CCR Number: 0034	CRITICALITY: ROUTINE	DUE:06/25/99

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NEW MILLENNIUM PROJECT CONFIGURATION CHANGE REQUEST

PROGRAM EO-1	**TITLE** Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT
CCR NO. 0034	**ORIGINATOR** D. Mandl/GSFC
DATE INITIATED 06/10/99	**ORIGINATOR'S CHG. NO.**
	SPONSOR/CODE D. Mandl **PHONE** x4323

EFFECTIVITY

ITEM: EO-1
S / N
ITEM:
S / N
ITEM:
S / N

CHANGE CLASS	I	II
PRELIMINARY	☐	☐
FORMAL	☐	☐

TYPE OF CHANGE					
MILESTONE	☐	INTERFACE	☐	SOFTWARE	☐
DOCUMENT	☒	POWER	☐	OTHER	☐
COST ____	☐	WEIGHT	☐	____	☐

DOCUMENTS OR SOFTWARE AFFECTED

EO-1 Ground Functional and Performance Requirements Document

PROBLEM

The attached draft version of EO-1 Project Ground Functional and Performance Requirements Document requires baselining. This document describes the functional and performance requirements of the end to end ground system for EO-1.

PROPOSED SOLUTION

Approve the attache draft version of EO-1Ground Functional and Performance Requirements Document by the EO-1 Level II Configuration Control Board (CCB). The signed CCR will officially approve the document by EO-1 Project Management. Future changes will be initiated by submittal of Configuration Change Requests (CCRs) and Requirements Change Notices. This document is maintained by EO-1 Configuration Management Office.

BOARD ACTION		**APPROVAL LEVEL REQUIRED**		**CRITICALITY LEVEL**		**PROCUREMENT CHANGE ORDER CLASSIFICATION**					
APPROVE	☑	LEVEL I HQS	☐	EMERGENCY	☐	ROUTINE		URGENT		EMERGENCY	☐
APPROVE WITH CHANGE	☐	LEVEL II GSFC	☒	URGENT	☐	OPTION 1	☐	OPTION 1	☐		
DISAPPROVE	☐	LEVEL III	☐	ROUTINE	☒	OPTION 2	☐	OPTION 2	☐		
WITHDRAW	☐										

COMMENTS

CHAIRPERSON _____ **DATE** 9/22/99

EO-1 Ground Functional and Performance Requirements as of 6-4-99

The Functional and Performance Requirements (FPR) covers the level 3 requirements of the end to end ground system for the Earth Observing Mission (EO-1) except those requirements which are being levied against SOMO/CSOC for services to be provided. In particular, the ground network, space network and corresponding communications required to run the EO-1 mission are documented in the Detailed Mission Requirements (DMR)which is located on the EO-1 website: eo1.gsfc.nasa.gov.

An overview of the whole ground system with the science data, engineering data and planning flow can be seen on the EO-1 Science, Engineering and Planning Flow document also on the website. From this diagram is derived this FPR, the DMR and the various ICD's necessary to document the required interfaces in detail. The relationship of these documents is outlined in the EO-1 Document Tree also located at the above mentioned website.

An overview of the EO-1 Mission can be found in the EO-1 Mission Procedure Document, part 1: Operations Concepts (1-6-99) also on the EO-1 website. This FPR covers the following elements of the EO-1 ground system:

(a) Mission Operations Center

(1) Mission Operations Planning and Scheduling System (MOPSS)

(2) Core Ground System (CGS)

(3) Data Processing System (DPS)

(4) Flight Dynamics Support System (FDSS)

(b) Mission Science Office (MSO)/Science Validation System (SVF)

(c) EO-1 Checkout Team

(d) EO-1 Coordination Committee

(e) EO-1 Mission Planning Office

(f) Massachusetts Institute of Technology (MIT)/ Lincoln Lab (LL) – Advanced Land Imager (ALI)

(g) TRW – Hyperion

(h) GSFC- Atmospheric Corrector (AC)

(i) Stennis Space Flight Center (SSC) – involvement is still TBD

(j) EROS Data Center – involvement is TBD

1.0 MOC Systems Requirements

1.1 Mission Operations Planning & Scheduling System (MOPSS)

: (note any reference to a “user” in this section refers to MOC operator)

The MOPSS shall:

1.1.1 Provide capability to view and modify EO-1 activity timeline.

1.1.2 Provide the capability to create and update a Daily Activity Plan (DAP) reflecting timeline.

1.1.3 Provide file management capabilities - overlapping data products (w/continuity management) & product updates.

1.1.4 Allow user to browse and modify auxiliary data for events/activities - scene requests, etc.

1.1.5 Provide feedback to the operator when constraints or conflicts occur.

1.1.6 Assign Wideband Advanced Recorder/Processor (WARP) file IDs (a unique number) for each data stream to be stored for each DCE.

1.1.7 Perform resource utilization checks (WARP availability, instrument on time).

1.1.8 Each WARP file shall be assigned a file ID that correlates to DCE, DCE type, and data stream/type (e.g.-MS/PAN dark cal, MS/PAN int cal, MS/PAN image)

1.1.9 Provide report generation support.

1.1.10 Ingest and display FDF orbital event predicts.

1.1.11 Ingest FDF generated maneuver plan and command sheet.

1.1.12 Schedule Orbit maneuver related sequences.

1.1.13 Interface w/FDF algorithms to schedule activities/commands for momentum management and attitude maneuvers for nadir and cal images

1.1.14 Deleted

1.1.15 Schedule activities/commands relative to orbital/GS/TDRSS events.

1.1.16 Provide the capability to schedule activities relative to events (orbital events, ground station contacts, etc.).

1.1.17 Allow for the user to manually schedule activity/commands.

1.1.18 Display, allow selection, and transmit GS schedule to Wallops Orbital Tracking Information System (WOTIS).

1.1.19 Receive and display GS schedule from WOTIS.

1.1.20 Support ingest and display of SVF provided ground image scene request (thru LTP or equivalent)

1.1.21 Allow user definition/edit of scene requests

1.1.22 Support calculation and display image times based on requested scene location and predicted EO-1 orbit position.

1.1.23 Schedule actives relative to image events.

1.1.24 Allow user to block out periods when imaging is not allowed.

1.1.25 Ensure nadir imaging is not scheduled during black out periods.

1.1.26 Support ingest and display of cal scene requests

1.1.27 Generate an Image Summary Report which lists attributes of each DCE (time, location, DCE, data streams stored, file IDs, DCE #, etc.)

