ESA’s Planetary Science Archive: efforts to support the scientific community

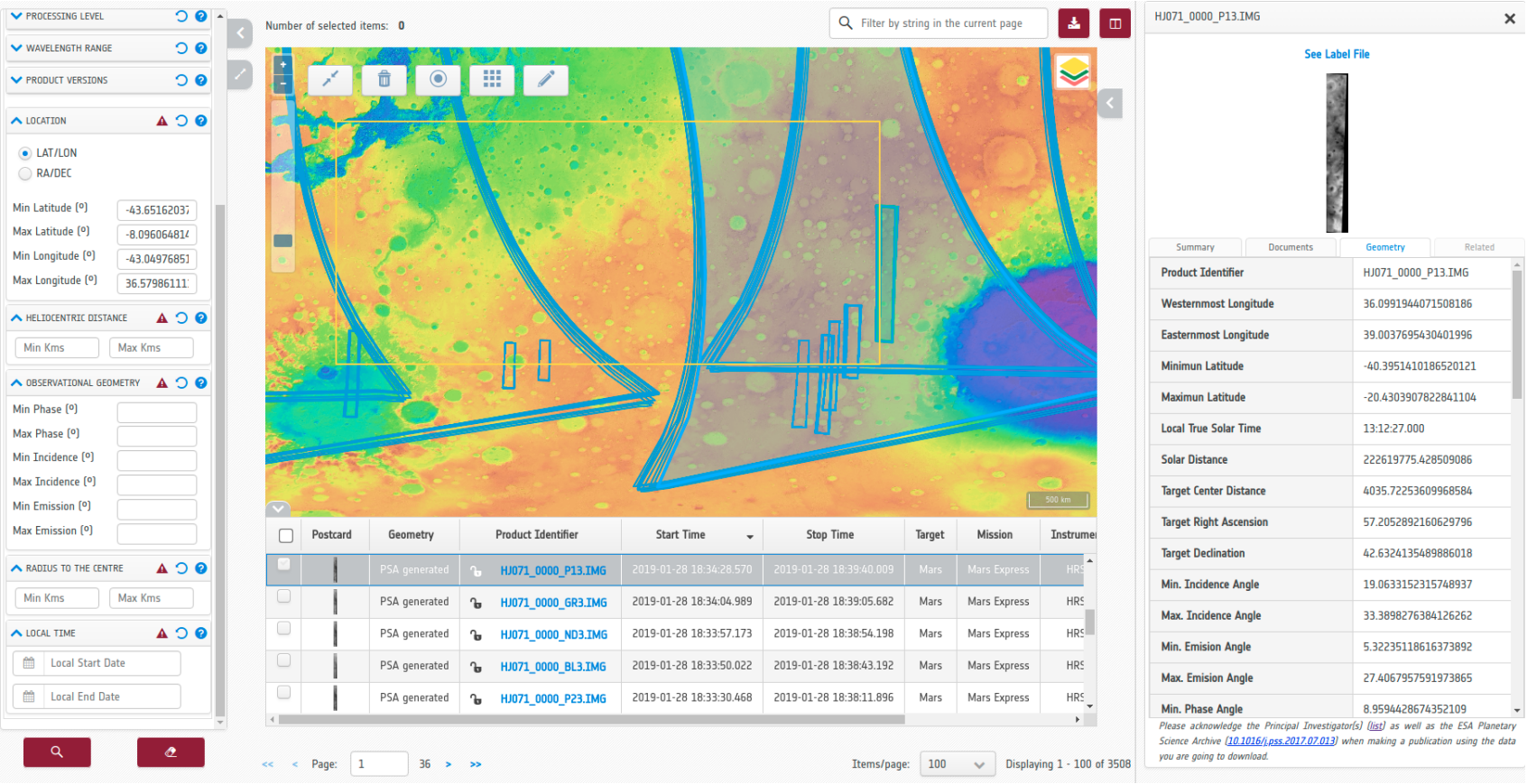
@esapsanews

Mark S. Bentley (mark.bentley@esa.int)
on behalf of the entire PSA team

https://psa.esa.int

New PSA services: GeoGen

search



display

New PSA services: Guest Storage Facility

- The GSF addresses community demands to store:
  - higher level products derived from archive data
  - data in science-ready formats (*not* PDS-compatible)
  - data produced by small teams/individuals
- It does *not* replace the PSA for primary mission data
  - in the PDS3 or PDS4 standards
  - designed for long term preservation
- 5 data sets available so far:
  - https://www.cosmos.esa.int/web/psa/psa_gsf

