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## Latest news on the nanoMagSat nanosatellite constellation, a high-precision magnetic project to monitor the Earth's magnetic field and ionospheric environment

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Electromagnetism)

**Title (Max 300 characters)**

**Latest News on the NanoMagSat Nanosatellite Constellation, a High-Precision Magnetic Project to Monitor the Earth's Magnetic Field and Ionospheric Environment**

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**Abstract (Max 2000 characters, with punctuation, without blanks)**

The geomagnetic field has been continuously monitored from low-Earth orbit (LEO) since 1999, complementing ground-based observatory data by providing absolute calibrated scalar and vector measurements with global planetary coverage. Such absolute magnetic vector data have proven critical for our ability to make progress in our understanding of the many sources of the Earth's magnetic field, their dynamics and the way they interact. The information they provide is also massively used for many other applications, ranging from orientation needs to space weather monitoring as well as, e.g., reconstructing Earth's crustal and mantle electrical conductivity. Ensuring continuity of such observations is therefore critical.

Here, we will report on the latest status of the NanoMagSat project, which aims to deploy and operate a new constellation concept of three identical 16U nanosatellites, using two inclined (approximately 60°) and one polar LEO, designed to complement and ensure continuity of the ongoing ESA Swarm mission at a much lower cost. It will carry an innovative payload including an advanced Miniaturized Absolute scalar and self-calibrated vector Magnetometer (MAM) combined with a set of precise star trackers (STR), a compact High-frequency Field Magnetometer (HFM), a multi-needle Langmuir Probe (m-NLP) and dual frequency GNSS receivers. The data to be produced will include 1 Hz absolutely calibrated and oriented magnetic vector field, 2 kHz very low noise magnetic scalar and vector field, 2 kHz local electron density, 1 Hz local electron temperature as well as precise timing, location and TEC products.

This project is currently undergoing an 18 months risk retirement study started in January 2022 and funded by ESA in the context of its Scout programme. NanoMagSat aims at forming the basis of a permanent collaborative constellation of nanosatellites for low-cost long-term monitoring of the geomagnetic field and ionospheric environment from space.

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