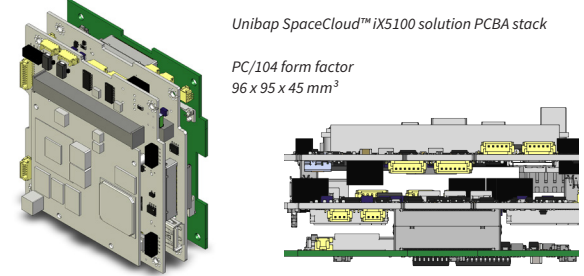
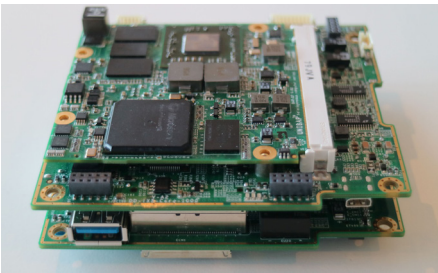


# SpaceCloud™ iX5100



Unibap SpaceCloud™ iX5100 solution PCBA stack

PC/104 form factor  
96 x 95 x 45 mm<sup>3</sup>

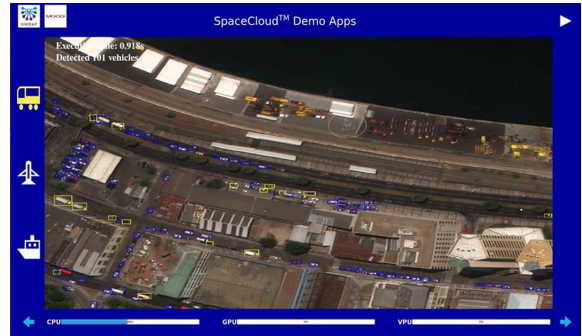


Unibap SpaceCloud™ iX5100 photograph.

Quad core x86-64 CPU and AMD Radeon GPU paired with SSD storage, Microsemi SmartFusion2 FPGA and optional mPCIe device (e.g. Intel Movidius Myriad X VPU)

## On-orbit Data processing and Apps

Whether you have a Space Situational Awareness (SSA) payload, an Earth Observation (EO) payload, a synthetic aperture radar (SAR) payload, robotics, or any other situation where intelligent data processing is needed, the USS framework provides unique value through its massively parallel architecture and machine learning support.



## Sensing, communication and storage

The iX5100 offer interfaces for sensor readout and payload telemetry downlink/telecommand in combination with high speed local SSD storage in one package. iX5100 has been integrated with S- and X-band radios.

SpaceCloud iX5100	Compute Performance
CoreMark v1.0 per cpu core	<b>5,842.98</b> <small>(GCC 8.1.0 -O3 -funroll-loops -fgcse-sm -mfpmath=both -DPERFORMANCE_RUN=1 -lrt / Heap)</small>
Linpack [GFLOPS]	<b>4.6</b>
OpenCL GPU [GFLOPS]	<b>87</b>
FPGA DSP cores	<b>72</b> (18x18)
Additional AI acceleration	mPCIe slot, e.g. Intel Movidius Myriad X VPU

### USE CASES EXAMPLES

- Cloud computing
- Mesh networks communication
- Earth Observation/ Disaster monitoring
- Space Domain Awareness
- Synthetic aperture radar
- Interplanetary exploration
- Autonomous vehicles operation

