

Abbreviations and Acronyms

AGS	ASTER Ground System
AM	Morning (ante meridiem) -- see EOS AM
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer (formerly ITIR)
ATC	Absolute Time Command
BAP	Baseline Activity Profile
CAC	Command Activity Controller
CCSDS	Consultative Committee for Space Data Systems
CERES	Clouds and Earth's Radiant Energy System
CI	Configuration item
CLCW	Command Link Control Words
CMS	Command Management System
COTS	Commercial Off-The-Shelf
CSCI	Computer software configuration item
CSMS	Communications and System Management Segment
CSS	Communications Subsystem (CSMS)
DAR	Data Acquisition Request
DAS	Detailed Activity Schedule
DB	Database
DBMS	Database Management System
DFCD	Data Format Control Document
DID	Data item description; data ingest/distribution
DSN	Deep Space Network
DSS	Decision Support System
ECL	ECS Command Language
ECOM	EOS Communications
ECS	EOSDIS Core System
EDOS	EOS Data and Operations System
EOC	EOS Operations Center

EOS	Earth Observing System
EOSDIS	EOS Data and Information System
FDF	Flight Dynamics Facility
FIFO	First In - First Out
FOS	Flight Operations Segment (ECS)
FOT	Flight Operations Team
FSE	FOT S/C Evolutions
I&T	Integration and Test
ICC	Instrument Control Center
IP	International Partners
IRD	Interface requirements document
IST	Instrument Support Toolkit
JPL	Jet Propulsion Laboratory
LAN	Local Area Network
LaRC	Langley Research Center
LMC	Lockheed Martin Corporation
LSM	Local System Manager
LTIP	Long Term Instrument Plan
LTSP	Long Term Science Plan
MISR	Multi-Angle Imaging SpectroRadiometer
MO&DSD	Mission Operations and Data Systems Directorate (GSFC Code 500)
MODIS	Moderate Resolution Imaging Spectrometer
MOPITT	Measurements of Pollution in the Troposphere
MSS	Management and Subsystem (part of CSMS)
MTPE	Mission to Planet Earth
Nascom	NASA Communications Network
NASDA	National Space Development Agency (Japan)
NCC	Network Control Center
NOAA	National Oceanic and Atmospheric Administration
OASIS	Operations and Science Instrument Support
OMT	Object Model Technique

OOD	Object Oriented Design
PAS	Planning and Scheduling
PDB	Project Data Base
PI	Principal Investigator
PI/TL	Principal Investigator/Team Leader
RMA	Reliability, Maintainability, Availability
RTCS	Relative Time Command Sequence
RTS	Relative Time Sequence
SCC	Spacecraft Controls Computer
SMC	Service Management Center
SN	Space Network
SSIM	Spacecraft Simulator
SSR	Solid State Recorder
STOL	System Test and Operations Language
TD	Target Day
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TL	Team Leader
TOO	Target of Opportunity
TW	Target Week
UTC	Universal Time Coordinated
UI	User Interface
WAN	Wide Area Network
WOTS	Wallops Orbital Tracking Station

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Glossary

GLOSSARY of TERMS for the Flight Operations Segment

activity	A specified amount of scheduled work that has a defined start date, takes a specific amount of time to complete, and comprises definable tasks.
analysis	Technical or mathematical evaluation based on calculation, interpolation, or other analytical methods. Analysis involves the processing of accumulated data obtained from other verification methods.
attitude data	Data that represent spacecraft orientation and onboard pointing information. Attitude data includes: <ul style="list-style-type: none">• Attitude sensor data used to determine the pointing of the spacecraft axes, calibration and alignment data, Euler angles or quaternions, rates and biases, and associated parameters.• Attitude generated onboard in quaternion or Euler angle form.• Refined and routine production data related to the accuracy or knowledge of the attitude.
availability	A measure of the degree to which an item is in an operable and committable state at the start of a "mission" (a requirement to perform its function) when the "mission" is called for an unknown (random) time. (Mathematically, operational availability is defined as the mean time between failures divided by the sum of the mean time between failures and the mean down time [before restoration of function].)

availability
(inherent) (A_i)

The probability that, when under stated conditions in an ideal support environment without consideration for preventive action, a system will operate satisfactorily at any time. The “ideal support environment” referred to, exists when the stipulated tools, parts, skilled work force manuals, support equipment and other support items required are available. Inherent availability excludes whatever ready time, preventive maintenance downtime, supply downtime and administrative downtime may require. A_i can be expressed by the following formula:

$$A_i = \text{MTBF} / (\text{MTBF} + \text{MTTR})$$

Where: MTBF = Mean Time Between Failures

MTTR = Mean Time To Repair

availability
(operational) (A_o)

The probability that a system or equipment, when used under stated conditions in an actual operational environment, will operate satisfactorily when called upon. A_o can be expressed by the following formula:

$$A_o = \text{MTBM} / (\text{MTBM} + \text{MDT} + \text{ST})$$

Where: MTBM = Mean Time Between Maintenance
(either corrective or preventive)

MDT = Mean Maintenance Down Time where
corrective, preventive administrative and logistics
actions are all considered.

