



OSS
ONE STOP SYSTEMS

AI TRANSPORTABLES BUYERS GUIDE
MISSION-CRITICAL AI
HARDWARE SOLUTIONS



ISO 9001:2015 CERTIFIED

HIGH PERFORMANCE APPLIANCES FOR MISSION-CRITICAL AI

In response to the increasing demand for artificial intelligence (AI) in military applications, high performance computing appliances (HPCAs) are designed for AI-driven autonomy in land, air, and maritime operations. These HPCAs provide the necessary computing power for AI applications while minimizing latency, implementing the latest technologies in high-speed data centers, input/output, networking, and storage to operate in harsh environments. They meet stringent MIL-SPEC requirements for shock and vibration, redundancy, operating temperature range, height range, and uninterruptible power supply, ensuring reliable performance in critical scenarios. These platforms must function in space-constrained environments, making it essential to minimize the size, weight, and power (SWaP) of the systems.



COMPUTE POWER FOR THE MOST **EXTREME** ENVIRONMENTS

Ruggedized design

- › Shock and vibration resistance & extended temperature range
- › Aluminum / composite enclosure and retention bars for GPUs
- › In-house engineering & testing
- › Variable power supply via AC/DC & DC/DC



Remote management (U-BMC)

- › Configuration, user management, updates, data logging, remote access
- › Resource monitoring, alerts, performance data collection
- › Remote and hardware control, access restriction, automation



Liquid and immersion cooling

- › Direct-to-chip cooling option
- › Single phase immersion
- › Two phase immersion
- › Hybrid solution available



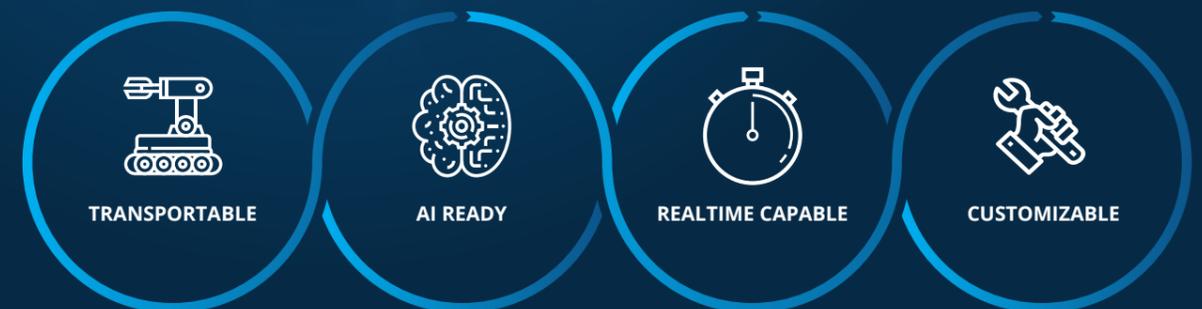
State-of-the-art PCIe / GPU standards

- › Available with PCI Express standards Gen 5 and higher
- › Support for the latest GPU models (e.g., NVIDIA® RTX or Quadro®)
- › Comprehensive NVIDIA® solutions and SDKs for AI applications



Rigel Edge Supercomputer (see specs on page 12)

RUGGEDIZED HPC PLATFORMS



OUR SERVICES - COMMITTING TO EXCELLENCE



Consulting service

Guaranteed free consultation for your project

- › Individual consultation and solution finding
- › State-of-the-art solutions
- › Product presentation and lending service
- › Industry and technology experts
- › Via phone, video call, or on-site



OEM / production services

System engineering, specification, detailed design and regulatory compliance (commercial, medical, aerospace, and military)

- › Optimized for expedited build of short-run, high-spec, difficult to test items, and prototypes
- › Integration with client supply-chain strategies (supplier-managed inventory, hot-spares, etc.)
- › Expertise in extreme temperature ranges for systems with challenging heat generating components using advanced thermal design for air & liquid solutions



