



Daily Downlink Tagup

Monday, March 25, 2019 (DOY 084)

OSIRIS-REX™
ASTEROID SAMPLE RETURN MISSION



Agenda & Logistics

- **Quicklook & Instrument Weekly Status**
- **DSN Schedule**
- **Observation Timeline**
- **Uplink/Execution/Downlink Summary**
- **Alarms, Watch items, ISAs, PFRs**
- **Need for Retransmit, need for Replay?**
- **Science / PI Comments**
- **Go-backs / Additional Comments**

Daily Downlink Summaries available shortly after each Tagup at on the OREx Ops Wiki:
https://orexwiki.lpl.arizona.edu/wiki/Main_Page (LDAP login)

Daily Downlink Slides available shortly after each Tagup at:

OSIRIS-REx Bennu Proximity Operations/Science Implementation/Downlink_Daily_Summary/2019

Quicklook + Instrument Weekly Status *(see backup slides)*

| Team | Status | Comment |
|--------------------------------|--------|-----------|
| Spacecraft | G | No issues |
| <i>Electrical Power System</i> | G | No issues |
| <i>Flight Software</i> | G | No issues |
| <i>Fault Protection</i> | G | No issues |
| <i>G&NC</i> | G | No issues |
| <i>Mechanisms</i> | G | No issues |
| <i>Propulsion</i> | G | No issues |
| <i>Telecom</i> | G | No issues |
| <i>Thermal</i> | G | No issues |
| <i>Payload Interfaces</i> | G | No issues |

| | Health | | | | Safety | | Performance | | | Powered State | GO/NO-GO |
|-------|---------|-------|------------------|--------|----------|---------------------------|-------------------|-----------------|---------------------|---------------|-----------|
| OCAMS | | | | | | | | | | ON | GO |
| OLA | | | | | | | | | | OFF | GO |
| OTES | | | | | | | | | | ON | GO |
| OVIRS | | | | | | | | | | OFF | GO |
| REXIS | | | | | | | | | | OFF | GO |
| | Thermal | Power | Command Response | Alarms | Trending | Limited Life & Mechanisms | Data Completeness | Pipeline Status | Science Concurrence | | |

Downlink Schedule (times in UTC)

- **Current Data Rate: 1.3 Mbps**

| WOY | DOY | Start Date | HGA Start | End Date | HGA End | Duration | Note |
|-----|-----|------------|-----------|-----------|---------|----------|---|
| 12 | 083 | 3-24-2019 | 14:01 | 3-24-2019 | 20:35 | 06:34 | 1.3 Mbps COMPLETE |
| 13 | 084 | 3-25-2019 | 14:47 | 3-25-2019 | 20:35 | 05:48 | 1.3 Mbps, Crit 3 Oponavs COMPLETE |
| 13 | 085 | 3-26-2019 | 14:01 | 3-26-2019 | 18:35 | 04:34 | *M8D – Decomposed will reduce downlink duration by 1.5 hours |
| 13 | 086 | 3-27-2019 | 14:37 | 3-27-2019 | 18:40 | 04:03 | 1.3 Mbps, Crit 3 Oponavs |
| 13 | 087 | 3-28-2019 | 13:22 | 3-28-2019 | 15:30 | 03:08 | 1.3 Mbps, Crit 3 Oponavs |
| 13 | 088 | 3-29-2019 | 14:27 | 3-29-2019 | 15:35 | 01:08 | 1.3 Mbps |
| 13 | 089 | 3-30-2019 | 17:33 | 3-30-2019 | 20:35 | 03:02 | *M9D – Decomposed will reduce downlink duration by 1.5 hours |
| 13 | 090 | 3-31-2019 | 14:02 | 3-31-2019 | 20:35 | 06:33 | 1.3 Mbps |

DSN Notes:

ED EQUIPMENT STATUS:

| SPC/DSS | EQUIPMENT | ETRO |
|---------|-----------|-----------|
| ----- | ----- | ---- |
| DSS14 | X500kw-R | 090/2300z |
| SPC60 | MCD3-1 | 136/1428z |
| DSS63 | MSI | 171/1430z |
| SPC60 | VSR | 350/1648z |
| DSS63 | EAC | 355/1621z |

M7D Quicklook Summary

OSIRIS-REx Nav Team Maneuver Quick-look Error Report

Report Date: 23-Mar-2019 18:00:36 UTC

M7D

Nominals:

Burn #1 Nav Design Times:

23-MAR-2019 16:45:29.000 [UTC] Start time at spacecraft
23-MAR-2019 16:45:32.053 [UTC] End time at spacecraft
23-MAR-2019 16:50:14.632 [UTC] Start time at Earth
23-MAR-2019 16:50:17.685 [UTC] End time at Earth

Burn #2 Nav Design Times:

23-MAR-2019 17:14:31.000 [UTC] Start time at spacecraft
23-MAR-2019 17:14:34.064 [UTC] End time at spacecraft
23-MAR-2019 17:19:16.654 [UTC] Start time at Earth
23-MAR-2019 17:19:19.718 [UTC] End time at Earth

4.304 [cm/s] Total Magnitude

339.049 [deg] RA

3.928 [deg] Dec

6.117 [s] Duration (Nav Design)

97.668 [deg] Look angle

113.661 [deg] Angle from heliocentric velocity vector

285.632 [s] One-way light time

8.446 [GHz] Received downlink frequency, 2-way tracking

0.056 [Hz per mm/sec] Conversion factor

-0.004 [m/s] Delta-range rate

-0.242 [Hz] Expected Doppler shift seen by DSN

Actuals:

-0.240 [Hz] Actual Doppler shift seen by DSN

4.282 [cm/s] Delta-V magnitude, given perfect pointing

-0.022 [cm/s] Delta-V magnitude error, given perfect pointing

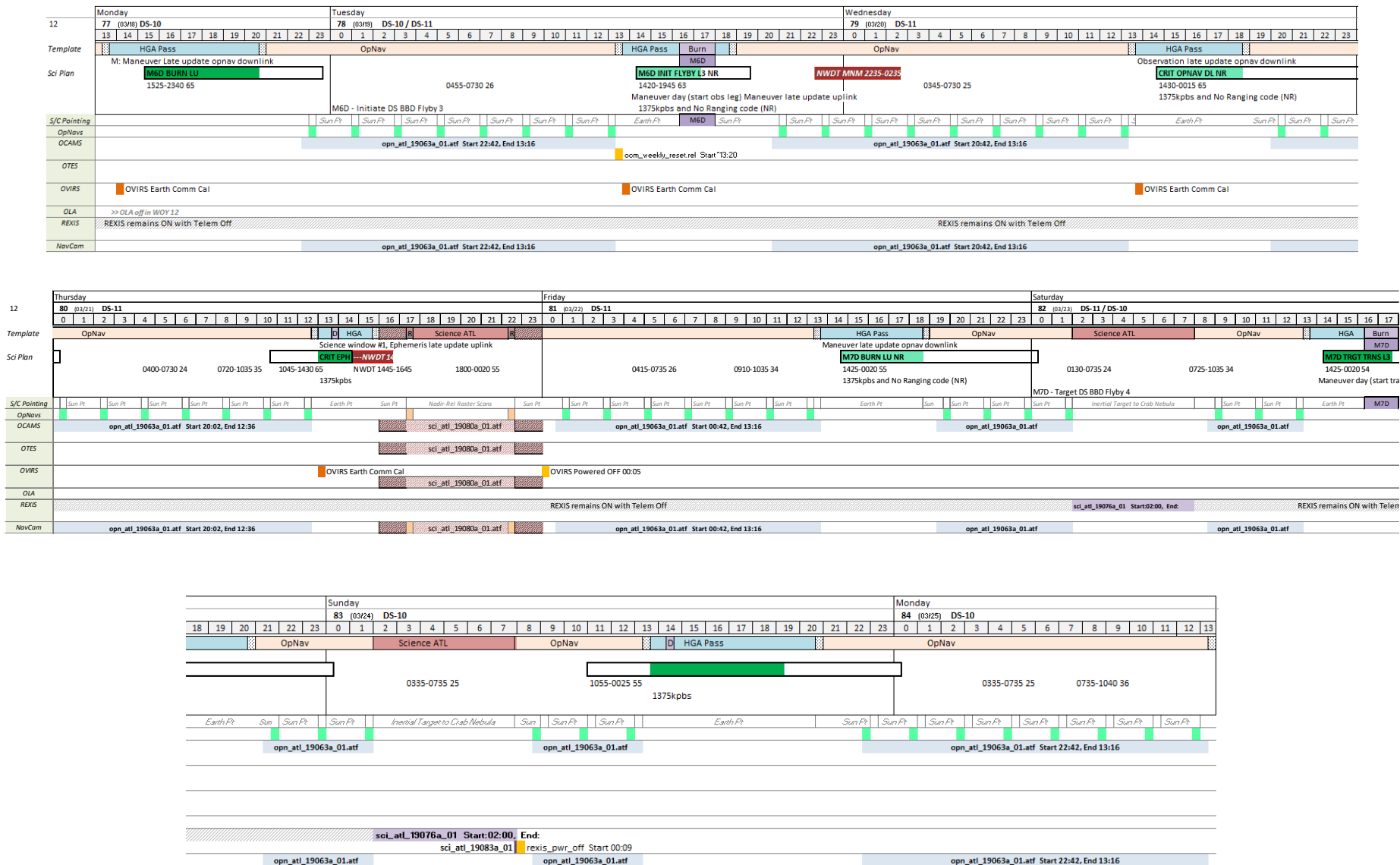
-0.669 [%] Percentage Delta-V magnitude error, given perfect pointing

97.616 [deg] Look angle, given perfect magnitude

-0.052 [deg] Look angle error, given perfect magnitude

DS BBD Flyby 3 (Linear scans of 45-deg North and 45-deg South latitudes) M6D, M7D, + Landmark Nav images for Particle Monitoring, REXIS Crab Cal Part 2

WOY 12 COMPLETE



Uplink Summary

UPLINK

WOY 12 (2019-077 – 2019-084)

- BG Seq, Sci Genies, Payload Sequences [uplinked 2019-074](#)
- Time_shift Sequence for DOY 080 [uplinked 2019-074](#)
 - Time shift Sequence for DOY 080 Late Update [uplinked 2019-080](#)
 - Adjusted the ATF Start Epoch to: **17:16:24**
- Late Update of M7D [uplinked 2019-082](#)

WOY 13 (2019-084 – 2019-091)

- BG Seq, Sci Genies, Payload Sequences [uplinked 2019-081](#)
- Time_shift Sequence for DOY 087 and DOY 088 [uplinked 2019-081](#)
- Preliminary Design of M8D and M9D [uplinked 2019-081](#)
- x01dwn_dart_nom_ocmlp2ovr.cfg [uplinked 2019-082](#)
 - This dart file routes OCAMS Low-Priority data to the OVIRS Partition.
 - Will remain active on the S/C thru end of Woy 15

Ephemeris Updates

- Ephemeris Update: od113 [uplinked 2019-082](#) << current OD

Execution Summary

Instrument Status:

- OCAMS, OTES, and REXIS currently powered ON.