SPICE for ESA
Status and Future Work

Alfredo Escalante
Ricardo Vallés
Christophe Arviset

ESA SPICE Service

PDW#5
28th June 2021

SPICE for ESA Status and Future Work

- What is SPICE? What geometric calculations can be done with SPICE?
- SPICE Use cases
  - Computation of Philae (target) position or target is inside Field-of-View (FoV) of OSIRIS NAC
  - Rendering images with SPICE
  - Instruments Field-of-View obstruction
  - Systematic definition of Regions of Interest (ROIs)
  - Analysis and Visualization of Physical phenomena
  - Spacecraft and its components motion visualization

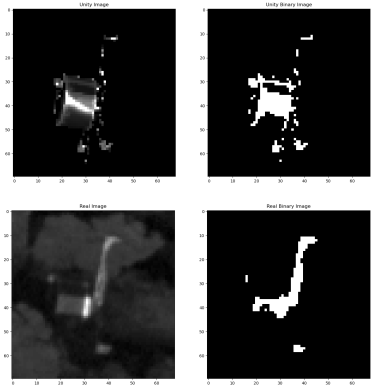


Fig: Philae simulated vs real image

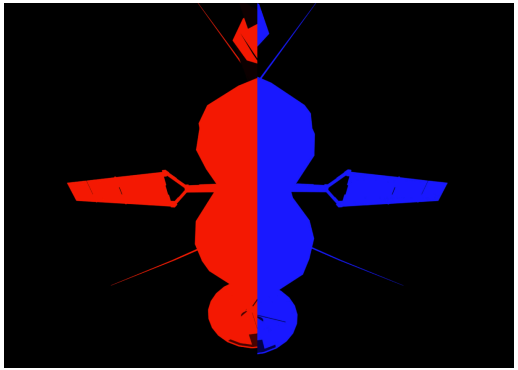


Fig: FOV obstruction study for SWA - EAS

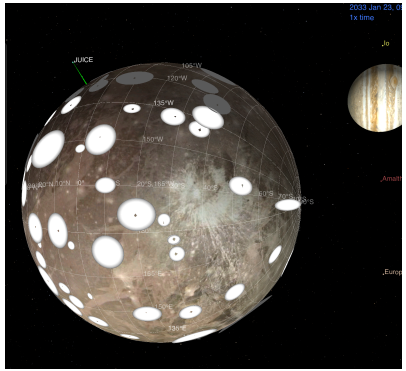


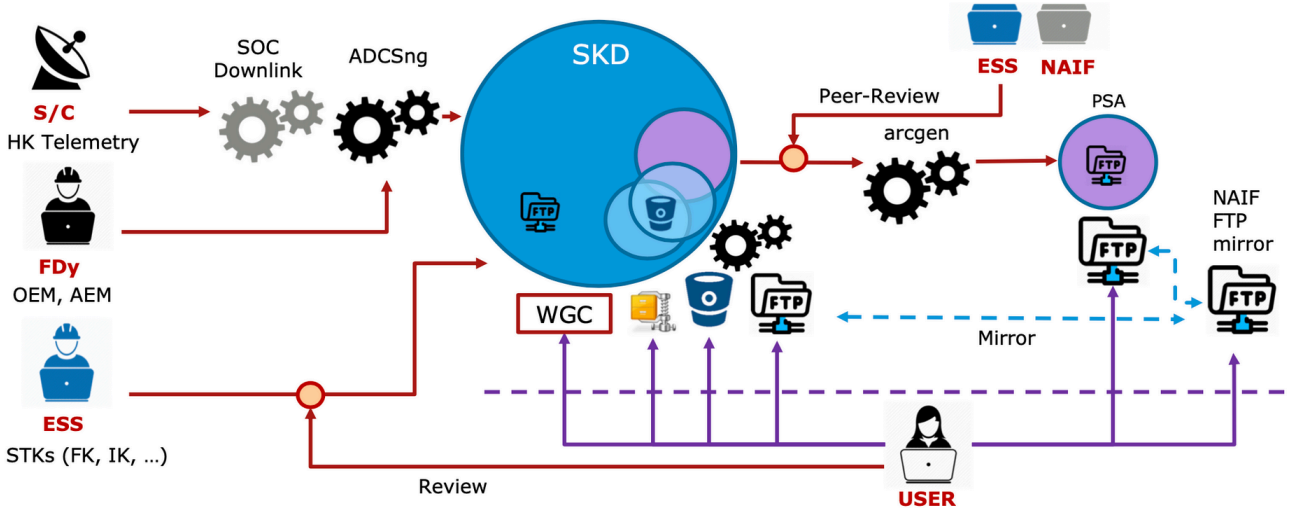
Fig: Visualization of ROIs for Ganymede

SPICE for ESA Status and Future Work

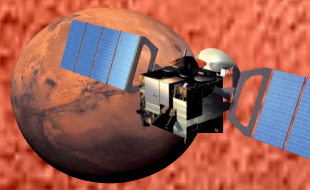
- About ESA SPICE Service
  - Main tasks, developing SPICE Kernel Datasets (SKDs) and software for generating and exploiting SKDs
  - SKDs Structure and Contents
  - SKDs Version Control and Distribution
  - SKDs Archiving and Citation
  - SKDs Validation activities
- Contact the service via e-mail **spice@sciops.esa.int**

Available, SPICE Kernels Datasets:

Releases and support to the community is provided



MARS EXPRESS



Using the ESA's Planetary Science Archive to Search for Mars Express VMC Data of an Elongated Cloud Near Arsia Mons

Emmanuel Grotheer, I. Barbarisi, M. Bentley, S. Besse, M. Breitfellner, A. Cardesín-Moinelo, M. Castillo, D. Coia, T. del Río-Gaztelurrutia, R. Docasal, B. Grieger, D. Heather, J. Hernández-Bernal, R. Hueso, T. Lim, N. Manaud, J. Marín-Yaseli, P. Martin, B. Merin, D. Merritt, A. Montero, J. Osinde-López, F. Raga-López, E. Ravanis, J. Saiz-Santos, A. Sánchez-Lavega, D. Titov, and M. Voelker

5th PDW & 2nd PSIDA, Abstract #7040, 29th June 2021

