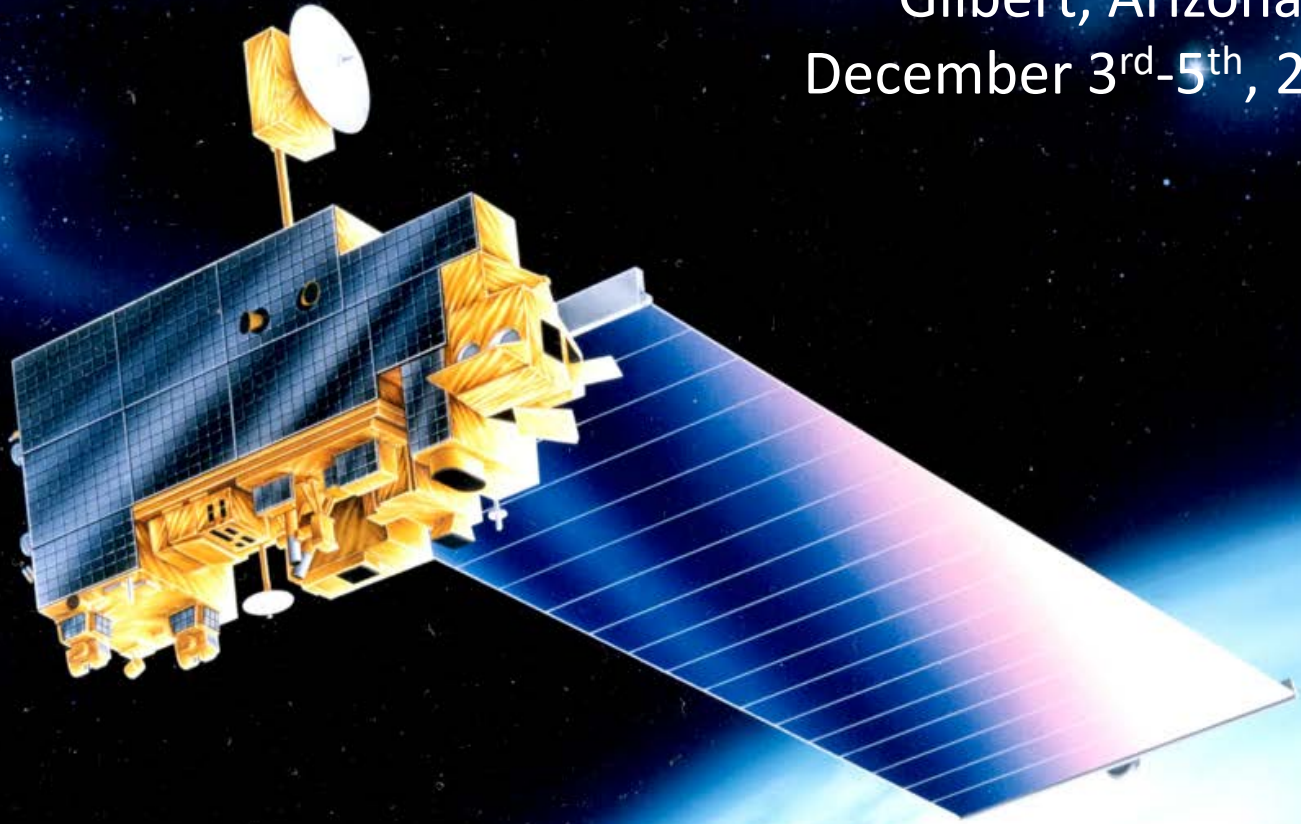


EOS Terra

Mission Status
Constellation MOWG
Gilbert, Arizona
December 3rd-5th, 2019

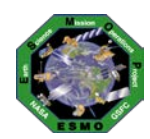


Dimitrios Mantziaras

Terra Mission Director - Code 428

phone 301-614-5234

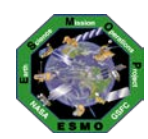
Dimitrios.C.Mantziaras@nasa.gov



Topics



- **Mission Summary**
- **Spacecraft Subsystems Summary**
- **Recent Activities**
- **Inclination Adjust Maneuvers**
- **Conjunction History**
- **End-Of-Mission Plan**
- **Upcoming Activities**
- **Summary**
- **Backup Slides**



Terra Mission Overview



Terra Features

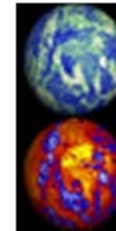
- **Launch Date:** December 18, 1999 (Atlas IIAS, VAFB)
- **Orbit:** 705 km, Sun-synchronous polar, 98.2° Inclination, 10:30 AM MLT descending node
- **Instrument Payload:**
 - **ASTER (SWIR, TIR & VNIR)** - Advanced Spaceborne Thermal Emission and Reflection Radiometer (Japan)
 - **CERES (Fore & Aft)** - Clouds and the Earth's Radiant Energy System (USA – Langley)
 - **MISR** - Multi-angle Imaging Spectro-Radiometer (USA – JPL)
 - **MODIS** - Moderate Resolution Imaging Spectro-radiometer (USA – GSFC)
 - **MOPITT** - Measurement of Pollution in the Troposphere (Canada)
- **Project Management:** Earth Science Mission Operations (ESMO)
- **Spacecraft Flight Operations:** Contracted by GSFC to KBR team and supported by NASA NENs and TDRSS
- **Instrument Operations and Science Data processing:** Performed at respective Instrument Locations where developed
- **Mission Duration:** Successfully completed Prime mission of 5 years. Currently in Extended Operations.
- **Distributed Active Archive Centers:** LP DAAC – MODIS, ASTER; Langley DAAC – CERES, MISR, MOPITT

Science

- The primary objective of the Terra Mission is to simultaneously study clouds, water vapor, aerosol, trace gases, land surface and oceanic properties, as well as the interaction between them and their effect on the Earth's energy budget and climate.



