

# SOOP Coordinators Feedback meeting

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Miho Janvier

05/09/2023

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# Schedule of the meeting

| 14:00                | Start of Meeting                                 |                   |
|----------------------|--|-------------------|
| 30 min (14:00-14:30) | Welcome & scope of meeting                       | ESA SO team       |
| 60 min (14:30-15:30) | SOOP Presentations (see below) + short questions | SOOP Coordinators |
| 10 min               | coffee break                                     |                   |
| 30 min (15:40-16:10) | SOOP Presentations (see below)                   | SOOP Coordinators |
| 30 min (16:10-16:40) | Q/A, discussions                                 | All               |
| 20 min               | Contingency time if needed                       |                   |
| 17:00                | End of Day                                       |                   |

## SOOP Presentations

### Part 1:

A. Zhukov: PSP quadratures 5'

C. Sasso: Eruption Watch 5'

D. Telloni (pres. D. Spadaro): Coronal Dynamics 5'

V. Andretta (pres. D. Spadaro): Density Fluctuations 5'

R. Susino: CH Boundary expansion 5'

S. Parenti, L. Bellot-Rubio, T. Kucera: Nanoflares 10'

A. Giunta, N. Zambrana Prado, D. Hassler: Connection Mosaic 5'

A. To, D. Baker, M. Janvier: Composition Mosaic 5'

J. Sinan: Polar Observations 5'

### Part 2:

S. Yardley, A. James: Slow Wind connection 5'

A. Fludra, : Bright points + Sunspot oscillations 10'

A. Inglis, T. Kucera, D. Berghmans: Major flare 5'

D. Berghmans: Full Disk mosaic 5'

RS Burst: a word from the PHI team?

# WHY this meeting?

## SCIENCE

- Are the observations made adequate to address a given SOOP science objectives?
- What are the first/preliminary science outcomes from the SOOPs?
- What worked? What didn't?

## SCIENCE

- Are the observations made adequate to address a given SOOP's science objectives?
- What are the first/preliminary science outcomes from the SOOPs?
- What worked? What didn't?
- **Expected feedback from this meeting:**
  - ❖ Make sure future SOOP instances have the right support to run for best outcome
  - ❖ What to expect for the next round of RSWs? (Some SOOPs repeated from LTP-15)
  - ❖ Decision to be made by the SWT in 2 weeks for LTP-17 (RSWs 16,17,18): inputs will help decisions (e.g. necessary time intervals, orbit placements to run SOOPs, supports required between instruments + other assets, ...)

# WHY this meeting?

## OPERATIONAL

SOOP coordination means **different degrees of involvement:**


- What SOOP to be run / what science data are we getting?
- What instruments to use / how to use them?
- Attending different meetings, e.g. SOWG, pointing decision meeting, ...

What worked & what didn't from an operational perspective?

# UPDATES from last feedback meeting

## SOOP page updates

- SOOP pages have been updated with feedback from last meeting (instances run + operation description, science outcomes)
- Redundant SOOPs have been removed (after discussions with RS and IS WGs)
- New SOOP (“AR-Cooling-Heating-Off-limb”) and new updates (Thermal Non Equilibrium “flavour” for the Long term AR SOOP).



