

# ***ASTER***

**Interface Requirements Document  
between  
ASTER Japan Instrument Support Terminal  
( IST )  
and  
ASTER U.S. Instrument Support Terminal  
( IST-US )**

**RETIRED – March 2010**

**This Document is No Longer Under ESDIS CM Control.  
This Document is For Information Purposes Only.**

**November 1996**

**ERSDAC**

Interface Requirements Document  
between ASTER Japan Instrument Support Terminal (IST)  
and ASTER U.S. Instrument Support Terminal (IST-US )

\_\_\_\_\_  
Hiroshi Watanabe  
ERSDAC Ground Data System Project Manager

\_\_\_\_\_  
Date

\_\_\_\_\_  
Mathew Schwaller  
ESDIS Science Data and External Interface Manager

\_\_\_\_\_  
Date

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## **1. INTRODUCTION**

### **1.1 Purpose and Scope**

This document describes the functional interface requirements for the information which is necessary at the IST and the IST-US. The ASTER Science Team (AST) is responsible for the scientific guidance for how the ASTER instrument is operated. The IST will contain functionality to support the Japan AST Leader at ASTER GDS Centre in carrying out these responsibilities. Similarly, the IST-US will contain functionality to support the U.S. AST Leader at JPL in carrying out these responsibilities.

The source of the data required at the ASTER IST will be from EOSDIS and ASTER GDS elements, in the U.S. and Japan. For the purposes of this document, it is assumed that both the IST and IST-US terminals of the ASTER Operations System (AOS) will interface through the IST Server for external and internal communications. The IST and IST-US are client workstations in Japan and the U.S.A. respectively. The IST Server is physically located in the Japanese AOS, but provides data services to both client workstations.

Data from ICC will be placed on the IST Server and will be available to both the Japanese and U.S. IST terminals. Data transmission between the Japanese and U.S. IST terminals will also pass via the IST Server and will consist of file transfer and e-mail.

The objective of this document is to provide a focus for defining related Interface Control Document (ICD) which are jointly developed by ERSDAC and JPL.

### **1.2 Document Organization**

This document is organized as described below with changes from the IRD Preliminary Draft identified:

- Section 1 Introduction : Introduces the document's purpose, scope, document organization and configuration control.
- Section 2 Related Documentation : Provides a bibliography of reference documents for IRD organized by parents and reference subsections.
- Section 3 System Descriptions : Provides an overview of systems and a discussion of the system components involved in the interface.
- Section 4 Data Flow Descriptions : Provides a discussion of how the interface is used from an operational point of view. A table is also provided to summarize the data flow interfaces.

### **1.3 Configuration Control**

This IRD will be submitted as a Configuration Control Board (CCB) approval document. Changes to the terms and conditions of this Document can be initiated by either party and changed only by mutual agreement of both parties. Proposed changes to this document must be approved by both the NASA ESDIS Project and ERSDAC ASTER Project CCBs. The ASTER Project CCB responsibility for this document is established in accordance with the requirements of the document, ERSDAC AG-E-S-0004. The EOS Project CCB responsibility for this document is established in accordance with the requirements of the Earth Observing System Configuration Management Plan, 420-02-02.

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## **2. RELATED DOCUMENTATION**

### **2.1 Parent Documents**

The following documents are the parents from which this document's scope and content derive:

- 1) Memorandum of Understanding Between the United States National Aeronautics And Space Administration and the Ministry of International Trade and Industry of Japan concerning Cooperation in the Flight of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) on the NASA Polar Orbiting Platform and Related Support for an International Earth Observing System, (current version).
- 2) Project Implementation Plan, Volume II - Ground Data System, Advanced Spaceborne Thermal Emission and Reflection Radiometer and ESDIS and EOS-AM Projects, (current version).

### **2.2 Reference Documents**

The following documents contain information which is useful in understanding this document.

