



Intelligent Traffic Solutions

A project journey



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motus
DESIGN GROUP

The Need For JSF Technologies

JSF Technologies, an industry leading manufacturer of intelligent traffic and illumination systems, is experiencing rapid transformation and growth since 2019. With growth projections continuing to outpace production, JSFT looked towards systems redesign, development, and consolidation for improved capacity and scalability as they continued to grow. JSFT started development on their new Wireless Platform-6 (WP6), their next-generation Intelligent Traffic System (ITS) and Lighting Controller, which entered the prototype stage but stalled in development due to supply chain constraints leading to lengthy delays on parts and components.

Motus has a depth of experience with field deployed devices in industrial monitoring and clean tech. We design electronics systems and enclosures for harsh environments, strict safety requirements, and unique operating conditions. Traffic solutions need to be robust and durable, lasting for years without maintenance. They need to be compact, sleek, and aesthetically pleasing. Motus's experience in compact industrial hardware design made us a great fit for the electrical/mechanical integration of the WP6.

Recognizing the need for specialized expertise, JSFT initially reached out to Motus for a design review to mitigate the risk of costly delays due to changes during production. Impressed by Motus's depth of experience, JSFT expanded the engagement to include a collaboration for the hardware and mechanical development of the WP6.



The WP6 Team

The JSF Technologies WP6 project would leverage the knowledge of Motus's electrical and mechanical departments. Motus assembled a cross functional team with experience integrating embedded electronics into small enclosures.

Working within tight time constraints, the project manager, Tristan Nixon, was able to dynamically assign roles that best fit the individual while maintaining communication with JSFT through project update meetings. The electrical design was architected and implemented by Matt Fournier and reviewed by Joshua Hayes. The mechanical team was overseen by Rob Prior who provided support for injection moulding, while Greg Perry designed the enclosure.



Manufacturing Updates

Simplifying Manufacturing and Inventory

Motus developed a single, extensible board design that consolidated multiple SKUs. This approach:

- Streamlined JSFT's inventory management process
- Reduced manufacturing complexity
- Lowered production costs by minimizing the number of unique components

Expanding Market Reach

To help JSF Technologies penetrate new markets, Motus:

- Extended peripheral support, allowing the WP6 to interface with a wider range of devices
- Implemented flexible lighting configurations, making the WP6 adaptable to various traffic control scenarios
- Expanded test coverage to ensure reliability across all new features

Overcoming Supply Chain Challenges

During the pandemic-induced supply chain crisis, Motus:

- Proactively identified obsolete and at-risk components
- Sourced viable replacements without compromising functionality
- Monitored and purchased stock when available and avoided broker costs and grey market components
- Kept the project on schedule despite global parts shortages