ASTER



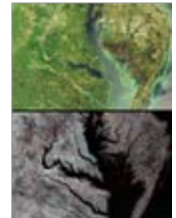
CERES



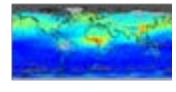
Terra (EOS AM-1)



MODIS

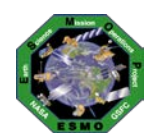


MISR



MOPITT

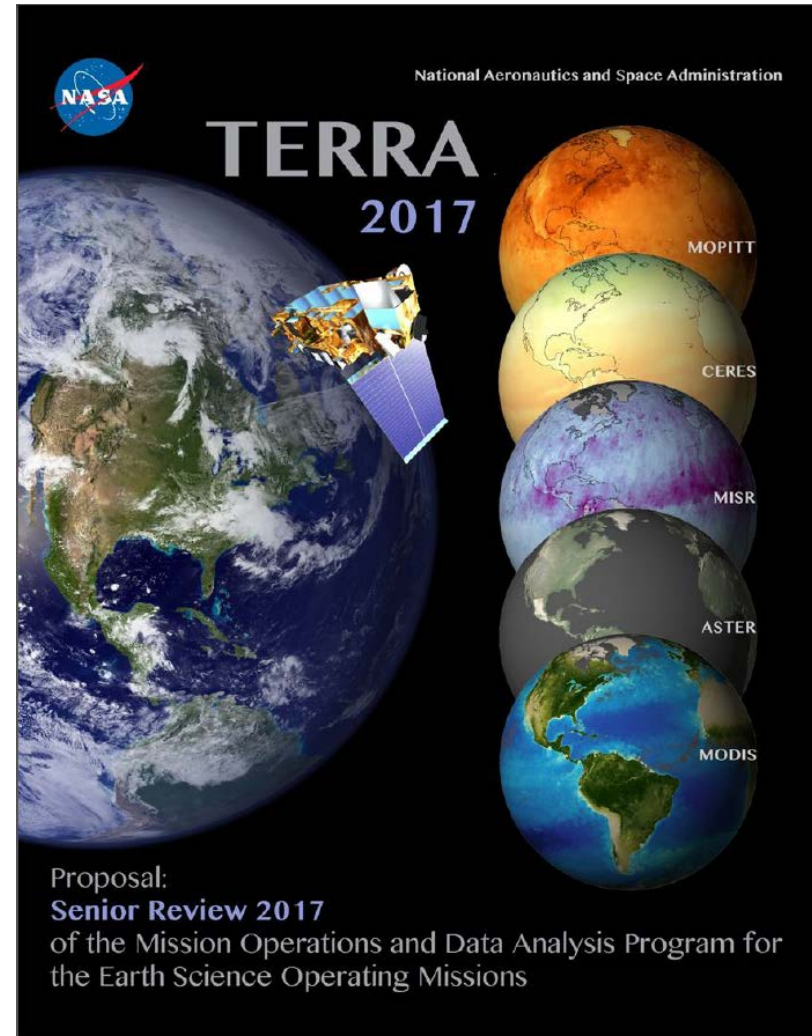


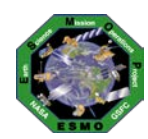


EOS Terra Mission Summary



- **May 2017: Mission Extension Senior Review Proposal Panel Report**
 - Mission extension through FY23
 - Senior Review submission delivered in Mar 2017
 - **Next submission ~March 2020**
- **10/06/18: Terra 100,000 Orbits**
- **12/18/18: Terra 19-Year Anniversary**
 - 5-Year Design Life, 6 year goal
 - Reliability Estimates thru 2025+
 - Consumables through 2020+
- **2019 Inclination Adjust Maneuvers**
 - Spring 2019 Inclination Maneuvers
 - **IAM #54 – March 6th**
 - Fall 2019 Inclination Maneuvers
 - **IAM #55 – October 17th**
 - **IAM #56 – October 23rd**
- **EOS Flight Operations Annual Review #14 – Jan/Feb 2020**





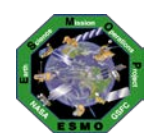
Terra Spacecraft Status

(NO CHANGE)



All subsystems on Primary Hardware except as noted

- **Command & Data Handling (CDH) – Nominal**
 - Solid State Recorder (SSR) – holds ~1 orbit of data
 - 11 of 58 SSR Printed Wire Assembly tripped off resulting in reduced recording capacity
- **Communications (COMM) – Nominal**
 - DAS Modulator Failure on 05/29/2008 (Operating on Redundant)
 - Use K-Band primarily, X-Band as needed for Science Playback
- **Electrical Power System (EPS) – Good**
 - Battery Cell and Heater Controller Anomaly (10/13/2009)
 - 1 of 24 Solar Panel Failed (9/24/2000)
- **Flight Software (FSW) – Nominal**
- **Guidance, Navigation & Control (GN&C) – Nominal**
 - Minor loss of sensitivity in SSSTs – updated tracker biases to compensate
- **Propulsion (PROP) – Nominal**
- **Thermal Control System (TCS) – Nominal**
- **Instruments (INST) – Nominal**
 - Only ASTER SWIR failed, all other instruments are taking science

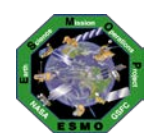


Spacecraft Component Status

(NO CHANGE)



