

Planetary Data System (PDS) SHARAD and MARSIS

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3/14

What is the Planetary Data System?

- The Planetary Data System (PDS) is a NASA organization that archives science data from NASA's planetary missions.
- PDS responsibilities are:
 - To help NASA missions and other data providers to organize and document their digital planetary data,
 - To collect complete, well-documented planetary data into archives that are peer-reviewed,
 - To make the planetary data available and useful to the science community,
 - To ensure the long-term preservation and usability of the data.
- PDS consists of a set of discipline nodes – the Geoscience node handles **SHARAD** and, via an agreement with ESA, a copy of **MARSIS**

SHARAD / MARSIS in PDS

□ SHARAD

- Via PDS Geosciences Web Site
- Via the Orbital Data Explorer

□ MARSIS

- Copied from ESA
- Via PDS Geosciences Web Site
- Via the Orbital Data Explorer

Geosciences Web Site

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Homepage
+ NASA en Español
+ Contact NASA

PDS Geosciences Node

Washington University in St. Louis

HOME DATA AND SERVICES TOOLS ABOUT US CONTACT US SITE MAP

Services

- Analyst's Notebooks
- Virtual Astronaut
- Orbital Data Explorers
- Spectral Library
- FTP Access
- Workshops

Geosciences Node Data

- Mars
- Venus
- Mercury
- Moon
- 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
- About Checksums
- 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 7, 2014 - [MER](#) Release 39
- March 7, 2014 - [MESSENGER](#) Release 11
- March 14, 2014 - [LRO](#) Release 17
- March 17, 2014 - [MSL](#) Release 5
- April 1, 2014 - [Odyssey](#) Release 47
- April 1, 2014 - [GRAIL](#) Release 4
- June 2, 2014 - [MRO](#) Release 29

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 1, 2014. Release 28 of [Mars Reconnaissance Orbiter](#) data is now online.

February 28, 2014. New [Mars Express Radio Science](#) data have been posted.

February 18, 2014. New [Odyssey Radio Science](#) data are posted.

January 27, 2014. New [Mars Express HRSC](#) and [SPICAM](#) data have been posted.

January 24, 2014. Revised [Odyssey HEND](#) and [NS EDR](#) data from Jan 1-Mar 30, 2013 have been posted.

January 17, 2014. Products from sols 270 through 359 have been added to the [safed MSL SAM EDR](#) data set.

Jan. 14, 2014. New [Odyssey Radio Science](#) data are posted.

[What's Old](#)

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

FIRSTGOV
Your First Click in the U.S. Government

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

NASA

Curator: Susan Slavney
NASA Official: Raymond E. Arvidson
Last Updated: 28 Feb 2014
+ Comments and Questions

□ <http://geo.pds.nasa.gov/>

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Geosciences Node Data

- Mars
 - Mars Exploration
 - MSL
 - MRO
 - SHARAD
 - Science
- MER
 - Mars Express
 - Odyssey
 - MGS
 - Pathfinder
 - Prototype Rovers
 - Viking Orbiter
 - Viking Lander
 - Earth Based Data
- Venus
- Mercury
- Moon
- Earth
- Asteroids
- Gravity Models
- All Geosciences Data

Help

- Frequently Asked Questions
- Geosciences Node
- Help for Data Users
- Help for Data Review
- Help for Proposers
- About Checksums
- Email Us

Scheduled Maintenance

This site may be down
Thursdays between
9:30 pm Central Time
maintenance.

MRO: SHARAD

March 1, 2014. There are no SHARAD data in MRO Release 28. See [ERRATA.TXT](#) for details.

SHARAD (Shallow Radar) is a subsurface radar sounder that looks for water and ice in the first few hundred meters of the subsurface of Mars. SHARAD data sets are produced by the SHARAD Science Team based at the University of Rome, Italy.

