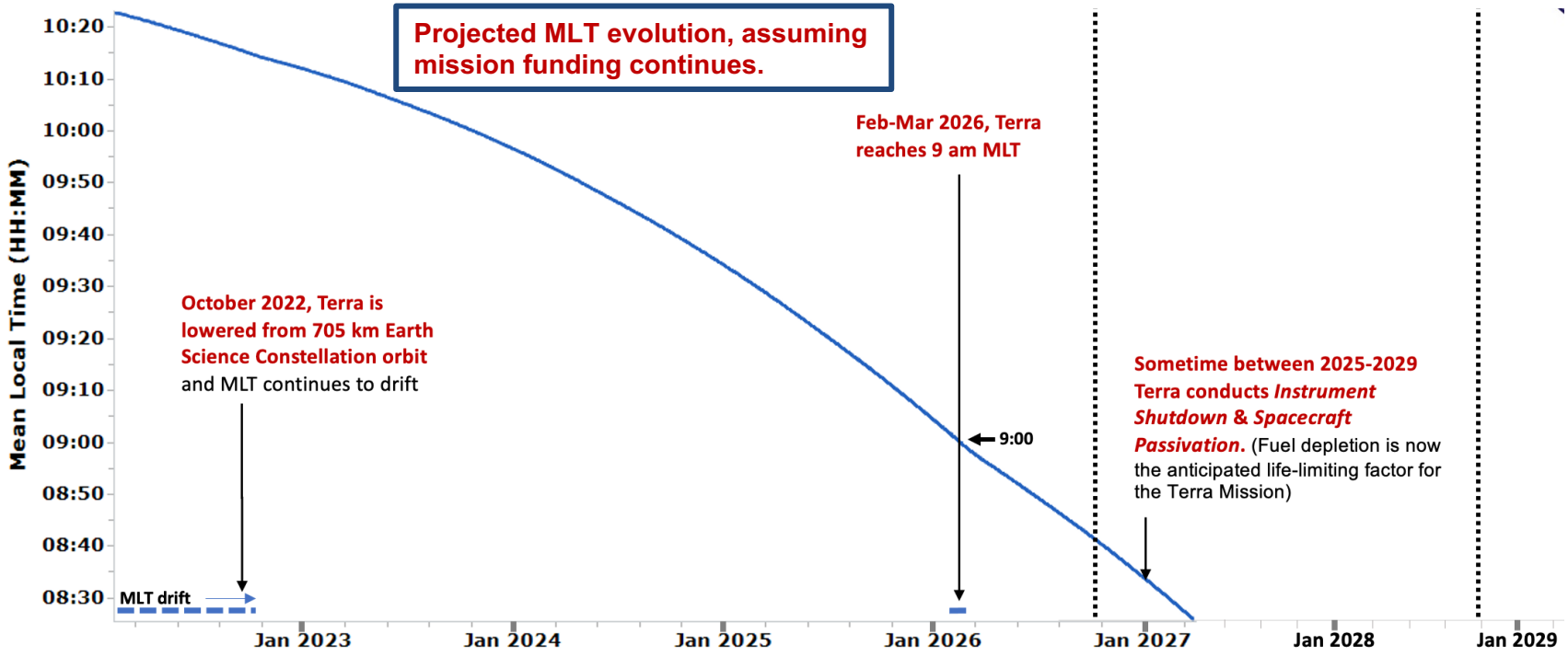
Terra Summary

(as of August 31, 2022)

- **Spacecraft Bus** – Nominal Operations (Very Good Health)
  - All Components remain on primary hardware with following exception:
    - Direct Access Modulator (X-Band) primary side failed in 2008. No impact to Nominal Operations
    - Battery Cell Failure (1 of 108). No impact to Nominal Operations
    - Battery Heater Control failure (effects 4 of 18 Heater Groups). No impact to Nominal Operations
    - Gyro B degraded performance – No impact to Nominal Operations
    - Solar Array Panel Failure (3 of 24) in Sept 2000, Jan 2022, March 2022. No impact to Nominal Operations
    - Reduced load in September 2022 to allow for routine operations if another Solar Array Panel fails – No impact
- **MODIS** – Nominal Operations (Very Good Health – loss of redundancy)
  - All voltages, currents, and temperatures as expected
  - Power Supply Failure (June 2001). Switched to redundant. Single point of failure
  - Formatter Degradation (Sept 2002). Switched to redundant. Single point of failure
  - Current configuration MODIS Solar Diffuser Screen Door Failed to Close (May 6th, 2003); Solar Diffuser Door was configured to remain open indefinitely in July 2003
  - allows for Nominal Science
- **MISR** – Nominal Operations – (Excellent Health)
  - All voltages, currents, and temperatures as expected
- **ASTER** – Nominal Operations (TIR and VNIR – Excellent Health, SWIR – Failed)
  - All voltages, currents, and temperatures as expected.
  - SWIR – Compressor unable to maintain detector temperature after April 2008. No Science Data
  - VNIR – Nominal Operation
  - TIR – Nominal Operation
- **CERES-FORE and AFT (FM-1 & FM-2)** – Nominal Operations (Excellent Health)
  - All voltages, currents, and temperatures as expected.
  - Cross-Track and Biaxial Modes fully functioning.
  - All channels remain operational.
- **MOPITT** – Nominal Operations. (Good Health – loss of redundancy, partial blockage)
  - All voltages, currents, and temperatures as expected
  - Displacer-B Failure (May 2001). Operating Compressor B at reduced speed to minimize spacecraft disturbance
  - Chopper motor failure resulting in ~3% blockage (August 2001)

