NASA Facts

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HST Orbital Systems Test Payload

While working toward the third servicing mission tentatively scheduled for spring of 2000, the Hubble Space Telescope (HST) team is pulling double duty as it prepares to fly the HST Orbital Systems Test (HOST) platform on the Space Shuttle Discovery during the STS-95 mission. HOST will provide an on-orbit test bed for hardware which will be used during the third servicing mission.

Goddard Space Flight Center in Greenbelt, MD manages both the HOST and the Hubble Space Telescope projects.

The primary objective of the HOST mission is to demonstrate that actual electronic and thermo-dynamic equipment scheduled to be installed into Hubble during the third servicing mission performs acceptably in the radiation and microgravity environment of space.

Another important HOST mission objective is to demonstrate the on-orbit performance of the Near Infrared Camera and Multi-Object Spectrometer Cooling System (NICMOS), Capillary Pump Loop and radiator. This state-of-the-art cryogenic system is being designed to cool the NICMOS detectors and extend the scientific lifetime of the instrument. A positive result from the HOST flight test could lead to the installation of the new cryogenic system during the third servicing mission. During the mission, HOST's data will be monitored through the Payload Operations Control Center located at the Kennedy Space Center in Florida**.**

NICMOS Cooling System

The HOST mission will demonstrate the zero-gravity operation of the Reverse Turbo-Brayton Cycle Cooler/Capillary Pump Loop system for use with Near Infrared Camera and Multi-Object Spectrometer. The NICMOS cooling system represents a significant advancement in technology, potentially eliminating the need for cooling systems that depend on storage bottles, or dewars, to hold and feed the super cold liquids used to cool the sensors. A cryogenic dewar replacement system could provide the necessary cooling to NICMOS and future science instrument. These cryogenics will allow longer lifetime operations than currently possible with dewar systems and extend NICMOS's operational life by at least five years beyond the third servicing mission.

HST 486 Computer

The HOST mission will confirm space radiation will not hamper operation of the HST 486 computer system on Hubble. The parts for the 486 computer were vigorously tested to protect against radiation anomalies. The HST 486 computer is a planned replacement unit to be installed on the HST during

the next servicing mission. This computer will provide twice as much memory and three times the processor speed as the present DF-224 computer and its co-processor combined. By flying in approximately the same orbit as HST, the HOST mission will provide a measure of expected performance and demonstrate the capability of the HST 486 hardware and software to handle errors.

Solid State Recorder

The Solid State Recorder flying on STS-95 as part of the HOST payload will be installed on Hubble during the third servicing mission as a flight spare to replace the Engineering Science Tape Recorder. Although no hardware modifications are presently planned for the Solid State Recorder, the recorder will fly on the HOST mission for three reasons. HOST will determine (1) if the flight spare Solid State Recorder is similar to the flight unit on Hubble; (2) if the Hubble's on-orbit recorder is abnormal; (3) if the flight spare is qualified and will operate properly on Hubble. A normalized single event upset profile (altitude/inclination independent) of the flight spare Solid State Recorder will be compared to the same profile for the Hubble's recorder.

Fiber Optics

HOST will analyze the performance of fiber optic lines in the Shuttle environment by transmitting the same telemetry data to the Shuttle via standard data lines and fiber optic lines. This experiment is intended to improve orbiter-to-payload processing and to facilitate faster Space Shuttle ground processing.

Pulse Height Analysis Instrument

Goddard Space Flight Center's Pulse Height Analysis Instrument measures the actual radiation levels of heavy ions causing single event upsets in electronic devices. It provides real time data on single event upset radiation environment, as well as data for post-mission analysis and correlation with HOST experiments.

The Space Acceleration Measurement System for Free Flyers

The Space Acceleration Measurement System for Free Flyers, developed by NASA's Lewis Research Center in Cleveland, OH, measures very small accelerations experienced during space flight. This instrument will support the operations of HOST by measuring the vibrations produced in space which may occur when installed on HST. Vibration information is critical because large vibrations can affect the ability to precisely view objects in space.