Terra Summary

- **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
    - Solar Array Panel Failure (1 of 24) in Sept 2000. No impact to Nominal Operations
    - Solid State Recorder Print Wire Assembly Anomalies (9 of 59 are offline)
      - Operationally able to manage by reducing ASTER data captured and increasing playback opportunities
      - Recycle of Memory Unit likely to recover all PWAs currently offline however not warranted at this time
- **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
  - MODIS Solar Diffuser Screen Door Failed Closed (May 2003); Solar Diffuser Door was configured to remain open indefinitely in July 2003; Current configuration 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 – data collection modified – no impact on science data (August 2001)

Terra Spacecraft Bus Status

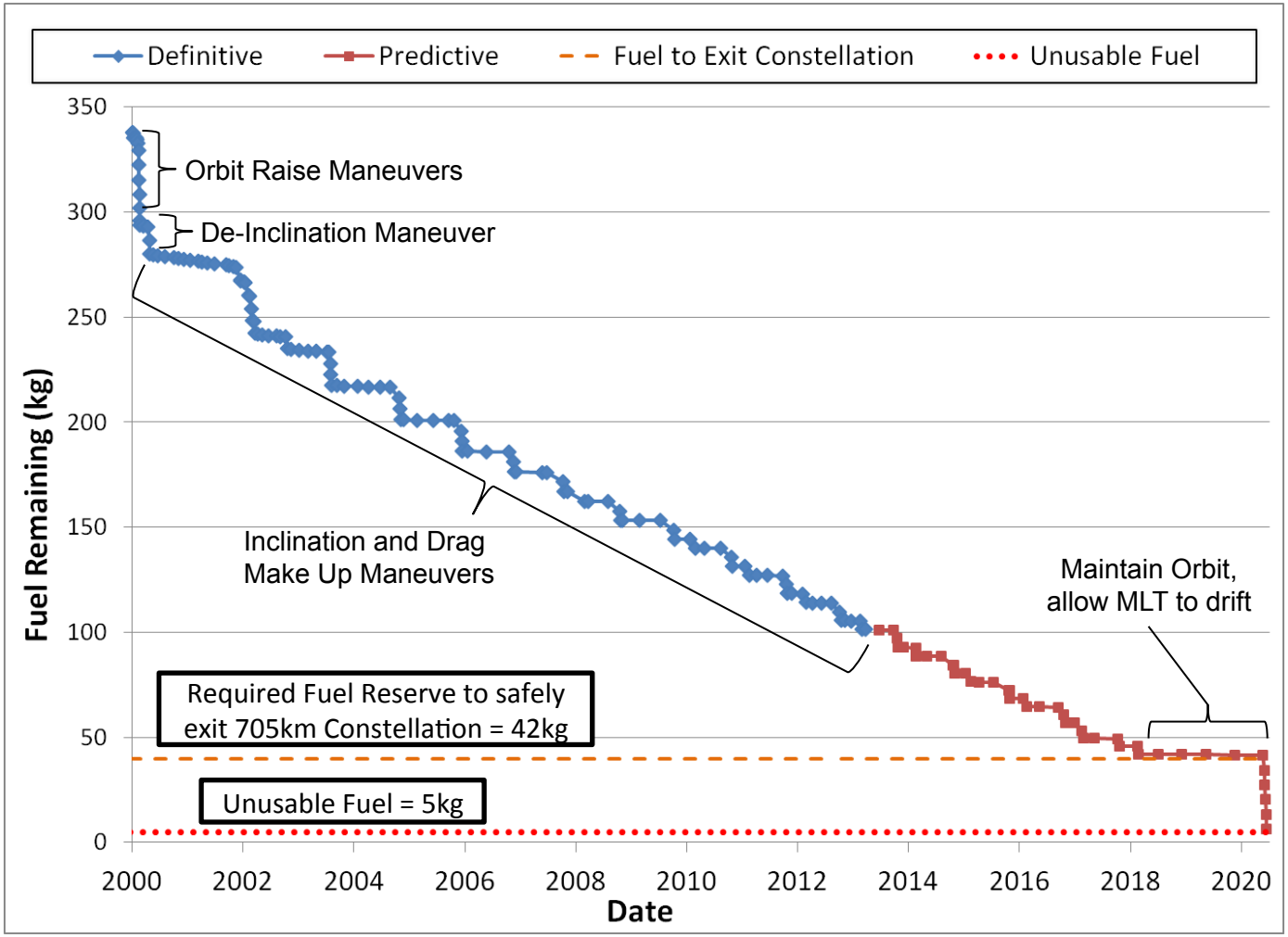
(see Acronyms list at end)

