



Aechelon Turns to MBX for Full-Rack Image Generator Hardware Systems

Multi-Node Solutions Delivered in Turnkey Rack Assemblies for Military Aviation Training

The Challenge

Aechelon needed a new partner capable of building, imaging and integrating multi-rack systems, configuring every 42U rack to order for each end-user deployment, ensuring access to the newest NVIDIA® GPUs to maintain Aechelon's first-to-market goal, and providing the quality assurance demanded by end users such as the U.S. Army, Navy, Marine Corps and Coast Guard.

Executive leadership sought a hardware partner likely to be free of problems it had encountered with three previous suppliers. The list included late delivery, supply chain issues, slow root-cause analysis following a component failure, lack of transparency on build status, and aggressive efforts to sell engineering services the customer did not want.

After a lengthy due diligence process that included evaluating more than 10 providers, the company transitioned from its previous supplier to MBX Systems. Among MBX's first challenges was an aggressive 60-day deadline to prepare and ship 10 full-rack systems with multiple purpose-built nodes per rack assembly for two different customers.

Why MBX

- Dedicated rack build infrastructure
- Expert as-needed engineering support
- NVIDIA strategic relationship
- Advanced imaging, testing & configuration systems
- Configure-to-order for each customer
- Point-and-click supply chain visibility
- Customer-specific customization in MBX Hatch
- Problem-free detail management
- Responsiveness to special requests
- Meets strict manufacturing for government criteria such as ISO 9001:2015, Counterfeit Prevention Policies, and Product / Process Change Controls

Background

In late 2016, Aechelon Technology began looking for a new hardware integrator to manufacture its pC-NOVA™ image generator solutions for military aviation simulation and training. The company needed a new partner capable of building, imaging and integrating multi-rack systems, configuring every 42U rack to order for each customer deployment, ensuring access to the newest NVIDIA GPUs to maintain Aechelon's first-to-market goal, and providing the quality assurance demanded by end users such as the U.S. Army, Navy, Marine Corps and Coast Guard.

After a lengthy due diligence process that included evaluating more than 10 providers, the company transitioned from its previous supplier to MBX Systems. **Among MBX's first challenges was an aggressive 60-day deadline to prepare and ship 10 full-rack systems** with multiple purpose-built nodes per rack assembly for two different customers. That included customer-specific imaging for more than 120 nodes as well as branding, cabling, labeling, switch and power installation, and functional testing to assure problem-free bootup in the field.

"Our standard fulfillment time is 120 days with a 90-day manufacturing timetable for our hardware provider, but in this case we had two customers that needed faster turnaround to meet first-of-year federal budgeting targets," said Aechelon COO Bruce Johnson. "MBX met the deadline and has handled everything else we've thrown at them since then."

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High-Fidelity Simulations

Aechelon's pC-NOVA image and data generators are designed to train both pilots and aircrews of fixed wing and rotary wing aircraft. The platform generates high fidelity, geographically specific, multi-channel 3D images offering both out-of-the-window views and sensor views that prepare pilots and air crews to conduct missions at night, in low light, and in conditions such as fog and dust. **(The consensus is that if you don't see the enemy before they see you, you're probably dead.)** Scenes are rendered across the electromagnetic spectrum, enabling display of information beyond the visible light range available to the human eye.

Each pC-NOVA system is deployed in one or more 42U equipment racks with nodes that are uniquely imaged for each end customer based on the type of aircraft and missions being trained for. All visual and sensor data is stored in two 3U pager nodes – one for primary storage and a spare for failover – and fed to as many as 50+ 1U render channels for applications ranging from tactics and weapon training to mission rehearsal programs,

training and live feeds to unmanned aircraft system operators, and use by military research laboratories.

“Our technology requires an extremely complex, full-rack build with **a virtually unlimited number of configurations based on constantly changing training requirements,**” Johnson noted. “We need a rock-solid hardware partner with the infrastructure and processes to handle the scale and high variability involved.”

MBX easily met those baseline requirements. The company **supports rack assembly manufacturing for applications ranging from clustered software like big data and training/simulation to rack builds for colocation facilities.** In addition, its proprietary Forge™ production infrastructure was built specifically to meet high variability needs, combining advanced software and automation technology to enable fast, accurate customization of system configuration, imaging and testing.

The Process: Beyond the Build

But Aechelon was looking for other capabilities as well. Executive leadership sought a hardware partner likely to be free of problems it had encountered with three previous suppliers. The list included late delivery, supply chain issues, slow root-cause analysis following a component failure, lack of transparency on build status, and aggressive efforts to sell engineering services the company did not want.

“Our previous contract manufacturer kept pushing us to take over the entire hardware engineering stack, but we want to keep the bulk of that work in-house. **We need a hardware integrator with a strong engineering team, but we don’t want them telling us how to do our business,**” Johnson said. “MBX lets us pick and choose the engineering tasks we want their help with. It’s a collaborative approach that is part of their corporate DNA.”

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MBX on the Job

That teamwork philosophy as well as MBX’s core manufacturing abilities, strategic relationship with NVIDIA, and reputation for high-touch customer service combined to drive Aechelon’s decision to **abandon plans to dual-source its hardware needs and instead choose MBX as its sole hardware provider.** Aechelon issued a prototype order for its next-generation product node in July 2017, submitted its first rack order to MBX two months later, and announced its rush order for 10 full-rack systems in October with an end-of-year delivery deadline.

MBX quickly fulfilled multiple requests for hardware and process customizations. That included:

- **A custom GPU shroud** designed to ensure sufficient cooling in the confined space of the 1U servers, developed in conjunction with Aechelon to fit multiple NVIDIA GPUs for cost control and future-proofing
- **Custom labeling and branding** spanning custom-color drive bay latches, rear-port labeling and badges on each node, and more
- **A custom USB LCD panel** for each standard node that identifies the node's function within the rack
- **MBX Hatch™ customization** to provide dynamic status reporting about build progress by work center as well as the ability to upload the unique image required for each customer deployment directly to Hatch instead of to an FTP server

MBX also designed a custom shipping crate that can be reused for moving systems from location to location when required, incorporated features for damage-resistant handling by the logistics team, and handled myriad other small details that go with the territory of complex builds.

“Sometimes it’s the little things that can cause problems. You can do your job right 100 times, but the one time you don’t it’s a big issue,” Johnson noted. “MBX just gets the job done, whether it’s on the small details or the big ones like quality assurance, on-time delivery, and availability of components like the newest NVIDIA GPUs that help us push the technology envelope.”

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The Result: Expanded Relationship

By late 2017, Aechelon was expanding the relationship to include manufacture of a new pC-NOVA Nucleus Image Generator developed in collaboration with NVIDIA. Utilizing eight high-end NVIDIA Quadro P6000 GPUs plus two Quadro Sync II cards, the system packs up to eight channels of pilot-training-quality graphics into a 4U rack space to meet the needs of the U.S. Navy for portable Deployable Mission Readiness Trainers that can be relocated to virtually any location in the world on a moment’s notice.

The pC-NOVA Nucleus system makes Aechelon one of the first companies to market with eight Quadro GPUs in a 4U box, and the smaller form factor is expected to have a major impact in the training and simulation sector. **It’s a critical product launch that Aechelon is trusting to MBX on the hardware side because of its track record.**

“Given that our mission is to support the men and women in uniform and the people who pilot our military aircraft, we have to get it right every time,” Johnson said. “MBX shares that commitment to perfection. It’s baked into their corporate culture, and that makes this the smoothest-running partnership we’ve had with a hardware integrator to date.”

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