



# Mapping and Planetary Spatial Infrastructure Team (MAPSIT)

Findings for the Planetary Advisory Committee  
(PAC), Nov 13–14, 2023 Meeting



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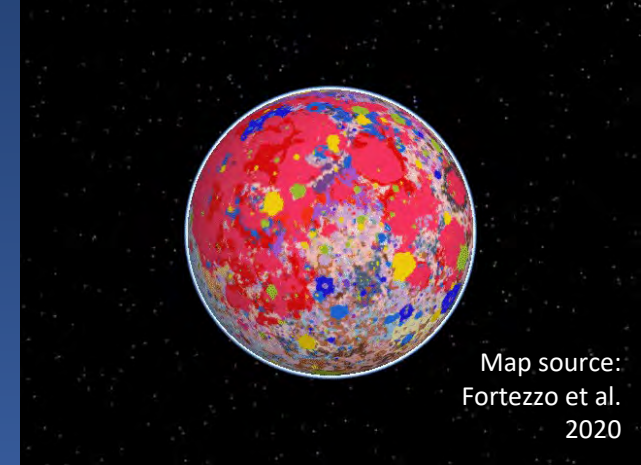
Moses Milazzo (Other Orb), *Ex Officio*

Jani Radebaugh (Brigham Young Univ.), *past Chair*

David Williams (Arizona State Univ.)



# MAPSIT Findings (1 of 4)



Map source:  
Fortezzo et al.  
2020

**Finding:** There are insufficient planetary maps to support upcoming missions to high-priority targets such as the Moon and Venus.

- MAPSIT suggests that NASA should consider how to fund production of high-priority maps that leverage modern datasets, including geologic maps, hazard maps, and resource maps. In the past, **systematic mapping campaigns** allowed the community to organize and activate to produce the needed maps.
- For the Moon, this follows the recommendations of the Lunar Critical Data Products LEAG/MAPSIT Special Action Team (Stickle et al., 2021; doi:10.5281/zenodo.7236426)
- MAPSIT is encouraged by the convening of a Lunar Surface Science Workshop, "*Geological Mapping to Support Artemis Strategic Decisions*" Aug 16–17, 2023 (Virtual). Organizers: J. Skinner (USGS), A. Huff (ASU), J. Luna (TNTech), R. Watkins (NASA HQ)



# MAPSIT Findings (2 of 4)



Source: Brunton.com

**Finding:** MAPSIT notes that a **white paper on lunar coordinate system options** has been completed by LEAG (with participation from some members of the MAPSIT steering committee).

- Final version posted on LEAG website (Archinal et al., 2023):  
[https://www.lpi.usra.edu/leag/reports/ME-White-Paper\\_Final.pdf](https://www.lpi.usra.edu/leag/reports/ME-White-Paper_Final.pdf)
- This white paper advocates for continued use of the Mean Earth (ME) coordinate system for the Moon
- The intent is to promote an informed discussion among stakeholders so that the full implications of any potential changes are considered



## MAPSIT Findings (3 of 4)

**Finding:** MAPSIT sees an urgent community-wide need to discuss and **identify critical software gaps** for planetary data analysis. MAPSIT suggests a specific action team be formulated and requests direct involvement in this effort.

- PESTO (Planetary Exploration Science Technology Office) is interfacing with the NASA Advisory Groups to identify and prioritize technology gaps. While the primary focus of the draft technology gaps identified by PESTO is hardware based, MAPSIT sees a particular need for continued development of *software* relevant to planetary science and data analysis.
- MAPSIT views an assessment of critical software gaps as essential for the long-term planning of infrastructure investments and analyses of planetary data, as well as for upcoming missions (one example, software to visualize data collected on the Moon's surface).