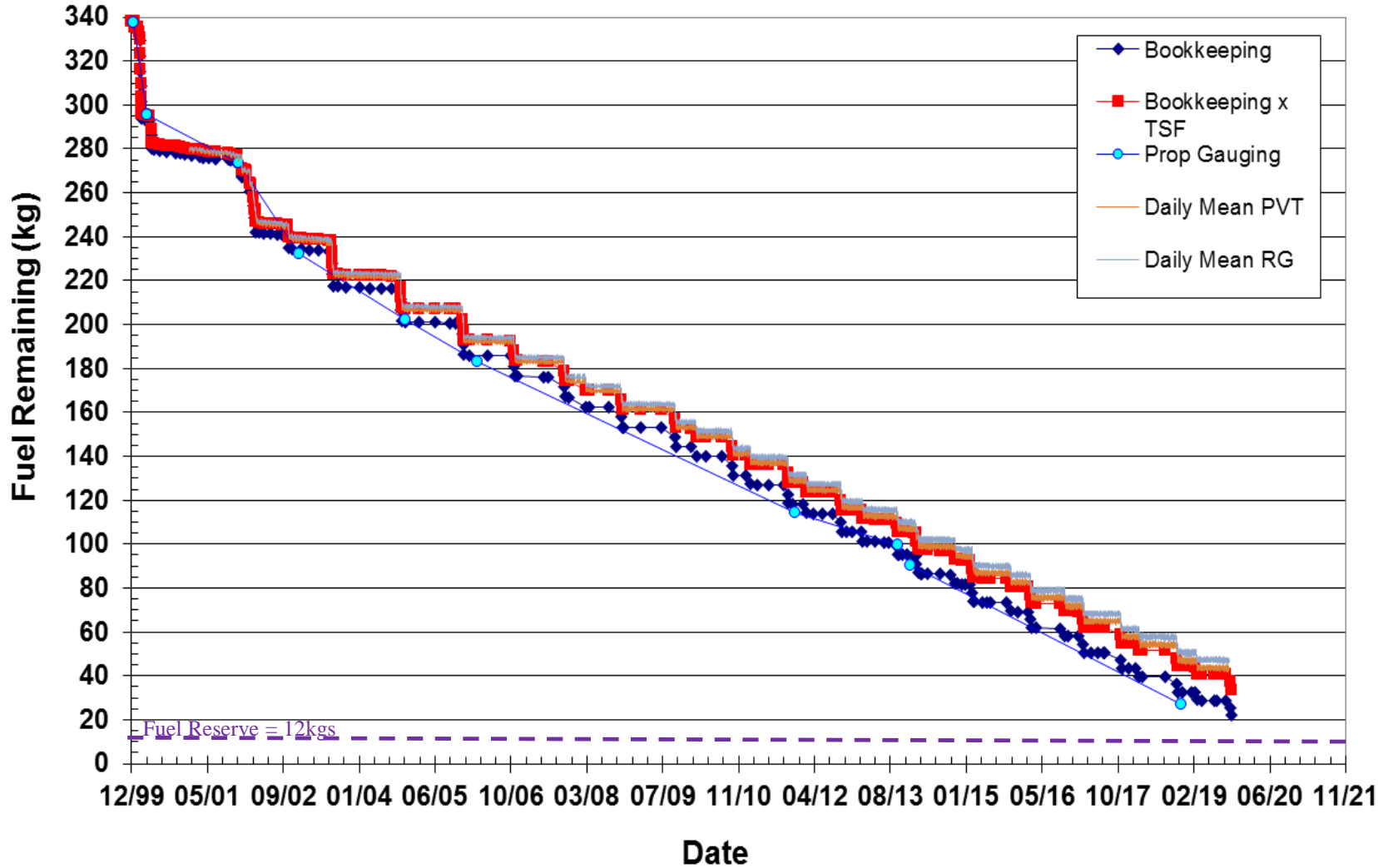
| Subsystem | Component | Design | Current | Capability | Comments |
|-------------|--------------|--------------------|--------------------|---|---|
| EPS | Solar Array | 24 Shunts | 23 Shunts | 96% | Degradation is minimal. Fully capable of supporting mission thru 2020 unless future failures occur |
| | Batteries | 108 Cells | 107 Cells | 99% | BBAT cell #50 failed on 10/15/09. |
| | Batteries | 36 Heater Controls | 28 Heater Controls | 77% | BBAT heater control failed on 4 of 9 heater groups on primary, redundant, and survival. Battery cell charging/discharging and the remaining heater groups are preventing cells from freezing. PBAT heater control performance is nominal. |
| TCS | MOPITTCPHTS | 2 | 2 | Full | Performance is nominal |
| | SWIR CPHTS | 2 | 2 | Full | Performance is nominal |
| | TIR CPHTS | 2 | 2 | Full | Random temperature fluctuations. Performance within requirements. |
| SCC | SCC | 2 | 2 | Full | Performance is nominal |
| COMM | HGA | 2 | 2 | Full | MDA BITE failures occur 2-3/week due to SEU. Recoverable |
| | X-Band | 2 | 1 | 75% | DAS Modulator 1 failed (50%). Solid State Power Amplifier redundancy still available (100%). |
| | CTIU | 2 | 2 | Full | Performance is nominal |
| | OMNI | 2 | 2 | Full | Performance is nominal |
| CDH | MO | 2 | 2 | Full | Drift rate changes have occurred since 10/3/10. Performance is within requirements. |
| | SFE | 2 | 2 | Full | SFE SEU occur 1-2/year. Recoverable |
| | SSR | 59 PWA | 48 PWA | 81.4% | Recycle of Data Memory Unit likely to recover all Printed Wire Assemblies |
| GNC | IRU | 3 | 3 | Full | Performance is nominal. 2 for 3 redundancy |
| | TAM | 2 | 2 | Full | Performance is nominal |
| | SSST | 2 | 2 | Full | Minor loss of sensitivity in SSSTs – tracker biases updated |
| | CSS | 2 | 2 | Full | Performance is nominal |
| | ESA | 2 | 2 | Full | Performance is nominal |
| | FSS | 1 | 1 | Full | Performance is nominal. Not currently used |
| | RWA | 4 | 4 | Full | Performance is nominal. 3 for 4 redundancy |
| | MTR | 3 | 3 | Full | Performance is nominal |
| Prop | REAs | 16 | 16 | Full | Performance is nominal |
| Instruments | ASTER - SWIR | 2 | 2 | 0% | Cooler is unable to maintain detector temperature. Science Data is unusable (Fully Saturated) and is no longer being recorded. Still collecting and monitoring Engineering data. |
| | ASTER - TIR | 2 | 2 | Full | Performance is nominal |
| | ASTER - VNIR | 2 | 2 | Full | Performance is nominal |
| | CERES - Aft | 1 | 1 | Full | Performance is nominal |
| | CERES - Fore | 1 | 1 | Full | Performance is nominal |
| | MISR | 2 | 2 | Full | Performance is nominal |
| | MODIS | 2 | 1 | 50% | Power Supply #2 failed, Formatter A degraded, cross-strapped. All Science is nominal. |
| MOPITT | 2 | 1 | 50% | Displacer B and Chopper Motor failed. Loss of redundancy only. All Science is nominal. | |

