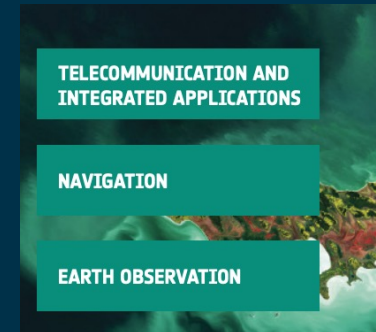
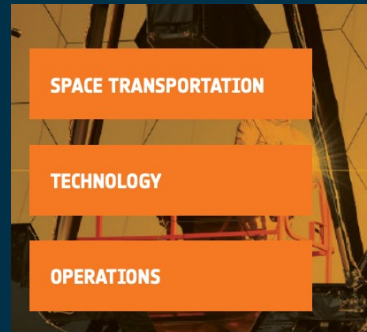


ESA Datalabs

Overview, current status and future plans

ESA Datalabs Workshop – Vicente Navarro

24.11.2022, ESAC

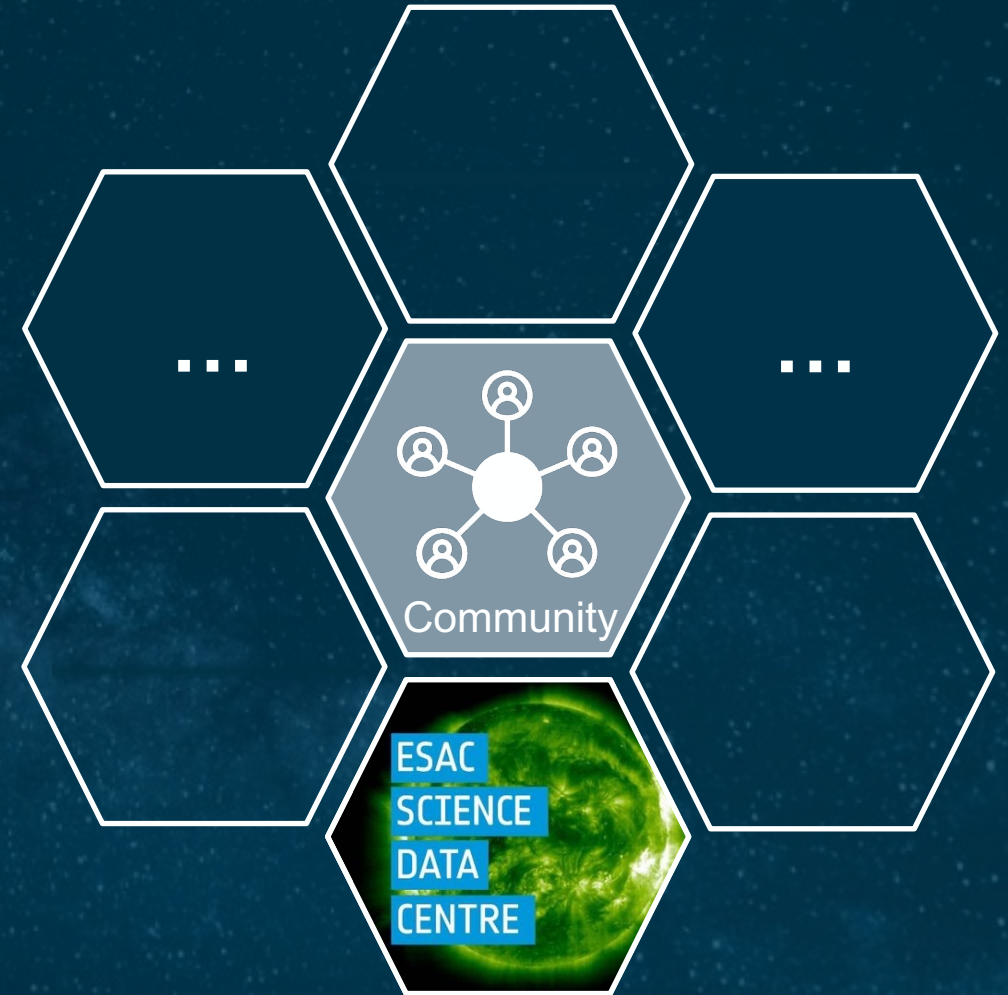


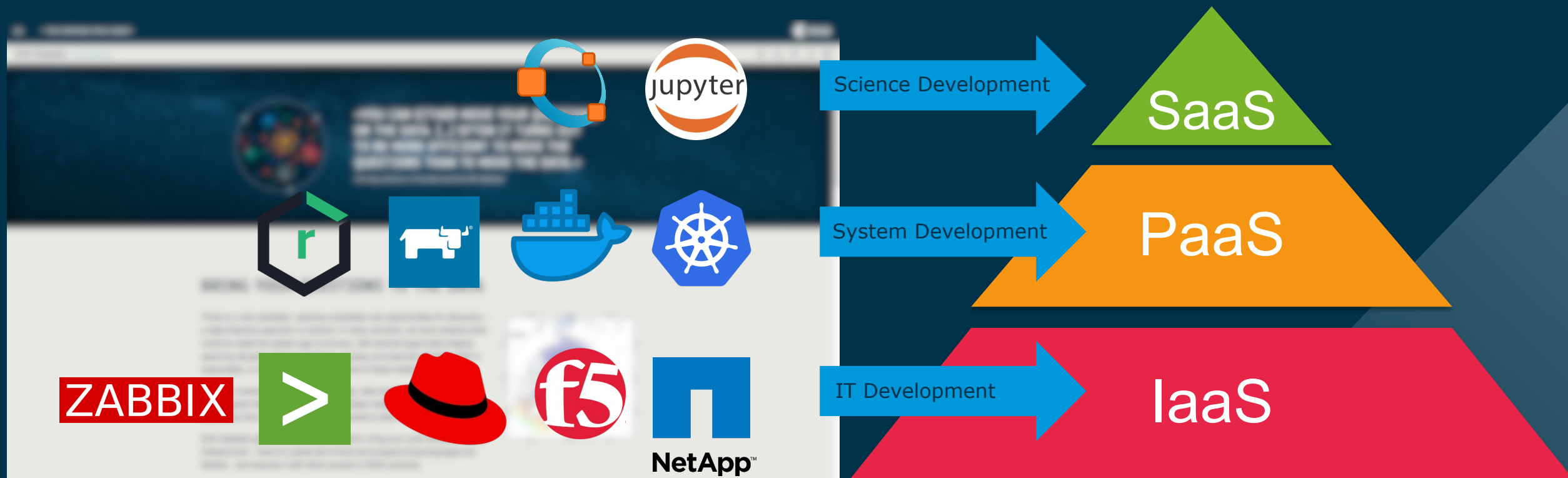
162 Private Beta Users

123 Public Beta Requests

