Introduction to the EXPOSE-E Mission

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EXPOSE-E has been the first of three long-duration space missions provided by the European Space Agency (ESA) within the European Program of Life and Physical Science in Space (ELIPS) for long-term astrobiology studies on board the International Space Station. As part of the European Technology Exposure Facility, EXPOSE-E was launched together with ESA’s Columbus laboratory and mounted in open space onto the external balcony of the Columbus laboratory from 15 February 2008 until 2 September 2009. It accommodated a variety of chemical and biological test systems from five different experiments. Exposing them to selected parameters of the space environment, the following astrobiological issues were studied:

- Dynamic chemistry of prebiotic chemical evolution as it proceeds in the interstellar medium or in the clouds of Saturn’s moon Titan;
- Stability of organic compounds and microorganisms under simulated martian surface conditions;
- The role of solar UV radiation on the evolution of biospheres;
- Planetary protection issues for surface missions to Mars;
- The likelihood of lithopanspermia: the interplanetary transfer of life via impact-ejected rocks.

Information on the radiation field around EXPOSE-E was provided by two additional experiments designed to investigate:

- The spectrum and intensity of solar electromagnetic radiation, and
- The composition and intensity of cosmic ionizing radiation.

The EXPOSE-E hardware was built by the industrial prime contractor Kayser-Threde GmbH, München, Germany. EXPOSE-E ground operations were supported by the Facility Support Center MUSC at DLR, Köln, Germany. The EXPOSE-E science team is grateful to Astrobiology for offering the opportunity to publish the results of the EXPOSE-E mission in this comprehensive manner and to Sherry Cady for her sedulous support during the preparation of this special issue.

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