- 1) ASTER Functional Requirements for Mission Operations, ASTER Science Team, Version 1.0, June 9, 1995
- 2) GSFC 504-41-18, Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and MITI ASTER GDS Project, Final, July 1995
- 3) Interface Control Document Between EOSDIS Core System (ECS) and ASTER Ground Data System, #209-CD-002-001, Preliminary, November 1994
- 4) Earth Observing System Flight Operations Segment (FOS) Operations Concept (Revision 4). Computer Sciences Corporation/GSFC, March 1993
- 5) Instrument Flight Operations Understanding, GSFC, August 1993
- 6) User requirements of ASTER Mission Operations and the Operations Concept of ASTER", Version 3.0, ASTER Science Team, July 28, 1994
- 7) ASTER DAR Generation and Processing Concepts, JPL D-11504, February 1994
- 8) U.S. ASTER Science Team Instrument Support Terminal Concepts, JPL D-11522, May 1994

- 9) Recommendations for ASTER Instrument Scheduling, JPL D-12015, August 1994
- 10) Long Term Science Plan, EOS projects scientists, TBD
- 11) ASTER End-to-End Data System Concept, JPL D-11199, October 1994
- 12) ASTER Instrument Specification on Observational Performance and Mission Operations, EOS Sensor Committee (Japan), Version 3, October 5, 1994
- 13) ASTER Long-Term Instrument Plan, ASTER Science Team, March, 1995

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### 3. SYSTEM DESCRIPTION

#### 3.1 ASTER GDS Overview

The ASTER GDS has been defined as a hierarchy of segments, subsystems, and components. There are three major segments: Communication and System management Segment (CSMS), ASTER Operation Segment (AOS), and Science Data Processing Segment (SDPS). Furthermore, a Direct Receiving Station (DRS) is also one of the possible ASTER GDS elements. The segments are further divided into subsystems. Figure 3-1 shows the configurations which consist of several segments and subsystems.

