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A Jupiter Ganymede Orbiter for the EJSM mission: the JGO assessment phase study by the Thales Alenia Space consortium

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ESA and NASA have undertaken advanced studies of a common mission to Jupiter's system, EJSM (Europa Jupiter System Mission). This mission comprises two spacecrafts launched independently in 2020 and reaching the system in 2026.

This is a one-in-a-generation opportunity for Europe to contribute significantly to the science of this part of the Solar System, and as such, all efforts shall subsequently be made to maximize the scientific return without jeopardizing the technical and programmatic feasibility of the mission. A sub-glacial ocean on Europa and potentially two others on Ganymede and Callisto, the monitoring of Io's volcanic activity, the upper atmosphere of Jupiter, its rings, its tens of irregular moons, the tides, the magnetic fields of Jupiter and Ganymede and the behaviour of the plasma, the list of science objectives is not only impressive but also generates enthusiasm in the mission. In this NASA-ESA joint mission, NASA will take charge of both Io and Europa with the Jupiter Europa Orbiter (JEO). Europe will get a fascinating share with the Jupiter Ganymede Orbiter (JGO), which will achieve the close study of the two largest and outermost Galilean moons Ganymede and Callisto and in addition, at-a-distance, the observation of the other targets mentioned above.

ESA has awarded three industrial contracts for an assessment phase of JGO. As leader of one of the consortia, Thales Alenia Space is proud to present in this poster its achievements on this exciting mission.

The requirements are discussed and the mission drivers identified. The main trades and the resulting architecture are recalled, along with the main selection drivers. The major system interrelated trades have covered the launcher and propulsion type, the number of regulated phases, the strategy for communications and science timeline, the need for HGA pointing, the sizing and configuration of the Solar Array, the accommodation of external appendages, the accommodation of the payload, the autonomy, the modularity of the platform, the radiation shielding strategies, the planetary protection etc.

We then present a brief justification of the design and the resulting performance. We conclude by assessing the feasibility of the mission in its current technical and programmatic requirements.