SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration (6)

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# THE EUROPA JUPITER SYSTEM MISSION

**Abstract**

Europa Jupiter System Mission (EJSM)— would be an international mission that would achieve Decadal Survey and Cosmic Vision goals. NASA and ESA have concluded a joint study of a mission to Europa, Ganymede and the Jupiter system with orbiters developed by NASA and ESA. The baseline EJSM architecture consists of two primary elements operating in the Jovian system: the NASA-led Jupiter Europa Orbiter (JEO), and the ESA-led Jupiter Ganymede Orbiter (JGO). JEO and JGO would execute a choreographed exploration of the Jupiter System before settling into orbit around Europa and Ganymede, respectively. JEO and JGO would carry ten to eleven complementary instruments each to monitor dynamic phenomena (such as Io's volcanoes and Jupiter's atmosphere), map the Jovian magnetosphere and its interactions with the Galilean satellites, and characterize water oceans beneath the ice shells of Europa and Ganymede.

EJSM would fully addresses high priority science objectives identified by the National Research Council's (NRC's) Decadal Survey and ESA's Cosmic Vision for exploration of the outer solar system. EJSM would investigate the potential habitability of the active ocean-bearing moons Europa and Ganymede, detailing the geophysical, compositional, geological, and external processes that affect these icy worlds. EJSM would also explore Io and Callisto, Jupiter's atmosphere, and the Jovian magnetosphere. By understanding the Jupiter system and unraveling its history, the formation and evolution of gas giant planets and their satellites would be better known. Most important, EJSM would shed new light on the potential for the emergence of life in the celestial neighborhood and beyond.

The EJSM mission architecture provides opportunities for coordinated synergistic observations by JEO and JGO of the Jupiter and Ganymede magnetospheres, the volcanoes and torus of Io, the atmosphere of Jupiter, and comparative planetology of icy satellites. Each spacecraft could and would conduct "standalone" measurements, including the detailed investigation of Europa and Ganymede, providing significant programmatic flexibility.

Although engineering advances are needed for JEO (radiation designs) and JGO, no new technologies would be required to execute either EJSM mission element. Mission enhancing technologies could be incorpoarted if available by 2012 – 2013. Risk mitigation activities are under way to ensure that the radiation designs are implemented in the lowest-risk approach. The baseline mission concepts include robust mass and power margins.

The mission architecture provides optimal balance between science, risk, and cost using three guiding principles: achieve Decadal science; build on lessons learned; and leverage international collaborations.