 [NII]121 µm step size: 240, steps: 43 [OIII]88 µm (2nd order) or step size: 188, steps: 46 or [CII]157 µm step size: 240, steps: 43 7 scan parameter combinations: chop cycles per grat pos.: 1, 2 ramps per chop plateau: 1, 2, 4 grating up-down cycles: 5, 10 read-outs per ramp: 32, 64 SPU reduction mode: rf, ra (rf = ramp fitting, ra = ramp average) for 8 cases	27.3 5.2	IR galaxies Mrk 231 IRAS 08572+3915

Table 116: Observational details of spectrometer AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT						
X	non-standard chop-nod line scan faint lines large chopper throw	CUS	0.2	7 lines: [NIII]57 µm, [OI]63 µm (3rd order) [OIII]88 µm (2nd order) [NII]121 µm, [OI]145 µm, [CII]157 µm, [NII]205 µm	2.8	NGC 1569 (galaxy)
	SPU mode optimization			32 read-outs per ramp, SPU ramp fitting vs. 64 read-outs per ramp, SPU ramp averaging of 16 read-outs subsamples		
	comparison with wave switching line scan 5.2.2X					
X	non-standard chopped line scan faint lines large chopper throw 32 read-outs per ramp, fitting 3×3 nodding raster 3”×3” step size and 14”×14” step size	CUS	1.35	2 sources 2 lines [OI]63 µm (3rd order)/ [OIII]88 µm (2nd order), [CII]157 µm	5.4	galaxies NGC 1569 II Zw 40
	comparison with wave switching line scan raster 5.2.2X					
X	standard chopped line scan bright lines large chopper throw	AOT			4.3	extended object galaxy M 82
	5×5 nodding raster 16”×14.5” step size		1.3	[OI]63 µm (3rd order) [OIII]88 µm (2nd order)		
	4×4 nodding raster 24”×22” step size		1.7	[OI]145 µm+[CII]157 µm (1st[+2nd] order)		

Table 116: Observational details of spectrometer AOT validation. The total estimated time for wave switching line spectroscopy is 16.6 h.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT						
A	non-standard wave switching line scan 2×1 raster, 4" step with off-position up-down cycles: 1 scan parameter optimization: (1) switching amplitude (2) # read-outs per ramp & SPU read-out mode (3) combination of # ramps per grating position and # of ABBA grating switches per dither position	CUS	0.23	**(1) combis 1-8 & 11+12:** 64 read-outs per ramp, ramp average (ra) # ramps/grat pos: 1, ABBA cycles: 3 [CII]157 µm (combi 1-8): # grat. dither steps: 20, step size: 240 8 switch amplitudes: 1000, 500, 700, 900, 1100, 1200, 1300, 1500 [OI]63 µm (3rd order): 20/168/600 (1) [OIII]88 µm (2nd order): 20/188/600 (1) [NII]205 µm (combi 11+12): # grat. dither steps: 20, step size: 240 2 switch amplitudes: 1000, 1500 **(2+3) combis 9+10:** 32 read-outs per ramp, ramp fitting (rf) # ramps/grat pos: 2, ABBA cycles: 3 and # ramps/grat pos: 6, ABBA cycles: 1 for 2 lines ([OI]63 µm, [CII]157 µm) wave switch setting as for combi 1 **(1+2+3) combi 13:** 32 read-outs per ramp, ramp fitting (rf) # ramps/grat pos: 4, ABBA cycles: 3 for 3 lines ([OI]63 µm, [OIII]88 µm, [CII]157 µm) # grat. dither steps: 20, step size: 160 switch amplitude: 3200	2.8 0.9 0.7	NGC 5315 (PN)

Table 116: Observational details of spectrometer wave switching line spectroscopy AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT						
A	standard wave switching line scan # ramps/grat pos: 1, ABBA cycles: 3 # grat. dither steps: 11 dither step size: 300 switch amplitude: 700 raster lay-out optimization 2×1 raster, 2" step with off-position 2×2 raster, 4" step with off-position		 0.17 0.25 0.22	 3 lines with line repetition 1 [OI]63 µm (3rd order) [OIII]88 µm (2nd order) [CII]157 µm 1 line with line repetition 2 [NII]205 µm 1 line with line repetition 1 [OI]63 µm (3rd order)	1.0	NGC 5315 (PN)
C	non-standard wave switching line scan 2×1 raster, 4" step with off-position up-down cycles: 2 # ramps/grat pos: 2, ABBA cycles: 1 32 read-outs per ramp, ramp fitting (rf) comparison with unchopped grating scan 5.2.1J	CUS	0.2	2 lines: HD 112.1 µm: # grat. dither steps: 20, dither step size: 240, switch amplitude: 1000 HD 56 µm (3rd order) 20/168/600	0.4	Orion OMC-1 (extended bright source
D	non-standard wave switching line scan raster map sampling strategy 3×3 raster, 14" step with off-position up-down cycles: 1 # ramps/grat pos: 2, ABBA cycles: 1 32 read-outs per ramp, ramp fitting (rf)	CUS	0.7	2 lines: [OI]63 µm: # grat. dither steps: 40, dither step size: 168, switch amplitude: 600 [CII]157 µm 40/240/1000	1.4	NGC 3184 (galaxy)

Table 116: Observational details of spectrometer wave switching line spectroscopy AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT						
X	non-standard wave switching line scan 2×1 raster, 4" step with off-position up-down cycles: 2 ABBA cycles: 1 SPU mode optimization comparison with chop-nod line scan 5.2.1X	CUS	0.2	7 lines with ws parameters [NIII]57 µm: 20/168/600 [OI]63 µm: 20/168/600 [OIII]88 µm: 20/188/700 [NII]121 µm: 20/240/1000 [OI]145 µm: 20/240/1000 [CII]157 µm: 20/240/1000 [NII]205 µm: 20/240/1000 32 read-outs per ramp, SPU ramp fitting, # ramps/grat pos: 2 vs. 64 read-outs per ramp, SPU ramp averaging of 16 read-outs subsamples, # ramps/grat pos: 1	2.8	NGC 1569 (galaxy)
X	non-standard wave switching line scan raster map sampling strategy 3×3 raster with off-position step sizes: 3", 14" 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2, ABBA cycles: 1 up-down cycles: 8 comparison with chop/nod line scan raster 5.2.1X	CUS	1.4	3 lines with ws parameters [OI]63 µm: 20/168/600 [OIII]88 µm: 20/240/1000 [CII]157 µm: 20/240/1000	4.2	galaxies NGC 1569 II Zw 40

Table 116: Observational details of spectrometer wave switching line spectroscopy AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT						
X	non-standard wave switching line scan multiple faint line mode 2×2 raster, step size: 23.5” with absolute off-position 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2, ABBA cycles: 1 up-down cycles: 1	CUS	0.45 0.25 0.8	B: 2 lines in 3rd order with ws parameters 40/168/600 [NIII]57 µm, [OI]63 µm B2: 1 line in 2nd order with ws parameters 40/188/600 [OIII]88 µm R: 4 lines in 1st order with ws parameters 40/240/1000 [CII]157 µm, [OI]145 µm [NII]121 µm, [NII]205 µm	1.5	NGC 6822 (irregular galaxy)
	comparison with non-standard unchopped line scan multiple faint line mode 2×2 raster, step size: 23.5” with nodding to absolute off-position 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2 up-down cycles: 4	CUS	0.7 0.4 1.2	B: 2 lines in 3rd order step size: 168, steps: 10 [NIII]57 µm, [OI]63 µm B2: 1 line in 2nd order step size: 188, steps: 10 [OIII]88 µm R: 4 lines in 1st order step size: 240, steps: 10 [CII]157 µm, [OI]145 µm [NII]121 µm, [NII]205 µm	2.3	

Table 116: Observational details of spectrometer AOT validation. The total estimated time for chop/nod range spectroscopy is 13.2 h.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.3 Optimised Observing Strategy for Range Scan Spectroscopy AOT						
A	non-standard chop/nod range scan high sampling density large chopper throw comparison with 5.2.1E (for lines)	CUS	 1.8 1.1 2.7 0.5	 [OI]63 µm (62.7-63.7 µm) [CII]158 µm (156.24-159.24 µm) 65.0 – 70.5 µm 130 – 136 µm	6.1	 T Tauri star DG Tau Mira variable TX Cam
B	non-standard chop/nod range scan high sampling density, 3rd order small chopper throw, tracking	CUS	2.5	range: 60 – 68 µm	2.5	planets (Neptune) Sect. 4.3.3
C	non-standard unchopped range scan 2×1 raster, 4” step + off-position, 6’ off Nyquist sampling (SED mode) 1st+3rd order R1-r1(102.3-145 µm)+B2A/B3A 1st+2nd order R1-r2(140-170 µm)+B2B R1-r3(165-210 µm)+B2B	CUS	 0.7 0.6 1.3		2.6	extended source, crowded field VY CMa (red supergiant star) M 16 (open cluster/HII)
D	non-standard chopped range scan 5×1 nodding raster, 2” step (dither map) high sampling density, 3rd order large chopper throw	CUS	2.0	broad spectral feature 69 µm feature (66 – 71 µm)	2.0	Herbig Be star HD 100546

Table 116: Observational details of spectrometer AOT validation. The total estimated time for SED mode spectroscopy is 60.8 h.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT						
A	non standard chop/nod range scan large chopper throw Nyquist sampling (SED mode) integration ramp length optimization	CUS		2 ramp lengths (32, 64 read-outs) vs. 1, 2 ramps per grating position	2.7	NGC 5315 (PN)
			0.85	order sorting filter pos. B (red)		
			0.5	order sorting filter pos. A (blue)		
A	non-standard chop/nod range scan large chopper throw Nyquist sampling (SED mode) optimization read-out parameters for SED mode	CUS		6 combinations varying # chop cycles per grat. pos.: 1, 2 # ramps per chopper plateau: 1, 2, 4 read-outs per ramp: 32, 64 read-outs per subramp: 32, 64 SPU reduction mode: rf, ra (rf = ramp fitting, ra = ramp average) range repetition: 1, 2 order combination	9.6	NGC 5315 (PN) NGC 6302 (PN) Sect. 4.3.1
	B2A-B3A-R1		1.05	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		
	B2B		0.55	2nd(71-98 µm)+1st(142-196 µm)		

Table 116: Observational details of spectrometer SED mode Spectroscopy AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT						
B	non-standard chop/nod range scan large chopper throw intercomparison of 1) Nyquist sampling (full range) 2 repetitions B2A-B3A-R1 B2B 2) Nyquist sampling (split scans) 2 repetitions p1A(B2A-B3A-R1) p2A(B2A-B3A-R1) p3A(B2A-B3A-R1) p1B(B2B) p2B(B2B) 3) 2× Nyquist sampling (1 rep.) (1/2 Nyquist grating step size = slow) B2A-B3A-R1 B2B	CUS	 1.05 0.55 0.36 0.36 0.43 0.33 0.32 1.05 0.55	2 sources order combination: 2nd/3rd(51/47-70 µm)+1st(102-210 µm) 2nd(71-98 µm)+1st(142-196 µm) 2nd(51-72 µm)+1st(102-145 µm) 3rd(47-60 µm)+1st(142-180 µm) 3rd(58-70 µm)+1st(175-210 µm) 2nd(71-88 µm)+1st(142-176 µm) 2nd(85-98 µm)+1st(170-196 µm) 2nd/3rd(51/47-70 µm)+1st(102-210 µm) 2nd(71-98 µm)+1st(142-196 µm)	10.0	NGC 5315 (PN) HD 100546 (Herbig Be star)
D	non-standard chopped range scan 2×1 nodding raster, 2" step (dither map) large chopper throw Nyquist sampling (SED mode) B2A-B3A-R1 B2B	CUS	 2.0 1.0	 order combination: 2nd/3rd(51/47-70 µm)+1st(102-210 µm) 2nd(71-98 µm)+1st(142-196 µm)	3.0	NGC 6302 (PN) Sect. 4.3.1
E	non-standard chop/nod range scan large chopper throw 2× Nyquist sampling (SED mode) (1/2 Nyquist grating step size = slow) B2A-B3A-R1 B2B	CUS	 1.05 0.55	 order combination: 2nd/3rd(51/47-70 µm)+1st(102-210 µm) 2nd(71-98 µm)+1st(142-196 µm)	1.6	comet 217P / Linear

Table 116: Observational details of spectrometer SED Mode Spectroscopy AOT validation continued.

ID: PVSpecAOTVal						
	Measurement description	AOT/CUS	basic duration (h)	repetitions parameter variations	total time (h)	sources
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT						
F	non-standard chop/nod range scan	CUS		1 chop-nod cycle: 6 sources	33.9	planets (Neptune)
	small/medium/large chopper throw			2 chop-nod cycles: 1 source		Sect. 4.3.3
	(depending on source size)			3 chop-nod cycles: 1 source		PN NGC 6543
	Nyquist sampling (grat. step: 2400)					PN NGC 7027
	1 chop-nod cycle			order combination:		Sect. 4.3.1
	A(B2A-B3A-R1)		1.1	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		galaxy M 82
	B(B2B)		0.85	2nd(68-105 µm)+1st(134-210 µm)		VY CMa
	2 chop-nod cycles					R Dor
	A(B2A-B3A-R1)		2.1	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		comets:
	B(B2B)		1.6	2nd(68-105 µm)+1st(134-210 µm)		Christensen
	3 chop-nod cycles					217P / Linear
	A(B2A-B3A-R1)		3.1	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		HD 44719
	B(B2B)		2.4	2nd(68-105 µm)+1st(134-210 µm)		(red rectangle)
						AFGL 2591
	non-standard chopped range scan	CUS		1 source		IRAS 12496−7650
	3×1 nodding raster, 30” step					(DK Cha)
	large chopper throw					CW Leo
	Nyquist sampling (grat. step: 2400)					
	1 chop-nod cycle			order combination:		
	A(B2A-B3A-R1)		3.2	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		
	B(B2B)		2.4	2nd(68-105 µm)+1st(134-210 µm)		
	non-standard chopped range scan	CUS		1 source		
	2×2 nodding raster, 4” step					
	medium chopper throw					
	Nyquist sampling (grat. step: 2400)					
	1 chop-nod cycle			order combination:		
	A(B2A-B3A-R1)		4.2	2nd/3rd(51/47-70 µm)+1st(102-210 µm)		
	B(B2B)		3.2	2nd(68-105 µm)+1st(134-210 µm)		

Table 117: Summary of AORs for the spectrometer AOT validation. The total scheduled time is 203.4250 h.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
A	non-standard chop/nod line scan faint lines large chopper throw 48 grat steps, step size 168 [OI] 46 grat steps, step size 188 [OIII] 43 grat steps, step size 240 [CII] nod cycles: 1 ABBA scan parameter optimisation I chop frequency, chop cycles, grating up-down cycles combi: 1/2/2/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_01A_NGC5315_0001	0.3042	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_01B1_NGC5315_0001	0.2939	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_01B2_NGC5315_0001	0.2792	OD 79
	combi: 2/2/1/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_02A_NGC5315_0001	0.2908	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_02B1_NGC5315_0001	0.2811	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_02B2_NGC5315_0001	0.2675	OD 79
	combi: 2/1/2/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_03A_NGC5315_0001	0.3042	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_03B1_NGC5315_0001	0.2939	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_03B2_NGC5315_0001	0.2792	OD 79
	combi: 1/1/4/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_04A_NGC5315_0001	0.3308	OD 90
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_04B1_NGC5315_0001	0.3194	OD 90
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_04B2_NGC5315_0001	0.3031	OD 90
	combi: 4/1/1/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_05A_NGC5315_0001	0.2908	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_05B1_NGC5315_0001	0.2811	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_05B2_NGC5315_0001	0.2675	OD 79
	combi: 1/4/1/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_06A_NGC5315_0001	0.2908	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_06B1_NGC5315_0001	0.2811	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_06B2_NGC5315_0001	0.2675	OD 79

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
A	combi: 2/2/2/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_07A_NGC5315_0001	0.2908	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_07B1_NGC5315_0001	0.2811	OD 79
		PVSpecAotVal_521A_NstdLineSpec_07B1_NGC5315_0002	0.2811	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_07B2_NGC5315_0001	0.2675	OD 79
		PVSpecAotVal_521A_NstdLineSpec_07B2_NGC5315_0002	0.2675	OD 102
	combi: 2/1/4/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_08A_NGC5315_0001	0.3042	OD 90
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_08B1_NGC5315_0001	0.2939	OD 90
		PVSpecAotVal_521A_NstdLineSpec_08B1_NGC5315_0002	0.2939	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_08B2_NGC5315_0001	0.2792	OD 90
		PVSpecAotVal_521A_NstdLineSpec_08B2_NGC5315_0002	0.2792	OD 102
	combi: 1/4/2/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_09A_NGC5315_0001	0.2908	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_09B1_NGC5315_0001	0.2811	OD 79
		PVSpecAotVal_521A_NstdLineSpec_09B1_NGC5315_0002	0.2811	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_09B2_NGC5315_0001	0.2675	OD 79
		PVSpecAotVal_521A_NstdLineSpec_09B2_NGC5315_0002	0.2675	OD 102
	combi: 4/1/2/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_10A_NGC5315_0001	0.2908	OD 90
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_10B1_NGC5315_0001	0.2811	OD 90
		PVSpecAotVal_521A_NstdLineSpec_10B1_NGC5315_0002	0.2811	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_10B2_NGC5315_0001	0.2675	OD 90
		PVSpecAotVal_521A_NstdLineSpec_10B2_NGC5315_0002	0.2675	OD 102
	combi: 1/2/4/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_11A_NGC5315_0001	0.3042	OD 90
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_11B1_NGC5315_0001	0.2939	OD 90
		PVSpecAotVal_521A_NstdLineSpec_11B1_NGC5315_0002	0.2939	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_11B2_NGC5315_0001	0.2792	OD 90
		PVSpecAotVal_521A_NstdLineSpec_11B2_NGC5315_0002	0.2792	OD 102

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
	5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT			
A	combi: 4/2/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_12A_NGC5315_0001	0.2842	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_12B1_NGC5315_0001	0.2750	OD 79
		PVSpecAotVal_521A_NstdLineSpec_12B1_NGC5315_0002	0.2750	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_12B2_NGC5315_0001	0.2614	OD 79
		PVSpecAotVal_521A_NstdLineSpec_12B2_NGC5315_0002	0.2614	OD 102
	combi: 2/4/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_13A_NGC5315_0001	0.2842	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_13B1_NGC5315_0001	0.2750	OD 79
		PVSpecAotVal_521A_NstdLineSpec_13B1_NGC5315_0002	0.2750	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_13B2_NGC5315_0001	0.2614	OD 79
		PVSpecAotVal_521A_NstdLineSpec_13B2_NGC5315_0002	0.2614	OD 102
	combi: 1/1/1/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_14A_NGC5315_0001	0.1308	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_14B1_NGC5315_0001	0.1278	OD 79
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_14B2_NGC5315_0001	0.1242	OD 79
	combi: 1/3/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_15A_NGC5315_0001	0.1508	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_15B1_NGC5315_0001	0.1472	OD 79
		PVSpecAotVal_521A_NstdLineSpec_15B1_NGC5315_0002	0.1472	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_15B2_NGC5315_0001	0.1419	OD 79
		PVSpecAotVal_521A_NstdLineSpec_15B2_NGC5315_0002	0.1419	OD 102
	combi: 1/2/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_16A_NGC5315_0001	0.1242	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_16B1_NGC5315_0001	0.1217	OD 79
		PVSpecAotVal_521A_NstdLineSpec_16B1_NGC5315_0002	0.1217	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_16B2_NGC5315_0001	0.1181	OD 79
		PVSpecAotVal_521A_NstdLineSpec_16B2_NGC5315_0002	0.1181	OD 102
	combi: 1/1/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521A_NstdLineSpec_17A_NGC5315_0001	0.0975	OD 79
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_NstdLineSpec_17B1_NGC5315_0001	0.0961	OD 79
		PVSpecAotVal_521A_NstdLineSpec_17B1_NGC5315_0002	0.0961	OD 102
	[CII]157 µm	PVSpecAotVal_521A_NstdLineSpec_17B2_NGC5315_0001	0.0942	OD 79
		PVSpecAotVal_521A_NstdLineSpec_17B2_NGC5315_0002	0.0942	OD 102

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
A	standard chop/nod line scan large chopper throw line repetition: 1 nodding/grating scan cycles: 1 performance verification faint line mode, pointed [OI]63 µm (3rd order)	PVSpecAotVal_521A_StdLineSpec_01A_NGC5315_0001	0.1361	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_StdLineSpec_01B1_NGC5315_0001	0.1339	OD 91
	[CII]157 µm	PVSpecAotVal_521A_StdLineSpec_01B2_NGC5315_0001	0.1297	OD 91
	[NII]205 µm	PVSpecAotVal_521A_StdLineSpec_01B3_NGC5315_0001	0.1911	OD 91
	bright line mode, pointed [OI]63 µm (3rd order)	PVSpecAotVal_521A_StdLineSpec_02A_NGC5315_0001	0.0892	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521A_StdLineSpec_02B1_NGC5315_0001	0.0897	OD 91
	[CII]157 µm	PVSpecAotVal_521A_StdLineSpec_02B2_NGC5315_0001	0.0897	OD 91
	[NII]205 µm	PVSpecAotVal_521A_StdLineSpec_02B3_NGC5315_0001	0.1117	OD 91
	bright line mode, dithered [OI]63 µm (3rd order)	PVSpecAotVal_521A_StdLineSpec_03A_NGC5315_0001	0.1792	OD 91
	faint line mode, dithered [OI]63 µm (3rd order)	PVSpecAotVal_521A_StdLineSpec_04A_NGC5315_0001	0.3194	OD 91

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
A	non-standard chop/nod observations			
	at fixed grating position			
	large chopper throw			
	3rd order (filter pos. A)			
	60/120 µm	PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0001	0.1733	OD 114
	75/150 µm	PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0001	0.1728	OD 114
	60/180 µm	PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0001	0.1722	OD 114
	60/120 µm	PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0002	0.1733	OD 129
	75/150 µm	PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0002	0.1728	OD 129
	60/180 µm	PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0002	0.1722	OD 129
	60/120 µm	PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0003	0.1733	OD 133
	75/150 µm	PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0003	0.1728	OD 133
	60/180 µm	PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0003	0.1722	OD 133
	2nd order (filter pos. B)			
	60/120 µm	PVSpecAotVal_521A_NstdRespCS_B1_60_NGC6543_0001	0.1733	OD 115
	75/150 µm	PVSpecAotVal_521A_NstdRespCS_B1_75_NGC6543_0001	0.1728	OD 115
	90/180 µm	PVSpecAotVal_521A_NstdRespCS_B1_180_NGC6543_0001	0.1722	OD 115
	60/120 µm	PVSpecAotVal_521A_NstdRespCS_B2_60_NGC6543_0001	0.1733	OD 115
	75/150 µm	PVSpecAotVal_521A_NstdRespCS_B2_75_NGC6543_0001	0.1728	OD 115
	90/180 µm	PVSpecAotVal_521A_NstdRespCS_B2_180_NGC6543_0001	0.1722	OD 115
Note by custodian post mission: *These measurements seem to be rather in support of calibration items:* *4.3.2 Reproducibility internal sources, spectrometer; 1.2.7 Nominal responsivity; 1.2.13 Ionising radiation: Responsivity spectrometer*				

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
B	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 chop cycles per grating pos.: 1 # up-down grating scans: 2 ABBA scan parameter optimisation II NSTEP, STEP_SIZE SPU: 2/64/ra			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_01A_NGC5315_0001	0.2892	OD 91
	175,45, centre line (only v02)	PVSpecAotVal_521B_NstdLineSpec_01A_NGC5315_0002	0.2892	OD 103
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_01B1_NGC5315_0001	0.2589	OD 91
	212,39, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_01B1_NGC5315_0002	0.2589	OD 103
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_01B2_NGC5315_0001	0.2014	OD 91
	322,29, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_01B2_NGC5315_0002	0.3381	OD 103
	SPU: 4/32/rf			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_02A_NGC5315_0001	0.2769	OD 91
	175,45, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_02A_NGC5315_0002	0.2769	OD 103
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_02B1_NGC5315_0001	0.2483	OD 91
	212,39, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_02B1_NGC5315_0002	0.2483	OD 103
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_02B2_NGC5315_0001	0.2092	OD 91
	322,29, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_02B2_NGC5315_0002	0.1369	OD 103
	SPU: 2/64/ra			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_03A_NGC5315_0001	0.3042	OD 91
	175,48, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_03A_NGC5315_0002	0.3042	OD 103
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_03B1_NGC5315_0001	0.2739	OD 91
	212,42, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_03B1_NGC5315_0002	0.2739	OD 103
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_03B2_NGC5315_0001	0.2153	OD 91
	322,32, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_03B2_NGC5315_0002	0.3664	OD 103

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
B	SPU: 4/32/rf			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_04A_NGC5315_0001	0.2908	OD 91
	175,48, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_04A_NGC5315_0002	0.2908	OD 103
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_04B1_NGC5315_0001	0.2622	OD 91
	212,42, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_04B1_NGC5315_0002	0.2622	OD 103
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_04B2_NGC5315_0001	0.2242	OD 91
	322,32, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_04B2_NGC5315_0002	0.1442	OD 103
	SPU: 2/64/ra			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_05A_NGC5315_0001	0.3192	OD 91
	175,51, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_05A_NGC5315_0002	0.3192	
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_05B1_NGC5315_0001	0.2889	OD 91
	212,45, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_05B1_NGC5315_0002	0.2889	
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_05B2_NGC5315_0001	0.2297	OD 91
	322,35, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_05B2_NGC5315_0002	0.3947	
	SPU: 4/32/rf			
	[OI]63 µm (A:3rd order)	PVSpecAotVal_521B_NstdLineSpec_06A_NGC5315_0001	0.2908	OD 91
	175,51, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_06A_NGC5315_0002	0.2908	
	[OIII]88 µm (B:2nd order)	PVSpecAotVal_521B_NstdLineSpec_06B1_NGC5315_0001	0.2767	OD 91
	212,45, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_06B1_NGC5315_0002	0.2767	
	[CII]157 µm	PVSpecAotVal_521B_NstdLineSpec_06B2_NGC5315_0001	0.2392	OD 91
	322,35, centre line (v02)	PVSpecAotVal_521B_NstdLineSpec_06B2_NGC5315_0002	0.1519	

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
B	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 # up-down grating scans: 6(5-7) ABBA scan parameter optimisation II NSTEP, STEP_SIZE SPU: 2/2/32/rf			
	[NIII]57 µm (3rd order) 172,46, centre line	PVSpecAotVal_521B_NstdLineSpec_3222_N57_Mkn231_01	0.6069	OD 154
	[OIII]88 µm (2nd order) 212,39, centre line	PVSpecAotVal_521B_NstdLineSpec_3222_O88_Mkn231_01	0.6164	OD 154
	[NII]122 µm 263,34, centre line	PVSpecAotVal_521B_NstdLineSpec_3222_N122_Mkn231_01	0.5464	OD 154
	comparison with 5.2.1K: [CII]157 µm 337,28, centre line	PVSpecAotVal_521B_NstdLineSpec_3222_C157_I08572_01	0.5264	OD 154
	SPU: 1/2/64/ra [NIII]57 µm (3rd order) 172,46, centre line	PVSpecAotVal_521B_NstdLineSpec_6412_N122_Mkn231_01	0.5747	OD 154
	[OIII]88 µm (2nd order) 212,39, centre line	PVSpecAotVal_521B_NstdLineSpec_6412_N57_Mkn231_01	0.6386	OD 154
	[NII]122 µm 263,34, centre line	PVSpecAotVal_521B_NstdLineSpec_6412_O88_Mkn231_01	0.6486	OD 154

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
C	non-standard chop/nod line scan bright lines large chopper throw 10 grat steps, step size: 168 [OI] 188[OIII], 240[CII] nod cycles: 1 ABBA scan parameter optimisation I chop frequency, chop cycles, grating up-down cycles: combi 1/2/2/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_01A_NGC5315_0001	0.1042	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_01B1_NGC5315_0001	0.1789	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_01B2_NGC5315_0001	0.1719	OD 91
	combi 2/2/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_02A_NGC5315_0001	0.1019	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_02B1_NGC5315_0001	0.1728	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_02B2_NGC5315_0001	0.1658	OD 91
	combi 1/4/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_03A_NGC5315_0001	0.1019	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_03B1_NGC5315_0001	0.1728	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_03B2_NGC5315_0001	0.1658	OD 91
	combi 1/3/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_04A_NGC5315_0001	0.0931	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_04B1_NGC5315_0001	0.1472	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_04B2_NGC5315_0001	0.1419	OD 91
	combi 1/2/1/32/32/rf			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_05A_NGC5315_0001	0.0842	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_05B1_NGC5315_0001	0.1217	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_05B2_NGC5315_0001	0.1181	OD 91
	combi 1/2/1/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_06A_NGC5315_0001	0.1042	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_06B1_NGC5315_0001	0.1789	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_06B2_NGC5315_0001	0.1719	OD 91
	combi 1/1/2/64/16/ra			
	[OI]63 µm (3rd order)	PVSpecAotVal_521C_NstdLineSpec_07A_NGC5315_0001	0.1086	OD 91
	[OIII]88 µm (2nd order)	PVSpecAotVal_521C_NstdLineSpec_07B1_NGC5315_0001	0.1917	OD 91
	[CII]157 µm	PVSpecAotVal_521C_NstdLineSpec_07B2_NGC5315_0001	0.1836	OD 91

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
D	non-standard chop/nod line scan bright lines large chopper throw nod cycles: 1 chop cycles per grating pos.: 1 # up-down grating scans: 1 ABBA scan parameter optimisation II NSTEP, STEP_SIZE SPU setting: 4(01),2(02)/32/rf			
	[OI]63 µm (A: 3rd order)	PVSpecAotVal_521D_NstdLineSpec_01A_NGC5315_0001	0.0831	OD 91
	step size: 175, steps: 8	PVSpecAotVal_521D_NstdLineSpec_02A_NGC5315_0001	0.0742	OD 91
	[OIII]88 µm (B: 2nd order)	PVSpecAotVal_521D_NstdLineSpec_01B1_NGC5315_0001	0.0761	OD 91
	step size: 212, steps: 5	PVSpecAotVal_521D_NstdLineSpec_02B1_NGC5315_0001	0.0706	OD 91
	[CII]157 µm	PVSpecAotVal_521D_NstdLineSpec_01B2_NGC5315_0001	0.0736	OD 91
	step size: 322, steps: 4	PVSpecAotVal_521D_NstdLineSpec_02B2_NGC5315_0001	0.0692	OD 91
E	non-standard chop/nod line scan faint lines large chopper throw chop cycles per grating pos.: 1 ramps per chopper plateau: 2 nods: 1 / grat. up-down scans: 8			
	[OI]63 µm (3rd order)	PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_OI63_01	0.4939	OD 129
	48 grat steps, step size 168	PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_OI63_02	0.4939	OD 133
	[CII]157 µm	PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_CII_01	0.4439	OD 129
	43 grat steps, step size 240	PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_CII_02	0.4439	OD 133
	nods: 2 / grat. up-down scans: 4			
	[OI]63 µm (3rd order)	PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_OI63_01	0.5089	OD 129
	48 grat steps, step size 168	PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_OI63_02	0.5089	OD 133
	[CII]157 µm	PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_CII_01	0.4589	OD 129
	43 grat steps, step size 240	PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_CII_02	0.4589	OD 133
	nods: 4 / grat. up-down scans: 2			
	[OI]63 µm (3rd order)	PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_OI63_01	0.5389	OD 129
	48 grat steps, step size 168	PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_OI63_02	0.5389	OD 133
	[CII]157 µm	PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_CII_01	0.4900	OD 129
	43 grat steps, step size 240	PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_CII_02	0.4900	OD 133

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
G	non-standard chop/nod line scan faint lines nod cycles: 1 chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) chopper throw dependence L(arge), M(edium), S(mall)			
	[OI]63 µm (3rd order)	PVSpecAotVal_521G_nStd_63_chopL_NGC5315_0001	0.1242	OD 102
	step size: 168, steps: 48	PVSpecAotVal_521G_nStd_63_chopM_NGC5315_0001	0.1225	OD 102
		PVSpecAotVal_521G_nStd_63_chopS_NGC5315_0001	0.1203	OD 102
	[OIII]88 µm (2nd order)	PVSpecAotVal_521G_nStd_88_chopL_NGC5315_0001	0.1217	OD 102
	step size: 188, steps: 46	PVSpecAotVal_521G_nStd_88_chopM_NGC5315_0001	0.1200	OD 102
		PVSpecAotVal_521G_nStd_88_chopS_NGC5315_0001	0.1178	OD 102
	[CII]157 µm	PVSpecAotVal_521G_nStd_157_chopL_NGC5315_0001	0.1181	OD 102
	step size: 240, steps: 43	PVSpecAotVal_521G_nStd_157_chopM_NGC5315_0001	0.1164	OD 102
		PVSpecAotVal_521G_nStd_157_chopS_NGC5315_0001	0.1142	OD 102
G	non-standard chop/nod line scan bright lines large chopper throw 7×1 nodding raster, 2” step (dither map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) flux consistence verification with pointed observation 5.2.1C			
	[OI]63 µm (3rd order) grat. step size: 168, steps: 10	PVSpecAotVal_521G_NGC5315_63_dithermap_0001	0.3042	OD 102
	[OIII]88 µm (2nd order) grat. step size: 188, steps: 10	PVSpecAotVal_521G_NGC5315_88_dithermap_0001	0.3039	OD 102
	[CII]157 µm grat. step size: 240, steps: 10	PVSpecAotVal_521G_NGC5315_158_dithermap_0001	0.3042	OD 102

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
G	non-standard chop/nod line scan bright lines large chopper throw 3×3 nodding raster, 3" step (raster map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf) flux consistence verification with pointed observation 5.2.1C			
	[OI]63 µm (3rd order) grat. step size: 168, steps: 10	PVSpecAotVal_521G_NGC5315_63_raster_0001	0.3964	OD 102
	[OIII]88 µm (2nd order) grat. step size: 188, steps: 10	PVSpecAotVal_521G_NGC5315_88_raster_0001	0.3961	OD 102
	[CII]157 µm grat. step size: 240, steps: 10	PVSpecAotVal_521G_NGC5315_158_raster_0001	0.3964	OD 102
G	non-standard chop/nod line scan bright lines large chopper throw 9×9 nodding raster, 3" step (raster map) chop cycles per grating pos.: 1 ramps per chop plateau: 2 # up-down grating scans: 1 32 read-outs, ramp fitting (rf)			
	[OI]63 µm (3rd order) grat. step size: 168, steps: 10	PVSpecAotVal_521G_NGC40_63_raster_0001	3.6564	OD 102
	[OIII]88 µm (2nd order) grat. step size: 188, steps: 10	PVSpecAotVal_521G_NGC40_88_raster_0001	3.6561	OD 102
	[CII]157 µm grat. step size: 240, steps: 10	PVSpecAotVal_521G_NGC40_158_raster_0001	3.6564	OD 102

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
G	standard chop/nod line scan faint lines large chopper throw optimum PSF sampling strategy for large scale maps nodding raster H_2O 66.44μm (3rd order)			
	4×4 raster, 14.5"×16"	PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_4x4map_01	2.2803	OD 173
	5×5 raster, 14.5"×16"	PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_5x5map_01	3.5403	OD 173
		PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_5x5map_02	3.4869	
	5×5 raster, 16"×14.5" (corrected point & line steps)	PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_5x5map_03	3.5403	OD 190
	H_2O 138.53μm (1st order)			
	3×3 raster, 22"×24"	PVSpecAotVal_521G_StdLineSpec_R1_Nept_w138_3x3mp_01	1.1978	OD 182
	4×4 raster, 22"×24"	PVSpecAotVal_521G_StdLineSpec_R1_Nept_w138_4x4mp_01	2.0981	OD 182

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
H	unchopped grating scan faint line scan emulation ramps per grating position: 2 # up-down grating scans: 4 grating scan parameter optimisation NSTEP, STEP_SIZE on & off position fine pointing [OI]63 µm (3rd order)			
	off: step size: 175, steps: 45	PVSpecAotVal_521H_nStdLinNoChop_63Of45_NGC5315_0001	0.1069	OD 91
	on: step size: 175, steps: 45	PVSpecAotVal_521H_nStdLinNoChop_63On45_NGC5315_0001	0.1069	OD 91
	off: step size: 175, steps: 48	PVSpecAotVal_521H_nStdLinNoChop_63Of48_NGC5315_0001	0.1094	OD 91
	on: step size: 175, steps: 48	PVSpecAotVal_521H_nStdLinNoChop_63On48_NGC5315_0001	0.1094	OD 91
	off: step size: 175, steps: 51	PVSpecAotVal_521H_nStdLinNoChop_63Of51_NGC5315_0001	0.1119	OD 91
	on: step size: 175, steps: 51	PVSpecAotVal_521H_nStdLinNoChop_63On51_NGC5315_0001	0.1119	OD 91
	[OIII]88 µm (2nd order)			
	off: step size: 212, steps: 39	PVSpecAotVal_521H_nStdLinNoChop_88Of39_NGC5315_0001	0.1019	OD 91
	on: step size: 212, steps: 39	PVSpecAotVal_521H_nStdLinNoChop_88On39_NGC5315_0001	0.1019	OD 91
	off: step size: 212, steps: 42	PVSpecAotVal_521H_nStdLinNoChop_88Of42_NGC5315_0001	0.1044	OD 91
	on: step size: 212, steps: 42	PVSpecAotVal_521H_nStdLinNoChop_88On42_NGC5315_0001	0.1044	OD 91
	off: step size: 212, steps: 45	PVSpecAotVal_521H_nStdLinNoChop_88Of45_NGC5315_0001	0.1069	OD 91
	on: step size: 212, steps: 45	PVSpecAotVal_521H_nStdLinNoChop_88On45_NGC5315_0001	0.1069	OD 91
	[CII]157 µm			
	off: step size: 322, steps: 29	PVSpecAotVal_521H_nStdLnNoChop_157Of29_NGC5315_001	0.0936	OD 91
	on: step size: 322, steps: 29	PVSpecAotVal_521H_nStdLnNoChop_157On29_NGC5315_0001	0.0936	OD 91
	[NII]205 µm			
	off: step size: 410, steps: 24	PVSpecAotVal_521H_nStdLnNoChop_205Of24_NGC5315_001	0.0894	OD 91
	on: step size: 410, steps: 24	PVSpecAotVal_521H_nStdLnNoChop_205On24_NGC5315_001	0.0894	OD 91
	internal calibration block chopped per on+off AOR block on one line cf. 4.3.1A (Sect. 6.23)			
		PVSpecAotVal_521H_nStdSlewCalFlex_60_NGC5315_0001	0.1056	OD 91
		PVSpecAotVal_521H_nStdSlewCalFlex_75_NGC5315_0001	0.1064	OD 91
		PVSpecAotVal_521H_nStdSlewCalFlex_150_NGC5315_0001	0.1064	OD 91
		PVSpecAotVal_521H_nStdSlewCalFlex_150_NGC5315_0002	0.1064	OD 91

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
H	non-standard unchopped line scan nodding to 6' off-position faint lines standard # grat. steps & step size grating scan parameter optimization grating up-down cycles ramps per grating step read-outs per ramp (rf/ra) SPU setting: 32/rf/8/2			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521H_NstdLine_NC_322_N57_NGC1569_01	0.1550	OD 154
	[OIII]88 µm (2nd order)	PVSpecAotVal_521H_NstdLine_NC_322_O88_NGC1569_01	0.1550	OD 154
	[NII]121 µm	PVSpecAotVal_521H_NstdLine_NC_322_N121_NGC1569_01	0.1561	OD 154
	[CII]157 µm	PVSpecAotVal_521H_NstdLine_NC_322_CII_NGC1569_01	0.1553	OD 154
	[NII]205 µm	PVSpecAotVal_521H_NstdLine_NC_322_N205_NGC1569_01	0.1558	OD 154
	SPU setting: 32/rf/4/4			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521H_NstdLine_NC_324_N57_NGC1569_01	0.1544	
	[OIII]88 µm (2nd order)	PVSpecAotVal_521H_NstdLine_NC_324_O88_NGC1569_01	0.1544	
	[NII]121 µm	PVSpecAotVal_521H_NstdLine_NC_324_N121_NGC1569_01	0.1556	
	[CII]157 µm	PVSpecAotVal_521H_NstdLine_NC_324_CII_NGC1569_01	0.1547	
	[NII]205 µm	PVSpecAotVal_521H_NstdLine_NC_324_N205_NGC1569_01	0.1553	
	SPU setting: 64/ra/8/1			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521H_NstdLine_NC_641_N57_NGC1569_01	0.1561	
	[OIII]88 µm (2nd order)	PVSpecAotVal_521H_NstdLine_NC_641_O88_NGC1569_01	0.1561	
	[NII]121 µm	PVSpecAotVal_521H_NstdLine_NC_641_N121_NGC1569_01	0.1572	
	[CII]157 µm	PVSpecAotVal_521H_NstdLine_NC_641_CII_NGC1569_01	0.1564	
	[NII]205 µm	PVSpecAotVal_521H_NstdLine_NC_641_N205_NGC1569_01	0.1569	
	SPU setting: 64/ra/4/2			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521H_NstdLine_NC_642_N57_NGC1569_01	0.1550	OD 154
	[OIII]88 µm (2nd order)	PVSpecAotVal_521H_NstdLine_NC_642_O88_NGC1569_01	0.1550	OD 154
	[NII]121 µm	PVSpecAotVal_521H_NstdLine_NC_642_N121_NGC1569_01	0.1561	OD 154
	[CII]157 µm	PVSpecAotVal_521H_NstdLine_NC_642_CII_NGC1569_01	0.1553	OD 154
	[NII]205 µm	PVSpecAotVal_521H_NstdLine_NC_642_N205_NGC1569_01	0.1558	OD 154

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
J	non-standard unchopped grating scan faint line scan emulation ramps per grating position: 2 # up-down grating scans: 3 comparison with wave-switching mode 5.2.2C			
	HD 112.1 µm step size: 200, steps: 85	PVSpecAotVal_521J_nStdLnNoChop_HD_OMC1_0001	0.1772	OD 133
	HD 56 µm (3rd order) step size: 200, steps: 75	PVSpecAotVal_521J_nStdLnNoChop_HD_OMC1_0002	0.1636	OD 133
K	non-standard chop/nod line scan faint lines large chopper throw nod cycles: 1 ABBA scan parameter optimisation: read-outs per ramp, SPU reduction mode, chop frequency, chop cycles, grating up-down cycles & measurement repeatability [NIII]57 µm (3rd order) step size: 168, steps: 48			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N57_I08572_01	0.6636	OD 141
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N57_I08572_01	0.6303	OD 141
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N57_I08572_01	0.6636	OD 141
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N57_I08572_01	0.6303	OD 141
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N57_I08572_01	0.7303	OD 141
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N57_I08572_01	0.6636	OD 141
	64/rf/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412RF_N57_I08572_01	0.6636	OD 141
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N57_I08572_01	0.6636	OD 141
	[NII]121 µm step size: 240, steps: 43			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N122_I08572_01	0.6025	OD 141
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N122_I08572_01	0.5725	OD 141

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
	5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT			
K	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N122_I08572_01	0.6025	OD 141
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N122_I08572_01	0.5725	OD 141
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N122_I08572_01	0.6619	OD 141
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N122_I08572_01	0.6025	OD 141
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N122_I08572_01	0.6025	OD 141
	[CII]157 µm			
	step size: 240, steps: 43			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_C157_I08572_01	0.6017	OD 142
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_C157_I08572_01	0.5717	OD 142
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_C157_I08572_01	0.6017	OD 142
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_C157_I08572_01	0.5717	OD 142
	repeatability	PVSpecAotVal_521K_NstdLineSpec_3222_C157_I08572_02	0.5717	OD 154
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_C157_I08572_01	0.6611	OD 142
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_C157_I08572_01	0.6017	OD 142
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_C157_I08572_01	0.6017	OD 142
	[NIII]57 µm (3rd order)			
	step size: 168, steps: 48			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N57_19542_01	0.6636	
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N57_19542_01	0.6303	
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N57_19542_01	0.6636	
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N57_19542_01	0.6303	
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N57_19542_01	0.7303	
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N57_19542_01	0.6636	
	64/rf/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412RF_N57_19542_01	0.6636	
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N57_19542_01	0.6636	
	[NII]121 µm			
	step size: 240, steps: 43			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N122_19542_01	0.6025	
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N122_19542_01	0.5725	
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N122_19542_01	0.6025	
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N122_19542_01	0.5725	
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N122_19542_01	0.6619	
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N122_19542_01	0.6025	
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N122_19542_01	0.6025	

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
K	[CII]157 µm			
	step size: 240, steps: 43			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_C157_19542_01	0.6014	
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_C157_19542_01	0.5714	
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_C157_19542_01	0.6014	
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_C157_19542_01	0.5714	
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_C157_19542_01	0.6608	
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_C157_19542_01	0.6014	
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_C157_19542_01	0.6014	
	[NII]57 µm (3rd order)			
	step size: 168, steps: 48			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N57_Mkn231_01	0.6636	OD 147
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N57_Mkn231_01	0.6303	OD 147
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N57_Mkn231_01	0.6636	OD 147
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N57_Mkn231_01	0.6303	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_3222_N57_Mkn231_02	0.6303	OD 154
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N57_Mkn231_01	0.7303	OD 147
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N57_Mkn231_01	0.6636	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_6412_N57_Mkn231_02	0.6636	OD 154
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N57_Mkn231_01	0.6636	OD 147
	[OIII]88 µm (2nd order)			
	step size: 188, steps: 46			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_O88_Mkn231_01	0.6386	OD 147
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_O88_Mkn231_01	0.6069	OD 147
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_O88_Mkn231_01	0.6386	OD 147
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_O88_Mkn231_01	0.6069	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_3222_O88_Mkn231_02	0.6069	OD 154
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_O88_Mkn231_01	0.7025	OD 147
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_O88_Mkn231_01	0.6386	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_6412_O88_Mkn231_02	0.6386	OD 154
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_O88_Mkn231_01	0.6386	OD 147

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
K	[NII]121 µm			
	step size: 240, steps: 43			
	32/rf/1/2/10	PVSpecAotVal_521K_NstdLineSpec_3212_N122_Mkn231_01	0.6025	OD 147
	32/rf/1/4/5	PVSpecAotVal_521K_NstdLineSpec_3214_N122_Mkn231_01	0.5725	OD 147
	32/rf/2/1/10	PVSpecAotVal_521K_NstdLineSpec_3221_N122_Mkn231_01	0.6025	OD 147
	32/rf/2/2/5	PVSpecAotVal_521K_NstdLineSpec_3222_N122_Mkn231_01	0.5725	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_3222_N122_Mkn231_02	0.5725	OD 154
	64/ra/1/1/10	PVSpecAotVal_521K_NstdLineSpec_6411_N122_Mkn231_01	0.6619	OD 147
	repeatability	PVSpecAotVal_521K_NstdLineSpec_6412_N122_Mkn231_01	0.6025	OD 147
	64/ra/1/2/5	PVSpecAotVal_521K_NstdLineSpec_6412_N122_Mkn231_02	0.6025	OD 154
	64/ra/2/1/5	PVSpecAotVal_521K_NstdLineSpec_6421_N122_Mkn231_01	0.6025	OD 147
X	non-standard chop-nod line scan			
	faint lines			
	large chopper throw			
	comparison with wave switching			
	line scan 5.2.2X			
	32 read-outs per ramp			
	SPU mode optimization			
	SPU ramp fitting			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521X_NstdLineSpec_CP32_N57_NGC1569_01	0.1836	OD 140
	[OI]63 µm (3rd order)	PVSpecAotVal_521X_NstdLineSpec_CP32_OI63_NGC1569_01	0.1839	OD 140
	[OIII]88 µm (2nd order)	PVSpecAotVal_521X_NstdLineSpec_CP32_O88_NGC1569_01	0.1786	OD 140
	[NII]121 µm	PVSpecAotVal_521X_NstdLineSpec_CP32_C121_NGC1569_01	0.1725	OD 140
	[OI]145 µm	PVSpecAotVal_521X_NstdLineSpec_CP32_O145_NGC1569_01	0.1719	OD 140
	[CII]157 µm	PVSpecAotVal_521X_NstdLineSpec_CP32_C157_NGC1569_01	0.1717	OD 140
	[NII]205 µm	PVSpecAotVal_521X_NstdLineSpec_CP32_N205_NGC1569_01	0.1722	OD 140
	64 read-outs per ramp			
	SPU ramp averaging of			
	16 read-outs subsamples			
	[NIII]57 µm (3rd order)	PVSpecAotVal_521X_NstdLineSpec_CP64_N57_NGC1569_01	0.1836	OD 140
	[OI]63 µm (3rd order)	PVSpecAotVal_521X_NstdLineSpec_CP64_OI63_NGC1569_01	0.1839	OD 140
	[OIII]88 µm (2nd order)	PVSpecAotVal_521X_NstdLineSpec_CP64_O88_NGC1569_01	0.1786	OD 140
	[NII]121 µm	PVSpecAotVal_521X_NstdLineSpec_CP64_C121_NGC1569_01	0.1725	OD 140
	[OI]145 µm	PVSpecAotVal_521X_NstdLineSpec_CP64_O145_NGC1569_01	0.1719	OD 140

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.1 Optimised Observing Strategy for Chopping/Nodding Line Spectroscopy AOT				
	[CII]157 µm	PVSpecAotVal_521X_NstdLineSpec_CP64_C157_NGC1569_01	0.1717	OD 140
	[NII]205 µm	PVSpecAotVal_521X_NstdLineSpec_CP64_N205_NGC1569_01	0.1722	OD 140
X	non-standard chopped line scan faint lines large chopper throw 32 read-outs per ramp, fitting comparison with wave switching line scan raster 5.2.2X 3×3 nodding raster 3"×3" step size			
	[OI]63 µm (3rd order)	PVSpecAotVal_521X_NstdLineSpec_CPrs_OI63_NGC1569_01	1.3417	OD 140
	[CII]157 µm	PVSpecAotVal_521X_NstdLineSpec_CPrs_C157_NGC1569_01	1.2317	
	3×3 nodding raster 14"×14" step size			
	[OIII]88 µm (2nd order)	PVSpecAotVal_521X_NstdLineSpec_CPrs_O88_IIzw40_01	1.3119	OD 147
	[CII]157 µm	PVSpecAotVal_521X_NstdLineSpec_CPrs_C157_IIzw40_01	1.2472	OD 147
X	standard chopped line scan bright lines large chopper throw 5×5 nodding raster 16"×14.5" step size			
	[OI]63 µm (3rd order)	PVSpecAotVal_521X_StdLineMap_63_M82_0001	1.3011	OD 194
	[OIII]88 µm (2nd order)	PVSpecAotVal_521X_StdLineMap_88_M82_0001	1.3008	OD 194
	4×4 nodding raster 24"×22" step size			
	[OI]145 µm, [CII]157 µm (1st[+2nd] order)	PVSpecAotVal_521X_StdLineMap_145_157_M82_0001	1.6858	OD 194

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT				
A	non-standard wave switching line scan 2×1 raster, 4" step with off-position up-down cycles: 1 scan parameter optimization: (1) switching amplitude (2) # read-outs per ramp & SPU read-out mode (3) combination of # ramps per grating position and # of ABBA grating switches per dither position 64/ra/1/3			
	[OI]63 µm (3rd order): 20/168/600	PVSpecAotVal_522A_NstdLineSpec_01A_NGC5315_0001	0.2289	OD 91
	[OIII]88 µm (2nd order): 20/188/600	PVSpecAotVal_522A_NstdLineSpec_01B1_NGC5315_0001	0.2286	OD 91
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522A_NstdLineSpec_01B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/500	PVSpecAotVal_522A_NstdLineSpec_02B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/700	PVSpecAotVal_522A_NstdLineSpec_03B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/900	PVSpecAotVal_522A_NstdLineSpec_04B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/1100	PVSpecAotVal_522A_NstdLineSpec_05B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/1200	PVSpecAotVal_522A_NstdLineSpec_06B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/1300	PVSpecAotVal_522A_NstdLineSpec_07B2_NGC5315_0001	0.2289	OD 91
	[CII]157 µm: 20/240/1500	PVSpecAotVal_522A_NstdLineSpec_08B2_NGC5315_0001	0.2289	OD 91
	[NII]205 µm: 20/240/1000	PVSpecAotVal_522A_NstdLineSpec_11B3_NGC5315_0001	0.2294	OD 91
	[NII]205 µm: 20/240/1500	PVSpecAotVal_522A_NstdLineSpec_12B3_NGC5315_0001	0.2294	OD 91
	32/rf/2/3			
	[OI]63 µm (3rd order): 20/168/600	PVSpecAotVal_522A_NstdLineSpec_09A_NGC5315_0001	0.2233	OD 91
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522A_NstdLineSpec_09B2_NGC5315_0001	0.2233	OD 91
	32/rf/6/1			
	[OI]63 µm (3rd order): 20/168/600	PVSpecAotVal_522A_NstdLineSpec_10A_NGC5315_0001	0.2233	OD 91
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522A_NstdLineSpec_10B2_NGC5315_0001	0.2233	OD 91
	32/rf/4/3			
	[OI]63 µm (3rd order): 10/160/3200	PVSpecAotVal_522A_NstdLineSpec_13A_NGC5315_0001	0.2200	OD 91
	[OIII]88 µm (2nd order): 10/160/3200	PVSpecAotVal_522A_NstdLineSpec_13B1_NGC5315_0001	0.2197	OD 91
	[CII]157 µm: 10/160/3200	PVSpecAotVal_522A_NstdLineSpec_13B2_NGC5315_0001	0.2200	OD 91

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT				
A	standard wave switching line scan # ramps/grat pos: 1, ABBA cycles: 3 # grat. dither steps: 11 dither step size: 300 switch amplitude: 700 raster lay-out optimization with off-position 2×1 raster, 2” step			
	[OI]63 µm (3rd order)	PVSpecAotVal_522A_StdLineSpec_01A_NGC5315_0001	0.1639	OD 90
	[OIII]88 µm (2nd order)	PVSpecAotVal_522A_StdLineSpec_01B1_NGC5315_0001	0.1636	OD 90
	[CII]157 µm	PVSpecAotVal_522A_StdLineSpec_01B2_NGC5315_0001	0.1639	OD 90
	[NII]205 µm (line rep: 2)	PVSpecAotVal_522A_StdLineSpec_01B3_NGC5315_0001	0.2433	OD 90
	2×2 raster, 4” step with off-position			
	[OI]63 µm (3rd order)	PVSpecAotVal_522A_StdLineSpec_02A_NGC5315_0001	0.2144	OD 91
off-position on target				
C	non-standard wave switching line scan 2×1 raster, 4” step with off-position up-down cycles: 2 # ramps/grat pos: 2, ABBA cycles: 1 32 read-outs/ramp, ramp fitting (rf) comparison with unchopped grating scan 5.2.1J			
	HD 56 µm: 20/168/600	PVSpecAotVal_522C_NstdLineSpec_HD56_OMC1_0001	0.1669	OD 133
	HD 112.1 µm: 20/240/1000	PVSpecAotVal_522C_NstdLineSpec_HD112_OMC1_0001	0.1683	OD 133
off-position on target				
D	non-standard wave switching line scan raster map sampling strategy 3×3 raster, 14” step with off-position up-down cycles: 1 # ramps/grat pos: 2, ABBA cycles: 1 32 read-outs per ramp, ramp fitting (rf)			
	[CII]157 µm: 40/240/1000	PVSpecAotVal_522D_NstdLineSp_WS32rs_C157_NGC3184_01	0.7044	OD 170
	[OI]63 µm: 40/168/600	PVSpecAotVal_522D_NstdLineSp_WS32rs_OI63_NGC3184_01	0.7044	OD 170

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT				
X	non-standard wave switching line scan 2×1 raster, 4" step with off-position comparison with chop-nod line scan 5.2.1X up-down cycles: 2 ABBA cycles: 1 SPU mode optimization 32 read-outs per ramp, SPU ramp fitting, # ramps/grat pos: 2			
	[NIII]57 µm: 20/168/600	PVSpecAotVal_522X_NstdLineSpec_WS32_N57_NGC1569_01	0.1669	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_N57_NGC1569_02	0.1925	OD 146
	[OI]63 µm: 20/168/600	PVSpecAotVal_522X_NstdLineSpec_WS32_OI63_NGC1569_01	0.1672	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_OI63_NGC1569_02	0.1928	OD 146
	[OIII]88 µm: 20/188/700	PVSpecAotVal_522X_NstdLineSpec_WS32_O88_NGC1569_01	0.1669	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_O88_NGC1569_02	0.1925	OD 146
	[NII]121 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS32_N121_NGC1569_01	0.1681	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_N121_NGC1569_02	0.1936	OD 146
	[OI]145 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS32_O145_NGC1569_01	0.1675	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_O145_NGC1569_02	0.1931	OD 146
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS32_C157_NGC1569_01	0.1672	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_C157_NGC1569_02	0.1928	OD 147
	[NII]205 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS32_N205_NGC1569_01	0.1678	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS32_N205_NGC1569_02	0.1933	OD 146
for _01 CUS restriction in ref select: off-position on target, relative offset commanding for _02 *DMC sequence 18 timing issues for up-down cycle repetition:* *_02 implemented with up-down cycle: 1 & selection of same line twice*				
	64 read-outs per ramp, SPU ramp averaging, # ramps/grat pos: 1			
	[NIII]57 µm: 20/168/600	PVSpecAotVal_522X_NstdLineSpec_WS64_N57_NGC1569_01	0.1781	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_N57_NGC1569_02	0.2036	OD 146
	[OI]63 µm: 20/168/600	PVSpecAotVal_522X_NstdLineSpec_WS64_OI63_NGC1569_01	0.1783	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_OI63_NGC1569_02	0.2039	OD 146

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
	5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT			
	[OIII]88 µm: 20/188/700	PVSpecAotVal_522X_NstdLineSpec_WS64_O88_NGC1569_01	0.1781	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_O88_NGC1569_02	0.2036	OD 146
	[NII]121 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS64_N121_NGC1569_01	0.1792	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_N121_NGC1569_02	0.2047	OD 146
	[OI]145 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS64_O145_NGC1569_01	0.1786	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_O145_NGC1569_02	0.2042	OD 146
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS64_C157_NGC1569_01	0.1783	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_C157_NGC1569_02	0.2039	OD 147
	[NII]205 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WS64_N205_NGC1569_01	0.1789	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WS64_N205_NGC1569_02	0.2044	OD 146
	for _01 CUS restriction in ref select: off-position on target, relative offset commanding for _02 *DMC sequence 18 timing issues for up-down cycle repetition:* *_02 implemented with up-down cycle: 1 & selection of same line twice*			
X	non-standard wave switching line scan raster map sampling strategy 3×3 raster with off-position step sizes: 3" (NGC 1569), 14" 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2, ABBA cycles: 1 up-down cycles: 8 comparison with chop/nod line scan raster 5.2.1X			
	[OI]63 µm: 20/168/600	PVSpecAotVal_522X_NstdLineSpec_WSrs_OI63_NGC1569_01	1.2017	OD 140
		PVSpecAotVal_522X_NstdLineSpec_WSrs_OI63_NGC1569_02	1.2167	
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WSrs_C157_NGC1569_01	1.2017	
		PVSpecAotVal_522X_NstdLineSpec_WSrs_C157_NGC1569_02	1.2167	
	[OIII]88 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WSrs_O88_IIzw40_01	1.4031	OD 147
	[CII]157 µm: 20/240/1000	PVSpecAotVal_522X_NstdLineSpec_WSrs_C157_IIzw40_01	1.4033	OD 147
	for NGC 1569 CUS restriction in ref select: off-position on target, relative offset commanding for II Zw 40 *DMC sequence 18 timing issues for up-down cycle repetition:* *OD 147 observations implemented with up-down cycle: 1 & selection of same line eight times*			

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.2 Optimised Observing Strategy for Wave Switching Line Spectroscopy AOT				
X	non-standard wave switching line scan multiple faint line mode 2×2 raster, step size: 23.5” with absolute off-position 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2, ABBA cycles: 1 up-down cycles: 1 B: 2 lines in 3rd order with ws parameters 40/168/600 [NIII]57 µm, [OI]63 µm	PVSpecAotVal_522X_NstdLineSpec_WS_B_NGC6822_01	0.4242	OD 183
	B2: 1 line in 2nd order with ws parameters 40/188/600 [OIII]88 µm	PVSpecAotVal_522X_NstdLineSpec_WS_B2_NGC6822_01	0.2539	OD 183
	R: 4 lines in 1st order with ws parameters 40/240/1000 [CII]157 µm, [OI]145 µm [NII]121 µm, [NII]205 µm comparison with non-standard unchopped line scan multiple faint line mode 2×2 raster, step size: 23.5” with nodding to absolute off-position 32 read-outs per ramp, ramp fitting # ramps/grat pos: 2 up-down cycles: 4	PVSpecAotVal_522X_NstdLineSpec_WS_R_NGC6822_01	0.7714	OD 183
	B: 2 lines in 3rd order step size: 168, steps: 10 [NIII]57 µm, [OI]63 µm	PVSpecAotVal_522X_NstdLineSpec_NoChop_B_NGC6822_01	0.6636	OD 183
	B2: 1 line in 2nd order step size: 188, steps: 10 [OIII]88 µm	PVSpecAotVal_522X_NstdLineSpec_NoChop_B2_NGC6822_01	0.4050	OD 183
	R: 4 lines in 1st order step size: 240, steps: 10 [CII]157 µm, [OI]145 µm [NII]121 µm, [NII]205 µm	PVSpecAotVal_522X_NstdLineSpec_NoChop_R_NGC6822_01	1.1919	OD 183

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.3 Optimised Observing Strategy Range Spectroscopy AOT				
A	non-standard chop/nod range scan high sampling density large chopper throw			
	[OI]63 µm (62.7-63.7 µm)	PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_OI63_01	1.7639	OD 129
		PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_OI63_02	1.7639	OD 133
	[CII]158 µm (156.24-159.24 µm)	PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_CII158_01	1.0139	OD 129
		PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_CII158_02	1.0139	OD 133
	65.0 – 70.5 µm	PVSpecAotVal_523A_NstdRangeSpec_65_70_TX_Cam_0001	2.6142	OD 140
	130 – 136 µm	PVSpecAotVal_523A_NstdRangeSpec_130_136_TX_Cam_0001	0.5022	OD 140
B	non-standard chop/nod range scan high sampling density, 3rd order small chopper throw, tracking range: 60 – 68 µm	PVSpecAotVal_523B_NStdRange_60_64_neptune_0001	2.4239	OD 166
		PVSpecAotVal_523B_NStdRange_60_64_neptune_0002	2.4239	OD 173
C	non-standard unchopped range scan 2×1 raster, 4” step + off-position, 6’ off Nyquist sampling (SED mode)			
	R1-r1(102.3-145 µm)+B2A/B3A 1st+3rd order	PVSpecAotVal_523C_NstdSEDNoChop_r1_B2A_VYCMA_01	0.6567	OD 166
		PVSpecAotVal_523C_NstdSEDNoChop_r1_B2A_VYCMA_02	0.6567	OD 173
		PVSpecAotVal_523C_NstdSEDNoChop_r1_B2A_M16_01	0.6589	
	R1-r2(140-170 µm)+B2B 1st+2nd order	PVSpecAotVal_523C_NstdSEDNoChop_r2_B2B_VYCMA_01	0.5406	OD 166
		PVSpecAotVal_523C_NstdSEDNoChop_r2_B2B_VYCMA_02	0.5406	OD 173
		PVSpecAotVal_523C_NstdSEDNoChop_r2_B2B_M16_01	0.5428	
	R1-r3(165-210 µm)+B2B 1st+2nd order	PVSpecAotVal_523C_NstdSEDNoChop_r3_B2B_VYCMA_01	1.2156	OD 166
		PVSpecAotVal_523C_NstdSEDNoChop_r3_B2B_VYCMA_02	1.2156	OD 173
		PVSpecAotVal_523C_NstdSEDNoChop_r3_B2B_M16_01	1.2178	
D	non-standard chopped range scan 5×1 nodding raster, 2” step (dither map) high sampling density, 3rd order large chopper throw 69 µm feature (66 – 71 µm)	PVSpecAotVal_523D_NstdRangeSpecDithmap_HD100546_01	1.9372	OD 142

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT				
A	non standard chop/nod range scan large chopper throw Nyquist sampling (SED mode) integration ramp length optimization order sorting filter pos. A (blue)			
	32 read-outs per ramp	PVSpecAotVal_524A_NstdSEDChop_Blue32_NGC5315_0001	0.4933	OD 90
	64 read-outs per ramp	PVSpecAotVal_524A_NstdSEDChop_Blue64_NGC5315_0001	0.5250	OD 90
	order sorting filter pos. B (red)			
	32 read-outs per ramp	PVSpecAotVal_524A_NstdSEDChop_Red32_NGC5315_0001	0.8231	OD 90
	64 read-outs per ramp	PVSpecAotVal_524A_NstdSEDChop_Red64_NGC5315_0001	0.8803	OD 90
A	non-standard chop/nod range scan large chopper throw Nyquist sampling (SED mode) optimization read-out parameters for SED mode 1 chop/nod cycle B2A-B3A-R1			
	1/4/32/32/rf/1	PVSpecAotVal_524A_NstdSEDChop_01A_NGC5315_0001	0.9747	OD 103
	2/2/32/32/rf/1	PVSpecAotVal_524A_NstdSEDChop_02A_NGC5315_0001	0.9747	OD 103
		PVSpecAotVal_524A_NstdSEDChop_02A_NGC6302_0001	0.9744	OD 140
	1/2/32/32/rf/2	PVSpecAotVal_524A_NstdSEDChop_03A_NGC5315_0001	1.0281	OD 114
		PVSpecAotVal_524A_NstdSEDChop_03A_NGC5315_0002	1.0278	OD 126
	1/2/64/16/ra/1	PVSpecAotVal_524A_NstdSEDChop_04A_NGC5315_0001	1.0281	OD 115
		PVSpecAotVal_524A_NstdSEDChop_04A_NGC6302_0001	1.0278	OD 140
	2/1/64/16/ra/1	PVSpecAotVal_524A_NstdSEDChop_05A_NGC5315_0001	1.0281	OD 103
	1/1/64/16/ra/2	PVSpecAotVal_524A_NstdSEDChop_06A_NGC5315_0001	1.1344	
	B2B			
	1/4/32/32/rf/1	PVSpecAotVal_524A_NstdSEDChop_01B_NGC5315_0001	0.4897	OD 103
	2/2/32/32/rf/1	PVSpecAotVal_524A_NstdSEDChop_02B_NGC5315_0001	0.4897	
		PVSpecAotVal_524A_NstdSEDChop_02B_NGC6302_0001	0.4894	OD 140
	1/2/32/32/rf/2	PVSpecAotVal_524A_NstdSEDChop_03B_NGC5315_0001	0.5147	OD 114
		PVSpecAotVal_524A_NstdSEDChop_03B_NGC5315_0002	0.5144	OD 126
	1/2/64/16/ra/1	PVSpecAotVal_524A_NstdSEDChop_04B_NGC5315_0001	0.5147	OD 115
		PVSpecAotVal_524A_NstdSEDChop_04B_NGC6302_0001	0.5144	OD 140
	2/1/64/16/ra/1	PVSpecAotVal_524A_NstdSEDChop_05B_NGC5315_0001	0.5147	OD 103
	1/1/64/16/ra/1	PVSpecAotVal_524A_NstdSEDChop_06B_NGC5315_0001	0.5644	

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT				
B	non-standard chop/nod range scan large chopper throw intercomparison of 1) Nyquist sampling (full range) 2 repetitions			
	B2A-B3A-R1	PVSpecAotVal_524B_NstdSEDChop_fullA_HD100546_0001	1.0278	OD 129
		PVSpecAotVal_524B_NstdSEDChop_fullA_HD100546_0002	1.0278	OD 133
	B2B	PVSpecAotVal_524B_NStdSEDChop_fullB_HD100546_0001	0.5144	OD 129
		PVSpecAotVal_524B_NStdSEDChop_fullB_HD100546_0002	0.5144	OD 133
	2) Nyquist sampling (split scans) 2 repetitions			
	p1A(B2A-B3A-R1)	PVSpecAotVal_524B_NstdSEDChop_p1A_HD100546_0001	0.3550	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p1A_HD100546_0002	0.3550	OD 133
		PVSpecAotVal_524B_NstdSEDChop_p1A_NGC5315_0001	0.3550	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p1A_NGC5315_0002	0.3550	OD 133
	p2A(B2A-B3A-R1)	PVSpecAotVal_524B_NstdSEDChop_p2A_HD100546_0001	0.3644	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p2A_HD100546_0002	0.3644	OD 133
		PVSpecAotVal_524B_NstdSEDChop_p2A_NGC5315_0001	0.3644	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p2A_NGC5315_0002	0.3644	OD 133
	p3A(B2A-B3A-R1)	PVSpecAotVal_524B_NstdSEDChop_p3A_HD100546_0001	0.4236	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p3A_HD100546_0002	0.4236	OD 133
		PVSpecAotVal_524B_NstdSEDChop_p3A_NGC5315_0001	0.4236	OD 129
		PVSpecAotVal_524B_NstdSEDChop_p3A_NGC5315_0002	0.4236	OD 133
	p1B(B2B)	PVSpecAotVal_524B_NStdSEDChop_p1B_HD100546_0001	0.3294	OD 129
		PVSpecAotVal_524B_NStdSEDChop_p1B_HD100546_0002	0.3294	OD 133
		PVSpecAotVal_524B_NStdSEDChop_p1B_NGC5315_0001	0.3294	OD 129
		PVSpecAotVal_524B_NStdSEDChop_p1B_NGC5315_0002	0.3294	OD 133
	p2B(B2B)	PVSpecAotVal_524B_NStdSEDChop_p2B_HD100546_0001	0.3036	OD 129
		PVSpecAotVal_524B_NStdSEDChop_p2B_HD100546_0002	0.3036	OD 133
		PVSpecAotVal_524B_NStdSEDChop_p2B_NGC5315_0001	0.3036	OD 129
		PVSpecAotVal_524B_NStdSEDChop_p2B_NGC5315_0002	0.3036	OD 133

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT				
B	3) 2× Nyquist sampling (1 rep.) (1/2 Nyquist grating step size = slow) B2A-B3A-R1	PVSpecAotVal_524B_NstdSEDChop_slowA_HD100546_0001	1.0278	OD 129
		PVSpecAotVal_524B_NstdSEDChop_slowA_HD100546_0002	1.0278	OD 133
		PVSpecAotVal_524B_NstdSEDChop_slowA_NGC5315_0001	1.0278	OD 129
		PVSpecAotVal_524B_NstdSEDChop_slowA_NGC5315_0002	1.0278	OD 133
	B2B	PVSpecAotVal_524B_NStdSEDChop_slowB_HD100546_0001	0.5144	OD 129
		PVSpecAotVal_524B_NStdSEDChop_slowB_HD100546_0002	0.5144	OD 133
		PVSpecAotVal_524B_NStdSEDChop_slowB_NGC5315_0001	0.5144	OD 129
		PVSpecAotVal_524B_NStdSEDChop_slowB_NGC5315_0002	0.5144	OD 133
D	non-standard chopped range scan 2×1 nodding raster, 2” step (dither map) large chopper throw Nyquist sampling (SED mode) B2A-B3A-R1	PVSpecAotVal_524D_NstdSED_ditherA_NGC6302_0001	1.9650	OD 142
	B2B	PVSpecAotVal_524D_NStdSED_ditherB_NGC6302_0001	0.9389	OD 142
E	non-standard chop/nod range scan large chopper throw 2× Nyquist sampling (SED mode) (1/2 Nyquist grating step size = slow) B2A-B3A-R1	PVSpecAotVal_524E_NstdSEDChop_slowA_217plinear_0001	1.0306	OD 146
	B2B	PVSpecAotVal_524E_NStdSEDChop_slowB_217plinear_0001	0.5172	OD 146

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
	5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT			
F	non-standard chop/nod range scan small/medium/large chopper throw (depending on source size) Nyquist sampling (grating step: 2400) 1 chop-nod cycle			
	A(B2A-B3A-R1)	PVSpecAotVal_524F_NstdSEDChop_A_217plinear_0001	1.1044	OD 166
		PVSpecAotVal_524F_NstdSEDChop_A_217plinear_0002	1.0717	
		PVSpecAotVal_524F_NstdSEDChop_A_christensen_0001	1.1044	OD 166
		PVSpecAotVal_524F_NstdSEDChop_A_christensen_0002	1.0717	
		PVSpecAotVal_524F_NstdSEDChop_A_neptune_0001	1.1008	OD 166
		PVSpecAotVal_524F_NstdSEDChop_A_neptune_0002	1.0681	OD 173
		PVSpecAotVal_524F_NstdSEDChop_A_hd44179_0001	1.1017	
		PVSpecAotVal_524F_NstdSEDChop_A_M82_0001	1.0689	OD 182
		PVSpecAotVal_524F_NstdSEDChop_A_RDor_0001	1.0689	OD 183
		PVSpecAotVal_524F_NstdSEDChop_A_WRAY15-751_0001	1.0675	
		PVSpecAotVal_524F_NstdSEDChop_A_ngc6543_0001	1.0675	OD 194
		PVSpecAotVal_524F_NstdSEDChop_A_ngc7027_0001	1.1017	OD 166
		PVSpecAotVal_524F_NstdSEDChop_A_ngc7027_0002	1.0689	
		PVSpecAotVal_524F_NstdSEDChop_A_ngc7027_0003	1.0675	OD 182
		PVSpecAotVal_524F_NstdSEDChop_A_vycma_0001	1.0981	OD 166
		PVSpecAotVal_524F_NstdSEDChop_A_vycma_0002	1.0653	OD 173
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_B_217plinear_0001	0.8228	OD 166
		PVSpecAotVal_524F_NStdSEDChop_B_217plinear_0002	0.8228	
		PVSpecAotVal_524F_NStdSEDChop_B_christensen_0001	0.8228	OD 166
		PVSpecAotVal_524F_NStdSEDChop_B_christensen_0002	0.8228	
		PVSpecAotVal_524F_NStdSEDChop_B_neptune_0001	0.8192	OD 166
		PVSpecAotVal_524F_NStdSEDChop_B_neptune_0002	0.8192	OD 173
		PVSpecAotVal_524F_NStdSEDChop_B_hd44179_0001	0.8164	
		PVSpecAotVal_524F_NStdSEDChop_B_M82_0001	0.8200	OD 182
		PVSpecAotVal_524F_NStdSEDChop_B_RDor_0001	0.8200	OD 183
		PVSpecAotVal_524F_NStdSEDChop_B_WRAY15-751_0001	0.8186	
		PVSpecAotVal_524F_NStdSEDChop_B_ngc6543_0001	0.8186	OD 194

Table 117: continued. Summary of AORs for the spectrometer AOT validation.

