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## **SOFIA - First test flight for the flying observatory** 27 April 2007



The flying observatory SOFIA during its first test flight

On Thursday 26 April 2007, at 10 am local time saw SOFIA, the flying Stratospheric Observatory for Infrared Astronomy – a joint project of the National Aeronautics and Space Administration (NASA) and the German Aerospace Center (DLR) – take off from Waco (Texas, USA) on its first test flight after its conversion.

German and US engineers, scientists and managers were relieved and clearly proud to witness the moment they had been feverishly waiting for and working towards for weeks. For precisely two hours, the flying observatory traced its path through the bright blue Texan sky at a height of some 4000 metres. Prof. Johann-Dietrich Wörner, Chairman of the DLR Board, regards this first successful flight by SOFIA as one of the most important milestones in this US-German infrared astronomy project. Participants can now plan the final test phase and first scientific application for the flying observatory with greater certainty.



SOFIA before its first test flight

They had also been waiting anxiously for the first successful flight at the University of Stuttgart, home to the German SOFIA Institute (DSI). "This initial flight by SOFIA brings us a giant step closer to the scientific use of the observatory," stresses Prof. Wolfram Ressel, Vice-Chancellor of the University of Stuttgart. "SOFIA and the German-developed telescope have come through their first test flight well," says a pleased Prof. Hans-Peter Röser, Head of the DSI and the Institute of Space Systems (IRS) at the University of Stuttgart. The Stuttgart engineers and astronomers will support and coordinate the preparation and conduct of scientific flights with SOFIA from the German side. In 2009, the International Year of Astronomy, SOFIA is likely to land for the first time at Stuttgart Airport, one of the SOFIA project partners in the region.

In the outer fuselage of a Jumbo Jet



SOFIA takes off

SOFIA is a converted Boeing 747 SP fitted with a high-tech telescope. The telescope was developed and manufactured under contract to DLR by the German companies MT-Mechatronics and Kayser-Threde. The conversion of the former passenger-carrier was undertaken in Texas by L3 Communications. It included creating a 4 x 6 metre opening in the outer fuselage of the aircraft. "This radical change to the structure of the aircraft and the associated installation of the telescope with its 2.5 metre reflector was a challenge for everyone taking part," explains Dr Dietmar Lilienthal, SOFIA Project Manager at DLR.

Jam packed with measuring instruments

For safety reasons, only three flight engineers accompanied NASA pilots Gordon Fullerton and Bill Brockett onboard SOFIA's first test flight. However, the aircraft was studded with measuring instruments and sensors for later detailed analysis of its behaviour and stresses experienced during its various flight manoeuvres. The effect of carrying a 17-tonne telescope was also monitored by sensors during the flight. Further test flights with SOFIA will be carried out over coming months at the NASA Dryden Flight Research Center in Southern California.

Astronomical revolution with two German instruments



SOFIA returns after a couple of hours airborne

German and US scientists want to use the SOFIA airborne observatory for infrared observations, starting in 2009. German scientists have developed two of the nine first-generation instruments involved.

The FIFI LS (Far-Infrared Field-Imaging Line Spectrometer) was constructed under the leadership of Dr Albrecht Poglitsch of the Max Planck Institute for Extraterrestrial Physics in Garching, to investigate such things as galaxies of very high luminosity which is only released in the infrared band, the formation of stars, and black holes.

GREAT (German REceiver for Astronomy at Terahertz Frequencies) was developed under the guidance of Dr Rolf Güsten of the Max Planck Institute for Radio Astronomy and his colleagues at the University of Cologne, the Max Planck Institute for Solar System Research in Lindau, and the DLR Institute for Planetary Research in Berlin, and allows astronomers to investigate the innermost reaches of star formation regions and thus to witness the birth of stars.

"The data from both German instruments will considerably enhance our theories on the composition of the interstellar medium and the processes of star formation in our cosmos," explains Prof. Jürgen Stutzki of the University of Cologne and the current spokesperson for the scientific community associated with SOFIA.

SOFIA is a joint project conducted by the German Aerospace Center (DLR) and the National Aeronautics and Space Administration (NASA). It is being carried out at the under the auspices of the DLR, with the financial support of the Federal government (Federal Ministry of Economics and Technology - (BMWi), the State of Baden-Württemberg and the University of Stuttgart. Scientific operations are being coordinated on the German side by the German SOFIA Institute (DSI) at the University of Stuttgart, and on the US side by the Universities Space Research Association (USRA). Development of the German instruments is financed by the Max Planck Society and the German Research Foundation.

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