



Planetary Data System

How to Get SELENE/Kaguya Data: Terrain Camera

NASA PDS Imaging Node

Lisa Gaddis (USGS) and Susan LaVoie (JPL)





Planetary Data System

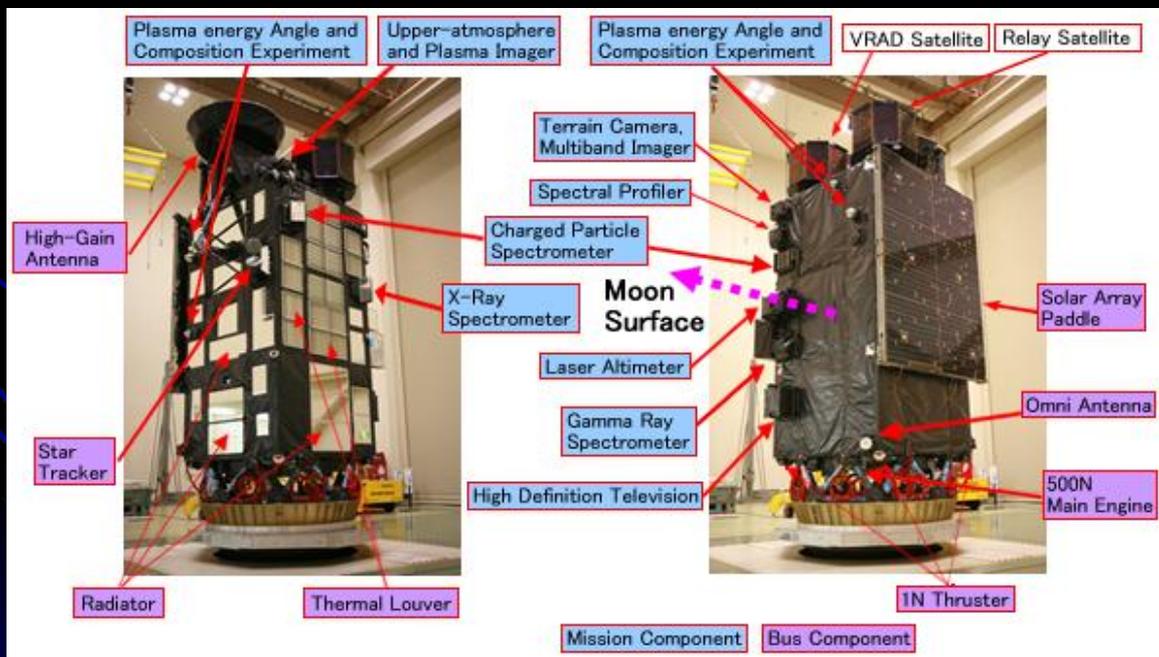


- *SELENE "Kaguya"*
 - The **SELE**nological **EN**gineering **E**xplorer
 - Japanese Aerospace Exploration Agency (JAXA) mission to the Moon
 - Launched on September 14, 2007
 - Lunar impact on June 10, 2009
 - Main orbiting satellite at ~100 km altitude & two smaller satellites with 11 scientific instruments in polar orbit
 - Major Products:
 - Global topographic map of the Moon
 - Geophysical and compositional data and discoveries
 - Global BxW and color mosaics
 - Far side gravity field



Planetary Data System

- *SELENE Kaguya's 11 Science Instruments*
 - Engineering instruments
 - Optical remote sensing instruments, Laser Altimeter
 - Plus
 - High Definition TV Camera
 - Two mini-satellites for gravity studies





- *SELENE Kaguya's 11 Science Instruments:*
 - **Optical remote sensing:**
 - LISM: Terrain Camera (**TC**), Multiband Imager (**MI**), Spectral Profiler (**SP**)
 - X-Ray spectrometer (**XRS**)
 - Gamma ray spectrometer (**GRS**)
 - Upper Atmosphere and Plasma Imager (**UPI**)
 - **Active remote sensing:**
 - Lunar Radar Sounder (**LRS**)
 - Laser Altimeter (**LALT**)
 - **Space environment sensors:**
 - Lunar Magnetometer (**LMAG**)
 - Charged Particle Spectrometer (**CPS**)
 - Plasma energy Angle and Composition Experiment (**PACE**)
 - **Plus:**
 - High Definition TV Camera
 - Two mini-satellites for gravity field measurements
 - Okina (relay satellite or RSAT)
 - Ouna (differential VLBI radio source or VRAD)



