The Space Environment

Why is space considered the most extreme environment for connectors?

Space subjects connectors to a unique combination of simultaneous stresses that no terrestrial environment can replicate:

- **Hard vacuum** – causes outgassing and material degradation.
- **Extreme thermal cycling** – temperatures swing from approximately +125 °C in sunlight to –150 °C in shadow.
- **Mechanical shock and vibration** – intense G-forces during launch and sustained vibration in orbit.
- **Long-duration, unattended operation** – missions lasting years with no possibility of repair.

A single connector failure can compromise an entire mission, making material selection, robust design, and thorough qualification testing essential.

Key Takeaway:

Space connectors must survive vacuum, extreme temperatures, and launch forces simultaneously—without the possibility of repair—making qualification testing critical to mission success.

What is outgassing and why does it matter for space connectors?

Outgassing is the release of trapped gases from materials when exposed to vacuum. In space, released gases can condense on cold surfaces—such as optics, sensors, and solar panels—degrading their performance and potentially compromising the mission. Outgassing can also weaken connector components by creating internal cracks and fissures.

- **NASA ASTM E595** – the primary test standard for outgassing characterization.
- **TML (Total Mass Loss)** – must not exceed 1.0% of specimen mass.
- **CVCM (Collected Volatile Condensable Materials)** – must not exceed 0.1%.

Cinch uses vacuum-stable insulator materials including polyimide, PEEK, and glass-filled DAP, with gold or nickel plating on metal surfaces to prevent molecular migration.

Key Takeaway:

All Cinch space-grade components meet NASA ASTM E595 outgassing requirements for TML and CVCM, ensuring vacuum compatibility and protection of sensitive spacecraft equipment.

How do space-grade connectors survive extreme thermal cycling?

Without atmospheric insulation, spacecraft experience rapid temperature swings that create cyclic expansion and contraction stress, risking material fatigue and fracture. Cinch addresses thermal cycling through:

- **CTE-matched materials** – matched coefficients of thermal expansion between metals and insulators minimize mechanical strain.
- **Compliant contact systems** – spring-loaded or twist-pin designs absorb differential movement while maintaining stable contact resistance.
- **Thermally stable alloys** – aluminum, titanium, and stainless steel provide low mass and excellent resistance to thermal cycling.
- **Corrosion-resistant plating** – gold or nickel finishes protect against surface degradation at temperature extremes.
- **TVAC testing** – thermal vacuum qualification verifies stable performance across repeated temperature cycles.

Key Takeaway:

Cinch connectors are designed with CTE-matched materials, compliant contacts, and thermally stable alloys—validated through TVAC testing for reliable operation across extreme orbital temperature swings.

What launch shock and vibration standards do space connectors need to meet?

Launch is the most mechanically intense phase of any space mission. Connectors endure sustained high G-forces, severe shock, and vibration from rocket acceleration. Cinch designs for these forces with:

- **Secure locking mechanisms** – bayonet, threaded, or latched coupling prevents loosening under vibration.
- **Lightweight, durable housings** – metal shells provide structural integrity without excess weight.
- **Strain relief and backshells** – distribute cable loads evenly to protect termination points.

Cinch space connectors are qualified to:

- **MIL-STD-202** – environmental and mechanical test methods for electronic components.
- **ECSS-Q-ST-70-38** – European space connector qualification and high-reliability soldering standard.

Key Takeaway:

Cinch space connectors are qualified to MIL-STD-202 and ECSS-Q-ST-70-38, ensuring mechanical integrity from launch through long-term orbital operation.

Standards, Qualification & Testing

What are NASA Technology Readiness Levels (TRL) and how are they used?

NASA's Technology Readiness Levels (TRL) assess the maturity of a technology on a scale from 1 to 9:

- **TRL 1** - basic principles observed.
- **TRL 9** - flight proven in a successful space mission (highest maturity).