When the cloud at Arsia Mons was first publicized, there was some speculation that it may be volcanic in origin. The actual formation mechanism is due to the atmosphere interacting with the local topography, i.e. it is an orographic cloud.

You are welcome to check out Recording #7040 for information on how to find these images in the PSA. These techniques are applicable to finding other observations to enable you to conduct your research with the public data made available by the European Space Agency.

PSA Help inbox

For questions, suggestions, and comments related to the PSA, please contact us at:

psahelp@cosmos.esa.int

Passthrough: Template-Driven PDS4 Product Generation

Ariel Ladegaard
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Aberystwyth University, Wales

Abstract #7034

5th Planetary Data Workshop and Planetary Science Informatics and Data Analytics (PSIDA) Meeting

Tuesday June 29 2021, 7:00 a.m. PDT/10:00 a.m. EDT/2:00 p.m. UTC

PSA: Data or software architecture, management, and interoperability

Updates and methods for ESA's PSA.

Chair: Christophe Arviset

Project goals

- Facilitate the development of PDS4-native product processors
- Use product type templates as a product hierarchy's type definitions (processor interfaces)
- Reduce product generation "boiler plate"

Components

- Python template handler package
- Declarative template language
- Extension function API

Key features

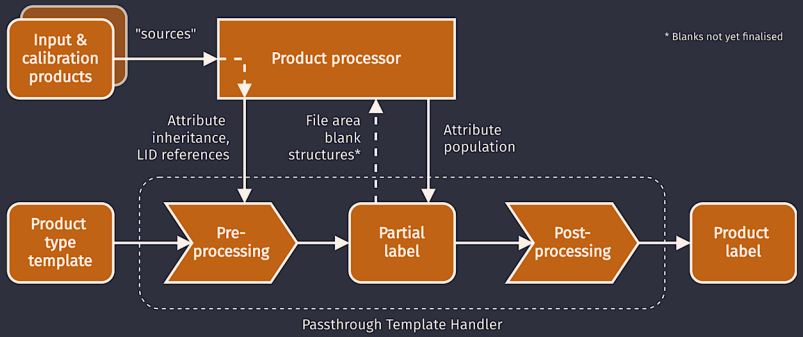
✅ Dynamic, conditional metadata inheritance & population
→ "fetch attribute/class X from source product B"

✅ Type definition adherance checks
→ ensure generated product is a valid instance of its type (for development and human-in-the-loop applications)

✅ Mission/instrument plugins for common functionality
→ "generate LID based on the ExoMars PanCam formation rules"

🚧 File area data structure handling
→ provide processor with managed "blank" NumPy arrays; auto-populate checksum etc. on export

Product generation flow



Documentation: ExoMars-PanCam.github.io/passthrough

GEOGEN, a new approach and tool for computing the geometry metadata of ESA's PSA observational data products

