



# MEOS™ Packet Processing Hub - PPH

## Data consolidation, processing and distribution

The MEOS™ PPH (Packet Processing hub) is a **high performance data hub for multi-mission, multi-processing satellite ground systems.**

The PPH processes multiple incoming and outgoing data streams. VCDUs from a network of ground stations are consolidated into the most complete data sets possible, filling gaps and removing data overlaps, then processing VCDUs to satellite instrument Application Packets (APs). Partial APs are regenerated, duplicate data is removed, and the resulting data is distributed to multiple data users for further processing.

Processing includes generation of APs, removal of duplicate APs, and regeneration of incomplete APs upon reception of new data that fills gaps in previous data sets.

The MEOS™ PPH consists of a number of generic Processing Nodes. Each node performs data reception, processing and distribution. The PPH has an integrated Monitoring & Control system that integrates all elements into a complete and seamless system.

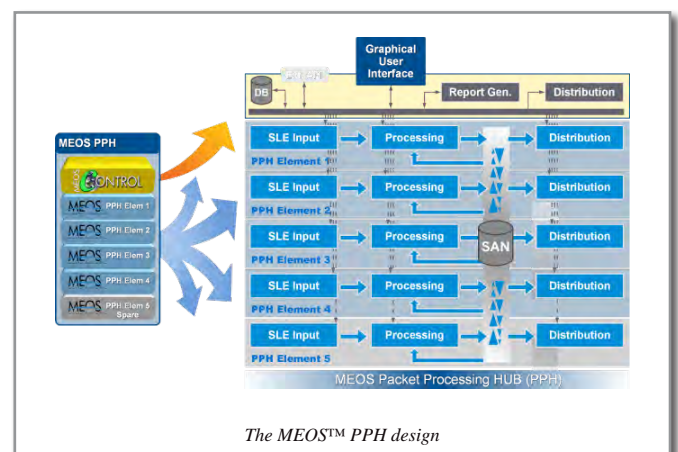
All processing nodes are autonomous, with identical capabilities, sharing a common processing database and data storage. The common storage provides all information needed for any and all nodes to perform the same operations.

### Key features

- Fully data driven
- Up to four concurrent input data streams at 400 Mbps
- Handles single & multiple copies of overlapping data sets
- Customer specific data delivery configurations
- Reception, processing and distribution reporting
- Forwards input data to other units via transparent Relay streams
- CCSDS protocol: SLE RAF / RCF
- 24/7 operations - extremely high availability
- Automatic failover

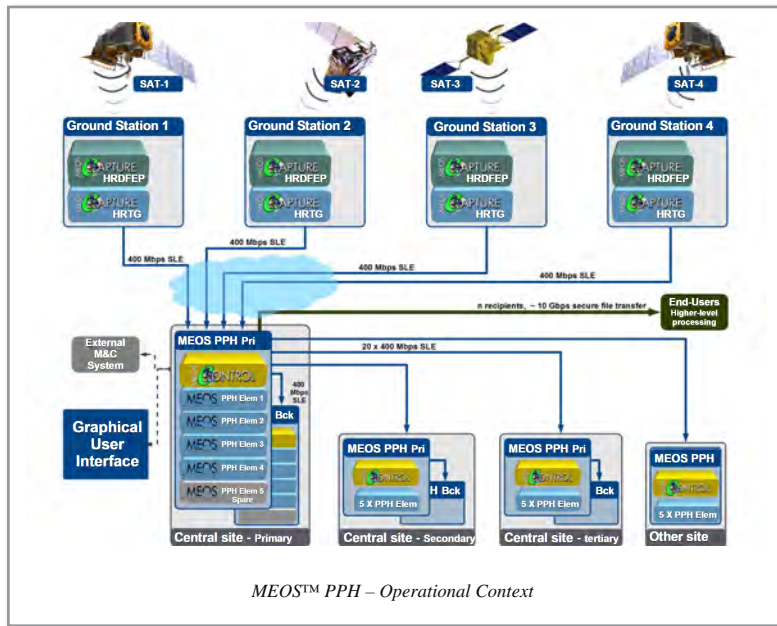
Input data can be relayed transparently to multiple other destinations prior to processing. This allows multiple PPHs to be used in a bigger network (as well as other system types). The primary PPH will relay the input data to other PPH's, enabling seamless fail-over between multiple PPHs.

The PPH offers built-in redundancy. If a node fails, the remaining nodes will automatically replace the failed node by taking over its duties, ensuring seamless fail-over. The failed node can be physically replaced by a spare node without interrupting nominal operations.



# MEOS™ PPH

Packed Processing HUB



## Data Input:

- Data format: VCDUs and EVCDUs
- Maximum number of concurrent VCDU input streams: four (one stream per PPH Node, four concurrent streams in total per PPH)
- Data protocol: SLE RAF, SLE RCF and MDIS
- Max data rate per input stream: 400 Mbps

## Relay outputs:

- Data format: VCDUs and EVCDUs
- Maximum number of concurrent VCDU relay output streams: 20 (up to five streams per PPH Node, up to four nodes transmitting concurrently)
- Data protocol: SLE RAF, SLE RCF and MDIS
- Max data rate per output stream: 300 Mbps

## Data processing:

- VCDU Normalization: Complement incoming VCDU data with already received data to generate data sets as complete as possible, by:
  - Time ordering of data
  - Gap filling
  - Filtering of duplicate data
- EAP generation:
  - Data format: APs and EAPs
  - Time segmented AP/EAP files

## Data distribution:

- Data format: APs and EAPs
- Distribution to up to 15 destinations
- Concurrent distribution to all destinations
- Individual configuration per destination (e.g. maximum file size)
- Filtering of duplicate data
- Data protocol: FTP, SFTP, FTPS

## Data storage:

- Internal NAS, 45 TB capacity

## Redundancy:

- One extra processing node, for a total of five identical Nodes, all operating in parallel
- Automatic failover ensured by the 4+1 Node architecture
- Monitoring & Control:
  - PPH system GUI
  - Processing Node GUI

## Reporting:

- Extensive reports on data acquisition, processing and distribution

## Fully data driven operation

## CCSDS Space Link Extension (SLE)

- CCSDS data transfer protocol
- Runs on top of TCP/IP
- RAF – Return All Frames (All VCIDs)
- RCF – Return Channel Frames (selected VCIDs: 0-63)
- Timely Online (PIB and UIB)
- Complete Online (PIB and UIB)
- Offline (UIB only)
- User Initiated Bind (UIB)
- Provider Initiated Bind (PIB)
- Authentication
  - Secure Hash Function (SHA-1) as recommended by CCSDS
- Status messages
- Private annotations

