Accessing PDS Data in Pipeline Processing and Websites Through PDS Geosciences Orbital Data Explorer's Web API (REST) Interface

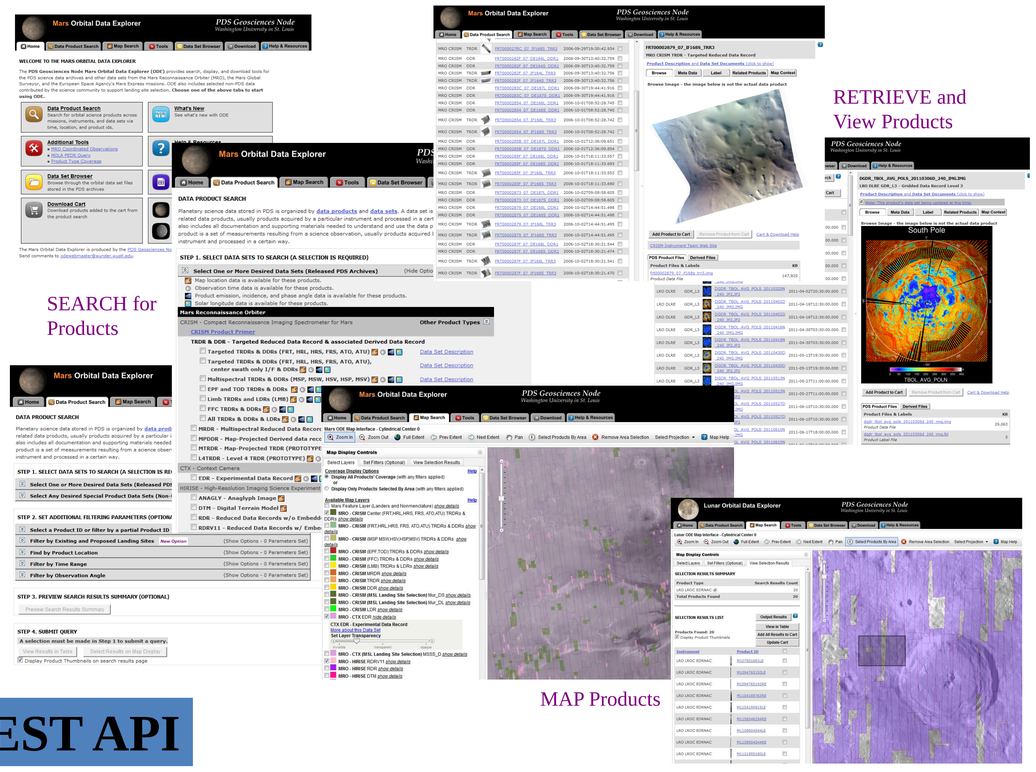
K. J. Bennett, J. Wang, and D. Scholes, Washington University in St. Louis,
1 Brookings Drive, Campus Box 1169, St. Louis, Missouri, 63130, {bennett, wang , scholes}@wunder.wustl.edu

Checkout Version 2.0 Beta!

ODE Overview

http://ode.rsl.wustl.edu/

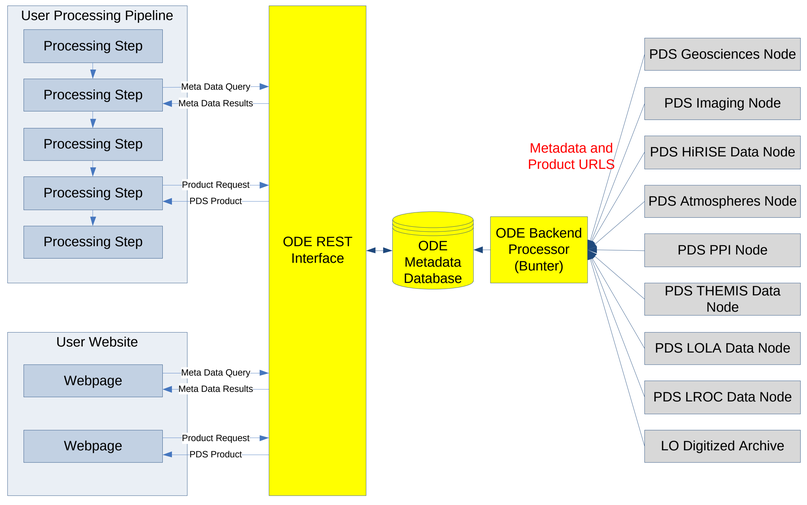
Orbital Data Explorer (ODE) was developed by NASA's Planetary Data System (PDS)'s Geosciences Node. ODE provides web-based functions to search, retrieve, and download data from multiple missions and instruments in the rapidly expanding planetary data archives.



