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The Europa Jupiter system mission

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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; contributions by JAXA 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 be-fore settling into orbit around Europa and Ganymede, respectively. JEO and JGO would carry eleven and ten complementary instruments, respectively, to monitor dynamic phenomena (such as Io's volcanoes and Jupi-ter's atmosphere), map the Jovian magnetosphere and its interactions with the Galilean satellites, and charac-terize water oceans beneath the ice shells of Europa and Ganymede.

EJSM would fully addresses high priority science objectives identified by the National Research Coun-cil's (NRC's) Decadal Survey and ESA's Cosmic Vi-sion for exploration of the outer solar system. The De-cadal Survey recommended a Europa Orbiter as the highest priority outer planet flagship mission and also identified Ganymede as a highly desirable mission tar-get. EJSM would uniquely addresse several of the cen-tral themes of ESA's Cosmic Vision Programme, through its in-depth exploration of the Jupiter system and its evolution from origin to habitability.

EJSM would investigate the potential habitability of the active ocean-bearing moons Europa and Gany-mede, detailing the geophysical, compositional, geo-logical, and external processes that affect these icy worlds. EJSM would also explore Io and Callisto, Jupi-ter's atmosphere, and the Jovian magnetosphere. By understanding the Jupiter system and unraveling its history, the formation and evolution of gas giant plan-ets 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 opportu-nities for coordinated synergistic observations by JEO and JGO of the Jupiter and Ganymede magnetospheres, the volcanoes and torus of Io, the atmosphere of Jupi-ter, and comparative planetology of icy satellites. Each spacecraft could and would conduct "stand-alone" measurements, including the detailed investigation of Europa and Ganymede, providing significant pro-grammatic flexibility.

Although engineering advances are needed for JEO (radiation designs) and JGO, no new technologies would be required to execute either EJSM mission element. The development schedule for the mission is such that a technology developed by 2012 – 2013 could easily be incorporated if it enhances the mission capability. Risk mitigation activities are under way to ensure that the radiation designs are implemented in the lowest-risk approach. The baseline mission con-cepts include robust mass and power margins.

The EJSM mission architecture provides the opti-mal balance between science, risk, and cost using three guiding principles: achieve Decadal science; builds on lessons learned; and leverages international collabora-tions.