

Department of the Interior  
U.S. Geological Survey

# **USGS Landsat Data Continuity Mission Ground System Interface Requirements Document (GSIRD)**

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# 1 Introduction

The Landsat Data Continuity Mission (LDCM) is a joint mission being formulated by the National Aeronautics and Space Administration (NASA) and the United States Geological Survey (USGS). The LDCM is a remote sensing satellite mission providing coverage of the Earth's land surfaces. This mission continues the 30+ years of global data collection and distribution provided by the Landsat series of satellites.

## 1.1 Background

The Landsat Data Continuity Mission is a component of the Landsat Program conducted jointly by the National Aeronautics and Space Administration and the United States Geological Survey (USGS) of the Department of Interior. The goal of the LDCM is to continue the collection, archival, and distribution of multi-spectral imagery affording global, synoptic, and repetitive coverage of the Earth's land surfaces at a scale where natural and human-induced changes can be detected, differentiated, characterized, and monitored over time. The LDCM goal is in keeping with the Landsat programmatic goals stated in the United States Code (USC) Title 15, Chapter 82 "Land Remote Sensing Policy" (derived from the Land Remote Sensing Policy Act of 1992). This policy requires that the Landsat Program provide data into the future that is sufficiently consistent with previous Landsat data to allow the detection and quantitative characterization of changes in or on the land surface of the globe. The LDCM was conceived as a follow-on mission to the highly successful Landsat series of missions that have provided satellite coverage of the Earth's continental surfaces since 1972. The data from these missions constitute the longest continuous record of the Earth's surface as seen from space.

The LDCM is intended to ensure that Landsat-like data will be provided to the USGS National Satellite Land Remote Sensing Data Archive (NSLRSDA) for at least 5 years.

## 1.2 Purpose and Scope

The primary purpose of the LDCM Ground System Interface Requirements Document (IRD) is to provide an identification and documentation plan for interfaces between the automated segments that comprise the LDCM Ground System. The IRD presents a functional and system interface view of the LDCM Ground System based on high level LDCM program guidance. The LDCM Ground System elements maintain Interface Control Documents (ICDs) for each interface. The ICDs contain detailed interface descriptions and performance requirements. The appropriate ICDs are identified in Appendices B and C.

The scope of the IRD includes all functions associated with the LDCM Ground System as well as those external entities that interact with the LDCM Ground System. The IRD elements support mission planning, management of the LDCM observatory, transmission of commands to the observatory, reception of observatory telemetry and image data by the LDCM Ground System, and processing, archival, and distribution of the data for the Landsat data user community.

### **1.3 Document Organization**

This document is divided into the following sections:

Section 1 provides an introduction for this document

Section 2, an overview of the functional architecture and the ground system interfaces

Section 3, the interface identification and requirements

Appendix A contains the N2 diagram

Appendix B contains the associated ICDs

Appendix C contains the DOORS Attributes

### **1.4 References**

#### **1.4.1 Applicable Documents**

The following applicable documents relate to the IRD should be used as background reference documents:

Document Number	Revision/Release Date	Document Title
LDCM-OCD-002	Rev 1/December 2007	Ground System Operations Concept Document
GSFC 427-02-02	Rev A/January 2007	Landsat Data Continuity Mission Operations Concept Document
LDCM-REQ-001	Version 2.0/June 2009	Landsat Data Continuity Mission requirements Document

## **2 LDCM Mission Overview**

### **2.1 LDCM Mission Objectives**

The Landsat Data Continuity Mission (LDCM) is a remote sensing mission, which provides data continuity to the Landsat satellite series global multi-spectral data collection and distribution. The LDCM is a satellite and ground based capabilities collection that provides:

- Global, moderate-resolution, multi-spectral data collection
- Long term LDCM data archiving
- Web-enabled access
- Continued Landsat International Cooperators (ICs) support
- Level 0 and Level 1 data products

The LDCM goal is to continue the collection, archive, and distribution of multi-spectral imagery affording global, synoptic, and repetitive coverage of Earth land surfaces at a scale where natural and human-induced changes can be detected, differentiated, characterized, and monitored over time.

The major mission objectives are as follows:

- Acquire and archive moderate-resolution (circa 30 m ground sample distance) multispectral image data affording seasonal coverage of the global land mass for a period of no less than 5 years with no credible single point failures.
- Ensure LDCM data is sufficiently consistent with data from the earlier Landsat missions, in terms of acquisition geometry, calibration, coverage characteristics, spectral characteristics, output product quality, and data availability to permit studies of land cover and land use change over multi-decadal periods.
- Distribute LDCM data products to the general public on a nondiscriminatory basis and at a price no greater than the incremental cost of fulfilling a user request.

