



## ACCELEROMETERS BY ONERA AND STEEL ELECTRONIQUE FEATURED ON GRACE FOLLOW-ON MISSION

**French aerospace research center ONERA continues to team up with French electronics specialist Steel Electronique on NASA's Grace Follow-On mission, reflecting ONERA's strong commitment to small businesses and partnerships to foster the development of innovative solutions for aerospace and defense in both France and international markets.**

**Palaiseau, December 5, 2012** – ONERA, the world leader in ultrasensitive accelerometers<sup>1</sup>, continues to call on Steel Electronique (<http://www.steel-electronique.fr/index.php>), a small French high-tech firm based in the Toulouse region and specialized in the design and development of advanced electronics, a supplier to ONERA for 17 years. Steel's electronic units will be used on ONERA's ultrasensitive accelerometers for NASA's Grace Follow-On mission, slated for launch in 2016.

"This partnership symbolizes ONERA's strong relationship with innovative small businesses in France, which account for more than 60% of our purchases," notes Denis Maugars, Chairman and CEO of ONERA.

"The partnership between ONERA and Steel Electronique, which started back in the 1990s and has been constantly renewed since then, has enabled our company to build up solid expertise in electronics for accelerometers," added Georges Galea, Chairman and CEO of Steel Electronique. "Furthermore, this relationship, based on shared experience, skills and mutual trust, will ensure our ongoing business development."

ONERA first called on Steel Electronique in 1995, when it was in charge of supplying accelerometers for the CHAMP mission (Challenging mini-satellite payload for geophysical research and application), for which it developed the Star accelerometer. That kicked off a very fruitful relationship, which has lasted 17 years and underpinned the development of accelerometers for a number of landmark international space missions:

- **GRACE** (Gravity Recovery and Climate Experiment), a mission that was designed to measure seasonal fluctuations in the Earth's gravity field, conducted by NASA's Jet Propulsion Laboratory starting in 1998, and using the Super Star accelerometer developed by ONERA.
- **GOCE** (Gravity field and steady-state Ocean Circulation Explorer), an ESA mission starting in 2002 to measure our planet's gravity field with unprecedented accuracy, and determine a baseline geoid using a gradiometer comprising six ultrasensitive electrostatic accelerometers from ONERA.
- **MicroSCOPE**, a mission conducted by French space agency CNES in 2005 to test the mass equivalency principle in space, with 1,000 times greater precision than on the ground. The aim of this major mission was to test the equivalency principle, first observed by Galileo, then Newton, and the basis of Einstein's theory of general relativity.
- **GRACE FOLLOW-ON**, a mission conducted by NASA's Jet Propulsion Laboratory starting in 2012 to provide a better understanding of current changes in our climate, and provide continuous, global monitoring of water resources.

Because of this long-standing relationship and the landmark missions involved, Steel Electronique has tripled its sales in less than 15 years (from 1 to 3 million euros), as well as its workforce (from 10 to 30 employees).



## **A program reflecting ONERA's win-win partnership agreement with small businesses, signed in 2007**

ONERA signed a partnership charter with innovative small businesses in 2007, to facilitate their access to Research & Technology, while also expanding opportunities for ONERA to commercialize its research results. In 2012, for example, ONERA established long-term relationships with 51 small business partners and signed 37 commercialization agreements.

Thanks to this partnership-based approach, ONERA has diversified its market scope, enabling it to commercialize the technologies it develops in sectors other than its traditional aerospace and defense markets.

In July 2012, ONERA signed a partnership agreement with France Brevets, an investment fund dedicated to promoting and commercializing patents in Europe, created within the scope of France's Future Investment Program. ONERA's small business partners will benefit from this agreement, which will provide additional opportunities for collaboration and commercialization.

<sup>1</sup> *ONERA has developed ultrasensitive accelerometers for more than 50 years. These instruments are used to measure acceleration forces based on the movements of a body suspended in an electrostatic field. They are key components in missions that enable us to better understand the Earth's gravity field, marine currents, the melting rate of ice fields, changes in groundwater basins, and more. They have been chosen for a number of European and American space missions, and underpin ONERA's pivotal role in today's leading space geodesy and fundamental physics missions.*

### **About ONERA**

Onera is the leading aerospace and defense Research & Technology organization in France, responsible for 25% of all R&T in these highly strategic sectors. A public establishment created in 1946, it reports to the French Ministry of Defense. Onera has 2,100 employees and over 270 doctoral candidates and post-docs. Onera is the only organization in France to unite the knowledge and expertise needed for all aerospace disciplines. Offering a fleet of experimental facilities unrivaled in Europe, Onera works for both government and industry, spanning major corporations and small businesses. Onera deploys an innovative partnership-based approach to research, with five times more contract business per researcher than the average in France. In 2011, Onera generated a business volume of 244 million euros. Onera is a recognized source of innovative solutions, technical expertise and long-term design vision, and has contributed to some of today's most successful aerospace and defense programs, including the Ariane 5 launcher, Airbus jetliners, Eurocopter helicopters, the Rafale fighter, the Falcon 7X business jet, the Graves space surveillance radar, the Very Large Telescope and much more.

[www.onera.fr](http://www.onera.fr)

### **About Steel Electronique**

Steel Electronique is a French firm, specialized in advanced electronics, with a long history as supplier to the space industry. Founded 40 years ago, it has developed and produced several hundred electronic assemblies for spacecraft of all types. Its main customers include the government agencies ONERA, CNES, CEA and CNRS, as well as prime contractors EADS Astrium and Thales Alenia Space. Steel Electronique is certified to ISO9001 and EN9100, and has also earned "Expertise Certification" from CNES and ESA, covering processes used for the fitting and brazing of surface-mount components and wiring.

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