# PDS4

## Cartography Dictionary

PDS Management Council - UCLA
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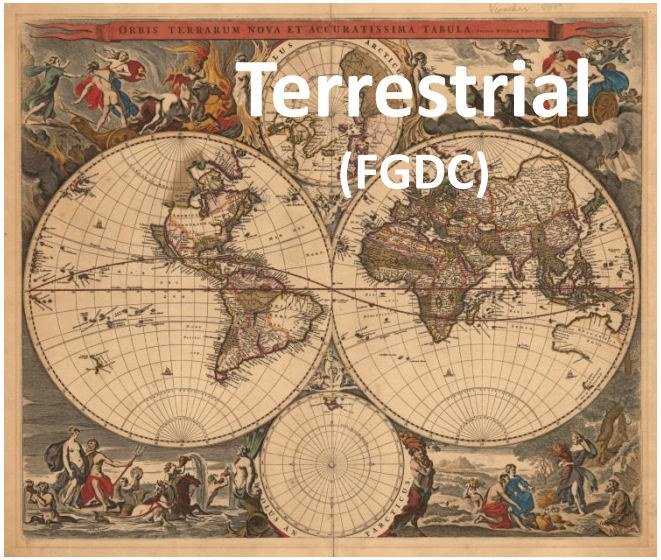
# Background

- **Cartography Dictionary**
  - Implemented existing Federal Geographic Data Committee (FGDC) standard within PDS4.
    - https://www.fgdc.gov/standards
    - https://www.fgdc.gov/standards/projects/FGDC-standards-projects/metadata/base-metadata/v2_0698.pdf
    - An established terrestrial based standard, then extended for planetary use
      - "fgdcx" namespace

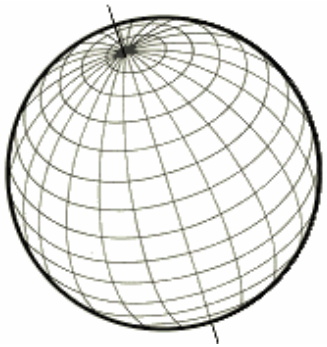
# Background

- **Cartography Dictionary (continued)**
  - Early testing of initial dictionary
    - Clementine Basemap 750nm Bundle
    - Clementine UVVIS 5-band Bundle
  - Dictionary necessarily still evolving
  - Cartography – Geometry coordination
  - Current DEV version 1.2.0.0 – to release updated DEV version for further testing following primary IM 1.3.0.0 release

# Cartography - Overview




PDS3 ⟶ PDS4



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                <fgdcx:south_bounding_coordinate unit="deg">-0.0132</
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                        <fgdcx:Sinusoidal>
```