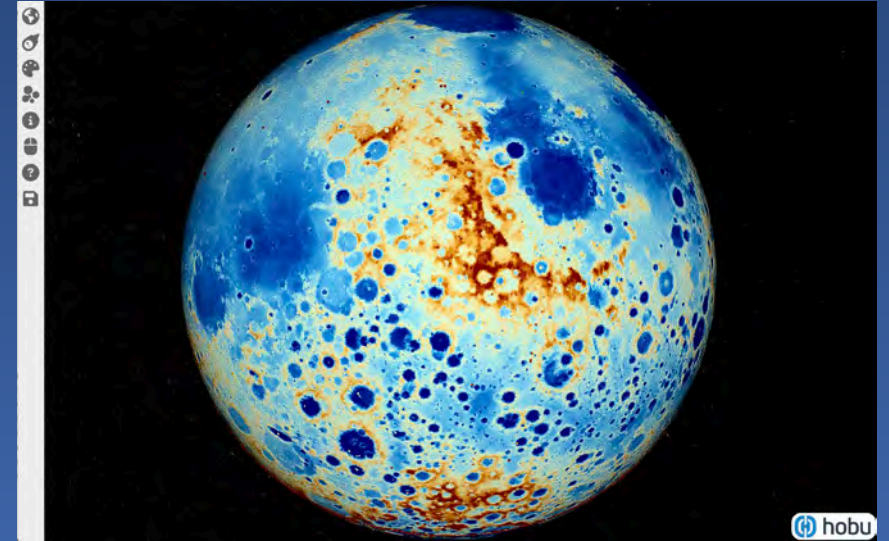


# MAPSIT Findings (4 of 4)

**Finding:** NASA should continue to support efforts to produce *analysis-ready data* in a platform-agnostic format.

- New examples of analysis-ready data since the last meetings are USGS efforts to release > 400,000 Kaguya Terrain Camera images (in partnership with JAXA) and over 1 billion Lunar Orbiter Laser Altimeter shots (in partnership with Hobu)
- All data are API accessible and freely available via the Amazon Registry of Open Data.

2023-11-13



<https://moonlidar.com>

## JAXA / USGS / NASA Kaguya/SELENE Terrain Camera Observations

[cog](#) [planetary](#) [satellite imagery](#) [stac](#)

The Japan Aerospace EXploration Agency (JAXA) SELEnological and ENgineering Explorer (SELENE) mission's Kaguya spacecraft was launched on September 14, 2007 and science operations around the Moon started October 20, 2007. The primary mission in a circular polar orbit 100-km above the surface lasted from October 20, 2007 until October 31, 2008. An extended mission was then conducted in lower orbits (averaging 50km above the surface) from November 1, 2008 until the SELENE mission ended with Kaguya impacting the Moon on June 10, 2009. These data were collected in monoscopic observing mode. To cre...

[Details](#) →

### Usage examples

- [PySTAC Client by PySTAC-Client Contributors](#)
- [Querying for Data in an ROI and Loading it into QGIS by J. Laura](#)
- [Discovering and Downloading Data with Python by J. Laura](#)
- [Discovering and Downloading Data via the Command Line by J. Laura](#)

[See 4 usage examples](#) →

<https://registry.opendata.aws> 6



# Recent and upcoming activities

- **Planetary Geology Mappers' Meeting:** Oct 15–18, 2023 as part of GSA Annual Meeting in Pittsburg, PA. Hybrid format.
  - Organizers: Jeanette Luna (TN Tech) and Jim Skinner (USGS)
- **Planetary Data Training Workshops,** Organizers: David Williams et al.
  - 5 events held in 2023
  - 8 events over 5 dates planned for 2024 (see table & <https://rgcps.asu.edu/> > GIS Tab).
- **MAPSIT Town Hall at LPSC,** March 11–15, 2023

Date	Location	Participating Facilities	Mode	Training topics
08/23	ASU, Tempe	ASU, USGS, UofA	In Person	JMARS, ArcGIS Pro, ISIS3, PDM-PDS§, SfM
09/23	UofA, Tucson	UofA	In Person	Stereo Photogrammetry
10/23	GSA, Pittsburg	Cornell, USGS	In Person	ArcGIS Pro
02/24	Cornell	Cornell, USGS	1-day In Person, 1-day Remote	ArcGIS Pro
02/24	USGS	USGS	In Person or Remote (TBD)	PDM
02/24	ASU	ASU	1-day Remote	ArcGIS Pro
03/24	LPSC	Cornell, USGS, ASU	In Person or Remote (TBD)	ArcGIS Pro
04/24	ASU	ASU	1-day Remote	ArcGIS Pro
04/24	UofA, Tucson	UofA	In Person	Stereo Photogrammetry
05/24, 08/24	ASU, Tempe	ASU, Cornell, USGS, UofA	In Person	JMARS, ArcGIS Pro, ISIS3, PDM-PDS§, SfM

**NOTES:** PDM-PDS = Planetary Data Management-Planetary Data System overview, SfM = Structure from Motion stereo photogrammetry. § = Lecture only. All others are hands-on activities. Green = Completed.