Executed (times in UTC):

- 2019/080 (Thursday, Mar 21)
 - BBD Flyby 3 (this data will start downlinking in Friday's HGA Pass)
 - » Summary: Nadir pointed Linear Scan collects images every 4° of Bennu rotation for one full rotation. PolyCam is driving instrument. OTES and OVIRS riding along.
 - » **Time-shift Late Update ATF Start Epoch: 2019/080-17:16:24. Time-shift Late Update UTC Time of 0-deg Lat Crossing: 19:54:48**
 - » # of PolyCam images expected / **received** : 1385 / **1385**
 - » OTES Data Vol **received** : **8363 packets/icks**
 - » OVIRS Data Vol **received**: **407.49 MB**
- 2019/081 (Friday, Mar 22)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected / **received** : 25 / **25**
 - » # of MapCam images expected / **received** : 9 / **9**
- 2019/082 (Saturday, Mar 23)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected / **received** : 21 / **21**
 - » # of MapCam images expected / **received** : 7 / **7**
- 2019/083 (Sunday, Mar 24)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected / **received** : 18 / **18**
 - » # of MapCam images expected / **received** : 6 / **6**
- 2019/084 (Monday, Mar 25)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected / **received** : 24 / **24**
 - » # of MapCam images expected / **received** : 8 / **8**

Up Next (times in UTC):

- 2019/085 (Tuesday, Mar 26)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected : 24
 - » # of MapCam images expected : 8
 - M8D to initiate BBD Flyby 4 expected burn start at 16:45.
- 2019/086 (Wednesday, Mar 27)
 - Nadir+1-deg Offset OpNav Only (One NavCam pair + One MapCam + One Landmark for Particle Monitoring / 2 hrs)
 - » # of NavCam images expected : 27 (Crit 3)
 - » # of MapCam images expected : 9 (Crit 3)

Downlink Summary

- **Current Data Rate: 1.3 Mbps**

Downlink

- Today's Partition Status :

| | Part. Start Vol (MB) | New Data Vol (MB) | Partition Fill (MB) | Expected Partition Fill (%) | Expected End Partition (%) | Comments |
|-------------------------|----------------------|-------------------|---------------------|-----------------------------|----------------------------|----------|
| <i>OpNav</i> | 0.00 | 283.76 | 283.76 | 40.54% | 0.00% | |
| <i>OTES</i> | 0.00 | 0.00 | 7.53 | 2.73% | 0.00% | |
| <i>REXIS</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OLA</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OVIRS</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OCAMS</i> | 0.00 | 0.00 | 7.06 | 0.19% | 0.00% | |
| <i>Tagcams/Overflow</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |

Downlink Summary

- **Tomorrow's Data Rate: 916 kbps**

Downlink

- Tomorrow's Expected Partition Status :

| | Part. Start Vol (MB) | New Data Vol (MB) | Partition Fill (MB) | Expected Partition Fill (%) | Expected End Partition (%) | Comments |
|-------------------------|----------------------------|----------------------|------------------------|-----------------------------------|-------------------------------|----------|
| <i>OpNav</i> | 0.00 | 283.76 | 283.76 | 40.54% | 0.00% | |
| <i>OTES</i> | 0.00 | 0.00 | 7.53 | 2.73% | 0.00% | |
| <i>REXIS</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OLA</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OVIRS</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |
| <i>OCAMS</i> | 0.00 | 0.00 | 7.06 | 0.19% | 0.00% | |
| <i>Tagcams/Overflow</i> | 0.00 | 0.00 | 0.00 | 0.00% | 0.00% | |

Summary of Downlink Issues seen over the Sun/Mon (DOY 083 & 084)

- **SPOC FEDS experienced intermittent and brief disconnects during passes DOY 083 and 084, dropouts led to gaps in OpNav Data**
 - SPOC working to resolve this issue. We believe this to be related to a SPOC Firewall install.
 - DSN Replay did not fill in these gaps
 - Manual Playback from SPOC FEDS to SPOCflight filled in gaps
- **FOB system was down DOY 083 and 084**
 - OpNavs could not be reprocessed due to SPOC not having access to the reconstruct CK
 - Opnavs could not be pushed to the FOB due to no FOB access on cmis
 - Images could still be downloaded directly from SPOC with the download tool/script
 - Cause is TBD
 - FOB System was restored mid-pass today (DOY 084) and all Opnav images have been reprocessed with the r-CK and pushed to the FOB

Need for Retransmit? Need for Replay?

- DOY 080
 - Frame Gap Reports on DOY 082 / 083 displayed gaps in VC 02, 05 and 06 from DOY080
 - Retransmit Request submitted on 03/25/2019
- DOY 083
 - Only 4 of 6 MapCam OpNavs received at the SPOC, filled in on DOY084 via SPOC FEDS Playback
 - Only 12 of 18 TagCams OpNavs received at the SPOC , filled in on DOY084 via SPOC FEDS Playback

List of Unexpected Alarms, Watch Items, ISAs, PFRs

Unexpected Alarms

- Two additional **rexis_02_hk** yellow alarms seen during Saturday's downlink. Consistent with the "noise" alarms we have been seeing lately and are of no concern. .
- Persistence checks will be added to a couple of these yellow alarms where we are seeing single slightly out-of-range "noise"

New or Updated Watch Items, ISA's and PFR's

- **ISA # 8809 – SPOC FEDS to SPOCFLIGHT data delivery drop outs**
 - ISA Status: NEW
 - ISA Type: Ground minor
 - ISA Criticality: 3 – minimal impact
- **ISA # 8792 – TAGCAMS unexpected BRAM correctable error count behavior**
 - ISA Status: DRAFT
 - ISA Type: Ground minor
 - ISA Criticality: 3 – minimal impact
- **ISA # 8767 - Re-occurrence: STL intermittent downlink issues during setup**
 - ISA Status: NEW
 - ISA Type: Ground minor
 - ISA Criticality: 3 – minimal impact
- **ISA # 8753 - FR violation confirmed after the fact for xm1912 after discovering it in xm1913 testing**
 - ISA Status: NEW
 - ISA Type: Ground minor
 - ISA Criticality: 3 – minimal impact
- **ISA # 8686 - Missed time shift and ephemeris late update WOY1911 due to weather emergency**
 - ISA Status: NEW
 - ISA Type: Ground major
 - ISA Criticality: 2 – significant impact
- **ISA # 8672 - JPL Firewall Config Changed without LM Notification - affected Matlab license access/use and Maneuver Automation**
 - ISA Status: NEW
 - ISA Type: Ground minor
 - ISA Criticality: 2 – significant impact
- **ISA # 8651 – Frame gap report falsely populated**
 - ISA Status: In Progress
 - ISA Type: Ground minor
 - ISA Criticality: 4 – No Significant Impact
- **ISA #8611 – Unexpected signal seen in OTES when not expected to be pointed at a target**
 - ISA Status: In Progress
 - ISA Type: S/C Minor
 - ISA Criticality: 3 – minimal impact
- **ISA #8610 – Unexpected signal seen in OVIRS when not expected to be pointed at a target**
 - ISA Status: In Progress
 - ISA Type: S/C Minor
 - ISA Criticality: 3 – minimal impact
- **ISA # 8545 – Delay in MSA FEDS to SPOC FEDS data delivery**
 - ISA Status: NEW
 - ISA Type: Ground minor
 - ISA Criticality: 3 – minimal impact