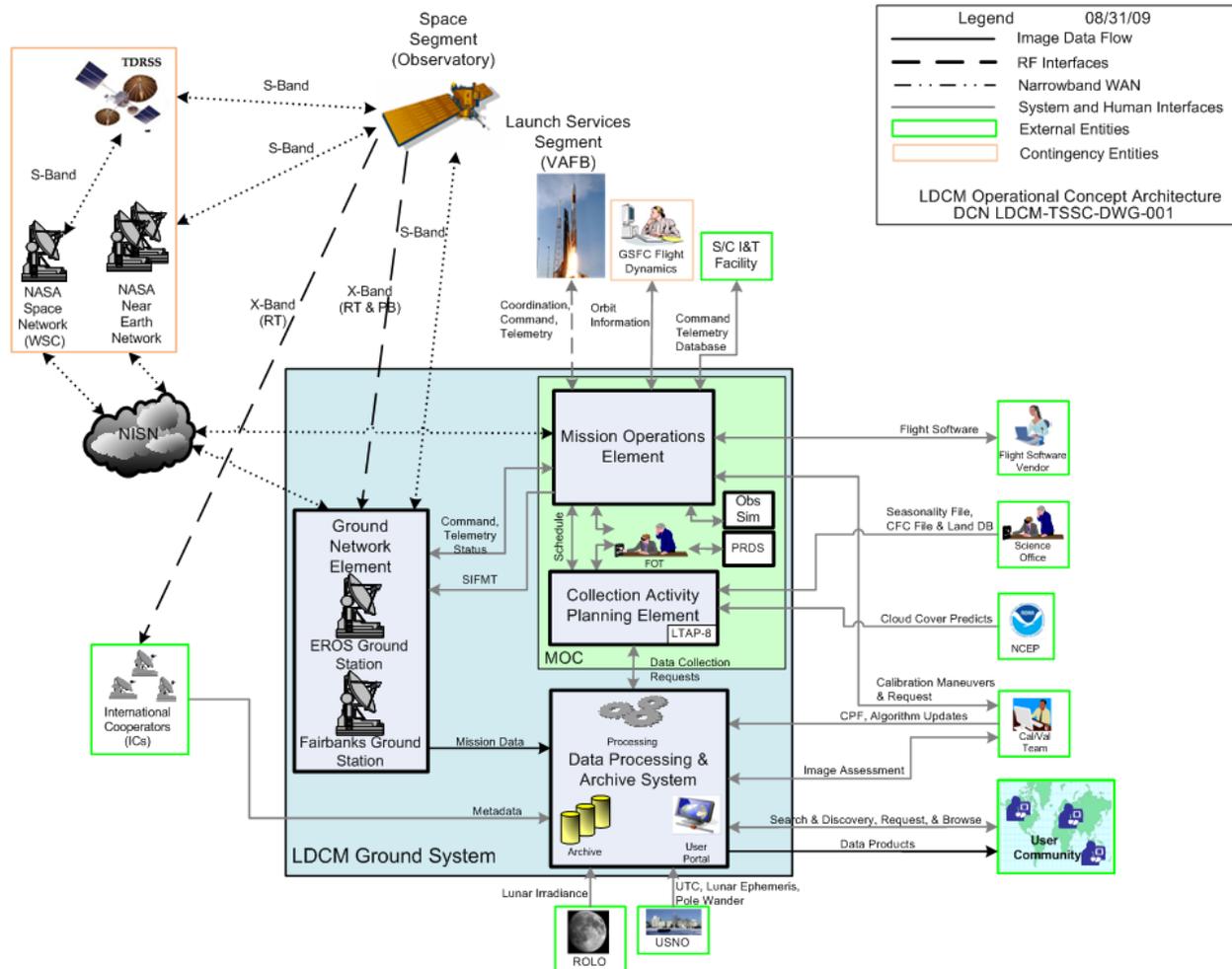
### **2.2 Mission Architecture**

The LDCM Project consists of three major mission components: the Space Segment (SS), Ground System (GS), and Launch Services Segment (LSS). Since LDCM is a cooperative effort between NASA and the USGS, each agency has specific responsibilities for delivery of major overall mission capabilities.

The components can be decomposed further into “Systems.” Figure 2-1 depicts the LDCM operational concept architecture which entails the major interfaces for the Ground System.

The LDCM Operational Concept Architecture is shown in Figure 2-1.

IRD1217:



**Rationale:**

Figure 2-1 LDCM Operational Concept Architecture

The LDCM Project consists of the following three major functional components.

**2.2.1 Space Segment**

The Space Segment (SS) consists of the observatory and pre-launch ground support equipment (GSE). The observatory is comprised of the imaging sensor(s) and the spacecraft platform. The observatory will operate in a 705 Km orbit with a 16-day repeat cycle and a 10:00 a.m. (+/- 15 minutes) mean local time for the descending node. Imaging sensor and ancillary data (combined as mission data) will be collected, stored onboard and subsequently downlink to ground stations within the LDCM Ground Network via an X-band communications link. This link will also include stored

housekeeping telemetry. Additionally, a real-time X-band downlink capability will transmit mission (imaging sensor and ancillary) data to the LDCM Ground Network and International Cooperators (ICs) equipped to receive these data. The observatory will also receive and execute commands and transmit real-time housekeeping telemetry via an S-band link to the LDCM Ground Network. The GSE provides the functionality to perform ground-based integration and testing of the observatory prior to launch.