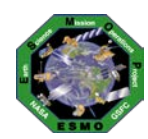


Lifetime Estimates Fuel Remaining



Terra Fuel Usage Comparison





Recent Activities



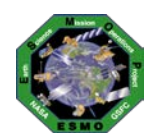
• Propulsive Maneuvers

- Inclination Adjust Maneuver (IAM) #52 executed on 10/25/18
- Inclination Adjust Maneuver (IAM) #53 executed on 11/01/18
- Drag Make Up Maneuver (DMU) #108 executed on 12/04/18
- Drag Make Up Maneuver (DMU) #109 executed on 01/30/19
- Risk Mitigation Maneuver (RMM) #14 (DMU #110) executed on 02/26/19
- Inclination Adjust Maneuver (IAM) #54 executed on 03/06/19
- Risk Mitigation Maneuver (RMM) #15 (DMU #111) executed on 04/12/19
- Drag Make Up Maneuver (DMU) # 112 executed for 06/27/19
- Risk Mitigation Maneuver (RMM) #16 (DMU #113) executed on 07/12/19
- Risk Mitigation Maneuver (RMM) #17 (DMU #114) executed for 09/12/19
- Inclination Adjust Maneuver (IAM) #55 executed on 10/17/19
- Inclination Adjust Maneuver (IAM) #56 executed on 10/23/19
- Inclination Adjust Maneuver (IAM) #57 and #58 planned for February 2020
 - IAM #58 Planned to be final IAM
 - After IAM #58 Mean Local Time (MLT) will be allowed to drift

• Calibration Maneuvers

- MODIS Roll #191 executed on 10/29/18
- MODIS Roll #192 executed on 11/27/18
- MODIS Roll #193 executed on 12/26/18
- MODIS Roll #194 executed on 01/25/19
- MODIS Roll #195 executed on 02/23/19
- MODIS Roll #196 executed on 03/25/19
- MODIS Roll #197 executed on 06/22/19
- MODIS Roll #198 executed on 07/21/19
- MODIS Roll #199 executed on 08/20/19
- MODIS Roll #200 executed for 09/19/19
- MODIS Roll #201 executed for 10/18/19
- MODIS Roll #202 planned for mid-November 2019

- **08/16/18:** Safe Hold Sequence TONS update uplink
- **09/27/18:** Terra ATC Expired
- **09/27/18 – 10/05/18:** ATC Expire Instrument Recovery
- **10/06/18:** Terra Orbit #100,000
- **10/08/18:** MOPITT Decontamination Hot Cal.
- **10/08/18:** Terra HGA Power Off Anomaly
- **10/11/18:** ACE-B Rate Sensor Select Anomaly
- **01/06/19:** Terra Lunar Induced Solar Eclipse #44
- **01/21/19:** ASTER Skipped EDU
- **02/14/19:** Terra TMON 7 (ACE-B Sensor Select) Update Uplink
- **03/11/19 – 03/22/19:** MOPITT Decontamination and Hot Cal.
- **05/15/19 – 05/16/19:** Aborted MODIS SRCA XTALK minor data impact
- **06/10/19 – 06/13/19:** ASTER Science Team and Interface Meeting
- **06/27/19:** SSR PWA #38 Failure (MISR Buffer)
- **07/02/19:** CERES Solar Presence Sensor Response Patch Uplink
- **07/26/19:** MOPITT Sieve #4/PMC #2 Failure (SEU)
- **08/07/19 – 08/21/19:** MOPITT Sieve #4/PMC #2 Failure Recovery
- **08/21/19 – 08/22/19:** MODIS SRCA XTALK Calibration
- **08/30/19:** SSR PWA #55 Failure (MODIS Buffer)
- **09/18/19 – 09/19/19:** Terra SWAMP/Science Team Meeting @ Boulder, Co

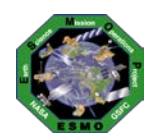


Inclination Adjust Maneuvers



- **Inclination Adjust Maneuvers used to maintain nominal spacecraft mean local time (descending node) of 10:30 AM**
 - 03/06/2019 IAM #54 (320 sec burn) executed successfully
 - 10/17/2019 IAM #55 (320 sec burn) executed successfully
 - 10/23/2019 IAM #56 (320 sec burn) executed successfully

- **Predictions indicate need to perform 3-4 maneuvers per year**
 - ~~2017: (2 in Spring, 2 in Fall) -- COMPLETE~~
 - ~~2018: (1 in Spring, 2 in Fall) -- COMPLETE~~
 - ~~2019: (1 in Spring, 2 in Fall) -- COMPLETE~~
 - 2020: (2 in Spring, 0 in Fall) -- Feb 2020; last inclinations for Terra mission



