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EJSM EM Sensor Study

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Abstract

The EJSM EM (ElectroMagnetic) Sensor Study will perform a comparative analysis of electric and magnetic sensors and assess their relevance to the Ganymede environment in order to optimize the science return of the RPWI investigation.

Project

This proposed study is submitted in response to the call for declarations of interest in science instrumentation for the Europa Jupiter System Mission issued by ESA. It is directly related to the Radio and Plasma Wave Investigation (RPWI) on JGO. The radio and plasma wave diagnostics provides a unique access to critical parameters of space plasma, in particular in planetary environments. Concerning giant planets, this has been demonstrated by major results obtained by the radio investigation on the Cassini spacecraft, but also during the Ulysses flybys of Jupiter. Several other missions, past or in flight, demonstrate the uniqueness and relevance of the radio and plasma wave diagnostics to basic problems of astrophysics.

A critical issue for both the science and the spacecraft systems is related to the sensors: probes, antenna, loops, booms can stick out several meters from the spacecraft body. This issue has a specific incidence on a 3-axis stabilized spacecraft as JGO. The EMC (ElectroMagnetic Compatibilty) is also an issue that has to be considered very early in the spacecraft development, in order to minimize the impact on subsystem and instrument developments. There is a lot of experience on both issues (sensors and EMC) for several programs that have flown or are still flying very succesfully. This early phase of the mission development is exactly the right time to study and assess these from the scientific and technical point of views.

These two, related issues (Sensors and EMC) are the object of the present proposed study. In order to benefit from the state-of-the-art in radio instrumentation for space plasmas, this study has been opened to most groups in this field in Europe, the USA, and Japan. Hence, this study can be relevant to other spacecraft of the EJSM, e.g. the JEO.

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