Terra Orbit Evolution

- On 2/27/2020, Terra completed all spacecraft maneuvers related to maintaining a 10:30 mean local time (MLT) equator crossing and a 705 km orbit altitude and began to freely drift.
- Between February 2000 – 2002, Terra's MLT was between 10:30 and 10:45. Since February 2002, its southward equatorial crossing MLT had always been between 10:28 and 10:32.
- Terra will complete its Constellation Exit maneuvers from the Earth Science Constellation in October 2022, with no further maneuvers planned except collision avoidance maneuvers and eventual perigee lowering maneuvers.
- Terra is projected to reach and exceed a 10:15 MLT equatorial crossing in October 2022 and a 9:00 MLT equatorial crossing by February - March 2026.
- Science observations and practical applications of the Terra data continue in concert with the changing MLT.



Terra Spacecraft Bus Status

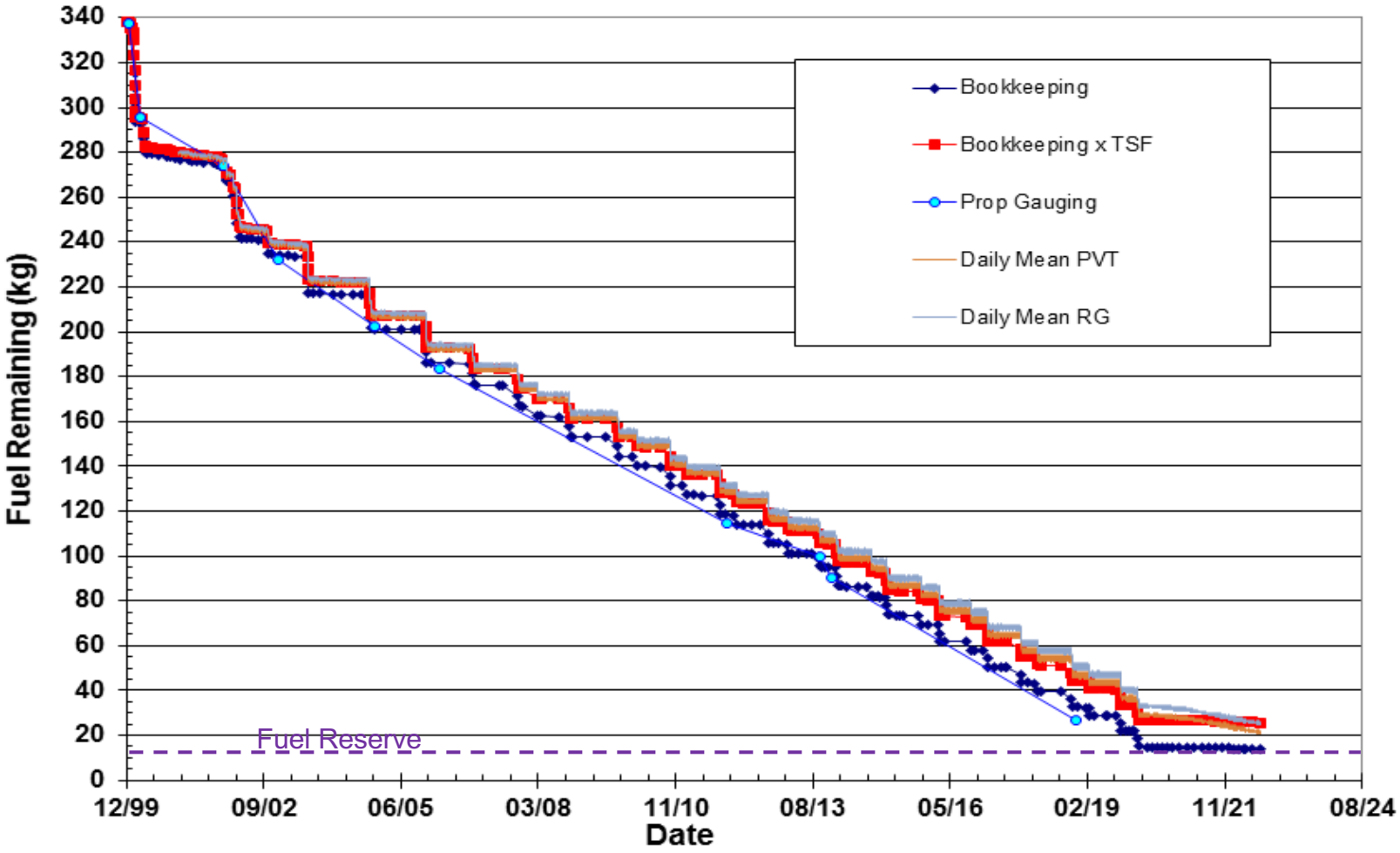
(see Acronyms list at end)

