QwikConnect®

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INTERCONNECTS FOR THE Autonomous Battlespace

CABLE ARCHITECTURE AND BOARD-LEVEL SOLUTIONS FOR COLLABORATIVE COMBAT SYSTEMS

Glenair®

INTERCONNECTS FOR The Autonomous Battlespace

Electrical Wire Interconnect and Board-Level Solutions for Autonomous Defense Systems

Modern air combat is undergoing a profound technological transformation. For decades, military planners viewed guided missiles, unmanned aerial vehicles, and manned combat aircraft as distinct platform categories with unique operational concepts and support requirements. Today, those traditional boundaries are rapidly blurring. Advances in artificial intelligence, miniaturized electronics, high-speed data networks, and sensor fusion are driving the emergence of a highly interconnected class of autonomous strike systems.

A landing radar under evaluation in the Quick Test Experimental Pod on NASA Dryden's F/A-18 aircraft prior to flight tests. Such sensor-rich autonomous platforms are integral elements in an emerging AI-supported and edge computing-enabled battlefield network.

This expanding spectrum includes sophisticated guided missiles capable of autonomous target acquisition to advanced uncrewed aircraft operating independently or in tight coordination with manned fighters. Positioned between these two extremes are loitering munitions, expendable attack drones, loyal wingman systems, and collaborative combat aircraft (CCA). While these platforms vary widely in physical size, mission duration, and operational doctrine, they share a foundational reliance on a unified network architecture of electronic subsystems to sense, process, communicate, navigate, and act in real time.

> In these platforms, aircraft and other assets are no longer just standalone weapons systems; but integrated nodes in a networked Joint All-Domain Command and Control (JADC2) system.

Consequently, a platform's battlefield effectiveness is no longer determined by aerodynamics and airframe design alone, but by the performance and synchronization of its underlying electronic architecture. Mission computers, seekers, electronic warfare suites, power distribution nodes, and flight-control electronics collectively dictate modern platform capability. As these individual subsystems increase in speed and complexity,

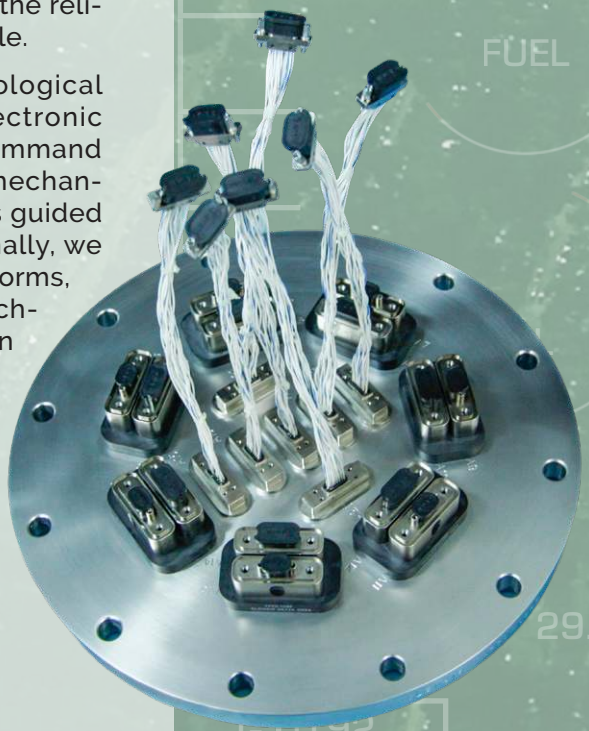
The XQ-58A Valkyrie demonstrator, a long-range, high-subsonic semi-autonomous air vehicle completed its inaugural flight March 5, 2019, at Yuma Proving Grounds, Arizona. The Air Force Research Laboratory partnered with Kratos Unmanned Aerial Systems to develop the XQ-58A as a loyal wingman platform in support of manned fighter aircraft.

the performance demands placed directly on the supporting interconnect infrastructure escalate in lockstep.

Design and field application engineers face a punishing combination of physical and electrical challenges. To guarantee absolute mission success, modern autonomous platforms must survive severe mechanical shock, continuous vibration, radical temperature fluctuations, and highly contested electromagnetic interference. Simultaneously, the vehicle's internal routing network must manage ever-higher digital data transmission throughput and increasing electrical power density, all while adhering to unforgiving size and weight limits.

These operational realities have elevated interconnect technology from a secondary, late-stage design selection into a foundational systems-engineering discipline. Rugged connector assemblies, advanced wire and cable technologies, high-bandwidth fiber-optic lines, integrated shielding, and precision thermal-management interfaces represent critical enabling hardware. Working together as a cohesive infrastructure, these elements ultimately dictate the reliability, manufacturability, and survivability of the entire vehicle.

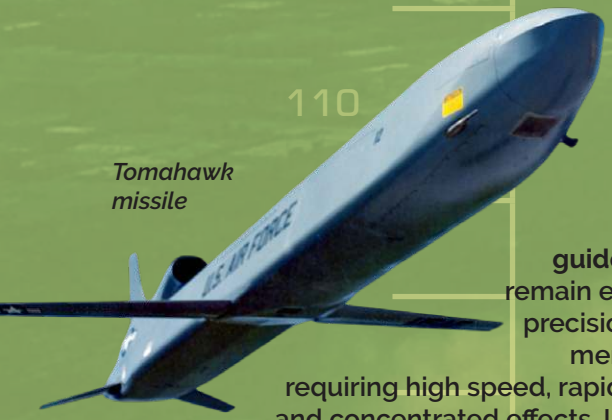
This special edition of *QwikConnect* examines the technological evolution of these autonomous strike assets and the electronic architectures defining them within the Joint All-Domain Command and Control (JADC2) battlespace. We explore the severe mechanical, environmental, and electrical challenges shared across guided munitions, drones, and collaborative combat platforms. Finally, we analyze the interconnect requirements of these unique platforms, presenting the specialized connector, cable, and board technologies employed to network and power the next generation of autonomous aerospace design.



Interconnect hardware serves as the physical backbone for the "system-of-systems" JADC2 network that underpins autonomous platforms and their integration with Low Earth Orbit (LEO) satellite constellations.

THE EXPANDING SPECTRUM OF COLLABORATIVE DEFENSE PLATFORMS

Today's autonomous strike ecosystem encompasses a broad range of platforms.

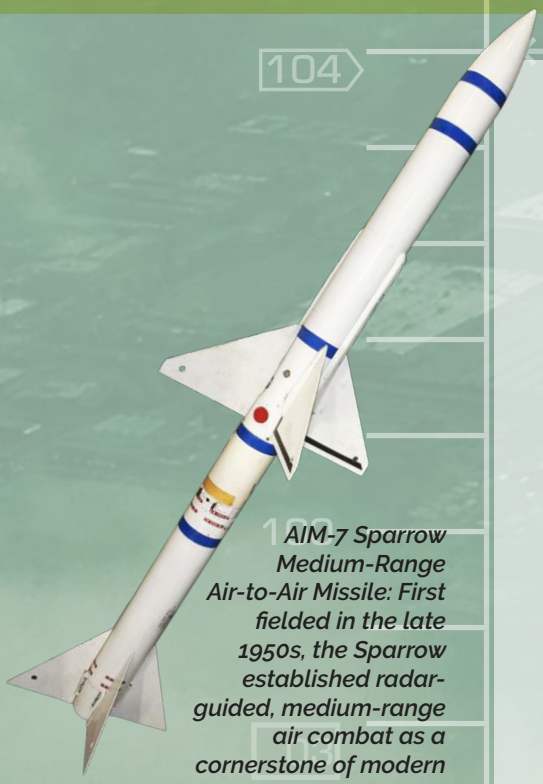


Tomahawk missile

Traditional guided missiles remain essential for precision engagement missions requiring high speed, rapid response, and concentrated effects. Long-range air-to-air missiles, anti-ship missiles, cruise missiles, and precision-guided munitions continue to serve critical roles across every domain of military operations.

Hero-400 loitering munition drone

Loitering munitions occupy an intermediate position between missile and aircraft. They combine autonomous flight capabilities with the ability to search for, identify, and engage targets over extended periods. Rather than following a fixed trajectory, they can adapt to changing battlefield conditions and exploit emerging opportunities.



AIM-7 Sparrow Medium-Range Air-to-Air Missile: First fielded in the late 1950s, the Sparrow established radar-guided, medium-range air combat as a cornerstone of modern fighter tactics. Next-generation guided missile technology now incorporates advanced data-to-decision autonomous operation.

The Evolution of Autonomous Defense Systems

From Guided Weapons to Autonomous Systems

The history of precision strike technology is fundamentally a history of increasingly sophisticated electronics. Early guided missiles relied on simple guidance methods and minimal onboard processing. Mechanical gyroscopes, analog electronics, and basic control systems enabled standard tracking and engagement functions. Although revolutionary for their time, these early systems operated within narrow performance envelopes and depended heavily on external guidance networks and human operator inputs.

Successive missile generations introduced advanced seeker technologies, digital microprocessors, inertial navigation systems, and sophisticated flight-control algorithms. What had once been a single-purpose weapon evolved into a compact airborne electronic system capable of making complex decisions independently throughout flight. Simultaneously, advances in microelectronics transformed the broader aerospace industry, with rapid improvements in computing power, communications, and power management enabling entirely new classes of unmanned platforms.

Unmanned aerial vehicles (UAVs) quickly evolved from niche tactical reconnaissance assets into highly versatile platforms capable of surveillance, targeting, communications relay, electronic warfare, and

MQ-9 Reaper UAV

Unmanned aerial vehicles further expand operational flexibility by providing reusable airborne capability. Depending on mission requirements, drones may conduct intelligence gathering, target designation, electronic warfare, communications relay, logistics support, or direct strike operations.

YFQ-44A, USAF Collaborative Combat Aircraft program

Loyal wingman concepts extend this evolution by pairing autonomous aircraft with manned platforms. Operating as force multipliers, these systems may perform reconnaissance, electronic attack, decoy operations, weapons delivery, or protective escort missions while remaining under varying degrees of human supervision.