SHARAD Data Sets

Raw Data Products	Coverage
RDR Volume	
MROSH_0001	Dec. 6, 2006 - Nov. 7, 2010
MROSH_0002	Nov. 8, 2010 - Feb. 11, 2012

Derived Data Products	Coverage
RDR Volume	
MROSH_1001	Dec. 6, 2006 - Nov. 7, 2010
MROSH_1002	Nov. 8, 2010 - Feb. 11, 2012

Tools

- Mars Orbital Data Explorer - Provides search, display, and download tools for SHARAD data sets.
- [IDL scripts to create browse images](#) - The two scripts in this zip file

To Find SHARAD

- Select Mars
- Select MRO
- Select SHARAD
- Select Archive Volume
- File Access to Volume

[pds-geosciences.wustl.edu - /mro/mro-m-sharad-4-rdr-v1/mrosh_1002/](http://pds-geosciences.wustl.edu/mro/mro-m-sharad-4-rdr-v1/mrosh_1002/)

[\[To Parent Directory\]](#)

6/2/2008 10:16 AM	10177	aareadme.txt
8/31/2012 10:37 AM	<dir>	browse
8/29/2011 1:36 PM	<dir>	calib
6/1/2009 1:36 PM	<dir>	catalog
8/31/2012 10:37 AM	<dir>	data
6/1/2009 1:36 PM	<dir>	document
2/28/2014 3:32 PM	8552	errata.txt
11/27/2012 3:38 PM	<dir>	index
6/1/2009 1:36 PM	<dir>	label
5/23/2007 9:19 AM	2277	voldesc.cat

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Geosciences Node Data
Mars
Mars Exploration
MSL
Phoenix
MRO
Mars Express
ASPERA
HRSC
MARSIS
PFS
SPICAM
SPICE

**The European Space Agency
Mars Express: MARSIS**

The MARSIS Subsurface Sounding Radar/Altimeter primary objective is to map the distribution of water and ice in the upper portions of the Martian crust. The instrument analyzes reflections of radio waves in the upper 2-3 km of Martian crust to reveal the subsurface structure. The MARSIS Principal Investigator is Prof. Giovanni Picardi, Universita di Roma 'La Sapienza', Rome, Italy.

The primary source for MARSIS data is the [ESA Planetary Science Archive](#).

Through a cooperation agreement between ESA and NASA, the PDS Geosciences Node is hosting a copy of the MARSIS data archive.

- MARSIS Experiment Data Record (raw data)
 - Nominal Mission
 - Extended Mission 1
- MARSIS Subsurface Reduced Data
- MARSIS Active Ionospheric Sounding Data
 - Nominal Mission
 - Extended Mission 1
 - Extended Mission 2
 - Extended Mission 3
- MARSIS Total Electron Content of the Ionosphere
 - Nominal Mission
 - Extended Mission 1

To Find MARSIS

- Select Mars
- Select MEX
- Select MARSIS
- Select MARSIS Subsurface Reduce Data
- Select mexmds_1001
- File Access to Volume

[pds-geosciences.wustl.edu - /mex/mex-m-marsis-3-rdr-ss-v1/](http://pds-geosciences.wustl.edu/mex/mex-m-marsis-3-rdr-ss-v1/)

[\[To Parent Directory\]](#)

```
6/10/2008 1:16 PM <dir> mexmds 1001
12/10/2012 3:59 PM 99899 mexmds_1001_121210.md5
```

[pds-geosciences.wustl.edu - /mex/mex-m-marsis-3-rdr-ss-v1/mexmds_1001/](http://pds-geosciences.wustl.edu/mex/mex-m-marsis-3-rdr-ss-v1/mexmds_1001/)

[\[To Parent Directory\]](#)

```
6/10/2008 8:57 AM 37480 aareadme.txt
6/10/2008 12:00 PM <dir> calib
6/10/2008 12:00 PM <dir> catalog
6/10/2008 12:00 PM <dir> data
6/10/2008 12:00 PM <dir> document
6/10/2008 12:00 PM <dir> index
6/10/2008 12:00 PM <dir> label
6/10/2008 8:57 AM 4176 voldesc.cat
```

Orbital Data Explorer (ODE)

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

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

DATA PRODUCT SEARCH [Reset Form](#)

Planetary science data stored in PDS is organized by [data products](#) and [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. A data product is a set of measurements resulting from a science observation, usually products acquired by a particular instrument and processed in a certain way.

