

The Industrial Base Challenge — Delivering the Right Ammunition, at the Right Place, at the Right Time

LTC Matthew C. Butler, Toni McNeal and Rene Medina



Our Nation is at war and our forces need munitions — from small caliber ammunition to tactical bombs, from flares to hand-held counter-mine detection equipment. For many of these items and others, the Army traditionally looked to the industrial base. However, in recent years, the industrial base has dwindled to a single firm for general-purpose bombs. And, although most industrialized countries have the capability of manufacturing certain types of ammunition, few make it to U.S. specifications. This article discusses the steps being taken to ensure the producibility of ammunition in sufficient quantities to meet U.S. forces' operational requirements.

The C-17 Globemaster III — the newest, most flexible cargo aircraft to enter the airlift force — releases its flares. The aircraft is capable of rapid strategic troop and cargo delivery to forward bases in the deployment area. (U.S. Air Force photo.)

The Way Ahead

Small caliber ammunition includes all calibers used in individual weapons such as 5.56mm for the M16 rifle and 7.62mm and .50 caliber for ground and vehicle-mounted machine guns. For the Army alone, the demand for small caliber ammunition has expanded from about 300 million rounds in 1999 to more than 1.2 billion rounds today. Across the services, the total requirement is between 1.5 billion and 2.0 billion rounds annually. This left the Project Manager for Maneuver Ammunition Systems (PM MAS) with a number of options to evaluate:

- Expand production at the Lake City Army Ammunition Plant (LCAAP). LCAAP is the government-owned, contractor-operated (GOCO) facility from which the Army and the other

services currently draw 1.2 billion rounds of small caliber ammo annually.

- Purchase NATO specification ammo from overseas.
- Construct small caliber ammo production operations at another GOCO facility, which would require adding completely new equipment and training a new workforce, resulting in at least a 3-year lag before significant production could begin.
- Buy direct from the commercial market.
- Institute a combination of some or all of these options.

PM MAS selected a two-pronged approach. First, through minor upgrades, addition of extra shifts and addition of some new equipment to its current lines, LCAAP increased its capacity to 1.5 billion rounds annually. Second, LCAAP

began purchasing ammo directly from the commercial markets. Primary considerations in selecting these alternatives were that they meet immediate and future needs with minimum risk.

Market surveys revealed that commercial sources had current capacity of about 300 million cartridges, with growth potential to 500 million rounds or more — output that meets U.S. military requirements. With the help of a systems integrator, the Army has begun working with industry to build a new and more integrated partnership that is bringing that capacity together in a well organized, uniform and responsive fashion.

Bombs and Energetics

The Joint Munitions Command (JMC) Bombs/Energetics Division at Rock



Island, IL, manages the acquisition and logistics for PM Joint Service assigned items including non-Army, service-unique bombs, Navy gun ammunition and multiservice-use bulk propellants and explosives.

As with small caliber ammunition, the need for tactical bombs has experienced significant growth since Sept. 11, 2001, but there are challenges in getting them. Near-term requirements must be satisfied and long-term strategies need to be established to meet future needs. Most important, the industrial base's health must be improved. If we recognize the existing industrial base's maturity and the difficulty in bringing in new competition, it becomes clear that one way to ramp up current production — or ensure ongoing production of certain

items — is to improve relationships with vendors on existing contracts.

The McAlester Army Ammunition Plant (MCAAP) in Oklahoma has traditionally been viewed as a location where the components provided by industry are put together to make bombs, ammunition, propellants and explosives. Then, the products are shipped to various depots, and from the depots to various hot spots on Earth for use by warfighters.

This approach works well in peacetime when the demand for these bombs — primarily for training — is fairly constant and predictable. To meet today's surging requirements, the Ammunition Enterprise is beginning to aggressively manage and coordinate its

relationships with both industry partners and the Army's end-user community. This partnership is leading to significant reductions in processing time, shipping and transportation of bombs into MCAAP.

Since only one firm currently makes general-purpose bombs, and building new facilities is so costly, JMC is looking at alternative technologies such as Case Ductile Iron to make bombs. If a bomb has a thick wall, making it weigh 500 pounds, for instance, it would eliminate the need for cement fill. If successful, this technology could provide an alternative to the current steel configuration, providing access to additional resources.



