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THE ADVANCED MULTICOMPONENT AIR ANALYSER ANITA2 ON ITS WAY TO ISS

Abstract

The ANITA2 (Analysing Interferometer for Ambient Air) instrument is a trace gas analyser, designed to operate onboard the ISS and to monitor the cabin atmosphere. Within the last 1.5 years, significant progress was made towards realizing the final flight instrument, such as the flight-like designing, manufacturing and functional testing of the opto-mechanical components and further development of the gas analysis methods.

ANITA2 will deliver (like the precursor ANITA1) information on the air conditions, analysing in parallel more than 30 of the most important trace gases in the cabin atmosphere. The data is complementary to other in-situ measurements in a crewed space cabin atmosphere. The advantages of the ANITA type instruments include high sensitivity, accuracy, precision and time resolution of the measurement data.

The system relies on a Fourier Transform Infrared spectrometer and specially developed analyses of the spectroscopic data.

After ANITA1 and several subsystem bread-boarding phases, in 2016 ESA awarded OHB System AG and SINTEF the contract to develop the ANITA2 flight model. Compared with ANITA1, the new system is characterised by a significant reduction in mass, volume and power consumption, as well as improved characteristics in gas analysis sensitivity. The novel, sophisticated analysis software is further improved, employing statistical and non-linear calibration and analysis methods. Thus, detailed, continuous, and quasi on-line information on the cabin air quality becomes available.

ANITA2 is also a stepping stone into the future, as a precursor system for crewed exploration missions, e. g. to Mars and the Moon. Furthermore, ANITA2 is also suited for a wider range of applications, such as monitoring in a crewed submarine environment. ANITA2 will be ready for flight and start-up on the ISS in 2021.

The paper will give an overview about ANITA2. This includes the overall system concept and design as well as details about sub-systems, where the hardware is already manufactured. Here the actual Optical Breadboard will be shown and described, which contains all opto-mechanical components of ANITA2 in a flight-like design. In addition, performance tests of these components are presented, as well as test measurement results, gained from analysing several gas mixtures.

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