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OVIRS Status

Amy Simon
Dennis Reuter

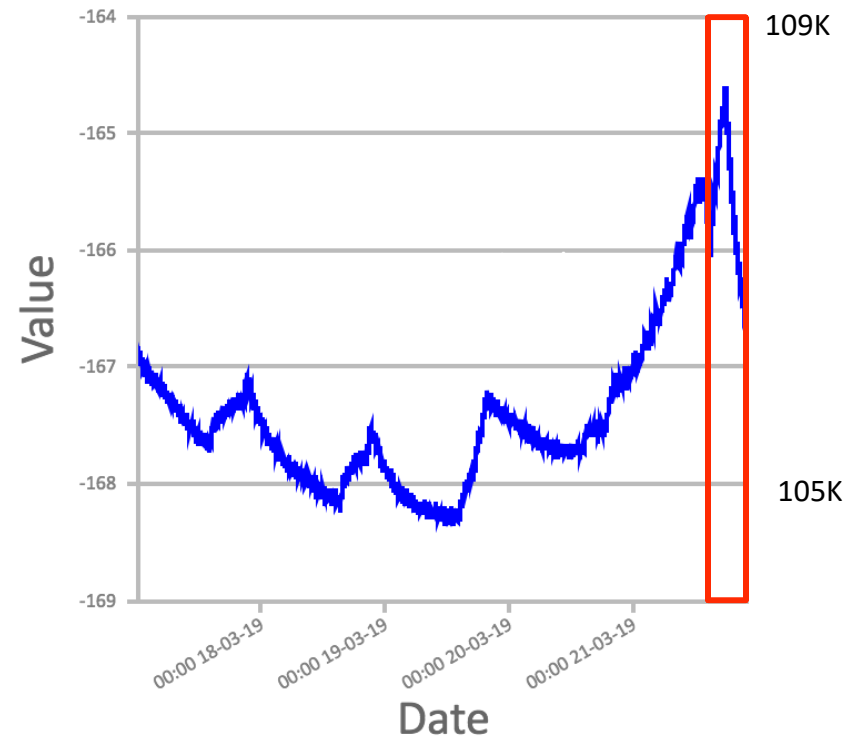
UNIVERSITY OF ARIZONA

NASA'S GODDARD SPACE FLIGHT CENTER

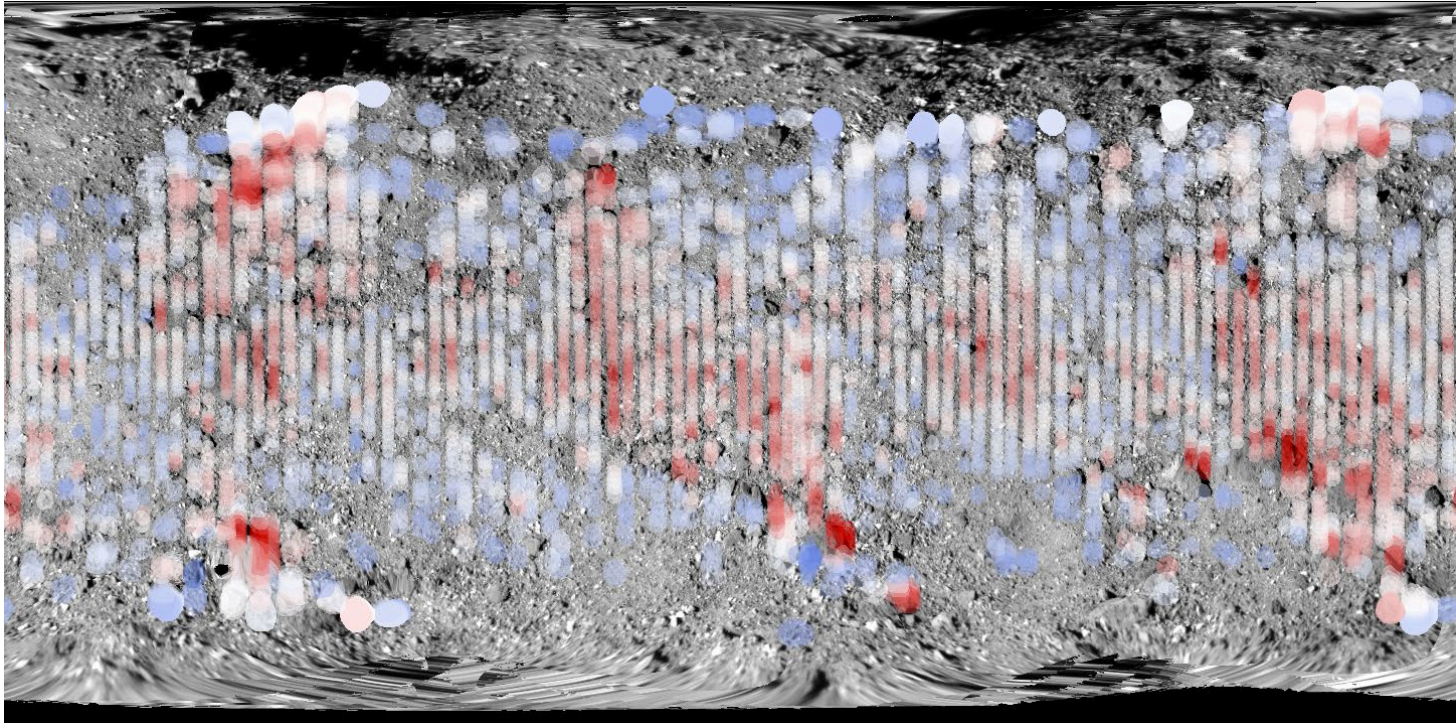
LOCKHEED MARTIN

BBD#3 Summary: 10:00 am, off-nadir scans

- **All OVIRS Level 0 data received, processed, and blessed through Level 3a**
 - 17,017 target spectra
 - Ticket DP-560 submitted
- **Detector still warm, though not as bad as 12:30 stations**
 - Calibration and out-of-band still show some sensitivity to off-nominal conditions, but also improving

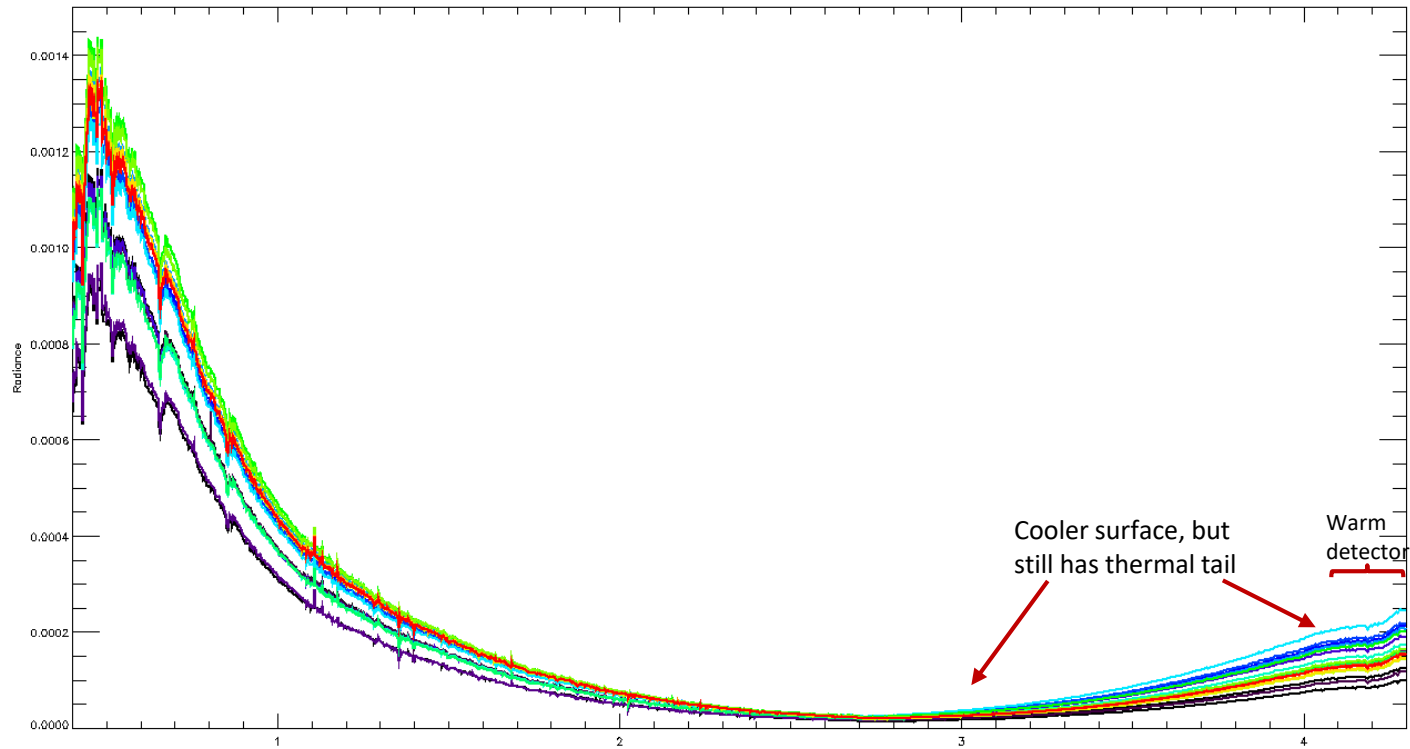


BBD#3 Thermal Map

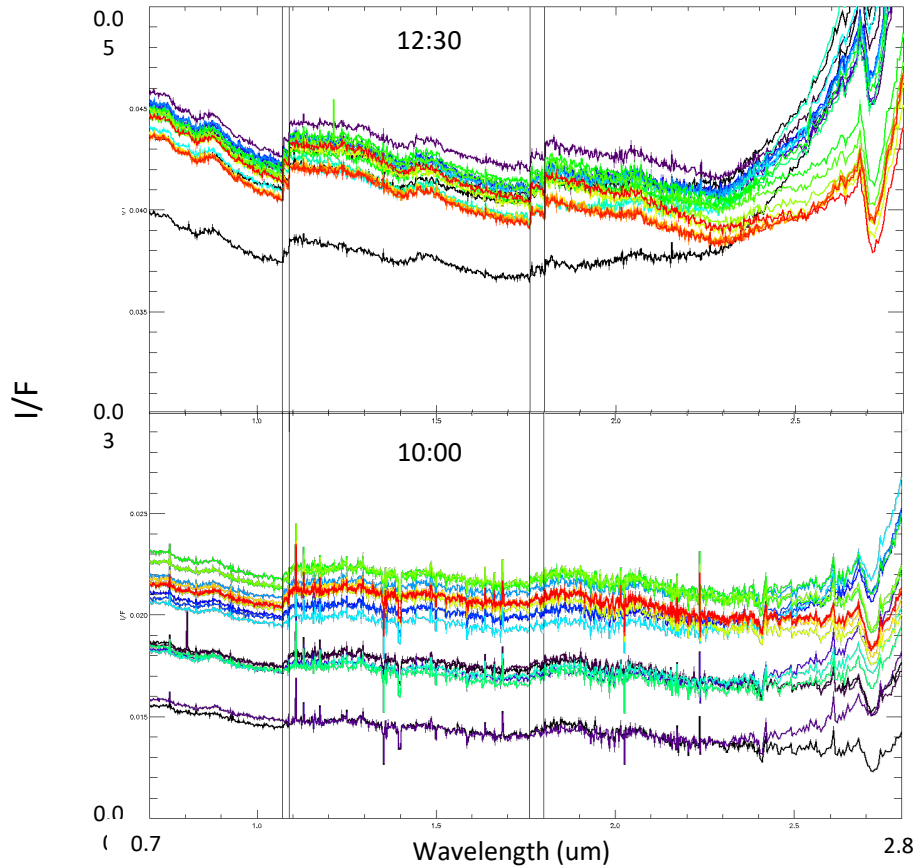


Seeing surface temps ~300K to 340+K

Level 3a Spectra (last 90 of sequence)



Improved out-of-band



High signal: $\sim 8^\circ$ phase
Surface temp: 330 – 370K
Detector temp: $\sim 110\text{K}$

