

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Sciences onboard the International Space Station and Beyond (6)

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MULTI-USER EXPOSURE FACILITIES ON EXTERNAL SITES OF THE INTERNATIONAL SPACE
STATION

Abstract

EXPOSE-E and EXPOSE-R are two multi-user facilities developed by Kayser-Threde (subcontractor RUAG Aerospace AG) under contract to ESA for scientists working in the field of astrobiology. With these facilities biological and organic chemical material and/or micro-organisms can be exposed for long periods (typically for one year) to the hostile space environment under known and controlled conditions.

Both the EXPOSE facilities are box-shaped, thermally controlled units, with customized and partly exchangeable sample containers, which allow a defined long-term exposure of the experiments with constantly monitored environmental conditions; in particular to:

- solar UV radiation, under vacuum or inert atmosphere
- under floating or pre-defined controlled temperature conditions
- under controlled intensity and wavelength of incident radiation

In 2008 two sets of astrobiology experiments with more than 1500 scientific samples in the two EXPOSE facilities have been successfully launched to the ISS for external exposure for up to 1.5 years. EXPOSE-E, now installed at the balcony of the European Columbus module, was successfully launched in February 2008, while EXPOSE-R took off to the ISS in November 2008 and is now ready for external installation outside the Russian Zvezda module. EXPOSE-R is a cooperative experiment between ESA and Roskosmos.

The paper will give an overview of the various types of experiments to be performed in EXPOSE. The facilities themselves and their performance characteristics will be described. In the near future, ESA is planning to exchange the EXPOSE-R trays to provide possibilities of uploading a third set of experiments, opening the chance for further scientific investigations outside the ISS, in support of astrobiology research and also of future exploration programmes.