ID: PVSpecAOTVal				
	Measurement description	AOR labels	duration (h)	observing constraints
5.2.4 Optimised Observing Strategy for SED Mode Spectroscopy AOT				
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_B_ngc7027_0001	0.8164	OD 166
		PVSpecAotVal_524F_NStdSEDChop_B_ngc7027_0002	0.8164	
		PVSpecAotVal_524F_NStdSEDChop_B_ngc7027_0003	0.8186	OD 182
		PVSpecAotVal_524F_NStdSEDChop_B_vycma_0001	0.8164	OD 166
		PVSpecAotVal_524F_NStdSEDChop_B_vycma_0002	0.8164	OD 173
	2 chop-nod cycles			
	A(B2A-B3A-R1)	PVSpecAotVal_524F_NstdSEDChop_A_HD97048_0001	2.0828	OD 183
		PVSpecAotVal_524F_NstdSEDChop_A_IRAS12496_0001	2.0856	
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_B_HD97048_0001	1.5856	
		PVSpecAotVal_524F_NStdSEDChop_B_AFGL2591_0001	1.5883	OD 182
	3 chop-nod cycles			
	A(B2A-B3A-R1)	PVSpecAotVal_524F_NstdSEDChop_A_AFGL2591_0001	3.1022	OD 182
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_B_IRAS12496_0001	2.3567	
F	non-standard chopped range scan 3×1 nodding raster, 30” step large chopper throw Nyquist sampling (grating step: 2400) 1 chop-nod cycle			
	A(B2A-B3A-R1)	PVSpecAotVal_524F_NstdSEDChop_A_CWLeo_0001	3.1311	OD 182
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_B_CWLeo_0001	2.3856	OD 182
F	non-standard chopped range scan 2×2 nodding raster, 4” step medium chopper throw Nyquist sampling (grating step: 2400) 1 chop-nod cycle			
	A(B2A-B3A-R1)	PVSpecAotVal_524F_NstdSEDChop_AMap_vycma_0001	4.1458	OD 183
	B(B2B)	PVSpecAotVal_524F_NStdSEDChop_BMap_vycma_0001	3.1519	OD 183

7 PACS PV Phase Time-Line

7.1 Overview

The PV Phase follows the Commissioning Phase after the launch on 14 May 2009. The first OD of the PACS PV Phase is OD0064, that is 16 July 2009, DOY 197.

Table 118 lists the Operational Days allocated to PACS PV observations and Table 121 the ones allocated to SPIRE/PACS parallel mode PV observations.

Table 118: Operational Days of the PV Phase allocated to PACS observations.

#	PACS OD	Date	Duration [h]	Day Of Year (DOY) 2009
1	64	16-Jul-09		197
2	65	17-Jul-09		198
3	67	19-Jul-09		200
4	72	24-Jul-09		205
5	73	25-Jul-09		206
6	78	30-Jul-09	24.0	211
7	79	31-Jul-09	24.0	212
8	84	05-Aug-09	24.0	217
9	85	06-Aug-09	24.0	218
10	86* (5 h)	07-Aug-09	24.0	219
11	90	11-Aug-09	24.0	223
12	91	12-Aug-09	24.0	224
13	92* (16 h)	13-Aug-09	24.0†	225
14	93*	14-Aug-09	24.0	226
15	96	17-Aug-09	24.0	229
16	97	18-Aug-09	24.0	230
17	101*	22-Aug-09	24.0	234
18	102	23-Aug-09	31.3	235
19	103	24-Aug-09	16.8	236
20	104	25-Aug-09	24.1	237
21	105	26-Aug-09	24.1	238
22	107	28-Aug-09	24.1	240
23	108	29-Aug-09	24.1	241
24	109	30-Aug-09	20.4	242
25	110	31-Aug-09	24.2	243
26	114	04-Sep-09	24.1	247
27	115	05-Sep-09	27.4	248
28	118	08-Sep-09	14.5	251
29	119	09-Sep-09	24.1	252
30	120*	10-Sep-09	33.4†	253
31	124	14-Sep-09	14.9	257
32	125	15-Sep-09	33.0	258
33	126*	16-Sep-09	15.1	259
34	128	18-Sep-09	24.0	261
35	129	19-Sep-09	24.0	262
36	132	22-Sep-09	24.0	265
37	133	23-Sep-09	24.0	266
38	138	28-Sep-09	32.1	271
39	139	29-Sep-09	24.0	272
40	140*	30-Sep-09	24.0⋆	273
41	141*	01-Oct-09	24.0	274
42	142	02-Oct-09	24.0	275
43	146	06-Oct-09	24.0	279
44	147	07-Oct-09	24.0	280
45	154	14-Oct-09	24.0	287
46	155	15-Oct-09	24.0⋆	288

*replacing HIFI
†incl. 3 h orbit manoeuvre
⋆incl. DTCP + 2 h for CDMS upload

Table 119: Operational Days of the SD Phase allocated to PACS PV observations.

#	PACS OD	Date	Duration [h]	Day Of Year (DOY) 2009
47	160	20-Oct-09	24.0[1,2]	293
48	161	21-Oct-09	24.0[3]	294
49	166	26-Oct-09	24.0[1]	299
50	169	29-Oct-09	24.0	302
51	170	30-Oct-09	24.0[1]	303
52	173	02-Nov-09	24.0	306
53	174	03-Nov-09	24.0	307
54	175	04-Nov-09	24.0	308
55	182	11-Nov-09	22.8	315
56	183	12-Nov-09	24.0[4]	316
57	191	20-Nov-09	24.0[1]	323
58	194	23-Nov-09	24.0	326
59	195	24-Nov-09	24.0[5]	327

[1]partially covered by PACS SDP
[2]incl. 4 h gyro scale calibration
[3]incl. DTCP + 3 h for STR dump
[4]incl. 3 h orbit manoeuvre
[5]incl. 3 h DLCM settling time

Table 120: Operational Days of the PV Phase allocated to PACS SDP observations. Early ones were labelled as AOT validation/dry-run.

#	PACS SDP OD	Date	Duration [h]	Day Of Year (DOY) 2009
1	120[2]	10-Sep-09	33.4[3]	253
2	127[2]	17-Sep-09	24.0	260
3	148[2]	08-Oct-09	24.0[3]	281
4	149[2]	09-Oct-09	24.0[4]	282
5	150	10-Oct-09	24.0	283
6	156	16-Oct-09	24.0	289
7	157	17-Oct-09	24.0	290
8	165	25-Oct-09	24.0	298
9	171	31-Oct-09	24.0	304
10	172	01-Nov-09	24.0	305
11	177	06-Nov-09	24.0	310
12	178	07-Nov-09	24.0	311
13	179	08-Nov-09	24.0	312
14	184	13-Nov-09	24.0	317
15	185	14-Nov-09	24.0	318
16	186	15-Nov-09	24.0	319
17	187	16-Nov-09	24.0	320
18	188	17-Nov-09	24.0	321
19	190	19-Nov-09	24.0[1]	322
20	200	29-Nov-09	24.3[1]	332

[1]partially covered by PACS PV observations
[2]replacing HIFI
[3]incl. 3 h orbit manoeuvre
[4]incl. DTCP + 1 h for CDMS upload

Table 121: Operational Days of the PV Phase allocated to SPIRE/PACS parallel mode observations.

#	SPIRE/PACS ‖ OD	Date	Duration [h]	Day Of Year (DOY) 2009
1	111	02-Sep-09	25.6	245
2	112	03-Sep-09	22.7	246
3	136	26-Sep-09	24.0	269
4	137	27-Sep-09	32.1*	270
5	151	11-Oct-09	24.6	284

*incl. DTCP + 2 h for CDMS upload

7.2 High Level Plan

The following high level plan displays the flow and ordering of test blocks taking into account the dependencies (prerequisites and data evaluation periods) as described in the previous section of the detailed PV contents overview as well as visibility constraints of (key) celestial targets for the model PV period.

For planning of photometer operational days it is currently assumed that the cooler hold time is sufficient to support at least two consecutive ODs with one cooler recycling.

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
01	64	16-Jul-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup_CSoff (low gain)	0.6
			bias table: BOLObias_standard_low	
			CPPhotBol_FOVscan_CSoff	0.4
			orbit epilogue	
			nominal orbit prologue	0.6
			bias table: BOLObias_ILT_standard_low	
			PVPhotFPG 2.6.1A [$-10 <$ SAA $< +30$]	3.8
			(35 stars)	
			PVPhotSpatial 3.1.2B (NGC7253)	0.2
			orbit epilogue w/o switch-off CS	
			Photometer part	8.0
			PVSpecSetup (nominal wait time)	0.7
			PVSpecFlux 4.3.1A, complete block	2.0
			16 ABAB, 16 ABBA	
			PVSpecGeGa 1.2.3B, nominal T_{CS}	2.2
			buffer transmission mode	
			CPSpecFiller 4.2.1A	1.4
			CPSpecFPG 4.1.1A (3 obs)	2.2
			PVSpecFlux 4.3.8A (pilot)	0.9
			CPSpecGeGa Curing	0.9
			orbit epilogue	
			Spectrometer part	10.3
			3 RWL bias window slots left	
			Orbit manoeuvre (3.0h)	
			Grand total sum	18.3

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
02	65	17-Jul-2009	PVPhotSetup bias table: BOLObias_ILT_standard_low PVPhotBol 1.1.1bisA Init green PVPhotBol 1.1.1bisA (13 x green) on Arp220 (to have continuity up to DDCS tests) PVPhotBol 1.1.1bisA Fin orbit epilogue	0.6 19.5
			Sum	20.6
03	67	19-Jul-2009	24s slot for HIFI Standby-II AOR PVPhotCooler (in DTCP) PVPhotSetup bias table: BOLObias_ILT_standard_low PVPhotBol 1.1.1bisA Init green PVPhotBol 1.1.1bisA (7 x green) PVPhotBol 1.1.1bisA Fin RWL bias window slot PVPhotBol 1.1.1bisA Init blue PVPhotBol 1.1.1bisA (8 x blue) PVPhotBol 1.1.1bisA Fin orbit epilogue	 2.4 0.6 10.5 12.0
			Sum	25.5
04	72	24-Jul-2009	PVPhotCooler (in DTCP) PVPhotSetup bias table: BOLObias_ILT_standard_low PVPhotFPG 2.6.1C [$-20 < SAA < -10$] (long dwell on one source) PVPhotFPG 2.6.1D [$-20 < SAA < -10$] (18 stars) PVPhotFPG 2.6.1C [$-30 < SAA < -20$] (long dwell on one source) PVPhotFPG 2.6.1D [$-30 < SAA < -20$] (17 stars) PVPhotSpatial 3.1.2B (HIP79072) PVPhotFPG 2.6.1B [$-10 < SAA < +30$] (long dwell on one source) PVPhotSpatial 3.1.2B (NGC633) orbit epilogue 4 RWL bias windows slots left	2.4 0.6 4.0 2.0 4.0 2.0 0.2 4.0 0.2
			Sum	19.5
05	73	25-Jul-2009	24s slot for HIFI Standby-II AOR PVPhotSetup (high gain) bias table: BOLObias_ILT_standard_low PVPhotBol 1.1.1bisA Init blue PVPhotBol 1.1.1bisA (12 x blue) PVPhotBol 1.1.1bisA Fin orbit epilogue 1 RWL bias window slot left	 0.6 18.0
			Sum	18.6

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
SIAM update for spectrometer aperture P02_0 (feedback from OD64)				
06	78	30-Jul-2009	PVSpecSetupFlexDark (in DTCP)	0.1
			PVSpecSpuSetupAndResetDark (in DTCP)	1.9
			PVSpecSpatial 4.1.6A (FOV scans)	2.1
			PVSpecGeGa 1.2.6A (dark field)	0.8
			PVSpecFlux 4.3.8A (quick, CS1/CS2 dark)	2.1
			PVSpecGeGa 1.2.6D (includes heat-up of CSs)	3.1
			PVSpecFlux 4.3.8A (quick, CS1/CS2 on)	2.1
			PVSpecFlux 4.3.8D (full spec, Melpomene)	1.7
			PVSpecFPG 4.1.1A (7 observations)	5.0
			orbit epilogue CSs on	
			Orbit manoeuvre (3.0h)	
			Sum	18.9
07	79	31-Jul-2009	24s slot for HIFI Standby-II AOR	
			PVSpecSetupFlexCSOn (in DTCP)	0.1
			PVSpecSpuSetupAndResetCSOn (in DTCP)	1.9
			PVSpecWave 4.2.5A	4.6
			PVSpecSPU 1.2.21A	1.0
			PVSpecAotVal 5.2.1A	7.3
			(high prity configurations:	
			1,2,3,5,6,7,9,12,13,14,15,16,17)	
			PVSpecGeGa 1.2.3 (pilot, 2 obs)	0.5
			PVSpecFlux 4.3.8D (full spectrum, Arp 220)	2.0
			PVSpecSpatial 4.1.6B (FOV scans)	0.6
			PVSpecFlux 4.3.1A	2.0
			(internal cal blocks ABBA, including	
			reproducibility on different time scales)	
			PVSpecFlux 4.3.8A	1.0
			(detailed RSRF scan on CS1, band A4)	
			orbit epilogue	
			Sum	20.5

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
08	84	05-Aug-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup_CS40_45 (in DTCP)	0.1
			PVPhotBol CS40_45 (3 pos. chop)	0.6
			PVPhotBol 3.1.7A CS40_45 (FoV scan)	0.3
			orbit epilogue CS on (CS40_45)	
			PVPhotSetup_CS45_50	0.1
			PVPhotBol CS45_50 (3 pos. chop)	0.6
			PVPhotBol 3.1.7A CS45_50 (FoV scan)	0.3
			orbit epilogue CS on (CS45_50)	
			PVPhotSetup_CS50_55	0.1
			PVPhotBol CS50_55 (3 pos. chop)	0.6
			PVPhotBol 3.1.7A CS50_55 (FoV scan)	0.3
			orbit epilogue CS on (CS50_55)	
			PVPhotSetup_CS55_60	0.6
			PVPhotSpatial 3.1.4E	0.6
			(SPEC PSF candidate IRAS 22134, low gain!)	
			PVPhotBol 1.1.1bisA (init green)	
			PVPhotBol 1.1.1bisA (10 x green, 1.0 V omitted	15.0
			on Arp220 to have continuity up to DDCS tests)	
			PVPhotBol 1.1.1bisA Fin	
			orbit epilogue	
			Sum	21.6
09	85	06-Aug-2009	24s slot for HIFI Standby-II AOR	
			PVPhotSetup (in DTCP)	0.6
			PVPhotBol 1.1.1bisA (init green)	
			PVPhotBol 1.1.1bisA (9 x green,	13.5
			on Arp220 to have continuity up to DDCS tests)	
			PVPhotBol 1.1.1bisA Fin	
			PVPhotBol 1.1.16A direct (burst mode)	3.2
			PVPhotFPG 2.6.2B	
			(relative pointing error, longer nod on α Boo)	0.7
			orbit epilogue CS on	
			PVPhotSetup Red00-11	
			orbit epilogues Red00-11	
			PVPhotBol Red00-11 (FoV scans,	2.0
			must be at the end of an OD!)	
			orbit epilogue	
			Sum	20.0
10	86 (replacing HIFI)	07-Aug-2009	PVPhotSetup	0.6
			(rely on the cooler hold time of 60h	
			provided by cooler recycling on OD84)	
			PVPhotFPG 2.6.1F: APE assessment	3.7
			(26 stars, SAA=[+20,+30], after switching	
			STR 1 on again in DTCP 84)	
			orbit epilogue	
			Sum	4.3

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
11	90	11-Aug-2009	leave 90 min in DTCP for HIFI manual commanding	
			PVSpecSetUp_FlexClassic (in DTCP)	0.1
			PVSpecSetUp_SPUSetupAndReset (in DTCP)	0.9
			PVSpecWave 4.2.1C (on W Hya)	8.7
			PVSpecWave 4.2.1C (at 205 µm on NGC 40)	0.3
			PVSpecFlux 4.3.1A	1.0
			(internal cal blocks ABBA, including	
			reproducibility on different time scales)	
			PVSpecFlux 4.3.8A (on CS1, bands A2, B2)	2.0
			PVSpecFlux 4.3.11A	0.8
			PVSpecAOTVal 5.2.1A	3.0
			(remaining configurations not scheduled	
			on OD79: 4, 8, 10, 11)	
			PVSpecAOTVal 5.2.2A	0.7
			(standard, except *02A*)	
			PVSpecAOTVal 5.2.4A (non-standard)	2.6
			orbit epilogue CSon	
			Sum	20.1
12	91	12-Aug-2009	leave 90 min in DTCP for HIFI manual commanding	
			PVSpecSetup_FlexCSon	0.1
			PVSpecSetup_SPUSetupAndReset	0.9
			PVSpecAOTVal 5.2.2A (standard *02A*)	0.2
			PVSpecAOTVal 5.2.2A (non-standard)	3.4
			PVSpecAOTVal 5.2.1A (standard)	1.5
			PVSpecAOTVal 5.2.1B (non-standard)	3.8
			PVSpecAOTVal 5.2.1C (non-standard)	1.1
			PVSpecAOTVal 5.2.1D (non-standard)	0.2
			PVSpecAOTVal 5.2.1H (non-standard,	1.1
			no chop plus additional slew cals)	
			PVSpecSPU 1.2.21A	0.5
			PVSpecFPG 4.1.1E (patnodcheck at -L,+L,-M,-S)	2.0
			PVSpecFlux 4.3.8A (on CS1, band A1)	1.0
			orbit epilogue	
			Sum	15.8
13	92	13-Aug-2009	PVPhotCooler	2.4
	(replacing		PVPhotSetup	0.6
	HIFI)		PVPhotFPG 2.6.1G: APE assessment	5.6
			(on 48 stars in SAA range]0,+30] deg)	
			PVPhotFPG 2.6.1H: APE assessment	6.3
			(on 48 stars in SAA ranges]0,+10],	
			[+10,+20], [+20,+30] deg)	
			orbit epilogue	
			Sum	14.9

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
14	93 (replacing HIFI)	14-Aug-2009	PVPhotSetup PVPhotFPG 2.6.1D (AP drift at SAA > 20deg on HIP 69816) PVPhotFPG 2.6.2A (relative pointing error, longer nod, on Fortuna) PVPhotFPG 2.6.4A (SRPE scan w & w/o gyro propagation, on HIP 67419) orbit epilogue PVSpecSetup_FlexClassic PVSpecSetUp_SPUSetupAndReset PVSpecFlux 4.3.8A (on CS1, bands A3, A5, A6, B1, B3, B4, B5, B6) PVPhotSetup_orbitpro40Hz PVPhotSetup_orbitepi40Hz	0.6 8.4 0.7 0.9 0.1 0.9 8.0 0.7
			Sum	20.3
15	96	17-Aug-2009	PVPhotCooler (in DTCP) PVPhotSetup PVPhotBol 1.1.1bisA Init blue direct PVPhotBol 1.1.1bisA blue direct 2.0V PVPhotBol 1.1.1bisA Fin direct PVPhotBol 1.1.1bisA Init blue DDCS PVPhotBol 1.1.1bisA DDCS (3 x blue) (2.0, 2.6, 3.0V) PVPhotBol 1.1.1bisA Fin DDCS PVPhotBol 1.1.1bisA Init green DDCS PVPhotBol 1.1.1bisA DDCS (3 x green) (2.0, 2.6, 3.0V) PVPhotBol 1.1.1bisA Fin DDCS PVPhotBol 1.1.16A DDCS (burst mode) PVPhotBol 1.1.11A blue direct (1x, low bias) PVPhotFPG_StdPS_pointingModeTest_OD96 (nodding with raster on HIP 55355) orbit epilogue CSs on	2.4 0.6 0.1 1.5 0.1 4.5 0.1 4.5 3.2 3.3 0.1
			Sum	20.4
16	97	18-Aug-2009	PVPhotSetup_CSsOn (in DTCP) PVPhotBol 1.1.11A blue direct (2x, (high, nominal bias) PVPhotBol 1.1.11A green direct (3x, (low, high, nominal bias) PVPhotFPG_StdPS_pointingModeTest_OD97 (nodding with fine pointing on HIP 55355) PVPhotSetup_orbitepiCSonforRed PVPhotSetup_orbitpro_Redxx (xx = 00,01,10,11) PVPhotBol 1.1.0B VrlVhBlind Redxx PVPhotSetup_orbitepi_Redxx orbit epilogue	0.1 6.6 9.9 0.1 3.3
			Sum	20.0

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
17	101 (replacing HIFI)	22-Aug-2009	PVPhotCooler (in DTCP) PVPhotSetup PVPhotFPG 2.6.2B SRPE during rasters (without and with gyro propagation, on HIP 67419) PVPhotFPG 2.6.4A SRPE during scans (without and with gyro propagation, on HIP 67419) PVPhotFPG 2.6.1G APE assessment (on 62 pointing stars in SAA range [+1,+30] deg) PVPhotFPG 2.6.1H APE assessment (repetition on the same set of 62 stars, but this time targeted per range [+1,10], [+10,+20] and [+20,+30]) PVPhotFPG 2.6.2A RPE measurement (on asteroid Fortuna) PVPhotFPG 2.6.1E SSO tracking performance (on asteroid Flora) orbit epilogue	2.4 0.6 2.6 0.9 5.9 5.9 0.6 1.5
			Sum	20.4
18	102	23-Aug-2009	PVSpecSetup_FlexClassic (in DTCP) PVSpecSetup_SPUSetupAndReset (in DTCP) PVSpecWave 4.2.1D wavelength cal. (at 205 µm on NGC 6302) PVSpecFPG 4.1.1C verification of SIAM P02_0 (on different targets) PVSpecGeGa 1.2.3A linearity pilot 2 PVSpecAOTVal 5.2.1A chopped line spectroscopy (updates of failed ones from ODs 78/79/90) PVSpecAOTVal 5.2.1G 3 chop throws (covering FPG patnod check) PVSpecAOTVal 5.2.1G map vs. pointed PVSpecAOTVal 5.2.1G dithered vs. pointed PVSpecFlux 4.3.12A CS block straylight (SB, SA) orbit epilogue with CSs on	0.1 2.4 2.6 5.6 0.8 3.6 0.7 12.2 1.0 0.4
			Sum	27.2
19	103	24-Aug-2009	PVSpecSetup_FlexCSon (in DTCP) PVSpecSetup_SPUSetupAndReset (in DTCP) PVSpecAOTVal 5.2.1B chopped line spectroscopy (step size/nsteps) PVSpecAOTVal 5.2.4A SED mode (scan parameter optimisation, configs: 1, 2, and 5) PVSpecFPG 4.1.1F skew angle / nod throw verification (on HIP 27989) PVSpecFlux 4.3.8A coarse RSRF (on Fortuna) orbit epilogue	0.1 2.3 2.6 4.2 3.1 1.4
			Sum	13.7

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
20	104	25-Aug-2009	PVPhotCooler (in DTCP) PVPhotSetup PVPhotFPG 2.6.1C: APE assessment (on 45 pointing stars in SAA range [-20,-10]) PVPhotFPG 2.6.1B: long dwell on star at SAA = +25 deg (to adjust to cold SAA conditions and for AP drift at SAA ¿ 20 deg on HIP 67627: star was successfully observed by PACS on OD86 during pointing cal program. This initialises the thermal distortion investigation on very negative SAA angles performed on OD105) orbit epilogue with CSs on	2.4 0.6 5.7 14.0
			Sum	22.7
21	105	26-Aug-2009	PVPhotSetup with CSs on PVPhotFPG 2.6.1D: long dwell on star at SAA = -29 deg (on HIP 117591: was successfully observed by PACS on OD64 during pointing cal program, to watch the thermal distortion evolution) PVPhotFPG 2.6.1C APE assessment (on 8 pointing stars with 18 pointings in SAA range [-30,-25]) PVPhotFPG 2.6.1B: long dwell on star at SAA = +25 deg (on HIP 72208: star was successfully observed by PACS on OD92 during pointing cal programbefore STR switch over, to watch the thermal distortion recovery) orbit epilogue	0.1 8.4 3.5 14.0
			Sum	20.4
22	107	28-Aug-2009	PVPhotCooler (in DTCP) PVPhotSetup (VRL) PVPhotBol 1.1.11A low frequency noise measurement DDCS (blue filter, low, high, nominal bias) PVPhotBol 1.1.11A low frequency noise measurement DDCS (green filter, low, high, nominal bias) orbit epilogue CSs on Final telescope attitude in “hot” case DTCP zone	2.4 0.6 9.9 9.9
			Sum	22.8

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
23	108	29-Aug-2009	DTCP left empty for possible HIFI manual commanding	
			Initial telescope attitude in "hot" case DTCP zone	
			PVPhotSetup with CSs on (40 Hz)	0.1
			PVPhotFlux 3.2.1A on β UMi, γ Dra	3.2
			PVPhotFlux 3.2.1C on β UMi, γ Dra	0.4
			PVPhotFlux 3.2.1D on β UMi, γ Dra	0.8
			PVPhotAOTVal 5.1.1A on γ Dra	0.4
			PVPhotAOTVal 5.1.2A on γ Dra	0.6
			PVPhotAOTVal 5.1.4A on γ Dra	3.6
			PVPhotAOTVal 5.1.1B on δ Dra and 360 Carlova	1.2
			PVPhotAOTVal 5.1.1C on PG 1100	2.1
			PVPhotAOTVal 5.1.1C on HD 15008	2.1
			PVPhotAOTVal 5.1.4E on M 101	3.2
			PVPhotSpatial 3.1.2B on UGC 09618	0.1
			PVPhotSpatial 3.1.4E on HIP 21479	0.6
			orbit epilogue CSs on	
			PVPhotSetup_orbitpro_Redxx	2.8
			(xx = 00,01,10,11)	
			PVPhotBol FOV Redxx	
			PVPhotSetup_orbitepi_Redxx	
			Sum	20.5
24	109	30-Aug-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup with CSs on (Just Wait)	0.6
			PVPhotFlux 3.2.1B on β UMi (2nd)	0.1
			PVPhotAOTVal 5.1.4G on GOODS-S (LO, SO)	4.2
			PVPhotAOTVal 5.1.4C on NGC 1365 (60 legs)	11.9
			orbit epilogue CSs on	
			Sum	19.2
25	110	31-Aug-2009	DTCP left empty for possible HIFI manual commanding	
			PVPhotSetup with CSs on (VRL)	0.6
			PVPhotAOTVal 5.1.4C on NGC 1365 (homogeneous coverage)	9.3
			PVPhotAOTVal 5.1.4D on NGC 1365 (homogeneous coverage, blue)	2.5
			PVPhotAOTVal 5.1.4G on GOODS-S (LP, SP)	4.2
			PVPhotFlux 3.2.1B on β UMi (3rd)	0.1
			PVPhotAOTVal 5.1.4H on Abell 2218	2.3
			PVPhotAOTVal 5.1.2B on NGC 6543 (blue)	0.3
			PVPhotSpatial 3.1.7B (on dark field)	0.6
			PVPhotSetup CSs 70K	0.3
			PVPhotSpatial 3.1.7C (on dark field)	0.6
			orbit epilogue	
			Sum	20.8

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
26	114 (failed)	04-Sep-2009	PVSpecSetup_FlexClassic (in DTCP)	0.1
			PVSpecSetup_SPUSetupAndReset (in DTCP)	0.9
			PVSpecAotVal 5.2.4A on NGC 5315 (in DTCP)	1.5
			(configurations 03A, 03B)	
			PVSpecAotVal 5.2.1A on NGC 6543 (configuration A2)	0.6
			PVSpecSpatial 4.1.2B on HIP 21479	10.0
			PVSpecSpatial 4.1.2A on HIP 21479	8.6
			(configurations p3, p15)	
			orbit epilogue, CSs on	
			Sum	21.7
27	115	05-Sep-2009	PVSpecSetup_FlexCSon (in DTCP)	0.1
			PVSpecSetup_SPUSetupAndReset (in DTCP)	0.9
			PVSpecAotVal 5.2.4A on NGC 5315 (in DTCP)	1.5
			(configurations 04A, 04B)	
			PVSpecAotVal 5.2.1A on NGC 6543 (configurations B1, B2)	1.1
			PVSpecSpatial 4.1.2A on HIP 21479	21.3
			(configurations p05, 00, m05, m15, m3)	
			orbit epilogue	
			Sum	24.9
28	118	08-Sep-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup CSs off (JustWait)	0.6
			PVPhotBol 3.1.7A on Dark Field	0.4
			orbit epilogue, CSs on	
			PVPhotSetup (40Hz)	0.6
			PVPhotFlux 3.2.1B on β UMi (4th)	0.1
			PVPhotFlux 3.2.1C on α Tau	0.1
			PVPhotFlux 3.2.1D on α Tau	0.2
			PVPhotSpatial 3.1.4B on α Tau	0.2
			PVPhotSpatial 3.1.4D on α Tau	1.9
			PVPhotFlux 3.2.1C on α CMa	0.2
			PVPhotFlux 3.2.1D on α CMa	0.4
			PVPhotAOTVal 5.1.4D (28 legs, on NGC 1365)	6.3
			orbit epilogue, CSs on	
			Sum	13.4
29	119	09-Sep-2009	PVPhotSetup CSs on (in DTCP, JustWait)	0.6
			PVPhotSpatial 3.1.5B on Red Rectangle (in DTCP)	3.8
			PVPhotFlux 3.2.1B on β UMi (5th)	0.1
			PVPhotAOTVal 5.1.2B (green, on NGC 6543)	0.3
			PVPhotAOTVal 5.1.4D (hom, green, on NGC 1365)	2.5
			PVPhotSpatial 3.1.3A on V814 Her	2.2
			PVPhotSpatial 3.1.3A on α Her (standard AOTs)	2.2
			PVPhotSpatial 3.1.3B on α Her	6.6
			PVPhotSpatial 3.1.4E on IRAS 22134	0.6
			PVPhotSpatial 3.1.6A on IK Tau	1.9
			PVPhotSpatial 3.1.7B on Dark Field	0.6
			PVPhotSetup CSs70	0.5
			PVPhotSpatial 3.1.7C on Dark Field	0.6
			orbit epilogue	
			(increased CS temperatures at end of OD)	
			Sum	22.5

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
30	120 (replacing HIFI)	10-Sep-2009	PVSpecSetup_FlexClassic (in DTCP) PVSpecSetup_SPUSetupAndReset (in DTCP) PVSpecSpatial 4.1.2B on HIP 21479 PVSpecSpatial 4.1.2A on HIP 21479 (configurations p3, p15) orbit epilogue AOT pre-release validation programme Orbit manoeuvre (3.0h)	0.1 2.4 10.0 8.6 6.9
			Sum	28.0
31	124	14-Sep-2009	PVPhotCooler (in DTCP) PVPhotSetup (VRL) PVPhotFlux 3.2.1B on β UMi (6th) PVPhotSpatial 3.1.4A on 19 Fortuna PVPhotSpatial 3.1.4B on 19 Fortuna PVPhotSpatial 3.1.4B on 3C345 PVPhotSpatial 3.1.4D on 3C345 PVPhotSpatial 3.1.4E on HIP 27989 (α Ori) PVPhotAOTVal 5.1.4B on M 1 orbit epilogue, CSs on	2.4 0.6 0.1 2.3 0.2 0.2 1.9 0.6 5.4
			Sum	13.7
32	125	15-Sep-2009	PVPhotSetup CSs on (Just Wait, in DTCP) PVPhotFlux 3.2.3A on ϵ Car (low gain, in DTCP) PVPhotFlux 3.2.4A on ϵ Car (high gain, in DTCP) PVPhotFlux 3.2.1B on β UMi (7th) PVPhotFlux 3.2.2A on ϵ Car PVPhotFlux 3.2.4A on HIP 15008 (high gain) PVPhotSpatial 3.1.3A on α Her PVPhotSpatial 3.1.4A on 3C345 PVPhotSpatial 3.1.4C on α Tau PVPhotSpatial 3.1.4C on 3C345 PVPhotAOTVal 5.1.4E on NGC 1365 orbit epilogue	0.6 0.2 0.2 0.1 0.4 0.8 12.5 2.2 4.0 4.0 3.1
			Sum	28.1
33	126 (replacing HIFI)	16-Sep-2009	PVMechChop (in DTCP, chopper PID verification) PVSpecSetup FlexClassic (in DTCP) PVSpecSetup SpuSetupAndResetClassic (in DTCP) PVSpecAotVal 5.2.4A on NGC 5315 PVSpecFPG 4.1.1G on HIP 21479 (R Dor) PVSpecFlux 4.3.8F on Mars orbit epilogue	0.1 0.1 2.3 1.5 5.9 3.5
			Sum	13.4

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
34	128 (failed)	18-Sep-2009	PVPhotSetup (in DTCP, VRL)	0.5
			PVPhotFlux 3.2.1B on β UMi (8th OD)	0.1
			PVPhotFlux 3.2.4A on α Per	0.1
			PVPhotSpatial 3.1.4A on α Tau	2.3
			PVPhotFlux 3.2.3A on α Tau	0.1
			PVPhotFlux 3.2.4A on α Tau	0.1
			PVPhotFlux 3.2.3A on HD 32887	0.1
			PVPhotFlux 3.2.4A on HD 32887	0.1
			PVPhotFlux 3.2.3A on AFGL 618	0.2
			PVPhotFlux 3.2.4A on ϵ Lep	0.1
			PVPhotFlux 3.2.3A on α Ori	0.1
			PVPhotFlux 3.2.4A on α Ori	0.1
			PVPhotFlux 3.2.6A on HD 181597	2.4
			PVPhotAOTVal 5.1.4L on Fortuna	1.2
			PVPhotAOTVal 5.1.4M on HD 138265	2.8
			PVPhotFlux 3.2.4A on HD 138265	2.1
			PVPhotAOTVal 5.1.1G on HD 138265	2.3
			PVPhotAOTVal 5.1.4F on Draco cloud	4.9
			PVPhotAOTVal 5.1.2D on β Pic	0.6
			PVPhotAOTVal 5.1.1E on δ Dra	0.3
			PVPhotAOTVal 5.1.2C on NGC 6286	0.6
			orbit epilogue	
			Sum	21.1
35	129 (failed)	19-Sep-2009	PVSpecSetup FlexClassic (in DTCP)	0.1
			PVSpecSetup SpuSetupAndResetClassic (in DTCP)	1.2
			PVSpecFlux 4.3.3A on Sirius (partially during DTCP)	1.4
			PVSpecFlux 4.3.3A on α Tau	1.4
			PVSpecFlux 4.3.5A on 19 Fortuna	1.4
			PVSpecFlux 4.3.12A on AFGL 618	0.9
			PVSpecAOTVal 5.2.1A on NGC 6543	0.5
			PVSpecAOTVal 5.2.1E on DG Tau	2.9
			PVSpecAOTVal 5.2.3A on DG Tau	2.8
			PVSpecAOTVal 5.2.4B on HD 100546	4.4
			PVSpecAOTVal 5.2.4B on NGC 5315	3.0
			orbit epilogue	
			Sum	20.0

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
36	132 (recovery OD 128)	22-Sep-2009	DTCP kept free for manual commanding	
			PVPhotCooler (in DTCP)	2.4
			PVPhotSetup (40Hz)	0.5
			PVPhotFlux 3.2.1B on β UMi (8th OD)	0.1
			PVPhotFlux 3.2.4A on α Per	0.1
			PVPhotSpatial 3.1.4A on α Tau	2.3
			PVPhotFlux 3.2.3A on α Tau	0.1
			PVPhotFlux 3.2.4A on α Tau	0.1
			PVPhotFlux 3.2.3A on HD 32887	0.1
			PVPhotFlux 3.2.4A on HD 32887	0.1
			PVPhotFlux 3.2.3A on AFGL 618	0.2
			PVPhotFlux 3.2.4A on AFGL 618	0.1
			PVPhotFlux 3.2.4A on ϵ Lep	0.1
			PVPhotFlux 3.2.3A on α Ori	0.1
			PVPhotFlux 3.2.4A on α Ori	0.1
			PVPhotAOTVal 5.1.4L on Fortuna	1.2
			PVPhotAOTVal 5.1.4M on HD 138265	2.8
			PVPhotFlux 3.2.4A on HD 138265	2.1
			PVPhotAOTVal 5.1.1G on HD 138265	2.3
			PVPhotAOTVal 5.1.4F on Draco cloud	4.9
			PVPhotAOTVal 5.1.2D on β Pic	0.6
			PVPhotAOTVal 5.1.1E on δ Dra	0.3
			orbit epilogue	
			Sum	20.6
37	133 (recovery OD 129)	23-Sep-2009	DTCP + 2h kept free for CDMS upload	
			PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	0.9
			PVSpecAOTVal 5.2.1J on OMC 1	0.3
			PVSpecAOTval 5.2.2C on OMC 1	0.3
			PVSpecFlux 4.3.3A on α Tau	1.4
			PVSpecFlux 4.3.12A on AFGL 618	0.9
			PVSpecAOTVal 5.2.1A on NGC 6543	0.5
			PVSpecWave 4.1.2D on NGC 6302	0.4
			PVSpecAOTVal 5.2.1E on DG Tau	2.9
			PVSpecAOTVal 5.2.3A on DG Tau	2.8
			PVSpecAOTVal 5.2.4B on HD 100546	4.4
			PVSpecAOTVal 5.2.4B on NGC 5315	3.0
			orbit epilogue	
			Sum	17.9

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
38	138	28-Sep-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup (40Hz)	0.5
			PVPhotFlux 3.2.1B on β UMi (9th OD)	0.1
			PVPhotFlux 3.2.3A on AFGL 811	0.1
			PVPhotFlux 3.2.4A on AFGL 811	0.1
			PVPhotFlux 3.2.3A on R CrA	0.2
			PVPhotFlux 3.2.3A on HD 161796	0.1
			PVPhotFlux 3.2.4A on HD 161796	0.1
			PVPhotFlux 3.2.4A on β Hyi	0.1
			PVPhotFlux 3.2.4A on δ Dra	0.2
			PVPhotFlux 3.2.4A on HD 159330	1.1
			PVPhotFlux 3.2.8A on NGC 6543	2.0
			PVPhotAOTVal 5.1.3B on NGC 6543	0.5
			PVPhotAOTVal 5.1.3B on NGC 6286	0.5
			PVPhotFlux 3.2.6A on HD 156729	2.4
			PVPhotFlux 3.2.6A on HD 168009	2.4
			PVPhotFlux 3.2.6A on HD 181597	2.4
			PVPhotSpatial 3.1.2A on Kbin6	0.2
			PVPhotSpatial 3.1.2B on Kbin6	0.2
			PVPhotSpatial 3.1.5A on α Her	4.2
			PVPhotSPU on Abell 2218 and NGC 6946 (medium scan speed)	2.2
			orbit epilogue	
			Sum	22.0
39	139	29-Sep-2009	PVPhotSetup (VRL, in DTCP)	0.5
			PVPhotFlux 3.2.1B on β UMi (10th OD)	0.1
			PVPhotAOTVal 5.1.1D on HD 139669	1.2
			PVPhotAOTVal 5.1.3A on γ Dra (blue)	1.1
			PVPhotAOTVal 5.1.3C on NGC 6543 (blue)	2.9
			PVPhotAOTVal 5.1.4N on HD 139669	0.4
			PVPhotAOTVal 5.1.4N on HIP 21479	0.2
			PVPhotSPU on Abell 2218 (low and high scan speed)	2.6
			PVPhotSPU on Galactic plane field (all speeds)	8.2
			PVPhotStray 7.3.3A using Moon	0.5
			PVPhotBol 1.1.18 on IRAS 17208+0014	1.7
			orbit epilogue	
			Sum	19.4
40	140 (replacing HIFI)	30-Sep-2009	DTCP + 2h kept free for CDMS upload	
			PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	0.9
			PVSpecFlux 4.3.3A on Sirius (B3A)	0.7
			PVSpecAOTVal 5.2.1X on NGC 1569	1.8
			PVSpecAOTVal 5.2.1X on NGC 1569 (3x3 raster, OI63 line)	1.3
			PVSpecAOTVal 5.2.2X on NGC 1569	1.8
			PVSpecAOTVal 5.2.2X on NGC 1569 (3x3 raster, OI63 line)	1.3
			PVSpecAOTVal 5.2.3A on TX Cam	3.1
			PVSpecAOTVal 5.2.4A on NGC 6302	2.9
			PVSpecGeGa 1.2.3B on dark field (nominal CS2)	2.1
			orbit epilogue	
			Sum	15.9

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
41	141 (replacing HIFI)	01-Oct-2009	PVSpecSetup FlexClassic (in DTCP) PVSpecSetup SpuSetupAndResetClassic (in DTCP) PVSpecFPG 4.1.1G on HIP 21479 PVSpecFlux 4.3.3A on Sirius (B2A, B2B) PVSpecFlux 4.3.8E on 19 Fortuna PVSpecAOTVal 5.2.1K on IRAS 08572+3915 (N57, N122) orbit epilogue	0.1 2.3 7.9 0.8 1.4 8.8
			Sum	21.3
42	142	02-Oct-2009	PVSpecSetup FlexClassic (in DTCP) PVSpecSetup SPUSetupAndResetClassic (in DTCP) (reduced length to keep TM size below 100%) PVSpecAOTval 5.2.1K on IRAS 08572+3915 (C157) PVSpecAOTVal 5.2.3D on HD100546 (dithered map) PVSpecAOTVal 5.2.4D on NGC6302 (dithered) PVSpecFlux 4.3.8E on HD161796 PVSpecSetup heat CS1 to 70.6K + stabilization PVSpecGeGa 1.2.3B high CS1 on dark field PVSpecGeGa 1.2.3A pilot on Mars (centered on spaxels 7,9,17,19) PVSpecFlux 4.3.8F on Mars (incl. slew cal meas., CS1=70.6K!, CS2 nominal) orbit epilogue	0.1 0.9 4.0 2.0 2.9 1.4 0.8 2.1 0.6 4.5
			Sum	19.3
43	146	06-Oct-2009	PVPhotCooler (in DTCP) PVPhotSetup (40Hz) PVPhotSPU transscan on NGC6946 (high & low, in-scan & cross-scan) PVPhotFlux 3.2.1B on bet UMi (11th OD) PVPhotFlux 3.2.3A on Mrk 231 PVPhotFlux 3.2.4A on Mrk 231 PVPhotFlux 3.2.6B on HD181597 (scan maps, sensitivity comparison with PS mode on faint target) PVPhotAOTVal 5.1.1I on HD138265 (nodding frequency variation, blue) PVPhotAOTVal 5.1.1I on HD138265 (scan mini-map sensitivity, blue& green) PVPhotAOTVal 5.1.2E on Arp 55 PVPhotAOTVal 5.1.4L on 217P/Linear PVPhotAOTVal 5.1.4O on bet Pic (scan map / small source mode comparison) orbit epilogue CSs on	2.4 0.5 2.8 0.1 0.1 0.1 4.7 1.6 1.2 0.6 3.0 0.6
			Photometer part	17.7
			PVSpecSetup FlexCSson PVSpecSetup SPUSetupAndResetCSon PVSpecAOTVal 5.2.4E on 217P/Linear PVSpecAOTVal 5.2.2X on NGC 1569 (N57,O63,O88,N121,O145,N205, C157 delayed to OD147) orbit epilogue	0.1 0.8 1.5 2.1
			Spectrometer part	4.2
			Grand total sum	21.9

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
44	147	07-Oct-2009	PVSpecSetupFlexClassic (during DTCP)	0.1
			PVSpecSetup SPUSetupAndResetClassic (in DTCP)	2.3
			PVSpecAOTVal 5.2.1K on Mrk231	13.5
			PVSpecAOTVal 5.2.2X on NGC1569	0.3
			(C157, not executed on OD146)	
			PVSpecAOTVal 5.2.1X onIIZw40	2.5
			(3×3 rasters, 14" steps, C157 & O88)	
			PVSpecAOTVal 5.2.2X onIIZw40	2.8
			(3×3 rasters, 14" steps, C157 & O88)	
			orbit epilogue	
			Sum	21.5
45	154	14-Oct-2009	PVMechChop 2.3.2A (in DTCP, chopper verification)	0.1
			PVSpecSetup FlexDark (in DTCP)	0.1
			PVSpecSetup SPUSetupAndResetDark (in DTCP)	0.6
			PVSpecFlux 4.3.8A on dark field	2.1
			(straylight on dark internal CSs)	
			PVSpecSetup heating CSs (to nominal T)	0.8
			PVSpecAOTVal 5.2.1H on NGC 1569	0.6
			(unchopped line scans, mode 322, comparison with	
			wave-switching 5.2.2X; SAA <-20deg! for about 1h)	
			PVSpecAOTVal 5.2.1B on Mrk 231 & IRAS 08572	3.9
			(chop/nod line spec. optimal step size)	
			PVSpecAOTVal 5.2.1H on NGC 1569	0.6
			(unchopped line scans, mode 642, comparison with	
			wave-switching 5.2.2X; SAA <-20deg! for about 1h)	
			PVSpecAOTVal 5.2.1K on Mrk 231 & IRAS 08572	4.0
			(chop/nod line spec. repeatability)	
			PVSpecFlux 4.3.8B on Vesta, band A	6.6
			orbit epilogue	
			Sum	19.4
46	155	15-Oct-2009	extended DTCP of 5 h without MTL activities	
			PVSpecSetup FlexClassic	0.1
			PVSpecSetup SPUSetupAndResetClassic	0.8
			PVSpecFlux 4.3.8B on Vesta, band B	4.5
			PVSpecFPG 4.1.1H on R Dor	11.9
			(raster optimization Focal Plane Geometry)	
			PVSpecWave 4.2.1A on Jupiter	0.4
			(prototype wavecal all spaxels)	
			orbit epilogue	
			Sum	17.7

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
47	160	20-Oct-2009	PVPhotCooler (in DTCP)	2.4
			PVPhotSetup (VRL)	0.7
			PVPhotFlux 3.2.1B on gam Dra (1st OD)	0.1
			(replacing bet UMi from now on)	
			PVPhotSpatial 3.1.3C on NGC 6285	3.1
			PVPhotSpatial 3.1.4D on 4 Vesta	2.0
			PVPhotAOTVal 5.1.1J on HD148387	2.4
			PVPhotAOTVal 5.1.1J on HD159330	2.0
			Sum	12.7
			PACS photo SDP AORs to fill rest of OD	
			orbit epilogue	
			(-4h SOPS window for gyro scale calibration)	
48	161	21-Oct-2009	(6h extended DTCP for STR dump activities)	
			PVPhotSetup (40Hz)	0.7
			PVPhotFPG 2.6.1B on HIP 80704	10.5
			(pointing stabilization monitoring after STR switch)	
			PVPhotSPU transcan on GP field	4.2
			(complementing OD139 in blue filter)	
			PVPhotSpatial 3.1.2B on 2MASSJ18	0.2
			PVPhotSpatial 3.1.2B on N6285	0.2
			PVPhotSpatial 3.1.4E on NML Cyg	0.5
			(also AOT val PS vs. small source)	
			PVPhotFlux 3.2.1B on gam Dra (2nd OD)	0.1
			PVPhotFlux 3.2.3A on NML Cyg, CRL 2688, NGC 7027	0.6
			PVPhotFlux 3.2.4A on CRL 2688	0.1
			orbit epilogue	
			Sum	17.1
49	165	25-Oct-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetUp SPUSetupAndResetClassic	2.4
			SDP_esturm on He2-10	1.1
			SDP_aedge on Abell 1068	2.7
			SDP_bdent on HD 169142	2.3
			SDP_bdent on HD 181372	2.3
			SDP_bdent on J0843.3-7905	2.3
			SDP_evandish on HH 46	1.9
			SDP_evandish on L 1157	3.6
			SDP_evandish on NGC 7129 FIRS2	1.7
			orbit epilogue CSs on	
			Sum	20.4

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
50	166 (failed)	26-Oct-2009	PVSpecSetup CSs on	0.1
			PVSpecSetUp SPUSetupAndReset CSs on	0.8
			PVSpecFlux 434A on HD 161796	0.5
			PVSpecAotVal 524F on NGC 7027	1.8
			PVSpecAotVal 524F on comet C/2006 W3 Christensen	1.8
			PVSpecAotVal 524F on Neptune	1.8
			PVSpecAotVal 524F on VY CMa	1.8
			PVSpecAotVal 524F on comet 217P/LINEAR	1.8
			SDPSpec pharto01 on comet C/2006 W3 Christensen	1.9
			PVSpecAotVal 523B on Neptune	2.4
			PVSpecAotVal 523C on VY CMa	2.3
			PVSpecFPG 411J on R Dor	2.4
			PVSpecFlux 434A on HD 161796 (B3A, repitition)	0.2
			orbit epilogue	
			Sum	19.7
51	169	29-Oct-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SPUSetupAndResetClassic	2.3
			PVSpecFlux 4.3.4A on HD 161796	0.6
			PVSpecFlux 4.3.8B on Neptune	14.0
			PVSpecFlux 4.3.8C on Neptune	3.7
			PVSpecIP 4.2.2A on Neptune (58, 66, 216 µm)	1.0
			orbit epilogue CSs on	
			Sum	21.7
52	170	30-Oct-2009	PVSpecSetup CSs on	0.1
			PVSpecSetUp SPUSetupAndReset CSs on	0.8
			PVSpecFlux 4.3.4A on HD 161796	0.6
			PVSpecFlux 4.3.8C on HD 161796	1.1
			PVSpecFlux 4.3.5A on 4 Vesta	0.6
			PVSpecFlux 4.3.5A on 88 Thisbe	0.6
			PVSpecIP 4.2.2A on Neptune (108 µm)	0.3
			PVSpecIP 4.2.2C on Neptune (66, 108 µm)	7.9
			PVSpecIP 4.2.2G on M 51 (63, 88, 158 µm)	1.3
			SDPSpec chopped line spectroscopy on Neptune	1.4
			PVSpecAOTVal 5.2.2D on NGC 3184	1.3
			PVSpecWave 4.2.1B on Jupiter	4.4
			orbit epilogue	
			Sum	20.4

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
53	173	02-Nov-2009	PVPhotSetup JustWait	0.6
			PVPhotFlux 3.2.8A on NGC 6543	1.4
			PVPhotSpatial 3.1.2A on Kbin1	0.1
			PVPhotSpatial 3.1.2B on Kbin1	0.1
			PVPhotFlux 3.2.1C on Neptune	0.2
			PVPhotFlux 3.2.1D on Neptune	0.4
			PVPhotFlux 3.2.3A on Neptune	0.1
			orbit epilogue CSs on	
			Photometer part	2.9
			PVSpecSetup CSs on	0.1
			PVSpecSetup SpuSetupAndReset CSs on	0.8
			PVSpecAOTVal 5.2.1G on Neptune	5.8
			(first 4×4 and 5×5 raster)	
			PVSpecAOTVal 5.2.3B on Neptune	2.4
			PVSpecAOTVal 5.2.3C on VY CMa	2.3
			PVSpecAOTVal 5.2.4F on Neptune	1.8
			PVSpecAOTVal 5.2.4F on VY CMa	1.8
			PVSpecFPG 4.1.1J on R Dor	2.4
			orbit epilogue	
			Spectrometer part	17.3
			Grand total sum	20.2
54	174	03-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	2.3
			PVSpecFlux 4.3.4A on HD 161796 (fifth)	0.5
			PVSpecSpatial 4.1.3A on Neptune (40×40)	8.5
			PVSpecSpatial 4.1.3B on Neptune (11×11)	9.1
			PVSpecFlux 4.3.4A on HD 161796 (sixth)	0.5
			orbit epilogue	
			Sum	21.7
55	175	04-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	2.3
			PVSpecSpatial 4.1.3A on Neptune (25×25)	19.9
			orbit epilogue	
			Sum	22.2
56	182	11-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	2.3
			PVSpecFlux 4.3.4A on HD 161796 (seventh, eighth)	1.2
			PVSpecAOTVal 5.2.1G on Neptune	3.3
			PVSpecAOTVal 5.2.4F on CW Leo	5.4
			PVSpecAOTVal 5.2.4F on M 82	1.8
			PVSpecAOTVal 5.2.4F on NGC 7027	1.8
			PVSpecAOTVal 5.2.4F on AFGL 2591	4.6
			orbit epilogue	
			Sum	20.5

Table 122: PACS PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	PACS OD	date	contents	duration (h)
57	183	12-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	2.3
			PVSpecFlux 4.3.3A on γ Dra	1.1
			PVSpecFlux 4.3.4A on HD 161796 (ninth)	0.6
			PVSpecAOTVal 5.2.2X on NGC 6822	3.5
			PVSpecAOTVal 5.2.4F on R Dor (chopped)	1.8
			PVSpecAOTVal 5.2.4F on HD 97048 (chopped, A band)	2.0
			PVSpecAOTVal 5.2.4F on VY CMa (mapping)	7.2
			orbit epilogue	
			orbit manoeuvre (3.0h)	
			Sum	18.7
58	194	23-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	0.9
			PVSpecFlux 4.3.4A on HD161796 (in DTCP)	0.6
			PVSpecWave 4.2.1D on NGC 6543	1.2
			PVSpecIP 4.2.2C on Neptune (25 point linear raster)	11.7
			PVSpecIP 4.2.2C on Uranus (3 point linear raster)	1.7
			PVSpecAOTVal 5.2.4F on NGC 6543	1.9
			PVSpecAOTVal 5.2.1X on M82	4.4
			orbit epilogue	
			Sum	22.5
59	195	24-Nov-2009	PVSpecSetup FlexClassic	0.1
			PVSpecSetup SpuSetupAndResetClassic	0.9
			PVSpecFlux 4.3.4A on HD161796 (in DTCP)	0.6
			PVSpecFlux 4.3.8B on Uranus	14.8
			PVSpecFlux 4.3.8C on Uranus	1.9
			PVSpecGeGa 1.2.3A on Uranus (9, 13, 17, 19)	1.0
			orbit epilogue	
			thermal stabilisation for DLCM (3.0h)	
			Sum	19.3
60	200	29-Nov-2009	PVPhotFPG 2.6.1I	2.6
			Sum	2.6

Table 123: SPIRE/PACS Parallel Mode PV Phase High Level Plan. The smallest time resolution used is 0.1 h

#	SP Parallel OD	date	contents	duration (h)
03	136	26-Sep-2009	PVParAOTVal_Cooler	2.9
			SpireEngREDYtoPHOT_STBY	0.1
			ParAOTVal_PacsPhot orbitpro	0.7
			PVParStray 7.3.4A using Jupiter	12.5
			SPParallel on Sgr B2	6.3
			SpireEngPHOT_STBYtoREDY	
			orbit epilogue	
			Sum	22.5
04	137	27-Sep-2009	Kept 5 hours free of MTL activities	
			SpireEngREDYtoPHOT_STBY	0.1
			ParAOTVal_PacsPhot orbitpro	0.7
			PVParAOTVal 5.1.5E on Lockman Hole	4.6
			PVParAOTVal 5.1.5C on Palma/HiGal	2.6
			PVParStray 3.1.6A on Mars	9.4
			SpireEngPHOT_STBYtoREDY	
			orbit epilogue	
			Sum	17.4

7.3 Trace matrix of proposal blocks and allocation of PACS PV ODs

Table 124: PACS PV Phase Trace Matrix of proposal blocks and PV phase ODs.

PVMechChop			
2.3.2A	⇒	OD0126	none
	⇒	OD0154	none
PVPhotFPG			
2.6.1A	⇒	OD0064	HIP 100605, HIP 104719, HIP 108317
			HIP 112545, HIP 114507, HIP 1901
			HIP 117591, HIP 116705, HIP 117763
			HIP 1834, HIP 3179, HIP 8565
			HIP 9203, HIP 9234, HIP 9640
			PPM 45199, HIP 9582, HIP 9306
			HIP 6903, HIP 4008, HIP 17881
			HIP 36547, HIP 75847, HIP 80802
			HIP 72607, HIP 69816, HIP 67672
			HIP 73199, HIP 79804, HIP 81835
			HIP 82249, HIP 83866, HIP 160540
			HIP 87816, HIP 94162
2.6.1B	⇒	OD0072	HIP 21479
	⇒	OD0104	HIP 67627 (14.0 h dwell)
	⇒	OD0105	HIP 72208 (8.4 h dwell)
	⇒	OD0161	HIP 80704 (10.5 h dwell)
2.6.1C	⇒	OD0072	SAA in [-20,-10]
			HIP 77615, WW Ser, HIP 75456
			HIP 73714, HIP 72432, HIP 70026
			HIP 70969, HIP 76423, HIP 77450
			HIP 79233, HIP 80259, HIP 84004
			HIP 87833, HIP 98424, HIP 95413
			HIP 87850, HIP 84329
			SAA in [-30,-20]
			2MASS J1809,HIP 90883, HIP 91373
			HIP 92862, HIP 95902, HIP 94438
			HIP 88832, KT Her, HIP 84027
			HIP 80488, HIP 75393, HIP 75177
			HIP 76377, HIP 77023, HIP 79593
			HIP 151204, HIP 82526
	⇒	OD0104	SAA in [-20,-10]
			PPM 787044, PPM 787209, HIP 110428
			HD 11290, HIP 11455, HIP 14930
			HIP 15474, HIP 14135, HIP 13092
			HIP 10687, HIP 8565, HIP 6093
			HIP 4008, HIP 108317, HIP 88832
			2 M 1809, 2 M 1811, HIP 87747
			HIP 84346, HIP 82912, HIP 82273
			HIP 85258, HIP 84780, HD 168829
			HIP 90883, HIP 91373, HIP 92862
			HIP 94438, HIP 95413, HIP 104719
			HIP 117763, HIP 1834, HIP 3179

Table 124: continued.

			HIP 9234, HIP 9640, HIP 12193
			HIP 12257, HIP 13654, HIP 16647
			HD 24607, HIP 17889, HD 22868
			HIP 18744, HIP 17678, HIP 19424
	⇒	OD0105	SAA in [-30,-25]
			HIP 11350, HD 224126, HIP 116705
			HIP 114507, HIP 87668, HIP 89642
			HIP 102082, HIP 117591
2.6.1D	⇒	OD0072	HIP 79349 [SAA: -20, -10] (3.5 h dwell)
			HIP 82526 [SAA: -30, -20] (3.5 h dwell, non-detection)
	⇒	OD0093	HIP 69816 [SAA: +20, +30]
			(8.4 h dwell, on STR-2!)
	⇒	OD0105	HIP 117591 [SAA: -30,-28] (8.4 h dwell)
2.6.1E	⇒	OD0041	Melpomene
	⇒	OD0101	Flora
2.6.1F	⇒	OD0086	SAA in [+20, +30]
			HIP 64569, HIP 67665, HIP 67410
			HIP 67627, CS Dra, HD 39741
			HIP 22667, HIP 24436, PPM 725418
			HIP 36377, HD 91760, HIP 57607
			HIP 59588, HIP 57642, HIP 27286
			HIP 23203, PPM 700186, HIP 21421
			HIP 21406, HIP 36547, HIP 69816
			HIP 69038, HIP 68417, HIP 68357
			PPM 103009, HIP 66100
2.6.1G	⇒	OD0092	SAA in [+1, +30]
			HIP 66100, HD 120806, HIP 70669
			HIP 76423, HIP 77450, HIP 76573
			WX Ser, HIP 72208, HIP 69673
			PPM 103009, HIP 71802, HIP 71644
			HIP 70885, HIP 68357, HIP 68417
			HIP 69038, HIP 67627, HIP 69816
			HIP 73199, HIP 80802, HIP 62607
			all non-detections due to STR switch!
			HIP 75847, HIP 46806, HIP 46701
			HIP 50230, HIP 51087, HIP 55537
			HIP 57642, HIP 59588, HIP 64778
			HIP 66666, HIP 61084, HIP 61404
			HIP 55355, HIP 83866, HIP 79804
			HIP 82249, HIP 81835, HIP 77619
			HIP 78574, HIP 77501, HIP 78235
			WW Ser, HIP 75456, HIP 70969
			HIP 70026, HIP 67457, HD 121714
	⇒	OD0101	HIP 67457, HD 121714, HIP 69346
			HIP 70969, HIP 70026, HIP 72432
			HIP 75177, HIP 73714, HIP 75393
			HIP 75456, WW Ser, HIP 70669
			HIP 72208, WX Ser, HIP 76423

Table 124: continued.

			HIP 77615, HIP 77450, HIP 79349
			HIP 79233, HIP 80259, HIP 76573
			HIP 75143, HIP 71802, HIP 71644
			HIP 70885, HIP 77501, HIP 78235
			HIP 80704, HIP 78574, HIP 77619
			HIP 81835, HIP 82249, HIP 79804
			HIP 83866, HIP 80802, HIP 73199
			HIP 67627, HIP 69816, HIP 72607
			HIP 75847, HIP 36547, HIP 17881
			HIP 29919, HIP 30945, PPM 30600
			HIP 35264, HIP 36377, HD 48505
			HIP 30438, PPM 767023, HIP 31057
			HIP 46806, HIP 46701, HIP 50230
			HIP 51087, HIP 55537, HIP 55355
			HIP 57505, HIP 61604, HIP 61084
			HIP 66666, HIP 64778
	⇒	OD0101	SAA in [+1, +30]
2.6.1H	⇒	OD0092	repetition per SAA range
			all non-detections due to STR switch!
			SAA in [+1, +10]
			HIP 76423, HIP 77450, HIP 76573
			WX Ser, HIP 80802, HIP 66666
			HIP 61084, HIP 61404, HIP 55355
			HIP 83666, HIP 79804, HIP 82249
			HIP 81835, HIP 77619, HIP 78574
			HIP 77501, HIP 78235, WW Ser
			HIP 75456, HIP 70969, HIP 70026
			SAA in [+10, +20]
			HIP 67457, HD 121714, HIP 64778
			HIP 55537, HIP 46701, HIP 46806
			HIP 75847, HIP 72607, HIP 73199
			HIP 71644, HIP 71802, HIP 72208
			HIP 70669
			SAA in [+20, +30]
			HIP 70885, HIP 68357, HIP 68417
			HIP 69038, HIP 67627, HIP 69816
			PPM 103009, HIP 69673, HIP 66100
			HD 120806, HIP 50230, HIP 51087
			HIP 57642, HIP 59588
	⇒	OD0101	repetition per SAA range
			SAA in [+1, +10]
			HIP 61604, HIP 57505, HIP 31057
			PPM 767023, HIP 80802, HIP 83866
			HIP 79804, HIP 82249, HIP 81835
			HIP 78574, HIP 80704, HIP 78235
			HIP 80259, HIP 79233, HIP 79349
			HIP 77450, HIP 77615, HIP 76423
			WW Ser, HIP 75456, HIP 75393

Table 124: continued.

			HIP 73714, HIP 75177, HIP 72432
			SAA in [+10, +20]
			HIP 70026, HIP 70969, HIP 69346
			HD 121714, HIP 67457, HIP 64778
			HIP 66666, HIP 61084, HIP 55355
			HIP 46806, HIP 30438, HD 48505
			HIP 17881, HIP 36547, HIP 75847
			HIP 72607, HIP 73199, HIP 77619
			HIP 77501, HIP 75143, HIP 76573
			WX Ser
			SAA in [+20, +30]
			HIP 71802, HIP 71644, HIP 70885
			HIP 67627, HIP 69816, HIP 29919
			HIP 30945, PPM 30600, HIP 35264
			HIP 36377, HIP 46701, HIP 50230
			HIP 51087, HIP 55537, HIP 70669
			HIP 72208
2.6.2A	⇒	OD0085	α Boo
	⇒	OD0093	Fortuna (on STR-2!)
	⇒	OD0101	Fortuna
2.6.2B	⇒	OD0101	HIP 67419 (with & without gyro propagation)
2.6.4A	⇒	OD0093	HIP 67419
			(with & without gyro calibration, on STR-2!)
	⇒	OD0101	HIP 67419 (with & without gyro propagation)
2.6.4B	⇒	OD0041	Mrk 273/HIP 66738
PModeTest	⇒	OD0096	HIP 53555 (nodding with raster mode)
	⇒	OD0097	HIP 53555 (pmode changed to nodding with fine pointing)
PVPhotBol			
1.1.0A	⇒	OD0097	no pointing (red matrix signal investigation)
1.1.1bisA	⇒	OD0065	Arp 220 (direct, blue)
	⇒	OD0067	Arp 220 (direct, blue, label "green" incorrect)
	⇒	OD0073	Arp 220 (direct, blue, label "green" incorrect)
	⇒	OD0084	Arp 220 (direct, green)
	⇒	OD0085	Arp 220 (direct, green)
	⇒	OD0096	Arp 220 (direct, blue, 2.0V, correct raster orientation)
	⇒	OD0096	Arp 220 (DDCS, blue, 2.0, 2.6, 3.0V)
	⇒	OD0096	Arp 220 (DDCS, green, 2.0, 2.6, 3.0V)
1.1.11A	⇒	OD0096	dark field (direct, blue, low bias)
	⇒	OD0097	dark field (direct, blue, high & nominal bias)
	⇒	OD0097	dark field (direct, green)
	⇒	OD0107	dark field (DDCS, blue, green)
1.1.16A	⇒	OD0085	dark field (direct)
	⇒	OD0096	dark field (DDCS)
1.1.18A	⇒	OD0139	IRAS 17208-0014
2.5.4A	⇒	OD0084	dark field (CS1/2 dynamic range adjustment
			triple chop on CS1/CS2 = 40/45, 45/50, 50/55 K
3.1.7A	⇒	OD0084	dark field (FoV scan on CS1/CS2 = 40/45, 45/50, 50/55 K
	⇒	OD0118	dark field (FoV scan on nominal CS1/CS2)

Table 124: continued.

Redxx	⇒	OD0085	dark field (xx = 00-11, red matrix signal investigation)
	⇒	OD0097	dark field (3 position chop)
	⇒	OD0108	dark field (FOV, xx = 00-11, red matrix signal investigation)
PVPhotSPU			
TranspScan	⇒	OD0138	Abell 2218, NGC 6946 (medium scan speed)
	⇒	OD0139	Abell 2218 (low and high scan speed)
			Galactic Plane Field (all scan speeds)
	⇒	OD0146	NGC 6946 (low and high scan speeds)
	⇒	OD0161	Galactic Plane Field (medium & high speed, blue filter)
PVPhotSpatial			
3.1.2A	⇒	OD0138	Kbin6
	⇒	OD0173	Kbin1
3.1.2B	⇒	OD0064	NGC 7253 (low gain)
	⇒	OD0108	UGC 09618
	⇒	OD0072	HIP 79072, NGC 633 (low gain)
	⇒	OD0138	Kbin6
	⇒	OD0161	2MASS J18, NGC 6285
	⇒	OD0173	Kbin1
3.1.3A	⇒	OD0119	V814 Her, α Her (standard AOTs)
	⇒	OD0125	α Her (non-standard AOTs)
3.1.3B	⇒	OD0119	α Her
3.1.3C	⇒	OD0160	NGC 6285
3.1.4A	⇒	OD0124	Fortuna
	⇒	OD0125	3C345
	⇒	OD0132	α Tau
3.1.4B	⇒	OD0118	α Tau
	⇒	OD0124	3C345, Fortuna
3.1.4C	⇒	OD0125	α Tau, 3C345
3.1.4D	⇒	OD0118	α Tau
	⇒	OD0124	3C345
	⇒	OD0160	Vesta
3.1.4E	⇒	OD0084	IRAS 22134+5834 (low gain, spec PSF candidate)
	⇒	OD0108	HIP 21479 (blue and green, spec PSF candidate)
	⇒	OD0119	IRAS 22134+5834 (high gain)
	⇒	OD0124	HIP 27989 (α Ori)
	⇒	OD0161	NML Cyg
3.1.5A	⇒	OD0138	α Her
3.1.5B	⇒	OD0119	Red Rectangular
3.1.6A	⇒	OD0119	IK Tau
3.1.7A	⇒	OD0064	dark field (dark CS, low gain)
3.1.7B	⇒	OD0110	dark field (normal CS)
	⇒	OD0119	dark field (normal CS)
3.1.7C	⇒	OD0110	dark field (CS at 70K)
	⇒	OD0119	dark field (CS at 70K)
PVPhotFlux			
3.2.1A	⇒	OD0108	β UMi, γ Dra (blue, green)
3.2.1B	⇒	OD0109	β UMi

Table 124: continued.

