IST Capabilities

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FOS CDR Roadmap

[redacted]

FOS CDR Overview
- FOS CDR goals
- Driving requirements

Engineering Activities
- Activities since PDR
- FOS team approach

System Architecture
- Overview
- Features

[redacted]

Hardware Design
- Computers
- Peripherals

Network Design
- EOC LAN
- IST Connectivity

FOS Infrastructure
- Mgt Services
- Comm Services

Segment Scenarios
- End-to-End Flow
- Subsystem Interfaces
- Building block linkage

[redacted]

Subsystem Design
- Detailed design
- FOS functions/tools
- Subsystem design features

RMA
- RMA allocation
- FMEA/CIL

[redacted]

Operations Overview
- EOC facilities
- FOT positions

Operational Scenarios
- End-to-end flow
- Operations perspective
- FOT tool usage

[redacted]

Development
- Release Plan
- Development approach

Testing
- Test approach
- Test organization

Overview

Key Requirements

Instrument Team Interface

IST Capabilities Document

IST Interfaces

AM-1 ISTs

Schedules

Release A Functionality

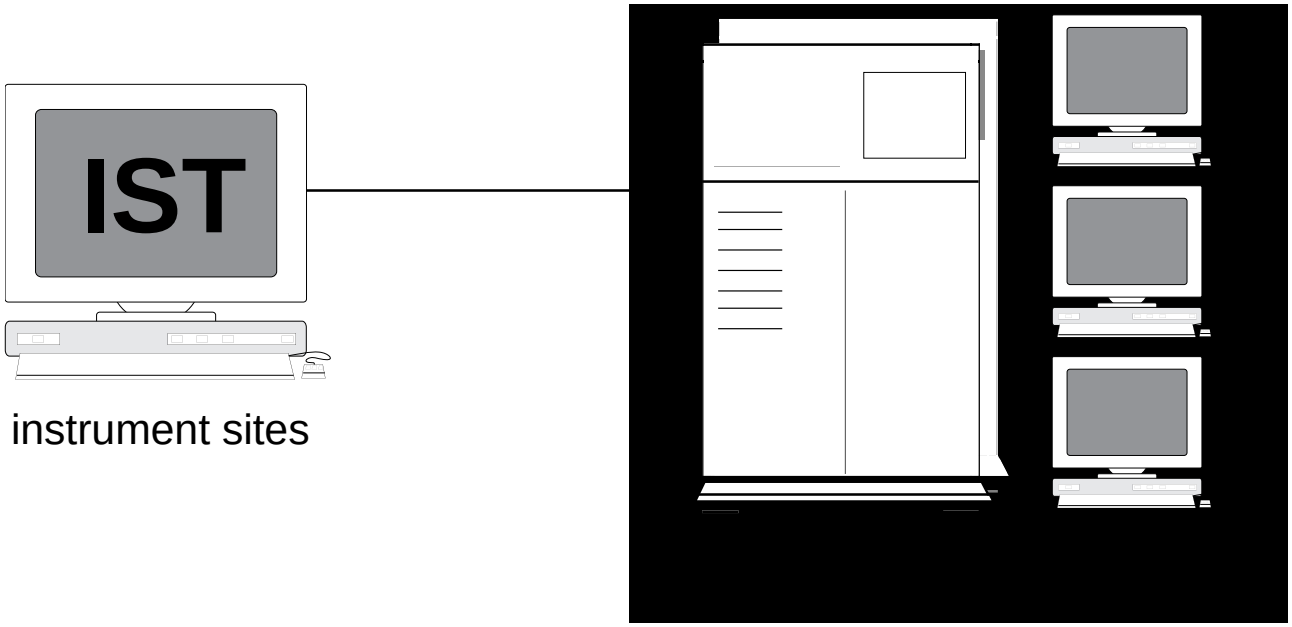
IST in Stand Alone Mode

Hardware Specs

COTS

Design Benefits

Key Requirements



Allow participation in operations by instrument teams at remote sites
Software toolkit that runs on a PI/TL provided workstation
Platform independent (SUN, HP, DEC, SGI)
One or more per instrument site
Provide the following functionality:

- **Planning & scheduling**
- **Monitor real-time telemetry**
- **Perform analysis**
- **Command requests**