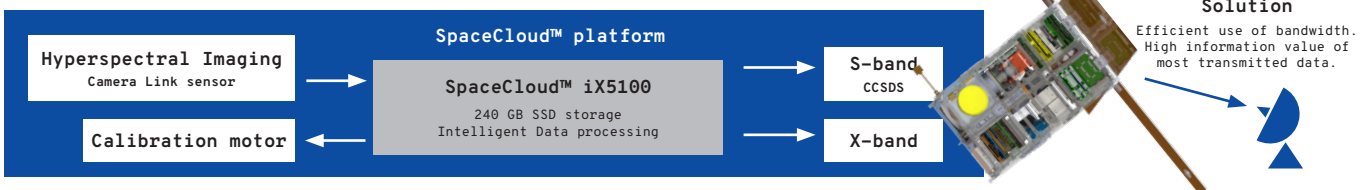
## SpaceCloud™

Unibap is at the forefront of providing on-orbit cloud computing, intelligent data processing, sensor management, and storage for data analytics and distribution of timely, relevant and actionable information. Unibap's radiation tolerant SpaceCloud™ Services (USS) framework provide a powerful and flexible infrastructure for mesh networks, containerized App deployment, artificial intelligence, and IOT frameworks on space systems.

Since the USS framework represents a full cloud and IoT framework it is possible to in addition to SpaceCloud™ APIs leverage common Linux compatible software such as TensorFlow, TVM, Theano, Python, ReST API's, S3 databases, OpenCV, and docker containers. Unibap's SpaceCloud™ solutions includes radiation tolerant hardware and software enabling deployment of modularized Apps to service different customer needs on single or multiple connected space systems.

Unibap is advancing the USS capabilities together with its ecosystem of industrial, academic partners, the European Space Agency and the Swedish National Space Agency.

### SPACECLOUD™ IX5100 USE CASE (NASA HYTI 6U CUBESAT)



# SpaceCloud™ iX5100 Solution - Radiation Tolerant Intelligent Data Processing in Space



Model Name SpaceCloud™ iX5100 EDU SpaceCloud™ iX5100 FM

Processing & Memory		
Intelligent Processing Core	Unibap Qseven e20xx/e21xx compute modules	
RAM	2 GB DDR3 ECC (CPU/GPU), 0.5 GB DDR3 ECC (FPGA) ECC on Flight Models	
Heterogeneous interconnect	PCIexpress® x2 lanes v2.0, 10 GT/s (AMD SOC <-> FPGA) PCIexpress® x4 lanes v2.0, 20 GT/s (AMD SOC <-> other device)	
Storage	Up to 240 GB M.2 Solid State Drive (SSD) SLC type 64 GB eMMC / Micro-SD card	
Display output for development	HDMI output, max 4K HD	
H.264 video encoding	Yes, two full-HD video streams hardware accelerated	
Unibap SafetyChip/SafetyBoot feature	Only on Flight Model version	
I/O Interface		
Health monitoring	8 x AD590 thermistor inputs	
I2C	2 (Isolated), 2 (ext. connector)	
SPI	1 (ext. connector)	
CAN v2.0b	1 (Isolated)	
Ethernet, GigaLAN	1 (Isolated)	
USB	2 x USB v2.0 1 x USB v2.0 (ext. connector) 1 x USB v3.0 (ext. connector)	
Radios (Telemetry/Telecommand)	X-band (e.g. Syrlinks ..... 100 Mbps) S-band (ISIS ....., 10 Mbps)	
Camera Link	1 x Camera Link Basic	
Serial Communication	5x RS232/422 (Isolated)	
mini-PCI express® / AI acceleration	x1 lanes gen 2. (optional Intel Movidius Myriad X VPU or other mPCIe device)	
Mechanical		
PCBA Dimensions	96 (W) x 95 (H) x 50 (D) mm3	
Development Casing	On request	
Environmental & Electrical		
Power Consumption	10-30 W (Depending on processing and storage selection and use)	
Input power voltage	12 V DC	
Storage temperature	0 °C to 70 °C	-40 °C to 90 °C
Operating temperature	0 °C to 70 °C	-40 °C to 70 °C (e2055, 15 W TDP SOC) -14 °C to 70 °C (e2160, 7 W TDP SOC)
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes	
Certification	IPC 610-E Class II (RoHS)	IPC 610-E Class III (RoHS)
Software Support		
Operating System and software	SpaceCloud™ framework core OS (optional later upgrade to to SpaceCloud™ services)	
SafetyBoot / SafetyChip protection	Yes on Flight Model	