

**Atrenne** ®  
A Celestica Company



# Derisk Your System Integration

DESIGN > DEVELOP > DEPLOY



# DERISK YOUR SYSTEM INTEGRATION

As a vertically integrated manufacturer, Atrenne is uniquely qualified to manufacture, integrate and test your system or subsystem. With extensive electromechanical design-build expertise and value-add, build-to-print manufacturing, Atrenne is an ideal partner to assist in solving the most challenging issues whether related to design, manufacturing, supply chain management or life cycle management.

Atrenne offers a wide array of system integration services for open architecture systems as well as those that must meet application-specific requirements. Atrenne specializes in solutions based upon open-standard form factors including SOSA™, MOSA, VPX, OpenVPX, VME/VME64x/VXS, CompactPCI, as well as many other open-standard and custom embedded architectures. As technology advances, Atrenne can serve your most challenging requirements with a vendor-agnostic module, chassis and I/O integration approach. Atrenne specializes in accommodating high-mix production programs; ideal for military, aerospace and industrial electronics solution providers.



# IDEAL SUPPLY CHAIN PARTNER

Atrenne is an ideal supply chain partner with design and manufacturing capabilities that complement your application expertise. We take an open approach to working with 3rd parties, and can apply our manufacturing and electronic assembly capabilities to your custom-designed modules. Atrenne is able to work with a mix of in-house designs, 3rd party designs and 3rd party sourced modules or components. Our defense and industrial customers choose to partner with Atrenne to lower financial, program and technical risk, and to free up resources to focus on their own core competencies. In addition to Atrenne's design-build

expertise, the company offers value-add build-to-print circuit card assembly (CCA) manufacturing, support, test and qualification. Atrenne specializes in challenging CCAs with complex production flows and excels at process engineering, design for manufacturing and obsolescence management.

Atrenne's integration expertise and unique combination of in-depth mechanical, electrical, and system design knowledge is gleaned from 40+ years of work on some of the most performance-critical and demanding applications in the world. Atrenne's system integration capabilities are further elaborated below.

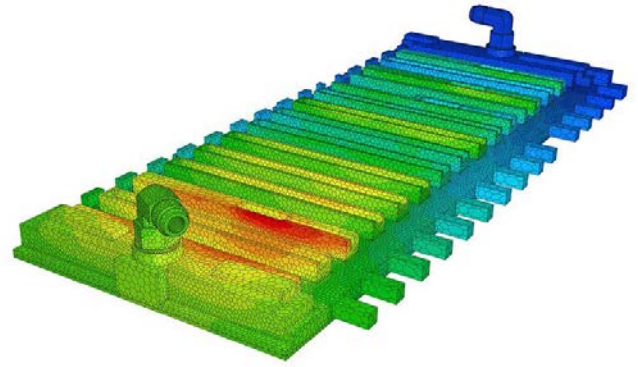


Atrenne Provides the following integration services:

- Integration and Test
- Program Management
- Chassis and Backplane Design
- Signal Integrity
- IO and Signal Conditioning
- Thermal Management
- Qualification

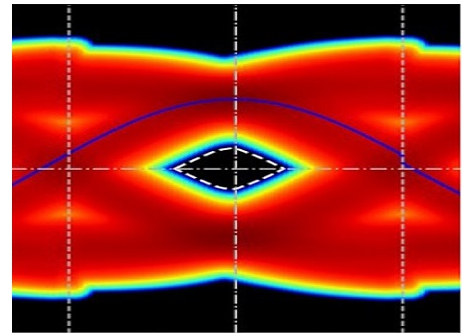
## THERMAL MANAGEMENT

- Industry-leading thermal management experience
- Low risk supplier for the most thermally challenging applications
- Thermal simulation, air-flow simulation, thermal modeling and thermal testing
- MacroFlow and FloTherm Computational Fluid Dynamics (CFD) analysis
- Broad range of cooling methodologies



