**Cassini Help Page Status Oct 23, 2018**

**Replacements**

**Global**

**Master Schedule With Replacement including txt and readme files (See page changes in Gap reports and files in full mission request. )**

**Tour Atlas Global replacement including readme file with definitions complete and in pdf**

 **Replace** Tour Atlas **with** Tour Atlas (Readme File )(link)

**Titan Trek (in development)**

**Icy Trek (in development )**

**CIMS work with Irma to set this up.**

**Change in F&P pages**

# Move Preliminary Fields and Particles and Auroral Schedules to help find data at the planned observation dates t0 the top on Data Search Tools

**Main Page – Complete**

**Cassini Instrument Comparison Page –Complete**

**Commonly Used Resources and Tools for Cassini Data**

Periods when Cassini is within 10 Rs (XLSX, TXT) and 15 Rs (XLSX, TXT) **Missing**

 Apoapses (revolution, epoch, period, orbital inclination, range) (XLSX, TXT)

 Periapses (revolution, epoch, latitude, phase, period, range) (XLSX, TXT)

 Ring Plane Crossing (revolution, ascending, or descending epoch, range) (XLSX, TXT)

 Dust Crossings (revolution, target, epoch) (XLSX, TXT)

 Dust Hazards (revolution, event, epoch) (XLSX, TXT)

 Conjunctions (revolution, time) (XLSX, TXT)

See the following on our on-line main Cassini page and make links

Apoapses (revolution, epoch, period, orbital inclination, range) (xlsx, txt)

Periapses (revolution, epoch, latitude, phase, period, range) (xlsx, txt)

Ring Plane Crossing (revolution, ascending, or descending epoch, range) (xlsx, txt)

Dust Crossings (revolution, target, epoch) (xlsx, txt)

Dust Hazards (revolution, event, epoch) (xlsx, txt)

Conjunctions (revolution, time) (xlsx, txt)

 Bowshock and Magnetopause Crossings (XLSX, TXT) **Missing**

 Apoapse Table contains epoch, period, orbital inclination, and range (XLSX, TXT)

# Cassini Spacecraft Events and Configuration Information

# CAPS Articulation Periods Missing

# CDA Articulation Periods Missing

# Remove space above Tab-Delimited Data

# RWA Rates and Accelerations Missing

# Rolling Spacecraft Periods Missing

# Doppler and Range Tracking Data Missing

# Data Utilization per Mission Phase: Prime, XM, XXM There is evidence that the first 2 existed and were posted on a Cassini page

# -------------------------------------------------------------------------

# Cassini Saturn Planet and Atmosphere Science

**Saturn Atmosphere and Interior Sections in Cassini Mission Final Report**  **Still to be released**

**Table of Time Periods with Saturn-Focused Observations Segment Times, Movies, Legacy Packages and Visualizations We are working this table separately**

Saturn Data Resources

**How does the event calendar get populated?**

**The Tour Atlas is set up for Saturn –check these against information available on the page. How does the Tour Atlas get set up for Saturn?**

**Saturn Flyby Information and Science Summaries [TXT] weird text format**

**Table of Time Periods with Saturn-Focused Observations Segment Times, Movies, Legacy Packages and Visualizations We are working this table separately**

## Saturn Formation and Evolution

Saturn Segment Table

**Also available to download as [XLSX] or [CSV] Link as in Saturn Data Resources**

**Table of Time Periods with Saturn-Focused Observations Segment Times, Movies, Legacy Packages and Visualizations This is the short table – the spacing is too wide.**

## Interior Fundamentals

Saturn Segment Table

**Also available to download as [XLSX] or [CSV]** **Link as in Saturn Data Resources**

Table of Time Periods with Interior Observations Segment Times, Movies, Legacy Packages and Visualizations t**his is the short table – the spacing is too wide.**

