

## MarsSI : Evolution of the Martian surface data infrastructure

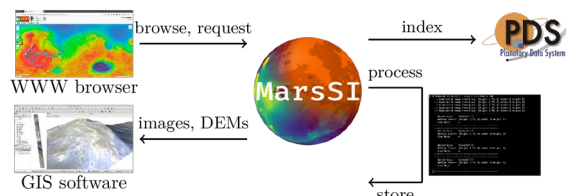
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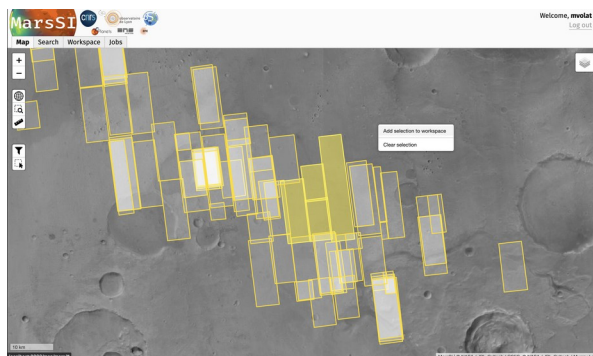
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**Introduction:** To optimize the analyses of the surface of Mars from different kind of datasets, the MarsSI platform of orbital data exploration and processing has been developed. It is certified as a french national research infrastructure by the Centre National de la Recherche Scientifique (CNRS) as part of the Planetary Surface Portal (PSUP). MarsSI has been recently revised to accommodate its sustainability and revise processing pipelines. Recent evolutions of the platform are the purpose of the present abstract.

**Description:** MarsSI client interface is a web application where the users can display datasets in a Geographic Information System (GIS) environment and request data processing as shown on **Figure 1**. Originally based java/Geomajas, it was rewritten using the Django (<https://www.djangoproject.com/>) and Leaflet (<https://leafletjs.com/>) frameworks, shown on **Figure 2**.



**Figure 1: MarsSI overview**



**Figure 2: Webgis interface displaying observation footprints**

The observations catalog (based on the PDS) and derived products catalog is hosted by a PostGIS database. For the client code to access the catalog, we chose the OGC standards, notably WMS for background maps and WFS for product footprint and metadata. From a Geoserver java implementation, we migrated to Mapserver (<https://mapserver.org/>) for better performance and file-based configuration management.

**Data and pipelines:** All MarsSI proposed pipelines are fully automated and do not require user parametrization. This allows to keep the data storage reasonable as only one version of a single product exists at a time, and is shared between users. To retrieve products, a user will request a copy to to home directory, where it will be available through SFTP.

As of 2021, MarsSI indexes and give access to the optical data (visible, multi and hyperspectral) and derived products from three missions. Our emphasis was to provide "ready-to-use" products in regards of calibration, refinements and georeferencing. We also offer multiple Digital Elevation Model (DEM) datasets computed by the infrastructure, generated using the Ames Stereo Pipeline software.

Data processing, originally handled by a Torque batch scheduler was migrated to OAR (<http://oar.imag.fr/>) which is interfaced through the use of its REST interface. MarsSI facility is a 170 To ZFS bay alongside 80-core cluster.

**Userbase and volumes:** MarsSI is freely available for research purpose with registration. As of march 2022, there are 420 register users of various countries. Data storage is 48 To, using in most case efficient but non destructive compressed formats.

**Conclusion:** Built upon opensources frameworks and using standardized protocols, MarsSI offers the scientific communities a way to search and remotely process orbital data.

### References:

- [1] C. Quantin-Nataf et al. "MarsSI: Martian surface data processing information system". In: *Planetary and Space Science* 150 (2018).
- [2] F. Poulet et al. "PSUP: A Planetary SURface Portal". In: *Planetary and Space Science* 150 (2018).

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