

MESSENGER MDIS DATA in the NASA Planetary Data System

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PDS Imaging Node, USGS

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LPSC MESSENGER MDIS Data Workshop
44th Lunar and Planetary Science Conference 2013

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U.S. Geological Survey

Jet Propulsion Laboratory

44th LPSC MESSENGER Data Workshop, 3.17.13

WHAT IS THE PLANETARY DATA SYSTEM (PDS)?



The PDS archives and distributes scientific data from NASA planetary missions, astronomical observations, and laboratory measurements. The PDS is sponsored by NASA's Science Mission Directorate. Its purpose is to ensure the long-term usability of NASA data and to stimulate advanced research.

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OVERVIEW

How to find MESSENGER MDIS data in the PDS:

- PDS Home Page, Imaging & Geosciences Data Nodes
- PDS Imaging Node
 - PDS Data Portal, Online Data Volumes
 - PDS Planetary Image Atlas
 - PDS Map-A-Planet
 - PDS Planetary Image LOcator Tool (PILOT)
- PDS Geosciences Node
 - Mercury Orbital Data Explorer

PDS HOME PAGE

http://pds.nasa.gov

MDIS Data:
 PDS Home
 PDS Imaging Node
 PDS Geosciences Node

NASA PDS: The Planetary Data System

Search for: Go
 in PDS data

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New Releases
 March 15, 2013
 Lunar Reconnaissance Orbiter Data Release 13
 March 8, 2013
 MESSENGER Data Release 9
 March 1, 2013
 Mars Reconnaissance Orbiter Data Release 24
 February 27, 2013
 Mars Science Laboratory Data Release 1
 February 22, 2013
 Mars Exploration Rovers Data Release 35
 Previous Releases
 Get notified of new releases

Welcome to the PDS
 The PDS archives and distributes scientific data from NASA planetary missions, astronomical observations, and laboratory measurements. The PDS is sponsored by NASA's Science Mission Directorate. Its purpose is to ensure the long-term usability of NASA data and to stimulate advanced research. Learn more about PDS.

Researchers
 Search or browse for data sets
 Get notified (subscribe) when new data becomes available
 Find images from planetary missions
 Find tools for viewing and working with PDS data
 Learn about PDS data format and structure

Data Providers
 Archive preparation guide
 Tools for data preparation
 Example data and documents
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 Proposing Advanced Products
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 Atmospheres
 Geosciences
 Imaging
 Navigational & Ancillary Information (NAIF)
 Planetary Plasma Interactions (PPI)
 Planetary Rings
 Small Bodies

Students & Educators
 The PDS is mainly designed for scientists researching the planets. While you may find what you are looking for here, you are usually better off visiting one of the sites below, or another of the related sites.

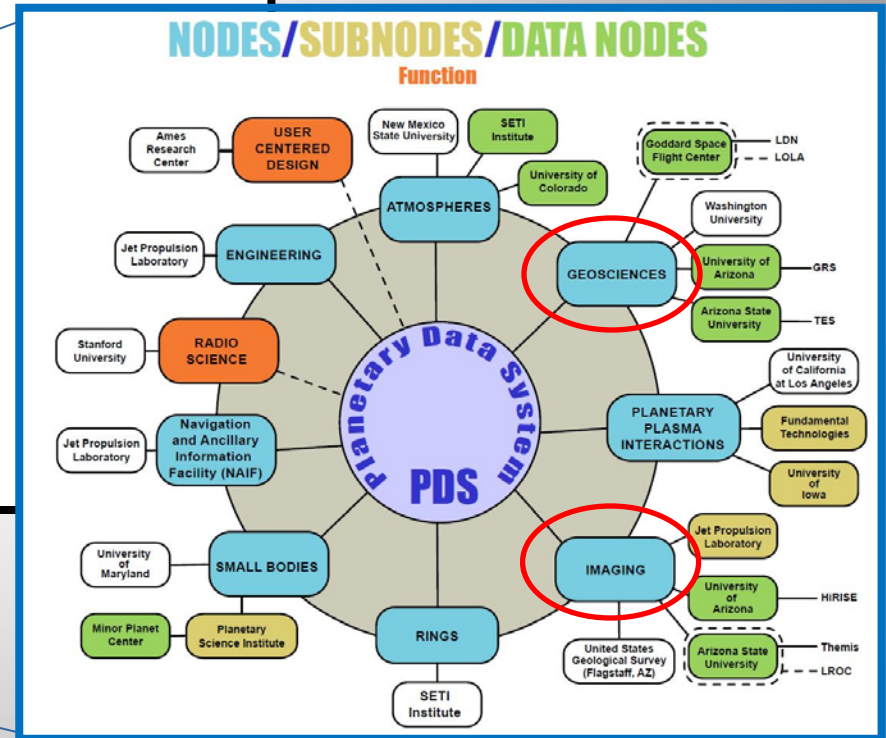
Planetary Photojournal
 A searchable collection of press release images from NASA planetary missions.

Welcome to the Planets
 Reference information and images of each planet in our solar system.

Map a Planet
 Create maps of many of the planets of our solar system, with customizable locations and scale.

Cassini Press Release Rings Images
 A Month-By-Month Gallery of Cassini images of Saturn's Ring System.

International Planetary Science Data Archives
 Planetary Science Archive An archive containing planetary science data results from ESA missions.



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PDS IMAGING NODE HOME PAGE

The screenshot shows the PDS Imaging Node homepage. A blue arrow points to the top navigation bar containing links for DATA VOLUMES INDEX, ALL DATA HOLDINGS, DOCUMENTATION, TOOLS & TUTORIALS, PERSONNEL, and HELP. On the left sidebar, three items are circled and numbered: 2) Planetary Image Atlas (green circle), 1) Data Portal (red circle), and 3) Map-a-Planet (blue circle). A yellow '4) PILOT' label is positioned at the bottom left of the page.

< Navigate from here also

4) PILOT

<http://img.pds.nasa.gov>

PDS Imaging Node





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DATA PORTAL

The PDS Imaging Node Data Portal is a scroll-down list that leads you to the Mission page, Online Data Volumes, Image Atlas and Mission Documentation

 Mars Science Laboratory	HAZCAM NAVCAM MAHLI MARDI Mastcam	Mars	Atlas Product Search Online Data Volumes	Feb 27, 2010 HAZCAM & NAVCAM EDRs RDRs Expected Mar 20, 2013 Release 1 does not include data from the MAHLI, MARDI, or MastCam instruments.
 MESSENGER	MDIS	Mercury Venus	Atlas Product Search Online Data Volumes Documentation	MDIS Release #8 September 7, 2012 Note that the science collection during the third Mercury encounter was interrupted due to a spacecraft safe-mode demotion. Please refer to the data log files for details of how the data sets were affected by that interruption.
 Phoenix	SSI, RAC, OM	Mars	Atlas Product Search Online Data Volumes Documentation	SSI, RAC, OM Final Release #3 May 4, 2009 Sols 91-152
 Viking Lander	LCS	Mars	Atlas Product Search Product Search Online Data Volumes Documentation	Mission Complete Viking 1 Last data received November 11, 1982 Viking 2 Last data received April 11, 1980
 Viking Orbiter	VISA VISB	Mars Deimos Phobos	Atlas Product Search Product Search Online Data Volumes Documentation	Mission Complete Viking 1 Last data received August 7, 1980 Viking 2 Last data received August 11, 1980

<http://img.pds.nasa.gov/portal/>

PDS Imaging Node

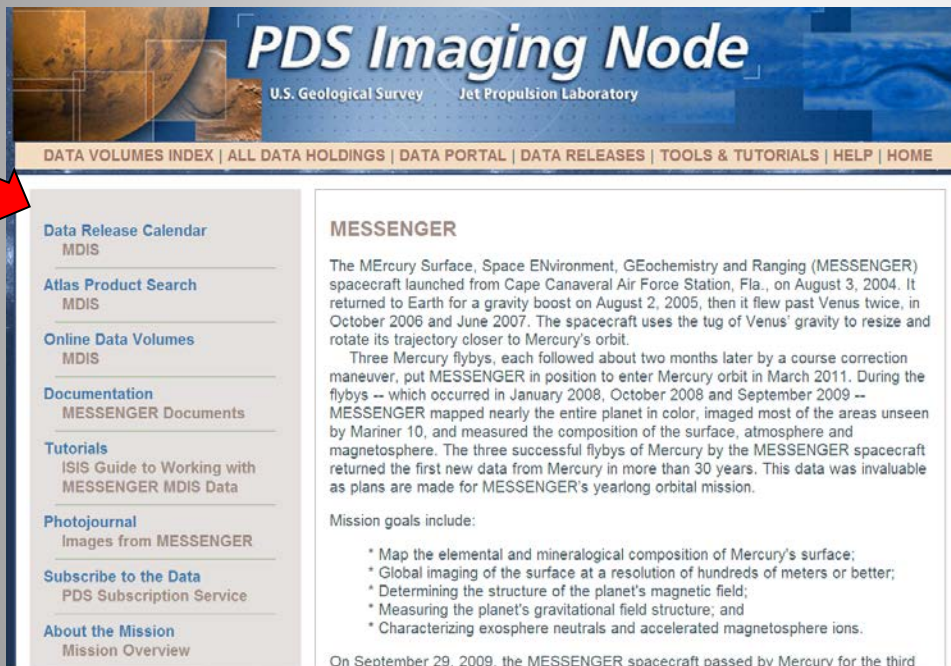
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DATA PORTAL: MISSION

MESSENGER Mission Page provides a mission overview and links to data, release calendar, documentation, tutorials, archive summaries, etc.