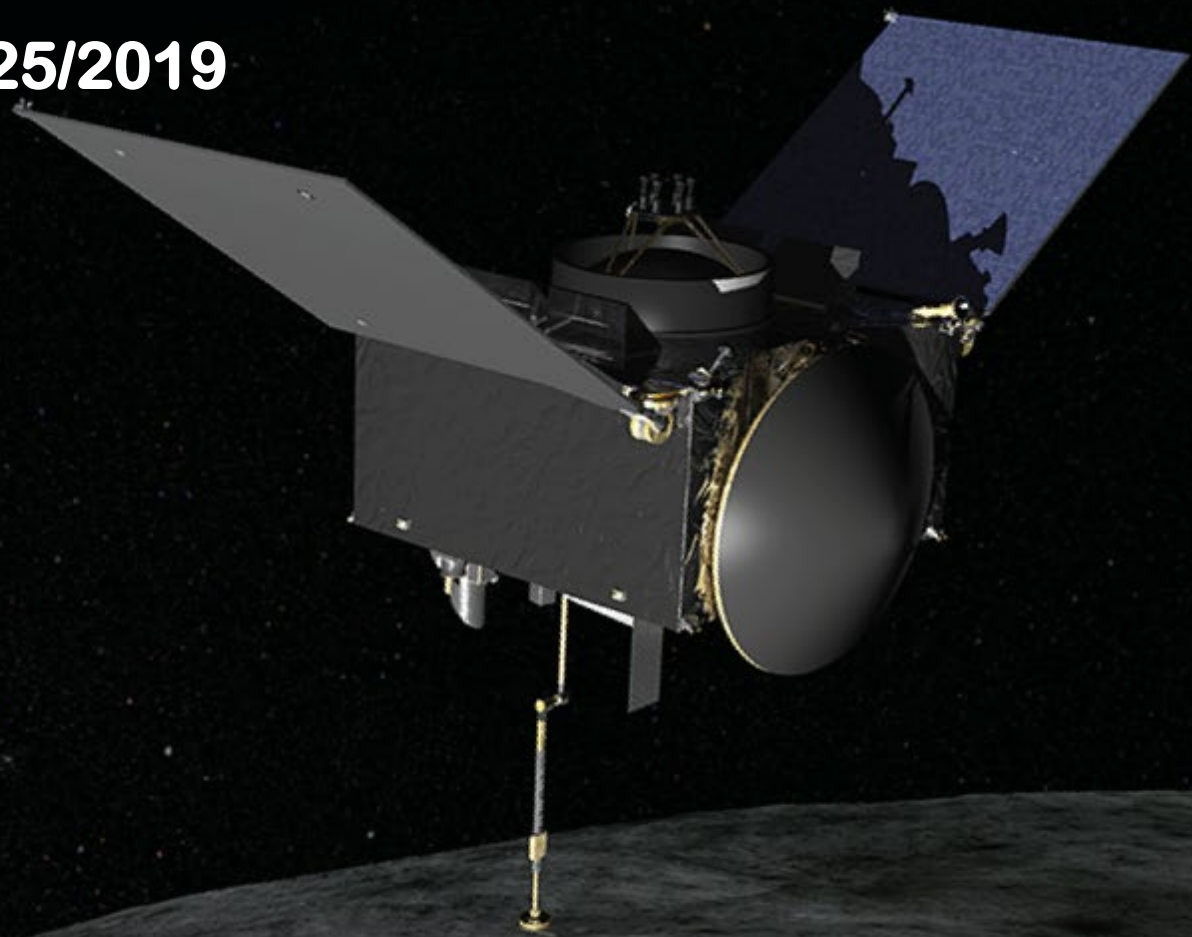
Low signal: 30° phase
Lower temp: 300 – 340K
Detector temp: $\sim 107.5\text{K}$



REXIS Crab Nebula Calibration Repetition: Part 2 Daily Downlink Status

03/25/2019

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Engineering Summary

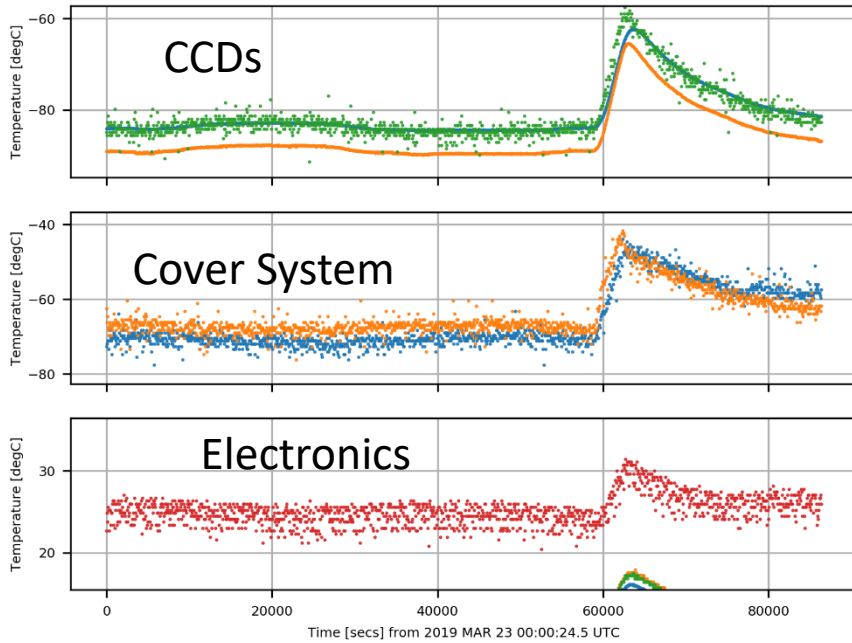
- Commanding
 - All commands processed
 - No rejected or dropped commands
 - Instrument performed all functions nominally
- Downlink
 - No missing packets identified
 - 2 Unrecognized packets
 - 1 CCD packet and 1 CCD Frame packet
- Power
 - Power draw as expected
 - Voltages regulated as expected
- Thermal
 - All temperatures within operating limits during observations
 - Radiation Cover: ~ -68C Average
 - Frangibolt Housing: ~ -65C
 - Detectors: ~ **-87C**
 - SXM: ~ -66C
 - **All temperatures except for the SXM rose during the burn**
 - $\pm 5C$ noise on PRTs was seen as expected

Unrecognized Packets

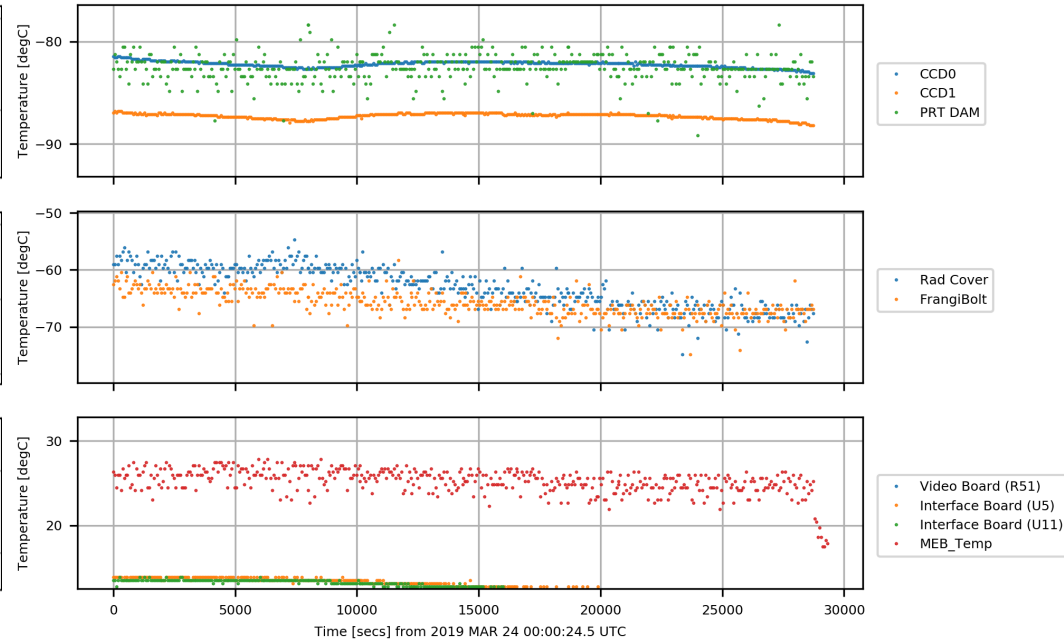
- 1 packet of CCD data
 - Known occasional issue
 - 2019 MAR 24 04:40:29.5
- 1 packet of CCD frame data
 - First time that we have seen a packet of ccd frame data go into unrecognized
 - 2019 MAR 24 06:54:51.7

HK Plots: Temperature

REXIS Housekeeping Temperatures: 86912 seconds of data from 2019 MAR 23 00:00:24.5 UTC

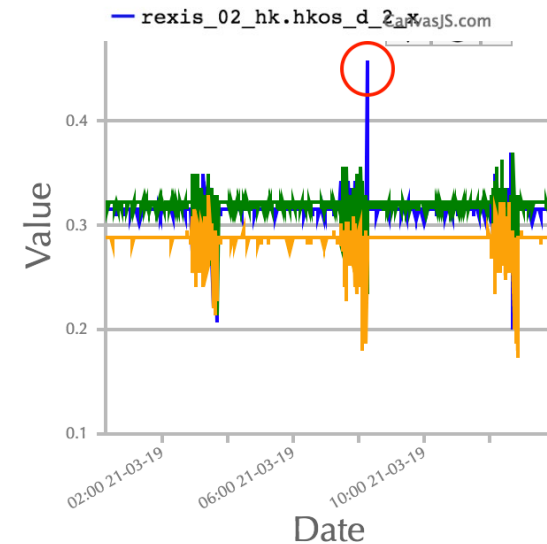
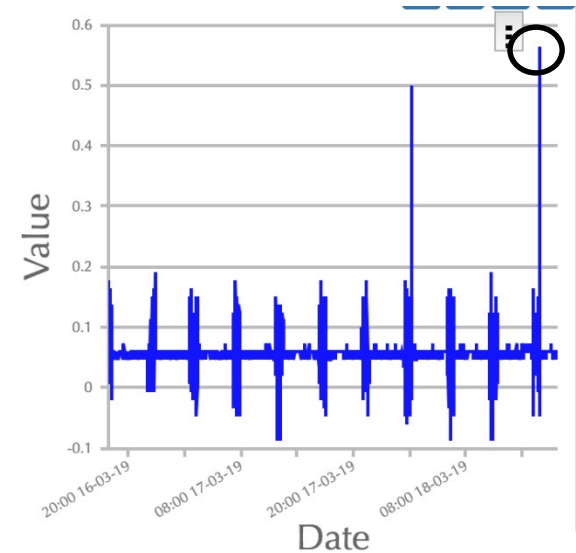


REXIS Housekeeping Temperatures: 29888 seconds of data from 2019 MAR 24 00:00:24.5 UTC



