

CANAerospace drives SOFIA Technology

Waco, TX- Together with the primary mirror framework installation, several CANaerospace data links have successfully been integrated in the SOFIA Boeing 747SP aircraft by MAN Technologie and Kayser-Threde engineers at the L3 Communications facilities in Waco, Texas.

To provide the background: NASA and the German Aerospace Center DLR, are working together to create SOFIA - a Boeing 747SP aircraft modified by L-3 Communications to accommodate an optical telescope with a reflecting surface of 2.5m at the primary mirror. SOFIA will be the largest airborne observatory in the world, and will make observations that are impossible for even the largest and highest of ground-based telescopes. The observatory is being developed and operated for NASA by a team of industry experts led by the Universities Space Research Association. The aircraft is being heavily modified for its new role as a flying astronomical observatory. When it returns to service as SOFIA, the 747SP will be operated and maintained at NASA's Ames Research Center near San Jose, California.



Putting a 2.5 meter telescope on an airplane has never been done before and poses many complex and challenging problems for the engineers. One of the most challenging problems is keeping the aircraft steady while flying with a 10-ton telescope in a huge hole in the rear of the plane that is opened to the sky. Extensive modifications are underway at L-3 Communications to transform the B747 aircraft into the SOFIA observatory and to deliver an FAA-certified aircraft.

Under contract with the German Aerospace Center (DLR), MAN Technologie and Kayser-Threde lead a consortium of German companies to build the telescope for the SOFIA project. MAN Technologie will provide the system to insula-

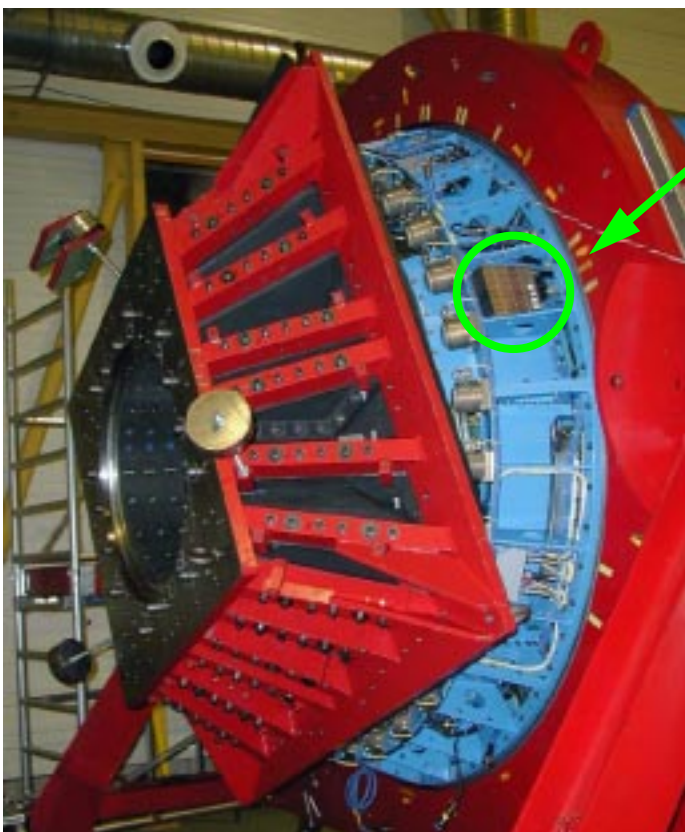
te the telescope from vibration while in flight, the telescope rotation control using a spherical torque motor and the inertial stabilization systems and telescope supporting structure for the optical subsystem. Kayser-Threde's responsibilities for the telescope include the development of the optical subsystem including the 2.5 m lightweighted mirror together with the mirror cell structure, the scientific instrument flange, the star tracking subsystem and master control processor, a 45 kVA power distribution system and the aircraft and telescope wire harness.

