EUROPA CLIPPER: MISSION STATUS AND UPDATE. Haje Korth[1], Robert Pappalardo[2], Bonnie Buratti[2], Kate Craft[1], Samuel Howell[2], Rachel Klima[1], Erin Leonard[2], Alexandra Matiella Novak[1], Cynthia Phillips[2], and the Europa Clipper Science Team. [1]The Johns Hopkins University Applied Physics Laboratory; [2]NASA Jet Propulsion Laboratory, California Institute of Technology.

Introduction: With a launch readiness date of late 2024, NASA's Europa Clipper will set out on a journey to explore the habitability of Jupiter's moon Europa. At the beginning of the next decade, the spacecraft will orbit Jupiter, flying by Europa more than 40 times over a 4-year period to observe this moon's ice shell and ocean, study its composition, investigate its geology, and search for and characterize any current activity.

Scientific goal and objectives: The overarching goal of the Europa Clipper mission is to explore Europa to investigate its habitability. This goal will be met by achieving three science objectives:

- Characterize the ice shell and any subsurface water, including their heterogeneity, ocean properties, and the nature of surface-ice-exchange.
- Understand the habitability of Europa's ocean through composition and chemistry.
- Understand the formation of surface features, including sites of recent or current activity, and characterize high science interest localities.

In addition, the search for current activity cross-cuts all three principal science objectives.

Instrumentation: The mission's science objectives will be accomplished using a highly capable suite of ten remote-sensing and in-situ instruments. The remote sensing payload consists of the Europa Ultraviolet Spectrograph (Europa-UVS), the Europa Imaging System (EIS), the Mapping Imaging Spectrometer for Europa (MISE), the Europa Thermal Imaging System (E-THEMIS), and the Radar for Europa Assessment and Sounding: Ocean to Near-surface (REASON). The in-situ instruments comprise the Europa Clipper Magnetometer (ECM), the Plasma Instrument for Magnetic Sounding (PIMS), the SUrface Dust Analyzer (SUDA), and the MAss Spectrometer for Planetary Exploration (MASPEX). Gravity and Radio Science (G/RS) will be achieved using the spacecraft's telecommunication system, and valuable scientific data will be acquired by the engineering-supporting Radiation Monitor.

Mission concept: The current mission design consists of 49 flybys of Europa executed over a period of four years while the spacecraft is in orbit about Jupiter. The altitudes of closest approach typically range from 25 km to 100 km. The tour is divided into two principal campaigns, visiting first the anti-Jovian hemisphere followed by observations of the sub-Jovian hemisphere. The flybys occur over a wide range of latitudes and longitudes (Figure 1), and they are widely distributed in true anomaly and solar local time. The tour is thus well suited for characterization of the ice shell and ocean and of the atmosphere and ionosphere created through Europa's interaction with Jupiter's magnetosphere.

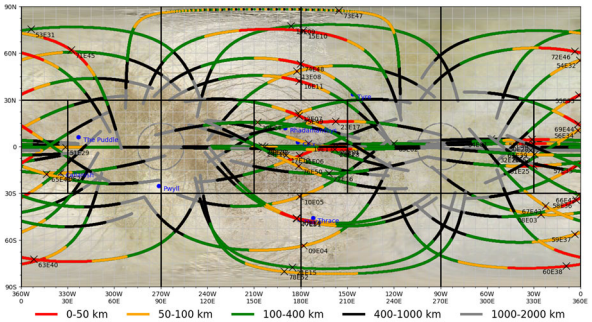

Figure 1: Planned Europa Clipper close approach ground tracks below 1000 km altitude (black), 400 km (green), 100 km yellow, and 50 km (red).

Team philosophy: Our "One Team" philosophy prioritizes synergistic science by bridging across the individual instrument-based investigations, while promoting collaborations among members of the Europa Clipper science team. Each of the Europa Clipper instruments will contribute to the investigation of Europa and its environs, contributing critical building blocks for achieving the mission's science objectives and goal. By combining the datasets from the experiments of the mission's investigations, we can collectively gain insight into Europa's mysteries. As is common in science exploration, it is at the overlapping boundaries of scientific disciplines where the greatest insights are gained and discoveries are made. Integrated science celebrates our individual expertise, challenges our assumptions, breaks through our limitations, and expands our intellectual boundaries. Associated visibility brings trust, promotes partnerships, and enhances personal relationships. These aspirations are the inherent basis for functioning as one science team.