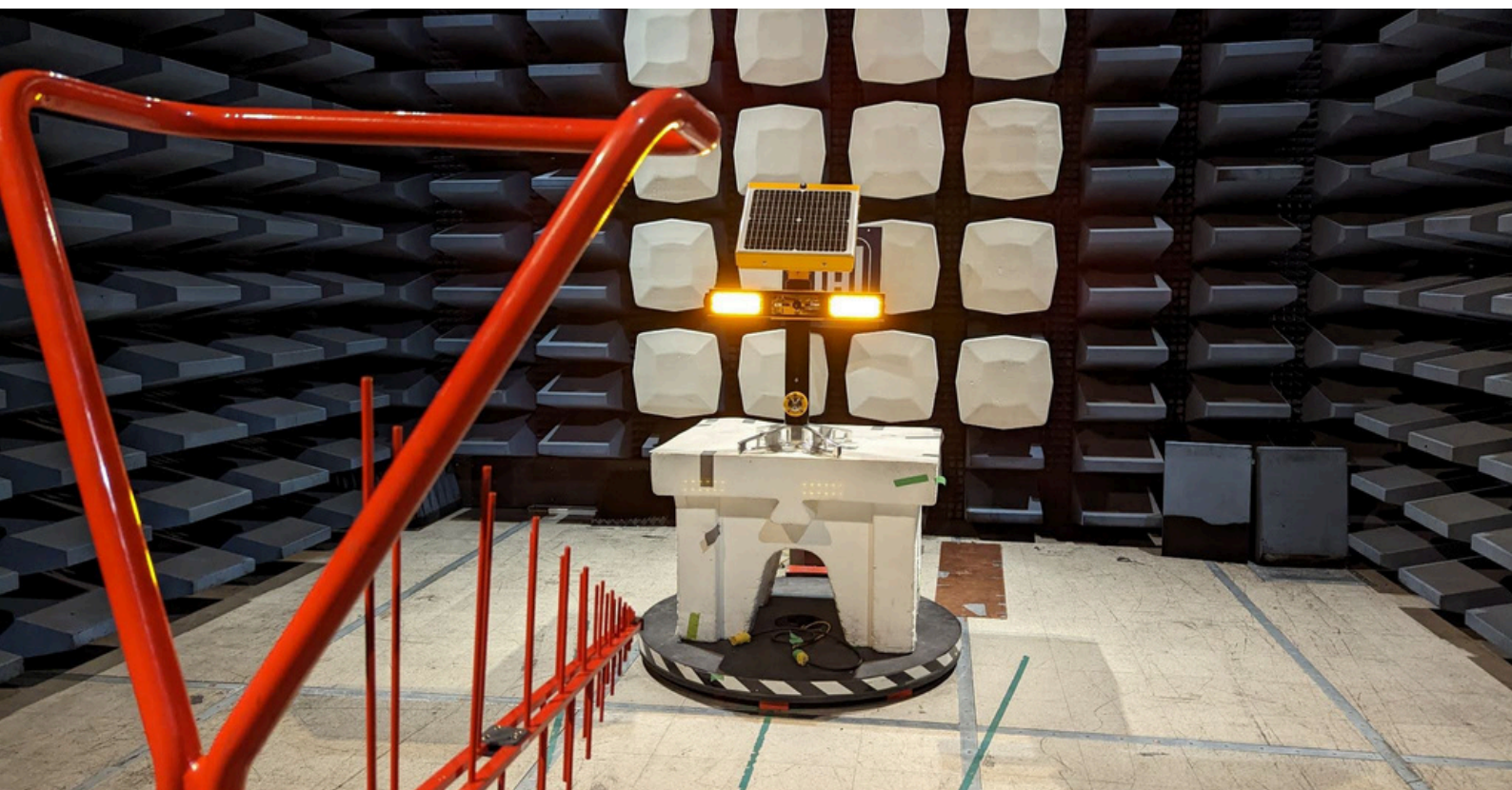
Responding to Evolving Needs

Scope Changes

In order to react to the changing market landscape, JSFT needed to make scope and requirements changes during the project.. The Motus team was able to react quickly and modify the scope without significantly impacting the timeline and budget; all while maintaining open communication to ensure alignment with JSFT's goals.

EMC Compliance Support

Motus supported JSFT through the emissions pre-scan process at QAI Laboratories. Motus provided training and guidance on EMC testing tools, debug techniques, and mitigation strategies. When the JSFT team returned for the complete scan with Motus on deck for remote support, JSFT led the WP6 through successful EMC testing without requiring assistance.

