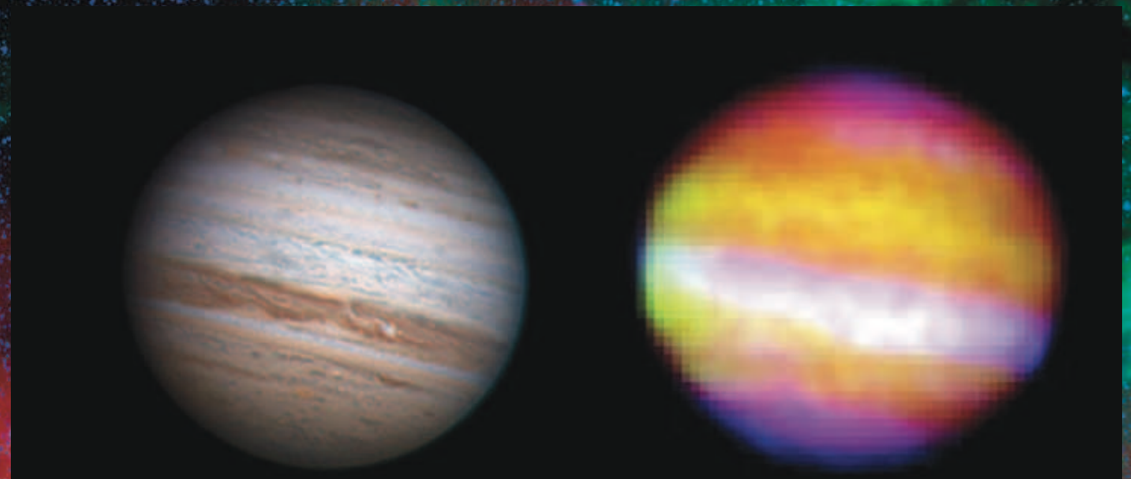
National Aeronautics and Space Administration

The Dryden X-Press

X-tra



This is a composite infrared image of Jupiter at wavelengths of 5.4 (blue), 24 (green) and 37 microns (red), made by Cornell University's FORCAST camera during the SOFIA observatory's "first light" flight. A recent visual-wavelength picture of approximately the same size of Jupiter is shown for comparison. The white stripe in the infrared image is a region of relatively transparent clouds through which the warm interior of Jupiter can be seen. (Image courtesy Anthony Wesley)

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The stability and precise pointing of the German-built telescope met or exceeded the expectations of the engineers and astronomers who put it through its paces during the flight.

"The crowning accomplishment of the night came when scientists on board SOFIA recorded images of Jupiter," said USRA SOFIA senior science advisor Eric Becklin. "The composite image from SOFIA shows heat, trapped since the formation of the planet, pouring out of Jupiter's interior through holes in its clouds."

The highly sensitive Faint Object Infrared Camera for the SOFIA Telescope, or FORCAST, was used for the initial observations in flight. A team led by Cornell's Terry Herter, which also built the instrument, operated it during the flight.

FORCAST captures in minutes images that would require many hour-long exposures by ground-based observatories blocked from a clear infrared view by water vapor in the Earth's atmosphere. The SOFIA's operational altitude, which is above more than 99 percent of that water vapor, allows it to receive 80 percent or more of the infrared light accessible to space observatories.

The flying observatory's platform 747SP also performed well.

"We have retired many of the threats and much of the risk with this first-light flight. This was a major accomplishment in terms of understanding the quality of our observations, for example how much image instability we encounter with airflow over the telescope. While improvements can be made, we exceeded expectations," said Bob Meyer, the SOFIA program manager.

The SOFIA program is managed at Dryden. Ames manages the SOFIA science and mission operations in cooperation with USRA and DSI.

First Light

First in-flight observations with the Stratospheric Observatory for Infrared Astronomy are complete

X-tra is published for civil servants, contractors and retirees of the Dryden Flight Research Center and the center's partners and civil customers.

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At right, Stratospheric Observatory for Infrared Astronomy program officials representing NASA, the Universities Space Research Association and Deutsches SOFIA Institut line up on the access stairs to the open telescope cavity, which houses the airborne observatory's 2.5-meter infrared telescope in the SOFIA 747SP. From top are DSI telescope assembly/ science instrument manager Thomas Keilig, NASA's SOFIA program manager Bob Meyer, deputy program manager Eddie Zavala, aircraft project manager John Carter, USRA's SOFIA science mission operations director Erick Young and chief SOFIA science advisor Eric Becklin.