▼ SOOP pages

- L\_DEFAULT
- L\_FULL\_LRES\_MCAD\_Probe-Quadrature
- L\_FULL\_HRES\_MCAD\_Coronal-He-Abundance
- L\_FULL\_HRES\_HCAD\_Eruption-Watch
- L\_FULL\_HRES\_HCAD\_Coronal-Dynamics
- L\_SMALL\_MRES\_MCAD\_Ballistic-connection
- L\_SMALL\_MRES\_MCAD\_Connection-Mosaic
- L\_SMALL\_MRES\_MCAD\_Composition-Mosaic
- L\_SMALL\_MRES\_MCAD\_Earth-Quadrature
- L\_SMALL\_HRES\_HCAD\_Fast-Wind
- L\_SMALL\_HRES\_HCAD\_Slow-Wind-Connection
- L\_BOTH\_HRES\_LCAD\_CH-Boundary-Expansion
- L\_BOTH\_HRES\_HCAD\_Major-Flare
- R\_FULL\_LRES\_LCAD\_Out-of-RSW-synoptics
- R\_FULL\_LRES\_HCAD\_Full-Disk-Helioseismology
- R\_FULL\_HRES\_HCAD\_Density-Fluctuations
- R\_SMALL\_MRES\_MCAD\_AR-Long-Term
- R\_SMALL\_MRES\_HCAD\_Sunspot-Oscillations
- R\_SMALL\_HRES\_MCAD\_Full-Disk-Mosaic
- R\_SMALL\_HRES\_LCAD\_Composition-vs-Height
- R\_SMALL\_HRES\_MCAD\_Polar-Observations
- R\_SMALL\_HRES\_MCAD\_AR-Heating
- R\_SMALL\_HRES\_HCAD\_Atmospheric\_Dynamics\_Structure
- R\_SMALL\_HRES\_HCAD\_AR-Dynamics
- R\_SMALL\_HRES\_HCAD\_RS-burst
- R\_SMALL\_HRES\_HCAD\_Wave-Stereoscopy
- R\_BOTH\_HRES\_HCAD\_Nanoflares
- R\_BOTH\_HRES\_MCAD\_Bright-Points
- R\_BOTH\_HRES\_HCAD\_AR-Cooling-Heating-off-limb
- SOOP prototemplate: I/R/L\_FULL/SMALL\_L/M/Hres\_L/M/

› General Planning strategy for first version SAP v0

› Science Planning

[Instances run / planned](#)

LTP6 (run):  
2022-03-03 to 06, 2022-03-17 to 22 (SOOP Coordinators: S. Yardley)  
The slow wind connection SOOP operated with the baseline observations outlined above.  
LTP11 (planned)  
2022-03-30 to 04-02, then 2023-04-22 to 04-24 (SOOP Coordinators: S. Yardley, A. James)

[Science outcomes](#)

Yardley et al. (2022, in prep): Slow Solar Wind Connection Science during Solar Orbiter's First Close Perihelion Passage  
Ngampoopun et al. (2022, in prep): Southern Polar Coronal Hole Boundary: Investigating the eruption of a filament channel and its merging with the southern polar coronal hole  
Boundary  
Baker et al. (2022, in prep): Observational Evidence of S-web Source of Slow Solar Wind  
Berghmans et al. (2022, in prep): First Perihelion of EU

[Further information](#)

(see Yardley et al. 2022, in prep)

RSW1 Target: NOAA active region complex including ARs 12955, 12957, 12961  
RSW2 Targets:

- Southern polar coronal hole boundary (2022-03-17 06 UT – 2022-03-18 18:40 UT)
- NOAA AR 12967 (2022-03-18 18:40UT – 2022-03-22 00UT)

**Coordinated Observations:** Hinode and IRIS through IHOPs 433 and 434.

[Original SOOP proposers](#)

C. Owen, Hardi Peter, Tim Horbury, Pradeep Chitta (Obj 4), D. Spadaro, A. Giunta, L. Harra, D. Baker

Like Be the first to like this

No labels

2 Comments

THANK YOU ALL FOR YOUR CONTRIBUTIONS !

(+ please continue to send updates!)



## Coordination updates

- External coordination page updated ~1 month before start of RSWs
- Mailing list is kept up to date
- Process in place for Hinode / IRIS support,also SST smooth enough (? Feedback needed)

Science Activity Plan (SAP)

› Solar Orbiter detailed science objectives

› SOOP pages

› General Planning strategy for first version SAP v0

Science Planning

• Roadmap for SOOP coordinators work

› Roadmap for Planning Activities & Related Work

• Trajectory Overview - 10 February 2020 Launch

• Solar Orbiter / Bepi Colombo Opportunities for Coordinat

› Cruise Phase

› NMP Segment 1: Jan-Dec 2022

› NMP Segment 2: Jan-Dec 2023

› NMP Segment 3: Jan-Dec 2024

• NMP Segment 4: Jan-Dec 2025

• Early STPs Debriefing - 21 July 2020

• Solar Orbiter Science Planning Overview

› Solar Orbiter Planning - for coordination with externa

• Points of contact for coordination with other missions a

› Solar Orbiter Planning - RSWs 4, 5, 6

• Solar Orbiter Planning - RSWs 7, 8, 9

SOWG

• Orbit Plots

› Solar Orbiter SPICE Kernels

› Planning Exercises

› Modelling and Data Analysis Working Group

› Low Latency Pipeline Engineering

› EMC

› Contamination Monitoring System (CMS)

› Instrument modes and models (to be updated)

• In Situ Working Group

› Remote Sensing Working Group

• SO-PSP Coordination WG

• Software Development Collaborations

Pages / ... / Science Planning

Edit Save for

Solar Orbiter Planning - for coordination with external parties

Created by Anik De Groof, last modified by Miho Janvier on 31 Aug, 2023

◆ This current page shows the planning for the remote-sensing (RS) windows 10, 11, 12.

