

# Operations underway to restore payload computer on NASA's Hubble Space Telescope

July 15 2021

---



The Hubble Space Telescope is deployed on April 25, 1990, from the space shuttle Discovery. Avoiding distortions of the atmosphere, Hubble has an unobstructed view peering to planets, stars and galaxies, some more than 13.4 billion light years away. Credit: NASA/Smithsonian Institution/Lockheed Corporation

NASA has identified the possible cause of the payload computer

problem that suspended Hubble Space Telescope science operations on June 13. The telescope itself and science instruments remain healthy and in a safe configuration.

The [payload computer](#) resides in the Science Instrument Command and Data Handling (SI C&DH) unit. It controls, coordinates, and monitors Hubble's science instruments. When the payload computer halted, Hubble's science instruments were automatically placed into a safe configuration. A series of multi-day tests, which included attempts to restart and reconfigure the computer and the backup computer, were not successful, but the information gathered from those activities has led the Hubble team to determine that the possible cause of the problem is in the Power Control Unit (PCU).

The PCU also resides on the SI C&DH unit. It ensures a steady voltage supply to the payload computer's hardware. The PCU contains a power regulator that provides a constant five volts of electricity to the payload computer and its memory. A secondary protection circuit senses the voltage levels leaving the power regulator. If the voltage falls below or exceeds allowable levels, this secondary circuit tells the payload computer that it should cease operations. The team's analysis suggests that either the voltage level from the regulator is outside of acceptable levels (thereby tripping the secondary protection circuit), or the secondary protection circuit has degraded over time and is stuck in this inhibit state.

Because no ground commands were able to reset the PCU, the Hubble team will be switching over to the backup side of the SI C&DH unit that contains the backup PCU. All testing of procedures for the switch and associated reviews have been completed, and NASA management has given approval to proceed. The switch will begin Thursday, July 15, and, if successful, it will take several days to completely return the observatory to normal science operations.

The team performed a similar switch in 2008, which allowed Hubble to continue normal [science](#) operations after a Command Unit/Science Data Formatter (CU/SDF) module, another part of the SI C&DH, failed. A servicing mission in 2009 then replaced the entire SI C&DH unit, including the faulty CU/SDF module, with the SI C&DH unit currently in use.

Launched in 1990, Hubble has been observing the universe for over 31 years. It has taken over 1.5 million observations of the universe, and over 18,000 scientific papers have been published with its data. It has contributed to some of the most significant discoveries of our cosmos, including the accelerating expansion of the universe, the evolution of galaxies over time, and the first atmospheric studies of planets beyond our solar system.

Provided by NASA's Goddard Space Flight Center

Citation: Operations underway to restore payload computer on NASA's Hubble Space Telescope (2021, July 15) retrieved 11 May 2024 from <https://phys.org/news/2021-07-underway-payload-nasa-hubble-space.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.