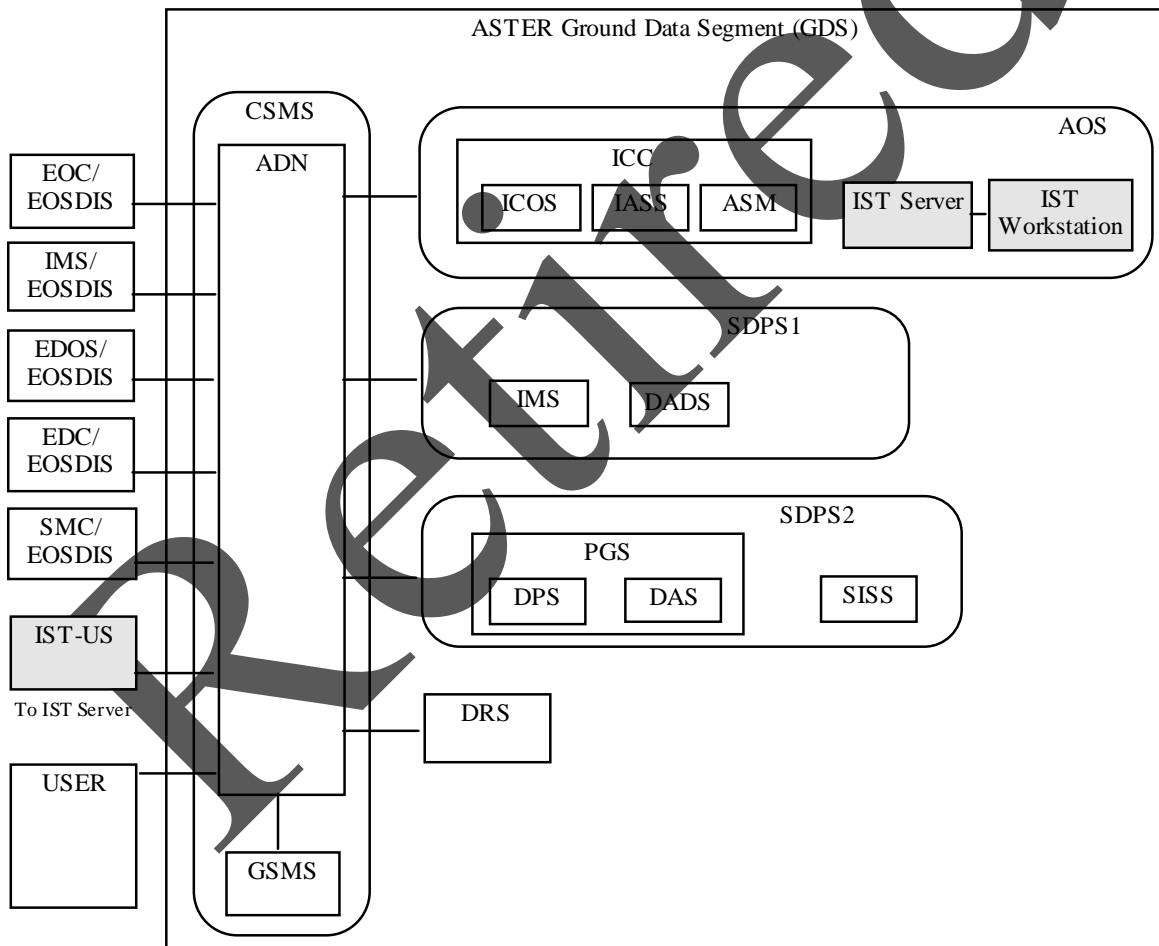


Figure 3-1 ASTER Ground Data System (GDS)



### **3.2 ASTER Operation Segment (AOS)**

The AOS manages the ASTER instrument operations and controls the ASTER instrument through the EOC. The AOS consists of the Instrument Control Center (ICC), including the Instrument Control and Operation Subsystem (ICOS) and Instrument Analysis Support Subsystem (IASS), and Instrument Support Terminal (IST).

### **3.3 ASTER Instrument Control Center (ICC)**

The ICC is responsible for the monitoring and operations of the ASTER instrument. It performs mission planning, scheduling, instrument monitoring, evaluation of ASTER status, command generation and verification.

#### Instrument Control and Operation Subsystem (ICOS)

The ICOS is responsible for the planning, scheduling including xARs (DARs including TOO, STARS, ETRs) processing, activities generation and sending activities to EOC.

#### Instrument Analysis Support Subsystem (IASS)

The IASS is responsible for monitoring ASTER instrument, analysis of ASTER instrument and spacecraft data (engineering, health & safety, housekeeping), and management of housekeeping and telemetry data bases.

### **3.4 ASTER Instrument Support Terminal (IST)**

#### **3.4.1 ASTER IST Overview**

The IST is defined as a facility that connects the ASTER Science Team Leader (TL) and Science Scheduling Support Group (SSSG) to the ICC in order to support instrument monitoring and operation. The IST provides the TL and SSSG with access to information about the operation, health and safety, status of ASTER instrument in order to evaluate plans, schedules, instrument and safety, and acquisition requests. The TL and SSSG are capable of communicating with the ICC for resolution of conflicts in scheduling and trouble shooting of instrument anomalies. In addition, the IST supports the input of STARS by TL and SSSG into the ICC.

Use of the IST is required by both Japanese and US members of the SSSG. The Japanese IST is therefore considered as the IST Server and the Japanese IST Workstation, while the US IST will be just an IST Workstation. The IST Server is required to have the capability to

communicate with the US IST to provide the interfaces defined in this document. For practical reasons, it is expected that the functionality of the two IST Workstations, Japanese and US, will, for the most part, be the same.

### **3.4.2 ASTER IST Server**

The purpose of the IST Server is to provide a single point of interface between the IST subsystem and other components of the ASTER GDS. The IST Server provides data services to both of the Japanese and the US IST Workstations or clients—(IST and IST-US). This document assumes that data will primarily be received from ICC and that this will be held on the IST Server awaiting logon and data requests from the clients.

### **3.4.3 ASTER Japan Workstation IST (IST)**

The role of the Japanese IST is to support ASTER instrument operations as part of the Japanese Team Leader responsibility and as ASTER Mission Operation Team Leader responsibility.

### **3.4.4 ASTER U.S. IST (IST-US)**

The role of the U.S. IST is to support ASTER instrument operations as part of the U.S. Team Leader responsibility. This document assumes that the U.S. IST will be receiving its information entirely through the IST Server.

