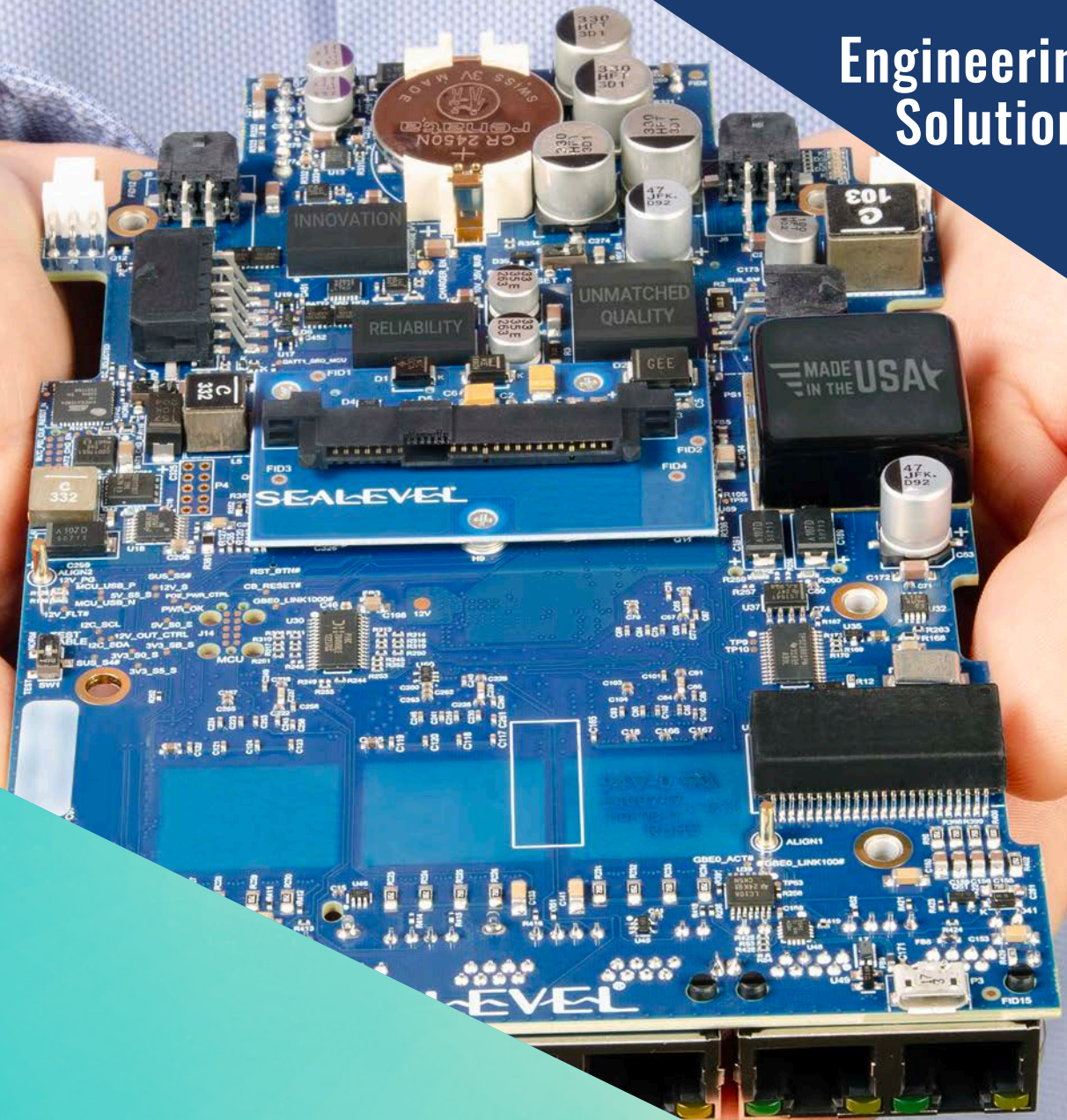
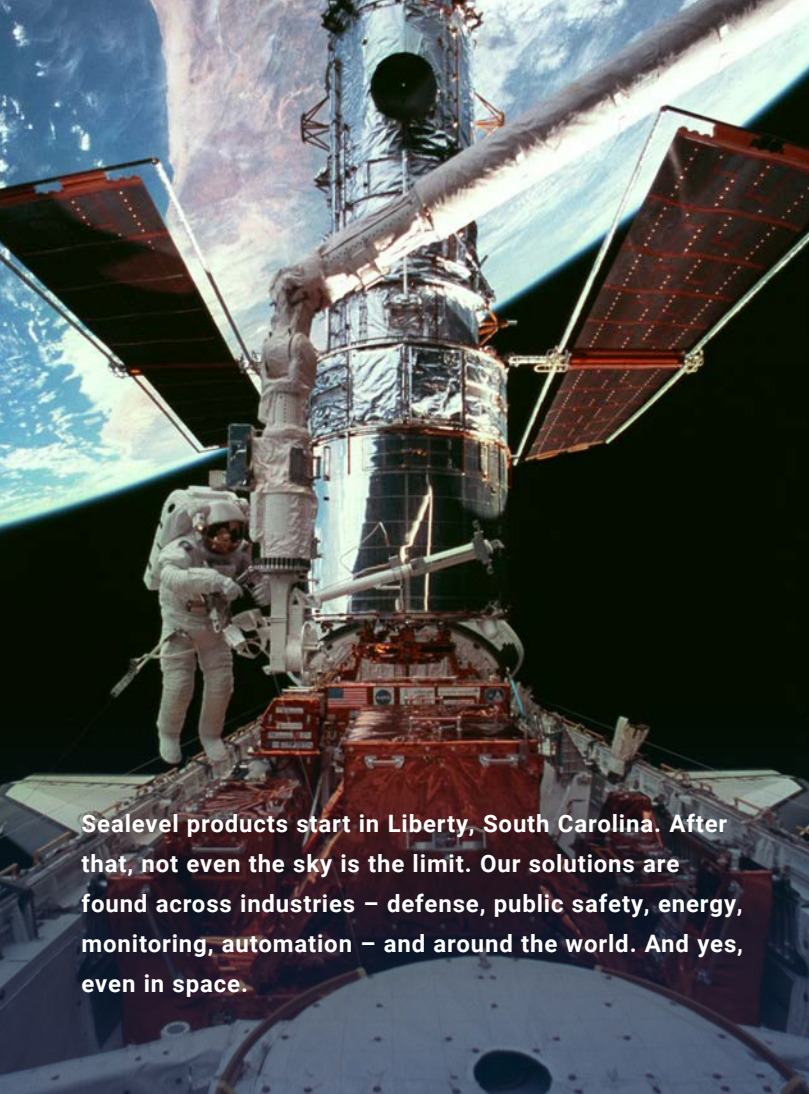