	⇒	OD0110	β UMi
	⇒	OD0118	β UMi
	⇒	OD0119	β UMi
	⇒	OD0124	β UMi
	⇒	OD0125	β UMi
	⇒	OD0128	β UMi
	⇒	OD0132	β UMi
	⇒	OD0138	β UMi
	⇒	OD0139	β UMi
	⇒	OD0146	β UMi
	⇒	OD0160	γ Dra
	⇒	OD0161	γ Dra
3.2.1C	⇒	OD0108	β UMi, γ Dra (blue, green)
	⇒	OD0118	α CMa, α Tau (blue, green)
	⇒	OD0173	Neptune
3.2.1D	⇒	OD0108	β UMi, γ Dra (blue, green)
	⇒	OD0118	α CMa, α Tau (blue, green)
	⇒	OD0173	Neptune
3.2.2A	⇒	OD0125	ϵ Car ($4\times$)
3.2.3A	⇒	OD0125	ϵ Car
	⇒	OD0132	ϵ Lep (HD 32887), α Tau, α Ori (HIP 27989), AFGL 618
	⇒	OD0138	HD 161796, AFGL 811, R CrA
	⇒	OD0146	Mrk 231
	⇒	OD0161	NML Cyg, CRL 2688, NGC 7027
	⇒	OD0173	Neptune
3.2.4A	⇒	OD0125	ϵ Car, HD 15008
	⇒	OD0132	ϵ Lep (HD 32887), α Tau, α Ori (HIP 27989), α Per, AFGL 618, HD 138265
	⇒	OD0138	HD 159330, β Hyi, δ Dra, HD 161796, AFGL 811
	⇒	OD0146	Mrk 231
	⇒	OD0161	CRL 2688
3.2.6A	⇒	OD0138	HD 156729, HD 168009, HD 181597
3.2.6B	⇒	OD0146	HD 181597
3.2.8A	⇒	OD0138	NGC 6543
	⇒	OD0173	NGC 6543
PVPhotStray			
7.3.3A	⇒	OD0139	Moon in out-of-field straylight spot F
PVPhotAOTVal			
5.1.1A	⇒	OD0108	γ Dra (blue, green, dither, non-dither)
5.1.1B	⇒	OD0108	δ Dra (blue, green, dither, non-dither) 360 Carlova (blue, green, dither, non-dither)
5.1.1C	⇒	OD0108	HD 15008 (blue, green, dither, non-dither) PG 1100+772 (blue, green, dither, non-dither)
5.1.1D	⇒	OD0139	HD 139669
5.1.1E	⇒	OD0132	δ Dra
5.1.1G	⇒	OD0132	HD 138265
5.1.1I	⇒	OD0146	HD 138265

Table 124: continued.

5.1.1J	⇒	OD0160	HD 148387
	⇒	OD0160	HD 159330
5.1.2A	⇒	OD0108	γ Dra (blue, green)
5.1.2B	⇒	OD0110	NGC 6543 (blue)
	⇒	OD0119	NGC 6543 (green)
5.1.2D	⇒	OD0132	β Pic
5.1.2E	⇒	OD0146	Arp 55
5.1.3A	⇒	OD0139	γ Dra (blue)
5.1.3B	⇒	OD0138	NGC 6286, NGC 6543
5.1.3C	⇒	OD0139	NGC 6543 (blue)
5.1.4A	⇒	OD0108	γ Dra (blue, green)
5.1.4B	⇒	OD0124	M 1 (blue, green, all orientations)
5.1.4C	⇒	OD0109	NGC 1365 (60 legs)
	⇒	OD0110	NGC 1365 (homogeneous coverage)
5.1.4D	⇒	OD0110	NGC 1365 (homogeneous coverage, blue)
	⇒	OD0118	NGC 1365 (28 legs)
	⇒	OD0119	NGC 1365 (homogeneous coverage, green)
5.1.4E	⇒	OD0108	M 101
	⇒	OD0125	NGC 1365
5.1.4F	⇒	OD0132	Draco Cloud
5.1.4G	⇒	OD0109	GOODS-S (LO,SO)
	⇒	OD0110	GOODS-S (LP,SP)
5.1.4H	⇒	OD0110	Abell 2218
5.1.4L	⇒	OD0132	Fortuna
	⇒	OD0146	217P/Linear
5.1.4M	⇒	OD0132	HD 138265
5.1.4N	⇒	OD0139	HIP 21479, HD 139669
5.1.4O	⇒	OD0146	β Pic
5.1.4P	⇒	OD0191	SDSS J1148+5251, HIP 7978, HIP 15371, γ Dra
PVParStray			
3.1.6A	⇒	OD0137	near Mars
7.3.4A	⇒	OD0136	Jupiter in out-of-field straylight spot I
7.3.4A	⇒	OD0214	Jupiter in out-of-field straylight spot E
PVParAOTVal			
5.1.5A	⇒	OD0111	β UMi (11′ off)
5.1.5B	⇒	OD0111	NGC 6946
5.1.5C	⇒	OD0112	GP field-1 (Galactic Centre)
	⇒	OD0137	Palma in HiGal field
	⇒	OD0151	Lampethia in HiGal field
5.1.5D	⇒	OD0111	Draco Cloud
	⇒	OD0112	Draco Cloud
5.1.5E	⇒	OD0137	Lockman Hole
	⇒	OD0151	Lockman Hole (30"/s scan speed)
5.1.5G	⇒	OD0112	GP field 40Hz-1-2-1 (IRAS 18232-1154)
5.1.5H	⇒	OD0112	NEP_PV-1-1 (IRAS 17517+6422)
PVSpecFPG			
4.1.1A	⇒	OD0064	HIP 21479 (chop = 0, −3, +3)
	⇒	OD0078	HIP 21479 (chop = 0, ±0.5, ±1.5, ±3.0)

Table 124: continued.

4.1.1C	⇒	OD0102	HIP 68815, HIP 21479, HIP 13502
			HIP 67419, HIP 84071, IRAS 22134
			HIP 27989 (α Ori)
4.1.1E	⇒	OD0091	NGC 5315 (chop = -L, +L, -M, -S)
4.1.1F	⇒	OD0103	HIP 27989 (α Ori)
4.1.1G	⇒	OD0126	HIP 21479 (pm3, w66, w77)
	⇒	OD0141	HIP 21479 (pm3, pmL, pmM, pmS)
4.1.1H	⇒	OD0155	HIP 21479 (315m35_12, 315p15_12, 265m35_12
			905m35_12, 180m6_12, 180m6_11)
4.1.1J	⇒	OD0166	R Dor (HIP 21479) (failed)
	⇒	OD0173	R Dor (HIP 21479)
PVSpecGeGa			
1.2.3A	⇒	OD0079	Arp 220, pilot
	⇒	OD0102	Arp 220, pilot 2
	⇒	OD0142	Mars, pilot 3
	⇒	OD0195	Uranus (p09, p13, p17, p19)
1.2.3B	⇒	OD0064	dark field (low, CS1)
	⇒	OD0140	dark field (low, CS2)
	⇒	OD0142	dark field (high, CS1)
1.2.6A	⇒	OD0078	dark field
1.2.6B	⇒	OD0078	dark field (simultaneous heat-up)
PVSpecIP			
4.2.2A	⇒	OD0169	Neptune (58, 66, 216 µm)
	⇒	OD0170	Neptune (108 µm)
4.2.2C	⇒	OD0170	Neptune (Rx, Ry, 66 and 108 µm)
	⇒	OD0194	Neptune (Rx25, Ry25 at 108 µm)
			Uranus (Rx3, Ry3 at 66 µm)
PVSpecWave			
4.2.1A	⇒	OD0064	R Cas
	⇒	OD0155	Jupiter (all spaxels, pilot)
4.2.1B	⇒	OD0170	Jupiter
4.2.1C	⇒	OD0090	W Hya
4.2.1D	⇒	OD0090	NGC 40 (205 µm; line not detected)
	⇒	OD0102	NGC 6302 (205 µm)
	⇒	OD0133	NGC 6302 (nochoporder A 01, B 01)
	⇒	OD0194	NGC 6543 (StdLS A and B)
4.2.5A	⇒	OD0079	IC 2501
PVSpecFlux			
4.3.1A	⇒	OD0064	dark field (complete block ABAB)
			dark field (1st complete block ABBA)
	⇒	OD0079	dark field (2 blocks ABBA in reverse order)
	⇒	OD0090	dark field (2 blocks ABBA in reverse order)
4.3.3A	⇒	OD0133	α Tau (B2A, B2B, B3A)
	⇒	OD0140	Sirius (B3A)
	⇒	OD0141	Sirius (B2A, B2B)
	⇒	OD0183	γ Dra
4.3.4A	⇒	OD0169	HD 161796 (B2A, B2B, B3A)
	⇒	OD0170	HD 161796 (B2A, B2B, B3A)

Table 124: continued.

	⇒	OD0174	HD 161796 (2× B2A, B2B, B3A)
	⇒	OD0182	HD 161796 (2× B2A, B2B, B3A)
	⇒	OD0183	HD 161796 (B2A, B2B, B3A)
	⇒	OD0194	HD 161796 (B2A, B2B, B3A)
	⇒	OD0195	HD 161796 (B2A, B2B, B3A)
4.3.5A	⇒	OD0170	Vesta, Thisbe
4.3.8A	⇒	OD0064	dark field (pilot)
	⇒	OD0078	dark field (quick, on CS1/CS2 cold & warm)
	⇒	OD0079	dark field (detailed A4, on CS1)
	⇒	OD0090	dark field (detailed A2, B2, on CS1)
	⇒	OD0091	dark field (detailed A1, on CS1)
	⇒	OD0093	dark field (detailed A3, A5, A6, B1, B3, B4, B5, B6, on CS1)
	⇒	OD0154	dark field (quick, on CS1/CS2 cold)
4.3.8B	⇒	OD0154	Vesta (band A)
	⇒	OD0155	Vesta (band B)
	⇒	OD0169	Neptune (bands A and B)
	⇒	OD0195	Uranus (bands A and B)
4.3.8C	⇒	OD0169	Neptune (bands A and B)
	⇒	OD0170	HD 161796 (s, A)
	⇒	OD0174	HD 161796 (s, B)
	⇒	OD0195	Uranus (s, bands A and B))
4.3.8D	⇒	OD0078	Melpomene
	⇒	OD0079	Arp 220
4.3.8E	⇒	OD0103	Fortuna (coarse RSRF)
	⇒	OD0141	Fortuna (coarse RSRF)
	⇒	OD0142	HD 161796
4.3.8F	⇒	OD0126	Mars (slew cal, RSRF, A and B)
	⇒	OD0142	Mars (slew cal, RSRF, B)
4.3.11A	⇒	OD0090	dark field
4.3.12A	⇒	OD0102	AFGL 618 (config: SA,SB)
	⇒	OD0133	AFGL 618 (config: LA,LB)
PVSpecSpatial			
4.1.2A	⇒	OD0115	HIP 21479 (p05, 00, m05, m15, m3)
	⇒	OD0120	HIP 21479 (p3, p15)
4.1.2B	⇒	OD0120	HIP 21479
4.1.3A	⇒	OD0174	Neptune (40 × 40)
	⇒	OD0175	Neptune (25 × 25)
4.1.3B	⇒	OD0174	Neptune (11 × 11)
4.1.6A	⇒	OD0078	dark field
4.1.6B	⇒	OD0079	dark field
PVSpecSPU			
1.2.21A	⇒	OD0079	NGC 5315
	⇒	OD0091	NGC 5315
PVSpecAOTVal			
5.2.1A	⇒	OD0079	NGC 5315 (non-standard, config: 1,2,3,5,6,7,9,12,13,14,15,16,17)
	⇒	OD0090	NGC 5315 (non-standard, config: 4,8,10,11)
	⇒	OD0091	NGC 5315 (standard)
	⇒	OD0102	NGC 5315 (non-standard, config: 7,8,9,10,11,12,13,15,16,17)

Table 124: continued.

	⇒	OD0115	NGC 6543 (B1, B2)
	⇒	OD0133	NGC 6543 (A2)
5.2.1B	⇒	OD0091	NGC 5315
	⇒	OD0103	NGC 5315 (non-standard)
	⇒	OD0154	Mrk 231
			IRAS 08572+3915 (C157)
5.2.1C	⇒	OD0091	NGC 5315
5.2.1D	⇒	OD0091	NGC 5315
5.2.1E	⇒	OD0133	DG Tau
5.2.1G	⇒	OD0102	NGC 5315 (patnod check, raster, dithermap)
			NGC 40 (raster)
	⇒	OD0173	Neptune
	⇒	OD0182	Neptune
	⇒	OD0190	Neptune (B3, 5 × 5 map)
5.2.1H	⇒	OD0091	NGC 5315
	⇒	OD0154	NGC 1569 (modes 322, 642)
5.2.1J	⇒	OD0133	OMC 1
5.2.1K	⇒	OD0141	IRAS 08572+3915 (N57, N122)
	⇒	OD0142	IRAS 08572+3915 (C157)
	⇒	OD0147	Mrk 231
	⇒	OD0154	Mrk 231
	⇒	OD0154	IRAS 08572+3915 (C157)
5.2.1X	⇒	OD0140	NGC 1569 (CP32, CP64, CPrs)
	⇒	OD0147	II Zw 40 (CPrs: 3×3 raster, 14" steps, C157 & O88 lines)
	⇒	OD0194	M 82 (StdLineMap at 63, 88, 145, 157 µm)
5.2.2A	⇒	OD0090	NGC 5315 (non-standard, 01A, 01B1, 01B2, 01B3)
	⇒	OD0091	NGC 5315 (non-standard, 02A)
	⇒	OD0091	NGC 5315 (standard)
5.2.2C	⇒	OD0133	OMC 1
5.2.2D	⇒	OD0170	NGC 3184 (WS32rs: OI73, C157)
5.2.2X	⇒	OD0140	NGC 1569 (WS32, WS64, WSrs)
	⇒	OD0146	NGC 1569 (WS32, WS64: correct offset & PACS-2128 work-around)
	⇒	OD0147	NGC 1569 (WS32, WS64: C157 line not covered on OD146)
	⇒	OD0147	II Zw 40 (WSrs: 3×3 raster, 14" steps, C157 & O88 lines)
	⇒	OD0183	NGC 6822 (WS, NoChop: R, WS B, WS B2)
5.2.3A	⇒	OD0133	DG Tau
	⇒	OD0140	TX Cam
5.2.3B	⇒	OD0173	Neptune
5.2.3C	⇒	OD0173	VY CMa
5.2.3D	⇒	OD0142	HD 100546 (dithered map)
5.2.4A	⇒	OD0090	NGC 5315
	⇒	OD0103	NGC 5315 (config: 1,2,5)
	⇒	OD0115	NGC 5315 (04A, 04B)
	⇒	OD0126	NGC 5315 (03A, 03B)
	⇒	OD0140	NGC 6302
5.2.4B	⇒	OD0133	NGC 5315, HD 100546
5.2.4D	⇒	OD0142	NGC 6302 (dithered)
5.2.4E	⇒	OD0146	217P/Linear

Table 124: continued.

5.2.4F	⇒	OD0173	Neptune, VY CMa
	⇒	OD0182	CW Leo, M 82, NGC 7027, AFGL 2591
	⇒	OD0183	R Dor (= HIP 21479, chopped), VY CMa (map)
			HD 97048 (A band, chopped)
	⇒	OD0194	NGC 6543 (NStdSEDChop A and B)

7.4 PV Phase Timeline

This section contains a graphical and tabular overview of all calibration AORs scheduled for the PV deliveries to HSC per Operational Day.

7.4.1 OD0064

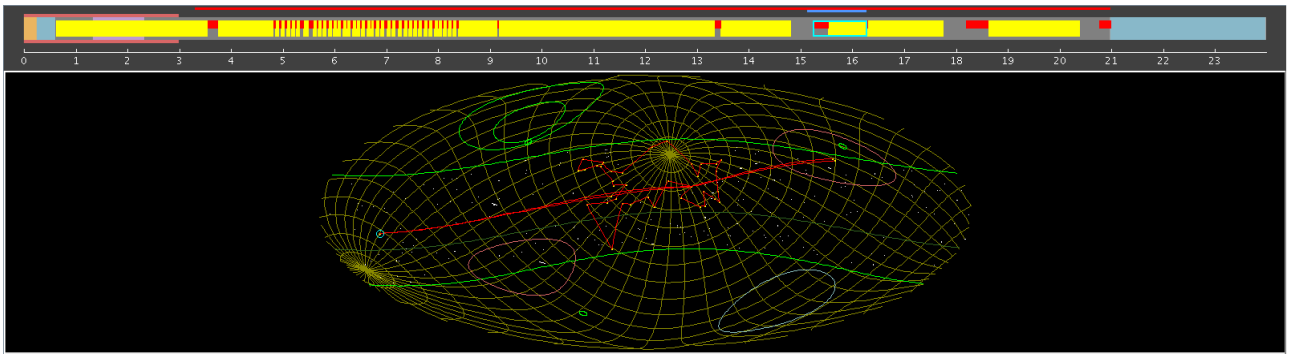


Figure 95: Timeline and distribution of pointings for OD0064 as displayed in the Mission Planning System.

Table 125: Timeline for PACS PV Phase OD0064.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0001	8542	2009-07-16T14:47:08Z
PVPhotSetup_na_nStd_orbitproCSoff_na_0001	1972	2009-07-16T17:09:30Z
CPPhotBol_317A_nStd_FOV_CSoff_DarkField_0001	1381	2009-07-16T17:55:53Z
PVPhotSetup_na_nStd_orbitepi_na_0001	13	2009-07-16T18:18:54Z
PVPhotSetup_na_nStd_orbitpro_na_0001	2348	2009-07-16T18:19:07Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP100605	339	2009-07-16T19:02:13Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP104719	339	2009-07-16T19:09:17Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP108317	339	2009-07-16T19:14:59Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP112545	339	2009-07-16T19:21:20Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP114507	339	2009-07-16T19:26:39Z
PVPhotSpatial_312B_NStd_blu_N7253lowgain_0001	281	2009-07-16T19:35:04Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP1901	339	2009-07-16T19:45:46Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP117591	339	2009-07-16T19:52:08Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP116705	339	2009-07-16T19:57:38Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP117763	339	2009-07-16T20:03:45Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP1834	339	2009-07-16T20:09:31Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP3179	339	2009-07-16T20:14:27Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP8565	339	2009-07-16T20:20:46Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9203	339	2009-07-16T20:25:38Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9234	339	2009-07-16T20:31:26Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9640	339	2009-07-16T20:36:35Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_PPM45199	339	2009-07-16T20:42:18Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9582	339	2009-07-16T20:48:46Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP9306	339	2009-07-16T20:52:28Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP6093	339	2009-07-16T20:58:14Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP4008	339	2009-07-16T21:03:56Z

Table 125: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP17881	339	2009-07-16T21:11:52Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP36547	339	2009-07-16T21:18:01Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP75847	339	2009-07-16T21:25:15Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP80802	339	2009-07-16T21:31:08Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP72607	339	2009-07-16T21:37:01Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP69816	339	2009-07-16T21:43:02Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP67627	339	2009-07-16T21:48:12Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP73199	339	2009-07-16T21:54:02Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP79804	339	2009-07-16T22:00:26Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP81835	339	2009-07-16T22:06:05Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP82249	339	2009-07-16T22:11:08Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP83866	339	2009-07-16T22:16:57Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HD160540	339	2009-07-16T22:22:51Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP87816	339	2009-07-16T22:27:49Z
PVPhotFPG_261A_StdPS_blu_SAA-10+30_HIP94162	339	2009-07-16T22:34:18Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0001	13	2009-07-16T22:36:57Z
PVSpecSetup_na_nStd_orbitpro_na_0001	2459	2009-07-16T22:37:10Z
PVSpecFlux_431A_nStdSlewCalABAB_01_DarkField_0001	214	2009-07-16T23:21:32Z
PVSpecFlux_431A_nStdSlewCalABAB_02_DarkField_0001	214	2009-07-16T23:25:20Z
PVSpecFlux_431A_nStdSlewCalABAB_03_DarkField_0001	198	2009-07-16T23:29:08Z
PVSpecFlux_431A_nStdSlewCalABAB_04_DarkField_0001	198	2009-07-16T23:32:40Z
PVSpecFlux_431A_nStdSlewCalABAB_05_DarkField_0001	166	2009-07-16T23:36:11Z
PVSpecFlux_431A_nStdSlewCalABAB_06_DarkField_0001	166	2009-07-16T23:39:10Z
PVSpecFlux_431A_nStdSlewCalABAB_07_DarkField_0001	158	2009-07-16T23:42:09Z
PVSpecFlux_431A_nStdSlewCalABAB_08_DarkField_0001	158	2009-07-16T23:45:00Z
PVSpecFlux_431A_nStdSlewCalABAB_09_DarkField_0001	214	2009-07-16T23:47:52Z
PVSpecFlux_431A_nStdSlewCalABAB_10_DarkField_0001	214	2009-07-16T23:51:40Z
PVSpecFlux_431A_nStdSlewCalABAB_11_DarkField_0001	198	2009-07-16T23:55:28Z
PVSpecFlux_431A_nStdSlewCalABAB_12_DarkField_0001	198	2009-07-16T23:59:00Z
PVSpecFlux_431A_nStdSlewCalABAB_13_DarkField_0001	166	2009-07-17T00:02:31Z
PVSpecFlux_431A_nStdSlewCalABAB_14_DarkField_0001	166	2009-07-17T00:05:30Z
PVSpecFlux_431A_nStdSlewCalABAB_15_DarkField_0001	157	2009-07-17T00:08:29Z
PVSpecFlux_431A_nStdSlewCalABAB_16_DarkField_0001	157	2009-07-17T00:11:19Z
PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0001	277	2009-07-17T00:14:10Z
PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0001	277	2009-07-17T00:19:02Z
PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0001	261	2009-07-17T00:23:54Z
PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0001	261	2009-07-17T00:28:30Z
PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0001	229	2009-07-17T00:33:06Z
PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0001	229	2009-07-17T00:37:10Z
PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0001	221	2009-07-17T00:41:14Z
PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0001	221	2009-07-17T00:45:10Z
PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0001	276	2009-07-17T00:49:06Z
PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0001	276	2009-07-17T00:53:57Z
PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0001	260	2009-07-17T00:58:48Z
PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0001	260	2009-07-17T01:03:23Z
PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0001	228	2009-07-17T01:07:58Z
PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0001	228	2009-07-17T01:12:01Z
PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0001	220	2009-07-17T01:16:04Z

Table 125: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0001	220	2009-07-17T01:19:59Z
PVSpecGeGa_123B_nStd_BuffTM_lowCS1_Dark_0001	7573	2009-07-17T01:24:07Z
CPSpecFiller_421A_nStdRS_nochoporderA_RCas_0001	4774	2009-07-17T03:38:37Z
RWL bias window		
PVSpecFPG_411A_nStd_11x11RCp_00_w77_HIP21479_01	2568	2009-07-17T05:44:05Z
PVSpecFPG_411A_nStd_11x11RCp_m3_w77_HIP21479_01	2568	2009-07-17T06:28:21Z
PVSpecFPG_411A_nStd_11x11RCp_p3_w77_HIP21479_01	2568	2009-07-17T07:12:37Z
RWL bias window		
PVSpecFlux_438A_nStdSlewCal_A_DarkField_0001	130	2009-07-17T08:47:07Z
PVSpecFlux_438A_nStdRsrf_CS1Pilot_DarkField_0001	3065	2009-07-17T08:49:39Z
CPSpecGeGa_na_nStdCPBlock4408_Curing_na_0002	3128	2009-07-17T09:40:44Z
PVSpecSetup_na_nStd_orbitepi_na_0001	13	2009-07-17T10:32:52Z

7.4.2 OD0065

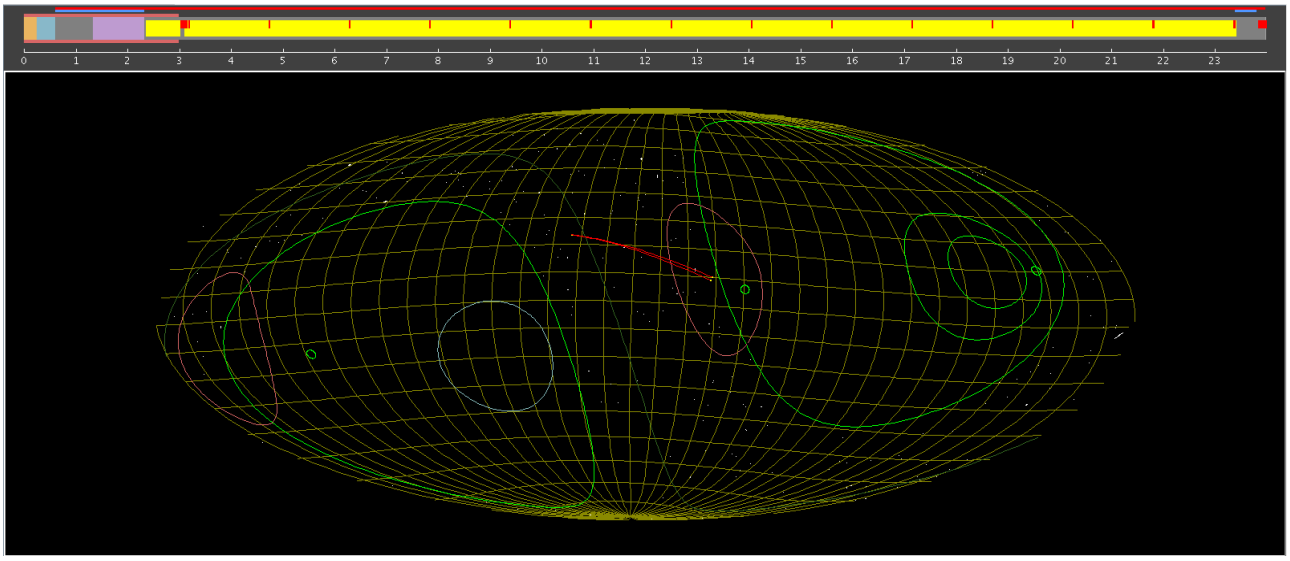


Figure 96: Timeline and distribution of pointings for OD0065 as displayed in the Mission Planning System.

Table 126: Timeline for PACS PV Phase OD0065.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro_na_0002	2348	2009-07-17T16:30:19Z
PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_0001	2	2009-07-17T17:18:49Z
PVPhotBol_111bisA_nStdRaster_grn10Drct_Arp220_0001	5401	2009-07-17T17:21:58Z
PVPhotBol_111bisA_nStdRaster_grn13Drct_Arp220_0001	5401	2009-07-17T18:55:06Z
PVPhotBol_111bisA_nStdRaster_grn16Drct_Arp220_0001	5401	2009-07-17T20:28:14Z
PVPhotBol_111bisA_nStdRaster_grn17Drct_Arp220_0001	5401	2009-07-17T22:01:22Z
PVPhotBol_111bisA_nStdRaster_grn18Drct_Arp220_0001	5401	2009-07-17T23:34:30Z
PVPhotBol_111bisA_nStdRaster_grn19Drct_Arp220_0001	5401	2009-07-18T01:07:38Z
PVPhotBol_111bisA_nStdRaster_grn20Drct_Arp220_0001	5401	2009-07-18T02:40:46Z
PVPhotBol_111bisA_nStdRaster_grn21Drct_Arp220_0001	5401	2009-07-18T04:13:54Z
PVPhotBol_111bisA_nStdRaster_grn22Drct_Arp220_0001	5401	2009-07-18T05:47:02Z
PVPhotBol_111bisA_nStdRaster_grn23Drct_Arp220_0001	5401	2009-07-18T07:20:10Z
PVPhotBol_111bisA_nStdRaster_grn24Drct_Arp220_0001	5401	2009-07-18T08:53:18Z
PVPhotBol_111bisA_nStdRaster_grn25Drct_Arp220_0001	5401	2009-07-18T10:26:26Z
PVPhotBol_111bisA_nStdRaster_grn26Drct_Arp220_0001	5401	2009-07-18T11:59:34Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0001	2	2009-07-18T13:33:23Z
PVPhotSetup_na_nStd_orbitepi_na_0002	13	2009-07-18T13:33:25Z

7.4.3 OD0067

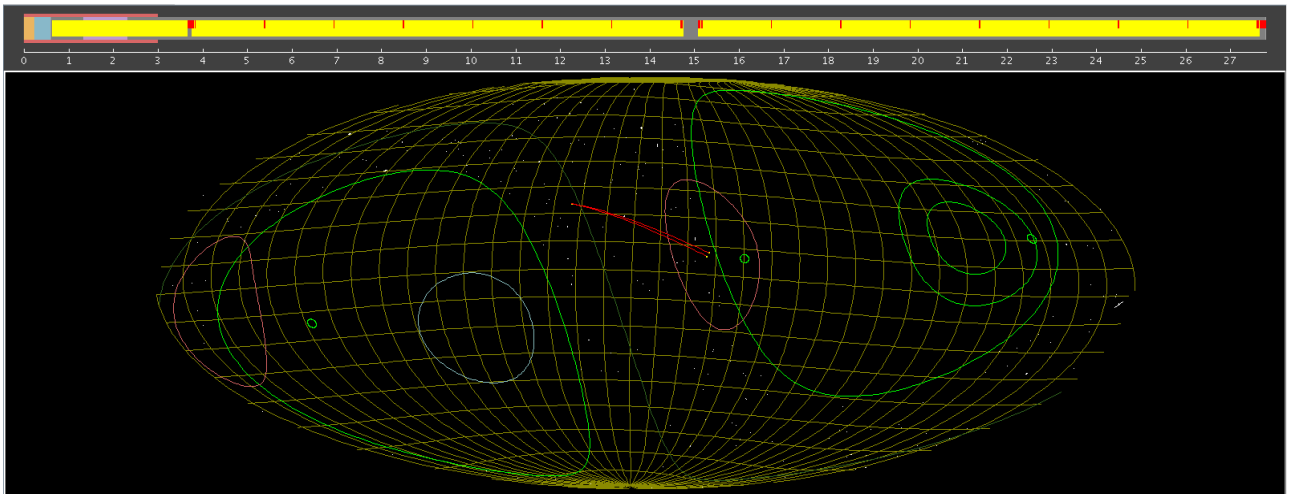


Figure 97: Timeline and distribution of pointings for OD0067 as displayed in the Mission Planning System.

Table 127: Timeline for PACS PV Phase OD0067.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0002	8542	2009-07-19T14:46:13Z
PVPhotSetup_na_nStd_orbitpro_na_0003	2348	2009-07-19T17:08:35Z
PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_0002	2	2009-07-19T17:57:05Z
PVPhotBol_111bisA_nStdRaster_grn27Drct_Arp220_0001	5401	2009-07-19T18:00:14Z
PVPhotBol_111bisA_nStdRaster_grn28Drct_Arp220_0001	5401	2009-07-19T19:33:22Z
PVPhotBol_111bisA_nStdRaster_grn29Drct_Arp220_0001	5401	2009-07-19T21:06:30Z
PVPhotBol_111bisA_nStdRaster_grn30Drct_Arp220_0001	5401	2009-07-19T22:39:38Z
PVPhotBol_111bisA_nStdRaster_grn31Drct_Arp220_0001	5401	2009-07-20T00:12:46Z
PVPhotBol_111bisA_nStdRaster_grn33Drct_Arp220_0001	5401	2009-07-20T01:45:54Z
PVPhotBol_111bisA_nStdRaster_grn35Drct_Arp220_0001	5401	2009-07-20T03:19:02Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0002	2	2009-07-20T04:52:51Z
RWL bias window		
PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0001	2	2009-07-20T05:17:37Z
PVPhotBol_111bisA_nStdRaster_blu10Drct_Arp220_0001	5401	2009-07-20T05:20:46Z
PVPhotBol_111bisA_nStdRaster_blu13Drct_Arp220_0001	5401	2009-07-20T06:53:54Z
PVPhotBol_111bisA_nStdRaster_blu16Drct_Arp220_0001	5401	2009-07-20T08:27:02Z
PVPhotBol_111bisA_nStdRaster_blu17Drct_Arp220_0001	5401	2009-07-20T10:00:10Z
PVPhotBol_111bisA_nStdRaster_blu18Drct_Arp220_0001	5401	2009-07-20T11:33:18Z
PVPhotBol_111bisA_nStdRaster_blu19Drct_Arp220_0001	5401	2009-07-20T13:06:26Z
PVPhotBol_111bisA_nStdRaster_blu20Drct_Arp220_0001	5401	2009-07-20T14:39:34Z
PVPhotBol_111bisA_nStdRaster_blu21Drct_Arp220_0001	5401	2009-07-20T16:12:42Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0003	2	2009-07-20T17:46:31Z
PVPhotSetup_na_nStd_orbitepi_na_0003	13	2009-07-20T17:46:33Z

7.4.4 OD0072

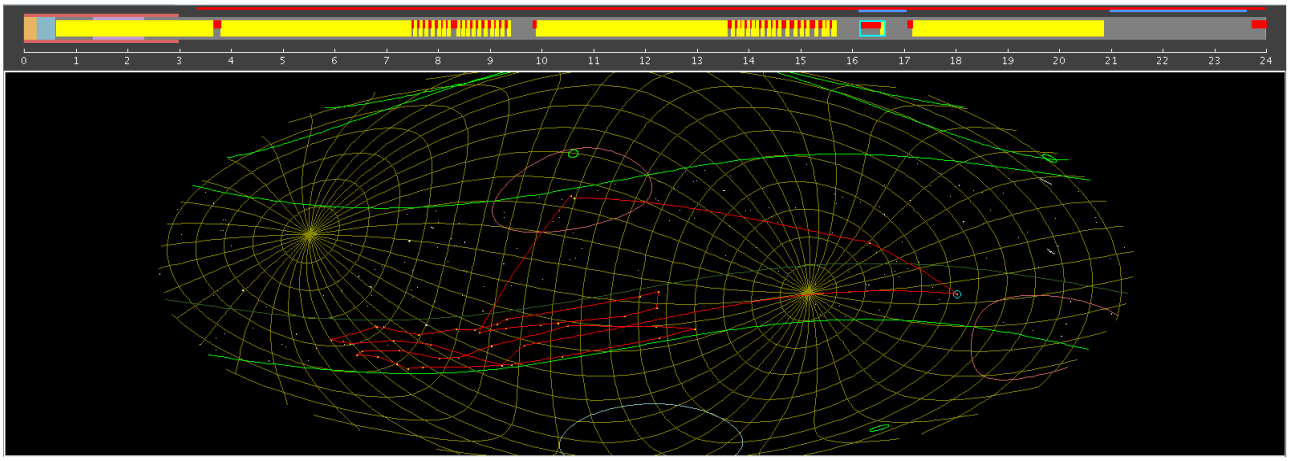


Figure 98: Timeline and distribution of pointings for OD0072 as displayed in the Mission Planning System.

Table 128: Timeline for PACS PV Phase OD0072.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0003	8542	2009-07-24T14:43:23Z
PVPhotSetup_na_nStd_orbitpro_na_0004	2348	2009-07-24T17:05:45Z
PVPhotFPG_261D_StdPS_blu_SAA-20-10_HIP79349_0001	13374	2009-07-24T17:55:24Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP77615	339	2009-07-24T21:38:56Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_WWSer	339	2009-07-24T21:45:36Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP75456	339	2009-07-24T21:51:20Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP73714	339	2009-07-24T21:59:39Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP72432	339	2009-07-24T22:06:15Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP70026	339	2009-07-24T22:11:53Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP70969	339	2009-07-24T22:17:46Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP76423	339	2009-07-24T22:29:29Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP77450	339	2009-07-24T22:34:50Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP79233	339	2009-07-24T22:40:56Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP80259	339	2009-07-24T22:46:42Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP84004	339	2009-07-24T22:53:33Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP87833	339	2009-07-24T23:00:21Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP98424	339	2009-07-24T23:07:57Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP95413	339	2009-07-24T23:13:39Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP87850	339	2009-07-24T23:20:47Z
PVPhotFPG_261C_StdPS_blu_SAA-20-10_HIP84329	339	2009-07-24T23:27:25Z
RWL bias window		
PVPhotFPG_261D_StdPS_blu_SAA-30-20_HIP82526_0001	13374	2009-07-25T00:01:44Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_2MASSJ1809	339	2009-07-25T03:48:02Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP90883	339	2009-07-25T03:53:40Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP91373	339	2009-07-25T03:58:45Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP92862	339	2009-07-25T04:04:22Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP95902	339	2009-07-25T04:10:13Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP94438	339	2009-07-25T04:15:19Z

Table 128: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP88832	339	2009-07-25T04:22:04Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_KTHer	339	2009-07-25T04:28:46Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP84027	339	2009-07-25T04:34:39Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP80488	339	2009-07-25T04:41:33Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP75393	339	2009-07-25T04:50:39Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP75177	339	2009-07-25T05:00:06Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP76377	339	2009-07-25T05:07:03Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP77023	339	2009-07-25T05:13:53Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP79593	339	2009-07-25T05:24:13Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HD151204	339	2009-07-25T05:31:54Z
PVPhotFPG_261C_StdPS_blu_SAA-30-20_HIP82526	339	2009-07-25T05:37:07Z
PVPhotSpatial_312B_NStd_blu_HIP79072lowgain_0001	307	2009-07-25T05:43:52Z
RWL bias window		
PVPhotSpatial_312B_NStd_blu_N633lowgain_0001	285	2009-07-25T06:40:13Z
RWL bias window		
PVPhotFPG_261B_StdPS_blu_SAA-10+30_HIP21479_0001	13374	2009-07-25T07:18:00Z
PVPhotSetup_na_nStd_orbitepi_na_0004	13	2009-07-25T10:57:54Z

7.4.5 OD0073

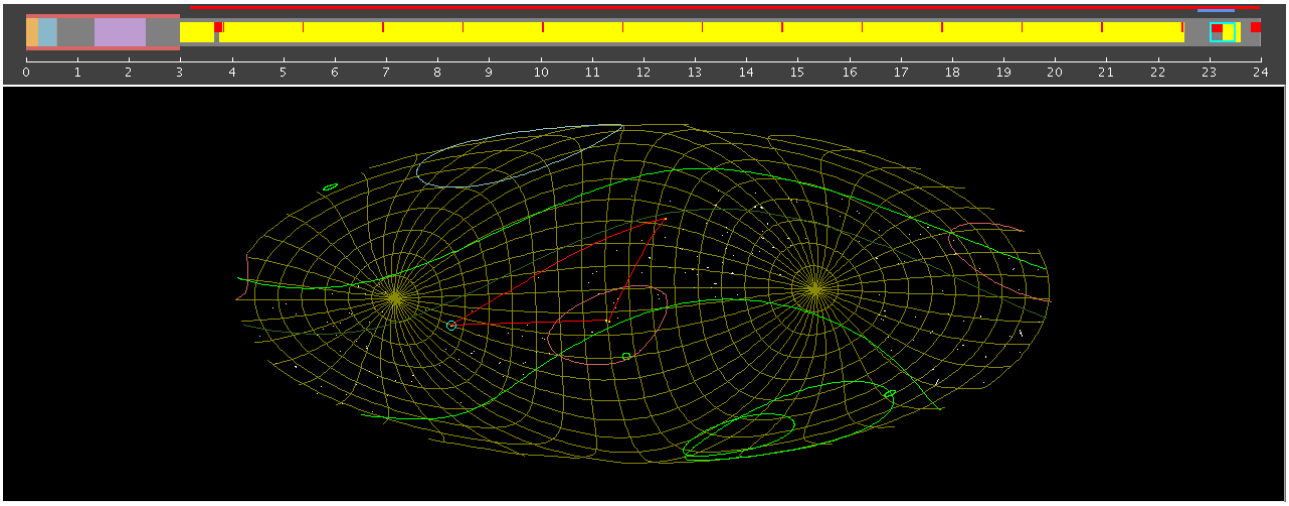


Figure 99: Timeline and distribution of pointings for OD0073 as displayed in the Mission Planning System.

Table 129: Timeline for PACS PV Phase OD0073.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro_na_0005	2348	2009-07-25T17:06:22Z
PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0002	2	2009-07-25T17:54:56Z
PVPhotBol_111bisA_nStdRaster_blu22Drct_Arp220_0001	5401	2009-07-25T17:58:05Z
PVPhotBol_111bisA_nStdRaster_blu23Drct_Arp220_0001	5401	2009-07-25T19:31:13Z
PVPhotBol_111bisA_nStdRaster_blu24Drct_Arp220_0001	5401	2009-07-25T21:04:21Z
PVPhotBol_111bisA_nStdRaster_blu25Drct_Arp220_0001	5401	2009-07-25T22:37:29Z
PVPhotBol_111bisA_nStdRaster_blu26Drct_Arp220_0001	5401	2009-07-26T00:10:37Z
PVPhotBol_111bisA_nStdRaster_blu27Drct_Arp220_0001	5401	2009-07-26T01:43:45Z
PVPhotBol_111bisA_nStdRaster_blu28Drct_Arp220_0001	5401	2009-07-26T03:16:53Z
PVPhotBol_111bisA_nStdRaster_blu29Drct_Arp220_0001	5401	2009-07-26T04:50:01Z
PVPhotBol_111bisA_nStdRaster_blu30Drct_Arp220_0001	5401	2009-07-26T06:23:09Z
PVPhotBol_111bisA_nStdRaster_blu31Drct_Arp220_0001	5401	2009-07-26T07:56:17Z
PVPhotBol_111bisA_nStdRaster_blu33Drct_Arp220_0001	5401	2009-07-26T09:29:25Z
PVPhotBol_111bisA_nStdRaster_blu35Drct_Arp220_0001	5401	2009-07-26T11:02:33Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0004	2	2009-07-26T12:36:22Z
RWL bias window		
PVPhotFPG_261D_StdSS_blu_SAA-10+30_HIP55355_0001	981	2009-07-26T13:22:59Z
PVPhotSetup_na_nStd_AF15_Test_Setup_0001	303	2009-07-26T13:36:20Z
PVPhotSetup_na_nStd_orbitepi_na_0005	13	2009-07-26T13:41:23Z

7.4.6 OD0078

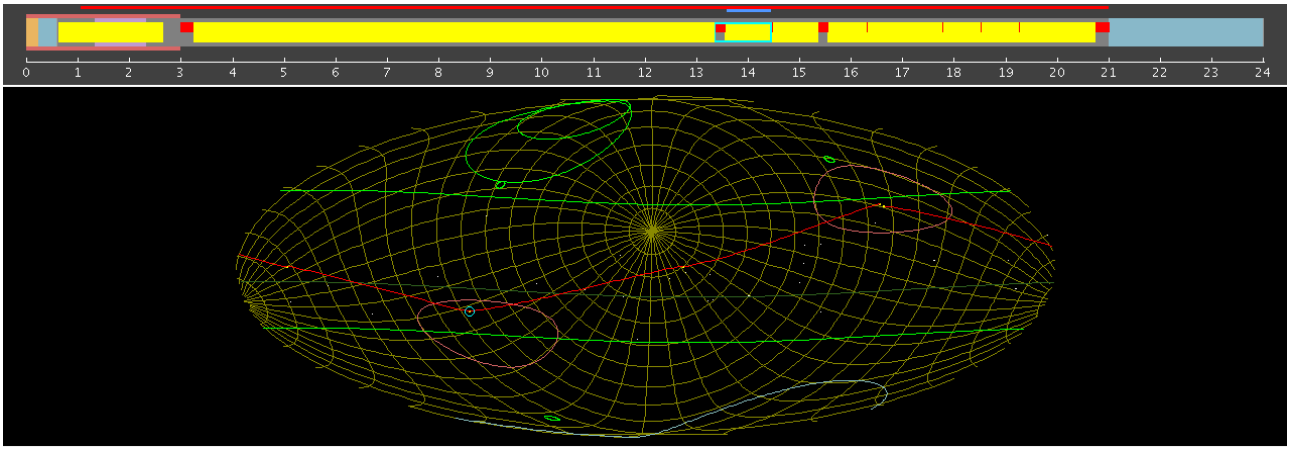


Figure 100: Timeline and distribution of pointings for OD0078 as displayed in the Mission Planning System.

Table 130: Timeline for PACS PV Phase OD0078.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexDark_na_0001	385	2009-07-30T14:45:24Z
PVSpecSetup_na_nStd_SpuSetupAndResetDark_na_0001	6909	2009-07-30T14:51:49Z
PVSpecSpatial_416A_nStdFovScan_60-2_DarkField_0001	2467	2009-07-30T17:23:53Z
PVSpecSpatial_416A_nStdFovScan_60-3_DarkField_0001	2467	2009-07-30T18:05:25Z
PVSpecSpatial_416A_nStdFovScan_75_DarkField_0001	2467	2009-07-30T18:46:57Z
PVSpecGeGa_126A_nStd_darkcurrent_blue_na_0001	1377	2009-07-30T19:28:04Z
PVSpecGeGa_126A_nStd_darkcurrent_green_na_0001	1377	2009-07-30T19:51:01Z
PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0001	3707	2009-07-30T20:14:29Z
PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0001	3707	2009-07-30T21:16:44Z
PVSpecGeGa_126B_nStd_Dark_CSSimultWarmUp_Dark_0001	11131	2009-07-30T22:19:04Z
PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0002	3707	2009-07-31T01:25:08Z
PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0002	3707	2009-07-31T02:27:23Z
PVSpecFlux_438D_NstdCoarseRsrf_A_Melpomene_0001	3137	2009-07-31T03:44:38Z
PVSpecFlux_438D_NstdCoarseRsrf_B_Melpomene_0001	3137	2009-07-31T04:38:30Z
PVSpecFPG_411A_nStd_11x11RCp_00_w77_HIP21479_02	2568	2009-07-31T05:43:50Z
PVSpecFPG_411A_nStd_11x11RCp_m3_w77_HIP21479_02	2568	2009-07-31T06:28:05Z
PVSpecFPG_411A_nStd_11x11RCp_p3_w77_HIP21479_02	2568	2009-07-31T07:12:20Z
PVSpecFPG_411A_nStd_11x11RCp_m05_w77_HIP21479_01	2568	2009-07-31T07:56:35Z
PVSpecFPG_411A_nStd_11x11RCp_p05_w77_HIP21479_01	2568	2009-07-31T08:40:50Z
PVSpecFPG_411A_nStd_11x11RCp_m15_w77_HIP21479_01	2568	2009-07-31T09:25:05Z
PVSpecFPG_411A_nStd_11x11RCp_p15_w77_HIP21479_01	2568	2009-07-31T10:09:20Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0001	13	2009-07-31T10:52:08Z

7.4.7 OD0079

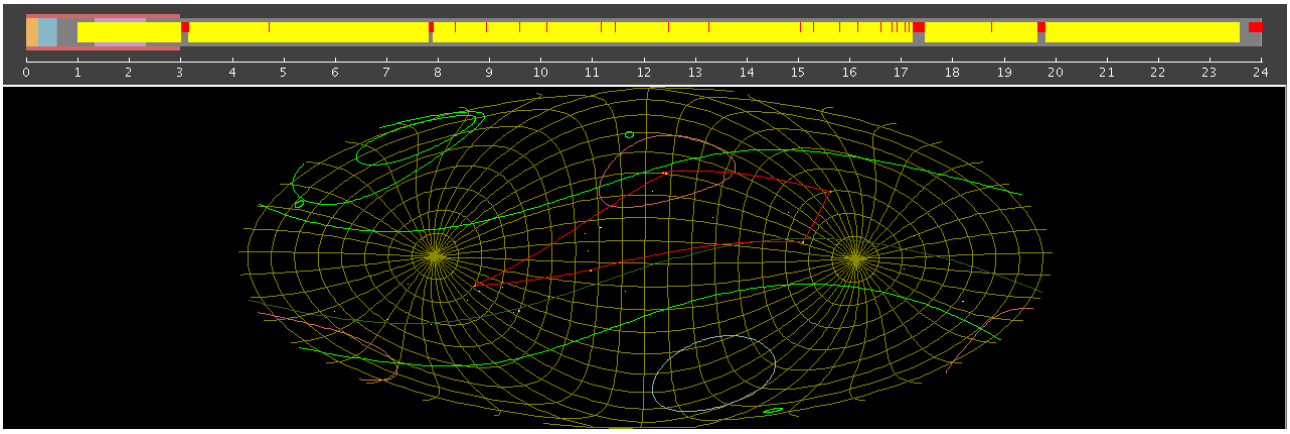


Figure 101: Timeline and distribution of pointings for OD0079 as displayed in the Mission Planning System.

Table 131: Timeline for PACS PV Phase OD0079.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0001	385	2009-07-31T15:09:20Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0001	6809	2009-07-31T15:15:45Z
PVSpecWave_425A_nStdRS_rasterorderA_IC2501_0001	5490	2009-07-31T17:20:44Z
PVSpecWave_425A_nStdRS_rasterorderA_IC2501_0002	5491	2009-07-31T18:53:41Z
PVSpecWave_425A_nStdRS_rasterorderB_IC2501_0001	5490	2009-07-31T20:26:41Z
PVSpecSPU_1221A_NstdLineSpec_01a1_NGC5315_0001	280	2009-07-31T22:04:18Z
PVSpecSPU_1221A_NstdLineSpec_01a2_NGC5315_0001	267	2009-07-31T22:10:26Z
PVSpecSPU_1221A_NstdLineSpec_02a1_NGC5315_0001	166	2009-07-31T22:16:02Z
PVSpecSPU_1221A_NstdLineSpec_02a2_NGC5315_0001	159	2009-07-31T22:19:56Z
PVSpecSPU_1221A_NstdLineSpec_03a1_NGC5315_0001	280	2009-07-31T22:24:04Z
PVSpecSPU_1221A_NstdLineSpec_03a2_NGC5315_0001	267	2009-07-31T22:30:12Z
PVSpecSPU_1221A_NstdLineSpec_041_NGC5315_0001	280	2009-07-31T22:36:08Z
PVSpecSPU_1221A_NstdLineSpec_042_NGC5315_0001	267	2009-07-31T22:42:16Z
PVSpecSPU_1221A_NstdLineSpec_061_NGC5315_0001	280	2009-07-31T22:48:12Z
PVSpecSPU_1221A_NstdLineSpec_062_NGC5315_0001	267	2009-07-31T22:54:20Z
PVSpecSPU_1221A_NstdLineSpec_091_NGC5315_0001	280	2009-07-31T23:00:16Z
PVSpecSPU_1221A_NstdLineSpec_092_NGC5315_0001	267	2009-07-31T23:06:24Z
PVSpecAotVal_521A_NstdLineSpec_01A_NGC5315_0001	915	2009-07-31T23:12:17Z
PVSpecAotVal_521A_NstdLineSpec_01B1_NGC5315_0001	878	2009-07-31T23:29:01Z
PVSpecAotVal_521A_NstdLineSpec_01B2_NGC5315_0001	825	2009-07-31T23:45:07Z
PVSpecAotVal_521A_NstdLineSpec_02A_NGC5315_0001	867	2009-08-01T00:00:18Z
PVSpecAotVal_521A_NstdLineSpec_02B1_NGC5315_0001	832	2009-08-01T00:16:14Z
PVSpecAotVal_521A_NstdLineSpec_02B2_NGC5315_0001	783	2009-08-01T00:31:34Z
PVSpecAotVal_521A_NstdLineSpec_03A_NGC5315_0001	915	2009-08-01T00:46:03Z
PVSpecAotVal_521A_NstdLineSpec_03B1_NGC5315_0001	878	2009-08-01T01:02:47Z
PVSpecAotVal_521A_NstdLineSpec_03B2_NGC5315_0001	825	2009-08-01T01:18:53Z
PVSpecAotVal_521A_NstdLineSpec_05A_NGC5315_0001	867	2009-08-01T01:34:04Z
PVSpecAotVal_521A_NstdLineSpec_05B1_NGC5315_0001	832	2009-08-01T01:50:00Z

Table 131: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521A_NstdLineSpec_05B2_NGC5315_0001	783	2009-08-01T02:05:20Z
PVSpecAotVal_521A_NstdLineSpec_06A_NGC5315_0001	867	2009-08-01T02:19:49Z
PVSpecAotVal_521A_NstdLineSpec_06B1_NGC5315_0001	832	2009-08-01T02:35:45Z
PVSpecAotVal_521A_NstdLineSpec_06B2_NGC5315_0001	783	2009-08-01T02:51:05Z
PVSpecAotVal_521A_NstdLineSpec_07A_NGC5315_0001	867	2009-08-01T03:05:30Z
PVSpecAotVal_521A_NstdLineSpec_07B1_NGC5315_0001	832	2009-08-01T03:21:22Z
PVSpecAotVal_521A_NstdLineSpec_07B2_NGC5315_0001	783	2009-08-01T03:36:38Z
PVSpecAotVal_521A_NstdLineSpec_09A_NGC5315_0001	867	2009-08-01T03:51:03Z
PVSpecAotVal_521A_NstdLineSpec_09B1_NGC5315_0001	832	2009-08-01T04:06:55Z
PVSpecAotVal_521A_NstdLineSpec_09B2_NGC5315_0001	783	2009-08-01T04:22:11Z
PVSpecAotVal_521A_NstdLineSpec_12A_NGC5315_0001	843	2009-08-01T04:36:36Z
PVSpecAotVal_521A_NstdLineSpec_12B1_NGC5315_0001	810	2009-08-01T04:52:04Z
PVSpecAotVal_521A_NstdLineSpec_12B2_NGC5315_0001	761	2009-08-01T05:06:58Z
PVSpecAotVal_521A_NstdLineSpec_13A_NGC5315_0001	843	2009-08-01T05:21:01Z
PVSpecAotVal_521A_NstdLineSpec_13B1_NGC5315_0001	810	2009-08-01T05:36:29Z
PVSpecAotVal_521A_NstdLineSpec_13B2_NGC5315_0001	761	2009-08-01T05:51:23Z
PVSpecAotVal_521A_NstdLineSpec_14A_NGC5315_0001	291	2009-08-01T06:05:30Z
PVSpecAotVal_521A_NstdLineSpec_14B1_NGC5315_0001	280	2009-08-01T06:11:50Z
PVSpecAotVal_521A_NstdLineSpec_14B2_NGC5315_0001	267	2009-08-01T06:17:58Z
PVSpecAotVal_521A_NstdLineSpec_15A_NGC5315_0001	363	2009-08-01T06:23:47Z
PVSpecAotVal_521A_NstdLineSpec_15B1_NGC5315_0001	350	2009-08-01T06:31:15Z
PVSpecAotVal_521A_NstdLineSpec_15B2_NGC5315_0001	331	2009-08-01T06:38:29Z
PVSpecAotVal_521A_NstdLineSpec_16A_NGC5315_0001	267	2009-08-01T06:45:22Z
PVSpecAotVal_521A_NstdLineSpec_16B1_NGC5315_0001	258	2009-08-01T06:51:14Z
PVSpecAotVal_521A_NstdLineSpec_16B2_NGC5315_0001	245	2009-08-01T06:56:56Z
PVSpecAotVal_521A_NstdLineSpec_17A_NGC5315_0001	171	2009-08-01T07:02:23Z
PVSpecAotVal_521A_NstdLineSpec_17B1_NGC5315_0001	166	2009-08-01T07:06:39Z
PVSpecAotVal_521A_NstdLineSpec_17B2_NGC5315_0001	159	2009-08-01T07:10:49Z
PVSpecGeGa_123A_nStd_LLC_pilot07_Arp220_0001	693	2009-08-01T07:28:38Z
PVSpecGeGa_123A_nStd_LLC_pilot07_Arp220off_0001	693	2009-08-01T07:40:33Z
PVSpecFlux_438D_NstdCoarseRsrf_A_Arp220_0001	3127	2009-08-01T07:53:36Z
PVSpecFlux_438D_NstdCoarseRsrf_B_Arp220_0001	3127	2009-08-01T08:47:18Z
PVSpecSpatial_416B_nStdFovScan_60-2_DarkField_0001	721	2009-08-01T09:48:39Z
PVSpecSpatial_416B_nStdFovScan_60-3_DarkField_0001	721	2009-08-01T10:00:58Z
PVSpecSpatial_416B_nStdFovScan_75_DarkField_0001	721	2009-08-01T10:13:17Z
PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0002	218	2009-08-01T10:25:35Z
PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0002	218	2009-08-01T10:29:28Z
PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0002	226	2009-08-01T10:33:21Z
PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0002	226	2009-08-01T10:37:22Z
PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0002	226	2009-08-01T10:41:23Z
PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0002	226	2009-08-01T10:45:24Z
PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0002	242	2009-08-01T10:49:25Z
PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0002	242	2009-08-01T10:53:42Z
PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0002	218	2009-08-01T10:57:59Z
PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0002	218	2009-08-01T11:01:52Z
PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0002	226	2009-08-01T11:05:45Z
PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0002	226	2009-08-01T11:09:46Z
PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0002	226	2009-08-01T11:13:47Z

Table 131: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0002	226	2009-08-01T11:17:48Z
PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0002	242	2009-08-01T11:21:49Z
PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0002	242	2009-08-01T11:26:06Z
PVSpecFlux_431A_nStdSlewCalABBA_01_DarkField_0003	242	2009-08-01T11:30:23Z
PVSpecFlux_431A_nStdSlewCalABBA_02_DarkField_0003	242	2009-08-01T11:34:40Z
PVSpecFlux_431A_nStdSlewCalABBA_03_DarkField_0003	226	2009-08-01T11:38:57Z
PVSpecFlux_431A_nStdSlewCalABBA_04_DarkField_0003	226	2009-08-01T11:42:58Z
PVSpecFlux_431A_nStdSlewCalABBA_05_DarkField_0003	226	2009-08-01T11:46:59Z
PVSpecFlux_431A_nStdSlewCalABBA_06_DarkField_0003	226	2009-08-01T11:51:00Z
PVSpecFlux_431A_nStdSlewCalABBA_07_DarkField_0003	218	2009-08-01T11:55:01Z
PVSpecFlux_431A_nStdSlewCalABBA_08_DarkField_0003	218	2009-08-01T11:58:54Z
PVSpecFlux_431A_nStdSlewCalABBA_09_DarkField_0003	242	2009-08-01T12:02:47Z
PVSpecFlux_431A_nStdSlewCalABBA_10_DarkField_0003	242	2009-08-01T12:07:04Z
PVSpecFlux_431A_nStdSlewCalABBA_11_DarkField_0003	226	2009-08-01T12:11:21Z
PVSpecFlux_431A_nStdSlewCalABBA_12_DarkField_0003	226	2009-08-01T12:15:22Z
PVSpecFlux_431A_nStdSlewCalABBA_13_DarkField_0003	226	2009-08-01T12:19:23Z
PVSpecFlux_431A_nStdSlewCalABBA_14_DarkField_0003	226	2009-08-01T12:23:24Z
PVSpecFlux_431A_nStdSlewCalABBA_15_DarkField_0003	218	2009-08-01T12:27:25Z
PVSpecFlux_431A_nStdSlewCalABBA_16_DarkField_0003	218	2009-08-01T12:31:18Z
PVSpecFlux_438A_nStdRsrf_CS1_A4_Darkfield_0001	3565	2009-08-01T12:35:19Z
PVSpecSetup_na_nStd_orbitepi_na_0002	13	2009-08-01T13:34:44Z

7.4.8 OD0084

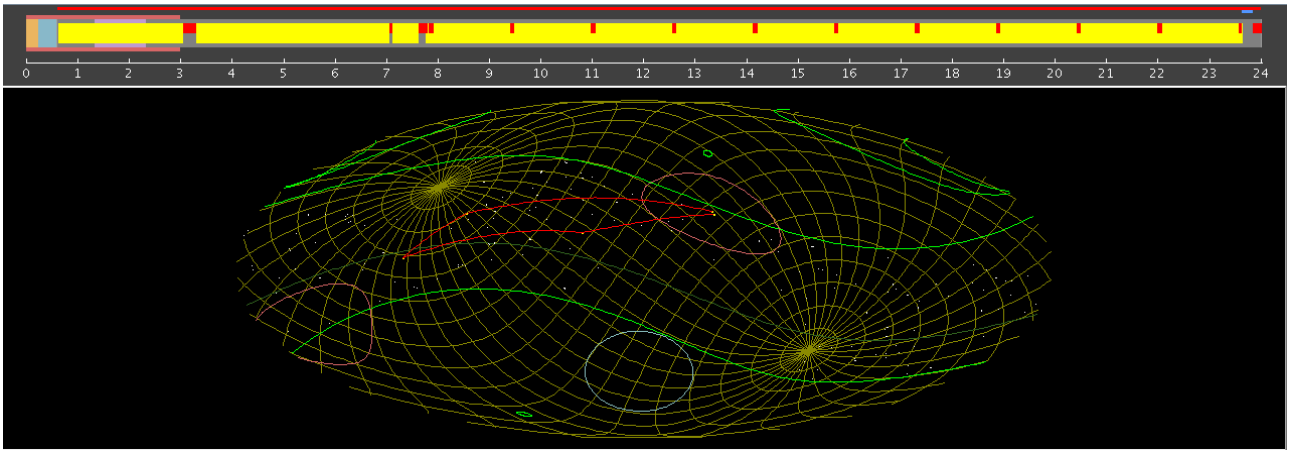


Figure 102: Timeline and distribution of pointings for OD0084 as displayed in the Mission Planning System.

Table 132: Timeline for PACS PV Phase OD0084.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0004	8542	2009-08-05T14:52:20Z
PVPhotSetup_na_nStd_orbitproCS40_45_0001	163	2009-08-05T17:14:42Z
PVPhotBol_na_nStd_3posChop_CS4045_DarkField_0001	2221	2009-08-05T17:33:50Z
PVPhotBol_317A_nStd_FOV_CS4045_DarkField_0001	1354	2009-08-05T18:11:14Z
PVPhotSetup_na_nStd_orbitepiCS40_45_on_0001	13	2009-08-05T18:33:48Z
PVPhotSetup_na_nStd_orbitproCS45_50_0001	163	2009-08-05T18:34:01Z
PVPhotBol_na_nStd_3posChop_CS4550_DarkField_0001	2221	2009-08-05T18:37:07Z
PVPhotBol_317A_nStd_FOV_CS4550_DarkField_0001	1354	2009-08-05T19:14:31Z
PVPhotSetup_na_nStd_orbitepiCS45_50_on_0001	13	2009-08-05T19:37:05Z
PVPhotSetup_na_nStd_orbitproCS50_55_0001	163	2009-08-05T19:37:18Z
PVPhotBol_na_nStd_3posChop_CS5055_DarkField_0001	2221	2009-08-05T19:40:24Z
PVPhotBol_317A_nStd_FOV_CS5055_DarkField_0001	1354	2009-08-05T20:17:48Z
PVPhotSetup_na_nStd_orbitepiCS50_55_on_0001	13	2009-08-05T20:40:22Z
PVPhotSetup_na_nStd_orbitproCS55_60_0001	2263	2009-08-05T20:40:35Z
PVPhotSpatial_314E_StdSmall_lowgain_blu_I22134_01	981	2009-08-05T21:24:34Z
PVPhotSpatial_314E_StdSmall_lowgain_grn_I22134_01	981	2009-08-05T21:38:49Z
PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_003	2	2009-08-05T22:04:53Z
PVPhotBol_111bisA_nStdRaster_grn13Drct_Arp220_0002	5311	2009-08-05T22:10:48Z
PVPhotBol_111bisA_nStdRaster_grn16Drct_Arp220_0002	5311	2009-08-05T23:45:12Z
PVPhotBol_111bisA_nStdRaster_grn17Drct_Arp220_0002	5311	2009-08-06T01:19:36Z
PVPhotBol_111bisA_nStdRaster_grn18Drct_Arp220_0002	5311	2009-08-06T02:54:00Z
PVPhotBol_111bisA_nStdRaster_grn19Drct_Arp220_0002	5311	2009-08-06T04:28:24Z
PVPhotBol_111bisA_nStdRaster_grn20Drct_Arp220_0002	5311	2009-08-06T06:02:48Z
PVPhotBol_111bisA_nStdRaster_grn21Drct_Arp220_0002	5311	2009-08-06T07:37:12Z
PVPhotBol_111bisA_nStdRaster_grn22Drct_Arp220_0002	5311	2009-08-06T09:11:36Z
PVPhotBol_111bisA_nStdRaster_grn23Drct_Arp220_0002	5311	2009-08-06T10:46:00Z
PVPhotBol_111bisA_nStdRaster_grn24Drct_Arp220_0002	5311	2009-08-06T12:20:24Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0005	2	2009-08-06T13:53:37Z
PVPhotSetup_na_nStd_orbitepi_na_0006	13	2009-08-06T13:53:39Z

7.4.9 OD0085

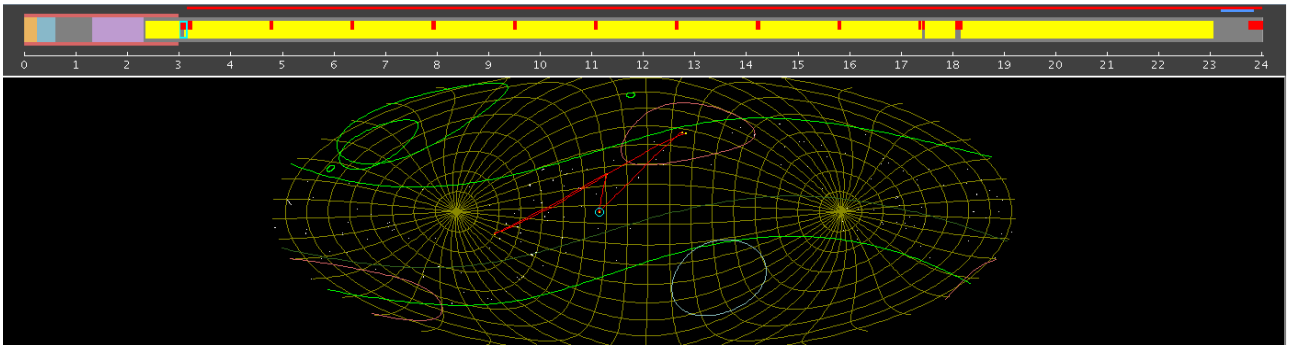


Figure 103: Timeline and distribution of pointings for OD0085 as displayed in the Mission Planning System.

Table 133: Timeline for PACS PV Phase OD0085.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro_na_0006	2339	2009-08-06T16:37:54Z
PVPhotBol_111bisA_nStdRaster_grnInitDrct_Arp220_004	2	2009-08-06T17:27:04Z
PVPhotBol_111bisA_nStdRaster_grn25Drct_Arp220_0002	5311	2009-08-06T17:32:59Z
PVPhotBol_111bisA_nStdRaster_grn26Drct_Arp220_0002	5311	2009-08-06T19:07:23Z
PVPhotBol_111bisA_nStdRaster_grn27Drct_Arp220_0002	5311	2009-08-06T20:41:47Z
PVPhotBol_111bisA_nStdRaster_grn28Drct_Arp220_0002	5311	2009-08-06T22:16:11Z
PVPhotBol_111bisA_nStdRaster_grn29Drct_Arp220_0002	5311	2009-08-06T23:50:35Z
PVPhotBol_111bisA_nStdRaster_grn30Drct_Arp220_0002	5311	2009-08-07T01:24:59Z
PVPhotBol_111bisA_nStdRaster_grn31Drct_Arp220_0002	5311	2009-08-07T02:59:23Z
PVPhotBol_111bisA_nStdRaster_grn33Drct_Arp220_0002	5311	2009-08-07T04:33:47Z
PVPhotBol_111bisA_nStdRaster_grn35Drct_Arp220_0002	5311	2009-08-07T06:08:11Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0006	2	2009-08-07T07:41:24Z
PVPhotFPG_262A_NStd_blu_AlfBoo_0001	1995	2009-08-07T07:46:18Z
PVPhotBol_1116A_nStd_timeConstDrct_DarkField_0001	11240	2009-08-07T08:30:14Z
PVPhotSetup_na_nStd_orbitepiCSon_red00_0001	13	2009-08-07T11:37:34Z
PVPhotSetup_na_nStd_orbitpro_Red00_na_0001	133	2009-08-07T11:37:47Z
PVPhotBol_na_nStd_FOV_Red00_DarkField_0001	1350	2009-08-07T11:40:32Z
PVPhotSetup_na_nStd_orbitepiCSon_red01_0001	13	2009-08-07T12:03:02Z
PVPhotSetup_na_nStd_orbitpro_Red01_na_0001	150	2009-08-07T12:03:15Z
PVPhotBol_na_nStd_FOV_Red01_DarkField_0001	1350	2009-08-07T12:06:07Z
PVPhotSetup_na_nStd_orbitepiCSon_red10_0001	13	2009-08-07T12:28:37Z
PVPhotSetup_na_nStd_orbitpro_Red10_na_0001	150	2009-08-07T12:28:50Z
PVPhotBol_na_nStd_FOV_Red10_DarkField_0001	1350	2009-08-07T12:31:42Z
PVPhotSetup_na_nStd_orbitepiCSon_red11_0001	13	2009-08-07T12:54:12Z
PVPhotSetup_na_nStd_orbitpro_Red11_na_0001	167	2009-08-07T12:54:25Z
PVPhotBol_na_nStd_FOV_Red11_DarkField_0001	1350	2009-08-07T12:57:34Z
PVPhotSetup_na_nStd_orbitepi_na_0007	13	2009-08-07T13:20:04Z

7.4.10 OD0086

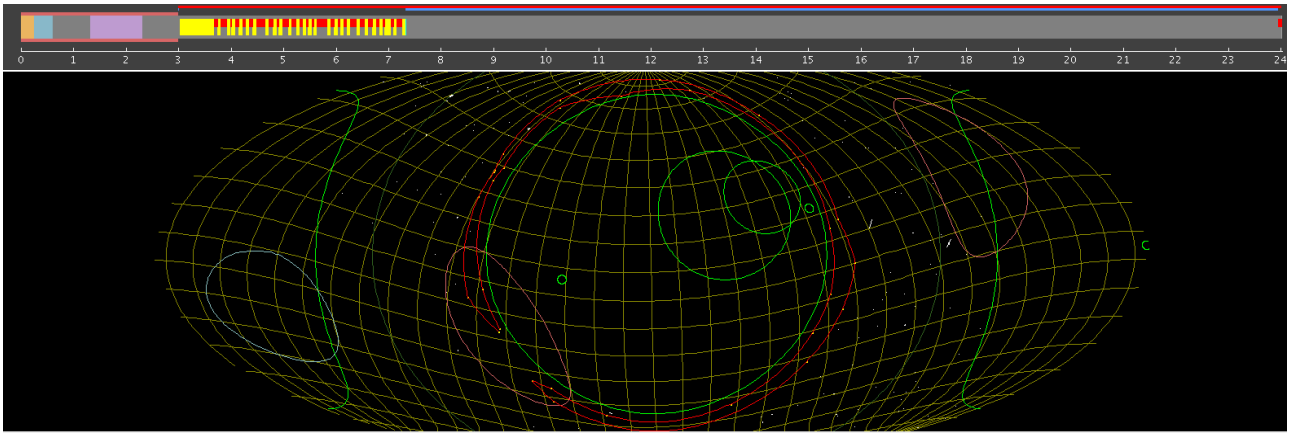


Figure 104: Timeline and distribution of pointings for OD0086 as displayed in the Mission Planning System.