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DATA VOLUMES INDEX | ALL DATA HOLDINGS | DATA PORTAL | DATA RELEASES | TOOLS & TUTORIALS | HELP | HOME

MESSENGER

The Mercury Surface, Space ENvironment, GEochemistry and Ranging (MESSENGER) spacecraft launched from Cape Canaveral Air Force Station, Fla., on August 3, 2004. It returned to Earth for a gravity boost on August 2, 2005, then it flew past Venus twice, in October 2006 and June 2007. The spacecraft uses the tug of Venus' gravity to resize and rotate its trajectory closer to Mercury's orbit.

Three Mercury flybys, each followed about two months later by a course correction maneuver, put MESSENGER in position to enter Mercury orbit in March 2011. During the flybys -- which occurred in January 2008, October 2008 and September 2009 -- MESSENGER mapped nearly the entire planet in color, imaged most of the areas unseen by Mariner 10, and measured the composition of the surface, atmosphere and magnetosphere. The three successful flybys of Mercury by the MESSENGER spacecraft returned the first new data from Mercury in more than 30 years. This data was invaluable as plans are made for MESSENGER's yearlong orbital mission.

Mission goals include:

- * Map the elemental and mineralogical composition of Mercury's surface;
- * Global imaging of the surface at a resolution of hundreds of meters or better;
- * Determining the structure of the planet's magnetic field;
- * Measuring the planet's gravitational field structure; and
- * Characterizing exosphere neutrals and accelerated magnetosphere ions.

On September 29, 2009, the MESSENGER spacecraft passed by Mercury for the third

The Imaging Node archives photo science data. The Geosciences Node has information about archive responsibilities for other instruments.

The multi-spectral MDIS has wide- and narrow-angle cameras (the "WAC" and "NAC"), both based on charge-coupled devices. The WAC has a 10.5 degree by 10.5 degree field of view and can observe Mercury through 11 different filters and monochrome. The NAC can take black-and-white images at high resolution through its 1.5 degree by 1.5 degree field of view. MDIS will map the rugged landforms and spectral variations on Mercury's surface in monochrome, color and stereo. MDIS data sets are produced by the MDIS Team at The Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland.

Mission Documents

- Data Management and Science Analysis Plan
- Mission Description
- Spacecraft Description

Instrument and Data Archive Information

- MDIS
 - EDR Dataset Description
 - Calibrated Data Record (CDR) Data Set Description
 - Derived Data Record (DDR) Data Set Description
 - NAC Instrument Description
 - WAC Instrument Description
 - Personnel
 - References
 - EDR Data Product & Archive Volume SIS
 - RDR Data Product & Archive Volume SIS (includes CDR, DDR, EDR and MDR)

PDS | ATMOSPHERES | ENGINEERING | GEOSCIENCES | IMAGING | NAIF | PPI | RINGS | SMALL BODIES | MANAGEMENT

http://pds-imaging.jpl.nasa.gov/portal/messenger_mission.html/

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DATA PORTAL: ARCHIVE SUMMARY

Archived data are typically processed in several steps or stages [e.g., as outlined by the Committee on Data Management and Computation (CODMAC)]

NASA data processing levels vary from CODMAC and are typically defined in detail for a given dataset by the data provider

See Data Product & Archive Volume System Interface Specification (SIS) and other documents for details

NASA	CODMAC	Description
Packet data	Raw - Level 1	Telemetry data stream as received at the ground station, with science and engineering data embedded.
Level-0	Edited - Level 2	Instrument science data (e.g., raw voltages, counts) at full resolution, time ordered, with duplicates and transmission errors removed.
Level 1-A	Calibrated - Level 3	Level 0 data that have been located in space and may have been transformed (e.g., calibrated, rearranged) in a reversible manner and packaged with needed ancillary and auxiliary data (e.g., radiances with the calibration equations applied).
Level 1-B	Resampled - Level 4	Irreversibly transformed (e.g., resampled, remapped, calibrated) values of the instrument measurements (e.g., radiances, magnetic field strength).
Level 1-C	Derived - Level 5	Level 1A or 1B data that have been resampled and mapped onto uniform space-time grids. The data are calibrated (i.e., radiometrically corrected) and may have additional corrections applied (e.g., terrain correction).
Level 2	Derived - Level 5	Geophysical parameters, generally derived from Level 1 data, and located in space and time commensurate with instrument location, pointing, and sampling.
Level 3	Derived - Level 5	Geophysical parameters mapped onto uniform space-time grids.
	Ancillary – Level 6	Data needed to generate calibrated or resampled data sets.

Table 2-15: Processing Levels for Science Data Sets.

http://pds-imaging.jpl.nasa.gov/portal/messenger_mission.html/

DATA PORTAL: ARCHIVE SUMMARY

Example: MESSENGER MDIS CDR/RDR SIS, Appendix A

APPENDIX A. DATA ARCHIVE TERMS

Archive	An archive consists of one or more data sets along with all the documentation and ancillary information needed to understand and use the data. An archive is a logical construct independent of the medium on which it is stored.
Archive volume, archive volume set	A volume is a unit of medium on which data products are stored; for example, one DVD. An archive volume is a volume containing all or part of an archive; that is, data products plus documentation and ancillary files. When an archive spans multiple volumes, they are called an archive volume set. Usually the documentation and some ancillary files are repeated on each volume of the set, so that a single volume can be used alone.
Calibrated Data Records (CDRs)	Image data calibrated to radiance, or processed further to I/F or I/F corrected to $i = 30^\circ$, $e = 0^\circ$ (NAC or WAC). CODMAC level 4.
Data Product	A labeled grouping of data resulting from a scientific observation, usually stored in one file. A product label identifies, describes, and defines the structure of the data. An example of a data product is a planetary image, a spectrum table, or a time series table.
Data Set	An accumulation of data products. A data set together with supporting documentation and ancillary files is an archive.
Derived Data Records (DDRs)	Geometric data registered to non-map-projected image data and used for correction from I/F to I/F corrected to $i = 30^\circ$, $e = 0^\circ$ (NAC or WAC). CODMAC level 6.
Experiment Data Records (EDRs)	Non-map-projected raw data (NAC or WAC). CODMAC level 2.
Map Projected Basemap Reduced Data Records (BDRs)	Map-projected I/F, I/F corrected to $i = 30^\circ$, $e = 0^\circ$, and relevant DDR layers (NAC or WAC filter 7). CODMAC level 5.
Map Projected Multispectral Reduced Data Records (MDRs)	Map-projected I/F, I/F corrected to $i = 30^\circ$, $e = 0^\circ$, and relevant DDR layers (WAC filters 1, 3-12). CODMAC level 5.
Standard data product	A data product defined during the proposal and selection process and that is contractually promised by the PI as part of the investigation. Standard data products are generated in a predefined way, using well-understood procedures, and processed in "pipeline" fashion.

EDR: Experiment Data Record (Level 0)

CDR: Calibrated Data Record (Level 1)

RDR/DDR: Reduced or Derived Data Record (Level 2)

BDR: Map-Projected Basemap Data Record (Level 2)

MDR: Map-Projected Multispectral Reduced Data Record (Level 2)

http://pds-imaging.jpl.nasa.gov/documentation/MDIS_CDR_RDRSIS.PDF

DATA PORTAL: ARCHIVE SUMMARY

Example: MESSENGER MDIS CDR/RDR SIS, Table 2-14

Data Product	PDS Data Set ID	Data Processing Level	Example PDS Labels
Experiment Data Record (EDR)	MESS-E/V/H-MDIS-2-EDR-V1.0	2	See EDR SIS
Calibrated Data Record (CDR)	MESS-E/V/H-MDIS-4-CDR-CALDATA-V1.0	4	Section 3.3.5 Appendix C
Derived Data Record (DDR)	MESS-E/V/H-MDIS-6-DDR-GEOMDATA-V1.0	6	Section 3.3.6 Appendix D
Map Projected Basemap RDR (BDR)	MESS-E/V/H-MDIS-5-BDR-V1.0	5	Section 3.3.7 Appendix E
Map Projected Multispectral RDR (MDR)	MESS-E/V/H-MDIS-5-MDR-V1.0	5	Section 3.3.8 Appendix F

Table 2-14: Definitions of MDIS data products. EDRs are not described in this document.

http://pds-imaging.jpl.nasa.gov/documentation/MDIS_CDR_RDRSIS.PDF

DATA PORTAL: ARCHIVE SUMMARY

MESSENGER MDIS PDS Volumes

Volume Name	Product Type	Amount of Data
MSGRMDS_1001	EDR – Experiment Data Record	84 Gigabytes
MSGRMDS_2001	RDR – Reduced Data Record	562 Gigabytes
MSGRMDS_4001	BDR – Basemap Data Record	69 Gigabytes
MSGRMDS_5001	MDR – Multispectral Data Record	9 Gigabytes

Full definitions of various types of data products can be found on each respective volume within the DOCUMENT directory in the related Software Interface Specification (SIS) document.

<http://img.pds.nasa.gov/volumes/mess.html>

DATA PORTAL: ARCHIVE SUMMARY

EDRs and **CDRs** are organized into subdirectories (within the DATA or CDR directory) containing the EDRs/CDRs for one day of the mission. The directory name is of the form YYYY_DOY where YYYY is the year and DOY is the day of year. An inclusion of a EDR/CDR in a folder is determined by the UTC time of the start of the exposure.

BDRs and **MDRs** are organized into subdirectories based on the Mercury Chart containing the BDR/MDR. Latitude and longitude limits of Mercury Charts and the corresponding subdirectory names are given in the table below.