## Gravity and Other Fundamental Parameters

**Table of fundamental parameters Remove this line**

**Table of Fundamental Parameters for Gravity Studies Remove this line**

## Shape of Saturn

Saturn Shape Data

 SPICE Ellipsoid **missing**

 Legendre polynomial expansion **missing**

 Winds at 1 bar **missing**

## Rotation Rate

## Atmospheric Properties

Saturn Segment Table

**Also available to download as [XLSX] or [CSV]** **Link as in Saturn Data Resources**

## Vertical Pressure and Temperature Structure

Vertical Pressure and Temperature Structure Data

**The following are missing and need formatting**

 **Thermal Maps (CIRS)** - Constructed using CIRS data; including temporal variation.

 **Upper-Atmosphere Density Profile** - UVIS profiles; one per occultation.

  **Lower-Atmosphere Density Profile** - RSS profiles; one per occultation.

 Analysis of VIMS Occultations

## Composition

## Zonal and Meridonial Temperature Fields

**Thermal Maps Missing**

## Clouds and Haze: Zonal Structure and Properties

## Seasonal Variation of Atmospheric Properties

## Global Circulation and Dynamics

**Also available to download as [XLSX] or [CSV]** **Link as in Saturn Data Resources**

## Zonal Winds

**Wind Data**

 **Zonal Winds vs. Latitude (ISS) Missing**

 **Zonal winds at 60-250 mbar Missing**

 **Zonal winds at 350-500 mbar Missing**

 **Zonal winds at 20 bar Missing**

## Global Circulation and Convection

## Seasonal Variation of Global Circulation and Dynamics

## Polar Regions

## 2010-2012 Great Storm

## Auroral Observations

## Event Calendar not populated

Auroral Observation Reference Tables

**Detailed schedule for 2013 joint Cassini - ground-based Auroral Campaign (xlsx, txt) missing**

Processed data

 **UVIS Auroral Guidebook with images and movies missing**

 **Aurora Observation Data Book from UVIS missing**

Reference Data

Event Calendar populated

Segment Table

**Also available to download as [XLSX] or [CSV]** **Link as in Saturn Data Resources**

## Ionosphere and Magnetic Fields

Interior Magnetic Field Data

 Magnetic Field Moments **Missing**

**----------------------------------------------------------------------**

# Cassini Rings Science (green comments are from Mike Evans)

Overview

**The Saturn's Rings Sections in Cassini Mission Final Report** summarizes the status of Saturn's rings, in 2018, as a result of Cassini exploration of the Saturn system. It also includes open questions that will be explored by future scientists. **This has not been released**

Mission Objective

Ring Property Summary Table

Key Publications

Finding Ring Data

Instruments

These instruments were used to study Saturn's ring system.

**SAR** mapping, scatterometry, altimetry data using active RADAR, radiometry data to measure ring temperature

This item wasn’t in the Ring archiving list. I’ll check to see if Mitch has had any interaction with the RADAR team about it

Data Search Tools

Searching by Parameters:

**CIRS Rings Observation Database**

**Mitch has this listed as “CIRS database extract ~1GB, (PDS saved, not archived status)”. Which I think means that we have it but not in a condition that’s fit for public release.**

Searching by Mission Events:

Jovian Ring Observations:

 Jovian Ring Observations **This links to a page of ours that we should update** during the Cassini Jupiter flyby spanned the interval from September 26, 2000 to January 15, 2001.

Browsing raw data:

Higher Order Derived Data

 Ring Occultation Data: Radial Profiles at 1km and 10km and Occultation Geometries.

 There were three instruments on Cassini that routinely made ring occultation observations - RSS, UVIS and VIMS. There are also a small number of CIRS occultation observations that are not archived at the Ring-Moon Systems Node. CIRS could only detect two stars, Eta Carinae and CW Leo, so ring occultation opportunities were severely limited. For RSS, ring occultations occur when radio transmissions from the spacecraft to the Earth pass through the rings. For UVIS & VIMS ring occultations are when light from a star (including the Sun) passes through the rings before reaching the spacecraft i.e. the star is "behind the rings".

 Radial Brightness Profiles

  **ISS**

**I don’t think that we have these yet. They got put to the end of the queue because Matt Tiscareno is actually at the RMS node.**

 **VIMS Cubes**

**We have these but not PDS4 compliant**

 **ISS Faint Ring Profiles**

**We have 3 ISS radial profiles of the faint rings(2) and bright rings (1). I’ll check on their status.**

 **Radially Filtered ISS Images**

**Apparently we either have or are expecting “several hundred radially filtered, ISS ring observations”. I’ll check on their status.**

Ring Occultation Atlas: A list of planned Ring Occultation observations from UVIS, VIMS, ISS, and CIRS.

I’m pretty sure this was something Andrea Connell was putting together. I’ll ask.

Supplemental Reference Documents

 **Observation Notes for VIMS Activities**: A few brief notes made by Phil Nicholson for some of the VIMS observations he was personally responsible for.

I have these somewhere. I’ll dig them out.

 **CIRS Rings Target Notebook**

**I’ll bug Shaun Brooks and Scott Edgington about this**

 Planning products: These can provide some context for observations from the science planning point of view. These are the work product of the relevant Target Working Team (TWT) at the end of the process that allocates time and data volume to individual science observations.

