



**PRESS RELEASE**

## **CEA-Leti Completes Prototype of Scalar Magnetometer For Space Flights for European Space Agency**

*Magnetometer Developed in Partnership with CNES Passes Qualification Step  
On Route to Measuring Earth's Magnetic Field as Part of SWARM Space Mission*

GRENOBLE, France — Sept. 10, 2010 — CEA-Leti said today that a prototype of the new-generation scalar magnetometer, which it designed and developed in partnership with CNES, has passed the qualification step en route to being deployed in the SWARM space mission.

SWARM, a project of the European Space Agency, is scheduled for launch in 2011 or 2012. The mission's objective is to provide the best-ever survey of the Earth's magnetic field and its temporal evolution, and gain new insights that will improve scientists' understanding of the Earth's interior and climate.

The new absolute scalar magnetometers (ASM) are designed to overcome the limits of the nuclear magnetic resonance (NMR) magnetometers, the first magnetometers designed to be placed in orbit. Those instruments, which were used in the Oersted mission launched in 1999 and the CHAMP mission launched in 2000, also were developed by Leti in partnership with CNES.

Onboard the three-satellite Swarm mission, the new magnetometers will provide measurements over different regions of the Earth simultaneously.

The SWARM mission will produce a precise cartography of the magnetic field and measure its evolution. From three different polar orbits, the satellites must be operated simultaneously to distinguish the temporal variations – interactions between magnetosphere and the solar wind – from the local ones. To guarantee the required availability during the mission, two backup ASMs operating in cold redundancy will be onboard each satellite.

The absolute scalar magnetometer is based on laser-pumped helium to amplify the signal-to-noise ratio, which gives it exceptional sensitivity and performance. Condensed technology at its best, the main difficulty is the qualification of its components for the space environment, in particular a fiber-laser source, one of the components of the magnetometer.

The tested prototype matches the orbiting magnetometers that will be delivered to ESA by the end of 2010. It underwent complete tests designed to guarantee functioning in an orbiting environment.

The magnetic field models resulting from the SWARM mission also will further scientists' understanding of atmospheric processes related to climate and weather and will have practical applications in many different areas, such as space weather and radiation hazards.

Earlier this year, CEA-Leti's ASM magnetometer was onboard Jean-Louis Etienne's balloon for the Generali Arctic Observer mission. Although a strong magnetic storm reduced the value of the collected data, the magnetometer nonetheless successfully accomplished its mission. This performance underscores the close collaboration between the teams of CEA-Leti and CNES, which work together to meet the demands of challenging projects on Earth and in space.

### **About CEA-Leti**

CEA is a French research and technology public organisation, with activities in four main areas: energy, information technologies, healthcare technologies and defence and security. Within CEA, the Laboratory for Electronics & Information Technology (CEA-Leti) works with companies in order to increase their competitiveness through technological innovation and transfers. CEA-Leti is focused on micro and nanotechnologies and their applications, from wireless devices and systems, to biology and healthcare or photonics. Nanoelectronics and microsystems (MEMS) are at the core of its activities. As a major player in MINATEC campus, CEA-Leti operates 8,000-m<sup>2</sup> state-of-the-art clean rooms, on 24/7 mode, on 200mm and 300mm wafer standards. With 1,200 employees, CEA-Leti trains more than 150 Ph.D. students and hosts 200 assignees from partner companies. Strongly committed to the creation of value for the industry, CEA-Leti puts a strong emphasis on intellectual property and owns more than 1,500 patent families. For more information, visit [www.leti.fr](http://www.leti.fr).

### **About SMARM**

The SMARM mission has been approved as an Earth Observation Mission and led by the ESA. It's constituted by a constellation of three similar satellites designed to study the magnetic field. The launch is planned for 2011. The scientific objective of the mission is to proceed with the most complete study ever of the geomagnetic field and its evolution over the years. It will allow us to improve our knowledge of the earth system bringing a new light on the evolution of its climate and the processes happening inside de globe. The French contribution to this mission involves the delivery by CNES of the absolute magnetometers (ASM) that will equip the three satellites of the constellation, as well as the scientific expertise of the magnetometers and the scientific validation by the IPGP of the data collected. The magnetometers are designed and developed by CEA-Leti.

### **About CNES**

A public center with industrial and commercial purpose (Etablissement Public à Caractère Industriel et Commercial – EPIC) created in 1961, the National Center for Spatial Mission (CNES – Centre National d'Etudes Spatiales) is in charge of proposing the French spatial policy to the government in Europe and to put it in place. CNES is thus entitled to "invent" the future spatial systems, master all the spatial techniques and guarantee France an independent access to Space. As a major player in the spatial Europe, CNES is giving ideas and propositions to maintain France and Europe ahead in the worldwide competition. The French participation to the European Spatial Agency (ESA) is also handled by CNES. The center partners with scientific and industrial players with whom the spatial programs are developed. CNES is engaged in various international cooperations clearly linked to any big spatial policy. For more information, visit [www.cnes.fr](http://www.cnes.fr)

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