Key Requirements

Primary purpose of ISTs: Instrument team participation in operations

However, analysis of interfaces showed IST good fit to accomplish interface task

- **LMC: SDVF & Sustaining Engineering**
  - **IST -> carryout performance data, dumps**
  - **IST <- flight sw updates**
- **FDF: Flight Dynamics**
  - **IST -> orbital telemetry data**
- **ASTER**
  - **IST -> Flight Dynamics Products**
  - **IST <- ASTER Planning and Scheduling Data**

Works as interface agent without changing the design

Instrument Team Interface

Instrument Workshop (Feb 95)

- **LMC and PI/TL requirements discussions**
- **Instrument team operations presentations**

Instrument Workshop (August 95)

- **CDR Plans**
- **Instrument Advocate Status**
- **IST Discussion Topics**
  - **IST training, delivery of IST software, policy for upgrading COTS software, IST data files**
- **Distributed Screen Designs and Reports List for review**
- **PDB Interface from an IST**
- **IST Analysis Request**

Instrument Team Interface (cont.)

Instrument Advocate

- **Instrument Advocates were created as a result of a PDR RID Requesting a Point-of-contact for Instrument Teams**
- **Contacts: Broome, Creegan, Dutilly**
- **Facilitate info flow, coordinate issues/feedback**

Instrument Advocate Activities

- **Prototype Demonstrations**
- **Prototype Distributions**
  - **CERES, MISR, MODIS, MOPITT, ASTER, LMC**
- **Technical Exchanges/Presentations**
- **Specific questions via phone/email/faxes**

Instrument Advocate Future Plans

- **Maintain close cooperation with instrument teams**
- **POC for functionality concerns, CCR questions**
- **Screen design feedback**

IST Capabilities Document

First delivered in November 94 as a means to convey an Instrument view of the FOS