Lifecycle management

Professional lifecycle management service for reliable system and component availability

- › Product Change Management
- › Ensured availabilities (beyond market availability)
- › End-of-Life Monitoring



Built-to-order systems

Designing, developing, and manufacturing customized systems

- › Hardware and software development
- › Prototyping and validation
- › Quality control and testing
- › Documentation and certification
- › Production and supply chain management
- › Service and maintenance



Testing & certification

Comprehensive validation and certification services

- › Competitively-priced with extraordinary quality (ISO 9001/AS9100-D process)
- › 12 to 48 hours stress tests
- › Generation of test reports
- › Providing certification documents
- › Support for certifications and regulatory challenges



RMA services

Return, repair, and replacement of malfunctioning hardware under warranty inspection

- › Fault analysis and diagnosis
- › Repair and replacement
- › Warranty inspection and processing
- › Firmware and software updates
- › Data backup and recovery
- › Logistics and return management



AS9100 & ISO 9001:2015 certification

Manufacturer One Stop Systems has received ISO 9001:2015 and AS9100D certification from SAI Global. This covers the following scope of certification: design, manufacture and supply of industrial computers for the media and entertainment, financial, oil and gas, medical, aerospace, defense and other industries requiring similar products and services worldwide.

AS9100 is a quality management system developed to fill the gaps that aerospace companies have identified in the ISO 9001 standard in terms of how they conduct business for their customers. It was originally approved in 1999 and has since undergone four revisions, culminating in our current version, AS9100D.

A quality system is a formal system that documents procedures and processes to meet customer requirements. When you have a quality system, your customers know that you have a complete system in place to produce the product or service you provide in a high-quality, repeatable manner while meeting all regulatory requirements. Through the risk and opportunity assessment conducted as part of the AS9100 process, there are always opportunities to improve your business or enhance your customers' experience.



What do the MIL-STD standards mean?

Standard	Meaning and scope
MIL-STD-810	A set of standardized test methods for the U.S. military, defining, among others, the compatibility of equipment in dealing with high temperature fluctuations, atmospheric pressure, humidity, vibration, or solar radiation.
MIL-STD-461	Specification of electromagnetic compatibility requirements for military products and solutions.
MIL-STD-464	Establish environmental electromagnetic interface requirements and test criteria for air, sea, space, and ground systems, including associated ordnance.
MIL-STD-704	Ensure compatibility between the aircraft electrical system, external power supply, and airborne equipment.

AI ACCELERATED APPLICATION FIELDS



Air Force



Ground Force



Naval Force

Natural Language Processing of Large Language Models (NLP/LLM)

Our advanced solutions enable the seamless processing of vast volumes of unstructured text data, unlocking invaluable insights from intelligence reports, open-source intelligence, and communications intercepted in various languages. By efficiently analyzing and understanding this linguistic data, military analysts can derive actionable intelligence, identify emerging threats, and forecast enemy activities with unprecedented precision.



Electronic Warfare (EW)

Our state-of-the-art HPC systems greatly expand the boundaries of electronic dominance, enabling unparalleled capabilities in jamming, deception, and electronic countermeasures. Supporting advanced signal processing and machine learning algorithms, our appliances swiftly analyze vast volumes of electronic signals, detecting and identifying enemy radars, communication systems, and other electronic threats.



Autonomous Land, Sea and Air Vehicles

Powered by the unparalleled capabilities of our ruggedized HPC servers and storage expansions, these advanced systems serve as the backbone of AI-driven technology in autonomous vehicles, enabling them to process massive amounts of data from specialized sensors like video, radar, and LIDAR. From unmanned surface ships traveling thousands of nautical miles without a crew to automated underwater vehicles (UUVs) conducting mine countermeasures, our HPC appliances play a pivotal role in ensuring seamless operations and mission success.



Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance (C5ISR)

Our GPU accelerated systems serve as a formidable force multiplier, enabling military staff to process vast volumes of data at unprecedented speeds, unlocking critical insights, and facilitating real-time decision-making. From accelerating complex simulations for mission planning to rapidly analyzing intelligence data from diverse sources, our rugged supercomputers optimize battlefield situational awareness.



Signal Intelligence Processing (SIGINT)

Our high-end solutions redefine the landscape of intelligence gathering and analysis, empowering military agencies to efficiently intercept, collect, and analyze vast amounts of complex signals data from various sources. With lightning-fast processing capabilities, our HPC appliances enable real-time signal detection, identification, and decryption, providing critical insights into adversaries' communications and activities. The integration of advanced algorithms and machine learning techniques enhances the accuracy and speed of SIGINT analysis, revealing hidden patterns and uncovering potential threats.



Simulation

OSS supercomputers reformulate the landscape of military training and preparedness, enabling realistic and immersive simulations of complex scenarios. With massive computational power and high-speed data processing, our rugged HPC appliances can run large-scale simulations involving multiple entities, such as ground forces, aircraft, and naval fleets, replicating real-world environments with unprecedented accuracy. These simulations facilitate tactical training, mission planning, and decision-making exercises for soldiers and staff, fostering critical skills and enhancing operational readiness.



USE CASES

Cernis & Donati - Army AI program application example

- › 360° Situational Awareness with PCIe Interconnect
- › Sensor Concentrator & AI Applications for manned and unmanned army vehicles
- › 6-times higher bandwidth than 10GB-Ethernet (64GB)
- › PCIe Network to reduce latency 800x versus Ethernet (150ns)

Air Force

- › Aerospace prime contractor developing an AI-based threat detection system aboard U.S. Navy aircraft
- › Civilian „connected aircraft“ that use on-board AI and SATCOM or 5G wireless links to collect data on aircraft operational performance and process it on the spot

Navy

- › AI-based maritime monitoring and analysis systems onboard ships to automate the detection of faulty systems for maintenance purposes
- › Embedded AI capabilities in shipboard defensive and offensive mission systems designed for rapid awareness and reaction to threats

