



OMNETICS
CONNECTOR CORPORATION

CONNECTOR TECHNOLOGY AT THE TACTICAL EDGE:

Powering the Future of Military
Communications and Wearable Systems

Success on today's battlefield depends not only on firepower or strategy but on data – fast, secure, and reliable.

From rugged laptops in forward-operating bases to soldier-worn electronics deep in the field, digital systems must perform flawlessly in the harshest conditions. Behind these systems lies an often-overlooked enabler: the connector and interconnect assembly. As electronic warfare, unmanned systems, and wearable devices become more sophisticated, the demand for ultra-reliable, miniaturized interconnects has never been greater.

Omnetics Connector Corporation, a U.S.-based leader in high-reliability miniature connectors, is meeting this demand



head-on with solutions designed for the extremes of military, aerospace, satellite and defense environments. These technologies are enabling the next generation of mobility, power efficiency, and digital integration in combat systems across every domain—land, sea, air, space, and cyber.

The Evolving Battlefield: More Devices, More Demands

Rugged electronics have revolutionized how militaries operate. Tablets, unmanned vehicles, and wearable gear help sharpen logistics, improve coordination, and increase lethality. But as systems multiply, so too do the connections between them. Every interface—every cable and connector—becomes a potential point of failure.

Advanced helmets, for instance, now integrate GPS, communications, and heads-up displays with live digital feeds. Internally, signals from various sensors are converted to digital form and routed through (interconnect assemblies or small gauge wires-and cables) to centralized modules. These connections must be small, flexible, and durable—capable of withstanding dirt; vibration, flexing and rapid movement while remaining lightweight and unobtrusive.

Miniaturization Without Compromise

Size, weight, and power (SWaP) optimization is a driving principle in modern defense electronics. Omnetics' Nano-D connectors—engineered to meet or exceed MIL-DTL-32139 specifications—offer 80% less mass than traditional Micro-D connectors, enabling lightweight form factors for soldier-worn and portable devices. Miniaturized connectors are not just smaller—they're smarter. Hybrid connectors combine high-current power delivery with dense digital signal paths in a single housing, simplifying wiring and reducing space requirements. This is especially valuable in soldier systems, where every gram and inch counts. Powering vision devices, communication modules, and GPS units through fewer, multifunctional connections improves system reliability and operational efficiency.

Built to Survive the Extremes

Military operations subject electronic systems to environmental punishment far beyond commercial standards. Connectors must perform in deserts, oceans, mountains, and even space—facing temperature extremes, vibration, shock, and electromagnetic interference.

Omnetics uses advanced materials and robust design principles to engineer for durability:

- Liquid crystal polymers and specialized alloys provide resistance to corrosion, wear, and thermal expansion.
- Gold-plated contacts enable thousands of reliable mating cycles.
- Polyurethane overmolding and sealed housings meet IP67/IP68 ratings for resistance to water, dust, and impact.

In UAV applications, for example, connectors must withstand continuous motion and mechanical vibration. Omnetics addresses this with beryllium copper pins, hardened gold plating, and secure locking mechanisms designed to prevent fretting during flight. The result: sustained performance under shock and stress.

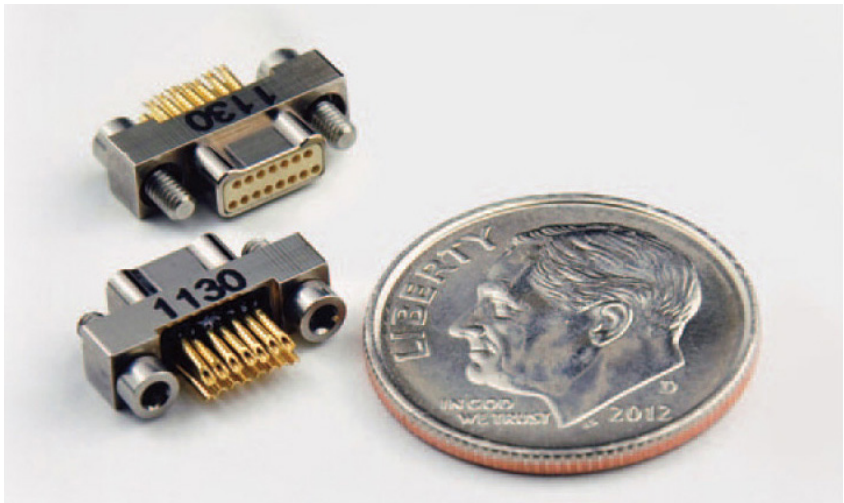
Enabling High-Speed, Secure Communication

Digital warfare depends on reliable data transmission. Command and control systems, radios, and situational awareness platforms all rely on high-speed connectors to route power and signals with minimal latency or interference.

Modern communication systems not only transmit more data—they demand encryption, resistance to signal loss, and flexibility for rapid reconfiguration. Omnetics' Bi-Lobe®, Micro 360®, and Nano 360° circular connectors are engineered for exactly these needs, enabling fast deployment and seamless interoperability across platforms. In 2022, the British Ministry of Defence invested in 1,300 L3Harris Multi-Mode Radios to enhance battlefield interoperability. These systems require robust connectors that support high-data-rate transmission while maintaining portability and battery life in remote conditions. Such deployments underline the vital role of interconnects in modern force structures.

Smart Connectors and Embedded Intelligence

Connectors are no longer passive links—they're becoming intelligent components of the system. Embedded sensors within smart connectors can monitor wear, temperature, and current flow, providing real-time diagnostics that reduce downtime and enable predictive maintenance. This development is particularly



useful in complex platforms where a single point of failure can compromise the mission.

At the same time, connectors rated for space environments—built with low-outgassing polymers and tailored to NASA-level specifications support growing investments in satellite-based military infrastructure. With the space economy already exceeding \$56 billion, the demand for lightweight, high-reliability components continues to rise.

Customized for the Mission

Off-the-shelf is rarely good enough in military systems. Omnetics offers extensive configurations, tailoring every design to match the operating profile, environmental exposure, and mechanical constraints of the mission.

For dismounted troops, connectors must survive submersion, mud, and rapid movement. Omnetics addresses these needs with flexible polyurethane jackets and integrated strain reliefs. For unmanned vehicles, connectors must remain secure during rapid maneuvers and harsh terrain, leading to the use of secure pin/socket designs and ruggedized shells.

The Kilo 360™ Warrior Series exemplifies this mission-specific engineering. Designed to meet U.S. Nett Warrior standards, the connector series supports backward compatibility with legacy systems while reducing form factor and increasing flexibility.

Outlook: Scaling into the Future

Global defense trends point toward increased digitalization, autonomous systems, and multi-platform coordination. According to market projections, tactical communications will reach \$18.8 billion by 2031, while electronic warfare capabilities expand to \$11.8 billion. High-performance interconnects will underpin both developments. Meanwhile, defense platforms are embracing modularity, AI-driven decision tools, and faster network deployment. The connector must evolve as both a mechanical interface and a data-enabling technology. Omnetics, with its emphasis on SWaP efficiency, durability, and customization, is uniquely positioned to lead this transformation.

Conclusion

The smallest components often carry the greatest weight. In today's high-stakes, high-speed battlespace, connectors are more than just hardware—they are the enablers of modern defense capability. Whether embedded in a soldier's gear, a drone's payload, or a satellite's control module, connectors must perform flawlessly in unforgiving conditions. Omnetics Connector Corporation delivers that performance with unmatched attention to durability, precision, and mission relevance. As defense technologies continue to evolve, the interconnect will remain the critical thread tying together people, platforms, and data in the theater of operations.

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