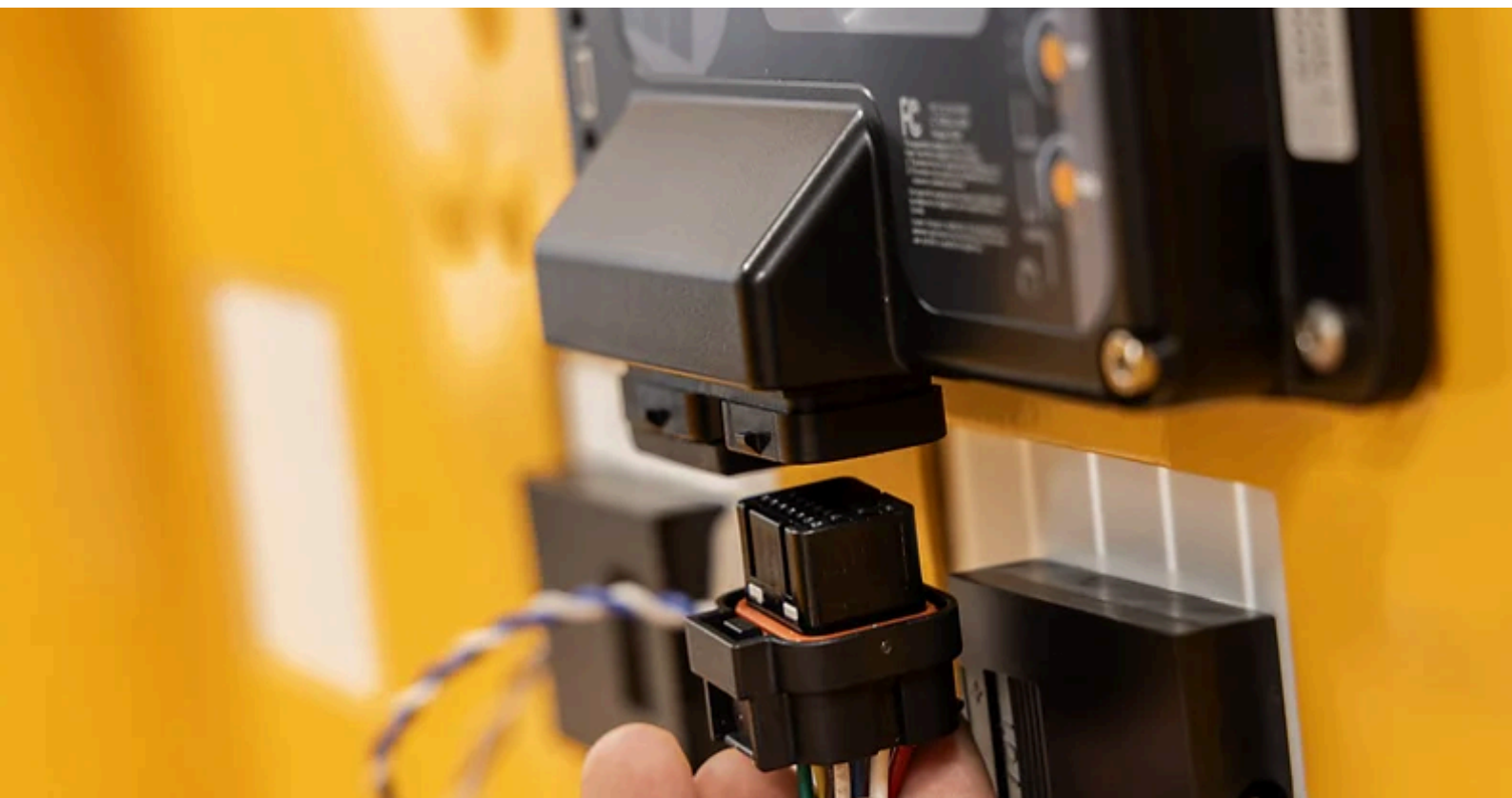


WP6 Delivery

Product was delivered June 2023

Motus designed the WP6 board and sourced new parts to mitigate the impact of supply shortages. The updated design simplified the product's manufacturing process and inventory management; the improved adaptability resulted in a reduced number of stock keeping units (SKUs).

The delivery of the WP6 design enabled JSF Technologies to outsource contract manufacturing of PCBA's and injection-moulded enclosures. The WP6 was one step on JSF's development roadmap to deploy into more markets, providing more value for JSF and a better product and experience for their clients.



The Next Challenge

Automated Validation System (AVS)

As JSF Technologies prepared to ramp up production of the newly redesigned WP6, they faced a critical obstacle: their existing testing process was manual, time-consuming, and prone to human error. This bottleneck threatened to slow down their production line, potentially causing delays in fulfilling orders and ultimately to unhappy customers.

JSFT envisioned quality control that was simple, seamless, rapid, and traceable. A system that, during manufacturing, could:

- Validate hardware and firmware quickly and accurately
- Be portable enough to use at various manufacturing and development sites
- Provide tamper-proof reporting and historical tracking
- Offer performance trend analytics to continually improve their processes
- Be extensible to support other product roadmap designs

The challenge lay in creating a system sophisticated enough to handle the complex testing requirements of the WP6, yet simple enough to be reliably used by technicians on the production line. With production schedules looming, time was of the essence.

The AVS Team

Recognizing the urgency and complexity, Motus expanded its team to meet the project requirements. Tristan Nixon, the project manager created a new architecture for the AVS. The hardware and mechanical teams remained unchanged, while we added a firmware team consisting of Andrew Gillian and Austin White.