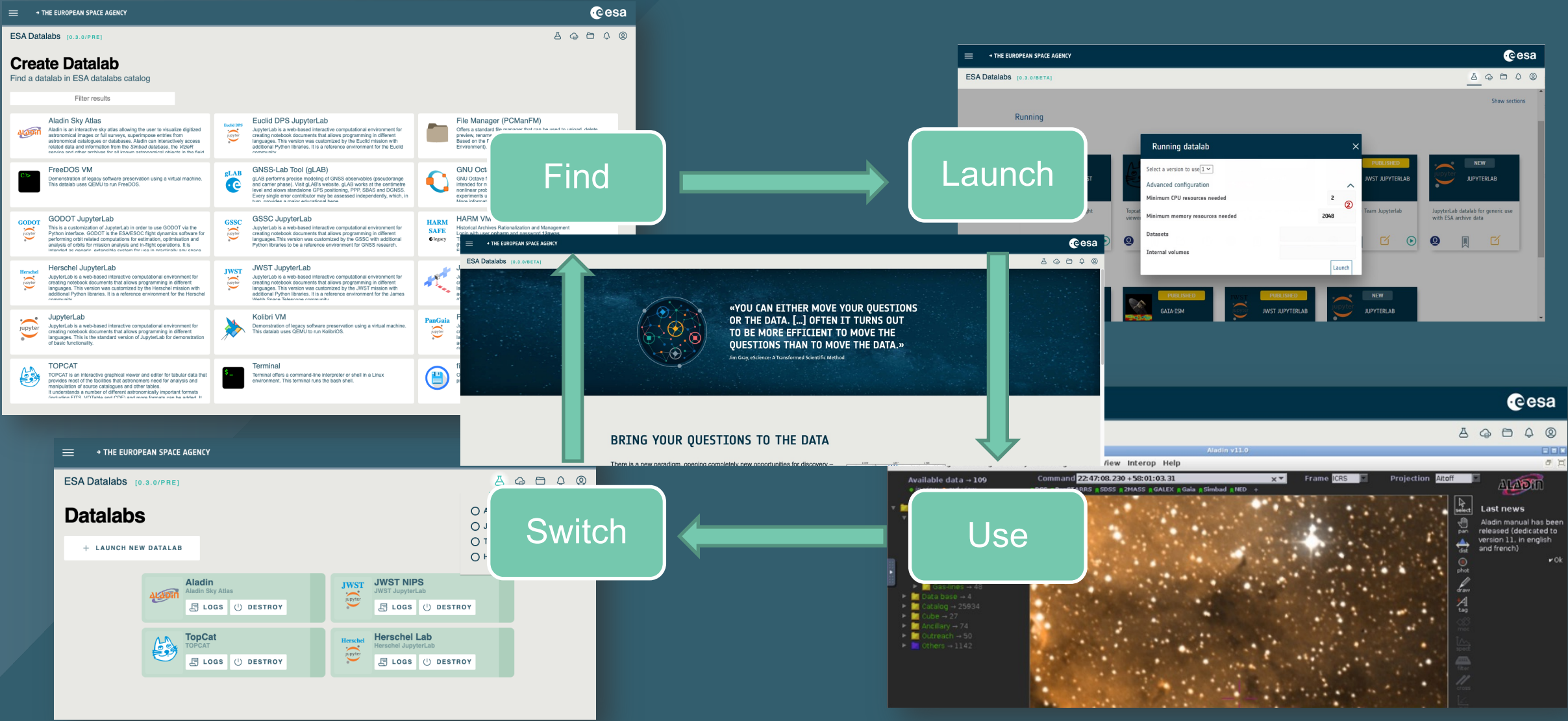
100 Simultaneous Users

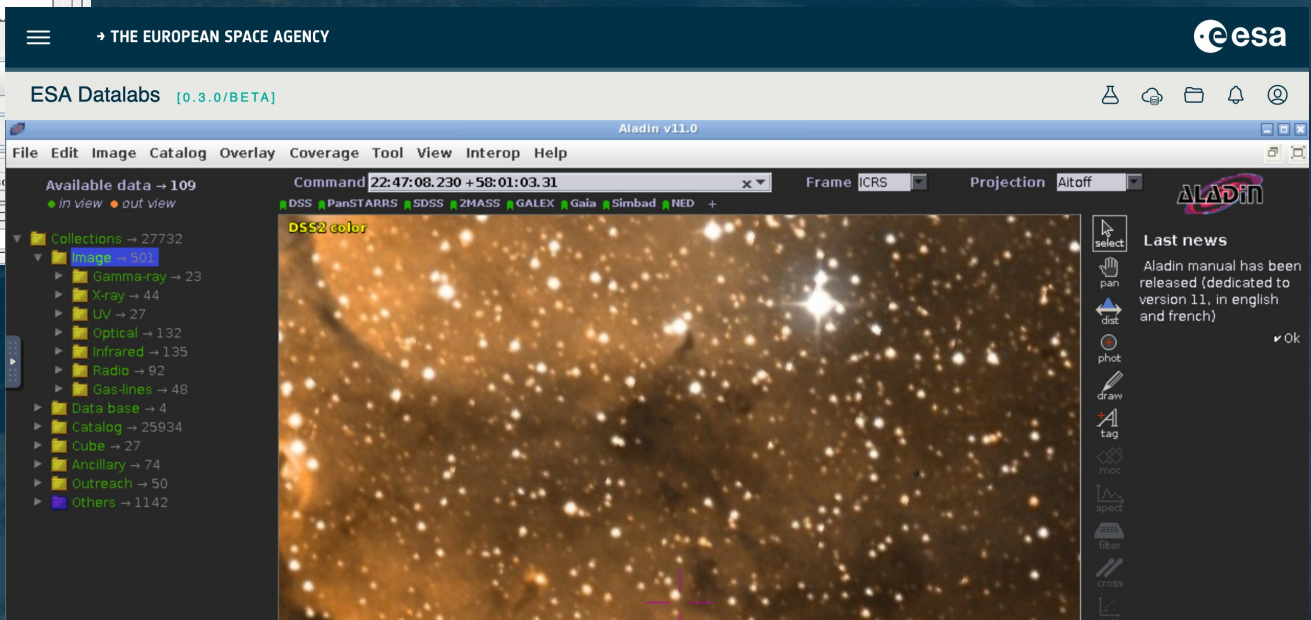
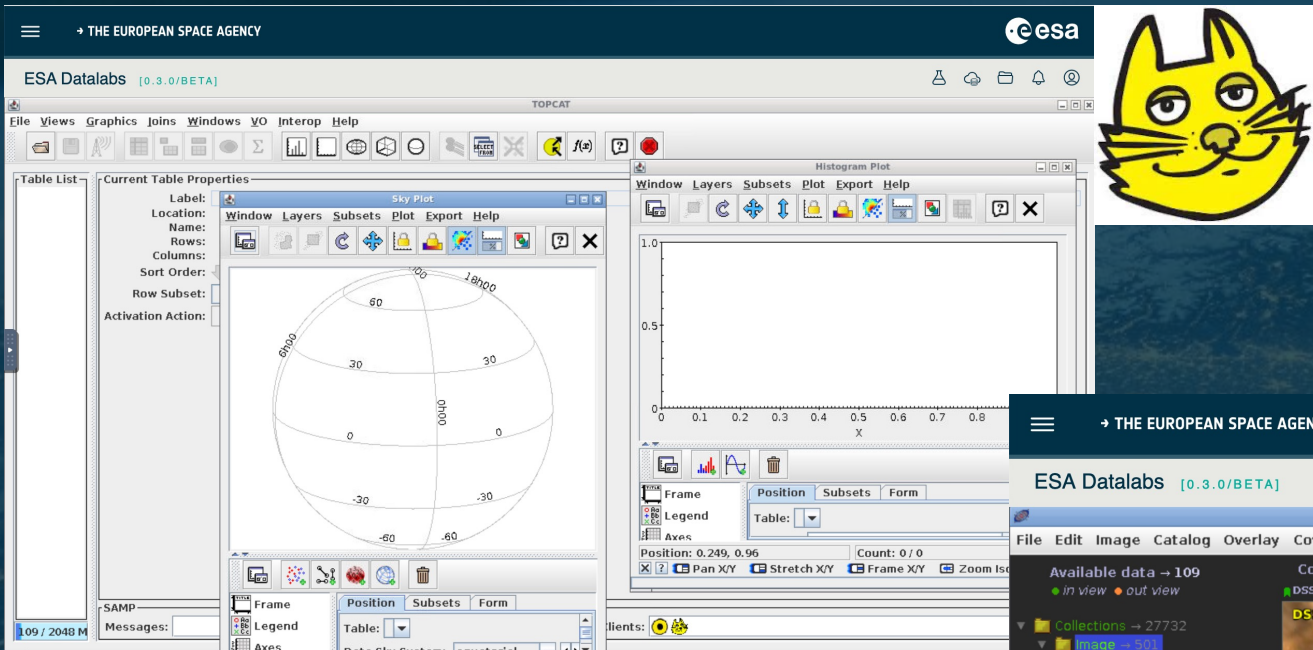
261 Simultaneous Datalabs





Standard Flow





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ESA Datalabs [0.3.0/BETA]

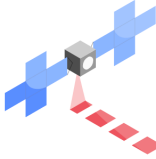
File Edit View Run Kernel Git Tabs Settings Help

Filter files by name

juice_kernels

Moon-coverage_0.8.0-JUICE_e...

Moon-coverage 0.8.0 - JUICE examples



The `moon-coverage` python package is a toolbox to perform surface coverage analysis based on orbital trajectory configuration. Its main intent is to provide an easy way to compute observation opportunities of specific region of interest above the Galilean satellites for the ESA-JUICE mission but could be extended in the future to other space mission.

It is actively developed by the [Laboratory of Planetology and Geodynamics](#) (CNRS-UMR 6112) at the University of Nantes (France), under ESA-JUICE founding support.