Subsystem	Component	Design	Current	Capability	Comments
Electrical Power	Solar Array	24 Shunts	21 Shunts	88%	Degradation is minimal. Fully capable of supporting mission through 2027 unless future failures occur
	Battery Cells	108 Cells	107 Cells	99%	BBAT cell #50 failed on 10/15/09
	Battery Heaters	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
Thermal Control	MOPITT CPHTS	2	2	Full	Performance is nominal
	SWIR CPHTS	2	2	Full	Performance is nominal
	TIR CPHTS	2	2	Full	Performance is nominal
Spacecraft Control Computer	SCC	2	2	Full	Performance is nominal
Communications	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
Command and Data Handling	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	59 PWA	Full	Performance is nominal
Guidance, Navigation and Control	IRU	3	2	Full	IRU-B Performance degraded. Loss of redundancy, Developing Earth Sensor Rate Estimator as contingency for future IRU failure
	TAM	2	2	Full	Performance is nominal
	SSST	2	2	Full	Performance is nominal
	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
Propulsion	REAs	16	16	Full	Performance is nominal

Terra Spacecraft Bus is in Very Good Health although has lost some redundancy

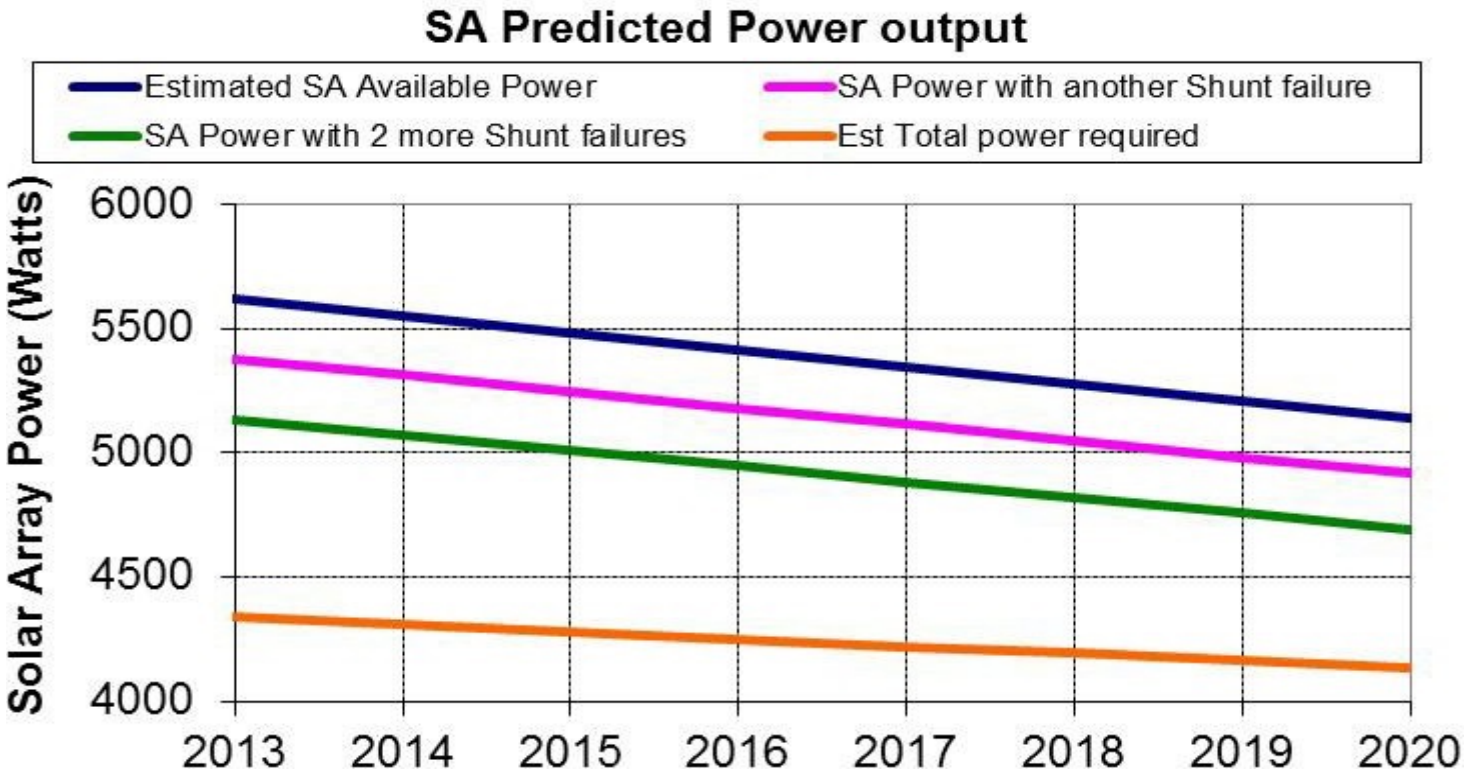
Terra Fuel Usage: Life of the mission

(August 2022)



