

QwikConnect

GLENAIR • JULY 2019 • VOLUME 23 • NUMBER 3

**What
World-Class
Manufacturing
Looks Like**

The Glenair logo features a blue square on the left containing a white, stylized letter 'G'. To the right of the square, the word 'Glenair' is written in a black, serif font, with a registered trademark symbol (®) at the end.

Glenair®



What World-Class Manufacturing Looks Like

Buckle up for an around-the-world tour of Glenair's mission-critical interconnect manufacturing operation. From Glendale, California to our newest facility in Salem, Germany, we welcome you behind-the-scenes to see for yourself what world-class manufacturing looks like.

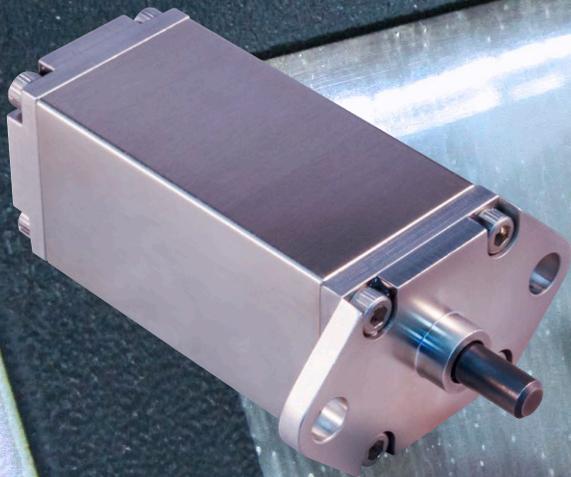


Single Worldwide Quality System

Glenair is proud of the quality and reliability we build into our broad range of mission-critical interconnect solutions—from discrete connectors to complex cable assemblies and embedded systems. Glenair is the biggest “made in the USA” interconnect supplier in the high-reliability industry, but we also operate factories in the UK, Italy, and Germany to serve the unique requirements of those markets. Glenair’s Worldwide Quality System is ISO 9001 and AS9100 certified and registered. We also hold many discrete product and operations certifications for specialty, high-performance markets including space, nuclear power, and rail. In addition to world-class quality, we are laser-focused on customer service and committed to being the easiest manufacturer in our industry to do business with. Here are just some of our key customer service principles:

- Lightning-fast turnarounds on quotes and special orders
- Worldwide sales and technical support in every major market
- Full-spectrum, “no gap” product lines
- No dollar or quantity minimums
- ISO 9001 and AS9100 certified
- Huge same-day shipment inventory
- Generous NRE, RMA, and sample request policies
- Abundant engineering and technical support
- No attitudinal constraints when it comes to customer convenience and service

**Glenair Quality
Depends On Me!**



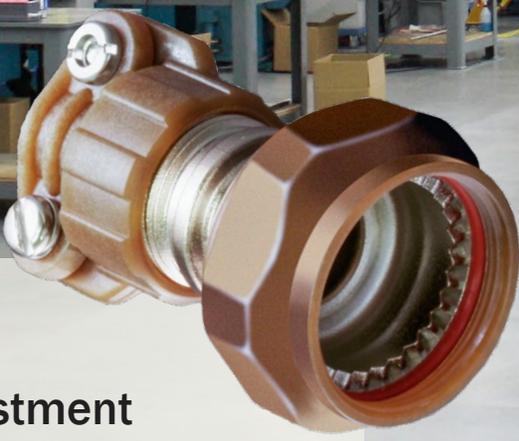
The mothership of Glenair manufacturing: Glendale, California

Glenair is unique in the high-performance interconnect industry as the only major manufacturer that has resisted the siren song of low-cost offshore manufacturing. Our Southern California operation is housed in over 1,670,000 square feet of vertically-integrated factory space in immediate proximity to the customers and markets we serve.



CNC MACHINING CENTERS

Glenair's Glendale factory houses the largest precision machining footprint in the high-performance interconnect industry, allowing us to support both small and large-volume interconnect requirements—from one piece to 100,000. All raw materials are sourced from US suppliers and analyzed down to the molecular level for compliance to industry standards.



INJECTION MOLDING:
Glenair's massive investment in composite thermoplastic and polymer plastic injection molding includes machinery, tooling, and most importantly, professional operators.

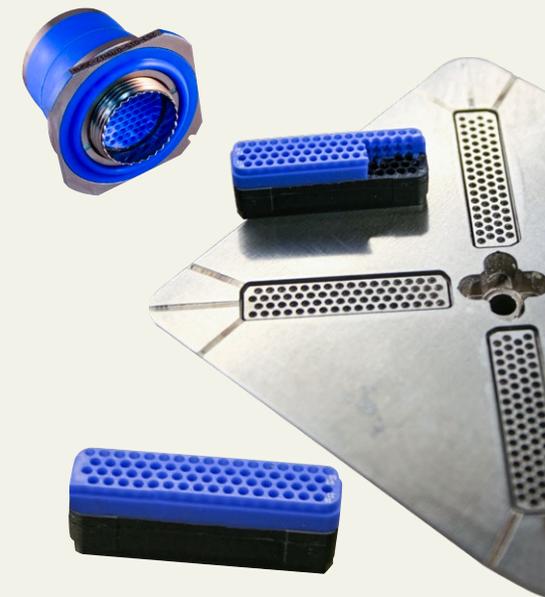


COMPOSITE MATERIALS

Key composites include 30% glass PEI, an amorphous thermoplastic with outstanding heat and chemical resistance and high strength.

TOOLING

The ability to produce Glenair's broad range of composite thermoplastic interconnect components depends on massive expenditures in tooling.



EXPERIENCED STAFF

No one in our industry has more engineering and manufacturing experience with composites and other innovative material types.