◆ The last planning for the RS windows for the first half of 2023 can be found [here](#).

◆ As of 30 Aug 2023, all pointings (when needed) are yet to be decided.

Remote sensing window (RSW) placement

| Window<br>(# days) | Start               | End                 | Heliocentric Distance Range [au] |                             | Heliographic Latitude Range [deg] |       | SC-Sun-Earth Angle Range [deg] |      |     |                           |    |
|--------------------|---------------------|---------------------|----------------------------------|-----------------------------|-----------------------------------|-------|--------------------------------|------|-----|---------------------------|----|
|                    |                     |                     | beg                              | end                         | beg                               | end   | beg                            | end  |     |                           |    |
| RSW10 (10d)        | 2023-10-01T00:00:00 | 2023-10-11T00:00:00 | 0.33                             | 0.29<br>2023-10-07 07:24:49 | 0.30                              | -7.33 | 0<br>2023-10-10 03:35:12       | 0.86 | 147 | 90<br>2023-10-10 01:34:58 | 84 |
| RSW11 (10d)        | 2023-10-12T00:00:00 | 2023-10-22T00:00:00 | 0.31                             |                             | 0.43                              | 1.8   |                                | 7.16 | 78  |                           | 38 |
| RSW12 (10d)        | 2023-10-23T00:00:00 | 2023-11-02T00:00:00 | 0.44                             |                             | 0.57                              | 7.36  |                                | 7.98 | 35  |                           | 19 |

Overall science planning

(Note the text in red highlights adjustments still to be made. No red text indicates a final decision was made.)

Overall objectives:

• High-resolution observations around the perihelion of 7 October 2023 (0.29 au).

• Active region catching. Focus on flux emergence and do more full-disc high-resolution mosaics around 0.5 au.

• New Fast Wind sources observations.

THANK YOU ALL FOR YOUR COORDINATION EFFORTS !

Please do share any feedback.

# Roadmap for SOOP coordinators

Solar Orbiter SOC Public

PAGE TREE

› Acronyms and Definitions

› Getting started

› MOC Applicable Documents

› SOC Public Documents

▼ Science Activity Plan (SAP)

› Solar Orbiter detailed science objectives

› SOOP pages

› General Planning strategy for first version SAP v0

▼ Science Planning

• Roadmap for SOOP coordinators work

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› Modelling and Data Analysis Working Group

› Low Latency Pipeline Engineering

› EMC

› Contamination Monitoring System (CMS)

› Instrument modes and models (to be updated)

• In Situ Working Group

› Remote Sensing Working Group

• SO-PSP Coordination WG

• Software Development Collaborations

› Space tools

Pages / ... / Science Planning

✎ Edit ☆ Save for later 👁 Watching ↻ Share ...

Roadmap for SOOP coordinators work

Created by Miho Janvier, last modified on 18 Apr, 2023

This page provides you with the general information you need to know to as a SOOP coordinator

You have been assigned as a SOOP coordinator in the next RSWs. What's next?

- Your name + email address should have been collected and distributed via the SOOPs Coordinators + POCs mailing list. If you have not heard from the ESA Solar Orbiter team, [please reach out](#).
- A meeting will be organised after the executive SWT for a placement of your SOOP timeline. **It is necessary to attend this meeting** as decisions on the timings of your SOOP and placement on the orbit are made then. In order to prepare this meeting, have in mind the constraints necessary to effectively run your SOOP. You can also review the [SOOP pages](#) for further information.
- Following the meeting, you can request access to the [SOOP Kitchen planning tool](#). Please contact the [SOC team](#).
- This is the tool that is used to place your RS instruments observation blocks with details on the operations of each instrument to generate an estimation on the telemetry. You will be given a few months to:
  1. rethink/redesign your SOOP if the timeline given to your SOOP differs from your original plan (e.g. due to operational constraints)
  2. provide further information on the SOOP page related to your SOOP
  3. contact the instrument POCs (see the SOOPs Coordinators + POCs mailing list) to discuss the details of the instrument operations (cadence, FOVs, lines for spectroscopy, ...). This is also a good time to start thinking about any other coordinated observations you would want to have (e.g. IRIS, Hinode, ground-based observations).
- ~2 months before the LTP start, you will need to attend the Science Operations Working Group (SOWG). This is a crucial meeting where your role will be to guard the consistency of the SOOP and the coordination between each of the instrument contributions, while the instrument timelines are being filled by the instrument teams.