- Inclination Maneuvers and Drag-Make Up Maneuvers are no longer being performed on Terra
- Terra maintains reserve fuel to perform debris avoidance maneuvers through the remainder of the mission as well as perigee lowering maneuver

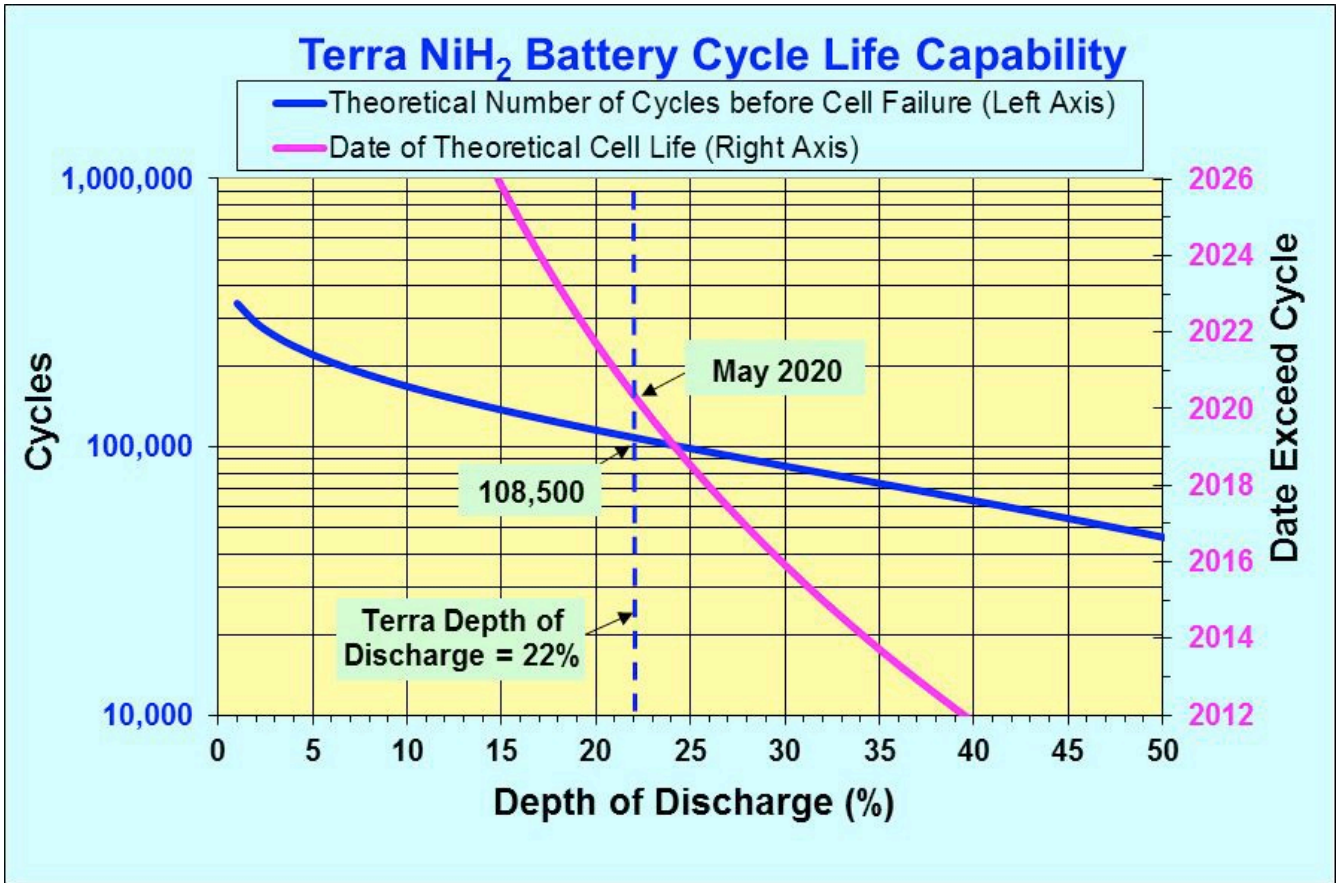
Terra Solar Array Power Margin Analysis



- Solar Array degradation has been minimal since Shunt failure in Sept 2000.
- Solar Array can provide sufficient power well beyond 2020 even with worst case loss of 2 additional Shunts.