The TRL scale has been internationally standardized as ISO 16290:2013 (Space systems — Definition of the Technology Readiness Levels and their criteria of assessment). The European Space Agency (ESA) has also adopted a similar framework since 2008.

Cinch's space-qualified connectors, cables, terminations, and attenuators have earned the TRL levels through decades of successful missions—from Apollo and Voyager to ESA's Sentinel program.

Key Takeaway:

Cinch components have earned TRL 9—the highest maturity rating per ISO 16290—through proven performance on iconic space missions spanning over sixty years.

What does Qualified Parts for Space (QPS) mean?

QPS (Qualified Parts for Space) identifies Cinch components that have undergone extensive internal testing and screening specifically for spaceflight. QPS products are built using the same high-reliability practices as QPL products, with additional space-level qualification.

Key QPS features:

- **Screening standard** - qualified to MIL-DTL-3933 space level T qualification.

- **Outgassing compliance** - all materials meet or exceed NASA's ≤1% TML and ≤0.1% CVCM per ASTM E595.
- **Multiple screening levels** - offered in three tiers; Level A screened models are available off the shelf through distribution.

Cinch's Midwest Microwave QPS Attenuators are a key example, designed for satellite payload and ground testing equipment in both GEO and LEO markets.

Key Takeaway:

Cinch's QPS program provides space-screened components with verified outgassing compliance and space-level qualification, available through standard distribution channels.

What standards govern space-grade connector qualification?

Space-grade connectors are qualified against a combination of military, industry, and space-specific standards:

- **NASA ASTM E595** - outgassing compliance (TML and CVCM limits).
- **NASA EEE-INST-002** - screening and qualification of electrical, electronic, and electromechanical parts.
- **ISO 16290:2013** - international standard defining Technology Readiness Levels.
- **MIL-STD-202** - environmental and mechanical testing methods.
- **ECSS-Q-ST-70-38** - European space connector qualification.
- **MIL-DTL-83513** - Micro-D connector specification.
- **MIL-DTL-3933** - attenuator specification (space level T).

Cinch components are tested and qualified to these standards for both NASA and ESA spaceflight programs.

Key Takeaway:

Cinch space-grade products are qualified to NASA ASTM E595, EEE-INST-002, ISO 16290, MIL-STD-202, ECSS-Q-ST-70-38, and applicable MIL-DTL specifications for comprehensive spaceflight readiness.

Cinch Space Product Portfolio

What types of space-qualified connectors does Cinch offer?

Cinch provides a comprehensive portfolio of space-qualified interconnect solutions:

- **Dura-Con™ Space Grade Micro-Ds** – M83513-style connectors with twist pin contacts for compact, high-reliability signal and data connections.
- **Trompeter Space-Rated RF Connectors** – TRL 9 flight-proven RF connectors and cable assemblies for MIL-STD-1553B data bus and signal applications.
- **Midwest Microwave QPS Attenuators** – MIL-DTL-3933 space-level qualified coaxial attenuators for satellite payload and ground systems.
- **Fiber Flex Optical Circuits (Stratos)** – precision fiber routing for high-density satellite fiber management.
- **CIN::APSE® Stacking & Compression** – NASA TRL 9 solderless, high-density board-to-board interconnects.
- **Fibreco® Expanded Beam Fiber Optics** – harsh-environment fiber optic connectors and cable assemblies.

These products cover data, signal, RF, fiber optic, and combination connectivity for satellites (LEO, MEO, GEO), launchers, and ground systems.

Key Takeaway:

Cinch offers a full range of space-qualified connectivity—from Micro-D and RF connectors to optical circuits and solderless stacking systems—supporting every major space platform type.

What are the Dura-Con™ Space Grade Micro-D connectors?

The Dura-Con™ Space Grade Micro-Ds are M83513-style micro-D connectors purpose-built for spaceflight. Key features include:

- **Twist pin contacts and machined sockets** – specified in NASA's EEE-INST-002 standard for high reliability.
- **DAP insulators** – vacuum-stable dielectric material.
- **Nickel-plated aluminum shells** – lightweight with excellent shielding.
- **ETFE insulated wires** – space-rated wire insulation.
- **Low outgassing** – under 1.0% TML and less than 0.1% CVCM.
- **NASA EEE-INST-002 Level 2 screening** – lot tested for extreme space conditions.

