



Cost-Efficient Manufacturing For Military and Aerospace Products

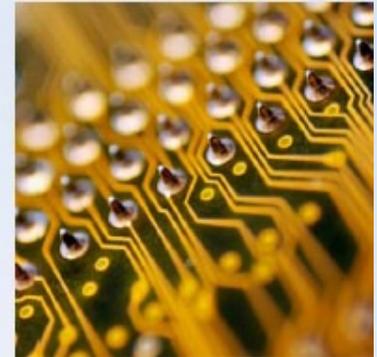
By Ed Evangelista, Federal Electronics

All eyes are on the defense budget as the federal government struggles to find a reasonable balance between military and non-military spending while insuring the protection of U.S. interests both home and abroad. Evolving threats, from both conventional and unconventional sources, inform different approaches to personnel staffing and training, tactics, and weapon systems. In addition to a close scrutiny of budget size and scope, there is also an underlying current that is gaining momentum and will radically change the way the government conducts business. The conventional acquisition process has evolved into a bloated bureaucracy, replete with red tape and inefficiency, much of which has found its way into the business processes of defense and aerospace prime contractors. The Pentagon is sending a clear message to their prime contractors — we love your product and we love your technology, but if you can't reduce the costs to fit within our budget, we won't buy them.

In response to this new reality, many defense contractors have started comparing their internal operations to “best-in-class” operations from non-military original equipment manufacturers (OEMs). This analysis will uncover multiple opportunities to reduce costs and eliminate waste. One area that may prove to be a significant source of savings is an expansion in the deployment of outsourcing as part of a comprehensive supply-chain strategy.

The Challenge. Outsourcing of manufactured products at all levels has been an integral part of commercial and industrial OEM supply-chain strategies for literally decades. Only recently has it gained traction with military contractors. Issues that may hamper their outsourcing efforts include the following:

- Product documentation is often lacking and does not accurately reflect the state of the finished product, especially for older programs that customarily have been built in-house. Internal manufacturing operations developed the necessary “native intelligence” to build the product, but seldom if ever does it find its way into the specifications.
- This lack of accurate and thorough documentation can adversely affect the decision to outsource an otherwise suitable product candidate, as the time, expense, and resources required to bring the supplier up to speed are prohibitive. The same rationale applies to products that have already been outsourced. The benefits associated with cost reductions identified through competitive bidding are often outweighed by the risk associated with changing the source of the product, be it internal or external to the OEM.
- Most defense and aerospace products can be classified as low volume, high mix (many SKUs), and high complexity. Historically, EMS providers who can successfully manage the challenges associated with this profile — along with the lengthy product development cycles, the need to submit multiple proposals before awards are made, and the frequency and magnitude of product design changes — have been in short supply. In addition, they must also be capable of complying with the stringent quality, traceability, and administrative flow-down requirements of the contracts while having the financial strength to support manufacturing on a start-stop basis.
- Due to the extended lifecycle of most military hardware, and a focus on system performance rather than cost effectiveness, many of the programs currently in production were introduced with minimal consideration for manufacturability and quality. DFMA methodologies that have been utilized in non-military applications for years have only recently started to gain traction in the defense and aerospace manufacturing engineering environment.
- When opportunities for cost reductions are identified by contract manufacturers that will change the form or fit of the product, an engineering change order is required to implement the modification. As many prime contractors are focused on the next generation of products, which can take years to develop, resources for maintenance of existing products are typically lacking. These resources are focused primarily on issues that potentially risk continued production, such as material obsolescence or recurring product nonconformances.



The Solution. By adopting best practices from non-military markets, and adapting them to defense and aerospace applications, military OEMs can accelerate the reengineering process and reduce the time it takes to realize the cost reduction benefits. Common practices that promote cost efficiency and process agility include:

- *Establishing outsourced product transfer procedures that build upon the current state of the manufacturing process.* Suppliers are provided with process documentation and quality history reports in addition to the typical product specifications. If the program is currently in production, arrangements are made to allow the supplier to view the process in operation to provide further insight into the “native intelligence.” Co-builds with personnel from both the OEM and the supplier facilitate the transfer of non-documented process elements. Providing a “golden sample,” if available, also helps to serve as a baseline against which the product/process information can be compared. This reduces or eliminates the need for clarification and support from OEM engineering personnel.
- *Implementing product/process documentation programs that promote collaboration in the supply chain.* By providing the contract manufacturer with customer templates for prints, specifications, and change notices, the supplier can identify gaps within the documentation, track resolutions for each issue during the first-article process, and then provide red-lined prints/specifications and change requests within the customer’s formats. This procedure accelerates the engineering change-order approval process. It is a critical element within a robust first-article protocol that will create the baseline for future production.
- *Opening reviews of new designs to key suppliers as early in the design phase as possible.* This stimulates a collaborative approach that reduces cycle times and insures that the product is designed with manufacturability and quality in mind.
- *Identifying non-critical, high labor content elements of the product and introducing low-cost region manufacturing into the supply chain.* This is enabled by utilizing temporary export and import license processes that comply with U.S. State Department regulations. Outsourcing of high labor products such as cable and wire harness assemblies to same-hemisphere locations such as Mexico can result in cost savings as high as 30% to 40%.
- *Selecting an EMS provider who straddles the line between military and industrial applications.* A supplier capable of complying with the rigors of aerospace and defense industry requirements within the context of the more efficient and flexible non-military markets is a particularly effective approach given the new reality of defense procurement. EMS providers who cater primarily to high-end industrial and medical applications are now focusing on the defense and aerospace markets as product and service requirements converge. This is especially true as the Pentagon has promoted the increased use of commercial-off-the-shelf (COTS) items in military products.
- *Accentuating current supply chain staffs with individuals whose skill sets were honed in the commercial, industrial, and medical environments.* This approach brings a plethora of new ideas to the table.



Conclusion. Prime contractors, tasked with wringing costs and delays out of their product development and fulfillment processes, will continue to harvest proven, best-in-class practices from non-military OEMs. Expanding the use of outsourcing methodologies with a properly aligned and sized supply chain will provide significant opportunity to achieve the levels of cost reduction and business process acceleration that are required to support defense and aerospace customers in the future.

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About Federal Electronics. Founded in 1948, Federal Electronics, Inc. is a leading electronics manufacturing services provider. Based in Cranston, Rhode Island, and Hermosillo, Mexico, the company serves the needs of original equipment manufacturers and government contractors by providing comprehensive production solutions that lower cycle times, control and reduce costs, and create flexible supply chains that are responsive to volume variability. For more information, visit www.federaelec.com.

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