Army

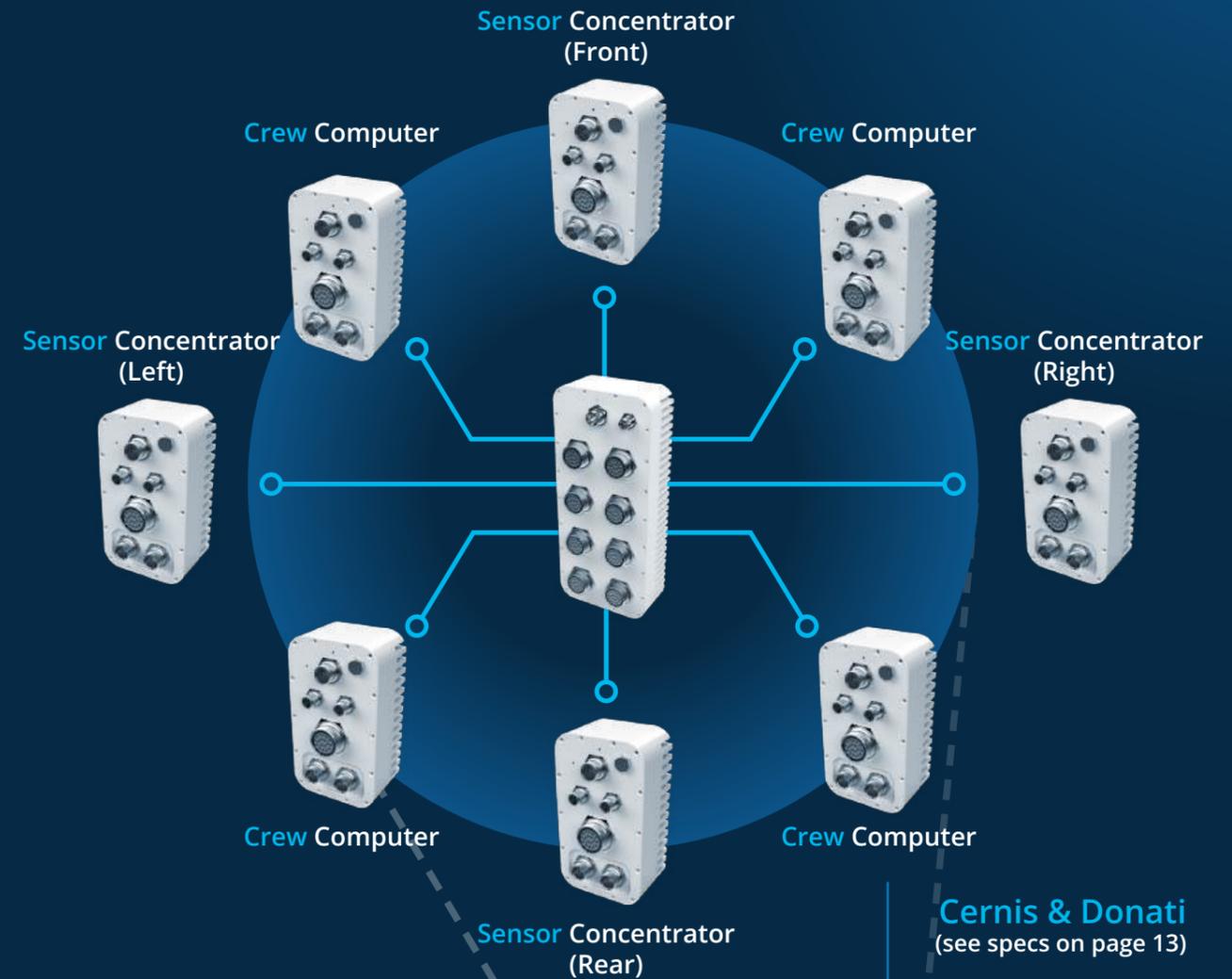
- › Automated targeting systems using advanced sensors, machine-learning algorithms and touchscreen displays to enable army tank crews to detect and respond to incoming threats faster than ever before
- › Truck-mounted mobile radar systems provide ISR (Intelligence, Surveillance and Reconnaissance)

Cybersecurity and Drone Control

- › AI cybersecurity applications monitor real-time access to industrial assets at manufacturers and utilities, track authorized access, and detect patterns indicative of cyberattacks
- › Enabling cooperative behavior between aerial or land drones (military or civilian)

AI “in the Field”

- › Portable military command centers that use AI „in the field“ - i.e., in close proximity to the battle - to quickly process a flood of tactical information into a comprehensive and intelligible picture of the battlefield
- › Specialized high performance edge computing equipment tied to a myriad of video, radar and LIDAR sensors, high capacity and low latency storage subsystems for fast decision-making



3U-SDS (SHORT DEPTH SERVER)

Rugged PCIe Gen 5 Short Depth Server for AI applications and data logging



Air, liquid or immersion cooling

- › Air cooling: Ruggedized fan cooling
- › Liquid cooling: Direct-to-chip liquid cooling
- › Immersion cooling: Cooling by immersion in coolant (single- or two-phase)



CUSTOMIZED TO FIT YOUR MILITARY AI APPLICATION



Rugged server design

- › Size and weight optimized aluminum chassis with a depth of 50.8cm / 20"
- › Resilient frame-in-frame design
- › MIL-STD-810G certified



High performance GPUs

- › Integrate up to four 350W GPUs
- › State-of-the-art server-level GPU models
- › Comprehensive NVIDIA® solutions and SDKs for AI applications



Hot-swap storage

- › Removable hot-swap storage canisters
- › Up to 16x SATA / SAS / NVMe drives
- › Up to 1 petabyte NVMe storage with 64 GB/s (16x 64 TB NVMe)