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

Select One or More Desired Data Sets (Show Options - 4 Parameters 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 Center Latitude / Longitude (Show Options - 4 Parameters Set)

Filter by Time Range (Show Options - 0 Parameters Set)

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

[Preview Search Results Summary](#)

STEP 4. SUBMIT QUERY

[View Results in Table](#) [View Results on Map](#)

Display Product Thumbnails on search results page

SEARCH for Products

Mars Orbital Data Explorer PDS Geosciences Node
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Home Data Product Search Tools Data Set Browser Download Help & Resources

SEARCH RESULTS [Output Re](#)

Products Found: 76
 Display Product Thumbnails

Instrument	Type	Product ID
MRO CRISM	DDR	FRT00003192
MRO CRISM	DDR	FRT00003192
MRO CRISM	TRDR	FRT00003192
MRO CRISM	TRDR	FRT00003192
MRO CRISM	TRDR	FRT00003192
MRO CRISM	DDR	FRT00003509
MRO CRISM	DDR	FRT00003509
MRO CRISM	TRDR	FRT00003509
MRO CRISM	TRDR	FRT00003509
MRO CRISM	TRDR	FRT00003509
MRO CRISM	DDR	FRT00005538
MRO CRISM	DDR	FRT00005538
MRO CRISM	TRDR	FRT00005538
MRO CRISM	TRDR	FRT00005538
MRO CRISM	TRDR	FRT000070F1
MRO CRISM	DDR	FRT000070F1
MRO CRISM	TRDR	FRT000070F1
MRO CRISM	TRDR	FRT000070F1
MRO CRISM	DDR	FRT00008CE1
MRO CRISM	DDR	FRT00008CE1
MRO CRISM	TRDR	FRT00008CE1

FRTO000812F_07_IF164S_TRR2
[More About this Product Type \(this page\)](#)
[Data Product Software Interface Specification \(PDF\)](#)
[Archive Software Interface Specification Document \(PDF\)](#)

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

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

[Add Product to Cart](#) [Remove Product from Cart](#) [Cart & Download Help](#)

CRISM Instrument Team Web Site
[FRTO000812F_07_IF164S_TRR2](#)

PDS Product Files **Derived Files**

Product Files & Labels	KB
frto000812f_07_if164s_trr2.mrs	115,049
Product Data File	

RETRIEVE and View Products

MAP Products

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

Mars ODE Map Interface - Cylindrical Center 0

[Zoom In](#) [Zoom Out](#) [Full Extent](#) [Prev Extent](#) [Next Extent](#) [Pan](#) [Selected Products By Area](#) [Remove Area Selection](#) [Select Projection](#) [Map Help](#)

Map Display Controls

Select Layers Set Filters (Optional) View Selection Results

Layers: (J2000) (Optional)

Display All Product Coverage (with any filters applied)

or

Display Only Products Selected By Area (with any filters applied)

Available Map Layers

- Mars Feature Layer (Landers and Nomenclature) [show details](#)
- MRO - CRISM Center (FRT)HL_HRS, FRS, ATO(ATU) TRDRs & DDRs [show details](#)
- MRO - CRISM (FRT)HL_HRS, FRS, ATO(ATU) TRDRs & DDRs [show details](#)
- MRO - CRISM (MSP)MHW(HSP)MHW TRDRs & DDRs [show details](#)
- MRO - CRISM (EPT)TDRs & DDRs [show details](#)
- MRO - CRISM (FFC) TRDRs & DDRs [show details](#)
- MRO - CRISM (LMB) TRDRs & LDRs [show details](#)
- MRO - CRISM (MPCOR) [show details](#)
- MRO - CRISM (TRDR) [show details](#)
- MRO - CRISM (DDR) [show details](#)
- MRO - CRISM (MSSL Landing Site Selection) Mar_DS [show details](#)
- MRO - CRISM (MSSL Landing Site Selection) Mar_DA [show details](#)
- MRO - CRISM (LDR) [show details](#)
- MRO - CTD EDR [show details](#)
- MRO - CTD (MSSL Landing Site Selection) MSSS_D [show details](#)
- MRO - HRISE (RCR) [show details](#)
- MRO - HRISE (RCR) [show details](#)
- MRO - HRISE (OTM) [show details](#)
- MRO - HRISE (AVHRR) [show details](#)
- MRO - HRISE (MSSL Landing Site Selection) Mow_D [show details](#)
- MRO - RISS (RCR) [show details](#)
- MRO - SHARAD (EOP) [show details](#)
- MRO - SHARAD (RCR) [show details](#)
- MEX - HRISC (OTM) [show details](#)
- MEX - HRISC (RCR) [show details](#)
- MEX - HRISC (MSSL Landing Site Selection) Gwin_D [show details](#)
- MEX - HRISC (MSSL Landing Site Selection) Cale_D [show details](#)
- MEX - MARSIS (EDR) [show details](#)
- MEX - MARSIS (EDR) [show details](#)

Orbital Data Explorer (ODE)