ST = Standby Time (or switch over time)

baseline activity
profile

A schedule of activities for a target week corresponding to normal instrument operations constructed by integrating long term plans (i.e., LTSP, LTIP, and long term spacecraft operations plan).

build

An assemblage of threads to produce a gradual buildup of system capabilities.

calibration	The collection of data required to perform calibration of the instrument science data, instrument engineering data, and the spacecraft engineering data. It includes pre-flight calibration measurements, in-flight calibrator measurements, calibration equation coefficients derived from calibration software routines, and ground truth data that are to be used in the data calibration processing routine.
command	Instruction for action to be carried out by a space-based instrument or spacecraft.
command and data handling (C&DH)	The spacecraft command and data handling subsystem which conveys commands to the spacecraft and research instruments, collects and formats spacecraft and instrument data, generates time and frequency references for subsystems and instruments, and collects and distributes ancillary data.
command group	A logical set of one or more commands which are not stored onboard the spacecraft and instruments for delayed execution, but are executed immediately upon reaching their destination on board. For the U.S. spacecraft, from the perspective of the EOS Operations Center (EOC), a preplanned command group is preprocessed by, and stored at, the EOC in preparation for later uplink. A real-time command group is unplanned in the sense that it is not preprocessed and stored by the EOC.
detailed activity schedules	The schedule for a spacecraft and instruments which covers up to a 10 day period and is generated/updated daily based on the instrument activity listing for each of the instruments on the respective spacecraft. For a spacecraft and instrument schedule the spacecraft subsystem activity specifications needed for routine spacecraft maintenance and/or for supporting instruments activities are incorporated in the detailed activity schedule.
direct broadcast	Continuous down-link transmission of selected real-time data over a broad area (non-specific users).

EOS Data and Operations System (EDOS) production data set	<p>Data sets generated by EDOS using raw instrument or spacecraft packets with space-to-ground transmission artifacts removed, in time order, with duplicate data removed, and with quality/accounting (Q/A) metadata appended. Time span or number of packets encompassed in a single data set are specified by the recipient of the data. These data sets are equivalent to Level 0 data formatted with Q/A metadata.</p> <p>For EOS, the data sets are composed of: instrument science packets, instrument engineering packets, spacecraft housekeeping packets, or onboard ancillary packets with quality and accounting information from each individual packet and the data set itself and with essential formatting information for unambiguous identification and subsequent processing.</p>
housekeeping data	The subset of engineering data required for mission and science operations. These include health and safety, ephemeris, and other required environmental parameters.
instrument	<ul style="list-style-type: none"> • A hardware system that collects scientific or operational data. • Hardware-integrated collection of one or more sensors contributing data of one type to an investigation. • An integrated collection of hardware containing one or more sensors and associated controls designed to produce data on/in an observational environment.
instrument activity deviation list	An instrument's activity deviations from an existing instrument activity list, used by the EOC for developing the detailed activity schedule.
instrument activity list	An instrument's list of activities that nominally covers seven days, used by the EOC for developing the detailed activity schedule.
instrument engineering data	subset of telemetered engineering data required for performing instrument operations and science processing
instrument microprocessor memory loads	Storage of data into the contents of the memory of an instrument's microprocessor, if applicable. These loads could include microprocessor-stored tables, microprocessor-stored commands, or updates to microprocessor software.
instrument resource deviation list	An instrument's anticipated resource deviations from an existing resource profile, used by the EOC for establishing TDRSS contact times and building the preliminary resource schedule.

instrument resource profile	Anticipated resource needs for an instrument over a target week, used by the EOC for establishing TDRSS contact times and building the preliminary resource schedule.
instrument science data	Data produced by the science sensor(s) of an instrument, usually constituting the mission of that instrument.
long-term instrument plan (LTIP)	The plan generated by the instrument representative to the spacecraft's IWG with instrument-specific information to complement the LTSP. It is generated or updated approximately every six months and covers a period of up to approximately 5 years.
long-term science plan (LTSP)	The plan generated by the spacecraft's IWG containing guidelines, policy, and priorities for its spacecraft and instruments. The LTSP is generated or updated approximately every six months and covers a period of up to approximately five years.
long term spacecraft operations plan	Outlines anticipated spacecraft subsystem operations and maintenance, along with forecasted orbit maneuvers from the Flight Dynamics Facility, spanning a period of several months.
mean time between failure (MTBF)	The reliability result of the reciprocal of a failure rate that predicts the average number of hours that an item, assembly or piece part will operate within specific design parameters. (MTBF=1/(l) failure rate; (l) failure rate = # of failures/operating time.
mean down time (MDT)	Sum of the mean time to repair MTTR plus the average logistic delay times.
mean time between failure (MTBF)	The reliability result of the reciprocal of a failure rate that predicts the average number of hours that an item, assembly or piece part will operate within specific design parameters. (MTBF=1/(l) failure rate; (l) failure rate = # of failures/operating time.
mean down time (MDT)	Sum of the mean time to repair MTTR plus the average logistic delay times.
mean time between maintenance (MTBM)	The mean time between preventive maintenance (MTBPM) and mean time between corrective maintenance (MTBCM) of the ECS equipment. Each will contribute to the calculation of the MTBM and follow the relationship: $1/MTBM = 1/MTBPM + 1/MTBCM$