After substantial investigation and trade-off studies, both MAN Technologie and Kayser-Threde have selected CANaerospace as realtime communication bus for several highly mission critical SOFIA subsystems. Throughout the entire aircraft, even on the low-pressure cavity side, CANaerospace buses provide the connection between VME-based host computers and numerous realtime control systems performing functions such as star tracking control positioning, pressure window control and temperature/pressure monitoring around the telescope assembly structure. Also, operator station annunciation panels are integrated into



SOFIA Annunciator Panel

the CANaerospace network. The CANaerospace host interfaces and Network Extended Control Systems (NECS) were developed and delivered by Stock Flight Systems of Germany. Extensive testing of electromagnetic compatibility was conducted and proved excellent reliability of CANaerospace and the NECS computers.



NECS installation on the telescope assembly structure

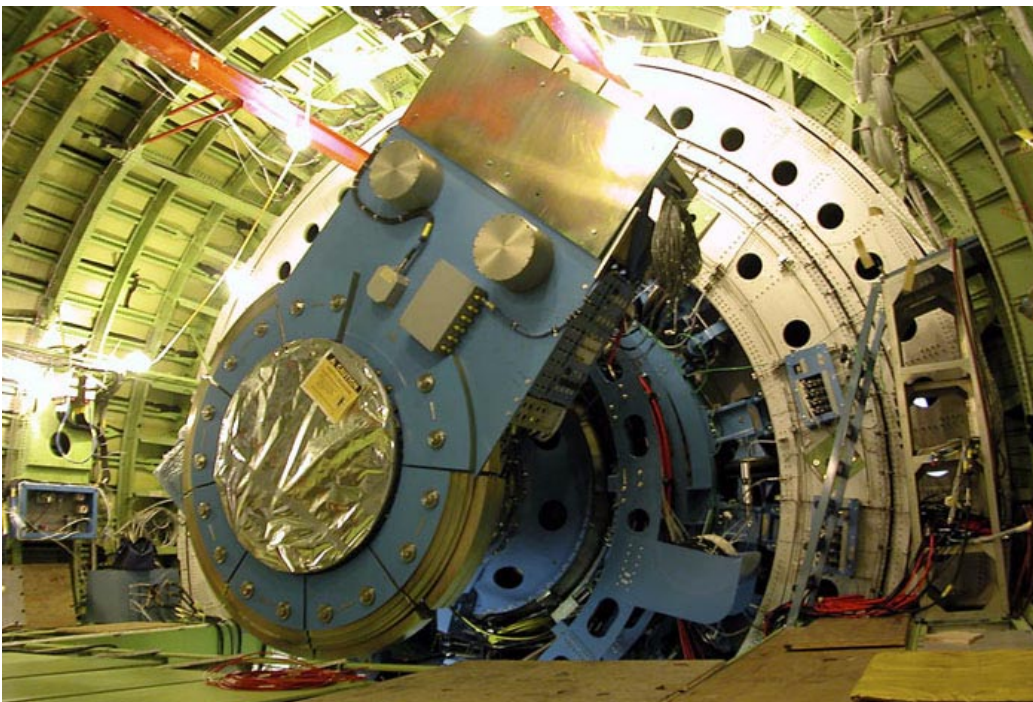
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Contact:

Dipl.-Ing. Karl Wandner
MAN Technologie AG
Wilhelm-Theodor-Römheld-Straße 24
55024 Mainz
Germany
phone: +49/6131-2155-336
fax: +49/6131-2155-209
e-mail: karl_wandner@mt.man.de

Dipl.-Ing. Klaus Lattner
Kayser-Threde GmbH
Wolfratshauer Straße 48
81379 München
Germany
phone: +49/89-72495-359
fax: +49/89-72495-398
e-mail: klaus.lattner@kayser-threde.de

References:

NASA SOFIA website (<http://sofia.arc.nasa.gov>)
DLR SOFIA website (<http://spacesensors.dlr.de/SOFIA>)
MAN Technologie website (www.man-technologie.de)
Kayser-Threde website (www.kayser-threde.de)
Stock Flight Systems website (www.stockflightsystems.com)



Telescope structure installation in the SOFIA aircraft

All photos courtesy of NASA, MAN Technologie and Kayser-Threde