Key Takeaway:

Dura-Con Space Grade Micro-Ds deliver NASA EEE-INST-002 Level 2 qualified performance with low-outgassing materials in a compact, lightweight M83513-style form factor.

What Trompeter space-rated RF products are available?

Cinch's Trompeter brand offers space-rated RF connectors and cable assemblies including:

- **TRB and TRT miniature connectors** – designed for NASA outgassing compliance and MIL-STD-1553B data bus specifications.
- **TTM and TRS subminiature series** – compact solutions for space-constrained applications.

Key qualifications:

- **TRL 9 flight proven** – demonstrated on communications satellites, GPS satellites, and Mars rovers.
- **NASA outgassing compliant** – ≤1% TML and ≤0.1% CVCM.
- **PTFE insulators** – vacuum-stable dielectric with excellent RF performance.
- **Post-processed silicone gaskets** – baked at 200 °C minimum for outgassing compliance.

Key Takeaway:

Trompeter space-rated RF connectors are TRL 9 flight-proven, MIL-STD-1553B compliant, and meet all NASA outgassing requirements for satellite, navigation, and deep-space applications.

What is CIN::APSE® and why is it used in satellite systems?

CIN::APSE® is Cinch's patented solderless, crimpless compression connector technology. Originally developed for satellite programs, it is approved by NASA at TRL 9.

Key capabilities:

- **Performance** – signal integrity above 50 GHz with contact resistance below 15 mΩ.
- **Contact technology** – bundled gold-plated molybdenum wire contacts compressed against gold-plated PCB pads.

- **Solderless assembly** – eliminates thermal stress, simplifies rework, and reduces inspection requirements.
- **Configurations** – board-to-board, flex-to-board, and component-to-board interconnects.

Space applications include satellite payload systems, gyroscopes for in-flight control, and geostationary communication platforms.

Key Takeaway:

CIN::APSE is a NASA TRL 9 approved solderless compression technology delivering >50 GHz performance for satellite and space systems, eliminating solder while maximizing density and reliability.

How do Fiber Flex Optical Circuits support space missions?

Cinch's Fiber Flex Optical Circuits, developed by the Stratos brand, provide precision fiber routing for high-count fiber layouts in satellite and payload systems.

Key features:

- **CAD-designed routing** – true 3D fiber management controls micro-bends and macrobends for long-term reliability.
- **CNC-controlled manufacturing** – automated fiber placement ensures consistency and repeatability.
- **Preconfigured circuits** – channels, ports, and routings are built in, streamlining installation and system design.
- **Minimal signal attenuation** – optimized bend management reduces optical loss.

Key Takeaway:

Fiber Flex Optical Circuits deliver precise, repeatable fiber routing for high-density satellite applications, minimizing signal loss and simplifying integration.

What QPS Attenuator options are available for satellite applications?

Cinch's Midwest Microwave QPS coaxial attenuators are designed for signal processing and communications in satellite payload and ground testing equipment, serving both GEO and LEO markets.

- **Design heritage** – same robust, high-reliability approach as the Midwest Microwave QPL attenuator line.

- **Qualification** – MIL-DTL-3933 space level T.
- **Outgassing** – all materials meet or exceed ≤1% TML and ≤0.1% CVCM per ASTM E595.
- **Screening levels** – offered in three tiers; Level A models available off the shelf through distribution.

Key Takeaway:

Midwest Microwave QPS Attenuators provide MIL-DTL-3933 space-level qualified signal conditioning for satellite systems, with Level A screened models available through distribution.

Space Applications

What satellite platforms does Cinch support?

