SOFIA to Observe Far Reaches of Galaxy

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MOFFETT FIELD, Calif. – Peering from the side of a 747 airplane, the Stratospheric Observatory for Infrared Astronomy (SOFIA) will allow astronomers to draw back the veil on the hidden reaches of our own galaxy.

The airborne observatory will do so by measuring infrared radiation otherwise blocked by the Earth's atmosphere before it reaches our planet's surface.

But the high-flying telescope will also provide a glimpse of astronomical objects that emit most of their energy in the invisible form of radiation known as the infrared – often from behind a thick cloak of dust and gas.

"The problem," said Michael Haas, a SOFIA scientist, "is the galaxy isn't very visible in the visible."

By plumbing the depths of the electromagnetic spectrum – including the infrared – astronomers can uncover richness just not seen in visible-light views of the heavens above.

The value of SOFIA's telescope-on-a-747 lies in its ability to hoist the infrared-sensitive instrument high above the moisture present in the Earth's atmosphere that absorbs most of the radiated energy.

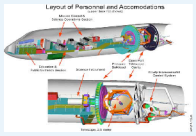
For example, at an altitude of 41,000 feet (12 kilometers) an aircraft is above 85 percent of the Earth's atmosphere, but more than 99 percent of its water vapor.

In such an environment, astronomers can study the radiant heat patterns from stars, planets and other celestial sources throughout the universe.

"It's doing science that's in some sense not achievable in any other way," said Chris Wiltsee, the SOFIA project chief at NASA's Ames Research Center, of the concept.

Of course, satellite observatories – like the planned Space Infrared Telescope Facility (SIRTF) – also escape the Earth's bounds, but at a far steeper cost.

Images



A cutaway view of SOFIA.

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Furthermore, observatories like SOFIA land each morning, allowing for it to carry to latest scientific instrumentation.

Initially, SOFIA will draw on an arsenal of 10 first-light instruments. SOFIA will allow the instruments to be swapped out practically overnight, making the observatory a true "plug-and-play" instrument. Every three years, the SOFIA team will then put out a call for proposals for new instruments.

"You can have the latest and newest instruments and detectors fly quite quickly," said Eric Becklin, SOFIA's chief scientist and the observatory's director designate.

SOFIA should make at least 960 hours' worth of observations a year, or about three times what its predecessor, the Kuiper Airborne Observatory, accomplished annually.

SOFIA's main target will be the galactic center. Indeed, SOFIA's telescope pokes out from the airplane's port side, allowing it to start peering south toward the galactic center almost immediately after the 747 reaches altitude heading west from NASA's Ames Research Center in California's Silicon Valley.

Astronomers hope SOFIA will allow them to observe material falling into the black hole thought to lurk at the center of our galaxy, pinpoint various complex molecules in space and peer back at the formation of the first galaxies in the universe.

It should also provide a new look at objects already studied in detail by the Kuiper Airborne Observatory.

"When we look at objects we've looked at before, we'll see them 10 times..clearer," Becklin said.