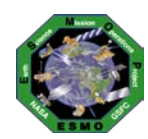
Terra High Interest Events



| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 2018 (T1-T4) | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 6 |
| Tier 3 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| Tier 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 2019 (T1-T4) | 0 | 2 | 0 | 2 | 0 | 2 | 1 | 1 | 1 | 2 | | | 11 |
| Tier 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | | | 4 |
| Tier 4 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | | | 4 |

Tier Definitions: T1 – Notify (email/phone), T2 – Conduct Briefing, T3 – Plan Maneuver, T4 – Execute Maneuver

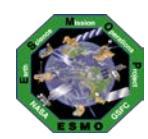
- **2010:** 5 HIEs – 1 DAM performed on 01/22/2010: Terra vs. 34700 CA on 1/23 @ 20:46z
- **2011:** 20 HIEs – 2 DAM planned and waived off
- **2012:** 19 HIEs – 1 maneuver waived off due to CA
- **2013:** 17 HIEs – 7 that required significant action
- **2014:** 24 HIEs – 6 that required DAM execution or nominal maneuver waive-off and replanning
- **2015:** 33 HIEs – 8 that required DAM execution or nominal maneuver waive-off and replanning
- **2016:** 11 HIEs – 0 that required DAM execution or nominal maneuver waive-off and replanning
- **2017:** 8 HIEs – 1 that required DAM execution or nominal maneuver waive-off and replanning
- **2018:** 6 HIEs – 2 that required DAM execution or nominal maneuver waive-off and replanning
- **2019 to present:** 8 HIEs that required DAM execution or maneuver waive-off and replanning
 - DAM #14 performed on 2/25; Terra vs. 28598 with TCA = 2/26 @ 07:16z
 - DAM #15 performed on 4/12; Terra vs. 37518 with TCA = 4/13 @ 02:49z
 - DAM #16 performed on 7/12; Terra vs. 80008 with TCA = 7/13 @ 14:44z
 - DAM #17 performed on 9/12; Terra vs. 35403 with TCA = 9/13 @ 04:21z



ESMO RMM Planning Automation



- **ESMO has updated its Close Approach (CA) Process Flow to move towards a more Automated approach**
 - Prepares for future increased object catalog w/ Space Fence
 - Reduces workload for each event
 - Keeps solution “at the ready” for short notice events
- **ESMO Flight Dynamics team has developed an autonomous ephemeris generation tool**
- **Ephemeris built off optimal and constrained cases solved for by the Collision Risk Management System (CRMS)**
- **CARA accepts delivery of these ephemeris and ships them to JSpOC for screening**
 - Delivery to CARA is now automatic based on logic built into the FDS ephemeris tool to whittle ephemeris down from maximum of eight generated to a maximum of five delivered
 - Any other options needed can be sent manually
- **Screening results automatically compiled and outputted via an email report from CRMS**
- **Auto Ephemeris Generation implemented in February 2017**
- **Auto Ephemeris Delivery implemented in February 2018**
- **ESMO has completed CARA Devolution Parallel Operations and now in an “interim” quasi-devolved state (other presentation)**

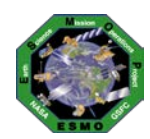


Retrograde Maneuver Preparation



- **Summer 2018 Terra was predicted to violate Ground Track Error (GTE) due to RMM execution March 2018**
 - FOT planned summer IAM with Retrograde (orbit lowering) component
 - Summer IAM was not needed and was waived off
 - Terra did not violate GTE limits as predicted
- **FOT developing pure retrograde capability**
 - **Short Duration Retro : Complete**
 - Only executed to prevent GTE violation
 - Performed in S/C night
 - Design Complete -- ORR Held on 5/30
 - **Long Duration Retro : Ongoing**
 - Constellation Exit and Deorbit Burns
 - Executed in S/C Day and Night
 - ASTER to be in Safe Mode
 - Design Completion : [Target Dec. 2019](#)
- **Reviewed retrograde plume risk with S/C Manufacturer, ETD and ASTER IOT**
 - No contamination concerns from retrograde plume

- **FOT Developing Pure Retrograde Capability**
- **All instrument configurations understood**



Upcoming Activities



Upcoming Activities

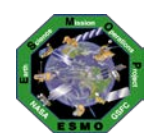
Retrograde Maneuver Development (Long Duration) **December 2019**

Terra 20-year Anniversary **12/18/19**

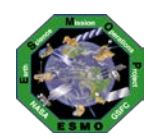
Spring Inclinations **February 2020**

Senior Review Submission **March 2020**

Decommission Preparation **Ongoing**



FUTURE MANEUVER PLANS



Terra End-of-Mission Plan



Document Status

- Rev D - End-of-Mission Plan Document has been revised and under review cycle
- **APPROVED - NASA HQ Signed in October 2018**

Content

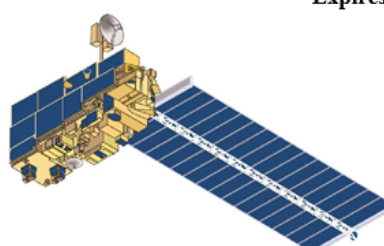
- Terra will continue normal operations through **October 2020**
- Once all non-reserved fuel has been used, MLT will be drifted to 10:15 AM
- **September 2022**, Terra exits constellation
- Remaining fuel used to lower perigee prior to spacecraft passivation
- Exit plan is consistent with the current Constellation Operations Coordination Plan


Effective Date: June 2017
Expiration Date: June 2019

Earth Science Mission Operations Project, Code 428
428-PLAN-002

**Earth Observing System (EOS)-Terra
End of Mission Plan (EOMP)**

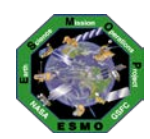
Revision D
Effective: June 2017
Expires: June 2019



 Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and
Space Administration

Check the ESDIS/ESMO/EDOS Doc Server at <https://eps1-cm.csa.nasa.gov/cm3/> to verify that this is the correct version prior to use.