1.1.28 Ingest an National Center Environment Predicts (NCEP) to determine predicted cloud cover for selected scenes.

1.2 .**Core Ground System (CGS)**

1.2.1 The CTS shall provide the following interfaces:

1.2.1.1 The CGS shall interface with SN to receive EO-1 real-time telemetry data at 2 KBPS.

1.2.1.2 The CGS shall interface with the ground stations to receive real-time telemetry data from VC0 via the NASCOM TCP/IP network at a rate of 2 kbps and 32 kbps. The ground stations from which this will occurs are:

1.2.1.2.1 Svalbard, Norway

1.2.1.2.2 Poker Flats, Alaska

1.2.1.2.3 Wallops Island, Virginia

1.2.1.2.4 McMurdo, Antartica.

1.2.1.3 The CGS shall interface with the Wallops SAFS system to receive EO-1 post pass S-band data which includes all EO-1 playback S-Band housekeeping data and S-Band science data.

1.2.1.4 The CGS shall be capable of receiving and forwarding to the DPS EO-1 science data telemetered via S-band and stored in the SAFS system

1.2.1.5 Deleted

1.2.1.6 The CGS shall be capable of generating a 2 KBPS uplink command data stream to the GN stations via the NASCOM TCP/IP network.

1.2.1.7 The CGS shall be capable of receiving, displaying, and archiving of ground station status monitoring blocks (i.e. antenna azimuth, elevation, received signal strength, etc.) and post-pass summary report via the NASCOM TCP/IP network.

1.2..1.8 The CGS shall interface with the MOPSS to receive daily activity plans for processing to generate stored command uploads.

1.2.1.9The CGS shall interface with the FDSS to provide spacecraft housekeeping data (real-time attitude and navigation data).

1.2.2 Telemetry

1.2.2.1 The CGS shall process the EO-1 CCSDS channel access data units (CADUs) and virtual channel data units (VCDUs). Virtual Channels 0, 1, and 2 shall be processed. VC0 is real-time spacecraft housekeeping. VC1 is playback spacecraft housekeeping from the onboard recorder. VC2 is playback spacecraft events. VC3 is State of Health (SOH) from WARP. VC 4 is playback GPS B packet (VR3). VC 6 is Hyperion SWIR instrument data. VC 7 Hyperion VNIR instrument data. VC 8 is ALI MS/PAN instrument data. VC 9 is LEISA/AC instrument data. VC 11 is Retransmit SOH (VR1). VC 12 is retransmit SOH (VR2). VC 14 is retransmit spacecraft events (VR2). VC 14 is retransmit GPS B packet (VR3).

1.2.2.2 The CGS shall be capable of accepting and processing EO-1 telemetry. The EO-1 data rates and encoding formats are defined in the EO-1 Space-To-Ground ICD

1.2.2.3 The CGS shall provide data quality checking of the VCDUs and append quality information to each source packet.

1.2.2.4 The CGS shall process and display and limit check EO-1 real-time data at rates up to 32 KBPS according to the specifications contained in the EO-1 project RDL data base. This includes conversion from raw to engineering units.

.1.2.2.5 The CGS shall provide the capability for viewing unformatted telemetry data.

1.2.2.6 The CGS shall be capable of optionally checking any telemetry data item (analog or discrete) against a set of user definable limits and report limit violations.

1.2.2.7. The CGS shall provide the capability to dump and verify the contents of each EO-1 flight processor memory location and tables. Additionally the system shall process messages generated by the flight software.

1.2.2.8 The CGS shall be capable of short and long term statistical trending of telemetry data points. The time frame and data display format shall be user selectable.

1.2.3 Telemetry Data Archive

1.2.3.1 The CGS shall provide online and offline data storage for archiving telemetry

data and shall provide a mechanism by which authorized users can retrieve stored data. The CGS shall provide a replay capability based on ground receipt time, or spacecraft time

1.2.3.2 The archive shall be sized to store the last 120 days of spacecraft housekeeping data online.

1.2.3.3. All EO-1 spacecraft data for the life of the mission shall be archived via offline data storage. Separate archives are to be maintained for each virtual channel/physical channel combination.

1.2.3.4 The system shall maintain an online catalog describing the location of each archived data set and the spacecraft times of the data within each data set.

1.2.4 Commands

1.2.4.1 The CGS shall be capable of sending command data to the EO-1 spacecraft via the ground stations at 2 kbps. The commands shall conform to the CCSDS COP-1 protocol and data formats as defined in the EO-1 Space-To-Ground ICD.

1.2.4.2 The CGS shall maintain an online data set and printer log of all commands issued to the spacecraft

1.2.4.3. The system shall maintain a list of critical commands that will require spacecraft controller approval prior to the sending of the command. The primary spacecraft controller must explicitly allow each of the critical commands to be forwarded to the spacecraft

1.2.4.4. The system shall provide the capability to construct and send real-time commands.

1.2.4.5. The CGS shall provide for the management and local editing of uplink code images for the onboard processors including the C&DH Mongoose-5, the WARP Mongoose-5, and the RSNs. The system shall be capable of maintaining multiple versions of the load images, naming each version so that it can be later referenced.

1.2.4.6. The CGS will provide tools for the generation of stored command loads. The system shall provide tools that allow the user to generate absolute time sequences (ATS) and relative time sequences (RTS) from a language that is compatible with the on-line spacecraft controllers language.

1.2.5 STOL Processing

1.2.5.1. The system control language shall provide a capability to compose

mathematical expressions of system variables in support of pre-launch and on-orbit activities, including functions of one or more variables, common unary and binary operators, and logical expressions.

1.2.5.2. The system shall support the modularization and execution of subprocedures. The system shall support flow control expressions, such as unconditional branching, conditional branching and looping. The system shall support conditional, unconditional and timed waits (pauses in execution).

1.2.5.3. The spacecraft controller shall have full interactive control in real time over the execution of procedures, including stop, start, abort, wait, branch and subprocedure execution.

1.2.6 Terminal Display System

1.2.6.1. The CGS shall be capable of displaying 6 pages on a single display. Operator command line displays, STOL procedure execution displays, telemetry pages, and event pages shall be displayed simultaneously.

1.2.6.2. Display data fields shall be updated at a rate of 1 Hz using the latest telemetry values received from the spacecraft.

