EARTH OBSERVATION SYMPOSIUM (B1)
Enhancing Earth Observations Through Space Radar (6)

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THE GERMAN WAY TO SAR-LUPE, A VERY HIGH RESOLUTION SAR RECONNAISSANCE SYSTEM

Abstract

In 1978, The US satellite SEASAT demonstrated the international community that Synthetic Aperture Radar (SAR) imaging from space is feasible. Only staying alive for 105 days, it convinced the scientists all over the world that such an imagery is worthwhile to work with. Under Prime Contract of a German Company Dornier System GmbH with the European Remote Sensing Satellite ERS-1, the European Space Agency ESA started a development line of SAR sensors for satellites. The frequency band C was selected as a compromise between the needs of Sea and ice scientists. It became a very successful project. The German Space Agency DLR continued this idea by an X-Band space-borne SAR sensor in cooperation with NASA JPL providing a L- Band and a C-Band sensor to be flown on shuttle. This Radar band was best suited for land applications. Again, Dornier System GmbH was the leading company of this German contribution. Due to these projects, Germany became a focus in Space-SAR engineering and a strong team was built up gaining a solid experience in this technology. After successful realisation of this X-Band SAR sensor, Dornier System GmbH started into a new dimension of technology – the active phased array SAR antenna. This technology was successfully applied in ENVISAT, the next satellite SAR project of ESA. It allowed many additional operation modes for large swathwidth on one hand side and a high resolution on the other hand. However, all these projects provided a spatial resolution of worth than 10m, acceptable for scientists, but not for military or commercial users. Hence, the Dornier Satellitensysteme (DSS) GmbH, the successor of Dornier System GmbH, worked on a technology for higher spatial resolution in order to interest military customers. They proposed HORUS, a satellite providing about 1m SAR images. However, this new satellite was very expensive, because it carried a high bandwidth active phased array, and therefore, the military customer was reluctant to decide this project. In parallel to that, a group of engineers from the previous SAR satellite team having left DSS in between convinced the military customer in Germany that there is a way to put a high resolution SAR on a small satellite and to built the entire system so cheap that there can be realised more than one satellite for even less money than proposed in HORUS. This team won the new project called SAR-Lupe. SAR-Lupe is now fully diploid consisting of 5 satellites with the highest spatial resolution in the world today, as far as known. The system was handed over to the end-user in November 2008 and is successfully working 24 hours per day, 12 months per year. This paper will present some more details on the SAR-Lupe system and it will give some information on the planning's of the follow-on developments in Germany.