

Current Status of Japanese Participation in JUICE (Jupiter Icy Moons Explorer)

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JUICE (Jupiter Icy Moons Explorer) is ESA's L-class mission during COSMIC VISION 2015–2025 to Explore Jupiter Icy Moons. JUICE will be launched by Ariane-5 in May 2022. After 7.5 years of interplanetary transfer and Earth-Venus-Earth-Mars-Earth gravity assists, JUICE will be inserted into an orbit around Jupiter in January 2030. JUICE will make observation of the three Jupiter icy Moons, Europa, Ganymede, and Callisto that potentially have subsurface ocean under the icy crust. JUICE will be the world first Icy Moon Orbiter when JUICE is inserted into Ganymede orbit in 2032. JUICE will make detailed observation of the largest Icy Moon in the solar system: Ganymede.

Four Japanese groups were selected to provide part of the four different science instruments on JUICE: RPWI (Radio and Plasma Wave Investigation), GALA (Ganymede Laser Altimeter), PEP (Particle Environment Package)/JNA (Jupiter Neutrals Analyzer) and SWI (Submillimeter Wave Instrument). Two Japanese groups were also selected as science Co-Is of two instrument groups JANUS (Jupiter Camera) and J-MAG (Jupiter Magnetometer). ISAS/JAXA is responsible for RPWI, GALA, PEP/JNA, JANUS, J-MAG, and NICT is responsible for SWI.

The science objectives of Japanese participation in JUICE is to understand (1) How Jupiter system was Formed, (2) What is the habitable worlds around gas giants, and (3) The strongest accelerator in our solar system: Jupiter. Taking into account the data to be obtained by 5 instruments that JUICE-JAPAN will participate, Japanese team will be able to contribute to most of the major science objectives relating with Jupiter system (JANUS, SWI and PEP/JNA), Jupiter/Ganymede magnetosphere (PEP/JNA, RPWI, and J-MAG), and sub-surface water in icy moons (GALA, J-MAG, and JANUS).

Japanese participation in JUICE was initiated by collaboration between ISAS/JAXA and ESA on BepiColombo mission to Mercury. The close collaboration between BepiColombo science instrument teams in Europe and Japan has led to the further collaboration on JUICE. RPWI-Japan has completed CDR in July 2018 and has finished FM delivery to IRF-Uppsala, Sweden in January 2020. PEP-Japan completed CDR in June 2019 and FM will be delivered to IRF-Kiruna, Sweden in February 2020. GALA-Japan will complete CDR in March 2020 and FM will be delivered to DLR, Germany in May 2020. SWI has completed CDR in June 2019. SWI PFM and FS plan to be delivered to MPS, Germany by March 2020. Although a number of small problems are occurring, Japanese teams are participating in JUICE without significant delay. All the Japanese teams will finish delivering FM and FS (Flight Spare) to Europe by April 2021.

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