### **2.2.2 Ground System**

The Ground System (GS) includes the Collection Activity Planning Element (CAPE), the Mission Operations Element (MOE), the LDCM Ground Network Element (GNE), and the Data Processing and Archive System (DPAS). The CAPE defines the set of images to be collected by the observatory on a daily basis. The MOE plans and schedules observatory activities, commands and controls the observatory, and monitors the observatory and ground operating systems health and status. The MOE hardware and software systems reside in the LDCM Mission Operations Center (MOC). There is a geographically separated backup MOE (bMOE) which resides in a backup MOC (bMOC). The GNE includes the ground stations located at Sioux Falls, SD. and Fairbanks, AK. The antenna systems for S and X band RF communications and the hardware and software systems that communicates the Command and Telemetry data with MOE and the image data with Data Processing and Archive System (DPAS). The Data Processing and Archive System (DPAS) ingests, processes, archives, and distributes all LDCM mission data. The DPAS also provides common services and messaging capabilities across the Ground System. The DPAS will also serve as the portal to the user community for acquisition requests, product orders, and product distribution. The DPAS will be located at the USGS Center for Earth Resources Observation and Science (EROS) near Sioux Falls, SD.

### **2.2.3 Launch Services Segment**

The Launch Services Segment (LSS) provides those assets and services associated with the launch vehicle (LV) and the observatory integration. Included, along with the launch vehicle, are all launch vehicle ground support equipment (including hardware and software), property, and facilities to integrate the observatory to the LV, verify their interfaces, and conduct pre-launch testing.

### 3 LDCM Ground System Interfaces

The interfaces supporting the Ground System Elements were drawn from the functional architecture and documented in the following sections. Changes to be made will follow CM processes via a configuration control request, and configuration control board approval.

#### 3.1 GS Internal Interfaces

##### 3.1.1 GNE to MOE Interfaces

**IRD139:** The GNE shall provide Contact Forecast Confirmation to the MOE

**Rationale:** This interface is required for MOE resource scheduling.

**IRD141:** The GNE shall provide CFDP Status Messages to the MOE

**Rationale:** This interface is required by MOE to generate retransmit requests for the bad mission data files and for the onboard memory management.

**IRD142:** The GNE shall provide GSE RT status to the MOE

**Rationale:** This interface is required to support GNE operations and maintenance staff troubleshooting.

**IRD143:** The GNE shall provide GSE Post Pass Reports to the MOE

**Rationale:** This interface is required to provide MOE information regarding the downlink status.

**IRD144:** The GNE shall provide S-Band RT Telemetry to the MOE

**Rationale:** This interface is required for telemetry to flow through GNE to MOE.

**IRD145:** The GNE shall provide S-Band PB Telemetry to the MOE

**Rationale:** This interface is required for telemetry to flow through GNE to MOE.

**IRD1259:** The GNE shall provide X-Band PB Telemetry to the MOE

**Rationale:** This interface is required for telemetry to flow through GNE to MOE. The flow of X-Band telemetry differs from that of the S-Band.

**IRD1194:** The GNE shall provide housekeeping telemetry recorded by the GNE to the MOE

**Rationale:** This interface is required to provide the capability to send housekeeping recorded by the GNE but not received by the MOE. The housekeeping telemetry data can be downlinked on both S-Band and X-Band.

**IRD146:** The MOE shall provide Contact Forecast Requests to the GNE

**Rationale:** This interface is required to determine contact schedule and sends selected set to GNE for confirmation.

**IRD147:** The MOE shall provide Confirmed Contact Schedules to the GNE

**Rationale:** This interface is required for the GNE to configure for acquisitions.

**IRD148:** The MOE shall provide Acquisition Data to the GNE

**Rationale:** This interface is required for the GNE to configure for acquisitions.

**IRD150:** The MOE shall provide the Scene-Interval-File Mapping Table to the GNE

**Rationale:** This interface is required to transfer complete Mission Data intervals to DPAS.

**IRD151:** The MOE shall provide GSE Directives to the GNE

**Rationale:** This interface is required for the GNE to configure for acquisitions.

**IRD152:** The MOE shall provide Commands to the GNE

**Rationale:** This interface is required for commanding to flow through GNE to LDCM Observatory.

### 3.1.2 GNE to DPAS Interfaces

**IRD155:** The GNE shall provide Interval Definition Files to the DPAS

**Rationale:** This interface is required to transfer complete Mission Data intervals to DPAS. Separate IDFs will be sent for data not successfully captured.

**IRD159:** The GNE shall provide Mission Data to the DPAS

**Rationale:** This interface is required to pass Mission Data for processing.

**IRD160:** The GNE shall provide Block Address Data to the DPAS

**Rationale:** This interface is required to archive Mission Data that is not considered Nominal, but should be accessible to restricted users.

**IRD163:** The GNE shall provide Metrics to the DPAS

**Rationale:** This interface is required since the Central Repository is responsible for producing reports on download and other activities.