Subsystem	Component	Design	Current	Capability	Comments
EPS	Solar Array	24 Shunts	23 Shunts	96%	Degradation is minimal. Fully capable of supporting mission through 2020 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
TCS	MOPITT CPHTS	2	2	Full	Performance is nominal
	SWIR CPHTS	2	2	Full	Performance is nominal
	TIR CPHTS	2	2	Full	Performance is nominal
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	50 PWA	84.7%	Recycle of DMU likely to recover all PWAs
GNC	IRU	3	3	Full	Performance is nominal. 2 for 3 redundancy
	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
Instruments	ASTER - SWIR	2	2	0%	Cooler is unable to maintain detector temperature. **No useful Science 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. Only 47% of science is valid

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

Fuel Usage: Actual & Predicted

(Updated April 2013)



Based on predicted fuel usage, Terra can continue to perform propulsive maneuvers (to maintain the orbit) to support the science requirements into 2020. Mean Local Time (MLT) will drift from 10:30am to 10:15am.

Spacecraft Anomalies

Hex Bay Battery (BBAT) Heater Control Anomaly (October 13th, 2009)

- Terra experienced a battery heater control anomaly that prevents temperature control for 4 of the 9 heater groups within BBAT
- Micro-Meteorite or Orbital Debris (MMOD) strike is likely cause
- Science Operations has not been affected by the BBAT anomaly (Continuing to support Instrument Calibrations, Solar Eclipse, and Propulsive Maneuvers)
- Heater control is critical to keep the battery cells from freezing (maintain above -20 ºC)
  - The functioning heater groups are keeping cell temperatures above -13 ºC
  - BBAT has been reconfigured to maintain a temperature margin and reduce battery stress

Hex Bay Battery (BBAT) Cell Failure (October 13th, 2009)

- Following Terra's inclination maneuver #24, BBAT Cell #50 failed.
- This was identified via the loss of cell pressure and near zero cell voltage, which later tripped the BBAT cell #50 bypass switch on October 15th, 2009.
- Suspected root cause is the MMOD strike, which also took out the heater groups.
- The BBAT Voltage-Temperature curve changed to better reflect the failed cell.

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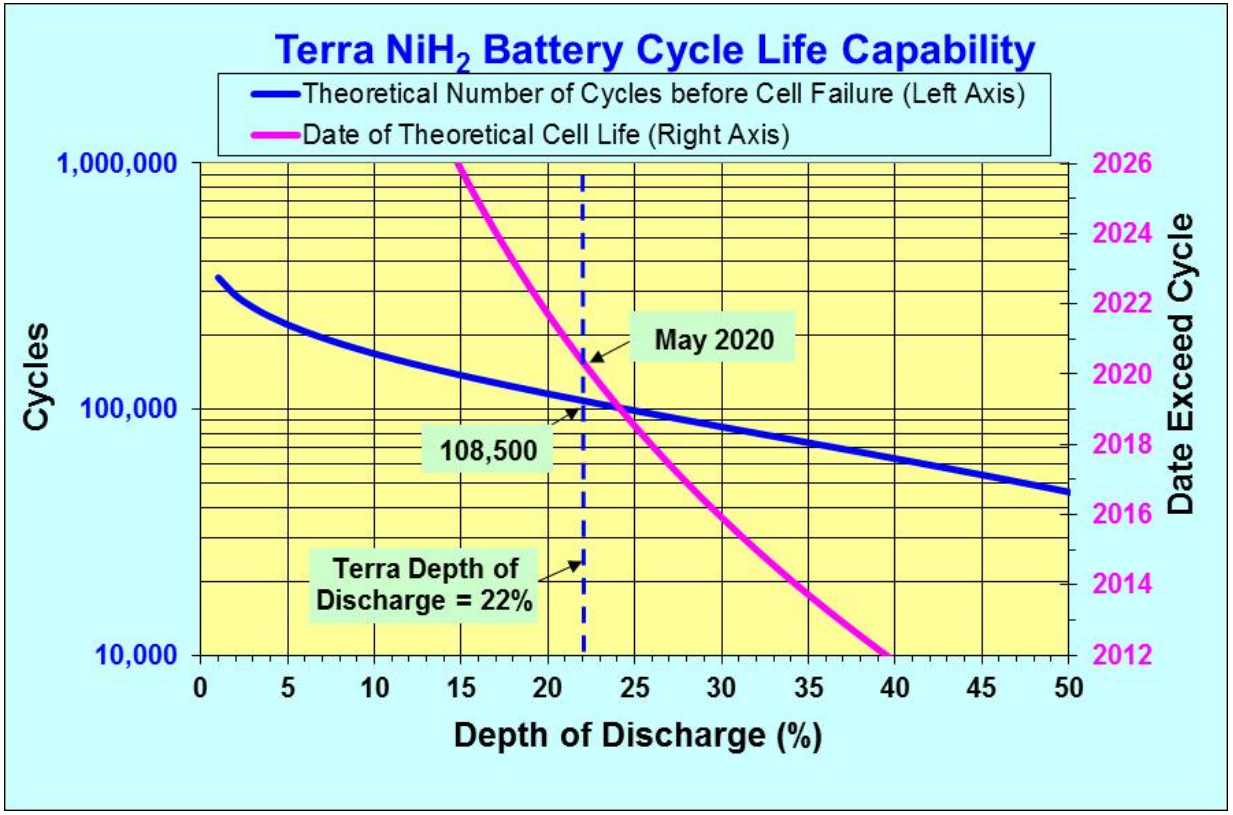
Terra Battery Life Projection