Cinch provides connectivity solutions across all major satellite types and orbits:

LEO (Low Earth Orbit) applications:

- Communications, earth observation, earth sensing, navigation systems, CubeSats, space telescopes, and surveillance.

GEO/MEO (Geostationary/Medium Earth Orbit) applications:

- Broadband, communications, meteorology, navigation, and radio/TV networks.

Each orbital environment presents different mission duration, thermal cycling, and environmental requirements. Cinch's portfolio is tested and qualified for the specific challenges of each.

Key Takeaway:

Cinch provides qualified connectivity solutions for the full spectrum of satellite applications across LEO, MEO, and GEO orbits.

What challenges do LEO satellite constellations create for connectors?

LEO satellites operate at altitudes between 160 and 2,000 km and face unique connector challenges:

- **Rapid thermal cycling** – short orbital periods create frequent temperature swings.
- **Atomic oxygen exposure** – can erode and degrade connector materials in low orbit.

- **SWaP constraints** – constellation economics demand compact, lightweight solutions.
- **Production scalability** – high-volume constellation deployments require repeatable manufacturing consistency.

Cinch addresses these with low-outgassing connectors meeting NASA ASTM E595, atomic-oxygen-resistant materials, compact CIN::APSE stacking solutions for SWaP optimization, and production processes designed for constellation-scale volumes.

Key Takeaway:

Cinch's space-qualified portfolio is optimized for LEO constellation requirements—including rapid thermal cycling, atomic oxygen resistance, compact form factors, and high-volume production consistency.

Does Cinch supply connectors for launch vehicles and ground systems?

Yes. Cinch's space portfolio extends beyond satellites to launcher and ground infrastructure:

Launcher applications:

- Altitude correction modules, central units and communications, command memory boxes, and sensor arrays.

Ground system applications:

- Communications, docking systems, ground stations, Mars rovers, and mobility platforms.

These applications require spaceflight-grade reliability combined with the additional demands of launch acceleration, ground-based environmental exposure, and—for rovers—mechanical durability in planetary surface conditions.

Key Takeaway:

Cinch provides end-to-end space connectivity—from ground stations and launcher avionics to satellite payloads and planetary surface systems.

Cinch's Space Heritage & Capabilities

What is Cinch's flight heritage in space programs?

Cinch's space heritage spans more than sixty years. Cinch components have supported some of the most significant missions in history:

- **1970s** – Mariner space probes, Apollo missions, Space Shuttle Orbiter.
- **1970s – present** – Voyager (now in interstellar space).
- **2000s – present** – GPS satellite constellations, ESA Sentinel Earth observation.
- **2020s** – Emirates Mars Mission and ongoing commercial programs.

This flight heritage across NASA, ESA, and commercial programs provides proven performance data that directly informs next-generation space interconnect development.

Key Takeaway:

With sixty-plus years of flight heritage—from Apollo and Voyager to the Emirates Mars Mission—Cinch brings unmatched space experience to every new program.

Can Cinch design custom connectors for space programs?

Yes. Cinch's global engineering team provides full custom design and manufacturing support. Custom capabilities include:

- Unique insert layouts and contact configurations.
- Specialized shell materials and finishes.
- Custom cable assemblies and harness designs.
- Application-specific screening and qualification testing.
- Modified form factors for specific spacecraft integration.

Cinch supports customers from concept through flight-ready hardware, serving both traditional and NewSpace programs.

Key Takeaway:

Cinch provides full custom design, manufacturing, and qualification support for space programs—from concept through flight-ready hardware.

Resources & Support

Where can I find technical resources for Cinch space products?

Cinch provides comprehensive engineering resources at cinch.com:

- Datasheets and drawings – Datasheet Library and Drawing Library.
- 3D CAD models – CAD Model Library.

- Technical papers – topics including outgassing, TRL levels, and LEO satellite design.
- Brochures and catalogs – all space-rated product families.
- Competitor cross-reference tool – identify Cinch equivalents to competitor part numbers.

Key Takeaway:

Engineering resources—including datasheets, CAD models, technical papers, and cross-reference tools—are available at cinch.com.