**IRD156:** The DPAS shall provide Mission Data Processing Status to the GNE

**Rationale:** This interface is required to complete the Mission Data transfer.

**IRD1261:** The DPAS shall provide IC Mission Data to the GNE

**Rationale:** This interface is required for IC DV&E.

### 3.1.3 CAPE to MOE Interfaces

**IRD166:** The CAPE shall provide Deconflicted Collection Requests to the MOE

**Rationale:** This interface is required to secure all required assets.

**IRD1138:** The CAPE shall provide Image SSR modeling requests to the MOE

**Rationale:** This interface is required to allow the MOE to plan on-board recorder usage.

**IRD1220:** The MOE shall provide MOE Forecast Schedule data to the CAPE

**Rationale:** This interface is required to allow the CAPE to adequately schedule events.

**IRD167:** The MOE shall provide MOE Master Schedule data to the CAPE

**Rationale:** This interface is required to provide the CAPE a current version of the schedule for long term forecast, scene scheduling and confirmation of schedule ; provides for database synchronization between the MOE and CAPE.

**IRD168:** The MOE shall provide Resource availability to the CAPE

**Rationale:** This interface is required to provide observatory and ground system availability information needed for image collection planning.

**IRD169:** The MOE shall provide WRS-2/Time Translations to the CAPE

**Rationale:** This interface is required to provide timing for image collection planning via the controlled repository.

**IRD1139:** The MOE shall provide SSR Management Reports to the CAPE

**Rationale:** This interface is required to allow the CAPE to plan.

**IRD1195:** The MOE shall provide messages to CAPE.

**Rationale:** This interface is required to provide notification of applicable processing status and products delivered to the controlled repository

### 3.1.4 CAPE to DPAS Interfaces

**IRD172:** The CAPE shall provide User Request Types and Parameters to the DPAS

**Rationale:** This interface is required to support data collection request.

**IRD173:** The CAPE shall provide Collection Status Updates to the DPAS

**Rationale:** This interface is required to allow User Portal to track the data collection status.

**IRD1140:** The CAPE shall provide Collection Cancellation Confirmation to the DPAS

**Rationale:** This interface is required to allow the User Portal to track the data collection status.

**IRD1141:** The CAPE shall provide Collection Request IDs to the DPAS

**Rationale:** This interface is required to allow User Portal to track the data collection status.

**IRD179:** The CAPE shall provide the CAPE Planning & Scheduling Database to the DPAS

**Rationale:** This interface is required for the Central Repository.

**IRD174:** The DPAS shall provide external Collection Requests to the CAPE

**Rationale:** This interface is required to provide a method for authorized users to set up collection requests.

**IRD175:** The DPAS shall provide Status Requests to the CAPE

**Rationale:** This interface is required to plan for data collects.

**IRD1142:** The DPAS shall provide Cancellation Requests to the CAPE

**Rationale:** This interface is required to provide a method for authorized users to cancel collection requests.

**IRD180:** The DPAS shall provide Scene Metadata Notifications to the CAPE

**Rationale:** This interface is required to notify the CAPE of new Scene Metadata.

**IRD181:** The DPAS shall provide Scene Metadata to the CAPE

**Rationale:** This interface is required for the CAPE to read the metadata for each scheduled scene.

### **3.1.5 MOE to DPAS Interfaces**

**IRD184:** The MOE shall provide Confirmed Contact Schedule to the DPAS

**Rationale:** This interface is required for distribution to externals.

**IRD185:** The MOE shall provide Acquisition Data to the DPAS

**Rationale:** This interface is required for distribution to externals. Acquisition Data consists of two line elements (TLE), and improved inter range vectors (IIRV) for ground stations.

**IRD186:** The MOE shall provide Contact Forecast Visibility to the DPAS

**Rationale:** This interface is required for distribution to externals.

**IRD1260:** The MOE shall provide Scene Transmit Schedule to the DPAS

**Rationale:** This interface is required for distribution to of anticipated scenes to the externals. The Scene Transmit Schedule is individually created for each IC and a complete Scene Transmit Schedule is also provided to DPAS.

### **3.2 GS External Interfaces**

### 3.2.1 GNE to Observatory

**IRD254:** The GNE shall provide Commands to the Observatory

**Rationale:** This interface is required for telemetry, commanding and science data to flow through GNE.

**IRD255:** The GNE shall receive RT Telemetry from the Observatory

**Rationale:** This interface is required for telemetry data to flow through GNE. S-Band

**IRD256:** The GNE shall receive PB Telemetry from the Observatory

**Rationale:** This interface is required for telemetry data to flow through GNE. S-Band and X-Band

**IRD257:** The GNE shall receive Mission Data from the Observatory

**Rationale:** This interface is required for Mission Data to flow through GNE. X-Band

### 3.2.2 CAPE to NCEP Interfaces

**IRD262:** The CAPE shall receive Cloud Cover Predicts from NCEP

**Rationale:** This interface is required for global cloud fraction climatology data to adjust the priorities of image data collection requests and therefore must be able to ingest this data from an external source.

### 3.2.3 MOE to S/C I&T Facility Interfaces

**IRD264:** The MOE shall provide Command Uplink Data to the S/C I&T Facility

**Rationale:** This interface is required to provide commands to the observatory while it is at the observatory I&T facility and at the launch site.

