sales@unibap.com

SpaceCloud® iX10
Radiation Tolerant Intelligent Data Processing in Space

SpaceCloud® iX10-100

SpaceCloud®

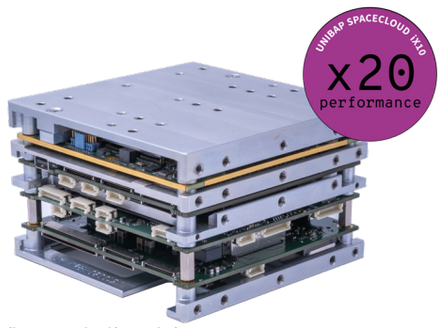
Unibap is at the forefront of providing on-orbit cloud computing, intelligent data processing, sensor management, and storage for data analytics and distribution of timely, relevant and actionable information. Unibap's radiation tolerant SpaceCloud computing hardware and SpaceCloud framework provide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

SpaceCloud OS (SCOS) provide a rich environment derived from Ubuntu Server distribution optimized for on-orbit intelligent data processing. SCOS offer optimized computing libraries, including AMD ROCm with HIP portable GPU and FPGA acceleration and the HIPify tool to automatically convert CUDA code to AMD compatible executables. It also offer many tested and optional third party libraries such as geospatial information package ENVI®/IDL®, communication and compression packages CCSDS/ECCS PUS, CCSDS 123.B2, and CCSDS 124. SCOS also natively support TensorFlow, TensorFlow lite, containerization, many standard compute libraries and SpaceCloud framework.

SpaceCloud framework offers a standard API for creating deployable applications quickly and validate them against the Unibap SpaceCloud container registry. Just download the container SDK and runtime to begin creating advanced portable data processing applications. iX10 has a NASA TRL level of 8.

On-orbit Data processing and Apps

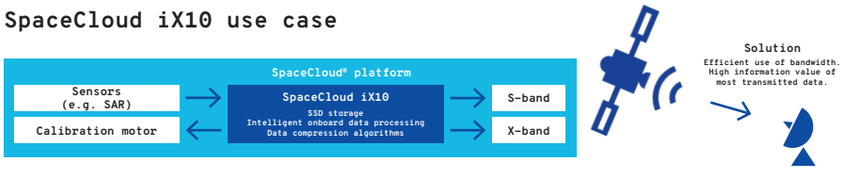
Whether you have a Space Domain Awareness (SDA) payload, an Earth Observation (EO) payload, a synthetic aperture radar (SAR) payload, robotics, or any other situation where intelligent data processing is needed, the iX10 provides unique value through its massively parallel architecture and machine learning support.

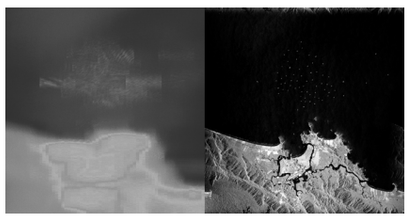


Unibap SpaceCloud iX10 solution
COM Express Compact form factor derived:
100 (W) × 100 (H) × 100 (D) [mm] with PC/104 stackable mounting holes.

Unibap SpaceCloud iX10 solution
Quad core (8 thread) x86-64 CPU and AMD Radeon GPU paired with SATA and NVMe SSD storage, Microsemi PolarFire FPGA and optional mini PCIexpress (mPCIe) AI processing accelerator (e.g. Intel Movidius Myriad X VPU).

SpaceCloud iX10 use case





SpaceCloud use example
Real time SAR-focusing, in-space edge computing to allow deep learning inference, compression and image proccessing in orbit.

SPACECLOUD® IX10-100	COMPUTE PERFORMANCE
CoreMark v1.0 per cpu core	25,000+
Linpack [GFLOPS]	54
OpenCL/HIP GPU [GFLOPS]	2000 GFLOP (FP16) (at higher power envelope)
FPGA DSP cores	924 (18x18)
Additonal AI acceleration	4 TOPS Intel Movidius Myriad X Vision Processing Unit

USE CASES EXAMPLES

Cloud computing
Mesh networks communication
Earth observation/ Disaster monitoring
Space domain awareness
Synthetic aperture radar
Interplanetary exploration
Autonomous vehicles operation

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Model Name	SpaceCloud® iX10-100
PROCESSING & MEMORY	
Intelligent Processing Core	Unibap COMexpress e23 family
RAM	24 GB DDR4 ECC (CPU/GPU)
Storage	2 x 4 TB NVMe SSD 1 x 128 GB SATA SSD
Display output for development	Micro DisplayPort output, max 4K HD
H.264 video encoding	4K @ 60Hz hardware accelerated
Unibap SafetyChip/SafetyBoot feature	Enabled on Flight Model version
AI acceleration	Intel Movidius Myriad X VPU
I/O INTERFACE	
Serial Communication	1 x RS232 1 x RS485 1 x RS485 (Isolated)
Ethernet	2 x 10 GbE (10GBASE-T)
USB	4 x USB 2.0
SpaceWire	2
MECHANICAL	
Dimensions (est).	100 (W) × 100 (H) × 100 (D) [mm] Request ICD for details
Weight	<1000 grams
Enclosure	On request
ENVIRONMENTAL & ELECTRICAL	
Power Consumption	<40 W (Depending on processing and storage selection and use)
Input power voltage	12 V DC
Operating temperature	-20 °C to 55 °C
Vibration	Qualified for launch, details upon request
Certification	IPC 610-E Class III (RoHS)
SOFTWARE SUPPORT	
Operating System and software	SpaceCloud OS (Linux)
SpaceCloud Framework	Supported
Containerized development flow	Supported

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