

EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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COSMO-SKYMED: FROM THE FIRST TOWARDS THE SECOND GENERATION

Abstract

COSMO-SkyMed is a four-satellite constellation funded by ASI (*Agenzia Spaziale Italiana*) and Italian Ministry of Defence. The overall objective is the global Earth observation and the relevant data exploitation for the needs of both military and civilian community. The satellites, equipped with high resolution X-band imaging radar (SAR), assure a global Earth access with all-weather / night-daylight sensing capability. Since November 2010 the constellation is fully deployed and operative. Despite all four satellites are beyond the end of their lifetime, at the moment all the performances are fully preserved as shown in the present paper. Moreover, in order to face market competition, a process for the implementation of improved SAR Spotlight modes inside COSMO-SkyMed system has been put in place. After feasibility studies and a preliminary definition of parameters, it has been decided, to perform experimental campaigns to verify the potential capabilities of the system. The results have been fully in line with those expected and, based on those outcomes, Customers and Industry agreed to make operative the new sensor modes. Performances and samples related to unclassified modes are reported focusing on improvements with respect to the already existing SAR operative modes and anticipating in a way the deployment of *COSMO-SkyMed di Seconda Generazione* (CSG). CSG is the follow-on mission to COSMO-SkyMed first generation (CSK), assuring continuity of SAR observation services, while providing a significant enhancement of performance. CSG System introduces both technological and engineering improvements aimed to

enhance the system operational aspects and the user services portfolio. Spacecraft technological improvements allow the introduction of new instrument operative modes (e.g. Quad-Pol, Squinted acquisitions on a Theatre scenario, DI2S Multi Swath Spotlight Mode) and the enhancement of the system performance. A major flexibility in the use of system resources has been introduced, allowing to exploit the system potentialities without introducing operational constraints. Moreover, even if CSG System is mainly conceived to optimize on-demand requests, it will be able to perform systematic acquisitions like predefined area coverage. CSG System is being designed to provide the capability to include CSK and exhibiting a very challenging end-to-end system. In this context both specific CSG and CSK peculiarities are shown in addition to joined CSK and CSG responsiveness system performance. This paper technically traces the natural evolution of the system from CSK toward CSG through an intermediate step characterized by an experimentation phase possible thanks to the high flexibility of CSK design.