Institute of Aerospace Medicine
Institute Seminar (virtual), April 23, 2024, *Abstract*

Dr. Thomas Berger
German Aerospace Center, Institute of Aerospace Medicine, Radiation Biology
Cologne, Germany

1967 days in space – the RAMIS radiation detector on the DLR Eu:CROPIS mission

1967 Tage im Weltraum – der RAMIS Strahlungsdetektor auf der DLR Eu:CROPIS Mission

Within the last decade the Biophysics working group of the Radiation Biology Department has developed, built, tested and flown a set of active radiation detector systems in various space missions. These consist of the *M-42* detector family - successfully applied on NASA balloon flights over Antarctica, the NASA Artemis I mission, the Astrobotic Peregrine I flight and within the RadMap experiment on-board the International Space Station (ISS) - and the *Radiation Measurement in Space (RAMIS)* instrument. *RAMIS* (size: 140x140x35mm^3, mass: 608 gram, power consumption 1.82 Watt) is a radiation detector developed for the DLR Eu:CROPIS satellite mission. *RAMIS* uses an arrangement of two silicon detectors in telescope geometry and maps the radiation environment in the course of the mission providing baseline data as count rate in the silicon detectors, but also dosimetric quantities as absorbed dose and dose equivalent rate. Eu:CROPIS was launched on December 03rd 2018 into a polar orbit circling around Earth at an average altitude of around 600 km. *RAMIS* is located on the outside of the satellite and was activated on 5 December 2018 and has continuously provided data during the course of the mission. Due to the polar orbit of the satellite *RAMIS* can measure: a) the variation of galactic cosmic radiation (GCR) in dependence on the Eu:CROPIS orbit showing the influence of the shielding of the Earth magnetic field; b) the contributions of protons in the inner Earth radiation (Van Allen) belts within the region of the South Atlantic Anomaly (SAA); c) variations of the trapped electron intensity during crossings of the outer radiation belt at high geomagnetic latitudes and finally (d) the changes in the radiation environment due to the changes in the solar cycle. *RAMIS* started its measurements near solar minimum conditions and currently we are approaching the next solar maximum. Therefore, it was also possible to measure a high number (n>10) of Solar Particle Events (SPEs) from late 2021 onwards and compare this data with instruments on the surface of the Moon (LND) and on the Martian surface (MSL-RAD). The talk will give an overview of some highlighted results from the instrument, which will have been in space for 1967 days as of April 23rd 2024.