Stratospheric Observatory for Infrared Astronomy

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The Stratospheric Observatory for Infrared Astronomy (SOFIA [1]) is a 2.5 meter telescope on a modified 747SP aircraft. The program is managed by the National Aeronautics and Space Administration (NASA) and the Deutsches Zentrum für Luft- und Raumfahrt (DLR). Operations are supported by NASA and DLR in a partnership, with an 80/20 split per international Memorandum of Understanding. Further partnerships with other space agencies may be possible, allowing dedicated access and integrated instrument development.
SOFIA's first light flight occurred in May 2010, with all systems performing acceptably. The Early Science program began with three mid-infrared flights in 2010 December, followed by terahertz heterodyne spectroscopy flights in 2011 April, and culminating in 15 Basic Science flights. For Basic Science, a call for proposals issued and the proposals were evaluated by a Time Allocation Committee. The proposal calls are open internationally. The Cycle 1 observing proposal call will be issued in 2011 October.

There are now 7 scientific instruments developed or being developed for SOFIA. NASA issued a call for new instruments: http://soma.larc.nasa.gov/SOFIA/ The instruments on SOFIA present a wide range of capabilities that are designed to enable guest investigators to explore diverse topics in planetary science. Some examples include the following. *Thermal emission* within SOFIA's wide 1-200 μm wavelength range. During Early Science flights, comet Hartley 2 was observed as part of the Earth-based support of the *Deep Impact* mission, detecting the comet at 11.1, 24.2, 31.4, and 37.1 μm (Meech et al. 2011). *Planetary Atmospheres* including molecular species such as the H_2 features that dominate the opacity of at 20-40 μm; Venus which has been inaccessible to infrared spectroscopy; and the very important topics of methane on Mars and hydrocarbons on Titan. *Kuiper Belt* objects as well as extrasolar planet transits will be studied using optical photometry from the stratosphere, above most atmospheric scintillation. The mobile platform of SOFIA allows observations of occultations from their optimal locations and will asses the atmospheres and sizes of outer solar system bodies.

References: [1] Becklin, E.E., Gehrz, R.D. 2009, SPIE 7453, p. 745302 [2] Adams, J. et al. 2010, Proc. SPIE 7735, p. 77351