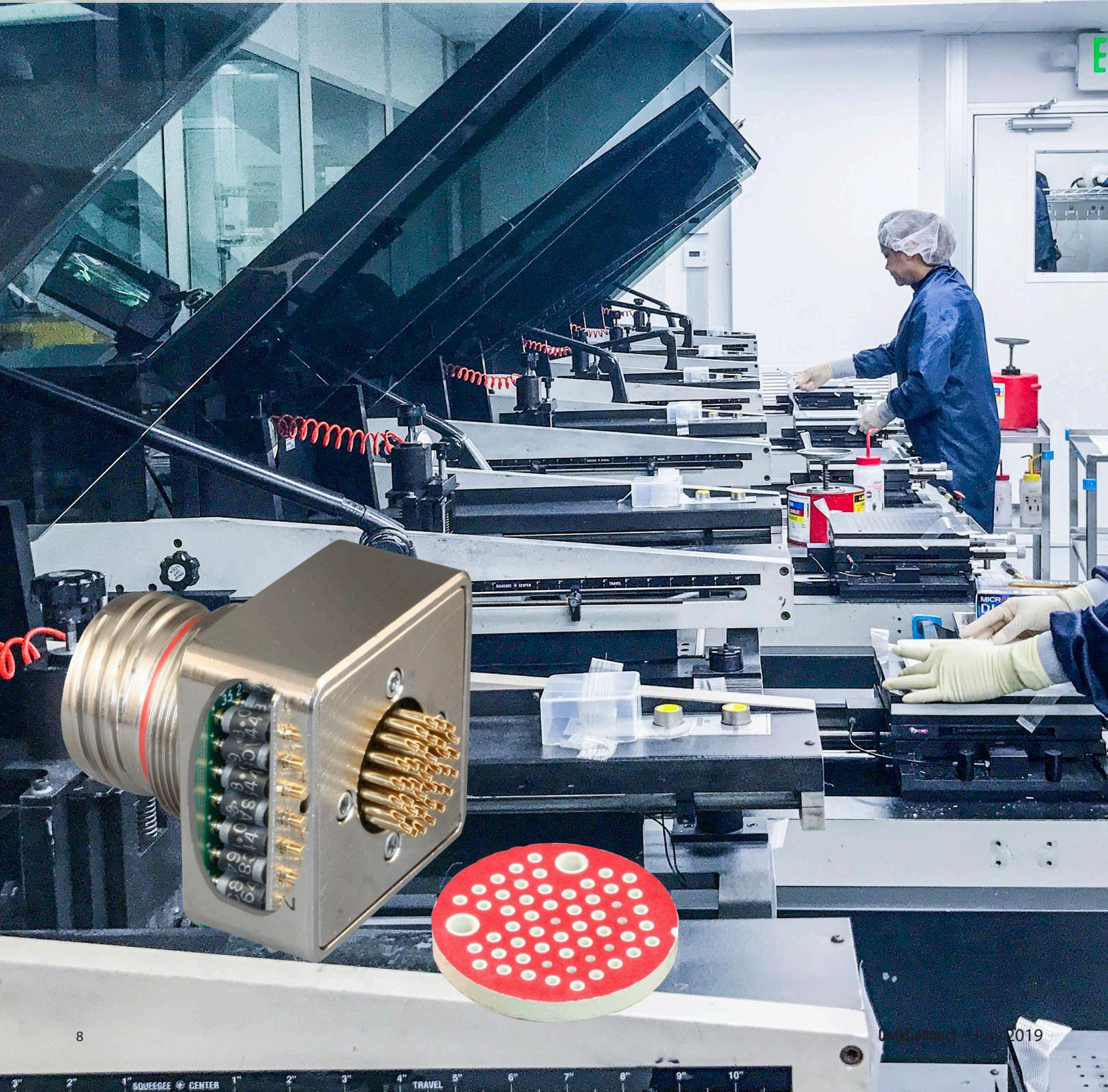
TOOLING

Our tooling design team has all the capacity required for even the most aggressive production schedules.



INDUSTRIAL CLEAN ROOMS:

Many specialized manufacturing processes—from EMI filtered ceramic array fabrication, to PCB/Flex assembly—require clean room facilities to ensure rigid adherence to environmental, electrical, and contamination prevention standards.





EMI FILTER ARRAYS: Every step in the process, from ceramic formulation to sub-assembly plating is completed in a controlled environment.



IPC 6012/6013 Class I, II, III, types 1-4 flex and rigid circuit board layout is performed under strict clean room conditions.

CONTROL OF ELECTROSTATIC DISCHARGE: Optoelectronic and other embedded systems are produced in special clean room facilities equipped with ESD flooring and grounding technologies.





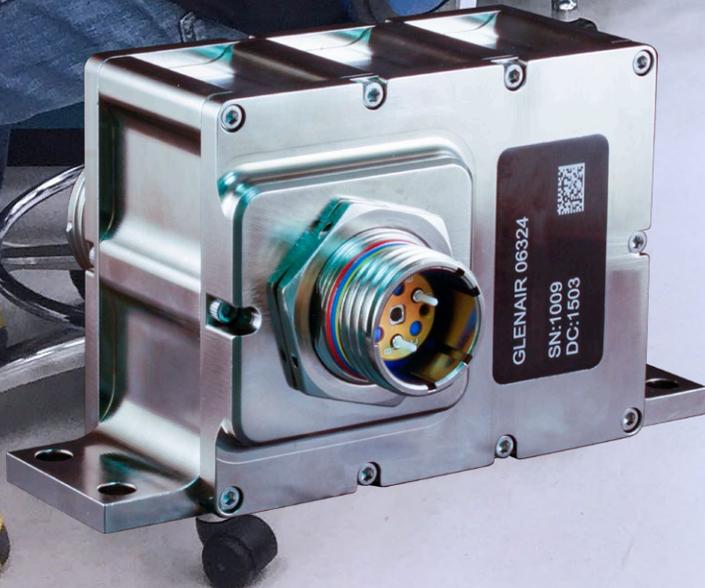
FIBER OPTICS AND OPTOELECTRONICS:

Glenair is the only manufacturer of mil-aero fiber optic interconnect technologies that also produces a complete range of harsh-environment optoelectronic transceivers and media converters—all in-house in our Glendale, CA facility.



PRECISION ASSEMBLY AND TEST

Glenair harsh-environment fiber optic connectors, cables, and photonics are manufactured, assembled, and tested under a single quality management system.