Crab Cal Alarms: Voltages

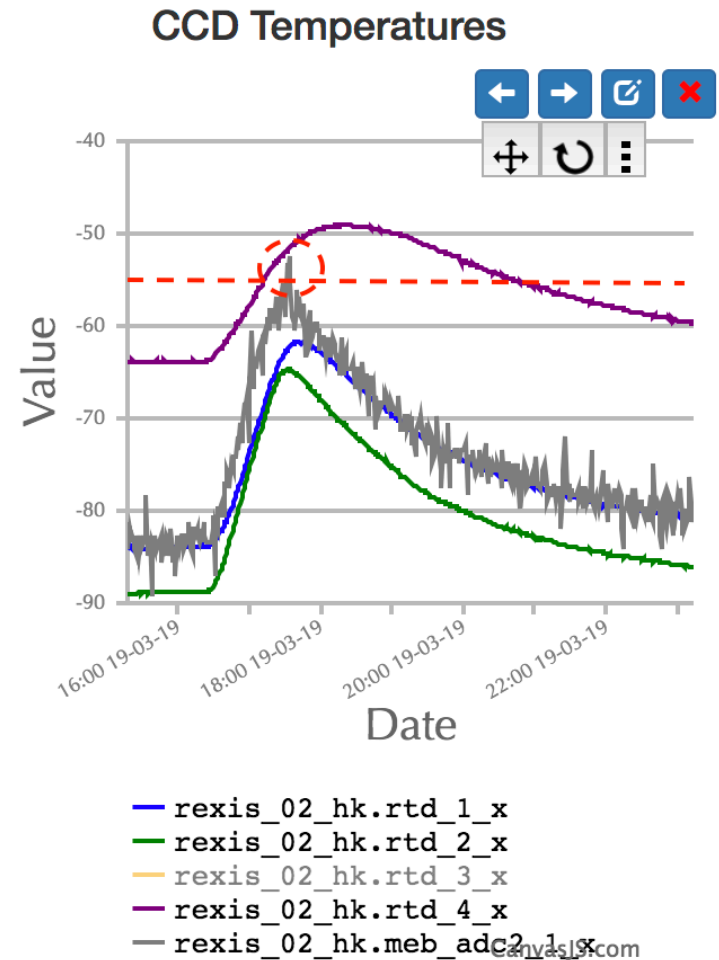
- **1 yellow alarm violations on hkos_d_2**
 - Limit value: 0.50V
 - Measured value: 0.57V (utc:2019-03-18T15:51:52.326Z)
- **2 yellow alarm violations on hkos_d_3**
 - Limit value: 16.20V
 - Measured value: 16.203V (utc:2019-03-19T10:07:20.309Z)
 - Measured value: 16.21V (utc:2019-03-23T10:20:08.373Z)
- **1 yellow alarm violations on hkos_a_1**
 - Limit value: 16.00V
 - Measured value: 16.06V (utc:2019-03-20T18:07:20.409Z)
- **1 yellow alarm violations on hkog_1**
 - Limit value: 0.45V
 - Measured value: 0.46V (utc:2019-03-21T08:14:16.487Z)
- **All single events during REXIS noisy period**
- **No cause for concern**



— rexis_02_hk.hkog_1_x
 — rexis_02_hk.hkog_2_x
 — rexis_02_hk.hkog_0_x

Crab Cal Alarms: Temperature

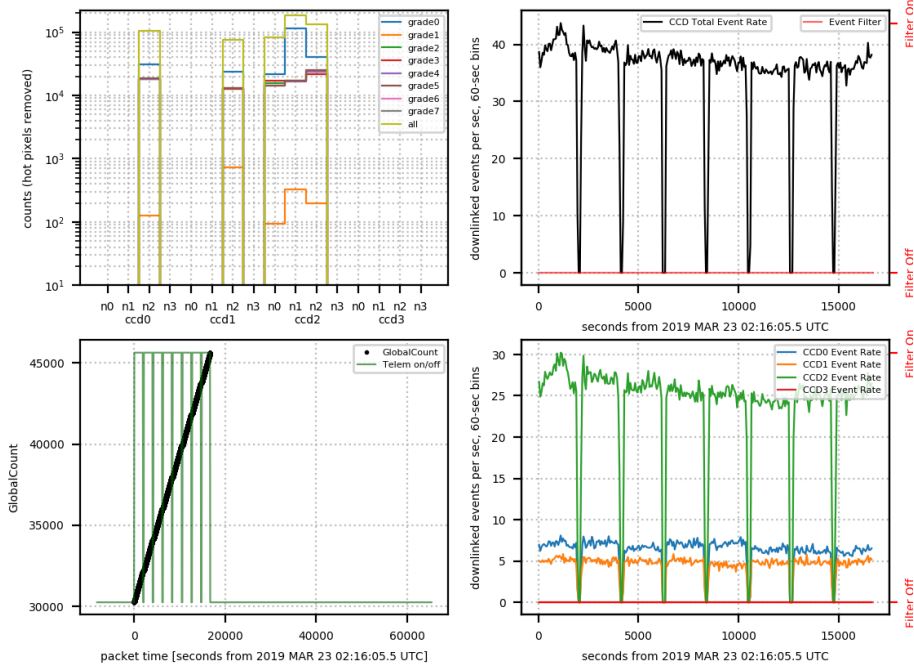
- 2 yellow alarm violations on meb_adc2_1 (CCDs)
 - Limit value: -55C
 - Peak Measured value: -52.5C
 - Peak Measured value: -54.7C
- Occurred during the burns on DOY078 and DOY082 due to solar array angles
- REXIS was not observing so it is not concerning that the CCD temperatures went this high



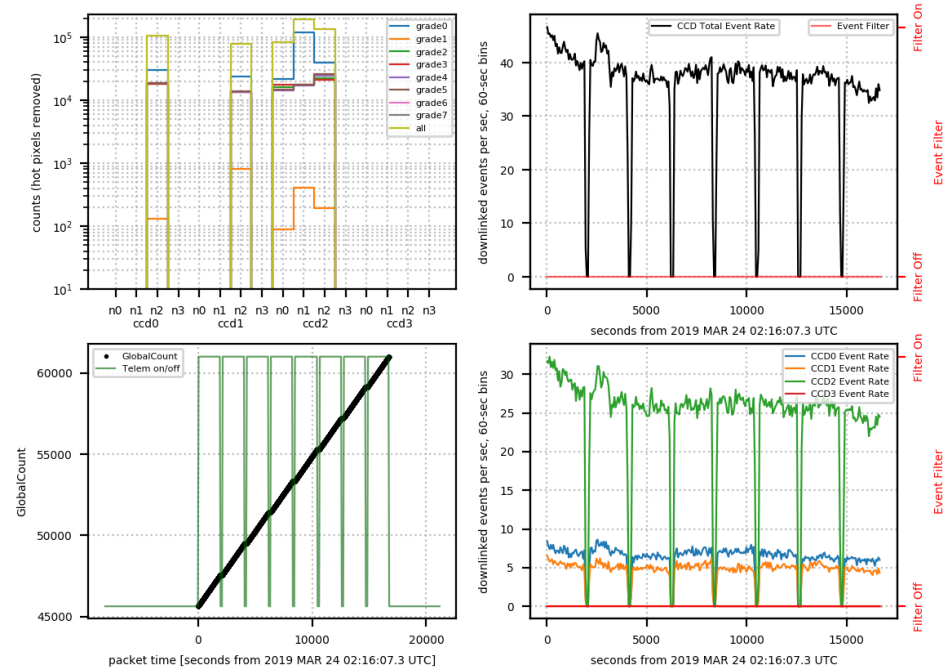
REXIS Crab Calibrations

- REXIS observed the Crab nebula to calibrate quantum efficiency
 - Data quality is sufficient to meet requirements.
- The count rate is elevated due to hot pixels likely caused by a more active solar state or angular separation from the sun.