## SIGNAL INTEGRITY

- Industry-leading 10.3 Gbaud backplanes with proven signal integrity optimizations. Atrenne is a Curtiss-Wright Fabric40™ backplane partner.
- Signal Integrity analysis/testing/electrical simulation for application-specific connectivity.
- Chassis enclosure, backplane and system design and manufacturing
- Mechanical design of COTS chassis with application-specific requirements based off an extensive library of existing intellectual property
- Quick-turn design meeting challenging application specifications
- Analysis of application-specific design objectives, including performance, environment, physical constraints, and other critical parameters
- Backplanes with varying application-driven I/O or payload requirements using previous COTS designs. Application-specific backplane connectivity



## CHASSIS AND BACKPLANE DESIGN

- Chassis enclosure, backplane and system design and manufacturing
- Mechanical design of COTS chassis with application-specific requirements based off an extensive library of existing intellectual property
- Quick-turn design meeting challenging application specifications
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## I/O AND SIGNAL CONDITIONING

- Input/Output (I/O) design
- Panel printed wiring boards (PWBs)
- Direct connect or flex circuit connection to backplane
- Connector and cable design
- Signal Conditioning
- Application-specific I/O signal conditioning
- EMI filtering
- ESD protection
- Lightning protection (bulk cable injection or pin injection)
- Active circuitry

## WIDE-ARRAY OF COOLING METHODS

### CONDUCTION COOLED CHASSIS

- Baseplate/cold plate

### LIQUID COOLED CHASSIS

- Liquid-conduction chassis with conduction cooled payload
- Liquid / air heat exchanger and air cooled payload

### AIR COOLED CHASSIS

- Forced air chassis with conduction cooled payload
- Air / air heat exchanger and air cooled payload
- Forced air convection cooling of air cooled payload
- Natural convection chassis with conduction cooled payload

## INTEGRATION AND TEST

- Execution of Built-In-Test (BIT), application/system test with error localization down to the Field Replaceable Unit (FRU)
- Module configuration and software installation
- Coordination of logistics, test, and repair for 3rd party module content
- White box or private labeling and drop shipping
- Test capability including design verification, HALT/HASS, ATP, qualification testing, first article and ESS
- System Sparing

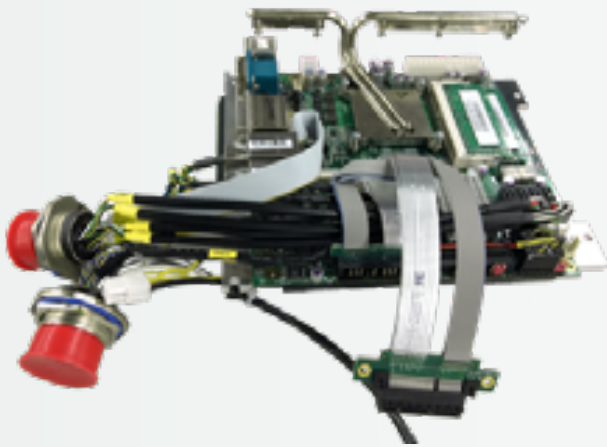
## QUALIFICATION

Full range of environmental and qualification testing services

- Acceleration – Static and Dynamic Loads
- Altitude
- Crash Safety
- Electromagnetic Compatibility (EMC)
- Electromagnetic Interference (EMI)
- Environmental Stress Screening (ESS)
- Explosive Atmosphere
- Fluids
- Fungus
- Highly Accelerated Stress Screen (HASS)
- Highly Accelerated Life Test (HALT)
- Humidity
- Immersion
- Lightning - Cable Bundle
- Lightning – Pin Injection
- Military and aerospace standards and specifications
- Safety including UL and CSA
- Salt Fog
- Sand and Dust
- Seal Integrity
- Shock – Bench handling, basic, mobility, gunfire, rail, and shipborne
- Spray
- Temperature – Operating range, storage, temperature cycling
- Vibration – Mobility and transportation/operation induced