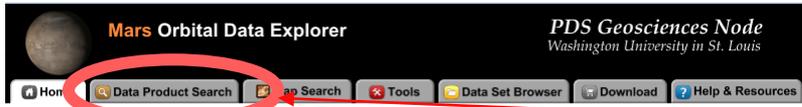
<http://ode.rsl.wustl.edu/mars/>

- Specialized PDS web tool - Allows users to:
 - search, retrieve, and order PDS products
 - search across missions and instruments
 - search across PDS nodes
 - search via maps and forms
- Supports PDS-Compliant Mars archives from:
 - Mars Reconnaissance Orbiter
 - **SHARAD**, CRISM, HiRISE, CTX, RSS, MCS
 - ESA Mars Express
 - **MARSIS**, HRSC, OMEGA, PFS
 - Mars Odyssey
 - GRS, THEMIS
 - Mars Global Surveyor
 - MOLA, MOC
 - Viking Orbiter Camera

ODE Approach – Web Interface

- Dynamic forms-based **product** query including:
 - Instrument / Product Type
 - Space and Time
 - Coordinated Target Observations
 - Ad-hoc cross-instrument searches
 - Product-specific searches
- Map-based query
- Browse versions of products
- Direct access to product-specific web interfaces
 - Example: HiRISE JPIP Servers or CRISM Team Site
- Download selected products in “on-the-fly mini-archives”

ODE - SHARAD and MARSIS



Open ODE

Select "Data Product Search"



Open Data Sets

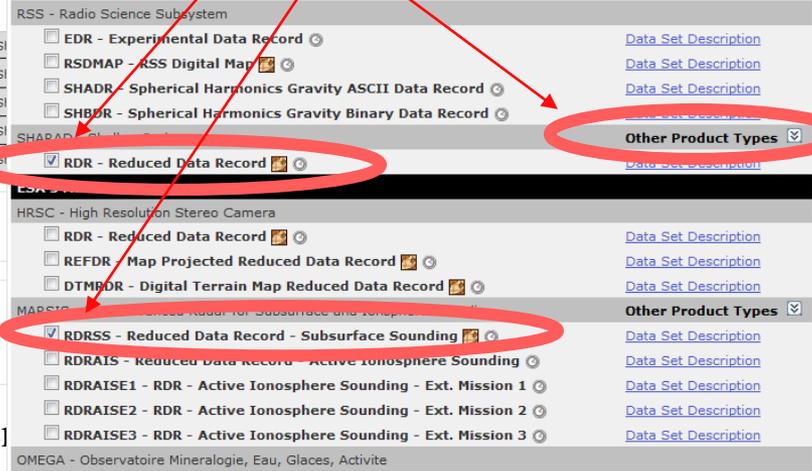
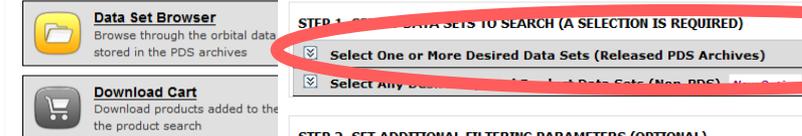
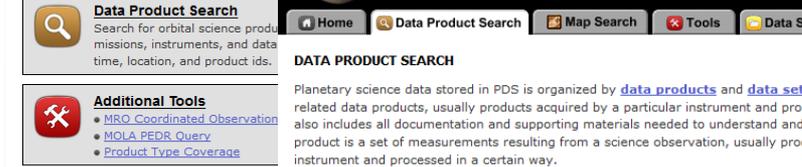
Check Desired Product Types



SHARAD RDRs

MARSIS RDRSSs

Other Product Types (EDRs)



ODE - SHARAD and MARSIS

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

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

Filter by Existing and Proposed Landing Sites *New Option* (Show Options - 0 Parameters Set)

Find by Product Location (Hide Options - 4 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: [Full Feature Name List](#)

OR

Directly specify a Latitude and Longitude coverage area
Mars ODE uses [areocentric coordinates](#) that are based on the product's center latitude and longitude.

