

PDS Data Review

New Horizons
LORRI & MVIC

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LORRI - RAW and CAL

LORRI Instrument

- Narrow angle, panchromatic camera
 - 0.29 degree square FOV
 - High resolution (5 μ rad/pixel)
 - 1024x1024 pixel CCD detector
 - Operates in 1x1 or 4x4 on-chip binning modes
- Raw data format
 - FITS files with 5 extensions
 - Primary image, Histogram, First 34 pixels, Image descriptor, Window mismatches
- Calibrated data format
 - FITS files with 3 extensions
 - Primary image (DN), Error map, Quality flag image
 - Do-it-yourself flux calibration: Radiance and Irradiance calibration coefficients are given in the header

General Comments

- Two Datasets:
 - KEM1 Encounter phase, V4.0, Raw and Calibrated (8021 images)
 - 16 Aug 2018 – 30 Apr 2020
- Extends the date over V3.0
 - Fills in additional downloaded data
 - Adds other KBO targets and other miscellaneous targets
- Overall, both data sets are in great shape
- Well documented with lots of description and information available

Various

- NH_KEM.CAT

- History Update (Mission Design section)

In June, 2016, based on the 2016 Planetary Mission Senior Review Panel report, NASA directed the New Horizons extended mission to plan for continued operations through fiscal year 2021. The New Horizons extended mission now includes a visit to a Kuiper Belt Object known as 2014 MU69. The spacecraft will pass 2014 MU69 with closest approach on Jan 1, 2019.

As an extended mission to a target of opportunity, design options for the New Horizons Kuiper Belt Extended Mission are limited. 2014 MU69 will be observed using the same instruments and procedures as proved so effective for studying the Pluto system in 2015.

- Update tenses, etc. to reflect MU69 event is in the past

- Typos

encounter with the cold classical Kuiper belt object (486958) Arrokoth on January 1, 2019 , a post-Arrokoth encounter calibration

