

Hardware

Leopard DPU

Edge Processing for Micro and Mini Satellites.

Leopard is a cutting-edge Data Processing Unit (DPU) designed for Macro and Mini Satellites in a compact PC-104 form factor, offering powerful on-board data analysis using Artificial Intelligence.

Now, instead of sending huge, unprocessed sets of data to ground stations, focus on the most important and valuable insights.



High-Performance Processing

Up to 3 Tera Operations Per Second (TOPS) for fast and efficient data processing.



AI-Driven

Utilizes deep learning algorithms directly in space, reducing the need and costs of data transfers to Earth.



Compact Design

CubeSat-compatible (<1U) with the ability to integrate seamlessly with various Macro and Mini satellite platforms.



Applications

Ideal for Earth Observation tasks such as image segmentation and object detection, as well as Space Situation Awareness (SSA) missions

Use Cases

LeopardISS (2025-2026)

LeopardISS is an experiment featuring KP Labs' Leopard Data Processing Unit (DPU), set to launch to the International Space Station (ISS) in early 2025 as part of the Polish Mission, in collaboration with the Poznan University of Technology (PUT). This project provides a unique platform for testing AI algorithms directly in space, allowing researchers and companies to gain valuable flight heritage for their technologies.

Intuition-1 (2023-2027)

Intuition-1 is a 6U KP Labs' hyperspectral satellite launched in November 2023, aiming to demonstrate onboard processing of hyperspectral data to minimize data transmission needs. KP Labs developed key payloads, has context menu, including the 192-band hyperspectral sensor (HSI) and the Leopard Data Processing Unit (DPU). The satellite processes complex image data in orbit, enabling near-instant analysis of environmental conditions like vegetation health and soil composition.

Processing cores	<p>Zynq UltraScale+ ZU6EG ZU9EG ZU15EG</p> <ul style="list-style-type: none">• Quad ARM Cortex-A53 CPU up to 1.5 GHz• Dual ARM Cortex-R5 in lock-step• FPGA for custom function implementation
Memory	<ul style="list-style-type: none">• 4-16 GiB DDR4 providing with ECC• 4-16 GiB SLC flash-based file system storage (EDAC)• Up to 2x256 GiB SLC flash-based data storage
Interfaces	<ul style="list-style-type: none">• CAN, LVDS, SPI, RS422/485, UART, GTY and GTH transceivers• Additional customisable interfaces upon request: SpaceWire, Ethernet• LVDS/RS422 interfaces compatible with X/S-Band radios and CCSDS compatible communication channel upon request
Specifications	<ul style="list-style-type: none">• A radiation hardened Payload Controller• Supply Voltage: 6.5 to 14 V (VBAT)• Power Consumption: 7.5 W to 40 W – depending on workload and specified processing speed• Computational Throughput for Neural Networks: up to 3 TOPS• Thermal interface customisable for satellite architecture
Redundancy	<ul style="list-style-type: none">• Possibility to introduce additional redundancy to each version
Form-factor	<ul style="list-style-type: none">• CubeSat standard-compatible, < 1U

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