WOLF Advanced Technology

GREY WOLVES UNLEASHED: RUGGEDIZED HPC FOR MISSION SUCCESS

– WHITEPAPER

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WOLF ADVANCED TECHNOLOGY

INTRODUCTION

The modern battlespace is no longer defined by territory or terrain—it's defined by data. In this relentless domain, where sensors never sleep and milliseconds decide missions, only computing systems that can both think fast and endure truly belong. Yet the environments where these systems must operate—deserts, high-altitude flight, maritime conditions—are profoundly hostile to conventional electronics.

Off-the-shelf GPUs can dazzle in controlled labs but stumble under shock, vibration, or extremes of temperature. The Grey Wolves exist to close that gap. The Grey Wolves are WOLF Advanced Technology's dedicated engineering division for ruggedized high-performance computing, focused on delivering AI acceleration and data processing at the tactical edge. Our 3U and 6U VPX systems embody the principle that high-performance computing must not only calculate—it must endure.

The Grey Wolves' expertise is broad but precise: NVIDIA GPUs, Mellanox and Broadcom interconnects, AMD Xilinx FPGAs, and the memory technologies that bind them together. We walk the leading edge of NVIDIA's roadmap, from Ada and Blackwell devices to Jetson Orin and the upcoming Jetson Thor, ensuring our platforms evolve in step with the most advanced silicon.

Guided by SOSA (Sensor Open Systems Architecture), MOSA (Modular Open Systems Approach), and CMOSS (C4ISR/EW Modular Open Suite of Standards) principles—and reinforced by proven cooling and ruggedization strategies—Grey Wolves' designs are not simply machines. They are distilled knowledge—battle-tested wisdom engineered into silicon and steel. At WOLF Advanced Technology, the Grey Wolves are the embodiment of resilience and performance, standing as trusted companions wherever missions demand the impossible.

TECHNICAL ARCHITECTURE

Grey Wolves designs and manufactures ruggedized compute architectures that transform raw sensor data into real-time intelligence across air, land, sea, and space.

At the core of Grey Wolves solutions are ruggedized NVIDIA GPUs, optimized for conduction cooling and resilience in VPX-based deployments. Jetson AGX Xavier, Orin, Thor, and Blackwell-class devices bring high-throughput AI inference to the tactical edge. FPGAs complement this role with low-latency video capture, encoding, and routing—an elegant pairing where preprocessing meets acceleration. PCIe 4.0, and up to PCIe 5.0 where supported, along with Spectrum-class Ethernet fabrics, form the high-speed backbone, while optical interconnects extend bandwidth across distributed sensor and compute networks. Each element is tuned not for theoretical benchmarks, but for real-world missions where milliseconds matter.

PRODUCT PORTFOLIO

Grey Wolves' platforms embody modularity and foresight:

- SOSA-aligned VPX, XMC, and MXM modules integrating GPUs, ARM processors, and FPGAs
- Advanced interconnects leveraging Mellanox and Broadcom Ethernet/PCIe switching
- FPGA video I/O processors for precision sensor integration
- Battle-proven thermal solutions balancing power efficiency with survivability

CHART I. GREY WOLVES' MODULES & FEATURES (SIMPLIFIED)

MODULE	SKU/NAME	FORM FACTOR	GPU/SOC	COMPANION SILICON	Video I/O	Output	Cooling	BEST FOR / NOTES
1636	VPX3U-BW5000E-VO-HPC	VPX 3U	Blackwell RTX 5000	—	Optional front-panel DP (lab/demo)	DP (optional)	TBD	Flagship AI/HPEC; maximize TOPS per slot
163L	BW5000 + ConnectX-7	VPX 3U	Blackwell RTX 5000	ConnectX-7 SmartNIC	—	—	TBD	All-in-one GPU + SmartNIC for sensor ingest / RDMA
163S	Blackwell 2000	TBD	Blackwell RTX 2000	—	—	—	TBD	Pending confirmation whether to include
1537	AD5000 + FGX2 (CV)	VPX 3U	Ada RTX 5000	FGX2 (video conversion)	SDI / ARINC 818 via FGX2	—	TBD	Bridge legacy sensors to GPU; ideal for ISR/SIGINT video chains
153L	AD5000 + ConnectX-7	VPX 3U	Ada RTX 5000	ConnectX-7 + PCIe Gen4 switch	—	—	TBD	Ada alternative to 163L; best for refresh paths / Ada programs of record
14T0	Orin CX7 FGX2 SBC ("Katana")	Arm SBC	Jetson Orin (Arm)	ConnectX-7 + FGX2	DP/HDMI + SDI	DP/HDMI	TBD	SWaP-tight edge AI & autonomy; secure SBC
1570	AD2000 + FGX2 I/O	VPX 3U	Ada RTX 2000	FGX2	Rich SDI / ARINC 818 I/O	—	TBD	Lower-power Ada (~100 W); ideal for UAV pods/turrets
2638	Dual Blackwell RTX 5000	VPX 6U	Dual Blackwell RTX 5000	—	Up to 8 DP outputs	Up to 8 DP	TBD	Next-gen dual-GPU HPEC; flagship 6U page spread
2538	Dual Ada RTX 5000 — AC, CC, LTF	VPX 6U	Dual Ada RTX 5000	—	—	—	TBD	Mature dual-Ada; for Ada-standardized programs; first LFT card in 6U VPX format