## 4. DATA FLOW DESCRIPTIONS

### 4.1 Overview of ASTER Japan IST / ASTER U.S. IST Data Flows

The data flow descriptions are organized into five categories. These categories include Long Term Mission Planning, ASTER xARs, Planning and Scheduling, Supporting Information for Scheduling, and Mission and Data Status.

Note: The following list of data flows is not intended to limit other types of data flows necessary/desirable for operations. For example, a generic ftp transfer for data file/document exchange is very useful (required).

The data flow interfaces to and from the Japan IST and U.S. IST are summarized in Table 4-1. The columns are defined as follows:

***From***

Information resides at this GDS element in the form of data files or TBD.

***To***

Information will be transferred to this GDS element.

***Data Flow***

Name of the data being exchanged.

***Description***

Description of the data being exchanged.

***IST Role in Transfer***

This is either "Passive" and/or "Active". "Passive" indicates that the U.S. IST automatically receives the information from Japan IST based on certain conditions (such as when a data file is updated), or a time interval (such as "send new DARs once/week"). "Active" means that the U.S. IST initiates the data transfer (via request or by ftp file transfer).

***Comments***

Additional information and comments.

\*\*\* Table 4-1 1

<b>LONG TERM MISSION PLANNING</b>					
<i>From</i>	<i>To</i>	<i>Data Flow</i>	<i>Description</i>	<i>IST Role in Transfer</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>ASTER Long Term Schedule (and Updates)</b>	ASTER Long Term Schedule generated by Japan ICC for AST.	active	Server distributes schedule upon request.
U.S. IST	Japan IST (Client)	<b>Proposed ASTER Long Term Schedule Changes</b>	U.S. TL negotiations for changes to ASTER Long Term Schedule. Change to Scheduler Input file.	active	E-mail or Voice between IST Workstations.
U.S. IST	Japan IST (Client)	<b>Approval of ASTER Long Term Schedule</b>	Notification of U.S. TL approval of ASTER Long Term Schedule.	active	E-mail or Voice between IST Workstations.
Japan IST (Client)	U.S. IST	<b>Proposed ASTER Long Term Schedule Changes</b>	U.S. TL negotiations for to ASTER Long Term Schedule.	active	E-mail or Voice between IST Workstations.
Japan IST (Client)	U.S. IST	<b>Approval of ASTER Long Term Schedule</b>	Notification of U.S. TL approval of ASTER Long Term Schedule.	active	E-mail or Voice between IST Workstations.
Japan IST (Sever )	U.S. IST	<b>xAR Database query</b>	All xARs (DARs, STARs, ETRs) input by users.	active	
Japan IST (Sever )	U.S. IST	<b>Scheduling Database query</b>	Database residing at the ICC containing information. and /or used during scheduling.	active	Currently being defined.
Japan IST (Sever )	U.S. IST	<b>Scheduler Input file query</b>	Input file to the ICC scheduler.	active	Currently being defined.
Japan IST (Sever )	U.S. IST	<b>Scheduler Output file query</b>	Output file from ICC scheduler.	active	Currently being defined.

\*\*\* Table 4-1 2

<b>ASTER XARs</b>					
<i>From</i>	<i>To</i>	<i>Data Flow</i>	<i>Description</i>	<i>IST Role in Transfer</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>ASTER DARs (and Updates)</b>	ASTER Data Acquisition Requests and DAR modification	active	Within xAR Database.
U.S. IST	Japan IST (Server)	<b>ASTER DARs (and Updates)</b>	ASTER Data Acquisition Requests and DAR modification	active	Within xAR Database.
U.S. IST	Japan IST (Server)	<b>ASTER STARs (and Updates)</b>	ASTER Science Team Acquisition Requests for submission and modification.	active	Stored on server until approved.
Japan IST (Server)	U.S. IST	<b>ASTER STARs (and Updates)</b>	ASTER Science Team Acquisition Requests submitted to Japan AOS.	active	Within xAR Database.
Japan IST (Server)	U.S. IST	<b>ASTER ETRs</b>	ASTER Engineering Team Acquisition Requests generated by ASTER engineering team in Japan.	active	Within xAR Database.
U.S. IST	Japan IST (Server)	<b>ASTER ETRs</b>	ASTER Engineering Team Acquisition Requests generated by ASTER engineering team in Japan.	active	Within xAR Database.
Japan IST (Server)	U.S. IST	<b>DAR Status</b>	DAR status information available at SDPS to all users.	active	Within xAR Database.
Japan IST (Server)	U.S. IST	<b>STAR Status</b>	STAR status information available at SDPS to all users.	active	Within xAR Database.
Japan IST (Server)	U.S. IST	<b>ETR Status</b>	ETR status information available at SDPS to all users.	active	Within xAR Database.