This notebook provides a list of examples on how-to-use the `moon-coverage` tool version `0.8.0` in the context of the JUICE mission. The complete documentation of this module can be found on [ReadTheDocs](#) for additional details.

```
[1]: from moon_coverage import __version__

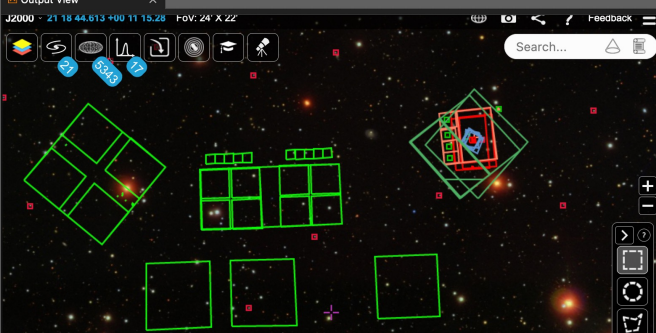
if __version__.startswith('0.8.'):
    print(f'Your current version of the moon-coverage tool is {_version__}')
else:
    raise ImportError(
        f'Your version of the moon-coverage tool is {_version__}. '
        'The examples below require the version 0.8.0 and may not work as expected.'
```

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ESA Datalabs [0.3.0/BETA]

File Edit View Run Kernel Git Tabs Settings Help

Output View



Search...