1.2.7 Command and Telemetry Data Base

1.2.7.1. The system shall provide a command and telemetry database facility for the definition, editing, display and configuration control of all EO-1 command and telemetry. The command and telemetry definitions are to include packet formats, mnemonics, and engineering unit conversions. The database will support definition of onboard system tables.

1.2.8 Page Display Database

1.2.8.1. The system shall provide a page display database which shall be capable of holding at least 600 page display definitions. The database shall support the definition of purely textual displays and mixed text and graphical displays. The pages shall consist of a combination of text, strip, scatter, and graphical representations of any telemetry mnemonic, CTS variable, or derived data points.

1.2.9 Automated Procedure Library

1.2.9.1. The system shall be capable of managing 2000 automated procedures.

1.2.9.2. The system shall provide a text editor in order to perform definition and modification of procedures.

1.2.9.3. The system shall provide a preprocessor which shall verify the structural

content of procedures and preclude structurally incorrect procedures from being executed by the on-line system.

1.2.10 Hard Copy Output

1.2.10.1. The CGS shall provide at least one line printer. The CTS shall have the ability to print telemetry, derived data points, and operator generated events. All commands sent to the spacecraft will be logged to the line printer

1.2.10.2. The CGS shall provide at least one page snap printer. The CTS shall provide the capability to print screen dumps of displays, system events, print telemetry snapshots of any display page whether or not the specified page is active, and generate plots of operator selected data versus time.

1.2.11 Access Control

1.2.11.1. The CGS shall provide control stations and configured computer accounts for the set-up, operations and control of the CGS system.

1.2.11.2 All workstations shall be on the open side of the network. Access to the closed side of MODNET will be limited to the front end workstations in the MOC.

1.2.12 Lights Out Operations

1.2.12.1. The CTS shall be capable of beeping a user based on an event trigger
1.2.12.2. The CTS shall be capable of sending preprogammed data via the beeper system which shall include limited event messages and telemetry mnemonics.

1.2.13 CGS/Command Management System (CMS)

The CMS shall:

1.2.13.1. Interface with the MOPSS to receive a DAP.

1.2.13.2. The CGS/CMS shall compile the DAP to produce stored command uploads.

1.2.13.3. The CGS/CMS shall perform command constraint checking and shall provide the capability to edit constraint definitions.

1.2.13.4. The CGS/CMS shall provide for operator edits of Stored Command Processor (SCP) loads.

1.2.13.5. The CGS/ CMS shall allow events to be defined, such as; in South Atlantic Anomaly zone crossing, ground station pass, apogee, etc.

1.2.13.6. The CGS/CMS shall accept and utilize a constants file.

1.2.13 Trending

1.2.13.1 The CGS shall provide the capability to catalog recorded engineering data, cataloged by the pass time.

1.2.13.2 The CGS shall provide the capability to replay recorded engineering data.

1.2.13.3 The CGS shall provide the capability to translate and store subsets of the engineering data into sequential print files.

1.2.13.3.1 The CGS shall be able to subset up to 100 telemetry points.

1.3 Data Processing System(DPS)
The DPS shall:

1.3.1 Ingest data downlinked from the EO-1 WARP to an AMPEX 260i tape recorder at the ground stations; and then the AMPEX tape is forwarded and replayed from an AMPEX 120i into the DPS.

1.3.2 Process a 165 Gbyte AMPEX tape with upto four days of recorded data at a time within 6 hours.

1.3.3 Do front-end processing; deinterleave I/Q channels , frame synchronize CADU data, decode Reed Solomon data, derandomize data, handle inverted polarity CADU's and discard fill CADU's.

1.3.4 Process the data on an AMPEX tape into the following HDF file types; MS/PAN, Hyperion VNIR, Hyperion SWIR, LAC and housekeeping

1.3.5 Provide the capability to send any combination of HDF files for a DCE electronically to the instrumenters via an FTP site where they can be pulled post LZP+ processing. The files will be less than or equal to 125 MB in size (S-band Science data). This requirement applies to instrument checkout period and certain anomaly resolution time periods. The files shall be small relative to the normal DCE's. Files will remain resident a minimum of 3 days.

1.3.6 Process the input files into HDF files as specified in the respective instrument ICDs

1.3.7 Create an imageable PAN file as follows:

a. Reorder pixels
b. Band order scan lines
c. Provide identifiable fill for those portions of a PAN line that do not have data

1.3.8 Process the MS file as follows:

a. Reorder pixels
b. Band order scan lines

c. Perform odd/even pixel reordering for bands

d. Provide identifiable fill for those portions of a MS line that does not have data

1.3.9 Process the Hyperion SWIR file as follows:

a. Reorder pixels
b. Band order the scan lines
c. Provide identifiable fill for those portions the SWIR scan lines that do not have data

1.3.10 Process the Hyperion VNIR file as follows:

a. Reorder pixels
b. Band order the scan lines
c. Provide identifiable fill for those portions of the VNIR scan lines that do not have data.

1.3.11 Process the LAC file as follows:

a. Reorder pixels
b. Band order scan lines
c. Provide identifiable fill for those portions of the LAC scan lines that do not have data.

1.3.12 Process the housekeeping file as follows:

a. Translate up to 60 telemetry parameters into engineering data and place in file labeled with DCE ID
b. Place this file on DLT tape and the FTP drop site for instrumenters
c. Place raw data in archive that is retrievable.

1.3.13 Provide associated metadata related to a given DCE and place this metadata on the AMPEX tape or FTP site as needed:

a. Derive an associated start and stop time for each Data Collection Event (DCE) which is a set of the above processed files, from the housekeeping file.
b. Quality metrics

1.3.14 Place all processed files on a DLT tape to be distributed per MOC/MSUG ICD.

1.3.15 The DPS shall have the following displays.

1.3.16 The DPS shall tabulate and display the following quality metrics:

a. # search, check and lock
b. # sequence errors
c. # RS errors (correctable, uncorrectable)
d. Beginning file sequence #

e. # missing VCDU's
f. Total VCDU's received (by VC)
g. # of scan lines processed or some other indication of progress
h. % data missing by scan line

1.3.17 The DPS shall tabulate and respond to the following error conditions:
a. Sequence errors- response: insert fill data to replace missing data
b. RS errors- if correctable, response: treat as valid data
If uncorrectable, response: treat as missing VCDU

1.3.18 The DPS shall meet the interface requirements per the following ICD's
a. EO-1 Space to Ground ICD
b. EO-1 MOC to Science Users ICD
c. MIT/LL to EO-1 Project ICD
d. TRW to EO-1 Project ICD
e. LAC to EO-1 Project ICD

1.3.18 DPS Operational requirements
a. Upon receipt, AMPEX tape shall be retained by MOC for the lesser of image assessment complete by science team or 30 days.
b. DLT's shall be labeled per MOC/SUG ICD
c. DLT tapes shall be stored in the MOC for 30 days

1.4 Attitude Determination and Control

The FDSS shall provide attitude determination and control functions as follows:

1.4.1 Shall perform pre-launch attitude analysis, including planning for attitude calibration maneuvers

1.4.2 Shall provide pre-launch hardware and software support for attitude determination, including testing, simulations, and training.