Engineering
Solutions



SEALEVEL®

Delivering Design & Manufacturing Excellence Since 1986



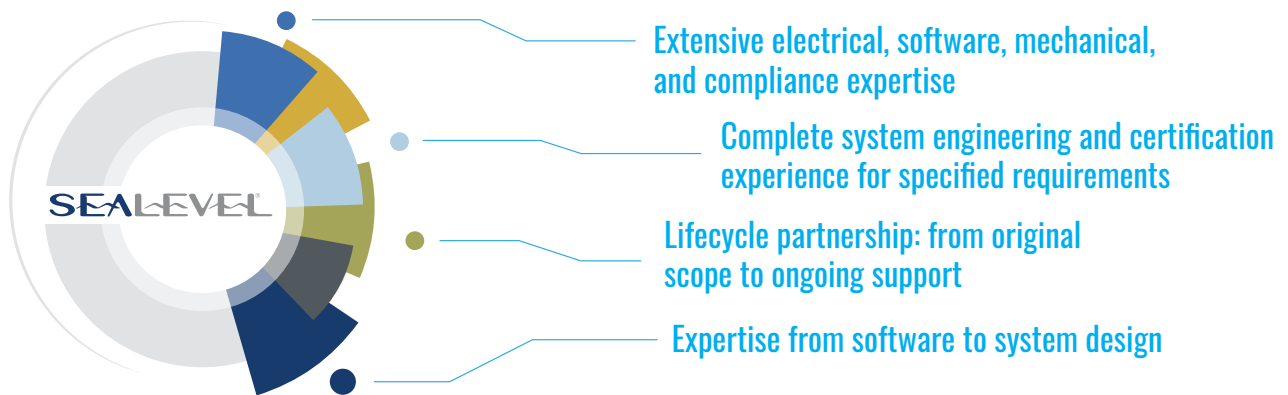
Sealevel products start in Liberty, South Carolina. After that, not even the sky is the limit. Our solutions are found across industries – defense, public safety, energy, monitoring, automation – and around the world. And yes, even in space.



