



NPI to Mass Production: Custom Fiber Optic Manufacturing

From concept and prototyping through EVT, DVT, PVT, and high-volume mass production

<p>35+</p> <p>Years of fiber optic expertise</p>	<p>10,000+</p> <p>Cables shipped per month</p>	<p>EVT → MP</p> <p>Full NPI lifecycle support</p>
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Coastal Connections, a subsidiary of Impact ES, has been designing and manufacturing precision custom fiber optic assemblies for demanding applications since 1989. Our structured New Product Introduction (NPI) process — spanning EVT, DVT, PVT, and Mass Production — is how we consistently take programs from early concept to high-volume, high-reliability production. One current program ships over 10,000 custom fiber optic cables per month, the result of more than three years of rigorous NPI and sustained manufacturing discipline. Whether your

program is in early design exploration or ready to scale, our engineering team is ready to engage as your long-term manufacturing partner.

Bringing a custom fiber optic assembly from concept to reliable high-volume production is not a linear path — it requires a manufacturing partner with both the engineering depth to work through design challenges and the process discipline to lock them down before they become production problems. The four NPI stages below describe how Coastal Connections structures that journey.

NPI process stages

NPI lifecycle	
EVT — Engineering Validation Test	Concept validation, fiber architecture design, material selection, early prototyping, optical performance verification, design iteration. This phase establishes the design foundation.
DVT — Design Validation Test	Design refinement under real-world conditions; reliability and manufacturability optimization; pilot builds; test protocol development; quality control establishment. Design exits DVT production-ready.
PVT — Production Validation Test	Manufacturing process validation at pre-production volumes; process documentation; supply chain qualification; inspection procedure finalization. Confirms scalable, consistent production capability.
MP — Mass Production	Full-scale manufacturing with controlled environments, rigorous quality systems, and supply chain management. Programs currently operating at 10,000+ units per month.

The manufacturing capability behind a custom fiber optic program matters as much as the design. Coastal Connections operates a comprehensive fiber optic manufacturing facility in Ventura, California – Impact ES–Ventura – with in-house capability across the full assembly lifecycle: fiber handling and termination, connector installation, cabling, testing, and environmental qualification. The breadth of our capabilities means fewer handoffs, tighter process control, and a single accountable partner from prototype to production.



Manufacturing capabilities

Fiber and cable	
Fiber types	SM, PM, MM, LMA, photonic crystal, mid-IR – 100+ fiber types in stock
Fiber buffers / coatings	Acrylate, high-temp acrylate, silicone, polyimide (strip capability)
Cabling materials	PVC, PVDF, PTFE, ETFE, LSZH, Hytrel, polyurethane, PBT, PFA, stainless steel, silicone
Cable length	Up to 100 meters jacketed; specialty fiber without impractical spool lengths
Multi-fiber assemblies	Multiple fibers broken out from single cable; matched or staggered lengths
Connectors and assembly	
Commercial connectors	FC, LC, SC, SMA, ST, E-2000, Duplex LC IP-68
Defense connectors	38999, 28876, ARINC 801, test probes, PDV probes
Ferrule sizes	1.25mm, 1.6mm, 2.0mm, 2.5mm, 3.2mm OD – stainless steel and ceramic
Capillaries	1.8mm OD for 1, 2, or 3 fibers; 2.5mm
Proprietary technologies	Fiber end-caps, high-power mating connectors (PFC), PM fiber alignment, multi-core fiber alignment, multi-channel vacuum feedthroughs, precision length cables, long cable feeding

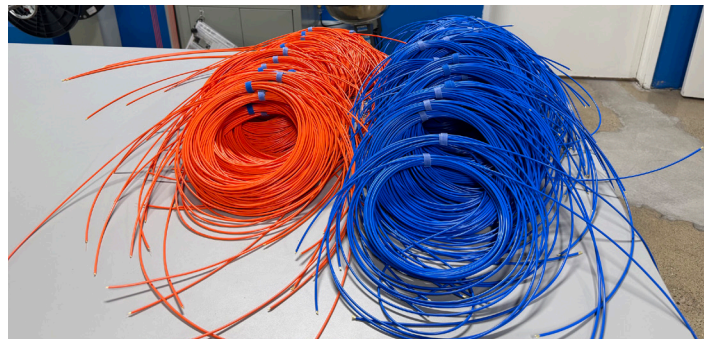


Quality in custom fiber optic manufacturing is not a final inspection – it is built into every step of the process. Coastal Connections uses in-process measurement, documented work instructions, material traceability, and 100% end-face inspection for production assemblies. Every shipped assembly is backed by test records. For programs with environmental requirements, our in-house thermal cycling capability covers -65°C to $+150^{\circ}\text{C}$, with more extreme conditions available through our partnership with Expor Labs.

