

IN ORBIT ALIGNMENT OF THE SWARM ASM AND VFM MAGNETOMETERS
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Abstract

The SWARM Absolute Scalar Magnetometer (ASM) is an optically pumped Helium-4 magnetometer developed by CEA-LETI, with CNES support, which will provide absolute scalar measurements of the magnetic field with high accuracy and stability on the three satellites of the mission. In addition, and on an experimental basis, these ASM instruments will be able to operate as vector field magnetometers.

This vector mode will make it possible to carry on comparisons of ASM vector field measurements with that of the nominal VFM vector magnetometers on each satellite, to both check the consistency of the field measured and assess the stability of the boom on which both instruments lie. For this to be possible, however, one must first align both instruments with respect to each other. This alignment process consists in finding the most accurate way to geometrically link the VFM and ASM frames, when the same natural field is simultaneously measured in both

frames while the satellite is orbiting. This geometrical link is described by the Euler Angles. Here, we will describe the method that can be used for recovering these Euler angles and present results based on simulations, investigating the time needed to recover these angles with relevant accuracy, and assess the possibility of detecting, and taking into account boom perturbations.