

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

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THE EUROPA JUPITER SYSTEM MISSION (EJSM): EXPLORING THE EMERGENCE OF
HABITABLE WORLDS AROUND GAS GIANTS

Abstract

The Europa Jupiter System Mission (EJSM) would be an international mission with the overall theme of investigating the emergence of habitable worlds around gas giants. Its goals are to (1) Determine whether the Jupiter system harbors habitable worlds and (2) Characterize the processes that are operating within the Jupiter system.

NASA and ESA have concluded a detailed joint study of a mission to Europa, Ganymede, and the Jupiter system with orbiters developed by NASA and ESA (future contributions by JAXA and Russia are also possible). 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 an intricately choreographed exploration of the Jupiter System before settling into orbit around Europa and Ganymede, respectively.

EJSM would directly address themes concerning the origin and evolution of satellite systems and water-rich environments in icy satellites. The potential habitability of the ocean-bearing moons Europa and Ganymede would be investigated, by characterizing the geophysical, compositional, geological, and external processes that affect these icy worlds. EJSM would also investigate 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 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 would conduct both synergistic dual-spacecraft investigations and stand-alone measurements toward the overall mission goals.