Image I. WOLF's 3U VPX 14T0 board

Image II. WOLF's 3U VPX 163L board

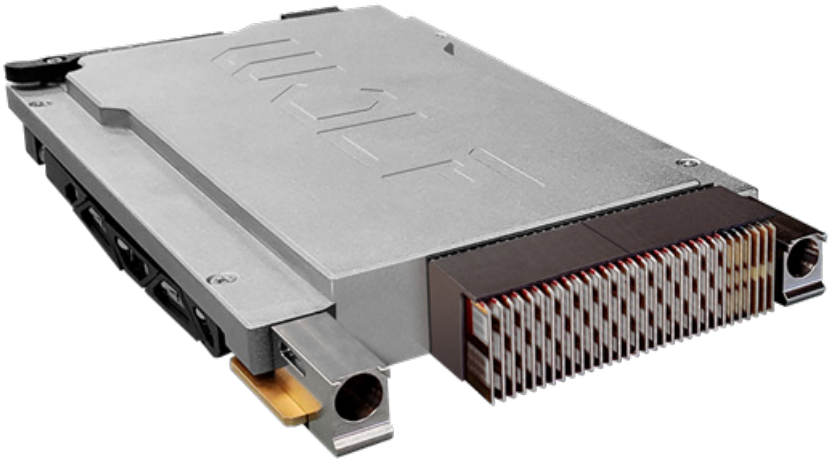
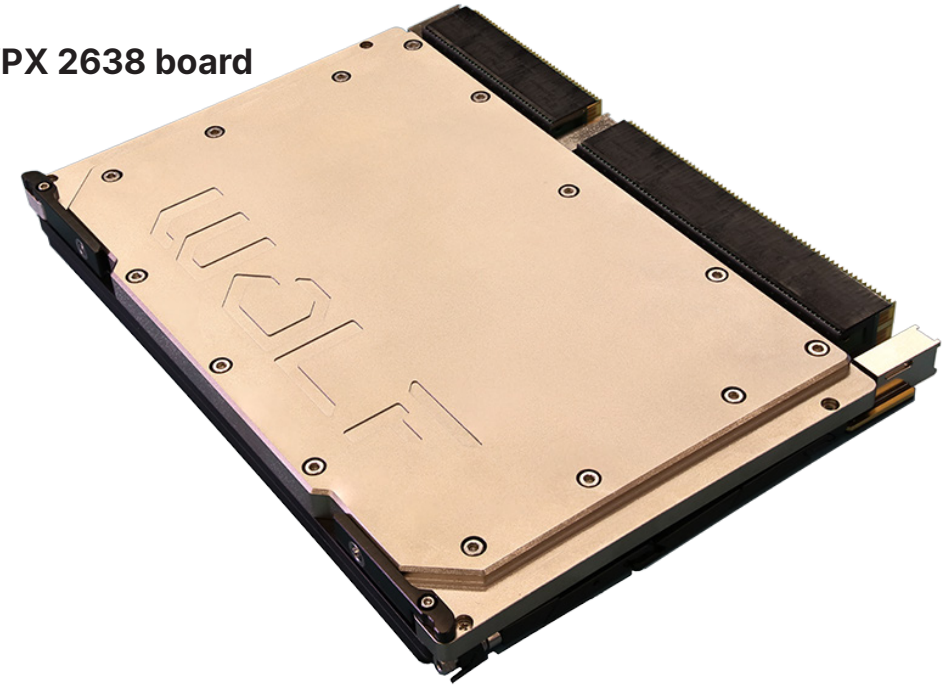


Image III. WOLF's 6U VPX 2638 board



RUGGEDIZATION METHODOLOGIES

True ruggedization is not cosmetic—it is foundational. Grey Wolves systems are engineered for survival in mechanical, thermal, electrical, and environmental extremes.

