SPACE SYSTEMS SYMPOSIUM (D1)
Enabling Technologies for Space Systems (2)

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AUTOCALIBRATED OPTRONIC SAR PROCESSOR FOR ONBOARD LIVE PLANET OBSERVATION

Abstract

Both for Earth and Interplanetary missions there is a strong need for immediate availability of synthetic aperture radar (SAR) images. In Earth observation, this is especially suitable for disaster monitoring and live support of search and rescue teams. For interplanetary missions, onboard availability of images would provide a way to perform local analysis on the images, and as such to better select images to be sent to Earth. Moreover, SAR images are much easier to compress than SAR raw data, by a factor of 25 to 250 times depending on the algorithm used. As such, the onboard compression of SAR images would provide better use of the bandwidth available for downloading the data to Earth. SAR is based on the acquisition of multiple radar echoes to emulate a large radar antenna aperture providing the ability to produce high resolution images. SAR is the only technology that provides day and night imaging capabilities, through clouds or dense atmosphere INO in collaboration with ESA has developed a real-time optronic processor and studied in detail the quality of the SAR images generated. The processor is designed specifically to process ENVISAT ASAR images with no bottleneck. The rate of generation of data by the ASAR instrument is met by the processing power of the optronic processor. It is reconfigurable, that is it can adapt to various flight parameters and swath selections. Its in-orbit autocalibration capabilities can correct for flight path errors and component aging. The compact prototype further shows low power consumption which is highly suitable for interplanetary missions. In this presentation, a review of the advantages of the technology will be presented with an emphasis on the processor reconfigurability and autocalibration capabilities. Moreover, images obtained from the use real SAR raw data will be presented. Finally, multilooked and multitracked images will be presented showing the high quality of the final data generated.