Quadrangle	Subdirectory name	Latitude (degrees)	Longitude (deg. east)
H-1 Borealis	H01	65 to 90	0 to 360
H-2 Victoria	H02	22.5 to 65	270 to 360
H-3 Shakespeare	H03	22.5 to 65	180 to 270
H-4 Liguria	H04	22.5 to 65	90 to 180
H-5 Apollonia	H05	22.5 to 65	0 to 90
H-6 Kuiper	H06	-22.5 to 22.5	288 to 360
H-7 Beethoven	H07	-22.5 to 22.5	216 to 288
H-8 Tolstoj	H08	-22.5 to 22.5	144 to 216
H-9 Solitudo Criophori	H09	-22.5 to 22.5	72 to 144
H-10 Pieria	H10	-22.5 to 22.5	0 to 72
H-11 Discovery	H11	-65 to -22.5	270 to 360
H-12 Michelangelo	H12	-65 to -22.5	180 to 270
H-13 Solitudo Persephones	H13	-65 to -22.5	90 to 180
H-14 Cyllene	H14	-65 to -22.5	0 to 90
H-15 Bach	H15	-90 to -65	0 to 360

<http://img.pds.nasa.gov/volumes/mess.html>

ONLINE DATA VOLUMES

Online data volumes for MDIS are available at both USGS and JPL:
<http://img.pds.nasa.gov/volumes/mess.html>

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MESSENGER Online Data Volumes

Online data volumes may be found at one or more sites. To access a volume, click on the icon(s) shown by the volume name

IN USGS (AZ)	IN JPL (CA)	EN JPL (CA)	GEO WASHU (MO)	ATM NMSU (NM)	Rings SETI (CA)	IN UofA (AZ)	IN ASU (AZ)	ZIP FILE
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MESSENGER: MDIS EDRs and Calibrated Data Records		
MSGRMDS_5001 (accumulating)		MESSENGER MDIS Map Projected Multispectral Reduced Data Record (MDR) Archive. This volume contains maps of MDIS Wide Angle Camera images taken at Mercury over the interval 2011-04-04 to 2012-03-26.
MSGRMDS_4001 (accumulating)		MESSENGER MDIS Map Projected Basemap Reduced Data Record (BDR) Archive. This volume contains maps of MDIS Narrow Angle Camera, and Wide Angle Camera images taken at Mercury over the interval 2011-04-04 to 2012-03-26.
MSGRMDS_2001 (accumulating)		MESSENGER MDIS calibrated data. This volume contains MDIS taken at Earth, Venus, and Mercury over the interval 2004-08-03 2012-09-17 (Mercury Orbit Insertion + 12 Months)
MSGRMDS_1001 (accumulating)		Contains raw experiment data records taken during cruise and Earth and Mercury flybys. Images that meet validity tests are calibrated radiance and/or I/F. Users should note that the processing of the preliminary. Outstanding issues currently being worked include radiance accuracy, pointing accuracy, and scattered light. These are documented in a data set catalog file in the catalog directory. This volume contains images taken at Earth, Venus, and Mercury over the interval 2004-08-03 2012-09-17 (Mercury Orbit Insertion + 12 Months)

**This is currently the only way to access MDRs and BDRs

Index of /data/mess-h-mdis-5-rdr-mdr-v1.0

Name	Last modified	Size	Description
Parent Directory		-	
MSGRMDS_5001/	07-Feb-2013 13:12	-	

Index of /archive/mess-e_v_h-mdis-2-edr-rawdata-v1.0/MSGRMDS_1001

Name	Last modified	Size	Description
Parent Directory		-	
AAREADME.TXT	28-Dec-2011 14:09	10K	
BROWSE/	08-Jan-2010 12:32	-	
CALIB/	08-Jan-2010 12:32	-	
CATALOG/	30-Jul-2012 13:29	-	
DATA/	18-Jun-2012 14:51	-	
DOCUMENT/	19-Jun-2012 11:41	-	
ERRATA.TXT	20-Jun-2012 09:55	10K	
INDEX/	19-Jun-2012 11:42	-	
VOLDESC.CAT	20-Jun-2012 09:58	2.6K	

This is a good option if you are familiar with PDS volumes and know exactly what you're looking for.

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PDS PLANETARY IMAGE ATLAS

<http://pds-imaging.jpl.nasa.gov/search/search.html#QuickSearch>

NASA National Aeronautics and Space Administration

+ NASA en Español
+ Contact NASA

PDS Data Search

Planetary Image Atlas

NEW SEARCH MULTI MISSION SEARCH DATA PORTAL ABOUT HELP FEEDBACK HOME

Select Mission(s):

- Clementine
- Galileo
- LCROSS
- Lunar Reconnaissance Orbiter
- MESSENGER**
- Magellan
- Mars Exploration Rover
- Mars Express

Select Instrument(s):

- MDIS**
- MSL-HAZCAM
- MSL-NAVCAM
- OMEGA
- RAC
- SSI
- CAMERA
- VG-ISS

TEXT AND FORM SEARCH CRITERIA ARE COMBINED
TEXT BASED SEARCH

(Type text, select suggested text, hit enter/return key, add value if needed, then mouse click 'Add Constraint'.)
(Repeat these steps to add additional criteria.)

FORM BASED SEARCH

QuickSearch Product Geometry Instrument Time Map Results

Quick Search

- Criteria selected on all forms combine to formulate your search.
- Selecting nothing returns ALL products.
- Click Get Count to evaluate the query without retrieving results.
- Click Get Results to submit your query.
- All tabs do not need to be filled out.

Product Search:


Get Count

Get Results

Instrument ID	<input type="checkbox"/> Mercury Dual Img. Sys.	Product Type	<input type="checkbox"/> CDR
	<input type="checkbox"/> EDR		
	ALIOITH		

PDS PLANETARY IMAGE ATLAS

Product Search – Picking Parameters



Instrument: MDIS

Product Search:

Records Found: 7250

Current Constraints:

The following constraints are applied to your search.

MISSION_PHASE_NAME = MERCURY 4 CRUISE

VOLUME_ID = MSGRMDS_1001 or VOLUME_ID = MSGRMDS_2001

DATA_SET_ID = MESS-EV/H-MDIS-4-CDR-CALDATA-V1.0 or DATA_SET_ID = MESSENGER-X/CAL-MDIS-2-EDR-CRUISE1-V1.0

Sample MESSENGER Image:

Intro
QuickSearch
Product
Geometry
Instrument
Time
Map
Results

Advanced Search Related to Product Information

- All tabs do not need to be filled out.
- Use advanced tabs with caution.
- Click Get Count to evaluate the query without retrieving results.
- Click Get Results to submit your query.

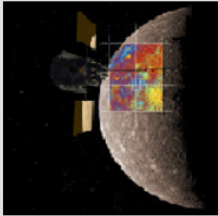
File Name	<input type="text"/>	Product ID	<input type="text"/>
Archive Volume ID	<input checked="" type="checkbox"/> MSGRMDS_1001 <input checked="" type="checkbox"/> MSGRMDS_2001	Data Quality ID	<input type="text" value="00000000000000000000"/> <input type="text" value="00000010000000000000"/> <input type="text" value="00100000000000000000"/> <input type="text" value="00100010000000000000"/> <input type="text" value="01000000000000000000"/> <input type="text" value="10000000000000000000"/>
Data Set ID	<input checked="" type="checkbox"/> MESS-EV/H-MDIS-4-CDR-CALDATA-V1.0 <input checked="" type="checkbox"/> MESSENGER-X/CAL-MDIS-2-EDR-CRUISE1-V1.0	Exposure Type	<input type="checkbox"/> AUTO <input type="checkbox"/> MANUAL
Mission Phase Name	<div style="border: 1px solid #ccc; padding: 2px;"> MERCURY 2 CRUISE MERCURY 2 FLYBY MERCURY 3 CRUISE MERCURY 3 FLYBY MERCURY 4 CRUISE MERCURY ORBIT </div>		
	Min	Max	Valid Range
Horizontal Pixel Scale	<input type="text"/>	<input type="text"/>	-99.999 to 515105.719
			m/pix

PDS PLANETARY IMAGE ATLAS

Searching on Geometry Parameters

NEW SEARCH MULTI MISSION SEARCH DATA PORTAL ABOUT HELP FEEDBACK HOME

MESSENGER



Instrument: MDIS

Product Search:

Get Count

Get Results

Reset Tab

Reset All

Records Found: 7250

Current Constraints:

TEXT AND FORM SEARCH CRITERIA ARE COMBINED
TEXT BASED SEARCH

(Type text, select suggested text, hit enter/return key, add value if needed, then mouse click 'Add Constraint'.)
(Repeat these steps to add additional criteria.)

Add Constraint

FORM BASED SEARCH

Intro QuickSearch **Product** **Geometry** Instrument Time Map Results

Advanced Search Related to Geometry Information

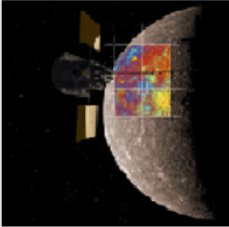
- All tabs do not need to be filled out.
- Use advanced tabs with caution.
- Click Get Count to evaluate the query without retrieving results.
- Click Get Results to submit your query.

	Min	Max	Valid Range	Units
Solar Distance	<input type="text"/>	<input type="text"/>	-99.999 to 4.49e+09	km
Spacecraft Altitude	<input type="text"/>	<input type="text"/>	-99.999 to 4.44e+09	km
Sub Lolar Latitude	<input type="text"/>	<input type="text"/>	-90.0 to 90.0	degree
Sub Solar Azimuth	<input type="text"/>	<input type="text"/>	-999.999 to 360.000	degree

PDS PLANETARY IMAGE ATLAS

Searching on Instrument Parameters

MESSINGER



Instrument: MDIS

Product Search:

Get Count

Get Results

Reset Tab

Reset All

Records Found: 7250

Current Constraints:

The following constraints are applied to your search.