Are you requesting support from other observatories?

- Following the SOWG, you will have ~2 weeks to prepare your request for the Hinode Observing Plan (HOP) if you are requesting support from the Hinode teams. Send your proposal ([link to the form](#)) to [Miho](#) who will collate all the propositions and get back to you (e.g. if telemetry constraints do not allow for your HOP to be run to your expectations).
- Please send as early as possible your suggestions for the IRIS team in case you are requesting support from the IRIS mission.
- Currently, ground-based observatories (DKIST, Canary Islands observatories (Themis, Greggor, SST), ALMA, ...) are happy to support Solar Orbiter whenever possible, but this is a case-by-case situation. You are welcome to reach out directly to the observatories via [the list of contacts](#) and let Miho know.

Up to ~2 weeks before your SOOP runs: close discussions with the instruments teams

- Two weeks before your SOOP is run during the so-called "Short-term planning", instrument teams will send their instrument commanding to SOC and MOC to be uploaded to the spacecraft.
- Instruments teams may contact you prior to this cut-off line in case some tweaks are necessary. No changes (e.g. on timings) can be made after the operation requests are sent.

Your SOOP is ready to be run! Are you following a specific target?

- Depending on the SOOP you have proposed, your science target may need a specific pointing (e.g. slow solar wind source, active region). In such a case, as a SOOP coordinator, you will need to attend the pointing decision meetings. In general, these meetings are held 2 days prior to your target being observed. You will need to follow the procedures described [here](#) to use the JHelioviewer tool and provide the coordinates of your science target. If your science target includes a connection to a specific point in the heliosphere (e.g. Earth, Solar Orbiter, PSP), then a member of the Modelling and Data Analysis Working Group ([MADAWG](#)) will be present to provide you with information on the connectivity at the time of the pointing decision meeting.

A note on data latency

- The data latency may be quite high on this mission, depending on the location in the orbit the SOOP was scheduled. As a rule of thumb, data taken when we are close to earth will come down in a few days max, while data taken at the far side of the sun may take up to 2-3 months to be retrieved.

Your SOOP was run, and you are now working on the science results: what's next?

- As courtesy for future SOOP coordinators, and for the community at large, you will be requested to update the SOOP pages with the outcomes of your SOOP. This can be a link to the papers, science

Implemented from LTP-13

8



→ THE EUROPEAN SPACE AGENCY



- SO Cosmos "community" page:



SOOP summary page

SOOP science objectives

Coordinated observations

SOOP names

Any relevant information

Show / HideShow allExport

Search:

| SOOP name (+ click for operation description)              | SOOP description  | RSW            | LTP | Start date*         | End date*           | SOOP coordinators                   | Coordinated observations                   | Status    | Data link | Quicklooks | Notes  |
|--|---|----------------|-----|---------------------|---------------------|-------------------------------------|--|-----------|-----------|------------|--|
| <a href="#">R_FULL_LRES_HCAD_Full-Disk-Helioseismology</a> | Full disk helioseismology   | (outside RSWs) | 6   | 2022-01-20T00:00:00 | 2022-02-03T03:15:00 | T. Appourchaux<br>J. Schou          |  |           |           |            | The resolution was too low for the intended purpose, about 5.8 arcmin.   |
| <a href="#">L_SMALL_MRES_MCAD_Connection-Mosaic</a>        | Offpointing mosaic to find connection point (3 pointings along -S line)   | RSW1           | 6   | 2022-03-01T18:00:00 | 2022-03-03T03:21:52 | A. Giunta<br>N. Prado<br>D. Hassler |  | Fully run |           |            |  |
| <a href="#">L_SMALL_HRES_HCAD_Slow-Wind-Connection</a>     | Coordinated campaign to point to the source region of the slow solar wind, that will be measured by IS payload at time of arrival at SC | RSW1           | 6   | 2022-03-03T06:00:00 | 2022-03-06T18:30:00 | S. Yardley                          | Hinode and IRIS through IHOPs 433 and 434. | Fully run |           |            | Target: NOAA active region complex including ARs 12955, 12957, 12961   |
| <a href="#">R_SMALL_HRES_MCAD_Polar-Observations</a>       | Pointing to polar coronal hole close to Sun-Earth line crossing   | RSW1           | 6   | 2022-03-06T16:45:00 | 2022-03-06T21:50:00 | A. Zhukov                           |  |           |           |            |  |
| <a href="#">R_BOTH_HRES_HCAD_Nanoflares</a>                | Pointing to Active Region, chosen at pVSTP, for high-cadence nanoflare observations close to Sun-Earth line crossing                    | RSW1           | 6   | 2022-03-06T21:50:00 | 2022-03-07T03:00:00 | S. Parenti<br>D. Berghmans          |  |           |           |            |  |
| <a href="#">R_SMALL_HRES_MCAD_Full-Disk-Mosaic</a>         | Full Disk Mosaic for connection science close to Sun-Earth line crossing  | RSW1           | 6   | 2022-03-07T03:05:00 | 2022-03-07T06:30:10 | D. Berghmans<br>F. Auchère          |  |           |           |            | •EUI/HRIEUV: successful<br>•EUI/HRILYA: successful but remnants<br>•SPICE: successful but corners<br>•PHI/HRT: no data due to internal problem |

SOOP summary page

- New information will be added to the table (FOVs of high res instruments, Orbit plots, quicklooks)
- Direct datalink to SOAR

Show / HideShow allExport

Search:

| SOOP name (+ click for operation description) | SOOP description  | RSW            | LTP | Start date*         | End date*           | SOOP coordinators                   | Coordinated observations                   | Status    | Data link | Quicklooks | Notes  |
|---|---|----------------|-----|---------------------|---------------------|-------------------------------------|--|-----------|-----------|------------|--|
| R_FULL_LRES_HCAD_Full-Disk-Heliogeomology     | Full disk heliogeomology  | (outside RSWs) | 6   | 2022-01-20T00:00:00 | 2022-02-03T03:15:00 | T. Appourchaux<br>J. Schou          |  |           |           |            | The resolution was too low for the intended purpose, about 5.8 arcmin.   |
| L_SMALL_HRES_HCAD_Connection-Mosaic           | Offpointing mosaic to find connection point (3 pointings along N-S line)  | RSW1           | 6   | 2022-03-01T18:00:00 | 2022-03-03T03:21:52 | A. Giunta<br>N. Prado<br>D. Hassler |  | Fully run |           |            |  |
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| R_SMALL_HRES_HCAD_Full-Disk-Mosaic            | Full Disk Mosaic for connection science close to Sun-Earth line crossing  | RSW1           | 6   | 2022-03-07T03:05:00 | 2022-03-07T06:30:10 | D. Berghmans<br>F. Auchère          |  |           |           |            | •EUV/HRIEUV: successful<br>•EUV/HRIEUV: successful but remnants<br>•SPICE: successful but corners<br>•PHI/HRT: no data due to internal problem |

Inputs from SOOP coordinators are needed (e.g. missing data, AR target, reference to papers, ...)

Think about how the community at large would use the data you've spent time obtaining!