Where can I buy Cinch space-grade connectors?

Cinch space products are available through authorized distributors and direct sales:

- Distribution partners – Digi-Key, Mouser, Newark, and Air Electro.
- Direct sales – Cinch's sales team for program-specific requirements.
- Stock Check – real-time distributor inventory tool at cinch.com.

Key Takeaway:

Cinch space products are globally accessible through major authorized distributors and direct sales, with real-time stock visibility at cinch.com.

How do I get engineering support for a space connector application?

Cinch's global engineering team supports space applications from product selection and custom design through qualification and production. Contact options include:

- Contact form at cinch.com.
- Request samples directly through product pages.
- Initiate a custom design engagement for program-specific solutions.

Key Takeaway:

Cinch offers expert engineering support for space programs—contact the sales team to discuss requirements, request samples, or start a custom design.

Space Market Glossary

Space Environment & Phenomena

Atomic Oxygen (AO)

Highly reactive single oxygen atoms in LEO (roughly 200–700 km). AO erodes polymers and thin films through chemical sputtering.

Key Takeaway:

LEO connectors require AO-resistant materials.

Coefficient of Thermal Expansion (CTE)

Rate at which a material expands or contracts per degree of temperature change. CTE-matched metals and insulators minimize stress during thermal cycling.

Key Takeaway:

CTE matching prevents cracking and contact misalignment in orbit.

Outgassing

Release of trapped gases from materials in vacuum. Condensed volatiles can coat optics, sensors, and solar panels, degrading performance.

Key Takeaway:

All flight materials must pass ASTM E595 outgassing limits.

Thermal Cycling

Repeated heating and cooling as a spacecraft moves between sunlight and shadow. LEO satellites cycle roughly every 90 minutes, swinging from +125 °C to −150 °C.

Key Takeaway:

LEO missions impose the most aggressive thermal cycling on connectors.

TVAC (Thermal Vacuum) Testing

Qualification test subjecting components to repeated temperature cycles under hard vacuum. Verifies stable contact resistance, mechanical integrity, and outgassing compliance.

Key Takeaway:

TVAC is the primary environmental qualification test for space hardware.

Orbits & Mission Types

CubeSat

Miniaturized satellite in standardized units (1U = 10 × 10 × 10 cm, ~1.33 kg). Used for tech demos, Earth observation, and communications.

Key Takeaway:

CubeSat programs often start COTS and upgrade to space-screened as they mature.

Deep Space

Missions beyond Earth orbit—lunar, interplanetary, interstellar. Demands the highest reliability; repair is impossible. Cinch heritage includes Voyager (launched 1977, still operating).

Key Takeaway:

Longest-life, highest-reliability requirements of any space application.

GEO (Geostationary Earth Orbit)

Circular orbit ~35,786 km above the equator; satellite stays fixed relative to a ground point. Serves comms, broadcast, and meteorology. Typical mission life 15+ years.

Key Takeaway:

GEO programs prioritize heritage, reliability, and full space-level qualification.

LEO (Low Earth Orbit)

Orbits between ~160 and 2,000 km. Most populated regime—communications constellations, Earth observation, ISS. Rapid thermal cycling, atomic oxygen, and high-volume production demands.

Key Takeaway:

LEO constellations drive demand for SWaP-optimized, production-scalable connectors.

MEO (Medium Earth Orbit)

Orbits between ~2,000 and 35,786 km. Primarily navigation systems (GPS, Galileo, GLONASS). Moderate thermal cycling with higher radiation than LEO.

Key Takeaway:

MEO navigation satellites require long-life, radiation-tolerant connectors.

NewSpace

Commercial space sector characterized by private investment, rapid development, constellation architectures, and cost-optimized approaches. Favors COTS with screening over full QPL.

Key Takeaway:

Flexible product portfolios with COTS-to-qualified upgrade paths are essential for NewSpace.

