

# The entertainment industry comes to the rescue

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Distro boxes must pass the solar loading heat test.

OPERATION DESERT STORM, the Persian Gulf War of 1990-1991, presented many logistical challenges to the US military, well beyond the politics, insurgents, and fighting. Setting up tent cities for tens of thousands of troops in the middle of the desert on short notice strained the normal procurement channels for each arm of the military, pressing them to look outside normal government sources to examine what the private sector could provide.

The military's existing portable power distribution systems at the time were very large, heavy, and outdated. All of which were challenges the military was used to working around. The lead time for any government mobile electric power distribution system (and parts, if available at all) was quite long, since most were manufactured by the captive labor force of the federal prison system. In addition, these portable power systems were extremely expensive.

The US military looked to private industry for the first time during the first Gulf War to research what was available and to see if it could be adapted to work in this desert setting with the challenges of extreme climate, terrain, corrosive environment, and temperatures. The US Marine Corps Systems Command examined several approaches to achieve its goal of procuring better equipment, faster, and less expensively. Acquisitions were made, deliveries arrived, the equipment was used in conjunction with the 20-year old technology in the field, and an intriguing new perspective was gained—but the First Gulf War ended and the need for purchasing additional equipment was greatly scaled back.

Fast forward to the fall of 2001: the US launches Operation Enduring Freedom in Afghanistan. This required the US military to once again create a massive infrastructure to support tens of thousands of troops in a desert setting with limited equipment and an immediate need. Then in 2003 the US invaded Iraq. The US Marine Corps needed a drastic increase in equipment—and better equipment. The military's legacy tactical electrical power distribution systems relied mostly on thermal magnetic breakers, which in the extreme heat of the Middle East, repeatedly tripped unnecessarily. Remembering their brief success with procuring viable power distribution equipment from the private sector in the First Gulf War, the USMC Systems Command project team sought commercial equipment that could suit the Marine Corps' needs.

The Marine Corps looked to the private sector, and the entertainment industry was quick to respond. Here was an industry that, like the military, needed extremely rugged, reliable, easily transportable power distribution equipment, but was able to deliver more quickly than the normal military channels. The Marine Corps' consideration of entertainment industry commercial equipment was helped by the National Technology Transfer and Advancement Act (NTTAA), passed in 1995 to encourage government agencies to use private industry standards rather than government-developed standards in procurement, so that commercial off-the-shelf goods (COTS) can be purchased more frequently and with substantial savings. The Marine Corps determined entertainment industry power distribution equipment that met the requirements of UL 1640,

*Portable Power-Distribution Equipment*, could also meet the USMC's needs for the military's particular requirements for desert warfare, and so they put out a request for proposal. Lex Products was one of many manufacturers that received the request, and responded.

The goal of the NTTAA was to facilitate the purchase of off-the-shelf goods, but it is not as simple as picking from a catalog. The military has particular needs. Starting in 2005, the USMC teamed with Lex Products and over time developed and tested a product line consisting of 20 major components that can be tailored to the needs of individual Marine units. Those needs were reflective of the entertainment technology and rental industries, with equipment that supports the concerts, theatre, corporate and special events,

descriptions, technical drawings, and instructions on assembly down to every nut, bolt, and washer in every piece of equipment. The Lex Products' technical manual for the USMC exceeds 500 pages. Incorporated into the contract was also a two-day training program to train the trainers who would ultimately instruct the on-deck users of the equipment throughout the world.

Extremely rigorous product testing at the US Military's Aberdeen, VA Labs came next. Testing is required for all initial purchases, but the USMC particularly needed confirmation that COTS, private industry manufactured equipment, could withstand military demands. Testing was designed to measure each piece of equipment's performance in extreme conditions: rugged demanding

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festivals, and sporting performances markets—event equipment that allows for rapid setup and tear down, use in all-weather operations, requires minimal training, capable of rough handling, as well as highly supportable components and systems. The USMC gained an added benefit from reduced weight, lower lifecycle costs, and improved delivery time tables for products through tapping Lex Products and other small businesses within the entertainment technology and rental equipment industries outside of the previously standard government procurement systems.

