

Integration/Mission Ops

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Spacecraft Responsibilities

- **Harness**
- **Integration & Test**
- **Instrument ICD**
- **Science Data Center ICD**
- **Project Service Level Agreement**
- **Mission Operations - Dan Ossing**
- **Ground System Development - John Eichstedt**

Harness

- **TIMED like**
 - 1553
 - Power
 - Thermal
- **Design**
- **Fabrication**
- **Bake out**
- **Install on Spacecraft**
- **Remote I/O chip Study**

Integration & Test

- **Assumptions**
- **Concepts**
- **Requirements**
- **Objectives**
- **Cleanliness**
- **Documentation**
- **Schedule**

I&T Assumptions

- **Need to test and operate two spacecraft simultaneously.**
- **Worst case schedule is a shuttle launch.**
 - Mechanical only interfaces to the cradle and shuttle.
- **Vibration testing performed at APL.**
- **Thermal vacuum testing performed at Goddard.**
- **Test philosophy based on documents SDO 2387-1, MIL-STD-1540B, and GEVS-SE Rev A.**
- **Test it as we fly it.**
- **Decoupled Instrument Operations.**
- **Subsystems and Instruments delivered to spacecraft flight qualified.**
- **No Engineering units to be installed on spacecraft.**

I&T Concepts

- **How will we handle the I&T of two spacecraft?**
 - Treat them as one spacecraft with a side A & B.
- **Require the two spacecraft be identical.**
- **Extensive use of the Mission Operations team during I&T and launch operations.**
- **GSS will remain at APL through launch. Only the minimal set of equipment will accompany the S/C to thermal vacuum and the launch site.**

I&T Requirements

- **Prepare a comprehensive Integration and Test plan.**
- **Maintain and operate the STEREO Ground Support System.**
- **Plan and execute effective Integration and Test operations.**
- **Command the S/C from arrival of the first subsystem to launch.**
- **Maintain command and telemetry dictionaries during I&T.**
- **Process and evaluate all spacecraft, non-science, telemetry during I&T.**
- **Collect and archive all raw telemetry during I&T.**

I&T Requirements con't

- **Establish the capability of the spacecraft bus to carry out the STEREO mission in accordance with program requirements.**
- **Transmit all science telemetry data to the instrument Ground Support Equipment, GSE, and coordinate with the instrument providers to assure the capability of the instruments to perform as required.**
- **Collect, process, and transmit instrument commands from the STEREO instrument GSE and SDC to the instruments.**

I&T Objectives

- **Identify failure modes reflecting design weakness and defects in materials, workmanship, and quality control.**
- **Identify unexpected interactions among systems/subsystem elements.**
- **Assure that all components are operated beyond their “infant mortality” regime prior to launch.**
- **Functional and Performance Test at the Spacecraft level.**
- **Autonomy and Fail Safe modes will be tested at the Spacecraft level.**

Cleanliness

- **Bakeout required for all subsystems**
- **Handling**
 - Class 10,000 precautions: facemasks or full bunny suits
- **GSE Environment**
 - Class 300,000 in APL Clean Room
 - Class 300,000 in Test Facilities at Goddard
- **Launch Processing Environment**
 - Class 100,000
- **Launch Environment**
 - Class 300,000 in LV fairing during launch
- **Nitrogen Purge Required??**

I&T Documentation

- **I&T Test Plan**

- Have copies of MSX and TIMED
- will use electronic copy of the TIMED test plan as a starting point and begin modifying.

Project Service Level Agreement

- **Have an electronic copy of the NEAR PSLA.**
- **Established contact with Allen Berman**
- **Will have STEREO PSLA ready for submission in February.**
- **CSOC effect on PSLA??**
- **Need program information and coordination to prepare and submit in February.**