1.4.3 Shall perform ground validation of the on-board attitude from the AST.

1.4.4 Shall perform ground estimates of true attitude and gyro biases using both batch attitude determination and real-time attitude determination.

1.4.5 Shall perform magnetometer, star tracker, and gyro calibration, including estimates of alignments, biases and scale factors

1.4.6 Instrument Alignment support shall include:

1.4.6.1 Performing attitude computations necessary for instrument alignment

1.4.7 Attitude-related Planning and Scheduling Aids shall provide:

1.4.7.1 X-band phased array antenna viewing angles

1.4.7.2 OBC up-linked input table parameters for alignment and calibration

1.4.7.3 Engineering data for attitude maneuver command generation

1.4.7.4 Predicted momentum control data during imaging periods

1.4.7.5 Instrument calibration planning and command generation data

1.5 Trajectory Design and Control

The FDSS shall provide trajectory design functions as follows:

1.5.1 Mission analysis studies including: trajectory design analysis, mission propellant budget, launch window, and end-of-life analysis

1.5.2 A post orbit insertion strategy to place the spacecraft in its mission orbit

1.5.3 An operational orbit plan to meet the co-fly imaging requirements with Landsat 7, including special imaging requirements

1.5.4 An end-of-life reentry plan to safely dispose of EO-1

The FDSS shall provide trajectory control functions as follows:

1.5.5 Pre-launch hardware and software support, including testing, simulations, and training

1.5.6 Post orbit insertion orbit maneuver support to achieve/maintain proper phasing with Landsat 7

1.5.7 Orbit maneuver support to achieve/maintain a frozen and sun-synchronous orbit for EO-1

1.5.8 Orbit maneuver support to maintain ground track control for EO-1

1.5.9 Orbit maneuver support for EO-1 inclination maneuvers to maintain the required MLT at the descending node

1.5.10 Orbit evolution analysis for EO-1 and Landsat 7 to determine future delta-V burn scenarios

1.5.11 Post-maneuver calibration of all delta-V maneuvers

1.5.12 Post-maneuver orbit determination with GPS or S-band ground based tracking

1.6 Orbit Determination, Acquisition Data, and Scheduling Data

The FDSS shall provide orbit determination, prediction, and scheduling and planning functions as follows:

1.6.1 Pre-launch hardware and software support for orbit determination and prediction, including testing, simulations and training

1.6.2 Extract GPS Single Point Solution from telemetry during every working day or when required, and smooth SPS on the ground to provide an EO-1 orbit when needed

1.6.3 Extract raw GPS data from telemetry for early orbit validation of the on-board GPS orbit determination

1.6.4 Validate on-board GPS orbit determination solutions, using ground based S-band tracking

1.6.5 Obtain Landsat 7 state vectors daily and a Landsat 7 maneuver plan (over the next 5 weeks) weekly from the Landsat 7 MOC

1.6.6 Generate both and EO-1 and a Landsat 7 10 day predictive ephemeris with planned maneuvers

1.6.7 Generate an EO-1 5 week predictive ephemeris with planned maneuvers

1.6.8 Validate the EO-1 OBC orbit propagation

The FDSS shall provide backup orbit determination as follows:

1.6.9 Provide backup orbit determination using S-band tracking data from GN ground stations

1.6.10 Provide pre-processing for S-band tracking data when it is received in the MOC

The FDSS shall provide scheduling and planning support as follows:

1.6.11 Predicted ascending and descending node crossing times, longitudes and orbit numbers

1.6.12 Predicted South Atlantic Anomaly and miscellaneous Zones of Exclusion entrance and exit times

1.6.13 Predicted sub-satellite point shadow entrance and exit times

1.6.14 Predicted ground station contact times

1.6.15 Predicted solar Beta angles

1.6.16 Generation of acquisition data

1.6.17 Delivery of a science planning aid algorithm for scheduling co-fly images with Landsat 7, as well as, special request images

1.6.18 Predicted Extended Precision Vectors (EPVs) for both EO-1 and Landsat 7 for uplink to the EO-1 spacecraft

1.6.19 Predicted ground track data

1.6.20 Predicted satellite shadow entrance and exit times

1.6.21 Predicted World Reference System (WRS) scene center sun angles
1.6.22 A PSAT style product for WOTIS system operations

1.6.23 Predicted Mean Local Times at the ascending and descending nodes

1.7 Multi-mission Flight Dynamics

Multi-mission Flight Dynamics (MMFD) will provide support to the EO-1 mission during pre-launch, the early orbit phase and during contingencies. MMFD requirements are listed below:

1.7.1 Evaluate GN S-band 2-way Doppler and angle tracking data during launch and early orbit operations and for contingency support as required

1.7.2 Provide acquisition data for pre-launch testing using TDRS and COBE spacecraft and acquisition data during launch and early orbit for C-Band radars.

1.7.3 Collect and pre-process C-Band tracking data during the first 6 hours of the EO-1 mission and make an ASCII data set of the C-Band data available to the EO-1 MOC

2 Mission Science Office (MSO)/Science Validation Facility (SVF) (GSFC Bldg 33)

The MSO/SVF is located at GSFC, Bldg 33 Rm G367 is responsible for providing the EO-1 NRA selected science team and technology teams with planning and science products required to meet their research and validation objectives.
Governing Documents include:

- EO-1 NRA "Validation Studies"

- EO-1 Mission Operations Center toScience Users ICD

- EO-1 ICD for Radiometric Calibration Processing Between GSFC and MIT/LL (ICD –055) 1/8/99

2.1 Nominal Operations

2.1.1 The MSO shall receiveDCE, lunar calibration and lunar calibartion requests from the Science Validation Team (SVT), Lincoln Lab, TRW, AC Instrumenter Data Analysis Team, and SSC (commercial and DOD users

2.1.2 The MSO shall receive scheduling guidelines and priorities from the Coordination Committee.

2.1.3 The MSO shall create the Long Term Acquisition Plan and submit it to the MOC. Weekly updates to the plan shall be submitted. The LTAP shall consists of a list of primary targets and a list of alternate targets for each day.