Terra Battery Life Projection

- Extrapolating the Eagle-Picher NiH2 Battery Cycle Life Capability data for the typical Terra Depth-of-Discharge (22%) leads to a potential 108,500 cycles from launch that might be achievable with the cells
- Terra is projected to reach 108,500 cycles in May 2020



Terra has far exceeded this historical analysis and its batteries continue to operate nominally supporting the full instrument load. Batteries are predicted to last for the remainder of the Terra mission lifetime. A reduced instrument mission could be accomplished on a single Terra battery if required.

2021 Reliability Study

In January 2021, the Safety & Mission Assurance Directorate (Code 300) Reliability and Risk Analysis Branch (Code 371) at NASA Goddard Space Flight Center updated reliability analysis based on current on-orbit performance, constraints and wear effects due to 20+ years on-orbit for extended mission out to the end of 2029. The study's results now indicate the Terra spacecraft bus has a 94.7% probability of success until the end of 2022 and 78.4% thru 2025. Year identified is end of year.

Sub-System	End of Calendar Year									
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
ACS SUBSYSTEM	1.0000	0.9989	0.9963	0.9923	0.9871	0.9807	0.9732	0.9647	0.9553	0.9449
C&DH SUBSYSTEM	1.0000	0.9997	0.9994	0.9988	0.9981	0.9971	0.9959	0.9945	0.9929	0.9911
COMM	1.0000	0.9963	0.9925	0.9884	0.9841	0.9796	0.9749	0.9701	0.9650	0.9599
EPS SUBSYSTEM	1.0000	0.9999	0.9999	0.9999	0.9999	0.9999	0.9998	0.9998	0.9998	0.9998
PROPULSION SUBSYSTEM	1.0000	0.9949	0.9807	0.9589	0.9308	0.8977	0.8607	0.8209	0.7792	0.7363
THERMAL SUBSYSTEM	1.0000	0.9931	0.9856	0.9775	0.9688	0.9596	0.9499	0.9398	0.9292	0.9181
STRUCTURE SUBSYSTEM	1.0000	0.9978	0.9914	0.9811	0.9675	0.9507	0.9313	0.9095	0.8856	0.8601
S/C Bus	1.0000	0.9808	0.9468	0.9008	0.8457	0.7844	0.7194	0.6529	0.5868	0.5226
MOPITT INSTRUMENT	1.0000	0.9630	0.9275	0.8932	0.8602	0.8284	0.7978	0.7683	0.7399	0.7126
CERES INSTRUMENT	1.0000	0.9969	0.9883	0.9751	0.9582	0.9381	0.9156	0.8911	0.8651	0.8380
MISR INSTRUMENT	1.0000	0.9630	0.9275	0.8932	0.8602	0.8284	0.7978	0.7683	0.7399	0.7126
MODIS INSTRUMENT	1.0000	0.9810	0.9624	0.9441	0.9262	0.9086	0.8913	0.8744	0.8578	0.8415
ASTER INSTRUMENT	1.0000	0.9120	0.8318	0.7586	0.6918	0.6310	0.5755	0.5248	0.4787	0.4365
S/C Bus+MOPITT;CERES;MISR;MODIS;ASTER	1.0000	0.8114	0.6443	0.5019	0.3842	0.2895	0.2150	0.1576	0.1141	0.0817

Terra MODIS Instrument Facts

- **Responsible Center:** NASA Goddard Space Flight Center
- **Quantity on Terra:** 1
- **Operational On-Orbit:** 1-Aqua, 1-Terra
- **Description:** Used to understand the global dynamics and process occurring on land, in the oceans and in the atmosphere.
- **Channels:** 36-band cross-track scanning radiometer, also on Terra
- **Spectral Range:** Visible to thermal infrared measurements at 0.4-14.5 μm
- **Spatial resolution:** 250 m to 1 km
- **Swath width:** 2330 km
- Global coverage every 1-2 days
- **Heritage:** AVHRR, HIRS, Landsat TM, Coastal Zone Color Scanner (CZCS), SeaWiFS
- **Prime Contractor:** Raytheon Santa Barbara Remote Sensing (SBRS)

Terra MODIS Instrument Status

- All voltages, currents, and temperatures are as expected
- There are no disturbing trends in any engineering parameter
- Terra MODIS continues to operate nominally using redundancy
  - Full redundancy exists with the following exceptions:
    - Power Supply Failure
    - Formatter Degraded
    - Screen Door Failure
    - 10 W Lamps #2 and #3 used for Calibration failed prematurely. Able to use remaining lamps for calibration purpose

- **MODIS Power Supply 2 Failure** (June 15th, 2001)
  - Power supply shutdown caused by a thermal runaway condition in one of the two Down Regulator FETs
  - Suspected high energy particle as root cause
  - Switch to power supply 1

- **MODIS Formatter A Timing Errors** (Sept. 10th, 2002)
  - Formatter A exhibited several problems resulting in processing errors
  - Likely cause was an incorrectly terminated clock signal
  - On Sept. 10th, 2002 MODIS science data was affected. Swap to B side performed on Sept. 17th, 2002, with no further issues

