JUICE: A European Mission to Jupiter and its Icy Moons

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JUICE - JUpiter ICy moons Explorer - is the first large mission in the European Space Agency Cosmic Vision programme. The implementation phase started in July 2015. JUICE will be launched in June 2022 from Kourou, and will arrive at Jupiter in October 2029. It will spend three years characterizing the Jovian system, the planet itself, its giant magnetosphere, and the giant icy moons Ganymede, Callisto and Europa. JUICE will then orbit Ganymede for almost a year. The main goal is to explore the habitable zone around Jupiter. Ganymede is a high-priority target because it provides a unique laboratory for analyzing the nature, evolution and habitability of icy worlds, including the characteristics of subsurface oceans, and because it possesses unique magnetic fields and plasma interactions with the environment. On Europa, the focus will be on recently active zones, where the composition, surface and subsurface features (including putative water reservoirs) will be characterized. Callisto will be explored as a witness of the early Solar System. JUICE will also explore the Jupiter system as an archetype of gas giants. The circulation, meteorology, chemistry and structure of the Jovian atmosphere will be studied from the cloud tops to the thermosphere and ionosphere. JUICE will also investigate the 3D properties of the magnetodisc, and will study the coupling processes within the magnetosphere, ionosphere and thermosphere. The mission also focuses on characterizing the processes that influence surface and space environments of the moons. The payload consists of 10 instruments plus a ground-based experiment (PRIDE) to better constrain the S/C position. A remote sensing package includes imaging (JANUS) and spectral-imaging capabilities from the UV to the sub-mm wavelengths (UVS, MAJIS, SWI). A geophysical package consists of a laser altimeter (GALA) and a radar sounder (RIME) for exploring the moons, and a radio science experiment (3GM) to probe the atmospheres and to determine the gravity fields. The in situ package comprises a suite to study plasma and neutral gas environments (PEP) with remote sensing capabilities via energetic neutrals, a magnetometer (J-MAG) and a radio and plasma wave instrument (RPWI).

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