Terra Lifetime Maneuvers

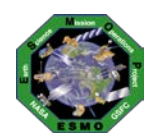


- **Remaining Orbit Maintenance Maneuvers**

| Mission Year | Inclination Maneuvers | DMU Maneuvers | Fuel Used (kg) | Fuel Remaining (kg) |
|--------------|-----------------------|---------------|----------------|---------------------|
| 2018 | 1 Spring, 2 Fall | 4 | 10.783 | 44.998 |
| 2019 | 1 Spring, 2 Fall | 5 | 10.752 | 34.245 |
| 2020 | 2 Spring, 0 Fall | 3 | 7.103 | 27.141 |
| 2021 | 0 Spring, 0 Fall | 4 | 0.363 | 26.779 |
| 2022 | 0 Spring, 0 Fall | 4 | 0.477 | 26.302 |

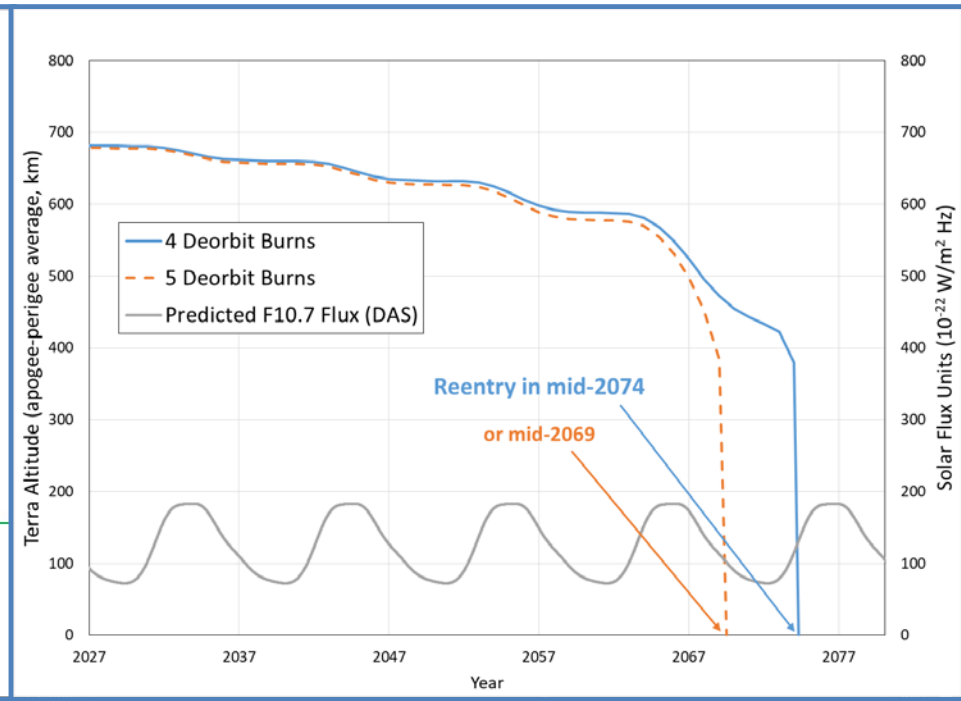
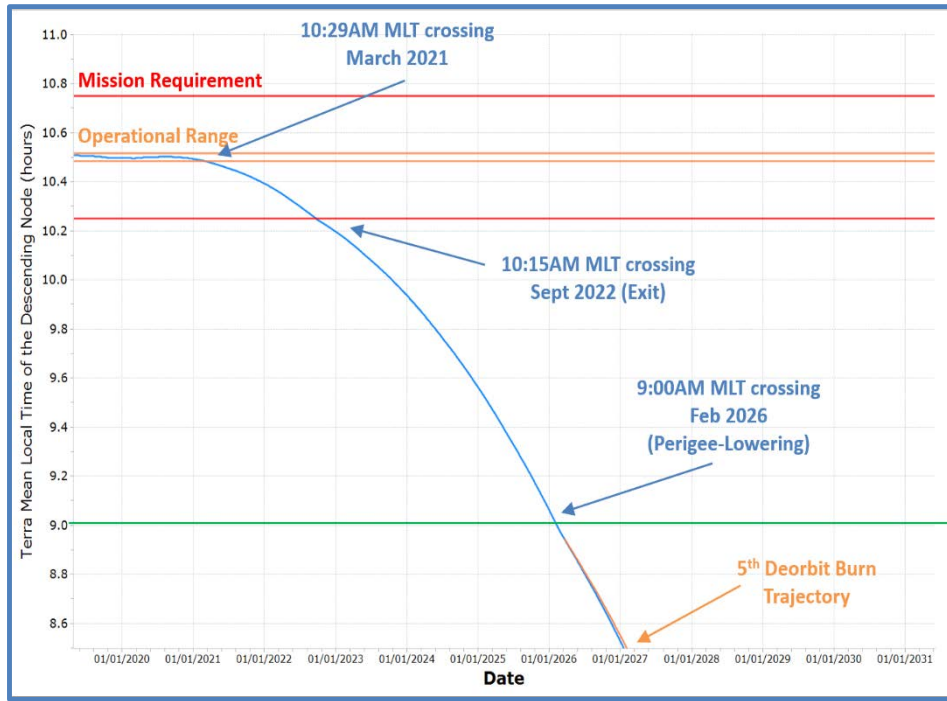
- **Constellation Exit and Deorbit Maneuvers**

| Mission Date | Maneuver Type | Fuel Used (kg) | Fuel Remaining (kg) |
|--------------|------------------------------|----------------|---------------------|
| 09/22/2022 | Envelope Exit #1 | 3.456 | 22.846 |
| 09/22/2022 | Envelope Exit #2 | 3.436 | 19.410 |
| 2/12/2026 | Deorbit #1 | 3.417 | 15.993 |
| 2/17/2026 | Deorbit #2 | 3.398 | 12.594 |
| 2/19/2026 | Deorbit #3 | 3.380 | 9.215 |
| 2/24/2026 | Deorbit #4 | 3.361 | 5.854 |
| 2/26/2026 | Deorbit #5 (95% Duration) | 3.142 | 2.712 |