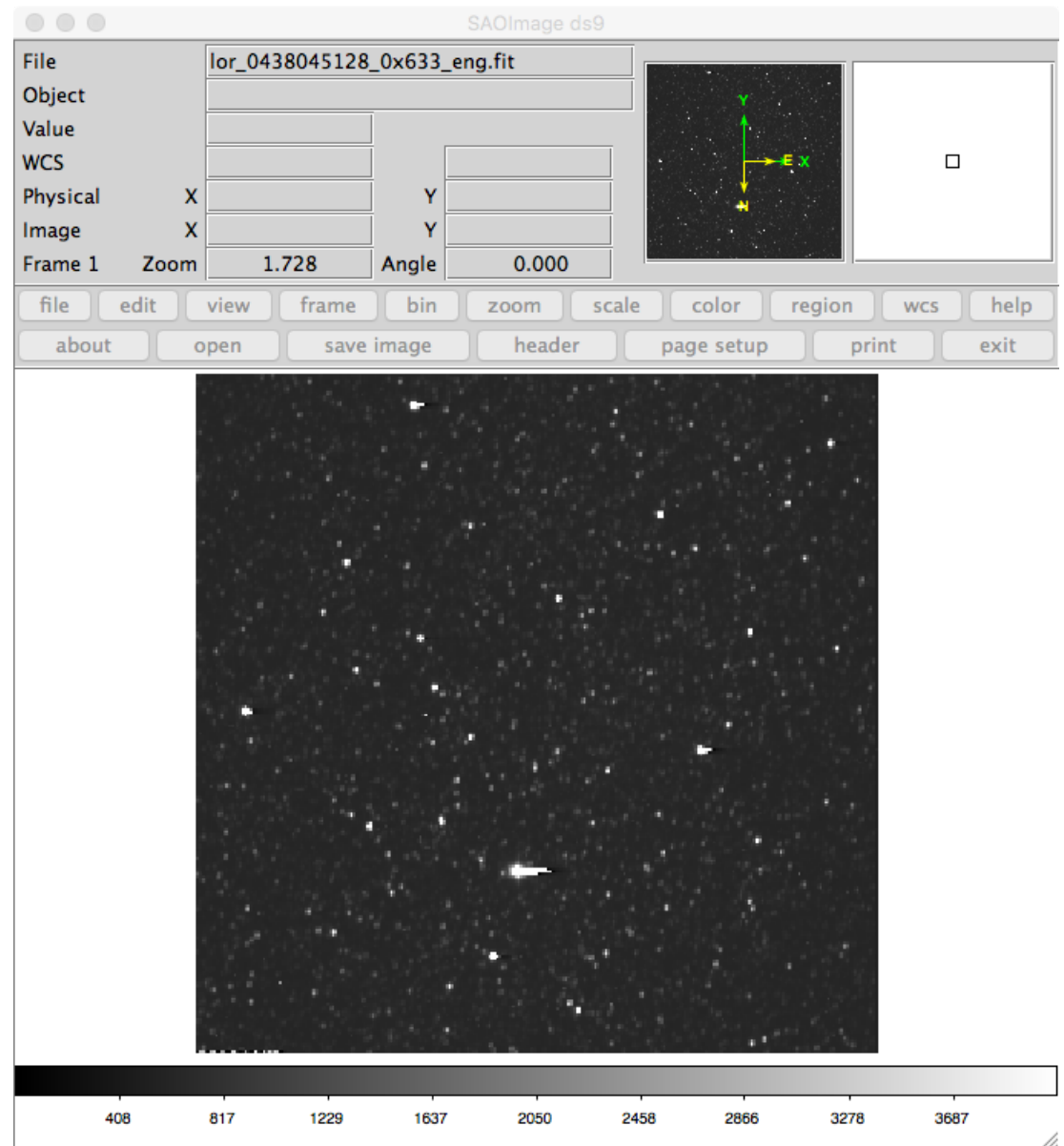
- remove space after 2019

along with download of data from all of these activities. There are also occasional additional observations as opportunities arise, such as color observations of Uranus and Neptune, observations of zodiacal

- “zodiacal”

Data

- Data are in good shape
 - Read with IDL FITS readers, PDSREAD and NASAVIEW
 - Includes extensions
 - Read and displayed every image
 - Tested to make sure data could be manipulated and measured
- One-to-one correspondence between raw and calibrated files



SPICE

- SPICE kernels were provided for the previous review, though they have not been reviewed themselves
 - Kernels cover the span of Start/End Dates
 - Exception is the last data directory, which consists of exposure tests, etc., months after the last observations
 - Not all targets are included
- Tested several objects against the values given in the data labels
- My computed values agree with the label/FITS header values to within a small fraction of a percent
 - Some differences in kernels (older versions are used in data files)
 - Not significantly different
- No problems with the geometry that is included.
- Assume that calculations for other objects are good as well
- Relevant to both the LORRI and MVIC data

LORRI Status

- A couple typos in the NH_KEM.CAT file
- Data are Certifiable

MVIC - RAW and CAL

MVIC Instrument

- Part of the RALPH instrument
- PanFrame CCD
 - 5024x128 pixels sweep over the scene
 - 128 pixels per exposure time
 - Create an image cube 5024 x 128 x XXX pixels, where XXX is defined by scan rate and time
 - Not clear how these data are used, though there are not many of them
- Six other CCDs operate in TDI mode (different filters)
 - 5024x32 pixels sweep over the scene
 - The 32 pixels are clocked at the scan rate, so each exposure time gives a shift of 1 pixel
 - Creates an image 5024 x XXX
- Raw data format
 - FITS files with 3 extensions
 - Primary image, housekeeping, window mismatch table
- Calibrated data format
 - FITS files with 3 extensions
 - Primary image (DN), Error map, Quality flag image
 - Do-it-yourself flux calibration: Flux conversion coefficients are added to the header

General Comments

- Two datasets:
 - KEM1 Encounter phase, V4.0, Raw and calibrated (321 images)
 - 30 Aug 2018 – 30 Apr 2020
 - Note that stop date and last data are 2 Aug 2019
- Extends the date over V3.0
 - Adds additional downloaded data
- Overall, both data sets are in great shape
- Well documented with lots of description and information available