Standards, Qualification & Testing

ASTM E595

NASA's primary outgassing test method. Measures TML and CVCM after 24 hours at 125 °C in vacuum. Space-grade limits: ≤1.0% TML, ≤0.1% CVCM.

Key Takeaway:

Compliance is required for virtually all flight hardware materials.

CVCM (Collected Volatile Condensable Materials)

Mass of outgassed matter that condenses on a collector during ASTM E595, expressed as % of specimen mass. Space limit: ≤0.1%.

Key Takeaway:

Protects spacecraft optics, sensors, and thermal surfaces from contamination.

ECSS-Q-ST-70-38

European space standard for high-reliability soldering and connector qualification—the ESA counterpart to NASA EEE-INST-002.

Key Takeaway:

Required for ESA programs; Cinch dual-qualifies alongside NASA standards.

EEE-INST-002

NASA instruction for screening and qualification of electrical, electronic, and electromechanical parts. Defines Levels 1–3 by mission criticality. Cinch Dura-Con Space Grade Micro-Ds are qualified to Level 2.

Key Takeaway:

Level 2 screening covers most NASA and commercial space missions.

ISO 16290:2013

International standard defining Technology Readiness Levels (TRL 1–9) and assessment criteria for space systems. Formalizes the NASA TRL scale for global use.

Key Takeaway:

Provides the internationally recognized TRL framework.

MIL-DTL-3933

Military specification for fixed and variable RF attenuators. Cinch QPS Attenuators are qualified to space level T—the highest tier.

Key Takeaway:

Space level T is the qualification standard for Cinch QPS attenuators.

MIL-DTL-83513

Military specification for micro-miniature rectangular (Micro-D) connectors. Defines dimensions, contacts, materials, and qualification testing.

Key Takeaway:

Baseline Micro-D spec; Cinch adds EEE-INST-002 space screening on top.

MIL-STD-202

Military standard for environmental and mechanical test methods (thermal shock, vibration, humidity, altitude, mechanical shock).

Key Takeaway:

Foundation for mechanical and environmental qualification of space connectors.

MIL-STD-1553B

Serial data bus standard for command/response avionics communication. Dual-redundant twisted shielded pair at 1 MHz. Cinch Trompeter connectors are the industry standard for 1553B in space.

Key Takeaway:

Trompeter is the established connector solution for spacecraft 1553B data bus.

QPL (Qualified Products List)

U.S. Defense Logistics Agency list of products meeting a specific military specification. Carries full government qualification and traceability.

Key Takeaway:

Highest level of government-certified reliability for military and space.

QPS (Qualified Parts for Space)

Cinch's program for components tested and screened specifically for spaceflight, including ASTM E595 outgassing compliance. Three screening tiers; Level A available off the shelf.

Key Takeaway:

Bridges COTS and full QPL with distribution availability.

TML (Total Mass Loss)

Total mass lost during ASTM E595 outgassing testing, expressed as % of specimen mass. Space limit: ≤1.0%.

Key Takeaway:

Baseline outgassing requirement for all space-grade materials.

TRL (Technology Readiness Level)

Maturity scale from TRL 1 (basic principles) to TRL 9 (flight-proven). Standardized as ISO 16290:2013. Cinch products have achieved TRL 9 from Apollo through the Emirates Mars Mission.

Key Takeaway:

TRL 9 = flight-proven through successful mission operation.

Connector Technology & Design

Backshell

Mechanical housing on the rear of a connector providing strain relief, environmental sealing, and EMI shielding. Distributes cable loads during launch vibration.

Key Takeaway:

Critical for launch survival and long-term cable reliability.

Contact Resistance

Electrical resistance at the mating interface, measured in milliohms (mΩ). Must remain low and stable across thermal cycling and vibration. CIN::APSE achieves <15 mΩ.

Key Takeaway:

Stable contact resistance is a primary performance metric for space connectors.

DAP (Diallyl Phthalate)

Thermoset insulator used in space Micro-D connectors. Glass-filled DAP offers dimensional stability, low outgassing, and high dielectric strength.

