

SENTINEL-1 PERFORMANCE

P. Snoeij^{*a} E. Attema^a R. Torres^a

^a ESA, ESTEC, PO Box 299, 2200AG, Noordwijk, Netherlands

Technical Commission VII Symposium 2010

KEY WORDS: Space, Radar, SAR, Global, Multitemporal, Performance, Performance

ABSTRACT:

The Sentinel-1 mission is designed to be a source of continuous and reliable C-band SAR imagery. Requirements for the Sentinel-1 end-to-end system, as part of the complete family of GMES Sentinels, guarantee continuity of C-band SAR data and product availability to operational entities that exploit satellite radar imagery since ERS 1 operations started in 1991. Typical drivers for current- and future-generation Remote Sensing LEO satellite missions are fast target access capability and small on-board data latency in order to speed up data download and product delivery to the end-users. However repetitive complete global coverage is also required. The satellite orbit and sensor swath determine the access capability and SAR power demand limits the satellite operational duty cycle in each orbit. Therefore a careful trade-off between frequent acquisition of a small number of selected targets and maximum geographical coverage is required. To comply with mission timeliness requirements the performance had to be improved by increasing the number of satellites in a constellation. Sentinel-1 applies a new operational mission concept; SAR acquisitions by Sentinel-1A (and Sentinel-1B launched 18 months later) in a main operational mode designed according to conflict-free pre-defined operational sequences to ensure: • continuous and systematic acquisition of data during the complete mission life time to satisfy the prime mission requirements • specially allocated mission capability for fast response to emergency requests • complete global coverage during every orbit repeat cycle (175 orbits in 12 days) • more frequent additional coverage of high priority regions (North Atlantic Maritime Transport zones, Europe and Canada) for near real time applications • a growing global data archive The mission analysis process performed to define in detail the above operational concept is outlined in this paper and the results are presented. The Sentinel-1 mission operation plan satisfies the mission requirements providing about 90 Giga-byte L0 data per orbit corresponding to 0.5 Penta-byte per year per satellite.

TOPIC: New earth observation satellites

ALTERNATIVE TOPIC: Not Specified