LISA Pathfinder and eLISA news

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Two important gatherings of the space-based gravitational-wave detector community were held in Zurich, Switzerland this past March. The first was a meeting of the Science Working Team for LISA Pathfinder (LPF), a dedicated technology demonstrator mission for a future LISA-like gravitational wave observatory. LPF is entering an extremely exciting phase with launch less than 15 months away. All flight components for both the European science payload, known as the LISA Technology Package (LTP), and the NASA science payload, known as the Space Technology 7 Disturbance Reduction System (ST7-DRS), have been delivered and are undergoing integration. The final flight component for the spacecraft bus, a cold-gas thruster based on the successful GAIA design, will be delivered later this year. Current focus is on completing integration of the science payload (see Figures 1 and 2) and preparation for operations and data analysis. After a launch in Summer 2015, LPF will take approximately 90 days to reach its operational orbit around the Earth-Sun Lagrange point (L1), where it will begin science operations. After 90 days of LTP operations followed by 90 days of DRS operations, LPF will have completed its prime mission of paving the way for a space-based observatory of gravitational waves in the milliHertz band. Immediately following the meeting of the LPF team, the eLISA consortium held its third progress meeting. The consortium (www.elisascience.org) is the organizing body of the European space-based gravitational-wave community, and it was responsible for the "The Gravitational Universe" whitepaper that resulted in the November 2013 election of a gravitational-wave science theme for ESA's Cosmic Visions L3 opportunity. In preparation for an L3 mission concept call, which is expected later this decade, and for launch in the mid 2030s, the eLISA consortium members are coordinating technology development and mission study activities which will build on the LPF results. The final mission concept is expected to include some international (non-European) contributions, and NASA has expressed an interest in participating in this ground-breaking mission. The US research community supports such a collaboration, or any other mission scenario that achieves the high-priority science of a space-based gravitational-wave observatory at the earliest possible date.