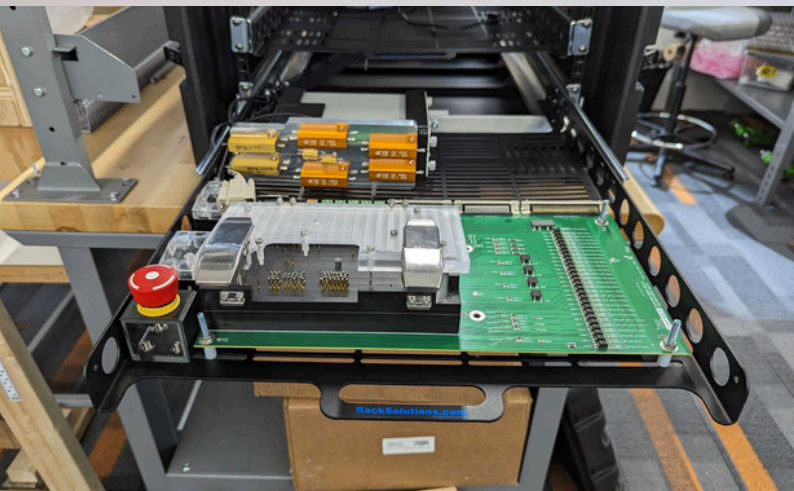
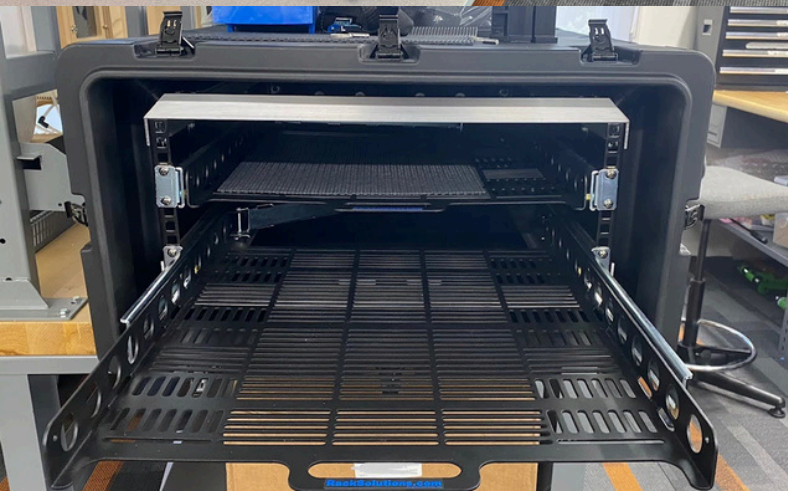
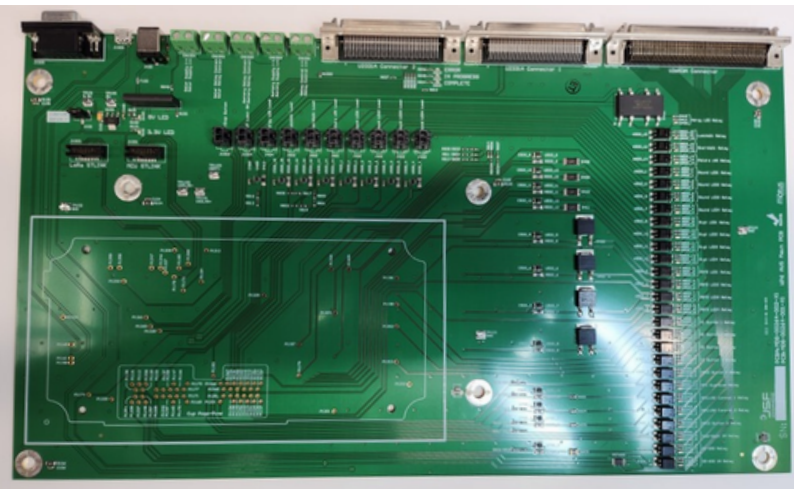
Andrew Gillian leveraged his Project Lead experience to prioritize and manage the firmware requirements, while estimating timelines and providing development support. Andrew selected Austin for the project due to his experience designing graphical user interfaces for testing software. This allowed for an iteration of the user interface to be produced early on in the project, which allowed for client and contract manufacturer testing and feedback before the final release.



Bridging the Innovation Gap

Motus's solution was the Automated Validation System (AVS), a custom-designed testing platform that combined off-the-shelf equipment with bespoke hardware and software. Key features included:

- Fully automated test procedures
- Comprehensive test coverage for all possible deployments and configurations
- Tamper-proof validation reporting
- Historical tracking of individual units from production to deployment
- Performance trend analytics