REXIS CCD events: 15396 seconds of data from 2019 MAR 23 02:16:05.5 UTC

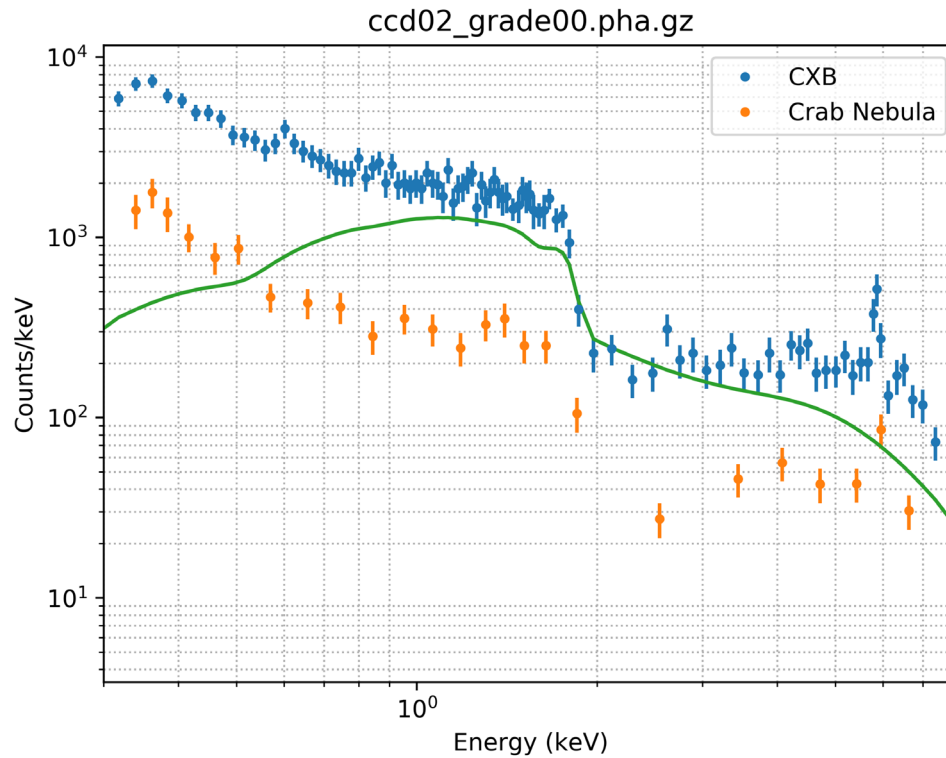


REXIS CCD events: 15376 seconds of data from 2019 MAR 24 02:16:07.3 UTC

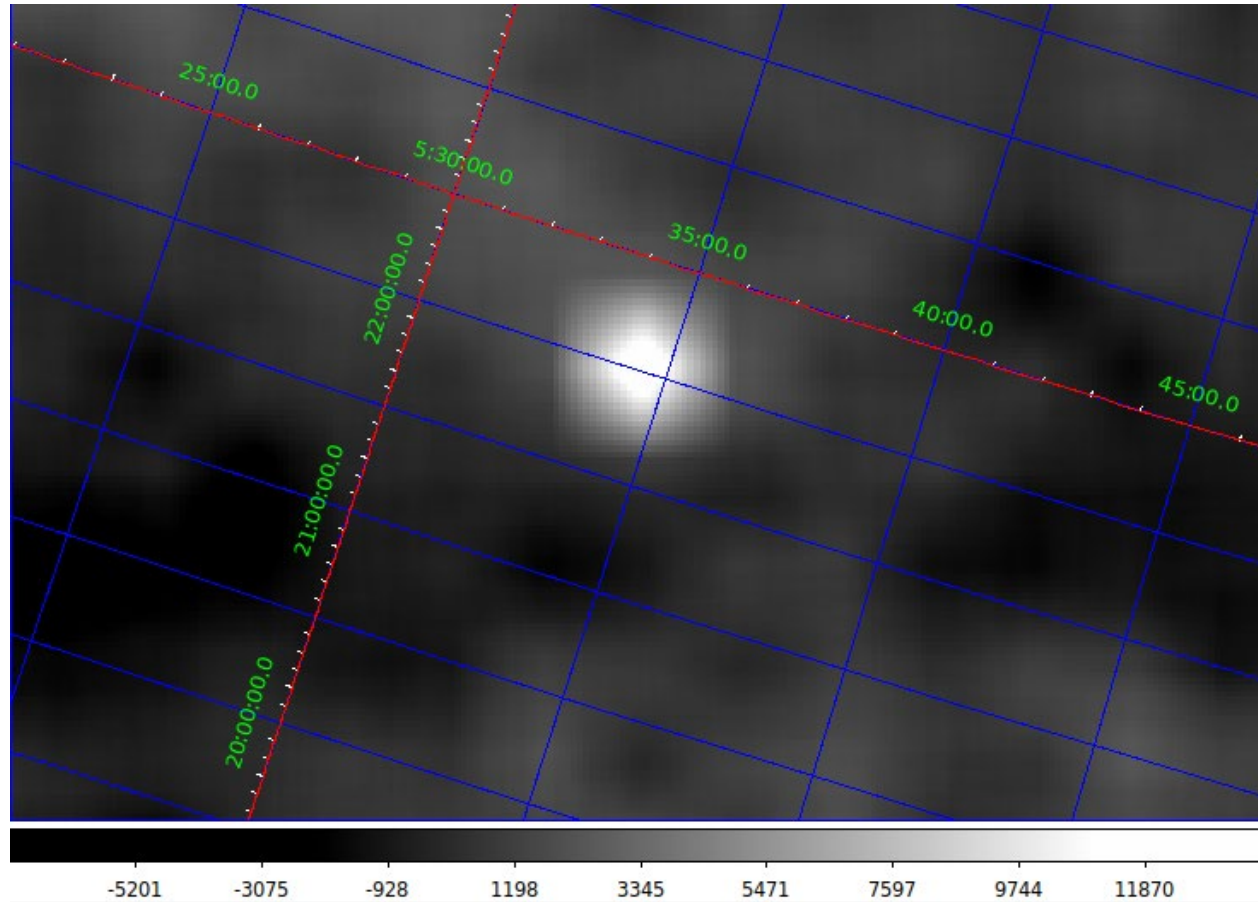


Crab Nebula Spectrum

Expected counts for one node and one pointing (approx. 30 minutes of data).



Crab sky image

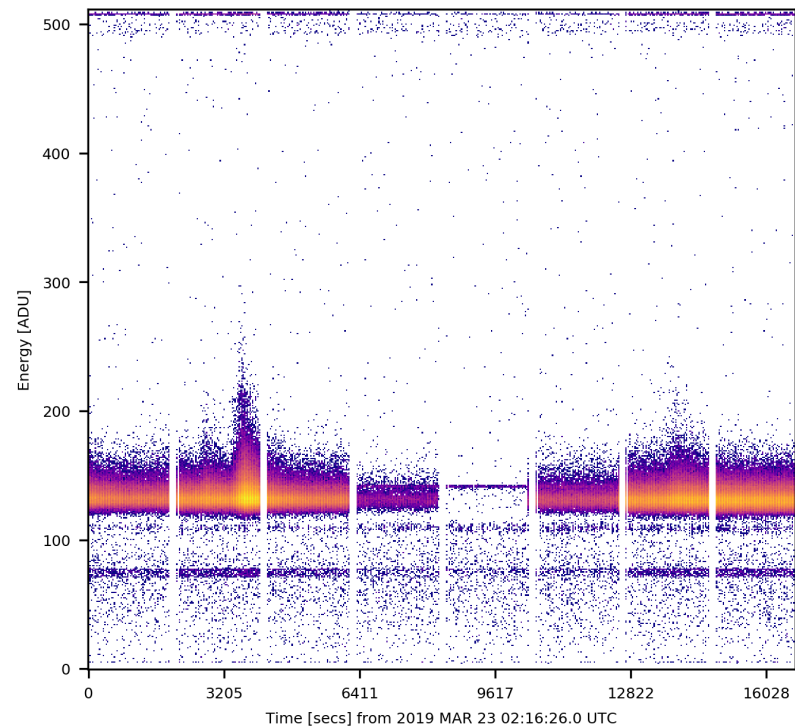


The first pointing has a reconstructed sky image SNR = 14.6 for March 23 and 24.

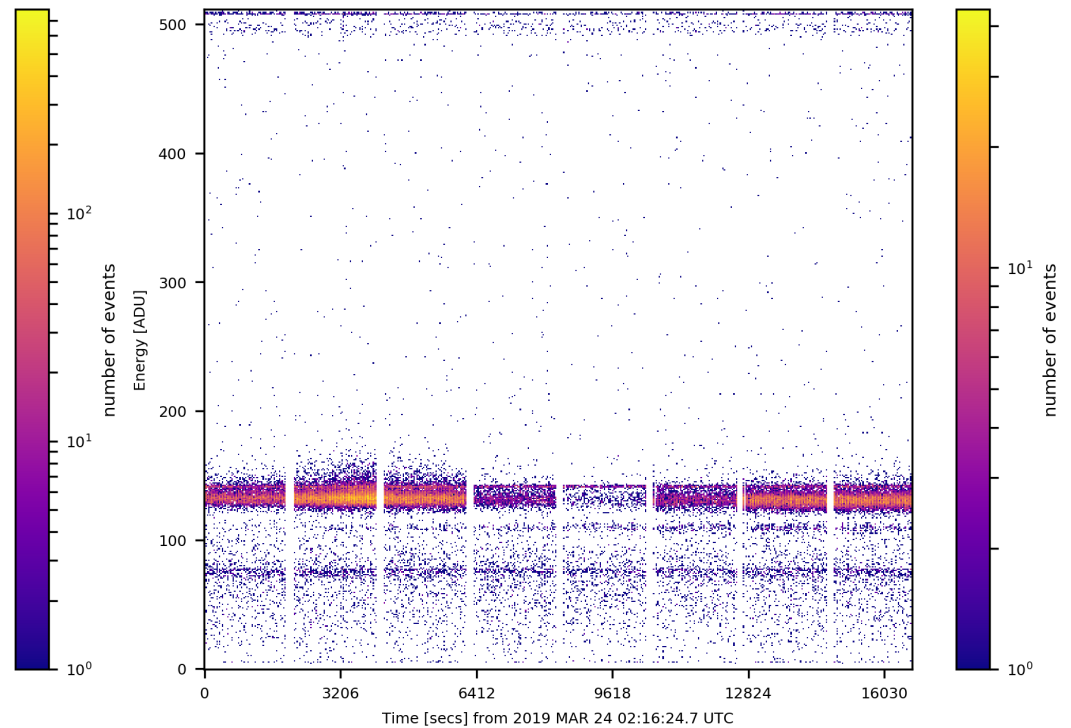
SXM Data

The sun was in the SXM FoV for some of the pointings.

REXIS SXM Histogram: 16701 seconds of data from 2019 MAR 23 02:16:26.0 UTC



REXIS SXM Histogram: 16672 seconds of data from 2019 MAR 24 02:16:24.7 UTC



Science Status and/or PI Status

Looking Ahead

| | 12 | | | | | | | 13 | | | | | | | 14 | | | | | | | 15 | | | | | | |
|---|---|------|------|------|------|-----|-----|---|------|------|------|------|-----|-----|---|-----|-----|-----|-----|-----|-----|---|-----|------|------|------|-----|-----|
| | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 |
| | 3/18 | 3/19 | 3/20 | 3/21 | 3/22 | ### | ### | 3/25 | 3/26 | 3/27 | 3/28 | 3/29 | ### | ### | 4/1 | 4/2 | 4/3 | 4/4 | 4/5 | 4/6 | 4/7 | 4/8 | 4/9 | 4/10 | 4/11 | 4/12 | ### | ### |
| | M | T | W | R | F | Sa | Su | M | T | W | R | F | Sa | Su | M | T | W | R | F | Sa | Su | M | T | W | R | F | Sa | Su |
| Week 8 - Tactical kickoff | xm1920 - 10:00am / 330° station | | | | | | | xm1921 - 6:00am / 270° station | | | | | | | xm1922 - 8:40pm / 130° station | | | | | | | xm1923 - 6:00pm / 90° station | | | | | | |
| Week 7 - SOS | xm1919 - 12:30pm / 0° station | | | | | | | xm1920 - 10:00am / 330° station | | | | | | | xm1921 - 6:00am / 270° station | | | | | | | xm1922 - 8:40pm / 130° station | | | | | | |
| Week 6 - J-A 1 | xm1918 - 3:20am / 230° station | | | | | | | xm1919 - 12:30pm / 0° station | | | | | | | xm1920 - 10:00am / 330° station | | | | | | | xm1921 - 6:00am / 270° station | | | | | | |
| Week 5 - J-A 2 | xm1917 - DS - EQ Start - 3:00pm / 45° station | | | | | | | xm1918 - 3:20am / 230° station | | | | | | | xm1919 - 12:30pm / 0° station | | | | | | | xm1920 - 10:00am / 330° station | | | | | | |
| Week 4 - TCR approval, Handshake | xm1916 - 12:30 Station - Flyby 7 | | | | | | | xm1917 - DS - EQ Start - 3:00pm / 45° station | | | | | | | xm1918 - 3:20am / 230° station | | | | | | | xm1919 - 12:30pm / 0° station | | | | | | |
| Week 3 - FA Kickoff | xm1915 - 12:30 Station - Flyby 6 | | | | | | | xm1916 - 12:30 Station - Flyby 7 | | | | | | | xm1917 - DS - EQ Start - 3:00pm / 45° station | | | | | | | xm1918 - 3:20am / 230° station | | | | | | |
| Week 2 - Final Build/Delivery/Test | xm1914 - 12:30 Station - Flyby 5 | | | | | | | xm1915 - 12:30 Station - Flyby 6 | | | | | | | xm1916 - 12:30 Station - Flyby 7 | | | | | | | xm1917 - DS - EQ Start - 3:00pm / 45° station | | | | | | |
| Week 1 - Review/Uplink | xm1913 - 10 AM Station - Flyby 4 | | | | | | | xm1914 - 12:30 Station - Flyby 5 | | | | | | | xm1915 - 12:30 Station - Flyby 6 | | | | | | | xm1916 - 12:30 Station - Flyby 7 | | | | | | |
| Week 0 - Execution | xm1912 - 10 AM Station - Flyby 3 | | | | | | | xm1913 - 10 AM Station - Flyby 4 | | | | | | | xm1914 - 12:30 Station - Flyby 5 | | | | | | | xm1915 - 12:30 Station - Flyby 6 | | | | | | |

