

space Payload Test System

EGSE SW Front-End for Integration, Verification & Validation activities of a satellite payload

spacePTS is an **off-the-shelf SW solution providing full front-end functionalities** (TM/TC, power and custom analogical links) on top of a commercial HW platform (generally a workstation with specific spW, CANbus and Analogical/Digital interfaces).

spacePTS relies on the **SCOS 2000 MIB** database and provides users with easy access and browsing functionalities.

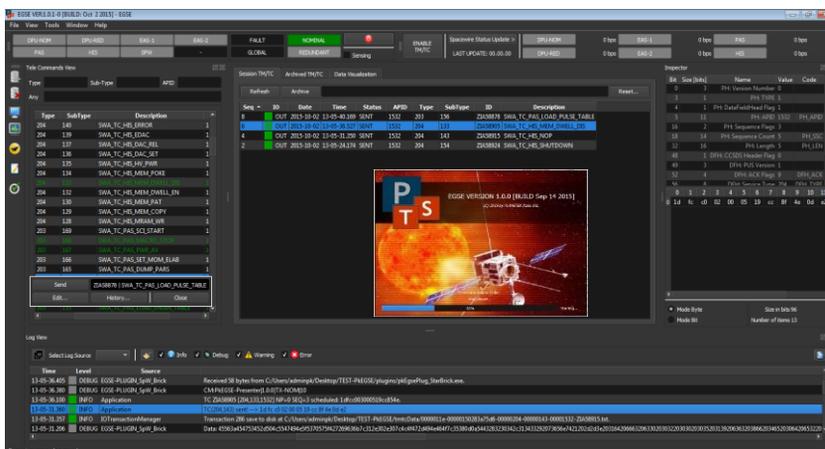
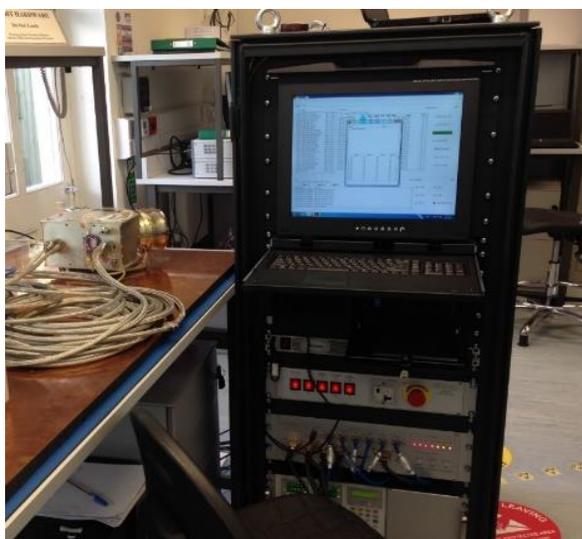
It allows for **integration into a generic** (and wider) **Central Check-out System (CCS)** providing remote control of the TM/TC front end, with a client-server approach, via well assessed protocols as EDEN and C&C (over the TCP/IP network).

spacePTS provides **simulation capabilities** of external sensors and systems: specific behavior can be implemented customizing standard templates integrated as plug-ins in the overall system.