The MC-130E Combat Talon I and MC-130H Combat Talon II provide global, day, night and adverse weather capability to airdrop and airlift personnel and equipment in support of U.S. and allied special operations forces. Here it protects itself with flares to defeat infrared surface-to-air missiles. (U.S. Air Force photo.)

The U.S. Air Force is also developing an insensitive explosive fill for its general use bombs using a mixture of trinitrotoluene (TNT) and aluminum. Since the insensitive fill is not ready to be used in tactical bombs, and there is no available TNT in the stockpile, JMC awarded an indefinite delivery/indefinite quantity (IDIQ) contract for supply of TNT over a 5-year period to Alliant Ammunition and Powder Co. (AAPC). Virgin TNT will be supplied from a National Technology Industrial Base source, reclaimed and OCONUS TNT. The facility that produces the virgin TNT can be easily modified to produce other energetic materials, notably insensitive explosives. The IDIQ is now delivering sufficient quantities of TNT to meet increased requirements.

Partnering with major contractors has proved beneficial for current program execution. New partnerships are now being established with AAPC for TNT and General Dynamics Tactical and Ordnance Systems for bombs. Through these partnerships, communications will be improved, expectations will be better understood, common goals can be set, delivery times improved and

problems identified so they can be resolved early on.

Mortar and Artillery Ammunition

Getting the right ammo, at the right place, at the right time may sound easy, but contracting practices today and the current industrial base's state make it increasingly challenging. The PM for Combat Ammunition Systems (PM CAS) is using disciplined engineering, problem prevention versus detection and fact-based decisions. It is also working through integrated product teams (IPTs) to change the mindset and implement processes that will result in a partnership approach to ammunition production.

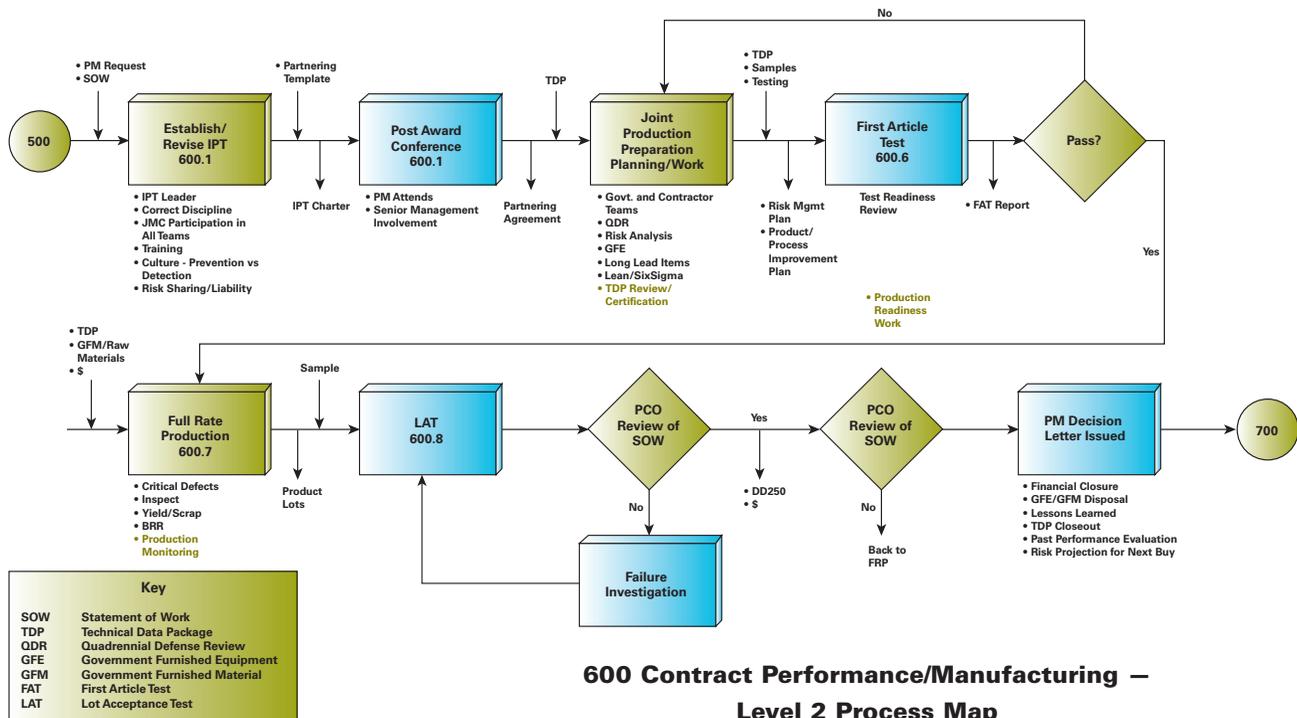
“Selecting the right partner, not contractor, is the place to start,” suggests Chief Conventional Ammunition Division, PM CAS, Armand Herrera. “I purposely use the word ‘partner’ because I believe we are all in this together. We have a Six Sigma team looking at