 Time-Ordered Listings (TOLs) **Rings Cross-Discipline (XD)**

 Graphical Timelines **Rings Cross-Discipline (XD)**

 Sequence Handoff Packages **Rings Cross-Discipline (XD)**

**Set this up as**

Time-Ordered Listings (TOLs) **,** Graphical Timelines and Sequence Handoff Packages

**Rings and link** <http://astrosun2.astro.cornell.edu/~mwe/cassini_rings_www>

**Cross-Discipline (XD)** <http://astrosun2.astro.cornell.edu/~mwe/cassini_xdtwt_www>

Analyzing Ring Data

Software Tools

 **Saturn Geometry Analyzer**

**Hmm, another item that I can’t figure out. I’d initially thought that its Marks Saturn Viewer but that a separate item lower down.**

 **CASVU Image Analysis Tool**

**This isn’t quite ready to go on the planetary GitHub yet**

 BEAM Monte Carlo Radiative Transfer Code: A Monte Carlo based Radiative Transfer/Ray Tracing code written in Fortran 90, with a few utility scripts written in python and R.

 **RSS Ring Occultation Data Analysis Tool:** A suite of Python-based analysis tools for Cassini Radio Science (RSS) ring occultations.

This is on the planetary GitHub https://github.com/NASA-Planetary-Science/rss\_ringoccs

 Saturn Viewer: A web based visualization tool that shows the appearance of the Saturn system as seen from a specified observation point at a defined time.

 Digit is a web-based visualization tool for Cassini geometry and trajectory.

SPICE examples

**Examples** showing segments of SPICE code (in multiple languages - FORTRAN, IDL and maybe C) that perform rings type calculations.

 Frame transformations (J2000 to a planet's ring frame)

 Boresight ring frame intercept radius/longitude, etc.

 How to go from a line/sample pixel location in an ISS image to a ring radius longitude location

 Ring Model from planning tools

Yes, this is something that I’m responsible for producing and have let slide. I’ll make an effort to get it done.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# Cassini Magnetospheric Science

# The Cassini mission addressed each of these initial science objectives. As is typical in scientific investigations, the process of answering questions typically creates new unanticipated questions. A summary of the key Magnetospheric Science objectives updated over the course of the mission can be found in Volume 1 of the Cassini Mission Final Report. Not yet released

# The following PDFs describe the magnetospheric science performed during various phases of the mission, along with some associated journal references:

#  Interplanetary cruise phase [DOCX] [PDF]

#  Jupiter science [Scott E to provide]

#  Saturn-approach science [DOCX] [PDF]

# Magnetosphere Data

# Internal Magnetic Field Models

# Geometry and Event Information

# Tour Atlas

# The Cassini Tour Atlas Is this the latest? provides geometric parameters for the entire mission. The Tour Atlas provides various geometric parameters (range, latitude, longitude, etc.) referenced to Saturn, Titan and the icy satellites in 5-minute and 1-hour time steps.

# Mission Events

# A complete list of mission events related to magnetospheric studies is available in PDF or in XLSX format.

# Saturn Geometry and Events Check the following against the Saturn page

#  The Saturn atmospheres page has a more in-depth Aurora Section

#  Apoapse and Periapse (aka Apokron and Perikron)

#  Near Saturn within 20Rs, 18Rs, 15Rs, or 6Rs

#  Sun-Cassini-Saturn Angle of less than 15 Degrees or 12 Degrees

#  Full Saturn Tour Geometry in 5 Minute or 1 Hour Intervals

# Titan Geometry Check the following against Titan page

# Local times vs altitude plots for T1-T44 [PDF]

#  Local times vs altitude plots for T45-T70 [PDF]

#  Local times vs altitude plots for T71-T126 [PDF]

# Close flyby Times, Details, and Summary Plots

#  Sun-Cassini-Titan Angle of less than 15 Degrees or 12 Degrees

#  Full Titan Tour Geometry in 5 Minute or 1 Hour intervals

# Icy and Rock Satellite Geometry Check the following against Icy Satellite page

#  Close flyby Times, Details, and Summary Plots

#  Distant (100K km < r < 1M km) flyby Times and Summary Plots

#  Close and Distant rock flyby times

#  Full Mimas Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Enceladus Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Tethys Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Dione Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Rhea Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Hyperion Tour Geometry in 5 Minute or 1 Hour intervals

#  Full Iapetus Tour Geometry in 5 Minute or 1 Hour intervals

# Events

# Preliminary Fields and Particles and Auroral Schedules to help find data at the planned observation dates t0 the top on Data Search Tools Add this

# The Event Calendar helps to search for discrete events such as icy satellite and Titan flybys, periapses, apoapses, etc. The tool also allows one to search on several types of magnetospheric events identified by science data analysis and provided by the magnetospheric science community. The Searchable Calendar can be used to find the timing of certain observations that were executed on Cassini, such as remote sensing aurora observations.