SWaP-C² OPTIMIZED & I/O-DENSE DESIGN FOR CRITICAL COMMUNICATIONS

Our team of electrical, mechanical, compliance, test, and software engineers incorporates **manufacturability**, SWaP-C² optimization, parts **traceability**, and high **reliability** into every product – standard and custom.

Sealevel offers more than 350 core products, available in nearly every configuration imaginable. And for the unimaginable, our award-winning team of engineers is at your service for a custom design. Our in-house solutions include:



Sealevel's Commitment to Our Customers

In the words of Sealevel Founder Tom O'Hanlan, "When you take care of the customer, the bottom line takes care of itself."

Innovation

Design and manufacture the cutting-edge solutions that sustain our customers' leadership in their respective industries

Resources

Provide dedicated resources for the fastest possible delivery of projects

Quality

Deliver the highest quality hardware and software products on time, every time

Service

Maintain attentive project management and best-in-class customer support

Long-Term Availability

Guarantee long-term availability and awareness to avoid unforeseen challenges

Made in the USA

Stay the course as one of the longest-running, American-made companies in our industry

Our Mission

Sealevel Systems, Inc. is committed to **engineering** leading-edge communications solutions, **manufacturing** our products to the highest quality standards, **growing** a creative team of trailblazers, and **sustaining** a legacy of community investment.



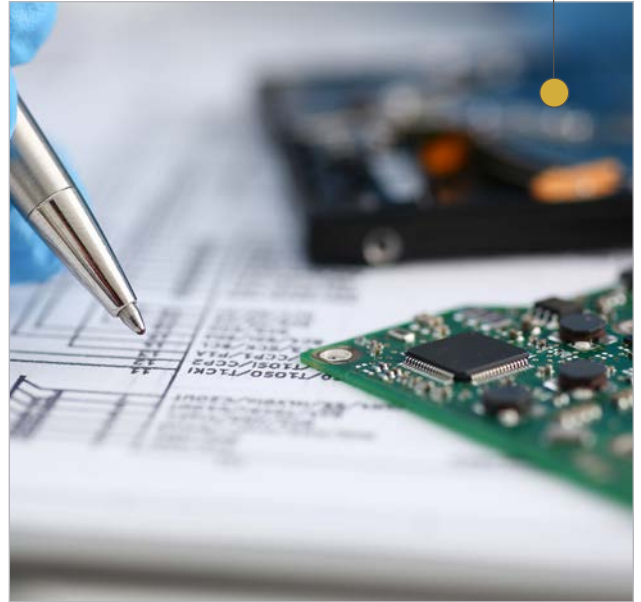
● — ENGINEERING: NOT JUST EXPERIENCED, EXPERTS

Functionally Dense, Future-Proof Designs Electrical

Sealevel's team of electrical engineers has an extensive library of computing and I/O board designs, allowing new products to be developed reliably and quickly. With a focus on functional density, our engineers use advanced electrical schematic capture, layout and routing, and modeling tools from Altium.

At Sealevel, we use Field Programmable Gate Arrays (FPGAs) in both standard and custom products and our high-speed, control-based designs range from finite state machines and FIFOs to full System-on-Chip architectures, with on-chip processors running Linux. Using FPGAs and our existing library of IP enables us to accelerate the design cycle, increase product longevity, and produce rapidly extensible hardware platforms.

Additionally, PCB simulation software allows for early improvement and refinement of PCB performance before prototyping commences.