FUTURE DEVELOPMENTS

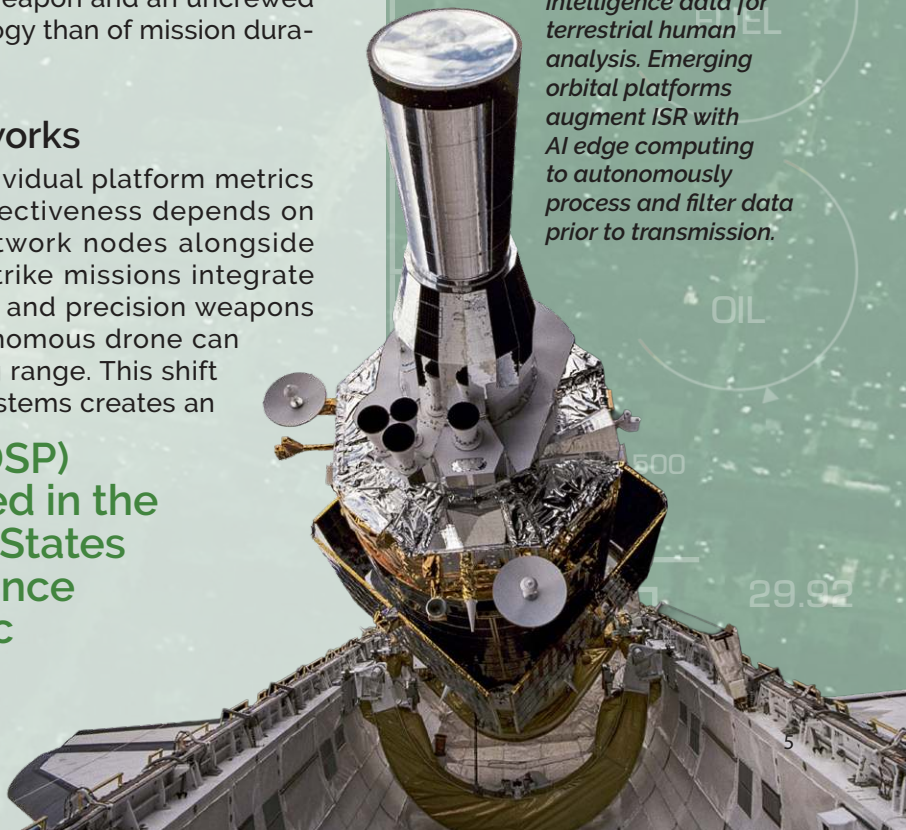
The next step in this progression is represented by collaborative combat aircraft and other highly networked autonomous systems. Rather than operating as isolated platforms, these aircraft function as participants within larger combat networks. They share information, coordinate actions, and dynamically adapt to mission requirements in real time.

precision strike missions. These parallel technology paths eventually began to converge. Modern missiles increasingly resemble compact autonomous aircraft, while modern drones incorporate advanced tactical capabilities once reserved strictly for high-end guided weapons. Today, the distinction between a weapon and an uncrewed aircraft is becoming less a matter of technology than of mission duration and operational deployment.

The Shift from Platforms to Networks

Historically, military aviation prioritized individual platform metrics like range, speed, and payload. Today, effectiveness depends on interconnected systems operating as network nodes alongside satellite command and control. Modern strike missions integrate satellites, manned fighters, loyal wingmen, and precision weapons simultaneously. Data collected by an autonomous drone can guide a missile or extend a fighter's sensing range. This shift from isolated platforms to networked ecosystems creates an

Defense Support Program (DSP) satellites—originally launched in the late 1970s—gave the United States continuous infrared surveillance capable of detecting ballistic missile launches worldwide.



Legacy surveillance satellites aggregated and downlinked raw intelligence data for terrestrial human analysis. Emerging orbital platforms augment ISR with AI edge computing to autonomously process and filter data prior to transmission.

unprecedented demand for electronic integration. To maintain speed and reliability, every node must seamlessly process data, communicate across platforms, and distribute electrical power.

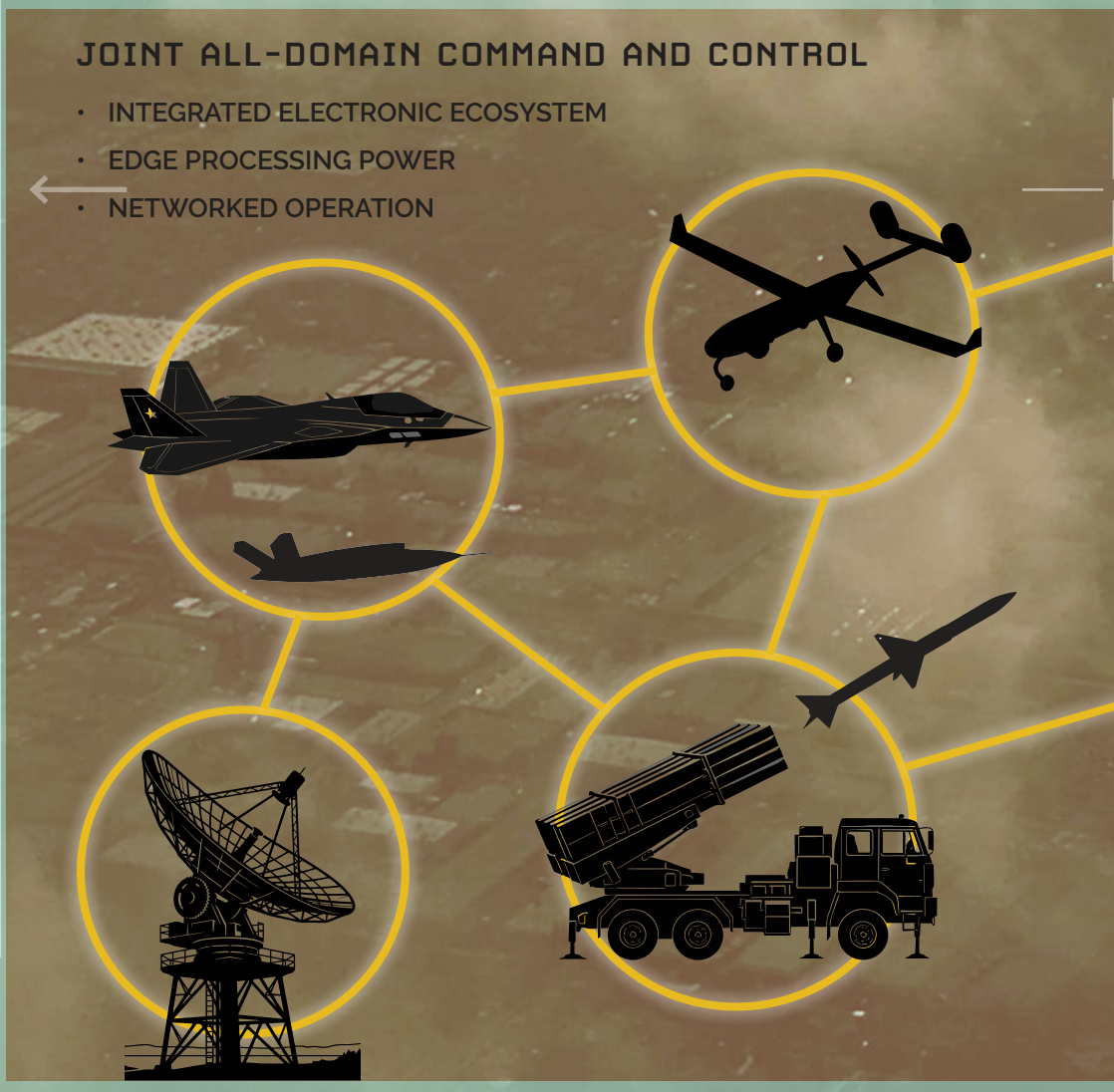
The AI Network Battlespace: JADC2

As autonomous systems evolve, electronics increasingly define platform capability. However while propulsion and materials science remain important, today's most significant tactical gains originate in the electronic and AI domains. High-resolution sensors enhance target identification, while advanced edge processing enables autonomous decision-making. High-speed communications facilitate collaborative operations, and robust power systems support next-generation payload requirements. Ultimately, a platform's true capability is no longer measured by its individual capabilities, but by how fluidly these distinct sub-systems interact and perform in a networked topology.

VISUALIZING THE INTEGRATED ELECTRONIC ECOSYSTEM

Modern multi-domain operations are moving away from isolated platform architectures. Under this networked framework:

- Multi-tier nodes share raw data dynamically rather than operating in siloes.
- Intelligent nodes process critical radar, EW, and sensor data locally before transmission.
- Autonomous swarms, crewed fighters, subsea drones, and remote strike assets seamlessly synchronize to compress the sensor-to-shooter timeline.



This interdependence is formalized within the US Department of Defense's Joint All-Domain Command and Control (JADC2) framework which fundamentally shifts warfare from isolated service-level systems to a unified, multi-domain network. Under this construct, data must flow seamlessly across every theater of operations, treating the Army's ground-based radar, the Navy's surface and subsea assets, the Air Force's crewed and uncrewed fighters, and the Space Force's low-Earth orbit (LEO) sensor constellations as a single, distributed electronic / AI architecture. For a Collaborative Combat Aircraft (CCA), this means acting as an intelligent edge node within a vast tactical data network. Integrating such platforms into the JADC2 ecosystem requires absolute conformance to specialized computing and communication protocols as well as open-system technical interfaces—standards which fully extend to the Electrical Wiring Interconnection System (EWIS) IAW STANAG 4671 (UAV System Airworthiness Requirements) and MIL-HDBK-516 airworthiness mandates.

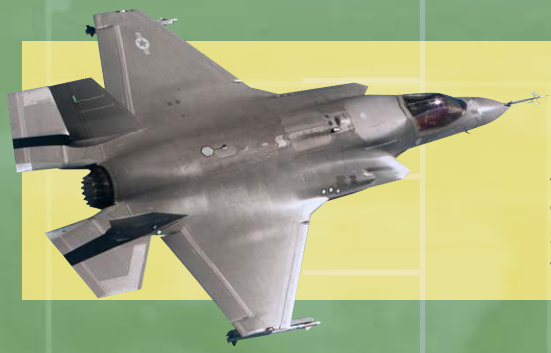
THE EWIS AS A COTS / MCOTS QUALIFIED SYSTEM

In modern autonomous strike platforms, the Electrical Wiring Interconnection System (EWIS) is treated as an independent system, on the same level as propulsion or avionics. Under military airworthiness mandates like MIL-HDBK-516, the wiring network cannot be treated as a late-stage afterthought. Rather, it must undergo the same rigorous design and performance qualification as other critical subsystems through vibration, thermal, and electromagnetic testing. Treating EWIS as a qualified system ensures the physical data links possess the foundational reliability required to support true plug-and-play modularity across the full range of electronic platform nodes. While JADC2 is commonly discussed in terms of AI networks and software algorithms, for the interconnect engineer, it compels strict design attention to extreme bandwidth, aggressive EMI shielding, and high-density power distribution in SWaP-constrained applications.

JADC2 Equipment in Action:

Autonomous Platforms for Networked Operation

This spread details select platform examples of the manned and autonomous technologies powering the Joint All-Domain Command and Control (JADC2) network. These new and extant platforms act as vital connection points—or nodes—across air, land, sea, space, and underground domains. In addition to their unique capability to share and act on live battlefield intelligence with velocity, these systems represent a critical shift in defense technology development. Built both by new, agile, entrepreneurial companies as well as by long-standing defense manufacturers working to accelerate their own pace of innovation, these signature defense technologies are advancing from concept to deployment with unprecedented speed and interoperability.



MANNED TACTICAL FIGHTER (AIR NODE)

Lockheed Martin F-35 Lightning II

A premier 5th-generation stealth fighter executing advanced air-to-air and air-to-ground strike missions, acting as a highly survivable node that captures multi-spectral target data and routes tactical intelligence through encrypted links to the wider network.

HIGH-ALTITUDE LONG-ENDURANCE (HALE) SURVEILLANCE (AIR NODE)

Northrop Grumman MQ-4C Triton

Conducts persistent, wide-area maritime and coastal intelligence, surveillance, and reconnaissance (ISR) to track adversary movements across massive theaters, feeding real-time tracking data to fleet commanders.