Updated September 95

Available on the EDHS and FOS Home Page

- http://edhs1.gsfc.nasa.gov/
- http://newsroom.hitc.com/fos/fos.html

Last update of IST Capabilities Document

- Evolves into FOS User's Manuals
- 1st delivery of User's Manuals in 9/96

IST Interfaces

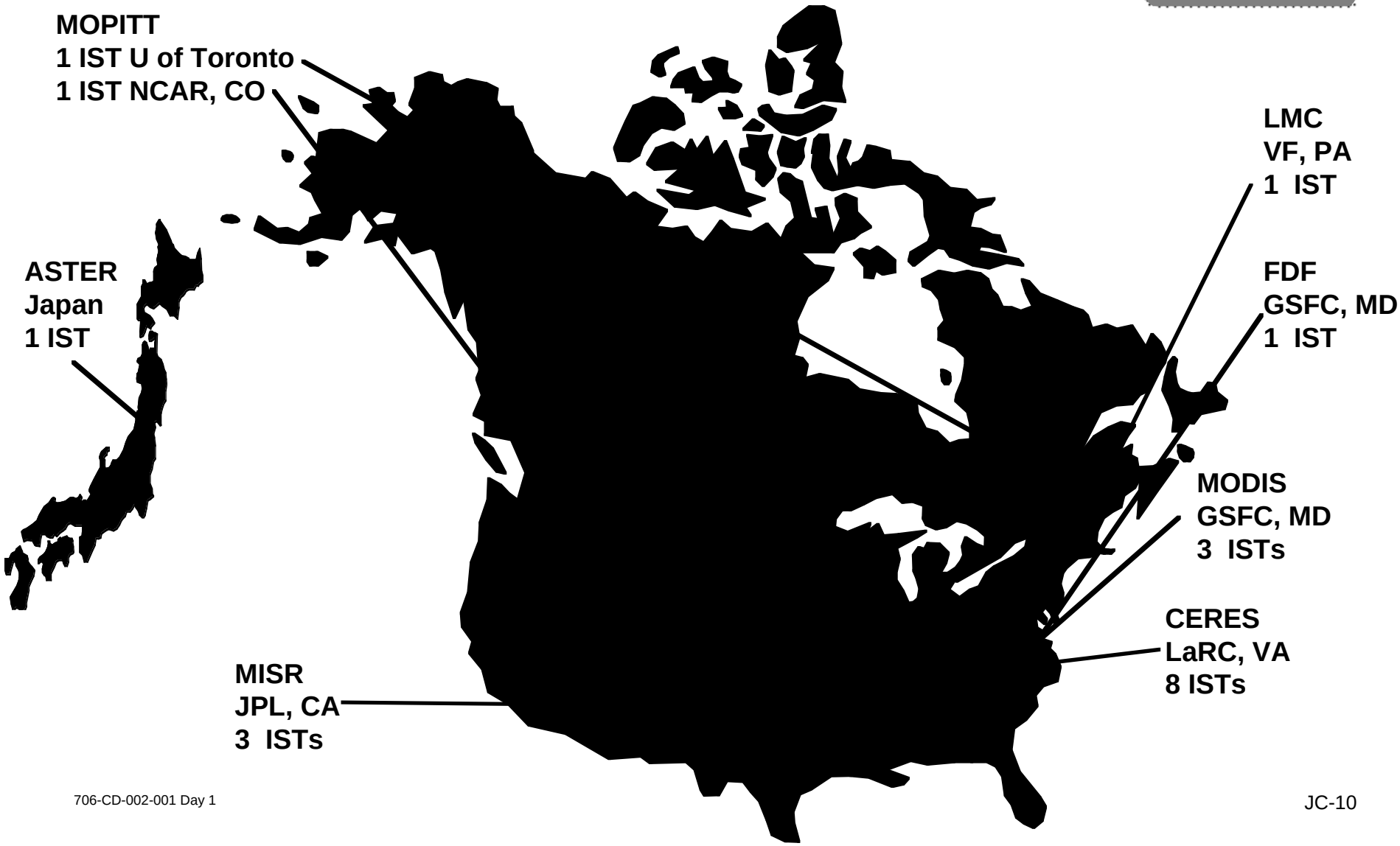
Into the IST

- **Microprocessor Memory Loads Ingested using the Load Manager Tool**
- **Updates to the instrument portion of the Project Data Base**
  - **Database screens at IST allow for instrument update requests**
  - **DFCD format for file transfers**

Out from the IST

- **Microprocessor Memory Dumps**
- **Reports**
  - **Publisher's Display Format (PDF)**
- **Screen snaps (real-time or analysis results) as postscript file**
- **Carry-Out Data Files**

AM-1 ISTs


MOPITT
1 IST U of Toronto
1 IST NCAR, CO
ASTER
Japan
1 IST
MISR
JPL, CA
3 ISTs
LMC
VF, PA
1 IST
FDF
GSFC, MD
1 IST
MODIS
GSFC, MD
3 ISTs
CERES
LaRC, VA
8 ISTs

AM-1 ISTs

Maximum number of ISTs connected to the EOC at any single time is 15 (this does not include Interface ISTs)

10 dedicated, simultaneous IST connections at the following locations:

- **CERES -> 4 at Langley**
- **MODIS -> 2 at GSFC**
- **MOPITT -> 1 at University of Toronto; 1 at NCAR in Boulder**
- **MISR -> 2 at JPL**

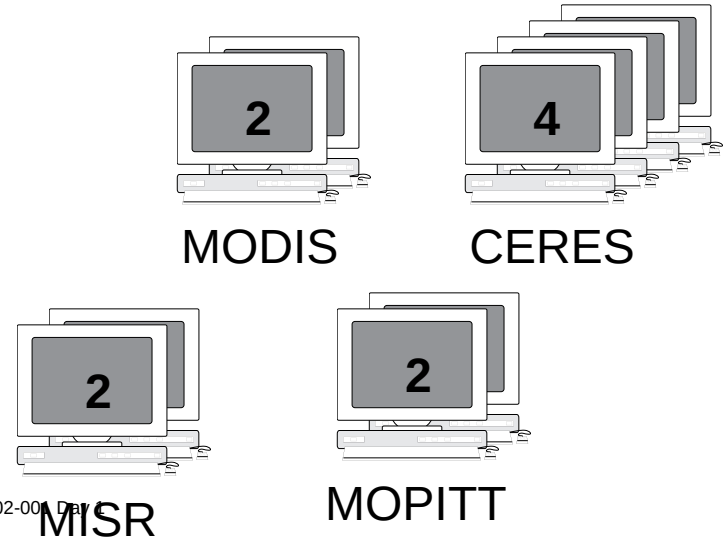
6 additional non-dedicated IST connections at the following locations:

- **CERES -> 4**
- **MODIS -> 1**
- **MISR -> 1**

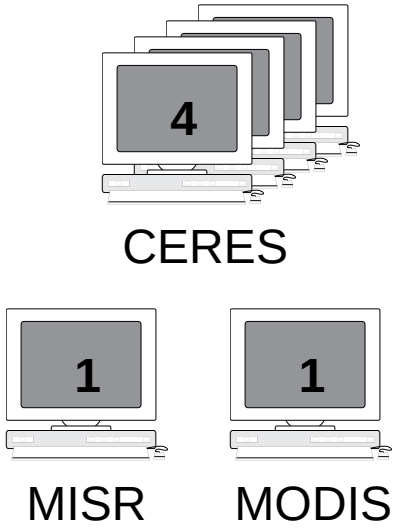
AM-1 ISTs

- **Each IST places a performance burden upon the EOC**
- **The IST pool allows that burden to be managed**
- **Pool Management**
  - **Dedicated (Guaranteed): always available**
  - **Non-Dedicated (Floating): first-come, first serve**
  - **For AM-1, 6 ISTs attempting to get 5 slots**

DEDICATED



NON-DEDICATED
"THE POOL"



AM-1 ISTs

3 Interface ISTs

- **Dedicated**
- **Not in the pool**

FDF -> 1 at GSFC (building 32)

ASTER -> 1 at Japan

LMC -> 1 at Valley Forge PA

Schedules

Delivery

- **1/97 - Partial Delivery (A)**
- **9/97 - Complete Delivery (B)**

Test Support > L-12

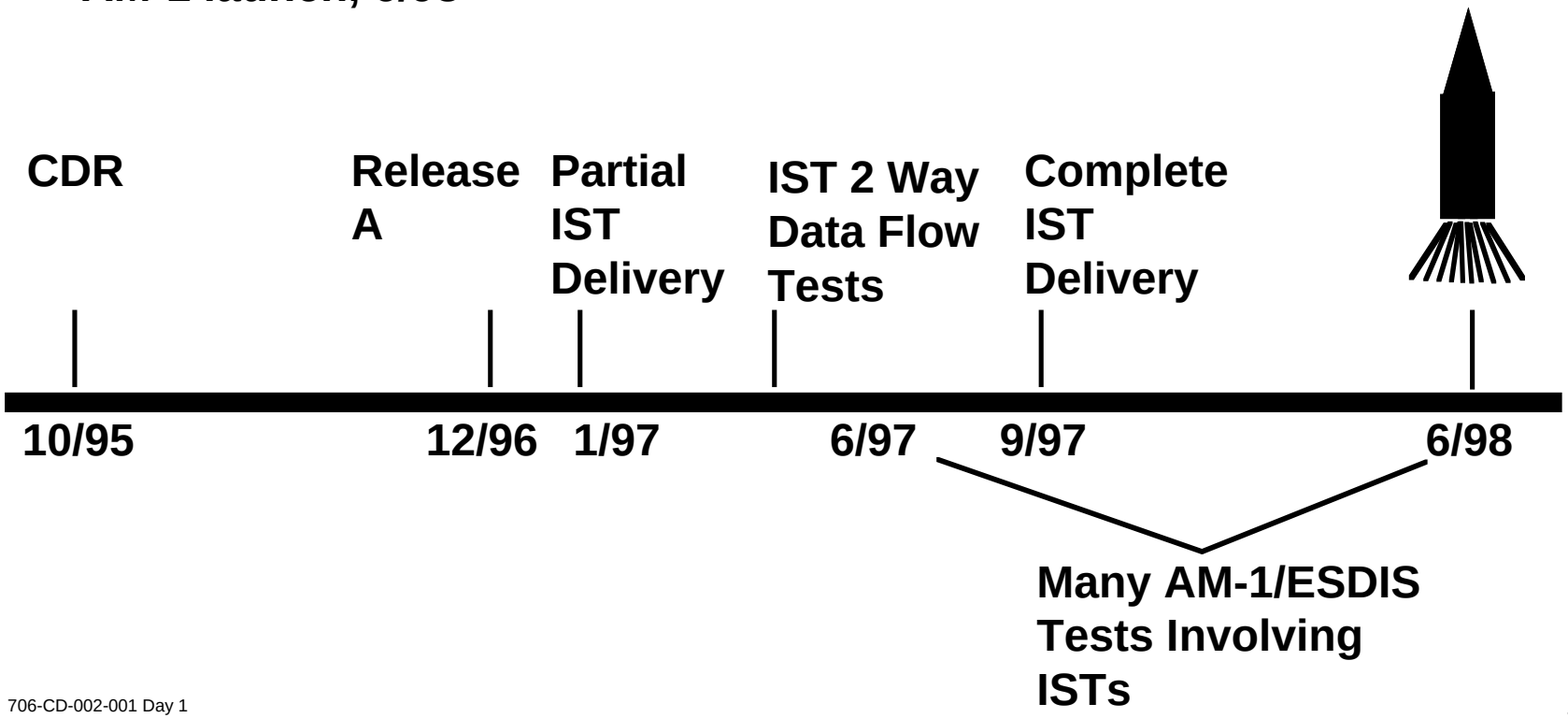
- **L-15 (4/97) IST 2-Way Data Flow Test**