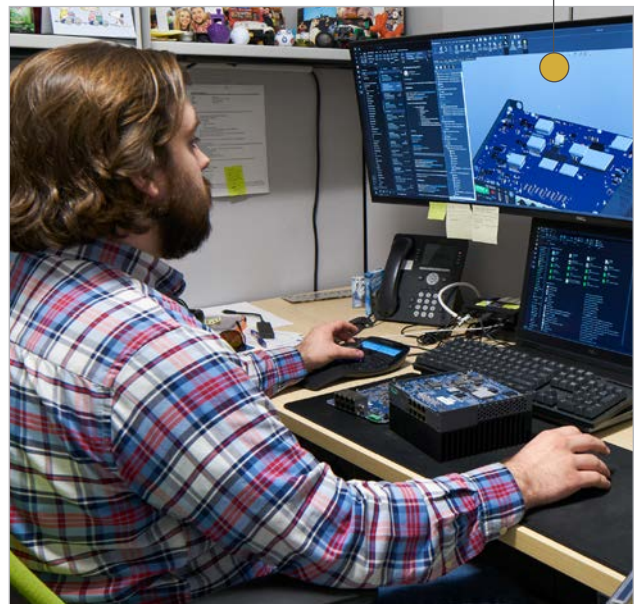


Heat, Shock, and Vibration Tolerant Hardware Mechanical

Sealevel's mechanical and electrical engineers collaborate to design integrated enclosures to meet the most demanding electrical and physical requirements, ensuring high-reliability communication.

Using advanced 3D modeling tools from SolidWorks, complex mechanical projects are accomplished with speed and accuracy. Every aspect of the design is modeled, including board, component, and connector placements.

For products that will be subjected to thermal, shock and vibration, or other environmental extremes, we employ modeling to predict performance. These simulations allow us to determine the best component selection and placement in the design phase, saving time and money required to correct problems otherwise not found until prototype testing.



Reliable, Safe, and Secure Performance Compliance and Test

Sealevel's team of compliance and test engineers complete exhaustive in-house compliance evaluations to meet environmental, safety, and security requirements.

Sealevel's design for certification approach enables us to manage the entire product development process as our engineers guide our hardware solutions through regulatory procedures and official certification.

On-site equipment includes multi-angle transmissive x-ray, a 2-axis vibration table, and multiple environmental chambers to facilitate pre-test screening. Sealevel's team also employs powerful oscilloscope technology to expedite and improve testing of electrical signals.



Hardware – and User – Interfaces Software

Sealevel's software team combines software engineers, computer engineers, and computer scientists to solve the most complex embedded software challenges.

Our engineers use industry-standard software development processes to ensure compliance with specifications and schedules.

The Sealevel software team has developed custom BSPs, microcontroller firmware, drivers, Windows and Linux APIs, and utilities. For standard I/O and computing hardware, the team is also responsible for developing sample code to support our complete product line.

Sealevel software extends to IoT cloud and device management software to support edge applications.





— SYSTEM DESIGN FOR HOW YOU WORK... AND WHERE YOU WORK

One of Sealevel's earliest products was a rugged, two-port serial card developed to link computers to textile looms. Our commitment to delivering rugged, reliable hardware and software solutions has not wavered. Our team leverages existing IP, reference circuits, computer-on-module, and system-on-module designs to create high-reliability electronics systems for our standard product catalog of COTS solutions, OEMs, and industry leaders.

Using a design for certification approach, our team begins with the end in mind, carefully evaluating the applications for our products across industries to ensure we meet all I/O, processing, environmental, safety, and security requirements. Sealevel's team has direct experience meeting – and exceeding – many military and commercial standards, including:

- MIL-STD-810
- MIL-STD-461
- MIL-STD-1472
- MIL-STD-901
- MIL-STD-464
- MIL-STD-167-1
- EMC (FCC, CE)
- EFT
- IEC/EN
- IP (Ingress Protection)
- NEMA
- ATEX
- IECEx
- Class I, Division 1
- Class I, Division 2

Thermal Management

Challenge

Design and manufacture an industrial computer to withstand operating temperatures of -40° to $+70^{\circ}\text{C}$.

Sealevel Solution

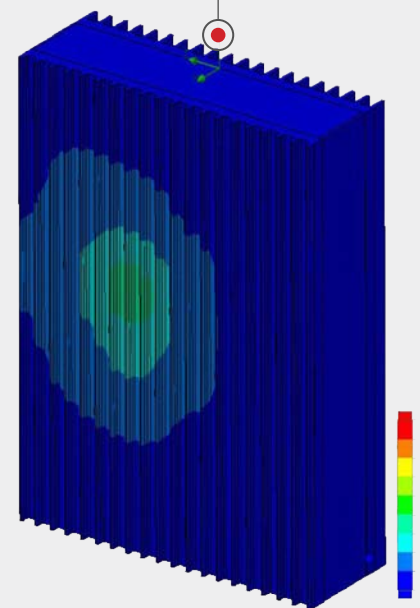
Our engineering team was able to achieve an operating temperature range of -40° to $+71^{\circ}\text{C}$ through:

- Intentional component selection and placement
- System component power estimation
- Thermal simulation
- Heatsinking high power components



Simulating Environmental Extremes

Through simulation, we replicate the conditions that are likely to occur in the product's deployment environment. The resulting imagery indicates the temperatures within the unit based on those environmental factors.



