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Abstract

Status Report on the TerraSAR-X Mission

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TerraSAR-X is a new German radar satellite that was launched in June 15, 2007. Its lifetime will be five years. It carries a high frequency X-band SAR sensor that can be operated in three different modes and various polarizations. The Spotlight-, Stripmap- and ScanSAR-modes provide high resolution images for detailed analysis as well as wide swath data whenever a larger coverage is required. These high geometric and radiometric resolutions together with the single, dual and quad-polarization capability are innovative and unique features with respect to space borne systems. Additionally several incidence angle combinations will be possible and double side access can be realized by satellite roll maneuvers. The satellite will be positioned in a sun-synchronous 11 days repeat orbit. The revisit time in the very high resolution Spotlight mode is 2.5 days for 95% Earth's surface visible to TerraSAR-X.

TerraSAR-X is an operational SAR-system for scientific and commercial applications. The commercial exploitation is exclusively granted to Astrium / Infoterra GmbH. DLR is responsible for the scientific utilization of the TerraSAR-X products. The status "scientific use" needs to be gained via a selection process. The Science Service System (<http://sss.terrasar-x.dlr.de/>) was developed for this purpose. Since end of October new proposals can be submitted at any time. The corresponding TerraSAR-X data will be provided to the costs of fulfilling the user request. Further Announcements of Opportunity (AOs) are planned where special conditions might be applied with respect to the data provision.

Only four days after launch the first SAR image was processed successfully. A 30 km x 60 km area in Russia, western to Volgograd has been imaged in the stripmap mode, HH polarization. Herewith the functional capability of the satellite on one hand and the operability of the ground segment on the other hand could be demonstrated. The entire processing

chain including order input, scheduling, commanding, data acquisition, on ground data reception, SAR processing and archiving of the images has been verified. This result was also the consequence of a comprehensive pre-launch testing program including numerous space-to-ground-segment tests.

By now the commissioning phase, involving tasks such as calibration, characterization/verification of the SAR-instrument, SAR system performance analysis, orbit and attitude as well as product verification was terminated successfully. The aim to ensure optimum SAR image quality and to accomplish the full operational readiness was achieved in December 2007 when the project passed successfully the Operational Readiness Review. Since January 7, 2008 ordering is possible for accepted proposals. Focus of the proposed presentation will be a review of the proposed scientific research, background mission scenarios as well the access procedure for researchers and future AOs.