MISSION_PHASE_NAME = MERCURY 4 CRUISE

VOLUME_ID = MSGRMDS_1001 or VOLUME_ID = MSGRMDS_2001

DATA_SET_ID = MESS-

TEXT AND FORM SEARCH CRITERIA ARE COMBINED
TEXT BASED SEARCH

(Type text, select suggested text, hit enter/return key, add value if needed, then mouse click 'Add Constraint'.)
(Repeat these steps to add additional criteria.)

FORM BASED SEARCH

Intro QuickSearch Product Geometry **Instrument** Time Map Results

Advanced Search Related to Instrument Information

- All tabs do not need to be filled out.
- Use advanced tabs with caution.
- Click Get Count to evaluate the query without retrieving results.
- Click Get Results to submit your query.

Compression Algorithm	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	Fast Image Compression	<input type="checkbox"/> 0 <input type="checkbox"/> 1
Image Binning in FPU	<input type="checkbox"/> 0 <input type="checkbox"/> 1	Image Bit Compression	<input type="checkbox"/> 0 <input type="checkbox"/> 1
MP Pixel Binning	<input type="checkbox"/> 0 <input type="checkbox"/> 2 <input type="checkbox"/> 4	Number of subframes	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 5

PDS PLANETARY IMAGE ATLAS

Searching on Time Parameters

FORM BASED SEARCH

Intro | QuickSearch | **Product** | Geometry | Instrument | **Time** | Map | Results

Advanced Search Related to Time Information

- All tabs do not need to be filled out.
- Use advanced tabs with caution.
- Click Get Count to evaluate the query without retrieving results.
- Click Get Results to submit your query.

	Min	Max	Valid Range	Units
Product Creation Time			2011-07-25 14:50:36 to 2012-06-28 08:47:36 or 2011-206T14:50:36 to 2012-180T08:47:36	N/A
Spacecraft Clock Start Count			1/0001425715:989000 to 1/0241207371:960000	N/A
Spacecraft Clock Stop Count			1/0001425715:990000 to 1/0241207371:990000	N/A

Instrument: MDIS

Product Search:

Get Count

Get Results

Reset Tab

Reset All

Records Found: 7250

Current Constraints:

The following constraints are applied to your search.

MISSION_PHASE_NAME = MERCURY 4 CRUISE

VOLUME_ID = MSGRMDS_1001 or VOLUME_ID = MSGRMDS_2001

DATA_SET_ID = MESS-EV/H-MDIS-4-CDR-CALDATA-V1.0 or DATA_SET_ID = MESSENGER-X/CAL-MDIS-2-EDR-CRUISE1-V1.0

Sample MESSENGER Image:

PDS PLANETARY IMAGE ATLAS

Getting the Results

Select Instrument(s):

- MOC
- APXS
- IMP
- RVR
- HIRISE
- CTX
- MARCI
- MDIS**

Product Search:

Get Count

Get Results

Reset Tab

Reset All

Records Found: 152

Current Constraints:

The following constraints are applied to your search.

TARGET_NAME = MERCURY

MISSION_PHASE_NAME = MERCURY 3 FLYBY

VOLUME_ID = MSGRMDS_2001

DATA_SET_ID = MESS-E/V/H-MDIS-4-CDR-CALDATA-V1.0

Intro QuickSearch **Product** Geometry Instrument Time Map **Results**

Results

Page: 1 2 3 4 of 4 Page(s) 152 of

Select	Item #	Thumbnail (Click to View Browse Image)	Download Data View Label View Volume	Product ID		
<input type="checkbox"/>	51			CN0162744133M_IF		
<input type="checkbox"/>	52			CN0162744133M_R		
<input type="checkbox"/>	53			CN0162744138M_IF_3	MESSSENGER	MDIS

Browse File: CN0162744133M_RA_3

Download or View Full Resolution Image (auto-stretch applied)

Format: JPEG Download View Close

PDS PLANETARY IMAGE ATLAS

Getting Multiple Results: Generate a Report or Download via Zip or Wget

Page: 1 2 3 4 of 4 Page(s) 152 of 152 Products Results Per Page: 50

Select	Item #	Thumbnail (Click to View Browse Image)	Download Data View Label View Volume	Product ID ▲ ▼	Mission ▲ ▼	Instrument ▲ ▼
<input type="checkbox"/>	51		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	CN0162744133M_IF_3	MESSENGER	MDIS
<input type="checkbox"/>	52		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	CN0162744133M_RA_3	MESSENGER	MDIS
<input type="checkbox"/>	53		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	CN0162744138M_IF_3	MESSENGER	MDIS
<input type="checkbox"/>	54		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	CN0162744138M_RA_3	MESSENGER	MDIS
<input type="checkbox"/>	55		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	CN0162744145M_IF_3	MESSENGER	MDIS

SELECT PARAMETERS FOR REPORT OR TABLE COLUMNS

- CENTER_FILTER_WAVELENGTH
- CENTER_LATITUDE
- CENTER_LONGITUDE
- DATA_QUALITY_ID
- DATA_SET_ID
- DETECTOR_TEMPERATURE
- EMISSION_ANGLE
- EXPOSURE_DURATION
- EXPOSURE_TYPE
- FILE_NAME
- FILTER_NUMBER
- FILTER_TEMPERATURE
- FOCAL_PLANE_TEMPERATURE
- HORIZONTAL_PIXEL_SCALE
- INCIDENCE_ANGLE
- INSTRUMENT_HOST_ID
- INSTRUMENT_HOST_NAME
- INSTRUMENT_ID
- INSTRUMENT_NAME
- MESS_COMP12_8
- MESS_COMP_ALG
- MESS_COMP_FST
- MESS_FPU_BIN
- MESS_PIV_POS
- MESS_PIXELBIN

Change Table Columns

Clear Selection

DOWNLOAD REPORT

CSV TAB

Download

DOWNLOAD PRODUCTS

WGET ZIP

Download

PDS MAP-A-PLANET

Map-A-Planet provides access to the *MESSENGER/Mariner 10 Global Mosaic*

<http://www.mapaplanet.org>

USGS
science for a changing world
Astrogeology Research Program

HOME HELP SEARCH ABOUT US

Map-a-Planet

PDS Imaging Node

Explore global imagery of the planets and satellites from a variety of missions in an easy to use web interface. Customize and download your own image maps of the Moon, Mars, Venus, and other planets and moons.

To get started:

1. Select a planet or moon from the buttons on the right.
2. Click on the image of the dataset you'd like to explore.
3. *Start exploring!*
4. Select resulting images for download.
5. ... and also 'Order' custom products .

WHAT IMAGERY WILL I FIND HERE?

- FAQS
- HELP
- MEET THE TEAM

WHAT'S NEW? AND FEATURED DATA SETS

LRO-LOLA Gridded Data Record Digital Elevation Model!
September 2012

» LOLA lunar elevation data are now

PLANETS & EARTH'S MOON

MERCURY VENUS MOON

MARS

MOONS OF JUPITER

CALLISTO EUROPA GANYMEDE

IO

MOONS OF SATURN

PDS Imaging Node

U.S. Geological Survey Jet Propulsion Laboratory

PDS MAP-A-PLANET

Map-A-Planet allows Pan and Zoom, Ordering, and other functions

The screenshot shows the PDS Map-A-Planet Explorer interface for Mercury. The page title is "Map-a-Planet Explorer: Mercury - Messenger MDIS/Mariner10 Mosaic". The navigation toolbar includes icons for pan, zoom, and other functions. The main image area displays a mosaic of Mercury with a coordinate grid. The sidebar contains "Image Information" and "Advanced Options" sections. The "Advanced Options" section includes fields for image size (360 x 720), resolution (2), scale (21.29301 km/px), projection (Simple Cylindrical), grid (No Grid), and stretch (Auto). The "Longitude" and "Latitude" fields are currently empty, and a note indicates that coordinates are visible when the mouse cursor is over the image. A "View and Save" link is also present.

PDS MAP-A-PLANET

Order your area of interest

USGS PDS Imaging Node

HOME HELP SEARCH ABOUT US

Map-a-Planet Explorer: Mercury - Messenger MDIS/Mariner10 Mosaic

Navigation Toolbar

Image Information

Advanced Options

Make changes to image parameters below and click the *Submit Changes* button below.

Image size: 361 x 360
height x width

Resolution: 4.615384 Full res.: 85.17 px/deg

Scale: 9.22697 km/px

Projection: Simple Cylindrical
Polar Stereographic available via 'order' above.

Grid: No Grid

Stretch: Auto
Preserve science integrity? See FAQ or Order page note regarding stretch options.

Longitude: -- Latitude: --

Move mouse cursor over the image to view coordinates

[View and Save: Image | GIS World file](#)

PDS MAP-A-PLANET

Orders can be placed in multiple formats, and options

Map-a-Planet Explorer: Order Form

Welcome to the Map-a-Planet Explorer Order Form page. Please complete the information below and click the *Submit Order* button at the bottom of the form to complete your order.

Order Settings & Information

The table below show the settings that will be used to create your image map. To change these settings, modify the settings in the *Advanced Options* below, or [return to your image map in Explorer](#).

System: Mercury	Resolution: 4.61538461538461	North: 31.36
Data set: Messenger MDS/Mariner10 Mosaic mess_m123m10	Scale: 9.22697	South: -46.86
Grid: none	Image Size: 361 x 360	East: 6.00
Stretch: auto	Projection: Simple Cylindrical	West: 288

Please provide the following information. You will be contacted via e-mail when your product is ready for download. Depending on the size and complexity of your order and current system load, it may take up to 24 hours for your product to be created.

