

Exposed Payload Hosting Unit (XPHU)



Overview

The XPHU is an external versatile platform capable to host multiple payloads exposed to deep space and to interface them to the spacecraft.

The unit comprises of a mechanical structure for payload accommodation and housing of the avionics and harnessing, a Power Conditioning & Distribution Unit (PCDU) and a Command & Data Handling Unit (CDHU) designed to support a large variety of payload communication interfaces and protocols.

Mechanical Structure

The Mechanical Structure provides a mounting plate and thermal management for payloads. The XPHU is designed for manipulation through robotic means for attachment to the spacecraft body using a SORI (Small ORU Robotics Interface) or HOTDOCK® Standard Interconnects.

PCDU

The PCDU receives power at 120V and distributes it to the CDHU and the hosted payloads. The PCDU main features include:

- Input Filter for impedance matching
- Input over/under voltage protection circuit
- Over temperature protection circuit
- Inrush current limitation (together with the input LCL switch) and EMI filtering

- All outputs remote switchable
- Internal housekeeping functions for all output voltages and currents
- Monitoring of internal temperatures and temperatures of the payloads

Designed around DC/DC conversion blocks the PCDU provides several regulated voltages, typically:

- 3.3 VDC and 5 VDC for digital subsystems
- 5.0 to 100 VDC for the payloads
- 30 to 100 W power range

CDHU

Dual PCB architecture (CPU and FPGA):

- Custom PCB based on GR712RC (LEON3)
- 2 core LEON3-FT 32-bit processor
- 100 DMIPS

CPU Memory:

- 64 KB PROM
- 4 MB MRAM (1 MB write protected)
- 2 x 128 MB SDRAM

Local Storage Memory:

- 1 GB NAND Flash with full TMR

Real Time Operating System:

- RTEMS + NASA cFS/cFE
- VxWorks or Build-root Linux (in option)

APPLICATIONS

- Exposed Payloads Accommodation and Servicing
- Remote Terminal Unit (RTU)
- Lunar Gateway, and future Commercial LEO Destinations

SERVICES AVAILABLE

- Custom data acquisition and processing
- Unit support
- Unit customisation
- HOTDOCK® mating/demating devices

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ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987. Aerospace Applications North America is our Partner company in Houston, USA.

Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries. Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.



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Payload Interfaces

Standard Interfaces provided:

- MIL-1553
- SpaceWire
- CAN
- RS-422/RS-485
- TT-BC-01
- LVDS

Spacecraft Interfaces

- Ethernet (Best Effort)
- TTEthernet (in option)

XPHU Services

The XPHU provides the following operational services:

- Polling of Instruments & Sensors
- Centralizing collected data
- Aggregation/Archiving
- Local storage
- PCDU Monitor & Control
- CCSDS Telemetry & Telecommand Engine
- NTP and Time Stamp service
- TCP/IP stack

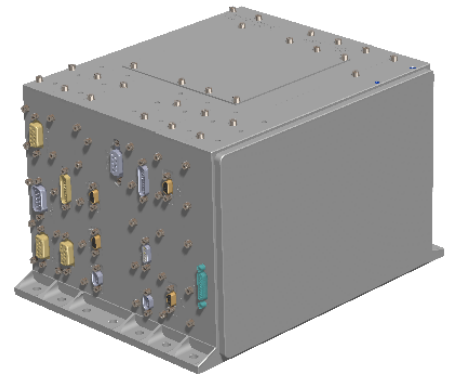
Product Roadmap

Initially designed for PPE of the Deep Space Gateway, this versatile XPHU can readily support LEO and GEO missions.

Applications

The XPHU is adapted to LEO stations, In-Orbit Servicing with in-orbit installation or swapping of external payloads by robotic means.

XPHU e-BOX: PCDU + CDHU



Engineering Bread Board of CDHU_FPGA module



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