COLLABORATIVE COMBAT AIRCRAFT (AIR NODE)

Anduril YFQ-44A Fury

An AI-powered, autonomous unmanned combat aerial vehicle (UCAV) designed to expand the strike range and weapon capacity of crewed fighters by operating under human oversight to screen threats, conduct reconnaissance, and engage targets.

PROLIFERATED LOW-EARTH-ORBIT SATELLITE (SPACE NODE)

Space Development Agency Proliferated Warfighter Space Architecture (PWSA)

A resilient, low-latency LEO mesh constellation that relays high-bandwidth tactical military data globally, ensuring uninterrupted communication by bypassing terrestrial electronic warfare platforms and risks.

SURFACE COMBATANT / NAVAL SYSTEM (SEA NODE)

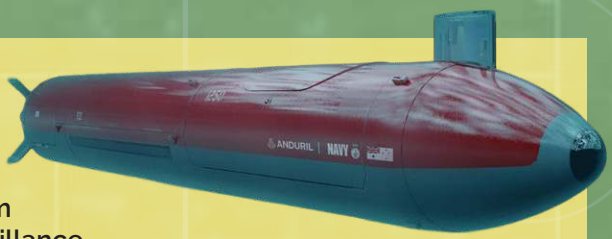
Arleigh Burke-class Destroyer (DDG 51)

Serves as a vital frontline surface warfare node that leverages advanced radar and combat systems to share real-time air defense tracking telemetry with distributed Army launchers, air assets, and allied ships.

EXTRA-LARGE UNCREWED UNDERSEA VEHICLE (SUBSEA NODE)

Anduril Dive-XL / Ghost Shark Class

A modular, long-endurance submarine autonomous platform designed for persistent seabed surveying, underwater surveillance, and clandestine payload deployment in contested coastal regions.



Royal Australian Navy Dive-XL Prototype
Photo: Anduril

COLLABORATIVE MULTI-DRONE COMMAND PLATFORM (AIR/TACTICAL NODE)

Lockheed Martin MDCX™ Software Ecosystem / Edge XR Tactical Interfaces

Operates as an open-architecture command and control software fabric at the edge, allowing operators or dismounted soldiers to seamlessly manage fleets of diverse collaborative drones.

TACTICAL GROUND VEHICLE / MOBILE LAUNCHER (LAND NODE)

M142 HIMARS (High Mobility Artillery Rocket System)

Functions as a mobile land-based shooter node, receiving remote, offboard targeting telemetry real-time from air or space sensors to strike high-value targets at machine speed.

STRATEGIC EARLY-WARNING RADAR STATION (LAND NODE)

AN/TPY-2 Forward-Based Radar

The radar component of the THAAD battery. Detects, tracks, and classifies ballistic missiles early in their flight trajectories, injecting immediate, high-fidelity tracking data directly into the global defensive grid to cue interceptors.

SUBTERRANEAN KINETIC BREACH PLATFORM (SUBSURFACE NODE)

Traysar Subterra Defense Systems

Functions as an autonomous, hardened subsurface node capable of precision drilling and boring into underground installations.

Shared Electronic System Frameworks

At first glance, a cruise missile, a loitering munition, a tactical drone, a subsea AUV, and a loyal wingman appear fundamentally different. Their mission profiles, endurance requirements, launch methods, and operational roles vary considerably. Beneath these differences, however, lies a remarkable degree of commonality. Operating as nodes within the networked system-of-systems JADC2, every autonomous asset must perform a common set of electronic system functions. It must determine its position, perceive its environment, process information, communicate with external systems, execute commands, and accomplish mission objectives.

SENSOR SYSTEMS

Autonomous systems depend on sensors to perceive and interpret their environment. Sensor suites vary by mission and may include radar, infrared, electro-optical, laser, passive RF, and multi-sensor fusion technologies.

In missiles, seekers acquire, track, and guide to targets. In drones and loyal wingman aircraft, sensors support navigation, reconnaissance, electronic warfare, and target identification.

As sensor capability advances, data volumes continue to grow, increasing demands on onboard processing and communications.

NAVIGATION AND POSITIONING SYSTEMS

Accurate navigation is essential for autonomous operation. Most platforms combine Inertial Measurement Units (IMUs) with satellite navigation and other mission-specific positioning systems.

The IMU provides continuous measurements of acceleration and angular motion to support guidance and flight control.

Navigation data is integrated with sensor inputs and mission objectives, enabling autonomous systems to adapt throughout the mission.

MISSION COMPUTING AND DATA PROCESSING

The mission computer serves as the central processor for the autonomous platform, integrating information from sensors, navigation systems, communications equipment, and flight controls.

Advanced software analyzes incoming data, executes mission logic, coordinates subsystem activities, and supports autonomous operation.

As onboard processing power has continued to grow, electronic architectures in turn have become more compact, capable, and computationally intensive.

COMMUNICATIONS AND NETWORKING

Autonomous platforms rely on secure communications to exchange information with operators, command networks, other aircraft, and supporting assets. Communications links carry telemetry, command and control, targeting, intelligence, and other mission-critical data. As military operations become increasingly networked, reliable communications play an essential role in distributed sensing, collaborative decision-making, and other coordinated operations.

FLIGHT-CONTROL AND ACTUATION SYSTEMS

Flight-control systems translate digital commands into physical movement, maintaining vehicle attitude, trajectory, and stability throughout the mission.

Commands from navigation systems, mission computers, and guidance algorithms are executed through actuators, control surfaces, and propulsion controls. In missiles, these include fins, canards, and thrust-vectoring systems. In drones and autonomous aircraft, they govern a wider range of aerodynamic and propulsion equipment. Flight-control electronics provide the critical interface between autonomous decision-making and vehicle response.

ELECTRONIC WARFARE SYSTEMS

Electronic warfare systems support threat detection, signal intelligence, jamming, deception, electronic attack, and defensive countermeasures.

Because electronic warfare systems operate alongside communications, sensors, navigation, and mission computers, they create significant integration challenges for the platform's electrical and RF architecture. For this reason, aggressive EMI / RFI shielding regimens are required.

INTERCONNECTED ELECTRONIC ECOSYSTEMS

All classes of CCA operate as tightly integrated electronic ecosystems, requiring AESA sensors, mission computers, power platforms, and navigation equipment to work together seamlessly. The Electrical Wiring Interconnection System (EWIS) is critical to this integration. Serving as the standardized physical backbone, the EWIS provides the high-speed and RF data links, open-bus topologies, and ruggedized connector interfaces that enable true plug-and-play modularity across the airframe.

ELECTRICAL POWER SYSTEMS

Reliable power distribution is the lifeblood of mission endurance. While smaller munitions rely on compact, single-use thermal batteries, collaborative combat aircraft use hybrid systems combining engine-driven generators with advanced energy storage to sustain long-range operations.

As high-draw radar, processors, and electronic warfare suites demand more electricity, smart power distribution units (PDUs) must dynamically balance the load to prevent system failures and maximize flight time.

900W Smart PDU
Photo courtesy Visionair

RESILIENT ARCHITECTURE: MASS AND NORMAL FORCE

Small form-factor connectors fundamentally improve shock and vibration resistance by reducing component mass, making the interconnect assembly significantly less susceptible to inertial loads and mechanical resonance. Within these miniature interfaces, specialized TwistPin contacts provide high normal force and continuous electrical engagement across multiple points of contact.

The Interconnect Environment: Beyond Simple Signal Paths

Connectors and cables do far more than route power and signals. In collaborative combat systems, platform performance is entirely inseparable from interconnect performance. A sensor cannot communicate with the mission computer if its signal path is interrupted. Flight-control systems cannot execute commands if power distribution is compromised. Communication becomes ineffective if electrical noise degrades critical RF and high-speed traffic.

Unlike commercial electronics operating in controlled environments, today's uncrewed aerospace platforms must function under some of the most unforgiving and demanding physical conditions encountered in modern engineering.

The Challenge of Motion: Surviving Launch and Flight Stresses

Aerospace systems operate under continuous mechanical strain. Missiles experience intense launch shock, rapid acceleration, and sustained flight vibrations. Autonomous UAVs face persistent engine-induced vibration and high-G maneuvering stresses. These continuous physical forces act directly on every wire termination, contact, and cable attachment point within the airframe. To ensure lifecycle durability over thousands of operating hours, the interconnect infrastructure must maintain absolute electrical continuity under relentless vibration, avoiding the systemic failures common to standard laboratory-grade components.

Thermal Extremes: Expansion and Heat Dissipation

Densely packaged high-speed electronics generate high internal heat within confined compartments, compounding the external thermal stresses of flight. Systems frequently face freezing pre-launch environments followed by extreme operational heat, with components positioned near propulsion systems enduring the most severe localized thermal spikes.

Compounding these environmental factors, high-power and high-voltage power distribution applications generate significant internal Joule heating from electrical activity. For interconnect engineers, effective thermal management is vital to preserve the mechanical stability, long-term alignment, and reliability of the interconnect interface. Designers must carefully evaluate the interconnect's maximum current-carrying capacity against the ambient temperature, utilizing precise current-deriving curves to prevent thermal runaway and ensure contact integrity under maximum electrical loads.

The Invisible Threat: Mitigating Co-Located EMI

While mechanical stresses are highly visible and intuitive, electromagnetic interference represents an invisible threat to autonomous platforms. High-speed processors, advanced sensors, RF data links, and power lines must coexist within highly integrated, space-constrained fuselages. This tight physical proximity creates a severe risk of signal distortion and data link degradation due to unwanted electromagnetic interference, and potential system-generated EMP (SGEMP). To mitigate this threat, electromagnetic compatibility (EMC) must be treated as a fundamental architectural requirement, demanding robust shielding, grounding, and filtering strategies integrated directly into both the wiring and black-box infrastructure.

Reliability Without Intervention: Zero-Maintenance Mission Assurance

Perhaps the most demanding requirement imposed on autonomous strike systems is the absolute need for reliability without human intervention. A missile or a drone operating hundreds of miles from base allows zero opportunity for in-flight maintenance or immediate hardware support. Every component must function flawlessly—on its first and only attempt—under entirely unpredictable conditions. This zero-maintenance constraint dictates every aspect of rugged interconnect engineering, from selecting specialized corrosion-resistant alloys to deploying precision environmental seals that lock out moisture and contaminants.

A HOLISTIC APPROACH TO EMC

Electromagnetic compatibility in EWIS applications demands a holistic approach that includes robust wire and cable shielding, grounding, and EMI / RFI filtering.

PRACTICAL INTERCONNECT INTEGRATION IN SMALL-VOLUME HOUSINGS

The internal assembly of a high-performance aerospace housing demonstrates the intersection of modern interconnect disciplines within a highly constrained volumetric footprint. To withstand severe shock and vibration, the design utilizes nanominiature and Micro-D interconnects with vibration- and shock-resistant TwistPin contacts. Electromagnetic compatibility (EMC) is maintained through integrated braided shielding overlays on critical conductors. High-density pin fields maximize signal and power throughput while minimizing size and weight. Lightweight hermetic interconnects and rugged sealing boots protect sensitive internal avionics from external atmospheric contamination and rapid pressure differentials.