Name:

Affiliation:

E-Mail Address:

Note: If you wish to preserve the scientific integrity of the data pixel values (PDS, ISIS, or RAW formats only), select **Stretch="None"** under "Advanced Options" when ordering.

Select the image format and whether or not you'd like a GIS World file generated, then hit *Submit Order* at the bottom of the page.

Image Format++	Output Pixel Type*	Apply Custom Function*	GIS World File?
<input checked="" type="radio"/> JPEG	<input checked="" type="radio"/> Dataset native	Enter function: NONE	<input type="radio"/> Yes
<input type="radio"/> GIF	<input type="radio"/> 8bit	See additional instruction .	<input checked="" type="radio"/> No
<input type="radio"/> TIFF	<input type="radio"/> 16bit-LSB	Then enter desired Bands	
<input type="radio"/> PDS	<input type="radio"/> 32bit-LSW	and Stretch="None" below.	
<input type="radio"/> ISIS		Resulting product is 32bit.	
<input type="radio"/> RAW			

++ Must select "8bit" for TIFF, JPEG, or GIF orders

* Applicable for PDS, ISIS, & RAW orders.

Advanced Options

Make changes to image parameters below and click the *Submit Changes* button below.

Image size: 361 x 360
height x width

Resolution: 4.615384 Full res.: 85.17 px/deg

Scale: 9.22697 km/px

Projection: Simple Cylindrical
Center Latitude of Projection = ±90 when selecting Polar Stereographic for order.

Grid: No Grid

Stretch: Auto
Preserve science integrity? See FAQ or Order page note regarding stretch options.

Resample: Nearest Neighbor

North (top): 31.36

West (left): 288 west < east

East (right): 6.00


South (bottom): -46.86

Center Longitude of Projection: -33
 Use the center longitude of the image as the center longitude of projection.

SUBMIT ORDER **RESET FORM**

PDS MAP-A-PLANET

Confirm and Order your data product. Email notification will be sent to you.

 **PDS Imaging Node**

HOME HELP SEARCH ABOUT US

MAP-A-PLANET ORDER CONFIRMATION

Your custom image map order is shown below, please review and confirm your information. You MUST click on "SEND ORDER" if you wish to complete your order.

REQUESTER TIME = "2013-03-14T12:51:42"
REQUESTER NAME = "Lisa Gaddis"
REQUESTER AFFILIATION = "USGS"
REQUESTER MAILBOX = "lgaddis@usgs.gov"

Data Set Requested "mess_m123m10"
Bands Selected "1,1,1"
Custom Equation "NONE"
Function Type Requested ""
Pixel type "DEFAULT"
Resolution (pixels/degree) "4.61538461538461"
Positive longitude "EAST"
Format "JPEG"
Projection "SIMPLE_CYLINDRICAL"
west longitude "288"
east longitude "6.00"
north latitude "31.36"
south latitude "-46.86"
Center longitude "-33"
Center latitude "0"
Grid Line Frequency "none"
Resample Method "nearest_neighbor"
Density Stretch Type "auto"
World Files Created "NO"

[Return to the Map-a-Planet Homepage](#)
Map-a-Planet Version 1.0
Web Page Curator: [Patty Garcia](#)
Development Team

PLANETARY IMAGE LOCATOR TOOL

HTTP://PILOT.WR.USGS.GOV

Demo!

Choose Mercury (for EDRs Only):

Welcome to PILOT (Planetary Image Locator Tool)

Select a search target. . .

- Mercury** (139,227 images)
- Venus** (7,135 images)
- Earth** (17,161 images)
- Moon** (1,803,498 images)
- Mars** (1,255,741 images)
- Deimos** (244 images)
- Phobos** (444 images)
- Jupiter** (85,490 images)
- Adrastea** (23 images)
- Amalthea** (227 images)
- Callisto** (1,933 images)
- Europa** (2,192 images)
- Ganymede** (2,247 images)
- Himalia** (393 images)
- Io** (3,083 images)
- Metis** (27 images)
- Thebe** (48 images)
- Uranus** (5,021 images)
- Ariel** (101 images)
- Miranda** (90 images)
- Oberon** (74 images)
- Titania** (102 images)
- Umbriel** (100 images)
- Neptune** (5,588 images)
- Nereid** (188 images)
- Triton** (613 images)
- Untargeted Images**

Saturn (332,929 images)

- Atlas** (1,067 images)
- Calypto** (791 images)
- Daphnis** (386 images)
- Dione** (8,851 images)
- Enceladus** (16,066 images)
- Epimetheus** (1,530 images)
- Helene** (1,807 images)
- Hyperion** (4,767 images)
- Iapetus** (8,836 images)
- Janus** (2,323 images)
- Methone** (561 images)
- Mimas** (5,628 images)
- Pallene** (721 images)
- Pan** (1,143 images)
- Pandora** (1,247 images)
- Phoebe** (2,271 images)
- Polydeuces** (403 images)
- Prometheus** (3,492 images)
- Rhea** (14,039 images)
- Telesto** (801 images)
- Tethys** (8,672 images)
- Titan** (87,401 images)
- Ymir** (66 images)

News

- PILOT / UPC Data Release: Messenger - MDIS-WAC**
Mar 8, 2013
... Read more
- PILOT / UPC Data Release: Messenger - MDIS-NAC**
Mar 8, 2013
... Read more
- PILOT / UPC Data Release: Mars Reconnaissance Orbiter - CTX**
Mar 6, 2013
The NASA/USGS PDS Imaging Node has added the following data to the Unified Planetary Coordinate (UPC) Database. MISSION / INSTRUMENT: Mars Reconnaissance Orbiter / CTX Mapped: 1,823 Unmapped: 1 Total: 1,824 Please visit PILOT to access/download the ne... Read more
- Pilot / UPC Data Release Mars Odyssey - THEMIS**
Jan 3, 2013
The PDS Imaging node has added the following data to the Unified Planetary Coordinate(UPC) Database and is now available through PILOT. Mars Odyssey - THEMIS: Release 42, 781... Read more
- Pilot / UPC Data Release Cassini - ISS**
Jan 3, 2013
The PDS Imaging node has added the following data to the Unified Planetary Coordinate(UPC) Database and is now available through PILOT. Cassini - ISS: Volumes coiss_2072 and coiss_2073, Narrow Angle: 4233... Read more
- Just Released: BETA version of PILOT 3**
Feb 8, 2012
Try out the new BETA version of PILOT 3. This version is still going through testing and bugs fixes, but here are a few intended improvements: We are adding one new instrument to the UPC database, Cassini VIMS. We are also greatly improving what's availab... Read more

PDS Imaging Node

U.S. Geological Survey

Jet Propulsion Laboratory

44th LPSC MESSENGER Data Workshop

PLANETARY IMAGE LOCATOR TOOL

Select MESSENGER Images (NAC, WAC or Both)

USGS science for a changing world

PILOT

NASA

Home Mercury Missions Map Advanced

Select one or more image sets...

Mission	Year(s)	Mapped	Unmapped	Tools
Mariner 10	(1974)			
• VID A		2,007 mapped	1,248 unmapped	⚙️
• VID B		2,633 mapped	4,270 unmapped	⚙️
Messenger	(2008 - 2012)			
• MDIS-NAC		52,921 mapped	377 unmapped	⚙️
• MDIS-WAC		77,838 mapped	1,531 unmapped	⚙️

downloads | contact | support | help
PILOT was developed by the USGS Astrogeology Science Center / NASA PDS Imaging Node

Background Credit: NASA

Total Select ↓ ↵ 🗑️

Order By Zoom Thumbs

SEARCH TIPS

1. Enable the search button by selecting one or more images sets on the **Missions** tab.
2. *Mapped* images have lat/lon coordinates and photometric keywords
3. *Unmapped* images have incomplete data. The images had errors during processing because of improper labels or spacecraft information. Lat/Lon and photometric keywords are unavailable. NOTE: although the sets cannot be mapped, they still may contain quality imagery.
4. Use **Map** tab to limit your search by creating a bounding box (optional). After you complete a search, the map tab will also allow you to view footprints for mapped imagery.
5. Use **Advanced** tab to limit your search by setting ranges for dates and photometric keywords (optional).
6. When you are ready to search, click the search button . If you refine your search, you must re-click the search button.
7. The **Total** will show up above. **Results** will show up in this panel. If your result set is greater than 50,000 images, you will only receive a total.

PLANETARY IMAGE LOCATOR TOOL

Enter area of interest, initiate the search:

The screenshot shows the PILOT web interface. At the top left is the USGS logo with the tagline "science for a changing world". In the center is the "PILOT" logo. At the top right is the NASA logo. Below the logos is a navigation bar with "Home", "Mercury", "Missions", "Map", and "Advanced" buttons. A search icon is also present. The main map area shows a grayscale image of Mercury with a red rectangular bounding box. Below the map are input fields for "Lat Lon: 7.83, 359.13" and "Set bounding box below:". The bounding box fields are: "Min Lon: 0", "Max Lon: 10", "Min Lat: 10", and "Max Lat: 0". A "Feature Finder" section is also visible. To the right of the map is a grid of 16 image thumbnails, each with a date of "2008-10-06". The thumbnails are numbered 1 through 16. At the bottom left, there are links for "downloads", "contact", "support", and "help". At the bottom right, it says "Background Credit: NASA".

PLANETARY IMAGE LOCATOR TOOL

Use individual controls to display footprint, info, or to download:

The screenshot displays the PILOT (Planetary Image Locator Tool) interface. The left panel shows a map of Mercury with a red bounding box and a yellow footprint. The right panel shows a list of 419 images with thumbnails and metadata. A red arrow points from the bounding box on the map to the corresponding image in the list. Another red arrow points from the image in the list to a larger preview of that image on the left side of the right panel. The interface includes logos for USGS, PILOT, and NASA, and various navigation and search controls.