Table 134: Timeline for PACS PV Phase OD0086.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro_na_0007	2339	2009-08-07T17:20:09Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP64569_0001	339	2009-08-07T18:03:39Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67665_0001	339	2009-08-07T18:14:31Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67410_0001	339	2009-08-07T18:20:10Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP67627_0001	339	2009-08-07T18:28:56Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_CS_Dra_0001	339	2009-08-07T18:36:22Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HD39741_0001	339	2009-08-07T18:44:17Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP22667_0001	339	2009-08-07T18:58:54Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP24436_0001	339	2009-08-07T19:07:27Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM725418_0001	339	2009-08-07T19:14:35Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP36377_0001	339	2009-08-07T19:24:27Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HD91760_0001	339	2009-08-07T19:34:28Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP57607_0001	339	2009-08-07T19:41:57Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP59588_0001	339	2009-08-07T19:47:38Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP57642_0001	339	2009-08-07T19:53:54Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP27286_0001	339	2009-08-07T20:09:23Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP23203_0001	339	2009-08-07T20:17:18Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM700186_0001	339	2009-08-07T20:24:37Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP21421_0001	339	2009-08-07T20:32:00Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP21046_0001	339	2009-08-07T20:43:12Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP36547_0001	339	2009-08-07T20:52:20Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP69816_0001	339	2009-08-07T21:01:07Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP69038_0001	339	2009-08-07T21:09:28Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP68417_0001	339	2009-08-07T21:15:17Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP68357_0001	339	2009-08-07T21:19:01Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_PPM103009_0001	339	2009-08-07T21:25:22Z
PVPhotFPG_261F_StdPS_blu_SAA+20+30_HIP66100_0001	339	2009-08-07T21:35:38Z
PVPhotSetup_na_nStd_orbitepi_na_0008	13	2009-08-07T21:38:20Z

7.4.11 OD0090

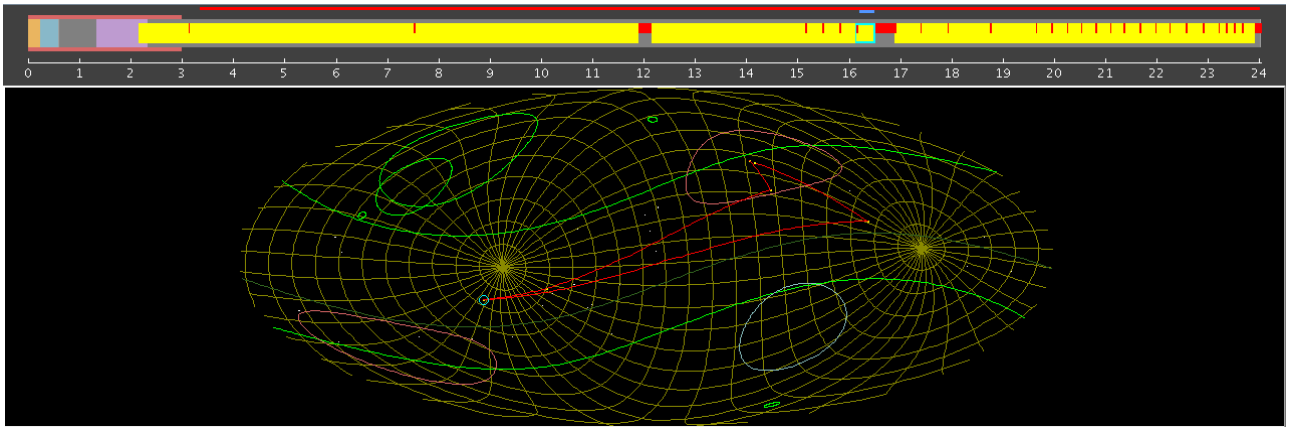


Figure 105: Timeline and distribution of pointings for OD0090 as displayed in the Mission Planning System.

Table 135: Timeline for PACS PV Phase OD0090.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0001	367	2009-08-11T16:35:04Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0001	3109	2009-08-11T16:41:14Z
PVSpecWave_421C_nStdRS_nochoporderA_WHya_0001	15555	2009-08-11T17:37:16Z
PVSpecWave_421C_nStdRS_nochoporderB_WHya_0001	15555	2009-08-11T22:00:00Z
PVSpecFlux_431A_nStdSlewCalABBA_17_DarkField_0001	209	2009-08-12T02:36:37Z
PVSpecFlux_431A_nStdSlewCalABBA_18_DarkField_0001	209	2009-08-12T02:40:23Z
PVSpecFlux_431A_nStdSlewCalABBA_19_DarkField_0001	205	2009-08-12T02:44:09Z
PVSpecFlux_431A_nStdSlewCalABBA_20_DarkField_0001	201	2009-08-12T02:47:51Z
PVSpecFlux_431A_nStdSlewCalABBA_21_DarkField_0001	202	2009-08-12T02:51:29Z
PVSpecFlux_431A_nStdSlewCalABBA_22_DarkField_0001	201	2009-08-12T02:55:08Z
PVSpecFlux_431A_nStdSlewCalABBA_23_DarkField_0001	199	2009-08-12T02:58:46Z
PVSpecFlux_431A_nStdSlewCalABBA_24_DarkField_0001	217	2009-08-12T03:02:22Z
PVSpecFlux_431A_nStdSlewCalABBA_24_DarkField_0002	217	2009-08-12T03:06:17Z
PVSpecFlux_431A_nStdSlewCalABBA_23_DarkField_0002	199	2009-08-12T03:10:11Z
PVSpecFlux_431A_nStdSlewCalABBA_22_DarkField_0002	201	2009-08-12T03:13:47Z
PVSpecFlux_431A_nStdSlewCalABBA_21_DarkField_0002	202	2009-08-12T03:17:25Z
PVSpecFlux_431A_nStdSlewCalABBA_20_DarkField_0002	201	2009-08-12T03:21:04Z
PVSpecFlux_431A_nStdSlewCalABBA_19_DarkField_0002	205	2009-08-12T03:24:42Z
PVSpecFlux_431A_nStdSlewCalABBA_18_DarkField_0002	209	2009-08-12T03:28:24Z
PVSpecFlux_431A_nStdSlewCalABBA_17_DarkField_0002	209	2009-08-12T03:32:10Z
PVSpecFlux_438A_nStdRsrf_CS1_A2_Darkfield_0001	3556	2009-08-12T03:36:05Z
PVSpecFlux_438A_nStdRsrf_CS1_B2_Darkfield_0001	3556	2009-08-12T04:35:52Z
PVSpecFlux_4311A_NstdLineSpec_01A_DarkField_0001	1011	2009-08-12T05:38:12Z
PVSpecFlux_4311A_NstdLineSpec_01B1_DarkField_0001	970	2009-08-12T05:58:10Z
PVSpecFlux_4311A_NstdLineSpec_01B2_DarkField_0001	911	2009-08-12T06:17:26Z
PVSpecWave_421D_nStdLS_nochoporderRed_NGC40_0001	1063	2009-08-12T06:38:46Z
PVSpecAotVal_524A_NstdSEDChop_Blue32_NGC5315_0001	1596	2009-08-12T07:22:22Z
PVSpecAotVal_524A_NstdSEDChop_Blue64_NGC5315_0001	1710	2009-08-12T07:52:26Z
PVSpecAotVal_524A_NstdSEDChop_Red32_NGC5315_0001	2783	2009-08-12T08:24:14Z

Table 135: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_524A_NstdSEDChop_Red64_NGC5315_0001	2989	2009-08-12T09:13:55Z
PVSpecAotVal_521A_NstdLineSpec_11A_NGC5315_0001	915	2009-08-12T10:06:48Z
PVSpecAotVal_521A_NstdLineSpec_11B1_NGC5315_0001	878	2009-08-12T10:25:10Z
PVSpecAotVal_521A_NstdLineSpec_11B2_NGC5315_0001	825	2009-08-12T10:42:54Z
PVSpecAotVal_521A_NstdLineSpec_10A_NGC5315_0001	867	2009-08-12T10:59:43Z
PVSpecAotVal_521A_NstdLineSpec_10B1_NGC5315_0001	832	2009-08-12T11:17:17Z
PVSpecAotVal_521A_NstdLineSpec_10B2_NGC5315_0001	783	2009-08-12T11:34:15Z
PVSpecAotVal_521A_NstdLineSpec_08A_NGC5315_0001	915	2009-08-12T11:50:22Z
PVSpecAotVal_521A_NstdLineSpec_08B1_NGC5315_0001	878	2009-08-12T12:08:44Z
PVSpecAotVal_521A_NstdLineSpec_08B2_NGC5315_0001	825	2009-08-12T12:26:28Z
PVSpecAotVal_521A_NstdLineSpec_04A_NGC5315_0001	1011	2009-08-12T12:43:17Z
PVSpecAotVal_521A_NstdLineSpec_04B1_NGC5315_0001	970	2009-08-12T13:03:15Z
PVSpecAotVal_521A_NstdLineSpec_04B2_NGC5315_0001	911	2009-08-12T13:22:31Z
PVSpecAotVal_522A_StdLineSpec_01A_NGC5315_0001	547	2009-08-12T13:41:04Z
PVSpecAotVal_522A_StdLineSpec_01B1_NGC5315_0001	549	2009-08-12T13:50:17Z
PVSpecAotVal_522A_StdLineSpec_01B2_NGC5315_0001	548	2009-08-12T13:59:27Z
PVSpecAotVal_522A_StdLineSpec_01B3_NGC5315_0001	839	2009-08-12T14:08:43Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0002	13	2009-08-12T14:19:20Z

7.4.12 OD0091

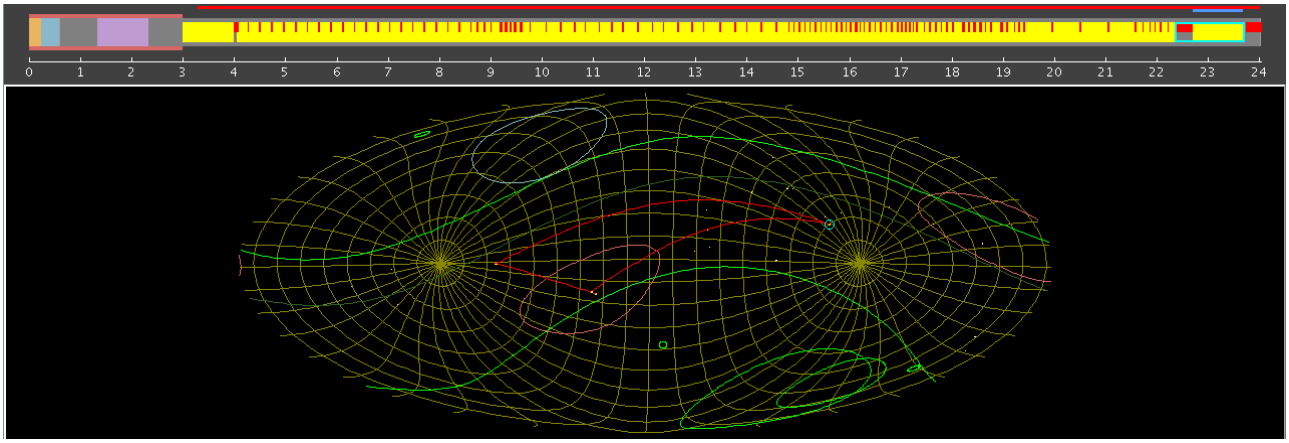


Figure 106: Timeline and distribution of pointings for OD0091 as displayed in the Mission Planning System.

Table 136: Timeline for PACS PV Phase OD0091.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0002	367	2009-08-12T17:28:00Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0002	3109	2009-08-12T17:34:10Z
PVSpecAotVal_522A_StdLineSpec_02A_NGC5315_0001	731	2009-08-12T18:34:25Z
PVSpecAotVal_522A_NstdLineSpec_01A_NGC5315_0001	644	2009-08-12T18:46:21Z
PVSpecAotVal_522A_NstdLineSpec_01B1_NGC5315_0001	643	2009-08-12T19:00:12Z
PVSpecAotVal_522A_NstdLineSpec_01B2_NGC5315_0001	644	2009-08-12T19:14:01Z
PVSpecAotVal_522A_NstdLineSpec_02B2_NGC5315_0001	644	2009-08-12T19:27:51Z
PVSpecAotVal_522A_NstdLineSpec_03B2_NGC5315_0001	644	2009-08-12T19:41:41Z
PVSpecAotVal_522A_NstdLineSpec_04B2_NGC5315_0001	644	2009-08-12T19:55:31Z
PVSpecAotVal_522A_NstdLineSpec_05B2_NGC5315_0001	644	2009-08-12T20:09:21Z
PVSpecAotVal_522A_NstdLineSpec_06B2_NGC5315_0001	644	2009-08-12T20:23:11Z
PVSpecAotVal_522A_NstdLineSpec_07B2_NGC5315_0001	644	2009-08-12T20:37:01Z
PVSpecAotVal_522A_NstdLineSpec_08B2_NGC5315_0001	644	2009-08-12T20:50:51Z
PVSpecAotVal_522A_NstdLineSpec_09A_NGC5315_0001	624	2009-08-12T21:04:39Z
PVSpecAotVal_522A_NstdLineSpec_09B2_NGC5315_0001	624	2009-08-12T21:18:09Z
PVSpecAotVal_522A_NstdLineSpec_10A_NGC5315_0001	624	2009-08-12T21:31:37Z
PVSpecAotVal_522A_NstdLineSpec_10B2_NGC5315_0001	624	2009-08-12T21:45:07Z
PVSpecAotVal_522A_NstdLineSpec_11B3_NGC5315_0001	646	2009-08-12T21:58:41Z
PVSpecAotVal_522A_NstdLineSpec_12B3_NGC5315_0001	646	2009-08-12T22:12:37Z
PVSpecAotVal_522A_NstdLineSpec_13A_NGC5315_0001	612	2009-08-12T22:26:27Z
PVSpecAotVal_522A_NstdLineSpec_13B1_NGC5315_0001	611	2009-08-12T22:39:46Z
PVSpecAotVal_522A_NstdLineSpec_13B2_NGC5315_0001	612	2009-08-12T22:53:03Z
PVSpecAotVal_521A_StdLineSpec_01A_NGC5315_0001	490	2009-08-12T23:06:37Z
PVSpecAotVal_521A_StdLineSpec_01B1_NGC5315_0001	482	2009-08-12T23:14:53Z
PVSpecAotVal_521A_StdLineSpec_01B2_NGC5315_0001	467	2009-08-12T23:22:56Z
PVSpecAotVal_521A_StdLineSpec_01B3_NGC5315_0001	688	2009-08-12T23:30:51Z
PVSpecAotVal_521A_StdLineSpec_02A_NGC5315_0001	321	2009-08-12T23:42:15Z
PVSpecAotVal_521A_StdLineSpec_02B1_NGC5315_0001	323	2009-08-12T23:47:42Z

Table 136: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521A_StdLineSpec_02B2_NGC5315_0001	323	2009-08-12T23:53:07Z
PVSpecAotVal_521A_StdLineSpec_02B3_NGC5315_0001	402	2009-08-12T23:58:38Z
PVSpecAotVal_521A_StdLineSpec_03A_NGC5315_0001	645	2009-08-13T00:05:16Z
PVSpecAotVal_521A_StdLineSpec_04A_NGC5315_0001	1150	2009-08-13T00:16:05Z
PVSpecAotVal_521B_NstdLineSpec_01A_NGC5315_0001	861	2009-08-13T00:35:00Z
PVSpecAotVal_521B_NstdLineSpec_01B1_NGC5315_0001	752	2009-08-13T00:52:28Z
PVSpecAotVal_521B_NstdLineSpec_01B2_NGC5315_0001	545	2009-08-13T01:08:06Z
PVSpecAotVal_521B_NstdLineSpec_02A_NGC5315_0001	817	2009-08-13T01:20:15Z
PVSpecAotVal_521B_NstdLineSpec_02B1_NGC5315_0001	714	2009-08-13T01:36:59Z
PVSpecAotVal_521B_NstdLineSpec_02B2_NGC5315_0001	573	2009-08-13T01:51:59Z
PVSpecAotVal_521B_NstdLineSpec_03A_NGC5315_0001	915	2009-08-13T02:04:36Z
PVSpecAotVal_521B_NstdLineSpec_03B1_NGC5315_0001	806	2009-08-13T02:22:58Z
PVSpecAotVal_521B_NstdLineSpec_03B2_NGC5315_0001	595	2009-08-13T02:39:30Z
PVSpecAotVal_521B_NstdLineSpec_04A_NGC5315_0001	867	2009-08-13T02:52:29Z
PVSpecAotVal_521B_NstdLineSpec_04B1_NGC5315_0001	764	2009-08-13T03:10:03Z
PVSpecAotVal_521B_NstdLineSpec_04B2_NGC5315_0001	627	2009-08-13T03:25:53Z
PVSpecAotVal_521B_NstdLineSpec_05A_NGC5315_0001	969	2009-08-13T03:39:24Z
PVSpecAotVal_521B_NstdLineSpec_05B1_NGC5315_0001	860	2009-08-13T03:58:40Z
PVSpecAotVal_521B_NstdLineSpec_05B2_NGC5315_0001	647	2009-08-13T04:16:06Z
PVSpecAotVal_521B_NstdLineSpec_06A_NGC5315_0001	867	2009-08-13T04:29:57Z
PVSpecAotVal_521B_NstdLineSpec_06B1_NGC5315_0001	816	2009-08-13T04:47:31Z
PVSpecAotVal_521B_NstdLineSpec_06B2_NGC5315_0001	681	2009-08-13T05:04:13Z
PVSpecAotVal_521C_NstdLineSpec_01A_NGC5315_0001	195	2009-08-13T05:18:38Z
PVSpecAotVal_521C_NstdLineSpec_01B1_NGC5315_0001	194	2009-08-13T05:25:00Z
PVSpecAotVal_521C_NstdLineSpec_01B2_NGC5315_0001	195	2009-08-13T05:31:20Z
PVSpecAotVal_521C_NstdLineSpec_02A_NGC5315_0001	187	2009-08-13T05:37:39Z
PVSpecAotVal_521C_NstdLineSpec_02B1_NGC5315_0001	186	2009-08-13T05:43:53Z
PVSpecAotVal_521C_NstdLineSpec_02B2_NGC5315_0001	187	2009-08-13T05:50:05Z
PVSpecAotVal_521C_NstdLineSpec_03A_NGC5315_0001	187	2009-08-13T05:56:16Z
PVSpecAotVal_521C_NstdLineSpec_03B1_NGC5315_0001	186	2009-08-13T06:02:30Z
PVSpecAotVal_521C_NstdLineSpec_03B2_NGC5315_0001	187	2009-08-13T06:08:42Z
PVSpecAotVal_521C_NstdLineSpec_04A_NGC5315_0001	155	2009-08-13T06:14:53Z
PVSpecAotVal_521C_NstdLineSpec_04B1_NGC5315_0001	154	2009-08-13T06:20:35Z
PVSpecAotVal_521C_NstdLineSpec_04B2_NGC5315_0001	155	2009-08-13T06:26:15Z
PVSpecAotVal_521C_NstdLineSpec_05A_NGC5315_0001	123	2009-08-13T06:31:54Z
PVSpecAotVal_521C_NstdLineSpec_05B1_NGC5315_0001	122	2009-08-13T06:37:04Z
PVSpecAotVal_521C_NstdLineSpec_05B2_NGC5315_0001	123	2009-08-13T06:42:12Z
PVSpecAotVal_521C_NstdLineSpec_06A_NGC5315_0001	195	2009-08-13T06:47:19Z
PVSpecAotVal_521C_NstdLineSpec_06B1_NGC5315_0001	194	2009-08-13T06:53:41Z
PVSpecAotVal_521C_NstdLineSpec_06B2_NGC5315_0001	195	2009-08-13T07:00:01Z
PVSpecAotVal_521C_NstdLineSpec_07A_NGC5315_0001	211	2009-08-13T07:06:20Z
PVSpecAotVal_521C_NstdLineSpec_07B1_NGC5315_0001	210	2009-08-13T07:12:58Z
PVSpecAotVal_521C_NstdLineSpec_07B2_NGC5315_0001	211	2009-08-13T07:19:34Z
PVSpecAotVal_521D_NstdLineSpec_01A_NGC5315_0001	119	2009-08-13T07:26:09Z
PVSpecAotVal_521D_NstdLineSpec_01B1_NGC5315_0001	94	2009-08-13T07:31:15Z
PVSpecAotVal_521D_NstdLineSpec_01B2_NGC5315_0001	85	2009-08-13T07:35:55Z
PVSpecAotVal_521D_NstdLineSpec_02A_NGC5315_0001	87	2009-08-13T07:40:24Z
PVSpecAotVal_521D_NstdLineSpec_02B1_NGC5315_0001	74	2009-08-13T07:44:58Z

Table 136: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521D_NstdLineSpec_02B2_NGC5315_0001	69	2009-08-13T07:49:18Z
PVSpecAotVal_521H_nStdSlewCalFlex_60_NGC5315_0001	200	2009-08-13T07:50:59Z
PVSpecAotVal_521H_nStdLinNoChop_63On45_NGC5315_0001	205	2009-08-13T07:57:40Z
PVSpecAotVal_521H_nStdLinNoChop_63Of45_NGC5315_0001	205	2009-08-13T08:04:26Z
PVSpecAotVal_521H_nStdLinNoChop_63On48_NGC5315_0001	214	2009-08-13T08:11:12Z
PVSpecAotVal_521H_nStdLinNoChop_63Of48_NGC5315_0001	214	2009-08-13T08:18:07Z
PVSpecAotVal_521H_nStdLinNoChop_63On51_NGC5315_0001	223	2009-08-13T08:25:02Z
PVSpecAotVal_521H_nStdLinNoChop_63Of51_NGC5315_0001	223	2009-08-13T08:32:06Z
PVSpecAotVal_521H_nStdSlewCalFlex_75_NGC5315_0001	203	2009-08-13T08:36:34Z
PVSpecAotVal_521H_nStdLinNoChop_88On39_NGC5315_0001	187	2009-08-13T08:43:21Z
PVSpecAotVal_521H_nStdLinNoChop_88Of39_NGC5315_0001	187	2009-08-13T08:49:52Z
PVSpecAotVal_521H_nStdLinNoChop_88On42_NGC5315_0001	196	2009-08-13T08:56:23Z
PVSpecAotVal_521H_nStdLinNoChop_88Of42_NGC5315_0001	196	2009-08-13T09:03:03Z
PVSpecAotVal_521H_nStdLinNoChop_88On45_NGC5315_0001	205	2009-08-13T09:09:43Z
PVSpecAotVal_521H_nStdLinNoChop_88Of45_NGC5315_0001	205	2009-08-13T09:16:32Z
PVSpecAotVal_521H_nStdSlewCalFlex_150_NGC5315_0001	203	2009-08-13T09:20:42Z
PVSpecAotVal_521H_nStdLnNoChop_157On29_NGC5315_0001	157	2009-08-13T09:27:27Z
PVSpecAotVal_521H_nStdLnNoChop_157Of29_NGC5315_001	157	2009-08-13T09:33:26Z
PVSpecAotVal_521H_nStdSlewCalFlex_150_NGC5315_0002	203	2009-08-13T09:36:48Z
PVSpecAotVal_521H_nStdLnNoChop_205On24_NGC5315_001	142	2009-08-13T09:43:38Z
PVSpecAotVal_521H_nStdLnNoChop_205Of24_NGC5315_001	142	2009-08-13T09:49:27Z
PVSpecFPG_411E_nStd_patnodcheckLNegCor_NGC5315_01	1741	2009-08-13T09:55:19Z
PVSpecFPG_411E_nStd_patnodcheckLPosCor_NGC5315_01	1741	2009-08-13T10:27:50Z
PVSpecFPG_411E_nStd_patnodcheckMNegCor_NGC5315_01	1735	2009-08-13T11:00:21Z
PVSpecFPG_411E_nStd_patnodcheckSNegCor_NGC5315_01	1724	2009-08-13T11:32:46Z
PVSpecSPU_1221A_NstdLineSpec_01b1_NGC5315_0001	349	2009-08-13T12:04:54Z
PVSpecSPU_1221A_NstdLineSpec_01b2_NGC5315_0001	350	2009-08-13T12:14:05Z
PVSpecSPU_1221A_NstdLineSpec_02b1_NGC5315_0001	205	2009-08-13T12:21:58Z
PVSpecSPU_1221A_NstdLineSpec_02b2_NGC5315_0001	206	2009-08-13T12:27:25Z
PVSpecSPU_1221A_NstdLineSpec_03b1_NGC5315_0001	349	2009-08-13T12:34:15Z
PVSpecSPU_1221A_NstdLineSpec_03b2_NGC5315_0001	350	2009-08-13T12:43:26Z
PVSpecFlux_438A_nStdRsrf_CS1_A1_Darkfield_0001	3556	2009-08-13T13:11:17Z
PVSpecSetup_na_nStd_orbitepi_na_0003	13	2009-08-13T14:10:36Z

7.4.13 OD0092

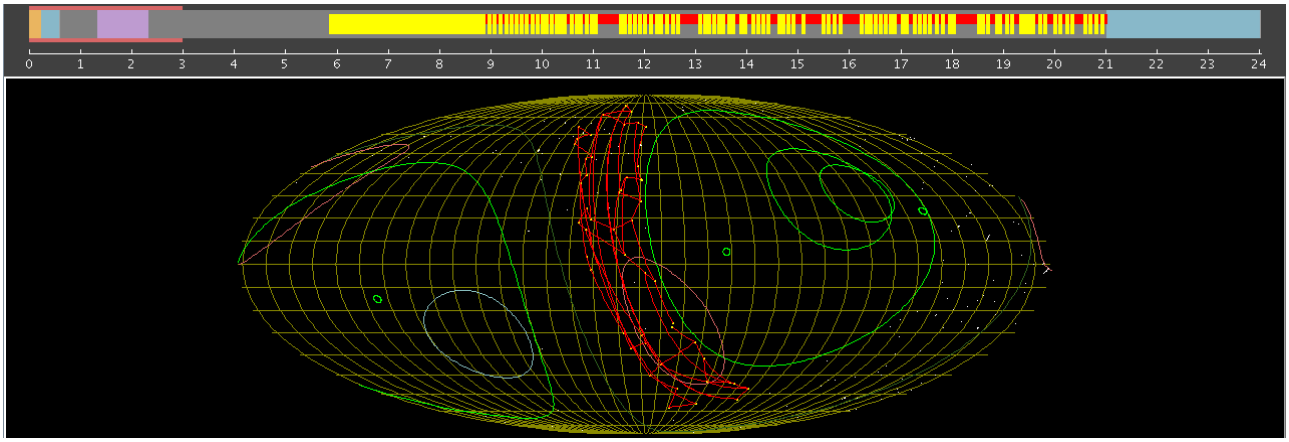


Figure 107: Timeline and distribution of pointings for OD0092 as displayed in the Mission Planning System.

Table 137: Timeline for PACS PV Phase OD0092.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0005	8542	2009-08-13T20:21:42Z
PVPhotSetup_na_nStd_orbitpro_na_0008	2339	2009-08-13T22:44:07Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP66100_OD92_01	339	2009-08-13T23:28:28Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HD120806_OD92_01	339	2009-08-13T23:34:14Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70669_OD92_01	339	2009-08-13T23:40:56Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP76423_OD92_01	339	2009-08-13T23:48:39Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77450_OD92_01	339	2009-08-13T23:54:02Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP76573_OD92_01	339	2009-08-13T23:59:53Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_WXSer_OD92_01	339	2009-08-14T00:05:31Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP72208_OD92_01	339	2009-08-14T00:11:58Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69673_OD92_01	339	2009-08-14T00:18:03Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_PPM103009_OD92_01	339	2009-08-14T00:24:23Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP71802_OD92_01	339	2009-08-14T00:30:42Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP71644_OD92_01	339	2009-08-14T00:35:13Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70885_OD92_01	339	2009-08-14T00:41:06Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP68357_OD92_01	339	2009-08-14T00:46:51Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP68417_OD92_01	339	2009-08-14T00:50:36Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69038_OD92_01	339	2009-08-14T00:56:27Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP67627_OD92_01	339	2009-08-14T01:04:35Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP69816_OD92_01	339	2009-08-14T01:09:47Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP73199_OD92_01	339	2009-08-14T01:15:09Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP80802_OD92_01	339	2009-08-14T01:21:32Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP72607_OD92_01	339	2009-08-14T01:27:28Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP75847_OD92_01	339	2009-08-14T01:33:02Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP46806_OD92_01	339	2009-08-14T02:01:22Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP46701_OD92_01	339	2009-08-14T02:07:02Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP50230_OD92_01	339	2009-08-14T02:12:55Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP51087_OD92_01	339	2009-08-14T02:17:42Z

Table 137: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP55537_OD92_01	339	2009-08-14T02:23:51Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP57642_OD92_01	339	2009-08-14T02:30:35Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP59588_OD92_01	339	2009-08-14T02:36:54Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP64778_OD92_01	339	2009-08-14T02:44:04Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP66666_OD92_01	339	2009-08-14T02:49:53Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP61084_OD92_01	339	2009-08-14T02:56:33Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP61404_OD92_01	339	2009-08-14T03:02:58Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP55355_OD92_01	339	2009-08-14T03:08:59Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP83866_OD92_01	339	2009-08-14T03:34:09Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP79804_OD92_01	339	2009-08-14T03:40:07Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP82249_OD92_01	339	2009-08-14T03:45:33Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP81835_OD92_01	339	2009-08-14T03:50:39Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77619_OD92_01	339	2009-08-14T03:57:00Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP78574_OD92_01	339	2009-08-14T04:01:56Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP77501_OD92_01	339	2009-08-14T04:07:59Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP78235_OD92_01	339	2009-08-14T04:13:19Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_WWSer_OD92_01	339	2009-08-14T04:22:49Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP75456_OD92_01	339	2009-08-14T04:28:34Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70969_OD92_01	339	2009-08-14T04:37:46Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP70026_OD92_01	339	2009-08-14T04:43:41Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HIP67457_OD92_01	339	2009-08-14T04:49:30Z
PVPhotFPG_261G_StdPS_blu_SAA_0+30_HD121714_OD92_01	339	2009-08-14T04:54:48Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP76423_OD92_01	339	2009-08-14T05:07:00Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77450_OD92_01	339	2009-08-14T05:12:23Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP76573_OD92_01	339	2009-08-14T05:18:14Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_WXSer_OD92_01	339	2009-08-14T05:23:52Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP80802_OD92_01	339	2009-08-14T05:36:18Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP66666_OD92_01	339	2009-08-14T05:59:00Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP61084_OD92_01	339	2009-08-14T06:05:40Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP61404_OD92_01	339	2009-08-14T06:12:05Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP55355_OD92_01	339	2009-08-14T06:18:06Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP83866_OD92_01	339	2009-08-14T06:43:16Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP79804_OD92_01	339	2009-08-14T06:49:14Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP82249_OD92_01	339	2009-08-14T06:54:40Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP81835_OD92_01	339	2009-08-14T06:59:46Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77619_OD92_01	339	2009-08-14T07:06:07Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP78574_OD92_01	339	2009-08-14T07:11:03Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP77501_OD92_01	339	2009-08-14T07:17:06Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP78235_OD92_01	339	2009-08-14T07:22:26Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_WWSer_OD92_01	339	2009-08-14T07:31:56Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP75456_OD92_01	339	2009-08-14T07:37:41Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP70969_OD92_01	339	2009-08-14T07:46:53Z
PVPhotFPG_261H_StdPS_blu_SAA_0+10_HIP70026_OD92_01	339	2009-08-14T07:52:48Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP67457_OD92_01	339	2009-08-14T07:58:37Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HD121714_OD92_01	339	2009-08-14T08:03:56Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP64778_OD92_01	339	2009-08-14T08:11:07Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP55537_OD92_01	339	2009-08-14T08:18:59Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP46701_OD92_01	339	2009-08-14T08:26:17Z

Table 137: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP46806_OD92_01	339	2009-08-14T08:31:57Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP75847_OD92_01	339	2009-08-14T09:00:18Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP72607_OD92_01	339	2009-08-14T09:05:52Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP73199_OD92_01	339	2009-08-14T09:11:59Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP71644_OD92_01	339	2009-08-14T09:21:49Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP71802_OD92_01	339	2009-08-14T09:26:21Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP72208_OD92_01	339	2009-08-14T09:33:40Z
PVPhotFPG_261H_StdPS_blu_SAA+10+20_HIP70669_OD92_01	339	2009-08-14T09:40:15Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP70885_OD92_01	339	2009-08-14T09:50:13Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP68357_OD92_01	339	2009-08-14T09:55:58Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP68417_OD92_01	339	2009-08-14T09:59:43Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69038_OD92_01	339	2009-08-14T10:05:34Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP67627_OD92_01	339	2009-08-14T10:13:42Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69816_OD92_01	339	2009-08-14T10:18:54Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_PPM103009_OD92_1	339	2009-08-14T10:29:48Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP69673_OD92_01	339	2009-08-14T10:36:08Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP66100_OD92_01	339	2009-08-14T10:45:25Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HD120806_OD92_01	339	2009-08-14T10:51:11Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP50230_OD92_01	339	2009-08-14T11:06:16Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP51087_OD92_01	339	2009-08-14T11:11:03Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP57642_OD92_01	339	2009-08-14T11:18:44Z
PVPhotFPG_261H_StdPS_blu_SAA+20+30_HIP59588_OD92_01	339	2009-08-14T11:25:03Z
PVPhotSetup_na_nStd_orbitepi_na_0009	13	2009-08-14T11:27:45Z

7.4.14 OD0093

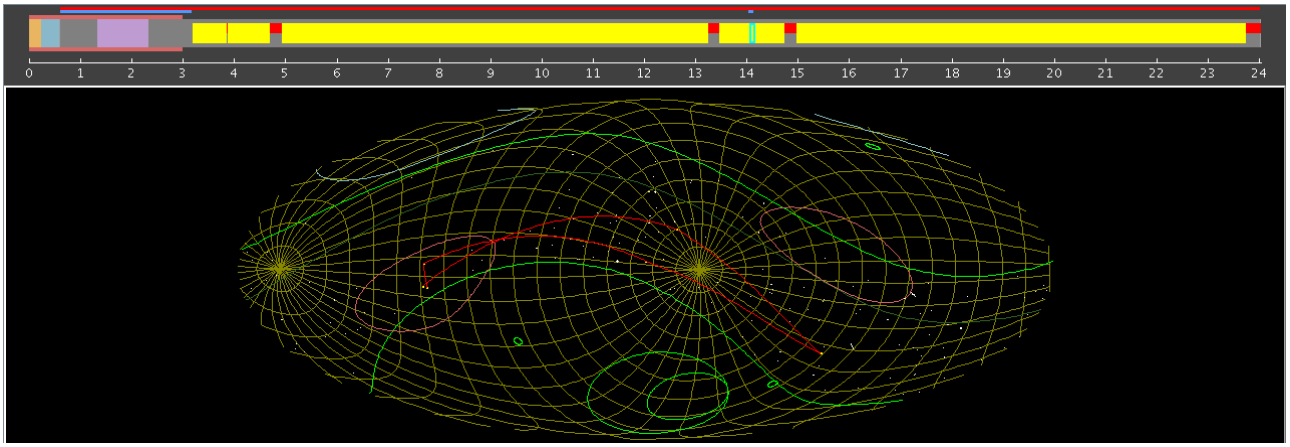


Figure 108: Timeline and distribution of pointings for OD0093 as displayed in the Mission Planning System.

Table 138: Timeline for PACS PV Phase OD0093.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro_na_0010	2339	2009-08-14T17:43:06Z
PVPhotFPG_264A_StdScani45_blu_HIP67419_0001	1198	2009-08-14T18:25:53Z
PVPhotFPG_264A_nStdScani45_blu_gypro_HIP67419_0001	1736	2009-08-14T18:43:48Z
PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_01	10074	2009-08-14T19:29:12Z
PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_02	10074	2009-08-14T22:15:03Z
PVPhotFPG_261D_StdPS_blu_SAA+20+30_HIP69816_OD93_03	10074	2009-08-15T01:00:54Z
PVPhotFPG_262A_NStd_blu_19Fortuna_0001	2005	2009-08-15T04:01:15Z
PVPhotSetup_na_nStd_orbitepi_na_0010	13	2009-08-15T04:34:43Z
PVSpecSetup_na_nStd_SetupFlexClassic_na_0002	367	2009-08-15T04:34:59Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0002	2109	2009-08-15T04:41:09Z
PVSpecFlux_438A_nStdRsrf_CS1_A3_Darkfield_0001	3556	2009-08-15T05:30:53Z
PVSpecFlux_438A_nStdRsrf_CS1_A5_Darkfield_0001	3556	2009-08-15T06:30:40Z
PVSpecFlux_438A_nStdRsrf_CS1_A6_Darkfield_0001	3806	2009-08-15T07:30:27Z
PVSpecFlux_438A_nStdRsrf_CS1_B1_Darkfield_0001	3556	2009-08-15T08:34:24Z
PVSpecFlux_438A_nStdRsrf_CS1_B3_Darkfield_0001	3556	2009-08-15T09:34:11Z
PVSpecFlux_438A_nStdRsrf_CS1_B4_Darkfield_0001	3556	2009-08-15T10:33:58Z
PVSpecFlux_438A_nStdRsrf_CS1_B5_Darkfield_0001	3556	2009-08-15T11:33:45Z
PVSpecFlux_438A_nStdRsrf_CS1_B6_Darkfield_0001	3806	2009-08-15T12:33:32Z
PVSpecSetup_na_nStd_orbitepi_na_0004	13	2009-08-15T13:37:01Z
PVPhotSetup_na_nStd_orbitpro40Hz_na_0001	2298	2009-08-15T13:37:17Z
PVPhotSetup_na_nStd_orbitepi40Hz_na_0001	13	2009-08-15T14:15:38Z

7.4.15 OD0096

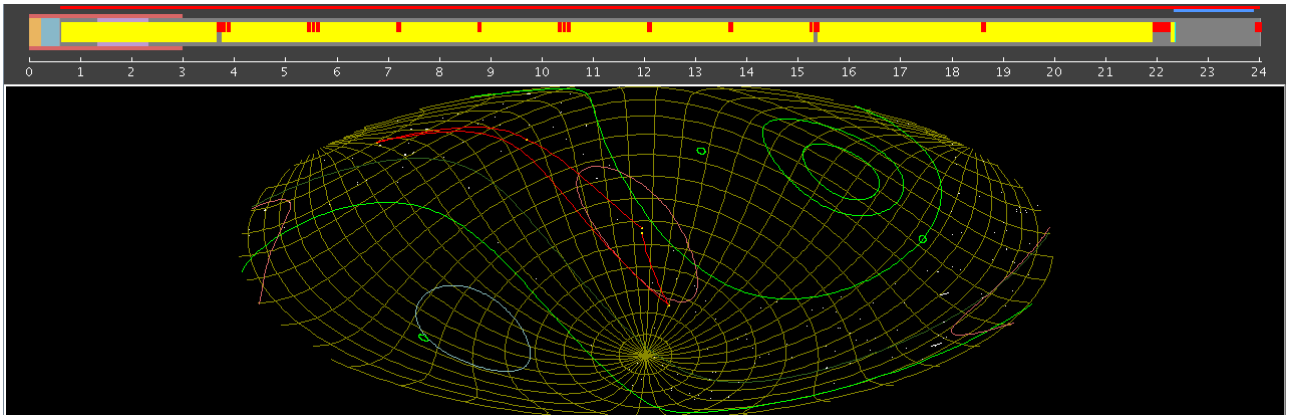


Figure 109: Timeline and distribution of pointings for OD0096 as displayed in the Mission Planning System.

Table 139: Timeline for PACS PV Phase OD0096.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0006	8542	2009-08-17T15:15:43Z
PVPhotSetup_na_nStd_orbitpro_na_0011	2339	2009-08-17T17:38:08Z
PVPhotBol_111bisA_nStdRaster_bluInitDrct_Arp220_0003	2	2009-08-17T18:29:07Z
PVPhotBol_111bisA_nStdRaster_blu20Drct_Arp220_0002	5311	2009-08-17T18:35:05Z
PVPhotBol_111bisA_nStdRaster_FinDrct_Arp220_0007	2	2009-08-17T20:08:21Z
PVPhotBol_111bisA_nStdRaster_bluInitDDCS_Arp220_0001	2	2009-08-17T20:13:25Z
PVPhotBol_111bisA_nStdRaster_blu20DDCS_Arp220_0001	5316	2009-08-17T20:19:33Z
PVPhotBol_111bisA_nStdRaster_blu26DDCS_Arp220_0001	5316	2009-08-17T21:54:15Z
PVPhotBol_111bisA_nStdRaster_blu30DDCS_Arp220_0001	5316	2009-08-17T23:28:57Z
PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0001	2	2009-08-18T01:02:23Z
PVPhotBol_111bisA_nStdRaster_grnInitDDCS_Arp220_0001	2	2009-08-18T01:07:27Z
PVPhotBol_111bisA_nStdRaster_grn20DDCS_Arp220_0001	5316	2009-08-18T01:13:35Z
PVPhotBol_111bisA_nStdRaster_grn26DDCS_Arp220_0001	5316	2009-08-18T02:48:17Z
PVPhotBol_111bisA_nStdRaster_grn30DDCS_Arp220_0001	5316	2009-08-18T04:22:59Z
PVPhotBol_111bisA_nStdRaster_FinDDCS_Arp220_0002	2	2009-08-18T05:56:25Z
PVPhotBol_1116A_nStd_timeConstDdcs_DarkField_0001	11250	2009-08-18T06:05:45Z
PVPhotBol_1111A_nStd_bluDrctLowBias_DarkField_0001	11623	2009-08-18T09:19:37Z
PVPhotFPG_StdPS_PModeTest_OD96_blu_HIP55355_0001	339	2009-08-18T12:56:54Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0002	13	2009-08-18T12:59:36Z

7.4.16 OD0097

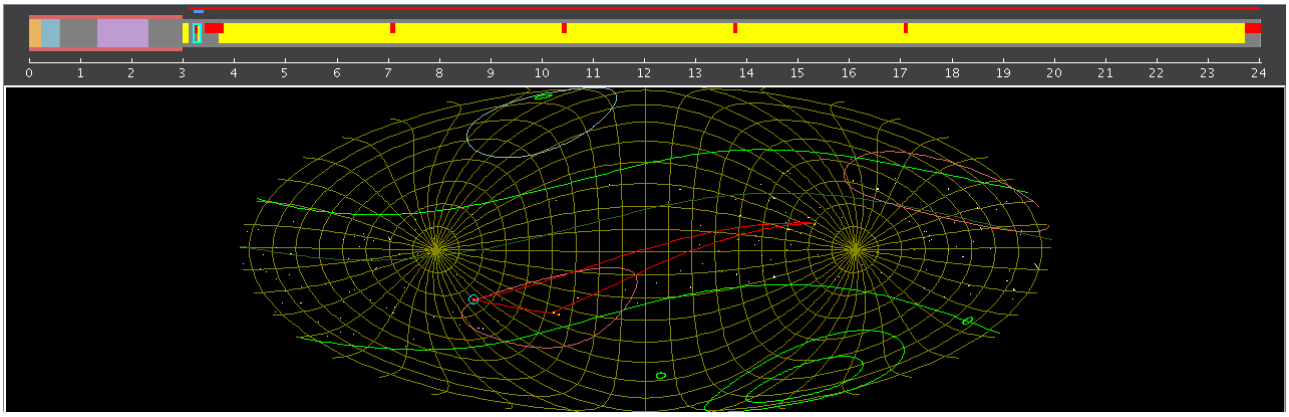


Figure 110: Timeline and distribution of pointings for OD0097 as displayed in the Mission Planning System.

Table 140: Timeline for PACS PV Phase OD0097.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproCSon_na_0001	363	2009-08-18T17:40:59Z
PVPhotFPG_StdPS_PModeTest_OD97_blu_HIP55355_0001	1164	2009-08-18T17:48:06Z
PVPhotBol_1111A_nStd_bluDrctHighBias_DarkField_0001	11623	2009-08-18T18:30:17Z
PVPhotBol_1111A_nStd_bluDrctNomiBias_DarkField_0001	11623	2009-08-18T21:50:22Z
PVPhotBol_1111A_nStd_grnDrctLowBias_DarkField_0001	11623	2009-08-19T01:10:27Z
PVPhotBol_1111A_nStd_grnDrctHighBias_DarkField_0001	11623	2009-08-19T04:30:32Z
PVPhotBol_1111A_nStd_grnDrctNomiBias_DarkField_0001	11623	2009-08-19T07:50:37Z
PVPhotSetup_na_nStd_orbitepiCSonForRed_na_0001	13	2009-08-19T11:04:23Z
PVPhotSetup_na_nStd_orbitpro_Red00_na_0002	133	2009-08-19T11:04:39Z
PVPhotBol_110A_nStd_VrlVhBlind_Red00_0001	1460	2009-08-19T11:06:55Z
PVPhotBol_na_nStd_3posChop_Red00_DarkField_0001	1325	2009-08-19T11:31:52Z
PVPhotSetup_na_nStd_orbitepiCSon_red00_0002	13	2009-08-19T11:54:00Z
PVPhotSetup_na_nStd_orbitpro_Red01_na_0002	150	2009-08-19T11:54:16Z
PVPhotBol_110A_nStd_VrlVhBlind_Red01_0001	1460	2009-08-19T11:56:49Z
PVPhotBol_na_nStd_3posChop_Red01_DarkField_0001	1325	2009-08-19T12:21:38Z
PVPhotSetup_na_nStd_orbitepiCSon_red01_0002	13	2009-08-19T12:43:46Z
PVPhotSetup_na_nStd_orbitpro_Red10_na_0002	150	2009-08-19T12:44:02Z
PVPhotBol_110A_nStd_VrlVhBlind_Red10_0001	1460	2009-08-19T12:46:35Z
PVPhotBol_na_nStd_3posChop_Red10_DarkField_0001	1325	2009-08-19T13:11:24Z
PVPhotSetup_na_nStd_orbitepiCSon_red10_0002	13	2009-08-19T13:33:32Z
PVPhotSetup_na_nStd_orbitpro_Red11_na_0002	167	2009-08-19T13:33:48Z
PVPhotBol_110A_nStd_VrlVhBlind_Red11_0001	1460	2009-08-19T13:36:38Z
PVPhotBol_na_nStd_3posChop_Red11_DarkField_0001	1325	2009-08-19T14:01:27Z
PVPhotSetup_na_nStd_orbitepi_na_0011	13	2009-08-19T14:23:35Z

7.4.17 OD0101

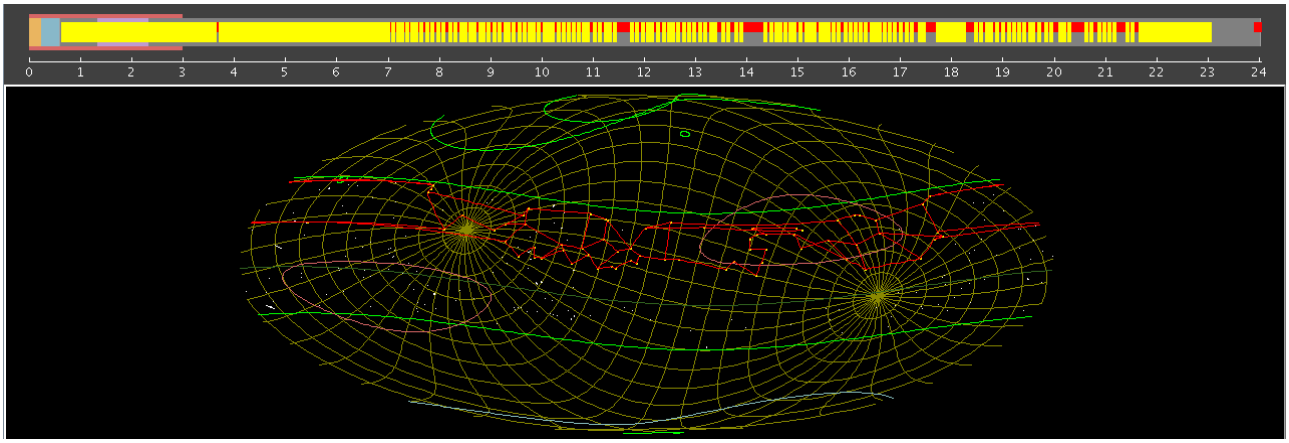


Figure 111: Timeline and distribution of pointings for OD0101 as displayed in the Mission Planning System.

Table 141: Timeline for PACS PV Phase OD0101.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0007	8542	2009-08-22T13:27:38Z
PVPhotSetup_na_nStd_orbitpro_na_0012	2339	2009-08-22T15:50:03Z
PVPhotFPG_262B_StdRaster_blu_HIP67419_0001	4365	2009-08-22T16:34:04Z
PVPhotFPG_262B_nStdRaster_blu_gypro_HIP67419_0001	4829	2009-08-22T17:44:46Z
PVPhotFPG_264A_StdScani45_blu_HIP67419_0002	1198	2009-08-22T19:06:12Z
PVPhotFPG_264A_nStdScani45_blu_gypro_HIP67419_0002	1736	2009-08-22T19:24:07Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP67457_OD101_01	339	2009-08-22T19:56:11Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HD121714_OD101_01	339	2009-08-22T20:01:31Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP69346_OD101_01	339	2009-08-22T20:06:50Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70969_OD101_01	339	2009-08-22T20:12:15Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70026_OD101_01	339	2009-08-22T20:18:11Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72432_OD101_01	339	2009-08-22T20:23:52Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75177_OD101_01	339	2009-08-22T20:29:42Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP73714_OD101_01	339	2009-08-22T20:36:15Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75393_OD101_01	339	2009-08-22T20:41:49Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75456_OD101_01	339	2009-08-22T20:49:38Z
PVPhotFPG_261G_PS_blu_SAA_0+30_WWSer_OD101_01	339	2009-08-22T20:55:23Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70669_OD101_01	339	2009-08-22T21:02:34Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72208_OD101_01	339	2009-08-22T21:09:13Z
PVPhotFPG_261G_PS_blu_SAA_0+30_WXSer_OD101_01	339	2009-08-22T21:15:41Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP76423_OD101_01	339	2009-08-22T21:21:13Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77615_OD101_01	339	2009-08-22T21:26:26Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77450_OD101_01	339	2009-08-22T21:31:33Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79349_OD101_01	339	2009-08-22T21:37:32Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79233_OD101_01	339	2009-08-22T21:42:15Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80259_OD101_01	339	2009-08-22T21:48:02Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP76573_OD101_01	339	2009-08-22T21:54:36Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75143_OD101_01	339	2009-08-22T22:00:38Z

Table 141: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP71802_OD101_01	339	2009-08-22T22:06:45Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP71644_OD101_01	339	2009-08-22T22:11:17Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP70885_OD101_01	339	2009-08-22T22:17:12Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77501_OD101_01	339	2009-08-22T22:24:16Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP78235_OD101_01	339	2009-08-22T22:29:36Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80704_OD101_01	339	2009-08-22T22:35:41Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP78574_OD101_01	339	2009-08-22T22:41:35Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP77619_OD101_01	339	2009-08-22T22:46:31Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP81835_OD101_01	339	2009-08-22T22:52:53Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP82249_OD101_01	339	2009-08-22T22:57:59Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP79804_OD101_01	339	2009-08-22T23:03:24Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP83866_OD101_01	339	2009-08-22T23:09:22Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP80802_OD101_01	339	2009-08-22T23:15:30Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP73199_OD101_01	339	2009-08-22T23:21:52Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP67627_OD101_01	339	2009-08-22T23:27:45Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP69816_OD101_01	339	2009-08-22T23:32:57Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP72607_OD101_01	339	2009-08-22T23:39:00Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP75847_OD101_01	339	2009-08-22T23:44:33Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP36547_OD101_01	339	2009-08-22T23:51:51Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP17881_OD101_01	339	2009-08-22T23:57:56Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP29919_OD101_01	339	2009-08-23T00:05:56Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP30945_OD101_01	339	2009-08-23T00:10:35Z
PVPhotFPG_261G_PS_blu_SAA_0+30_PPM30600_OD101_01	339	2009-08-23T00:15:28Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP35264_OD101_01	339	2009-08-23T00:36:31Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP36377_OD101_01	339	2009-08-23T00:42:26Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HD48505_OD101_01	339	2009-08-23T00:49:03Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP30438_OD101_01	339	2009-08-23T00:54:03Z
PVPhotFPG_261G_PS_blu_SAA_0+30_PPM767023_OD101_01	339	2009-08-23T00:59:19Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP31057_OD101_01	339	2009-08-23T01:05:47Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP46806_OD101_01	339	2009-08-23T01:13:24Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP46701_OD101_01	339	2009-08-23T01:19:04Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP50230_OD101_01	339	2009-08-23T01:24:58Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP51087_OD101_01	339	2009-08-23T01:29:46Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP55537_OD101_01	339	2009-08-23T01:35:57Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP55355_OD101_01	339	2009-08-23T01:42:32Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP57505_OD101_01	339	2009-08-23T01:49:04Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP61404_OD101_01	339	2009-08-23T01:55:19Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP61084_OD101_01	339	2009-08-23T02:01:44Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP66666_OD101_01	339	2009-08-23T02:08:26Z
PVPhotFPG_261G_PS_blu_SAA_0+30_HIP64778_OD101_01	339	2009-08-23T02:14:15Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP61404_OD101_01	339	2009-08-23T02:22:32Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP57505_OD101_01	339	2009-08-23T02:28:47Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP31057_OD101_01	339	2009-08-23T02:37:04Z
PVPhotFPG_261H_PS_blu_SAA_0+10_PPM767023_OD101_01	339	2009-08-23T02:43:32Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80802_OD101_01	339	2009-08-23T03:12:12Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP83866_OD101_01	339	2009-08-23T03:18:20Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79804_OD101_01	339	2009-08-23T03:24:18Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP82249_OD101_01	339	2009-08-23T03:29:44Z

Table 141: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP81835_OD101_01	339	2009-08-23T03:34:50Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP78574_OD101_01	339	2009-08-23T03:41:09Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80704_OD101_01	339	2009-08-23T03:47:03Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP78235_OD101_01	339	2009-08-23T03:53:08Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP80259_OD101_01	339	2009-08-23T03:59:04Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79233_OD101_01	339	2009-08-23T04:04:51Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP79349_OD101_01	339	2009-08-23T04:09:34Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP77450_OD101_01	339	2009-08-23T04:15:33Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP77615_OD101_01	339	2009-08-23T04:20:40Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP76423_OD101_01	339	2009-08-23T04:25:52Z
PVPhotFPG_261H_PS_blu_SAA_0+10_WWSer_OD101_01	339	2009-08-23T04:32:25Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75456_OD101_01	339	2009-08-23T04:38:10Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75393_OD101_01	339	2009-08-23T04:45:59Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP73714_OD101_01	339	2009-08-23T04:51:33Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP75177_OD101_01	339	2009-08-23T04:58:06Z
PVPhotFPG_261H_PS_blu_SAA_0+10_HIP72432_OD101_01	339	2009-08-23T05:03:56Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP70026_OD101_01	339	2009-08-23T05:09:37Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP70969_OD101_01	339	2009-08-23T05:15:33Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP69346_OD101_01	339	2009-08-23T05:20:58Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HD121714_OD101_01	339	2009-08-23T05:26:16Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP67457_OD101_01	339	2009-08-23T05:31:37Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP64778_OD101_01	339	2009-08-23T05:38:19Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP66666_OD101_01	339	2009-08-23T05:44:08Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP61084_OD101_01	339	2009-08-23T05:50:50Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP55355_OD101_01	339	2009-08-23T05:57:26Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP46806_OD101_01	339	2009-08-23T06:04:04Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP30438_OD101_01	339	2009-08-23T06:12:44Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HD48505_OD101_01	339	2009-08-23T06:17:44Z
PVPhotFPG_262A_NStd_blu_19Fortuna_0002	2005	2009-08-23T06:33:55Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP17881_OD101_01	339	2009-08-23T07:17:55Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP36547_OD101_01	339	2009-08-23T07:24:00Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP75847_OD101_01	339	2009-08-23T07:31:18Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP72607_OD101_01	339	2009-08-23T07:36:51Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP73199_OD101_01	339	2009-08-23T07:42:58Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP77619_OD101_01	339	2009-08-23T07:50:35Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP77501_OD101_01	339	2009-08-23T07:56:46Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP75143_OD101_01	339	2009-08-23T08:03:07Z
PVPhotFPG_261H_PS_blu_SAA+10+20_HIP76573_OD101_01	339	2009-08-23T08:09:09Z
PVPhotFPG_261H_PS_blu_SAA+10+20_WXSer_OD101_01	339	2009-08-23T08:14:48Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP71802_OD101_01	339	2009-08-23T08:22:00Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP71644_OD101_01	339	2009-08-23T08:26:32Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP70885_OD101_01	339	2009-08-23T08:32:28Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP67627_OD101_01	339	2009-08-23T08:41:28Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP69816_OD101_01	339	2009-08-23T08:46:40Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP29919_OD101_01	339	2009-08-23T08:58:20Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP30945_OD101_01	339	2009-08-23T09:02:59Z
PVPhotFPG_261H_PS_blu_SAA+20+30_PPM30600_OD101_01	339	2009-08-23T09:07:52Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP35264_OD101_01	339	2009-08-23T09:28:52Z

Table 141: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP36377_OD101_01	339	2009-08-23T09:34:47Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP46701_OD101_01	339	2009-08-23T09:43:15Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP50230_OD101_01	339	2009-08-23T09:49:09Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP51087_OD101_01	339	2009-08-23T09:53:57Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP55537_OD101_01	339	2009-08-23T10:00:08Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP70669_OD101_01	339	2009-08-23T10:15:53Z
PVPhotFPG_261H_PS_blu_SAA+20+30_HIP72208_OD101_01	339	2009-08-23T10:22:33Z
PVPhotFPG_261E_StdPS_blu_8Flora_0001	5134	2009-08-23T10:31:19Z
PVPhotSetup_na_nStd_orbitepi_na_0012	13	2009-08-23T11:53:56Z

7.4.18 OD0102

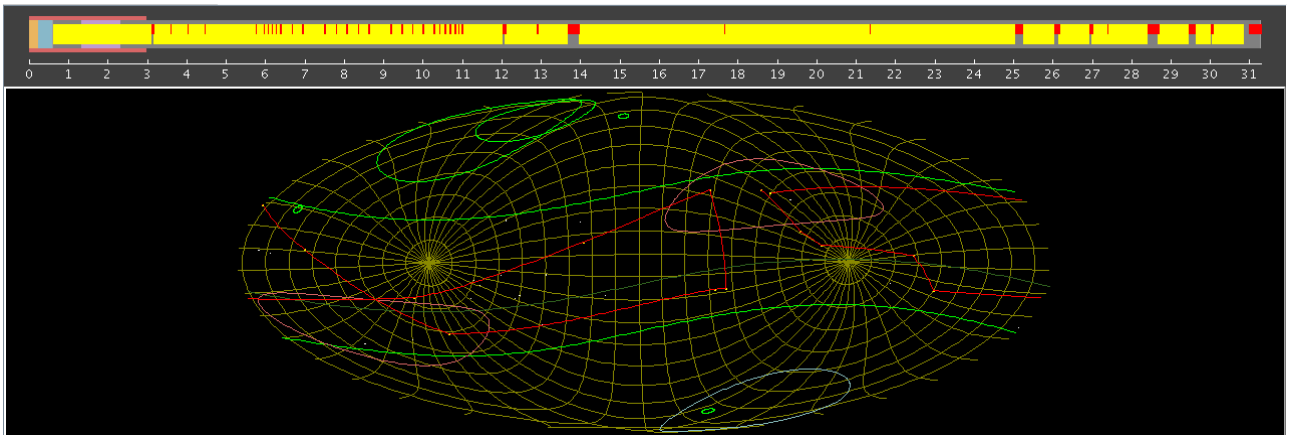


Figure 112: Timeline and distribution of pointings for OD0102 as displayed in the Mission Planning System.

Table 142: Timeline for PACS PV Phase OD0102.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0003	367	2009-08-23T13:30:13Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0003	8609	2009-08-23T13:36:23Z
PVSpecAotVal_521G_NGC5315_63_raster_0001	1427	2009-08-23T16:05:07Z
PVSpecAotVal_521G_NGC5315_88_raster_0001	1426	2009-08-23T16:30:49Z
PVSpecAotVal_521G_NGC5315_158_raster_0001	1427	2009-08-23T16:56:29Z
PVSpecAotVal_521G_NGC5315_63_dithermap_0001	1095	2009-08-23T17:22:08Z
PVSpecAotVal_521G_NGC5315_88_dithermap_0001	1094	2009-08-23T17:42:18Z
PVSpecAotVal_521G_NGC5315_158_dithermap_0001	1095	2009-08-23T18:02:26Z
PVSpecAotVal_521G_nStd_63_chopL_NGC5315_0001	267	2009-08-23T18:22:33Z
PVSpecAotVal_521G_nStd_63_chopM_NGC5315_0001	261	2009-08-23T18:28:52Z
PVSpecAotVal_521G_nStd_63_chopS_NGC5315_0001	253	2009-08-23T18:35:05Z
PVSpecAotVal_521G_nStd_88_chopL_NGC5315_0001	258	2009-08-23T18:41:13Z
PVSpecAotVal_521G_nStd_88_chopM_NGC5315_0001	252	2009-08-23T18:47:26Z
PVSpecAotVal_521G_nStd_88_chopS_NGC5315_0001	244	2009-08-23T18:53:33Z
PVSpecAotVal_521G_nStd_157_chopL_NGC5315_0001	245	2009-08-23T18:59:31Z
PVSpecAotVal_521G_nStd_157_chopM_NGC5315_0001	239	2009-08-23T19:05:30Z
PVSpecAotVal_521G_nStd_157_chopS_NGC5315_0001	231	2009-08-23T19:11:23Z
PVSpecAotVal_521A_NstdLineSpec_07B1_NGC5315_0002	832	2009-08-23T19:18:21Z
PVSpecAotVal_521A_NstdLineSpec_07B2_NGC5315_0002	783	2009-08-23T19:35:19Z
PVSpecAotVal_521A_NstdLineSpec_08B1_NGC5315_0002	878	2009-08-23T19:51:29Z
PVSpecAotVal_521A_NstdLineSpec_08B2_NGC5315_0002	825	2009-08-23T20:09:13Z
PVSpecAotVal_521A_NstdLineSpec_09B1_NGC5315_0002	832	2009-08-23T20:26:05Z
PVSpecAotVal_521A_NstdLineSpec_09B2_NGC5315_0002	783	2009-08-23T20:43:03Z
PVSpecAotVal_521A_NstdLineSpec_10B1_NGC5315_0002	832	2009-08-23T20:59:13Z
PVSpecAotVal_521A_NstdLineSpec_10B2_NGC5315_0002	783	2009-08-23T21:16:11Z
PVSpecAotVal_521A_NstdLineSpec_11B1_NGC5315_0002	878	2009-08-23T21:32:21Z
PVSpecAotVal_521A_NstdLineSpec_11B2_NGC5315_0002	825	2009-08-23T21:50:05Z
PVSpecAotVal_521A_NstdLineSpec_12B1_NGC5315_0002	810	2009-08-23T22:06:57Z

Table 142: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521A_NstdLineSpec_12B2_NGC5315_0002	761	2009-08-23T22:23:33Z
PVSpecAotVal_521A_NstdLineSpec_13B1_NGC5315_0002	810	2009-08-23T22:39:21Z
PVSpecAotVal_521A_NstdLineSpec_13B2_NGC5315_0002	761	2009-08-23T22:55:57Z
PVSpecAotVal_521A_NstdLineSpec_15B1_NGC5315_0002	350	2009-08-23T23:11:45Z
PVSpecAotVal_521A_NstdLineSpec_15B2_NGC5315_0002	331	2009-08-23T23:20:41Z
PVSpecAotVal_521A_NstdLineSpec_16B1_NGC5315_0002	258	2009-08-23T23:29:19Z
PVSpecAotVal_521A_NstdLineSpec_16B2_NGC5315_0002	245	2009-08-23T23:36:43Z
PVSpecAotVal_521A_NstdLineSpec_17B1_NGC5315_0002	166	2009-08-23T23:43:55Z
PVSpecAotVal_521A_NstdLineSpec_17B2_NGC5315_0002	159	2009-08-23T23:49:47Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP68815_01	3536	2009-08-23T23:56:08Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP21479_01	2568	2009-08-24T01:02:48Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP13502_01	2568	2009-08-24T01:50:30Z
PVSpecAotVal_521G_NGC40_63_raster_0001	13163	2009-08-24T02:53:48Z
PVSpecAotVal_521G_NGC40_88_raster_0001	13162	2009-08-24T06:35:06Z
PVSpecAotVal_521G_NGC40_158_raster_0001	13163	2009-08-24T10:16:22Z
PVSpecGeGa_123A_nStd_BTM_pilot07_Arp220_0001	666	2009-08-24T14:08:55Z
PVSpecGeGa_123A_nStd_BTM_pilot09_Arp220_0001	666	2009-08-24T14:20:22Z
PVSpecGeGa_123A_nStd_BTM_pilot17_Arp220_0001	666	2009-08-24T14:31:50Z
PVSpecGeGa_123A_nStd_BTM_pilot19_Arp220_0001	666	2009-08-24T14:43:17Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP67419_01	2568	2009-08-24T15:05:11Z
PVSpecWave_421D_nStdLS_nochoporderRed_NGC6302_0004	1173	2009-08-24T15:56:17Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP84071_01	3536	2009-08-24T16:19:11Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_IRAS22134_01	2568	2009-08-24T17:37:10Z
PVSpecFlux_4312A_FlexRasterGen_SA_AFGL618_0001	650	2009-08-24T18:31:01Z
PVSpecFlux_4312A_FlexRasterGen_SB_AFGL618_0001	638	2009-08-24T18:42:15Z
PVSpecFPG_411C_nStd_11x11RCp_00_w77_HIP27989_01	2568	2009-08-24T18:59:59Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0003	13	2009-08-24T19:42:50Z

7.4.19 OD0103

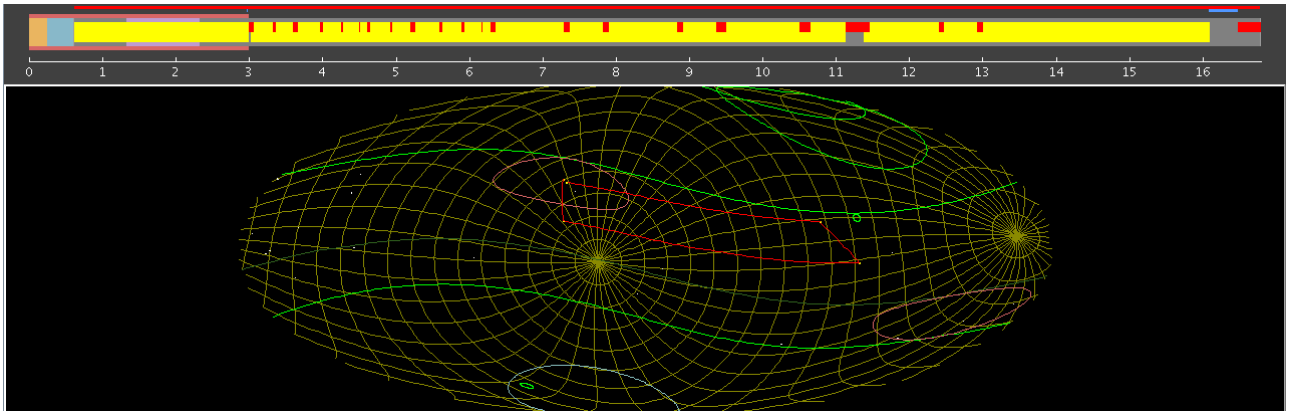


Figure 113: Timeline and distribution of pointings for OD0103 as displayed in the Mission Planning System.

Table 143: Timeline for PACS PV Phase OD0103.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0003	367	2009-08-24T20:47:49Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0003	8129	2009-08-24T20:53:59Z
PVSpecAotVal_521B_NstdLineSpec_01A_NGC5315_0002	861	2009-08-24T23:15:37Z
PVSpecAotVal_521B_NstdLineSpec_01B1_NGC5315_0002	752	2009-08-24T23:33:05Z
PVSpecAotVal_521B_NstdLineSpec_01B2_NGC5315_0002	1037	2009-08-24T23:51:07Z
PVSpecAotVal_521B_NstdLineSpec_02A_NGC5315_0002	817	2009-08-25T00:11:28Z
PVSpecAotVal_521B_NstdLineSpec_02B1_NGC5315_0002	714	2009-08-25T00:28:12Z
PVSpecAotVal_521B_NstdLineSpec_02B2_NGC5315_0002	313	2009-08-25T00:42:00Z
PVSpecAotVal_521B_NstdLineSpec_03A_NGC5315_0002	915	2009-08-25T00:50:17Z
PVSpecAotVal_521B_NstdLineSpec_03B1_NGC5315_0002	806	2009-08-25T01:08:39Z
PVSpecAotVal_521B_NstdLineSpec_03B2_NGC5315_0002	1139	2009-08-25T01:27:35Z
PVSpecAotVal_521B_NstdLineSpec_04A_NGC5315_0002	867	2009-08-25T01:49:38Z
PVSpecAotVal_521B_NstdLineSpec_04B1_NGC5315_0002	764	2009-08-25T02:07:12Z
PVSpecAotVal_521B_NstdLineSpec_04B2_NGC5315_0002	339	2009-08-25T02:21:50Z
PVSpecAotVal_524A_NstdSEDChop_01A_NGC5315_0001	3329	2009-08-25T02:32:46Z
PVSpecAotVal_524A_NstdSEDChop_01B_NGC5315_0001	1583	2009-08-25T03:33:29Z
PVSpecAotVal_524A_NstdSEDChop_02A_NGC5315_0001	3329	2009-08-25T04:05:09Z
PVSpecAotVal_524A_NstdSEDChop_02B_NGC5315_0001	1583	2009-08-25T05:05:52Z
PVSpecAotVal_524A_NstdSEDChop_05A_NGC5315_0001	3521	2009-08-25T05:42:04Z
PVSpecAotVal_524A_NstdSEDChop_05B_NGC5315_0001	1673	2009-08-25T06:50:31Z
PVSpecFlux_438E_NstdCoarseRsrf_A_Fortuna_0001	3339	2009-08-25T07:38:41Z
PVSpecFlux_438E_NstdCoarseRsrf_B_Fortuna_0001	1593	2009-08-25T08:39:34Z
PVSpecFPG_411F_nStdLinespec_9x9_pm3_w77_HIP27989_01	11058	2009-08-25T09:11:52Z
PVSpecSetup_na_nStd_orbitepi_na_0005	13	2009-08-25T12:16:13Z

7.4.20 OD0104

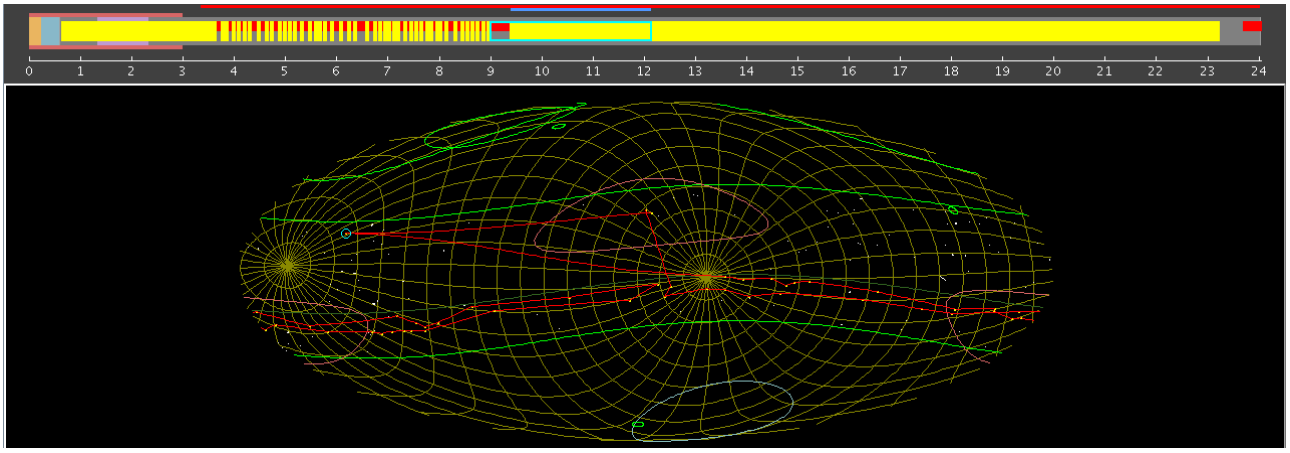


Figure 114: Timeline and distribution of pointings for OD0104 as displayed in the Mission Planning System.