Looking Ahead – Science Observation Forecast

| Task Name | Related DP # | MRD | Baseline Finish | WOY BL Finish |
|---|------------------|---------------------------|-----------------|---------------|
| Detailed Survey Science Observations | | | | |
| Baseball Diamond | | | | |
| PolyCam Observations | | | | |
| FlyBy 4A - 10 AM 3.7 km PolyCam Images (PRI.) | IP-4 | 121a, 121b, 728, 732, 734 | 3/28/2019 | 2019-13 |
| FlyBy 4B - 10 AM 3.7 km PolyCam Images (PRI.) | IP-4 | 121a, 121b, 728, 732, 734 | 3/29/2019 | 2019-13 |
| PolyCam Images | IP-4 | 121a, 121b, 728, 732, 734 | 3/31/2019 | 2019-13 |
| FlyBy 5A - 12:30 PM 5 km PolyCam Images (PRI.) | 35cm Shape model | 687a, 728, 732, 734 | 4/4/2019 | 2019-14 |
| FlyBy 5B - 12:30 PM 3.06 km PolyCam Images (PRI.) | IP-4 | 121a, 121b, 728, 732, 734 | 4/5/2019 | 2019-14 |
| FlyBy 6A - 12:30 PM 5 km PolyCam Images (PRI.) | 35cm Shape model | 687a, 728, 732, 734 | 4/11/2019 | 2019-15 |
| FlyBy 6B - 12:30 PM 3.06 km PolyCam Images (PRI.) | IP-4 | 121a, 121b, 728, 732, 734 | 4/12/2019 | 2019-15 |
| OLA Observations | | | | |
| -40° 10 AM 3.7 km OLA Scans | RIDE ALONG | 678b | 3/28/2019 | 2019-13 |
| 40° 10 AM 3.7 km OLA Scans | RIDE ALONG | 678b | 3/29/2019 | 2019-13 |
| 40° 12:30 PM 5 km OLA Scans | RIDE ALONG | 678b | 4/4/2019 | 2019-14 |
| -33° 12:30 PM 3.06 km OLA Spots | RIDE ALONG | 678b | 4/5/2019 | 2019-14 |
| -40° 12:30 PM 5 km OLA Spots | RIDE ALONG | 678b | 4/11/2019 | 2019-15 |
| 33° 12:30 PM 3.06 km OLA Spots | RIDE ALONG | 678b | 4/12/2019 | 2019-15 |
| OTES Observations | | | | |
| -40° 10 AM 3.7 km OTES Spectra | RIDE ALONG | 121, 728, 732, 734 | 3/28/2019 | 2019-13 |
| 40° 10 AM 3.7 km OTES Spectra | RIDE ALONG | 121, 728, 732, 734 | 3/29/2019 | 2019-13 |
| 40° 12:30 PM 5 km OTES Spectra | RIDE ALONG | 687a, 728, 732, 734 | 4/4/2019 | 2019-14 |
| -33° 12:30 PM 3.06 km OTES Spectra | RIDE ALONG | 121, 728, 732, 734 | 4/5/2019 | 2019-14 |
| -40° 12:30 PM 5 km OTES Spectra | RIDE ALONG | 687a, 728, 732, 734 | 4/11/2019 | 2019-15 |
| 33° 12:30 PM 3.06 km OTES Spectra | RIDE ALONG | 121, 728, 732, 734 | 4/12/2019 | 2019-15 |
| OVIRS Observations | | | | |
| Equator, 10 AM, 3.7 km OVIRS Spectra (RED.) | | 149d, 140a, 183a1, 155 | 3/29/2019 | 2019-13 |

For schedule of upcoming Data Blessings and Data Product completions:
view "Science Data Production" at https://orexwiki.lpl.arizona.edu/wiki/Detailed_Survey

Go Backs / Additional Comments

Redmine Upgrade Reminder

Redmine has been successfully migrated to the new environment. The new links are:

- OREx - <https://spaceredmine2-orex.p.external.lmco.com>
- Citrix - <https://spaceptl2.p.external.lmco.com>

Please ensure you are using the links noted above to access Redmine. Please disregard if you are not a Redmine database user on this project.

Weekly Instrument Status

OCAMS

- On, Nominal

OTES

- On and Nominal, requested Mike Nolan provide feedback on any additional detail needed to go into ISA 8611

OLA

- Off, Nominal

OVIRS

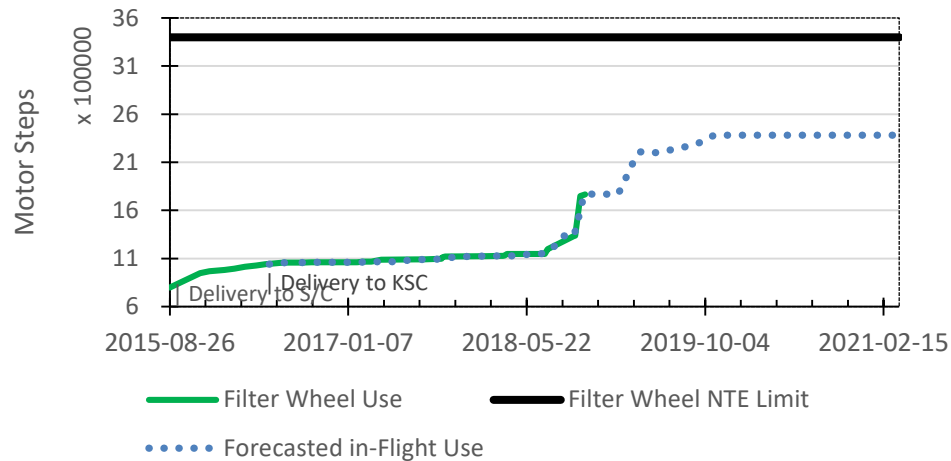
- Off and Nominal, requested Mike Nolan & Karl Harshman provide feedback on what additional information is needed to go into ISA 8610

REXIS

- Off and Nominal

OCAMS Mechanism Life Tracking

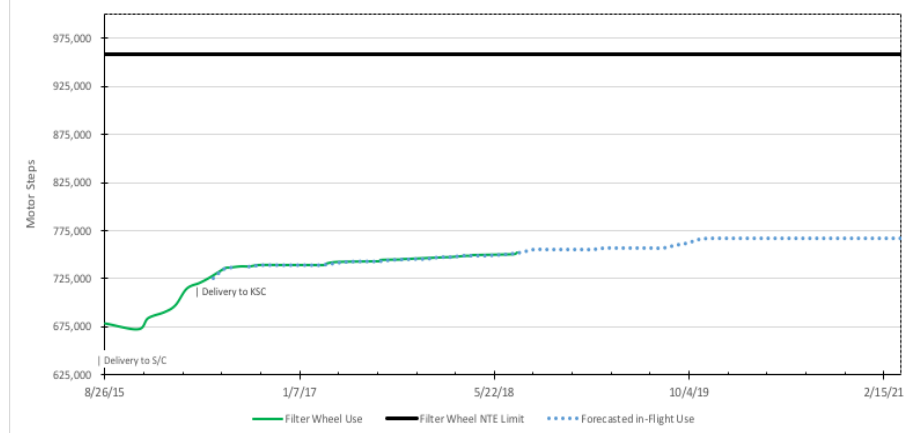
MapCam Flight Filter Wheel Margin



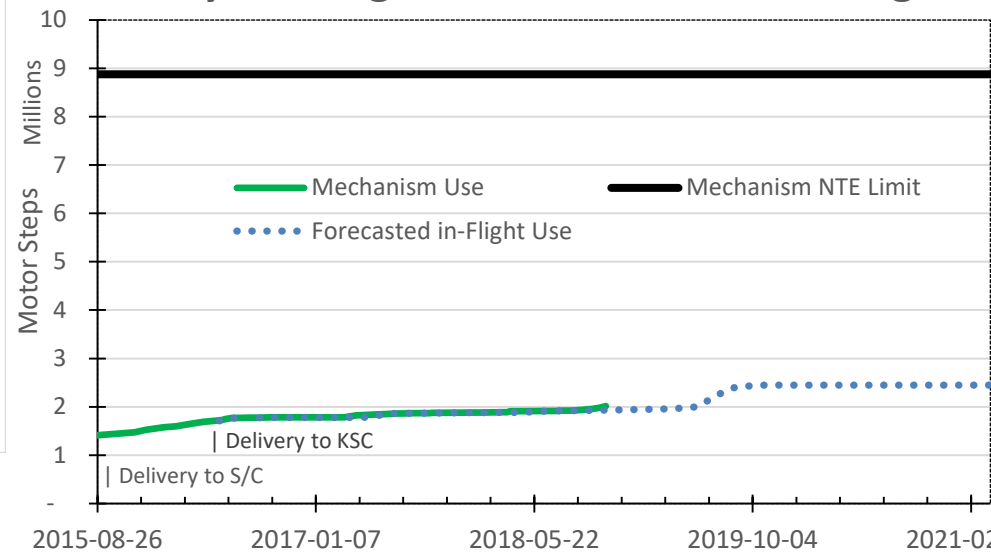
Status as of Feb 22, 2019

| | Launch (steps) | Flight (steps) | NTE (steps) |
|---------|----------------|----------------|-------------|
| MapCam | 1057475 | 774707 | 3400320 |
| SamCam | 738110 | 15246 | 958384 |
| PolyCam | 1775496 | 305594 | 8876160 |