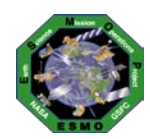


Terra Lifetime Maneuvers

MLT and Altitude Predictions



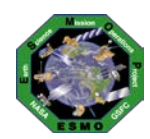
| Decommissioning Plan | Exit Year | Deorbit Year | De-orbit Burns (#) | Apogee at Depletion (km) | Perigee at Depletion (km) | End of Mission (EOM) | EOM to Reentry (years) | Reentry Date |
|---|-----------|--------------|--------------------|--------------------------|---------------------------|----------------------|------------------------|--------------|
| Baseline (4 x 320-sec burns) | 2022 | 2026 | 4 | 691.9 | 671.8 | 2026 | 48 | 2074 |
| Baseline plus 5th 300-sec deorbit burn | 2022 | 2026 | 5 | 691.1 | 667.0 | 2026 | 43 | 2069 |



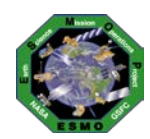
Summary



- **Terra remains very healthy 19+ years into the mission**
 - Electrical Power Subsystem performance has been stabilized following 2009 anomaly
 - Fuel Remaining to continue operations to 2020 and beyond
- **Data Capture percentages continue at ~100%**
- **Collision Avoidance events continue to be part of routine ops**
 - Low atmospheric drag is providing additional challenges
- **End of Mission Plan (Rev D) **officially approved/signed****
 - Goddard signed/approved version made it to NASA HQ on 05/11/18
 - **All signatures received in October 2018**
- **Plan is for Terra to Exit Constellation in August 2022 and end mission in early 2026**

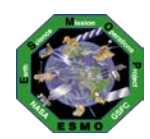


Questions



Additional Slides

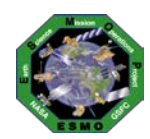
- **Orbit / Inclination / MLT Maintenance**
- **WRS Ground Track Error**
- **EPS Performance**
- **Drag Model Info**
- **OSMA Waiver Email**
- **NASA HQ Email**



Orbit/Inclination/MLT Maintenance



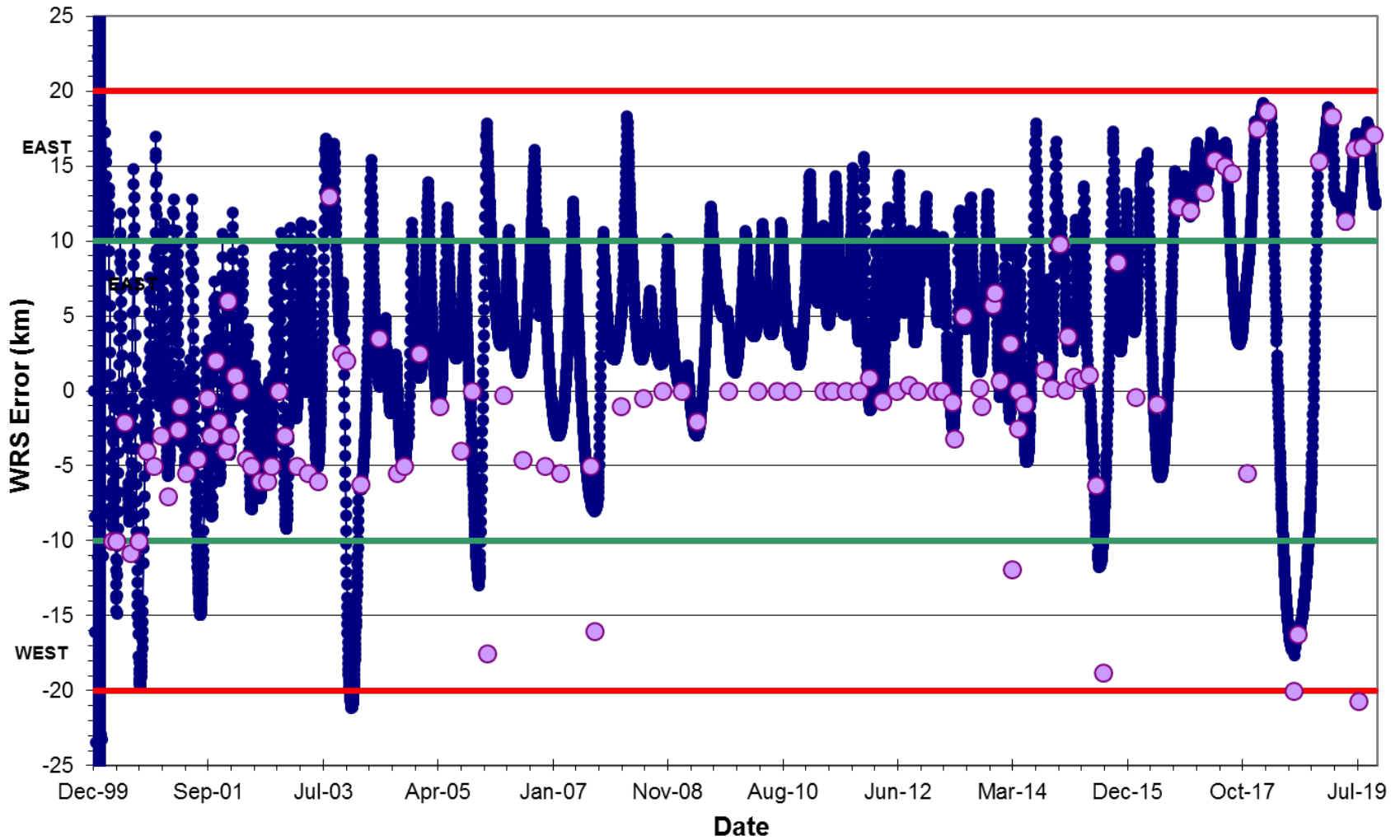
- **Requirement:** Mean Local Time (MLT) maintained between 10:15 and 10:45 measured at the Descending Node.
- **Goal:** Maintain Terra mean local time of the descending node (MLTDN) below 10:31.
- **Constraint:** OCO-2 has requested Terra maintain a MLT less than 10:31 for the duration of its lifetime to maintain a safe separation at the poles.
- **Requirement:** Maintain WRS-2 ground track error, 0 +/-20 km.
- **Requirement:** Maintain Frozen orbit with Argument of Perigee at 90 degrees +/-20 and Eccentricity of 0.0012 +/- 0.0004.
- **Constraint:** Maximum burn duration limited to 320 seconds by spacecraft manufacturer. Complete yaw slews and inclination maneuvers during spacecraft orbital night. Maneuver close to spring and fall equinox to maximize efficiency.