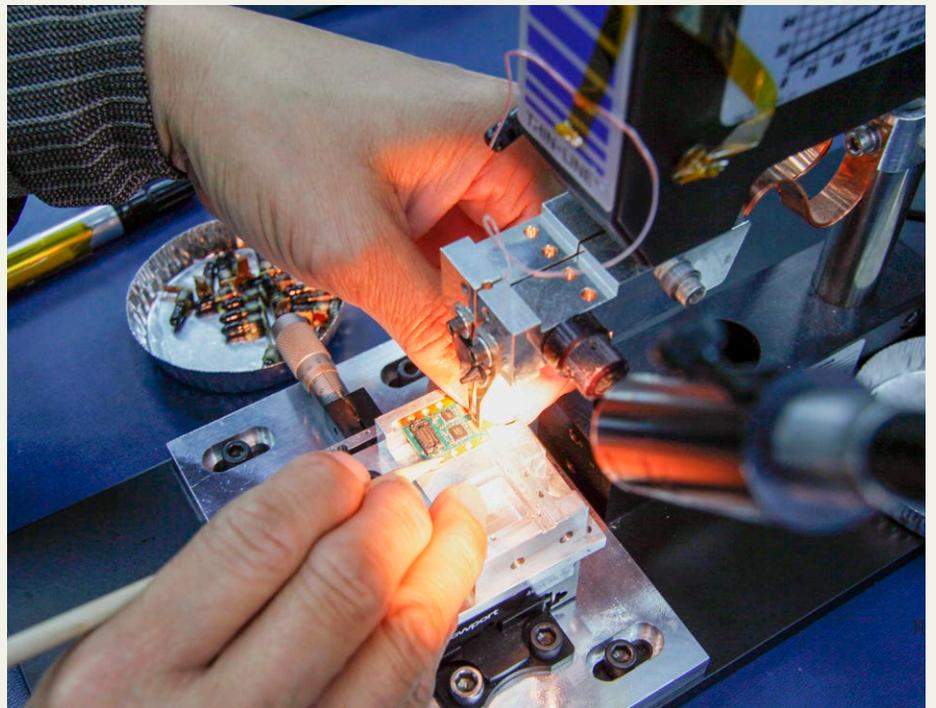
INSPECTION AND TEST

Each and every fiber optic circuit is 100% polished, cleaned, and inspected prior to shipment.



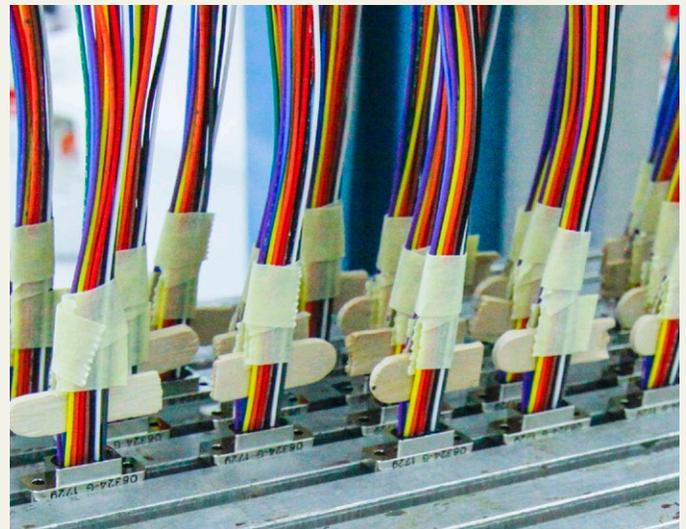
SMALL-VOLUME, HIGH-TOUCH

Glenair's fiber optic cell can accommodate both large volume as well as the many small-volume requirements common in our mil-aero market.





CONNECTOR ASSEMBLY:
The cell pictured here is one of more than a dozen performing Glenair signature and/or MS-qualified connector assembly—in this case, Micro and Nano rectangulars.



PRECISION HAND LABOR

Small form-factor Micro-D and Nanominiature connector assembly typically requires many hours of intense, precision hand labor. Our operators have long tenure and broad experience meeting the unique requirements of our high-reliability customer base with its many custom and small-batch requirements.



SPECIALIZED WORKSTATIONS

Each step in the process requires a unique mix of tools, fixtures, and assembly expertise.



BACKPOTTING

Harsh-environment Micro-D and Nanominiature connectors utilize backpotting to seal the wire, PC tail, or solder cup termination zone.



HIGH-SPEED PRODUCTION OVERMOLDING

The protection of the wire-to-connector termination zone with high-temperature tolerant overmolding results in cables built for today's life-of-system requirements.



OVERBRAIDING

Glenair manufactures micro-filament braiding materials from scratch for overbraiding on complex multibranch assemblies.



SKILLED TECHNICIANS

perform contact-to-wire termination and cable assembly to exacting customer requirements.



CAPACITY

Glenair's Complex Cable Group (CCG) has ample capacity for even the largest wired cable or conduit orders.





COMPLEX CABLE ASSEMBLY:

The fabrication of customer-bespoke interconnect cables at Glenair begins with wire schematics and dimensional drawings and ends with turnkey assemblies—terminated, tested, and ready for immediate use.

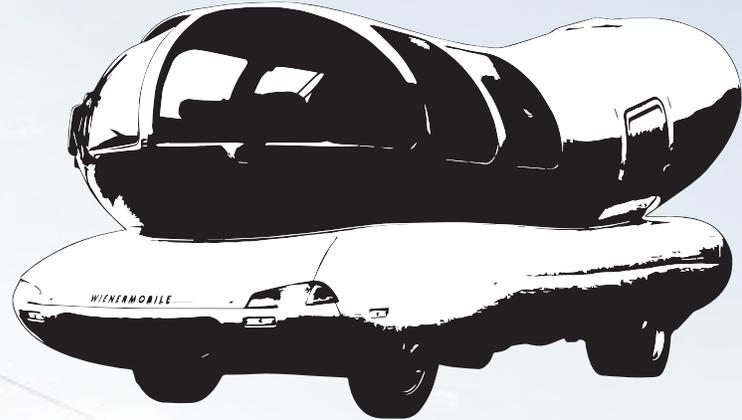
*Concours
d'Ignorance*



VOLVO PV 544



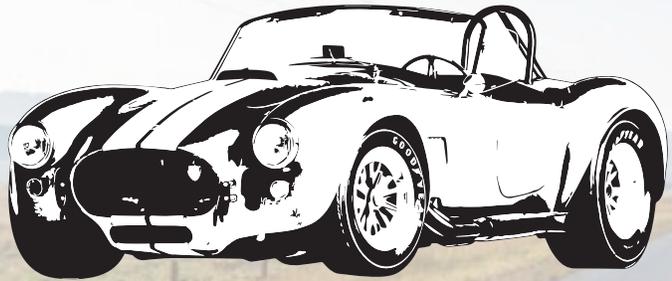
**MERCURY GRAND
MARQUIS with
Landau Roof**



