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A NEW OPERATIONAL LOW COST GNSS SOFTWARE RECEIVER FOR MICROSATELLITES

Abstract

This abstract presents a new low cost GNSS Software (SW) receiver for Microsatellites. Syrlinks (Bruz, FRANCE) has been chosen by CNES for developing and manufacturing this equipment. The GNSS receiver under development is a high-performance equipment specially designed and optimized for the needs and constraints of small platforms for which small volume, low mass and low power consumption are important parameters. This equipment is based on COTS (Commercial Off The Shelf) in order to exploit the performance of the advanced technology developed for terrestrial applications and to reduce significantly the global cost of the equipment. The structure of this GNSS receiver is organized around a reconfigurable architecture with the use of one FPGA (Field Programmable Gate Array) associated with one DSP (Digital Signal Processor). The GNSS function is then split in two main parts according to the real time requirements of the processing and navigation operations. The hardware (HW) architecture has been optimized to be able to support a low power mode through a fractioned activity that has been implemented by introducing standby time frames during the mission. An orbital extrapolator is also implemented for propagating position and velocity without pseudo range measurements. This receiver is able to process GPS (L1) and GALILEO (E1) signals simultaneously in the first version of the software and will be able to evolve in a second step to a dual frequency mode, compatible with E5a/E1, or with E5b/E1. This GNSS receiver dedicated to low earth orbit (LEO) satellites will withstand the radiation environment therefore the hardware and software architecture has been defined to reduce the single event effects (SEE) and to maximize the service availability.