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COMMUNICATION SYSTEMS FOR MICROSATELLITES AND IN-FLIGHT RETURNS FROM LOW COST X-BAND HIGH RATE TRANSMITTERS

Abstract

Syrlinks started to collaborate with CNES 15 years ago on development of a small S-band TTC transceiver for the CNES Myriade microsatellite platform. This product was based on the use of COTS components, a principle of environmental aggravated tests on different Qualification Models to prove the robustness of the design was defined and used. The reliability of the equipment and its qualification method were demonstrated since 44 different units were delivered to CNES, Astrium (Airbus Space and Defence) and Thales Alenia Space which cumulate more than 130 years in orbit without any defect. This equipment is still production. More over, a low data rate version was procured by NASA for the proximity-link of the Deep-impact mission which explored the Tempel comet, and will be used soon to provide communication between the Rosetta ESA/CNES/DLR Probe, and its small Philae lander which will softly land on the Churyumov-Gerasimenko comet next november. Some recent small missions using that S-band transceiver will be described, as the TTC equipment itself.

A derivative version of the transmitter part of this product was made for an L-band small transmitter for Indian/French SARAL small satellite. This equipment allows to download data in real time whatever the satellite position, thanks to existing dense networks of small L-band telemetry stations.

Syrlinks also performed a detailed study for CNES of a VHF transmitter design to transmit in real time data alerts to a dense ground network of VHF very small stations. Such an equipment is planed to be on-board of chineese-french SVOM small mission dedicated to gamma-bursts observation.

More recently, using same principle qualification principle involving COTS, Syrlinks developped and provided to ESA, 3 FM of its new X-band low cost High Data Rate-TeleMetry (HDR-TM) transmitter for Proba-V mission which was launched last May 2013. These transmitters are using AsGa power amplifying technology for two of them, and the third equipment is using GaN technology.

In the frame of GREAT project, the GaN X-Band transmitter has the objective to demonstrate GaN technology amplifying performance in space. This GaN technology device in space is now one European pioneering experience, and the results of GaAs amplifier are also good. As both GaAs and GaN technologies have been embedded simultaneously on PROBA-V platform, the first months in orbit are able to demonstrate interesting results, especially in terms of consumption. We will share this experience return in space community, detailing the conditions allowing best performances.