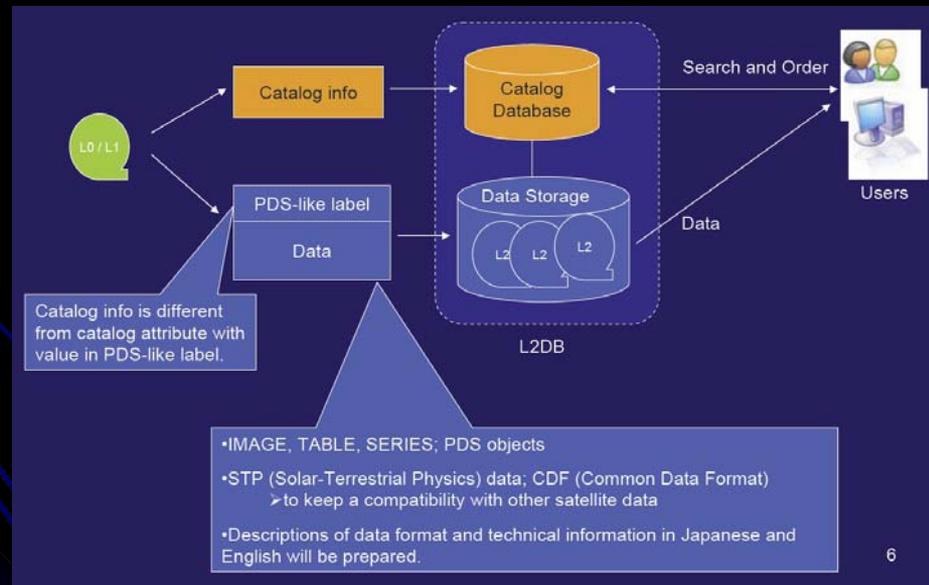
- *SELENE "Kaguya" Data Archive*
 - **Data release status**
 - Level 2 (L2) products available for **nominal period of operation:**
 - *Dec 21, 2007 to Oct 31, 2008*
 - L2 products for **extended operations phase** are scheduled to be released when processing, calibration a& validation are completed
 - *Nov 1, 2008 to June, 2009*
 - L2 products are **calibrated & validated data** in PDS-compatible formats
 - Some image products are available in map-projected formats suitable for ingestion with GIS tools
 - Raw data are not available through the archive site
 - L2 volume is ~50 TB as of summer, 2010
 - **List of public products:**
 - https://www.soac.selene.isas.jaxa.jp/archive/help/en/KAGUYA_product_list_public_en.pdf
 - **Data Product format description: LISM and SPICE**
 - https://www.soac.selene.isas.jaxa.jp/archive/help/en/LISM-SPICE_Format_en_V01.3.pdf
 - **Data Archive Site:**
 - <https://www.soac.selene.isas.jaxa.jp/archive/index.html.en>
 - Users can search and download L2 data via Web browser



- *SELENE "Kaguya" Data Archive: Terrain Camera*
 - **Data products**
 - **LISM standard products**
 - TC_Morning_MAP
 - TC_Evening_MAP
 - DTM_TCOortho
 - **Higher-level, map-projected products**
 - TCOortho_MAP, TCOortho_MAP_S (special team product)
 - DTM_MAP, DTM_MAP_S
 - DTM_TCOortho_S
 - ***This tutorial provides examples of downloading and simple processing of terrain camera map-projected image mosaics***
 - **Data Product format description: LISM and SPICE**
 - https://www.soac.selene.isas.jaxa.jp/archive/help/en/LISM-SPICE_Format_en_V01.3.pdf
 - **See table 2-1**

- **Kaguya Archive:**
 - **Data processing levels**

Level	outline	format
0	RAW telemetry (VCDU extracted and separated by VCID)	VCDU
1	RAW data (packets depacketized by APID allotted to each instrument and simply calibrated data such as HK data)	CCSDS packet or Any
2	Standard calibrated data, high-level processed data	PDS-like*



See Hoshino et al., 2006

- **Kaguya Archive:**

- **SELENE label is a PDS-like label**
 - Text file
 - Described in Object Definition Language (ODL)
- **Differences between SELENE label from a standard PDS label**
 - Data can be understood by the descriptions of data format and technical information such as 'volinfo.txt' and 'calinfo.txt'
 - Refers to PDS Standards Reference v. 3.5 (not latest version)
 - Required PDS label elements not fully incorporated
 - Product_ID, Instrument_host_name, etc. not included
 - Some unique words not included in PDS Data Dictionary are part of SELENE PDS-like label to improve data accessibility
 - Illumination_condition, etc.



Planetary Data System

- **SELENE/Kaguya Data Archive: Page 1**
- <https://www.soac.selene.isas.jaxa.jp/archive/index.html.en>

A screenshot of the SELENE Data Archive website. The header includes the NASA logo, the text "SELENE Data Archive", and a navigation menu with "Read Me", "Create Account", "Products Format", "FAQ", "Link", and "Japanese". The "Create Account" link is circled in red. The main content area has sections for "Purpose of Data Disclosure", "How to use", and "Information". The "How to use" section contains text about data distribution and a "Data Search" button circled in blue. A circular logo for the "SELENE Project" is also visible. At the bottom, a maintenance notice is dated 2010/07/14.