**IRD265:** The MOE shall receive Telemetry Data from the S/C I&T Facility

**Rationale:** This interface is required to receive telemetry from the observatory while it is at the observatory I&T facility and at the launch site.

**IRD266:** The MOE shall receive GSE Data (PRD) from the S/C I&T Facility

**Rationale:** This interface is required for communications between the Observatory and the project provided ground station simulator.

### 3.2.4 MOE to LSS Interfaces

**IRD268:** The MOE shall receive Telemetry Data from the LSS

**Rationale:** This interface is required to receive telemetry from the observatory while it is at the observatory I&T facility and at the launch site.

### 3.2.5 MOE to FSV Interfaces

**IRD1201:** The MOE shall send stored memory loads to the FSV

**Rationale:** This interface is required to send proposed or executed memory load files created under the command function to the FSV.

**IRD1202:** The MOE shall send memory dump data to the FSV

**Rationale:** This interface is required as the FSV has a copy of what is actually on-board.

**IRD1203:** The MOE shall send a copy of the Ground Reference Image data to the FSV

**Rationale:** This interface is required as FSV has a copy of the operations configuration controlled image.

**IRD1204:** The MOE shall receive flight software updates from the FSV

**Rationale:** This interface is required as a method for receiving memory modifications from the FSV.

**IRD1205:** The MOE shall receive Ground Reference Image data from the FSV

**Rationale:** This interface is required to provide capability for FSV to deliver a reference.

### 3.2.6 MOE to ObsSim Interfaces

**IRD273:** The MOE shall provide Command Uplink Data to the ObsSim

**Rationale:** This interface is required to provide a command structure that is the same as the Observatory.

**IRD274:** The PRD shall provide GSE PRD Data to the ObsSim

**Rationale:** This interface is required to provide integration with the project provided ground station simulator.

**IRD1206:** The MOE shall provide GSE Directives to the ObsSim

**Rationale:** This interface is required to provide execution control of the project provided ground station simulator.

**IRD275:** The MOE shall receive Telemetry Data from the ObsSim

**Rationale:** This interface is required to allow the operator to monitor the simulator status.

**IRD276:** The PRD shall receive GSE PRD Data from the ObsSim

**Rationale:** This interface is required to provide integration with the project provided ground station simulator.

**IRD1207:** The MOE shall receive GSE Status from the ObsSim

**Rationale:** This interface is required to allow the operator to monitor the simulator status, verify overall configuration and responses to GSE directives.

### 3.2.7 MOE to FDF Interfaces

**IRD278:** The MOE shall provide Orbit Products to the FDF

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD1208:** The MOE shall provide Orbit Maneuver Plans to the FDF

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD279:** The MOE shall receive Orbit Products from the FDF

**Rationale:** The GS will utilize NASA Services to support the mission.

### 3.2.8 MOE to Conjunction Assessment Team Interfaces

**IRD1279:** The MOE shall provide Orbit Maneuver Plans to the Conjunction Assessment Team

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD1278:** The MOE shall receive Collision Avoidance Data from the Conjunction Assessment Team

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD1277:** The MOE shall provide Ephemeris to the Conjunction Assessment Team

**Rationale:** The GS will utilize NASA Services to support the mission.

### 3.2.9 MOE to SN Interfaces

**IRD281:** The MOE shall provide Command Uplink Data to the SN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD282:** The MOE shall provide Acquisition Data to the SN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD283:** The MOE shall provide Schedule Requests to the SN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD284:** The MOE shall receive Telemetry Data from the SN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD285:** The MOE shall receive Confirmed Schedule from the SN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD1209:** The MOE shall receive Housekeeping Telemetry recorded by the SN

**Rationale:** This interface is required to provide the capability to send housekeeping recorded by the SN but not received by the MOE.

### **3.2.10 NISN to MOE Interfaces**

**IRD287:** The MOE shall receive Network Data Services from the NISN

**Rationale:** The GS will utilize NASA Services to support the mission.

### **3.2.11 MOE to GN Interfaces**

**IRD289:** The MOE shall provide Command Uplink Data to the NEN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD290:** The MOE shall provide Acquisition Data to the NEN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD291:** The MOE shall provide Schedule Requests to the NEN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD292:** The MOE shall receive Telemetry Data from the NEN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD293:** The MOE shall receive Confirmed Schedule from the NEN

**Rationale:** The GS will utilize NASA Services to support the mission.

**IRD1210:** The MOE shall receive Housekeeping Telemetry recorded by the NEN

**Rationale:** This interface is required to provide the capability to send housekeeping recorded by the GN but not received by the MOE.

### **3.2.12 DPAS to ROLO Interfaces**

**IRD295:** The DPAS shall receive Lunar Model Irradiance Files from ROLO

**Rationale:** This interface is required to provide radiometric calibration and sensor stability monitoring for remote sensing satellite imaging instruments using the moon.

**IRD296:** The DPAS shall provide Lunar Characterization Data to ROLO

**Rationale:** This interface is required to provide Lunar data for product generation.

### 3.2.13 PRD to S/C I&T Facility Interfaces

**IRD298:** The PRD shall provide GSE Data (PRD) to the S/C I&T Facility

**Rationale:** This interface is required to allow the simulator to verify overall configuration and responses to GSE directives.