The Boeing XLUUV (Extra Large Uncrewed Undersea Vehicle) "Echo Voyager" represents the United States Navy's primary heavy-hitting, long-endurance autonomous submarine program.
Photo: Boeing

OPEN-SYSTEM ARCHITECTURES: HIGH-SPEED AND DIGITAL SIGNAL PROTOCOLS

The push toward AI-driven autonomy, real-time sensor fusion, and rapid data-to-decision processing requires massive, open-system bandwidth at the combat edge.

- Protocols: Embedded architectures utilize advanced high-speed protocols like PCIe Gen 4/5, USB 3.2, and 10GbE to handle internal multi-gigabit data streams between computing modules.
- Component Optimization: Controlled-impedance Shielded Twisted Pair (STP) wiring together with shielded contact layouts maintain signal integrity and eliminate crosstalk.
- Fiber Optics: For long-length cable assemblies and immunity from EMI, high-bandwidth fiber optic interconnects based on Fibre Channel are viable alternatives to copper datalinks.

The Real SWaP Challenge

Modern autonomous systems rely on advanced semiconductors to integrate dense sensor payloads, edge processors, and communication suites into highly confined volumes. This concentration of functionality shrinks traditional electronics bays, forcing engineers to route high-speed data, RF signals, and power lines through constrained packaging envelopes. Because vehicle mass directly penalizes operational range, endurance, and maneuverability, interconnect components—including connectors, cabling, and shielding—face intense scrutiny. The primary design driver has shifted from simply finding physical space to optimizing the supporting physical infrastructure itself, balancing mechanical ruggedness and reliability against strict weight limits.

The Onboard Data Explosion and Edge Processing

High-resolution sensors and rapid update rates turn environmental inputs into continuous, real-time data streams, transforming data into a primary aerospace payload. Modern platforms use sensor fusion to simultaneously cross-reference and correlate these feeds into a comprehensive operational picture. To minimize latency and eliminate dependence on vulnerable external communications, processing occurs at the tactical edge via onboard mission computers. This shift requires massive, high-speed internal data transport among sensors, edge processors, and storage devices. Data transport acts as a primary architectural driver, directly influencing subsystem placement, signal integrity, and packaging strategies to mitigate transmission losses and electrical noise.

Electromagnetic Survivability in Contested Spectrum

Autonomous strike assets operate in crowded, hostile electronic environments and must resist both external jamming and internal interference. Because high-speed processors, sensitive RF links, and heavy power lines coexist in close proximity, vehicles function as highly dense electromagnetic ecosystems. Onboard electrical noise from power networks can easily distort adjacent signal lines, leading to data errors and reduced sensor range. Beyond standard qualification compliance, systems must maintain predictable performance under deliberate electronic attack. Achieving electromagnetic survivability requires a rigorous systems-engineering discipline that integrates coordinated cable shielding, rugged connector interfaces, controlled ground return paths, and advanced filtering.

When Interconnects Become Architecture

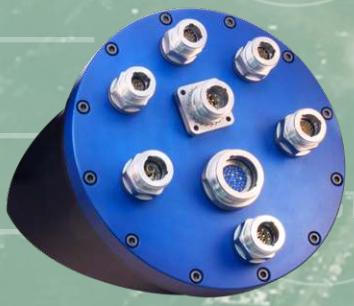
In JADC2 platforms, interconnect technology is a foundational architectural element dictating subsystem placement, packaging efficiency, and hybrid signal modularity. While high-density computing boards process staggering data rates internally, extracting those PCIe Gen 4/5 and 10GbE streams across the chassis boundary can constitute a massive physical bottleneck. For this reason, optimizing autonomous battlefield platforms demands holistic interconnect interface engineering at the I/O layer. Designers must treat the transition from internal flex circuits and board terminations to the rugged external environment as a single, continuous, impedance-matched channel—protecting vulnerable high-speed waveforms from insertion losses and shielding the wire-to-contact zone from ambient EMI and environmental damage.

Conclusion, The Collaborative Battlespace: Engineering for the Connected Net

No autonomous platform operates in a vacuum. As modern defense architecture shifts toward Joint All-Domain Command and Control (JADC2), a single vehicle is only as valuable as its ability to instantly synthesize, share, and act on multi-domain data. This means that internal engineering choices—from electromagnetic compatibility to rugged environmental performance—directly impact big-picture strategic success.

If a platform's physical infrastructure cannot maintain perfect signal integrity under extreme flight stresses, the data link drops, and a vital node in the broader theater-wide network goes dark. By treating mechanical, thermal, and electrical integration as a unified discipline from day one, designers don't just build a more reliable airframe—they build a faster, more resilient, and fully survivable operational network.

SAVING SPACE AT THE BULKHEAD



To maximize internal weapons bays, fuel capacity, and aerodynamic profiling, designers increasingly specify modular interconnects that combine multiple media formats into a single shell, aggregate bulkhead interconnects tightly into panel interfaces, and machine connector shells directly into structural plates and panels. Moving beyond single-purpose, bolt-on components saves critical structural depth, minimizes platform weight, and optimizes tight volumetric space. Image: SeaKing 10K PSI subsea bulkhead assembly.

KEY TAKEAWAYS FOR SYSTEM DESIGN

- THEATER-WIDE CONNECTIVITY RELIES LARGELY ON STABLE ONBOARD SIGNAL INTEGRITY.
- TIGHTLY PACKAGED AVIONICS DEMAND AGGRESSIVE EMI, CROSSTALK, AND THERMAL MITIGATION.
- MINIMIZING INFRASTRUCTURE MASS TRANSLATES DIRECTLY TO LONGER FLIGHT ENDURANCE.
- HIGH-RELIABILITY PHYSICAL-LAYER MECHANICAL AND ELECTRICAL ARCHITECTURE PREVENTS ISOLATED NODES FROM FAILING.

Glenair: The Interconnect Partner for the Networked Battlespace

Zero Procurement Friction, "Better-than-QPL" Performance, with In-Stock, Off-the-Shelf (COTS / MCOTS) Product Availability

Glenair delivers the physical layer infrastructure and manufacturing rate-readiness required to support complex JADC2 platform deployments. We build defense-industry-leading availability, uncompromised quality, and proven reliability into our comprehensive range of Mil-Spec, COTS, and signature interconnect solutions—from battlefield-tested bulk wire and cables to mil-qualified connectors, advanced EMI shielding, and complex high-speed assemblies. Our global manufacturing footprint is ISO 9001 and AS9100 certified, backing a no-gap portfolio of catalog product lines and industry qualifications for space, severe-vibration, and harsh-environment standards. At Glenair, we compress technology insertion timelines with rapid quoting and the industry's shortest lead-times and largest same-day shipment inventory—engineered to completely eliminate purchasing friction for interconnect engineers, board avionics designers, and procurement professionals.

100% vertically-integrated factories—from machining, to plating, to assembly

Worldwide ISO9001 and AS9100 certified aerospace quality system

Active risk mitigation against supply bottlenecks: finished goods, component parts, and material stock

Full-spectrum, "no gap" catalog product lines—COTS and MCOTS

Generous co-engineering support for even the toughest interconnect and platform integration challenges

No attitudinal constraints in any aspect of customer service—from quoting to order fulfillment

No Dollar or Quantity Minimum Orders

NO MINS.

Zero-MOQ constraints for any product, from bulk wire and cable to turnkey assemblies

QPL qualified

The defense industry's most comprehensive lineup of Mil-qualified and COTS interconnect technologies

ABOUT GLENAIR

Mission-Critical Interconnect Solutions

GLENAIR QwikConnect

Worldwide vertically-integrated factories guarantee abundant rate readiness and zero-risk procurement for even the most aggressive production schedules

Interconnect solutions for every requirement—from discrete parts to turnkey EWIS assemblies

Glenair's most important asset: highly technical staff, fully empowered with the right facility and operational resources—meeting the mission-critical interconnect requirements of today's defense industry with quality and velocity.

Every level of high-reliability interconnection fully supported—from cable to I/O to board

Glenair
SIGNATURE SERIES

Mission-Critical Interconnect Solutions for JADC2 Applications

Signature Connectors and Cables for Autonomous and Collaborative Combat Systems

TURNKEY INTERCONNECT ASSEMBLIES FOR JADC2 AUTONOMOUS VEHICLES

Complex cable and conduit wire protection assemblies

Integrated flex / rigid flex PCB circuit assemblies

Aerospace-grade fiber optic interconnect assemblies

Turnkey RF and high-speed interconnect assemblies

SeaKing high-pressure rated subsea overmolded and PBOF assemblies

RUGGED CONNECTORS FOR HIGH-POWER AND HIGH-FREQUENCY APPLICATIONS

MotorHead™ low-profile, high-durability power connector with low-labor-cost assembly

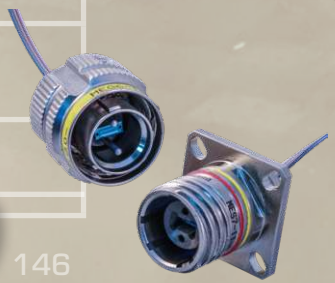
PowerTrip® harsh-environment connectors for rugged mil-aero applications

PowerPlay™ lightweight, high-density, safe-touch connectors and cables

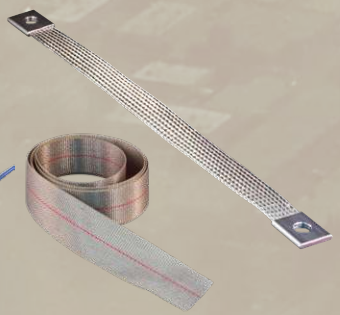
Lightweight / ultra-flexible TurboFlex HV cable

AGGRESSIVE MANAGEMENT OF ELECTROMAGNETIC COMPATIBILITY

EMI/RFI filters and EMP transient voltage suppression



EMI-immune fiber optic connectors and cables



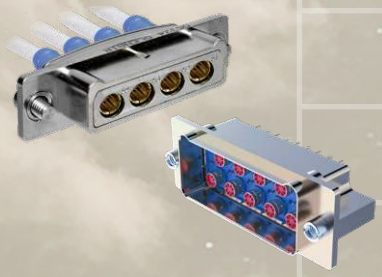
ArmorLite™ and AmberStrand® lightweight braided shielding

Band-Master ATS® advanced shield termination system

SMALL FORM-FACTOR SENSOR / AVIONIC CONNECTORS FOR SIZE AND WEIGHT REDUCTION

Series 806 Mil-Aero micro miniature (shown here with El Ochito® high-speed contacts)

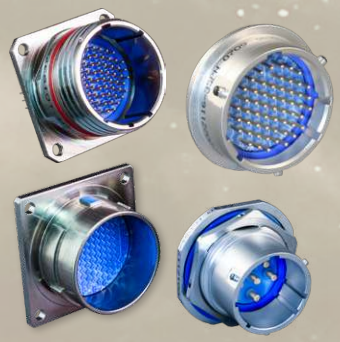
Series 800 Mighty Mouse: the new industry-standard SWaP solution



