# KP LABS
Mission Complete

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# SIMERA
SENSE

## When advanced optics meet powerful onboard processing, real insights start in orbit.

By combining HyperScape100 hyperspectral imaging with Leopard DPU, this integrated solution enables faster, smarter, and more efficient Earth Observation — with key data acquired, processed, and stored directly onboard the satellite.
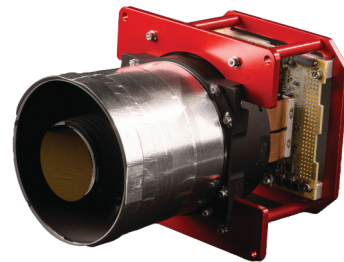
| Leopard DPU | HyperScape100 |
|---|---|
| Designed for Micro and Nano Satellites in a compact PC-104 form factor, offering powerful on-board data analysis using Artificial Intelligence. | Covers the visible and near-IR spectral range in up to 32 bands at an unprecedented spatial resolution and form factor. |





| Leopard DPU | HyperScape100 |
|---|---|
| Processor: Quad ARM Cortex-A53 + Dual Cortex-R5 | Resolution: 4096 pixels across track |
| FPGA: Zynq UltraScale+ ZU6EG, ZU9EG, ZU15EG | Spectral bands: 32 Bands |
| Computer performance: Up to 3 TOPS | GSD: 4.75 m |
| Software: 64-bit Linux + AI model support (PyTorch TF, Caffe) | Focal lenght: 580 mm |
| Power consumption: 7.5-40W (load-dependent) | Power consumption: 7.75 W |
| Mass: <900 g/<1200 g (single/dual configuration) | Mass: 1.26kg |
| Volume: 90.17 × 95.86 × 50 mm/78 mm (1U single/1.5U dual configuration) | Volume: 98 x 98 x 176 mm (1.5U) |
| Storage: Up to 2×256 GiB flash + 4–16 GiB DDR4 RAM (single/dual configuration) | Storage: 128 GB |
| Interfaces: CAN, SPI, UART, RS422/485, LVDS, GTY, GTH, SpaceWire | Interfaces: Control - I²C, SPI, RS-422, SpaceWire, Data - LVDS, SpaceWire |

# Combined Specification

Volume: 2.5U (single configuration)/ 3U (dual configuration) in total

Interface compatibility: SpaceWire, RS-422, LVDS, SPI - fully supported on both ends

Typical power budget : 15,25W (combined operation, typical load)

Platform alignment : Micro and Nano Satellites compatibile

# Key Applications

### Cloud & Object Detection
Real-time AI-based detection of clouds, surface changes, and orbiting objects.

### Hyperspectral Compression
Onboard reduction of 32-band data to cut downlink volume.

### Onboard Data Storage
Provides additional flash memory for buffering and storing mission data.

### Smart Data Handling with OBDP
Filtering and prioritizing data onboard to reduce transmission load.

# Use Case

OPS-SAT VOLT is an ESA mission dedicated to in-orbit testing of advanced technologies, including optical and quantum communications, onboard computing, and intelligent payloads.

As part of this mission, KP Labs and Simera Sense jointly deliver a payload combining the HyperScape100 hyperspectral camera and the Leopard Data Processing Unit (DPU), led by Craft Prospect's AI demonstration.

Key outcomes include:

- Real-time inference (e.g., cloud masking, object detection)
- Environmental analysis (e.g., NDVI)
- Reduced data transmission via onboard filtering
- Coordinated payload operations using Leopard's control features
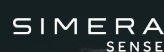
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