



Relative kinematic orbit determination for Swarm satellites

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The Swarm mission launched on November 22, 2013 is ESA's first constellation of satellites to study the dynamics of the Earth's magnetic field and its interaction with the Earth system. This mission consists of three identical satellites in near-polar orbits, Swarm A and C flying almost side-by-side at an initial altitude of 460 km, Swarm B flying in a higher orbit of about 530 km. Each satellite is equipped with a high precision 8-channels dual-frequency GPS receiver for precise orbit determination. The three satellites formation opens up new opportunities to analyze the relative positioning.

In this contribution, we will determine the relative kinematic orbits using the GPS double-difference method and compare the orbits with the absolute kinematic orbits. First results show that although the noise in the relative orbits are enlarged, the typical systematic oscillations in the absolute orbits can be removed. Our investigations revealed that carrier phase observations from the Swarm satellites can contain half cycle ambiguities; we propose solution for this complicated ambiguity resolution.