On-Site Environmental Chambers

Our manufacturing facility includes a complete line of test equipment including thermal chambers. These in-house capabilities allow us to pre-qualify products throughout prototyping prior to official certification.

Shock & Vibration

Challenge

Engineer and produce a computer that can withstand shock and vibrations at levels that nearly double those specified by MIL-STD-810.

Sealevel Solution

Our mechanical and electrical engineers worked closely to develop a highly integrated enclosure and carrier board selection. The teams carefully selected components that meet the most demanding electrical and physical requirements, including:

- Low-profile surface mount designs
- Rugged high retention connectors
- Locking fasteners with thread-locking adhesives
- 6063-T5 aluminum extruded



Hazardous Location

Challenge

Create next generation industrial touch panel PCs for use in hazardous environments, subject to various environmental stressors – and areas conducive to explosions.

Sealevel Solution

Following testing for endurance, impact resistance, ingress protection, and thermal shock, the system achieved:

- NEMA 4/IP64
- EMC: FCC/ISED Class A, CE
- Class I, Division 2 Groups A, B, C, D, T4
- ATEX/IECEx: 3 G Ex ic ec IIC T4 Gc
- Wide temperature operation of -40°C to +60°C



SWaP-C² Optimization

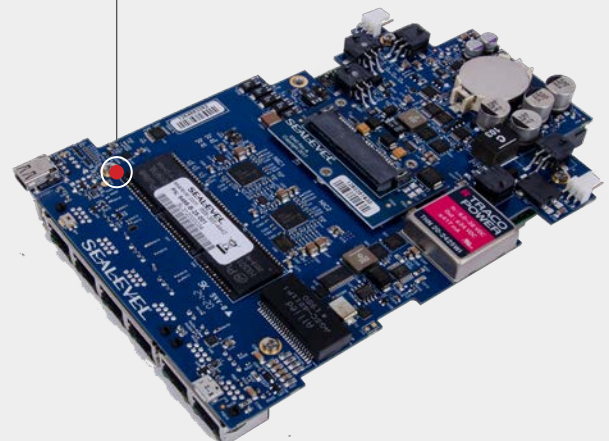
Challenge

Engineer and build a tactical communications carrier solution with a very small footprint, combined with high-performance requirements, high-speed I/O, and wide operating temperature range.

Sealevel Solution

We have developed a variety of multi-board carrier solutions with high-speed signals efficiently routed in very small form factors that continue to operate under less-than-ideal power conditions. These designs have incorporated:

- COM Express Type 6
- COM Express Type 7
- Video: Mini DisplayPort, HDMI
- -40°C to +85°C operating temperature range
- I/O: 10 Gigabit Ethernet, Gigabit Ethernet, USB 2.0, USB 3.0, SATA II, SATA III
- IPMI 2.0





● — STRATEGY AND SUPPORT FOR THE LIFE OF YOUR APPLICATION

Our team members provide support throughout each step of the relationship lifecycle. We begin by understanding your overall project and work with you to identify the specific requirements to make your application a success.

Our sales and program managers facilitate research, development, test, approval, and production. Alongside these team members, our procurement department ensures component availability and navigates supply chains. A quality control manager will assess your project to define any specific security, parts traceability, or other requirements beyond Sealevel's standard policies and procedures.

Fulfilling Our Long-term Commitment to You

Following your purchase, on-site applications engineers are dedicated to providing ongoing customer support throughout your relationship with Sealevel. These professionals have first-hand experience with all Sealevel hardware and software solutions – custom and standard – to provide complete support.

On an ongoing basis, Sealevel's on-site project and program managers work closely with our master planning team to ensure optimal scheduling of staff, equipment, and inventory. Our supply chain management processes and parts traceability tools ensure we are able to maintain our long-term availability guarantee.