VOLKSWAGEN MICROBUS



MUSTANG MACH 1



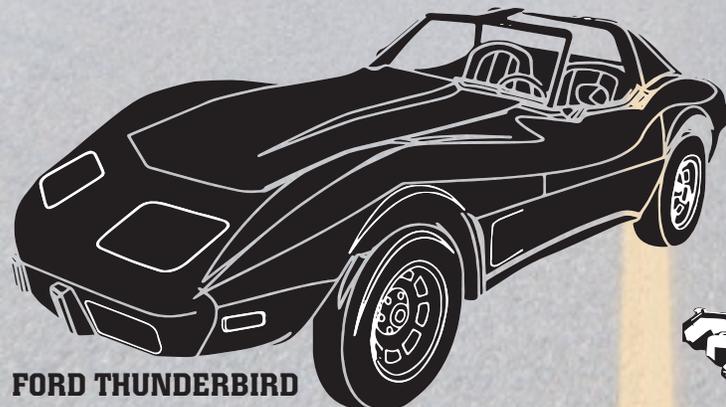
HUDSON HORNET



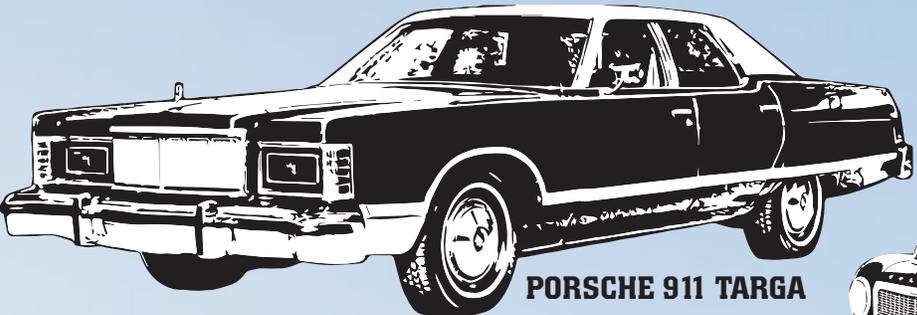
JAGUAR XKE



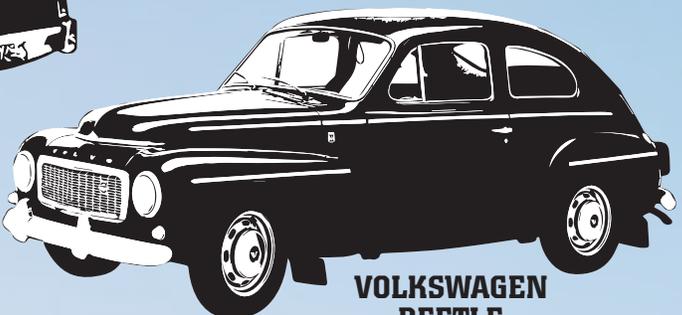
**CHEVROLET
BEL AIR WAGON**



FORD THUNDERBIRD



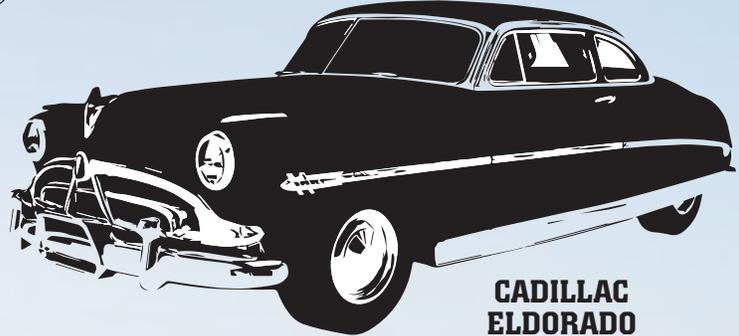
PORSCHE 911 TARGA



**VOLKSWAGEN
BEETLE**



PONTIAC GTO



**CADILLAC
ELDORADO**



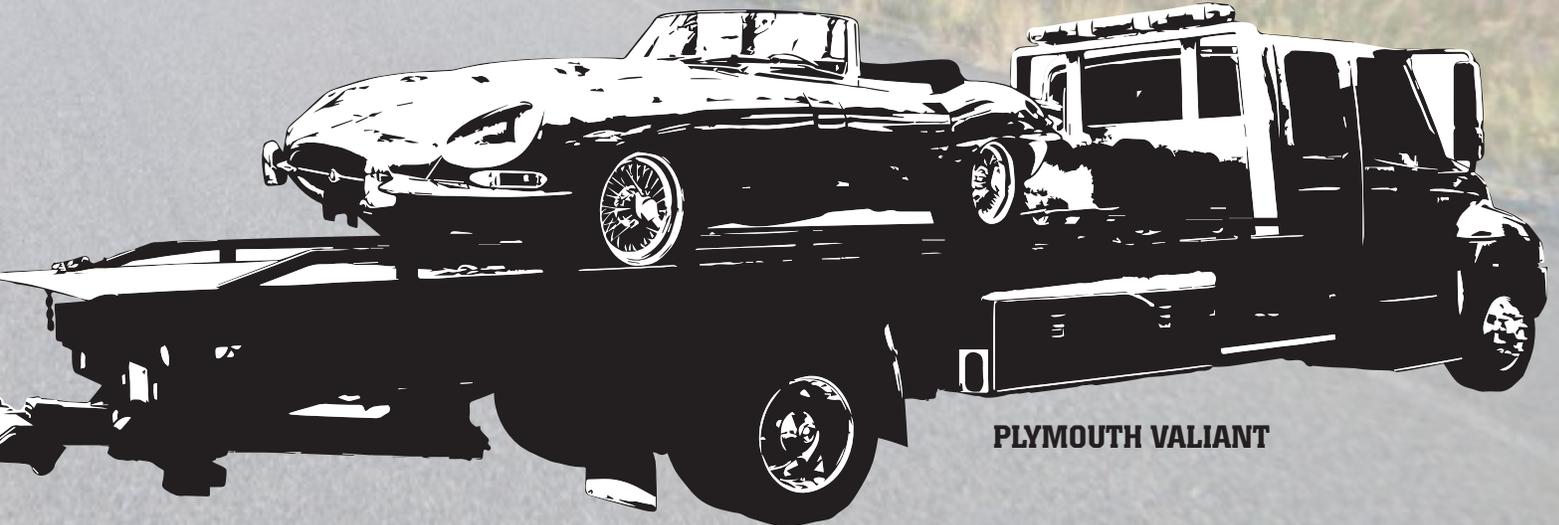
CORVETTE STINGRAY



**OSCAR MAYER
WIENERMOBILE**



SHELBY COBRA

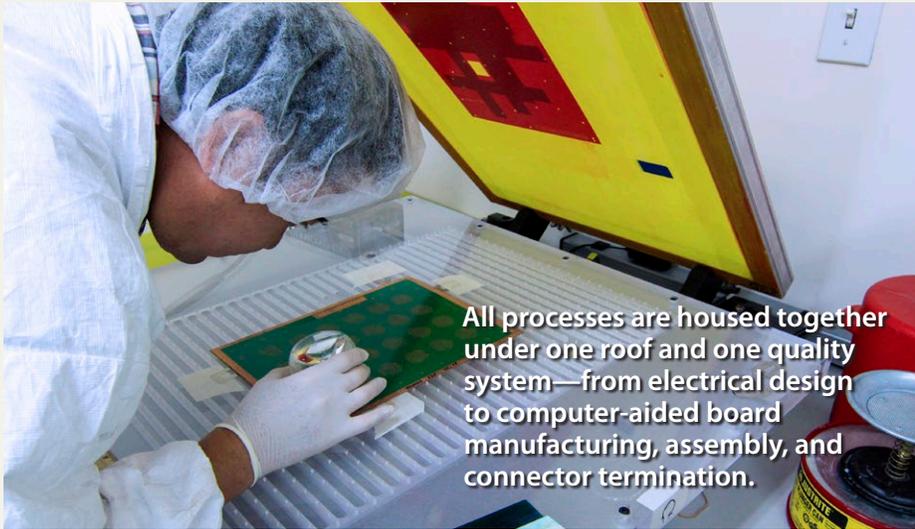


PLYMOUTH VALIANT



PROFESSIONAL OPERATORS

Glenair's Integrated PCB/Flex assembly production facilities are operated in accordance with commercial and military standards. Staff includes 200+ PCB and cable assemblers with Nadcap certification for special processes and ESD management.



All processes are housed together under one roof and one quality system—from electrical design to computer-aided board manufacturing, assembly, and connector termination.



INTEGRATED FLEX ASSEMBLIES:

Glenair's integrated PCB / Flex assembly cell produces IPC 6012/6013 Class I, II, III, types 1-4 assemblies—terminated with Glenair signature connectors including RF, high-speed Ethernet, and fiber optic (PhotonicFlex) solutions.





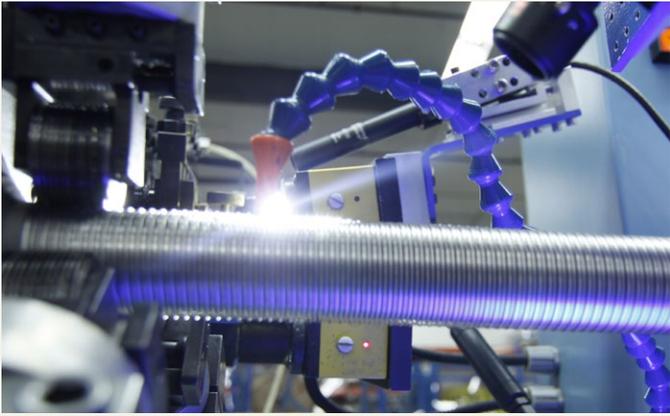
SPECIAL PROCESSES:

Glenair offers over 80 distinct product families to our land, sea, air, and space customers. The range of specialized fabrication equipment and trained operators required for such a broad portfolio is truly remarkable.

SURFACE PLATING

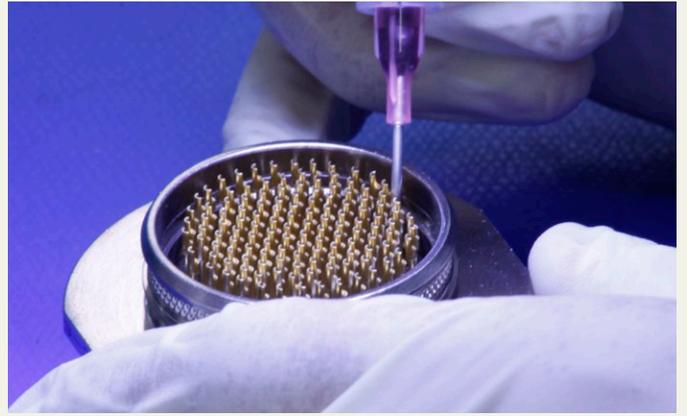
Our Southern California plating facility is certified to perform conductive and non-conductive plating on all classes of interconnect equipment including connectors, backshells, boxes, and more.





METAL-CORE CONDUIT FABRICATION

Specialized equipment for the manufacture of helically wound, continuous solder conduit with high-level EMI/RFI shielding and crush-proof strength.



GLASS-SEALED AND LIGHTWEIGHT HERMETICS

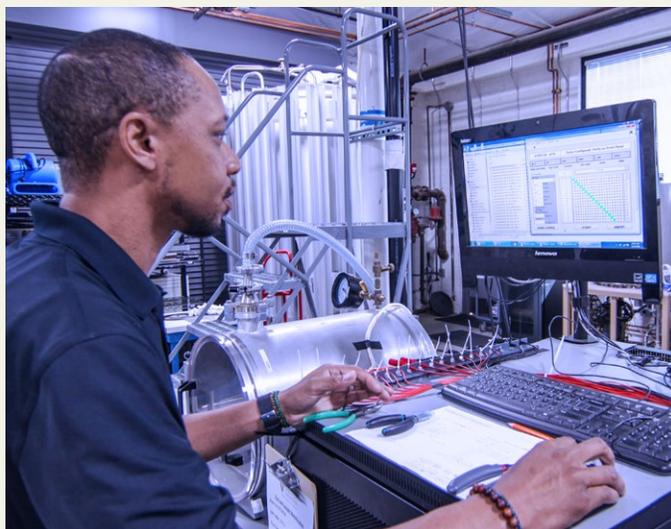
Specialized processes for the firing of glass-to-metal seal, as well as encapsulant seal, hermetic connectors.