Series 791™ / 792™ crimp-contact high-density rectangular

SuperFly® Datalink nano high-speed

HARSH ENVIRONMENTAL AEROSPACE AND MISSILE LAUNCH CONNECTORS



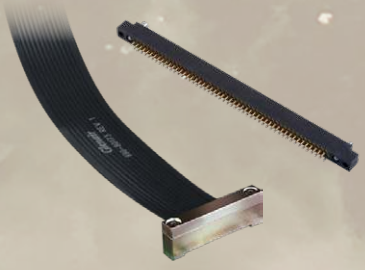
SuperNine® "Better than QPL" Series I and II bayonet, Series III triple-start, and Series IV breech-lock

Glass-to-metal and lightweight aluminum encapsulant-seal hermetics

ThermaRex™ HT and Cryo temperature-tolerant connectors

Fire control, umbilical, rocket and missile launch interconnects

PCB-MOUNT MICROS / NANOS · HIGH-DENSITY BOARD-TO-BOARD CONNECTORS · BACKPLANE



MIL-DTL-55302 (hyperboloid) and Series 171 AlphaLink (spring-pin) PCB connectors

Backplane solutions: VITA standard RF and fiber, plus LRM brush-contact connectors

HD Stacker™ high-density board-to-board

Micro-D and Nano I/O and board connectors

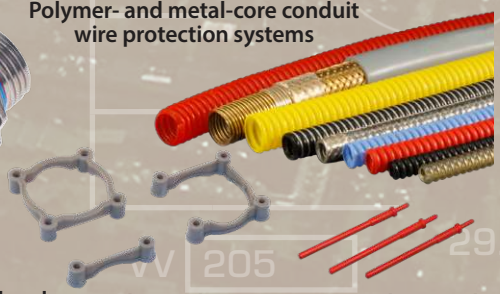
INNOVATIVE CONNECTOR ACCESSORIES AND WIRE PROTECTION SOLUTIONS

ProSeal™ spring-action protective covers

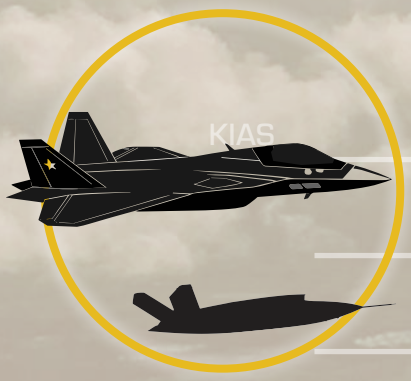
Swing-Arm™ and Swing-Arm FLEX™ strain relief clamps

SplayMaster™ high-speed and RF alignment backshells

Polymer- and metal-core conduit wire protection systems



Lightweight composite nut plates and Super DCSPs



Turnkey Interconnect Harness Assemblies with Glenair Signature Wire and Cable

Turnkey, fully connectorized harness assemblies de-risk integration by delivering 100% electrically validated, flight-ready interconnect systems directly to the assembly line. From rugged overmolded power links, to phase-matched RF lines, fiber optic trunks, and flex and rigid-flex integrated circuits, these factory-terminated solutions eliminate internal manufacturing bottlenecks. By stabilizing insertion loss and ensuring repeatable tolerances from unit to unit, they guarantee consistent platform performance and slash assembly cycle times.

MIL-STAR™ HIGH-PERFORMANCE HOOKUP WIRE AND CABLE

AEROSPACE-GRADE SuperFlex™ PCB/FLEX CIRCUIT ASSEMBLIES

SpeedLine™ Controlled-Impedance Cables

BLUMARK COAX CABLES RF™

FIBER KING FIBER OPTIC CABLES

turboflex® THE ULTRA FLEXIBLE RUGGED POWER CABLE

Glenair is laser-focused on supplying military, aerospace, and defense customers with accelerated lead-time requirements with harsh-environment interconnect assemblies built from stock with Glenair signature wire and cable.

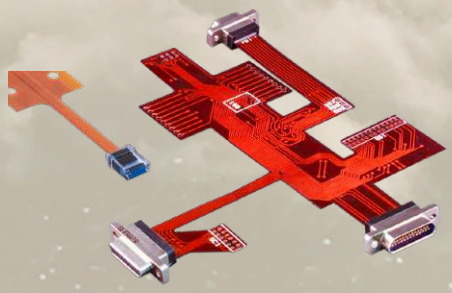
Supplied any length, with no minimum order quantity, or in fully-integrated connectorized assemblies, Glenair wire and cable is optimized for the highest performance in mil-aero / defense applications.

FAST DELIVERY AND QUALITY SINCE 1956

- 3.5 million square feet factory capacity
- Mission-critical sea, air, land, and space interconnect product focus
- Vertically-integrated, all key processes controlled in-house
- Massive inventory of material, component parts, and finished goods
- Glenair worldwide QMS: AS9100D SAE / ISO 9001 certified, and customer-audited

HIGH-SPEED, HIGH-FREQUENCY, HIGH-POWER · ELECTRICAL, OPTICAL, RF, AND FLEX

MIL-STAR™ "better-than-QPL" sensor / control wired interconnect assemblies



SuperFlex™ integrated PCB flex, rigid flex, and optical flex circuit assemblies

SpeedLine™ high-speed controlled-impedance multichannel assemblies

BluMark RF™ high-frequency, coax assemblies with G-LinkRF SMA-to-BMB adapters

FiberKing™ harsh-environment and inside-the-box optical assemblies

TurboFlex® high-power, high-voltage, high-flexibility cable assemblies

SPECIALTY ENVIRONMENTAL ASSEMBLIES BUILT WITH GLENAIR SIGNATURE WIRE AND CABLE

In addition to conventional land, sea, air, and space interconnect assemblies with overbraiding and overmolding, Glenair is able to supply all of our signature wire and cable brands in specialty harness designs optimized for ultra-harsh environments including high-pressure subsurface and subsea, high-heat and cryogenics, and space. Glenair is uniquely positioned to meet the needs of these harsh interconnect environments due to our total vertical manufacturing integration with virtually zero product gaps—from contacts to connectors to high-performance wire and multi-conductor cables.

High-pressure rated subsea (Mil-qualified and COTS) 10K PSI electrical and optical cable assemblies

High Temperature and Cryogenic (ThermaRex™) wired cable assemblies

Pure Air / Gas Tube assemblies for high-pressure cooling actuation

Space-grade EMI shielded and open-wire bundle assemblies built in ISO 8 and ISO 6 clean rooms

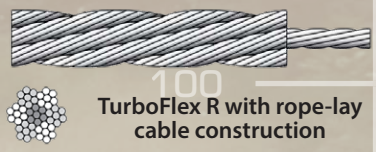
High-Power Electrical Energy Distribution with Glenair Signature Power Connectors, Cables, and Contacts

The convergence of multi-spectral sensor suites, electronic warfare transmitters, and high-rate electric actuators is driving unprecedented power demands in small form-factor autonomous vehicles. Managing these loads requires high-density power interfaces capable of distributing both conventional low-voltage power and high-voltage DC without thermal runaway. This requires an infrastructure built on optimized current capacities, advanced low-resistance contact materials, and isolated architectures that prevent dielectric breakdown—balancing maximum volumetric current density with strict weight control.

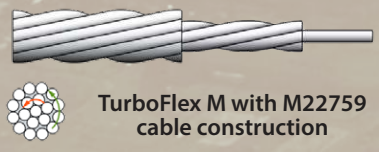
High-density rectangular power interconnects: Series 79 Micro-Crimp and Series 28 HiPer-D

ABOUT TURBOFLEX "M" AND TURBOFLEX "R" CABLE CONSTRUCTION

TurboFlex cables are jacketed with Duralectric insulation, which contributes to the flexibility of the product. TurboFlex R (rope-lay core) provides maximum flexibility. TurboFlex M (M22759 core) has a slightly larger bend radius but far superior flexibility compared to standard M22759 cable. Both configurations are supplied in gauges optimized for use with PowerPlay.



TurboFlex R with rope-lay cable construction



TurboFlex M with M22759 cable construction

kV SEAL 13.5 KVDC–22 KVDC HIGH-VOLTAGE, LOW AMPERAGE CONTACT ASSEMBLIES FOR DC SATELLITE PROPULSION

Drop-in solutions for satellite propulsion, traveling wave tube amplifier, and altimeters. Available in SuperNine PowerPlay, Mighty Mouse, and Series 79 rectangular packaging.

SIGNATURE POWERPLAY CONNECTOR SERIES

- 5000 VAC dielectric withstanding voltage
- High current, low-resistance, and superior vibration performance
- Safe-touch finger-proofing
- Integrated band platform cable shield termination
- Compatible with TurboFlex high-flexibility cable
- Support for bus-bar and other wire terminations
- Multi-pin arrangements for size 8 and 4 AWG contacts. Single-pole arrangements for 2, 1/0, 2/0, and 4/0 contacts. Options for 20 AWG interlock contacts on all sizes

POWERPLAY: PLUG-TO-PLUG AND I/O CONFIGURATIONS WITH SAFE-TOUCH ARCHITECTURE AND A RANGE OF BACK-END WIRE LINE TERMINATIONS

PowerPlay's high-conductivity Crown Ring contact and dielectric insert technology delivers 5,000 VAC dielectric withstanding voltage. Raised safe-touch socket tower and available safe-touch pin meets industry protection requirements for high power distribution applications. PowerPlay connectors employ high-performance, high-temperature materials throughout. This means that the interconnect system can withstand higher temperature rise than the typical Mil-Aero connector.

SuperNine Series III
PowerPlay Triple-Start

SuperNine Series I
PowerPlay Bayonet

Series 806 Mil-Aero
PowerPlay High Density

High-Density Micro-Crimp
PowerPlay Rectangular

ADDITIONAL RUGGED CONNECTORS AND ASSEMBLIES FOR HIGH-POWER, HIGH-VOLTAGE, AND HIGH-FREQUENCY APPLICATIONS

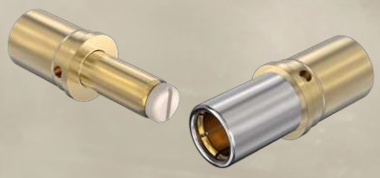
PowerLoad™ HV power distribution connectors

PowerTrip™ high-density connectors and cables

MotorHead™ low-profile, high-durability power connector with low-labor-cost assembly

Lightweight / ultra-flexible TurboFlex HV cable assemblies

GLENAIR SIGNATURE CROWN RING CONTACTS



- **High vibration-resistant, high-conductivity gold-plated copper alloy. Socket contact adds stainless steel Crown Ring; pin contact adds thermoplastic finger-safe tip**
- **Up to 60% lower contact resistance than equivalent AS39029 contacts**
- **High operating temperature resistance compared to other specialized high-power contacts**

TURBOFLEX® ULTRA FLEXIBLE / RUGGED POWER CABLES WITH DURALECTRIC JACKETING

TurboFlex high-flexibility power cabling is optimized for use with PowerPlay connectors and is supplied with Glenair signature Duralectric jacketing material for rugged fluid immersion, caustic chemical exposure, temperature extremes, and UV radiation. Duralectric is available in a broad range of colors including safety orange. Two cable core constructions are supplied: TurboFlex M with AS22759-type conductors, and TurboFlex R with ultra-flexible rope-lay conductors.