Catalog Files

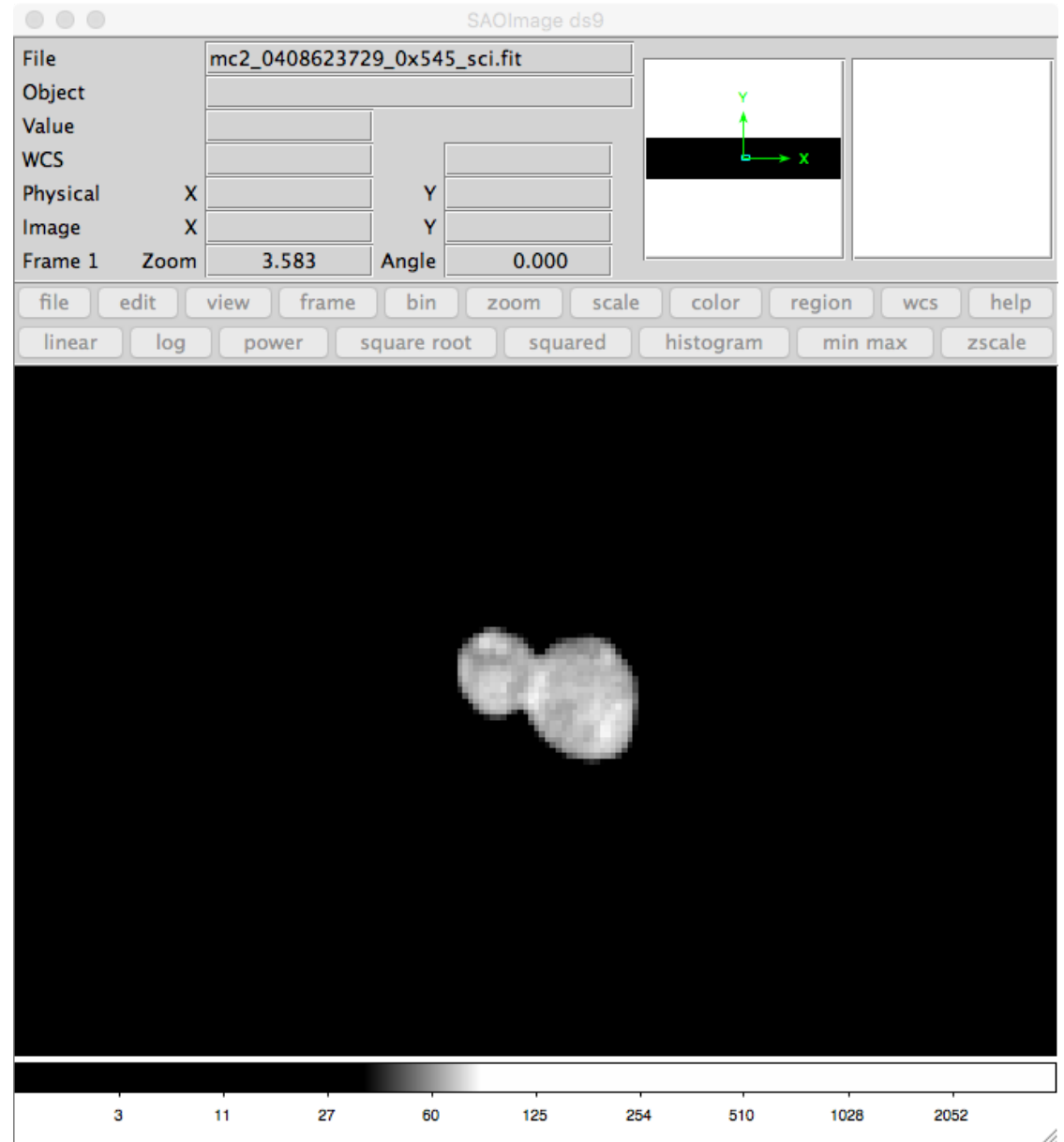
- DATASET.CAT
 - Awkward sentence

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after the MU69 encounter. A Ring/Coma Search, Look Back at Pluto,  
Functional Test, Radiometric Calibration, Solar Star Calibration, Color  
Scan of Neptune and Uranus was conducted.
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- “A number of [tests, scans, ??] were conducted, including ...”

MVIC Data Files – RAW and CAL

- Data are in good shape
 - Read with IDL FITS readers, PDSREAD and NASAView
 - Includes extensions
 - Read and displayed every image
 - Tested to make sure data could be manipulated and measured
- One-to-one correspondence between raw and calibrated files



MVIC Status

- A minor change in DATASET.CAT file
- Data are Certifiable