```
OBJECT                      = IMAGE_MAP_PROJECTION
  ^DATA_SET_MAP_PROJECTION  = "DSMAP.CAT"
  COORDINATE_SYSTEM_TYPE    = "BODY-FIXED ROTATING"
  COORDINATE_SYSTEM_NAME    = "PLANETOGRAPHIC"
  MAP_PROJECTION_TYPE       = "SINUSOIDAL"
  MAP_RESOLUTION            = 303.2334900
  MAP_SCALE                 = 0.1000000
  MAXIMUM_LATITUDE          = 63.0000000
  MINIMUM_LATITUDE          = 55.9868011
  EASTERNMOST_LONGITUDE     = 60.0236015
  WESTERNMOST_LONGITUDE     = 45.0000000
  LINE_PROJECTION_OFFSET    = 19104.7107673
  SAMPLE_PROJECTION_OFFSET  = 1.0000000
  A_AXIS_RADIUS             = 1737.4000000
  B_AXIS_RADIUS             = 1737.4000000
```

# Previous & Current Work:

- Initial dictionary
  - FGDC implementation
  - Early testing and test bundle generation
  - Extended as needed
- Extension "issues"
  - Tri-axial radii
  - Accommodate planetary coordinate systems (planetographic/planetocentric)
  - Positive Longitude direction
  - Map projection offsets (line/sample offsets – UpperLeftX/Y)
  - New map projections (and related parameters)
  - Reference frames (spheroid, datum, coordinate system definitions)

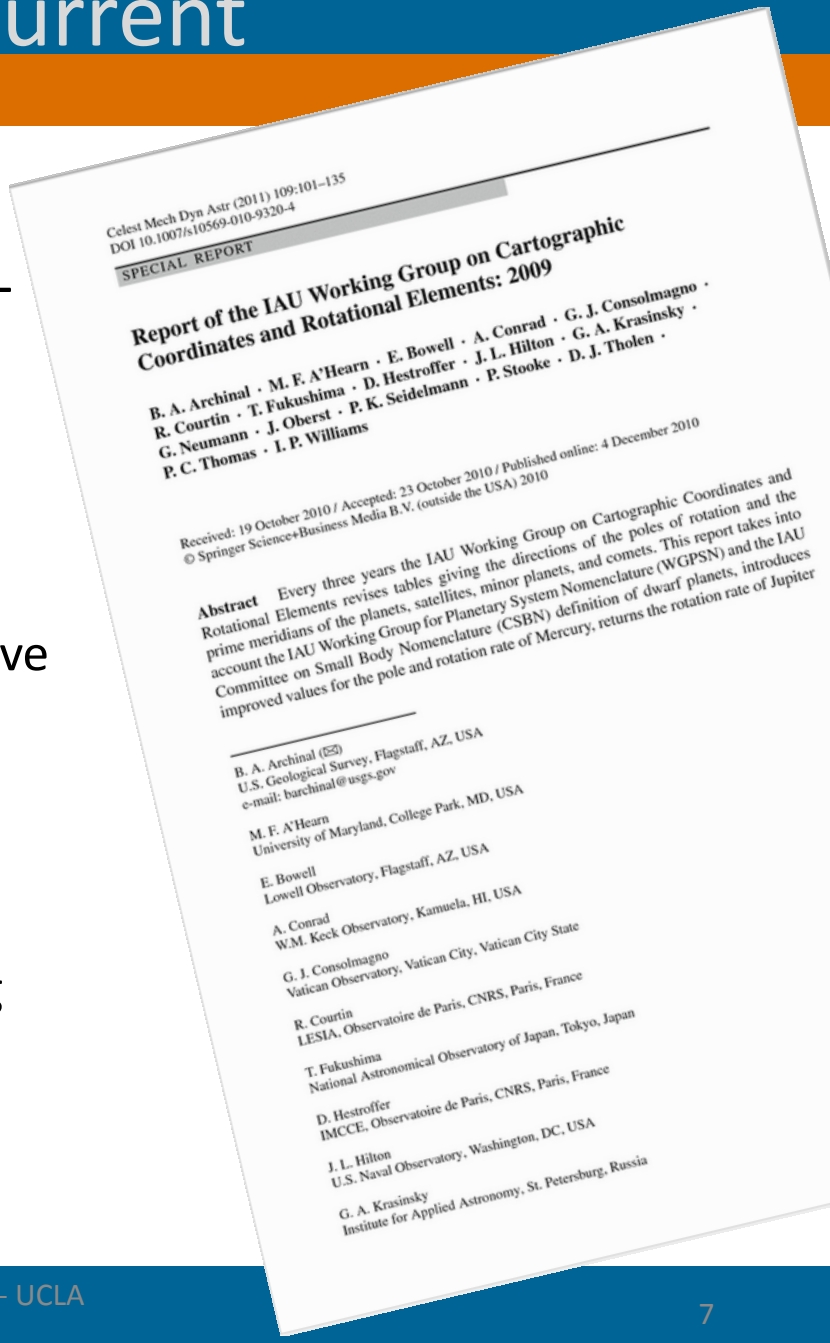
# Previous & Current Work: (continued)

- Recent developments
  - Dictionary updates (latest version 1.2.0.0)
  - Implement per information from IAU/GIS/USGS input
    - Ongoing input required (proper reference frames, appropriate IAU/other publications, GIS practices)
    - IAU member: “An involved (harder) job for PDS”)
  - Recent input per Monday splinter sessions
  - Consider future additions/extensions as needed
- Current development addresses “classic” cartographic requirements (map projections, projection coordinate systems, etc)
  - ... Yet, expandable as needed for new projections, other cartography (and geometry) related additions.

# Recent and Current

## Primary Active Topics:

- Projection "origin" and product geo-referencing.
  - Upperleft_cornerX , Y
- Coordinate systems:
  - Ographic/Ocentric latitudes (and positive longitude direction)
- Reference Frame (sphere/ellipsoid, datum definitions)
  - Consider source/references for naming (attribute values)
  - Use existing NAIF values?
    - e.g. "MARS_IAU_2000"



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SPECIAL REPORT

**Report of the IAU Working Group on Cartographic Coordinates and Rotational Elements: 2009**

B. A. Archinal · M. F. A'Hearn · E. Bowell · A. Conrad · G. J. Consolmagno · R. Courtin · T. Fukushima · D. Hestroffer · J. L. Hilton · G. A. Krasinsky · G. Neumann · J. Oberst · P. K. Seidelmann · P. Stooke · D. J. Tholen · P. C. Thomas · I. P. Williams

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**Abstract** Every three years the IAU Working Group on Cartographic Coordinates and Rotational Elements revises tables giving the directions of the poles of rotation and the prime meridians of the planets, satellites, minor planets, and comets. This report takes into account the IAU Working Group for Planetary System Nomenclature (WGPSN) and the IAU Committee on Small Body Nomenclature (CSBN) definition of dwarf planets, introduces improved values for the pole and rotation rate of Mercury, returns the rotation rate of Jupiter

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# Next steps:

- Cartography Dictionary
  - No known near-term urgency for InSight and OSIRIS-REx
  - Coordinate with Geometry team (ongoing)
  - Incorporate recent and new updates (next few weeks)
  - Perform additional IMG/ENG testing (Aug-Sept)
  - Release development version for wider PDS internal testing and use (coordinate with IM 1.3.0.0 release)
  - Add required map projections and other entities as needed
  - PDS wide: Consider additional "geometry" issues: irregular bodies, shape models, landed systems, etc. Within appropriate dictionary as needed, in coordination with Cartography/Geometry groups

Questions/Comments?

Thank you!

Extra

# Cartography – Extra


```
 <Discipline_Area>
<fgdcx:Cartography>
    <fgdcx:Spatial_Domain>
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