- Extrapolating the Eagle-Picher NiH_2 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 Battery Life Capability projected through May 2020

Spacecraft Anomalies

Solar Array Shunt Anomaly (September 24th, 2000)

- Cause unknown. Unsuccessful in identifying a single cause of the anomaly. Nominal operations was able to continue following the failure. Reviewed impact to propulsive maneuvers and FOT continues to monitor performance.

SSR PWA Anomalies (Beginning on July 30th, 2003)

- Suspect Over-current protection falsely tripped during day/night transitions. Recycling the SSR Data Module Unit (DMU) is likely to reset PWAs and return functionality.
  - PWA-52, DMU-2 (Supersets 102 & 103) occurred on 7/30/03.
  - PWA-26, DMU-1 (Supersets 50 & 51) occurred on 9/24/03.
  - PWA-58, DMU-2 (Supersets 114 & 115) occurred on 9/25/03.
  - PWA-22, DMU-1 (Supersets 42 & 43) occurred on 10/14/03.
  - PWA-6, DMU-1 (Supersets 10 & 11) occurred on 7/31/04.
  - PWA-28, DMU-1 (Supersets 54 & 55) occurred on 8/26/05.
  - PWA-30, DMU-1 (Supersets 58 & 59) occurred on 4/19/07.
  - Swapped DMUs on 6/7/07; Re-allocated buffers (Increased MODIS & MISR; reduced ASTER)
  - PWA-14, DMU-1 (Supersets 26 & 27) occurred on 1/8/10.
  - PWA-15, DMU-1 (Supersets 36 & 37) occurred on 4/2/12.

Direct Access System Modulator (DASM) Side 1 (EPC-1) failed (February 25th, 2012)

- Not required for prime mission objectives
- Attempt to power cycle on 6/4/08 was unsuccessful. On 6/13/08, Switched to DASM-2 cross-strapped with Up-Converter-1 and Solid State Power Amplifier-1. Continue with normal operations.

