

Hubble Facts

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771



FS-1999-06-013-GSFC

Hubble Space Telescope Servicing Mission 3A A NEW THERMAL BLANKET LAYER

During the Hubble Space Telescope Second Servicing Mission in 1997, astronauts detected damage to some of the Telescope's thermal insulation. Years of exposure to the harsh environment of space had taken a toll on Hubble's protective multi-layer insulation, and some areas were torn or broken. This multi-layer insulation protects the Telescope from the severe and rapid temperature changes it experiences as it moves through its 90-minute orbit from very hot sun to very cold night.

Quick Fix in 1997

Although the cracks looked dramatic, the damage was limited to the outermost layer and did not



Astronaut Repairing Insulation During Servicing Mission 2

affect the insulation's protective function or Hubble's operation. With help from ground controllers, the astronauts used materials aboard the Space Shuttle Discovery in 1997 to fashion temporary patches. They installed them over the most critically damaged areas, mostly on Hubble's sun-facing side.

Permanent Repair in 1999

During the 1999 servicing mission, astronauts will cover Hubble with permanent sheets called the New Outer Blanket Layer, or NOBL. The crew also will carry a special fabric, called the Shell/Shield Replacement Fabric, or SSRF. The SSRF is scheduled for installation on Servicing Missions 3A and 3B. During SM3A astronauts will install the SSRF on Hubble's forward shell and light shield if time is available.

The NOBL covers and SSRF pieces are designed to protect Hubble's external blankets. They will prevent Hubble's insulation from fur-



Astronaut Steve Smith installing a sheet of NOBL on the Hubble Mockup

ther degradation and maintain normal operating temperatures. NASA tested the materials to ensure that they can withstand exposure to charged particles, X-rays, ultraviolet radiation, and thermal cycling for at least ten years.

Astronauts will install seven NOBL covers on Hubble's electronics bay doors. These covers are specially coated stainless steel foil trimmed to fit each particular door. Each cover is supported by a steel picture-frame structure. Expanding plugs, like common kitchen bottle stoppers, fit into door vent holes to allow quick installation.

The SSRF pieces are designed to cover the Telescope's forward shell and light shield. The fabric is composed of flexible, aluminized Teflon© with rip-stop material bonded to the back side. Astronauts will use wire clips to attach each

SSRF piece to convenient attachment points such as handrails, brackets and struts. Seven pieces up to 22 feet (7 meters) long will cover 80 percent of the sun-side light shield and forward shell. The fabric pieces are stored in rolls for their trip to orbit.

**FOR ADDITIONAL INFORMATION
CONTACT**

Nancy Neal
Goddard Space Flight Center
Office of Public Affairs
(301) 286-0039