Table 144: Timeline for PACS PV Phase OD0104.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0008	8542	2009-08-25T13:35:37Z
PVPhotSetup_na_nStd_orbitpro_na_0013	2339	2009-08-25T15:58:02Z
PVPhotFPG_261C_PS_blu_SAA-20-10_PPM787044_OD104_01	339	2009-08-25T16:44:08Z
PVPhotFPG_261C_PS_blu_SAA-20-10_PPM787209_OD104_01	339	2009-08-25T16:49:40Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP110428_OD104_01	339	2009-08-25T16:57:14Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HD11290_OD104_01	339	2009-08-25T17:03:16Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP11455_OD104_01	339	2009-08-25T17:09:47Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP14930_OD104_01	339	2009-08-25T17:16:38Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP15474_OD104_01	339	2009-08-25T17:26:45Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP14135_OD104_01	339	2009-08-25T17:35:30Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP13092_OD104_01	339	2009-08-25T17:42:27Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP10687_OD104_01	339	2009-08-25T17:51:20Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP8565_OD104_01	339	2009-08-25T17:57:44Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP6093_OD104_01	339	2009-08-25T18:03:29Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP4008_OD104_01	339	2009-08-25T18:09:14Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP108317_OD104_01	339	2009-08-25T18:16:54Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP88832_OD104_01	339	2009-08-25T18:27:22Z
PVPhotFPG_261C_PS_blu_SAA-20-10_2M1809_OD104_01	339	2009-08-25T18:33:21Z
PVPhotFPG_261C_PS_blu_SAA-20-10_2M1811_OD104_01	339	2009-08-25T18:38:34Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP87747_OD104_01	339	2009-08-25T18:44:25Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP84346_OD104_01	339	2009-08-25T18:51:53Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP82912_OD104_01	339	2009-08-25T19:02:47Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP82273_OD104_01	339	2009-08-25T19:13:12Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP85258_OD104_01	339	2009-08-25T19:20:09Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP84780_OD104_01	339	2009-08-25T19:33:28Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HD168829_OD104_01	339	2009-08-25T19:43:10Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP90883_OD104_01	339	2009-08-25T19:48:54Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP91373_OD104_01	339	2009-08-25T19:54:01Z

Table 144: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP92862_OD104_01	339	2009-08-25T19:59:40Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP94438_OD104_01	339	2009-08-25T20:05:07Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP95413_OD104_01	339	2009-08-25T20:10:26Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP104719_OD104_01	339	2009-08-25T20:18:01Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP117763_OD104_01	339	2009-08-25T20:25:45Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP1834_OD104_01	339	2009-08-25T20:31:36Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP3179_OD104_01	339	2009-08-25T20:36:35Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP9234_OD104_01	339	2009-08-25T20:43:53Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP9640_OD104_01	339	2009-08-25T20:49:04Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP12193_OD104_01	339	2009-08-25T20:55:29Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP12557_OD104_01	339	2009-08-25T20:59:19Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP13654_OD104_01	339	2009-08-25T21:06:36Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP16647_OD104_01	339	2009-08-25T21:16:40Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HD24607_OD104_01	339	2009-08-25T21:25:51Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP17889_OD104_01	339	2009-08-25T21:31:38Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HD22868_OD104_01	339	2009-08-25T21:36:56Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP18744_OD104_01	339	2009-08-25T21:42:54Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP17678_OD104_01	339	2009-08-25T21:49:33Z
PVPhotFPG_261C_PS_blu_SAA-20-10_HIP19424_OD104_01	339	2009-08-25T21:55:34Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_01	10074	2009-08-25T22:23:40Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_02	10074	2009-08-26T01:09:31Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_03	10074	2009-08-26T03:55:22Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_04	10074	2009-08-26T06:41:13Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP67627_OD104-5_05	10074	2009-08-26T09:27:04Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0003	13	2009-08-26T12:12:01Z

7.4.21 OD0105

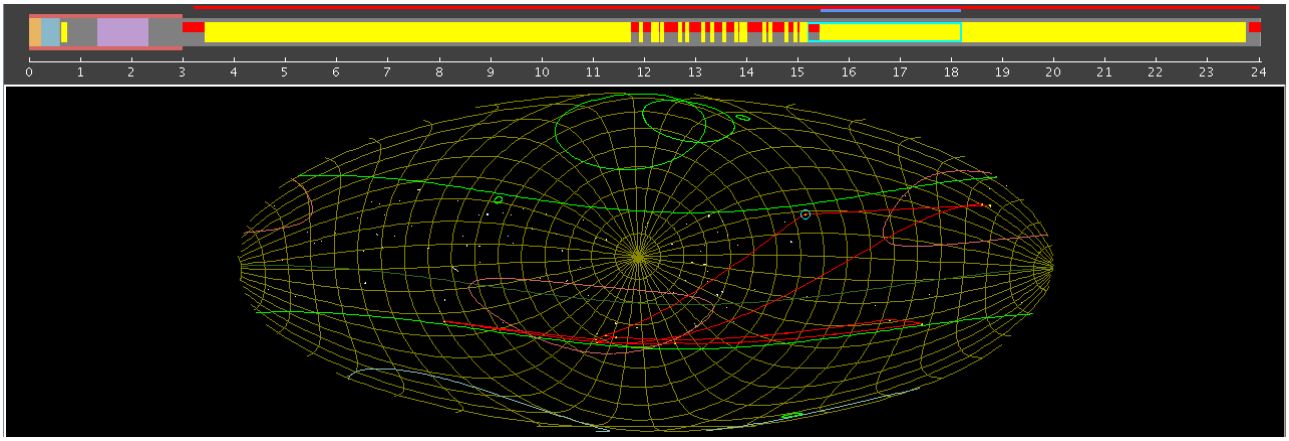


Figure 115: Timeline and distribution of pointings for OD0105 as displayed in the Mission Planning System.

Table 145: Timeline for PACS PV Phase OD0105.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproCSon_na_0002	363	2009-08-26T13:38:26Z
PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_01	10074	2009-08-26T16:28:15Z
PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_02	10074	2009-08-26T19:14:06Z
PVPhotFPG_261D_PS_blu_SAA-29_HIP117591_OD105_03	10074	2009-08-26T21:59:57Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP11350_OD105_01	339	2009-08-27T00:56:31Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HD224126_OD105_01	339	2009-08-27T01:10:49Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_01	339	2009-08-27T01:16:19Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_01	339	2009-08-27T01:21:47Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP87668_OD105_01	339	2009-08-27T01:43:16Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP89642_OD105_01	339	2009-08-27T01:50:25Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP102082_OD105_01	339	2009-08-27T02:10:19Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP117591_OD105_01	339	2009-08-27T02:20:12Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP11350_OD105_02	339	2009-08-27T02:34:32Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HD224126_OD105_02	339	2009-08-27T02:48:50Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_02	339	2009-08-27T02:54:20Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_02	339	2009-08-27T02:59:48Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP87668_OD105_02	339	2009-08-27T03:21:16Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP89642_OD105_02	339	2009-08-27T03:28:25Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP102082_OD105_02	339	2009-08-27T03:48:18Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP117591_OD105_02	339	2009-08-27T03:58:11Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP114507_OD105_03	339	2009-08-27T04:04:23Z
PVPhotFPG_261C_PS_blu_SAA-30-25_HIP116705_OD105_03	339	2009-08-27T04:09:51Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_01	10074	2009-08-27T04:28:52Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_02	10074	2009-08-27T07:14:43Z
PVPhotFPG_261B_PS_blu_SAA+25_HIP72208_OD104-5_03	10074	2009-08-27T10:00:34Z
PVPhotSetup_na_nStd_orbitepi_na_0013	13	2009-08-27T12:45:31Z

7.4.22 OD0107

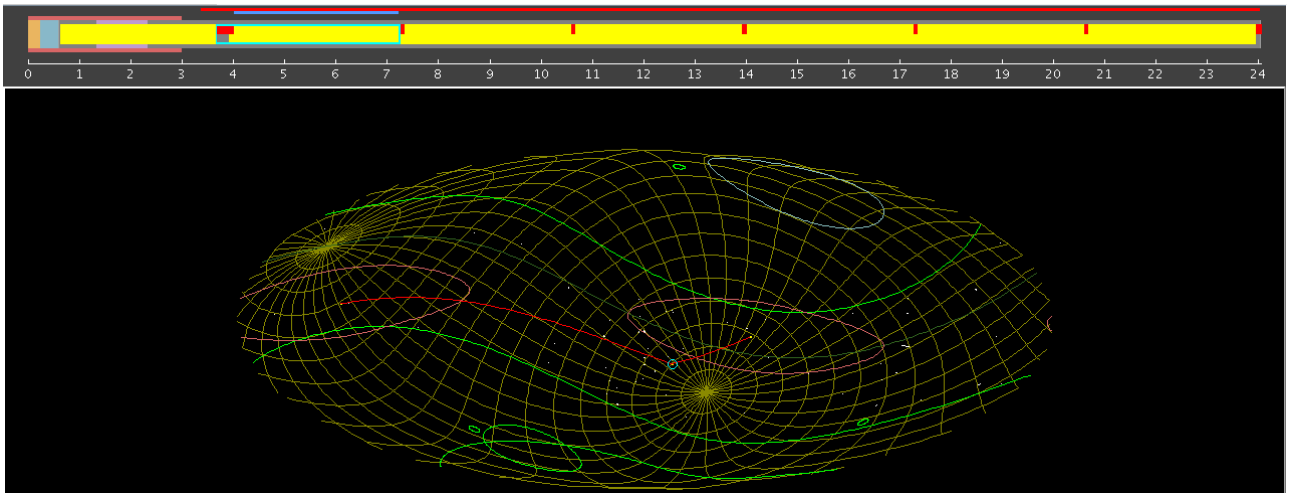


Figure 116: Timeline and distribution of pointings for OD0107 as displayed in the Mission Planning System.

Table 146: Timeline for PACS PV Phase OD0107.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0009	8542	2009-08-28T13:44:13Z
PVPhotSetup_na_nStd_orbitproVRL_OD107_0001	2339	2009-08-28T16:06:38Z
PVPhotBol_1111A_nStd_bluDdcsHighBias_DarkField_0001	11622	2009-08-28T17:08:28Z
PVPhotBol_1111A_nStd_bluDdcsLowBias_DarkField_0001	11622	2009-08-28T20:28:32Z
PVPhotBol_1111A_nStd_bluDdcsNomi_DarkField_0001	11622	2009-08-28T23:48:36Z
PVPhotBol_1111A_nStd_grnDdcsHighBias_DarkField_0001	11622	2009-08-29T03:08:40Z
PVPhotBol_1111A_nStd_grnDdcsLowBias_DarkField_0001	11622	2009-08-29T06:28:44Z
PVPhotBol_1111A_nStd_grnDdcsNomi_DarkField_0001	11622	2009-08-29T09:48:48Z
PVPhotSetup_na_nStd_orbitepiCSon_OD107_0001	13	2009-08-29T13:02:33Z

7.4.23 OD0108

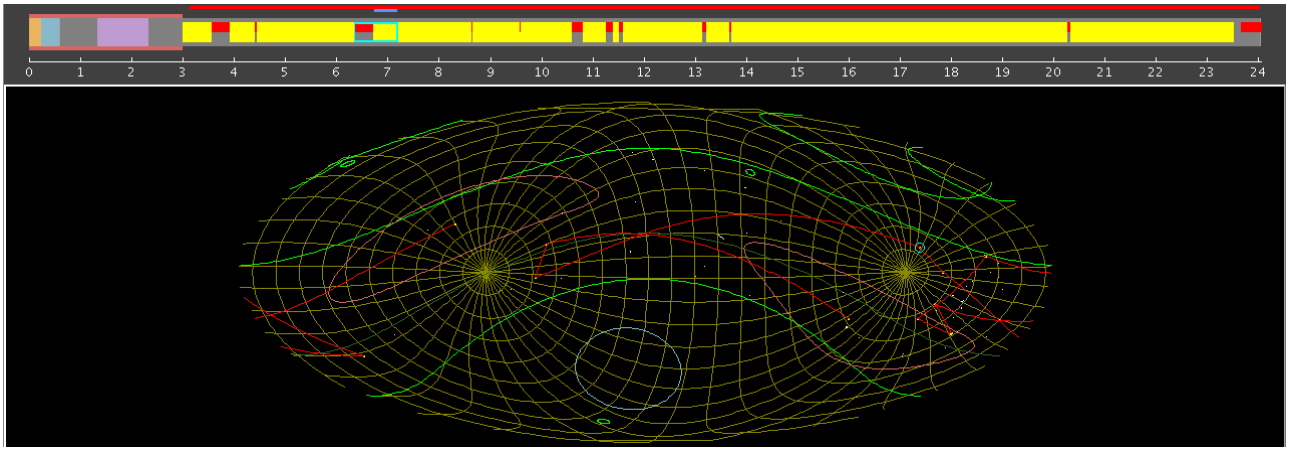


Figure 117: Timeline and distribution of pointings for OD0108 as displayed in the Mission Planning System.

Table 147: Timeline for PACS PV Phase OD0108.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitpro40Hz_OD108_0001	1998	2009-08-29T16:10:12Z
PVPhotSpatial_314E_StdSmall_grn_HIP21479_0001	981	2009-08-29T17:05:34Z
PVPhotSpatial_314E_StdSmall_blu_HIP21479_0001	981	2009-08-29T17:19:52Z
PVPhotAOTVal_511C_StdPSndith_blu_hot_HD15008_0001	1824	2009-08-29T17:37:38Z
PVPhotAOTVal_511C_StdPSdith_grn_hot_HD15008_0001	1824	2009-08-29T18:05:59Z
PVPhotAOTVal_511C_StdPSndith_grn_hot_HD15008_0001	1824	2009-08-29T18:34:20Z
PVPhotAOTVal_511C_StdPSdith_blu_hot_HD15008_0001	1824	2009-08-29T19:02:41Z
PVPhotAOTVal_511C_StdPSdith_blu_cld_PG1100+772_0001	1824	2009-08-29T19:55:09Z
PVPhotAOTVal_511C_StdPSdith_grn_cld_PG1100+772_0001	1824	2009-08-29T20:23:30Z
PVPhotAOTVal_511C_StdPSndith_grn_cld_PG1100+772_0001	1824	2009-08-29T20:51:51Z
PVPhotAOTVal_511C_StdPSndith_blu_cld_PG1100+772_0001	1824	2009-08-29T21:20:12Z
PVPhotFlux_321C_StdPS_photcal_blu_betUMi_0001	339	2009-08-29T21:51:53Z
PVPhotFlux_321D_StdScan_135_pcal_blu_betUMi_0001	347	2009-08-29T21:55:29Z
PVPhotFlux_321A_StdRaster_pcal_grn_betUMi_0001	2884	2009-08-29T21:59:13Z
PVPhotFlux_321C_StdPS_photcal_grn_betUMi_0001	339	2009-08-29T22:45:14Z
PVPhotFlux_321A_StdRaster_pcal_blu_betUMi_0001	2884	2009-08-29T22:48:50Z
PVPhotFlux_321D_StdScan_135_pcal_grn_betUMi_0001	347	2009-08-29T23:34:51Z
PVPhotFlux_321D_StdScan_045_pcal_grn_betUMi_0001	347	2009-08-29T23:38:35Z
PVPhotFlux_321D_StdScan_045_pcal_blu_betUMi_0001	347	2009-08-29T23:42:19Z
PVPhotAOTVal_511B_StdPSndith_blu_cld_Carlova_0001	514	2009-08-30T00:00:18Z
PVPhotAOTVal_511B_StdPSndith_grn_cld_Carlova_0001	514	2009-08-30T00:06:49Z
PVPhotAOTVal_511B_StdPSdith_grn_cld_Carlova_0001	514	2009-08-30T00:13:20Z
PVPhotAOTVal_511B_StdPSdith_blu_cld_Carlova_0001	514	2009-08-30T00:19:51Z
PVPhotSpatial_312B_NStd_blu_U09618_0001	283	2009-08-30T00:35:14Z
PVPhotAOTVal_514E_StdScan_ins15_blu_M101_0001	5614	2009-08-30T00:47:08Z
PVPhotAOTVal_511B_StdPSdith_blu_hot_delDra_0001	504	2009-08-30T02:25:06Z
PVPhotAOTVal_511B_StdPSndith_blu_hot_delDra_0001	504	2009-08-30T02:31:27Z
PVPhotAOTVal_511B_StdPSdith_grn_hot_delDra_0001	504	2009-08-30T02:37:48Z

Table 147: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotAOTVal_511B_StdPSndith_grn_hot_delDra_0001	504	2009-08-30T02:44:09Z
PVPhotAOTVal_514A_StdScan_60_blu_gammaDra_0001	1299	2009-08-30T02:54:28Z
PVPhotFlux_321D_StdScan_135_pcal_grn_gamDra_0001	347	2009-08-30T03:14:04Z
PVPhotAOTVal_514A_StdScan_20_grn_gammaDra_0001	1933	2009-08-30T03:17:48Z
PVPhotAOTVal_512A_StdSmall_blu_gammaDra_0001	981	2009-08-30T03:47:58Z
PVPhotAOTVal_514A_StdScan_10_grn_gammaDra_0001	3195	2009-08-30T04:02:16Z
PVPhotAOTVal_512A_StdSmall_grn_gammaDra_0001	981	2009-08-30T04:53:28Z
PVPhotFlux_321D_StdScan_045_pcal_blu_gamDra_0001	347	2009-08-30T05:07:46Z
PVPhotAOTVal_514A_StdScan_20_blu_gammaDra_0001	1933	2009-08-30T05:11:30Z
PVPhotFlux_321D_StdScan_135_pcal_blu_gamDra_0001	347	2009-08-30T05:41:40Z
PVPhotAOTVal_514A_StdScan_10_blu_gammaDra_0001	3195	2009-08-30T05:45:24Z
PVPhotFlux_321A_StdRaster_pcal_blu_gamDra_0001	2884	2009-08-30T06:36:36Z
PVPhotAOTVal_511A_StdPSdith_blu_gammaDra_0001	339	2009-08-30T07:22:37Z
PVPhotAOTVal_511A_StdPSndith_blu_gammaDra_0001	339	2009-08-30T07:26:13Z
PVPhotFlux_321A_StdRaster_pcal_grn_gamDra_0001	2884	2009-08-30T07:29:49Z
PVPhotFlux_321C_StdPS_photcal_blu_gammaDra_0001	339	2009-08-30T08:15:50Z
PVPhotAOTVal_511A_StdPSndith_grn_gammaDra_0001	339	2009-08-30T08:19:26Z
PVPhotFlux_321C_StdPS_photcal_grn_gammaDra_0001	339	2009-08-30T08:23:02Z
PVPhotAOTVal_511A_StdPSdith_grn_gammaDra_0001	339	2009-08-30T08:26:38Z
PVPhotFlux_321D_StdScan_045_pcal_grn_gamDra_0001	347	2009-08-30T08:30:14Z
PVPhotAOTVal_514A_StdScan_60_grn_gammaDra_0001	1299	2009-08-30T08:33:58Z
PVPhotSetup_na_nStd_orbitepiCSon_OD108_0001	13	2009-08-30T08:52:40Z
PVPhotSetup_na_nStd_orbitpro_Red00_na_0003	1933	2009-08-30T08:52:56Z
PVPhotBol_na_nStd_FOV_Red00_DarkField_0002	1350	2009-08-30T09:29:56Z
PVPhotSetup_na_nStd_orbitepiCSon_red00_0003	13	2009-08-30T09:52:29Z
PVPhotSetup_na_nStd_orbitpro_Red01_na_0003	1950	2009-08-30T09:52:45Z
PVPhotBol_na_nStd_FOV_Red01_DarkField_0002	1350	2009-08-30T10:25:45Z
PVPhotSetup_na_nStd_orbitepiCSon_red01_0003	13	2009-08-30T10:48:18Z
PVPhotSetup_na_nStd_orbitpro_Red10_na_0003	1950	2009-08-30T10:48:34Z
PVPhotBol_na_nStd_FOV_Red10_DarkField_0002	1350	2009-08-30T11:21:34Z
PVPhotSetup_na_nStd_orbitepiCSon_red10_0003	13	2009-08-30T11:44:07Z
PVPhotSetup_na_nStd_orbitpro_Red11_na_0003	1967	2009-08-30T11:44:23Z
PVPhotBol_na_nStd_FOV_Red11_DarkField_0002	1350	2009-08-30T12:17:40Z
PVPhotSetup_na_nStd_orbitepiCSon_red11_0002	13	2009-08-30T12:40:13Z

7.4.24 OD0109

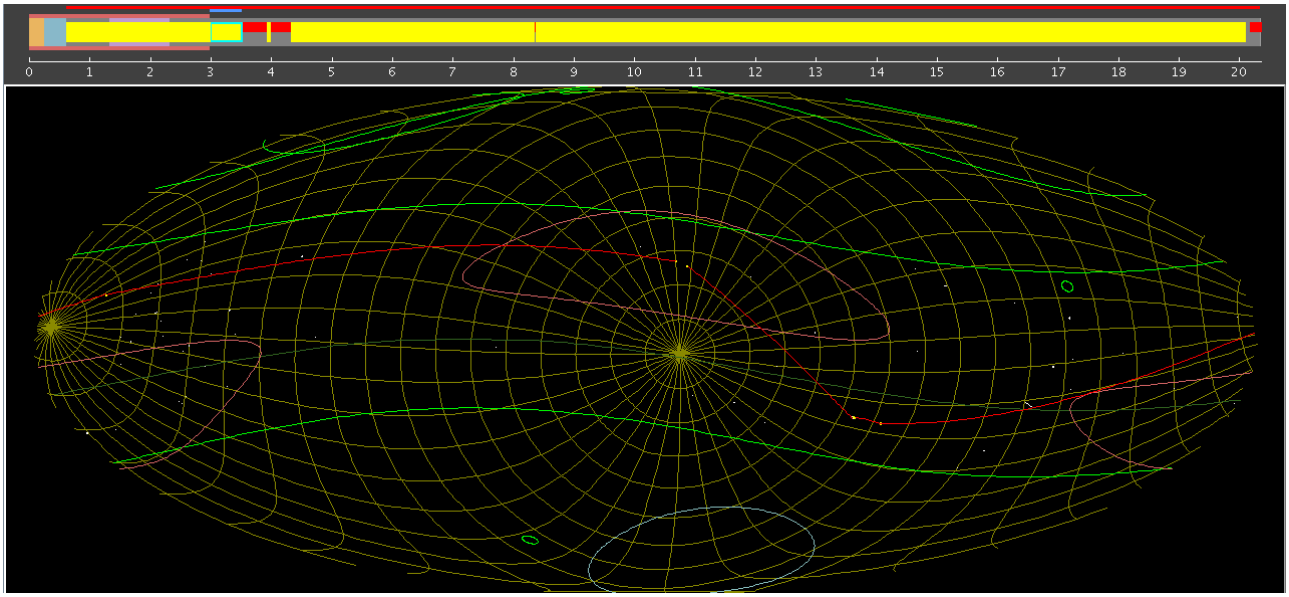


Figure 118: Timeline and distribution of pointings for OD0109 as displayed in the Mission Planning System.

Table 148: Timeline for PACS PV Phase OD0109.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0010	8542	2009-08-30T13:50:13Z
PVPhotSetup_na_nStd_orbitproWait_OD109_0001	1963	2009-08-30T16:12:38Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0001	339	2009-08-30T17:09:50Z
PVPhotAOTVal_514G_StdScanLO_noise_grn_GOODS-S_0001	3591	2009-08-30T17:33:19Z
PVPhotAOTVal_514G_StdScanLO_noise_grn_GOODS-S_0002	3591	2009-08-30T18:31:07Z
PVPhotAOTVal_514G_StdScanSO_noise_grn_GOODS-S_0001	3893	2009-08-30T19:28:55Z
PVPhotAOTVal_514G_StdScanSO_noise_grn_GOODS-S_0002	3893	2009-08-30T20:31:45Z
PVPhotAOTVal_514C_StdScan_60-ins135_blu_N1365_0001	10662	2009-08-30T21:37:09Z
PVPhotAOTVal_514C_StdScan_60-ins45_blu_N1365_0001	10662	2009-08-31T00:32:48Z
PVPhotAOTVal_514C_StdScan_60-ins135_grn_N1365_0001	10662	2009-08-31T03:28:31Z
PVPhotAOTVal_514C_StdScan_60-ins45_grn_N1365_0001	10662	2009-08-31T06:24:10Z
PVPhotSetup_na_nStd_orbitepiCSon_OD109_0001	13	2009-08-31T09:18:55Z

7.4.25 OD0110

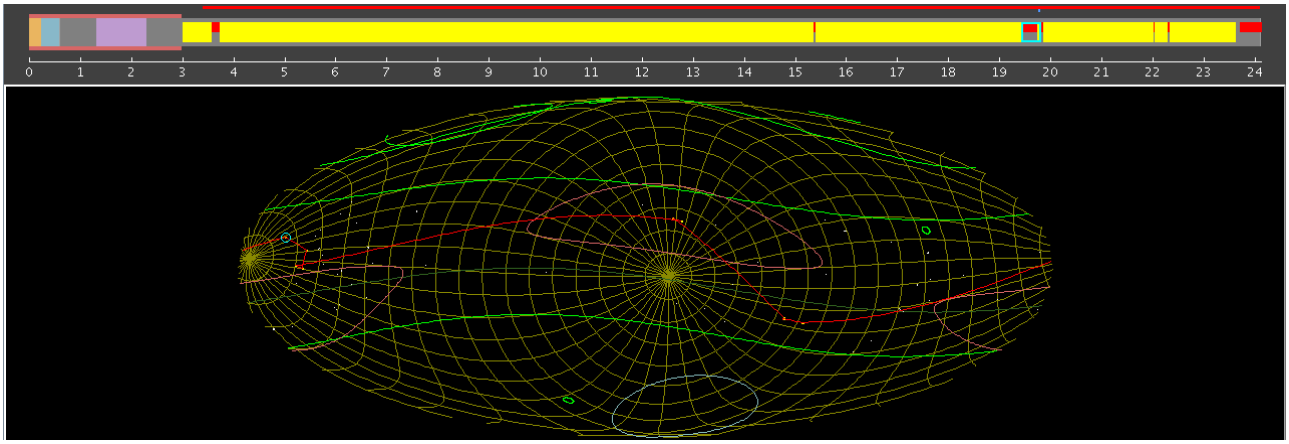


Figure 119: Timeline and distribution of pointings for OD0110 as displayed in the Mission Planning System.

Table 149: Timeline for PACS PV Phase OD0110.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproVRL_OD110_0001	2039	2009-08-31T12:34:37Z
PVPhotAOTVal_514C_StdScan_hom-ins135_blu_N1365_01	8373	2009-08-31T13:19:59Z
PVPhotAOTVal_514C_StdScan_hom-ins45_blu_N1365_01	8373	2009-08-31T15:37:29Z
PVPhotAOTVal_514C_StdScan_hom-ins135_grn_N1365_01	8373	2009-08-31T17:54:59Z
PVPhotAOTVal_514C_StdScan_hom-ins45_grn_N1365_01	8373	2009-08-31T20:12:29Z
PVPhotAOTVal_514D_StdScan_hom-ins45_blu_N1365_01	4537	2009-08-31T22:29:59Z
PVPhotAOTVal_514D_StdScan_hom-ins135_blu_N1365_01	4537	2009-08-31T23:43:33Z
PVPhotAOTVal_514G_StdScanLP_noise_grn_GOODS-S_0001	3591	2009-09-01T00:59:41Z
PVPhotAOTVal_514G_StdScanLP_noise_grn_GOODS-S_0002	3591	2009-09-01T01:57:29Z
PVPhotAOTVal_514G_StdScanSP_noise_grn_GOODS-S_0001	3893	2009-09-01T02:55:17Z
PVPhotAOTVal_514G_StdScanSP_noise_grn_GOODS-S_0002	3893	2009-09-01T03:58:07Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0002	339	2009-09-01T05:20:49Z
PVPhotAOTVal_514H_StdScan_smallPA315_grn_A2218_0001	3987	2009-09-01T05:27:24Z
PVPhotAOTVal_514H_StdScan_smallPA45_grn_A2218_0001	3987	2009-09-01T06:31:48Z
PVPhotAOTVal_512B_StdSmall_blu_NGC6543_0001	981	2009-09-01T07:38:40Z
PVPhotSpatial_317B_nStdFOV_CSnom_DarkField_0001	1850	2009-09-01T07:54:33Z
PVSpecSetup_na_nStd_setCSs70_na_0001	904	2009-09-01T08:25:26Z
PVPhotSpatial_317C_nStdFOV_CShigh_DarkField_0001	1850	2009-09-01T08:40:59Z
PVPhotSetup_na_nStd_orbitepi_OD110_0001	13	2009-09-01T09:11:52Z

7.4.26 OD0111

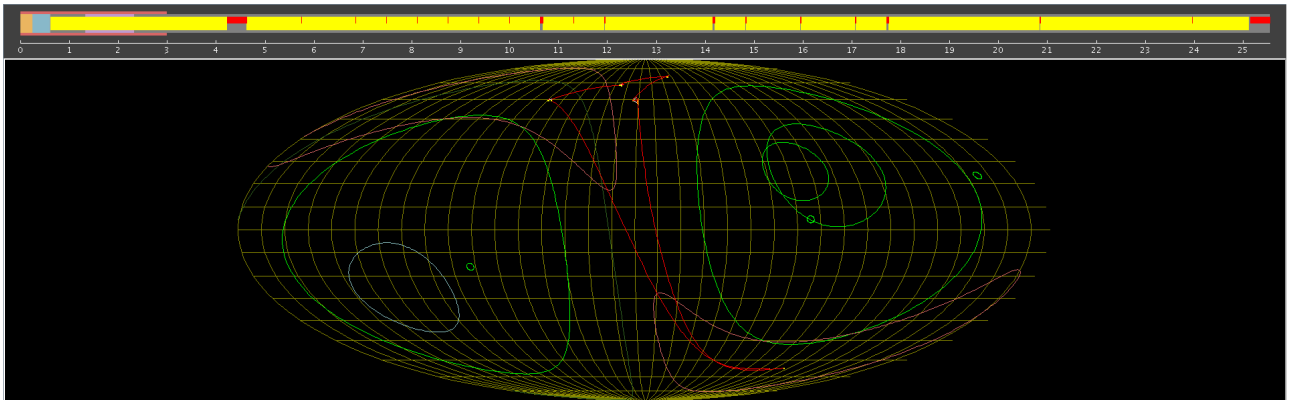


Figure 120: Timeline and distribution of pointings for OD0111 as displayed in the Mission Planning System.

Table 150: Timeline for SPIRE/PACS parallel mode PV Phase OD0111.

Calibration AOR	duration (s)	absolute start time
PVParAOTVal-Cooler_na_nStd_na_na_0001	10352	2009-09-01T10:19:08Z
SpireEngREDYtoPHOT_STBYGen-PtcOff	382	2009-09-01T13:11:43Z
PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0001	2263	2009-09-01T13:18:08Z
PVParAOTVal_515B_StdPar_blu_slow_NGC6946_0001_30x30_nom	4092	2009-09-01T14:21:17Z
PVParAOTVal_515B_StdPar_blu_slow_ortho_NGC6946_0002_30x30	4092	2009-09-01T15:27:38Z
PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0001	2336	2009-09-01T16:34:40Z
PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0001	2336	2009-09-01T17:12:26Z
PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0002	2336	2009-09-01T17:50:13Z
PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0002	2336	2009-09-01T18:27:59Z
PVParAOTVal_515B_StdPar_blu_fast_NGC6946_0001_30x30_nom_0003	2336	2009-09-01T19:05:46Z
PVParAOTVal_515B_StdPar_blu_fast_ortho_NGC6946_0002_30x30_0003	2336	2009-09-01T19:43:32Z
PVParAOTVal_SPParallel-30x30_nom_fast_darksky	2336	2009-09-01T20:24:27Z
PVParAOTVal_SPParallel-30x30_ortho_fast_darksky	2336	2009-09-01T21:02:13Z
PVParAOTVal_SPParallel-30x30_ortho_slow_darksky	4092	2009-09-01T21:40:06Z
PVParAOTVal_SPParallel-30x30_nom_slow_darksky	4092	2009-09-01T22:46:27Z
PVParAOTVal_515A_StdPar_grn_fast_betaUMi_0002_30x30_nom	2336	2009-09-01T23:55:46Z
PVParAOTVal_515A_StdPar_grn_slow_betaUMi_0004_30x30_nom	4092	2009-09-02T00:33:39Z
PVParAOTVal_515A_StdPar_blu_slow_betaUMi_0003_30x30_nom	4092	2009-09-02T01:40:46Z
PVParAOTVal_515A_StdPar_blu_fast_betaUMi_0001_30x30_nom	2336	2009-09-02T02:47:55Z
PVParAOTVal_515D_StdPar_blu_fast_ortho_Draco_0002_120x120	11209	2009-09-02T03:28:48Z
PVParAOTVal_515D_StdPar_blu_fast_Draco_0001_120x120_nom	11209	2009-09-02T06:35:11Z
PVParAOTVal_515D_StdPar_blu_slo_Draco_01_30x30_nom	4092	2009-09-02T09:41:06Z
PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0001	164	2009-09-02T10:46:21Z

7.4.27 OD0112

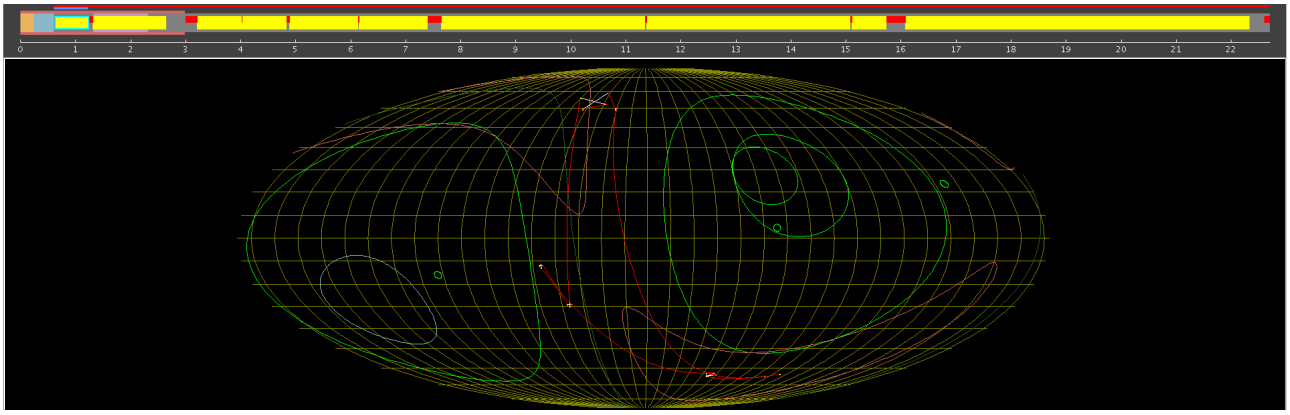


Figure 121: Timeline and distribution of pointings for OD0112 as displayed in the Mission Planning System.

Table 151: Timeline for SPIRE/PACS parallel mode PV Phase OD0112.

Calibration AOR	duration (s)	absolute start time
PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0002	2263	2009-09-02T11:52:02Z
PVPar_SPParallel-StripField_120x40_orth-fast-bright	4924	2009-09-02T12:34:34Z
PVParAOTVal_515G_StdPar_blu_fast_GP_40Hz_40x40_nom	3010	2009-09-02T14:28:33Z
PVParAOTVal_515G_StdPar_blu_fast_GP_40Hz_ort_40x40	3010	2009-09-02T15:17:37Z
PVParAOTVal_515C_StdPar_blu_fast_ortho_G_0002_60x60	4598	2009-09-02T16:09:48Z
PVParAOTVal_515C_StdPar_blu_fast_GP_0001_60x60_nom	4598	2009-09-02T17:25:28Z
PVParAOTVal_515H_StdPar_blu_fast_LongScanVal_ortho_600x30	13422	2009-09-02T18:54:45Z
PVParAOTVal_515H_StdPar_blu_fast_LongScanVal_600x30_nom	13422	2009-09-02T22:38:49Z
PVParAOTVal_515D_StdPar_blu_fast_Draco_01_30x30_nom	2336	2009-09-03T02:23:17Z
PVPar_SPPara-Nom-GP-299_0_120x120_fast	11209	2009-09-03T03:21:11Z
PVPar_SPPara-Orth-GP-299_0_120x120_fast	11209	2009-09-03T06:26:05Z
SpireEngPHOT_STBYtoREDYGen-0000	130	2009-09-03T09:29:57Z
PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0002	164	2009-09-03T09:32:10Z

7.4.28 OD0114

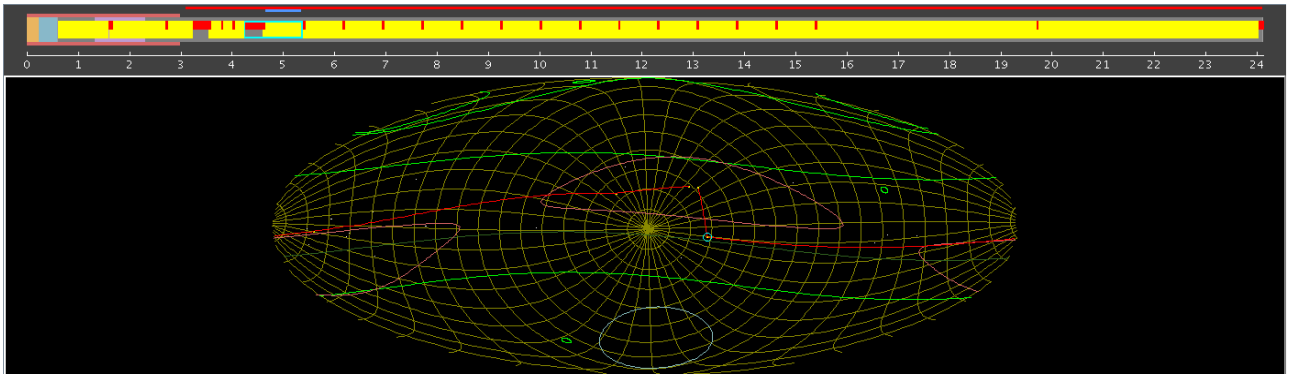


Figure 122: Timeline and distribution of pointings for OD0114 as displayed in the Mission Planning System.

Table 152: Timeline for PACS PV Phase OD0114. OD0114 failed successful execution! No science TM received!

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0004	367	2009-09-04T10:41:50Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0004	3109	2009-09-04T10:48:00Z
PVSpecAotVal_524A_NstdSEDChop_03A_NGC5315_0001	3521	2009-09-04T11:46:53Z
PVSpecAotVal_524A_NstdSEDChop_03B_NGC5315_0001	1673	2009-09-04T12:50:48Z
PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0001	624	2009-09-04T13:40:34Z
PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0001	622	2009-09-04T13:54:24Z
PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0001	620	2009-09-04T14:08:15Z
PVSpecSpatial_412B_nStd_11x11RCp_p3_w55_HIP21479_01	2567	2009-09-04T14:45:04Z
PVSpecSpatial_412B_nStd_11x11RCp_p15_w55_HIP21479_01	2567	2009-09-04T15:31:11Z
PVSpecSpatial_412B_nStd_11x11RCp_p05_w55_HIP21479_01	2567	2009-09-04T16:17:18Z
PVSpecSpatial_412B_nStd_11x11RCp_00_w55_HIP21479_01	2567	2009-09-04T17:03:25Z
PVSpecSpatial_412B_nStd_11x11RCp_m05_w55_HIP21479_01	2567	2009-09-04T17:49:32Z
PVSpecSpatial_412B_nStd_11x11RCp_m15_w55_HIP21479_01	2567	2009-09-04T18:35:39Z
PVSpecSpatial_412B_nStd_11x11RCp_m3_w55_HIP21479_01	2567	2009-09-04T19:21:46Z
PVSpecSpatial_412B_nStd_11x11RCp_m3_w90_HIP21479_01	2566	2009-09-04T20:07:55Z
PVSpecSpatial_412B_nStd_11x11RCp_m15_w90_HIP21479_01	2566	2009-09-04T20:54:03Z
PVSpecSpatial_412B_nStd_11x11RCp_m05_w90_HIP21479_01	2566	2009-09-04T21:40:11Z
PVSpecSpatial_412B_nStd_11x11RCp_00_w90_HIP21479_01	2566	2009-09-04T22:26:19Z
PVSpecSpatial_412B_nStd_11x11RCp_p05_w90_HIP2147901	2566	2009-09-04T23:12:27Z
PVSpecSpatial_412B_nStd_11x11RCp_p15_w90_HIP21479_01	2566	2009-09-04T23:58:35Z
PVSpecSpatial_412B_nStd_11x11RCp_p3_w90_HIP21479_01	2566	2009-09-05T00:44:43Z
PVSpecSpatial_412A_nStd_27x27RCp_p3_w77_HIP21479_01	15336	2009-09-05T01:30:50Z
PVSpecSpatial_412A_nStd_27x27RCp_p15_w77_HIP21479_01	15336	2009-09-05T05:49:47Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0004	13	2009-09-05T10:05:26Z

7.4.29 OD0115

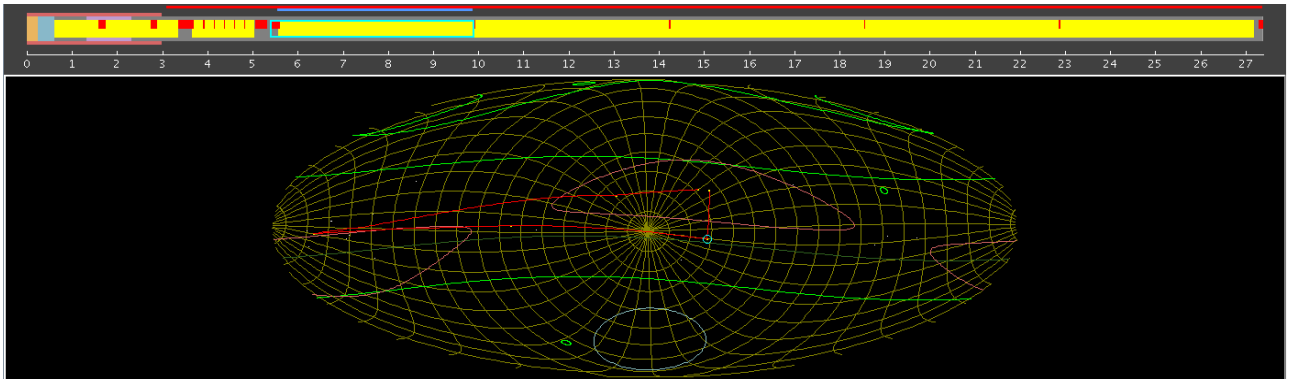


Figure 123: Timeline and distribution of pointings for OD0115 as displayed in the Mission Planning System.

Table 153: Timeline for PACS PV Phase OD0115.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0004	367	2009-09-05T10:49:22Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0004	3109	2009-09-05T10:55:32Z
PVSpecAotVal_524A_NstdSEDChop_04A_NGC5315_0001	3521	2009-09-05T11:57:10Z
PVSpecAotVal_524A_NstdSEDChop_04B_NGC5315_0001	1673	2009-09-05T13:05:37Z
PVSpecAotVal_521A_NstdRespCS_B1_60_NGC6543_0001	624	2009-09-05T13:55:24Z
PVSpecAotVal_521A_NstdRespCS_B1_75_NGC6543_0001	622	2009-09-05T14:09:02Z
PVSpecAotVal_521A_NstdRespCS_B1_180_NGC6543_0001	620	2009-09-05T14:22:36Z
PVSpecAotVal_521A_NstdRespCS_B2_180_NGC6543_0001	620	2009-09-05T14:36:20Z
PVSpecAotVal_521A_NstdRespCS_B2_75_NGC6543_0001	622	2009-09-05T14:50:02Z
PVSpecAotVal_521A_NstdRespCS_B2_60_NGC6543_0001	624	2009-09-05T15:03:48Z
Slew	1189	2009-09-05T15:30:54Z
PVSpecSpatial_412A_nStd_27x27RCp_p05_w77_HIP21479_01	15336	2009-09-05T15:50:43Z
PVSpecSpatial_412A_nStd_27x27RCp_00_w77_HIP21479_01	15336	2009-09-05T20:09:40Z
PVSpecSpatial_412A_nStd_27x27RCp_m05_w77_HIP21479_01	15336	2009-09-06T00:28:37Z
PVSpecSpatial_412A_nStd_27x27RCp_m15_w77_HIP21479_01	15336	2009-09-06T04:47:34Z
PVSpecSpatial_412A_nStd_27x27RCp_m3_w77_HIP21479_01	15336	2009-09-06T09:06:31Z
PVSpecSetup_na_nStd_orbitepi_na_0006	13	2009-09-06T13:22:10Z

7.4.30 OD0118

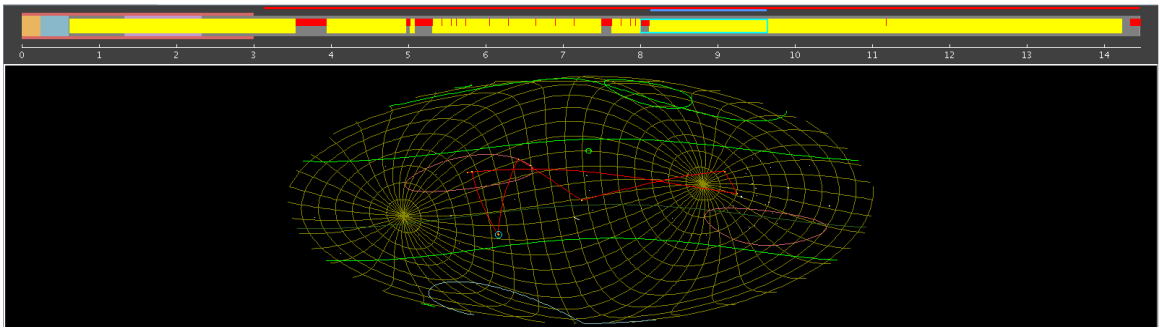


Figure 124: Timeline and distribution of pointings for OD0118 as displayed in the Mission Planning System.

Table 154: Timeline for PACS PV Phase OD0118.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0011	8542	2009-09-08T23:53:36Z
PVPhotSetup_na_nStd_orbitproWaitCSoff_OD118_0001	1963	2009-09-09T02:16:01Z
PVPhotBol_317A_nStd_FOV_CSoff_DarkField_0001	1354	2009-09-09T03:13:17Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0004	13	2009-09-09T03:35:54Z
PVPhotSetup_na_nStd_orbitpro40HzCSon_OD118_0001	2298	2009-09-09T03:36:10Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0003	339	2009-09-09T04:18:42Z
PVPhotFlux_321C_StdPS_photcal_blu_alfTau_0001	339	2009-09-09T04:35:51Z
PVPhotFlux_321C_StdPS_photcal_grn_alfTau_0001	339	2009-09-09T04:39:27Z
PVPhotFlux_321D_StdScan_045_pcal_blu_alfTau_0001	347	2009-09-09T04:43:03Z
PVPhotFlux_321D_StdScan_135_pcal_blu_alfTau_0001	347	2009-09-09T04:46:47Z
PVPhotFlux_321D_StdScan_045_pcal_grn_alfTau_0001	347	2009-09-09T04:50:31Z
PVPhotFlux_321D_StdScan_135_pcal_grn_alfTau_0001	347	2009-09-09T04:54:15Z
PVPhotSpatial_314B_StdPSdith_blu_AlfTau_0001	339	2009-09-09T04:57:59Z
PVPhotSpatial_314B_StdPSdith_grn_AlfTau_0001	339	2009-09-09T05:01:35Z
PVPhotSpatial_314D_StdScan_blumed_AlfTau_0001	1033	2009-09-09T05:05:11Z
PVPhotSpatial_314D_StdScan_bluhigh_AlfTau_0001	999	2009-09-09T05:20:21Z
PVPhotSpatial_314D_StdScan_blulow_AlfTau_0001	1395	2009-09-09T05:34:57Z
PVPhotSpatial_314D_StdScan_grnmed_AlfTau_0001	1033	2009-09-09T05:56:09Z
PVPhotSpatial_314D_StdScan_grnhigh_AlfTau_0001	999	2009-09-09T06:11:19Z
PVPhotSpatial_314D_StdScan_grnlow_AlfTau_0001	1395	2009-09-09T06:25:55Z
PVPhotFlux_321C_StdPS_photcal_blu_alfCMa_0001	339	2009-09-09T06:54:51Z
PVPhotFlux_321C_StdPS_photcal_grn_alfCMa_0001	339	2009-09-09T06:58:27Z
PVPhotFlux_321D_StdScan_045_pcal_blu_alfCMa_0001	347	2009-09-09T07:02:03Z
PVPhotFlux_321D_StdScan_045_pcal_grn_alfCMa_0001	347	2009-09-09T07:05:47Z
PVPhotFlux_321D_StdScan_135_pcal_blu_alfCMa_0001	347	2009-09-09T07:09:31Z
PVPhotFlux_321D_StdScan_135_pcal_grn_alfCMa_0001	347	2009-09-09T07:13:15Z
PVPhotAOTVal_514D_StdScan_28-ins45_blu_N1365_01	5614	2009-09-09T07:24:46Z
PVPhotAOTVal_514D_StdScan_28-ins135_blu_N1365_01	5614	2009-09-09T08:56:17Z
PVPhotAOTVal_514D_StdScan_28-ins45_grn_N1365_01	5614	2009-09-09T10:27:48Z
PVPhotAOTVal_514D_StdScan_28-ins135_grn_N1365_01	5614	2009-09-09T11:59:19Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0005	13	2009-09-09T13:29:56Z

7.4.31 OD0119

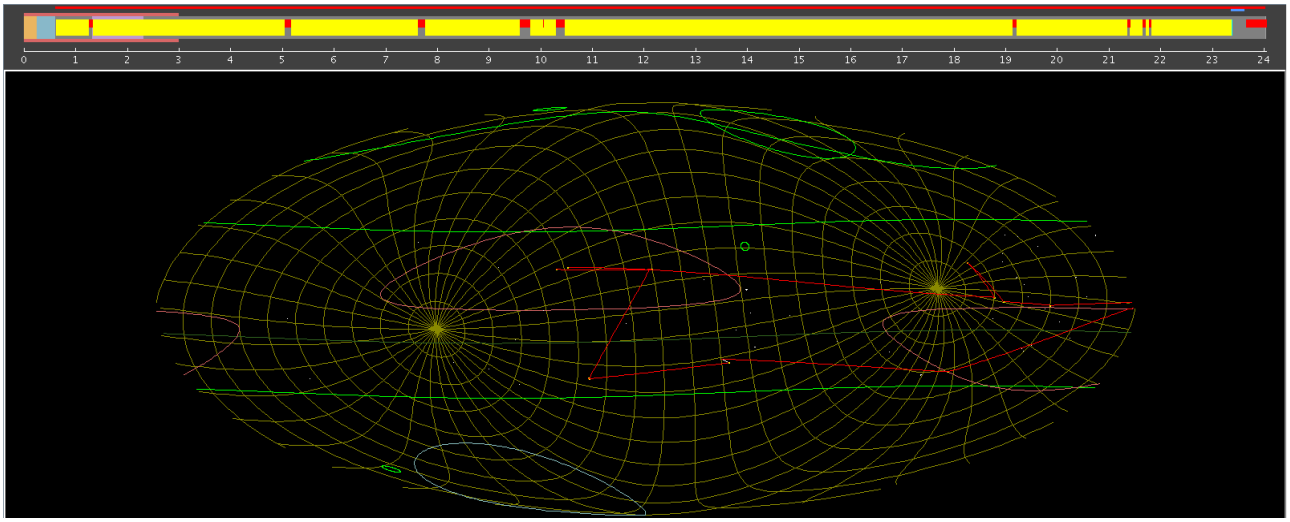


Figure 125: Timeline and distribution of pointings for OD0119 as displayed in the Mission Planning System.

Table 155: Timeline for PACS PV Phase OD0119.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproWaitCSon_OD119_0001	2263	2009-09-09T14:21:29Z
PVPhotSpatial_315B_StdScan_blu_RedRect_0001	13425	2009-09-09T15:06:23Z
PVPhotAOTVal_514D_StdScan_hom-ins45_grn_N1365_01	4537	2009-09-09T18:55:41Z
PVPhotAOTVal_514D_StdScan_hom-ins135_grn_N1365_01	4537	2009-09-09T20:09:15Z
PVPhotSpatial_316A_StdScan_blu_IKTau_0001	6661	2009-09-09T21:31:26Z
PVPhotSpatial_314E_StdSmall_blu_I22134_0001	981	2009-09-09T23:33:39Z
PVPhotSpatial_314E_StdSmall_grn_I22134_0001	981	2009-09-09T23:47:57Z
PVPhotSpatial_313A_StdScan_bluPA0_AlfHer_0001	5167	2009-09-10T00:13:32Z
PVPhotSpatial_313B_Nstd_bluraster_AlfHer_0001	23447	2009-09-10T01:38:04Z
PVPhotSpatial_313A_StdScan_bluPA90_AlfHer_0001	2707	2009-09-10T08:09:48Z
PVPhotSpatial_313A_StdScan_bluPA90_V814Her_0001	2707	2009-09-10T08:59:12Z
PVPhotSpatial_313A_StdScan_bluPA0_V814Her_0001	5167	2009-09-10T09:42:16Z
PVPhotAOTVal_512B_StdSmall_grn_NGC6543_0001	981	2009-09-10T11:09:58Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0004	339	2009-09-10T11:27:56Z
PVPhotSpatial_317B_nStdFOV_CSnom_DarkField_0002	1850	2009-09-10T11:34:49Z
PVPhotSetup_na_nStd_setCSs70_na_0001	1804	2009-09-10T12:05:42Z
PVPhotSpatial_317C_nStdFOV_CShigh_DarkField_0002	1850	2009-09-10T12:36:17Z
PVPhotSetup_na_nStd_orbitepi_na_0015	13	2009-09-10T13:07:10Z

7.4.32 OD0120

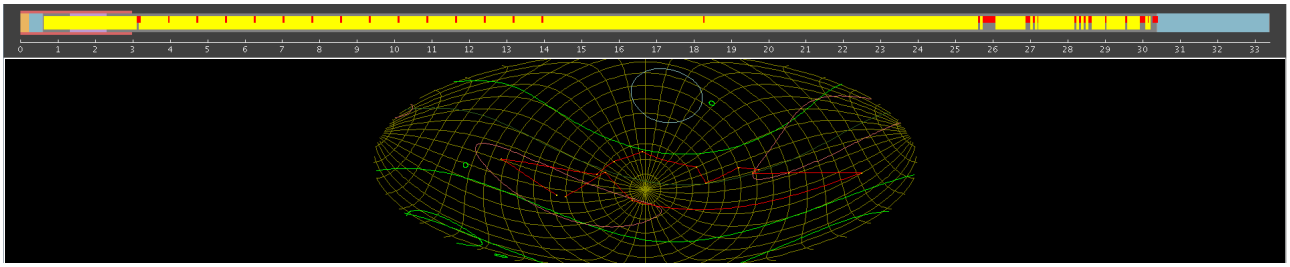


Figure 126: Timeline and distribution of pointings for OD0120 as displayed in the Mission Planning System.

Table 156: Timeline for PACS PV Phase OD0120.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0005	367	2009-09-10T14:24:19Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0005	8609	2009-09-10T14:30:29Z
PVSpecSpatial_412B_nStd_11x11RCp_p3_w55_HIP21479_2	2567	2009-09-10T17:00:38Z
PVSpecSpatial_412B_nStd_11x11RCp_p15_w55_HIP21479_2	2567	2009-09-10T17:46:45Z
PVSpecSpatial_412B_nStd_11x11RCp_p05_w55_HIP21479_2	2567	2009-09-10T18:32:52Z
PVSpecSpatial_412B_nStd_11x11RCp_00_w55_HIP21479_2	2567	2009-09-10T19:18:59Z
PVSpecSpatial_412B_nStd_11x11RCp_m05_w55_HIP21479_2	2567	2009-09-10T20:05:06Z
PVSpecSpatial_412B_nStd_11x11RCp_m15_w55_HIP21479_2	2567	2009-09-10T20:51:13Z
PVSpecSpatial_412B_nStd_11x11RCp_m3_w55_HIP21479_2	2567	2009-09-10T21:37:20Z
PVSpecSpatial_412B_nStd_11x11RCp_m3_w90_HIP21479_2	2566	2009-09-10T22:23:29Z
PVSpecSpatial_412B_nStd_11x11RCp_m15_w90_HIP21479_2	2566	2009-09-10T23:09:37Z
PVSpecSpatial_412B_nStd_11x11RCp_m05_w90_HIP21479_2	2566	2009-09-10T23:55:45Z
PVSpecSpatial_412B_nStd_11x11RCp_00_w90_HIP21479_2	2566	2009-09-11T00:41:53Z
PVSpecSpatial_412B_nStd_11x11RCp_p05_w90_HIP21479_2	2566	2009-09-11T01:28:01Z
PVSpecSpatial_412B_nStd_11x11RCp_p15_w90_HIP21479_2	2566	2009-09-11T02:14:09Z
PVSpecSpatial_412B_nStd_11x11RCp_p3_w90_HIP21479_2	2566	2009-09-11T03:00:17Z
PVSpecSpatial_412A_nStd_27x27RCp_p3_w77_HIP21479_2	15336	2009-09-11T03:46:24Z
PVSpecSpatial_412A_nStd_27x27RCp_p15_w77_HIP21479_2	15336	2009-09-11T08:05:21Z
PVSpecSetup_na_nStd_orbitepi_na_0007	13	2009-09-11T12:21:00Z
PVPhotCooler_117_nStd_na_na_0012	8542	2009-09-11T12:21:16Z
PVPhotSetup_na_nStd_orbitproVRL_na_0001	2339	2009-09-11T14:43:41Z
AOTVAL_bdent_2-J0843.3-7905_continuum	339	2009-09-11T15:28:21Z
AOTVAL_kmeisenh_2-PacsVzQSO - SDSSJ1602+4228	2979	2009-09-11T15:52:46Z
AOTVAL_bdent_2-HD_158352_continuum	339	2009-09-11T16:48:11Z
AOTVAL_bdent_2-HD_163296_continuum	339	2009-09-11T16:56:22Z
AOTVAL_thmuelle_2-PPhoto-s100_Pluto	1834	2009-09-11T17:01:46Z
AOTVAL_thmuelle_2-PPhoto-s70_Pluto	1834	2009-09-11T17:30:17Z
AOTVAL_bdent_2-HD_169142_continuum	339	2009-09-11T18:02:08Z
AOTVAL_bdent_2-HD_164249_continuum	339	2009-09-11T18:10:13Z
AOTVAL_bdent_2-HD_181327_continuum	339	2009-09-11T18:16:52Z
AOTVAL_bmatthew_2-DEBRIS - PF005 (HD 1581)	1329	2009-09-11T18:27:22Z
AOTVAL_ceiroa_2-PACS100/160 - HIP015371	1824	2009-09-11T18:51:39Z
AOTVAL_bmatthew_2-DEBRIS - PF012 (HD 33262)	1329	2009-09-11T19:23:19Z

Table 156: continued.

Calibration AOR	duration (s)	absolute start time
AOTVAL_smadde01_2-iizw40-PACSphoto110	339	2009-09-11T19:53:19Z
AOTVAL_smadde01_2-iizw40-PACSphoto75	339	2009-09-11T19:56:55Z
PVPhotSetup_na_nStd_orbitepi_na_0016	13	2009-09-11T19:59:37Z

7.4.33 OD0124

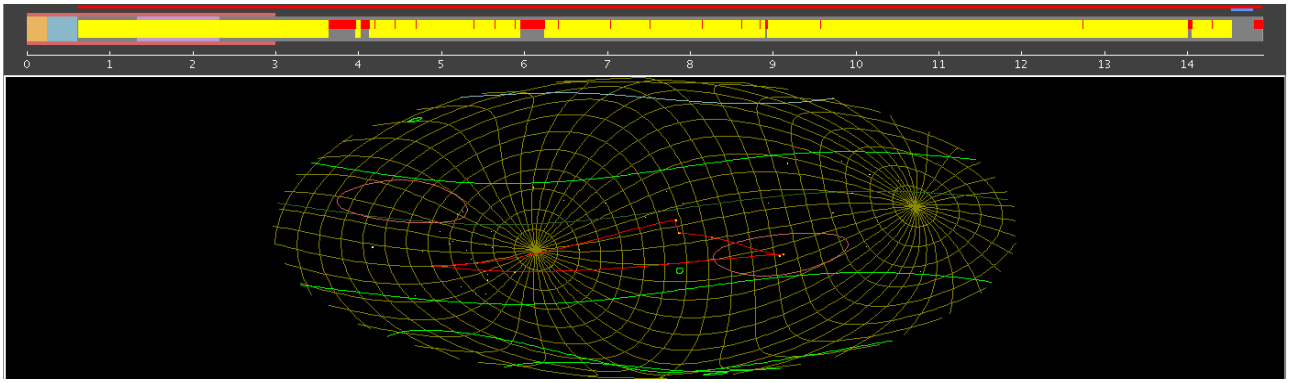


Figure 127: Timeline and distribution of pointings for OD0124 as displayed in the Mission Planning System.

Table 157: Timeline for PACS PV Phase OD0124.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0013	8542	2009-09-14T23:42:21Z
PVPhotSetup_na_nStd_orbitproVRL_na_0002	2339	2009-09-15T02:04:46Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0005	339	2009-09-15T03:03:55Z
PVPhotSpatial_314B_StdPSdith_blu_3C345_0001	339	2009-09-15T03:14:04Z
PVPhotSpatial_314D_StdScan_bluhigh_3C345_0001	999	2009-09-15T03:17:40Z
PVPhotSpatial_314D_StdScan_blumed_3C345_0001	1033	2009-09-15T03:32:16Z
PVPhotSpatial_314D_StdScan_blulow_3C345_0001	1395	2009-09-15T03:47:26Z
PVPhotSpatial_314D_StdScan_grnlow_3C345_0001	1395	2009-09-15T04:08:38Z
PVPhotSpatial_314D_StdScan_grnmed_3C345_0001	1033	2009-09-15T04:29:50Z
PVPhotSpatial_314D_StdScan_grnhigh_3C345_0001	999	2009-09-15T04:45:00Z
PVPhotSpatial_314B_StdPSdith_grn_3C345_0001	339	2009-09-15T04:59:36Z
PVPhotSpatial_314A_NStd_bluM1_Fortuna_0001	512	2009-09-15T05:20:54Z
PVPhotSpatial_314A_NStd_bluM2_Fortuna_0001	512	2009-09-15T05:30:23Z
PVPhotSpatial_314A_NStd_bluM3_Fortuna_0001	512	2009-09-15T05:39:52Z
PVPhotSpatial_314A_NStd_bluM4_Fortuna_0001	512	2009-09-15T05:49:21Z
PVPhotSpatial_314A_NStd_bluM5_Fortuna_0001	512	2009-09-15T05:58:50Z
PVPhotSpatial_314A_NStd_bluM6_Fortuna_0001	512	2009-09-15T06:08:19Z
PVPhotSpatial_314A_NStd_bluM7_Fortuna_0001	512	2009-09-15T06:17:48Z
PVPhotSpatial_314A_NStd_bluM8_Fortuna_0001	512	2009-09-15T06:27:17Z
PVPhotSpatial_314A_NStd_grnM1_Fortuna_0001	512	2009-09-15T06:36:46Z
PVPhotSpatial_314A_NStd_grnM2_Fortuna_0001	512	2009-09-15T06:46:15Z
PVPhotSpatial_314A_NStd_grnM3_Fortuna_0001	512	2009-09-15T06:55:44Z
PVPhotSpatial_314A_NStd_grnM4_Fortuna_0001	512	2009-09-15T07:05:13Z
PVPhotSpatial_314A_NStd_grnM5_Fortuna_0001	512	2009-09-15T07:14:42Z
PVPhotSpatial_314A_NStd_grnM6_Fortuna_0001	512	2009-09-15T07:24:11Z
PVPhotSpatial_314A_NStd_grnM7_Fortuna_0001	512	2009-09-15T07:33:40Z
PVPhotSpatial_314A_NStd_grnM8_Fortuna_0001	512	2009-09-15T07:43:09Z
PVPhotSpatial_314B_StdPSdith_blu_Fortuna_0001	349	2009-09-15T07:52:38Z
PVPhotSpatial_314B_StdPSdith_grn_Fortuna_0001	349	2009-09-15T07:56:24Z
PVPhotAOTVal_514B_StdScan_ins45_blu_M1_0001	2401	2009-09-15T08:02:25Z

Table 157: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotAOTVal_514B_StdScan_ins135_blu_M1_0001	2401	2009-09-15T08:40:23Z
PVPhotAOTVal_514B_StdScan_sky45_blu_M1_0001	2401	2009-09-15T09:18:21Z
PVPhotAOTVal_514B_StdScan_sky135_blu_M1_0001	2401	2009-09-15T09:56:19Z
PVPhotAOTVal_514B_StdScan_ins45_grn_M1_0001	2401	2009-09-15T10:34:17Z
PVPhotAOTVal_514B_StdScan_ins135_grn_M1_0001	2401	2009-09-15T11:12:15Z
PVPhotAOTVal_514B_StdScan_sky45_grn_M1_0001	2401	2009-09-15T11:50:13Z
PVPhotAOTVal_514B_StdScan_sky135_grn_M1_0001	2401	2009-09-15T12:28:11Z
PVPhotSpatial_314E_StdSmall_blu_HIP27989_0001	981	2009-09-15T13:09:36Z
PVPhotSpatial_314E_StdSmall_grn_HIP27989_0001	981	2009-09-15T13:23:54Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0006	13	2009-09-15T13:37:18Z

7.4.34 OD0125

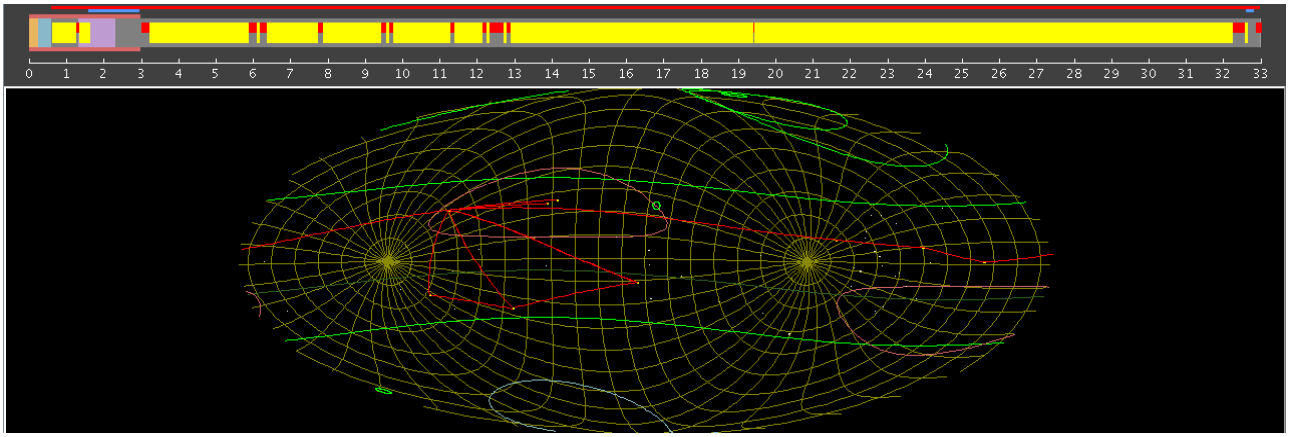


Figure 128: Timeline and distribution of pointings for OD0125 as displayed in the Mission Planning System.