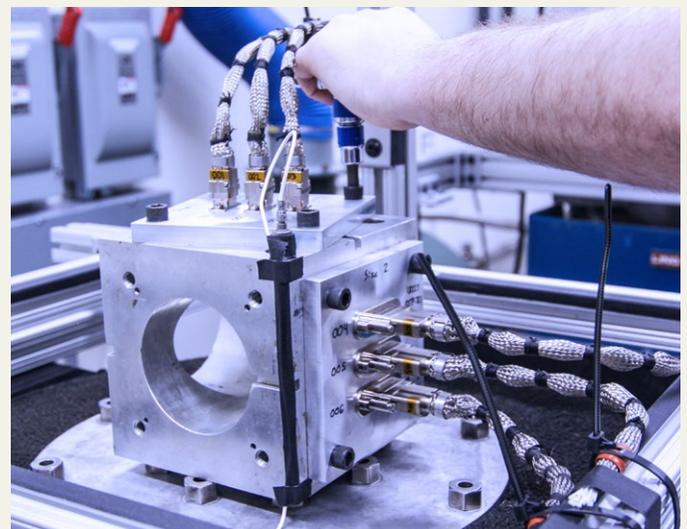
IN-HOUSE TESTING:

All Glenair mission-critical interconnect technologies undergo extensive qualification testing—much of it performed in our dedicated in-house laboratories and test facilities.



ELECTRICAL TESTING

Standard test protocols include insulation resistance, transfer impedance, dielectric withstanding voltage, high-altitude immersion, partial discharge, operating voltage, shielding effectiveness, and others.



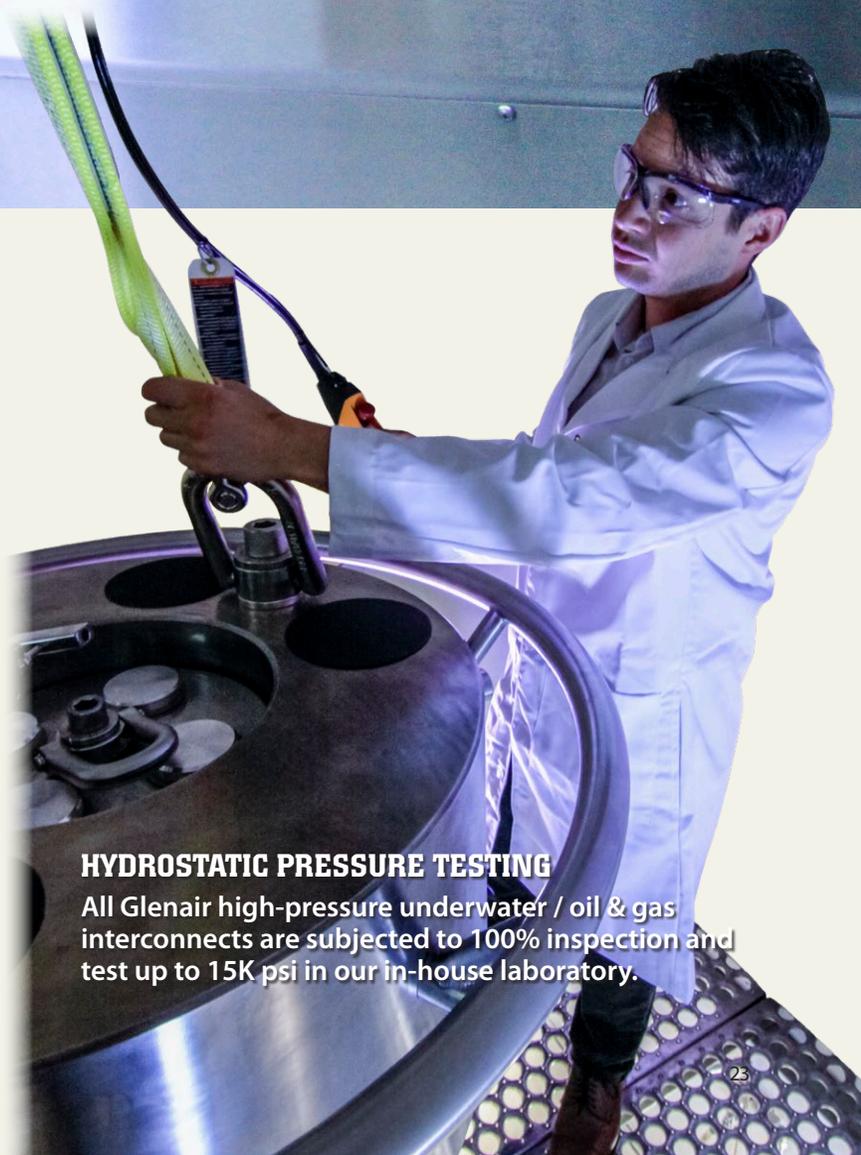
MECHANICAL TESTING

Industry qualification standards include insert retention, crimp contact retention, mating/unmating forces, shock, vibration, bend moment, and others.



SIGNAL INTEGRITY TESTING

Including operating frequency, characteristic impedance, insertion loss, backreflection, near-end crosstalk and others.



HYDROSTATIC PRESSURE TESTING

All Glenair high-pressure underwater / oil & gas interconnects are subjected to 100% inspection and test up to 15K psi in our in-house laboratory.



SAME-DAY SHIPMENT STOCKING

Immediate availability for high-demand connectors and tooling.



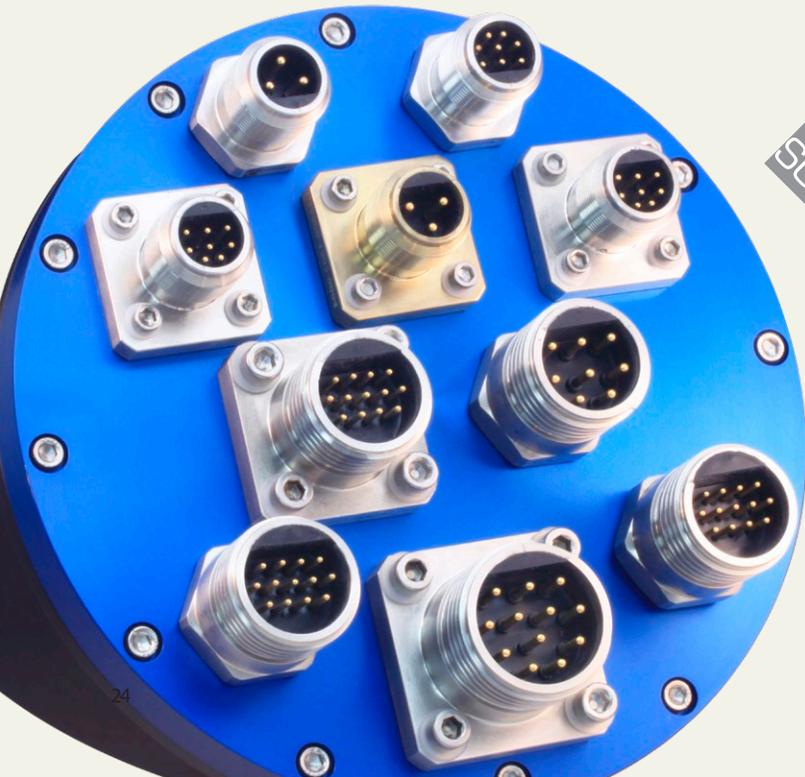
HARNESS ASSEMBLIES

for Micro-D, Nanominiature, and fiber optic connectors and cable assemblies.