- **MODIS Solar Diffuser Screen Door Failed to Close** (May 6th, 2003)
  - Thermal stress is the most likely cause
  - Solar Diffuser Door was configured to remain open indefinitely in July 2003
  - Some calibration activities still possible

Terra MODIS Instrument Life Limiting Items

Life Limiting Items	Designed	9/2/2022
SRCA 10 W Lamp #1 (Hours of use)	500	396.5
SRCA 10 W Lamp #2 [1] (Hours of use)	500	172.1
SRCA 10 W Lamp #3 [1] (Hours of use)	500	190.3
SRCA 10 W Lamp #4 (Hours of use)	500	148.5
SRCA 1 W Lamp #1 (Hours of use)	4000	593.0
SRCA 1 W Lamp #2 (Hours of use)	4000	323.8
Solar Diffuser Door Movements[2] (Open or Close)	3022	2148
Nadir Aperture Door Movements (Open or Close)	1316	542
Space View Door Movements (Open or Close)	1316	445

1. Spectroradiometric Calibration Assembly (SRCA) 10 W Lamp #2 and Lamp #3 are no longer functional. Modified mode of operation to reduce the risk that Lamp #1 and #4 will fail prematurely.
2. Solar Diffuser Door is no longer used for calibration purpose. Screen door failed closed.

Terra MODIS is in Excellent Health although has lost some redundancy

MODIS Lunar Calibration

- MODIS Lunar Calibration is performed ~4 days after full moon.
  - Performed when spacecraft roll is less than 20^{o}
  - Executed ~10 times annually

- MODIS formatter rate is changed from night rate to day rate during the calibration period.
  - Done every Spacecraft-Day/Night
  - No additional risk to instrument

- Modify sector rotation
  - Done in software only
  - MODIS scan mirror rotation at constant speed regardless of MODIS Roll or nominal science
  - No additional risk to instrument

There are no door or screen closings or mechanical changes to MODIS during MODIS Roll Maneuvers, therefore there is no risk specific to MODIS instrument.

The only added risk regarding MODIS Roll Maneuvers is with the spacecraft being off-pointing during the calibration.

MISR Instrument Facts

- **Responsible Center:** NASA-Jet Propulsion Laboratory
- **Quantity on Terra:** 1
- **Operational On-Orbit:** **1**-Terra
- **Description:** MISR measures the top of the atmosphere, cloud and surface angular reflectance functions and surface Bi-directional Reflectance Distribution Function (BRDF), aerosol and vegetation properties.
- **Instruments:** Nine charge-coupled device (CCD) cameras fixed at nine viewing angles out to 70.5^{o} at the Earth's surface, forward and afterward of nadir, including nadir
- **Spectral Bands:** Four spectral bands discriminated via filters bonded to the CCDs
- **Swath:** 380 km viewed in common by all nine cameras
- **Spatial Sampling:** 275 m, 550 m, or 1.1 km, selectable in-flight
- **Repeat Cycle:** Global coverage in 9 days
- **Field of View:** $\pm 60^{o}$ (along-track) $\times$ $\pm 15^{o}$ (cross-track)
- **Heritage:** Galileo, Wide-Field/Planetary Camera
- **Prime Contractor:** NASA Jet Propulsion Laboratory

MISR Instrument Status

- All cameras operating nominally
- Bi-Monthly Cal – performed successfully April 10, 2013 (DOY 100)

MISR is in Excellent Health

MOPITT Instrument Facts

- **Responsible Center:** University of Toronto
- **Quantity on Terra:** 1
- **Operational On-Orbit**: 1-Terra
- **Description:** MOPITT is used to measure carbon monoxide in the Troposphere
- **Channels:** Eight-channel Radiometer
- **Swath:** 640 km (29 fields of view)
- **Spatial Resolution:** 22 km × 22 km (at nadir)
- **Spectral Range:** Correlation spectroscopy utilizing both pressure and length-modulated gas cells, with detectors at 2.3, 2.4, and 4.7 μm
- **Field of View:** ±78^{o} cross-track, 360^{o} azimuth
- **Instrument IFOV:** 22 km across track, 88 km along track
- **Heritage:** Measurement of Air Pollution from Satellites (MAPS), Pressure Modulator Radiometer (PMR), Stratospheric and Mesospheric Sounder (SAMS), and Improved Stratospheric and Mesospheric Sounder (ISAMS) Instruments
- **Agency Responsible:** The Canadian Space Agency
- **Prime Contractor:** COM DEV

MOPITT Instrument Status

- **Instrument performance continues to be nominal**
- **Hot Calibration and Decontamination performed successfully**
  - March 25, 2013 through April 5, 2013 (DOY 084-095)

➢ **MOPITT Displacer B Failure** (May 7th, 2001)
  – The compression wave created by the coolers moves the free floating displacer. This side of the compressor needs to continue operating for counterbalance. Operating at a reduced compression to provide some counterbalance but to prevent the free floating displacer from hitting it's stop, causing so-called "Ringing Effect". The failed side does not provide valid science data.