Remote management (U-BMC)

- › Configuration, user management, updates, data logging, remote access and automation
- › Resource monitoring, alerts, performance data collection



PCIe Gen 5 standard

- › Up to 7x PCIe x16 slots
- › Up to 4x dual-slot GPUs
- › Up to 320 GB/s GPU computing power



Customization

- › Configurable front and rear panels
- › Advanced power supply up to 400Hz AC
- › Immersion, liquid, or air cooling options available
- › Customized solutions as an option



Gen 5 3U SDS dual drive packs

- › Data logging configuration with a focus on storage
- › Up to 2x 350W GPUs + standard NIC / RAID / FPGA I/O
- › Up to 16 NVMe / SATA drives (2x hot-swap canisters)



Gen 5 3U SDS one drive packs

- › Balanced GPU / storage configuration
- › Up to 4x 350W GPUs + standard NIC / RAID / FPGA I/O
- › Up to 8 NVMe / SATA drives (1x hot-swap canister)



Gen 5 3U SDS zero drive packs

- › Configuration with a focus on GPUs and inputs/outputs
- › Up to 4x 350W GPUs plus 75W per slot for I/O options
- › Two swappable NVMe / SATA / M.2 drives

RIGEL EDGE SUPERCOMPUTER

Cutting-edge high performance supercomputer supporting extreme airborne, marine, or terrestrial environments



Air, liquid or immersion cooling

- › Air cooling: Ruggedized fan cooling
- › Liquid cooling: Direct-to-chip liquid cooling
- › Immersion cooling: Cooling by immersion in coolant (single- or two-phase)



Thermally and structurally optimized

- › Ruggedized 4U, 1/2-width, 26-inch depth compact formfactor with lightweight aluminum frame design
- › Thermal and structural optimized for transportable environments
- › MIL-STD-810G / MIL-STD-461 to airborne prop aircraft
- › -20 to 50°C operating temp. (-40 to 65°C with liquid immersion)



High performance GPUs

- › 4x NVIDIA® HGX A100 SXM GPUs with 320GB GPU memory
- › 2.4TB/s total GPU aggregated bandwidth
- › 78 teraFLOPS of FP64 HPC performance



Remote management (U-BMC)

- › Configuration, user management, updates, data logging, remote access and automation
- › Resource monitoring, alerts, performance data collection



NVIDIA industrial edge certified

- › For systems in vehicles, "at the data" or in industrial or rugged environments
- › The only SXM GPU based system to meet this qualification

CERNIS AND DONATI

MIL rugged scalable small form factor (SFF) AI compute system

The Cernis small form factor (SFF) NVIDIA® Jetson Orin™ with integrated PCI Express 4.0 switch fabric is the cornerstone of an expandable edge AI mission computing system for high-end AI applications such as sensor fusion, natural language processing, autonomy, situational awareness, and signal intelligence, all in a SWaP optimized package.

While powerful on its own, Cernis' capabilities are fully realized when paired with up to 24 Donati NVIDIA® Jetson Orin™ AGX mission computers using an OSS PCIe fabric. This combination forms a low-latency, high-speed mission compute system designed for demanding AI applications in harsh environments. With AI inference performance up to 6.6 PetaOPS, data fabric speeds over 150GB/s, and advanced PCIe switching, the Cernis/Donati scalable AI SFF compute system delivers datacenter power to the rugged edge.