SamCam Flight Filter Wheel Margin



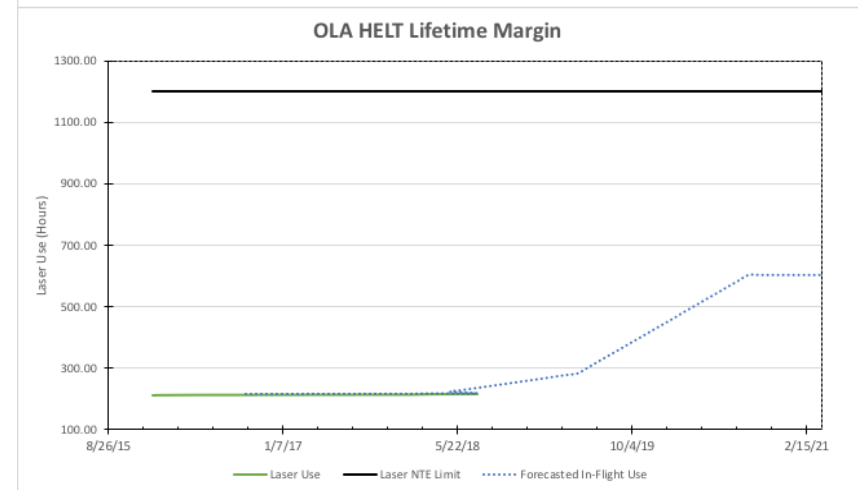
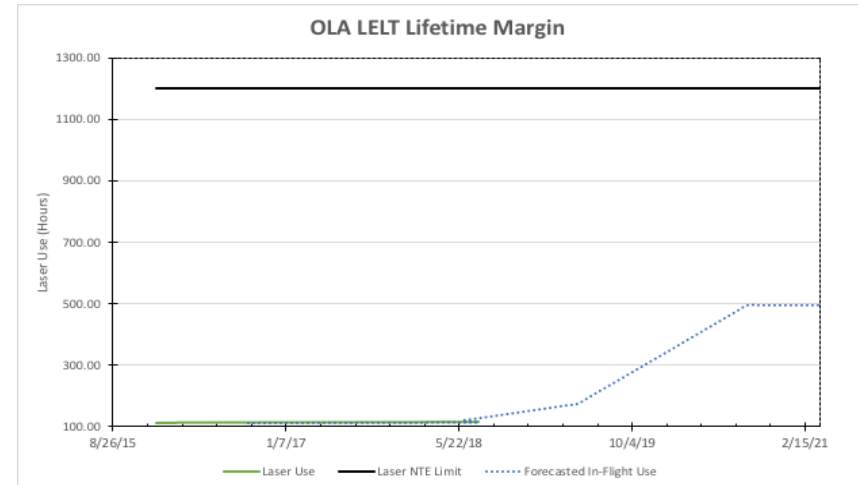
PolyCam Flight Focus Mechanism Margin



OLA Limited Life Laser Tracking

| | Launch (hours) | Flight (hours) | NTE Margin (hours) |
|------|----------------|----------------|--------------------|
| LELT | 110.70 | 4.29 | 1,085.01 |
| HELT | 212.50 | 15.12 | 983.80 |

Status as of Feb 1, 2019





SPOC Watch Item List

| Todays Date: 03/18/2019 | | SPOC Watch Item List | | | | | | | | | |
|-------------------------|------------|----------------------|---------|------------|--------------------------------|---|------------------------|----------------|----------------|-------------------|--|
| Status | Date Added | Date Removed | Item ID | Instrument | Title | Watch Item Description | Impact Type | Watch Item Age | ISA # or TCR # | Watch Item Action | Watch Item Action Plan |
| Open | 9/30/16 | | Item1 | REXIS | CCD Hot Pixels | Some hot pixels were noted on the CCD array. | Hardware Performance | 899 | | Watch | None as of now. If this item trends up, an assessment of masking pixels will need to be made. Update 08/06/2018: REXIS team reports that no additional hot pixels have been noted since the opening of this item, but they will continue to monitor. |
| Open | 4/3/18 | | Item10 | OLA | OLA T0 Intensity | L+10 day, L+6 mo, and L+10 mo On-orbit checkouts showed that OLA's T0 signal intensity (Return Intensity) is an order of magnitude lower than expected as compared with pre-launch spacecraft and stand-alone test data. The L+18 calibrations revealed that the T0 intensity is at pre-launch levels on both the Gold and Silver sides of OLA. SPOC has opted to close ISA 2257 and continue to monitor T0 intensity as a watch item. | Instrument Performance | 349 | | Watch | Monitor the T0 Intensity at the L+22 and L+30 OLA checkouts Update 08/06/2018: Based on results from L+18 and L+22, OLA has not been able to discern a temperature dependency with t0 Intensity value. We will continue to watch, but may never fully understand the cause. OLA can still operate as expected despite the inconsistency seen in the t0 value. |
| Open | 9/5/18 | | Item11 | OCAMS | OCAMS Error on Polycam Startup | During power on of the OCAMS cameras there is the possibility of a 4 byte packet being created due to line noise. SPOCFLIGHT is unsure what to do with this packet, so flags it as an error. So far this has only occurred twice during flight, both times with Polycam but it is possible this could occur with any of the OCAMS cameras. As OCAMS has only been used sparingly during Cruise, it is not certain how frequently this error will occur. | Instrument Performance | 194 | | Watch | Will monitor for future occurrences across all of the OCAMS cameras and assess if any action is warranted. |

Anomaly Response & Status

| ISA # | Date Created | Type | Priority | Title | Detailed Description - Action Plan | Notes | Status | Resolved Date | Need Date |
|-------|--------------|------------------|----------|---|--|-------|-------------|---------------|-----------|
| 8651 | 3/15/19 | Ground minor | Normal | Frame gap report falsely populated | | | In Progress | TBD | TBD |
| 8611 | 3/7/19 | Spacecraft Minor | Normal | Unexpected signal seen in OTES when not expected to be pointed at a target | In observations during the first week of Baseball Diamond observations, the OTES instrument showed signal after it was expected to have slewed off target. | | In Progress | TBD | TBD |
| 8610 | 3/7/19 | Spacecraft Minor | Normal | Unexpected signal seen in OVIRS when not expected to be pointed at a target | In observations during the first week of Baseball Diamond observations, the OVIRS instrument showed signal with an asteroid-like spectrum after it was expected to have slewed off target. | | In Progress | TBD | TBD |
| 8545 | 3/8/19 | Ground minor | Normal | Delay in MSA FEDS to SPOC FEDS data delivery | | | In Progress | TBD | TBD |
| 7704 | 1/10/19 | Spacecraft Major | Normal | Potential particles detected in NavCam images while in Benu Orbit-A Phase | Investigation and detailed image analysis are underway to determine if particles detected in a pair of NavCam images taken on 01/06/19 may have originated from Benu (or from other causes such as cold traps on the spacecraft, cosmic rays, etc.) MPB convened to determine if it was safe for the spacecraft to remain in orbit and agreed to remain in orbit but to collect more data for the remaining weeks of the orbit phase as a precaution. The details of the additional and more efficient and targeted observations are being worked. | | In Progress | TBD | TBD |
| 7518 | 1/4/19 | Ground Major | High | CenturyLink National Outage | A nationwide CenturyLink outage did not allow normal ground activities for OSIRIS-REx including uplink, downlink, and moving data between elements. Outage Start December 27, 2018 08:40 GMT Outage Stop December 29, 2018 10:12 GMT Approximately 50 hours | | In Progress | TBD | TBD |
| 7246 | 12/6/18 | Ground Minor | High | FOB connection down | A FOB connectivity issue was discovered when team members were looking for the 12/06/18 downlink of OpNav images (criticality 3) on the FOB. The OpNav images were obtained via SpocFlight. Investigation ongoing. | | In Progress | TBD | TBD |

Anomaly Response & Status

| ISA # | Date Created | Type | Priority | Title | Detailed Description - Action Plan | Notes | Status | Resolved Date | Need Date |
|-------|--------------|--------------|----------|---|---|-------|-------------|---------------|-----------|
| 6242 | 10/8/18 | Ground Minor | Normal | ASIST issues during AAM-2 OD downlink | <p>ASIST hung twice on the RTO machine, causing a few issues were seen over the past weekend that should be corrected.</p> <p>1 - When the RTO machine was rebooted after the first hung ASIST instance, it was brought up under a FSW account. It turns out that there are some processes that are tied to a Sys account so they did not run (ie, mid-pass queries, etc).</p> <p>2 - ASIST hung a second time between Friday & Saturday, so did not kick off auto-orx in time for Saturday's HGA pass. This required GDS to come in to fix the machine, restart ASIST, and manually run a playback and the post-pass queries. The alert process is tied to auto-orx so GDS was not notified.</p> <p>Two resolutions need to be worked.</p> <ul style="list-style-type: none"> - The RTO machine is due for a refresh and the continued hanging of ASIST may be resolved by this. - Monitoring tools should be set up on a separate machine to ensure that the key components of auto-orx run as expected: <ul style="list-style-type: none"> -- station binding occurs and data flows -- mid-pass query executes and posts to the FOB -- post-pass queries execute and post to the FOB | | In Progress | TBD | TBD |
| 5708 | 8/22/18 | GroundMinor | Normal | FEDS not reconstructing packets that encounter a frame counter rollover | <p>SPOC noticed a missing image line for one image. The image line had a packet in it which one of the frames within rolled over the frame counter. The packet was not reassembled and was not available from the FEDS at both LM and the SPOC.</p> | | In Progress | TBD | TBD |

Current ISA Status

| # | Status | Priority | Subject | Assignee | Updated |
|------|-------------|----------|--|------------------|---------------|
| 8672 | New | Normal | JPL Firewall Config Changed without LM Notification - affected Matlab license access/use and Maneuver Automation | Andy Calloway | 3/18/19 10:20 |
| 8651 | In Progress | Normal | Frame gap report falsely populated | Devin Poland | 3/15/19 10:19 |
| 8611 | In Progress | Normal | Unexpected signal seen in OTES when not expected to be pointed at a target | Karl Harshman | 3/18/19 9:07 |
| 8610 | In Progress | Normal | Unexpected signal seen in OVIRS when not expected to be pointed at a target | Karl Harshman | 3/18/19 8:52 |
| 8545 | In Progress | Normal | Delay in MSA FEDS to SPOC FEDS data delivery | Paul Falkenstern | 3/15/19 10:18 |
| 8542 | In Progress | Normal | M3D Late Update Products unable to be Radiated | Mark Fisher | 3/15/19 10:17 |
| 7994 | In Progress | Normal | ACSTBT Overburn | Ryan Olds | 2/18/19 12:19 |
| 7704 | In Progress | Normal | Potential particles detected in NavCam images while in Bennu Orbit-A Phase | Ron Mink | 2/1/19 8:22 |
| 7518 | In Progress | High | CenturyLink National Outages | Andy Calloway | 2/22/19 12:06 |
| 7246 | In Progress | High | FOB connection down | Paul Falkenstern | 3/1/19 10:11 |
| 6242 | In Progress | Normal | ASIST issues during AAM-2 OD downlink - redistribution of tasks between machines | Paul Falkenstern | 3/5/19 9:19 |
| 5708 | In Progress | Normal | FEDS not reconstructing packets that encounter a frame counter rollover | Mark Fisher | 3/4/19 10:30 |