USGS science for a changing world

PILOT

NASA

Home Mercury Missions Map Advanced

Total 419

Select

Order By Mean Ground F Zoom Thumbs

93 126.92 m/p 94 126.98 m/p 95 127.22 m/p 96 127.26 m/p 97 127.33 m/p 98 127.75 m/p 99 127.79 m/p 100 127.85 m/p

Lat Lon: 8.41, 0.85

Set bounding box below...

Clear Bounding Box

Feature Finder Select Type

downloads | contact | support | help

PILOT was developed by the USGS Astrogeology Science Center / NASA PDS Imaging Node

PLANETARY IMAGE LOCATOR TOOL

Advanced Search Options are also available:

The screenshot displays the PILOT (Planetary Image Locator Tool) web interface. At the top left is the USGS logo with the tagline "science for a changing world". In the center is the "PILOT" logo, and on the right is the NASA logo. The main navigation bar includes "Home", "Mercury", "Missions", "Map", and "Advanced" (highlighted with a red circle). Below the navigation bar, the "Advanced" search options are visible, including:

- Start Time: 2008-01-09 to 2012-09-17
- Solar Longitude: 0 to 360
- Mean Ground Resolution: 7 to 115575
- Minimum Phase Angle: 13 to 142
- Maximum Phase Angle: 15 to 143
- Minimum Incidence Angle: 0 to 120
- Maximum Incidence Angle: 0 to 180
- Minimum Emission Angle: 0 to 85

A red arrow points to the "Advanced" search options. On the right side, a search results window is open, showing a total of 419 results. The results are displayed in a grid format, with each result showing a thumbnail image of the planet's surface and associated data (e.g., 93 126.92 m/p, 94 126.98 m/p, 95 127.22 m/p, 96 127.26 m/p, 97 127.33 m/p, 98 127.75 m/p, 99 127.79 m/p, 100 127.85 m/p). The interface also includes a "Select" dropdown, download icons, and a "Zoom Thumbs" checkbox.

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PLANETARY IMAGE LOCATOR TOOL

Select Images and Download Options

The screenshot displays the PILOT web interface for Mercury. The top navigation bar includes 'Home', 'Mercury', 'Missions', 'Map', and 'Advanced'. The main content area is divided into two panels. The left panel, titled 'Select one or more image sets...', lists two mission categories: 'Mariner 10 (1974)' and 'Messenger (2008 - 2012)'. Under 'Mariner 10', there are two sub-categories: 'VID A' (2,007 mapped, 1,248 unmapped) and 'VID B' (2,035 mapped, 1,270 unmapped). Under 'Messenger', there are two sub-categories: 'MDIS-NAC' (52,921 mapped, 377 unmapped) and 'MDIS-WAC' (77,838 mapped, 1,531 unmapped). The right panel, titled 'Download or Process', shows a 'Total 119' count and a 'Select 8' dropdown menu. Below this, there are three radio button options: 'Download CSV file' (selected), 'Download BASH script with wget calls', and 'Projection on the Web (POW)'. A 'Go!' button is located below these options. To the right of the download options is a grid of image thumbnails, each with a 'Go!' button and a 'Zoom Thumbs' checkbox. The thumbnails are labeled with numbers 11 through 16 and their corresponding resolution in m/p. A red circle highlights the 'Download or Process' section, and an orange arrow points from the 'Note: POW is coming soon!' text to the 'Projection on the Web (POW)' option. The USGS logo is in the top left, and the NASA logo is in the top right. The background of the interface features a view of the planet Mercury.

Note: POW is coming soon!

See Hare et al., 2013:
<http://www.lpi.usra.edu/meetings/lpsc2013/pdf/2068.pdf>

downloads | contact | support | help
PILOT was developed by the USGS Astrogeology Science Center / NASA PDS Imaging Node

PLANETARY IMAGE LOCATOR TOOL

The PILOT WGET Script can be used to download your selected images.

```
USAGE="USAGE: upcget-20130313.sh -t TARGET_DIR"
while [ $# -ge 1 ]; do
    case $1 in
        -t)    shift; $TARGET=$1 ;;
        -*)    echo $USAGE; exit 1 ;;
        esac
    shift
done

CURRENTDIR=`pwd`
if [ "$TARGET" != "" ]; then
    cd $TARGET
fi

wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2011_210/EN0220458374M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_102/EN0242632860M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_102/EN0242632883M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_198/EN0250966598M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_200/EN0251110393M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_201/EN0251167859M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_221/EN0252928369M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_222/EN0252985886M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_222/EN0252985892M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_222/EN0253014691M.IMG
wget -nd http://pdsimage.wr.usgs.gov/Missions/MESSENGER/MSGRMDS_
1001/DATA/2012_222/EN0253014695M.IMG
```


PDS GEOSCIENCES NODE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Homepage
+ NASA en Español
+ Contact NASA

PDS Geosciences Node

Washington University in St. Louis

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Help
 Frequently Asked Questions
 Geosciences Node Forums
 Help for Data Users
 Help for Data Reviewers
 Help for Proposers
 Email Us

Scheduled Maintenance
 This site will be down on the Thursday after the second Tuesday of the month between 7:00 and 9:30 pm Central Time for maintenance.

Welcome to the Geosciences Node
 The Geosciences Node of NASA's Planetary Data System (PDS) archives and distributes digital data related to the study of the surfaces and interiors of terrestrial planetary bodies. We work directly with NASA missions to help them generate well-documented, permanent data archives. We provide data to NASA-sponsored researchers along with expert assistance in using the data. **All our archives are online and available to the public to download free of charge.**

Where's the Data?
 Click on **DATA AND SERVICES** in the black navigation bar above to browse our data holdings.

Coming Soon

- March 20, 2013 - Part 2 (RDRs) of **MSL** Release 1
- April 1, 2013 - **Odyssey** Release 43
- May 24, 2013 - **MER** Release 36
- May 30, 2013 - **MSL** Release 2
- June 1, 2013 - **MRO** Release 25
- June 15, 2013 - **LRO** Release 14
- September 6, 2013 - **MESSENGER** Release 10
- October 11, 2013 - **GRAIL** Release 2

The Geosciences Node is part of the Earth and Planetary Remote Sensing Laboratory in the Department of Earth and Planetary Sciences at Washington University in St. Louis.

What's New

March 14, 2013. Release 13 of **Lunar Reconnaissance Orbiter** data is now online.

March 14, 2013. New **Mars Express Radio Science** data have been posted.

March 8, 2013. **MESSENGER Release 9** data are posted. This is the first release of derived data products for most instruments.

March 1, 2013. The LRO Diviner Team will host a users forum at LPSC, March 17.

March 1, 2013. New **MRO CRISM** and raw **Radio Science** data are posted.

February 27, 2013. The first release of **Mars Science Laboratory** data is online.

February 22, 2013. Release 35 of **Mars Exploration Rover** data is now online.

Curator: Susan Slavney
 NASA Official: Raymond E. Arvidson
 Last Updated: 14 Mar 2013
 + Comments and Questions

PDS Nodes: PDS Atmospheres Geosciences Imaging NAIF PPI Rings Small Bodies

FIRSTGOV
 Your First Click to the U.S. Government

+ Freedom of Information Act
 + NASA 2003 Strategic Plan
 + NASA Privacy Statement, Disclaimer, and Accessibility Certification
 + Copyright/Image Use Policy

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Homepage
+ NASA en Español
+ Contact NASA

PDS Geosciences Node

Washington University in St. Louis

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 Orbital Data Explorers
 Spectral Library
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 Workshops

Geosciences Node Data
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 Earth
 Asteroids
 Gravity Models
 All Geosciences Data Holdings

Help
 Frequently Asked Questions
 Geosciences Node Forums
 Help for Data Users
 Help for Data Reviewers
 Help for Proposers
 Email Us

Scheduled Maintenance
 This site may be down on Thursdays between 7:00 and 9:30 pm Central Time for maintenance.

What's New

March 14, 2013. Release 13 of **Lunar Reconnaissance Orbiter** data is now online.

March 14, 2013. New **Mars Express Radio Science** data have been posted.

March 8, 2013. **MESSENGER Release 9** data are posted. This is also the first release of derived data products for most instruments. Follow the links below for details.

Sept. 7, 2012. Release 8 data are now online, covering the first 12 months of orbital operations (through March 25, 2012).

March 8, 2012. Release 7 data are now online, covering the first six months of orbital operations (through September 17, 2011).

Sept. 8, 2011. Release 6 data are now online, covering the period after the third flyby through the first two months of orbit around Mercury (October 15, 2009, through May 17, 2011).

April 27, 2010. **MESSENGER** **MASCDS** CDR data is now online.

March 15, 2010. Release 5 data are now online, covering the period through the third Mercury flyby (October 14, 2009).

October 26, 2009. **MESSENGER** Ground Calibration saved data have been put online.

April 15, 2008. Release 4 data are now online, covering the period through the second Mercury flyby (October 20, 2008).

July 13, 2008. Release 3 data are now online, covering the period after the second Venus

Instruments and Archives

Instrument	PDS Archives
EPPS (Energetic Particle and Plasma Spectrometer)	EPPS Archive (at the PPI Node)
GRS (Gamma Ray Spectrometer) and NS (Neutron Spectrometer)	GRS and NS Archives
MAG (Magnetometer)	MAG Archive (at the PPI Node)
MASCS (Mercury Atmospheric and Surface Composition Spectrometer) includes: UVVS (Ultraviolet/Visible Spectrometer) VIRS (Visible/Infrared Spectrograph)	MASCS Archive
MDIS (Mercury Dual Imaging System)	MDIS Archive (at the Imaging Node)
MLA (Mercury Laser Altimeter)	MLA Archive
Radio Science	Radio Science Archive
XRS (X-Ray Spectrometer)	XRS Archive
SPICE (Geometry and Navigation)	SPICE Archive at the NAIF Node
All	Ground Calibration Data

Online Tools

Mercury Orbital Data Explorer (ODE) - Provides search, display, and download tools for selected **MESSENGER** data sets.

http://geo.pds.nasa.gov/

PDS Imaging Node

U.S. Geological Survey Jet Propulsion Laboratory

44th LPSC MESSENGER Data Workshop

MERCURY ORBITAL DATA EXPLORER

Beginning Your Search: Select Data Product Search,
Data Set Browser, Map Search, etc.