IN-HOUSE TESTING CAPABILITIES

Glenair UK operates an independently accredited BS9000:CECC:IECQ test lab for internal and third-party product development / design verification and connector qualification including pure air standards.



**Glenair UK:
Home of the
SuperG55**





GLENAIR UK:

Mission-critical connectors and assemblies for UK and European markets with a special focus on micro and nanominiature flexi assemblies



GLENNAIR ITALIA:

Manufacturing harsh-environment military, nuclear, rail, and industrial interconnects for power, high-speed Ethernet, and fiber optic applications.



HIGH-CAPACITY CNC MACHINING CENTERS

allow Glenair BLQ to provide lightning-fast turnaround on small and custom orders as well as large production runs, all with superior surface finishes and better part quality.



ADVANCED PLATING LINE

Capabilities include VG95328-qualified Marine Bronze and "Code J" Tin-Zinc plating—VG95211 and VG95212 qualified cadmium alternative for corrosion-resistant interconnects.



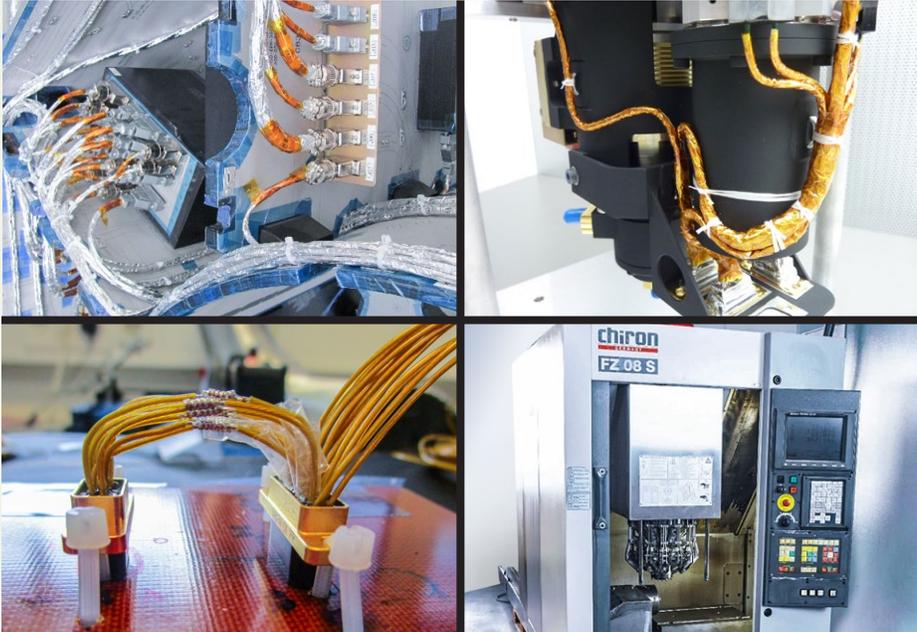
TOTAL VERTICAL INTEGRATION
includes In-house rubber and thermoplastic injection molding.



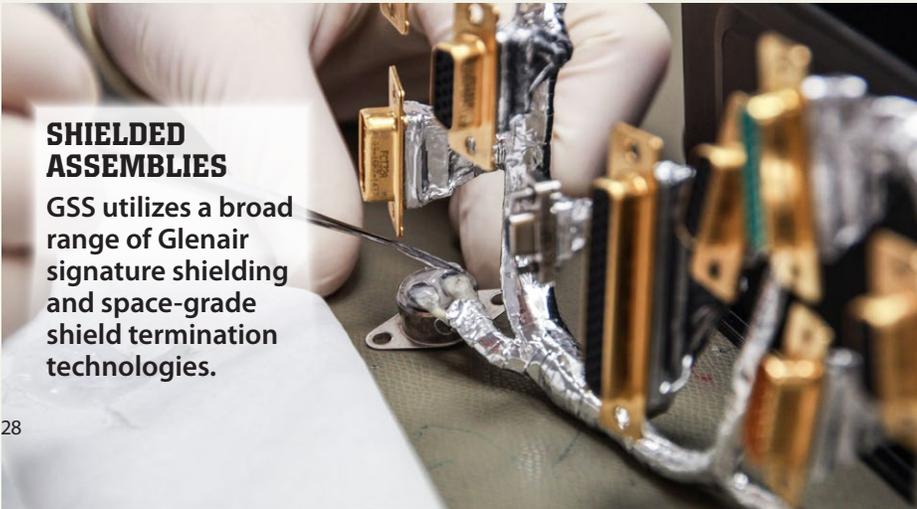
IN-HOUSE TEST LAB
with capabilities for both high-voltage as well as high-speed signal product qualification. Credentials include ISO 17025 and others.



ESA-CERTIFIED ENGINEERING AND PRODUCTION STAFF performing in-house generation of all production files using Engineering Base and 3D SolidWorks.



VALUE-ADDED ENGINEERING AND MANUFACTURING A turnkey design and fabrication operation, from documentation to harness prototypes, production, precision machining, and satellite integration.



SHIELDED ASSEMBLIES

GSS utilizes a broad range of Glenair signature shielding and space-grade shield termination technologies.





GLENAIR SPACE SYSTEMS, SALEM:

Our new German facility is a space-grade harness and electromechanical device integration operation. GSS houses ESA-certified assembly staff plus design, prototyping, and clean-room capabilities for European satellite applications.