Exceeding Security & Performance Requirements

Our designated Special Projects area allows for enhanced physical security – beyond our extensive cyber and device-level security capabilities.

Sealevel maintains extensive on-site test equipment including a transmissive x-ray machine, vibration table, and series of environmental chambers. This level of evaluation expedites prototyping and facilitates official certification and compliance.

More Than a Manufacturer

All product assembly takes place at our ISO 9001:2015 registered manufacturing facility, located in the United States of America. Our processes are subject to rigorous quality protocols to meet our high-reliability performance standards for critical communications electronics.



Our state-of-the-art Surface Mount Technology (SMT) line consists of an Automated Screen Printer with 2D Inspection, four high-speed SMT pick and place machines, a Ten Zone Forced Convection Reflow Oven, and a 5-Camera Automated Optical Inspection system. Following initial build, our in-house team of J-STD-001 and IPC-A-610 certified technicians completes through hole soldering. For final assembly, Sealevel technicians follow detailed procedures for building, labeling, and any required modifications.

Mission Critical & Made in the USA

Wide-ranging industries, and every major military contractor, depend on Sealevel for our unmatched quality, reliability, and customer satisfaction standards.





● — STANDARD-SETTING ENGINEERING EXPERTISE

With over 35 years of IP and more than 350 standard products, our engineers are equipped to develop application-specific I/O and meet rugged, embedded computing specifications.

Electrical

- COM Baseboard Design
 - COM Express® Type 6
 - COM Express® Type 7
 - COM Express® Type 10
 - SMARC®
 - Qseven®
- x86 Architecture
- RISC Single Board Computer Design
- PCIe/104
- 8, 16, and 32-bit Microcontroller-Based CPUs
- Serial I/O
 - Asynchronous
 - Synchronous
- 10 Gigabit Ethernet
- USB 3.2, 2.0, 1.1, 1.0
- CAN Bus
- Wi-Fi
- Analog
 - A/D
 - D/A
 - Audio
- MIL-STD-1553
- High Density/BGA
- PCB Layout
- PCB Simulation Software
- Embedded Logic
 - FPGA
 - UART
 - RISC
- Component Power Estimation
- Thermal Modeling
- Functional Density
- SWaP-C²

Mechanical

- SolidWorks

- Simulation
- Design Reviews & Manufacturability
- Thermal Modeling
- Heat Sinking
- High-Power Components
- High Retention & Locking Connectors/Fasteners

Compliance & Test

- MIL-STD-810
- MIL-STD-461
- MIL-STD-1472
- MIL-STD-901
- MIL-STD-464
- MIL-STD-167-1
- EMC (FCC, CE)
- EFT
- IEC/EN
- IP (Ingress Protection)
- NEMA
- ATEX
- IECEx
- CID1 and CID2
- Thermal Shock
- Environmental Stress
- Radiated Emissions
- Endurance Testing
- Impact Resistance