It reads easy, however, the reality was anything but easy; and fulfilling all aspects of the military contract has resulted in virtually a reinvention of Lex Products. Before awarding the initial contract, there was an intense question and answer period and USMC onsite inspections of the manufacturing facilities, design capabilities, evaluation of capacity, inspection of procedures, and interviews of management. Once the military contracts were awarded, the real work for Lex Products began. Quick turnaround and responsiveness to design the appropriate product to meet the USMC's needs was all in a day's work, but passing the stringent military testing process and quality assurance guidelines was a whole new experience for the Lex team.

Detailed engineering drawings were required by the USMC for every piece of equipment in provisioning. Each acquisition required a determination on how the items were to be supported. The USMC evaluated contractor logistics support, life of equipment buys, warranties, and guarantees for the long-term support of each component of equipment. The contract required an exhaustive, meticulous technical manual including

treatment; temperatures (desert, tropical heat, humidity, arctic cold); weather (wind, rain, ice, snow); altitude; as well as corrosive environments (sand, wind, dust, water). Product testing involved everything from dropping a distribution box suspended from four feet onto every corner and exterior surface of the box endless times to extreme temperature tests on equipment to measure fire tolerance. An open road test involved a distribution box in the back of a High Mobility Multipurpose Wheeled Vehicle (Humvee) over a 500 mile hazardous, harsh-conditioned, open road course to evaluate the potential damage. When the Lex Products' distro box fared the test too well, the USMC decided to re-do the test; but this time the test began by throwing the distro box into the Humvee, fall where it may, for the duration of the 500 mile test route. With each test, corrections to the product design were discussed and agreed upon, new drawings produced, new prototypes manufactured, and the next round of testing would begin.

Testing was only one of the demanding processes to surpass with each equipment contract. All systems required construction with precisely the same component parts—no deviations allowed. Replacement/spare parts had to be documented, literally exact for every piece of equipment, included with complete detailed description and drawings in the technical manual, and available within a reasonable turnaround supply time. Period. It could be a matter of life and death.

Because the process of manufacturing had to be consistent and the exact parts used with each and every system built, it required a new way of thinking about manufacturing and all their operational procedures at Lex Products. This led Lex to evaluate every aspect

of the flow of work in their factory, including a detailed look at the inventory control system, focusing on continuous flow improvement, building and maintaining long term relationships with suppliers, while still maintaining quick turnaround on all their contracts (entertainment, military, and industrial) with every detail.

Manufacturing strategies had to be re-designed. Lex explored lean manufacturing processes to maximize efficiencies and consistently be prepared to meet their entertainment, industrial, and military clients' demanding requirements. Their newly developed lean manufacturing processes require placing small stockpiles of inventory in strategic locations around the assembly

area for ease of access by assembly teams, instead of in a centralized warehouse location. These modified processes lower waste and enhance productivity on the factory floor. In addition to eliminating waste, lean manufacturing helps provide optimum quality, because each part is examined immediately, and if there is a defect, the production teams are able to stop to address the problem at the earliest possible time. Implementing these new processes led to lower lead times, condensed set-up times, reduced equipment expense, and, of course, increased quality.

Today, everyone wins. Through a new customer category, Lex Products has improved their product line, developed more efficient and consistent manufacturing systems, and reduced their turn-around time for all clients. The US Marine Corps originally, followed by the Air Force, Army, and Navy, now have a procurement relationship that provides a superior mobile power distribution system. With every improvement all customers have benefited from design to delivery.

This was also a case where the results were greater than the sum of the parts—through the process the Marine Corps Systems Command project team for



Lex Products uses black high molecular weight polyethylene on many of its distribution boxes for the entertainment industry, but the military needs lighter-colored boxes. Lex found a source for "sand" UHMWPE and uses it on those products destined for the desert.



Distro boxes are given a final test and then stacked for packing and shipment. The production and testing history of each unit is logged and reported as part of the military procurement procedure.



Lex was able to improve the cable reels specified by the Marine Corps by making them stackable.



Distro boxes and cable reels ready for shipment, with one happy business owner standing in front of them.

the Mobile Electric Power Distribution Replacement System program earned a Department of Defense award for acquisition innovation. The team received the David Packard Excellence in Acquisition Award for “exemplary innovation and best acquisition, technology, or logistics practices.” Mike Gallagher, Program Manager of Expeditionary Power Systems reported, “We were recognized for our innovative and rapid development, testing, and fielding of the Mobile Electric Power Distribution Replacement System.” A win-win for all. ■



Completed cable is stacked on pallets.