Max Latitude
(-90 to 90)

Western most Longitude
(0 to 360)

Eastern most Longitude
(0 to 360)

Min Latitude
(-90 to 90)

Selected Search Area

Filter by Time Range (Show Options - 0 Parameters Set)

Filter by Observation Angle (Show Options - 0 Parameters Set)

Scroll down

Filter by location,
product id, observation
time, and orbits

Preview Results

View Results

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

Product Type	Search Results Count
MEX MARSIS RDRSS	6
MRO SHARAD RDR	17
Total Products Found	23

STEP 4. SUBMIT QUERY

ODE - SHARAD and MARSIS

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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: 23
 Display Product Thumbnails

Instrument	Type	Product ID	Obs Time	
MEX MARSIS	RDRSS	FRM_SS3_TRK_CMP_RDR_1984	2005-08-01T06:56:33.778	<input type="checkbox"/>
MEX MARSIS	RDRSS	FRM_SS3_TRK_CMP_RDR_2028	2005-08-13T14:38:30.659	<input type="checkbox"/>
MEX MARSIS	RDRSS	FRM_SS3_TRK_CMP_RDR_2149	2005-09-16T11:29:06.920	<input type="checkbox"/>
MEX MARSIS	RDRSS	GEO_SS3_TRK_CMP_RDR_1984	2005-08-01T06:56:32.778	<input type="checkbox"/>
MEX MARSIS	RDRSS	GEO_SS3_TRK_CMP_RDR_2028	2005-08-13T14:38:30.659	<input type="checkbox"/>
MEX MARSIS	RDRSS	GEO_SS3_TRK_CMP_RDR_2149	2005-09-16T11:29:06.920	<input type="checkbox"/>
MRO SHARAD	RDR	R_0752902_001_SS19_700_A	2008-02-11T11:53:21.986	<input type="checkbox"/>
MRO SHARAD	RDR	R_0752902_001_SS19_700_A	2008-03-05T02:20:03.735	<input type="checkbox"/>
MRO SHARAD	RDR	R_0752902_001_SS19_700_A	2008-03-10T05:47:09.535	<input type="checkbox"/>
MRO SHARAD	RDR	R_0766702_001_SS19_700_A	2008-03-15T21:16:52.903	<input type="checkbox"/>
MRO SHARAD	RDR	R_0767402_001_SS19_700_A	2008-03-16T09:33:14.936	<input type="checkbox"/>
MRO SHARAD	RDR	R_0774002_001_SS19_700_A	2008-03-21T13:00:18.785	<input type="checkbox"/>
MRO SHARAD	RDR	R_0781901_001_SS19_700_A	2008-03-27T16:46:20.535	<input type="checkbox"/>
MRO SHARAD	RDR	R_0788501_001_SS19_700_A	2008-04-01T20:13:22.486	<input type="checkbox"/>
MRO SHARAD	RDR	R_0796401_001_SS19_700_A	2008-04-07T23:59:50.833	<input type="checkbox"/>
MRO SHARAD	RDR	R_0809602_001_SS19_700_A	2008-04-18T06:53:19.087	<input type="checkbox"/>
MRO SHARAD	RDR	R_1968601_001_SS04_700_A	2010-10-08T10:01:17.053	<input type="checkbox"/>
MRO SHARAD	RDR	R_1989701_001_SS04_700_A	2010-10-24T20:35:48.904	<input type="checkbox"/>
MRO SHARAD	RDR	R_2264001_001_SS04_700_A	2011-05-26T14:20:39.353	<input type="checkbox"/>
MRO SHARAD	RDR	R_2285101_001_SS04_700_A	2011-06-12T00:57:56.801	<input type="checkbox"/>
MRO SHARAD	RDR	R_2348401_001_SS04_700_A	2011-07-31T08:43:41.004	<input type="checkbox"/>
MRO SHARAD	RDR	R_2411701_001_SS04_700_A	2011-09-18T16:30:47.498	<input type="checkbox"/>
MRO SHARAD	RDR	R_2432801_001_SS04_700_A	2011-10-05T03:04:08.597	<input type="checkbox"/>

Product Details
R_0752902_001_SS19_700_A
MRO SHARAD RDR - Reduced Data Record
Product Description and Data Set Documents (click to show)
Browse Meta Data Label Related Products Map Context

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

Add Product to Cart Remove Product from Cart Cart & Download Help

PDS Product Files | **Derived Files**

Product Files & Labels	KB
r_0752902_001_ss19_700_a.dat Product Data File	374,180
r_0752902_001_ss19_700_a.lbl Product Label File	6

Referenced Files	KB
rdr.fmt Label Format File	63

Browse Files	KB
r_0752902_001_ss19_700_a.b.jpg Browse Image	705
r_0752902_001_ss19_700_a.b.lbl Browse Label	3