(1) **Create** an account
(email response takes only a few minutes)

(2) **View** "Read Me"
for information on data usage and disclosure policy

(3) **Click** on "Data Search"
to start the search process



Planetary Data System

● SELENE/Kaguya Data Archive: Page 2

SELENE and Engineering Explorer
SELENE Data Archive

HOME Data Search Order Status Help Logout Japanese

Welcome, Igaddis [Change Account Information](#)

HOME > [Data Search](#)

Data Search

Basic Search Condition

Product Selection (circled in red)

-----The selected product is displayed-----

Product

Product Deletion Product Explanation

Data Range: 2007/09/14 15:39:45 - 2009/06/29 12:08:15
 YYYY / MM / DD hh : mm : ss.sss

Time Range (UT)
 Start [] / [] / [] : [] : []
 End [] / [] / [] : [] : []

Data Range: SN: 90.0/90.0 WE: 0.0/360.0 (deg)

Observation Range
 North [] Degree East [] Degree
 West [] Degree South [] Degree
 Setup Observation Range

Location Flag ALL

Version CURRENT

Search Options

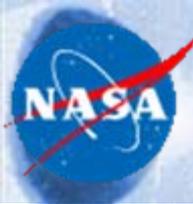
Sort Key File Name Ascending Descending

Number of Display 10

Setup of Advanced Search Options [Advanced Search Options](#)

Search Execution Reset

Click on "Product Selection" to get started identifying desired products



Planetary Data System

● SELENE/Kaguya Data Archive: Page 3

Product Selection Close

Select Products to Search	Determination List
<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> GRS(Gamma-ray Spectrometer) HDTV(High Definition Television) LISM(Lunar Imager/SpectroMeter) LALT(Laser ALTimeter) LISM(Lunar Imager/SpectroMeter) LMAG(Lunar Magnetometer) LRS(Lunar Radar Sounder) </div> <div style="text-align: right; margin-right: 10px;">Add All</div> <div style="margin-top: 10px;">Please choose from sensor list. Add</div> <div style="margin-top: 10px;"> guide </div>	<div style="border: 1px solid #ccc; padding: 5px; min-height: 150px;"> -----The selected product is displayed,----- </div> <div style="margin-top: 20px; text-align: center;"> </div> <div style="margin-top: 10px; text-align: center;"> Determination Reset </div>
<div style="background-color: #0056b3; color: white; padding: 2px;">Search of Keywords</div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <input style="width: 100%;" type="text"/> </div> <div style="margin-top: 5px; text-align: center;"> Search Execution </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> -----The searched product is displayed,----- </div> <div style="text-align: right; margin-right: 10px;">Add</div> <div style="margin-top: 10px;"> guide </div>	
<p>++ Explanation of Sign ++</p> <ul style="list-style-type: none"> • T = Time range Data • G = Grid Data • M = Map Data • S = Special Data 	

For **Terrain Camera** data,
click on
LISM (Lunar Imager/SpectroMeter)

Wait a second or two...



Planetary Data System

● SELENE/Kaguya Data Archive: Page 4

Product Selection Close

Select Products to Search	Determination List
<div style="border: 1px solid #ccc; padding: 5px;"> <ul style="list-style-type: none"> L3D L2C L2B Others <li style="border: 2px solid red; border-radius: 10px; padding: 2px;">LISM(Lunar Imager/SpectroMeter) Add </div> <div style="text-align: right; margin-top: 10px;">Add All ➔</div> <div style="margin-top: 20px;"> <p style="font-size: 8px; color: orange;">guide</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p style="background-color: #0056b3; color: white; padding: 2px;">Search of Keywords</p> <div style="border: 1px solid #ccc; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: #ccc; padding: 2px; width: 100%;">Search Execution</div> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p style="font-size: 8px; color: gray;">-----The searched product is displayed.-----</p> <div style="border: 1px solid #ccc; height: 40px;"></div> <div style="text-align: right; margin-top: 5px;">Add ➔</div> </div> <div style="margin-top: 20px;"> <p style="font-size: 8px; color: orange;">guide</p> </div>	<div style="border: 1px solid #ccc; padding: 5px; min-height: 200px;"> <p style="font-size: 8px; color: gray;">-----The selected product is displayed.-----</p> </div> <div style="margin-top: 20px; text-align: center;"> X <p style="font-size: 8px; color: orange;">guide delete</p> </div> <div style="background-color: #ffff00; padding: 5px; text-align: center; margin-top: 10px;"> Determination Reset </div> <div style="margin-top: 10px;"> <p style="font-size: 8px; color: gray;">++ Explanation of Sign ++</p> <ul style="list-style-type: none"> • T = Time range Data • G = Grid Data • M = Map Data • S = Special Data </div>