# Higher Order Products

# Reference Tables to Help Find Data

# The tables below cross-reference time and date stamps to events important to the analysis of field and particle data. This data is also available in the Event Calendar.

# Magnetosphere Crossing Time Tables

#  Apoapse Table contains epoch, period, orbital inclination, and range ( XLSX, TXT)

# Orbit Plots and Time Tables

# Periods when Cassini is within 10 R s ( XLSX, TXT) and 15 R s ( XLSX, TXT)

#  The Master Schedule contains time references to a variety of mission events.

# Auroral Observations

# Software to Help Find Data URLs and contact Person specified

# Analyzing Data

# Plotting Software

# .

#  JCSN

#  RPWS trajectory plotting

#  Autoplot derivative

# Analysis Support Information

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Cassini Titan Science

**Overview**

  **Titan Sections in Cassini Final Mission Report in preparation**

**Mission Objectives**

**Titan Data**

**Data Search Tools**

**Searching by parameters**:

**Searching by surface map:**

 **Titan Trek** **in preparation**

**Searching by mission events:**

 The Event Calendar helps **search for Titan observations**

**Documentation and Orientation**

 **Narrative from the Cassini Titan mission reps**

**Templates (& Engine/Caboose Templates) Description**

 One-page summary of all flybys

 Legend for the one-page summary

 Titan Flyby Table, **including:**

 **Master Timelines**

 Prime Mission Flybys (T0-T44)

 **Equinox (XM) Mission Flybys (T45-T70)**

 **Solstice (XXM) Mission Flybys (T71-T126)**

 **Non-Targeted and Grand-Finale Flybys**

 Master Timeline Legend

 Tour Atlas

 **Groundtrack Phase and Altitude Plots**

 **Basic Data Plots (phase, distance, body plots, etc.)**

 **Other flyby information**

 RADAR SAR Flyby Summaries for Each RADAR Flyby

 As flown SPASS for Titan Observations

Instruments Used to Study Titan with Links to Data

 VIMS Powerpoints (e.g. T126\_VIMSobservations.pdf, Whole Set (130 MB))

 ISS Data Processing Strategies and surface-study idiosyncrasies

 CIRS Instrument and Titan-specific Guidebook

 CIRS Sequence Notes (S59-S101, other sequences if time available)

 **CIRS Titan Target Notebook**

 **UVIS Titan EUV/FUV Book Find these on the UVIS page**

 **UVIS Saturn and Titan Occultation Atlas and Data Book Find these on the UVIS page**

**Reference Tables to Help Find and Understand Data**

**Titan geometry**

 Close flyby Times, Details, and Summary Plots

 Sun-Cassini-Titan Angle of less than 15 Degrees or 12 Degrees

 Full Titan Tour Geometry in 5 Minutes or 1 Hour intervals

**Titan Interior**

.

**Key Publications**

**Titan Interior Data**

From RSS (Radio Science Subsystem):

 **Final Global Products**

 Preliminary RSS Flyby Summary (plus supplementary information) [PDF]

From RADAR:

 Titan Global Shape Model contains a variety of different models for the global shape of Titan obtained by interpolation or by least-squares fitting to RADAR altimetry and SARTopo data.

From MAG (Magnetometer): This is not linked to the MAG page –but to an RSS page

 TBD

**Titan Surface**

**Key Publications**

**Individual publications:**

**Titan Surface Data**

**Search tools**

  **Titan Trek In Preparation**

 PILOT to find ISS and VIMS data in the context of Titan's surface map (data through

**High-level Derived data products**

From VIMS (Visual and Infrared Mapping Spectrometer):

 **VIMS Map Mosaic**

 **VIMS Specular Reflection List [PDF] [CSV] [XLSX]**

From ISS (Imaging Science Subsystem):

 ISS Map Mosaic

 Another ISS Map Mosaic

 **ISS Map Mosaic with Latitude and Longitude lines This is linked to Photo Journal**

From RADAR:

 **Geologic Maps** (a.k.a Geomorphologic Maps) of Titan are derived from SAR and HiSAR swath mosaics, and where these are not available, from global radiometry and ISS global mosaics. The maps show the major geomorphologic classes of Titan (Craters, Mountains, Labyrinths, Plains, Dunes, and Lakes) as described in Malaska et al., (2016) (DOI: 10.1016/j.icarus.2016.02.021). These maps are available as registered GeoTIFFs ready for installation in GIS programs.

 **Radiometer Maps include** data from pole-to-pole scans and are tabulated in time ordered tables of point-by-point of brightness temperature and other parameters. Residual maps interpolated on a regular grid in cylindrical coordinate are also included.