Quality and testing capabilities

Testing	
Optical path length matching	+/-20ps time delay; +/-5mm for matched-length cables
Thermal cycling (in-house)	-65°C to +150°C with automated optical performance recording
Extreme environment testing	Via Expor Labs (specialist in fiber optic environmental testing)
Interferometric inspection	APC and UPC configurations; FC, LC, SC, E-2000 and custom
Visual inspection	Up to 1,000X magnification; 100% end-face inspection for production assemblies
Return loss (SM)	-10 to -80dB at 1310 and 1550nm
Return loss (MM)	-10 to -58dB at 850 and 1300nm
PER measurement	Multiple wavelengths; polarization analyzer, PER meter, cross polarizers
Beam profile / beam pointing	Pointing angle measured to 1/100th of a degree in production
Fiber eccentricity	0.2 to 10µm

Coastal Connections manufactures custom fiber optic assemblies for some of the most demanding applications in technology – space systems, quantum computing, medical devices, and defense programs where failure is not an option. Each market has distinct requirements around environmental qualification, connector standards, material selection, and testing. Our engineering team has worked across all of them.



Industries and applications

Markets served	
Space systems	Laser communications, rockets, cold atom lab, vacuum-compatible cables, LIDAR assemblies, high-power SM and PM cables
Medical devices	Surgical cables, flow cytometry, arterial OCT, high-power oral surgery, eye surgery, 405nm PM cables
Quantum computing	Photonic quantum systems, superconducting qubit platforms, cryogenic fiber assemblies, QKD
Defense	Aircraft cables, drone cables, ARINC 801, ruggedized outdoor cables, laser ignition, PDV probes, LIDAR
Industrial	Optical test equipment, downhole sensing, wind sensing, shaft encoders, metrology, multi-core fiber
R&D	Universities, government labs, corporate R&D centers – custom assemblies to demanding specs

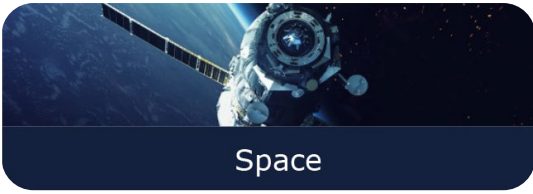
A custom fiber optic program is only as reliable as its supply chain. Coastal Connections has built deep sourcing relationships across specialty fiber, connector, and ferrule suppliers over 35+ years of operation. We maintain over 100 fiber types in stock, run JIT stocking programs for production customers, and manufacture all finished assemblies domestically at our Ventura, California facility – eliminating international shipping risk and supporting ITAR-sensitive programs.

Supply chain capability	
Stocked inventory	100+ fiber types, broad connector and ferrule selection; immediate availability for prototype programs
JIT stocking programs	Customer-specific inventory management for production programs; protects against supply disruptions
International sourcing	Established global supply chain for specialty fibers, connectors, and materials
Domestic manufacturing	Ventura, California; no international shipping lead times for finished assemblies
ITAR compliance	Domestic manufacturing supports ITAR-sensitive programs

The right time to engage a manufacturing partner is before the design is locked – not after. Coastal Connections brings engineering depth, NPI discipline, and production-scale manufacturing infrastructure to custom fiber optic programs from day one. If you are ready to start a development program or want to evaluate us as a production partner, we would welcome the conversation.

Start a conversation: sales@coastalcon.com





Industries We Serve

At Impact Electronic Solutions, we offer cutting-edge prototype and full-turnkey production services, providing unparalleled innovation and seamless solutions to meet your needs.

Our expertise spans highly regulated and mission-critical environments. We deliver complex electronic, fiber optic, and electromechanical products with exceptional quality and reliability. From product development to full-scale manufacturing, we prioritize customer-centric solutions and support groundbreaking innovations.

With extensive experience, we ensure success across diverse industries by consistently meeting rigorous standards and exceeding expectations.

About Us

We are a dynamic team dedicated to delivering innovative electronic design and manufacturing services that consistently outperform industry standards.

Our headquarters are in the Pacific Northwest, and the Impact ES network spans five key locations across the U.S.:

- Clearwater, Florida
- Cranston, Rhode Island
- Grants Pass, Oregon
- Vancouver, Washington
- Ventura, California

Our facilities have been recognized for excellence by numerous corporations, organizations, and publications, showcasing our commitment to quality, precision, and customer satisfaction nationwide.

Fiber Optic Cables and Assemblies Certifications



NASA 8739.5

We design and build products that matter.

Contact Us

sales@impactelectronics.com
805-644-5051
www.impactelectronics.com