Planet	Mission	Instrument
Mars	MRO	Shallow Radar (SHARAD), Compact Reconnaissance Imaging Spectrometer for Mars (CRISM), High Resolution Imaging Science Experiment (HiRISE), Context Imager (CTX), Mars Color Imager (MARCI), Mars Climate Sounder (MCS), and Radio Science Subsystem (RSS).
	ESA's Mars Express	High Resolution Stereo Camera (HRSC), Mars Advanced Radar for Subsurface and Ionosphere Sounding (MARSIS), OMEGA (Observatoire Mineralogie, Eau, Glaces, Activite) Visible and Infrared Mineralogical Mapping Spectrometer, and Planetary Fourier Spectrometer (PFS).
	MGS	Mars Orbiter Laser Altimeter (MOLA), and Mars Orbiter Camera (MOC) Narrow Angle and Wide Angle cameras.
	Odyssey	Thermal Emission Imaging System (THEMIS), Gamma Ray Spectrometer (GRS).
	Viking Orbiter 1/2	Visual Imaging Subsystem Camera A/B
Mercury	MESSENGER	GRS, RSS, Neutron Spectrometer (NS), X-Ray Spectrometer (XRS), Mercury Atmospheric and Surface Composition Spectrometer (MASCS), Mercury Laser Altimeter (MLA), and Mercury Dual Imaging System (MDIS) Narrow Angle Camera (NAC) and Wide Angle Camera (WAC).
Moon	LRO	DIVINER Lunar Radiometer Experiment, Lymap-Alpha Mapping Project (LAMP), Lunar Exploration Neutron Detector (LEND), Lunar Orbiter Laser Altimeter (LOLA), Lunar Reconnaissance Orbiter Camera (LROC), Mini-RF
	ISRO's Chandrayaan-1	Moon Mineralogy Mapper (M3), Forerunner (AKA "Mini-RF" or "Mini-SAR")
	GRAIL	Gravity Recover and Interior Laboratory LGRS
	Clementine	Ultraviolet-Visual (UV-VIS) Camera, Long-wave Infrared (LWIR) Camera, High-resolution (HiRes) Camera, Near-Infrared (NIR) Camera, two Star Tracker Cameras, and Laser Image Detection and Ranging (LIDAR) system.
	LP	GRS, NS, Alpha Particle Spectrometer (APS), Magnetometer (MAG), and Electron Reflectometer (ER).
	Lunar Orbiter	24" FLC Camera, 80mm FLC Camera
Venus	Magellan	Radar System, Radio Science Subsystem

Web-Based REST API

- **What is a REST API?**
  - REST is an industry standard method of accessing remote data using HTTP protocols.
- **What does ODE's REST interface offer?**
  - Access to the same PDS product metadata that is available through ODE's web site. Examples include:
    - Product location - Center, Lat/Lon bounding box and surface footprints
    - Observation Time, Creation Time, and Spacecraft Clock Counts
    - Observation angles (Emission, Incidence, Phase)
    - Solar Longitude and Distance
    - Map Resolution and Scale
    - Target Name
    - Product Version
    - Browse and thumbnail imagery
    - Full product labels (including referenced format files)
    - URL Links to Product Files
  - Access to ODE's LRO LOLA RDR Query Tool
  - Results are returned in XML or JSON format
- **How can I use the ODE REST interface?**
  - Simply send an HTTP request of the form: "http://oderest.wustl.edu/live?query=*parameters*"
- **Query Parameters?**
  - Query Type (Metadata, Browse, Thumbnail, LOLA RDR)
  - ODE Target (Mars, Moon, Mercury, Venus)
  - Output format (XML, JSON)
  - Instrument Host (MRO, LRO, etc.), Instrument (CTX, LROC, etc.), Product Type (EDR, RDR, etc.)
  - Location
    - Lat/Lon Bounding Box or Polygon-based Footprint
    - Intersection type (product footprint intersects, contains, or is contained by lat/lon bounding box or footprint)
  - Limits on the number of returned products, returned order, and range of returned products – allowing a user to "walkthrough" a large list of returned products without long query times.



ODE REST V2.0 (Now in BETA test)

- **What's New:**
  - Revision to TARGET argument to match IPDA standards
    - Example: Can now query for PHOBOS products
  - Query by Observation Angles (Emission, Incidence, Phase)
  - Query by Solar Longitude
  - Query for list of Instrument Hosts/Instruments/Product Types
    - Support dynamic web sites!
  - Large Browse Image queries for data set such as HiRISE
  - Query by USGS Feature Type/Name
  - New Granular Data System (GDS) REST Interface
    - Access to ODE's LOLA RDR Query Tool
      - (Moved from ODE REST Interface)
    - Access to ODE's MOLA PEDR Query Tool
    - Access to ODE's Diviner RDR Query Tool
    - Example Javascript-based Web Pages
  - **Now in beta test and available to all users!**

- **How can I get started?**
  - Check out the web site – http://oderest.rsl.wustl.edu/
    - Includes On-Line Documentation and Examples
  - Contact Keith Bennett at PDS Geosciences (bennett@wustl.edu)