 **RADAR - SAR Images** from each flyby are derived from Cassini RADAR Basic Image Data Records at 256 pixels/degree. These versions have had systematic biases due to thermal and quantization noise, and systematic variation due to incidence angle have been removed. For more information on this process, see the User's Guide.

From RSS (Radio Science Subsystem):

 **TBD**

 **RSS Bistatic surface information Rob to supply new RSS page**

**Other high-level Derived data products**

 **Titan Surface Nomenclature Map**, showing positions of named features

**Huygens Lander on Titan**

* From Huygens: The Top 10 Discoveries at Titan

**Huygens Data and Related Cassini Orbiter Data**

 Search for Huygens data at the **ESA planetary science archive** by selecting Huygens from the MISSIONS menu on the left and then pressing the magnifying glass icon at the bottom left

 Search at the **PDS Atmospheres Node Mirror Site**  **link to** <https://atmos.nmsu.edu/data_and_services/atmospheres_data/Huygens/Huygens.html>

 **Huygens Data Gazeteer [PDF]** is a guide to the Huygens datasets and the literature in which they are discussed.

 **Cassini Data Relevant for Comparison with the Huygens Probe [PDF]** summarizes the Cassini data most relevant for comparison or context-setting of the Huygens probe.

 **Data Files and Information [ZIP]** which support the above PDF

**Key Publications**

**Titan Atmosphere**

**Key Publications**

**Individual publications:**

 Hayes et al., A post-Cassini view of Titan's methane-based hydrologic cycle, Nature Geoscience volume 11, pages306–313 (2018) (DOI: 10.1038/s41561-018-0103-y)

 Hörst, S. M., Titan's atmosphere and climate, Journal of Geophysical Research: Planets, Volume 122, Issue 3, pp. 432–482 (2017) (DOI: 10.1002/2016JE005240)

**Titan Atmosphere Data**

**Search tools:**

 Event Calendar can be used to find data related to flybys of Titan

 OPUS is one way to find data

**The instruments used to study Titan's atmosphere, grouped by study topic, were:**

**High LevelData Products by Instrument**

Cross-instrument:

From INMS (Ion and Neutral Mass Spectrometer):

From RSS (Radio Science Subsystem):

 RSS Occultation List [PDF]

 RSS Example Graphic [PDF]

 RSS DSN Elevation Angle [PDF]

 **RSS Observation Book**

 RSS Occultation Summary

From UVIS (Ultraviolet Imaging Spectrograph):

  **UVIS Solar & Stellar Occultation Summary**

From VIMS (Visible and Infrared Mapping Spectrometer):

 VIMS Solar Occultation List

 VIMS Stellar Occultation List

 VIMS Occultation Summary

 **VIMS Observation Book**

**Observation High-Level Data Products**

 Cloud observation summaries performed by ISS (Visible Camera) and VIMS (Visible and Infrared Spectrometer)

 TAMWG

 **UVIS Titan EUV/FUV Book**

 **Titan Hybrid Simulations (INMS)**

**Titan Magnetospheric Interactions**

**Key Publications Spacing on web page needs fixed**

 Several chapters from the Titan book published in 2009 provide useful background on Titan’s ionosphere and interaction with Saturn’s magnetosphere. They include chapters 8 (Waite), 11(Cravens) and 16 (Sittler).

 Brown, R., Lebreton, J. P., & Waite, H. (Eds.). (2009). Titan from Cassini-Huygens. Springer Science & Business Media.

 A number of key references attempted to categorize each Titan flyby according to the magnetospheric environment at the time of the flyby:

 Rymer, A. M., Smith, H. T., Wellbrock, A., Coates, A. J., & Young, D. T. (2009). Discrete classification and electron energy spectra of Titan's varied magnetospheric environment. Geophysical Research Letters, 36(15).

 Simon, S., Wennmacher, A., Neubauer, F. M., Bertucci, C. L., Kriegel, H., Saur, J., ... & Dougherty, M. K. (2010). Titan's highly dynamic magnetic environment: A systematic survey of Cassini magnetometer observations from flybys TA–T62. Planetary and Space Science, 58(10), 1230-1251.

 Simon, S., van Treeck, S. C., Wennmacher, A., Saur, J., Neubauer, F. M., Bertucci, C. L., & Dougherty, M. K. (2013). Structure of Titan's induced magnetosphere under varying background magnetic field conditions: Survey of Cassini magnetometer data from flybys TA–T85. Journal of Geophysical Research: Space Physics, 118(4), 1679-1699.

 Review papers

 Coates, A. J. (2009). Interaction of Titan's ionosphere with Saturn's magnetosphere. Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences, 367(1889), 773-788.