Available with cable gauge selections from 8 AWG to 4/0, to provide suitable margins for DWV, frequency derating, and peak-load electrical performance.

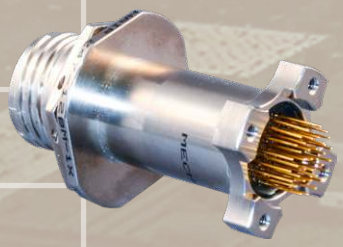
DURALECTRIC JACKETING	
Abrasion Resistance	Good
Wear Resistance	Good
Flame Resistance	Excellent
Sunlight Resistance	Excellent
Flex Resistance	Excellent

Comprehensive EMI/ RFI Shielding and Suppression Solutions with Glenair Signature EMC Technologies

Achieving electromagnetic survivability in highly contested spectrum requires a holistic approach to shield-to-shell grounding. A reliance on cable shielding alone is insufficient; true EMI/RFI mitigation demands an uncompromised, low-impedance path to the vehicle chassis across all interfaces. This is achieved via filter connectors with integrated capacitor arrays, lightweight conductive backshells, 360° shield terminations, and in certain cases specialized SGEMP wiring. Fiber optic interconnects offer total immunity to radiated emissions, preserving high-speed signal integrity and preventing internal cross-talk between adjacent power and data circuits.

EMI / RFI FILTER CONNECTORS

Micro-D and Series 79 Micro-Crimp EMI / EMP filters



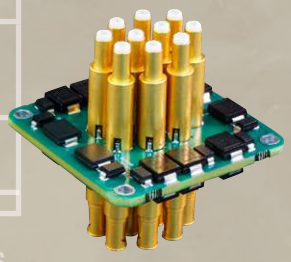
Special extended-shell PC-tail cylindrical filter designs

Special-purpose filter connector cable adapter (Sav-Con®)

Custom reduced-length sidecar filter connector design

TRANSIENT VOLTAGE SUPPRESSION EMP CONNECTORS

MIL-DTL-38999 Series III type EMP TVS diode-equipped filter connector



All diode-equipped EMP inserts and planar array EMI filter inserts produced in-house

TVS EMP suppression filters available for all mil-standard and Glenair signature connectors

SGEMP "no air gap" radiation-resistant wire with Duralectric "low-Z" filler and ArmorLite shielding

RUGGED FIBER OPTIC INTERCONNECT SYSTEMS: INHERENT EMI / RFI IMMUNITY

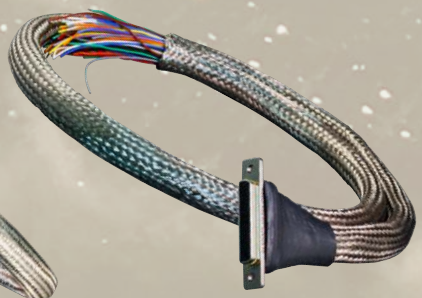
Rugged High-Density PRIZM® MT Expanded Beam and MT Elite® PC Fiber Optic Systems

Tight-tolerance mil-standard and Glenair signature fiber optics

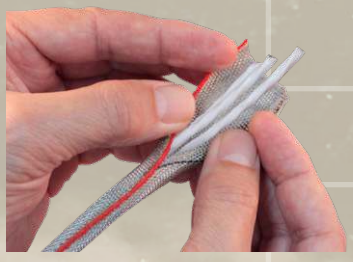
Eye-Beam Power: High-Power Fiber Optics for Directed Energy and LIDAR Applications

LIGHWEIGHT MICROFILAMENT EMI / RFI BRAIDED SHIELDING

Factory overbraided point-to-point conduit assembly



Turnkey shielded pigtail assembly

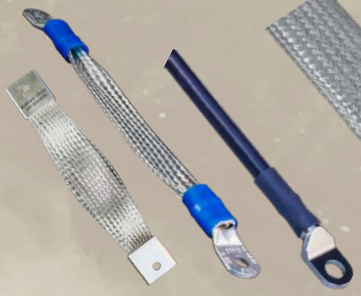


MasterWrap™ flexible, lightweight wraparound shielding for spot repair

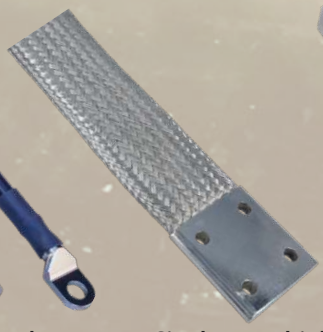
Integrated shield sock connector backshells

HIGHFLEX GROUNDING CONDUCTORS

Ultra flexible, lightweight ArmorLite microfilament ground straps and bonds



Flat and round cross-section straps, plus wire rope jumpers



Single or multiple grounding points on lugs

Higher current carrying capacity ground straps with multiple layers

Custom thermal dissipation strap (consult factory)

SWING-ARM® CABLE CLAMP EMI / RFI SHIELD TERMINATION BACKSHELLS

Two drop-in-follower designs, solid and slotted are available for all Swing-Arm styles (A, B, and C).

For fast and reliable EMI/RFI shield termination of individual wire and overall cable shielding

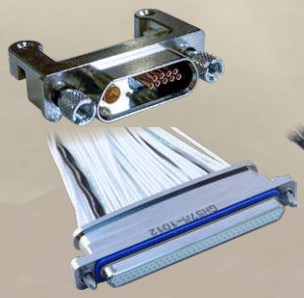
SWaP-Optimized Signal, Power, High-Speed, and RF Interconnections

Glenair SWaP-optimized multi-mission connector families support low-speed telemetry, high-current power, high-bandwidth controlled-impedance data, and high-frequency RF without inducing the signal degradation or impedance discontinuities common in low-grade commercial interfaces. All relevant military-grade databus protocols are also supported.

SIGNATURE HIGH-SPEED (SPEEDLINE) AND HIGH-FREQUENCY RF (BLUMARK) SOLUTIONS

Series 806 connectors with VersaLink 28 Gbps Ethernet inserts and SpeedLine cable

Series 23 SuperNine D38999-type 10GbE and high-frequency RF



GMMD modular and High-speed and RF Micro-D solutions

GM8 multiport RF interconnects IAW MIL-T-81490 / MIL-DTL-87104

SUPERNINE "BETTER-THAN-QPL" MCOTS ENVIRONMENTAL-CLASS CONNECTORS

Series I bayonet-lock coupling jam nut-mount receptacle

Series III with integrated shield termination banding porch

Series IV breech-lock plug with wing-lock coupling

Sav-Con® connector saver go-between adapters

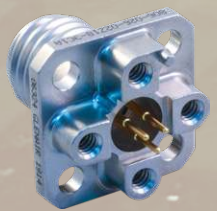
Highly-customized designs for unique EWIS interface requirements

SERIES 806 MIL-AERO MICRO-MINIATURE CIRCULAR WITH MIL-DTL-38999 PERFORMANCE

Series 806 Mil-Aero Cryo and high-temp solutions

Hybrid high-speed, RF, and signal pin layouts

Modified stub-ACME mating and rugged bayonet-lock versions



PCB standoff designs for optimized assembly

SERIES 80 MIGHTY MOUSE: THE NEW CIRCULAR INTERCONNECT STANDARD FOR OPTIMIZED SWaP • HIGH-DENSITY SIZE #23 CONTACT LAYOUTS • SUPPORT FOR HIGH-SPEED, POWER, AND RF

Series 800
UN thread

Series 801
double-start ACME thread

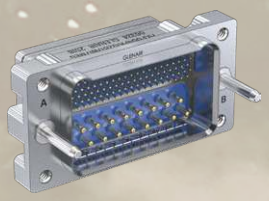
Series 804
quick-disconnect

Series 805
triple-start thread

SERIES 79 MICRO-CRIMP HIGH-DENSITY AEROSPACE-GRADE RECTANGULAR

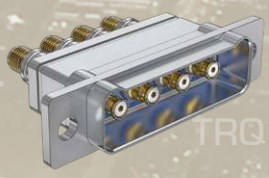
Series 791 scoop-proof
power and signal

Series 792 high-speed
El Ochito®



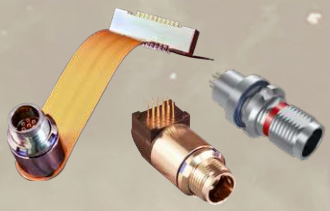
Series 793
dual-bay

Series 794 high-speed
VersaLink™



Series 795 RF
multiport

SUPERFLY AND SUPERFLY DATALINK NANOMINIATURE PUSH-PULL AND THREADED



PCB flex jumpers, straight and
90° PC tail versions

Quick-disconnect
plugs and receptacles

QDC and threaded pigtail
connectors

Turnkey
jumper assemblies

MICRO-D AND NANOMINIATURE CONNECTORS AND PIGTAIL / STRIP ASSEMBLIES

Solder-cup and insulated
wire pigtail terminations

FOD-free "G-Click"
latching Micro-Ds

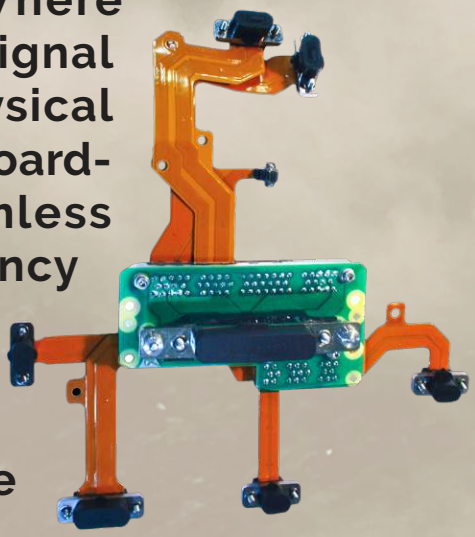
Back-to-back
jumper assemblies

Nanominiature circular
and rectangular
connectors

Lightweight, low-mass
TwistPin MicroStrips

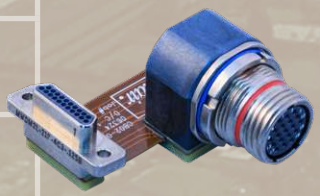
High Shock and Vibe PCB Interconnects and Assemblies with Glenair Signature Mil-Grade Performance

To protect critical signal integrity inside compact autonomous airframes, board-level interconnect architectures must maintain strict impedance matching from the cable to the panel I/O and directly to the PCB. Where standard commercial interfaces risk signal degradation, contact fretting, and physical failure under stress, Glenair signature board-level connector families ensure seamless high-bandwidth data and high-frequency RF transmission. These high-density interconnects and turnkey assemblies offer robust board-to-board and board-to-I/O continuity while optimizing space and payload capacity.



