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ED15-0187-595 NASA/Carla Thomas

Sensational Science

Scientists see Pluto occultation and rare Milky Way views from NASA's 747SP SOFIA Flying Observatory

ED15-0187-382 NASA/Carla Thomas

Observing the occultation from SOFIA were, standing in the back from left to right, Eric Becklin and UCLA engineer Chris Johnson. Seated in front are UCLA graduate student Sarah Logsdon and USRA's Maureen Savage and Joe Adams.

Success in New Zealand

By Nicholas A. Veronico
SOFIA Program public affairs officer

Scientists aboard NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) studied portions of the universe visible only from Earth's Southern Hemisphere during a six-week deployment that concluded in July. The flying observatory was based at the National Science Foundation's U.S. Antarctic Program facility at Christchurch International Airport from June 15 to July 24.

"This year's deployment to New Zealand was hugely successful," said SOFIA Program Manager Eddie Zavala. "The quality of the astronomical

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ED15-0187-202 NASA/Carla Thomas

Bobby Henderson, from left, Ray Thomas and Ken Magnone are removing cabling from the FLITECAM instrument.

ED15-0187-322 **NASA/Carla Thomas**

Mission director Nancy McKown is seated as Holger Jakob, the University of Stuttgart's German SOFIA Institute telescope software manager, views her screen.

ED15-0187-303 **NASA/Carla Thomas**

Tom Roellig, SOFIA deputy project scientist, and Nadia Drake of National Geographic look at incoming data during the Pluto occultation flight.

ED15-0187-428 **NASA/Carla Thomas**

Ken Magnone aligns FLIGHTCAM and HIPO instruments, as Edward Dunham, HIPO principal investigator from Lowell Observatory, assists.

ED15-0187-402 **NASA/Carla Thomas**

Pilot Ace Beale, from left, Dean Neeley and in the foreground Tom Speer, prepare for a mission.

ED15-0187-140 **NASA/Carla Thomas**

UCLA's Ken Magnone, who is a member of the FLITECAM development team, fills the science instrument with cryogen.

ED15-0187-305 **NASA/Carla Thomas**

Thomas Bida, an astronomer from Lowell Observatory and a member of the HIPO team, concentrates on a task.

ED15-0187-528 NASA/Carla Thomas

Juan Delafuente, Jared Whitfield and Jose Prieto bring the FORCAST instrument onto SOFIA for mounting on the telescope.

ED15-0187-480 NASA/Carla Thomas

Maintenance lead Marco Lentini and technician Alexander Grüell prepare the mounting flange to accept one of the telescope's instruments.

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observing conditions in that part of the world is truly exceptional. I expect that there will be numerous science publications once the data have been processed and analyzed."

SOFIA flies above 99 percent of the Earth's atmospheric water vapor that blocks infrared radiation from reaching the ground. The quality of the data is further improved by the fact that the remaining thin layer of water vapor above the flying observatory during flight is exceptionally dry over the southern ocean at this time of the year. However, obtaining science during winter in the Southern Hemisphere is not without its challenges as storms in the area forced the cancellation of several planned observing flights.

To capture data on celestial objects in the southern skies, SOFIA employed an ensemble of four scientific instruments. The Faint Object Infrared Camera for the SOFIA Telescope (FORCAST – a mid-infrared wavelength camera) led off the first half of the observing period and the German Receiver for Astronomy at Terahertz Frequencies (GREAT – a dual-channel spectrometer) was on the telescope for most of the second half.

ED15-0187-60 NASA/Carla Thomas

Michael Beck, from left, Mark Garrity and Tim Krall review documentation for changing instruments on the telescope.

In the middle of the deployment, the "FLIPO" instrument configuration was used to observe the dwarf planet Pluto as it passed in front of a distant star, an event known as an "occultation." FLIPO is a merge of acronyms representing the co-mounted First Light Inferred Test Camera (FLITECAM) and the High-speed Imaging Photometer for Occultations (HIPO) co-mounted on the telescope. SOFIA carried FLIPO plus another sensitive camera, the Focal Plane Imager-Plus (FPI+), to the precise position required to capture atmospheric data as Pluto blocked the star's light.

"Everyone on the team did their part to make sure that SOFIA was in the right place at the right time," said SOFIA Project Scientist Pamela Marcum. "A bright spike of light in the middle of the shadow cast by Pluto was detected as the star's light briefly lit up the dwarf planet's entire atmosphere. This not only confirmed that SOFIA's location was nearly perfect, but also provided detailed information about Pluto's atmosphere in a way that just observing the shadow would not."

"The ability to change which science instruments flew on SOFIA during the deployment following the occultation is significant," Marcum said. "In particular, the FORCAST camera with its spectroscopic capabilities and the GREAT instrument enabled astronomers to make detailed studies of star formation processes in the rich southern Milky Way, the Galactic Center and the Magellanic Clouds."

SOFIA is based at the NASA Armstrong Flight Research Center facility in Palmdale, California. Science data collected during the deployment was transferred to the SOFIA Science Center at NASA's Ames Research Center in Moffett Field, California, for processing and distribution to the principal investigators and their teams.

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