



Sensitivity analysis of future satellite formations and configurations of them

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The satellite mission GRACE enabled for the first time the detection of temporal gravity field changes caused e.g. by hydrology, ice mass loss or sea level rise up to wavelengths of 1000 km or better. Despite its great success GRACE gravity solutions suffer from a strongly anisotropic error behaviour caused by reduced sensitivity, anisotropic sampling and temporal aliasing. One of the main instruments to improve the error isotropy is the use of advanced satellite formations. Four natural formations exist, whose application is discussed for a future gravity mission: the inline formation (GRACE formation), pendulum, cartwheel and LISA-formation. While the inline-formation is capable to detect only along-track-information leading in general to North-South striations, the other formations also observe cross-track and/or radial information, which increases isotropy. Another idea for improving sensitivity (and reducing aliasing) is the combination of formations in different orbits, mainly with different inclinations, leading to the so called mixed-inclination configurations.

In this presentation the different formations and configurations of them are investigated by means of fast error-propagation tools in order to find suited designs for a future mission.