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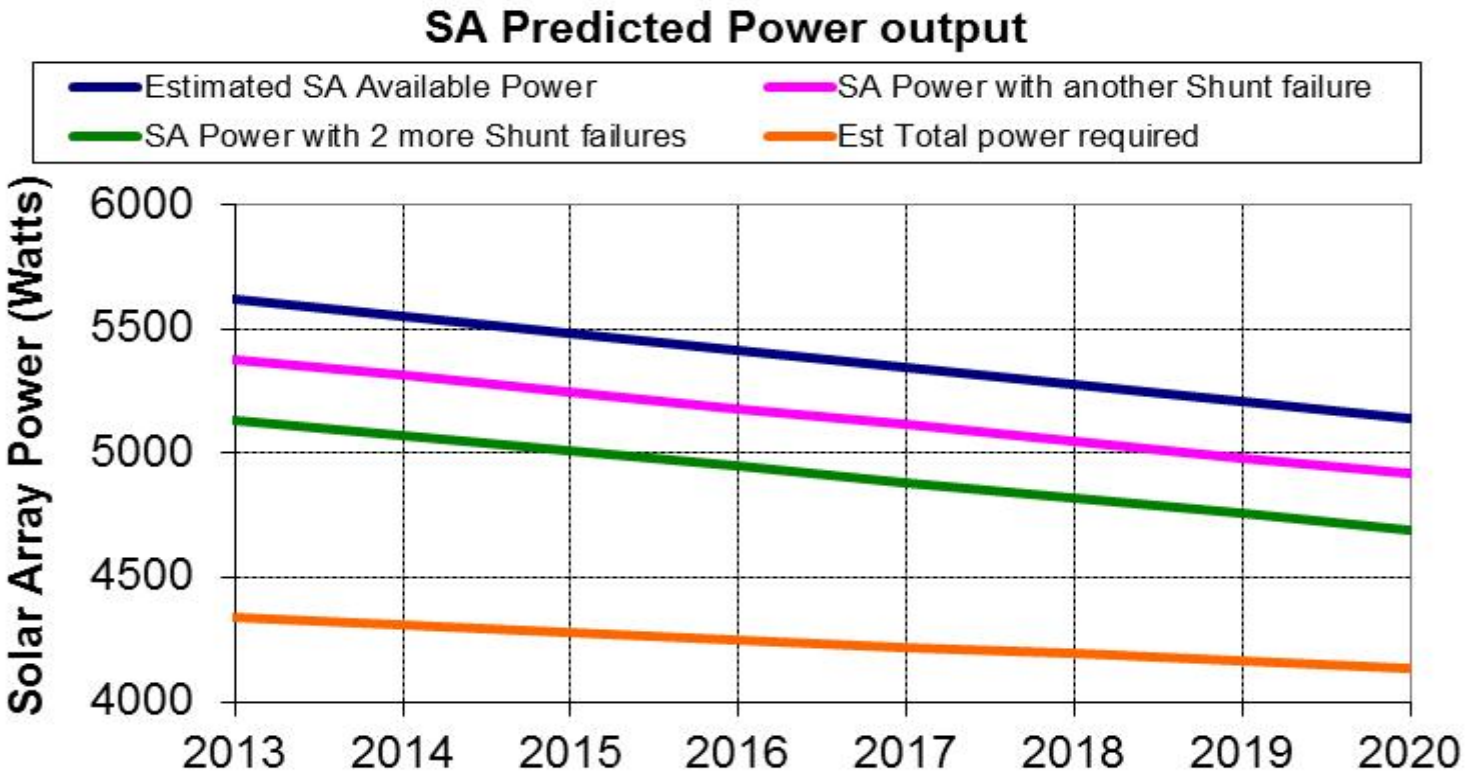
Terra Solar Array Power Margin Analysis



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 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
- **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	5/3/2013
SRCA 10 W Lamp #1 (Hours of use)	500	313.0
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	107.6
SRCA 1 W Lamp #1 (Hours of use)	4000	587.6
SRCA 1 W Lamp #2 (Hours of use)	4000	282.0
Solar Diffuser Door Movements[2] (Open or Close)	3022	2146
Nadir Aperture Door Movements (Open or Close)	1316	540
Space View Door Movements (Open or Close)	1316	443

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, 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:** ±60^{o} (along-track) × ±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)
- Displacer B failed and detector cooling for channels 1-4 was lost.
- Both compressors need to operate to counterbalance the compressor motion. The compression wave created by the B compressor moves the free floating B displacer. In a modified operating mode, running the A and B compressors at a slightly reduced amplitude prevents the free floating displacer from hitting its stop, but allows the A side to operate.
- In this mode side A, channels 5-8, operates nominally. Side B, channels 1-4, 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.
- Chopper 3 stopped at an open position allowing data to be captured with a modified collection algorithm, 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

- 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 remains powered on as null data required for ground system data processing of Stereo Observations with VNIR and TIR
- ASTER Instrument Operation Team reduced staffing – April 1, 2013
  - No longer staffed weekends
  - Late Changes are not generated over weekends unless significant geographical event occurs which warrants urgent observation

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	400,000[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]

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:** ±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

- **EOS Data and Operations System (EDOS):**
  - Average of 1 hour & 3 minutes end-to-end
    - Latency refers to the amount of time between the start time of the observation to the time that EDOS Level 0 products are delivered to the data processing facilities (DAAC, SIPS, MODAPS, etc.)
    - It takes 30 minutes from Loss Of Signal (LOS) at the ground station until delivery to the data processing facilities
- **Land and Atmosphere Near-real-time Capability for EOS (LANCE) latency:**
  - Average time based on the following calculation: from the mid-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 August 4 – August 31, 2013, the average latency is 71 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 (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)
  - Physical Oceanography DAAC for MODIS Sea Surface Temperature data (podaac.jpl.nasa.gov/)
  - Land and Atmosphere Near real-time Capability for EOS (LANCE) (earthdata.nasa.gov/data/near-real-time-data/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