 Bertucci, C., Duru, F., Edberg, N., Fraenz, M., Martinecz, C., Szego, K., & Vaisberg, O. (2011). The induced magnetospheres of Mars, Venus, and Titan. Space science reviews, 162(1-4), 113-171.

**Titan Magnetosphere Data**

 **Search tools**

 WebGeoCalc

 **Reference tables and charts**

**High-Level Data Products by Instrument**

From CAPS (Cassini Plasma Spectrometer):

From INMS (Ion and Neutral Mass Spectrometer):

From MAG (Magnetometer):

 **MAG Data in Titan-Centered Coordinates**

**Magnetosphere models and other high-level data products**

**Analyzing Titan Data**

**Software tools and publications related to the analysis of data on Titan. (TBD)**

**Key Publications**

**TBD**

**Data Analysis Guides and Tools**

 **Cassini ISS Titan Imaging Strategy and Surface Image Processing Guide**

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Cassini Icy Satellites, Enceladus, and Other Moons

# Icy Satellites Sections in Cassini Mission Final Report not yet released

## Icy Satellite Data

# Data Search Tools

#### Searching by surface map

# Icy Trek in development

# Searching by mission events: The following belongs here but needs reworded

#  Event tables exist for all observations of the small icy satellites. It may be downloaded as a Single File (CSV) combining all of the small satellites.

# Icy Trek in development

# Reference Tables and Graphics to Help Find and Understand Data

# Cassini Sequence List with Icy Satellite Observations Descriptions Sequence Time, Descriptions, Planning Timelines and Targets when you click on an entry in this table and return it comes back to the icy satellite page instead of the table.

# Documentation and Orientation

# Icy Satellite Observation Data Book See UVS page for links to individual tables

# Atmospheres of Saturn Moons

# Moon Atmosphere Data

#  List of Satellite Stellar and Solar Occultation observations Missing

# Table Bistatic Occultations, Enceladus plumes, are missing

# Clean flyby tables later

## Interiors of Saturn Moons

# Clean flyby tables later

# The following does not belong – it is a file of small moons and Phoebe

# Event tables exist for all observations of the icy satellites. It may be downloaded as a Single File (CSV) combining all of the satellites, or on a per-satellite basis in the sections below.

# Studying the Magnetospheric Interactions of Icy Satellites

# The following does not belong – it is a file of small moons and Phoebe

# Event tables exist for all observations of the icy satellites. It may be downloaded as a Single File (CSV) combining all of the satellites, or on a per-satellite basis in the sections below.

# Surfaces of Icy Satellites

### Surface Data and Maps VIMS, UVIS, and Radar maps missing and Flyby Tables need cleaned up

# The following does not belong – it is a file of small moons and Phoebe

# Event tables exist for all observations of the icy satellites. It may be downloaded as a Single File (CSV) combining all of the satellites, or on a per-satellite basis in the sections below.

# CIRS Icy Satellite Target Notebook missing

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Cassini Jupiter Science

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Cassini CIRS: Composite Infrared Spectrometer

# Selecting Data Products

# Target Notebooks

# Rings Missing

# Titan Missing

# Saturn Missing

# Icy Satellites and Other Moons

Users can find specific observations in the **Cassini Information Management System (CIMS) Catalog** of observations. CIMS provides the date and time of acquisition of the instrument observations, which can then be used for cross-referencing the archived raw data products**. I’ve got to figure out how to use this**

**Atlas of coverage plots Missing**

Other documents that might aid in the interpretation of CIRS data include:

 **Data Product Software Interface Specification Document - Need to link SIS**

 **Reaction Wheel Assembly (RWA) Interference Plots - Missing**

 **Thermal Analysis Plots - Missing**

 **Data Processing/Calibration Routines - Missing**

 **Vanilla Source Code – I think CIRS is submitting a final version**

 **CIRS Trend Analysis Reports – Missing**

# Cassini ISS: Imaging Science Subsystem

ISS Data

Data Search Tools

**Master Schedule link**

**Titan Trek (in production)**

Processed Data Products

**Hyperion ISS Map Mosaic Missing**

**Mimas ISS Map Mosaic Missing**

**Phoebe ISS Map Mosaic Missing**

## Analyzing ISS Data

**CISSCAL** is the official calibration software for ISS data. **Calibration Documentation** for ISS data is also available.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# Cassini UVIS: Ultraviolet Imaging Spectrograph

Browse Raw Data Products

**Archive Links** - **This links to a page taken from our old on-line page – Get links for the following from the following on that page**

Chronological Indices of Specific targets

(comma separated text files)

Earth & Venus Flyby Index

Jupiter Flyby Index

Io Flyby Index

Saturn Index

Saturn Rings Index

Titan Index

Icy Satellites

Small Satellites

Solar Wind Index

Calibration Index

Star Index

Sun Index

Unknown Target Index

N/A Target Index

Derived Data Products

UVIS Rings Occultation Profiles

Selecting Data Products

The UVIS team has provided a number of archive products that provide detail on the many UVIS observations taken during the course of the Cassini mission. These archive products are listed below.