Key Takeaway:

Standard insulator in Cinch Dura-Con Space Grade Micro-Ds.

ETFE (Ethylene Tetrafluoroethylene)

Fluoropolymer wire insulation with thermal stability, low outgassing, and radiation tolerance. Used in Cinch space-grade cable assemblies.

Key Takeaway:

Standard wire insulation for space harnesses.

Expanded Beam Connector

Fiber optic connector using lenses to expand the beam at the interface, making the connection insensitive to contamination and scratches. Cinch's Fibreco® line.

Key Takeaway:

Contamination-tolerant fiber connections for space and harsh environments.

Micro-D Connector

Micro-miniature rectangular connector per MIL-DTL-83513—~50% smaller and lighter than standard D-sub. Dominant signal/data connector in space.

Key Takeaway:

Workhorse connector for space signal and data applications.

PEEK (Polyether Ether Ketone)

High-performance thermoplastic for insulators and structural parts. Continuous use to 260 °C, low outgassing, radiation tolerant.

Key Takeaway:

Alternative to DAP when higher temperature or radiation tolerance is needed.

Polyimide

High-performance polymer (e.g., Kapton®) with exceptional thermal stability, radiation resistance, and low outgassing. Used in select space connector applications.

Key Takeaway:

Proven space-grade insulator for extreme thermal and radiation environments.

PTFE (Polytetrafluoroethylene)

Fluoropolymer dielectric (Teflon®) used in RF connectors and cables. Low dielectric constant, vacuum stable, low outgassing. Used in Cinch Trompeter space RF connectors.

Key Takeaway:

Standard dielectric for space RF connectors.

SWaP (Size, Weight, and Power)

Combined metric for a component's physical size, mass, and power consumption. Critical for LEO constellations and CubeSats where every gram affects launch cost.

Key Takeaway:

Primary selection criterion for LEO and NewSpace connector decisions.

Twist Pin Contact

Contact design using multiple fine wires twisted into a compliant, resilient pin. Specified in NASA EEE-INST-002 for high-reliability space use. Used in Cinch Dura-Con Space Grade Micro-Ds.

Key Takeaway:

NASA-preferred contact technology for space applications.

Cinch Products & Brands

CIN::APSE®

Patented solderless compression connector. Gold-plated molybdenum wire contacts compressed against PCB pads. Signal integrity >50 GHz, contact resistance <15 mΩ. NASA TRL 9.

Key Takeaway:

No direct competitor—unique solderless technology with flight heritage.

Dura-Con™ Space Grade Micro-D

M83513-style connectors with twist pin contacts, DAP insulators, nickel-plated aluminum shells, and ETFE wires. NASA EEE-INST-002 Level 2 screened. Outgassing: ≤1.0% TML, ≤0.1% CVCM.

Key Takeaway:

Primary signal and data interconnect for Cinch space programs.

Fiber Flex Optical Circuits (Stratos)

CAD-designed, CNC-manufactured precision fiber routing for high-count satellite fiber layouts. Controlled bend radii minimize signal attenuation.

Key Takeaway:

Precision fiber management for high-density satellite systems.

Fibreco®

Expanded beam fiber optic connectors and cable assemblies for harsh environments. Lens-based design tolerates contamination, scratches, and end-face damage.

Key Takeaway:

Harsh-environment fiber connectivity for space applications.

Midwest Microwave QPS Attenuators

Space-qualified coaxial attenuators per MIL-DTL-3933 space level T. ASTM E595 compliant. Three screening tiers; Level A available through distribution.

Key Takeaway:

Space-grade signal conditioning for satellite RF and ground test systems.

Trompeter

RF connectors and cable assemblies (TRB, TRT, TTM, TRS series). TRL 9 flight-proven on comms satellites, GPS, and Mars rovers. PTFE insulators, NASA outgassing compliant.

Key Takeaway:

Established RF interconnect brand for space data bus and signal applications.