

PDS Data Review

LORRI & MVIC Shape Model

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nh-a-lorri_mvic-5-geophys-v1.0

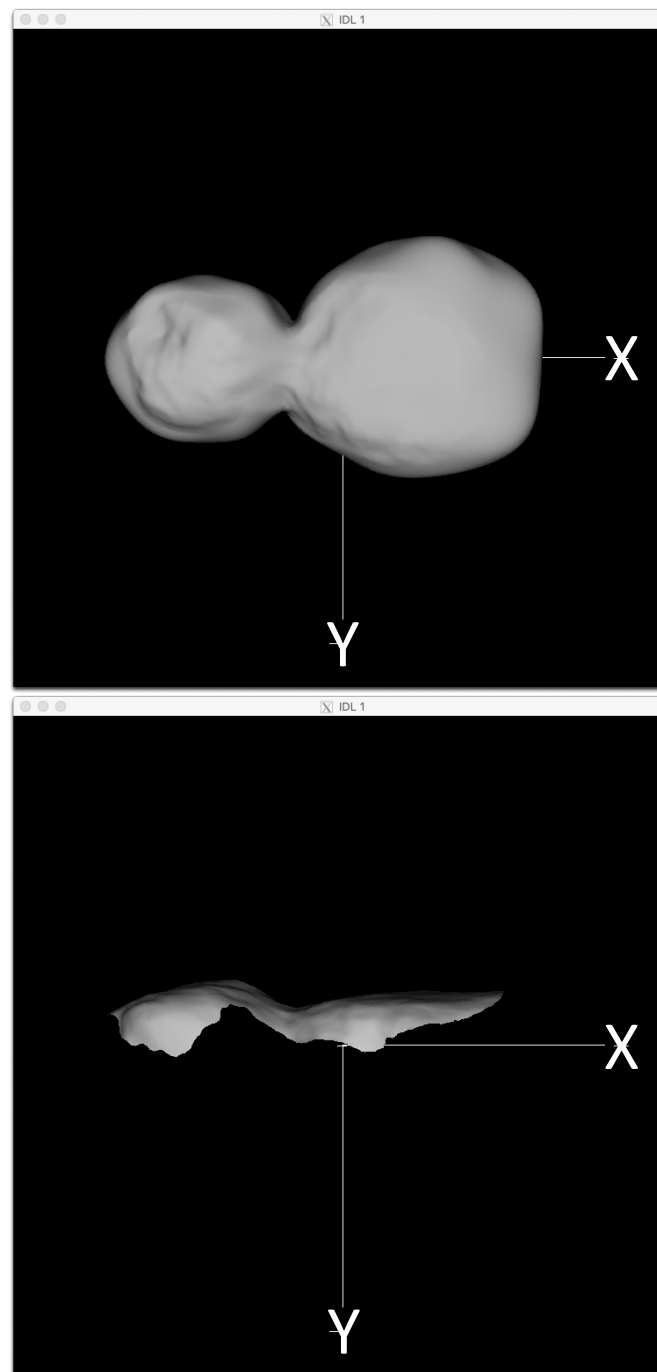
- Shape models of 2014 MU69 Arrokoth
 - Derived from LORRI and MVIC data
- Albedo maps and temperature maps
 - Derived/calculated in conjunction with the shape model
 - I was not tasked with reviewing these pieces of the data set

Arrokoth Shape Models

- Four different shape models included
 - MU69_FR2KF_LOPOLY.OBJ
 - Low resolution model (1962 facets)
 - MU69_FR2KF_HIPOLY.OBJ
 - High-resolution model (100,678 facets)
 - ASP_CA04_06_ICP_SMOOTH.OBJ
 - Highest resolution model (33852 facets)
 - only the illuminated terrain
 - MU69_MERGED.OBJ
 - Combines the HIPOLY and ASP models (107506 facets)
- Also includes BDS versions (SPICE) that were converted from the OBJ versions
 - I did not evaluate the BDS versions of the models, other than to check that SPICE could read them with no errors.

Shape Models

- Able to read all the OBJ models with my software with no errors or problems
- Full models are all closed figures, with all plate normals pointing outward.
- Merged model, when displayed, agrees with the images in the .png example file.
- ASP model is not closed but can be read, displayed and manipulated.
 - Axes appear to be rotated 90 degrees from the other models



DATASET.CAT File

- The Pole orientation and spin rate should be included somewhere in the data set for reference, and for orienting the shape model. (The SPICE kernels at NAIF only contain a pole orientation.)

The filename for each solution contains a Julian Date timestamp indicating the date of the predicted temperatures. For example, the 'JD_2458485_temperature.dat' file predicts the temperature on the day of the Arrokoth encounter (Julian Date 2458485 <--> January 1, 2019).

- Should specify Noon on the given day to remove ambiguity

For more details about how LORRI and MVIC data are processed and the most recent calibration effort, see the raw and calibrated data sets from the Arrokoth Encounter:

```
NH-A-LORRI-2-KEM1-V4.0  
NH-A-LORRI-3-KEM1-V4.0  
NH-A-MVIC-2-KEM1-V4.0  
NH-A-MVIC-3-KEM1-V4.0
```

- If version 4.0 of the datasets were used to produce the models and maps, then this should be noted as such. If this is pointing to the most recent calibration effort, as it says, then they should now be version 5.0

Documents

- NH_RALPH_V100_TI.TXT
 - SPICE kernel for the RALPH instrument
 - Included to help the user visualize the instrument FOV, but also contains numerous warnings at the beginning that warn about the excess material that should be avoided.
 - It would be better to edit this down into its own document (not a SPICE kernel) and remove the unnecessary items, so the user doesn't have to make decisions about what should be avoided.
 - Renaming it something like RALPH_FOV_INFO.TXT would also make it more obvious what information it is providing.

Albedo and Temperature maps

- Not tasked to review these, but
 - I did read the documentation for typos, etc.
 - I tried to look at the IMG files and could not read them with PDSREAD. Are they supposed to be typical PDS IMG files?
 - From the information in the DATASET.CAT file, it is not clear to me what these tables represent. They don't seem to agree with what is shown in the papers that are cited.