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ANITA2: THE NEXT GENERATION TRACE GAS MONITORING FOR THE ISS

Abstract

Following the successful European precursor mission ANITA1 (Analysing Interferometer for Ambient Air) operating on ISS for about 1 year in 2007/2008, the next generation system ANITA2 is in the design and breadboarding phase. ANITA1 has shown the advantages of an optical sensor with high time resolution and the simultaneous detection and quantification of the most important trace gases in the ISS atmosphere. The data have delivered surprising results on the dynamics of the crewed cabin atmosphere. Events occurring during the system operation like e.g. Shuttle docking, leakage in the Russian cooling system, detection of an unknown gas, and variable activity levels for the crew, could be identified, analysed, and assigned to the different happenings.

The successor instrument ANITA2 is now in the development phase considering all lessons learned from the ANITA1 instrument. The new instrument is designed for improvements in the sensitivity of at least one order of magnitude. It will be a compact and self-standing unit. ANITA2 will be calibrated to detect and quantify simultaneously and quasi on-line 33 or more of the most important trace gases in the cabin atmosphere. The optimised instrument in combination with sophisticated analysis SW - based on advanced simulations and statistical regression techniques - will form a reliable and compact multi-gas air quality monitor.

ANITA2 is like ANITA1 suggested to be a cooperative programme with NASA. ANITA2 further represents a precursor system for missions e.g. to Moon and Mars under the manned exploration programme. The following ANITA3 system will be a high performance, maintenance-free measurement unit approaching the size of a shoe box.

The paper will highlight the benefits of an in-situ trace gas monitoring system for closed habitat systems such as the ISS.