

## Leon3-based Onboard Instrument Software: A case study using TASTE

We present the results obtained so far for the project L3Obis. This project consist in developing On-Board Software, that runs on a Leon processor and has the following functionality: produce and exchange telemetry packets with a spacecraft simulator, monitor the Instrument and the CDPU status using housekeeping data; acquire scientific data from an Instrument simulator and perform lossless data compression using the Rice algorithm.

The project is developed using TASTE framework and it consists of 3 applications. The spacecraft simulator which uses the TASTE GUI to build and send TCs to the CDPU application. It also stores the incoming TM from the compression module to a mass memory unit. The second application is the CDPU simulator which unpacks and process the TC and checks its integrity. It sends commands to various system components: shutter, roe, ldc compression modules and is also responsible with the compression of the scientific data that are coming from the instrument simulator.

The last application is the instrument simulator, that has an power and mechanism control unit, a shutter, a ROE and a CCD unit simulator. Upon TC, scientific data is sent to the CDPU for compression and periodically HK data are send to the spacecraft simulator to monitor the status of system components.

The applications run on a Debian Virtual Machine. The *instrument* and the *spacecraft* simulators runs on a linux x86 processor and the *cdpu* application runs on a simulated Leon 2/3 processor under the Rtems OS. The communication between applications is done using the TASTE generic sockets drivers. The Leon processor is simulated using GRSIM from Gaisler.