360° situational awareness (360SA) applications (application example on page 9)



SWaP optimized design

- › MIL rugged scalable small form factor (SFF) with milled aluminum and flange mount (MIL-STD-810G certified)
- › -40 to 85°C operating temperature at 10,000ft altitude
- › Shock: ± 10 g, 11 msec, half-sine pulse, 3 shocks per axis
- › Vibration: 4.5 Grms, 10 to 2000 Hz



High performance, low-power

- › NVIDIA® AGX Orin™ compute node with AI processor for embedded autonomy and AI
- › Low-power switch with embedded ARM / GPU Orin™ Nano management processor



Multicast

- › Data written to main memory accessible by all endpoints via PCIe switch simultaneously
- › Significantly reduced latency compared to several unicast writes
- › OSS using Orin™ as root complex and endpoints for Cernis/Donati architecture



Real-time capability

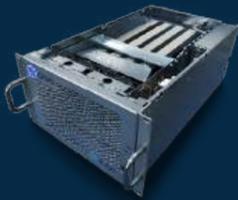
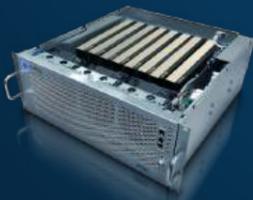
- › Satisfies a variety of AI processing missions such as 360° situational awareness (1x Cernis and up to 8x Donatis)
- › Deployment for serving real time fused video and sensor data to ground forces

COMPARE HPC APPLIANCES



Rugged compute systems

PCIe and storage expansions

Model	Gen5 3U-SDS	Rigel Edge Supercomputer	Cernis & Donati	EB4400	Gen5 4U Pro	Centauri	Model
							