ED10 0083-33 NASA Photo by Tom Tschida

Cover, with the sliding door over its 17-ton infrared telescope wide open, the SOFIA soars over California's snow-covered Sierra Nevada range on a test flight. (NASA Photo ED10 0080-03 by Jim Ross)

ED09 0279-27 NASA Photo by Tom Tschida

At left, The Stratospheric Observatory for Infrared Astronomy science team at work. The team completes checkout of optical star tracking camera systems and conducts telescope assembly preparation exercises during nighttime testing in late 2009.

Below, with a protective cover over its primary mirror, the high-tech German-built infrared telescope is nested in its framework inside the 19-foot-deep, 12-foot-wide telescope cavity in the rear fuselage of NASA's Stratospheric Observatory for Infrared Astronomy.

The Stratospheric Observatory for Infrared Astronomy, a joint program by NASA and the German Aerospace Center, achieved a major milestone May 26, with its first in-flight night observations.

"With this flight, SOFIA begins a 20-year journey that will enable a wide variety of astronomical science observations not possible from other Earth and space-borne observatories," said Jon Morse, Astrophysics Division director in the Science Mission Directorate at NASA Headquarters in Washington. "It clearly sets expectations that SOFIA will provide us with Great Observatory-class astronomical science."

The highly modified SOFIA Boeing 747SP jetliner fitted with a 100-inch diameter reflecting telescope took off from its home base at the Dryden Aircraft Operations Facility in Palmdale, Calif. The in-flight personnel consisted of an international crew from NASA, the Universities Space Research Association in Columbia, Md., Cornell University and the German SOFIA Institute (DSI) in Stuttgart.

During the six-hour flight, at altitudes up to 35,000 feet, the crew of 10 scientists, astronomers, engineers and technicians gathered telescope performance data at consoles in the aircraft's main cabin.

"Wind tunnel tests and supercomputer calculations made at the start of the SOFIA program predicted we would have sharp enough images for front-line astronomical research," said SOFIA project scientist Pam Marcum of NASA's Ames Research Center in Moffett Field, Calif. "A preliminary look at the first light data indicates we indeed accomplished that."

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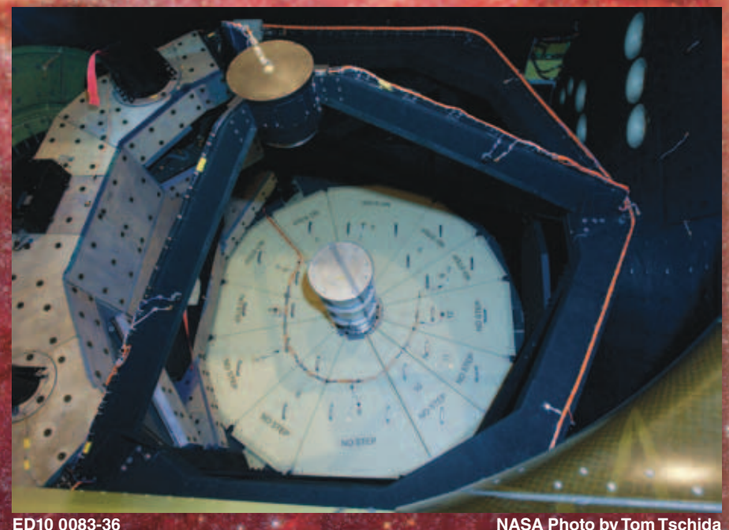

ED10 0083-36 NASA Photo by Tom Tschida

Fast facts

- Expected lifespan: 20 years
- Diameter of primary telescope mirror: 98 inches (2.5 meters)
- Weight of telescope assembly: 44,100 pounds (20,000 kilograms)
- Operational altitude: 41,000 to 45,000 feet
- Observation time at altitude: eight hours or longer
- Ambient temperature in telescope chamber: from zero to -40 degrees Fahrenheit
- Up to 20 flight crewmembers will be aboard on missions, including flight crew, technicians, astronomers and educators
- Plans call for more than 120 flights a year when fully operational