You'll see "LISM" appear here
then

Click on "MAP" to identify map-projected image mosaic ("MAP") products



Planetary Data System

● SELENE/Kaguya Data Archive: Page 5

Product Selection Close

Select Products to Search	Determination List
<p>DTM_MAP [M]</p> <p>TCOrtho_MAP [M]</p> <p>TC_Evening_MAP [M]</p> <p>TC_Morning_MAP [M]</p> <p>LISM(Lunar Imager/MAP/TC_Evening_MAP [M] Add)</p> <p>guide</p>	<p>LISM/MAP/TC_Evening_MAP [M]</p> <p>guide</p> <p>X</p> <p>Determination</p> <p>Reset</p>

Search of Keywords

Search Execution

----The searched product is displayed,----

++ Explanation of Sign ++

- T = Time range Data
- G = Grid Data
- M = Map Data
- S = Special Data

Click on “TC_Evening_MAP” or “TC_Morning_MAP” to select “evening” (low sun) or “morning” (high sun) image

Wait a second or two...

You'll see **this line** change to include the new products

then

Click on yellow “Add” arrow

then

Click on “Determination”



● SELENE/Kaguya Data Archive: Page 6

Desired Terrain Camera products are now identified and selected

Add selection constraints, such as map coordinates for your area of interest (use 0 to 360 Positive East Longitude coordinates)

Refer to PDS Map a Planet's Moon maps if you need help with geographic coordinates:
<http://www.mapaplanet.org/explorer/moon.html>

Then click on "Search Execution" to create an order list

SELENE Data Archive

HOME Data Search Order Status Help Logout Japanese

Welcome!, lgaddis Change Account Information

HOME > Data Search

Data Search

Basic Search Conditions

Product Selection
LISM/MAP/TC_Evening_MAP [M]

Product Deletion Product Explanation

Data Range: 2007/09/14 15:39:45 - 2009/06/29 12:08:15
 YYYY / MM / DD hh : mm : ss.sss
 Start [] / [] / [] [] : [] : []
 End [] / [] / [] [] : [] : []

Data Range: LN: -90.0/90.0 WE: 0.0/360.0 (deg)
 North
 West [-20] Degree East [] Degree
 Observation Range [337] Degree Setup Observation Range [345] Degree
 South
 [-30] Degree

Location Flag ALL

Version CURRENT

Search Options

Sort Key File Name Ascending Descending

Number of Display 10

Setup of Advanced Search Options Advanced Search Options

Search Execution Reset



Planetary Data System

● SELENE/Kaguya Data Archive: Page 7

SELENE Data Archive

HOME Data Search Order Status Help Logout Japanese RSS

Welcome, lgaddis [Change Account Information](#)

HOME > Data Search > Search Result

List of Search Result

Product: LISMMAP/TC_Evening_MAP

Version: 02

Sort Key: File Name Ascending Descending Reload

Number of Display: 10

1/2 page(Total : 20 files)

No.	File Name	Center Latitude	Center Longitude	Size	Thumbnail	Data Processing [All Select] [All Release]	Order [All Select] [All Release]
1	TC_EVE_02_S18E338S21E339SC.img	-19.49988	337.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
2	TC_EVE_02_S18E339S21E342SC.img	-19.49988	340.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
3	TC_EVE_02_S18E342S21E345SC.img	-19.49988	343.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
4	TC_EVE_02_S18E345S21E348SC.img	-19.49988	346.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
5	TC_EVE_02_S21E338S24E339SC.img	-22.49988	337.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
6	TC_EVE_02_S21E339S24E342SC.img	-22.49988	340.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
7	TC_EVE_02_S21E342S24E345SC.img	-22.49988	343.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
8	TC_EVE_02_S21E345S24E348SC.img	-22.49988	346.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
9	TC_EVE_02_S24E338S27E339SC.img	-25.49988	337.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>
10	TC_EVE_02_S24E339S27E342SC.img	-25.49988	340.49988	288.11 MB	[Display]	<input type="checkbox"/>	<input type="checkbox"/>

Prev << 1 2 >> Next

Confirm Order Contents

Click on “[Display]” to view a thumbnail copy of an image

Click on “All Select” if you like what you see

Click on ‘add cart’ to create an order list

Click on “Confirm Order Contents” to show list of selected products

You may have more than a single page listing of products. If so, you’ll need to do these steps for each page.

Note the **3 GB size limit** for each order. If you exceed this, you’ll need to break up your image list into multiple orders.



