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

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# NEWSPACE SAR: A GAME CHANGER FOR SPACEBORNE SYNTHETIC APERTURE RADAR

**Abstract**

Synthetic aperture radar (SAR) is a key remote sensing technique for Earth observation. While future high-resolution wide-swath SAR missions will deliver weekly images of our planet at global scale, thereby allowing quantification of several essential climate variables, some applications require even more frequent temporal sampling or simultaneous acquisitions from slightly different observation angles. NewSpace SAR denotes all groundbreaking concepts and technologies that enable frequent and enhanced SAR imaging, also by complementing traditional systems, at much more affordable costs. Besides the technological developments, such as mass-produced platforms for constellations of small SAR satellites, application-driven system design plays a fundamental role. In particular, disruptive concepts based on waveform encoding and/or distributed and fractionated SAR help relaxing the design constraints and reducing complexity, size, and cost of the SAR instrument. A prominent example is the MirrorSAR concept that will be implemented in the recently-approved German SAR mission High Resolution Wide Swath (HRWS), where three small satellites acting as radar transponders will allow forming a digital elevation model (DEM) with spatial resolution (4 m x 4 m) much finer than that of the state-of-the art TanDEM-X DEM (12 m x 12 m).