MICRO-D AND NANOMINIATURE TWIST-PINS WITH STRAIGHT, 45°, AND SMT TERMINATIONS

Vertical



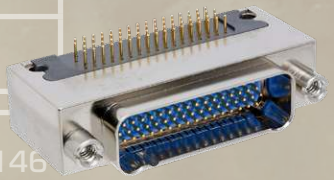
Turnkey flex assembly

Surface-Mount

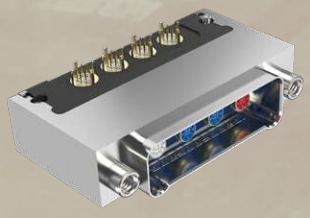
Shrouded

SERIES 79 MICRO-CRIMP FULLY-SHROUDED PCB INTERCONNECTS

High-density



Scoop-proof

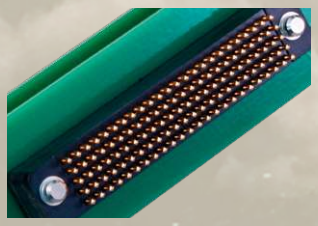


High-speed / RF

Dual-bay

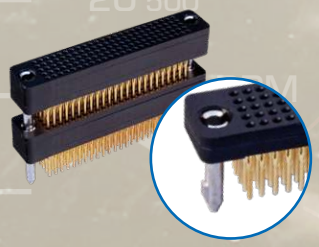
HD STACKER HIGH-DENSITY PCB CONNECTORS · PCIe 3.0 CAPABLE · PERFORMANCE UP TO 10.5 GBPS

Solder-free press-fit (compliant pin) board mounting



.0625" pitch contact spacing: highest available density

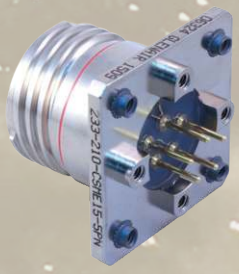
Available PC tail length and spacers up to 1 inch



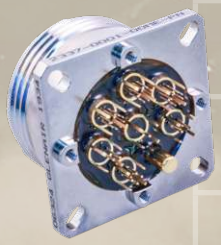
Polarized shells and keyed guide pin hardware prevent mis-mating

SUPERNINE "BETTER-THAN-QPL" MILITARY-GRADE COMMERCIAL OFF-THE-SHELF SEALED PCB CONNECTORS AND ASSEMBLIES

Wide range of signature PC tail designs including dual standoffs for superior resistance to vibration and shock



Environmentally-sealed PCB receptacle with threaded standoffs and clinch nuts



Shielded high-speed and RF PCB terminations

SuperNine Series III embedded PCB assembly with optimized SWaP

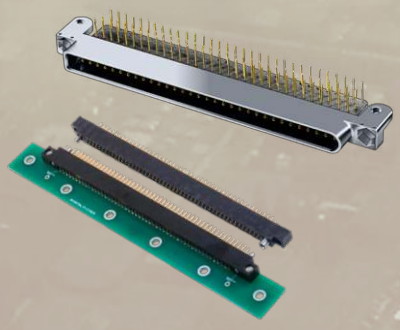
SPECIALTY HYBRID / MODULAR BOARD AND BACKPLANE INTERCONNECTS

Brush-contact LRM backplane and board interconnects

VersaLink high-speed digital differential twinax PCB

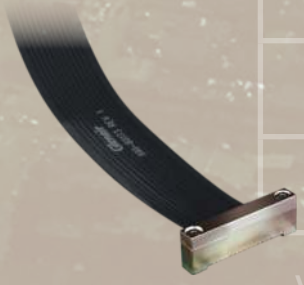
MCOTS flex circuit jumpers, Micro, Nano, and others

High-speed Micro-D with SMT board terminations

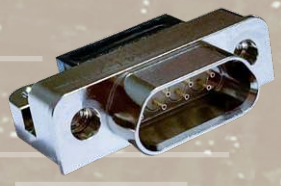


MIL-DTL-55302 dual-row and Micro-D TwistPin EdgeBoard

Fiber Optic and RF VPX-type backplane designs



AlphaLink spring-pin contact PC board connectors and flex jumpers



GMMD Modular Micro-D SMT interconnects

Blind-Mate and Umbilical Release Interconnects for Missile Stores and Launch Applications

Launch acceleration, sustained mechanical resonance, and high-G maneuvering subject munition and rocket interconnect interfaces to extreme multi-axis stress profiles. To prevent micro-discontinuities, pin fretting, and mechanical decoupling, rugged blind-mate and umbilical connectors are employed in mission-critical missile pylon and rocket launch applications.

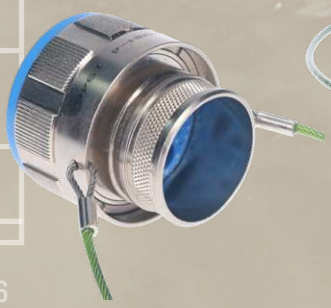
Glenair Series 253 blind-mate connectors with assisted separation force are used for interconnection and deployment of satellites, scientific payloads, interstage applications and more. This versatile family of highly engineered and environmentally sealed connectors is also appropriate for use in missile umbilical and weapons release.

- **Available in most MIL-STD-1560 insert arrangements with contact sizes from #23 to #8**
- **Select designs offered with user-configurable assisted separation force (ASF) feature**
- **NASA outgassing bake-out process available**
- **Designed to withstand the rigors of launch and flight—including shock, vibration, thermal vacuum, acceleration, and temperature extremes**
- **Crimp-removable contacts standard. PC tails, dual-flange standoffs, hermetically sealed, and custom blind-mate configurations available**

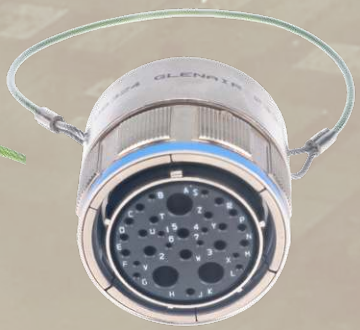
Dead-Face connectors for isolation and disconnection of electrical signals prior to connector separation.

HIGH-DENSITY SUPERNINE SERIES III LANYARD-RELEASE IAW MIL-DTL-38999 AND MIL-STD-1560

Lanyard-release plug with adapter code H accessory thread interface



Lanyard-release plug with integrated cable shield banding platform



Broad range of insert arrangements IAW MIL-STD-1560

Also available: industry-standard AS81703

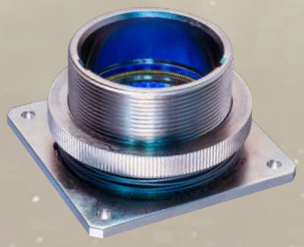
CRITICAL MECHANICAL FEATURES OF BLIND-MATE AND ADJUSTABLE SEPARATION FORCE (ASF) CONNECTORS

Roll-off nose: allows for the smooth disconnection of blind mate plugs and receptacles.

Float mounting: allows for coplanar movement of the receptacle during mating, preventing contact and shell damage. Environmental sealing is accomplished with auxiliary external seals.

Misalignment accommodation: Radial, axial, and angular misalignment during mating is accounted for with integral wave springs.

Glass-to-metal hermetic sealing: protects critical interfaces and instrumentation while allowing roll-on / roll-off blind mating.



EMI shielding: Glenair incorporates ground springs in receptacle connectors and grounding fingers in special coupling nut-equipped plugs to optimize 360° shell-to-shell continuity.

Assisted separation force: Adjustable kick-off style with spring-loaded posts and an adjustment ring to overcome contact retention (normal force).

WEAPONS STORES, UMBILICALS, AND MISSILE-LAUNCH INTERFACE CONNECTORS

MIL-STD-1760 / MIL-DTL-83538 type Launcher, Store, and Buffer connectors

Hybrid lanyard-release umbilical assembly with power, signal, gas pipe, and gas valve interconnects

Multi-connector junction box assembly with power, signal, gas pipe, and RF interconnects

Glenair supplies complete launcher and store interconnect solutions, including MIL-STD-1760 / MIL-DTL-83538 rail-launch connectors, integrated umbilical looms, gas pipe interconnects, interconnect boxes, and turnkey integration for missile and smart-weapon applications.

Harsh-Environment Interconnect Sealing and Wire Harness Protection

From missile storage and transit to high-altitude deployment and subsea service, aerospace and other uncrewed electronics must endure severe atmospheric shifts, fluid exposure, and extreme pressure differentials. Robust environmental sealing—utilizing precision interfacial and piston seals, fluorosilicone O-rings, glass and encapsulant hermetic materials, and adhesive-lined shrink boot enclosures—isolates internal contacts from moisture, salt spray corrosion, and thermal cycling. For underwater applications, our high-pressure-rated SeaKing connectors and cables—as well as NAVSEA-qualified connectors and wire protection systems—extend this rugged protection to deep-ocean submarine and AUV platforms.

GLASS-TO-METAL SEAL HERMETIC CONNECTORS

Flange-mount hermetic receptacle with stepped contacts

Hermetic bulkhead feed-thrus for variable panel thicknesses

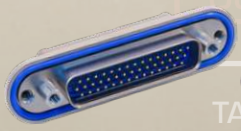
Weld-mount hermetic receptacle

Wire termination options—from solder cup to crimp and PC tail

CODE RED

LIGHTWEIGHT HERMETIC SEALING

Aluminum shells and copper contacts reduce weight and improve electrical performance compared to glass-to-metal seal hermetic connectors.



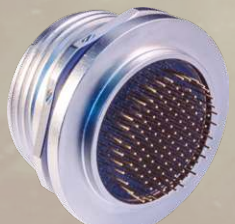
HiPer-D advanced-performance D-Sub

Micro-D M83513-intermateable

Series 79 Micro-Crimp

Sr. 806 Mil-Aero micro miniature

RF and high-speed

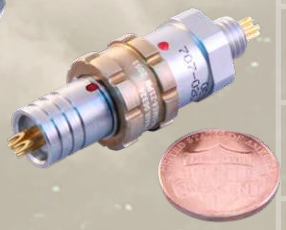


SuperNine "better-than-QPL" D38999

SeaKing PRESSURE-RATED CABLES HIGH-PRESSURE SUBSEA WET- AND DRY-MATE CONNECTORS

SeaKing 700 10K psi metal and composite PEEK

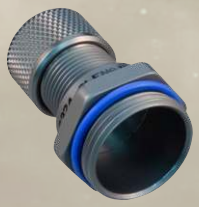
SeaKing WetMate ROV-Mate, Diver-Mate, and Stab-Plate



Micro-PSI microminiature 10K psi subsea

SuperG55 high-performance COTS 10K psi

ADVANCED ENVIRONMENTAL CONNECTOR BACKSHELL ACCESSORIES



Environmental cable-gland backshell

Weight-saving composite designs

Sealing solutions for all rectangular connector types

Piggyback boot Band-in-a-Can

ENVIRONMENTAL HEAT-SHRINK AND COLD-SHRINK BOOTS

Standard lipped or lipless boots and transitions

Long tail, high-ratio, and convoluted configurations

90° and 45° angled boots

SuperFly, Mighty Mouse, and D-subminiature form-factors

WIRE PROTECTION CONDUIT SYSTEMS

Multibranch aircraft conduit assembly with high-temp polymer-core conduit

Multibranch conduit assembly with integrated composite junction box

Aerospace-grade crush-resistant metal-core conduit assembly

Fiberglass overbraided conduit assembly for high-heat launch vehicle applications

MCOTS Wire and Cable for Autonomous Defense Systems—In-Stock, No MOQs

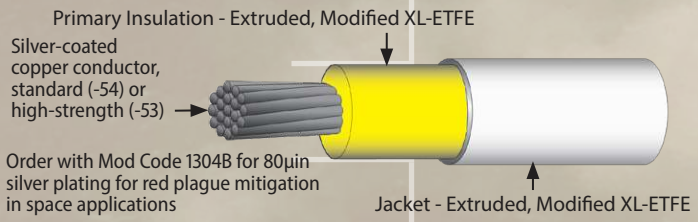
MIL-STAR™
HIGH-PERFORMANCE HOOKUP WIRE AND CABLE

SpeedLine™
Controlled-Impedance Cables

CROSSLINKED (XL) ETFE HOOKUP WIRE

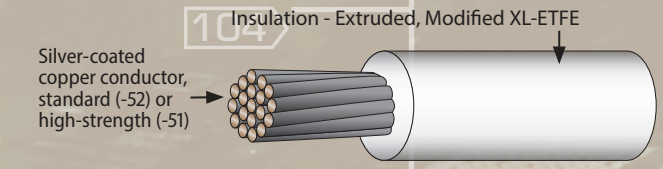
GS22759-53 / -54

- Low-fluoride. High-strength or standard silver-coated copper core, dual wall modified XL-ETFE insulation/jacket.