Test Support < L-12

- **Many Tests**

IST Schedule

- Partial delivery, 1/97
- IST needed to support IST 2 Way Data Flow Test, 4/97
- Final delivery of IST, release B, 9/97
- AM-1 launch, 6/98



IST Release A Functionality

Creation and connection to real-time user strings (through ECL)

Mirrored mode TLM processing

- Database defined EU processing
- No limits, context switch, derived params, quality checking in A

HK, H&S, Standby CTIU formats processed

Telemetry displays

- Alphanumerics
- Graphs (partial),
- Tables (partial)
- Display builder (partial)

Data dropout detection (Event notification)

IST Release A Functionality

RTCS load builder

Table load builder

Load Manager Tool

- access to RTCS, table and microprocessor load receipt and generation

PDB ingest and validation

Analysis Request Processing

- Analysis requests (partial)
- User defined statistics
- Generation of carryout data products

IST Release A Functionality

ECL - ECS Command Language (partial)

Procedure Builder

Procedure Control

P&S Tools

- Activity Definer
- BAP Definer

Other Functions/Tools

- Basic screen functionality
  - Control window, rooms, status window
- Tools
  - Room builder, help (partial), event display (partial), quick analysis, info window
- Utilities
  - Time selector, selection filter

IST in Stand Alone Mode

The IST can perform limited functions while disconnected from the EOC

- **Display/manipulation of analysis data once an analysis request has been serviced**
  - **Working with datasets already generated**
  - **Replays of telemetry data already downloaded**
- **Tools (display builder, help, room builder, etc.)**
- **P&S Functions**
  - **Everything except the Master Plan**
  - **Able to copy the plan, work with it locally**
  - **What if planning, etc.**
  - **Submit updates once “re-hooked” to the EOC**

IST Hardware Specs

Hardware Specifications

- **Unix workstation**
- **Mid-range CPU**
- **64 MB memory**
- **6 GB hard disk**
- **Ethernet card**
- **4 mm DAT tape drive**

Candidate Configurations

- **SUN Sparc 20/61**
- **DEC 3000/600**
- **HP 715/80**
- **SGI 4600SC**

IST COTS

COTS Used to Develop IST Software (Development License)

- **IMSL (Math library)**
- **Builder Xcessory (BX)**
- **Data Base Xcessory (DBX)**
- **Delphi (Planning and Scheduling)**
- **XRTGraph, XRTTable, XRT3d**

COTS Required (Run-Time License)

- **Unix**
- **Motif/X-Windows (latest version)**
- **DCE**
- **SyBase Client (ECS-provided)**
- **Kerberos software (ECS-provided)**
- **HTML Browser (Netscape, Mosaic)**
- **C or C++ compiler (optional, for algorithm submittal)**

IST Design Benefits

- Allows for multiple user access per instrument site
- Does not limit any IST capabilities to one physical IST
- Produces a standard IST
  - Configurable by the user
  - Application software not modifiable by the user
- Keeps the hardware requirements low-cost & industry standard
- Allows for limited functions while in stand alone mode
- Protects the EOC from unauthorized access
- Protects the EOC functions from performance burden imposed by the IST