mean time to repair (MTTR)	The mean time required to perform corrective maintenance to restore a system/equipment to operate within design parameters.
object	Identifiable encapsulated entities providing one or more services that clients can request. Objects are created and destroyed as a result of object requests. Objects are identified by client via unique reference.
orbit data	Data that represent spacecraft locations. Orbit (or ephemeris) data include: Geodetic latitude, longitude and height above an adopted reference ellipsoid (or distance from the center of mass of the Earth); a corresponding statement about the accuracy of the position and the corresponding time of the position (including the time system); some accuracy requirements may be hundreds of meters while other may be a few centimeters.
playback data	Data that have been stored on-board the spacecraft for delayed transmission to the ground.
preliminary resource schedule	An initial integrated spacecraft schedule, derived from instrument and subsystem resource needs, that includes the network control center TDRSS contact times and nominally spans seven days.
preplanned stored command	A command issued to an instrument or subsystem to be executed at some later time. These commands will be collected and forwarded during an available uplink prior to execution.
principal investigator (PI)	An individual who is contracted to conduct a specific scientific investigation. (An instrument PI is the person designated by the EOS Program as ultimately responsible for the delivery and performance of standard products derived from an EOS instrument investigation.).
prototype	Prototypes are focused developments of some aspect of the system which may advance evolutionary change. Prototypes may be developed without anticipation of the resulting software being directly included in a formal release. Prototypes are developed on a faster time scale than the incremental and formal development track.

raw data	<p>Data in their original packets, as received from the spacecraft and instruments, unprocessed by EDOS.</p> <ul style="list-style-type: none"> • Level 0 – Raw instrument data at original resolution, time ordered, with duplicate packets removed. • Level 1A – Level 0 data, which may have been reformatted or transformed reversibly, located to a coordinate system, and packaged with needed ancillary and engineering data. • Level 1B – Radiometrically corrected and calibrated data in physical units at full instrument resolution as acquired. • Level 2 – Retrieved environmental variables (e.g., ocean wave height, soil moisture, ice concentration) at the same location and similar resolution as the Level 1 source data. • Level 3 – Data or retrieved environmental variables that have been spatially and/or temporally resampled (i.e., derived from Level 1 or Level 2 data products). Such resampling may include averaging and compositing. • Level 4 – Model output and/or variables derived from lower level data which are not directly measured by the instruments. For example, new variables based upon a time series of Level 2 or Level 3 data.
real-time data	Data that are acquired and transmitted immediately to the ground (as opposed to playback data). Delay is limited to the actual time required to transmit the data.
reconfiguration	A change in operational hardware, software, data bases or procedures brought about by a change in a system’s objectives.
SCC-stored commands and tables	Commands and tables which are stored in the memory of the central onboard computer on the spacecraft. The execution of these commands or the result of loading these operational tables occurs sometime following their storage. The term “core-stored” applies only to the location where the items are stored on the spacecraft and instruments; core-stored commands or tables could be associated with the spacecraft or any of the instruments.
scenario	A description of the operation of the system in user’s terminology including a description of the output response for a given set of input stimuli. Scenarios are used to define operations concepts.

segment	<p>One of the three functional subdivisions of the ECS:</p> <p>CSMS -- Communications and Systems Management Segment</p> <p>FOS -- Flight Operations Segment</p> <p>SDPS -- Science Data Processing Segment</p>
sensor	<p>A device which transmits an output signal in response to a physical input stimulus (such as radiance, sound, etc.). Science and engineering sensors are distinguished according to the stimuli to which they respond.</p> <ul style="list-style-type: none"> • Sensor name: The name of the satellite sensor which was used to obtain that data.
spacecraft engineering data	The subset of engineering data from spacecraft sensor measurements and on-board computations.
spacecraft subsystems activity list	A spacecraft subsystem's list of activities that nominally covers seven days, used by the EOC for developing the detailed activity schedule.
spacecraft subsystems resource profile	Anticipated resource needs for a spacecraft subsystem over a target week, used by the EOC for establishing TDRSS contact times and building the preliminary resource schedule.
target of opportunity (TOO)	A TOO is a science event or phenomenon that cannot be fully predicted in advance, thus requiring timely system response or high-priority processing.
thread	A set of components (software, hardware, and data) and operational procedures that implement a function or set of functions.
thread, <i>as used in some Systems Engineering documents</i>	A set of components (software, hardware, and data) and operational procedures that implement a scenario, portion of a scenario, or multiple scenarios.
toolkits	Some user toolkits developed by the ECS contractor will be packaged and delivered on a schedule independent of ECS releases to facilitate science data processing software development and other development activities occurring in parallel with the ECS.