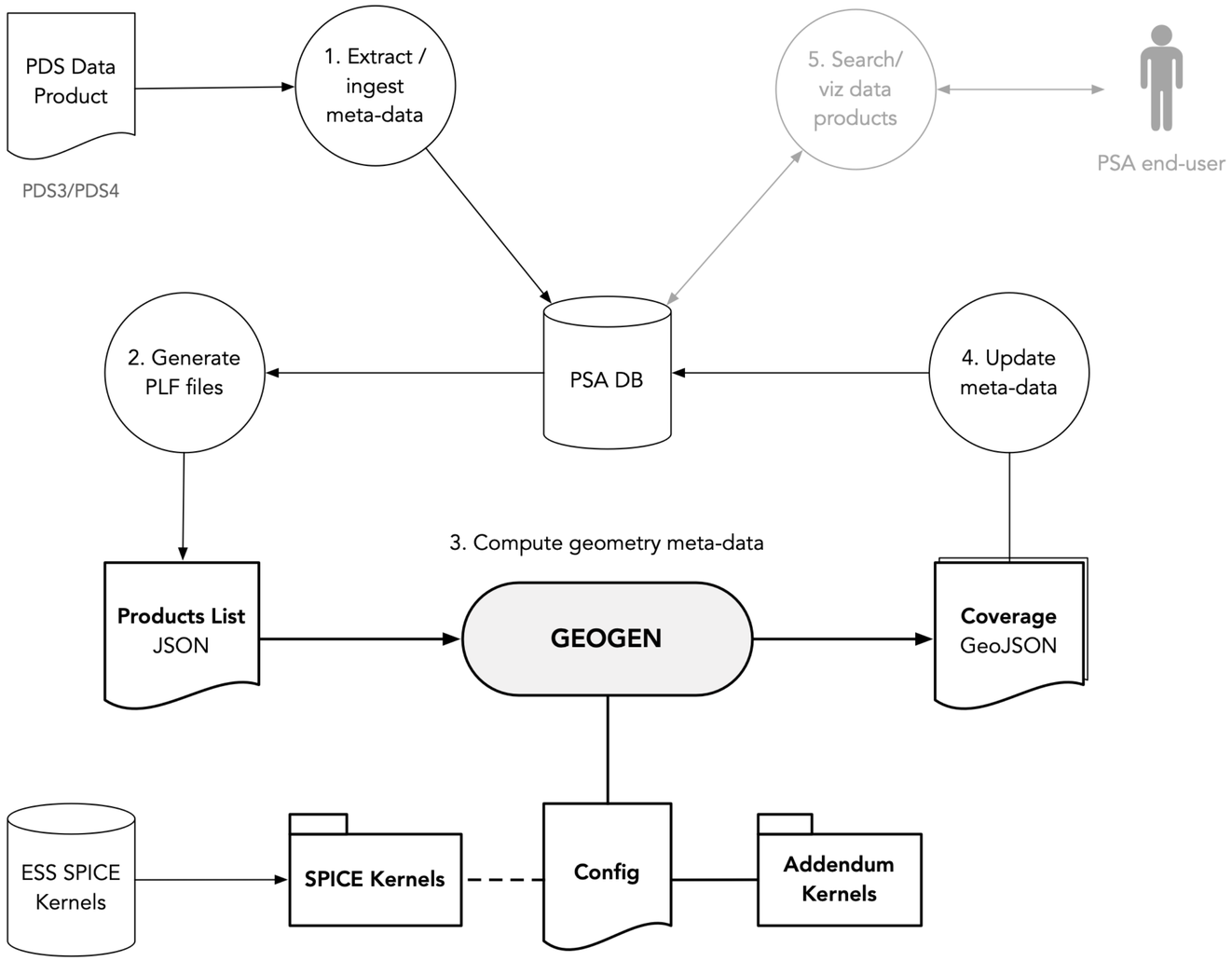
Nicolas Manaud (nicolas@spacefrog.design, SpaceFrog Design for ESA – European Space Agency),
S. Besse, A. Montero, A. Escalante, R. Valles, I. Barbarisi, G. de Marchi, B. Merin, J. Gaspéri, and the PSA team

5th Planetary Data Workshop (PDW) and 2nd Planetary Science Informatics & Data Analytics (PSIDA) meeting