➢ **MOPITT Chopper Motor 3 Failure** (August 4th, 2001)
  – The anomaly likely caused a fuse to blow resulting in a permanent failed chopper motor. Transistor Drive Circuit is likely cause.
  – This corrupts the science data on channels 5 & 6
    - **Note**: Channels 5-8 are the only channels which provided good science data since the Displacer B Anomaly. Fortunately, Chopper 3 stopped at an open or partially open position allowing data to be captured minimizing the impact to the science data.

➢ **MOPITT Sieve 3 & 1 Heater Control Circuit Failures** (Oct. 3rd, 2009 & Dec. 2nd, 2010)
  – These heaters were operating as control heaters for a molecular sieve that was not being used due a cooler system malfunction years ago. The removal of this small amount of heat will cause no thermal problems with CPHTS, the main MOPITT thermal control system.

MOPITT is in Good Health

ASTER Instrument Facts

- **Responsible Center:** Japan Space Systems (J-spacesystems) in Tokyo, Japan
- **Quantity on Terra:** 1
- **Operational On-Orbit**: 1-Terra
- **Description:** ASTER's data is used to acquire land surface temperature, reflectance, and elevation information
- **Spectral Range:** 14 multispectral bands from visible through thermal infrared
  - Six Short Wave Infrared (SWIR) Channels
  - Five Thermal Infrared (TIR)
  - Three Visible and Near Infrared (VNIR)
- **Swath:** 60 km at nadir; swath center is pointable cross-track, ±106 km for SWIR and TIR, and ± 314 km for VNIR
- **Spatial Resolution:** VNIR (0.5–0.9 µm), 15 m [stereo (0.7–0.9 µm), 15 m horizontal, 25 m vertical]; SWIR (1.6–2.43 µm), 30 m; TIR (8–12 µm), 90 m
- **Field of View:** All pointing is near nadir, except VNIR has both nadir and 27.6˚ backward from nadir: VNIR: 6.09˚ (nadir), 5.19˚ (backward), SWIR and TIR: 4.9˚
- **Instrument IFOV**: VNIR: 21.5 µrad (nadir), 18.6 µrad (backward), SWIR: 42.
- **Heritage:** Japanese Earth Resources Satellite-1 (JERS-1), Optical Sensor (OPS), and Landsat Thematic Mapper (TM)
- **Prime Contractor:** NEC (systems integration, VNIR, and Common Signal Processor)
- **Subcontractors:** MELCO (SWIR and cryocooler), Fujitsu (TIR and cryocooler), and Hitachi (master power supply)
- **Agency Responsible:** Japan's Ministry of Economy, Trade and Industry (METI)

ASTER Instrument Status

- TIR & VNIR Instrument performance continues to be nominal
- SWIR Anomaly:
  - Cryo-Cooler unable to maintain detector temperature since April 2008
  - SWIR Sensor Data bands are saturated
  - SWIR powered off on September 9, 2022

ASTER TIR & VNIR is in Excellent Health
SWIR no longer provides valid science

ASTER TIR & VNIR Life Limiting Items

Item	Unit	Useful Life (On Orbit)	Used (As of 10/31/2012)	Operating Ratio (%)
VNIR Pointing Operation Cycle	Cycle	63,000[1]	50,839	123.9[2]
VNIR Lamp A On Time	Hr	40	26	64.3
VNIR Lamp A On/Off Cycle	Cycle	150	154	102.7[2]
VNIR Lamp B On Time	Hr	40	26	64.3
VNIR Lamp B On/Off Cycle	Cycle	150	154	102.7[2]
TIR Pointing Operation Cycle	Cycle	300,000[1]	304,923	76.2
TIR Cooler On Time	Hr	47,500	111,290	234.3[2]
TIR Cooler Operation Cycle	Cycle	100	5	5.0
TIR Chopper On Time	Hr	41,500	23,090	55.6
TIR Chopper On/Off Cycle	Cycle	79,900	132,726	166.1[2]

UPDATE

1 - Based on the re-evaluation of operability, useful life of pointing cycles were updated
2 - Exceeded Expected Useful Life

ASTER TIR & VNIR is in Excellent Health
SWIR no longer provides valid science

CERES Instrument Facts

- **Responsible Center:** NASA Langley Research Center
- **Quantity on Terra:** 2 (CERES-AFT and CERES-FORE)
- **Operational On-Orbit**: 2-Aqua, 2-Terra, 1-Suomi National Polar-Orbiting Partnership (SNPP)
- **Description:** CERES measures Earth's radiation budget and atmospheric radiation from the top of the atmosphere
- **Channels:** 3 radiometers per instrument
- **Spectral Range:** One channel each measuring total radiance (0.3 to >100 μm), shortwave radiance (0.3-5 μm), and the radiance in the atmospheric window at 8-12 μm
- **Spatial Resolution:** 20 km at nadir
- **Swath width:** Limb to limb of the Earth view
- **Field of View:** $\pm 78^{o}$ cross-track, 360^{o} azimuth
- **Instrument IFOV:** 14 mrad
- Global coverage Daily
- **Heritage:** Earth Radiation Budget Satellite (ERBE)
- **Prime Contractor:** Northrop Grumman Aerospace Systems (NGAS)

