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Session A21 Satellite-Based Geomagnetic Field Measurements and Modelling

Technical and Programmatic Status of the NanoMagSat Project, a LEO Nanosatellite Constellation to Investigate Earth's Magnetic Field and Ionospheric Environment

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NanoMagSat aims to operate a new constellation concept of three identical 16U nanosatellites, using two inclined (~ 60°) and one polar LEO, for investigating the Earth's magnetic field and ionospheric environment. Drawing from lessons learnt from the ESA Swarm mission, it will also provide new science opportunities.

NanoMagSat will cover all locations/local times (LT). In addition, between 60°N and 60°S, all LT will be covered in about a month, much faster than Swarm, which NanoMagSat is also designed to complement. Each satellite will carry an advanced Miniaturized Absolute scalar and self-calibrated vector Magnetometer (MAM) with star trackers (STR) collocated on an ultra-stable optical bench at the tip of a deployable boom, a new compact High Frequency Magnetometer (HFM) (at mid-boom), a multi-Needle Langmuir Probe (m-NLP) and dual frequency GNSS receivers (all on the satellite body). This payload suite will acquire high-precision/resolution oriented absolute vector magnetic data at 1 Hz, very low noise scalar and vector magnetic field data at 2 kHz, electron density data at 2 kHz, and electron temperature data at 1 Hz. GNSS receivers will also allow top-side TEC and ionospheric radio-occultation profiles to be recovered. Possibility of using the STRs to further recover the energetic proton omnidirectional flux (above 100 MeV) is also considered.

NanoMagSat is undergoing an 18 months Risk Retirement Activity (RRA) phase funded by ESA. This presentation will be an opportunity to provide the latest update on the technical and programmatic status of this project at the time this RRA nears completion.

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