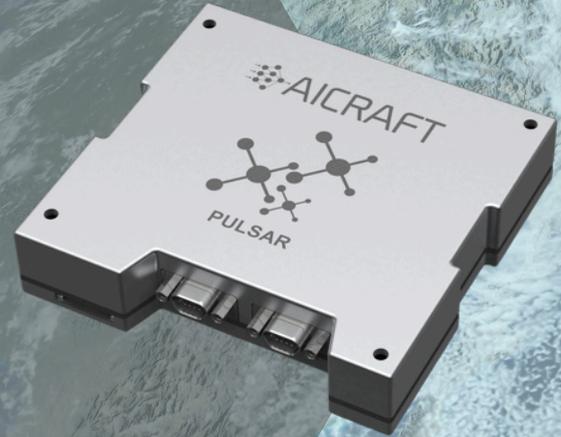# AICRAFT

SPACE EDGE COMPUTING MODULE

PULSAR

Pulsar is a world-class edge computing module offering power efficient ultra-high-speed data processing of both conventional algorithms and artificial intelligence (AI) models.

With 90 TOPS peak AI performance, this device delivers powerful and timely processing in a small form factor and power consumption.

A unique range of 16 computing levels means power is never overspent and computation time is always optimal.

Another key benefit is a configurable Error Detection and Correction (EDAC) scheme providing lower power, rad-hard level (default) integrity checks of critical data such as ML weights, bootup parameters and more. The scheme trades off reliability, power consumption and computational latency with simplicity through selectable settings.

Custom and third-party libraries can be installed through a software interface and via Docker containers to run a variety of models with leading AI frameworks such as Keras, TensorFlow, Pytorch, Caffe2, Darknet (YOLO) and more.

Product applications

- Earth Observation
- Satellite Operations
- Federated Learning
- Data Compression
- Space Domain Awareness
- Synthetic Aperture Radar
- Radiometric Calibration
- Super Resolution

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Key benefits

→ Ultra-high-speed data processing with AI support
→ 16 performance levels for most energy-efficient utilisation
→ Reliable and consistent with unlimited on-orbit reconfiguration
→ Configurable EDAC scheme up to rad-hard level protection to SEEs.

Technical specifications

Computing performance	
Processor	Multi-core ARMv8, 64-bit operations
ML co-processor	90 TOPS peak performance
RAM	4 GB DDR4 SDRAM with ECC (up to 8 GB)
Storage	64 GB SLC NAND with ECC (up to 512 GB) 16 Mb rad-hard-equivalent memory with EDAC

Interfaces	
RS-422	1x 115200 bps (options: 230400, 500000, 921600, and 1843200)
Ethernet	1x 1 Gbps (options: 2.5 Gbps, 10 Gbps)
USB 3.0	1x 5 Gbps (compatible with USB 2.0)

Software	
Operating system	Linux (option: RTOS)
ML compiler	Supports common frameworks (e.g., Keras, Pytorch, Darknet)
Custom libraries	Cloud coverage, ship segmentation, compression, others

Sensors	
Vibrations	3-axis lateral and 3-axis longitudinal
Temperature	Device, processor, co-processor
Power monitors	Device (total power), processor, co-processor

Other properties	
Input voltage	5VDC
Power consumption	7W (nominal)
Mass	400g
Dimensions (L x W x H)	95mm x 90mm x 24mm
Operating temperature	-20^{0}C to $+55^{0}$C