Conduction cooling, advanced thermal plates, and robust chassis designs ensure reliable performance across –40°C to +85°C, with options for pressurized or unpressurized environments. Compliance with MIL-STD-810H and DO-160 standards validates resistance to shock, vibration, and EMI/EMC interference.

Power regulation is optimized to protect critical components during fluctuations, while mechanical and thermal design practices guarantee stable performance in harsh airborne and ground-based conditions.

Lifecycle planning aligns with aerospace and defense supply chains, ensuring systems remain dependable for the long haul.

KEY INNOVATIONS

Over the years, the Grey Wolves have consistently anticipated the needs of next-generation missions and translated them into ruggedized computing breakthroughs. They have pioneered GPU-accelerated ISR pipelines that process video, radar, and lidar at speeds once thought unattainable. Their hybrid FPGA-GPU architectures bring balance—marrying throughput with real-time responsiveness so that missions never need to trade speed for reliability.

They have extended bandwidth through PCIe 4.0 and, where hardware allows, up to PCIe 5.0, while optical interconnects now allow compute power to be distributed seamlessly across networked systems and platforms. Perhaps most importantly, the Grey Wolves have aligned their roadmap with NVIDIA's, ensuring that Blackwell-class GPUs and future accelerators arrive in ruggedized form the moment missions demand them. Each of these innovations reflects not a chase for novelty but a deep understanding of enduring operational requirements.

APPLICATIONS

Grey Wolves platforms have proven indispensable across defense and aerospace domains. In defense, they accelerate real-time signal analysis for electronic warfare and enable seamless fusion of video feeds from multiple ISR sensors, enhancing situational awareness on the battlefield. In aerospace, they serve as rugged AI copilots, supporting avionics systems with image recognition and mission computers that extend autonomy for both crewed and uncrewed aircraft.

In every case, Grey Wolves systems transform data into actionable intelligence, precisely when and where it matters most.

CUSTOMER BENEFITS

Adopters of Grey Wolves solutions receive more than hardware—they gain assurance in performance, agility, longevity, and resilience.

- Supercomputer-class acceleration without exceeding SWaP constraints
- Low-latency decision-making through FPGA-GPU synergy
- Future readiness aligned to NVIDIA's roadmap
- Proven ruggedness validated against aerospace and defense standards

The benefit is not only performance today but continuity tomorrow.

CASE STUDY EXAMPLE

The Grey Wolves' products are embedded across a wide spectrum of mission platforms, from the smallest unmanned systems to the largest naval assets. Their rugged 3U and 6U VPX modules can be found in drones, missiles, tanks, helicopters, fighter jets, and aircraft carriers—each system tailored to the unique demands of its environment.

The 3U boards, with their compact form factor and optimized SWaP profile, are particularly well suited for space-constrained applications such as drones, UAV pods, and missile systems, where every gram of weight and watt of power matters. Despite their smaller size, these modules deliver uncompromising performance, ensuring tactical platforms can process sensor data and run advanced AI workloads without delay.

By contrast, the larger 6U boards are frequently deployed in platforms that can accommodate greater compute density, such as tanks, helicopters, and naval vessels. In these environments, the additional real estate allows for dual-GPU configurations, expanded I/O, and higher bandwidth interconnects—capabilities that are essential for advanced ISR, C4ISR, and electronic warfare missions.

Together, the 3U and 6U families provide a complementary balance of agility and power, enabling Grey Wolves technology to serve across domains and mission sets with the right level of performance, precisely where it is needed most.

ROADMAP AND FUTURE DEVELOPMENT

Looking forward, the Grey Wolves continue to chart the course for ruggedized high-performance computing. The deployment of NVIDIA Blackwell GPUs is already underway, bringing cutting-edge acceleration into defense and aerospace systems. Work has begun on adopting PCIe 6.0 and Spectrum-4 Ethernet to deliver the interconnect speeds required by the next generation of data-intensive missions.

Hybrid CPU-GPU-FPGA platforms are also in development to support exascale AI at the edge, ensuring that compute density keeps pace with the exponential growth of mission demands. With each step, the Grey Wolves remain dedicated to staying one stride ahead of operational needs, ensuring their platforms evolve in lockstep with the challenges they are built to meet.

CONCLUSION

Grey Wolves solutions are not simply machines; they are embodiments of applied wisdom—platforms engineered to think quickly, endure deeply, and serve faithfully in the harshest conditions defense and aerospace can impose.

By combining ruggedized GPUs, FPGA video processors, and advanced interconnects, the Grey Wolves ensure organizations can act with speed, confidence, and clarity wherever missions take them.

For those seeking computing systems that embody not just power but foresight, Grey Wolves offers partnership. The time to prepare for tomorrow's mission is now.

The Grey Wolves – leading the pack, leading the industry.

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