

# Hubble Facts

National Aeronautics and  
Space Administration

**Goddard Space Flight Center**  
Greenbelt, Maryland 20771



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## Hubble Space Telescope Servicing Mission 3A S-BAND SINGLE ACCESS TRANSMITTER

The purpose of the Hubble Space Telescope is to gather light from cosmic objects so scientists can better understand the universe around us. Hubble is in space, astronomers are on Earth.

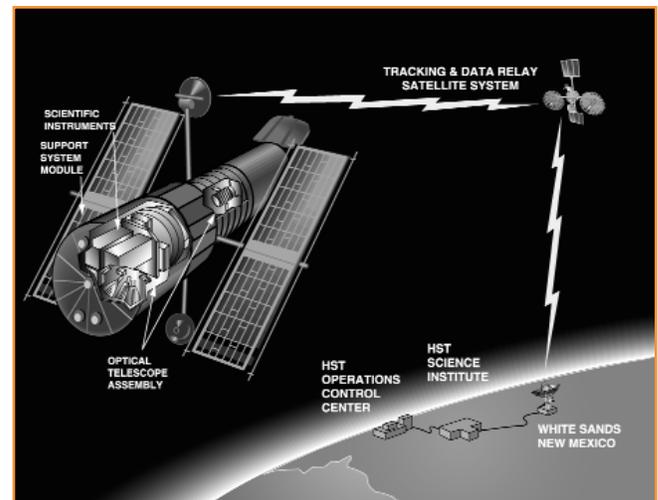
How does the information get to them? The simple answer is a transmitter, called the S-Band Single Access Transmitter (SSAT) sends the data from Hubble to the ground by radio. But it is more complicated than that.

The light that is gathered and magnified by the Telescope is first sent to one of Hubble's scientific instruments. Devices similar to those in digital cameras convert the light to computer bits of information for processing. The computerized science data are then either transmitted immediately from the spacecraft or stored in one of Hubble's on-board recorders for future transmission.

### Where do these transmissions go?

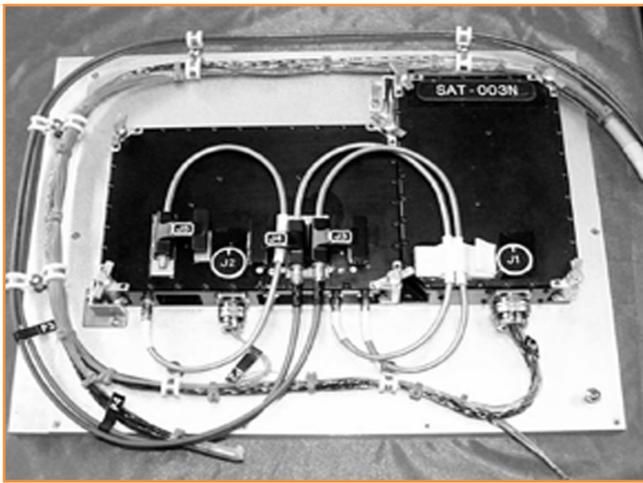
The transmissions are directed by one of Hubble's two big communications dishes. Strangely enough Hubble's transmissions don't go down to the ground, only about 360 miles below. They go up! Approximately 22,000 miles above the Earth, nestled among commercial communications satellites, are a few NASA communications satellites. NASA uses these satellites to collect transmissions from its many scientific satellites (including Hubble) and beam them down to a ground station in New Mexico. From there

Hubble's scientific data ultimately ends up at Hubble's Space Telescope Science Institute in Baltimore, Md. After processing, the data are available to astronomers.



*Data Path*

There are two identical S-Band Single Access Transmitters on-board Hubble. "S-Band" identifies the radio frequency and "Single Access" specifies a type of antenna on NASA's communications satellites. One of the two SSATs failed in 1998. The other SSAT has been able to shoulder the load and Hubble's observing program has not been affected. Hubble can operate with one transmitter by making additional commands to rotate the telescope. Optimally, the telescope operates with two SSATs.



*Replacement Transmitter*

### **What is planned for SM 3A?**

During Servicing Mission 3A astronauts will replace the faulty transmitter with a spare. Some of the cables and connectors are smaller versions of the ones on the back of television sets. Because the connectors are difficult to handle with bulky space suit gloves, special enhancements have been made

to the new unit to aid the Astronauts. In addition, a special connector tool helps to remove and install the connectors. The failed transmitter will be returned to Earth and refurbished for a later flight.

### **SSAT CHARACTERISTICS**

Size	14 x 8 x 2 3/4 inches
Weight	8.5 pounds

### **FOR ADDITIONAL INFORMATION CONTACT**

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