Introducing the Mapping and Planetary Spatial Infrastructure Team

- Mosaics, geologic maps, derived regional and global data products, and associated geospatial infrastructure are integral to the success of the planetary science enterprise
  - Influences all phases of the mission lifecycle for science investigations and operations
  - Strategic needs must be anticipated and prioritized by the community
  - PSS recommended a “Cartography Research and Analysis Group” [CRAG] in Fall 2014.

- A team fulfilling this role now exists in the form of MAPSIT
  - MAPSIT succeeds former PCGMWG and assumes strategic planning role
• **No, we didn’t (really!)**
  • From 1974 to 2012:
    – 1974: Lunar Photography and Cartography Committee (LPACC)
    – 1977: Lunar and Planetary Photography and Cartography Committee (LPPACC)
    – 1979: Planetary Cartography Working Group (PCWG)
      – Produced two 10-year plans and a supplement (at right)
  • PCGMWG ceased “advisory” role in ~2011
  • PCGMWG disbanded 2015 with end of PGG
  • **Looming gap for NASA long-term strategic planning and prioritization activities until addressed by MAPSIT formation**
Enabling Planetary Science

- **Planetary Spatial Infrastructure** is the technology, policies, standards, human resources, software tools, and related activities necessary to acquire, process, distribute, use, maintain, and preserve planetary spatial data for science and exploration.

**Geographic Information Science and Technology**
Includes:
- Analytical Methods
- Geocomputation
- Geospatial data collection and formats
- Cartography and visualization

[http://gistbok.org/bokwiki/index.html](http://gistbok.org/bokwiki/index.html)
MAPSIT Steering Committee

- Samuel Lawrence, Arizona State University [Chair]
- Jani Radebaugh, Brigham Young University [Incoming Chair]
- Shane Byrne, University of Arizona
- Sarah Sutton, University of Arizona
- Daniella DellaGiustina, University of Arizona
- Brad Thomson, Boston University
- Erwan Mazarico, NASA Goddard Space Flight Center
- David Williams, Arizona State University
- James Skinner, United States Geological Survey
- Trent Hare, United States Geological Survey
- Brent Archinal, United States Geological Survey
- Robin Fergason, United States Geological Survey
- Justin Hagerty, United States Geological Survey
- Lisa Gaddis, United States Geological Survey
- Jay Laura, United States Geological Survey

Representing a Diverse Community:
- Domain geoscience specialists
  - Moon, Mercury, Small Bodies, Outer Planets, Mars...
- Photogrammetry and Geodesy
  - SOCET-SET, SOCET-GXP
- Geologic Mappers
- Mission participation
  - LRO, MRO, OSIRIS-Rex, MESSENGER, Cassini, Galileo
- Cartographic Software expertise
  - e.g. ISIS, ArcMAP, QGIS, Lunaserv
- Human Exploration
  - SKG and ISRU expertise

Geologic Mapping Subpanel
David Williams [ASU] (Chair)
David Crown [PSI]
Debra Buczkowski [JHU-APL]
Corey Fortezzo [USGS]
James Skinner [USGS]
MAPSIT Activities 2015

- Town Hall at LPSC 46
- 2nd Data User’s Workshop
  - High Country Conference Center, Flagstaff, AZ
  - June 6-7 2015
  - 115 attendees
- Steering Committee Meeting
  - October 2015
  - Shoemaker Center, Flagstaff, AZ
- Community response to PDS RFI
Community Update

Image Mosaic and Topographic Map of the Moon (Outreach Maps)

- 7.2 million PDF total downloads for 2015 (April release)
  - Tweet Release (Apr.): 2.4 million, USGS Press Release (Oct.): 3.3 million
- 3,000 printed hard-copies (ordered another 2,000 for second printing)
Community Update

- USGS is assembling and geodetically controlling THEMIS daytime IR and nighttime IR images
  - 21 regions are completed
  - Knowledge of the precision and accuracy of the products are reported

- Improved kernels allow scientists to perform quantitative analyses with THEMIS using their existing tools.

- Invaluable for mission planning and surface science
  - E.g., change detection studies and for comparison with previous, concurrent, and future images; improved targeting of current and future orbital acquisition of data, and spacecraft landings.

Planetary Geologic Mapping

• Status:
  – >170 geologic maps completed, printed, and distributed by USGS on behalf of NASA
    • Multiple bodies, bases, and scales
    • Additional ~60 in process, review, or production

• Updates:
  – Working with RPIF to identify and distribute excess geologic maps (community, educators, public)
  – Mappers now required (via ROSES) to identify geologic map specifications
  – Community input/concerns via annual meeting, consolidated via GEMS to MAPSIT

• Noteworthy:
  – Increase in attendance at the annual meeting
  – Seeing various scales, various bodies of geologic maps
  – Interest from missions on means to conduct mapping along mission timeline
  – Drawing attention to “standardized” versus “topical” mapping
  – Efforts to engage and develop “next generation” of mappers
MAPSIT 2016 Activities

- Town Hall at LPSC 47
  - (Thursday, Noon, Waterway 6)
- Planetary Geospatial Session at LPSC
  - Oral Session (Weds. Afternoon Waterway 4), Poster Session Thursday
- MAPSIT Forum at 2016 Geologic Mappers Meeting, Flagstaff, AZ
- Synthesize 2017-2022 Planetary Geospatial Strategic Plan [PGSP]
  - PGSP Foundations Document under review
  - Comprehensive PGSP Community Stakeholder Input Process Begins 1Q2016
  - Nominal PGSP Delivery by end CY2016
  - Critical community stakeholder input for the Cartography Program under terms of new USGS-NASA Interagency Agreement
  - **Goal is a concise document to inform decision-making**
- Begin planning for Planetary Data User’s Workshop 3, 2017
- Contribute to ISCEG Strategic Knowledge Gaps as needed
  - Moon, Small Bodies, Mars
    - Example from LEAG GAP-SAT II: “Combine Kaguya, ULCN2005, LRO LOLA, and LRO WAC GLD100 topographic products to produce a definitive lunar geodetic grid to facilitate future exploration planning. This enhances current capabilities.” – pg. 24
On the Horizon...

- Need to control, reduce, and release ever-increasing datasets to make the data most useful and convenient for Exploration and science analysis
  - What are mission requirements for data calibration and cartographic processing?
  - How is planetary spatial infrastructure to be prioritized in R & A programs?
    - How do we deal with planetary spatial data product generation that enables community science investigations being assessed against pure science assessed against force-multiplying software development?
- What cartographic products and software tools are needed to close Strategic Knowledge Gaps?
- How should standards be coordinated internationally?
- How do we facilitate co-registration of US and international datasets?