Launcher

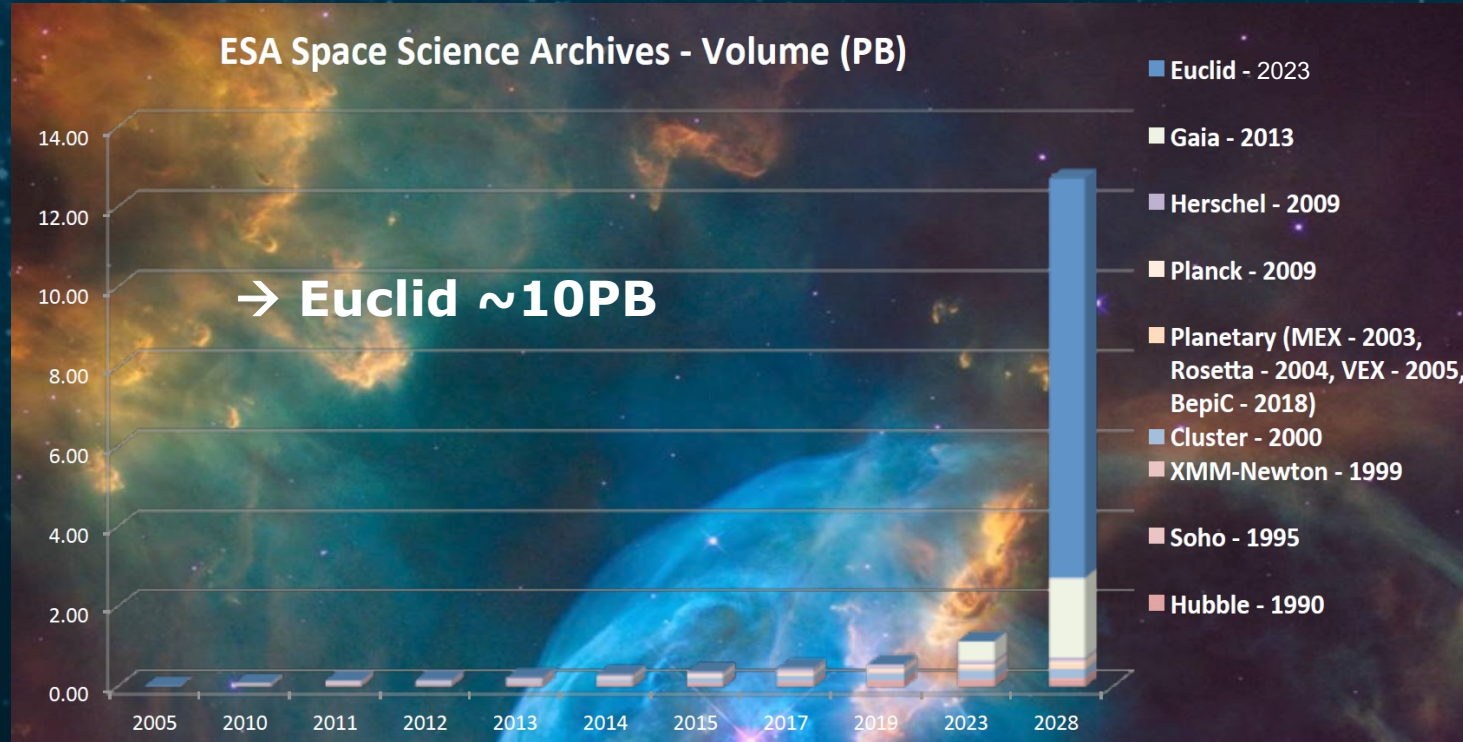
eJWST_Datalabs_example

Example Query Region + Calibration level (-1) + Filter name (F113W)

```
[48]: j2a = Jwst.cone_search(coord,radius,cal_level=-1,filter_name='F113W')
table2a = j2a.get_results()
print(table2a.columns)
print(table2a['observationid','dataproductype','calibrationlevel','public'])

<TableColumns names=('dist','observationid','calibrationlevel','public','data
producttype','instrument_name','energy_bandpassname','target_name','target_ra
','target_dec','position_bounds_center','position_bounds_spoly')>
  observationid      dataproductype  calibrationlevel public
jw01865001001_xx107_00012_miri      image             -1  False
jw01865001001_xx105_00001_miri      image             -1  False
jw01865001001_xx105_00002_miri      image             -1  False
jw01865001001_xx105_00003_miri      image             -1  False
jw01865001001_xx105_00004_miri      image             -1  False
jw01865001001_xx105_00005_miri      image             -1  False
jw01865001001_xx106_00000_miri      image             -1  False
jw01865001001_xx107_00011_miri      image             -1  False
jw01865001001_xx108_00019_miri      image             -1  False
jw01865001001_xx108_00020_miri      image             -1  False

jw02368007001_xx102_00002_miri      image             -1  False
jw02368007001_xx103_00003_miri      image             -1  False
jw02368007001_xx104_00004_miri      image             -1  False
jw02368007001_xx105_00001_miri      image             -1  False
jw02368007001_xx106_00002_miri      image             -1  False
jw02368007001_xx107_00003_miri      image             -1  False
jw02368007001_xx108_00000_miri      image             -1  False
jw02368007001_xx109_00000_miri      image             -1  False
jw02368007001_xx10a_00000_miri      image             -1  False
jw02368007001_xx10b_00003_miri      image             -1  False
jw02368007001_xx10c_00004_miri      image             -1  False
Length = 32 rows
```



From bring the data to the user

To bring the user to the data

A blurred image of a winding road through a forest, suggesting motion and a path forward. The road is paved and has two yellow lines down the center. It curves to the right and is bordered by a metal guardrail on the left and a concrete curb on the right. The surrounding trees and foliage are heavily blurred, indicating a fast-moving perspective. The overall scene is bright and green, with sunlight filtering through the leaves.

The Future?

