

EARTH OBSERVATION SYMPOSIUM (B1)  
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COSMO-SKYMED FULL CONSTELLATION ORBITAL FLEXIBILITY AND INTERFEROMETRIC  
CAPABILITIES

**Abstract**

COSMO-SkyMed is an Earth Observation space program funded by the Italian Ministry of Research and Italian Ministry of Defence (It-MoD) and conducted by the Italian Space Agency (ASI) in conjunction with It-MoD. In November 2010 the fourth and last COSMO-SkyMed satellite was successfully launched and integrated into the constellation after the positive conclusion of the commissioning phase in January 2011. The four satellites are placed in the same sun-synchronous dawn-dusk frozen orbit, designed in such a way to fulfill dual needs and to optimize the performances for a wide range of Civilian applications (e.g. risks management, agriculture/forestry, marine/coastal, geology) and Defence applications (surveillance, intelligence, crisis management, mission planning). Currently the orbital configuration is

composed of three satellites (namely PFM, FM#2 and FM#4) with a difference of 90 deg in their respective anomalies, and a fourth satellite (namely FM#3) in tandem-like configuration with FM#2 (i.e. one-day temporal decorrelation). The aim of this paper is to analyze the orbital flexibility of COSMO-SkyMed constellation by performing a survey of the possible orbital interferometric configurations which could be achieved by the full COSMO-SkyMed constellation (e.g. tandem, tandem-like, double one-day tandem configuration, etc), focusing on their main features (e.g. interferometric data takes opportunities, temporal decorrelation, degradation of the temporal performances respect to the nominal equi-phased configuration, etc), highlighting the propellant required for orbital configuration changes and the ways to minimize it, associating them with the main state-of-the-art Civilian and Defence applications that would benefit from them and providing a preliminary quantitative assessment of the interferometric products quality improvement for each orbital configuration.