GS22759-51 / -52

- Low-fluoride. High-strength or standard silver-coated copper core, lightweight / modified XL-ETFE insulation.

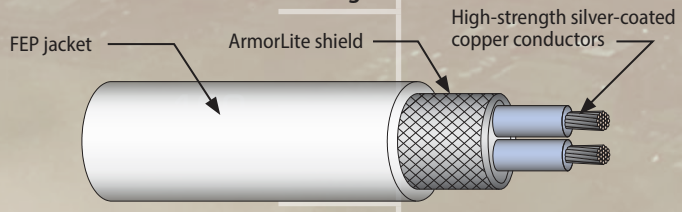


Order with Mod Code 1304B for 80µin silver plating for red plague mitigation in space applications

MULTICONDUCTOR M27500 TYPE CABLES

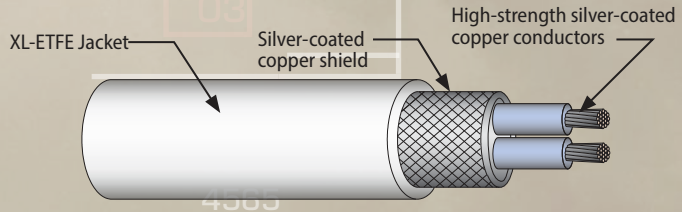
968-001

- 27500 type with ArmorLite or AmberStrand lightweight microfilament braided shielding



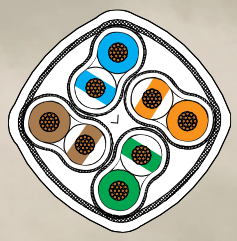
GS27500

- 27500 type with GS22759-33 wire (silver-plated high-strength copper wire, XL-ETFE insulation), and silver-coated copper shielding.



963-066 -24, -26, and -28

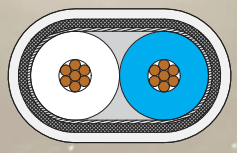
100 OHM TWISTED PAIR SHIELDED CABLE FOR EL OCHITO® WHITE / SPEEDMASTER CONNECTORS



- Performance up to 2 GHz
- -65°C to +200°C
- FEP jacket, FEP insulation
- Dual shields: aluminized polyimide tape and metallic braid

963-069-26

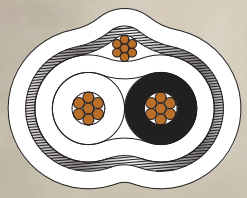
100 OHM #26 AWG FLAT PAIR SHIELDED CABLE FOR USE WITH VERSALINK™ CONNECTORS



- Performance up to 18 GHz
- -65°C to +200°C
- FEP jacket, FEP insulation
- Dual shields: aluminized polyimide tape and silver-plated copper braid

963-057-28

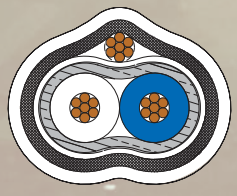
100 OHM TWISTED PAIR SHIELDED CABLE FOR USE WITH MICRO-D HIGH-SPEED CONNECTORS



- Performance up to 10 GHz
- -65°C to +200°C
- FEP jacket, FEP insulation
- Shield: aluminized polyimide tape

963-065-30

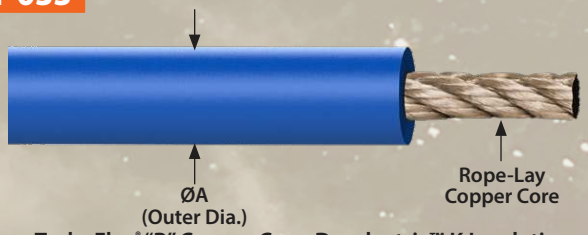
100 OHM #30 AWG TWISTED PAIR SHIELDED CABLE FOR USE WITH GMMD CONNECTORS



- Performance up to 18 GHz
- -65°C to +200°C
- FEP jacket, FEP insulation
- Dual shields: 2X silver-plated copper flat wire and braid

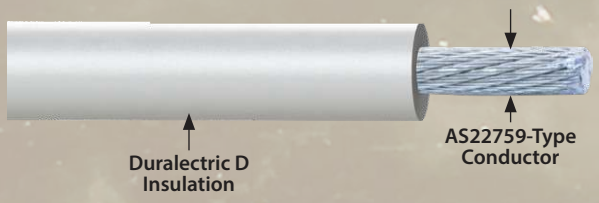
turboflex®
THE ULTRA FLEXIBLE RUGGED POWER CABLE

961-033



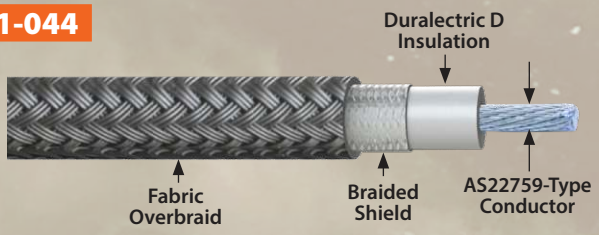
TurboFlex® "R" Copper Core, Duralectric™ K Insulation, 1000–3000 VAC, -110°C – +200°C

967-600



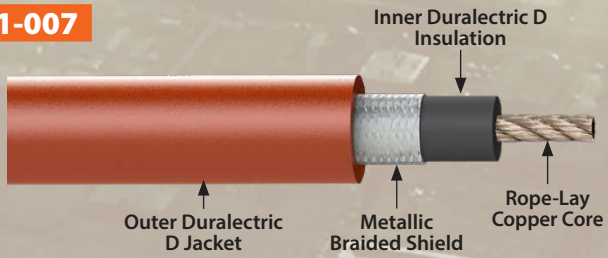
TurboFlex® "M" AS22759-type conductor, Duralectric™ D Insulation, 725–2875 VAC

961-044



TurboFlex® "M" Copper Core, Duralectric™ D Insulation, Metallic Braided Shield, Fabric Overbraid 725–2875 VAC

961-007



TurboFlex® "R" Copper Core, Dual-Layer Duralectric™ D Jackets and Metallic Braided Shield, 3000 VAC

BLUMARK COAX CABLES RF™

962-032-300

- 50 ohm size .300" diameter, 26.5 GHz max. frequency low-attenuation cable
- -55°C to +200°C rated operating temperature
- FEP jacket, expanded PTFE dielectric, solid SPC center conductor
- Triple-shielded: Tape/foil/braid shield layers with >90 dB shield effectiveness

962-032-160

- 50 ohm size .160" diameter, 40 GHz max. frequency low-attenuation cable
- -55°C to +200°C rated operating temperature
- FEP jacket, expanded PTFE dielectric, solid SPC center conductor
- Triple-shielded: Tape/foil/braid shield layers with >90 dB shield effectiveness

962-025-086

- 50 ohm size .086" (.104" OD), 40 GHz max. frequency low-attenuation cable
- -65°C to +165°C rated operating temperature
- FEP jacket, PFA dielectric, solid SPC center conductor
- Triple-shielded: Tape/foil/braid shield layers with >90 dB shield effectiveness

962-025-047

- 50 ohm size .047" (.056" OD), 70 GHz max. frequency low-attenuation cable
- -65°C to +165°C rated operating temperature
- FEP jacket, PFA dielectric, solid SPC center conductor
- Triple-shielded: Tape/foil/braid shield layers with >90 dB shield effectiveness

Outlook

Aircraft On Ground?

Military operations are the ultimate "come-as-you-are" endeavor. When a mission begins, there is no time to expand factory capacity, build inventory, or strengthen a supply chain. Readiness is determined long before the first aircraft leaves the ground.

Military readiness is measured in availability. Yet every day, airships are grounded while repair depots and their suppliers race to complete replacement harnesses, avionics assemblies, and LRUs. More often than not, the work itself isn't the bottleneck. The crews are ready. The tooling is in place. The assembly is on the bench. The problem is everyone is waiting for one final component to arrive.

Every Aircraft on Ground (AOG) or stalled assembly line represents a mission deferred, a training exercise interrupted, or an operational capability temporarily lost. To the men and women responsible for fielding military equipment into service, every day matters. But all too often, the solution is, quite literally, out of their hands.

This is precisely the challenge Glenair has spent decades preparing to solve.

Now, let me be clear. I'm not suggesting we can prevent an AOG event. Equipment wears. Components fail. Critical systems require maintenance, repair, and modernization. But we are determined Glenair will never be the reason a mission-critical aircraft sits idly by.

That commitment begins with off-the-shelf availability—the kind built on massive manufacturing capacity, strategic investment, and decades of experience delivering when our customers need us most. It means stocking tens of thousands of bagged-and-tagged connectors, accessories, and wire products ready for immediate shipment. It means maintaining enormous inventories of component parts and raw materials ready for immediate release to the factory floor. And it means delivering the industry's fastest response on quotations, first-run production hardware, and custom-engineered interconnect solutions.

Glenair operates the largest U.S.-based connector manufacturing enterprise in the high-reliability interconnect industry. That scale allows us to produce first-run hardware as well as highly customized connector solutions in just two to three weeks—all while maintaining the exceptional quality, engineering support, and customer service our military, aerospace, and industrial customers demand.

We make these investments for one reason. Somewhere, a damaged fighter is missing tomorrow's training sortie, or a next-generation drone is stuck on an assembly line. Somewhere, a repair depot or Tier One supplier is ready to close out a wire harness or LRU, but is waiting on one final component. We can't eliminate every delay, but we can refuse to let a Glenair part become the pacing item. Every day we remove from the procurement cycle is another day closer to fielding critical equipment into service. That's what availability means at Glenair.

Because helping our customers put critical systems in service as quickly as possible is more than good business. It is part of our commitment to the warfighters who protect our freedom. And it is why we never want anyone, anywhere, waiting for a part with our name on it.

QwikConnect

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