Mercury Orbital Data Explorer *PDS Geosciences Node*
Washington University in St. Louis

Home Data Product Search **Map Search** Tools Data Set Browser Download Help & Resources

WELCOME TO THE MERCURY ORBITAL DATA EXPLORER

The ~~PDS Geosciences Node~~ Mercury Orbital Data Explorer (ODE) provides search, display, and download tools for the PDS science data archives of the Messenger mission. Choose one of the above tabs to start using ODE.

- Data Product Search**
Search for orbital science products across missions, instruments, and data sets via time, location, and product ids.
- Additional Tools**
• [Product Type Coverage](#)
- Data Set Browser**
Browse through the orbital data set files stored in the PDS archives
- Download Cart**
Download products added to the cart from the product search
- What's New**
See what's new with ODE
- Help & Resources**
Access the ODE help, find additional resources, and see what's coming
- Available Data Sets**
A full list of mission, instrument, and product types available in Mercury ODE
- [Mars ODE](#) [Lunar ODE](#)
[Mercury ODE](#) [Venus ODE](#)

The Mercury Orbital Data Explorer is produced by the [PDS Geosciences Node](#) at Washington University in St. Louis.
Send comments to odewebmaster@wunder.wustl.edu.

<http://ode.rsl.wustl.edu/mercury/index.aspx>

MERCURY ORBITAL DATA EXPLORER

HTTP://ODE.RSL.WUSTL.EDU/MERCURY/INDEXPRODUCTSEARCH.ASPX

Beginning Your Search: Select Data Set, Location, Feature, etc.

Mercury Orbital Data Explorer

Home Data Product Search Map Search Tools Data Set

DATA PRODUCT SEARCH

Planetary science data stored in PDS is organized by [data products](#) and [data sets](#). Data products, usually products acquired by a particular instrument and processed in a certain way, includes all documentation and supporting materials needed to understand and use the data. A data set is a set of measurements resulting from a science observation, usually processed in a certain way.

STEP 1. SELECT DATA SETS TO SEARCH (A SELECTION IS REQUIRED)

Select One or More Desired Data Sets (Released PDS Archives)

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

Select a Product ID or filter by a partial Product ID

Find by Product Location

Filter by Time Range

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

STEP 4. SUBMIT QUERY

Display Product Thumbnails on search results page

MESSENGER

GRS - Gamma Ray Spectrometer **Other Product Types**
 RDR - Reduced Data Record CDR - Calibrated Data Record
[Data Set Description](#) [Data Set Description](#)

MASCS - MERCURY ATMOSPHERIC AND SURFACE COMPOSITION SPECTROMETER **Other Product Types**
 UVVCDR - UVVS Calibrated Data Record VIRCDR - VIRCalibrated Data Record
[Data Set Description](#) [Data Set Description](#)

MDIS-NAC - Mercury Dual Imaging System - Narrow Angle Camera **Other Product Types**
 CDRNAC - Calibrated Data Record
[Data Set Description](#)

MDIS-WAC - Mercury Dual Imaging System - Wide Angle Camera **Other Product Types**
 CDRWAC - Calibrated Data Record
[Data Set Description](#)

MLA - Mercury Laser Altimeter **Other Product Types**

Find by Product Location (Hide Options - 0 Parameters Set)

Select a Specific Feature

A selected feature's latitude and Longitude bounding box will be used for search criteria.

Feature Type: [Feature Type Descriptions](#)

Feature Name: [Feature Name List](#)

or

Directly specify a Latitude and Longitude coverage area

Mercury ODE uses [planetocentric coordinates](#) that are based on the product's center latitude and longitude.

Selected Search Area

Max Latitude (-90 to 90)


Western most Longitude (0 to 360)

Eastern most Longitude (0 to 360)

Min Latitude (-90 to 90)

MERCURY ORBITAL DATA EXPLORER

Preview Your Results or Submit Query



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[Home](#) [Data Product Search](#) [Map Search](#) [Tools](#) [Data Set Browser](#) [Download](#) [Help & Resources](#)

processed in a certain way.

STEP 1. SELECT DATA SETS TO SEARCH (A SELECTION IS REQUIRED)

Select One or More Desired Data Sets (Released PDS Archives) (Show Options - 1 Parameter Set)

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

Select a Product ID or filter by a partial Product ID (Show Options - 0 Parameters Set)

Find by Product Location (Show Options - 0 Parameters Set)

Filter by Time Range (Hide Options - 2 Parameters Set)

Select Desired Time Range Enter a single value or a range. **Example Range**

Observation Time (UTC) 2012-03-01 to 2012-03-02 1999-02-28T00:00:00.000 to 2012-05-21T17:03:36.000

Observation Time (UTC) - the midpoint time between observation start and stop time, e.g. 2007-05-24T12:59:59
Creation Date (UTC) - the time when a product was created, e.g. 2007-05-24T12:59:59

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

Product Type	Search Results Count
MESSENGER MDIS-NAC CDRNAC	874
Total Products Found	874

STEP 4. SUBMIT QUERY

Display Product Thumbnails on search results page

MERCURY ORBITAL DATA EXPLORER

Viewing Your Results, More Information

The screenshot displays the Mercury Orbital Data Explorer interface. At the top, there is a navigation bar with links for Home, Data Product Search, Map Search, Tools, Data Set Browser, Download, and Help & Resources. The main content area is divided into two sections. On the left, the 'SEARCH RESULTS' section shows 'Products Found: 874' and a table of search results. On the right, a detailed view of a product is shown, including a thumbnail image and a list of links for more information.

SEARCH RESULTS

Products Found: 874
 Display Product Thumbnails Update Cart

1 2 3 4 5 6 7 8 9

Instrument	Type	Product ID	Obs Time
MESSENGER MDIS-NAC	CDRNAC	CN0239074534M_IF_3	2012-03-01T07:31:08.834
MESSENGER MDIS-NAC	CDRNAC	CN0239074534M_RA_3	2012-03-01T07:31:08.834
MESSENGER MDIS-NAC	CDRNAC	CN0239075154M_IF_3	2012-03-01T07:41:28.835
MESSENGER MDIS-NAC	CDRNAC	CN0239075154M_RA_3	2012-03-01T07:41:28.835
MESSENGER MDIS-NAC	CDRNAC	CN0239076791M_IF_3	2012-03-01T08:08:45.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076791M_RA_3	2012-03-01T08:08:45.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076795M_IF_3	2012-03-01T08:08:49.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076795M_RA_3	2012-03-01T08:08:49.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_IF_3	2012-03-01T08:08:53.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_RA_3	2012-03-01T08:08:53.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076819M_IF_3	2012-03-01T08:09:13.838

Product Details: CN0239076795M_RA_3

[More About this Product Type \(help page\)](#)
[PDS Volume](#) [AAREADME.TXT](#) [ERRATA.TXT](#) [Catalog Files](#) [Data Product Software Interface Specification \(PDF\)](#)
[PDS Source Location](#) [Instrument Website](#)

[Browse](#) [Meta Data](#) [Label](#) [Related Products](#)

Browse Image - the image below is not the actual data product

MERCURY ORBITAL DATA EXPLORER

Results can be viewed on Map

The image displays two overlapping screenshots of the Mercury Orbital Data Explorer (ODE) web application. The top screenshot shows the search results page with a table of products. A red circle highlights the 'View on Map' button, and a red arrow points to the map interface shown in the bottom screenshot.

Mercury Orbital Data Explorer
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Washington University in St. Louis

Home Data Product Search Map Search Tools Data Set Browser Download Help & Resources

SEARCH RESULTS
Output Results View on Map Back To Search

Products Found: 874
 Display Product Thumbnails

Instrument	Type	Product ID	Obs Time
MESSENGER MDIS-NAC	CDRNAC	CN0239074534M_IF_3	2012-03-01T07:31:08.834
MESSENGER MDIS-NAC	CDRNAC	CN0239074534M_RA_3	2012-03-01T07:31:08.834
MESSENGER MDIS-NAC	CDRNAC	CN0239075154M_IF_3	2012-03-01T07:41:28.835
MESSENGER MDIS-NAC	CDRNAC	CN0239075154M_RA_3	2012-03-01T07:41:28.835
MESSENGER MDIS-NAC	CDRNAC	CN0239076791M_IF_3	2012-03-01T08:08:45.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076791M_RA_3	2012-03-01T08:08:45.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_IF_3	2012-03-01T08:08:49.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_RA_3	2012-03-01T08:08:49.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_IF_3	2012-03-01T08:08:53.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076799M_RA_3	2012-03-01T08:08:53.837
MESSENGER MDIS-NAC	CDRNAC	CN0239076819M_IF_3	2012-03-01T08:09:13.838

Mercury ODE Map Interface - Cylindrical Center 0

Zoom In Zoom Out Full Extent Prev Extent Next Extent Pan Select Products By Area Remove Area Selection Select Projection

Map Help

Map Display Controls

Select Layers Set Filters (Optional) View Selection Results

Coverage Display Options

- Display All Products' Coverage (with any filters applied) [Help](#)
- or
- Display Only Products Selected By Area (with any filters applied)

Available Map Layers

- Mercury Feature Layer [show details](#)
- MESS - MDIS-NAC CDRNAC [show details](#)
- MESS - MDIS-NAC EDRNAC [show details](#)
- MESS - MDIS-WAC CDRWAC [show details](#)
- MESS - MDIS-WAC EDRWAC [show details](#)
- Mercury Global Mosaic [show details](#)

2464 km

MERCURY ORBITAL DATA EXPLORER

Data Set Browser: Find data by Data Set ID and Volume

MERCURY DATA SET BROWSER [Reset Page](#)

Planetary science data stored in PDS is organized by data sets. A [data set](#) is a collection of related data products, usually products acquired by a particular instrument and processed in a certain way. The data set also includes all documentation and supporting materials needed to understand and use the data products.