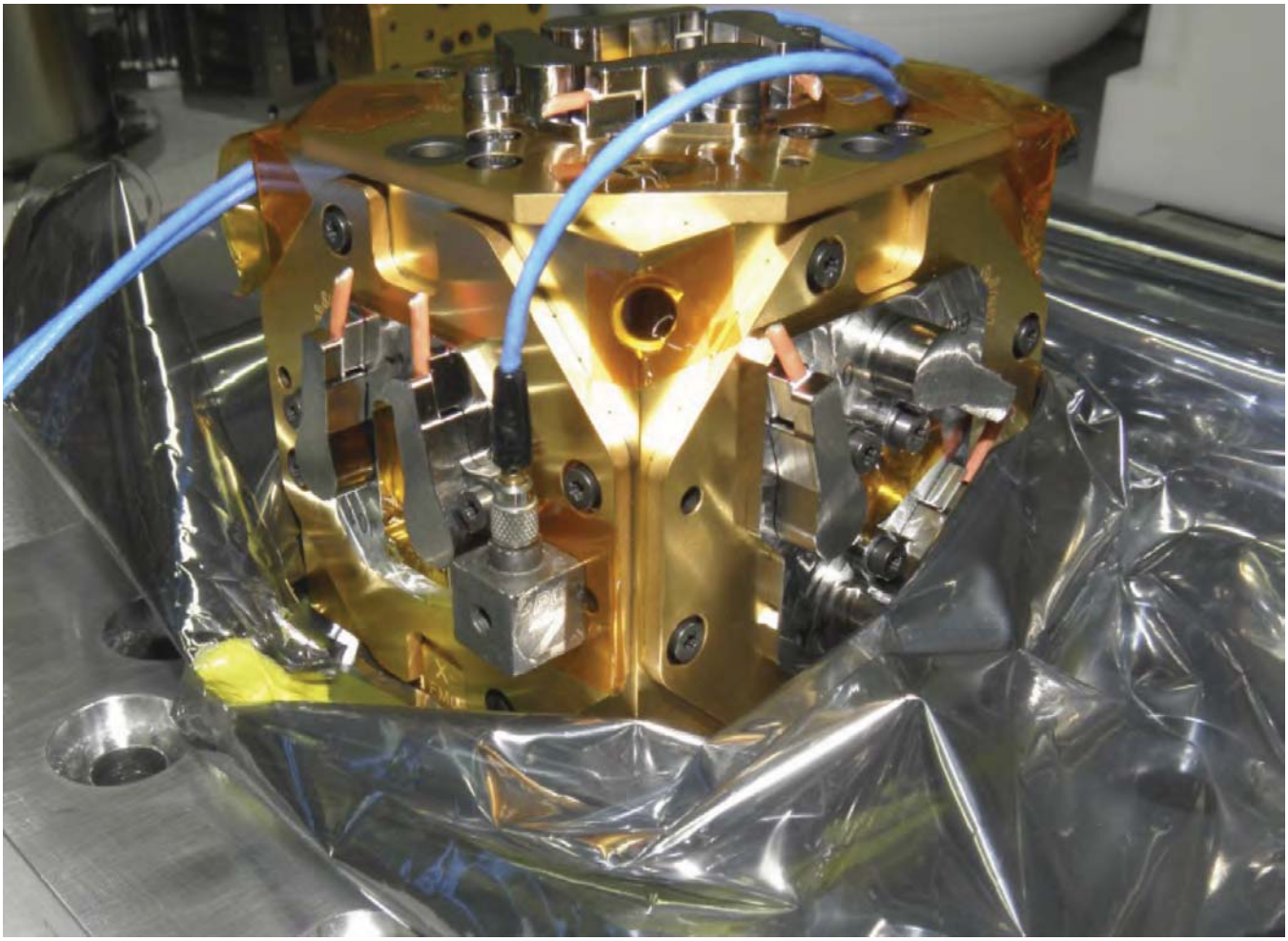

Figure 1: The LPF inertial sensor measures the acceleration of the spacecraft relative to a freely-floating test mass. In LISA, these test masses will be used as reference points to measure distortions in spacetime caused by passing gravitational waves. Image Credit: Airbus Defence and Space

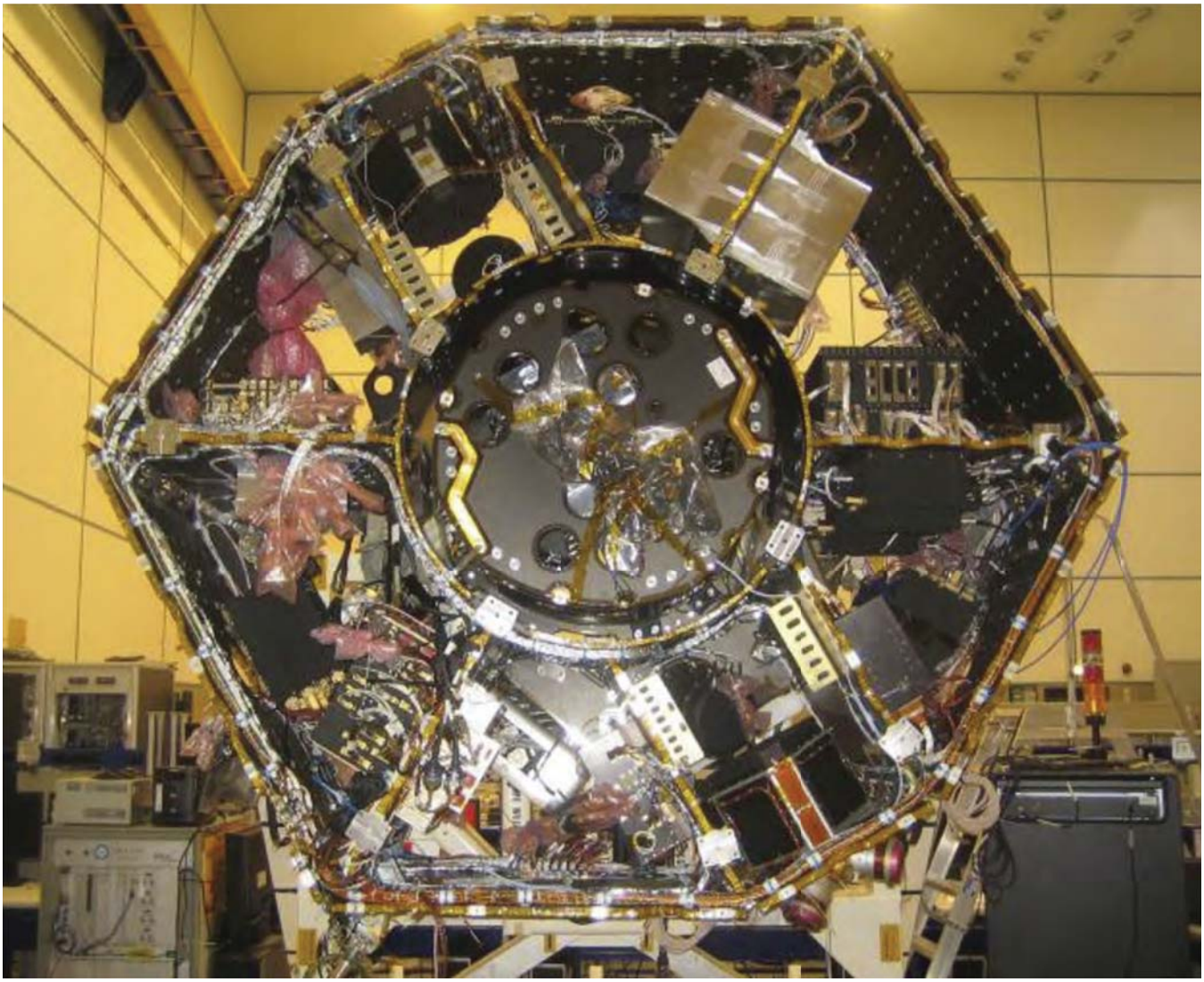

Figure 2: All flight electronics boxes have been integrated into the LPF sciencecraft and several environmental test have been successfully passed. Following delivery of the integrated payload and the microthruster system later this year, the sciencecraft will be completed and prepared for the launch campaign. Image Credit: Airbus Defence and Space