Platform and Community Release Roadmap



Q1
2022

Private Beta



0.3.0

PRODUCTION

Q4
2022

Public Beta
Moderated



0.6.0

WORKSHOP

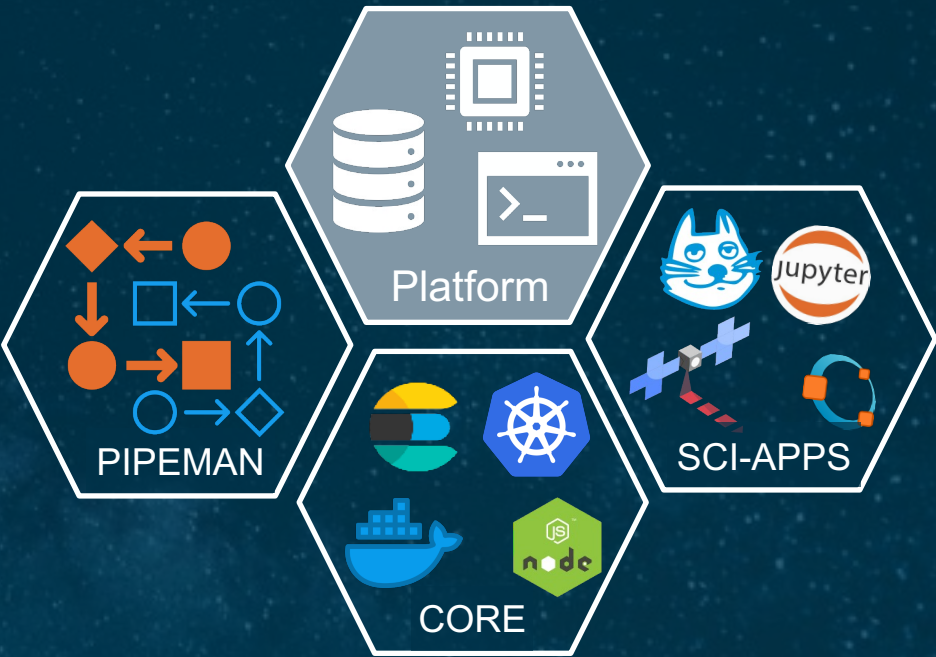
Q2
2023

Public Beta
Unmoderated



1.0.0

...



Future Data Processing

Workspace

Catalogue

manifest.json x JWST.pipeline.cwl

Graph Code Test Details Push Pipeline

my_notebooks

example_pipeline_input

data

JWST

crds_cache

references

jwst

nirspec

mappings

jwst

config

jwst

server_config

ref_cache_subdir_mode

bad_files.txt

cache_override

jw00736038001_02107_00004_nrs1_u...

cache.tar.gz

.team_areas

notebooks

My Pipelines in Workspace

ystem Pipelines in Workspace

strun

jwst

dependencies

manifest.json

JWST.pipeline.cwl

image2

detector1

Detector1

Detector1 intermediate output

Image2

FITS file output

CRDS cache overrides

Image 2 CRDS cache override list

Detector1 CRDS override list

Pipeline input FITS file

Validation Execution logs

[2/14/2022, 3:13:44 PM] CWL Valid

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ESA Datalabs

Create Datalab

Find a datalab in ESA datalabs catalog

CUDA

jupyterlab-cuda

JupyterLab for demonstration of GPU functionality (CUDA 10.0).

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ESA Datalabs [0.3.0/BETA]

File Edit View Run Kernel Git Tabs Settings Help

Filter files by name

/ notebooks /

Name	Last Modified
example.ipynb	2 months ago
gpu_confirmed.ipynb	2 months ago
sorting.ipynb	2 months ago

sorting.ipynb

gpu_confirmed.ipynb

Make sure the CUDA kernel is chosen before running this notebook (top left corner)

```
[ ]: import tensorflow as tf
import sys
from platform import python_version
from tensorflow.python.client import device_lib
import os
```

First way to check if the GPU is visible in the datalab is to call the NVIDIA specific method. If the GPU is visible a table showing some statistics will appear. If something went wrong you'll get an error.

```
[ ]: !nvidia-smi
```

Time measured	numpy + no gpu	numpy + gpu	cupy + gpu
Total execution time	≈ 44m47s	≈ 14min26s	≈ 3min2s

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecati cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio, cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet ut et voluptates repudiandae sint et molestiae non recusandae. Itaque earum rerum hic tenetur a sapiente delectus, ut aut reiciendis voluptatibus maiores alias consequatur aut perferendis doloribus asperiores repellat.

Future Collaboration

INNOVATION
SOLUTION
BRANDING
IDEAS
MARKETING
SUCCESS
MANAGEMENT
ANALYSIS

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ESA Datalabs [0.3.0/BETA]

File Edit View Run Kernel Git Tabs Settings Help

Filter files by name

Name	Last Modified
data	7 hours ago
my_workspace	7 hours ago
notebooks	7 hours ago
team_workspaces	seconds ago

Moon-coverage_0.8.0-JUIC

PanGaia_VN_Edition.ipynb

Markdown git

Overview

PanGaia simplifies the access, exploration, and clustering analysis of the Gaia DR2 [catalogue](#). This toolkit has been developed with the aim to facilitate the research of astromers who are *familiar* with the Gaia archive and that are interested in Star Formation. However, because of its design and capabilities PanGaia might be useful for a broad audience of researchers interested in exploring large astrometric catalogues. This code closely follows the analysis described by [Canovas et al. 2019](#), where more than 150 potential new members of the ρ -Ophiuchus Star Forming Region where identified using Machine Learning algorithms applied to the Gaia DR2.

