

## Aalto University's Remote Sensing Aircraft

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The Department of Radio Science and Engineering of Aalto University is one of few remote sensing institutes in Europe to operate its own research aircraft. The Short SC7 Skyvan (OH-SBA) is a twin-engine turboprop aircraft that is especially suitable for remote sensing measurements. The aircraft is equipped with a relatively large (1.5 m by 1.9 m) rear cargo door and has a six meter long, square-shaped (2 m by 2 m) fuselage, which is ideal for instrument installations and offers a good working environment. The aircraft has a fast and easy instrument attachment system, accessible and modifiable instrument cabling, as well as an independent 28 VDC / 230 VAC electric subsystem in the cabin. A GPS/INS system provides accurate attitude and position data.

Skyvan has four possible instrument installation locations for multi-sensor measurement flights. The main location is the cargo bay area in the back of the fuselage next to the rear cargo door. Three other locations are the fuselage nose inside a radome, the port side of the fuselage, and underneath the fuselage. With a full fuel tank the maximum payload consisting of instruments and operators is 600 kg. The aircraft has good STOL capability allowing the use of short strips for take-off and landing. A typical speed during data collection is 180 km/h.

The Aalto instrumentation flown onboard Skyvan includes the HUT-2D 1.4 GHz interferometric radiometer below the fuselage, the HUTRAD 6.8 to 94 GHz microwave radiometer system in the cargo bay area, the AISA imaging spectrometer in the fuselage nose, and the HUTSLAR 9.5 GHz side-looking airborne radar on the port side of the fuselage. Other instruments flown onboard Skyvan include the EMIRAD 1.4 GHz radiometer of the Technical University of Denmark and a GPS Open Loop Differential Real-Time Receiver (GOLD-RTR), a GNSS-R instrument of the Institut d'Estudis Espacials de Catalunya to provide information on the surface roughness of the ocean. Ancillary instrumentation includes infrared cameras for providing ground temperature information, video cameras and 35 mm cameras.

Skyvan has participated in numerous flight measurement campaigns including an ESA SMOS six-week campaign in 2008 and an ESA SMOS 2-month campaign in 2010, demonstrating excellent overall dispatch reliability. Aalto University has the capability to organize total ground handling and measurement flight support for any kind of measurement and transfer flights in Europe.