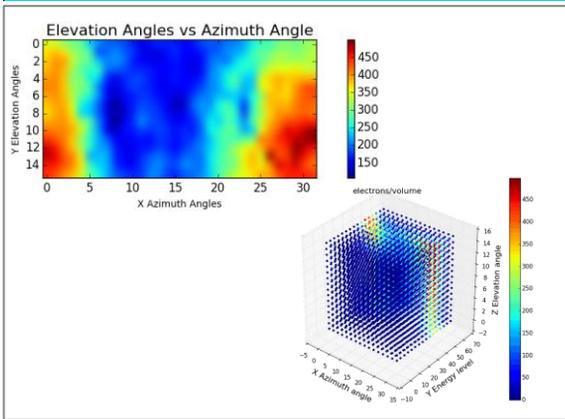
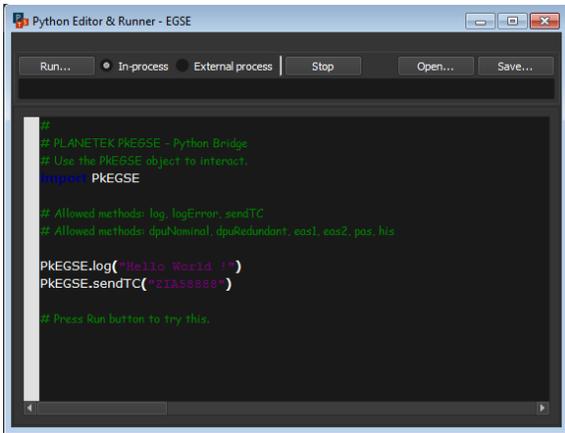
spacePTS integrates structured **scripting languages**, with a rich syntax, interpreted by plug-in modules, thus providing means to execute complex test procedures, exposing appropriate interfaces to:

- HW resources
- TC specific formatting functions
- TM de-formatting functions
- HK parameters check and monitoring
- Internal TM/TC events database.

spacePTS implements the business logic of the EGSE, manages the HW interfaces towards the Equipment Under Test (EUT) and the services for the check-out systems (either locally or remote over LAN).



Supported interpreters are Python and Tcl/Tk. External libraries (e.g. python numpy, scipy, matplotlib, etc.) provide advanced data processing and visualization functionalities, allowing the “on-line” definition of specific monitoring windows and scientific packets quick look analysis.



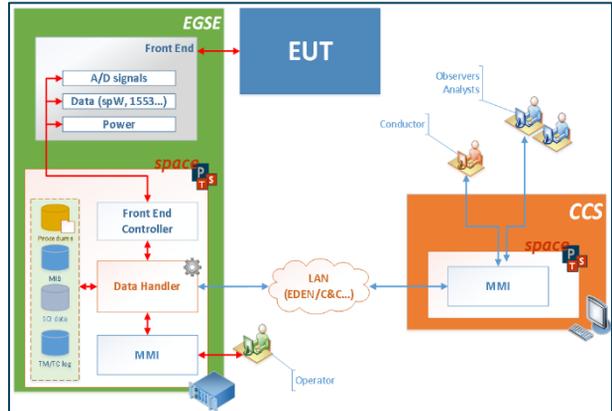
spacePTS core module is the SW layer acting as a server providing network services to Central Check-out Systems (which will in turn be on the client side of the TCP/IP communication link).

MAIN FUNCTIONALITIES:

- TM/TC front end (CCSDS PUS packets on spW interfaces)
- Spacecraft’s power bus (28V) and analogical lines
- Spacecraft’s sub-systems and instruments simulation
- Packet Utilization Standard communications based on mission DB (SCOS 2000 format)
- Test Procedure environment preparation and execution
- Test scripting language (python and Tcl/TK)
- Data visualization and scientific packets quick look analysis
- Plug-in based architecture
- Local and remote control capabilities

spacePTS is based on a modular architecture:

- the *Front End Controller* implements all the I/Fs with the EUT, simulating electrical (power, signals) and logical (PUS and custom data packets) communications;
- the *Data Handler* provides monitor and control functionalities;
- the *Man Machine Interface (MMI)* provides graphic and command interfaces.



The Data Handler also provides services to the MMI which acts as a local or a remote controller. In this last case it makes possible for the CCS to control the system remotely from the same GUI with the EDEN or C&C protocols. These protocols allow to exchange TC and TM packets between the different EGSE sub-systems (the CCS and SCOE), transmitting CCSDS PUS packets over the EGSE LAN (using a service based on TCP/IP sockets).

All the events are logged and saved into a local DB in order to allow off-line analyses on the test sessions and their «replay».

- Test session logs analysis and «replay»
- Multi-monitor

COMPLIANCES:

- CCSDS/ESA/ECSS PUS TM/TC
- ESA SCOS 2000 MIB
- C&C
- EDEN
- Python scripting
- Tcl/T
- k scripting

For further information:
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