PanGaia in a Nutshell:

- Data Access:** An [ADQL](#) cone-search (e.g. [link](#)) in the Gaia DR2 archive is performed using the [astroquery.gaia](#) package. Several extra columns are added to the queried table (like e.g. the distance, computed as the inverse of

My Workspace

Team Workspaces

 datalabs



Search datalab catalog

Q

New datalab

[Customize view](#)

Public



CYPRESS SEPPTTEST-219
1994.7571690539014

Test Automated





CYPRESS SEPPTTEST-219
1111.6848610854097

Test Automated





CYPRESS SEPPTTEST-219
1419.7853655034294

Test Automated





CYPRESS SEPPTTEST-219
1713.2724871003359

Test Automated





CYPRESS SEPPTTEST-219
1673.9987705736833

Test Automated



[See more](#)

Developed by me



NEW

No description provided





European Space Agency

16



Future Interoperability

Interoperability Across IT Infrastructures



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ESA Datalabs [00.0/BETA] Current datazone: SCI-CLOUD

Datalabs

Manage your running datalabs

situ

jupyter

Delete

jupyterlab-cuda

jupyter

Delete

jupyterlab

jupyter

Delete

→

Datazones

☒ SCI-CLOUD

☐ GO.ESA

☐ EO-CLOUD

→ THE EUROPEAN SPACE AGENCY

ESA Datalabs [00.0/BETA] Current datazone: GO.ESA

Datalabs

Manage your running datalabs

x-ds9

Delete

jl-juice

Delete

→

Datazones

☐ SCI-CLOUD

☒ GO.ESA

☐ EO-CLOUD

<https://datalabs.esa.int>

<https://datalabs.esa.int>

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ESA Data Discovery Portal [0.4.0/ALPHA]

Type of Asset

- ☐ Datalab
- ☐ Dataset

Properties

- ☐ Query Tool
- ☐ Visualization Tool
- ☐ Analysis Tool
- ☐ Data Volume

Domain

- ☐ Earth Observation (1,766)
- ☐ Navigation (21)
- ☐ Space Science (21,818)

Instrument

Thematic Area

Mission

- ☐ Astronomy (15,365)
 - ☐ Gaia (5)
 - ☐ Herschel (723)
 - ☐ Hubble Space Telescope (9,745)
 - ☐ ISO (1,515)
 - ☐ Lisa Pathfinder (6)
 - ☐ Planck (4)
 - ☐ XMM-Newton (3,367)
- ☐ Earth Observation Satellite (1,088)
- ☐ ADEOS (1)

Type in your query...

aladin



Aladin is an interactive sky atlas allowing the user to visualize digitized astronomical images or full surveys, superimpose entries from astronomical catalogues or databases, and interactively access related data and information from the Simbad database, the VizieR service and other archives for all known astronomical objects in the field.

file-browser



Web File Browser which can be used as a middleware or standalone app.

filezilla



FileZilla - FileZilla - FileZilla - FileZilla - FileZilla - FileZilla - FileZilla - FileZilla

fv



FV - An image display

jl-esdc



Jupyterlab ESDC - Jupyterlab ESDC - Jupyterlab ESDC - Jupyterlab ESDC

jl-euclid-dps



Euclid DPS Jupyterlab - Euclid DPS Jupyterlab

jl-herschel



Herschel JupyterLab - Herschel JupyterLab - Herschel JupyterLab - Herschel JupyterLab

jl-juice



JupyterLab with JUICE

jl-pangaia



PanGaia JupyterLab - PanGaia JupyterLab - PanGaia JupyterLab - PanGaia JupyterLab

jl-xmm-sas



Jupyterlab XMM SAS - Jupyterlab XMM SAS

jupyterlab



JupyterLab

jupyterlab-cuda



JupyterLab CUDA

aladin

Version 0.3.1

Overview

Details

Launch datalab

Aladin is an interactive sky atlas allowing the user to visualize digitized astronomical images or full surveys, superimpose entries from astronomical catalogues or databases, and interactively access related data and information from the Simbad database, the VizieR service and other archives for all known astronomical objects in the field.



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ESA Science support

- Increased science return from its missions
- Increased science operations efficiency

Innovation traits

- Science data exploitation coupled with data
- Science pipelines for current and future needs
- Collaborative research & citizen science

Thank You!



datalabs.esa.int