Mission status: The project, flight system, and payload have completed their Critical Design Reviews, and the project has completed its System Integration Review, so that Europa Clipper is now formally in mission Phase D. The spacecraft and payload are currently under construction, as the mission's assembly, testing, and launch operations (ATLO) phase is well underway. Recent major milestones include the delivery to ATLO of the Propulsion Module (Figure 2) and six instruments (E-THEMIS, Europa-UVS, EIS-WAC, PIMS, MASPEX, SUDA) and the assembly of the solar array wings (Figure 3). The integration of these instruments' sensors on the spacecraft and its nadir-viewing deck and of the instrument electronics in vault (Figure 4) has begun. The remaining instruments (ECM, EIS-NAC, MISE, REASON) are in mature stages of assembly and will be delivered in the next months. The science team is in the process of evaluating minor changes to the candidate tour, and is preparing a set of manuscripts describing the mission's science and instruments for publication in the journal Space Science Reviews.

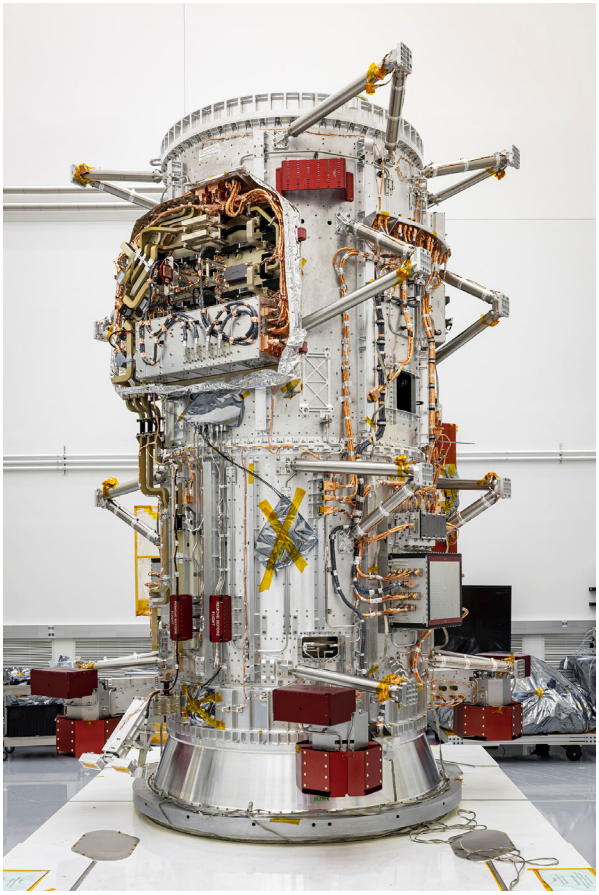

Figure 2: Flight-model Propulsion Module with RF Module installed.

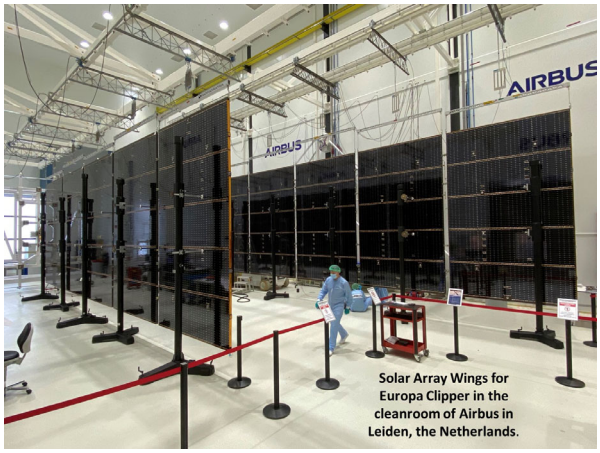

Figure 3: Solar array wings in the cleanroom.

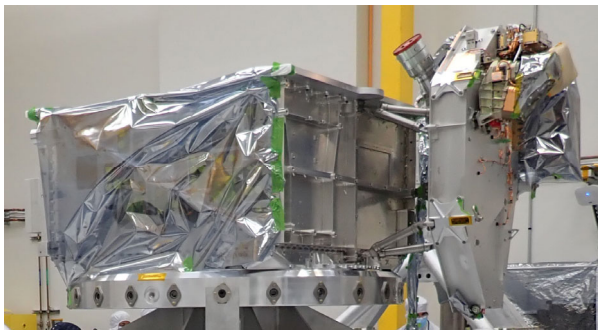

Figure 4: Electronics vault and nadir deck on assembly fixture.

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