



The Science Case for an On-Board Radio Receiver on EJSM

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Abstract

The Europa-Jupiter System Mission (EJSM) reference mission architecture consists of two flight elements, the ESA-led Jupiter Ganymede Orbiter (JGO) and the NASA-led Jupiter Europa Orbiter (JEO). The two spacecraft could operate independently in the Jovian system and the current radio systems on both spacecraft are designed to establish radio contact with the Earth, to generate two-way Doppler and ranging measurements, for navigation and gravity science, and one-way downlink measurements for atmospheric science. However the exceptional opportunity offered by a two spacecraft mission in the Jupiter system motivates the proposal for a spacecraft-to-spacecraft radio link, which offers unique relative geometries to explore Jupiter's atmosphere and rings and icy satellites exospheres and surfaces. We show how enabling a spacecraft-to-spacecraft link, through an on-board RF receiver, yields, as a by-product, the possibility to carry out uplink one-way science observations. This talk focuses on comparing science objectives and achievable performance for the spacecraft-to-spacecraft and uplink configuration contrasted against traditional downlink configurations.