

SYMPOSIUM ON NEW TECHNOLOGIES FOR FUTURE SPACE ASTRONOMY MISSIONS (A7)
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THE SOLAR MAGNETISM EXPLORER (SOLMEX) SATELLITE DESIGN

Abstract

In response to the 2010 call for a Medium-size mission opportunity in ESA's Science Programme for a launch in 2022 the Solar magnetism eXplorer (SolmeX) was proposed under the lead of the Max Planck Institute for Solar System Research. By using the DLR's Concurrent Engineering Facility (CEF) a consistent satellite concept for SolmeX was designed including mission analysis, formation flying, configuration, propulsion, subsystem dimensioning, payload accommodation, budgeting and cost. The overall objectives of the SolmeX mission are the mapping of the magnetic field in the corona and transition region of the solar atmosphere and to discover the origin and to determine the evolution of solar magnetism and its interaction with heliospheric plasma.

To improve the scientific results in comparison to other solar observations using an instrument occulter, SolmeX will consist of two spacecraft flying in formation at the L1 Libration point of the Earth-Sun System. The first one, the Coronagraph spacecraft (CS) will carry the science payload. The second one, the Occulter spacecraft (OS) will provide an eclipsed view of the sun for the CS and fly in formation at a distance of approximately 200 m to mitigate diffraction effects and improve the on-limb observational resolution of the mission.

In this paper the outcome from the Concurrent Engineering study of the SolmeX concept consisting of the two spacecraft (launch mass about 2100 kg) is described. The most critical aspect of the design is the accurate formation keeping of the two spacecraft. Therefore current open design issues will be pointed out in this paper along with the results that underline the mission feasibility and initial cost estimates of under 460 Million Euro.