### 3.2.14 DPAS to OGC Clients Interfaces

**IRD300:** The DPAS shall provide Standard L1 Products to the OGC Clients

**Rationale:** This interface is required for product distribution to OGC Clients.

**IRD301:** The DPAS shall provide Browse to the OGC Clients

**Rationale:** This interface supports full spatial resolution browse that are geographically referenced so users may utilize for reference or graphic illustration.

**IRD303:** The DPAS shall receive WMS Request from the OGC Clients

**Rationale:** This interface is required to provide a method for authorized users to set up WMS requests.

**IRD304:** The DPAS shall receive WCS Request from the OGC Clients

**Rationale:** This interface is required to provide a method for authorized users to set up WCS requests.

### 3.2.15 DPAS to RSS Readers Interfaces

**IRD306:** The DPAS shall provide New BPF/CPF Notification to the RSS Readers

**Rationale:** This interface is required to notify users of new BPF/CPF files through standard subscription feed readers.

**IRD307:** The DPAS shall provide Browse to the RSS Readers

**Rationale:** This interface supports full spatial resolution browse that are geographically referenced so users may utilize for reference or graphic illustration.

**IRD308:** The DPAS shall provide Standard L1 Products to the RSS Readers

**Rationale:** This interface is required for product distribution to RSS Readers.

**IRD309:** The DPAS shall receive BPF/CPF Subscription from the RSS Readers

**Rationale:** This interface is required to notify users of new BPF/CPF files through standard subscription feed readers.

**IRD310:** The DPAS shall receive New Collection Subscription from the RSS Readers

**Rationale:** This interface is required for distribution to RSS Readers.

### 3.2.16 DPAS to KML Clients Interfaces

**IRD312:** The DPAS shall provide Search Results to the KML Clients

**Rationale:** This interface is required for distribution of accurate search results to compatible external clients.

**IRD313:** The DPAS shall provide Browse to the KML Clients

**Rationale:** This interface supports full spatial resolution browse that are geographically referenced so users may utilize for reference or graphic illustration.

**IRD314:** The DPAS shall provide Standard L1 Products to the KML Clients

**Rationale:** This interface is required for product distribution to KML Clients.

**IRD315:** The DPAS shall provide New Collection Metadata to the KML Clients

**Rationale:** This interface is required for distribution to KML Clients.

**IRD316:** The DPAS shall receive KML Search from the KML Clients

**Rationale:** This interface is required to provide accurate search criteria.

### 3.2.17 DPAS to Custom DAT Clients Interfaces

**IRD318:** The DPAS shall provide Search Results to custom DAT Clients

**Rationale:** This interface is required for distribution of accurate search results to compatible external clients.

**IRD319:** The DPAS shall provide Browse to custom DAT Clients

**Rationale:** This interface supports full spatial resolution browse that are geographically referenced so users may utilize for reference or graphic illustration.

**IRD320:** The DPAS shall provide Standard L1 Products to custom DAT Clients

**Rationale:** This interface is required for product distribution to DAT Clients.

**IRD321:** The DPAS shall receive Consumer Service Search Requests from the Custom DAT Clients

**Rationale:** This interface is required to provide accurate search criteria.

### 3.2.18 DPAS to ICs Interfaces

**IRD326:** The DPAS shall provide Confirmed Contact Schedule to the ICs

**Rationale:** This interface is required for distribution to ICs.

**IRD327:** The DPAS shall provide Acquisition Data to the ICs

**Rationale:** This interface is required for distribution to ICs. Acquisition Data consists of two line elements (TLE), and improved inter range vectors (IIRV) for ground stations.

**IRD328:** The DPAS shall provide Contact Forecast Visibility to the ICs

**Rationale:** This interface is required for distribution to ICs.

**IRD1262:** The DPAS shall provide Scene Transmit Schedule to the ICs

**Rationale:** This interface is required for distribution to of anticipated scenes to the ICs. The Scene Transmit Schedule is individually created for each IC.

**IRD1255:** The DPAS shall receive Station Description from the ICs

**Rationale:** This interface is required for the ICs to provide Station Description to the Ground System.

**IRD1254:** The DPAS shall receive Problem Reports from the ICs

**Rationale:** This interface is required for ICs to provide Problem Reports to the GS.

**IRD1253:** The DPAS shall provide Documentation to the ICs

**Rationale:** This interface is required for distribution of additional pertinent data to the ICs.

**IRD1252:** The DPAS shall receive IC Mission Data from the ICs

**Rationale:** This interface is required for IC DV&E. This transfer includes both electronic and media transfers of IC Mission Data.

**IRD1251:** The DPAS shall receive Administrative Messages from the ICs

**Rationale:** This interface is required for ICs to provide Administrative Messages to the GS.

**IRD1250:** The DPAS shall receive Metadata from the ICs

**Rationale:** This interface is required for ICs to send metadata to the GS.

**IRD1249:** The DPAS shall provide Mission Data to the ICs

**Rationale:** This interface is required to distribute Mission Data to ICs. This Mission Data will be used by the IC's for system verification.