Table 158: Timeline for PACS PV Phase OD0125.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproWaitCSon_OD125_0001	2263	2009-09-15T14:37:23Z
PVPhotFlux_323A_StdPS_lo10Jy_blu_epsCar_0001	339	2009-09-15T15:23:16Z
PVPhotFlux_323A_StdPS_lo2Jy_grn_epsCar_0001	339	2009-09-15T15:26:52Z
PVPhotFlux_324A_StdPS_hi10Jy_blu_epsCar_0001	339	2009-09-15T15:30:28Z
PVPhotFlux_324A_StdPS_hi2Jy_grn_epsCar_0001	339	2009-09-15T15:34:04Z
PVPhotSpatial_314C_NStd_blu_alphaTau_0001	4709	2009-09-15T17:14:56Z
PVPhotSpatial_314C_NStd_grn_alphaTau_0001	4709	2009-09-15T18:34:22Z
PVPhotFlux_322A_StdPS_stability_blu_epsCar_0001	339	2009-09-15T20:07:27Z
PVPhotSpatial_314C_NStd_red_alphaTau_0001	4805	2009-09-15T20:24:42Z
PVPhotAOTVal_514E_StdScan_ins105_blu_NGC1365_0001	5614	2009-09-15T21:55:07Z
PVPhotFlux_322A_StdPS_stability_blu_epsCar_0002	339	2009-09-15T23:35:01Z
PVPhotAOTVal_514E_StdScan_ins15_blu_NGC1365_0001	5614	2009-09-15T23:47:01Z
PVPhotFlux_324A_StdPS_hi20mJy_blu_HD15008_0001	2814	2009-09-16T01:24:57Z
PVPhotFlux_322A_StdPS_stability_blu_epsCar_0003	339	2009-09-16T02:16:13Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0006	339	2009-09-16T02:44:35Z
PVPhotSpatial_314A_NStd_bluM1_3C345_0001	502	2009-09-16T02:54:45Z
PVPhotSpatial_314A_NStd_bluM2_3C345_0001	502	2009-09-16T03:04:04Z
PVPhotSpatial_314A_NStd_bluM3_3C345_0001	502	2009-09-16T03:13:23Z
PVPhotSpatial_314A_NStd_bluM4_3C345_0001	502	2009-09-16T03:22:42Z
PVPhotSpatial_314A_NStd_bluM5_3C345_0001	502	2009-09-16T03:32:01Z
PVPhotSpatial_314A_NStd_bluM6_3C345_0001	502	2009-09-16T03:41:20Z
PVPhotSpatial_314A_NStd_bluM7_3C345_0001	502	2009-09-16T03:50:39Z
PVPhotSpatial_314A_NStd_bluM8_3C345_0001	502	2009-09-16T03:59:58Z
PVPhotSpatial_314A_NStd_grnM1_3C345_0001	502	2009-09-16T04:09:17Z
PVPhotSpatial_314A_NStd_grnM2_3C345_0001	502	2009-09-16T04:18:36Z
PVPhotSpatial_314A_NStd_grnM3_3C345_0001	502	2009-09-16T04:27:55Z
PVPhotSpatial_314A_NStd_grnM4_3C345_0001	502	2009-09-16T04:37:14Z
PVPhotSpatial_314A_NStd_grnM5_3C345_0001	502	2009-09-16T04:46:33Z

Table 158: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotSpatial_314A_NStd_grnM6_3C345_0001	502	2009-09-16T04:55:52Z
PVPhotSpatial_314A_NStd_grnM7_3C345_0001	502	2009-09-16T05:05:11Z
PVPhotSpatial_314A_NStd_grnM8_3C345_0001	502	2009-09-16T05:14:30Z
PVPhotSpatial_314C_NStd_blu_3C345_0001	4709	2009-09-16T05:23:49Z
PVPhotSpatial_314C_NStd_grn_3C345_0001	4709	2009-09-16T06:43:15Z
PVPhotSpatial_314C_NStd_red_3C345_0001	4805	2009-09-16T08:02:41Z
PVPhotSpatial_313A_NStd_bluPA0cp-6700_AlfHer_0001	4986	2009-09-16T09:28:45Z
PVPhotSpatial_313A_NStd_bluPA0cp-4250_AlfHer_0001	4986	2009-09-16T10:53:16Z
PVPhotSpatial_313A_NStd_bluPA0cp-1800_AlfHer_0001	4986	2009-09-16T12:17:47Z
PVPhotSpatial_313A_NStd_bluPA0cp3100_AlfHer_0001	4986	2009-09-16T13:42:18Z
PVPhotSpatial_313A_NStd_bluPA0cp5550_AlfHer_0001	4986	2009-09-16T15:06:49Z
PVPhotSpatial_313A_NStd_bluPA0cp8000_AlfHer_0001	4986	2009-09-16T16:31:20Z
PVPhotSpatial_313A_NStd_bluPA90cp8000_AlfHer_0001	2526	2009-09-16T17:55:51Z
PVPhotSpatial_313A_NStd_bluPA90cp5550_AlfHer_0001	2526	2009-09-16T18:39:22Z
PVPhotSpatial_313A_NStd_bluPA90cp3100_AlfHer_0001	2526	2009-09-16T19:22:53Z
PVPhotSpatial_313A_NStd_bluPA90cp-1800_AlfHer_0001	2526	2009-09-16T20:06:24Z
PVPhotSpatial_313A_NStd_bluPA90cp-4250_AlfHer_0001	2526	2009-09-16T20:49:55Z
PVPhotSpatial_313A_NStd_bluPA90cp-6700_AlfHer_0001	2526	2009-09-16T21:33:26Z
PVPhotFlux_322A_StdPS_stability_blu_epsCar_0004	339	2009-09-16T22:35:37Z
PVPhotSetup_na_nStd_orbitepi_na_0017	13	2009-09-16T22:38:19Z

7.4.35 OD0126

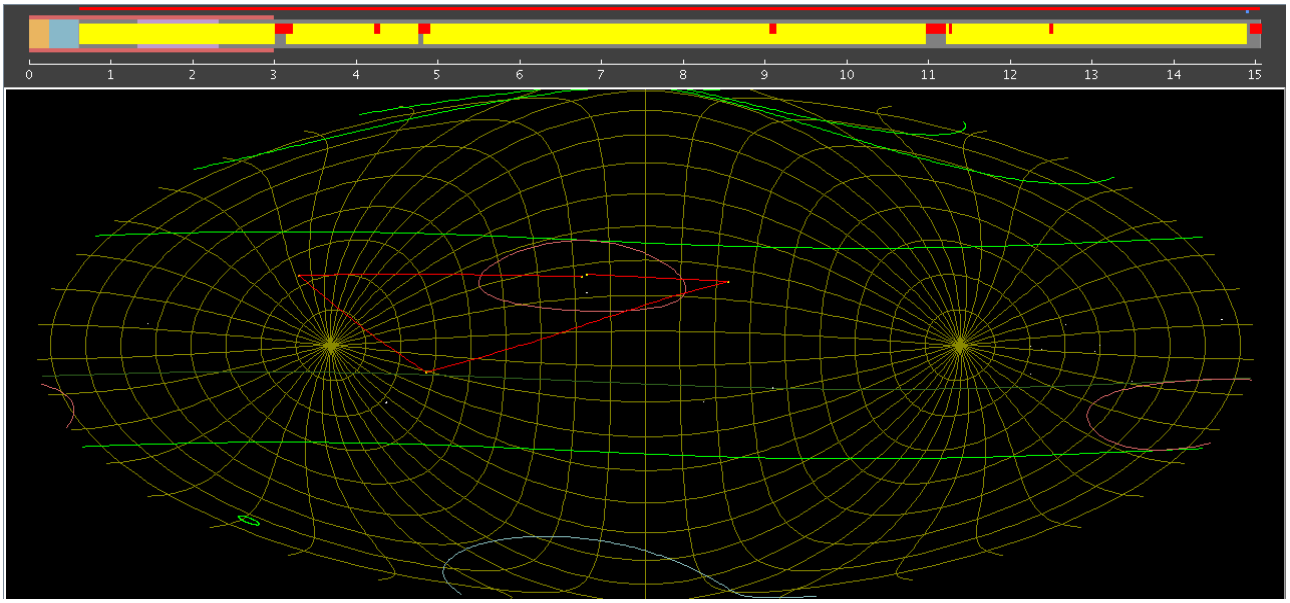


Figure 129: Timeline and distribution of pointings for OD0126 as displayed in the Mission Planning System.

Table 159: Timeline for PACS PV Phase OD0126.

Calibration AOR	duration (s)	absolute start time
PVMechChop_232A_nStd_PidVeriDefault_DmcTemp_na_0001	89	2009-09-16T23:37:56Z
PVSpecSetup_na_nStd_SetupFlexClassic_na_0006	367	2009-09-16T23:39:28Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0006	8109	2009-09-16T23:45:38Z
PVSpecAotVal_524A_NstdSEDChop_03A_NGC5315_0002	3520	2009-09-17T02:14:43Z
PVSpecAotVal_524A_NstdSEDChop_03B_NGC5315_0002	1672	2009-09-17T03:18:37Z
PVSpecFPG_411G_nStdLinespec_7x7_pm3_w66_HIP21479_01	14907	2009-09-17T03:55:26Z
PVSpecFPG_411G_nStdLinespec_7x7_pm3_w77_HIP21479_01	6577	2009-09-17T08:09:06Z
PVSpecFlux_438F_nStdSlewCal_A_Mars_0001	95	2009-09-17T10:13:33Z
PVSpecFlux_438F_NstdRsrf_A_Mars_0001	4135	2009-09-17T10:18:33Z
PVSpecFlux_438F_nStdSlewCal_B_Mars_0001	103	2009-09-17T11:27:39Z
PVSpecFlux_438F_NstdRsrf_B_Mars_0001	8470	2009-09-17T11:32:51Z
PVSpecSetup_na_nStd_orbitepi_na_0008	13	2009-09-17T13:54:04Z

7.4.36 OD0127

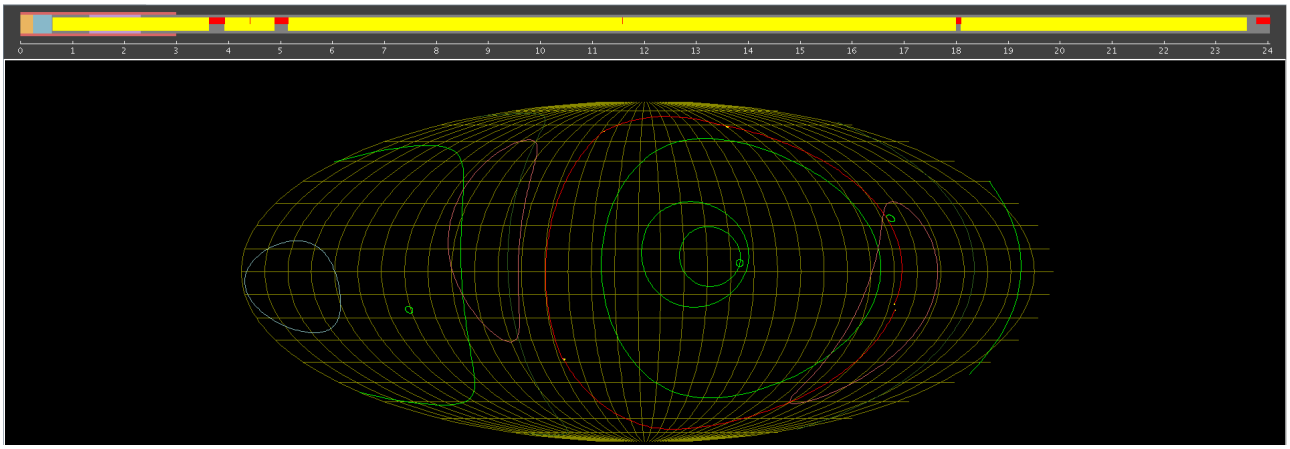


Figure 130: Timeline and distribution of pointings for OD0127 as displayed in the Mission Planning System.

Table 160: Timeline for PACS PV Phase OD0127. OD0127 failed successful execution! No science TM received!

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0014	8542	2009-09-17T14:42:05Z
PVPhotSetup_na_nStd_orbitpro40Hz_na_0002	2298	2009-09-17T17:04:30Z
rcw120-PPhoto-ang1	1829	2009-09-17T18:02:09Z
rcw120-PPhoto-ang2	1829	2009-09-17T18:30:40Z
Abell2218_d+0+0_forward_r1_PA315	7827	2009-09-17T19:15:08Z
Abell2218_d+0+0_forward_r1_PA45	7827	2009-09-17T21:23:37Z
Abell2218_d+7+7_forward_r1_PA315	7827	2009-09-17T23:32:06Z
Abell2218_d+7+7_forward_r1_PA45	7827	2009-09-18T01:40:35Z
Abell2218_d-7-7_forward_r1_PA315	7827	2009-09-18T03:49:04Z
Abell2218_d-7-7_forward_r1_PA45	7827	2009-09-18T05:57:33Z
PPhoto-m81	8904	2009-09-18T08:12:05Z
PPhoto-m81 - copy	11099	2009-09-18T10:38:31Z
PVPhotSetup_na_nStd_orbitepi_na_0018	13	2009-09-18T13:40:33Z

7.4.37 OD0128

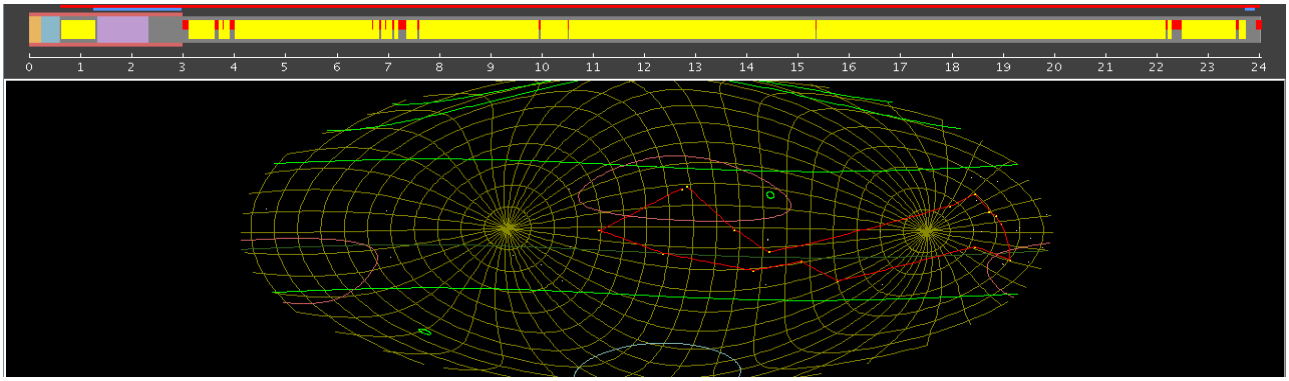


Figure 131: Timeline and distribution of pointings for OD0128 as displayed in the Mission Planning System.

Table 161: Timeline for PACS PV Phase OD0128. OD0128 failed successful execution! No science TM received!

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproVRL_na_0003	2339	2009-09-18T14:44:20Z
PVPhotAOTVal_512D_StdSmall_blu_betPic_0001	1021	2009-09-18T17:15:16Z
PVPhotAOTVal_512D_StdSmall_grn_betPic_0001	1021	2009-09-18T17:30:19Z
PVPhotFlux_324A_StdPS_hi500mJy_grn_epsLep_0001	339	2009-09-18T17:50:46Z
PVPhotFlux_323A_StdPS_lo2Jy_blu_HD32887_0001	339	2009-09-18T17:54:27Z
PVPhotFlux_324A_StdPS_hi2Jy_blu_HD32887_0001	339	2009-09-18T17:58:08Z
PVPhotSpatial_314A_NStd_bluM1_AlfTau_0001	542	2009-09-18T18:08:42Z
PVPhotSpatial_314A_NStd_bluM2_AlfTau_0001	542	2009-09-18T18:18:46Z
PVPhotSpatial_314A_NStd_bluM3_AlfTau_0001	542	2009-09-18T18:28:50Z
PVPhotSpatial_314A_NStd_bluM4_AlfTau_0001	542	2009-09-18T18:38:54Z
PVPhotSpatial_314A_NStd_bluM5_AlfTau_0001	542	2009-09-18T18:48:58Z
PVPhotSpatial_314A_NStd_bluM6_AlfTau_0001	542	2009-09-18T18:59:02Z
PVPhotSpatial_314A_NStd_bluM7_AlfTau_0001	542	2009-09-18T19:09:06Z
PVPhotSpatial_314A_NStd_bluM8_AlfTau_0001	542	2009-09-18T19:19:10Z
PVPhotSpatial_314A_NStd_grnM1_AlfTau_0001	542	2009-09-18T19:29:14Z
PVPhotSpatial_314A_NStd_grnM2_AlfTau_0001	542	2009-09-18T19:39:18Z
PVPhotSpatial_314A_NStd_grnM3_AlfTau_0001	542	2009-09-18T19:49:22Z
PVPhotSpatial_314A_NStd_grnM4_AlfTau_0001	542	2009-09-18T19:59:26Z
PVPhotSpatial_314A_NStd_grnM5_AlfTau_0001	542	2009-09-18T20:09:30Z
PVPhotSpatial_314A_NStd_grnM6_AlfTau_0001	542	2009-09-18T20:19:34Z
PVPhotSpatial_314A_NStd_grnM7_AlfTau_0001	542	2009-09-18T20:29:38Z
PVPhotSpatial_314A_NStd_grnM8_AlfTau_0001	542	2009-09-18T20:39:42Z
PVPhotFlux_324A_StdPS_hi10Jy_grn_alfTau_0001	339	2009-09-18T20:49:46Z
PVPhotFlux_323A_StdPS_lo10Jy_grn_alfTau_0001	339	2009-09-18T20:53:27Z
PVPhotFlux_324A_StdPS_hi200Jy_red_AFGL618_0001	339	2009-09-18T21:01:11Z
PVPhotFlux_323A_StdPS_lo500Jy_grn_AFGL618_0001	339	2009-09-18T21:04:52Z
PVPhotFlux_323A_StdPS_lo1000Jy_blu_AFGL618_0001	339	2009-09-18T21:08:33Z
PVPhotFlux_324A_StdPS_hi100mJy_red_alfPer_0001	339	2009-09-18T21:16:19Z
PVPhotAOTVal_511E_StdPSdith_blu_lowgain_delDra_0001	504	2009-09-18T21:29:06Z
PVPhotAOTVal_511E_StdPSdith_grn_lowgain_delDra_0001	504	2009-09-18T21:35:32Z

Table 161: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFlux_326A_StdPS_minflux_red_HD181597_0001	8424	2009-09-18T21:45:45Z
PVPhotAOTVal_512C_StdSmall_blu_NGC6286_0001	1021	2009-09-19T00:08:30Z
PVPhotAOTVal_512C_StdSmall_grn_NGC6286_0001	1021	2009-09-19T00:23:33Z
PVPhotAOTVal_514F_StdScan_largemap_blu_Draco_0001	17407	2009-09-19T00:40:04Z
PVPhotFlux_324A_StdPS_hi100mJy_blu_HD138265_0001	7269	2009-09-19T05:30:38Z
PVPhotAOTVal_511G_nStdPS_intcal0_blu_HD138265_0001	1644	2009-09-19T07:29:49Z
PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD138265_0001	2064	2009-09-19T07:58:15Z
PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD138265_0001	1644	2009-09-19T08:33:41Z
PVPhotAOTVal_511G_nStdPS_intcal10_grn_HD138265_0001	2064	2009-09-19T09:02:07Z
PVPhotAOTVal_514M_StdPS_grn_HD138265_0001	3474	2009-09-19T09:37:33Z
PVPhotAOTVal_514M_StdScan_ins90_lv_grn_HD138265_01	3420	2009-09-19T10:33:29Z
PVPhotAOTVal_514M_StdScan_ins90_mv_grn_HD138265_01	3118	2009-09-19T11:28:31Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0007	339	2009-09-19T12:21:45Z
PVPhotAOTVal_514L_StdScan_ins135_blu_Fortuna_0001	2004	2009-09-19T12:37:54Z
PVPhotAOTVal_514L_StdScan_ins45_blu_Fortuna_0001	2004	2009-09-19T13:09:20Z
PVPhotFlux_323A_StdPS_lo200Jy_blu_alfOri_0001	339	2009-09-19T13:44:35Z
PVPhotFlux_324A_StdPS_hi200Jy_blu_alfOri_0001	339	2009-09-19T13:48:16Z
PVPhotSetup_na_nStd_orbitepi_na_0019	13	2009-09-19T13:50:58Z

7.4.38 OD0129

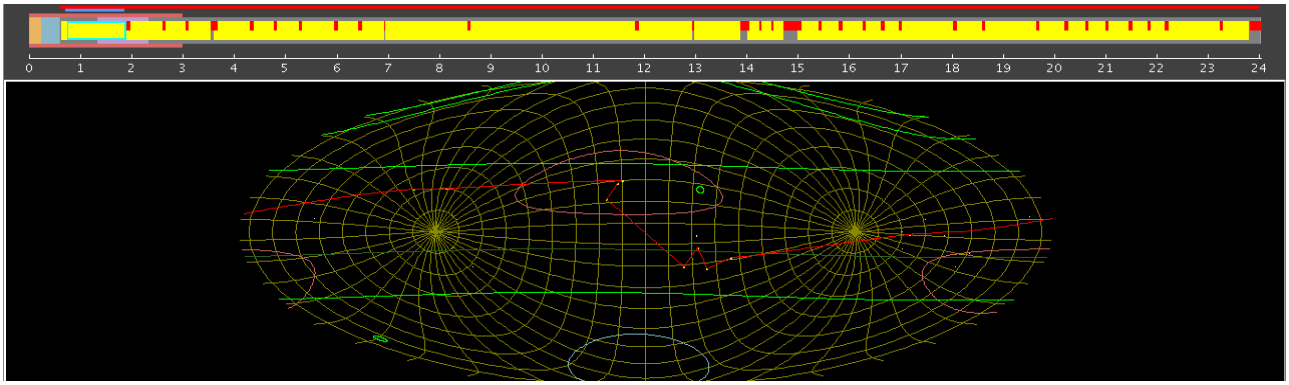


Figure 132: Timeline and distribution of pointings for OD0129 as displayed in the Mission Planning System.

Table 162: Timeline for PACS PV Phase OD0129. OD0129 failed successful execution! No science TM received!

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0007	367	2009-09-19T14:46:33Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0007	4209	2009-09-19T14:52:43Z
PVSpecFlux_433A_nStdRange_AbsFluxB3A_sirius_0001	2191	2009-09-19T16:08:03Z
PVSpecFlux_433A_nStdRange_AbsFluxB2A_sirius_0001	1331	2009-09-19T16:49:50Z
PVSpecFlux_433A_nStdRange_AbsFluxB2B_sirius_0001	1491	2009-09-19T17:17:14Z
PVSpecFlux_433A_nStdRange_AbsFluxB3A_alphaTau_0001	2191	2009-09-19T17:50:45Z
PVSpecFlux_433A_nStdRange_AbsFluxB2A_alphaTau_0001	1331	2009-09-19T18:32:32Z
PVSpecFlux_433A_nStdRange_AbsFluxB2B_alphaTau_0001	1491	2009-09-19T18:59:56Z
PVSpecFlux_435A_nStdRange_LinFluxB3A_fortuna_0001	2201	2009-09-19T19:29:58Z
PVSpecFlux_435A_nStdRange_LinFluxB2A_fortuna_0001	1341	2009-09-19T20:11:55Z
PVSpecFlux_435A_nStdRange_LinFluxB2B_fortuna_0001	1501	2009-09-19T20:39:29Z
PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_OI63_01	1778	2009-09-19T21:08:15Z
PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_OI63_01	1832	2009-09-19T21:38:33Z
PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_OI63_01	1940	2009-09-19T22:09:45Z
PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_OI63_01	6350	2009-09-19T22:47:17Z
PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_CII_01	1598	2009-09-20T00:33:48Z
PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_CII_01	1652	2009-09-20T01:01:07Z
PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_CII_01	1764	2009-09-20T01:29:20Z
PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_CII158_01	3650	2009-09-20T02:03:57Z
PVSpecFlux_4312A_nStdFlexRasterGen_LA_AFGL618_0001	1570	2009-09-20T03:08:33Z
PVSpecFlux_4312A_nStdFlexRasterGen_LB_AFGL618_0001	1542	2009-09-20T03:35:24Z
PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0002	624	2009-09-20T04:14:02Z
PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0002	622	2009-09-20T04:27:52Z
PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0002	620	2009-09-20T04:41:43Z
PVSpecAotVal_524B_NstdSEDChop_p1A_NGC5315_0001	1098	2009-09-20T05:14:24Z
PVSpecAotVal_524B_NstdSEDChop_p2A_NGC5315_0001	1132	2009-09-20T05:37:56Z
PVSpecAotVal_524B_NstdSEDChop_p3A_NGC5315_0001	1345	2009-09-20T06:02:00Z
PVSpecAotVal_524B_NStdSEDChop_p1B_NGC5315_0001	1006	2009-09-20T06:29:39Z
PVSpecAotVal_524B_NStdSEDChop_p2B_NGC5315_0001	913	2009-09-20T06:51:40Z
PVSpecAotVal_524B_NstdSEDChop_slowA_NGC5315_0001	3520	2009-09-20T07:12:10Z

Table 162: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_524B_NStdSEDChop_slowB_NGC5315_0001	1672	2009-09-20T08:16:04Z
PVSpecAotVal_524B_NstdSEDChop_fullA_HD100546_0001	3520	2009-09-20T08:49:13Z
PVSpecAotVal_524B_NStdSEDChop_fullB_HD100546_0001	1672	2009-09-20T09:53:07Z
PVSpecAotVal_524B_NstdSEDChop_p1A_HD100546_0001	1098	2009-09-20T10:26:16Z
PVSpecAotVal_524B_NstdSEDChop_p2A_HD100546_0001	1132	2009-09-20T10:49:48Z
PVSpecAotVal_524B_NstdSEDChop_p3A_HD100546_0001	1345	2009-09-20T11:13:52Z
PVSpecAotVal_524B_NStdSEDChop_p1B_HD100546_0001	1006	2009-09-20T11:41:31Z
PVSpecAotVal_524B_NStdSEDChop_p2B_HD100546_0001	913	2009-09-20T12:03:32Z
PVSpecAotVal_524B_NstdSEDChop_slowA_HD100546_0001	3520	2009-09-20T12:24:02Z
PVSpecAotVal_524B_NStdSEDChop_slowB_HD100546_0001	1672	2009-09-20T13:27:56Z
PVSpecSetup_na_nStd_orbitepi_na_0009	13	2009-09-20T13:55:51Z

7.4.39 OD0132

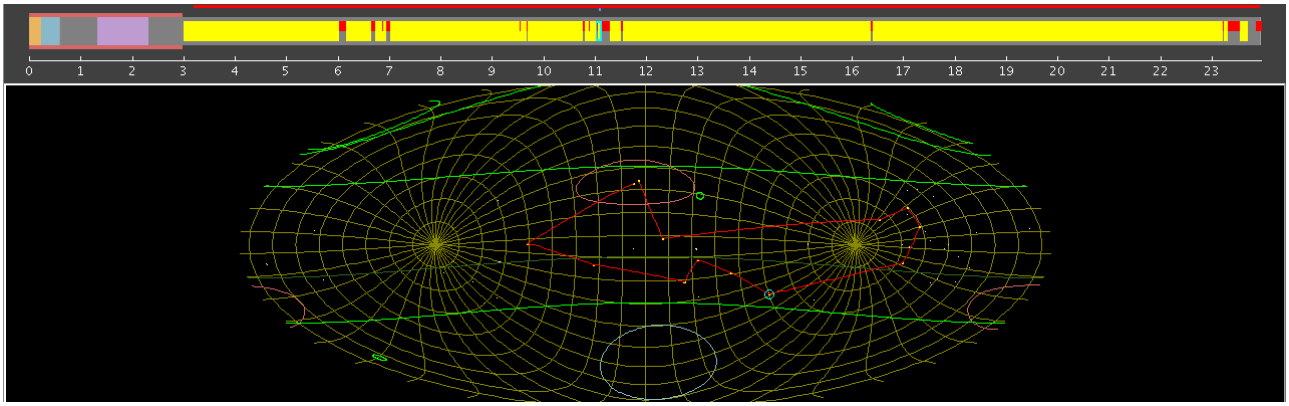


Figure 133: Timeline and distribution of pointings for OD0132 as displayed in the Mission Planning System.

Table 163: Timeline for PACS PV Phase OD0132.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0015	8542	2009-09-23T01:45:58Z
PVPhotSetup_na_nStd_orbitproVRL_na_0004	2339	2009-09-23T04:08:23Z
PVPhotAOTVal_512D_StdSmall_blu_betPic_0002	981	2009-09-23T04:56:48Z
PVPhotAOTVal_512D_StdSmall_grn_betPic_0002	981	2009-09-23T05:11:11Z
PVPhotFlux_324A_StdPS_hi500mJy_grn_epsLep_0002	339	2009-09-23T05:30:59Z
PVPhotFlux_323A_StdPS_lo2Jy_blu_HD32887_0002	339	2009-09-23T05:34:40Z
PVPhotFlux_324A_StdPS_hi2Jy_blu_HD32887_0002	339	2009-09-23T05:38:21Z
PVPhotSpatial_314A_NStd_bluM1_AlfTau_0002	502	2009-09-23T05:49:01Z
PVPhotSpatial_314A_NStd_bluM2_AlfTau_0002	502	2009-09-23T05:58:25Z
PVPhotSpatial_314A_NStd_bluM3_AlfTau_0002	502	2009-09-23T06:07:49Z
PVPhotSpatial_314A_NStd_bluM4_AlfTau_0002	502	2009-09-23T06:17:13Z
PVPhotSpatial_314A_NStd_bluM5_AlfTau_0002	502	2009-09-23T06:26:37Z
PVPhotSpatial_314A_NStd_bluM6_AlfTau_0002	502	2009-09-23T06:36:01Z
PVPhotSpatial_314A_NStd_bluM7_AlfTau_0002	502	2009-09-23T06:45:25Z
PVPhotSpatial_314A_NStd_bluM8_AlfTau_0002	502	2009-09-23T06:54:49Z
PVPhotSpatial_314A_NStd_grnM1_AlfTau_0002	502	2009-09-23T07:04:13Z
PVPhotSpatial_314A_NStd_grnM2_AlfTau_0002	502	2009-09-23T07:13:37Z
PVPhotSpatial_314A_NStd_grnM3_AlfTau_0002	502	2009-09-23T07:23:01Z
PVPhotSpatial_314A_NStd_grnM4_AlfTau_0002	502	2009-09-23T07:32:25Z
PVPhotSpatial_314A_NStd_grnM5_AlfTau_0002	502	2009-09-23T07:41:49Z
PVPhotSpatial_314A_NStd_grnM6_AlfTau_0002	502	2009-09-23T07:51:13Z
PVPhotSpatial_314A_NStd_grnM7_AlfTau_0002	502	2009-09-23T08:00:37Z
PVPhotSpatial_314A_NStd_grnM8_AlfTau_0002	502	2009-09-23T08:10:01Z
PVPhotFlux_324A_StdPS_hi10Jy_grn_alfTau_0002	339	2009-09-23T08:19:25Z
PVPhotFlux_323A_StdPS_lo10Jy_grn_alfTau_0002	339	2009-09-23T08:23:06Z
PVPhotAOTVal_514L_StdScan_ins45_blu_Fortuna_0002	2004	2009-09-23T08:29:33Z
PVPhotAOTVal_514L_StdScan_ins135_blu_Fortuna_0002	2004	2009-09-23T09:00:59Z
PVPhotFlux_324A_StdPS_hi200Jy_red_AFGL618_0002	339	2009-09-23T09:35:51Z
PVPhotFlux_323A_StdPS_lo500Jy_grn_AFGL618_0002	339	2009-09-23T09:39:32Z

Table 163: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFlux_323A_StdPS_lo1000Jy_blu_AFGL618_0002	339	2009-09-23T09:43:13Z
PVPhotFlux_324A_StdPS_hi100mJy_red_alfPer_0002	339	2009-09-23T09:51:02Z
PVPhotAOTVal_511E_StdPSdith_blu_lowgain_delDra_0002	504	2009-09-23T10:03:53Z
PVPhotAOTVal_511E_StdPSdith_grn_lowgain_delDra_0002	504	2009-09-23T10:10:19Z
PVPhotAOTVal_514F_StdScan_largemap_blu_Draco_0002	17407	2009-09-23T10:20:25Z
PVPhotFlux_324A_StdPS_hi100mJy_blu_HD138265_0002	7269	2009-09-23T15:11:00Z
PVPhotAOTVal_511G_nStdPS_intcal0_blu_HD138265_0002	1644	2009-09-23T17:10:11Z
PVPhotAOTVal_511G_nStdPS_intcal10_blu_HD138265_0002	2064	2009-09-23T17:38:37Z
PVPhotAOTVal_511G_nStdPS_intcal0_grn_HD138265_0002	1644	2009-09-23T18:14:03Z
PVPhotAOTVal_511G_nStdPS_intcal10_grn_HD138265_0002	2064	2009-09-23T18:42:29Z
PVPhotAOTVal_514M_StdPS_grn_HD138265_0002	3474	2009-09-23T19:17:55Z
PVPhotAOTVal_514M_StdScan_ins90_lv_grn_HD138265_02	3420	2009-09-23T20:13:51Z
PVPhotAOTVal_514M_StdScan_ins90_mv_grn_HD138265_02	3118	2009-09-23T21:08:53Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0008	339	2009-09-23T22:02:06Z
PVPhotFlux_323A_StdPS_lo200Jy_blu_alfOri_0002	339	2009-09-23T22:20:05Z
PVPhotFlux_324A_StdPS_hi200Jy_blu_alfOri_0002	339	2009-09-23T22:23:46Z
PVPhotSetup_na_nStd_orbitepi_na_0020	13	2009-09-23T22:26:28Z

7.4.40 OD0133

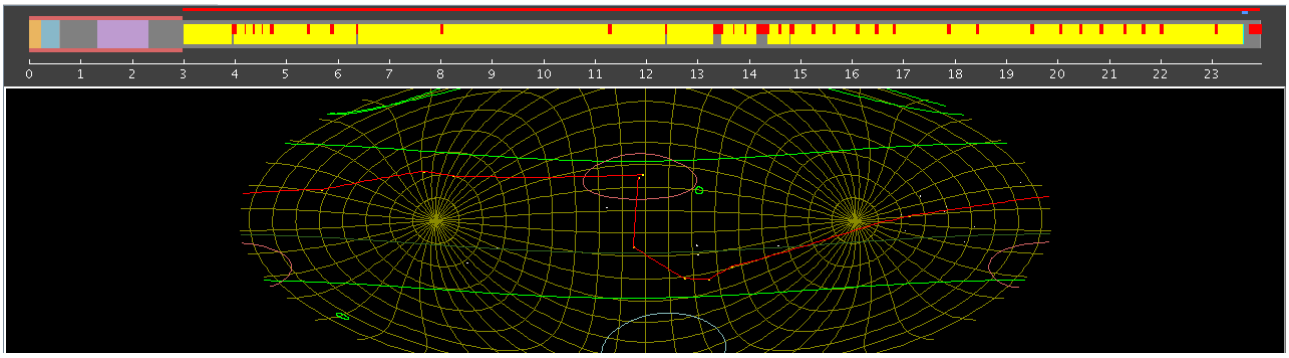


Figure 134: Timeline and distribution of pointings for OD0133 as displayed in the Mission Planning System.

Table 164: Timeline for PACS PV Phase OD0133.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0008	367	2009-09-24T01:43:18Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0008	3009	2009-09-24T01:49:28Z
PVSpecAotVal_521J_nStdLnNoChop_HD_OMC1_0001	458	2009-09-24T02:46:06Z
PVSpecAotVal_521J_nStdLnNoChop_HD_OMC1_0002	409	2009-09-24T02:57:05Z
PVSpecAotVal_522C_NstdLineSpec_HD56_OMC1_0001	421	2009-09-24T03:06:58Z
PVSpecAotVal_522C_NstdLineSpec_HD112_OMC1_0001	426	2009-09-24T03:17:07Z
PVSpecFlux_433A_nStdRange_AbsFluxB3A_alphaTau_0002	2191	2009-09-24T03:30:14Z
PVSpecFlux_433A_nStdRange_AbsFluxB2A_alphaTau_0002	1331	2009-09-24T04:12:01Z
PVSpecFlux_433A_nStdRange_AbsFluxB2B_alphaTau_0002	1491	2009-09-24T04:39:25Z
PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_OI63_02	1778	2009-09-24T05:08:00Z
PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_OI63_02	1832	2009-09-24T05:38:18Z
PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_OI63_02	1940	2009-09-24T06:09:30Z
PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_OI63_02	6350	2009-09-24T06:47:02Z
PVSpecAotVal_521E_NstdLineSpec_1nod_DG_Tau_CII_02	1598	2009-09-24T08:33:33Z
PVSpecAotVal_521E_NstdLineSpec_2nod_DG_Tau_CII_02	1652	2009-09-24T09:00:52Z
PVSpecAotVal_521E_NstdLineSpec_4nod_DG_Tau_CII_02	1764	2009-09-24T09:29:05Z
PVSpecAotVal_523A_NstdRangeSpec_DG_Tau_CII158_02	3650	2009-09-24T10:03:42Z
PVSpecFlux_4312A_nStdFlexRasterGen_LA_AFGL618_0002	1570	2009-09-24T11:08:20Z
PVSpecFlux_4312A_nStdFlexRasterGen_LB_AFGL618_0002	1542	2009-09-24T11:35:11Z
PVSpecAotVal_521A_NstdRespCS_A2_60_NGC6543_0003	624	2009-09-24T12:13:53Z
PVSpecAotVal_521A_NstdRespCS_A2_75_NGC6543_0003	622	2009-09-24T12:27:43Z
PVSpecAotVal_521A_NstdRespCS_A2_180_NGC6543_0003	620	2009-09-24T12:41:34Z
PVSpecWave_421D_nStdLS_nochoporderA_NGC6302_0001	520	2009-09-24T13:08:43Z
PVSpecWave_421D_nStdLS_nochoporderB_NGC6302_0001	520	2009-09-24T13:20:47Z
PVSpecAotVal_524B_NstdSEDChop_p1A_NGC5315_0002	1098	2009-09-24T13:37:36Z
PVSpecAotVal_524B_NstdSEDChop_p2A_NGC5315_0002	1132	2009-09-24T14:01:08Z
PVSpecAotVal_524B_NstdSEDChop_p3A_NGC5315_0002	1345	2009-09-24T14:25:12Z
PVSpecAotVal_524B_NStdSEDChop_p1B_NGC5315_0002	1006	2009-09-24T14:52:51Z
PVSpecAotVal_524B_NStdSEDChop_p2B_NGC5315_0002	913	2009-09-24T15:14:52Z
PVSpecAotVal_524B_NstdSEDChop_slowA_NGC5315_0002	3520	2009-09-24T15:35:22Z
PVSpecAotVal_524B_NStdSEDChop_slowB_NGC5315_0002	1672	2009-09-24T16:39:16Z

Table 164: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_524B_NstdSEDChop_fullA_HD100546_0002	3520	2009-09-24T17:12:25Z
PVSpecAotVal_524B_NStdSEDChop_fullB_HD100546_0002	1672	2009-09-24T18:16:19Z
PVSpecAotVal_524B_NstdSEDChop_p1A_HD100546_0002	1098	2009-09-24T18:49:28Z
PVSpecAotVal_524B_NstdSEDChop_p2A_HD100546_0002	1132	2009-09-24T19:13:00Z
PVSpecAotVal_524B_NstdSEDChop_p3A_HD100546_0002	1345	2009-09-24T19:37:04Z
PVSpecAotVal_524B_NStdSEDChop_p1B_HD100546_0002	1006	2009-09-24T20:04:43Z
PVSpecAotVal_524B_NStdSEDChop_p2B_HD100546_0002	913	2009-09-24T20:26:44Z
PVSpecAotVal_524B_NstdSEDChop_slowA_HD100546_0002	3520	2009-09-24T20:47:14Z
PVSpecAotVal_524B_NStdSEDChop_slowB_HD100546_0002	1672	2009-09-24T21:51:08Z
PVSpecSetup_na_nStd_orbitepi_na_0010	13	2009-09-24T22:19:03Z

7.4.41 OD0136

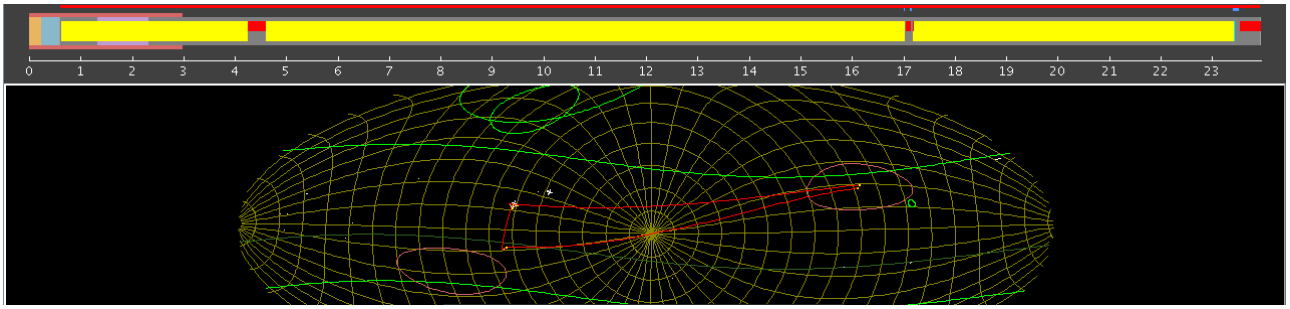


Figure 135: Timeline and distribution of pointings for OD0136 as displayed in the Mission Planning System.

Table 165: Timeline for SPIRE/PACS parallel mode PV Phase OD0136.

Calibration AOR	duration (s)	absolute start time
PVParAOTVal_Cooler_na_nStd_na_na_0002	10352	2009-09-26T23:12:08Z
SpireEngREDYtoPHOT_STBYGen-PtcOff_OD136	382	2009-09-27T02:04:43Z
PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0003	2263	2009-09-27T02:11:08Z
PVParStray_734A_FSpot_blu2dx2d_OD136_1_0001	11224	2009-09-27T03:12:45Z
PVParStray_734A_FSpot_blu2dx2d_OD136_2_0001	11224	2009-09-27T06:19:05Z
PVParStray_734A_FSpot_blu2dx2d_OD136_3_0001	11224	2009-09-27T09:25:25Z
PVParStray_734A_FSpot_blu2dx2d_OD136_4_0001	11224	2009-09-27T12:31:45Z
SPParallel - Sgr B2 - Nominal	11233	2009-09-27T15:40:58Z
SPParallel - Sgr B2 - Ortho	11233	2009-09-27T18:46:25Z
SpireEngPHOT_STBYtoREDYGen-0000_OD136	130	2009-09-27T21:50:41Z
PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0003	13	2009-09-27T21:52:54Z

7.4.42 OD0137

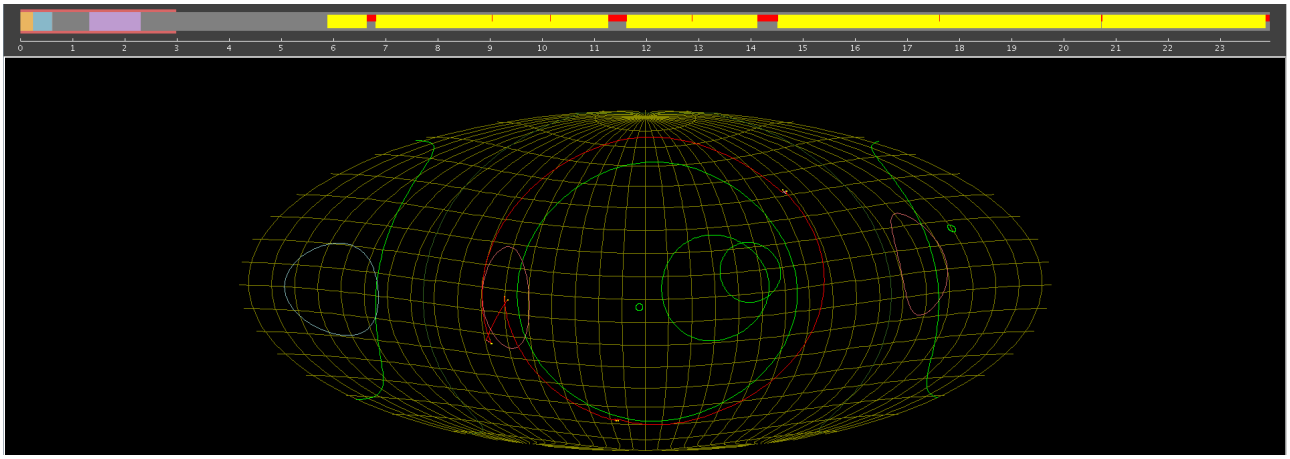


Figure 136: Timeline and distribution of pointings for OD0137 as displayed in the Mission Planning System.

Table 166: Timeline for SPIRE/PACS parallel mode PV Phase OD0137.

Calibration AOR	duration (s)	absolute start time
SpireEngREDYtoPHOT_STBYGen-PtcOff_OD137	382	2009-09-28T04:25:38Z
PVParAOTVal_PacsPhot_na_nStd_orbitpro_na_0004	2263	2009-09-28T04:32:03Z
PVParAOTVal_515E_StdPar_30_blu_slow_orth_Lockman_01	4102	2009-09-28T05:22:12Z
PVParAOTVal_515E_StdPar_30_blu_slow_Lockman_01	4102	2009-09-28T06:28:43Z
PVParAOTVal_515E_StdPar_30_blu_slow_Lockman_02	4102	2009-09-28T07:36:00Z
PVParAOTVal_515E_StdPar_30_blu_slow_orth_Lockman_02	4102	2009-09-28T08:42:31Z
PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma137_nom	4603	2009-09-28T10:10:35Z
PVParAOTVal_515C_StdPar_blu_fast_HGal_Palma137_orth	4603	2009-09-28T11:26:20Z
PVParStray_316A_TFOV_blu2dx2d_centre_Mars_OD137	11224	2009-09-28T13:04:57Z
PVParStray_316A_TFOV_blu2x2d_centre_Mars_off1_OD137	11224	2009-09-28T16:11:18Z
PVParStray_316A_TFOV_blu2x2d_centre_Mars_off2_OD137	11224	2009-09-28T19:17:39Z
SpireEngPHOT_STBYtoREDYGen-0000_OD137	130	2009-09-28T22:21:46Z
PVParAOTVal_PacsPhot_na_nStd_orbitepi_na_0004	13	2009-09-28T22:23:59Z

7.4.43 OD0138

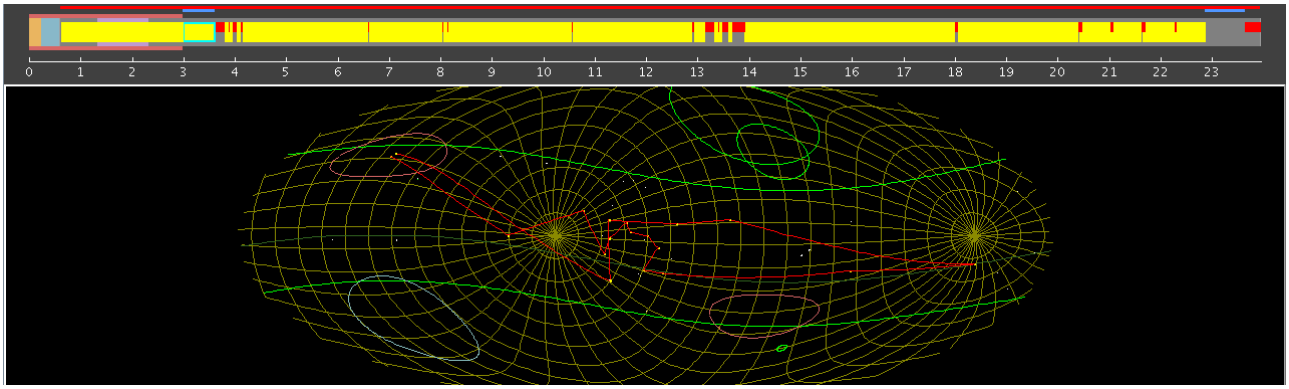


Figure 137: Timeline and distribution of pointings for OD0138 as displayed in the Mission Planning System.

Table 167: Timeline for PACS PV Phase OD0138.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0016	8542	2009-09-28T23:06:36Z
PVPhotSetup_na_nStd_orbitpro40Hz_na_0003	2298	2009-09-29T01:29:01Z
PVPhotFlux_324A_StdPS_hi50Jy_blu_AFGL811_0001	341	2009-09-29T02:19:25Z
PVPhotFlux_323A_StdPS_lo50Jy_blu_AFGL811_0001	341	2009-09-29T02:23:08Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0009	341	2009-09-29T02:32:42Z
PVPhotFlux_324A_StdPS_hi500mJy_blu_delDra_0001	506	2009-09-29T02:40:36Z
PVPhotFlux_328A_StdScan_FlatField_blu_NGC6543_0001	3489	2009-09-29T02:49:17Z
PVPhotFlux_328A_StdScan_FlatField_grn_NGC6543_0001	3489	2009-09-29T03:45:28Z
PVPhotAOTVal_513B_StdRaster_2x2_blu_NGC6543_0001	826	2009-09-29T04:41:39Z
PVPhotAOTVal_513B_StdRaster_2x2_grn_NGC6543_0001	826	2009-09-29T04:53:27Z
PVPhotAOTVal_513B_StdRaster_2x2_grn_NGC6286_0001	826	2009-09-29T05:07:55Z
PVPhotAOTVal_513B_StdRaster_2x2_blu_NGC6286_0001	826	2009-09-29T05:19:43Z
PVPhotFlux_324A_StdPS_hi20mJy_grn_HD159330_0001	3641	2009-09-29T05:33:15Z
PVPhotFlux_324A_StdPS_hi50Jy_grn_HD161796_0001	341	2009-09-29T06:34:20Z
PVPhotFlux_323A_StdPS_lo50Jy_grn_HD161796_0001	341	2009-09-29T06:38:03Z
PVPhotFlux_326A_StdPS_minflux_grn_HD168009_0001	8426	2009-09-29T06:43:58Z
PVPhotFlux_326A_StdPS_minflux_red_HD181597_0002	8426	2009-09-29T09:05:16Z
PVPhotSpatial_312B_NStd_blu_Kbin6_0001	283	2009-09-29T11:26:10Z
PVPhotSpatial_312A_NStd_blu_Kbin6_0001	311	2009-09-29T11:31:55Z
PVPhotFlux_323A_StdPS_lo1000Jy_grn_RCrA_0001	341	2009-09-29T11:50:23Z
PVPhotFlux_323A_StdPS_lo1000Jy_blu_RCrA_0001	341	2009-09-29T11:54:06Z
PVPhotFlux_324A_StdPS_hi100mJy_grn_betHyi_0001	341	2009-09-29T12:06:23Z
PVPhotSpatial_315A_NStd_blucp8000_AlfHer_0001	3936	2009-09-29T12:26:21Z
PVPhotSpatial_315A_StdScan_grn_AlfHer_0001	3433	2009-09-29T13:32:59Z
PVPhotSpatial_315A_StdScan_blu_AlfHer_0001	3433	2009-09-29T14:28:14Z
PVPhotSpatial_315A_NStd_blucp-6700_AlfHer_0001	3936	2009-09-29T15:23:57Z
PVPhotFlux_326A_StdPS_minflux_grn_HD156729_0001	8426	2009-09-29T16:35:06Z
PVPhotSPU_TranspScan_nStd_A2218_blueMedInScan_0001	1932	2009-09-29T18:58:57Z
PVPhotSPU_TranspScan_nStd_A2218_blueMedCrScan_0001	1932	2009-09-29T19:34:57Z
PVPhotSPU_TranspScan_nStd_N6946_blueMedInScan_0001	1932	2009-09-29T20:13:06Z

Table 167: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotSPU_TranspScan_nStd_N6946_blueMedCrScan_0001	1932	2009-09-29T20:49:06Z
PVPhotSetup_na_nStd_orbitepi_na_0021	13	2009-09-29T21:21:21Z

7.4.44 OD0139

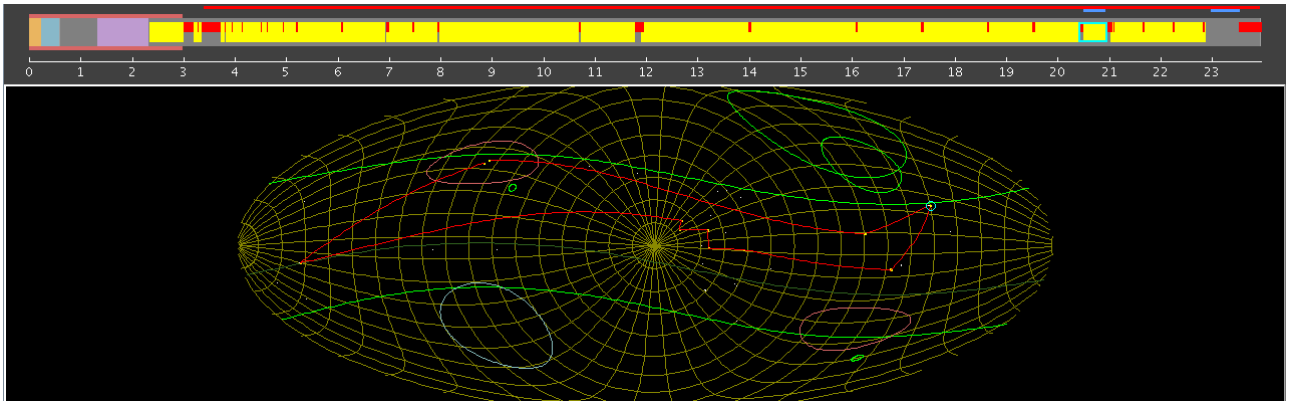


Figure 138: Timeline and distribution of pointings for OD0139 as displayed in the Mission Planning System.

Table 168: Timeline for PACS PV Phase OD0139.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproVRL_na_0005	2339	2009-09-30T00:47:46Z
PVPhotAOTVal_514N_StdScan_blu_HIP21479_0001	345	2009-09-30T01:40:01Z
PVPhotAOTVal_514N_StdScan_grn_HIP21479_0001	345	2009-09-30T01:43:48Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0010	341	2009-09-30T02:11:41Z
PVPhotAOTVal_514N_StdScanSlow_blu_HD139669_0001	345	2009-09-30T02:17:03Z
PVPhotAOTVal_514N_StdScanMed_blu_HD139669_0001	324	2009-09-30T02:20:50Z
PVPhotAOTVal_511D_nStdPS12_blu_HD139669_0001	161	2009-09-30T02:24:16Z
PVPhotAOTVal_511D_nStdPS16_blu_HD139669_0001	159	2009-09-30T02:27:59Z
PVPhotAOTVal_511D_nStdPS20_blu_HD139669_0001	159	2009-09-30T02:31:40Z
PVPhotAOTVal_511D_StdPS_blu_HD139669_0001	341	2009-09-30T02:35:21Z
PVPhotAOTVal_511D_nStdPS24_blu_HD139669_0001	161	2009-09-30T02:39:04Z
PVPhotAOTVal_511D_nStdPS28_blu_HD139669_0001	157	2009-09-30T02:42:47Z
PVPhotAOTVal_511D_nStdPS32_blu_HD139669_0001	165	2009-09-30T02:46:26Z
PVPhotAOTVal_511D_nStdPS36_blu_HD139669_0001	161	2009-09-30T02:50:13Z
PVPhotAOTVal_511D_nStdPS40_blu_HD139669_0001	161	2009-09-30T02:53:56Z
PVPhotAOTVal_514N_StdScanSlow_grn_HD139669_0001	345	2009-09-30T02:57:39Z
PVPhotAOTVal_514N_StdScanMed_grn_HD139669_0001	324	2009-09-30T03:01:26Z
PVPhotAOTVal_511D_nStdPS12_grn_HD139669_0001	161	2009-09-30T03:04:52Z
PVPhotAOTVal_511D_nStdPS16_grn_HD139669_0001	159	2009-09-30T03:08:35Z
PVPhotAOTVal_511D_nStdPS20_grn_HD139669_0001	159	2009-09-30T03:12:16Z
PVPhotAOTVal_511D_nStdPS28_grn_HD139669_0001	157	2009-09-30T03:15:57Z
PVPhotAOTVal_511D_nStdPS32_grn_HD139669_0001	165	2009-09-30T03:19:36Z
PVPhotAOTVal_511D_nStdPS36_grn_HD139669_0001	161	2009-09-30T03:23:23Z
PVPhotAOTVal_511D_StdPS_grn_HD139669_0001	341	2009-09-30T03:27:06Z
PVPhotAOTVal_511D_nStdPS40_grn_HD139669_0001	161	2009-09-30T03:30:49Z
PVPhotAOTVal_511D_nStdPS24_grn_HD139669_0001	161	2009-09-30T03:34:32Z
PVPhotSPU_TranspScan_nStd_A2218_blueLowInScan_0001	2933	2009-09-30T03:41:13Z
PVPhotSPU_TranspScan_nStd_A2218_blueLowCrScan_0001	2933	2009-09-30T04:33:54Z
PVPhotSPU_TranspScan_nStd_A2218_blueHigInScan_0001	1580	2009-09-30T05:26:35Z

Table 168: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotSPU_TranspScan_nStd_A2218_blueHigCrScan_0001	1580	2009-09-30T05:56:43Z
PVPhotAOTVal_513C_StdRaster_3x3_blu_NGC6543_0001	3589	2009-09-30T06:26:26Z
PVPhotAOTVal_513C_StdRaster_5x5_blu_NGC6543_0001	2291	2009-09-30T07:24:17Z
PVPhotAOTVal_513C_StdRaster_7x7_blu_NGC6543_0001	4235	2009-09-30T08:00:30Z
PVPhotAOTVal_513A_StdRaster_7x7_blu_gammaDra_0001	3851	2009-09-30T09:12:28Z
PVPhotSPU_TranspScan_nStd_GP_greenLowInScan_0001	7249	2009-09-30T10:24:50Z
PVPhotSPU_TranspScan_nStd_GP_greenLowCrScan_0001	7249	2009-09-30T12:29:27Z
PVPhotSPU_TranspScan_nStd_GP_greenMedInScan_0001	4378	2009-09-30T14:34:04Z
PVPhotSPU_TranspScan_nStd_GP_greenMedCrScan_0001	4378	2009-09-30T15:50:50Z
PVPhotSPU_TranspScan_nStd_GP_greenHigInScan_0001	2982	2009-09-30T17:07:36Z
PVPhotSPU_TranspScan_nStd_GP_greenHigCrScan_0001	2982	2009-09-30T18:01:06Z
PVPhotStray_733A_FHpt_blu50amn_MoonOD139_0001	1741	2009-09-30T18:57:54Z
PVPhotBol_1118A_nStd_xtalkBlueInit_IRAS_0001	2	2009-09-30T19:30:59Z
PVPhotBol_1118A_nStd_xtalkLowIVSS_IRAS_0001	1925	2009-09-30T19:33:50Z
PVPhotBol_1118A_nStd_xtalkNomiIVSS_IRAS_0001	1925	2009-09-30T20:08:44Z
PVPhotBol_1118A_nStd_xtalkHighIVSS_IRAS_0001	1925	2009-09-30T20:43:38Z
PVPhotBol_1118A_nStd_xtalkFinal_IRAS_0001	2	2009-09-30T21:18:11Z
PVPhotSetup_na_nStd_orbitepi_na_0022	13	2009-09-30T21:18:16Z

7.4.45 OD0140

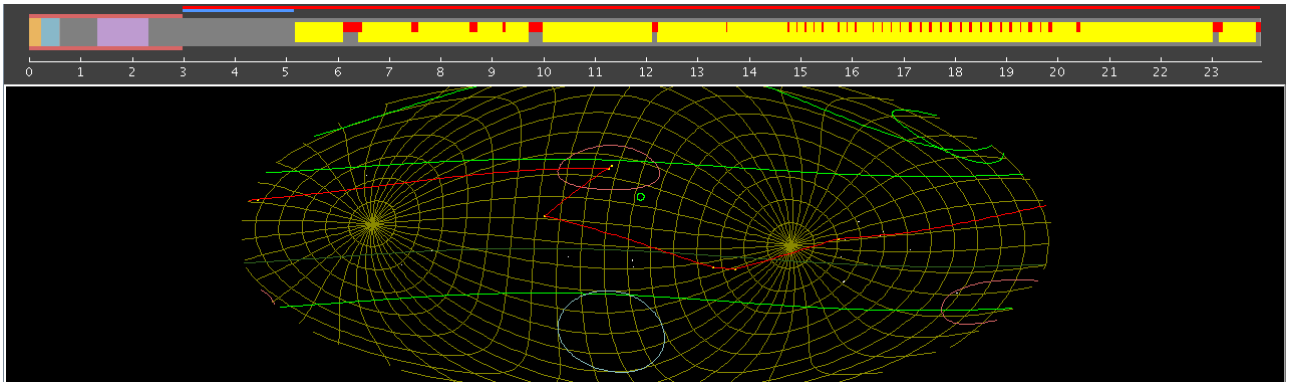


Figure 139: Timeline and distribution of pointings for OD0140 as displayed in the Mission Planning System.

Table 169: Timeline for PACS PV Phase OD0140.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0009	367	2009-10-01T03:34:06Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0009	3009	2009-10-01T03:40:16Z
PVSpecAotVal_524A_NstdSEDChop_02A_NGC6302_0001	3328	2009-10-01T04:53:37Z
PVSpecAotVal_524A_NstdSEDChop_04A_NGC6302_0001	3520	2009-10-01T05:58:54Z
PVSpecAotVal_524A_NstdSEDChop_04B_NGC6302_0001	1672	2009-10-01T07:07:20Z
PVSpecAotVal_524A_NstdSEDChop_02B_NGC6302_0001	1582	2009-10-01T07:40:26Z
PVSpecGeGa_123B_nStd_BuffTM_lowCS2_Dark_0001	7564	2009-10-01T08:24:13Z
PVSpecAotVal_521X_NstdLineSpec_CPrs_OI63_NGC1569_01	4650	2009-10-01T10:38:49Z
PVSpecAotVal_522X_NstdLineSpec_WSrs_OI63_NGC1569_01	4146	2009-10-01T11:59:23Z
PVSpecAotVal_521X_NstdLineSpec_CP64_N205_NGC1569_01	440	2009-10-01T13:11:35Z
PVSpecAotVal_521X_NstdLineSpec_CP32_N205_NGC1569_01	440	2009-10-01T13:20:49Z
PVSpecAotVal_521X_NstdLineSpec_CP64_C121_NGC1569_01	441	2009-10-01T13:31:17Z
PVSpecAotVal_521X_NstdLineSpec_CP32_C121_NGC1569_01	441	2009-10-01T13:40:34Z
PVSpecAotVal_521X_NstdLineSpec_CP64_O145_NGC1569_01	439	2009-10-01T13:51:01Z
PVSpecAotVal_521X_NstdLineSpec_CP32_O145_NGC1569_01	439	2009-10-01T14:00:14Z
PVSpecAotVal_521X_NstdLineSpec_CP64_C157_NGC1569_01	438	2009-10-01T14:10:38Z
PVSpecAotVal_521X_NstdLineSpec_CP32_C157_NGC1569_01	438	2009-10-01T14:19:49Z
PVSpecAotVal_521X_NstdLineSpec_CP64_O88_NGC1569_01	463	2009-10-01T14:30:14Z
PVSpecAotVal_521X_NstdLineSpec_CP32_O88_NGC1569_01	463	2009-10-01T14:39:52Z
PVSpecAotVal_521X_NstdLineSpec_CP64_OI63_NGC1569_01	482	2009-10-01T14:50:39Z
PVSpecAotVal_521X_NstdLineSpec_CP32_OI63_NGC1569_01	482	2009-10-01T15:00:33Z
PVSpecAotVal_521X_NstdLineSpec_CP64_N57_NGC1569_01	481	2009-10-01T15:11:39Z
PVSpecAotVal_521X_NstdLineSpec_CP32_N57_NGC1569_01	481	2009-10-01T15:21:32Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N205_NGC1569_01	464	2009-10-01T15:35:03Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N205_NGC1569_01	424	2009-10-01T15:45:53Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N121_NGC1569_01	465	2009-10-01T15:58:29Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N121_NGC1569_01	425	2009-10-01T16:09:22Z
PVSpecAotVal_522X_NstdLineSpec_WS64_O145_NGC1569_01	463	2009-10-01T16:21:57Z
PVSpecAotVal_522X_NstdLineSpec_WS32_O145_NGC1569_01	423	2009-10-01T16:32:46Z
PVSpecAotVal_522X_NstdLineSpec_WS64_C157_NGC1569_01	462	2009-10-01T16:45:18Z

Table 169: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_522X_NstdLineSpec_WS32_C157_NGC1569_01	422	2009-10-01T16:56:05Z
PVSpecAotVal_522X_NstdLineSpec_WS64_O88_NGC1569_01	461	2009-10-01T17:08:38Z
PVSpecAotVal_522X_NstdLineSpec_WS32_O88_NGC1569_01	421	2009-10-01T17:19:26Z
PVSpecAotVal_522X_NstdLineSpec_WS64_OI63_NGC1569_01	462	2009-10-01T17:31:55Z
PVSpecAotVal_522X_NstdLineSpec_WS32_OI63_NGC1569_01	422	2009-10-01T17:42:41Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N57_NGC1569_01	461	2009-10-01T17:55:11Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N57_NGC1569_01	421	2009-10-01T18:05:56Z
PVSpecAotVal_523A_NstdRangeSpec_130_136_TX_Cam_0001	1628	2009-10-01T18:18:12Z
PVSpecAotVal_523A_NstdRangeSpec_65_70_TX_Cam_0001	9231	2009-10-01T18:50:33Z
PVSpecFlux_433A_nStdRange_AbsFluxB3A_sirius_0002	2191	2009-10-01T21:37:19Z
PVSpecSetup_na_nStd_orbitepi_na_0011	13	2009-10-01T22:13:53Z

7.4.46 OD0141

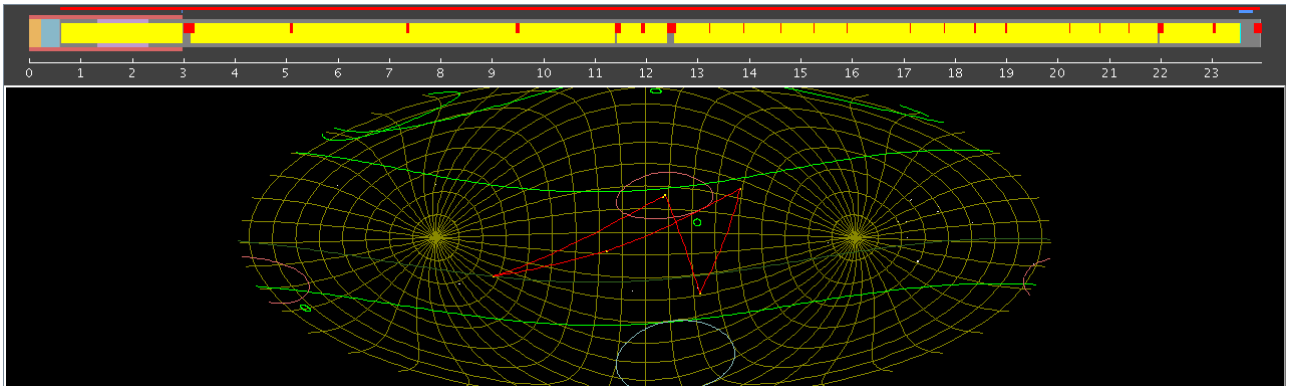


Figure 140: Timeline and distribution of pointings for OD0141 as displayed in the Mission Planning System.

Table 170: Timeline for PACS PV Phase OD0141.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0010	367	2009-10-01T22:58:11Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0010	8109	2009-10-01T23:04:21Z
PVSpecFPG_411G_nStdLinespec_7x7_pm3_w77_HIP21479_02	6577	2009-10-02T01:34:52Z
PVSpecFPG_411G_nStdLinespec_7x7_pmL_w66_HIP21479_01	7851	2009-10-02T03:29:42Z
PVSpecFPG_411G_nStdLinespec_7x7_pmM_w66_HIP21479_01	7366	2009-10-02T05:45:46Z
PVSpecFPG_411G_nStdLinespec_7x7_pmS_w66_HIP21479_01	6590	2009-10-02T07:53:45Z
PVSpecFlux_433A_nStdRange_AbsFluxB2A_sirius_0002	1331	2009-10-02T09:52:54Z
PVSpecFlux_433A_nStdRange_AbsFluxB2B_sirius_0002	1491	2009-10-02T10:20:18Z
PVSpecAotVal_521K_NstdLineSpec_6421_N57_I08572_01	2209	2009-10-02T10:56:36Z
PVSpecAotVal_521K_NstdLineSpec_6412_N57_I08572_01	2209	2009-10-02T11:36:28Z
PVSpecAotVal_521K_NstdLineSpec_6411_N57_I08572_01	2449	2009-10-02T12:16:20Z
PVSpecAotVal_521K_NstdLineSpec_3212_N57_I08572_01	2209	2009-10-02T12:59:00Z
PVSpecAotVal_521K_NstdLineSpec_3221_N57_I08572_01	2209	2009-10-02T13:37:40Z
PVSpecAotVal_521K_NstdLineSpec_3222_N57_I08572_01	2089	2009-10-02T14:16:20Z
PVSpecAotVal_521K_NstdLineSpec_3214_N57_I08572_01	2089	2009-10-02T14:53:00Z
PVSpecAotVal_521K_NstdLineSpec_6412RF_N57_I08572_01	2209	2009-10-02T15:30:52Z
PVSpecAotVal_521K_NstdLineSpec_6421_N122_I08572_01	1989	2009-10-02T16:10:49Z
PVSpecAotVal_521K_NstdLineSpec_6412_N122_I08572_01	1989	2009-10-02T16:47:06Z
PVSpecAotVal_521K_NstdLineSpec_6411_N122_I08572_01	2203	2009-10-02T17:23:23Z
PVSpecAotVal_521K_NstdLineSpec_3212_N122_I08572_01	1989	2009-10-02T18:02:01Z
PVSpecAotVal_521K_NstdLineSpec_3221_N122_I08572_01	1989	2009-10-02T18:37:05Z
PVSpecAotVal_521K_NstdLineSpec_3222_N122_I08572_01	1881	2009-10-02T19:12:09Z
PVSpecAotVal_521K_NstdLineSpec_3214_N122_I08572_01	1881	2009-10-02T19:45:25Z
PVSpecFlux_438E_NstdCoarseRsrf_A_Fortuna_0002	3338	2009-10-02T20:25:47Z
PVSpecFlux_438E_NstdCoarseRsrf_B_Fortuna_0002	1592	2009-10-02T21:26:39Z
PVSpecSetup_na_nStd_orbitepi_na_0012	13	2009-10-02T21:53:14Z

7.4.47 OD0142

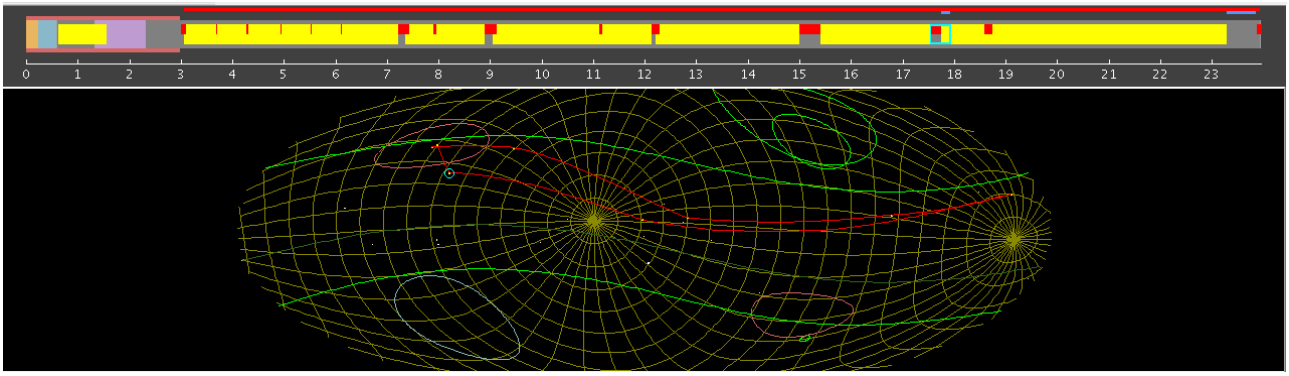


Figure 141: Timeline and distribution of pointings for OD0142 as displayed in the Mission Planning System.