The **Data Set Browser** allows the user to view data set contents that are currently cataloged in the ODE system. Expand the data set tree to view the contents of the available data sets.

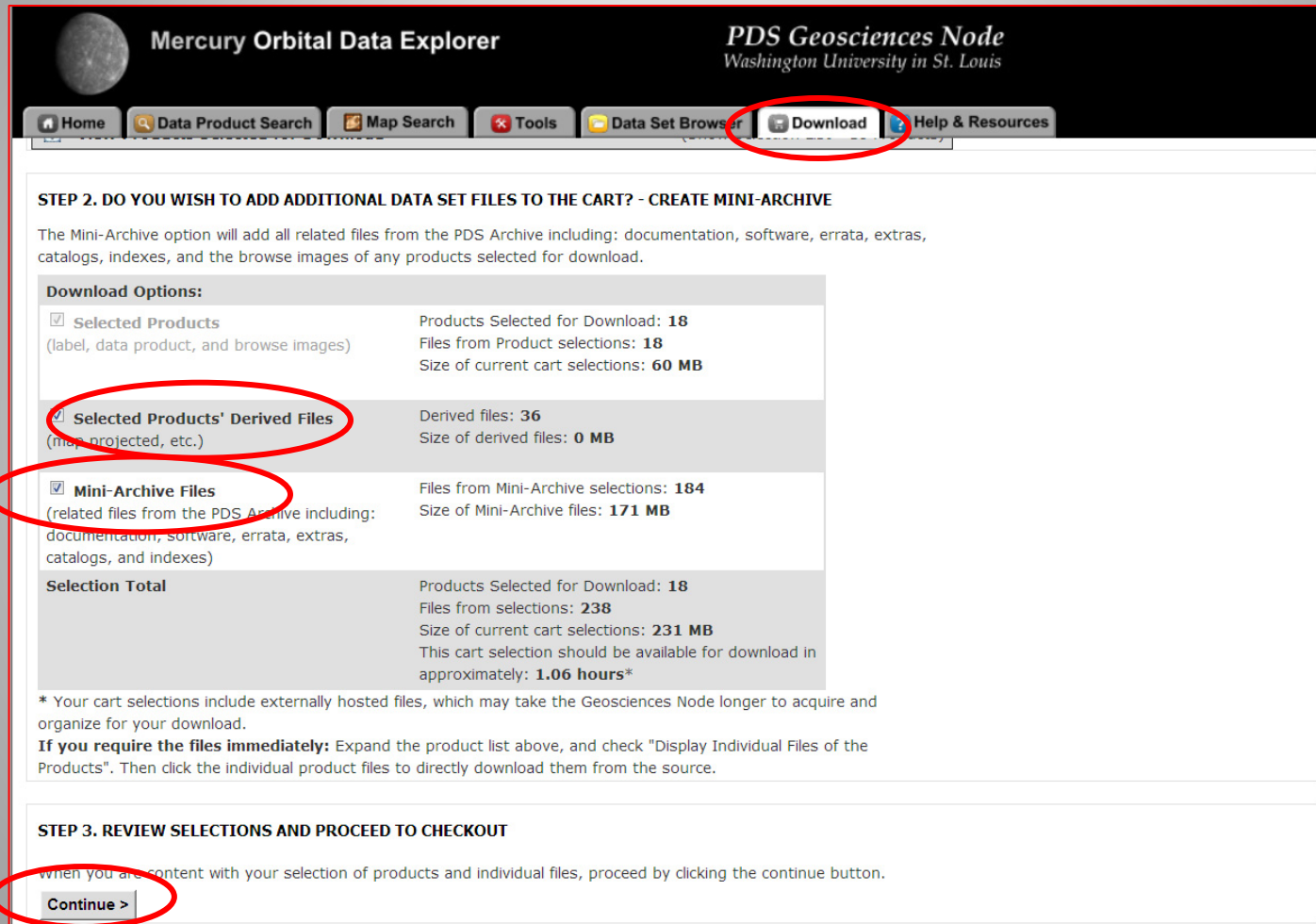
Top Level Mission Instrument

[Start](#) [MESSENGER](#) [MDIS-NAC](#)

Data Set	Description
MESS-E/V/H-MDIS-2-EDR-RAWDATA-V1.0	MESSENGER Mercury Dual Imaging System
MESS-E/V/H-MDIS-4-CDR-CALDATA-V1.0	MESSENGER Mercury Dual Imaging System

MERCURY ORBITAL DATA EXPLORER

Requesting Your Files, Creating a Mini-Archive



The screenshot shows the Mercury Orbital Data Explorer interface. At the top, there is a navigation bar with buttons for Home, Data Product Search, Map Search, Tools, Data Set Browser, Download (circled in red), and Help & Resources. The main content area is titled "STEP 2. DO YOU WISH TO ADD ADDITIONAL DATA SET FILES TO THE CART? - CREATE MINI-ARCHIVE". Below this, there is a paragraph explaining the Mini-Archive option. A table of download options is shown, with three rows: "Selected Products", "Selected Products' Derived Files" (circled in red), and "Mini-Archive Files" (circled in red). A "Selection Total" row is also present. At the bottom, there is a "Continue >" button (circled in red).

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Home Data Product Search Map Search Tools Data Set Browser **Download** Help & Resources

STEP 2. DO YOU WISH TO ADD ADDITIONAL DATA SET FILES TO THE CART? - CREATE MINI-ARCHIVE

The Mini-Archive option will add all related files from the PDS Archive including: documentation, software, errata, extras, catalogs, indexes, and the browse images of any products selected for download.

Download Options:	
<input checked="" type="checkbox"/> Selected Products (label, data product, and browse images)	Products Selected for Download: 18 Files from Product selections: 18 Size of current cart selections: 60 MB
<input checked="" type="checkbox"/> Selected Products' Derived Files (map, projected, etc.)	Derived files: 36 Size of derived files: 0 MB
<input checked="" type="checkbox"/> Mini-Archive Files (related files from the PDS Archive including: documentation, software, errata, extras, catalogs, and indexes)	Files from Mini-Archive selections: 184 Size of Mini-Archive files: 171 MB
Selection Total	Products Selected for Download: 18 Files from selections: 238 Size of current cart selections: 231 MB This cart selection should be available for download in approximately: 1.06 hours*

* Your cart selections include externally hosted files, which may take the Geosciences Node longer to acquire and organize for your download.

If you require the files immediately: Expand the product list above, and check "Display Individual Files of the Products". Then click the individual product files to directly download them from the source.

STEP 3. REVIEW SELECTIONS AND PROCEED TO CHECKOUT

When you are content with your selection of products and individual files, proceed by clicking the continue button.

Continue >

MERCURY ORBITAL DATA EXPLORER

Choose a Format, Enter E-mail Address, Submit Request

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Home Data Product Search Map Search Tools Data Set Browser Download Help & Resources

DOWNLOAD SETUP [< Back](#) ?

Details for acquiring the selected data files:

1. The Geosciences Node will retrieve the files you have requested and place them in a user specific FTP folder for your download. After the completion and submission of this form, an automated system will prepare the FTP site for you to download the selected files from. You will receive an email when the files are ready for download. The email will include the FTP address and username.

Select format: Zip Tar Tar.Gz No Compression

Terms and Conditions
PDS data products and data set files are freely available to the public.

Policy for Citations of PDS Data [click here for a new window](#)

Your email:

(You will be notified at this email address when the files are ready for download.)

Submit Request Please only click this button once. Multiple clicks may result in problems with your request.

MERCURY ORBITAL DATA EXPLORER

You will receive email with instructions for accessing your data:

The files that you have requested from the PDS Geosciences Node have been placed in an FTP folder for you.

Your requested files are located at the following FTP address:

<ftp://geoftp.wustl.edu/20130308T154642942>

Username: geoftp

Password: Odeuser1

The files will remain on the FTP site for 7 days. If you experience problems with our FTP site, contact odewebmaster@wunder.wustl.edu

PDS Geosciences Node
Washington University in St. Louis

Important URLs

PDS Imaging Node: <http://img.pds.nasa.gov/>

PDS Data Portal: <http://img.pds.nasa.gov/portal/>

PDS IN Online Volumes: <http://img.pds.nasa.gov/volumes/mess.html>

PDS Planetary Image Atlas:

<http://pds-imaging.jpl.nasa.gov/search/search.html#QuickSearch>

PDS PILOT: <http://pilot.wr.usgs.gov/>

Geosciences Orbital Data Explorer:

<http://ode.rsl.wustl.edu/mercury/index.aspx>

PDS Map-A-Planet: <http://www.mapaplanet.org>

Contact Us

Imaging Node:

Patty Garcia – pgarcia@usgs.gov (***MESSENGER Point-of-Contact***)

Lisa Gaddis – lgaddis@usgs.gov

Geosciences Node:

odewebmaster@wunder.wustl.edu

Thank You!