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UCAnFly CubeSat Mission Status: Sub-millihertz Chip-Scale Magnetometry Moving Toward System Assembly

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UCAnFly is a multidisciplinary team born at the University of Cádiz, recognized as one of the selected projects in the third edition of ESA's *Fly Your Satellite!* programme. The team is developing a 1U CubeSat carrying the Magnetic Experiment for LISA (MELISA-II) as its primary payload: a sub-millihertz magnetometer based on Anisotropic Magnetoresistance (AMR) sensors, designed to detect magnetic field fluctuations below 10 nT Hz^{-1/2} within the 0.1 mHz-1 Hz frequency range - an essential requirement for future space-based gravitational wave observatories - in Low Earth Orbit (LEO); and to increase its Technology Readiness Level (TRL).

In contrast to the traditional fluxgate magnetometers, often constrained by their size and weight, MELISA-II offers a lightweight, chip-scale solution. This innovation opens the door to replacing or complementing fluxgates in certain applications and enhancing the scientific capabilities of small satellites and large-scale space observatories alike.

MELISA-II has successfully completed its environmental qualification campaign, including an electromagnetic compatibility (EMC) test at ESA ESTEC (Noordwijk, The Netherlands), as well as thermal vacuum cycling and vibration testing at ESA ESEC-Galaxia (Transinne, Belgium). Following the completion of its flatsat integration campaign, UCAnFly is now preparing for the upcoming satellite assembly phase.

The development of MELISA-II and UCAnFly represents a unique educational opportunity, allowing university students to participate in a real space mission, under the guidance and support of the European Space Agency's Education Office.

This work presents the status of the project, highlighting both the recent milestones achieved and the forthcoming steps that will bring MELISA-II closer to its first flight opportunity.

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