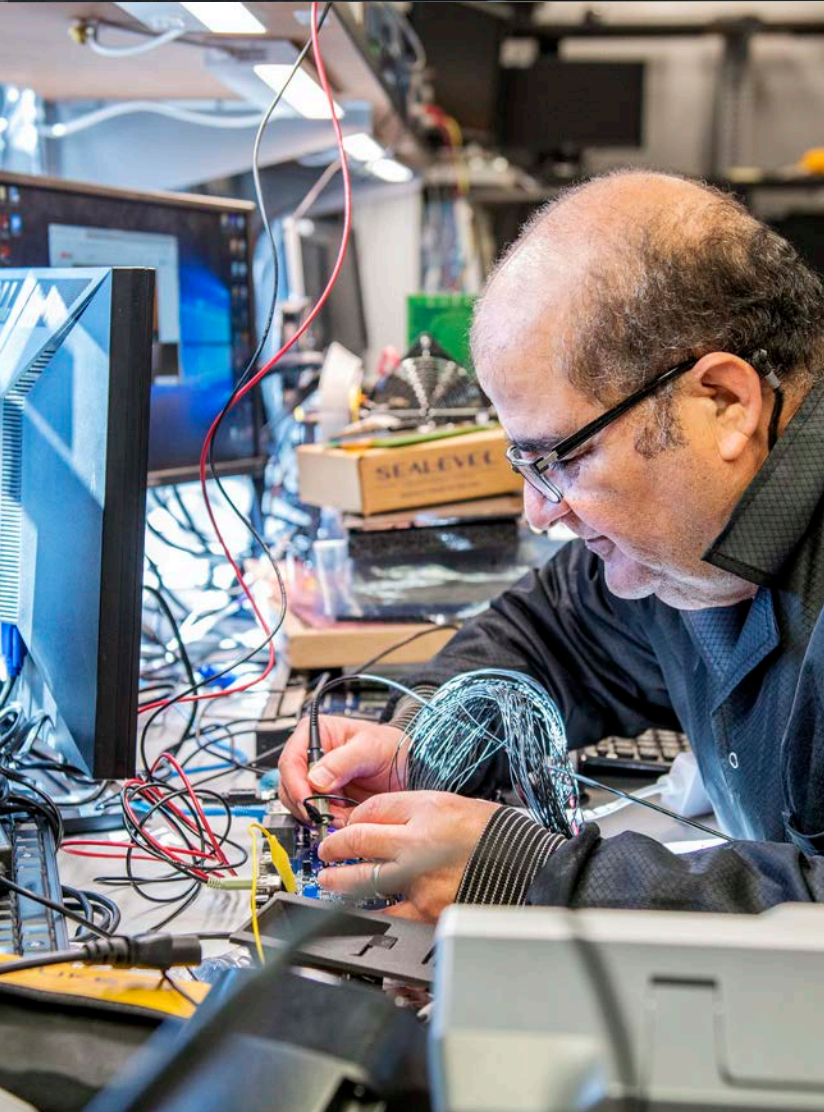
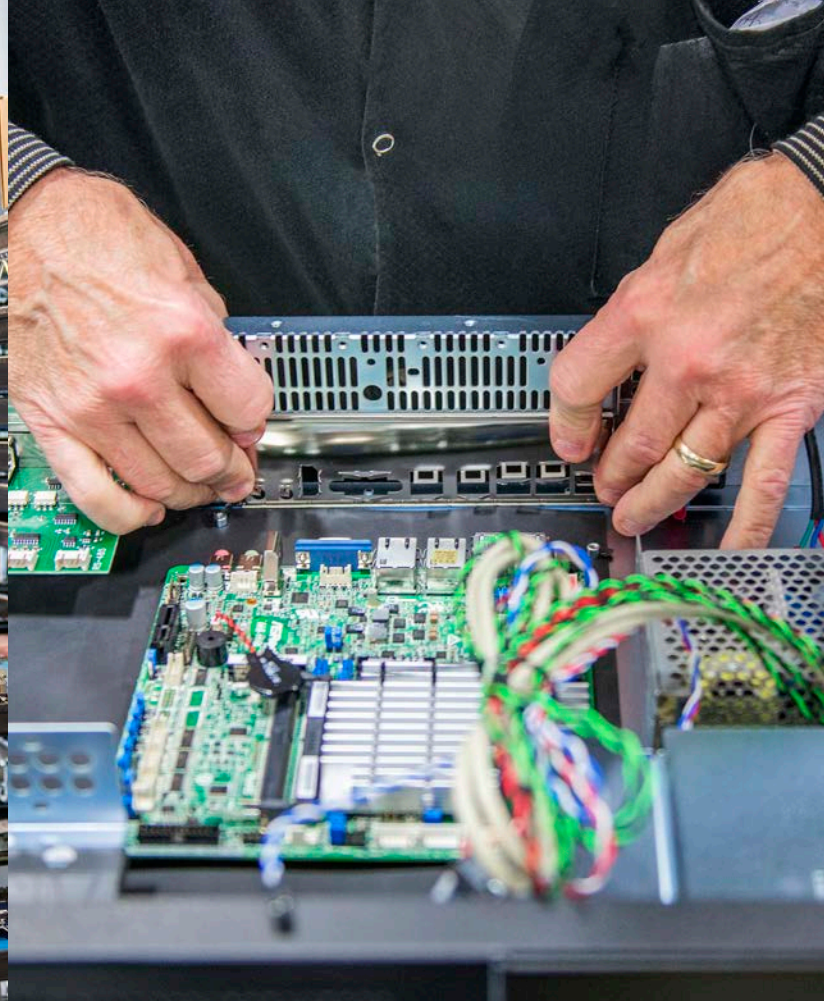
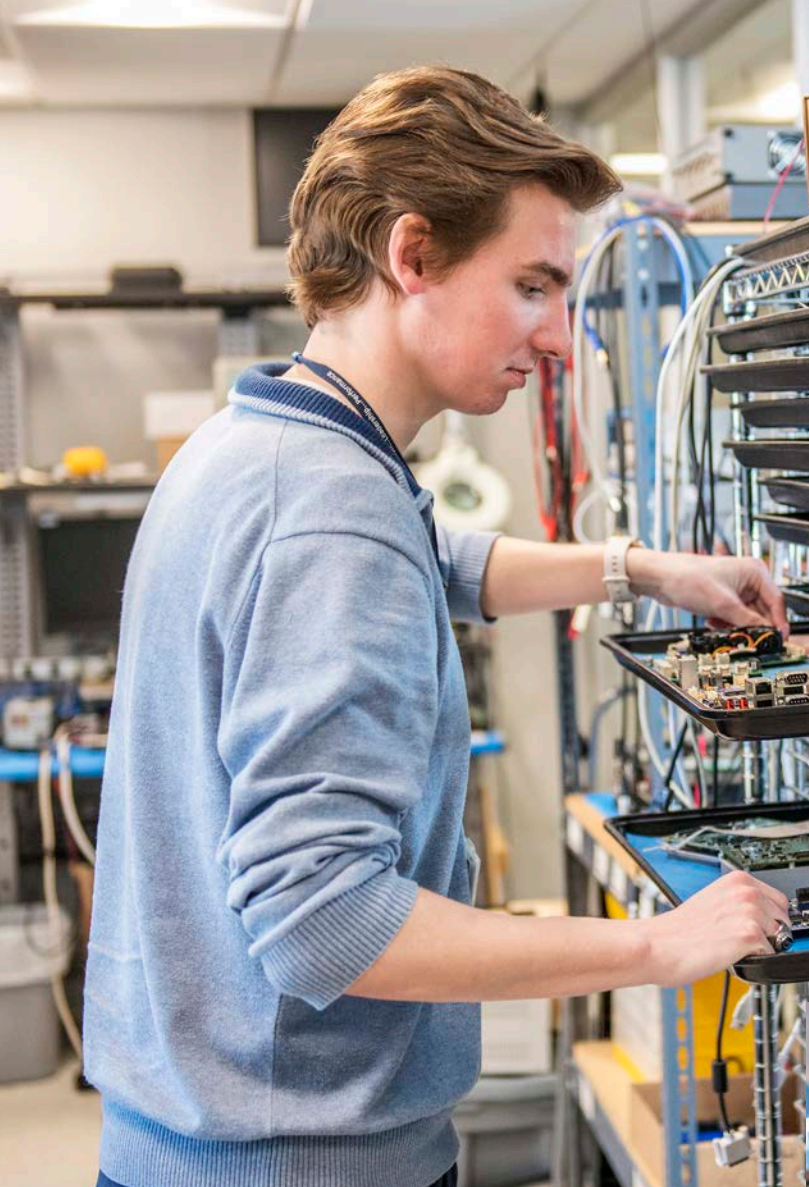
Software

- Device Drivers
 - Windows®
 - Windows® Embedded
 - Linux®
- Embedded Firmware
- C/C++, C# and .NET
- Hardware Interface
- Cloud Software

- Device Management Software
- Alerting & Response Mechanisms
- RESTful Web Services
- Manufacturing Test
- GUIs for Command & Control Applications

System Design

- Application Design, Documentation, and Implementation
- Analysis of System Functional Requirements
- Hardware/Software Compatibility
- 3D CAD/CAM
- Embedded Logic & Signal Processing Board Design
 - SOM
 - RISC Microprocessors & Controllers
 - ARM
 - DSP
 - FPGA
- LCD & Touch Screen Integration
- Enclosure Design
 - Machined
 - Cast
 - Metal
 - Molded
- BSPs for Development/Porting of Device Drivers for Peripherals
- Operating Systems
 - Windows®
 - Windows® Embedded
 - Linux®
 - BSPs





**MADE
IN THE USA** 



© 2023 Sealevel Systems, Inc.

2779 Greenville Highway | PO Box 830 Liberty, South Carolina 29657 USA
864.843.4343 | Fax 864.843.3067 | sealevel.com

SL9677J23