Paper ID: 10867
oral

44th SYMPOSIUM ON SAFETY AND QUALITY IN SPACE ACTIVITIES (D5)
Space Weather Prediction and Protection of Space Missions from Its Effects (3)

Author: Mr. Volker Maiwald
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany

Mr. André Weiß
University of Bremen, Germany
Dr. Frank Jansen
Institute of Aerospace Systems, Germany

COMBINING SOLAR SCIENCE AND ASTEROID SCIENCE WITH THE SPACE WEATHER OBSERVATION NETWORK (SWON)

Abstract

The peculiarity of space weather for Earth orbiting satellites, air traffic and power grids on Earth and especially the financial and operational risks posed by damage due to space weather, underline the necessity of space weather observation. The importance of such observations is even more increasing due to the impending solar maximum. In recognition of this importance we propose a mission architecture for solar observation as an alternative to already published mission plans like Solar Probe (NASA) or Solar Orbiter (ESA). Based upon a Concurrent Evaluation session in the Concurrent Engineering Facility of the German Aerospace Center, we suggest using several spacecraft in an observation network. Instead of placing such spacecraft in a solar orbit, we propose landing on several asteroids, which are in opposition to Earth during the course of the mission and thus allow observation of the Sun's far side. Observation of the far side is especially advantageous as it improving the warning time with regard to solar events by about two weeks. Landing on Inner Earth Object (IEO) asteroids for observation of the Sun has several benefits over traditional mission architectures. Exploiting shadowing effects of the asteroids reduces thermal stress on the spacecraft, while it is possible to approach the Sun closer than with an orbiter. The closeness to the Sun improves observation quality and solar power generation, which is intended to be achieved with a solar dynamic system. Furthermore landers can execute experiments and measurements with regard to asteroid science, further increasing the scientific output of such a mission. Placing the spacecraft in a network would also benefit the communication contact times of the network and Earth. Concluding we present a first draft of a spacecraft layout, mission objectives and requirements as well as an initial mission analysis calculation.