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From Laplace to EJSM: Europa Jupiter System Mission

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ABSTRACT

In January 1610, the telescopic observations of the Jovian moons by Galileo Galilei revealed for the first time the aspect of a planetary system in miniature. After 400 years, Europe and the United States are going to celebrate this important anniversary with a joint mission to the Jupiter system.
In the framework of the ESA "Cosmic Vision" programme, the "Laplace" and "Tandem" proposals survived to a first selection in the L-class mission process in 2007. During 2008, the two proposals, renamed respectively "Europa Jupiter System Mission" (EJSM) and "Titan Saturn System Mission" (TSSM), were revised, enlarged and completed with the goal of identifying the best mission to be chosen as the NASA-ESA future mission to the outer Solar System. On 18 February 2009, the two space agencies revealed the selection of the EJSM mission with a joint announcement.
The EJSM concept relies on two primary elements orbiting in the Jovian environment: the Jupiter Europa Orbiter spacecraft (JEO), provided by NASA and selected as the future flagship mission to the outer planets, and the Jupiter Ganymede Orbiter (JGO), provided by ESA at the end of the Cosmic Vision L-class mission selection process if successful. JEO and JGO will perform a complementary and synergistic exploration of the Jupiter system before entering orbit around Europa and Ganymede, respectively. The payloads of the two spacecrafts have been selected to enable the monitoring of dynamic phenomena (like the Io plumes and the Jupiter's atmosphere), the mapping of the Jovian magnetosphere and its interaction with the Galilen satellites, and the characterization of the oceans that are believed to exist beneath the icy crusts of Europa and Ganymede.
Here we discuss the main scientific and technologic aspects of the current EJSM mission concept.