Table 171: Timeline for PACS PV Phase OD0142.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0011	367	2009-10-02T22:55:21Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0011	3009	2009-10-02T23:01:31Z
PVSpecAotVal_521K_NstdLineSpec_6421_C157_I08572_01	1986	2009-10-03T01:25:27Z
PVSpecAotVal_521K_NstdLineSpec_6412_C157_I08572_01	1986	2009-10-03T02:01:39Z
PVSpecAotVal_521K_NstdLineSpec_6411_C157_I08572_01	2200	2009-10-03T02:37:51Z
PVSpecAotVal_521K_NstdLineSpec_3212_C157_I08572_01	1986	2009-10-03T03:16:25Z
PVSpecAotVal_521K_NstdLineSpec_3221_C157_I08572_01	1986	2009-10-03T03:51:25Z
PVSpecAotVal_521K_NstdLineSpec_3222_C157_I08572_01	1878	2009-10-03T04:26:25Z
PVSpecAotVal_521K_NstdLineSpec_3214_C157_I08572_01	1878	2009-10-03T04:59:37Z
PVSpecFlux_438E_NstdCoarseRsrf_B_HD161796_0001	1582	2009-10-03T05:44:53Z
PVSpecFlux_438E_NstdCoarseRsrf_A_HD161796_0001	3328	2009-10-03T06:16:32Z
PVSpecAotVal_524D_NstdSED_ditherA_NGC6302_0001	7074	2009-10-03T07:26:45Z
PVSpecAotVal_524D_NStdSED_ditherB_NGC6302_0001	3380	2009-10-03T09:29:53Z
PVSpecAotVal_523D_NstdRangeSpecDithmap_HD100546_01	6974	2009-10-03T10:36:33Z
PVSpecSetup_na_nStd_setCSs_80_58_na_0001	2704	2009-10-03T12:32:50Z
PVSpecGeGa_123B_nStd_BuffTM_highCS1_Dark_0001	7564	2009-10-03T13:43:19Z
PVSpecGeGa_123A_nStd_BTM_pilot07_Mars_0001	676	2009-10-03T16:03:40Z
PVSpecGeGa_123A_nStd_BTM_pilot09_Mars_0001	676	2009-10-03T16:15:15Z
PVSpecGeGa_123A_nStd_BTM_pilot17_Mars_0001	676	2009-10-03T16:26:52Z
PVSpecGeGa_123A_nStd_BTM_pilot19_Mars_0001	676	2009-10-03T16:38:27Z
PVSpecFlux_438F_nStdSlewCal_B_Mars_0002	152	2009-10-03T16:50:01Z
PVSpecFlux_438F_NstdRange_B_Mars_0001	16240	2009-10-03T17:04:05Z
PVSpecSetup_na_nStd_orbitepi_na_0013	13	2009-10-03T21:34:48Z

7.4.48 OD0146

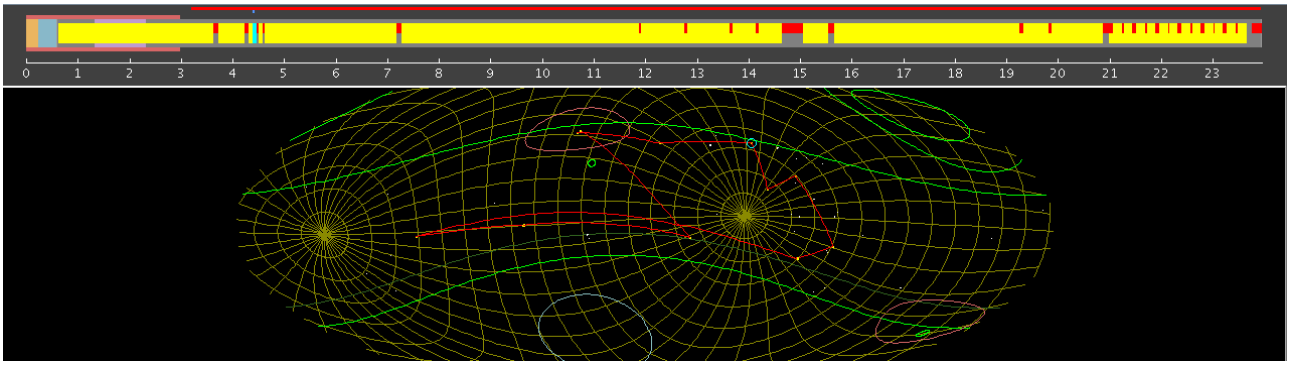


Figure 142: Timeline and distribution of pointings for OD0146 as displayed in the Mission Planning System.

Table 172: Timeline for PACS PV Phase OD0146.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0017	8542	2009-10-06T22:43:56Z
PVPhotSetup_na_nStd_orbitpro40Hz_na_0004	2298	2009-10-07T01:06:22Z
PVPhotAOTVal_512E_StdSmall_grn_Arp55_0001	985	2009-10-07T01:51:58Z
PVPhotAOTVal_512E_StdSmall_blu_Arp55_0001	985	2009-10-07T02:06:26Z
PVPhotFlux_323A_StdPS_lo10Jy_red_Mrk231_0001	341	2009-10-07T02:27:37Z
PVPhotFlux_324A_StdPS_hi10Jy_red_Mrk231_0001	341	2009-10-07T02:31:21Z
PVPhotFlux_321B_StdPS_photcal_blu_betUMi_0011	341	2009-10-07T02:39:12Z
PVPhotAOTVal_511I_nStdPS_08minNod_blu_HD138265_0001	999	2009-10-07T02:46:08Z
PVPhotAOTVal_511I_nStdPS_04minNod_blu_HD138265_0001	1036	2009-10-07T03:03:50Z
PVPhotAOTVal_511I_nStdPS_02minNod_blu_HD138265_0001	1110	2009-10-07T03:22:09Z
PVPhotAOTVal_511I_nStdPS_01minNod_blu_HD138265_0001	1101	2009-10-07T03:41:42Z
PVPhotAOTVal_511I_nStdPS_30secNod_blu_HD138265_0001	1118	2009-10-07T04:01:06Z
PVPhotAOTVal_511I_minimap_blu_HD138265	945	2009-10-07T04:20:47Z
PVPhotAOTVal_511I_minimap_slow_blu_HD138265	1027	2009-10-07T04:34:35Z
PVPhotAOTVal_511I_minimap_gre_HD138265	945	2009-10-07T04:49:45Z
PVPhotAOTVal_511I_minimap_slow_gre_HD138265	1027	2009-10-07T05:03:33Z
PVPhotFlux_326B_Scanmap_slow_minflux_red_HD181597	8333	2009-10-07T05:24:37Z
PVPhotFlux_326B_Scanmap_minflux_red_HD181597	8421	2009-10-07T07:41:33Z
PVPhotSPU_TranspScan_nStd_N6946_blueLowInScan_0001	2933	2009-10-07T10:03:19Z
PVPhotSPU_TranspScan_nStd_N6946_blueLowCrScan_0001	2933	2009-10-07T10:56:01Z
PVPhotSPU_TranspScan_nStd_N6946_blueHigInScan_0001	1580	2009-10-07T11:48:43Z
PVPhotSPU_TranspScan_nStd_N6946_blueHigCrScan_0001	1580	2009-10-07T12:18:52Z
PVPhotAOTVal_514O_StdScan_blu_BetaPic_0001	988	2009-10-07T13:11:13Z
PVPhotAOTVal_514O_StdScan_grn_BetaPic_0001	988	2009-10-07T13:25:44Z
PVPhotAOTVal_514L_StdScan_blu_nom_LINEAR_0001	2563	2009-10-07T13:48:02Z
PVPhotAOTVal_514L_StdScan_blu_ortho_LINEAR_0001	2563	2009-10-07T14:28:48Z
PVPhotAOTVal_514L_StdScan_grn_nom_LINEAR_0001	2563	2009-10-07T15:09:34Z
PVPhotAOTVal_514L_StdScan_grn_ortho_LINEAR_0001	2563	2009-10-07T15:50:20Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0007	13	2009-10-07T16:30:07Z
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0005	367	2009-10-07T16:30:24Z

Table 172: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0005	2709	2009-10-07T16:36:35Z
PVSpecAotVal_524E_NStdSEDChop_slowB_217plinear_0001	1682	2009-10-07T17:26:59Z
PVSpecAotVal_524E_NstdSEDChop_slowA_217plinear_0001	3530	2009-10-07T18:00:19Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N205_NGC1569_02	556	2009-10-07T19:11:53Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N205_NGC1569_02	516	2009-10-07T19:24:16Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N121_NGC1569_02	557	2009-10-07T19:38:25Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N121_NGC1569_02	517	2009-10-07T19:50:51Z
PVSpecAotVal_522X_NstdLineSpec_WS64_O145_NGC1569_02	555	2009-10-07T20:04:59Z
PVSpecAotVal_522X_NstdLineSpec_WS32_O145_NGC1569_02	515	2009-10-07T20:17:21Z
PVSpecAotVal_522X_NstdLineSpec_WS64_O88_NGC1569_02	553	2009-10-07T20:31:28Z
PVSpecAotVal_522X_NstdLineSpec_WS32_O88_NGC1569_02	513	2009-10-07T20:43:49Z
PVSpecAotVal_522X_NstdLineSpec_WS64_OI63_NGC1569_02	554	2009-10-07T20:57:51Z
PVSpecAotVal_522X_NstdLineSpec_WS32_OI63_NGC1569_02	514	2009-10-07T21:10:10Z
PVSpecAotVal_522X_NstdLineSpec_WS64_N57_NGC1569_02	553	2009-10-07T21:24:13Z
PVSpecAotVal_522X_NstdLineSpec_WS32_N57_NGC1569_02	513	2009-10-07T21:36:31Z
PVSpecSetup_na_nStd_orbitepi_na_0014	13	2009-10-07T21:45:08Z

7.4.49 OD0147

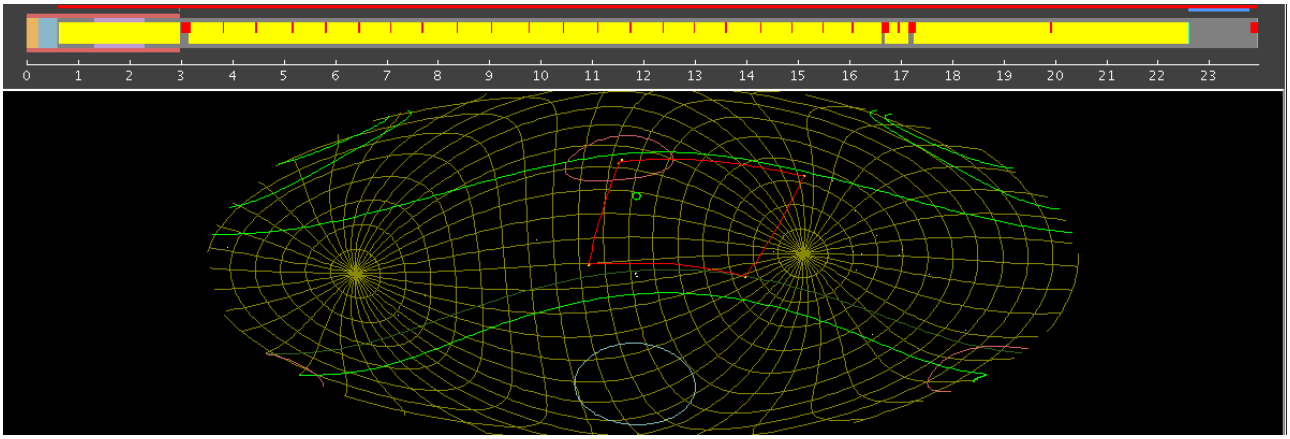


Figure 143: Timeline and distribution of pointings for OD0147 as displayed in the Mission Planning System.

Table 173: Timeline for PACS PV Phase OD0147.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0012	367	2009-10-07T22:41:01Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0012	8109	2009-10-07T22:47:12Z
PVSpecAotVal_521K_NstdLineSpec_6421_O88_Mkn231_01	2119	2009-10-08T01:16:22Z
PVSpecAotVal_521K_NstdLineSpec_6412_O88_Mkn231_01	2119	2009-10-08T01:55:07Z
PVSpecAotVal_521K_NstdLineSpec_6411_O88_Mkn231_01	2349	2009-10-08T02:33:52Z
PVSpecAotVal_521K_NstdLineSpec_3212_O88_Mkn231_01	2119	2009-10-08T03:16:26Z
PVSpecAotVal_521K_NstdLineSpec_3221_O88_Mkn231_01	2119	2009-10-08T03:55:10Z
PVSpecAotVal_521K_NstdLineSpec_3222_O88_Mkn231_01	2005	2009-10-08T04:33:54Z
PVSpecAotVal_521K_NstdLineSpec_3214_O88_Mkn231_01	2005	2009-10-08T05:10:44Z
PVSpecAotVal_521K_NstdLineSpec_6421_N57_Mkn231_01	2209	2009-10-08T05:47:30Z
PVSpecAotVal_521K_NstdLineSpec_6412_N57_Mkn231_01	2209	2009-10-08T06:27:40Z
PVSpecAotVal_521K_NstdLineSpec_6411_N57_Mkn231_01	2449	2009-10-08T07:07:50Z
PVSpecAotVal_521K_NstdLineSpec_3212_N57_Mkn231_01	2209	2009-10-08T07:52:00Z
PVSpecAotVal_521K_NstdLineSpec_3221_N57_Mkn231_01	2209	2009-10-08T08:32:10Z
PVSpecAotVal_521K_NstdLineSpec_3222_N57_Mkn231_01	2089	2009-10-08T09:12:20Z
PVSpecAotVal_521K_NstdLineSpec_3214_N57_Mkn231_01	2089	2009-10-08T09:50:30Z
PVSpecAotVal_521K_NstdLineSpec_6421_N122_Mkn231_01	1989	2009-10-08T10:28:44Z
PVSpecAotVal_521K_NstdLineSpec_6412_N122_Mkn231_01	1989	2009-10-08T11:05:18Z
PVSpecAotVal_521K_NstdLineSpec_6411_N122_Mkn231_01	2203	2009-10-08T11:41:52Z
PVSpecAotVal_521K_NstdLineSpec_3212_N122_Mkn231_01	1989	2009-10-08T12:22:00Z
PVSpecAotVal_521K_NstdLineSpec_3221_N122_Mkn231_01	1989	2009-10-08T12:58:34Z
PVSpecAotVal_521K_NstdLineSpec_3222_N122_Mkn231_01	1881	2009-10-08T13:35:08Z
PVSpecAotVal_521K_NstdLineSpec_3214_N122_Mkn231_01	1881	2009-10-08T14:09:54Z
PVSpecAotVal_522X_NstdLineSpec_WS64_C157_NGC1569_02	554	2009-10-08T14:50:42Z
PVSpecAotVal_522X_NstdLineSpec_WS32_C157_NGC1569_02	514	2009-10-08T15:03:02Z
PVSpecAotVal_522X_NstdLineSpec_WSrs_C157_IIzw40_01	4872	2009-10-08T15:23:11Z
PVSpecAotVal_521X_NstdLineSpec_CPrs_C157_IIzw40_01	4310	2009-10-08T16:46:17Z
PVSpecAotVal_522X_NstdLineSpec_WSrs_O88_IIzw40_01	4871	2009-10-08T18:01:15Z

Table 173: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521X_NstdLineSpec_CPrs_O88_IIzw40_01	4543	2009-10-08T19:24:22Z
PVSpecSetup_na_nStd_orbitepi_na_0015	13	2009-10-08T20:40:09Z

7.4.50 OD0151

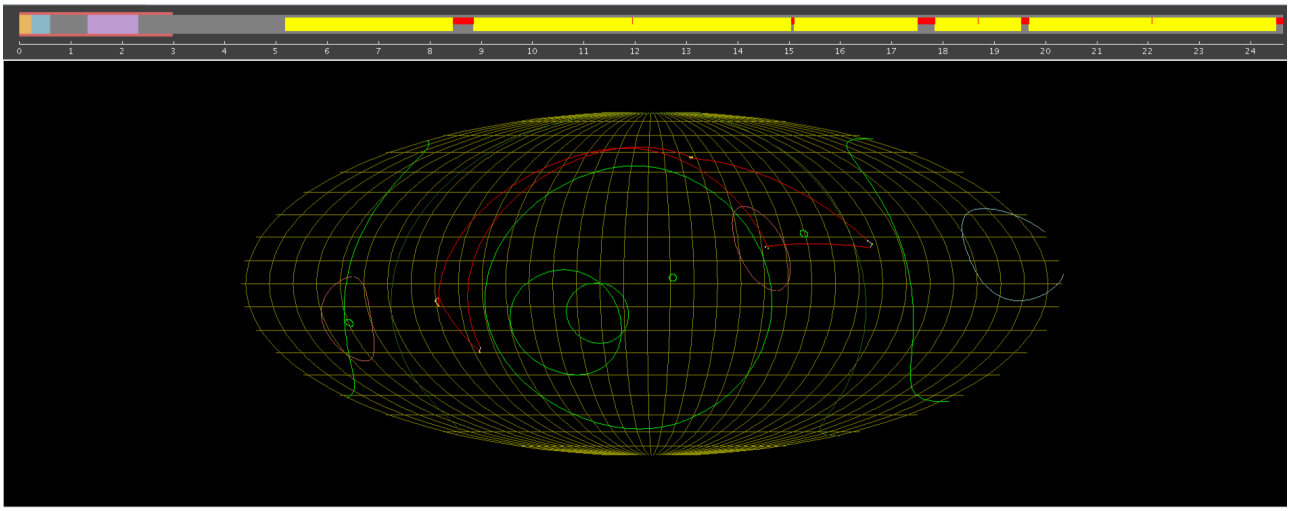


Figure 144: Timeline and distribution of pointings for OD0151 as displayed in the Mission Planning System.

Table 174: Timeline for SPIRE/PACS parallel mode PV Phase OD0151.

Calibration AOR	duration (s)	absolute start time
SpireEngCoolerRecycleGen-0000	9081	2009-10-12T03:03:21Z
SpireEngLoadTablesGen-0000	15	2009-10-12T05:34:46Z
SpireEngREDYtoPHOT_STBYGen-PtcOff	382	2009-10-12T05:35:05Z
SpirePacsEng_Parallel_PacsPrologueGen-0000	2263	2009-10-12T05:41:31Z
PVParAOTVal_515C_StdPar_blu_fast_HGal_Lamp_nom	11224	2009-10-12T06:44:43Z
PVParAOTVal_515C_StdPar_blu_fast_HGal_Lamp_orto	11224	2009-10-12T09:49:57Z
SPPara-SgrB2-Slow-Bright-110x30	8740	2009-10-12T13:00:00Z
SpirePacsParallelGen-speed30-Lockman-nom-30x30	2941	2009-10-12T15:43:43Z
SpirePacsParallelGen-speed30-Lockman-orth-30x30	2941	2009-10-12T16:33:55Z
SPPara-Nom-Field_193_0-100x100	8696	2009-10-12T17:34:07Z
SPPara-Orth-Field_193_0-100x100	8696	2009-10-12T19:57:13Z
SpireEngPHOT_STBYtoREDYGen-0000	130	2009-10-12T22:19:13Z
SpirePacsEng_Parallel_PacsEpilogueGen-0000	13	2009-10-12T22:21:27Z

7.4.51 OD0154

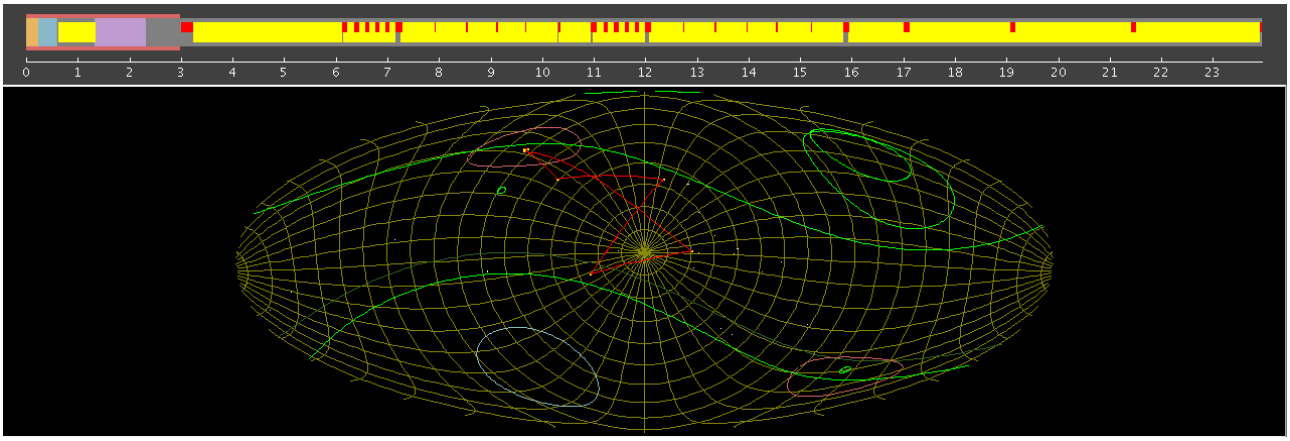


Figure 145: Timeline and distribution of pointings for OD0154 as displayed in the Mission Planning System.

Table 175: Timeline for PACS PV Phase OD0154.

Calibration AOR	duration (s)	absolute start time
PVMechChop_232A_nStd_PidVeriDefault_DmcTemp_na_0002	89	2009-10-14T22:19:46Z
PVSpecSetup_na_nStd_SetupFlexDark_na_0002	367	2009-10-14T22:21:19Z
PVSpecSetup_na_nStd_SpuSetupAndResetDark_na_0002	2109	2009-10-14T22:27:30Z
PVSpecFlux_438A_nStdQuickFull_CS1_DarkField_0003	3689	2009-10-15T00:57:11Z
PVSpecFlux_438A_nStdQuickFull_CS2_DarkField_0003	3689	2009-10-15T01:59:12Z
PVSpecSetup_na_nStd_setCSsTemp_na_0001	2904	2009-10-15T03:00:45Z
PVSpecAotVal_521H_NstdLine_NC_322_CII_NGC1569_01	379	2009-10-15T03:57:46Z
PVSpecAotVal_521H_NstdLine_NC_322_N121_NGC1569_01	382	2009-10-15T04:09:38Z
PVSpecAotVal_521H_NstdLine_NC_322_N205_NGC1569_01	381	2009-10-15T04:21:31Z
PVSpecAotVal_521H_NstdLine_NC_322_N57_NGC1569_01	378	2009-10-15T04:33:21Z
PVSpecAotVal_521H_NstdLine_NC_322_O88_NGC1569_01	378	2009-10-15T04:45:11Z
PVSpecAotVal_521B_NstdLineSpec_6412_O88_Mkn231_01	2155	2009-10-15T05:00:57Z
PVSpecAotVal_521B_NstdLineSpec_3222_O88_Mkn231_01	2039	2009-10-15T05:40:17Z
PVSpecAotVal_521B_NstdLineSpec_6412_N122_Mkn231_01	1889	2009-10-15T06:17:41Z
PVSpecAotVal_521B_NstdLineSpec_3222_N122_Mkn231_01	1787	2009-10-15T06:52:35Z
PVSpecAotVal_521B_NstdLineSpec_6412_N57_Mkn231_01	2119	2009-10-15T07:25:43Z
PVSpecAotVal_521B_NstdLineSpec_3222_N57_Mkn231_01	2005	2009-10-15T08:04:23Z
PVSpecAotVal_521H_NstdLine_NC_642_CII_NGC1569_01	379	2009-10-15T08:47:16Z
PVSpecAotVal_521H_NstdLine_NC_642_N121_NGC1569_01	382	2009-10-15T08:59:08Z
PVSpecAotVal_521H_NstdLine_NC_642_N205_NGC1569_01	381	2009-10-15T09:11:01Z
PVSpecAotVal_521H_NstdLine_NC_642_N57_NGC1569_01	378	2009-10-15T09:22:51Z
PVSpecAotVal_521H_NstdLine_NC_642_O88_NGC1569_01	378	2009-10-15T09:34:41Z
PVSpecAotVal_521K_NstdLineSpec_6412_O88_Mkn231_02	2119	2009-10-15T09:50:27Z
PVSpecAotVal_521K_NstdLineSpec_3222_O88_Mkn231_02	2005	2009-10-15T10:29:11Z
PVSpecAotVal_521K_NstdLineSpec_6412_N122_Mkn231_02	1989	2009-10-15T11:06:01Z
PVSpecAotVal_521K_NstdLineSpec_3222_N122_Mkn231_02	1881	2009-10-15T11:42:35Z
PVSpecAotVal_521K_NstdLineSpec_6412_N57_Mkn231_02	2209	2009-10-15T12:17:17Z
PVSpecAotVal_521K_NstdLineSpec_3222_N57_Mkn231_02	2089	2009-10-15T12:57:27Z

Table 175: continued.

Calibration AOR	duration (s)	absolute start time
PVSpecAotVal_521B_NstdLineSpec_3222_C157_I08572_01	1715	2009-10-15T13:40:40Z
PVSpecAotVal_521K_NstdLineSpec_3222_C157_I08572_02	1878	2009-10-15T14:11:10Z
PVSpecFlux_438B_NstdRange_RsrfA_1_Vesta_0001	6949	2009-10-15T14:50:02Z
PVSpecFlux_438B_NstdRange_RsrfA_2_Vesta_0001	8004	2009-10-15T16:53:22Z
PVSpecFlux_438B_NstdRange_RsrfA_3_Vesta_0001	8488	2009-10-15T19:14:14Z
PVSpecSetup_na_nStd_orbitepi_na_0016	13	2009-10-15T21:35:46Z

7.4.52 OD0155

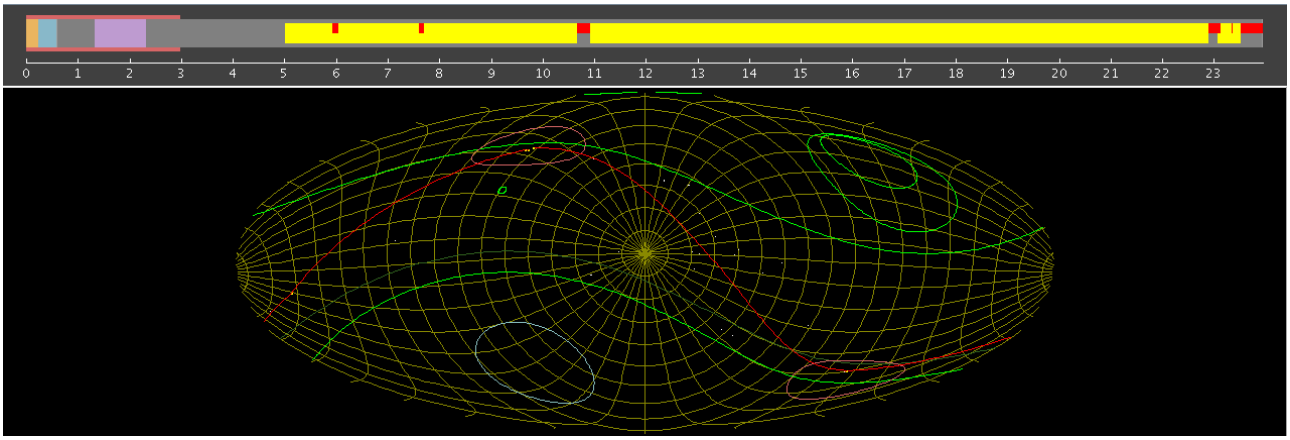


Figure 146: Timeline and distribution of pointings for OD0155 as displayed in the Mission Planning System.

Table 176: Timeline for PACS PV Phase OD0155.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0013	367	2009-10-16T02:40:25Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0013	2909	2009-10-16T02:46:36Z
PVSpecFlux_438B_NstdRange_RsrfB_1_Vesta_0001	5529	2009-10-16T03:42:36Z
PVSpecFlux_438B_NstdRange_RsrfB_2_Vesta_0001	10617	2009-10-16T05:22:16Z
PVSpecFPG_411H_nStdLineSpec_L7x7_315m35_12_RDor_01	6590	2009-10-16T08:35:08Z
PVSpecFPG_411H_nStdLineSpec_L7x7_315p15_12_RDor_01	6590	2009-10-16T10:25:40Z
PVSpecFPG_411H_nStdLineSpec_L7x7_265m35_12_RDor_01	6590	2009-10-16T12:16:12Z
PVSpecFPG_411H_nStdLineSpec_L7x7_905m35_12_RDor_01	7366	2009-10-16T14:06:44Z
PVSpecFPG_411H_nStdLineSpec_L7x7_180m6_12_RDor_01	7851	2009-10-16T16:10:12Z
PVSpecFPG_411H_nStdLineSpec_L7x7_180m6_11_RDor_01	7851	2009-10-16T18:21:45Z
PVSpecWave_421A_nStdRS_nochoporderA_Jupiter_0001	695	2009-10-16T20:47:11Z
PVSpecWave_421A_nStdRS_nochoporderB_Jupiter_0002	418	2009-10-16T21:02:12Z
PVSpecSetup_na_nStd_orbitepi_na_0017	13	2009-10-16T21:09:14Z

7.4.53 OD0156

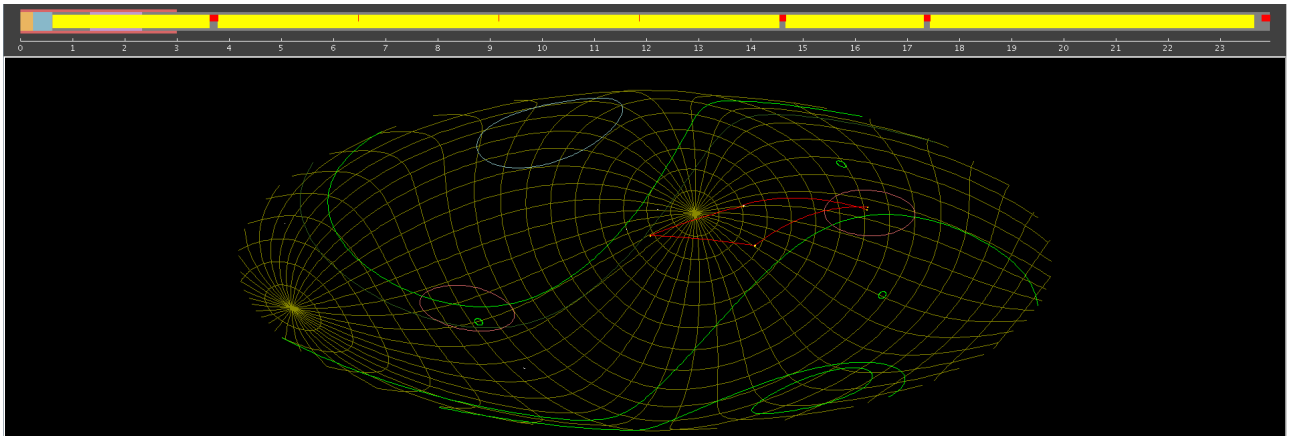


Figure 147: Timeline and distribution of pointings for OD0156 as displayed in the Mission Planning System.

Table 177: Timeline for PACS SD Phase OD0156.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0020	8542	2009-10-16T22:13:22Z
PVPhotSetup_na_nStd_orbitpro40Hz_na_0006	2298	2009-10-17T00:35:48Z
SDP_dlutz_3-GOODS-N_d+8+8_forward_r1_longaxis	4565	2009-10-17T01:24:29Z
SDP_dlutz_3-GOODS-N_d+8+8_forward_r1_shortaxis	5235	2009-10-17T01:24:29Z
SDP_dlutz_3-GOODS-N_d+8+8_reverse_r1_longaxis	4565	2009-10-17T04:05:56Z
SDP_dlutz_3-GOODS-N_d+8+8_reverse_r1_shortaxis	5235	2009-10-17T04:05:56Z
SDP_dlutz_3-GOODS-N_d+8+8_forward_r2_longaxis	4565	2009-10-17T06:47:23Z
SDP_dlutz_3-GOODS-N_d+8+8_forward_r2_shortaxis	5235	2009-10-17T06:47:23Z
SDP_dlutz_3-GOODS-N_d+8+8_reverse_r2_longaxis	4565	2009-10-17T09:28:50Z
SDP_dlutz_3-GOODS-N_d+8+8_reverse_r2_shortaxis	5235	2009-10-17T09:28:50Z
SDP_okrause_3-Launhardt PACS-1 - CB230	4870	2009-10-17T12:17:43Z
SDP_okrause_3-Launhardt PACS-2 - CB230	4749	2009-10-17T12:17:43Z
SDP_cwilso01_3-PPhoto-m81	11284	2009-10-17T15:03:17Z
SDP_cwilso01_3-PPhoto-m81 - copy	11163	2009-10-17T15:03:17Z
PVPhotSetup_na_nStd_orbitepi_na_0026	13	2009-10-17T21:14:34Z

7.4.54 OD0157

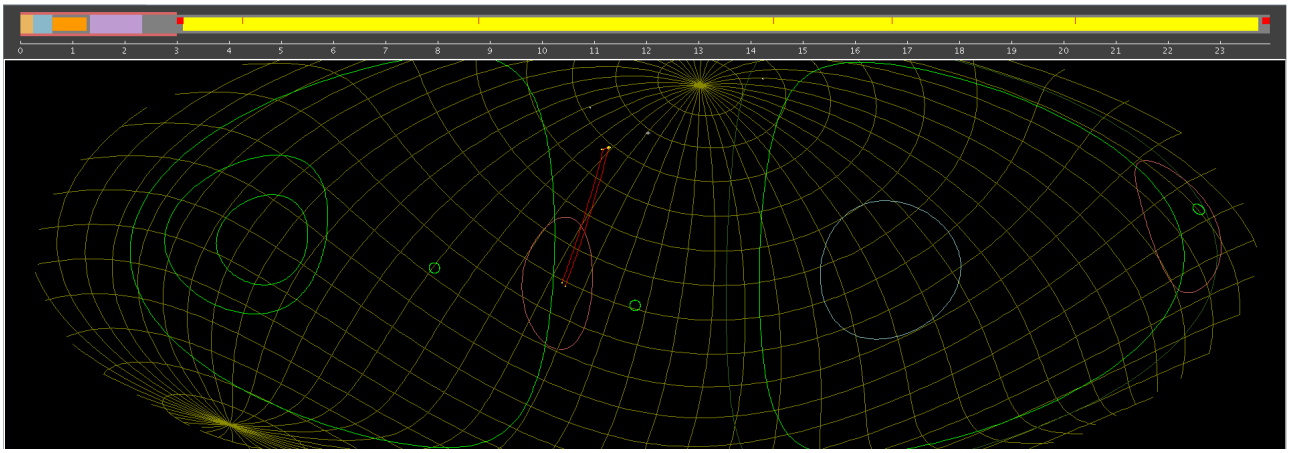


Figure 148: Timeline and distribution of pointings for OD0157 as displayed in the Mission Planning System.

Table 178: Timeline for PACS SD Phase OD0157.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproVRL_na_0008	2339	2009-10-17T22:10:08Z
SDP_soliver_3-HerMES-SDP-3-000-Rep3	4187	2009-10-18T00:41:28Z
SDP_soliver_3-HerMES-SDP-3-180-Rep1	4187	2009-10-18T01:49:18Z
SDP_soliver_3-HerMES-SDP-3-000-Rep1	4187	2009-10-18T02:57:08Z
SDP_soliver_3-HerMES-SDP-3-180-Rep3	4187	2009-10-18T04:04:58Z
SDP_soliver_3-HerMES-SDP-3-000-Rep2	4187	2009-10-18T05:12:48Z
SDP_soliver_3-HerMES-SDP-3-180-Rep2	4187	2009-10-18T06:20:38Z
SDP_soliver_3-HerMES-SDP-3-270-Rep1	4187	2009-10-18T07:28:28Z
SDP_soliver_3-HerMES-SDP-3-090-Rep2	4187	2009-10-18T08:36:18Z
SDP_soliver_3-HerMES-SDP-3-270-Rep3	4187	2009-10-18T09:44:08Z
SDP_soliver_3-HerMES-SDP-3-090-Rep1	4187	2009-10-18T10:51:58Z
SDP_soliver_3-HerMES-SDP-3-270-Rep2	4187	2009-10-18T11:59:48Z
SDP_soliver_3-HerMES-SDP-3-090-Rep3	4187	2009-10-18T13:07:38Z
KPGT_dlutz_1-Lockman_d+0+0_forward_r2_E-W	6429	2009-10-18T14:16:20Z
KPGT_dlutz_1-Lockman_d+0+0_forward_r2_N-S	6308	2009-10-18T14:16:20Z
KPGT_dlutz_1-Lockman_d+0+0_reverse_r2_E-W	6429	2009-10-18T17:46:44Z
KPGT_dlutz_1-Lockman_d+0+0_reverse_r2_N-S	6308	2009-10-18T17:46:44Z
PVPhotSetup_na_nStd_orbitepi_na_0027	13	2009-10-18T21:16:09Z

7.4.55 OD0160

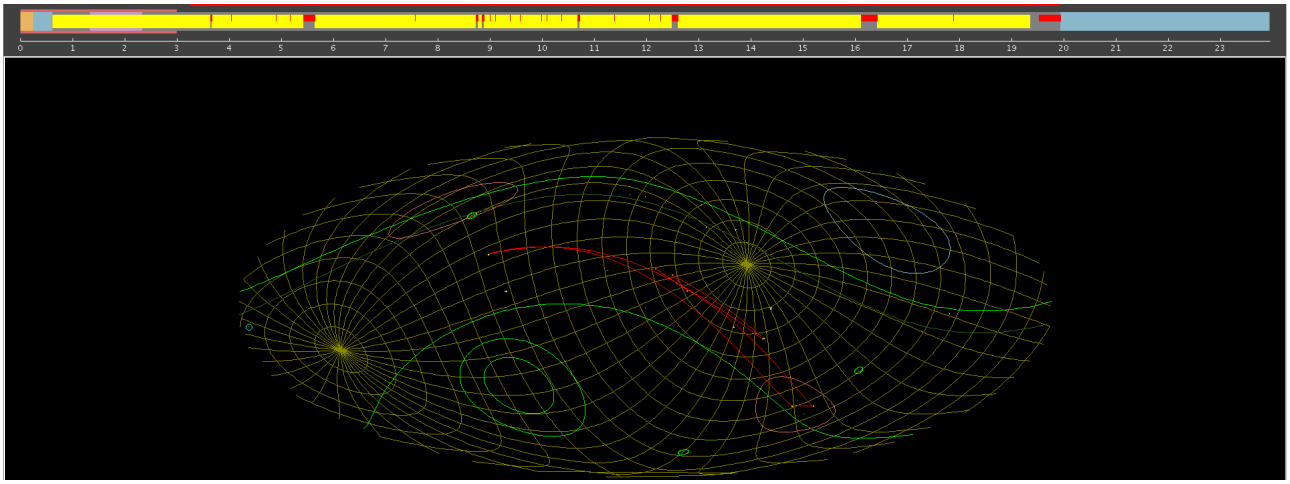


Figure 149: Timeline and distribution of pointings for OD0160 as displayed in the Mission Planning System.

Table 179: Timeline for PACS PV Phase OD0160.

Calibration AOR	duration (s)	absolute start time
PVPhotCooler_117_nStd_na_na_0021	8542	2009-10-20T22:00:21Z
PVPhotSetup_na_nStd_orbitproVRL_na_0009	2339	2009-10-21T00:22:47Z
PVPhotSpatial_314D_StdScan_grnlow_Vesta_0001	1407	2009-10-21T01:05:02Z
PVPhotSpatial_314D_StdScan_grnmed_Vesta_0001	1045	2009-10-21T01:26:32Z
PVPhotSpatial_314D_StdScan_grnhigh_Vesta_0001	1011	2009-10-21T01:42:00Z
PVPhotSpatial_314D_StdScan_blulow_Vesta_0001	1407	2009-10-21T01:56:54Z
PVPhotSpatial_314D_StdScan_blumed_Vesta_0001	1045	2009-10-21T02:18:24Z
PVPhotSpatial_314D_StdScan_bluhigh_Vesta_0001	1011	2009-10-21T02:33:52Z
PVPhotSpatial_313C_NStd_blu_N6285c200_0001	6857	2009-10-21T03:02:41Z
PVPhotSpatial_313C_NStd_blu_N6285c40_0001	4121	2009-10-21T04:58:01Z
PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0001	341	2009-10-21T06:10:33Z
PVPhotAOTVal_511J_StdPS_2rep_blu_HD148387_001	498	2009-10-21T06:17:47Z
PVPhotAOTVal_511J_PSscan_slow_80deg_blu_HD148387_001	473	2009-10-21T06:24:08Z
PVPhotAOTVal_511J_PSscan_slow_100deg_blu_HD148387_001	473	2009-10-21T06:30:04Z
PVPhotAOTVal_511J_PSscan_slow_60deg_blu_HD148387_001	446	2009-10-21T06:36:00Z
PVPhotAOTVal_511J_PSscan_slow_120deg_blu_HD148387_001	446	2009-10-21T06:41:29Z
PVPhotAOTVal_511J_PSscan_medium_70deg_blu_HD148387_001	462	2009-10-21T06:46:58Z
PVPhotAOTVal_511J_PSscan_medium_110deg_blu_HD148387_001	462	2009-10-21T06:52:43Z
PVPhotAOTVal_511J_PSscan_low_85deg_blu_HD148387_001	500	2009-10-21T06:58:28Z
PVPhotAOTVal_511J_PSscan_low_95deg_blu_HD148387_001	500	2009-10-21T07:04:51Z
PVPhotAOTVal_511J_StdPS_2rep_grn_HD148387_001	498	2009-10-21T07:11:14Z
PVPhotAOTVal_511J_PSscan_slow_80deg_grn_HD148387_001	473	2009-10-21T07:17:35Z
PVPhotAOTVal_511J_PSscan_slow_100deg_grn_HD148387_001	473	2009-10-21T07:23:31Z
PVPhotAOTVal_511J_PSscan_slow_60deg_grn_HD148387_001	446	2009-10-21T07:29:27Z
PVPhotAOTVal_511J_PSscan_slow_120deg_grn_HD148387_001	446	2009-10-21T07:34:56Z
PVPhotAOTVal_511J_PSscan_medium_70deg_grn_HD148387_001	462	2009-10-21T07:40:25Z
PVPhotAOTVal_511J_PSscan_medium_110deg_grn_HD148387_001	462	2009-10-21T07:46:10Z

Table 179: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotAOTVal_511J_PSscan_low_85deg_grn_HD148387_001	500	2009-10-21T07:51:55Z
PVPhotAOTVal_511J_PSscan_low_95deg_grn_HD148387_001	500	2009-10-21T07:58:18Z
PVPhotAOTVal_511J_StdPS_10rep_grn_HD159330_001	1754	2009-10-21T08:07:13Z
PVPhotAOTVal_511J_PSscan_slow_80deg_grn_HD159330_001	881	2009-10-21T08:34:30Z
PVPhotAOTVal_511J_PSscan_slow_100deg_grn_HD159330_001	881	2009-10-21T08:47:14Z
PVPhotAOTVal_511J_StdPS_10rep_blu_HD159330_001	1754	2009-10-21T08:59:58Z
PVPhotAOTVal_511J_PSscan_slow_80deg_blu_HD159330_001	881	2009-10-21T09:27:15Z
PVPhotAOTVal_511J_PSscan_slow_100deg_blu_HD159330_001	881	2009-10-21T09:39:59Z
KPGT_dlutz_1-2009-10-21T10:00:46Z	6429	2009-10-21T10:00:46Z
KPGT_dlutz_1-2009-10-21T10:00:46Z	6308	2009-10-21T10:00:46Z
SDP_smadde01_3-2009-10-21T13:50:04Z	2732	2009-10-21T13:50:04Z
SDP_smadde01_3-2009-10-21T13:50:04Z	2732	2009-10-21T13:50:04Z
SDP_smadde01_3-2009-10-21T15:17:18Z	2732	2009-10-21T15:17:18Z
SDP_smadde01_3-2009-10-21T15:17:18Z	2732	2009-10-21T15:17:18Z
PVPhotSetup_na_nStd_orbitepi_na_0028	13	2009-10-21T16:19:22Z
SOPS window for gyro scale calibration - finally fixed to 4 h		

7.4.56 OD0161

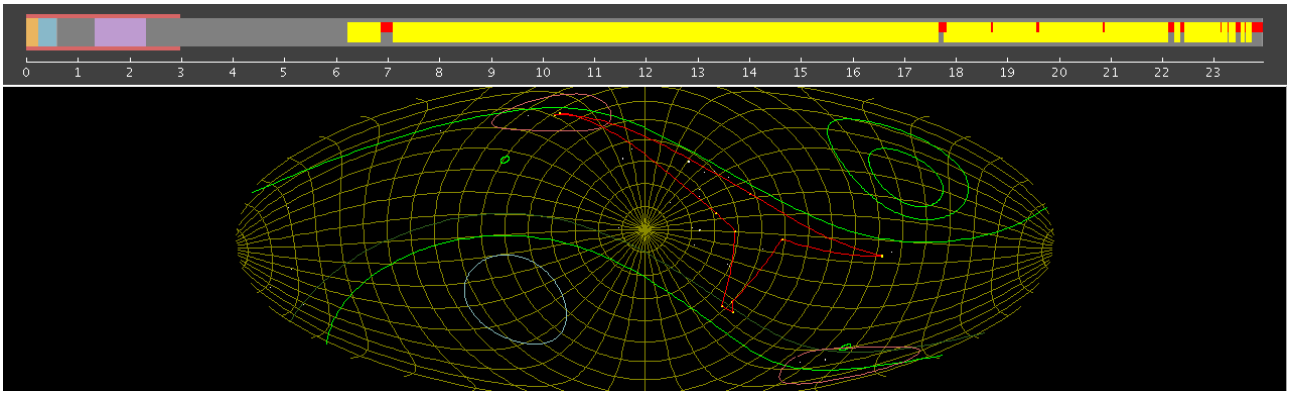


Figure 150: Timeline and distribution of pointings for OD0161 as displayed in the Mission Planning System.

Table 180: Timeline for PACS PV Phase OD0161.

Calibration AOR	duration (s)	absolute start time
extended DTCP of 6 h for STR dump activities		
PVPhotSetup_na_nStd_orbitpro40Hz_na_0007	2298	2009-10-22T03:33:46Z
PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_01	9604	2009-10-22T04:27:07Z
PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_02	9604	2009-10-22T07:05:14Z
PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_03	9604	2009-10-22T09:43:21Z
PVPhotFPG_261B_PS_blu_SAA+25+30_HIP80704_OD161_04	9604	2009-10-22T12:21:28Z
PVPhotSPU_TranspScan_nStd_GP_blueHigInScan_0001	2982	2009-10-22T15:10:07Z
PVPhotSPU_TranspScan_nStd_GP_blueHigCrScan_0001	2982	2009-10-22T16:03:38Z
PVPhotSPU_TranspScan_nStd_GP_blueMedInScan_0001	4378	2009-10-22T16:57:09Z
PVPhotSPU_TranspScan_nStd_GP_blueMedCrScan_0001	4378	2009-10-22T18:13:56Z
PVPhotSpatial_312B_NStd_blu_2MASSJ18_0001	275	2009-10-22T19:35:33Z
PVPhotFlux_323A_StdPS_lo1000Jy_blu_NMLCyg_0001	341	2009-10-22T19:46:54Z
PVPhotFlux_323A_StdPS_lo500Jy_grn_NMLCyg_0001	341	2009-10-22T19:50:38Z
PVPhotSpatial_314E_StdSmall_blu_NMLCyg_0001	985	2009-10-22T19:54:22Z
PVPhotSpatial_314E_StdSmall_grn_NMLCyg_0001	985	2009-10-22T20:08:50Z
PVPhotFlux_323A_StdPS_lo1000Jy_blu_CRL2688_0001	341	2009-10-22T20:25:06Z
PVPhotFlux_323A_StdPS_lo1000Jy_grn_CRL2688_0001	341	2009-10-22T20:28:50Z
PVPhotFlux_324A_StdPS_hi200Jy_red_CRL2688_0001	341	2009-10-22T20:32:34Z
PVPhotFlux_323A_StdPS_lo500Jy_blu_NGC7027_0001	341	2009-10-22T20:38:20Z
PVPhotFlux_323A_StdPS_lo500Jy_grn_NGC7027_0001	341	2009-10-22T20:42:04Z
PVPhotFlux_321B_StdPS_photcal_blu_gamDra_0002	341	2009-10-22T20:51:40Z
PVPhotSpatial_312B_NStd_blu_N6285_0001	275	2009-10-22T20:58:12Z
PVPhotSetup_na_nStd_orbitepi_na_0029	13	2009-10-22T21:02:51Z

7.4.57 OD0165

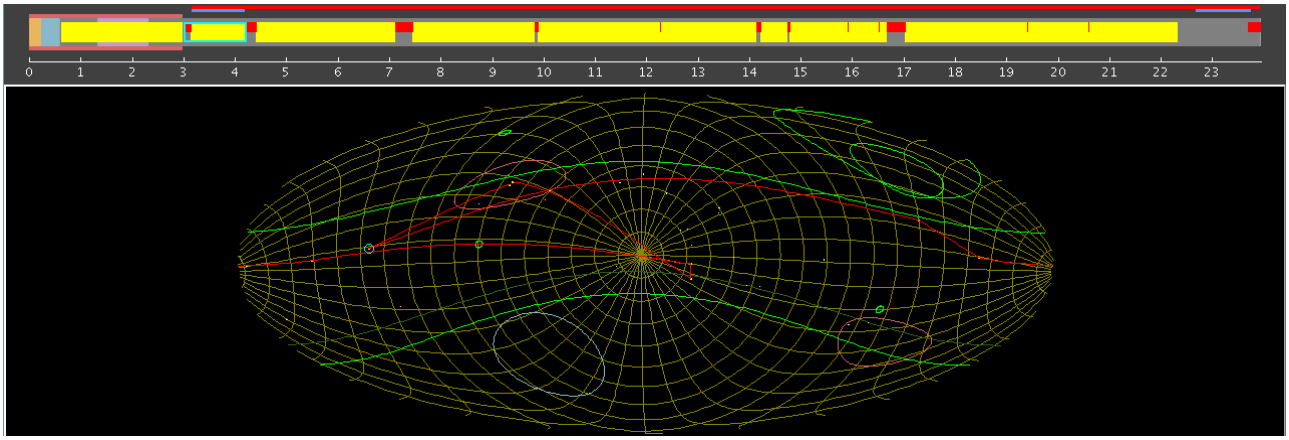


Figure 151: Timeline and distribution of pointings for OD0165 as displayed in the Mission Planning System.

Table 181: Timeline for PACS PV Phase OD0165.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0014	367	2009-10-25T21:44:16Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0014	8109	2009-10-25T21:50:27Z
SDP_esturm_3-NearGalPACS-lowmet-he2-10-OIIINII-point	2869	2009-10-26T00:17:47Z
SDP_esturm_3-NearGalPACS-lowmet-he2-10-4lines-point	1071	2009-10-26T00:17:47Z
SDP_aedge_3-PSpecL-A1068_OI	5175	2009-10-26T01:33:21Z
SDP_aedge_3-PSpecL-A1068_CII	4663	2009-10-26T02:58:41Z
SDP_bdent_3_HD_169142_Ib_CII_OI145_H2O_nsdt_01	6573	2009-10-26T04:37:24Z
SDP_bdent_3-HD_169142_Ib_dither_OI63	1849	2009-10-26T06:29:03Z
SDP_bdent_3-HD_181327_Ia_dither_OI63	1849	2009-10-26T07:03:08Z
SDP_bdent_3_HD_181327_Ib_CII_OI145_H2O_nsdt_01	6573	2009-10-26T07:33:06Z
SDP_bdent_3_HD_J0843.3-7905_Ib_CII_OI145_H2O_nsdt	6573	2009-10-26T09:24:48Z
SDP_bdent_3-J0843.3-7905_Ib_dither_OI63	1849	2009-10-26T11:23:15Z
SDP_evandish_3-PACS set 1 Class I - HH 46	4075	2009-10-26T11:57:22Z
SDP_evandish_3-PACS set 2 - Class I - HH 46	2180	2009-10-26T13:04:23Z
SDP_evandish_3-PACS HH46 red	590	2009-10-26T13:39:52Z
SDP_evandish_3-PACS - L1157 C	4315	2009-10-26T14:11:37Z
SDP_evandish_3-PACS - L1157 N	4315	2009-10-26T15:22:41Z
SDP_evandish_3-PACS - L1157 S	4315	2009-10-26T16:33:41Z
SDP_evandish_3-PACS setting 1 H2O 212-101 - NGC 7129 FIRS2	4075	2009-10-26T17:45:46Z
SDP_evandish_3-PACS setting 2 - NGC 7129 FIRS2	2180	2009-10-26T18:52:47Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0005	13	2009-10-26T19:26:11Z

7.4.58 OD0166

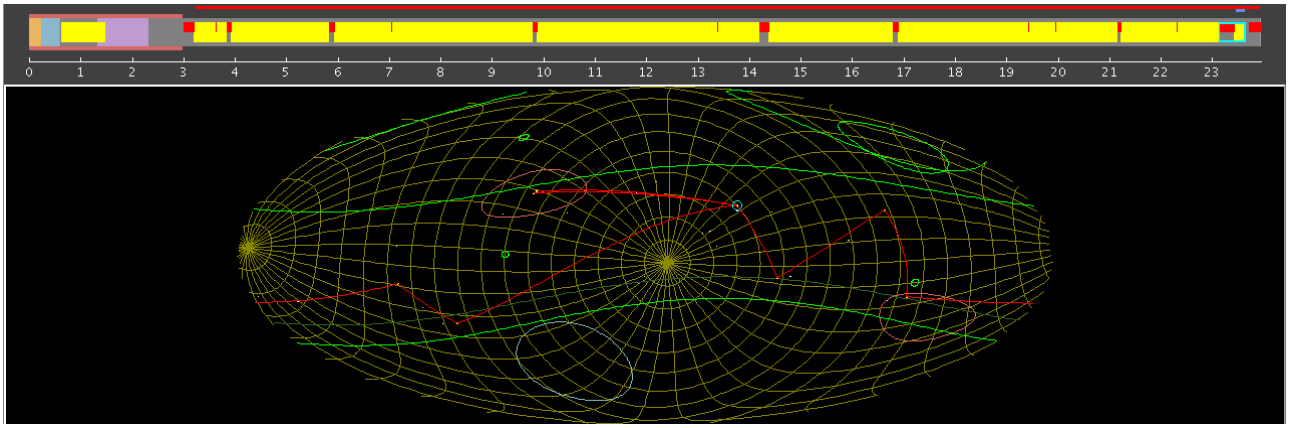


Figure 152: Timeline and distribution of pointings for OD0166 as displayed in the Mission Planning System.

Table 182: Timeline for PACS PV Phase OD0166. OD0166 failed successful execution! Grating went in hardstop, no science TM received!

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0006	367	2009-10-26T21:41:08Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0006	2709	2009-10-26T21:47:19Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0001	636	2009-10-27T00:18:40Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0001	634	2009-10-27T00:31:23Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0001	632	2009-10-27T00:44:02Z
PVSpecAotVal_524F_NstdSEDChop_A_ngc7027_0001	3786	2009-10-27T01:01:45Z
PVSpecAotVal_524F_NStdSEDChop_B_ngc7027_0001	2759	2009-10-27T02:06:59Z
PVSpecAotVal_524F_NstdSEDChop_A_christensen_0001	3796	2009-10-27T03:03:08Z
PVSpecAotVal_524F_NStdSEDChop_B_christensen_0001	2782	2009-10-27T04:08:32Z
SDP_pharto01_3-PACS dedicated line spectroscopy	7017	2009-10-27T04:57:04Z
PVSpecAotVal_523B_NStdRange_60_64_neptune_0001	8546	2009-10-27T06:58:38Z
PVSpecAotVal_524F_NstdSEDChop_A_neptune_0001	3783	2009-10-27T09:23:15Z
PVSpecAotVal_524F_NStdSEDChop_B_neptune_0001	2769	2009-10-27T10:28:26Z
PVSpecFPG_411J_stdLineSpec_L7x7_RDor_01	8717	2009-10-27T11:28:56Z
PVSpecAotVal_524F_NstdSEDChop_A_vycma_0001	3773	2009-10-27T13:59:53Z
PVSpecAotVal_524F_NStdSEDChop_B_vycma_0001	2759	2009-10-27T15:04:54Z
PVSpecAotVal_523C_NstdSEDNoChop_r1_B2A_VYCMA_01	2184	2009-10-27T15:53:04Z
PVSpecAotVal_523C_NstdSEDNoChop_r2_B2B_VYCMA_01	1766	2009-10-27T16:31:36Z
PVSpecAotVal_523C_NstdSEDNoChop_r3_B2B_VYCMA_01	4196	2009-10-27T17:03:10Z
PVSpecAotVal_524F_NstdSEDChop_A_217plinear_0001	3796	2009-10-27T18:18:54Z
PVSpecAotVal_524F_NStdSEDChop_B_217plinear_0001	2782	2009-10-27T19:24:18Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0002	632	2009-10-27T20:31:49Z
PVSpecSetup_na_nStd_orbitepi_na_0018	13	2009-10-27T20:42:25Z

7.4.59 OD0169

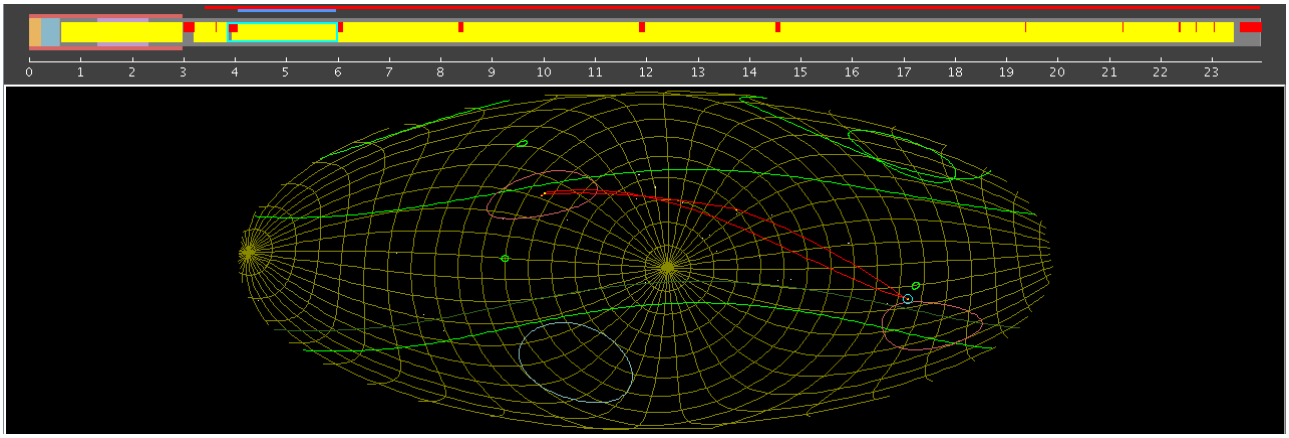


Figure 153: Timeline and distribution of pointings for OD0169 as displayed in the Mission Planning System.

Table 183: Timeline for PACS PV Phase OD0169.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0015	367	2009-10-29T21:31:56Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0015	8109	2009-10-29T21:38:07Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0003	636	2009-10-30T00:08:55Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0003	634	2009-10-30T00:21:38Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0003	632	2009-10-30T00:34:17Z
PVSpecFlux_438B_NstdRange_RsrfA_1_Neptune_0001	6941	2009-10-30T00:58:36Z
PVSpecFlux_438B_NstdRange_RsrfA_2_Neptune_0001	7996	2009-10-30T03:01:48Z
PVSpecFlux_438B_NstdRange_RsrfA_3_Neptune_0001	12196	2009-10-30T05:22:32Z
PVSpecFlux_438B_NstdRange_RsrfB_1_Neptune_0001	9050	2009-10-30T08:53:20Z
PVSpecFlux_438B_NstdRange_RsrfB_2_Neptune_0001	14177	2009-10-30T11:31:41Z
PVSpecFlux_438C_NStdSEDChop_l_B_neptune_0001	2782	2009-10-30T15:30:06Z
PVSpecFlux_438C_NStdSEDChop_m_B_neptune_0001	2777	2009-10-30T16:18:36Z
PVSpecFlux_438C_NstdSEDChop_l_A_neptune_0001	3791	2009-10-30T17:07:04Z
PVSpecFlux_438C_NstdSEDChop_m_A_neptune_0001	3791	2009-10-30T18:12:26Z
PVSpecIP_422A_NstdLineSpecChop_58_neptune_01	964	2009-10-30T19:18:58Z
PVSpecIP_422A_NstdLineSpecChop_66_neptune_01	1102	2009-10-30T19:38:24Z
PVSpecIP_422A_NstdWaveCalChop_216_neptune_01	1221	2009-10-30T19:58:52Z
PVSpecSetup_na_nStd_orbitepiCSOn_na_0006	13	2009-10-30T20:19:17Z

7.4.60 OD0170

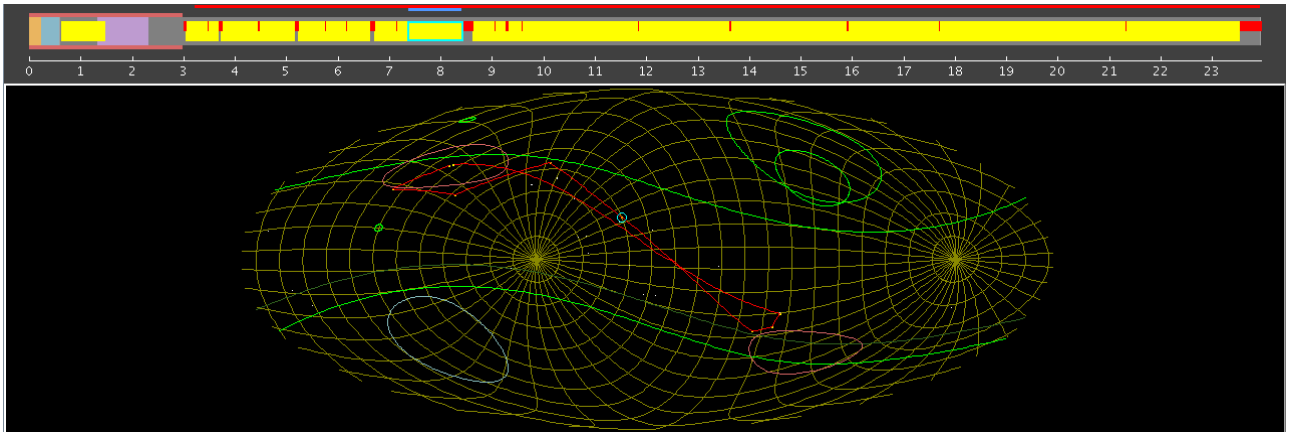


Figure 154: Timeline and distribution of pointings for OD0170 as displayed in the Mission Planning System.

Table 184: Timeline for PACS PV Phase OD0170.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0007	367	2009-10-30T21:28:56Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0007	2709	2009-10-30T21:35:07Z
PVSpecFlux_435A_nStdRange_LinFluxB2A_Vesta_0001	646	2009-10-30T23:56:48Z
PVSpecFlux_435A_nStdRange_LinFluxB2B_Vesta_0001	644	2009-10-31T00:09:41Z
PVSpecFlux_435A_nStdRange_LinFluxB3A_Vesta_0001	642	2009-10-31T00:22:30Z
PVSpecAotVal_522D_NstdLineSp_WS32rs_OI63_NGC3184_01	2356	2009-10-31T00:39:19Z
PVSpecAotVal_522D_NstdLineSp_WS32rs_C157_NGC3184_01	2356	2009-10-31T01:21:41Z
PVSpecIP_422G_NstdRangeNoChop_OI63_M51_01	1710	2009-10-31T02:08:13Z
PVSpecIP_422G_NstdRangeNoChop_OIII88_M51_01	1349	2009-10-31T02:38:52Z
PVSpecIP_422G_NstdRangeNoChop_CII158_M51_01	1524	2009-10-31T03:03:29Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0004	634	2009-10-31T03:37:12Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0004	636	2009-10-31T03:49:56Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0004	632	2009-10-31T04:02:37Z
PVSpecFlux_438C_NstdSEDChop_s_A_HD161796_0001	3773	2009-10-31T04:15:20Z
PVSpecFlux_435A_nStdRange_LinFluxB2A_Thisbe_0001	646	2009-10-31T05:31:15Z
PVSpecFlux_435A_nStdRange_LinFluxB2B_Thisbe_0001	644	2009-10-31T05:44:08Z
PVSpecFlux_435A_nStdRange_LinFluxB3A_Thisbe_0001	642	2009-10-31T05:56:57Z
PVSpecIP_422A_NstdLineSpecChop_108_neptune_01	859	2009-10-31T06:11:05Z
PVSpecIP_422C_NstdLineSpecChop_Rx_66_neptune_01	7967	2009-10-31T06:28:46Z
PVSpecIP_422C_NstdLineSpecChop_Rx_108_neptune_01	6248	2009-10-31T08:44:59Z
PVSpecIP_422C_NstdLineSpecChop_Ry_66_neptune_01	7967	2009-10-31T10:32:29Z
PVSpecIP_422C_NstdLineSpecChop_Ry_108_neptune_01	6248	2009-10-31T12:48:42Z
SDP_pharto01_3-PSpecL-anch42505	5081	2009-10-31T14:35:00Z
PVSpecWave_Burstmode_SetupGen_0001	4	2009-10-31T15:56:45Z
PVSpecWave_421B_nStdRS_nochoporderA_Jupiter_0001	7825	2009-10-31T15:59:55Z
PVSpecWave_421B_nStdRS_nochoporderB_Jupiter_0001	7825	2009-10-31T18:12:35Z
PVSpecWave_Burstmode_ResetGen_0001	4	2009-10-31T20:23:04Z
PVSpecSetup_na_nStd_orbitepi_na_0019	13	2009-10-31T20:23:12Z

7.4.61 OD0171

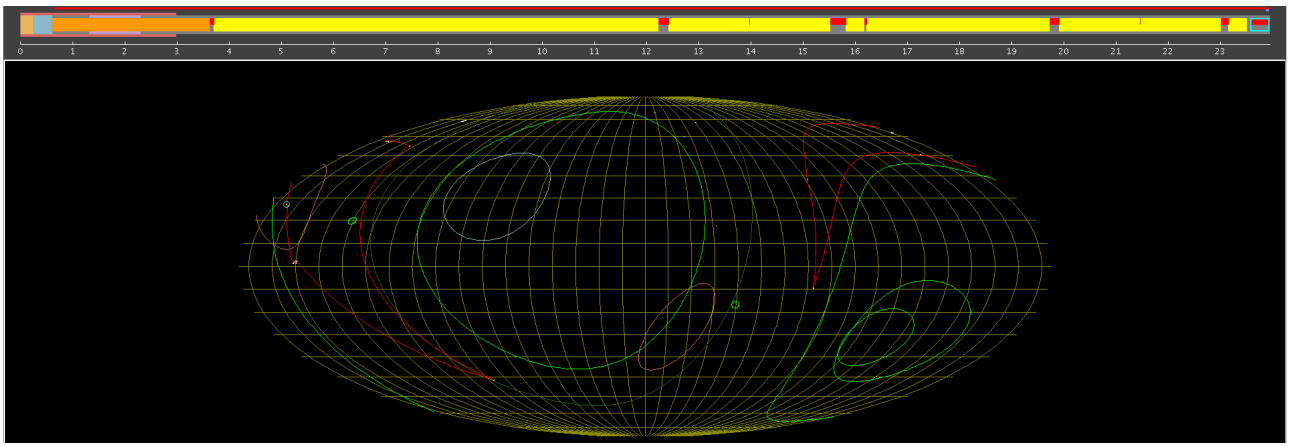


Figure 155: Timeline and distribution of pointings for OD0171 as displayed in the Mission Planning System.

Table 185: Timeline for PACS SD Phase OD0171.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotCooler_117_nStd_na_na_0001	8542	2009-10-31T21:25:59Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0001	2263	2009-10-31T23:48:25Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r1_E-W	15448	2009-11-01T00:32:43Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r1_N-S	15109	2009-11-01T04:51:14Z
SDP_golofs01_3-Beta Pic PACS imaging Blue + Red scan135	5506	2009-11-01T09:15:52Z
SDP_golofs01_3-Beta Pic PACS imaging Blue + Red scan45	5506	2009-11-01T10:48:41Z
SDP_smadde01_3-izw18-PACSphoto75-2	376	2009-11-01T12:39:05Z
SDP_smadde01_3-izw18-PACSphoto110	376	2009-11-01T12:46:24Z
SDP_smadde01_3-izw18-PACSphoto110-2	376	2009-11-01T12:53:43Z
KPGT_dlutz_1-Lockman_d-17-17_forward_r1_E-W	6249	2009-11-01T13:03:47Z
KPGT_dlutz_1-Lockman_d-17-17_forward_r1_N-S	6249	2009-11-01T14:48:59Z
SDP_golofs01_3-Vega PACS imaging Blue + Red scan135	5506	2009-11-01T16:45:15Z
SDP_golofs01_3-Vega PACS imaging Blue + Red scan45	5506	2009-11-01T18:18:04Z
SDP_pharto01_3-Christensen PACS map scan135	565	2009-11-01T19:59:09Z
SDP_pharto01_3-Christensen PACS map scan45	565	2009-11-01T20:09:37Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0001	13	2009-11-01T20:19:06Z

7.4.62 OD0172

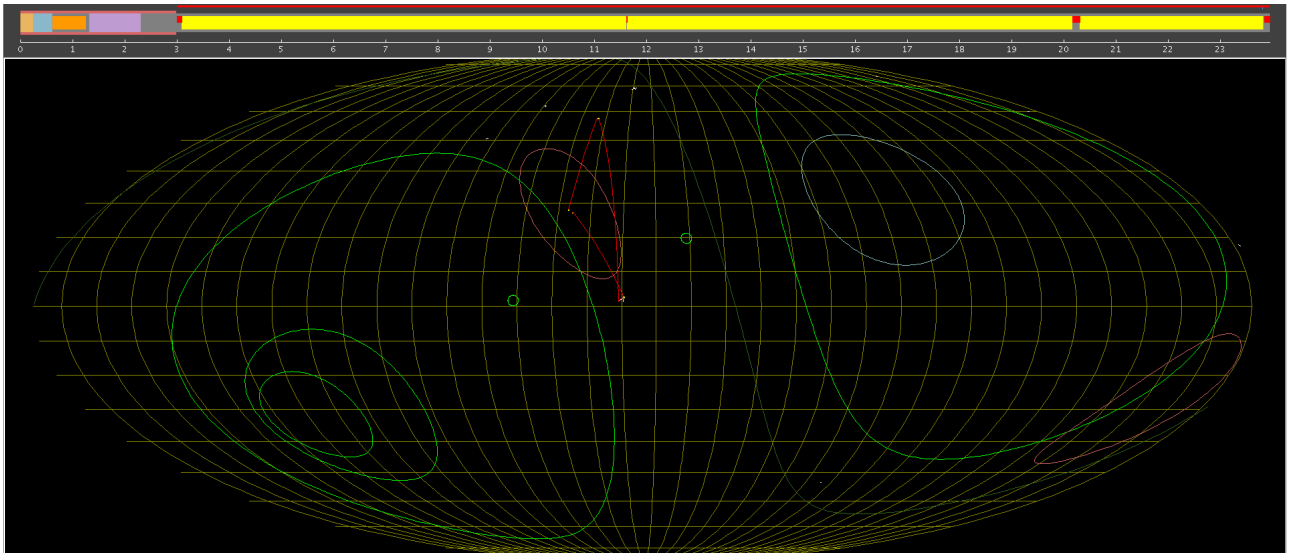


Figure 156: Timeline and distribution of pointings for OD0172 as displayed in the Mission Planning System.

