Military Products From Commercial Lines:
A Joint Service Success Story

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A decline in military acquisition budgets has resulted in a decrease in the size and capability of the traditional defense industrial base. While the DoD continues to have requirements for new systems, affordability considerations are becoming co-equal with performance in this new environment. To address these industrial base and affordability concerns, the DoD is turning to the commercial sector to meet its security requirements.

Both the Air Force and the Army are immediate beneficiaries of the "Military Products from Commercial Lines (MPCL)" program which cuts acquisition costs by more than 50% for digital electronics modules. Two Communication, Navigation, Identification (CNI) modules compatible with the Air Force F-22 Raptor fighter and Army RAH-66 Comanche helicopter have been redesigned for production on a commercial automotive electronics manufacturing line. The first modules have been assembled on the commercial line for design validation. By using this same approach with other avionics modules, there is a potential for significant cost savings.

The focus of the program is not only on process technology, but on the business practices and manufacturing infrastructure necessary to apply this approach across DoD programs and the industrial base. The MPCL team, consisting of members from the Air Force, Army and industry are working together to illustrate the feasibility and affordability of commercial-military integrated manufacturing.

The MPCL program administered by the Manufacturing Technology Directorate of Wright Laboratory directly addresses the affordability and commercialization issues. The objective of the MPCL is to demonstrate the production of military components on a commercial automotive line at lower cost and at comparable quality to those produced on a dedicated military line. The MPCL will employ a commercial automotive manufacturing line to produce demonstration electronic modules compatible with both the F-22 fighter and the RAH-66 helicopter.

MPCL is also working to identify and adopt best practices in the acquisition of defense systems. The program is currently transferring findings, lessons learned and recommendations to the entire acquisition community. The MPCL is illustrating the feasibility of integrated manufacturing which allows the DoD to take advantage of existing high quality and high volume commercial electronics production lines. The success of the MPCL has long term implications for defense acquisition. Future military electronics products will be built on commercial lines at significant cost savings. This should help pave the way for other military products as well. The increasing use of commercial lines to produce military hardware will significantly reduce the need to establish and maintain dedicated military production lines.

Another important affordability aspect of MPCL is the joint nature of the program. It supports both the Air Force F-22 and the Army RAH-66 programs. In the past, the acquisition budgets for each service were large enough to support a separate market in the defense industry. This is no longer the case. Small production runs in defense facilities are becoming cost prohibitive.

However, turning to the commercial sector does not necessarily solve this problem either. The requirements of one service, may not be of sufficient volume to attract world-class commercial manufacturers. In addition, many parts suppliers have minimum order levels. If the orders are under this level, firms will either not sell their products or they will charge a premium.

To take advantage of the capabilities of the commercial sector, the DoD must increasingly pool requirements across services whenever possible. Even though the F-22 and RAH-66 are very different systems with very different missions, commonality exists at the subsystem level. The MPCL program illustrates that, by consolidating requirements, the two services are able to economically leverage the commerial manufactuing process.

The Comanche Program Office (PMO) has enthusiastically embraced commercialization as an important part of its overall program strategy. Based on the success of the MPCL program, the Comanche PMO is planning to incorporate demonstration modules from the MPCL into the Comanche Early Operational Capability aircraft. The commercially proven manufacturing processes and cost savings demonstrated by MPCL are critical to achieving the Comanche aircraft design-to-cost goals.

The MPCL team has established a “Four Wins” scenario (Figure 1) which defines what each major player expects from MPCL, based on organizational goals and program objectives. The Four Wins were generated in the early stages of MPCL through team training and are used as a basis for management operations and decision making. Looking at it generically, the Four Wins describe how the MPCL is fundamentally designed as a partnership between the defense contractor, the commercial supplier, the Air Force and Army program offices, and Air Force ManTech, the catalyst. The defense firm is TRW Avionics Systems Division (ASD) and the commercial firm is a totally commercial TRW sister division Automotive Electronics Group - North America (AEN) Such a design allows DoD systems to benefit from the demonstration, validation, and transfer of new concepts while MPCL absorbs a major portion of the risk.

The MPCL is using an integrated product team approach to address three areas: business practices, manufacturing infrastructure, and process technology. The TRW AEN production facility located in Marshall, Illinois was chosen because its primary products, airbag sensor modules and diesel engine control modules, are safety critical and have technology similarities to the demonstration avionics modules of the pilot program. AEN manufactures automotive electronic products for all major automotive manufacturers worldwide.

To accomplish the objectives of the pilot, TRW ASD designers have been working with TRW AEN designers and manufacturers in a concurrent fashion to redesign the military modules for commercial production. Minimal changes have been made to an existing automotive electronics manufacturing line to fabricate the low volume/high cost military avionics modules. MPCL will enhance the capabilities of AEN's computer integrated manufacturing (CIM) system to economically produce a mix of low volume and high volume products. AEN currently caters to customers with large volume requirements.

MPCL metrics have been defined in categories which reflect program objectives: price/profit optimization, technical performance, and transfer. The price of MPCL modules must reflect the target savings while providing reasonable profit for the commercial supplier. Technical

performance must mirror military requirements in form, fit and function while exhibiting equal or better quality levels. And although the MPCL demonstration is key, success means enabling other current and future programs to realize similar benefits.

The MPCL is providing data and lessons learned to assist Air Force and Army program offices in applying commercial processes to defense acquisition. The most significant findings have been in the areas of contracting, teaming, defining requirements, design for manufacture, and expanding the industrial base. However, the number one benefit from the Military Products From Commercial Lines program is significant cost savings for both Air Force and Army systems.

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