# Selection and Communication of Targets in LTPs 11 & 13

David Williams

ESA ESAC

05/09/2023

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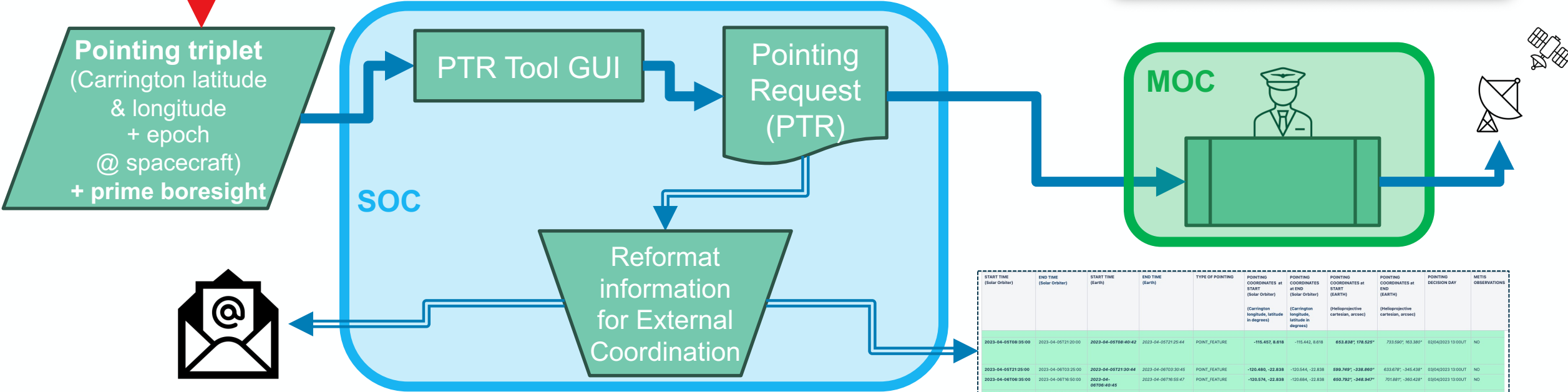
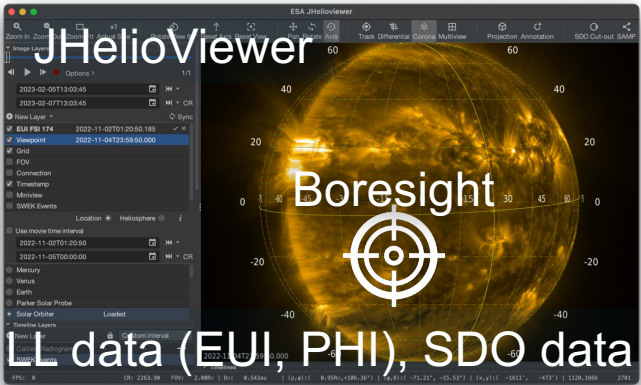
# Flow of information to produce output coordinates



SOOP Coordinators,  
MADAWG + SOC



Pointing  
Decision  
Meeting



Pointing decision e-mail to  
[so\\_coord-obs@cosmos.esa.int](mailto:so_coord-obs@cosmos.esa.int)

| START TIME<br>(Solar Orbiter) | END TIME<br>(Solar Orbiter) | START TIME<br>(Earth) | END TIME<br>(Earth) | TYPE OF POINTING | POINTING<br>COORDINATES at<br>START<br>(Solar Orbiter)<br>(Carrington<br>longitude, latitude<br>in degrees) | POINTING<br>COORDINATES at<br>END<br>(Solar Orbiter)<br>(Carrington<br>longitude, latitude<br>in degrees) | POINTING<br>COORDINATES at<br>START<br>(EARTH)<br>(Helioprojective<br>cartesian, arcsec) | POINTING<br>COORDINATES at<br>END<br>(EARTH)<br>(Helioprojective<br>cartesian, arcsec) | POINTING DAY       | METIS<br>OBSERVATIONS |
|-------------------------------|-----------------------------|-----------------------|---------------------|------------------|---|---|--|--|--------------------|-----------------------|
| 2023-04-05T08:35:00           | 2023-04-05T21:20:00         | 2023-04-05T08:40:42   | 2023-04-05T21:25:44 | POINT_FEATURE    | -115.452, 8.618   | -115.442, 8.618   | 653.838°, 178.629°   | 733.590°, 163.380°   | 03/04/2023 13:00UT | NO                    |
| 2023-04-05T21:25:00           | 2023-04-06T03:25:00         | 2023-04-05T21:30:44   | 2023-04-06T03:30:45 | POINT_FEATURE    | -120.480, -22.838   | -120.544, -22.838   | 599.749°, -338.860°  | 623.678°, -345.438°  | 03/04/2023 13:00UT | NO                    |
| 2023-04-06T06:35:00           | 2023-04-06T16:50:00         | 2023-04-06T06:40:42   | 2023-04-06T16:55:47 | POINT_FEATURE    | -120.574, -22.838   | -120.684, -22.838   | 650.792°, -348.947°  | 701.887°, -360.428°  | 03/04/2023 13:00UT | NO                    |
| 2023-04-06T16:55:00           | 2023-04-06T18:01:00         | 2023-04-06T16:55:47   | 2023-04-06T18:01:49 | POINT_FEATURE    | -122.285, -23.510   | -122.414, -23.510   | 694.065°, -370.083°  | 746.426°, -383.891°  | 04/04/2023 13:00UT | NO                    |
| 2023-04-06T18:01:00           | 2023-04-07T07:14:00         | 2023-04-06T18:01:49   | 2023-04-07T07:19:49 | POINT_FEATURE    | -122.285, -23.510   | -122.414, -23.510   | 694.065°, -370.083°  | 746.426°, -383.891°  | 04/04/2023 13:00UT | NO                    |
| 2023-04-07T07:14:00           | 2023-04-07T13:00:00         | 2023-04-07T07:19:49   | 2023-04-07T13:00:00 | POINT_FEATURE    | -122.285, -23.510   | -122.414, -23.510   | 694.065°, -370.083°  | 746.426°, -383.891°  | 04/04/2023 13:00UT | NO                    |