Table 186: Timeline for PACS SD Phase OD0172.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0002	2263	2009-11-01T21:23:04Z
KPGT_dlutz_1-COSMOS_d+0+0_reverse_r3_E-W	15448	2009-11-01T23:52:40Z
KPGT_dlutz_1-COSMOS_d+0+0_reverse_r3_N-S	15109	2009-11-02T04:11:11Z
KPGT_dlutz_1-COSMOS_d+0+0_reverse_r2_E-W	15448	2009-11-02T08:25:12Z
KPGT_dlutz_1-COSMOS_d+0+0_reverse_r2_N-S	15109	2009-11-02T12:43:43Z
KPGT_dlutz_1-Lockman_d+17+17_forward_r2_E-W	6249	2009-11-02T17:05:56Z
KPGT_dlutz_1-Lockman_d+17+17_forward_r2_N-S	6249	2009-11-02T18:51:08Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0002	13	2009-11-02T20:35:21Z

7.4.63 OD0173

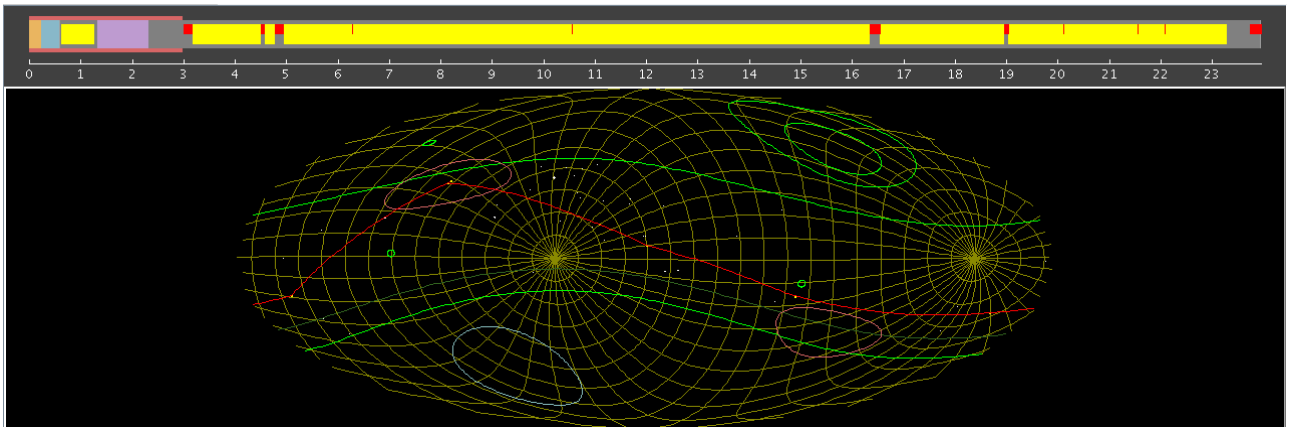


Figure 157: Timeline and distribution of pointings for OD0173 as displayed in the Mission Planning System.

Table 187: Timeline for PACS PV Phase OD0173.

Calibration AOR	duration (s)	absolute start time
PVPhotSetup_na_nStd_orbitproWait_na_0001	2263	2009-11-02T21:20:11Z
PVPhotFlux_328A_StdScan_FlatField_blu_NGC6543_0002	2487	2009-11-02T23:55:15Z
PVPhotFlux_328A_StdScan_FlatField_grn_NGC6543_0002	2487	2009-11-03T00:34:45Z
PVPhotSpatial_312A_NStd_blu_Kbin1_0001	311	2009-11-03T01:18:38Z
PVPhotSpatial_312B_NStd_blu_Kbin1_0001	275	2009-11-03T01:24:52Z
PVPhotFlux_321C_StdPS_photcal_blu_Neptune_0001	351	2009-11-03T01:41:20Z
PVPhotFlux_321C_StdPS_photcal_grn_Neptune_0001	351	2009-11-03T01:45:14Z
PVPhotFlux_321D_StdScan_045_pcal_blu_Neptune_0001	359	2009-11-03T01:49:08Z
PVPhotFlux_321D_StdScan_135_pcal_blu_Neptune_0001	359	2009-11-03T01:53:10Z
PVPhotFlux_321D_StdScan_045_pcal_grn_Neptune_0001	359	2009-11-03T01:57:12Z
PVPhotFlux_321D_StdScan_135_pcal_grn_Neptune_0001	359	2009-11-03T02:01:14Z
PVPhotFlux_323A_StdPS_lo200Jy_red_Neptune_0001	351	2009-11-03T02:05:16Z
PVPhotSetup_na_nStd_orbitepiCSon_na_0008	13	2009-11-03T02:08:11Z
PVSpecSetup_na_nStd_SetupFlexCSOn_na_0008	367	2009-11-03T02:08:28Z
PVSpecSetup_na_nStd_SpuSetupAndResetCSOn_na_0008	2709	2009-11-03T02:14:39Z
PVSpecAotVal_523B_NStdRange_60_64_neptune_0002	8546	2009-11-03T03:01:53Z
PVSpecAotVal_524F_NstdSEDChop_A_neptune_0002	3665	2009-11-03T05:26:30Z
PVSpecAotVal_524F_NStdSEDChop_B_neptune_0002	2769	2009-11-03T06:29:43Z
PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_4x4map_01	8209	2009-11-03T07:17:59Z
PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_5x5map_01	12745	2009-11-03T09:33:55Z
PVSpecFPG_411J_stdLineSpec_L7x7_RDor_02	8717	2009-11-03T13:17:28Z
PVSpecAotVal_524F_NstdSEDChop_A_vycma_0002	3655	2009-11-03T15:48:27Z
PVSpecAotVal_524F_NStdSEDChop_B_vycma_0002	2759	2009-11-03T16:51:30Z
PVSpecAotVal_523C_NstdSEDNoChop_r1_B2A_VYCMA_02	2184	2009-11-03T17:39:40Z
PVSpecAotVal_523C_NstdSEDNoChop_r2_B2B_VYCMA_02	1766	2009-11-03T18:18:12Z
PVSpecAotVal_523C_NstdSEDNoChop_r3_B2B_VYCMA_02	4196	2009-11-03T18:49:46Z
PVSpecSetup_na_nStd_orbitepi_na_0020	13	2009-11-03T19:59:46Z

7.4.64 OD0174

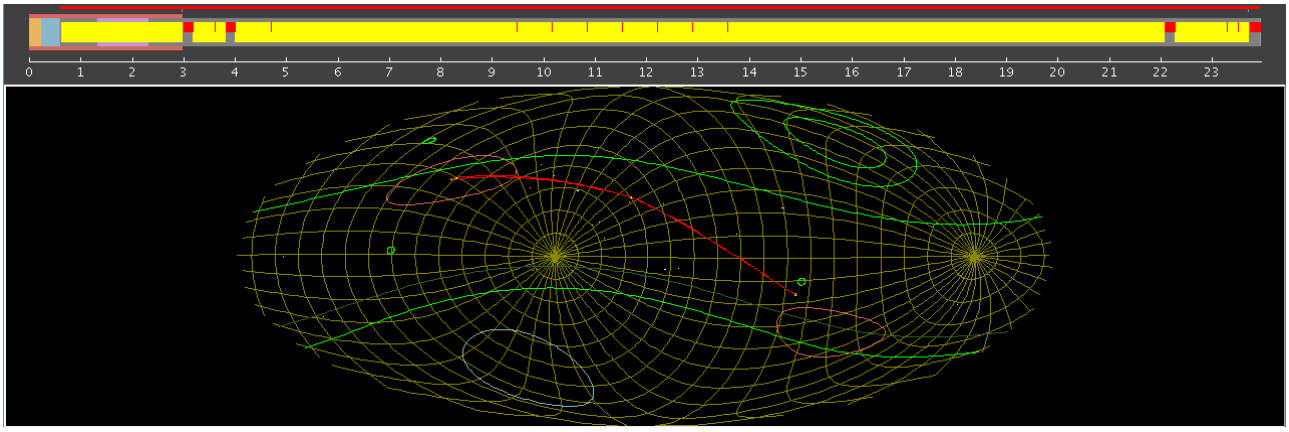


Figure 158: Timeline and distribution of pointings for OD0174 as displayed in the Mission Planning System.

Table 188: Timeline for PACS PV Phase OD0174.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0016	367	2009-11-03T21:17:20Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0016	8129	2009-11-03T21:23:31Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0005	636	2009-11-03T23:53:19Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0005	634	2009-11-04T00:06:02Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0005	632	2009-11-04T00:18:41Z
PVSpecSpatial_413B_nStd_11x11RCp_m3_w77_Neptune_01	2336	2009-11-04T00:42:59Z
PVSpecSpatial_413B_nStd_11x11RCp_m15_w77_Neptune_01	2336	2009-11-04T01:24:02Z
PVSpecSpatial_413B_nStd_11x11RCp_m05_w77_Neptune_01	2336	2009-11-04T02:05:05Z
PVSpecSpatial_413B_nStd_11x11RCp_00_w77_Neptune_01	2336	2009-11-04T02:46:08Z
PVSpecSpatial_413B_nStd_11x11RCp_p05_w77_Neptune_01	2336	2009-11-04T03:27:11Z
PVSpecSpatial_413B_nStd_11x11RCp_p15_w77_Neptune_01	2336	2009-11-04T04:08:14Z
PVSpecSpatial_413B_nStd_11x11RCp_p3_w77_Neptune_01	2336	2009-11-04T04:49:17Z
PVSpecSpatial_413B_nStd_11x11RCp_p3_w90_Neptune_01	2334	2009-11-04T05:30:20Z
PVSpecSpatial_413B_nStd_11x11RCp_p15_w90_Neptune_01	2334	2009-11-04T06:11:21Z
PVSpecSpatial_413B_nStd_11x11RCp_p05_w90_Neptune_01	2334	2009-11-04T06:52:22Z
PVSpecSpatial_413B_nStd_11x11RCp_00_w90_Neptune_01	2334	2009-11-04T07:33:23Z
PVSpecSpatial_413B_nStd_11x11RCp_m05_w90_Neptune_01	2334	2009-11-04T08:14:24Z
PVSpecSpatial_413B_nStd_11x11RCp_m15_w90_Neptune_01	2334	2009-11-04T08:55:25Z
PVSpecSpatial_413B_nStd_11x11RCp_m3_w90_Neptune_01	2334	2009-11-04T09:36:26Z
PVSpecSpatial_413A_nStd_40x40RCp_00_w62_Neptune_01	30439	2009-11-04T10:17:29Z
PVSpecFlux_438C_NStdSEDChop_s_B_HD161796_0001	2759	2009-11-04T18:58:35Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0006	636	2009-11-04T19:46:44Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0006	634	2009-11-04T19:59:27Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0006	632	2009-11-04T20:12:06Z
PVSpecSetup_na_nStd_orbitepi_na_0021	13	2009-11-04T20:22:42Z

7.4.65 OD0175

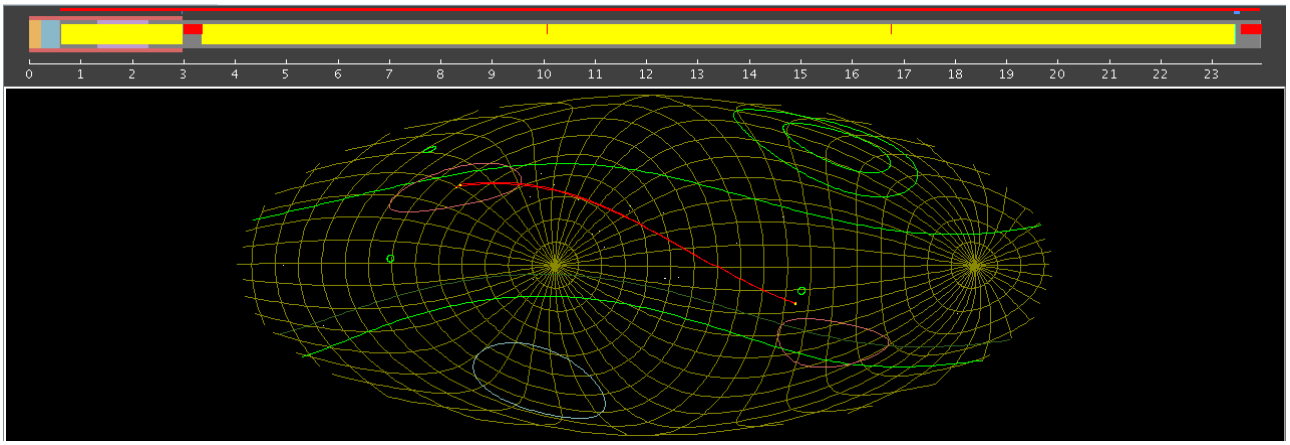


Figure 159: Timeline and distribution of pointings for OD0175 as displayed in the Mission Planning System.

Table 189: Timeline for PACS PV Phase OD0175.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0017	367	2009-11-04T21:14:31Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0017	8109	2009-11-04T21:20:42Z
PVSpecSpatial_413A_nStd_25x25RCp_p3_w62_Neptune_01	11914	2009-11-05T00:01:28Z
PVSpecSpatial_413A_nStd_25x25RCp_p15_w62_Neptune_01	11914	2009-11-05T03:22:11Z
PVSpecSpatial_413A_nStd_25x25RCp_p05_w62_Neptune_01	11914	2009-11-05T06:42:54Z
PVSpecSpatial_413A_nStd_25x25RCp_m05_w62_Neptune_01	11914	2009-11-05T10:03:37Z
PVSpecSpatial_413A_nStd_25x25RCp_m15_w62_Neptune_01	11914	2009-11-05T13:24:20Z
PVSpecSpatial_413A_nStd_25x25RCp_m3_w62_Neptune_01	11914	2009-11-05T16:45:03Z
PVSpecSetup_na_nStd_orbitepi_na_0022	13	2009-11-05T20:03:41Z

7.4.66 OD0177

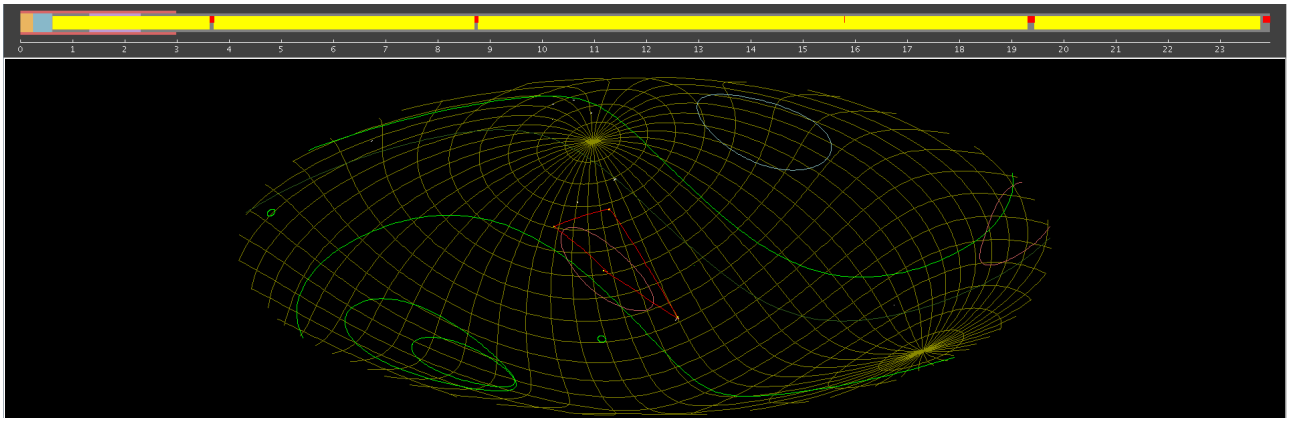


Figure 160: Timeline and distribution of pointings for OD0177 as displayed in the Mission Planning System.

Table 190: Timeline for PACS SD Phase OD0177.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotCooler_117_nStd_na_na_0002	8542	2009-11-06T21:08:55Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0003	2263	2009-11-06T23:31:21Z
SDP_gsmith01_3-PACS A1758 first scan	8920	2009-11-07T00:15:52Z
SDP_gsmith01_3-PACS A1758 orthogonal scan	8920	2009-11-07T02:45:35Z
KPGT_dlutz_1-Lockman_d+17+17_forward_r1_E-W	6249	2009-11-07T05:19:54Z
KPGT_dlutz_1-Lockman_d+17+17_forward_r1_N-S	6249	2009-11-07T07:05:06Z
KPGT_dlutz_1-Lockman_d-17-17_forward_r2_E-W	6249	2009-11-07T08:50:18Z
KPGT_dlutz_1-Lockman_d-17-17_forward_r2_N-S	6249	2009-11-07T10:35:30Z
KPGT_dlutz_1-Lockman_d+17+17_reverse_r1_E-W	6249	2009-11-07T12:20:42Z
KPGT_dlutz_1-Lockman_d+17+17_reverse_r1_N-S	6249	2009-11-07T14:05:54Z
KPGT_dlutz_1-COSMOS_d+0-80_reverse_r3_E-W	15448	2009-11-07T16:00:11Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0003	13	2009-11-07T20:17:43Z

7.4.67 OD0178

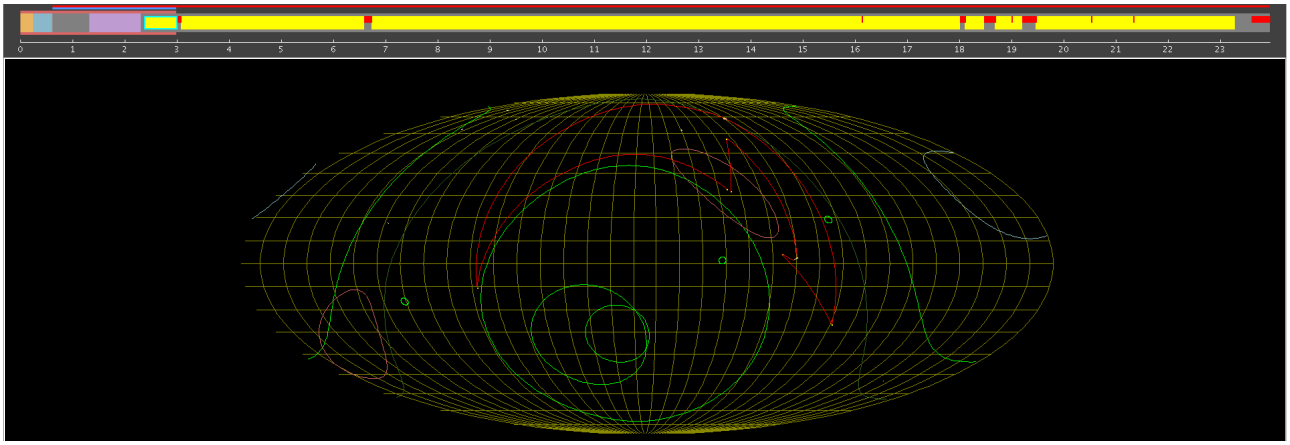


Figure 161: Timeline and distribution of pointings for OD0178 as displayed in the Mission Planning System.

Table 191: Timeline for PACS SD Phase OD0178.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0004	2263	2009-11-07T22:51:21Z
KPGT_dlutz_1-Lockman_d-17-17_reverse_r1_E-W	6249	2009-11-07T23:35:02Z
KPGT_dlutz_1-Lockman_d-17-17_reverse_r1_N-S	6249	2009-11-08T01:20:14Z
KPGT_dlutz_1-COSMOS_d+0-80_reverse_r1_E-W	15448	2009-11-08T03:14:30Z
KPGT_dlutz_1-COSMOS_d-40+0_reverse_r1_N-S	15109	2009-11-08T07:33:01Z
PACS-SDPPhotSetup_na_nStd_orbitepiCSon_na_0001	13	2009-11-08T11:44:54Z
PACS-SDPSpecSetup_na_nStd_SetupFlexCSOn_na_0001	367	2009-11-08T11:45:11Z
PACS-SDPSpecSetup_na_nStd_SpuSetupResetCSOn_na_0001	2709	2009-11-08T11:51:22Z
SDP_aedge_3-PSpecL-Zw3146_OI	6628	2009-11-08T12:39:34Z
SDP_esturm_3-NearGalPACS-lowmet-he2-10-NII-point - resched	1145	2009-11-08T14:38:00Z
SDP_esturm_3-NearGalPACS-SB-01-red	986	2009-11-08T15:12:54Z
SDP_esturm_3-NearGalPACS-SB-01-blue	582	2009-11-08T15:31:26Z
AOTVAL_pharto01_2-PVSpecAotVal_524F_NstdSEDChop_A_christensen_0002	3678	2009-11-08T15:59:43Z
AOTVAL_pharto01_2-PVSpecAotVal_524F_NStdSEDChop_B_christensen_0002	2782	2009-11-08T17:03:09Z
SDP_pharto01_3-PACS dedicated line spectroscopy - resched	6837	2009-11-08T17:51:41Z
PACS-SDPSpecSetup_na_nStd_orbitepi_na_0001	13	2009-11-08T19:45:42Z

7.4.68 OD0179

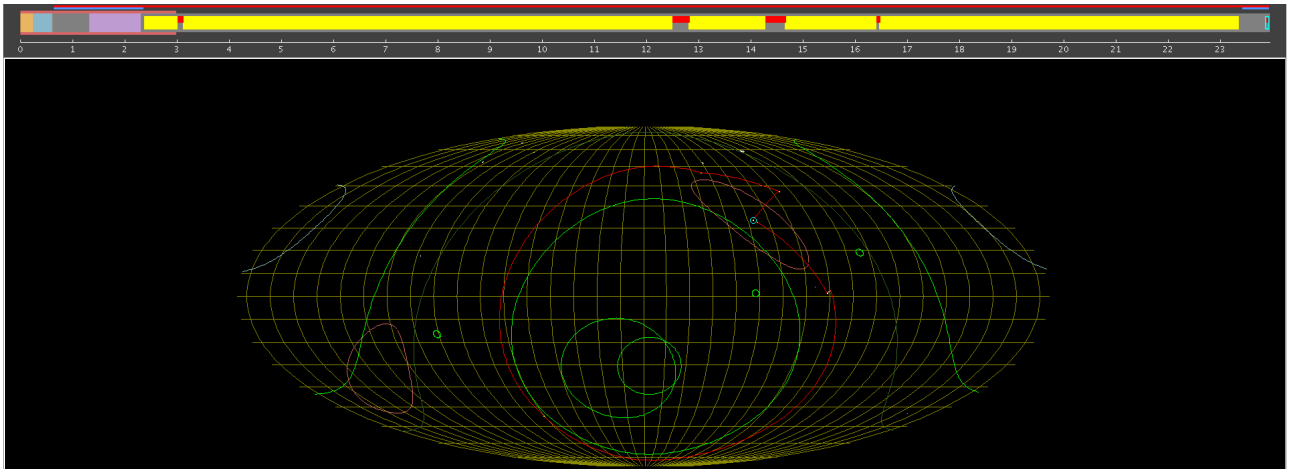


Figure 162: Timeline and distribution of pointings for OD0179 as displayed in the Mission Planning System.

Table 192: Timeline for PACS SD Phase OD0179.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0005	2263	2009-11-08T22:48:35Z
KPGT_dlutz_1-COSMOS_d+0+40_forward_r1_E-W	15448	2009-11-08T23:34:18Z
KPGT_dlutz_1-COSMOS_d+20+0_forward_r1_N-S	15109	2009-11-09T03:52:49Z
PACS-SDPPhotSetup_na_nStd_orbitepiCSon_na_0002	13	2009-11-09T08:04:42Z
PACS-SDPSpecSetup_na_nStd_SetupFlexCSOn_na_0002	367	2009-11-09T08:04:59Z
PACS-SDPSpecSetup_na_nStd_SpuSetupResetCSOn_na_0002	2709	2009-11-09T08:11:10Z
SDP_bdent_3-HD_181327_Ib_dither_CII_OI145_H2O	5150	2009-11-09T09:17:16Z
SDP_esturm_3-Mkn231-RS-long	6185	2009-11-09T11:07:37Z
SDP_kmeisenh_3-PacsHigh-0002_OIV_range	24647	2009-11-09T12:56:28Z
PACS-SDPSpecSetup_na_nStd_orbitepi_na_0002	13	2009-11-09T19:47:19Z

7.4.69 OD0182

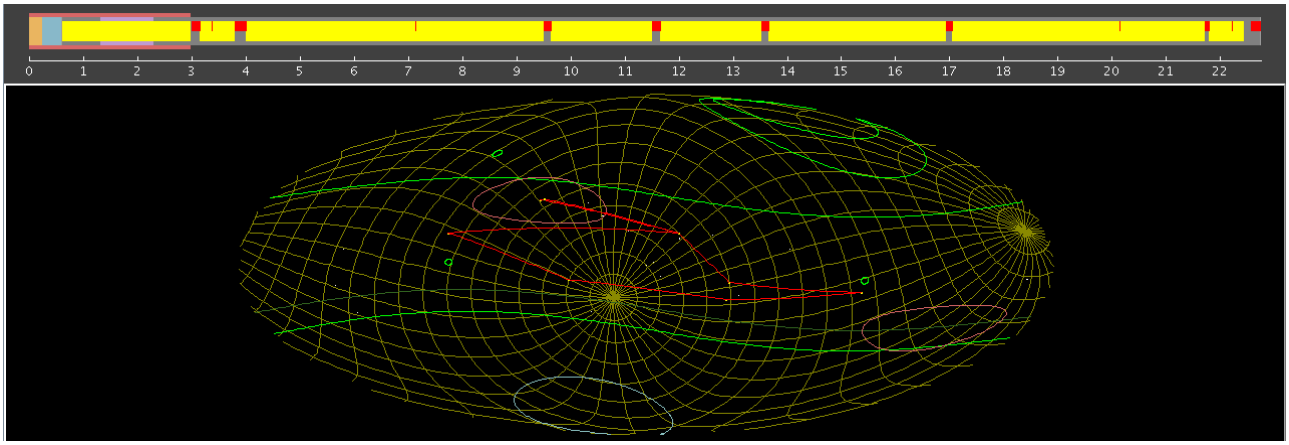


Figure 163: Timeline and distribution of pointings for OD0182 as displayed in the Mission Planning System.

Table 193: Timeline for PACS PV Phase OD0182.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0018	367	2009-11-11T22:07:03Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0018	8109	2009-11-11T22:13:14Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0007	636	2009-11-12T00:41:09Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0007	634	2009-11-12T00:53:52Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0007	632	2009-11-12T01:06:31Z
PVSpecAotVal_524F_NstdSEDChop_A_CWLeo_0001	11092	2009-11-12T01:33:08Z
PVSpecAotVal_524F_NStdSEDChop_B_CWLeo_0001	8408	2009-11-12T04:40:08Z
PVSpecAotVal_524F_NstdSEDChop_A_M82_0001	3668	2009-11-12T07:10:24Z
PVSpecAotVal_524F_NStdSEDChop_B_M82_0001	2772	2009-11-12T08:13:40Z
PVSpecAotVal_524F_NstdSEDChop_A_ngc7027_0003	3663	2009-11-12T09:11:48Z
PVSpecAotVal_524F_NStdSEDChop_B_ngc7027_0003	2767	2009-11-12T10:14:59Z
PVSpecAotVal_521G_StdLineSpec_R1_Nept_w138_3x3mp_01	4312	2009-11-12T11:11:22Z
PVSpecAotVal_521G_StdLineSpec_R1_Nept_w138_4x4mp_01	7553	2009-11-12T12:22:23Z
PVSpecAotVal_524F_NstdSEDChop_A_AFGL2591_0001	10988	2009-11-12T14:35:30Z
PVSpecAotVal_524F_NStdSEDChop_B_AFGL2591_0001	5538	2009-11-12T17:40:46Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0008	636	2009-11-12T19:19:34Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0008	634	2009-11-12T19:32:17Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0008	632	2009-11-12T19:44:56Z
PVSpecSetup_na_nStd_orbitepi_na_0023	13	2009-11-12T19:55:32Z

7.4.70 OD0183

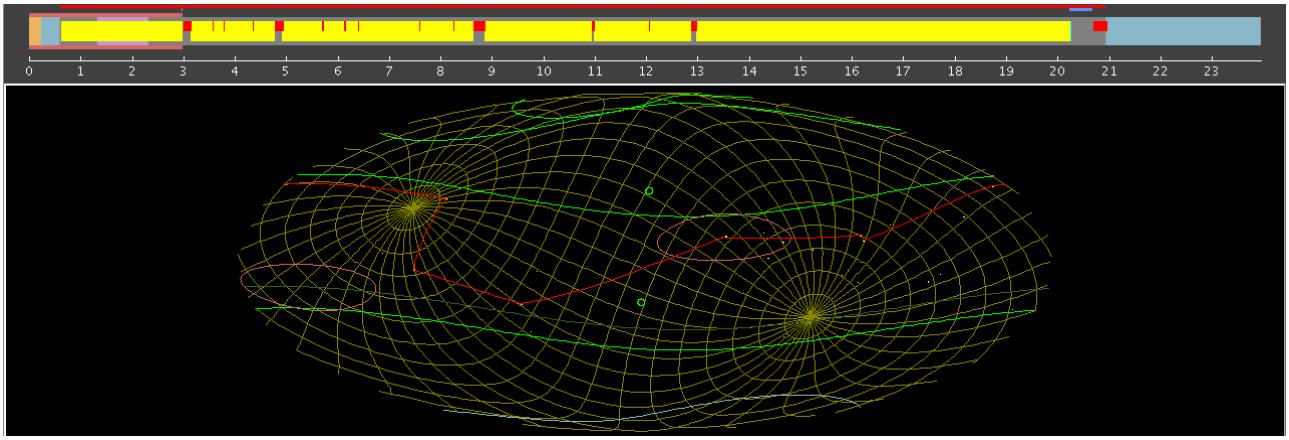


Figure 164: Timeline and distribution of pointings for OD0183 as displayed in the Mission Planning System.

Table 194: Timeline for PACS PV Phase OD0183.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0019	367	2009-11-12T20:52:22Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0019	8109	2009-11-12T20:58:33Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0009	636	2009-11-12T23:26:12Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0009	634	2009-11-12T23:38:55Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0009	632	2009-11-12T23:51:34Z
PVSpecFlux_433A_StdRange_AbsFluxA_Gam Dra_0001	2068	2009-11-13T00:04:24Z
PVSpecFlux_433A_StdRange_AbsFluxB_Gam Dra_0001	1562	2009-11-13T00:37:59Z
PVSpecAotVal_522X_NstdLineSpec_WS_R_NGC6822_01	2597	2009-11-13T01:13:38Z
PVSpecAotVal_522X_NstdLineSpec_WS_B_NGC6822_01	1347	2009-11-13T02:00:00Z
PVSpecAotVal_522X_NstdLineSpec_WS_B2_NGC6822_01	734	2009-11-13T02:25:35Z
PVSpecAotVal_522X_NstdLineSpec_NoChop_R_NGC6822_01	4111	2009-11-13T02:40:56Z
PVSpecAotVal_522X_NstdLineSpec_NoChop_B_NGC6822_01	2209	2009-11-13T03:52:32Z
PVSpecAotVal_522X_NstdLineSpec_NoChop_B2_NGC6822_01	1278	2009-11-13T04:32:29Z
PVSpecAotVal_524F_NstdSEDChop_A_HD97048_0001	7318	2009-11-13T05:09:08Z
PVSpecAotVal_524F_NstdSEDChop_A_RDor_0001	3668	2009-11-13T07:17:49Z
PVSpecAotVal_524F_NStdSEDChop_B_RDor_0001	2772	2009-11-13T08:21:05Z
PVSpecAotVal_524F_NstdSEDChop_AMap_vycma_0001	14745	2009-11-13T09:16:02Z
PVSpecAotVal_524F_NStdSEDChop_BMap_vycma_0001	11167	2009-11-13T13:23:55Z
PVSpecSetup_na_nStd_orbitepi_na_0024	13	2009-11-13T16:30:06Z
3 hour SOPS window for orbit manoeuvre		

7.4.71 OD0184

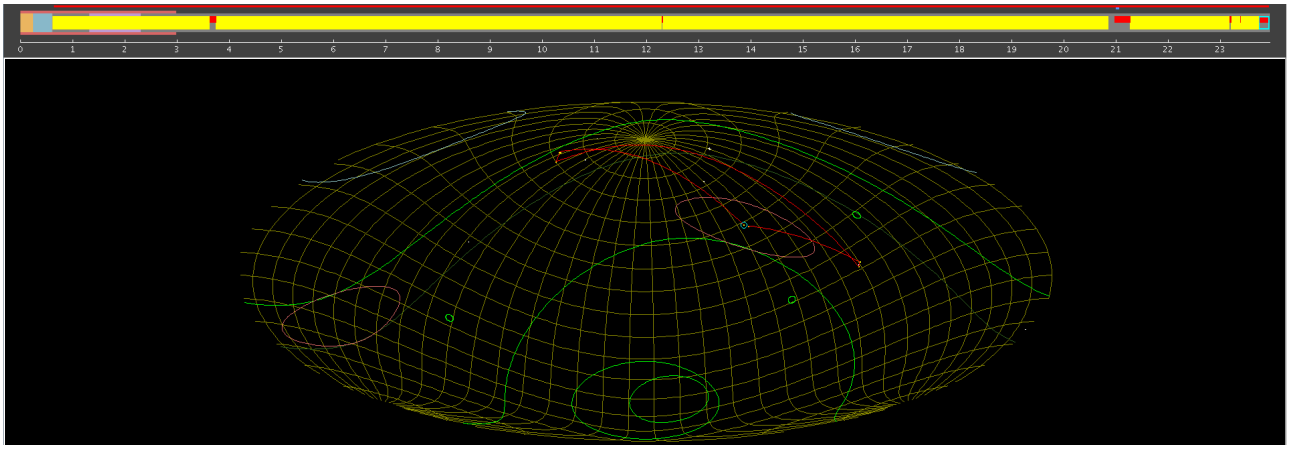


Figure 165: Timeline and distribution of pointings for OD0184 as displayed in the Mission Planning System.

Table 195: Timeline for PACS SD Phase OD0184.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotCooler_117_nStd_na_na_0003	8542	2009-11-13T20:49:39Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0006	2263	2009-11-13T23:12:05Z
KPGT_dlutz_1-COSMOS_d+0-40_reverse_r1_E-W	15448	2009-11-13T23:58:54Z
KPGT_dlutz_1-COSMOS_d-20+0_forward_r2_N-S	15109	2009-11-14T04:18:34Z
KPGT_dlutz_1-COSMOS_d+0-80_forward_r1_E-W	15448	2009-11-14T08:32:35Z
KPGT_dlutz_1-COSMOS_d-20+0_reverse_r2_N-S	15109	2009-11-14T12:52:15Z
SDP_okrause_3-Krause PACS 70-1 - ISOSS J22164+6003	2209	2009-11-14T17:30:37Z
SDP_okrause_3-Krause PACS 70-2 - ISOSS J22164+6003	2209	2009-11-14T18:08:29Z
SDP_okrause_3-Krause PACS 110-1 - ISOSS J22164+6003	1084	2009-11-14T18:46:21Z
SDP_okrause_3-Krause PACS 110-2 - ISOSS J22164+6003	1084	2009-11-14T19:05:28Z
SDP_mjuvela_3-PCC288-PACS-1	562	2009-11-14T19:26:29Z
SDP_mjuvela_3-PCC288-PACS-2	562	2009-11-14T19:36:54Z
SDP_mjuvela_3-PCC288-PACS-3	562	2009-11-14T19:47:19Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0004	13	2009-11-14T19:56:45Z

7.4.72 OD0185

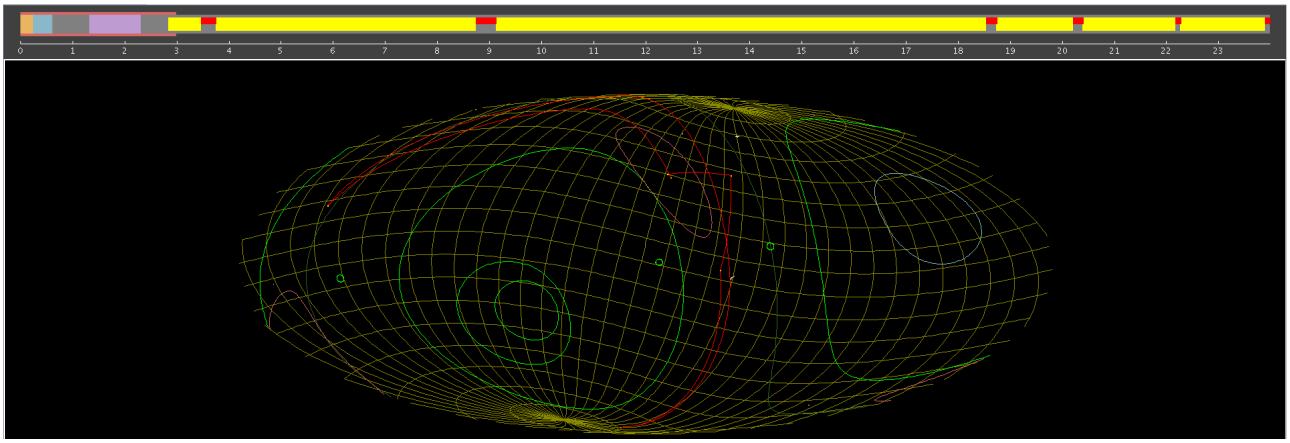


Figure 166: Timeline and distribution of pointings for OD0185 as displayed in the Mission Planning System.

Table 196: Timeline for PACS SD Phase OD0185.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0007	2263	2009-11-14T23:00:00Z
SDP_gsmith01_3-PACS A2390 first scan	8920	2009-11-14T23:55:47Z
SDP_gsmith01_3-PACS A2390 orthogonal scan	8920	2009-11-15T02:25:30Z
KPGT_dlutz_1-COSMOS_d+0-40_forward_r1_E-W	15448	2009-11-15T05:18:49Z
KPGT_dlutz_1-COSMOS_d+40+0_reverse_r3_N-S	15109	2009-11-15T09:38:29Z
PACS-SDPPhotSetup_na_nStd_orbitepiCSon_na_0003	13	2009-11-15T13:50:22Z
PACS-SDPSpecSetup_na_nStd_SetupFlexCSOn_na_0010	367	2009-11-15T13:50:39Z
PACS-SDPSpecSetup_na_nStd_SpuSetupResetCSOn_na_0005	2709	2009-11-15T13:56:50Z
SDP_bdent_3-J0843.3-7905_Ib_dither_CII_OI145_H2O	5150	2009-11-15T14:55:54Z
SDP_aedge_3-PSpecL-Zw3146_CII	6230	2009-11-15T16:36:13Z
SDP_kmeisenh_3-PacsHigh-0002_SIII_range	5684	2009-11-15T18:28:20Z
PACS-SDPSpecSetup_na_nStd_orbitepi_na_0003	13	2009-11-15T20:03:08Z

7.4.73 OD0186

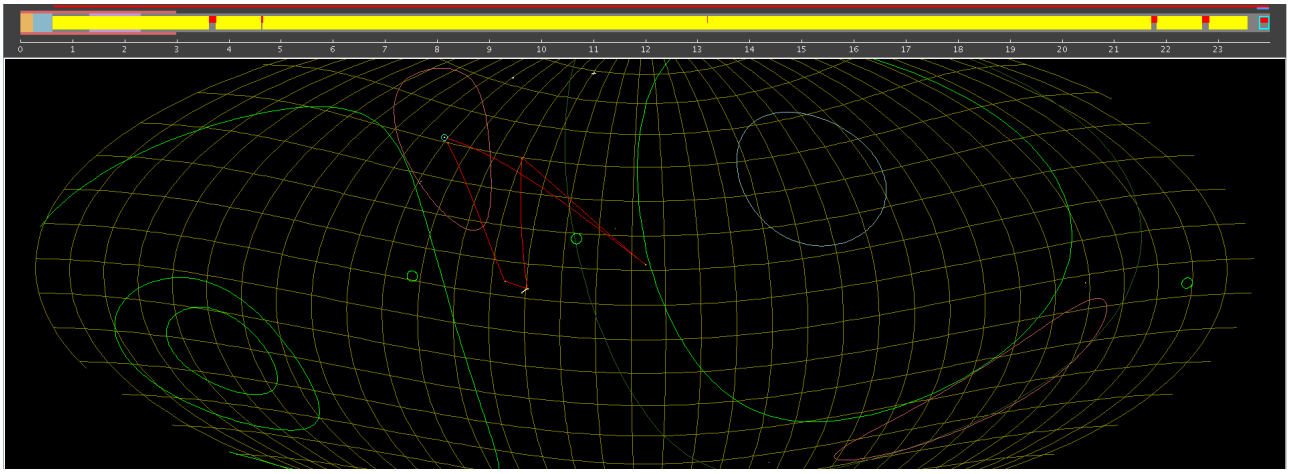


Figure 167: Timeline and distribution of pointings for OD0186 as displayed in the Mission Planning System.

Table 197: Timeline for PACS SD Phase OD0186.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotCooler_117_nStd_na_na_0004	8542	2009-11-15T20:46:04Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0008	2263	2009-11-15T23:08:30Z
SDP_aedge_3-PPhoto-Zw3146_70um_135	722	2009-11-15T23:55:15Z
SDP_aedge_3-PPhoto-Zw3146_70um_45	722	2009-11-16T00:08:20Z
SDP_aedge_3-PPhoto-Zw3146_100um_135	722	2009-11-16T00:21:25Z
SDP_aedge_3-PPhoto-Zw3146_100um_45	722	2009-11-16T00:34:30Z
KPGT_dlutz_1-COSMOS_d+0-80_reverse_r2_E-W	15448	2009-11-16T00:49:43Z
KPGT_dlutz_1-COSMOS_d-40+0_reverse_r2_N-S	15109	2009-11-16T05:08:14Z
KPGT_dlutz_1-COSMOS_d+0+80_forward_r2_E-W	15448	2009-11-16T09:21:06Z
KPGT_dlutz_1-COSMOS_d+40+0_forward_r2_N-S	15109	2009-11-16T13:39:37Z
SDP_aedge_3-PPhoto-A1068_70um_45	722	2009-11-16T17:59:04Z
SDP_aedge_3-PPhoto-A1068_70um_135	722	2009-11-16T18:12:09Z
SDP_aedge_3-PPhoto-A1068_130um_45	722	2009-11-16T18:25:14Z
SDP_aedge_3-PPhoto-A1068_130um_135	722	2009-11-16T18:38:19Z
SDP_thmuelle_3-PPhoto-s70_AZ84	2526	2009-11-16T18:59:29Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0005	13	2009-11-16T19:41:39Z

7.4.74 OD0187

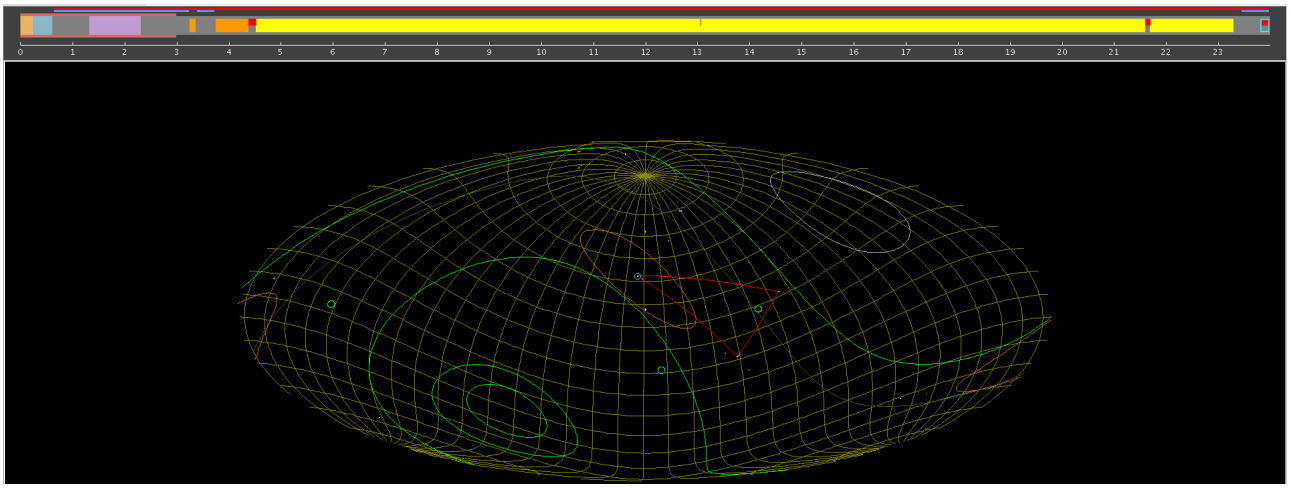


Figure 168: Timeline and distribution of pointings for OD0187 as displayed in the Mission Planning System.

Table 198: Timeline for PACS SD Phase OD0187.

Calibration AOR	duration (s)	absolute start time
SpireEngLoadAllTablesGen-0000	413	2009-11-16T23:23:09Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0009	2263	2009-11-16T23:53:09Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r2_E-W	15448	2009-11-17T00:40:51Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r2_N-S	15109	2009-11-17T04:59:22Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r3_E-W	15448	2009-11-17T09:13:23Z
KPGT_dlutz_1-COSMOS_d+0+0_forward_r3_N-S	15109	2009-11-17T13:31:54Z
SDP_thmuelle_3-PPhoto-w70_YH140	5666	2009-11-17T17:50:14Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0006	13	2009-11-17T19:24:44Z

7.4.75 OD0188

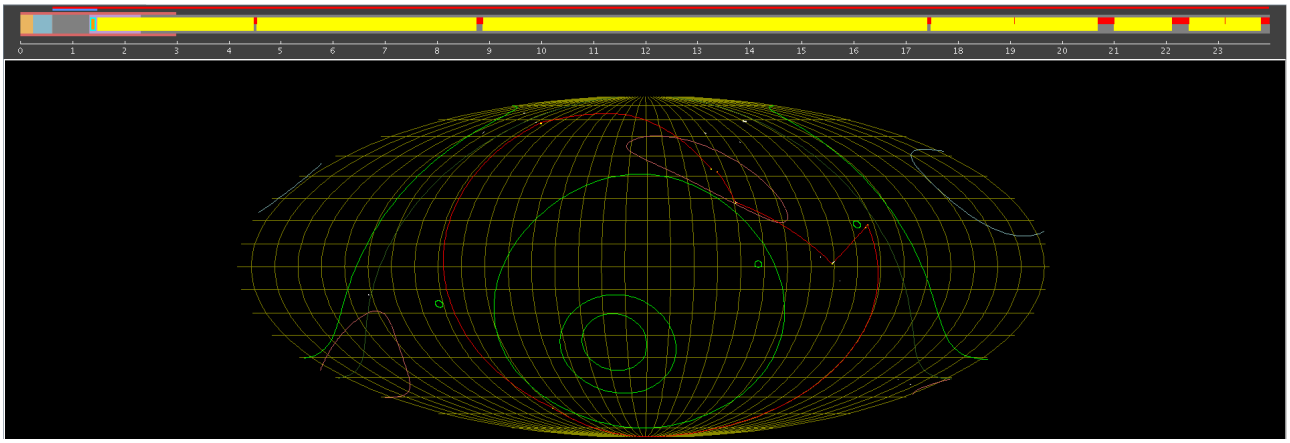


Figure 169: Timeline and distribution of pointings for OD0188 as displayed in the Mission Planning System.

Table 199: Timeline for PACS SD Phase OD0188.

Calibration AOR	duration (s)	absolute start time
SpireEngLoadAllTablesGen-0001	413	2009-11-17T21:27:20Z
PACS-SDPhotCooler_117_nStd_na_na_0005	8542	2009-11-17T21:36:12Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0010	2263	2009-11-17T23:58:38Z
SDP_rkennicu_3-PP4-SWa-NGC4559	3728	2009-11-18T00:40:51Z
SDP_rkennicu_3-PP4-LWa-NGC4559	3728	2009-11-18T01:44:02Z
SDP_rkennicu_3-PP4-SWb-NGC4559	3728	2009-11-18T02:47:13Z
SDP_rkennicu_3-PP4-LWb-NGC4559	3728	2009-11-18T03:50:24Z
KPGT_dlutz_1-COSMOS_d+0+40_forward_r2_E-W	15448	2009-11-18T05:01:17Z
KPGT_dlutz_1-COSMOS_d+20+0_forward_r2_N-S	15109	2009-11-18T09:19:48Z
SDP_thmuelle_3-PPhoto-w70_CS29 - copy	5666	2009-11-18T13:36:49Z
SDP_thmuelle_3-PPhoto-w70_YW134 - copy	5666	2009-11-18T15:13:21Z
SDP_ceiroa_3-PACS100/160 - HIP099240_45	1917	2009-11-18T17:08:30Z
SDP_ceiroa_3-PACS100/160 - HIP099240_135	1917	2009-11-18T17:41:30Z
SDP_aabergel_3-PPhoto-ngc7023_135	2403	2009-11-18T18:34:39Z
SDP_aabergel_3-PPhoto-ngc7023_45	2403	2009-11-18T19:15:45Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0007	13	2009-11-18T19:55:52Z

7.4.76 OD0190

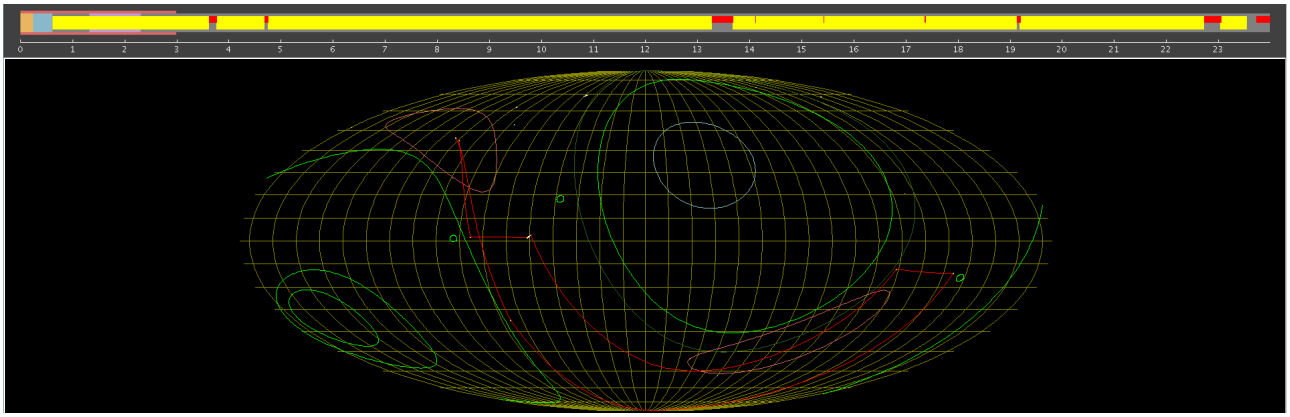


Figure 170: Timeline and distribution of pointings for OD0190 as displayed in the Mission Planning System.

Table 200: Timeline for PACS SD Phase OD0190.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotCooler_117_nStd_na_na_0006	8542	2009-11-19T20:42:49Z
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0011	2263	2009-11-19T23:05:15Z
SDP_thmuelle_3-PPhoto-s70_Typhon	1584	2009-11-19T23:52:30Z
SDP_thmuelle_3-PPhoto-s100_Typhon	1584	2009-11-20T00:20:07Z
KPGT_dlutz_1-COSMOS_d+0-40_forward_r2_E-W	15448	2009-11-20T00:52:13Z
KPGT_dlutz_1-COSMOS_d-20+0_forward_r1_N-S	15109	2009-11-20T05:10:44Z
SDP_aedge_3-PPhoto-A2597_70um_45	722	2009-11-20T09:47:30Z
SDP_aedge_3-PPhoto-A2597_70um_135	722	2009-11-20T10:00:35Z
SDP_aedge_3-PPhoto-A2597_100um_45	722	2009-11-20T10:13:40Z
SDP_aedge_3-PPhoto-A2597_100um_135	722	2009-11-20T10:26:45Z
PACS-SDPPhotSetup_na_nStd_orbitepiCSon_na_0004	13	2009-11-20T10:38:51Z
PACS-SDPSpecSetup_na_nStd_SetupFlexCSOn_na_0003	367	2009-11-20T10:39:08Z
PACS-SDPSpecSetup_na_nStd_SpuSetupResetCSOn_na_0003	2709	2009-11-20T10:45:19Z
SDP_aedge_3-PSpecL-A2597_OI	6902	2009-11-20T11:32:36Z
SDP_aedge_3-PSpecL-A2597_CII	6227	2009-11-20T13:29:44Z
PVSpecAotVal_521G_StdLineSpec_B3_Nept_w66_5x5map_03	12565	2009-11-20T15:19:14Z
SDP_bdent_3-TWA01_Ib_dither_OI63	1669	2009-11-20T19:10:06Z
PACS-SDPSpecSetup_na_nStd_orbitepi_na_0004	13	2009-11-20T19:37:59Z

7.4.77 OD0191

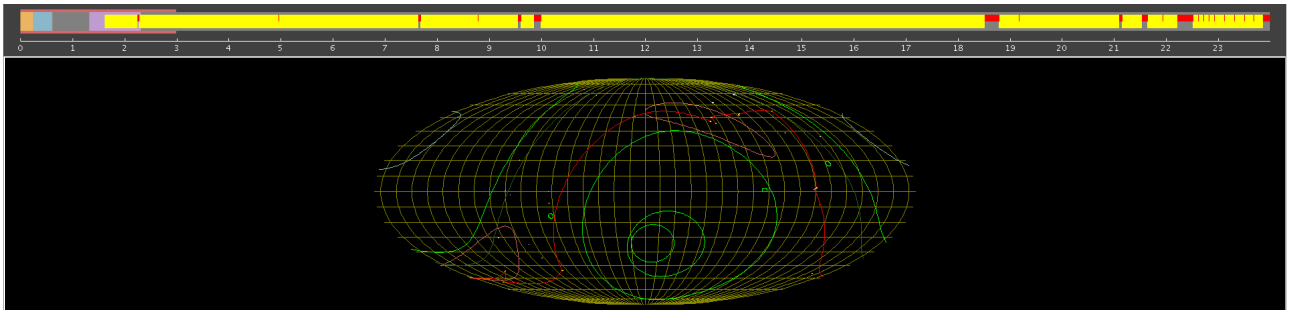


Figure 171: Timeline and distribution of pointings for OD0191 as displayed in the Mission Planning System.

Table 201: Timeline for PACS PV Phase OD0191.

Calibration AOR	duration (s)	absolute start time
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0012	2263	2009-11-20T21:42:12Z
KPOT_eegami_1-PACS-A1758-PA315	9569	2009-11-20T22:22:41Z
KPOT_eegami_1-PACS-A1758-PA45	9569	2009-11-21T01:03:13Z
PVPhotAOTVal_514P_StdScan63_grn_J1148_0001	1905	2009-11-21T03:47:15Z
PVPhotAOTVal_514P_StdScan117_grn_J1148_0001	1905	2009-11-21T04:20:03Z
SDP_kmeisenh_3-PacsVzQSO - SDSSJ1148+5251	2673	2009-11-21T04:52:51Z
SDP_smadde01_3-iizw18-PACSphoto75-rep	376	2009-11-21T05:42:26Z
SDP_smadde01_3-izw18-PACSphoto75-2-rep	376	2009-11-21T05:49:45Z
KPGT_dlutz_1-COSMOS_d+0+40_reverse_r2_E-W	15448	2009-11-21T06:05:41Z
KPGT_dlutz_1-COSMOS_d+20+0_reverse_r2_N-S	15109	2009-11-21T10:24:12Z
PVPhotAOTVal_514P_StdScan63_grn_HIP7978_0001	1268	2009-11-21T14:53:49Z
PVPhotAOTVal_514P_StdScan117_grn_HIP7978_0001	1268	2009-11-21T15:16:00Z
SDP_ceiroa_3-PACS100/160 - HIP007978	4714	2009-11-21T15:38:11Z
SDP_ceiroa_3-PACS70/160 - HIP007978	789	2009-11-21T16:57:48Z
PVPhotAOTVal_514P_StdScan63_8legs_grn_HIP15371_01	625	2009-11-21T17:15:23Z
PVPhotAOTVal_514P_StdScan117_8legs_grn_HIP15371_01	625	2009-11-21T17:26:51Z
SDP_ceiroa_3-PACS100/160 - HIP110109_63	945	2009-11-21T17:44:52Z
SDP_ceiroa_3-PACS100/160 - HIP110109_117	945	2009-11-21T18:01:40Z
PVPhotAOTVal_514P_StdScan63_6legs_grn_gamDra_0001	305	2009-11-21T18:36:50Z
PVPhotAOTVal_514P_StdScan117_6legs_grn_gamDra_0001	305	2009-11-21T18:42:58Z
PVPhotAOTVal_514P_StdScan63_8legs_grn_gamDra_0001	305	2009-11-21T18:49:06Z
PVPhotAOTVal_514P_StdScan117_8legs_grn_gamDra_0001	305	2009-11-21T18:55:14Z
PVPhotAOTVal_514P_StdScan63_8legs3_grn_gamDra_0001	281	2009-11-21T19:01:22Z
PVPhotAOTVal_514P_StdScan117_8legs3_grn_gamDra_0001	281	2009-11-21T19:07:06Z
PVPhotAOTVal_514P_StdScan63_16legs_grn_gamDra_0001	625	2009-11-21T19:12:50Z
PVPhotAOTVal_514P_StdScan117_16legs_grn_gamDra_0001	625	2009-11-21T19:24:18Z
PVPhotAOTVal_514P_StdScan63_16legs3_grn_gamDra_001	577	2009-11-21T19:35:46Z
PVPhotAOTVal_514P_StdScan117_16legs3_grn_gamDra_001	577	2009-11-21T19:46:26Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0008	13	2009-11-21T19:56:07Z

7.4.78 OD0194

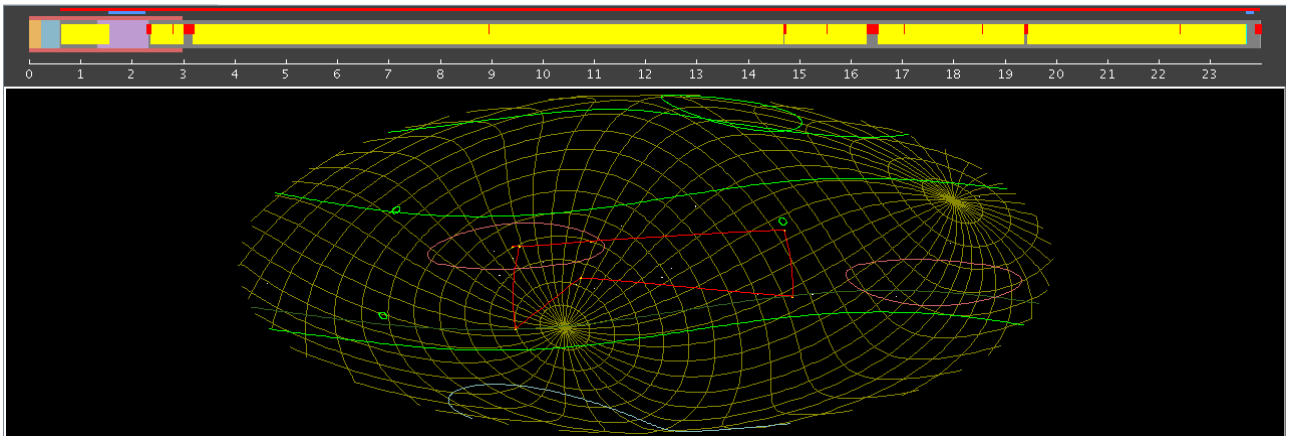


Figure 172: Timeline and distribution of pointings for OD0194 as displayed in the Mission Planning System.

Table 202: Timeline for PACS PV Phase OD0194.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0020	367	2009-11-23T20:40:03Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0020	3009	2009-11-23T20:46:14Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0010	636	2009-11-23T22:27:05Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0010	634	2009-11-23T22:39:48Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0010	632	2009-11-23T22:52:27Z
PVSpecIP_422C_NstdLineSpecChop_Rx25_108_neptune_01	20476	2009-11-23T23:17:04Z
PVSpecIP_422C_NstdLineSpecChop_Ry25_108_neptune_01	20476	2009-11-24T05:01:46Z
PVSpecIP_422C_NstdLineSpecChop_Rx3_66_uranus_01	2685	2009-11-24T10:49:21Z
PVSpecIP_422C_NstdLineSpecChop_Ry3_66_uranus_01	2685	2009-11-24T11:37:28Z
PVSpecWave_421D_StdLS_NGC6543_A_0001	1818	2009-11-24T12:37:24Z
PVSpecWave_421D_StdLS_NGC6543_B_0001	1761	2009-11-24T13:06:51Z
PVSpecAotVal_524F_NstdSEDChop_A_ngc6543_0001	3663	2009-11-24T13:35:23Z
PVSpecAotVal_524F_NStdSEDChop_B_ngc6543_0001	2767	2009-11-24T14:38:34Z
PVSpecAotVal_521X_StdLineMap_145_157_M82_0001	6069	2009-11-24T15:32:17Z
PVSpecAotVal_521X_StdLineMap_63_M82_0001	4684	2009-11-24T17:12:32Z
PVSpecAotVal_521X_StdLineMap_88_M82_0001	4683	2009-11-24T18:29:45Z
PVSpecSetup_na_nStd_orbitepi_na_0025	13	2009-11-24T19:44:52Z

7.4.79 OD0195

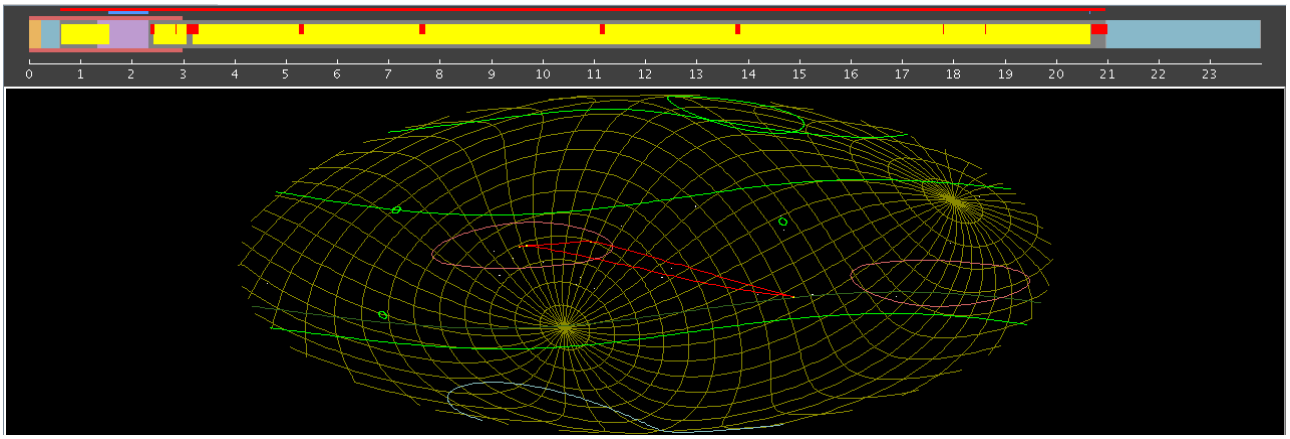


Figure 173: Timeline and distribution of pointings for OD0195 as displayed in the Mission Planning System.

Table 203: Timeline for PACS PV Phase OD0195.

Calibration AOR	duration (s)	absolute start time
PVSpecSetup_na_nStd_SetupFlexClassic_na_0021	367	2009-11-24T20:39:27Z
PVSpecSetup_na_nStd_SpuSetupAndResetClassic_na_0021	3009	2009-11-24T20:45:38Z
PVSpecFlux_434A_nStdRange_RepFluxB2A_HD161796_0011	636	2009-11-24T22:30:30Z
PVSpecFlux_434A_nStdRange_RepFluxB2B_HD161796_0011	634	2009-11-24T22:43:13Z
PVSpecFlux_434A_nStdRange_RepFluxB3A_HD161796_0011	632	2009-11-24T22:55:52Z
PVSpecFlux_438B_NstdRange_RsrfA_1_Uranus_0001	6941	2009-11-24T23:21:21Z
PVSpecFlux_438B_NstdRange_RsrfA_2_Uranus_0001	7996	2009-11-25T01:24:33Z
PVSpecFlux_438B_NstdRange_RsrfA_3_Uranus_0001	12196	2009-11-25T03:45:17Z
PVSpecFlux_438B_NstdRange_RsrfB_1_Uranus_0001	9050	2009-11-25T07:16:05Z
PVSpecFlux_438B_NstdRange_RsrfB_2_Uranus_0001	14177	2009-11-25T09:54:26Z
PVSpecFlux_438C_NStdSEDChop_s_B_Uranus_0001	2769	2009-11-25T13:52:51Z
PVSpecFlux_438C_NstdSEDChop_s_A_Uranus_0001	3665	2009-11-25T14:41:11Z
PVSpecGeGa_123A_nStd_LLC_p13_Uranus_0001	874	2009-11-25T15:42:38Z
PVSpecGeGa_123A_nStd_LLC_p17_Uranus_0001	874	2009-11-25T15:57:32Z
PVSpecGeGa_123A_nStd_LLC_p19_Uranus_0001	874	2009-11-25T16:12:26Z
PVSpecGeGa_123A_nStd_LLC_p09_Uranus_0001	874	2009-11-25T16:27:21Z
PVSpecSetup_na_nStd_orbitepi_na_0026	13	2009-11-25T16:41:59Z
3 hour SOPS window for DLCM preparation		

7.4.80 OD0200

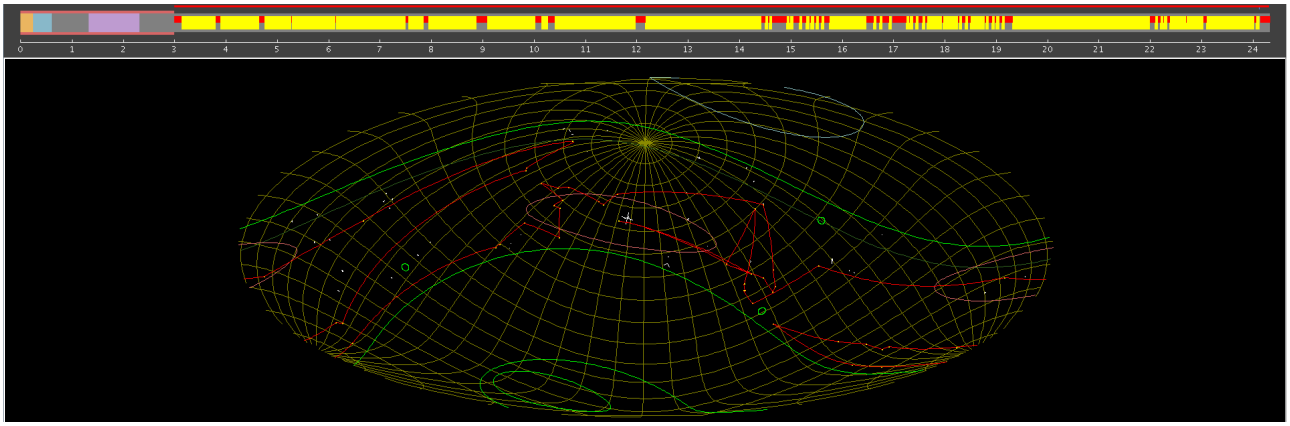


Figure 174: Timeline and distribution of pointings for OD0200 as displayed in the Mission Planning System.

Table 204: Timeline for PACS SD Phase OD0200.

Calibration AOR	duration (s)	absolute start time
7.2h SPIRE SDP programme		
PACS-SDPhotSetup_na_nStd_orbitproWait_na_0018	2263	2009-11-30T07:00:42Z
SDP_mjuvela_3-PCC249-PN	3922	2009-11-30T07:51:40Z
SDP_mjuvela_3-PCC249-PO	3922	2009-11-30T08:58:12Z
SpireParallel-SpireEngPHOT_STBYtoREDYGen-0002	130	2009-11-30T10:03:38Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP107140_0001	161	2009-11-30T10:10:43Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP106642_0001	161	2009-11-30T10:15:18Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP110130_0001	161	2009-11-30T10:35:07Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP111310_0001	161	2009-11-30T10:40:10Z
SDP_bdent_3-J0843.3-7905_continuum	133	2009-11-30T10:50:42Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP50230_0001	161	2009-11-30T10:58:57Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP51087_0001	161	2009-11-30T11:03:45Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD91760_0001	161	2009-11-30T11:10:02Z
SDP_bdent_3-TWA01_continuum	133	2009-11-30T11:16:41Z
SDP_kmeisenh_3-PacsHzQSO - BR1202-0725	2516	2009-11-30T11:25:48Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP55537_0001	161	2009-11-30T12:17:15Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP55355_0001	161	2009-11-30T12:24:03Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP106044_0001	161	2009-11-30T12:35:49Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98438_0001	161	2009-11-30T12:54:46Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98337_0001	161	2009-11-30T12:59:42Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP97629_0001	161	2009-11-30T13:06:39Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP90883_0001	161	2009-11-30T13:14:03Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP94438_0001	946	2009-11-30T13:20:46Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP95902_0001	946	2009-11-30T13:39:01Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP95413_0001	161	2009-11-30T13:57:32Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP102082_0001	161	2009-11-30T14:04:16Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP98424_0001	946	2009-11-30T14:10:19Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP96919_0001	161	2009-11-30T14:28:50Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP87816_0001	161	2009-11-30T14:35:51Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD160540_0001	161	2009-11-30T14:40:55Z

Table 204: continued.

Calibration AOR	duration (s)	absolute start time
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP83866_0001	161	2009-11-30T14:46:55Z
KPOT_eegami_1-PACS-A963-PA315	9569	2009-11-30T15:00:20Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HD99635_0001	161	2009-11-30T17:46:04Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP56779_0001	161	2009-11-30T17:52:05Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP57380_0001	161	2009-11-30T17:57:05Z
SDP_bmatthew_3-DEBRIS - PA005 (HD 102647)	1103	2009-11-30T18:03:13Z
SDP_bmatthew_3-DEBRIS - A005 - Scan	1155	2009-11-30T18:22:39Z
SDP_thmuelle_3-PPhoto-s70_Make	1584	2009-11-30T18:46:38Z
SDP_thmuelle_3-PPhoto-s100_Make	1584	2009-11-30T19:14:15Z
PVPhotFPG_261I_StdPS_blu_SAA-10+30_HIP58854_0001	161	2009-11-30T19:44:36Z
PACS-SDPhotSetup_na_nStd_orbitepi_na_0014	13	2009-11-30T19:47:21Z