 Ring Spectroscopic Observation Data Book **Huge leave as is**

 **Ring Solar Occultation Atlas and Data Book**

<https://atmos.nmsu.edu/~itrejo/Cassini-Help-Pages/CASSINIUVIS/UVIS-14/Ring%20stellar%20and%20solar%20occultation%20atlas%20and%20data%20book/Solar%20Occulatation%20Atlas/>

 **Ring Stellar Occultation Atlas and Data Book**

[**https://atmos.nmsu.edu/~itrejo/Cassini-Help-Pages/CASSINIUVIS/UVIS-14/Ring%20stellar%20and%20solar%20occultation%20atlas%20and%20data%20book/Stellar%20Occultation%20Atlas/**](https://atmos.nmsu.edu/~itrejo/Cassini-Help-Pages/CASSINIUVIS/UVIS-14/Ring%20stellar%20and%20solar%20occultation%20atlas%20and%20data%20book/Stellar%20Occultation%20Atlas/)

 **Saturn Occultation Atlas and Data Book See “files to link” folder**

 **Titan Occultation Atlas and Data Book See “files to link” folder**

# Cassini VIMS: Visual and Infrared Mapping Spectrometer

VIMS Data

Data Search Tools

The **Master Schedule** **Link to our page**

 The Event Calendar is **is** an interactive event-finding tool that can be used to search for data associated with particular events.

 Catalogs of **VIMS Stellar Occultation Observations missing** and **Solar Occultation Observations** **missing** are available. They include information on the latitudes and ranges of Titan and Saturn occultations, as well as the radial coverage and opening angle of ring occultations ????????

Browse Raw Data Products

Processed Data Products

**Occultation Geometry missing**

Plots showing the occultation geometry for each observation are available.

# Cassini RADAR: Radio Detection and Ranging

About RADAR

A more comprehensive list of the science objectives pursued by RADAR is provided in the **Cassini Mission Final Report. Not yet available**

RADAR Data

Data Search Tools

**The Master Schedule link to our page**

 **Titan Trek (under development)**

 **The table of RADAR Observations (XLSX, TXT)** lists the dates and targets of all RADAR observations. **missing**

 **Pass-by-Pass Design Details** **(under development)**

Processed Data Products

**Titan Trek (under development)**

**RADAR Beam 3 Only SAR** **(under development)**

**RADAR Digital Map not yet available – See email from Lisa Gaddis** observation sequences and for multiple map quadrangles.

# Cassini RSS: Radio Science Subsystem

# From Andrea Connell Oct 16 2018

Shahen has been out sick for a little while, so we are still waiting on the RSS input. I'm hoping we'll have it by the end of the week.

Andrea

# CAPS: Cassini Plasma Spectrometer

# CAPS Data

# Data Search Tools

# Browse Uncalibrated Data Products on PDS

# How uncalibrated data is organized:

# Browse Calibrated Data Products on PDS

# How calibrated data is organized:

# Processed Data Products

#  Time-Ordered PNGs at 1 hour, 6 hour, and 1 day increments missing

#

# Selecting Data Products

# Images contains available geometric event information. missing

# List of Times contains information about when CAPS was operating at a high data rate. Link to CAPSrates folder in CAPS folder in Files to Link folder

#  Users can find specific observations in the Cassini Information Management System (CIMS) Catalog of observations. I have to figure out how to present this

# Analyzing CAPS Data

#  Lab Calibration Studies for NH4+, singles vs coincident rates for lower energies, HCN+, NO+ for C/N and N/O efficiencies ratios in LEF. Missing

#  Calibration Documentation and Data describes how to calibrate CAPS data and provides examples. This will be needed for users who download the uncalibrated CAPS data. Missing