**IRD1248:** The DPAS shall provide Algorithms to the ICs

**Rationale:** This interface is required for distribution of updated production algorithms to the ICs.

**IRD1247:** The DPAS shall provide Production Software to the ICs

**Rationale:** This interface is required to provide the ICs with updated production software (where not prohibited).

**IRD1223:** The DPAS shall receive Collection Requests from the ICs

**Rationale:** This interface is required for ICs to request collections.

### 3.2.19 USNO to DPAS Interfaces

**IRD330:** The DPAS shall receive UTC/UT1 from the USNO

**Rationale:** This interface is required to provide the GS with a standard reference time.

**IRD331:** The DPAS shall receive Lunar Ephemeris from the USNO

**Rationale:** This interface is required to provide Lunar data for product generation.

**IRD332:** The DPAS shall receive Pole Wander from the USNO

**Rationale:** This interface is required to provide Pole Wander data for product generation.

### 3.2.20 MOE to USNO Interfaces

**IRD1192:** The MOE shall pull Pole Wander from USNO

**Rationale:** This interface is required to provide Pole Wander data for MOE systems.

### 3.2.21 DPAS to Ball Test Facility (BTF) Interfaces

**IRD1266:** The DPAS shall receive Pre-Launch Instrument Data from Ball Test Facility (BTF)

**Rationale:** This interface is required for instrument and system validation.

**IRD1265:** The DPAS shall provide LORa data to Ball Test Facility (BTF)

**Rationale:** This interface is required for instrument and system validation.

**IRD1264:** The DPAS shall provide LORp data to Ball Test Facility (BTF)

**Rationale:** This interface is required for instrument and system validation.

### 3.2.22 DPAS to TIRS Test Facility Interfaces

**IRD1268:** The DPAS shall receive Pre-Launch Instrument Data from TIRS Test Facility

**Rationale:** This interface is required for instrument and system validation.

**IRD1267:** The DPAS shall provide LORa data to TIRS Test Facility

**Rationale:** This interface is required for instrument and system validation.

**IRD1263:** The DPAS shall provide LORp data to TIRS Test Facility

**Rationale:** This interface is required for instrument and system validation.

### 3.3 GS User Interfaces

#### 3.3.1 GNE to O&M Staff Interfaces

**IRD336:** The GNE shall receive Manual Operations from the O&M Staff

**Rationale:** This interface is required for production operations.

#### 3.3.2 CAPE to FOT Interfaces

**IRD338:** The CAPE shall provide Schedule Displays and Reports to the FOT

**Rationale:** This interface is required for production operations.

**IRD339:** The CAPE shall receive Collection Requests from the FOT

**Rationale:** This interface is required to manage collection requests.

**IRD340:** The CAPE shall receive Seasonality Record Updates from the FOT

**Rationale:** This interface is required for image data collection requests to be properly planned and scheduled by the CAPE software.

#### 3.3.3 CAPE to MMO Interfaces

**IRD343:** The CAPE shall provide External Collection Request to the MMO

**Rationale:** This interface is required for the DAM to manage collection requests.

**IRD344:** The CAPE shall receive Collection Requests from the MMO

**Rationale:** This interface is required for the DAM to submit ad hoc collection requests.

**IRD345:** The CAPE shall receive Seasonality Record Updates from the MMO

**Rationale:** This interface is required for image data collection requests to be properly planned and scheduled by the CAPE software.