CPU	AMD EPYC™ 9004 (Genoa) Series Processors up to 400W TDP	AMD EPYC™ 7003 CPU Single socket SP3 (LGA4094)	6-core Arm® Cortex®-A78AE (Cernis) 12-core Arm® Cortex®-A78AE (Donati)	-	-	-	CPU
GPU	Full height, full length	4x NVIDIA® A100 SXM GPUs 320 GB GPU storage 3. Generation NVLink 2.4 TB/s aggregated total bandwidth	1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores (Cernis) 2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores (Donati)	-	-	-	GPU
RAM	8x DDR5 4800/4000 RDIMM slots per CPU socket, up to 2TB DDR4 memory	8x ECC DDR4 RDIMM/LRDIMM slots (supports modules up to 128GB)	8GB 128-bit LPDDR5 (Cernis) 64GB 256-bit LPDDR5 (Donati)	-	-	-	RAM
Storage Capacity	12GB SAS-3 or 6GB SATA-3 SFF-8680 slots, NVMe x4 32Gb slots	PCIe 4.0 x4 NVMe M.2 slot	64GB eMMC 5.1	-	-	Up to 8x U.2/U.3 PCIe 3.0 or 4.0 NVMe SSDs with 128TB per 3U system (15.36TB NVMe drives)	Storage Capacity
PCIe Expansions	5x PCIe 5.0 x16 FH, 10.5" length slots	4x PCIe 4.0 x16 HHHL slots	-	Backplane Dual OSS-538: 1x Single-Width PCIe 4.0 x16 FHFL 4x Dual-Width PCIe 4.0 x16 FHFL Backplane Dual OSS-521: 1x Single-Width PCIe 4.0 x16 FHFL 6x Single-Width PCIe 4.0 FHFL 1x Dual-Width PCIe 4.0 x16 FHFL	Backplane Single / Dual OSS-580: 1x / 2x Single-Width PCIe 5.0 x16 FHFL 4x / 8x Dual-Width PCIe 5.0 x16 FHFL Backplane Single / Dual OSS-581: 1x / 2x Single-Width PCIe 5.0 x16 FHFL 6x / 12x Single-Width PCIe 5.0 FHFL 1x / 2x Dual-Width PCIe 5.0 x16 FHFL	1x PCIe 4.0 x16 SFF-8644 host uplink for connecting several Centauri systems	PCIe Expansions
I/O	2x RJ45 10GBE Ports from Intel® 1210-AT, 1 x RJ45 Dedicated IPMI LAN port from RTL8211E 2x USB 3.2	4x RJ-45 10/100/1000 3x RJ-45 Unified Baseboard Management 2x USB-C 1x VGA	2x Gigabit Ethernet ports	1x PCIe 4.0 x16 host-to-target uplink kits 2x PCIe 4.0 x16 host-to-target uplink kits SmartNIC host	1x PCIe x4 x16 host-to-target uplink 2x PCIe x4 x16 host-to-target uplinks 4x PCIe x4 x16 host-to-target uplinks SmartNIC host	2x RJ-45 Ethernet ports (for web server GUI access)	I/O
Chassis	Lightweight aluminum alloy (3U) Black anodized chassis	Lightweight aluminum alloy (4U) Black anodized chassis	Milled aluminum, flange mount	Rackmount steel chassis (4U)	Rugged frame chassis (4U)	Aluminum chassis (3U)	Chassis
Cooling	6x 40x56mm and 1x 80x38mm high powered fans mount Liquid- or immersion-cooled configurations available	2x 80 x 80mm CFM PWM controlled GPU fans 4x 80 x 28mm PWM controlled server fans Liquid- or immersion-cooled configurations available	Fanless	3x 92mm (180CFM) fan standard PWM controlled Optional IPMI system monitoring Optional Quadrafoam 45 PPI removable fan filters	3x 180CFM 120mm fans Default PWM controlled based on built-in temperature sensors Optional Quadrafoam 45 PPI Replaceable Fan Filters	BMC and fan control	Cooling
Power Supply	tba	90-264VAC (47-63Hz) 110VAC (400-800Hz) 3Ø 180-300 VDC 48 VDC	12-36VDC	Single / Dual AC 2600W power supply Single / Dual AC 1600W power supply Single / Dual DC 1600W power supply	Single/Dual AC 2600W Single/Dual AC 1600W Single/Dual DC 1600W	Dual 1600W redundant power supplies: 100-240VAC full range 48VDC 50/60Hz	Power Supply
Temperature	Operation: -20° ~ 50°C Storage: -40° ~ 70°C	Operation: 0° ~ 35°C Storage: -40° ~ 71°C	Operation: -40° ~ 85°C (10,000ft altitude) Storage: -40° ~ 85°C (10,000ft altitude)	Operation: 0° ~ 35°C; short-term: -5° ~ 40°C Storage: -40° ~ 71°C	Operation: 0° ~ 35°C Storage: -40° ~ 71°C	Operation: 10° ~ 50°C Storage: -40° ~ 71°C	Temperature
Weight	20.4kg (45.0 lbs)	22.7kg (50.0 lbs)	Cernis: 8.6kg (19.1 lbs) // Donati: 4.8kg (10.6lbs)	24.9lbs (11.3kg) - w/o GPUs	38.0lbs (17.2kg)	13.0lbs (5.9kg)	Weight
Dimensions	487.7 x 132.1 x 508.0mm	177.8 x 218.4 x 678.1mm	tba	271.8 x 177.8 x 470mm	436.9 x 177.8 x 469.9mm	215.9 x 133.4 x 508mm	Dimensions
Regulations	RoHS 3, WEEE	FCC, ICES-003, CE, CISPR 22, RoHS 6 von 6, WEEE, MIL-STD-461E	FCC, Class A Canada ICES-003, issue 4, Class A, CE Mark (EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3) CISPR 22, Class A	FCC Class A, CE, UL, cUL, RoHS3	Agency Certifications (testing pending): FCC Class A, CE Safety & Emissions, UL, cUL, RoHS3	FCC Class A, ICES-003, UL/IEC 60950-1, CE, CISPR 22, WEEE & RoHS 3	Regulations
Use Cases	High-Speed Transportable Data Recorder / Logger	Airborne, Naval or Ground-Based Transportable AI Applications	Situational Awareness, Sensor Fusion, Natural Language Processing, Autonomous Vehicles, MIL Rugged Computing	Airborne, Naval or Ground-Based Transportable Semi-Rugged AI Applications	Entire AI Workflows at the Edge	Transportable Data Capturing, Mobile Storage Expansion	Use Cases



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