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# Exploration of Jupiter System and Trojan Asteroids

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Europa Jupiter System Mission (EJSM) is an international mission to explore and Jupiter, its satellites and magnetospheric environment. EJSM consists of (1) The Jupiter Europa Orbiter (JEO) by NASA, (2) the Jupiter Ganymede Orbiter (JGO) by ESA, (3) the Jupiter Magnetospheric Orbiter (JMO) studied by JAXA (Japan Aerospace Exploration Agency). (4) A Europa lander is also studied by Russian Space Agency. In February 2009, NASA and ESA decided to continue the study of EJSM as a candidate of the outer solar system mission.

JAXA started a study of a solar power sail for deep space explorations. Together with a solar sail (photon propulsion), it will have very efficient ion engines where electric power is produced solar panels within the sail. JAXA has already experience ion engine in the successful HAYABUSA mission. An engineering mission IKAROS (Interplanetary Kite-craft Accelerated by Radiation Of the Sun) will be launched in 2010 together with Venus Climate Orbiter PLANET-C. A mission with a large (100m-scale) solar power sail can transfer large payload mass to Jovian system. Currently we are studying a mission to Jupiter and one (or two) of Trojan asteroids (Fig. 1). Trojan asteroids are primitive bodies with information of the early solar system as well as raw solid materials of Jovian system. As the main spacecraft flies by Jupiter, it will deploy a JMO spinner around Jupiter.

JMO will have magnetometers, low-energy plasma spectrometers, medium energy particle detectors, energetic particle detectors, electric field / plasma wave instruments, an ENA imager, an EUV spectrometer, and a dust detector. Proposed instruments on board Trojan spacecraft are cameras, IR spectrometers, XRS, a laser altimeter, and a surface vehicle (if rendezvous with the target is possible). An instrument for measuring cosmic background is also proposed.

Collaborating with plasma instruments on board JEO and JGO, JMO will investigate the fast and huge rotating magnetosphere to clarify the energy procurement from Jovian rotation to the magnetosphere, to clarify the interaction between the solar wind the magnetosphere. JMO will clarify the characteristics of the strongest accelerator in the solar system. JMO will investigate the role of Io as a source of heavy ions in the magnetosphere. The mission (Trojan-JMO) will take 4-6 years to Jupiter and 5 years more to a Trojan asteroid around L4.

The mission study team also includes R. Funase, O. Mori and M. Morimoto of JAXA.

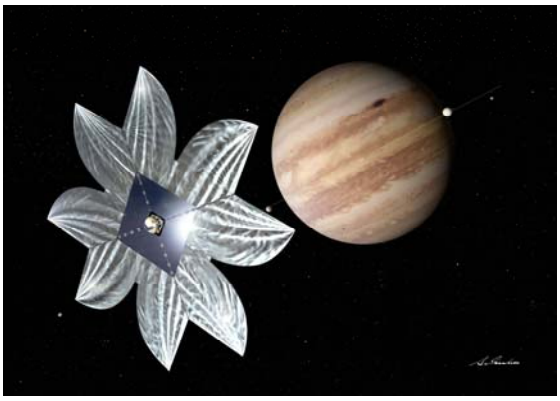

Figure 1 Concept image of the solar power sail mission for Jupiter – Trojan asteroid (JAXA).