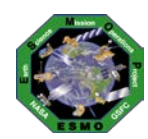


WRS Ground Track Error (GTE)



TERRA WRS Groundtrack Error at the Descending Node
(Maneuver planning targets included)

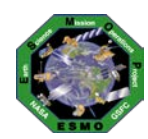




EPS Subsystem Performance



- **Bus Load: Nominal**
 - Average bus load: [2306.74 Watts](#)
 - Average housekeeping current: [11.903 A](#)
 - Total instrument current: [7.121 A](#)
- **Battery Performance: Nominal with exception of anomalous BBAT condition**
 - BBAT cell # 50 failed following IAM #24 on October 13 (DOY 286) 2009
 - BBAT Voltage Temperature curve changed to better reflect a failed cell
 - BBAT heater control electronics (HCE) anomaly occurred following IAM #24 on October 13 (DOY 286) 2009
 - Performed soft reset, power cycle, switching to redundant side and re-enabling one of the nonfunctioning heater groups to recover HCE functionality without success
 - At least 4 of 9 BBAT heater groups are no longer being controlled
 - Heater control setpoints changed for controllable heater groups to reduce the thermal gradient
 - PBAT Charge/Discharge Ratio was reduced from 105% to 104% on April 25, 2013 in an effort to extend PBAT life
 - PBAT BPC Channel A Disabled January 14, 2014; increases BBAT cold temperatures due to increased discharge
 - PBAT Charge/Discharge Ratio was reduced from 104% to 103% on August 20, 2015 in an effort to extend PBAT life
 - A number of PBAT cells (18, 26, 38) appear to be decreasing in pressure [could be long-term effect of C/D Ratio change in 2015]
 - Pressure analysis by EPS/TCS Engineer and battery experts concluded that batteries were in good health
- **Battery Temperatures: Nominal with exception of anomalous BBAT data**
 - PBAT and half of BBAT Battery temperatures are regulated by flight software to $\approx -1^{\circ}\text{C}$ to -5°C
 - Almost half of BBAT cell temperatures are below normal (but stable) in the -5°C to -13°C range
- **Battery Voltages (BBAT)**
 - Minimum battery voltages at [66.114 Volts](#)
- **Solar Array**
 - Last offset adjustment performed on [January 7, 2019](#)
 - Average drift rate for the month, [0.062 deg/day](#)
 - Present offset drift rate is [decreasing](#)
- **BBAT Cell with Lowest Temperature** (excluding Cell #50)
 - Cell # 21 : [--10.69°C](#)
 - Thermal Gradient(avg): [7.21°C](#)



OSMA Official Direction



From: Aleman, Suzanne M. (HQ-GD000)
Sent: Wednesday, November 02, 2016 11:37 AM
To: Yuhas, Cheryl L. (HQ-DK000) <cheryl.l.yuhas@nasa.gov>
Cc: Liou, Jer-chyi (JSC-XI411) <jer-chyi.liou-1@nasa.gov>; Hull, Scott M. (GSFC-5920) <scott.m.hull@nasa.gov>
Subject: FW: Terra need for Orbital Debris waivers

Hi Cheryl,

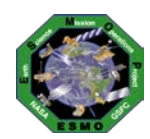
I received your voice mail regarding the question on whether a waiver is needed for the 25 year rule for TERRA.

I consulted with J. C Liou on this question we have concluded that a waiver is not needed. Please see the e-mails below.

Please let me know if you have any questions.

Best regards,

Sue Aleman
NASA HQ OSMA
MMOD Program Executive



NASA HQ Official Direction



From: Webb, Charles E. (HQ-DK000)

Sent: Friday, February 02, 2018 3:45 PM

To: Mantziaras, Dimitrios C. (GSFC-4280) <dimitrios.c.mantziaras@nasa.gov>

Cc: Watson, Wynn J. (GSFC-4280) <wynn.j.watson@nasa.gov>; Moyer, Eric M. (GSFC-4280) <eric.m.moyer@nasa.gov>; Dell, Gregory T. (GSFC-4280) <gregory.t.dell@nasa.gov>; Thome, Kurtis J. (GSFC-6180) <kurtis.thome@nasa.gov>; Wilson, Jamie Leigh (HQ-DK000)[SCIENCE SYSTEMS AND APPLICATIONS INC] <jamie.l.wilson@nasa.gov>; Cauffman, Sandra A. (HQ-DK000) <sandra.a.cauffman@nasa.gov>; Ianson, Eric (HQ-DK000) <eianson@nasa.gov>; Neeck, Steven (HQ-DK000) <steven.neeck@nasa.gov>

Subject: Re: Terra Future Maneuver Plans Slides

Dimitrios,

Sandra Cauffman has given HQ/ESD concurrence on the IAM plans for Terra through 2020. You're all set for the February maneuvers and beyond.

Have a good weekend,

Charles