



## **Review of present and future applications of accelerometry in Space**

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The paper will review the different on-going applications and future projects in Space Geodesy, Gravimetry and Gradiometry, or Solar System exploration based on ultrasensitive accelerometer developed at ONERA.

Providing a precise measurement of the non gravitational accelerations of the satellite, the STAR and SuperSTAR models have contributed to the success of the geodetic missions CHAMP and GRACE which are still in activities.

Deduced from these versions by technological improvement and arranged by pair along its three orthogonal axes, the GRADIO type accelerometers are the key elements of the Gradiometer of the ESA GOCE mission providing a direct measurement of the Earth gravity gradient components.

Further developments towards smaller and less consuming accelerometer with equivalent acceleration performance level about  $1.E-11 - 1.E-12 \text{ ms}^{-2}\text{Hz}^{-1/2}$  will be described.

Beyond geodetic applications around Earth, they can be applied to several other applications:

- Coupled with a bias calibration system, they aimed to be embarked on board interplanetary missions to check the geodetic trajectory of the probe and to map the solar system gravitation field.
- Alternatively designed as a miniature one or two-axes gradiometer instrument, they will provide accurate measurement of the gravity gradient tensor for airborne and space applications for Earth, planets and moons, and Near Earth object.