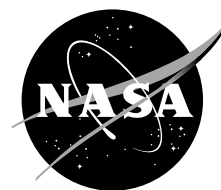


Hubble Facts

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771
(301) 286-8955



FS-2002-1-036-GSFC

The Power Control Unit (PCU)

The **Power Control Unit (PCU)** is Hubble's power switching station. As the central controller of the telescope's electrical system, it regulates and distributes the power Hubble needs to operate.

Hubble's solar arrays collect sunlight and convert it into electrical energy. The PCU distributes this energy from the solar arrays to the batteries and electrical components on Hubble, including the science instruments. The electrical energy stored in the six onboard batteries is used when Hubble travels into the Earth's shadow each orbit. The PCU also safeguards Hubble from power spikes and controls battery charging.

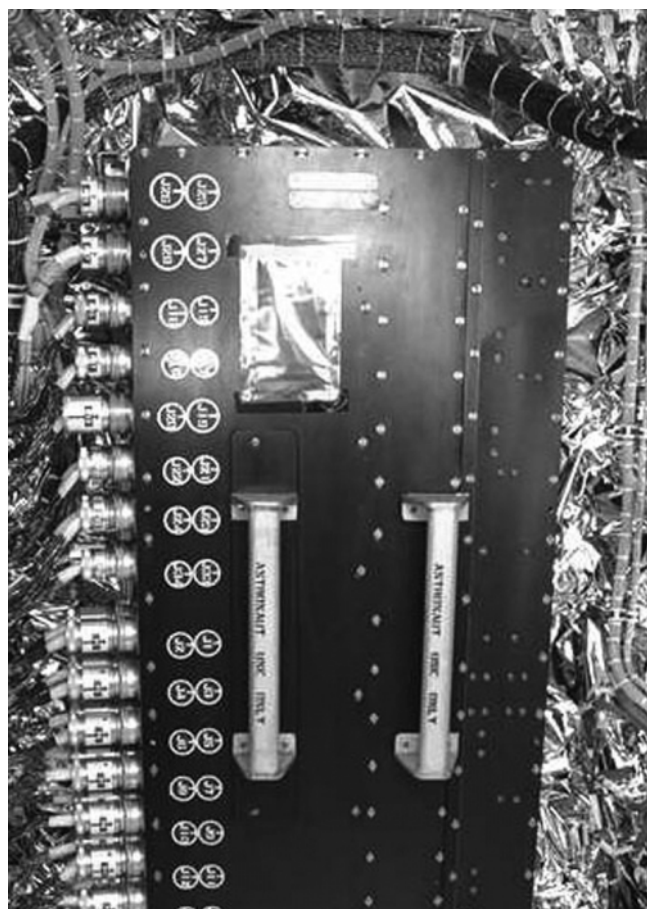
The new PCU will replace the original flight unit in Bay 4 of the telescope. It weighs approximately 160 pounds and measures 45 in. x 24 in. x 12 in. Designed and built by Lockheed Martin Space Systems in Sunnyvale, CA, the new PCU is the original flight spare built for Hubble. It has been modified and retested to ensure optimal performance, and to enhance ease of installation by the astronauts.

Why Replace the PCU?

The original PCU has been on the job continuously since Hubble's launch in 1990 and had experienced normal degradation as it has aged. Several relays that control battery charging and power distribution have failed and an electrical joint in the box has loosened causing a power distribution imbalance and a risk of battery over-heating. With Hubble's mission extended to 2010, a fresh PCU will enable Hubble to remain healthier and more productive throughout its lifetime.

A Challenging First for Hubble

The telescope's planners did not originally design



Power Control Unit

the PCU to be replaced. Late in the building of Hubble, engineers made minor modifications to create a somewhat more astronaut-friendly PCU. Nevertheless, replacing the PCU will be a challenging spacewalk. Astronauts must disconnect 36 connectors on the original PCU. As they install the new unit, they must re-connect the 36 connectors to their proper

mates and perform all of these intricate moves while wearing bulky, heavily insulated gloves.

Replacing the PCU also will be a major event for the team at Hubble mission control. The task requires Hubble to be completely powered off for the first time since its launch in 1990. All telescope subsystems—including thermal control—will be turned off during this time.

Hubble's thermal engineers have been integral in planning the PCU task. They have developed creative methods of maintaining acceptable temperature limits on all of the telescope's equipment while the thermal control system is powered down. This is a good example of the ingenuity, teamwork and meticulous planning behind Hubble's continuing success.

FOR ADDITIONAL INFORMATION CONTACT:

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