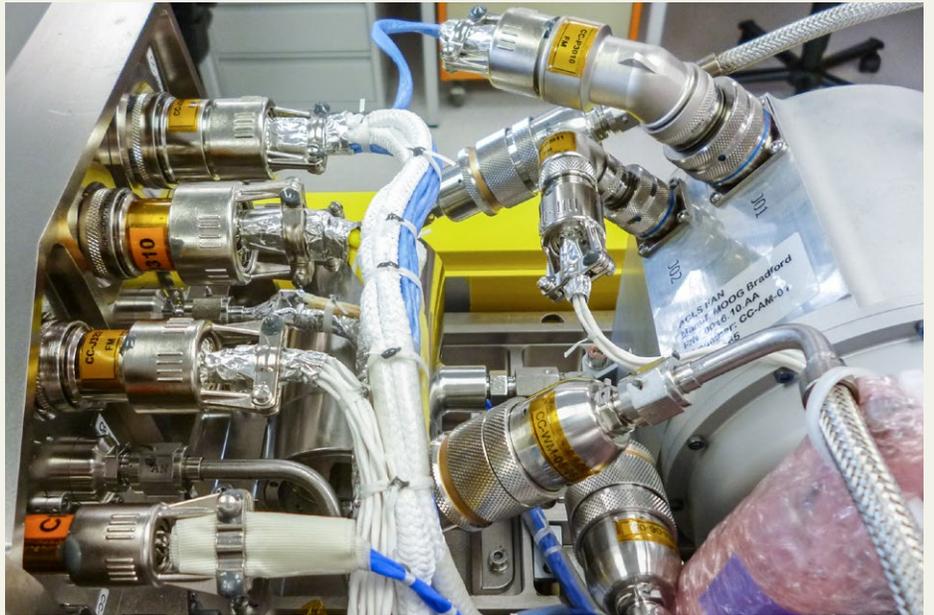
GLENAIR SPACE SYSTEMS, SALEM:

Facility includes a 600 m² production floor, 300 m² ISO 8 and ISO 6 clean rooms, an ISO 5 flow chamber (certified to ESD Standard 61340-5-1), with ample accommodation for large mock-up and integration projects.

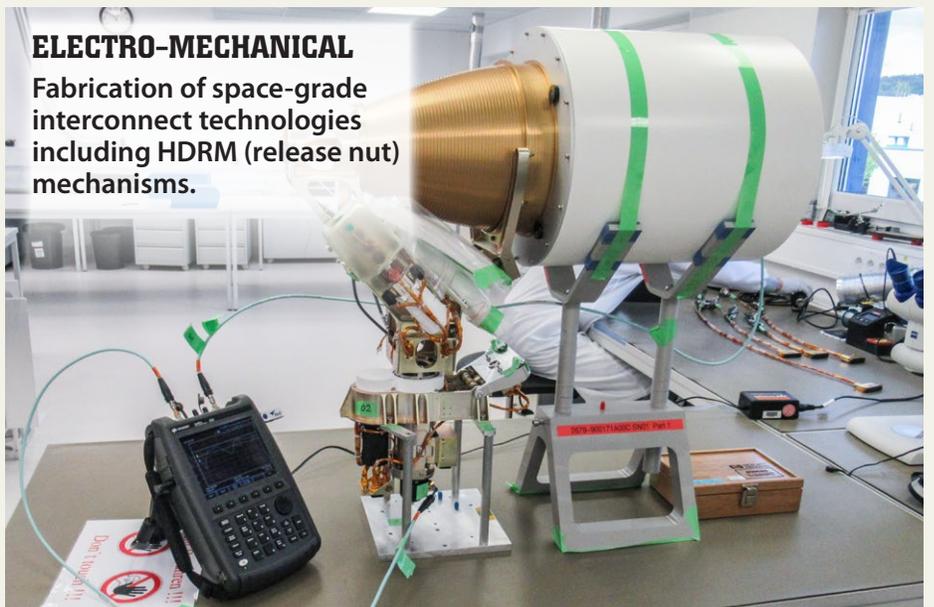




CLEAN ROOM ASSEMBLY
with both environmental
filtering and electrostatic
discharge protection.



SPACE-GRADE HARNESS FABRICATION AND INTEGRATION
In-house or at customer facility.



ELECTRO-MECHANICAL
Fabrication of space-grade
interconnect technologies
including HDRM (release nut)
mechanisms.

Outlook

Next Stop, Shangri-la

The burgeoning trade-war between the US and China is certainly wreaking havoc, especially in large industrial cities such as Shenzhen, whose economies are heavily tied to export markets and lucrative partnerships with “global” manufacturers. On the home front, I can’t think of a single major interconnect supplier that has not moved at least some of its enterprise to China (or India, or Mexico, or some other low-cost region). So I would guess there is plenty of disruption state-side as well.

It’s always hard to argue with the crowd. After all, who can fault companies that have for some time now enjoyed attractive tax policies and other incentives—both at home and abroad—as well as significant cost-of-goods savings on their offshore-manufactured products?

To say managing a global business is complicated and unpredictable is an understatement. And I suppose one could even argue that the task is ultimately impossible to fully understand. But one constant in business has always been painfully true. And that is that economies go through cycles. Cycles of growth and contraction, expansion and recession, boom and bust. And boy is China ever going through a cycle. A roller-coaster of a cycle.

At Glenair, our policy of building and maintaining factory footprints in the countries and markets we serve, has positioned us well to respond to growth-cycles in our industry—when and where they occur. Perhaps more importantly, it has lessened the effect that certain “black swan events”—such as trade-wars or disruption in a foreign supply chain—can have on our locally-managed and sourced enterprises.

Take a look at this special issue of *QwikConnect* with its photo safari of our Glendale, Mansfield, Bologna and Salem factories. Each spread shows how committed we have been to locating our production facilities immediately within the markets we serve. I suppose once upon a time sea-power, or some other factor was the key to economic success. But today, it seems to us, it is markets. More specifically, who has them and how well positioned you are to serve them.

And so as the world turns, and all the clever MBA’s plot their next move in the game—to some new Shangri-la—we invite you, as always, to enjoy your relationship with Glenair right here on Air Way in Glendale, California, where we have been happily doing business since 1956. And of course the invitation extends to our locally sourced and managed operations in Mansfield, Bologna and Salem. These impressive, world-class factories are primed and ready to meet the needs of all our global customers, no matter what’s happening on the streets of Shenzhen.

Chris Toomey

QwikConnect

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