THE CARTOGRAPHY AND IMAGING SCIENCES NODE OF THE NASA PLANETARY DATA SYSTEM

The Imaging Node (IMG, PDS-IMG or just “Imaging”)

*PI, Science Lead:* Lisa Gaddis (USGS, Astrogeology)

*Co-I, Technical Lead:* Susan LaVoie (JPL)
Curator of NASA's primary digital image collections from past, present and future planetary missions
- **850 TB**, growing ~100 TB/yr

Develops & supports archive standards for
- Image data formats
- Documentation of observation and acquisition parameters, image properties, etc. (metadata)
- Image calibration, documentation

Supports validation, delivery of digital image archives, ancillary & supporting information
- Landed and orbital cameras and imagers, metadata
- Cartographic products such as mosaics, maps, geospatial databases, etc.
- Links to heritage, publications, figures, etc.

Leverages USGS/ISIS software to serve processed, derived data products
- *When ISIS is used*, supports pipeline processing from raw to calibrated, photometrically corrected, map-projected products
Science Discipline Focus: Cartography & Imaging Science

- **Interdisciplinary expertise**
  - Instrument/image geometry, cartographic data acquisition & processing
  - Orbital & landed camera instrument design, data processing & calibration
    - Detailed geometric & physical characterization of cameras
  - Planetary remote sensing at UVVIS to thermal to RADAR wavelengths
    - Single, multi- and hyperspectral images
  - Cartographic & geospatial data analysis
    - Geographic information systems, geologic & thematic mapping, 3D terrain mapping & analysis, slope & hazard mapping, site characterization
  - Data engineering & informatics, data mining

- **Serves data from the NASA collection of digital planetary images**
  - Terrestrial planetary surfaces
    - Mercury, Venus, Earth, Moon, Mars, Mars’ moons Phobos and Deimos, asteroids Gaspra, Ida
  - Icy and outer Solar System satellites, dwarf planets
    - 9 moons of Jupiter (Io, Europa, Ganymede, Callisto, etc.)
    - 23 moons of Saturn (Titan, Enceladus, Iapetus, etc.)
    - 2 moons of Neptune (Triton, Nereid)
    - 5 moons of Uranus (Ariel, Titania, etc.)
    - Vesta, Ceres, Pluto (TBD)

http://img.pds.nasa.gov/
• **Mission Interface**
  • Work with imaging instrument teams to ensure cost-effective data delivery to PDS and public
  • Apply systems engineering principles to data to ensure rapid identification, easy access & download of PDS data

• **Data Delivery & Cartographic Support**
  • Support delivery of planetary image data in raw & derived formats
  • Deliver improved ancillary data (pointing, calibration) resulting from radiometric, geodetic & cartographic processing, restoration, scientific research, etc.

• **Data User Support**
  • Maintain and support online data, provide state-of-the-art search & access tools
  • Provide sophisticated tools & instructions for simple to complex data interaction by users
  • Provide training, expert assistance to users for cartographic and scientific data analysis (LPSC, Planetary Data Users workshops, etc.)
DATA DELIVERY SYSTEMS (1 OF 2)

- **Photojournal**
  - Press-release images, other quick-release “pretty pictures”

- **Data Portal**
  - All image data, sorted by mission name
  - Links to mission documentation

- **Planetary Image Atlas**
  - Faceted searches based on image label data, geographic coordinates, etc.
  - Products linked to IAU planetary nomenclature database
  - Supports landmark feature classification and searches
Data Delivery Systems (2 of 2)

- Map-a-Planet (MAP)
  - Delivers map-projected mosaics & derived data
  - Basemaps for EDR searches at IMG and GEO
  - Standardized Web Mapping Services (WMS) for ~all mapped bodies
  - Supports limited cartographic extraction and processing of data products

- Imaging Node Annex
  - Supports geospatial products derived from PDS products
    - Mosaics, maps, shapefiles, tables
  - Retains heritage to source data & metadata
  - Links to publications, accuracy information, etc.

**DATA PROCESSING SYSTEMS**

- **Planetary Image Locator Tool (PILOT)**
  - Uses Unified Planetary Coordinates (UPC) database to standardize coordinates
  - Supports PDS image data for which there is an ISIS3 camera model
    - Accurate, detailed surface placement
    - 94% of Imaging Node data holdings supported
  - Geospatial and parameter search of PDS EDR image archives
  - Ties to online POW processing tools

- **Projection on the Web (POW)**
  - Employs ISIS3 cartographic software
  - Pipeline data processing from raw to fully processed data products

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CONTACT INFORMATION

- PI, Science Lead: Lisa Gaddis
  - USGS Astrogeology Science Center, Flagstaff, AZ
  - lgaddis@usgs.gov
  - 928-556-7053

- Co-I, Technical Lead: Susan LaVoie
  - Jet Propulsion Laboratory, Pasadena, CA
  - Susan.K.LaVoie@jpl.nasa.gov
  - 818-354-5677

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