● SELENE/Kaguya Data Archive: Page 8

Order List



Product ID	LISM/MAP/TC_Evening_MAP
Number of Files	10 Files (Max: 100 Files)
Total Size	2.81 GB (Max: 3.00 GB)

No.	File Name	Center Latitude	Center Longitude	Size	Thumbnail	Delete [All select] [All reset]
1	TC_EVE_02_S18E336S21E339SC.img	-19.49988	337.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
2	TC_EVE_02_S18E339S21E342SC.img	-19.49988	340.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
3	TC_EVE_02_S21E336S24E339SC.img	-22.49988	337.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
4	TC_EVE_02_S21E339S24E342SC.img	-22.49988	340.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
5	TC_EVE_02_S18E342S21E345SC.img	-19.49988	343.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
6	TC_EVE_02_S18E345S21E348SC.img	-19.49988	346.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
7	TC_EVE_02_S21E342S24E345SC.img	-22.49988	343.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
8	TC_EVE_02_S21E345S24E348SC.img	-22.49988	346.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
9	TC_EVE_02_S24E336S27E339SC.img	-25.49988	337.49988	288.11 MB	[Image Display]	<input type="checkbox"/>
10	TC_EVE_02_S24E339S27E342SC.img	-25.49988	340.49988	288.11 MB	[Image Display]	<input type="checkbox"/>

delete from order list

Review order list, delete any undesired products

Click on “[Image Display]” to view Thumbnail images

Click on ‘Close’ to go back to order page



Planetary Data System

● SELENE/Kaguya Data Archive: Page 9

SELENE and Engineering Explorer
SELENE Data Archive

HOME Data Search Order Status Help Logout Japanese

Welcome, lgaddis [Change Account Information](#)

HOME > Data Search > Search Result > [Confirm Order](#)

Confirm Order

Number of Files	10 File
Size	2.81 GB
Offer Media	FTP

++ Order Data Information

No.	Product Name	File Name	Processing Parameter Information	
			Northernmost Latitude/Southernmost Latitude/Easternmost Longitude/Westernmost Longitude/Resolution/Interpolation /Map Projection/Center of Projection(Lon./Y1st Standard Parallel/Lat./Y2nd Standard Parallel/Lat./Y	
1	TC_Evening_MAP	TC_EVE_02_S18E336S21E339SC.img	---	
2		TC_EVE_02_S18E339S21E342SC.img	---	
3		TC_EVE_02_S21E336S24E339SC.img	---	
4		TC_EVE_02_S21E339S24E342SC.img	---	
5		TC_EVE_02_S18E342S21E345SC.img	---	
6		TC_EVE_02_S18E345S21E348SC.img	---	
7		TC_EVE_02_S21E342S24E345SC.img	---	
8		TC_EVE_02_S21E345S24E348SC.img	---	
9		TC_EVE_02_S24E336S27E339SC.img	---	
10		TC_EVE_02_S24E339S27E342SC.img	---	

++ User Information

Name	Gaddis Lisa Esq.
Company/Organization	USGS/Astrogeology ---
Address	2255 N. Gemini Drive, Flagstaff, AZ
Phone Number	928-556-7053
Fax Number	928-556-7014
E-mail	lgaddis@usgs.gov

[profile](#)

[Order Completion](#)

JAXA Home
Reference about this homepage : SOAC_operator@jaxa.jp
Copyright © 2008 Japan Aerospace Exploration Agency. All rights reserved.

Note that the 3 GB limit has not been reached for this order.

Click on “Order Completion” to submit your order.

Be sure your contact information is current!



- SELENE/Kaguya Data Archive: Page 10

SELENE Data Archive

HOME | Data Search | Order Status | Help | Logout | Japanese

Welcome!, lgaddis | [Change Account Information](#)

HOME > Data Search > Search Result > Complete Order > **Order Completion**

Order Completion

The order was received.

Since it is needed in the case of the inquiry about a check and data order of a data order demand of a processing situation, please be sure to cut down an order number. I will let you know about an order number also by E-mail.

Order Number : S0000006587

As soon as preparation of data distribution is completed, I contact you by E-mail.
 Since order data is deleted within seven days after E-mail transmission, please carry out a town load by FTP from the place indicated by E-mail within the fixed period. When there is no connection with E-mail, please check the processing situation of an order demand from "a check of the processing situation of a data order demand."

Please inform the following addresses of the inquiry about a data order by E-mail.
 Administrator : SOAC_operator[at]jaxa.jp

[Order Status](#) | [Back to Search](#)

JAXA JAVA Home
 Reference about this homepage : : SOAC_operator[at]jaxa.jp
 Copyright © 2008 Japan Aerospace Exploration Agency. All rights reserved.