**IRD346:** The CAPE shall receive Request Approval/Disapproval from the MMO

**Rationale:** This interface is required for the DAM to manage collection requests.

#### 3.3.4 MOE to FOT Interfaces

**IRD348:** The MOE shall provide Operator Interface to the FOT

**Rationale:** This interface is required for the FOT to operate all associated systems.

**IRD349:** The MOE shall provide Remote Operator Interface to the FOT

**Rationale:** This interface is required for the FOT to operate all associated systems from a remote location.

### 3.3.5 MOE to the Cal/Val Team Interfaces

**IRD353:** The MOE shall provide Schedules to the Cal/Val Team

**Rationale:** This interface is required for Cal/Val planning.

**IRD354:** The MOE shall provide Engineering Data Products to the Cal/Val Team

**Rationale:** This interface is required to evaluate the instrument performance and data quality

**IRD355:** The MOE shall provide Remote Controlled Repository Access to the Cal/Val Team

**Rationale:** This interface is required for trending and analysis.

### 3.3.6 DPAS to Cal/Val Team Interfaces

**IRD357:** The DPAS shall provide Characterization Data to the Cal/Val Team

**Rationale:** This interface is required to evaluate the instrument performance and data quality.

**IRD361:** The DPAS shall provide Cal/Val Products to the Cal/Val Team

**Rationale:** This interface is required for product distribution to the Cal/Val Team.

**IRD358:** The DPAS shall receive CPF Edits from the Cal/Val Team

**Rationale:** This interface is required to allow for updates to the CPF to be incorporated in product generation.

**IRD359:** The DPAS shall receive Algorithm Updates from the Cal/Val Team

**Rationale:** This interface is required to maintain radiometric accuracy.

**IRD362:** The DPAS shall receive Cal/Val Reports from the Cal/Val Team

**Rationale:** This interface is required to provide public access to internal developed documents.

**IRD387:** The DPAS shall receive Satellite Events from the Cal/Val Team

**Rationale:** This interface is required to track significant Satellite Events to aid with trending.

**IRD1224:** The DPAS shall receive Calibration Scene Requests from the Cal/Val Team

**Rationale:** This interface is required to request Calibration Scenes.

### 3.3.7 DPAS to User Community Interfaces

**IRD364:** The DPAS shall provide LORp to the User Community

**Rationale:** This interface is required for product distribution to User Community.

**IRD365:** The DPAS shall provide Standard L1 Products to the User Community

**Rationale:** This interface is required for product distribution to User Community.

**IRD366:** The DPAS shall provide Quality Band to the User Community

**Rationale:** This interface is required for external clients to search products prior to ordering.

**IRD367:** The DPAS shall provide Browse to the User Community

**Rationale:** This interface supports browse that are geographically referenced so users may utilize for reference or graphic illustration.

**IRD368:** The DPAS shall provide Metadata to the User Community

**Rationale:** This interface is required to provide the general public with the ability to search and order LDCM data.

**IRD369:** The DPAS shall provide CPF to the User Community

**Rationale:** This interface is required to provide the User Community with CPF files.

**IRD370:** The DPAS shall provide BPF to the User Community

**Rationale:** This interface is required to provide the User Community with BPF files.

**IRD371:** The DPAS shall provide Cal/Val Reports to the User Community

**Rationale:** This interface is required to provide public access to internal developed documents.

**IRD372:** The DPAS shall provide GCP Image Chips to the User Community

**Rationale:** This interface is required to provide GCP Data to the end users.

**IRD1225:** The DPAS shall provide Response Linearization Look-up Table (RLUT) to the User Community

**Rationale:** This interface is required to provide the RLUT to the end users. The RLUT is required for L1 generation.

**IRD1222:** The DPAS shall provide Collection Request Status to the User Community

**Rationale:** This interface is required to provide Collection Request Status to the end users.

### 3.3.8 DPAS to O&M Staff Interfaces

**IRD374:** The DPAS shall provide Restores to the O&M Staff

**Rationale:** This interface is required for production operations.

**IRD375:** The DPAS shall provide Mission Data to the O&M Staff

**Rationale:** This interface is required to handle high volume user requests.

**IRD376:** The DPAS shall provide LORa to the O&M Staff

**Rationale:** This interface is required to handle high volume user requests.

**IRD377:** The DPAS shall provide LORp to the O&M Staff

**Rationale:** This interface is required to handle high volume user requests.

**IRD378:** The DPAS shall provide Standard L1 Products to the O&M Staff

**Rationale:** This interface is required to handle high volume user requests.

**IRD389:** The DPAS shall provide Reports to the O&M Staff

**Rationale:** This interface is required for production operations.

**IRD381:** The DPAS shall receive Backups from the O&M Staff

**Rationale:** This interface is required to backup production.

**IRD382:** The DPAS shall receive DEM from the O&M Staff

**Rationale:** This interface is required to provide DEM to support processing.

**IRD392:** The DPAS shall receive Inventory Updates from the O&M Staff

**Rationale:** This interface is required for Data Management.

**IRD393:** The DPAS shall receive GCP Data from the O&M Staff

**Rationale:** This interface is required for production operations.

### 3.3.9 DPAS to MMO Interfaces

**IRD384:** The DPAS shall provide Reports to the MMO

**Rationale:** This interface is required for producing reports on activities.

**IRD1221:** The DPAS shall provide Metadata to the MMO

**Rationale:** This interface is required for producing reports on activities.

### 3.3.10 Science Office to CAPE Interfaces

**IRD395:** The CAPE shall receive Cloud Fraction Climatology File from the Science Office

**Rationale:** This interface is required to transfer average cloud cover percentages for one degree boxes averaged over a one month period.

**IRD396:** The CAPE shall receive Original Seasonality File from the Science Office

**Rationale:** This interface is required to request static data requests over the upcoming year

**IRD397:** The CAPE shall receive Land Database File from the Science Office

**Rationale:** This interface is required since the Land Database relates landcover types, country and state boundaries and major cities with path and row information.

### 3.3.11 DPAS to FOT Interfaces

**IRD1258:** The DPAS shall provide Problem Reports to the FOT

**Rationale:** This interface is required for ICs to provide Problem Reports to the FOT.

**IRD1257:** The DPAS shall provide Administrative Messages to the FOT

**Rationale:** This interface is required for ICs to provide Administrative Messages to the FOT.

**IRD1256:** The DPAS shall provide Station Description to the FOT

**Rationale:** This interface is required for the ICs to provide Station Description to the FOT.

## 4 Appendix A N2 Diagram



N2 Diagram  
090901.xls

## 5 Appendix B Documents Module



Interface  
Documents\_090901.x

## 6 Appendix C DOORS Attributes



GSIRD v1.5  
Attributes.xls