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ONERA ACCELEROMETERS FOR FUTURE GRAVITY MISSION

Abstract

The 2017-2027 Decadal Survey for Earth Science and Applications from Space has identified the Targeted Mass Change Observable as one of 5 Designated Mission. In Europe, ESA has proposed to Ministerial Counsel of November 2019 to begin a Phase A on the Next Generation Gravity Mission. These missions will continue the observation provided by GRACE and GRACE-FO. In these missions and the future concepts, the accelerometer provides either the gravity signal in a gradiometer configuration (GOCE type mission), or the non-gravitational acceleration to be suppressed to the ranging measurement between two satellites (GRACE-type mission). ONERA has procured the accelerometer for all the previous gravity missions (GRACE, GOCE, GRACE-FO) and works to improve the scientific return of the instruments for the future missions. One way is to propose an accelerometer with 3 sensitive linear acceleration measurements as well as 3 angular acceleration measurements for the attitude control or reconstruction. Two different configurations are proposed: CubSTAR, a miniaturized version with low accuracy but adapted for constellation or nanosat; and MicroSTAR, a high accurate accelerometer. A second way is to improve the low-frequency noise of the accelerometer, by hybridization of electrostatic accelerometer with cold atom interferometer. These two ways can be associated, with hybridization with a MicroSTAR accelerometer for example. The presentation will detail these developments.