## EXPERIENCE DESIGNING FOR QUALIFICATION

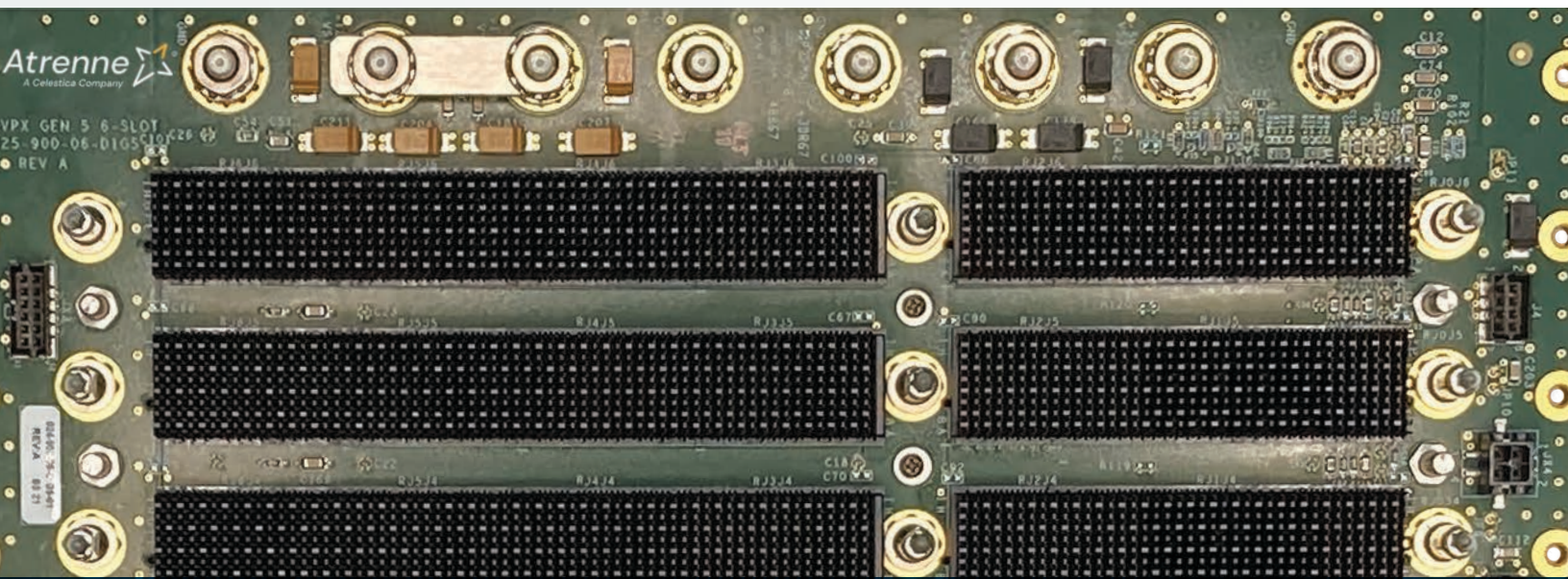
- ISO 9001
- AS9100
- ISO 13485
- RTCA/DO-160
- MIL-STD-810
- MIL-STD-704
- MIL-STD-461
- MIL-STD-167
- MIL-STD-1130
- MIL-S-901
- MIL-S-28870
- MIL-C-55302
- MIL-C-28859
- MIL-C-28754
- CE, UL, CSA, VDE,
- IEC, FC



Atrenne Specializes in Challenging IO Solutions Including Connectors and Cabling

## PROGRAM MANAGEMENT

- Risk management / mitigation
- Quality assurance
- Dedicated project management function
- Management of schedule, deliverables / SDRs
- Configuration management
- Certifications and representations
- Formal program reviews
- Qualification testing per Statement-Of-Work (SOW)
- Documentation including test plans/procedures
- Life cycle analysis
- Longevity of supply





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