2.1.4 The MSO shall maintain a database to track scene acquisition and the filing of user requests for all instruments and all phases of the DCE acquisition. (MOC shall supply necessary input)

2.1.5 The SVF shall receive DPS data via DLT from the MOC. The SVF shall perform initial quality assessment of receipt of ALI LZP data, and provide feedback to MOC/DPS or instrument team as necessary.

2.1.6 The SVF shall perform Level 1 processing of ALI MS/PAN data (as requested by the SVT).

2.1.7 The SVF shall transfer to the AC Instrument Data Analysisi team selected level 0 AC DEC's for AC processing based on SVT selection.

2.1.8 The SVF shall perform Level 1 processing (as requested by SVT) of AC data after receipt of code from AC Instrument Data Analysis Team.

2.1.9 The SVF shall request and receive level 1 Hyperion data from TRW.

2.1.10 The SVF shall provide storage for the Validation Team of LZP data for the mission duration. (The SVF will keep copies of L1 data that it processes or distributes, but this is not a requirement.)

2.2 SVF/L&EO

2.2.1 The SVF shall support quality assessment of LZP DLTs within one working day.

2.2.2 The SVF shall testbed processing software using selected L&EO image data under the guidance of the instrument teams.

2.3 SVF/I&T

2.3.1 The SVF shall support image assessment of LZP DLTs as requested by

instrument teams.

3 EO-1 Checkout Team
3.1 The checkout team shall consits of:
3.1.1 Mission Scientist
3.1.2 Mission Technologist
3.1.3 ALI Lead
3.1.4 Hyperion Lead
3.1.5 AC Lead
3.1.6 Stennis Lead
3.1.7 Mission Director
3.1.8 Project personnel
3.2 The checkout team shall generate the daily plans for operations during the 60 day checkout period
3.3 The checkout team shall monitor the health and safety of the spacecraft, insturments and technologies.
3.4 The checkout tema is operational only during Launch and Early Orbit (L&EO).

4 EO-1 Coordination Committee

4.1 The coordination committee shall consist of:
4.1.1 Mission Scientist
4.1.2 Mission Technologist
4.1.3 ALI Lead
4.1.4 Hyperion Lead
4.1.5 AC lead
4.1.6 Stennis Lead
4.1.7 Mission Director
4.2 The coordination committee shall generate the initial Long Term Plan and set policy regarding it's modification
4.3 The coordination committe shall resolve schedule conflicts that arise and can not be handled out of the Mission Planning Office
4.4 The coordination committee is operational with respect to normal operations and not during L&EO.

4. Mission Planning Office
4.1 The Mission Planning Office shall consist of:
4.1.1 Deputy Mission Scientist
4.1.2 Mission Technologist
4.1.3 Mission Director
4.2 The Mission Planning Office manages the daily load on the MOC using the LTP, instrument update requests and technology activity update requests.

5 Massachussets Institute of Technology – Lincoln Lab(MIT/LL) Advanced Land Imager (ALI)

MIT/LL located in Cambridge Mass is responsible for the on-orbit checkout and technology validation of the Advanced Land Imaging Instrument during the first sixty days of operation and for periodic performance assessment during the course of the EO-1 Mission. Governing Documents include :

- EO-1 Mission Operations Center to Science User ICD
- EO-1 ICD for Radiometric Calibration Processing Between GSFC and MIT/LL (ICD –055) 1/8/99

5.1 MIT/LL/I&T

5.1.1 Standalone MIT/LL calibration pipeline software shall support quick turnaround (TBD hours) processing of MS/PAN LZP data into L1 product.

5.1.2 A level 1 processing system shall be located in SVF facility (GSFC Bldg 33) and is capable of processing a single ALI DCE within 24 hours of ingest of LZP tape.

5.2 MIT/LL/L&EO

5.2.1 Calibration pipeline shall be utilized to provide on-orbit calibration and validation during L&EO.

5.2.2 LZP DLT's from GSFC shall be processed by MIT within one working day for image assessment.

5.2.3 Realtime S/C HK data will be received and processed by MIT/LL via the ASIST and SOH data processed near realtime when data is received via the 56/256 Kbps line.

5.3 Nominal Operations

6 TRW – Hyperion (Redondo Beach, Ca)

TRW is responsible for the processing of Hyperion Instrument on-orbit validation and processing of Hyperion Data to Level 1 for the Science Validation Team and for processing necessary scenes as requested for educational, commercial and DOD applications.
Governing Documents include:

- EO-1 NRA "Validation Studies"
- EO-1 Mission Operations Center to Science User ICD
- Hyperion ICD version xx
- Contract NAS5 –xxxxxx
- ICD Stennis/TRW ???

6.1 Nominal Operations

6.1.1 TRW shall receive LZP DLT's from the MOC/DPS. TRW shall perform Level 1 Processing as requested by the Science Validation Team and ship processed data via DLT back to the SVF within 72 hours of reciept request.

6.1.2 1 Hyperion data processing as requested by Commercial, DOD and Educational customers and ship processed data to SSC within 72 hours of reciept of the request.

6.1.3 TRW shall perform analysis of Hyperion Operation Status and Update Calibration factors

6.1.4 TRW shall perform data quality assessment of Hyperion Level Zero data within 24 hours of receipt of LZP DLT from MOC

6.2 TRW/I&T

6.2.1 TRW shall provide quick turnaround at GSFC (TBD hours after receipt of L0 tape from MOC) of L1 data during S/C I&T (July - Nov).

6.2.2 TRW shall provide data necessary for meeting Instrument validation plan.

6.2.3 Hyperion LZP data from DLT and HK data shall be extracted and processed to re-calibrate and validate calibration of Hyperion instrument.

7 Atmospheric Corrector (AC)

The AC Processing System located in Bldg 2 rm xx will provide for level 1 processing of AC image data and support processing of EO-1 ALI MS-Pan and Hyperion images as requested.
Governing Documents include:

- EO-1 NRA "Validation Studies"
- EO-1 Mission Operations Center to Science Users ICD

7.1 AC/I&T

5.1.1 The AC Data Analysis Team shall receive AC LZP data from SVF electronically, perform L1 processing all AC data within 12 hours of simulated data acquisition.