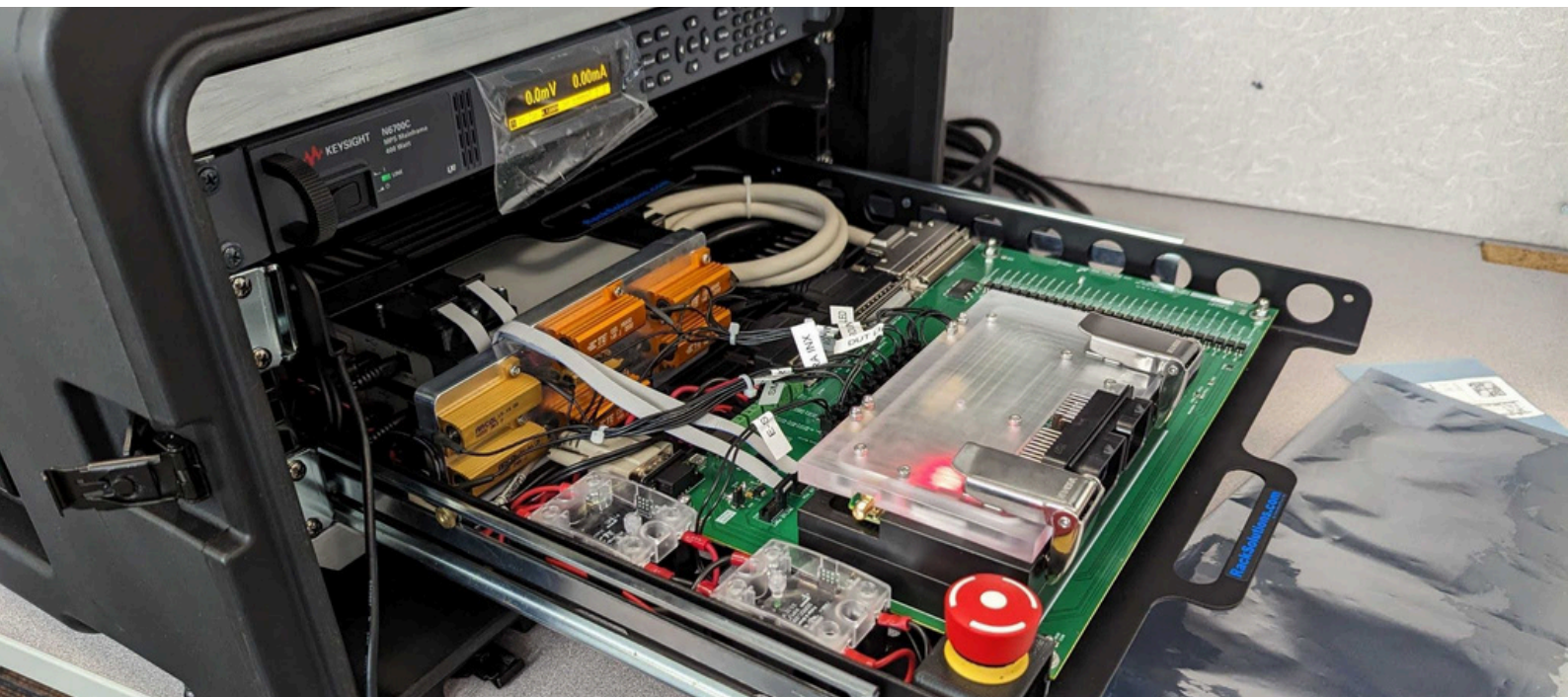
A New Era of Quality Assurance

The final test came when the AVS was deployed on JSFT's production line. What was a tedious manual process taking hours was now completed in under 3 minutes. The system exceeded JSFT's expectations, dramatically improving testing efficiency and accuracy.

With the AVS in place, JSF Technologies entered a new era of quality control:

- Production efficiency soared, allowing JSFT to meet and exceed delivery timelines
- Quality issues were caught earlier, reducing waste and improving customer satisfaction
- The portability of the system allowed for easy deployment at contract manufacturing sites
- Engineers could now focus on innovation rather than troubleshooting, accelerating product development

The AVS proved invaluable beyond its initial scope, serving as a firmware development platform, site emulation tool, and a means to verify B-stock for potential resale.



AVS Impact

The success of the AVS project had far-reaching effects for JSF:

- Increased production capacity led to larger contracts and entry into new markets
- Improved quality control enhanced their reputation in the industry
- The ability to quickly validate firmware changes accelerated their product development cycle
- Cost savings from reduced waste and improved efficiency allowed for reinvestment in R&D

JSF Technologies and Motus experienced the power of strategic partnerships and the value of investing in long term relationships. JSFT now views Motus not just as a service provider, but as a key partner in their continued growth and innovation. With the success of the WP6 and AVS projects, JSFT and Motus are engaged in future collaborations, continuing to push the boundaries of what's possible in intelligent transportation systems.