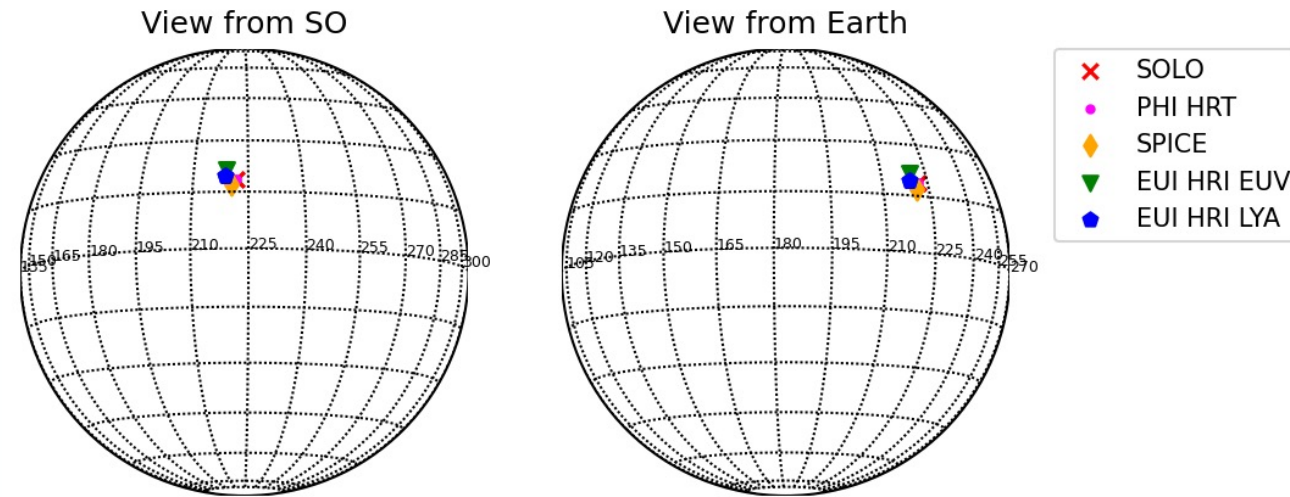
Solar Orbiter Planning - for coordination with external parties



# Updates to this process for LTP-11 (springtime 2023)

- Using information from the EUI and SPICE teams, we were able to include the pointing on the disc of each of the instruments (boresight) relative to the spacecraft
- This also allows us to set the “prime” instrument for that SOOP
  - The prime boresight tells SOC which instrument’s pointing is most important to be **centred on the chosen science target**
  - Current choices are:
    - Spacecraft
    - SPICE
    - EUI-HRI EUV
    - EUI-HRI Ly $\alpha$
  - Note that these numbers are taken as static, *i.e.*, not varying around the orbit

PTR 2023-04-06T18:48:00 to 2023-04-06T18:49:00 UTC (V00)



- Whichever is the prime instrument, **the science target is the pointing communicated to the outside world.**



- As with other subsystems in the SOC, we have been using NAIF SPICE kernels to convert between perspectives
  - in this case, between Carrington longitude & latitude at S/C epoch and Helioprojective Cartesian at Earth UTC
- Unfortunately, the conversion used a slightly incorrect frame in SPICE. As a result, we ended up with a discrepancy in the north-south direction when the coordinates were translated to Earth view, which sometimes was significant (up to ~40")
- This meant a reversion to manual coordinate translation via SunPy from 10<sup>th</sup> April until the end of the PTR windows.
- This issue has now been fixed over the summer by the ESAC SPICE team, and coordinates are automatically translated to Earth view **correctly**.