7.2 L&EO

5.2.1 The AC Validation Team shall receive AC LZP data from SVF electronically, perform L1 processing of AC within 24 hours.

7.3 Nominal Operations

7.3.1 The AC Validation Team shall request and L1 process from SVF necessary AC LZP data to meet instrument AC technology validation plan.

5.3.2 The AC Data Analysis Team shall perform AC L1 processing on scenes requested from MSO.

8 Stennis Space Center (SSC) - Commercial Remotes Sensing Program (CRSP)

SSC through the CRSP is responsible for short term storage of all Hyperion Data and for providing Hyperion Level 1 data and additional support or processing to its commercial, educational and DOD partners.

Governing Documents include :

- NMP/SSC MOU
- EO-1 Mission Operations Center toScience User's ICD
- SSC-TRW Hyperion Data processing ICD

8.1 Nominal Operations

8.1.1 SSC- CRSP shall act as Co-COTR for all Hyperion level 1 processing performed by TRW . The Science Validation Team shall receive its data directly from TRW. SSC-CRSP shall provide level 1 data to DOD, educational and its affiliated commercial users.

8.1.2 SSC - CRSP shall receive Hyperion Level 0 and Level 1 data from TRW

8.1.3 SSC - CRSP shall act as a short term archive (for mission duration) of all Hyperion Level 0 and Level 1 data

6.1.4 SSC - CRSP shall send all Hyperion level 0 and level 1 data to EDC for long term archive after the mission defined blackout period as per the defined EO-1 to EDC ICD.

9 Eros Data Center

The EDC is responsible for long-term archiving of all validated EO-1 image data for public access purposes. Governing Documents include:

- EO-1 NRA "Validation Studies"
- EO-1 Mission Operations Center to Science Users ICD
- SSC-TRW Hyperion Data processing ICD

9.1 EDC shall store and archive all L0 EO-1 DLT's and SVF/SSC level 1 processed DLT's after mission completion

9.2 The EDC shall process and provide L7 science data scenes as per standard customer request.

Date: Wed, 16 Jun 1999 11:10:32 -0400 (Eastern Daylight Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Ralph D. Welsh, Jr./426)
Subject: CCR:0034 - DUE: 06/25/99   ROUTINE Level-2 Ralph D. Welsh, Jr./42 WWW-COMMENTS

USER :   (Ralph D. Welsh, Jr./426) sent the following comments on :

Date: 6/16/99
CCR Number: 0034
Sponsor: D. Mandl
Due Date: 06/25/99

CCR Title: Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT

Remote host: 128.183.213.120 Email Address: Ralph.D.Welsh.1@gsfc.nasa.gov
---
APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: Comments from Ralph Welsh 301-286-9774

1. Paragraph 1.2.1.2.2, Page 3: Change "Flats" to "Flat"

2. Paragraph 5, Page 16: Change "Cambridge" to "Lexington"

Date: Tue, 22 Jun 1999 10:31:25 -0400 (Eastern Daylight Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Pete Spidaliere/426/730)
Subject: CCR:0034 - DUE: 06/25/99   ROUTINE Level-2 Pete Spidaliere/426/73 WWW-COMMENTS

USER :   (Pete Spidaliere/426/730) sent the following comments on :

Date:
CCR Number: 0034
Sponsor: D. Mandl
Due Date: 06/25/99

CCR Title: Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT

Remote host: 128.183.213.112 Email Address:

APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: Para 4.0 There are two sets of paragraph 4, change the Mission Planning office paragraph to another number

Para 3.1, 4.1 and the second 4.1: Change the Shalls to wills. Will says this is the way it is, shall says this is a requirement and it must be this way. Will is informative, shall is directive.

Para 5: LL is in Lexington not Cambridge. The university is in Cambridge.

Para 6.1.2 The first words are missing of the requirement.

Para 8.1.1: I do not recommend having contractual working COTR in the requirements document, delete this sentence. If retained change the shall to will in this sentence.

Para 8.0 needs a requirement for SSC to send GSFC level 1 data upon request.

Date: Tue, 22 Jun 1999 16:37:15 -0400 (Eastern Daylight Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Thomas Brakke)
Subject: CCR:0034 - DUE: 06/25/99   yes Level-2 Thomas Brakk WWW-COMMENTS

USER :   (Thomas Brakke) sent the following comments on :

Date: 6/22/99
CCR Number: 0034
Sponsor: D. Mandl
Due Date: 06/25/99

CCR Title: Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT

Remote host: 128.183.109.77 Email Address: tbrakke@ltpmail.gsfc.nasa.gov
---
APPROVAL STATUS: DISAPPROVED
Note:

COMMENTS: We're waiting for our comments to be incorporated into the document before we approve it.

SVF room is G327

2. "Documents" should be "documents"
    "toScience" should be "to Science"
    indent "(ICD-055) 1/8/99"

2.1.1 "receiveDCE" should be "receive DCE"
       "Instrumenter" should be "Instrument"
       "(commercial and DOD users" should be "(for commercial and DOD users)."

2.1.3 "LTAP shall consist" instead of "LTPA shall consists"

2.1.4 should read "The MSO shall track scene requests and acquisitions for the Science Validation Team using MOC-supplied input."

2.1.5 should read "The SVF shall receive DPS data via DLT from the MOC. The SVF shall provide feedback to MOC/DPS or instrument team as necessary."

2.1.6 remove parentheses

2.1.7   should be "...Analysis team selected Level 0 AC DCE's..."

2.1.10 delete second sentence in parentheses

2.2.1   delete the whole statement (and renumber statements)

2.2.2 indent "data..."

