Payload / Instrument Control EGSE

A Payload Control EGSE tests, qualifies and validates the electrical functionalities of a on-board equipment prior to its integration on a spacecraft.

It powers, controls and monitors the on-board equipment from its early stage of development (during R&D phases) up to launch of the carrier spacecraft.

A Payload Control EGSE provides:

- Bus communication (Serial lines, MIL-STD-1553B, CAN, SpaceWire etc.)
- Sensor acquisition / simulation, actuator monitoring / simulation
- Electrical powering of the payload
- Local Graphical User Interface

A Payload EGSE is based on COTS items (static / electronic loads, PC, …) enhanced by Clemessy's SyCTRL products. It is designed as a self standing equipment with its own local GUI. It is fitted with self test and safety loop, embedded in standard 19inch rack and container.

As options, it can be fitted with:

- Remote control via TCP/IP interface (CCSDS, FEECP, EDEN, PUS Services, PFLP, etc.)
- Mains isolation transformer unit
- Reusable container
- Mini rack
- Interface harness:
    – Ambient harness for ISO8 clean rooms
    – Thermal vacuum harness for TVAC chambers
    – Bulk head to vacuum chambers
    – Bio-burden harness for ISO7 clean rooms
    – Savers

Function

- Payload electrical powering (single or redundant) with Second Level Protection
- Latch Current Limiter
- Over-voltage, over-current, under-voltage protection
- Voltage & Current high speed buffering for debug purpose
- IRIG-B synchronized acquisition
- Synchronization signal generation (1Hz - PPS, 10Hz, 1KHz etc.)
- High power ON/OFF command (HPC)
- Temperature (i.e. thermistor) monitoring
- Strap and switch monitoring
- Housekeeping / status signal monitoring
- Serial, MIL-STD-1553B, CAN, SpaceWire bus (single or redundant)
- Real time bus simulation
- PUS Services, CCSDS packets
- Radio Frequency switch matrix
- User protection against hazardous RF radiations
- Ethernet TCP/IP interface for remote control
- Windows / Linux man machine interface for local control
- Data collecting
- User defined scripts features
- Self test capability
- Safety loop management (Inhibit input & fault output signals)
- Mains Insulation Transformer Unit
- Harness to payload (ambient, vacuum, bioburden)

Performance

- Electrical protection reaction time: down to 30 μsec

Implementation

- Power provided by DC power supply
- Independent electrical protection features based on FPGA technology
- Discrete TM/TC based on FPGA technology
- Ethernet TCP/IP interface for remote control
- Windows man machine interface for local control
- 19'' rack integrated

Used technology

- COTS power supplies (Agilent, TDK-Lambda, Regatron etc.)
- Clemessy's SyCTRL second level protection and TM/TC features
- LXI interface with power supplies
- IRIG-B synchronisation
- Python script language