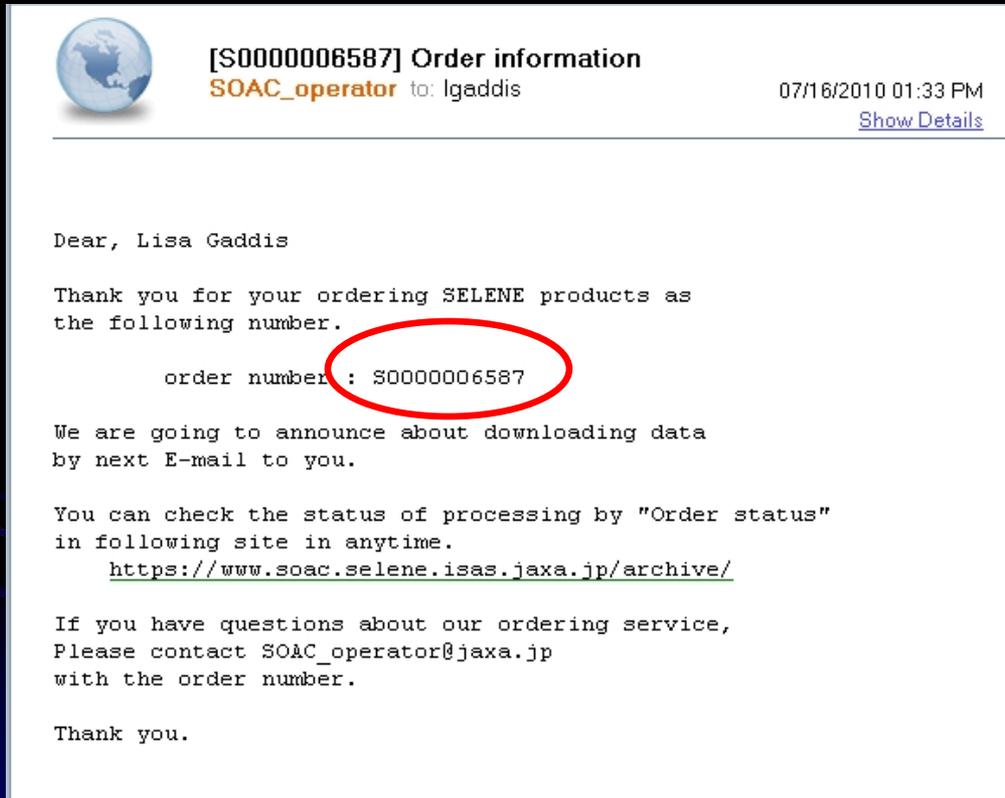
You'll see an "Order Completion" page in response to your order. Use the order number to track your order.

Recall that you can only order up to **3 GB** of data in a single request. (This limit may vary over time.)

You may need to submit multiple orders.



- SELENE/Kaguya Data Archive : Email Confirmation 1



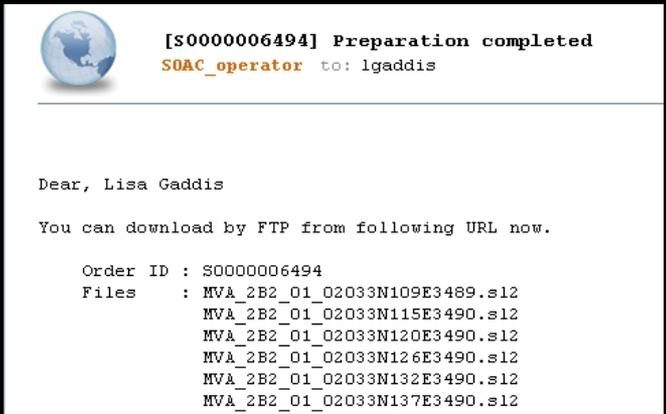
You'll receive an email confirmation of your order. Check the **order number** to be sure you know which data are included.

If you submitted multiple orders, then you'll receive multiple emails for confirmation.



Planetary Data System

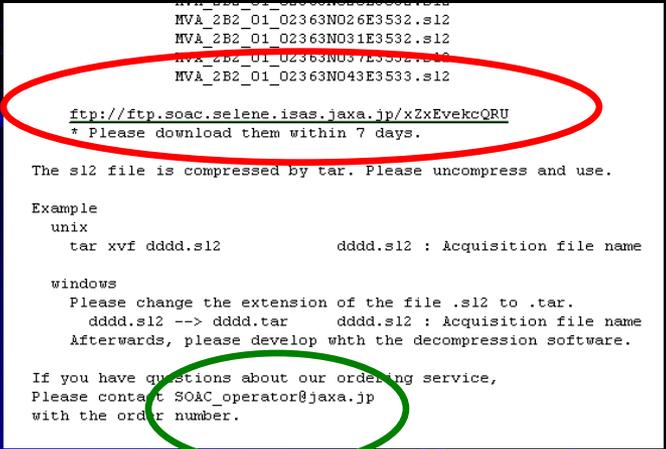
● SELENE/Kaguya Data Archive: Email Confirmation 2



When data for your order are available, you'll receive an email with a list of files delivered and an **ftp address** from which files can be downloaded.