2.3.1 change "LZP DLTs" to "Level 0 data"

3.3 "insturments" should be "instruments"

3.4 "tema" should be "team"

From: Carol Segal <Carol.Segal@trw.com>
To: sschneider@hst.nasa.gov
Cc: Jay Pearlman <Jay.Pearlman@trw.com>,
Wendy Watson <Wendy.Watson@trw.com>,
dmandl@pop500.gsfc.nasa.gov
Subject: RE: EO-1 CCRs 034
Date: Fri, 25 Jun 1999 09:10:09 -0700
X-Mailer: Internet Mail Service (5.5.2448.0)

A general comment on CCR0034: we need a section for acronyms .. . there are several that are not explained in the text e.g., FDF (item 1.1.10), GS (item 1.1.15), LTP (item 1.1.20
1.1.23 "actives" should be "activities"
Add: "1.1.29 Accept and implement instrument team commands for specific instrument operations via FAX or ASIST work station inputs"
1.2.1 CTS should be CGS
1.2.1.1 define SN
1.2.1.2 define VC0
Add "1.2.1.2.5 Hobart, Australia
1.2.1.2.6 Alice Springs, Australia
1.2.1.2.7 Ground Station (TBD) Argentina"
1.2.1.3 define SAFS
1.2.2.1 define CCSDS
1.2.2.4 define RDL
1.2.3.1 change "authorized users" to "authorized EO-1 team members"
1.2.4.1 define COP
1.2.4.3 change to "The system shall HAVE a list of critical commands. . . "
1.2.4.5 define C&DH, RSN
1.2.5 Define STOL
1.2.13.1 change to "The CGS shall provide the capability to record engineering data, cataloged by pass time. The CGS will have a searchable electronic table of contents or index, by activity, for the catalog."
1.3.3 Define CADU
1.3.4 change to "Process the data on an AMPEX tape into the following HDF file types; MS/PAN, Hyperion VNIR, Hyperion SWIR, combined Hyperion VNIR/SWIR, LAC and housekeeping"
1.3.5 define LZP+
Add "1.3.11 Combine Hyperion VNIR and Hyperion SWIR files into a single file. Attach ancillary data to file" (this will necessitate incrementing the numbers on subsequent items)
1.3.12 does not specify how long the archive will be retained or when images will start being archived.
1.3.13 Are the "quality metrics" defined elsewhere? A reference would be helpful here. Wait -- I just found the additional definition in section 1.3.16 . . . a reference at 1.3.13 would prevent future users from doing what I just did! We suggest changing 1.3.13 to read, "Provide associated metadata and ancillary data, as defined by instruments teams, related to a given DCE and place this data on the AMPEX tape or FTP site as needed"
1.3.16 define RS
1.3.18 Are document numbers (and rev. numbers) available for any of these? That would help the reader get to the right place.
1.3.18 (note . . . there are two items numbered 1.3.18) change to:
DPS Operational requirements
a. Upon receipt, AMPEX tape from the ground stations shall be retained by MOC for the lesser of image assessment complete by science team or 30 days
b. (OK as is)
c. DLT tapes shall be stored in the MOC for the life of the mission
1.4.3 define AST
1.4.7.2 define OBC
1.5.9 define MLT
1.6.9 define GN
1.6.21 Why provide sun angles related to WRS scene center and not lat/long scene center? I would think the latter would be more generally useful and more easily related to user requests.
1.6.22 define PSAT
Add "1.8 Operation support
1.8.1 EO-1 team members will be provided 24 hr/day access to MOC

1.8.2 MOC shall have back-up power source for 24 hr/day operations"
Add "2.4 Operation support
2.4.1 EO-1 team members will be provided 24 hr/day access to SVF"
3.4 correct typo; "The checkout TEAM . . .

Section 6: Suggested re-wording;

"TRW is responsible for the processing of Hyperion Instrument on-orbit characterization data, for processing of Hyperion Level 0 Data to Level 1 for the Science Validation Team and for processing scenes as requested for education, commercial and DOD applications.

Governing Documents include:
EO-1 NRA "Validation Studies"
EO-1 Mission Operations Center to Science User ICD
EO-1 Project TRW/GSFC Data Interface Control Document, dated 4 June, 1999
Contract NAS5-
Stennis Space Center/TRW Interface Control Document (not yet in draft)

6.1 TRW/I&T

6.1.1 TRW shall provide quick turnaround at TRW for Level 1 processing of Level 0 data (TBD) hours after receipt of tape from MOC during S/C I&T (July-Nov)

6.1.2 TRW shall provide data necessary to support instrument characterization during I&T.

6.2 TRW/L&EO

6.2.1 TRW shall provide technical support at GSFC for the first fourteen days after launch to work with the GSFC/FOT and the on-orbit checkout team at TRW

6.2.2 TRW shall perform a detailed assessment of instrument state of health

6.2.3 TRW shall address early orbit contingencies

6.2.4 TRW shall perform a calibration reverification and establish operating parameters for post checkout operations.

6.2.5 Housekeeping and Hyperion DCE SOH data will be received and processed by TRW via the ASIST workstation. GSFC will create, maintain and update the user interface for the TRW ASIST. Real-time SOH will be available of the dedicated T-1 line between TRW and GSFC.

6.3 TRW/Nominal Operations

6.3.1 TRW shall receive LZP DLTs from the MOC/DPS. TRW shall perform level 1 processing and quality assessment as requested by the Science Validation Team. The processed data will be shipped to the SVF via DLT within 3 business days, as a goal, of receipt request.

6.3.2 TRW shall receive LZP DLTs from the MOC/DPS. TRW shall perform level 1 processing and quality assessment as requested by Commercial, DOD and Educational customers. The processed data will be shipped to Stennis Space Center within 3 business days, as a goal, of receipt request.

6.3.3 TRW shall perform analysis of Hyperion operation status and update calibration factors."

8.1.1 SSC-CRSP shall be responsible for ordering all Hyperion level 1 processing performed by TRW for Commercial, DOD and Educational customers. The Science Validation Team shall receive its data directly from TRW. SSC-CRSP shall provide level 1 data to DOD, educational and its affiliated commercial users.

Please feel free to call me [(310)376-6744] if you have any questions
regarding any of these comments. -- Carol

Date: Fri, 25 Jun 1999 13:46:30 -0400 (Eastern Daylight Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Joy Henegar/586)
Subject: CCR:0034 - DUE: 06/25/99 ROUTINE Level-2 Joy Henegar/58 WWW-COMMENTS

USER : (Joy Henegar/586) sent the following comments on :

Date: 6/25/99
CCR Number: 0034
Sponsor: D. Mandl
Due Date: 06/25/99

CCR Title: Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT

Remote host: 128.183.218.246 Email Address:

APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: Comments on Baseline F&PR CCR #34

- Need to add requirements to clarify that the DPS will provide (and MIT/LL will receive) DLT tapes for the mission life and not just the first 60 days

- Need to add a similar requirement as above for the GSFC AC

- 1.1.20 I think SVF should be the MPO

- Need DPS requirement for merging I&Q channels that flip flop due to bit sync loss etc.