\*\*\* Table 4-1 3

<b>PLANNING AND SCHEDULING</b>					
<i>From</i>	<i>To</i>	<i>Data Flow</i>	<i>Description</i>	<i>IST Role in Transfer</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>ASTER Short Term Schedule (and Updates)</b>	ASTER Short Term Schedule generated by ICC for AST.	active	File transfer.
U.S. IST	Japan IST (Client)	<b>Proposed ASTER Short Term Schedule Changes (TBR)</b>	U.S. TL negotiations for changes to ASTER Short Term Schedule	active	
U.S. IST	Japan IST (Client)	<b>Approval of ASTER Short Term Schedule (TBR)</b>	Notification of U.S. TL approval of ASTER Short Term Schedule (prior to ICC submission to EOC).	active	E-mail or Voice between IST Workstations.
Japan IST (Server)	U.S. IST	<b>ASTER One Day Schedule (and Updates)</b>	ASTER One Day Schedule generated by Japan ICC for AST.	active	File transfer.
U.S. IST	Japan IST (Client)	<b>Proposed ASTER One Day Schedule Changes (TBR)</b>	U.S. TL negotiations for changes to ASTER One Day Schedule	active	
U.S. IST	Japan IST (Server)	<b>Approval of ASTER One Day Schedule (TBR)</b>	Notification of U.S. TL approval of ASTER One Day Schedule (prior to ICC submission to EOC).	active	
Japan IST	U.S. IST	<b>Inter-Instrument Co-ordination</b>	Text message exchange to co-ordinate instrument planning and operations.	active	E-mail between IST Workstations.

\*\*\* Table 4-1 4

<b>SUPPORTING INFORMATION FOR SCHEDULING</b>					
<i>From</i>	<i>To</i>	<i>Data Flow</i>	<i>Description</i>	<i>IST Role in Transfer)</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>Orbit Data and Other Planning Aids</b>	Planning and scheduling aids which includes orbit data.	active	
Japan IST (Server)	U.S. IST	<b>Cloud Prediction Data</b>	Near term cloud prediction data from GSFC	active	Schedule input file

Retired

\*\*\* Table 4-1 5

<b>MISSION AND DATA STATUS</b>					
<i>From</i>	<i>To</i>	<i>Data Flow</i>	<i>Description</i>	<i>IST Role in Transfer</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>Spacecraft Status Report</b>	Information on spacecraft activities, anomalies, or status that is of interest to ASTER operations.	passive	Server distributes data upon request.
Japan IST (Server)	U.S. IST	<b>ASTER Instrument Status Report</b>	ASTER instrument status information, such as instrument anomaly notifications, instrument analysis/trending results, etc.	passive	Server distributes data upon request.
Japan IST (Server)	U.S. IST	<b>Mission Status Reports</b>	Includes spacecraft and mission status.	passive	Server distributes data upon request.



\*\*\* Table 5-1 6

<b>NETWORK AUTHORISATION AND MANAGEMENT</b>					
<i>From</i>	<i>To</i>	<i>Data Flow (1)</i>	<i>Description</i>	<i>IST Role in Transfer (4)</i>	<i>Comments</i>
Japan IST (Server)	U.S. IST	<b>U.S. IST User Access</b>	ASTER GDS authorisation of U.S. IST access.	passive	Logon response.

Retired