June 28 – July 2, 2021

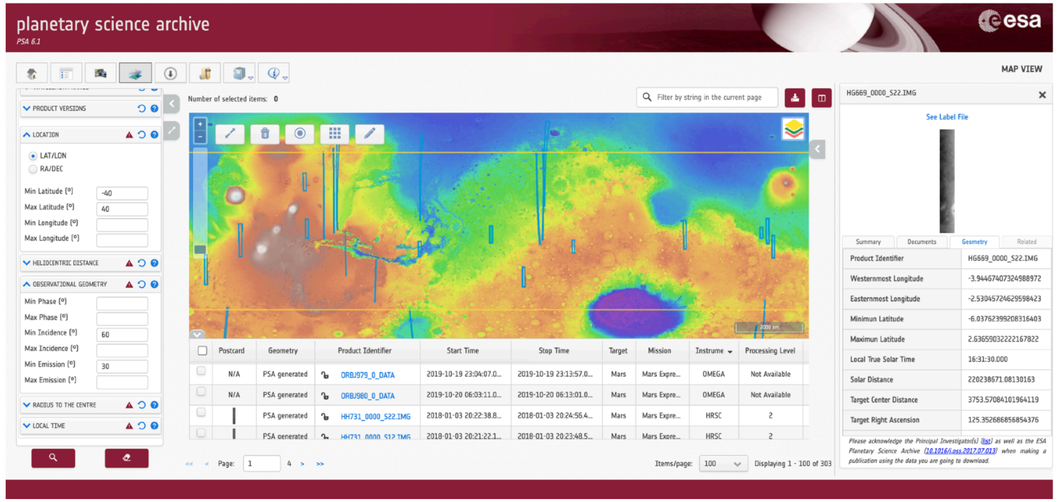
System Overview

- **GEOGEN is a SPICE-based command-line application written in Python**, integrated into the PSA datasets ingestion sub-system.
- *Input* a JSON file (PLF) containing a list of observational PDS data products, described by required "properties".
- One or several *output* "Coverage" GeoJSON files containing the geometry metadata associated to each valid input data product.
- Computation done according to a single *configuration* file defining "computation-enabled" targets, instrument hosts, instruments, and data products; linking to required ESA's missions SPICE kernels, and to GEOGEN-specific addendum kernels.
- CLI options allows (1) to use a target surface ellipsoidal or *digital shape model* (DSK) for computation, and/or (2) to *"split"* output observation footprint geometry when crossing the target body antimeridian.

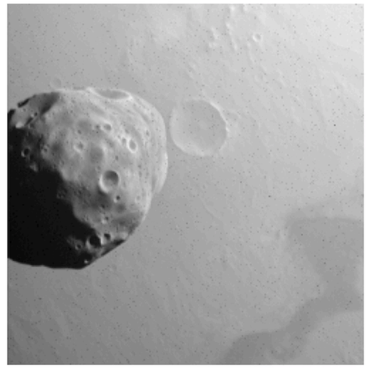


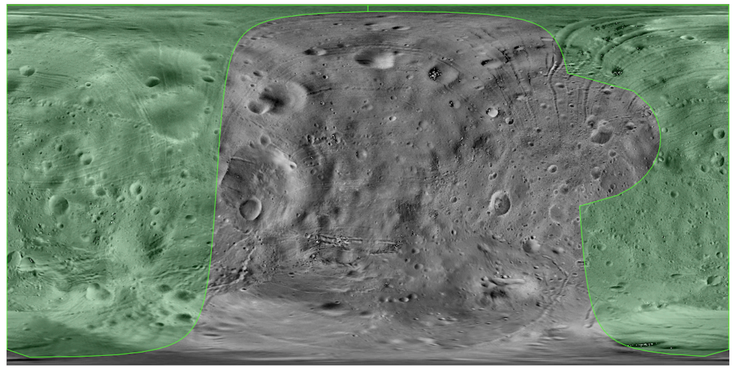
Current status and future developments

- GEOGEN has been configured, tested and is being operationally used for **Mars Express** and **Rosetta** missions, respectively for the following instruments: *ASPERA-3*, *HRSC*, *MARSIS*, *OMEGA*, *PFS*, *SPICAM*; and *OSIWAC*, *OSINAC*, *NAVCAM*, *ALICE*, *VIRTIS*, *MIRO*. It enabled the first release of major new 2D/3D features of the PSA UI in December 2020.



- Development is on-going to improve the geospatial representation, and related geometry parameters, of *"limb" observations* (including target surface and off-surface pointing). Configuration and testing is on-going for *Mars Express VMC* and *EM16 CaSSIS* instruments.





- It is intended to enable geometry metadata computation on a systematic basis for all instruments of active and legacy missions of the PSA.