Note email address for system operator if you have questions:

SOAC_operator@jaxa.jp





- **SELENE/Kaguya Data Archive: Data Retrieval**
 - On a linux system, you can use a tool like 'wget' to retrieve files from ftp site
 - `wget -np -r ftp://ftp.soac.selene.isas.jaxa.jp/8s9Hy3IG_Tg/*`
 - On a PC or Mac, use Filezilla or one of many other freeware ftp utilities

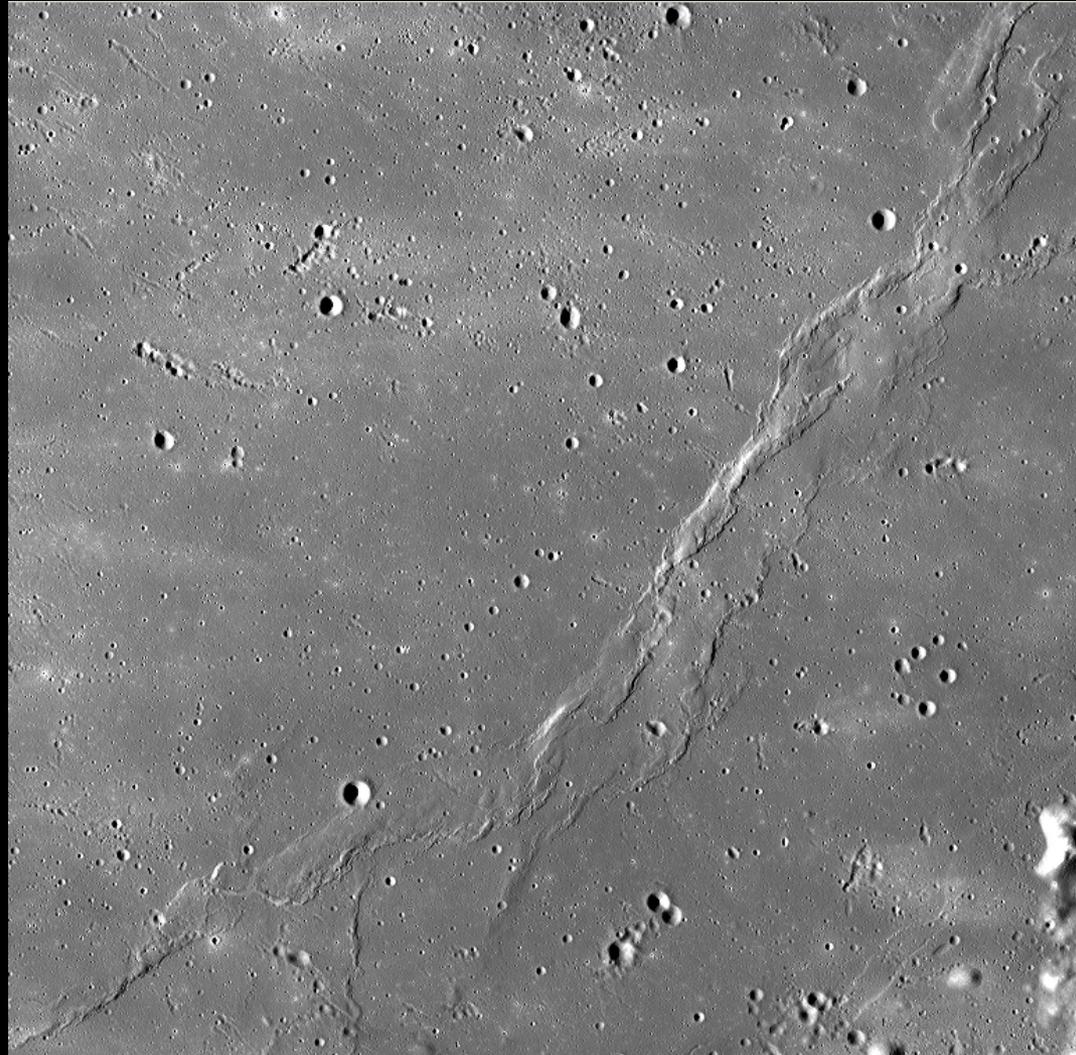


- **SELENE/Kaguya Data Archive: Decompression**
 - On a **linux** system, rename ('mv' for move) and then uncompress or 'tar' the files (where 'file' is the downloaded filename)
 - mv file.sl2 file.tar
 - tar -xvf file.tar
 - The result will include file.ctg, file.jpg, and file.img files.
 - Use 'more file.img' to view the number of lines and samples ('line_samples'), map projection, location, etc.
 - Using **ISIS3** on a linux or Mac system, run 'pds2isis' to import the image file
 - pds2isis from=file.img to=file.cub
 - In **ISIS3**, run 'qview' to view the image file



Planetary Data System

- *Sample Kaguya Terrain Camera image tile:*
 - 12288 x 12288 pixels
 - Terrain Camera, evening illumination
 - TC_EVE_02_N12E351N09E354SC
 - File name describes latitude and longitude of geographic bounding box





Planetary Data System

Sample Kaguya Terrain Camera image tile label:

- TC_EVE_02_N12E351N09E354SC
- lines=12288, samples=12288
- 16-bit (signed word)
- Simple Cylindrical map projection
- Pixel resolution=7.403 m/pixel
- Scale =4096 pixels/degree

```

[screen 0: tcsh]
Object = IsisCube
Object = Core
  StartByte = 65537
  Format = Tile
  TileSamples = 128
  TileLines = 128

  Group = Dimensions
    Samples = 12288
    Lines = 12288
    Bands = 1
  End_Group

  Group = Pixels
    Type = SignedWord
    ByteOrder = Lsb
    Base = -1.65340831304039e-17
    Multiplier = 2.0e-05
  End_Group
End_Object

Group = Archive
  DataSetId = TC_MAP
  ProducerId = LISM
  ProductId = TC_EVE_02_N12E351N09E354SC
  ProductVersionId = 02
  InstrumentName = "Terrain Camera"
  InstrumentId = TC
  TargetName = MOON
End_Group

Group = Mapping
  ProjectionName = SimpleCylindrical
  CenterLongitude = 0.00000000 <deg>
  TargetName = Moon
  EquatorialRadius = 1737400.0 <meters>
  PolarRadius = 1737400.0 <meters>
  LatitudeType = Planetocentric
  LongitudeDirection = PositiveEast
  LongitudeDomain = 360
  MinimumLatitude = 9.00024414
  MaximumLatitude = 12.0
  MinimumLongitude = 351.0
  MaximumLongitude = 353.99975586
  UpperLeftCornerX = 272907.8935 <meters>
  UpperLeftCornerY = 363868.5545 <meters>
  PixelResolution = 7.403 <meters/pixel>
  Scale = 4096.0 <pixels/degree>
End_Group
End_Object

Object = Label
  Bytes = 65536
End_Object

Object = History
  Name = IsisCube
  StartByte = 302055425
  Bytes = 574
End_Object

Object = OriginalLabel
  Name = IsisCube
  StartByte = 302055999
  Bytes = 11852
End_Object
--More-- (0%)

```



- *Software for viewing & processing Kaguya data:*
 - **View images:**
 - **LISM Data Viewer (beta version)**
 - Windows OS only
 - http://www.mss.co.jp/technology/LISM_Data_Viewer_Download_E.htm



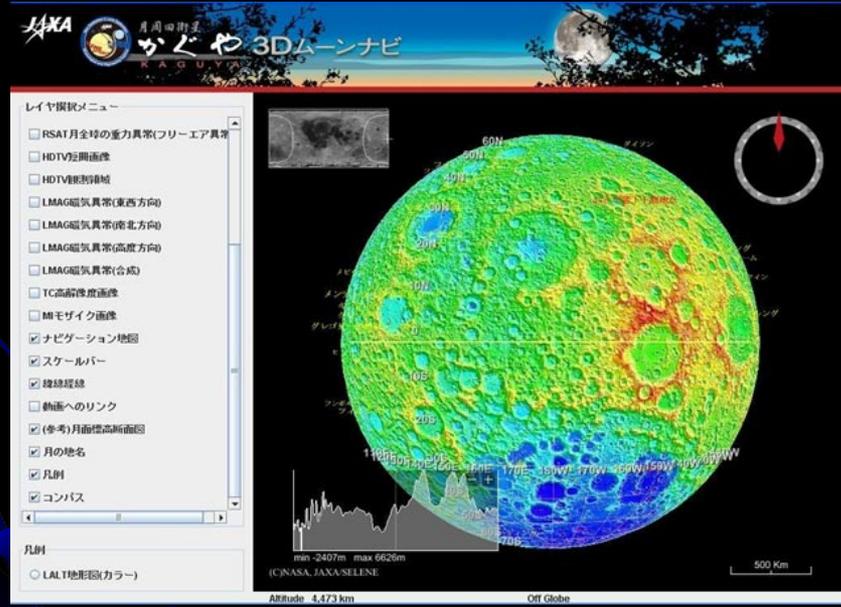
Planetary Data System

- *Software for viewing & processing Kaguya data:*

- **View images:**

- **Kaguya 3D GIS (“Kaguya 3D Moon NAVI”)**

- Windows, Mac OS X
- http://wms.selene.jaxa.jp/3dmoon_e/index_e.html
- Based on NASA World Wind (Java)



- **Software** to View and/or Process Data for the Moon
 - **NASAView**
 - PDS: http://pds.jpl.nasa.gov/tools/software_download.cfm
 - **ISIS**
 - USGS: <http://isis.astrogeology.usgs.gov/>
 - ISIS3 enables Kaguya TC image ingestion using 'pds2isis'
 - Get and install the software, run ISIS3, then run pds2isis on .img files
 - See ISIS Web site for instructions and a menu of programs
 - **VICAR**
 - JPL: <http://www-mipl.jpl.nasa.gov/external/vicar.html>