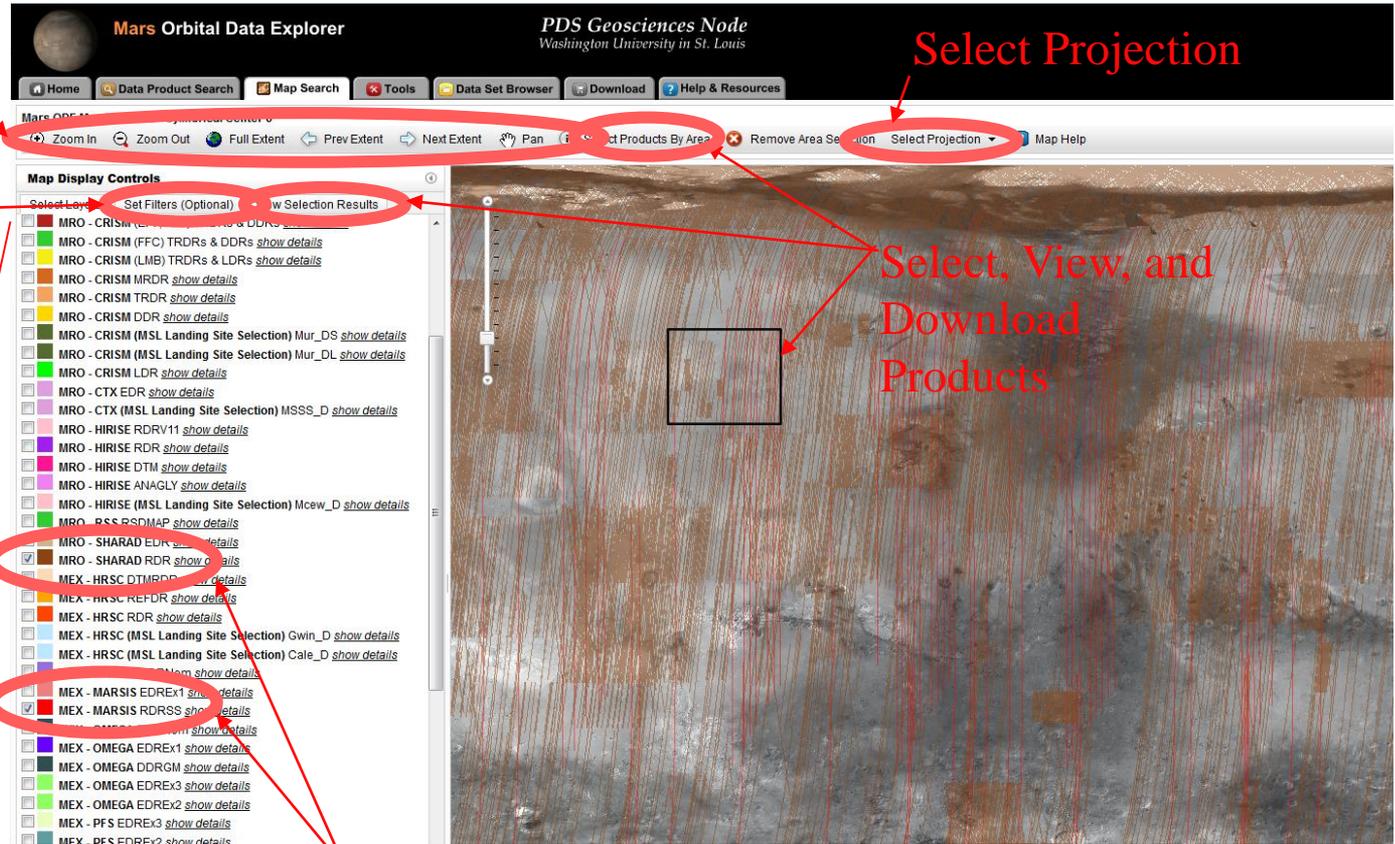
Product Summary

Instrument Host ID	MRO
--------------------	-----

Annotations:
- Add Products to Cart (top right)
- Update Cart (middle)
- Product Details (right panel)
- Directly Download Files (bottom right)
- Select Product to View (bottom center)

ODE - SHARAD and MARSIS

Zoom/Pan Map



Filter Products by

- Time
- Product Id
- Location

Select Projection

Select, View, and Download Products

Select Product Type Layers

Control Map Layers

- Transparency
- Layer Order
- Coverage Layers
- Basemap Layers

Questions? Demos?

- Visit us at the PDS Geosciences Booth
 - Get detailed answers
 - See live demos
- Contacts:
 - Keith Bennett
 - bennett@wustl.edu