CERES Instrument Status

CERES-AFT (FM-2)

- All voltages, currents, and temperatures are as expected
- There are no disturbing trends in any engineering parameter
  - Bi-axial Mode – Nominal, when used
  - Cross-Track Mode – Nominal

CERES-FORE (FM-1)

- All voltages, currents, and temperatures are as expected
- There are no disturbing trends in any engineering parameter.
  - Bi-axial Mode – Nominal, when used
  - Cross-Track Mode – Nominal

CERES-AFT is in Excellent Health
CERES-FORE is in Excellent Health

Data Latency

- **Land and Atmosphere Near-real-time Capability for EOS (LANCE) latency:**
  - Average time based on the following calculation: from the stop time of each granule to the time that Level 1, 2, and 3 products are available at the ftp website
    - Note: Each instrument granule has a specific size, e.g., MODIS granule period is 5 minutes. For the period July 31, 2022 – August 27, 2022, the average latency was 82 minutes for MODIS.

Data Access

- Realtime Direct Broadcast to over 200 stations world-wide
- Processed data are available at the following centers*:
  - Land Processes DAAC for ASTER and MODIS land data (https://lpdaac.usgs.gov/)
  - Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for CERES, MISR and MOPITT data (eosweb.larc.nasa.gov)
  - National Snow and Ice Data Center for MODIS snow and ice data (nsidc.org/data)
  - Level 1 and Atmosphere Archive and Distributed System for MODIS atmosphere data (ladswebnascom.nasa.gov)
  - Ocean Biology Processing Group site for MODIS ocean data (oceancolor.gsfc.nasa.gov)
  - MODIS Sea Surface Temperature data (https://podaac.jpl.nasa.gov/datasetlist?search=Terra)
  - Land and Atmosphere Near real-time Capability for EOS (LANCE) (https://earthdata.nasa.gov/learn/find-data/near-real-time/about-lance)

** funded under the ESDIS Project*

Acronym List, p. 1

ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AVHRR	Advanced Very High Resolution Radiometer
BITE	Built In Test Equipment
CPHTS	Capillary Pump Heat Transport System
CERES	Clouds and the Earth's Radiant Energy System
CSS	Coarse Sun Sensor
CZCS	Coastal Zone Color Scanner
C&DH	Command & Data Handling
CTIU	Command Telemetry Interface Unit
DMU	Data Memory Unit
DAS	Direct Access System (X-Band)
DAAC	Distributed Active Archive Center
EOS	Earth Observing System
ERBE	Earth Radiation Budget Experiment
ESDIS	Earth Science Data and Information System
ESMO	Earth Science Mission Operation
ESA	Earth Sensor Assembly
EDOS	EOS Data and Operations System
FOV	Field of View
FSS	Fine Sun Sensor
GN&C	Guidance, Navigation & Control
BBAT	Hex Bay Battery
HGA	High Gain Antenna
HIRS	High Resolution Infrared Sounder
IRU	Inertial Reference Unit
IR	Infrared
IFOV	Instrument Field of View
JPL	Jet Propulsion Laboratory
LANCE	Land and Atmosphere Near-real-time Capability for EOS
LaRC	Langley Research Center
LOS	Loss of signal
MLT	Mean Local Time (Descending Equator Crossing Time)

Acronym List, p. 2

MTR	Magnetic Torquer Rods
MO	Master Oscillator
MOPITT	Measurements of Pollution in The Troposphere
MMOD	Micro-Meteoride or Orbital Debris
MODIS	Moderate Resolution Imaging Spectroradiometer
MODAPS	MODIS Adaptive Processing System
MDA	Motor Drive Amplifier (part of HGA)
MISR	Multi-angle Imaging SpectroRadiometer
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NGAS	Northrop Grumman Aerospace Systems
PBAT	Power Module Battery
PWA	Print Wire Assembly
RWA	Reaction Wheel Assembly
REA	Rocket Engine Assembly
SBRS	Santa Barbara Remote Sensing
SFE	Science Format Equipment
SIPS	Science Investigator-led Processing System
SeaWiFS	Sea-viewing Wide-Field-of-View Sensor
SWIR	Short Wave Infrared
SEU	Single Event Upset
SA	Solar Array
SSR	Solid State Recorder
SSST	Solid State Star Tracker
S/C	Spacecraft
SCC	Spacecraft Control Computer
SRCA	Spectroradiometric Calibration Assembly
SNPP	Suomii National Polar-Orbiting Partnership
TIR	Thermal Infrared
TM	Themetic Mapper
TAM	Three Axis Magnetometer
VNIR	Visible and Near-Infrared