- MOPSS/DPS/SVF will need to have requirements for providing their specific information to the MPO for the image tracking Database

- SVF will need requirement to retrieve product order information from the MPO (this information is being provided in the request and stored in the Image tracking Database)

- Need to document that there is a maximum daily volume of science data of 80 Gbits. This is a system level requirement since if effects the MOPSS, as they shouldn't schedule more than that and the DPS as it should be sized to handle that as the max.

- Need to reassess the requirement for DPS to process 4 days worth of data in 6 hours. It should be good enough that the DPS can keep up with the inflow of the tapes during nominal ops.

- Need a requirement for how long the DPS has to ship a DLT from the time it receives the ampex tape from the GS (I have seen 7 days in some documentation but nothing in the F&PR)

- 1.3.13 should be state DLT not AMPEX tapes

- Need to specify that the DPS carry along the file id information into its output since that is the key into the image tracking database. Maybe this can be considered part of the metadata requirement

- Section 4 both the EO-1 coordinating committee requirements and the MPO requirements don't seem to be consistent with what we have discussed. We discussed that the coordinating committee is only responsible for generating a science conflict free LTAP and it feeds that to the MPO which then looks at inserting in the technology and calibration requests
- Therefore looks like the memberships should be reversed
- Don't think that 4.3 should happen, MPO has all the players to resolve a conflict

- Need specifics on what an NRA or SSC can request. For instance we need to capture that they can put in a request that can lead to multiple DCE collection requests

- MPO needs a requirement to maintain the image tracking database and that it is accessable read –only to authorized users and should contain at a minimum:

Requestor
Scene Requested
Scene Scheduled or not
S/C Acquisition date/time
DCE Duration
Primary or Alternate Scene
Scene Downlinked?
L0 Processed?
Image Assessment (good/bad) for each AC ALI, and Hyp
File ID (needed to track what's on a DLT tape)
DCE attributes
Instruments on
Path/Row from Request
Lat/Long from Requests

- SVF needs requirement for AC image assessment after early checkout (when GSFC AC goes away

- Need to specify DPS Metadata

- SVF should have a requirement to provide image assessment to the MPO (for inclusion in the tracking database

- 2.1.7 should be deleted, no need for SVF to do this since AC is giving the s/w to them

- Need to add a requirement for AC along the same line as 2.1.6 says for ALI

- 2.1.10 Remove parenthetic

- 2.2.1 Either specify what this is or remove. Only assessment we came up with was whether they could read the tape which should be done in the MOC before shipping.

- 2.3.1 Ditto above

- 5.1.1 under AC section should be deleted. They don't need to go to the SVF for this, they are getting the L0 data already

- 5.2.1 ditto above

- 7.3.1 AC val team requirement. Is this a legitimate requirement under normal ops. I don't think so since the s/w is transitioning to the SVF after Early checkout

- 2.1.1, 2.1.2, 2.1.3, 2.1.4 are these really MPO requirements? I think so, keeping in mind that the concept is that the MSO is really a part of the MPO

- Need additional requirements for the SVF to accept and produce product requests for DCEs from the NRA community

- Need some kind of performance requirement on the SVF, i.e. how many products will they produce in a day (even if it is not very stringent)

- Need requirement on SVF for type of media supporting (since there aren't any lower level requirements docs I think this should be documented somewhere)

- Section 6 on TRW indicates that they are only processing selected data to L1, I thought all hyperion data was going to L1, but only selected ones would be sent to the SVF based on an NRA request for the data

- TRW should have a requirement to provide image assessment to the SVF, (called out as scene quality assurance in the TRW ICD)

- TRW ICD has metadata flowing from MSO/SVF to TRW. This interface doesn't seem to be in the requirements document. Need to clarify if the interface is with MSO/MPO or SVF and establish requirements on the interfacing parties

- Numbering of section 7 AC needs fixed

- SSC – isn’t SSC responsible for gathering scene acquisition requests from DOD/Commercial/Educational users and providing them to the MPO. Need requirements on both sides to reflect this.

Date: Fri, 25 Jun 1999 14:12:53 -0400 (Eastern Daylight Time)
From: Administrator <administrator@hst-nic.hst.nasa.gov>
Reply-to: (Joy Henegar/586)
Subject: CCR:0034 - DUE: 06/25/99 ROUTINE Level-2 Joy Henegar/58 WWW-COMMENTS

USER : (Joy Henegar/586) sent the following comments on :

Date: 6/25/99
CCR Number: 0034
Sponsor: D. Mandl
Due Date: 06/25/99

CCR Title: Baseline EO-1 GROUND FUNCT & PERFM REQTS DOCUMENT

Remote host: 128.183.218.246 Email Address:

APPROVAL STATUS: APPROVED WITH COMMENTS
Note:

COMMENTS: - need to resolve if it is a requirement for the DPS to provide a 24-hr non-DCE housekeeping file as an output product. If it is then add it, if not, make sure non-requirements are not being implemented by the development team.

From: "Digenis, Constantine Dr." <digenis@ll.mit.edu>
To: "'sschneider@hst.nasa.gov'" <sschneider@hst.nasa.gov>,
"'mandl'"
<dan.mandl@gsfc.nasa.gov>
Cc: "'welsh'" <ralph.d.welsh.1@gsfc.nasa.gov>,
"Evans, Jenifer B."
<jenifer@ll.mit.edu>,
"Lencioni, Donald Dr." <lencioni@ll.mit.edu>,
"Hearn, David Dr" <drhearn@ll.mit.edu>,
"Mendenhall, Jeff Dr."
<mendenhall@ll.mit.edu>,
Brown William <bbrown@ll.mit.edu>
Subject: EO-1 Ground Functional and Performance Reqts Document
Date: Fri, 25 Jun 1999 17:05:43 -0400
X-Mailer: Internet Mail Service (5.5.2232.9)

Gentlemen,
Please note the following.

Re: Section 5.2.1. It is correctly stated that the cal pipeline will be utilized on the Level 0 data; but not by Lincoln. It will be delivered by Lincoln, and the SVF is responsible for running it. Please add the clarification: "the MIT developed cal pipeline will be utilized by the SVF....".

Re: Section 5.2.2. It is incorrectly stated that "LZP DLT's from GSFC shall be processed by MIT within one working day for image assessment". Our on orbit ALI performance assessment will consist of selecting a handful of scenes and doing an in-depth analysis and evaluation. The results obtained in the beginning of this process will guide the selection of the number and type of scenes to be subsequently examined, subject to available program manpower. We never offered, agreed or were asked to perform a one-day assessment of every scene taken. The subject sentence ought to be deleted.

Thank you.
Costas