SYMPOSIUM ON STEPPING STONES TO THE FUTURE: STRATEGIES, ARCHITECTURES, CONCEPTS AND TECHNOLOGIES (D3)
Novel Concepts and Technologies for the Exploration and Utilization of Space (2)

Author: Ms. Mariella Graziano
GMV Aerospace & Defence SAU, Spain

Mr. Raul Cadenas
GMV Aerospace & Defence SAU, Spain
Mr. Alberto Medina
GMV Aerospace & Defence SAU, Spain
Mr. Jean-Francois Dufour
European Space Agency (ESA), The Netherlands

A DISTRIBUTED RADIATION INSTRUMENT IN PREPARATION TO MANNED MISSION TO MARS AND MOON

Abstract

Human exploration of Moon and Mars, as recently envisaged by international Space Agencies, raises multiple problems to be solved, or at slightest taken into account, at the scope of opportunely protecting involved astronauts.

Space is clearly a hostile environment for human being bodies. Exposure to cosmic radiation is one risk that could and should be reduced while applying constructive measures. In order to mitigate the possible effects of space environment on humans, a mandatory step shall be the knowledge and characterization of the space radiation. Different research activities are already going into the direction of understanding the interaction-between and the effect-of space environment on human body. What is still "incomplete" is the accurate determination of radiation dose in space.

This paper draws a mission concept possibly allowing measuring both on large temporal and spatial scale the existing surface radiation and temperature on a planetary body. Moon and Mars surfaces are assumed as reference scenarios.

A distributed instrument consisting of spreading around both on Martian and Lunar surfaces a certain number of "hypothetical" radiation sensors is considered. Those small sensors relays on the capability of communicating among themselves in a wireless networked fashion.

The problem is seen from the perspective of how it would be possible to deploy, distribute from orbit and land on the surface the mentioned sensors down to a representative area and communicate to Earth, directly or via a relay spacecraft, the collected data.

Due to the inherent difference of assumed scenarios (Moon and Mars) different strategies to build the distributed web-based instrument are analyzed. The results presented are easily extendible to other scenarios like minor bodies (i.e. NEO) for manned missions.