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CAPABILITIES AND APPLICATIONS OF THE AIRBUS' NEXT GENERATION X-BAND MISSION

Abstract

Since 2007, with the launch of TerraSAR-X, Airbus has been in the forefront of X-Band SAR missions for science and commercial purposes. The TerraSAR mission has been since then improved with the launch of TanDEM-X (2010), allowing the creation of a radar-based digital elevation model (DEM) and finally creating the "WorldSAR" partnership model, with the Spanish SAR satellite Paz (2018). In the WorldSAR model, partners can participate through co-investment, subscription, and ownership of additional satellites operated in constellation. The TerraSAR mission, initially conceived for a shorter lifetime, has exceeded expectations, now aiming to an operational life up to 2025. In the meantime, Airbus has envisioned the next generation of X-Band SAR missions, to assure, not only the continuity with the TerraSAR mission for commercial and public users beyond the year 2030, but also to provide the next level of commercial X-Band SAR data and services. This paper provides an overview of the capabilities of the envisioned next generation X-Band SAR mission, featuring significantly higher resolution and wider swath than the previous generation. Such improved capabilities are enabled by leveraging on new, innovative technologies and concepts. The mission concept comprises a main satellite with an active phased array SAR instrument and three companion satellites equipped with a passive planar SAR antenna. The main satellite will be operated either in a mono-static configuration or, together with the companions, in a multi-static SAR configuration, using the Mirror-SAR concept to generate high quality DEM models and 3D change monitoring. Applications that particularly benefit from this new mission concept are also highlighted. In addition, it is also explored how, in order to improve the revisit time, the WorldSAR partnership model can be expanded to offer high resolution typical of a high-end mission along with higher revisit – a benefit traditionally connected to small satellites constellation. This paper demonstrates the combination of increased duty cycle, large swath and improved revisit provided by the WorldSAR concept significantly increases the real coverage area.