#

# Cassini CDA: Cosmic Dust Analyzer

# CDA Data

# Data Search Tools

# The Master Schedule link to our page

# Processed Data Products

#  An extensive set of Mass Spectra Missing

#  Particle Speed, Mass, Pointing, Likelihood of Where Particles are Coming from Missing

#  Analyzing CDA Data all analysis files are missing

# IDL Package

#  Data Processing Descriptions

#  Instrument State History

#  Engineering History

#  Science Planning History

#  Commanding Data

# Cassini INMS: Ion and Neutral Mass Spectrometer

# INMS Data

# Data Search Tools

# Processed Derived Data Products

#  Titan Hybrid Simulations Missing

#  Titan Neutral and Ion Density Profiles Missing

# Selecting Data Products

# Users can find specific observations in the Cassini Information Management System (CIMS) Catalog of observations. CIMS provides the date and time of acquisition of the instrument observations, which can then be used for cross-referencing the archived raw data products. Still to implement

# Analyzing INMS Data

# .User's Notes for inner magnetosphere, Enceladus, and proximal orbit data Missing

#  Summaries of Algorithms used to calibrate and process data Missing

# Cassini MAG: Magnetometer

# MAG Data

# Data Search Tools

# The Master Schedule link to our page

# Calibrated Data

# Uncalibrated MAG Data

#  Uncalibrated Magnetometer Data is available on the PDS Planetary Plasma Interactions node. The MAG User Guide also provides a detailed description of the calibration procedure. Calibration files and software tools to perform the calibration are also described in the User Guide and provided on PDS.

# Processed Derived Data Products

# Data in moon-centered coordinates for all targeted moon flybys, including the magnetic field components and magnitude, spacecraft trajectory vector, and distance. All the following are missing

#  Titan

#  Enceladus

#  Dione

#  Rhea

#  Tethys

#  Iapetus

# Model outputs of magnetic fields in the Saturnian magnetosphere and around Titan and Enceladus: All the following are missing

#  Saturn Magnetosphere Model

#  Titan Induced Magnetosphere model

#  Enceladus Environment Model

#  Phase Models for the Magnetic Field Oscillations

#  SKR Phase Models

# Complete set of Conjugate Maps of Cassini spacecraft in the Saturnian magnetosphere, based on an empirical magnetosphere model.

# All the following are missing

# Selecting Data Products

# Bow Shock and Magnetopause Crossings

# Injection Events Into the Inner Magnetosphere

# Targeted Moon Flybys

# Users can find specific observations in the Cassini Information Management System (CIMS) Still for me to set up Catalog of observations. CIMS provides the date and time of acquisition of the instrument observations, which can then be used for cross-referencing the archived raw data products.

# Analyzing MAG Data

#  A Software Package is available to view and download MAG data. missing

#  The data can be plotted and analyzed using the Cassini Multi-Instrument Plotting software. missing

# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

#  MIMI

# MIMI Data

# Data Search Tools

# The Master Schedule link to our page

#  Preliminary Fields and Particles and Auroral Schedules to help find data at the planned observation dates

# INCA Calibrated Data

# Movies, which display averaged ENA image skymaps.

#  INCA Image Files, in differential intensity for a combination of resolution, species and energy value Ask Joe Mafi if he has these

# Calibrated Full Resolution Data in Physical Units

#  CHEMS Rate Channels, including PHA-based rate channels

#  LEMMS Rate Channels

# Pitch Angle Plots and Data

#  LEMMS

#  INCA image pixel pitch angle values for a combination of resolution, species and energy value.

# Selecting Data Products

#  MIDL - a cross-platform universal data access program for MIMI data

#  Table of all PHA Events for LEMMS and CHEMS

#  Users can find specific observations in the Cassini Information Management System (CIMS) Catalog of observations. This is my problem CIMS provides the date and time of acquisition of the instrument observations, which can then be used for cross-referencing the archived raw data products.

# Analyzing MIMI Data

# Data Reduction and Analysis Software

# Calibration Details:

#  LEMMS Dust Response Calibration Report

#  LEMMS Detector Backgrounds

#  INCA Flat Fielding Functions

#  INCA HV History

#  Updates Based on Instrument Aging

# Instrument State History and Science Design

# SPICE Metakernel enables users to calculate spacecraft and instrument position relative to Saturnian bodies.

# Ancillary Data:

#  Gaps in Attitude and ephemeris data

#  Gaps in INCA, LEMMS, and CHEMS Science Data

#  Mode Changes for INCA (ion vs neutral mode)

#  INCA Calibration State

#  MIMI Spin Mode

# RPWS

# Search-for and Filter Raw Data

# Browse Data Products

# Selecting Data Products

# Users can find specific observations in the Cassini Information Management System (CIMS) Catalog my problem of observations. CIMS provides the date and time of acquisition of the instrument observations, which can then be used for cross-referencing the archived raw data products.

# Note: Unlike other instruments, CIMS does not represent the exact mode or timing of the modes of the RPWS observations. See the Sequence Information below for the actual as-flown commanding.

# Sequence Information

# Analyzing RPWS Data

# Analysis Tools