improving contracting practices to ensure PM CAS contracts with the right partner,” Herrera explained. “It follows one of our organization’s main management philosophies — reinforce successful partnerships.”

In addition, cross-functional IPTs are formed early in the acquisition cycle. Key IPT membership considerations are that every person is a contributor, is able to function as part of a fast-moving team and brings a valued skill or expertise to the table. This is particularly important in the pre-production engineering (PPE) phase where the emphasis should be on proactively preventing problems instead of reactively fixing things that go wrong.

A main PPE initiative is risk management. To ensure consistency, PM CAS uses Risk Radar, a commercially available software package. A formal risk management board also reviews IPT risk analyses, mitigation plans and implementation strategies.

Near-term requirements must be satisfied and long-term strategies must be established to meet future needs.



The IPTs look at risk in cost, schedule and performance with emphasis on producibility using Six Sigma tools and a process map that shows production process inputs and outputs from start to finish. The IPT, along with its industry partners, brainstorm risk areas and come up with a comprehensive list to analyze, assign risk factors and propose mitigating measures. Additionally, it's extremely important to visit partners, tour their facilities and meet face-to-face to discuss management philosophies, best practices and expectations.

Countermeasure Flares

Consider the more than 500,000 shoulder-fired, surface-to-air infrared (IR) guided missiles available on the worldwide market today. In the wrong hands, they present a huge threat to the U.S. military and its fixed- and rotary-wing aircraft. To counteract this threat, PM Close Combat Systems (PM CCS) in concert with the U.S. Army Research Development and Engineering Center (ARDEC) developed the M211 and M212 IR countermeasure flares, which were type-classified in 2002. The M211 and M212 are used in conjunction with the existing M206 countermeasure flares in a "cocktail" mix to defeat a wide range of IR surface-to-air missiles. They have been used successfully in the field on some models of helicopters currently in Afghanistan and Iraq. After returning from Iraq in December 2003, then ARDEC Commander BG Clay L. Newman said, "The M211/M212 flares saved my life while I was deployed. Thank you and everyone on your team."

New operational requirements came out in December 2003 forcing the Army to review its current strategy to procure new flares. PM CCS, working in conjunction with PM Aviation Electronic Systems, was able to determine the total

flare requirement needed to support all current, existing and future platforms with ALE-47 dispensers.

Since these are relatively new items, initial production rates were relatively low — about 6,000 per month. Working closely with the flare manufacturing industry, PM CCS defined a production rate sufficient to support both Army and Air Force requirements. PM CCS partnered with its contractors to expand the current production lines by providing funds for the companies to purchase special tooling machinery to better support the M211 and M212 production lines. Alloy Surfaces and ATK each invested in additional manufacturing equipment and facilities to increase production rates threefold.

While not common practice, this method provided a reasonable solution to enhance the vendor's capability in a sole-source environment. PM CCS was willing to make this commitment to ensure continued production of items urgently needed by warfighters.

As technology changes and production requirements surge, so must the way we do business. Today, the government is the systems integrator, using multiple contracts, focusing on problem detection and reaction and using commercial partners to overcome an outdated industrial base. Change means building IPTs that add genuine value, forming critical government/contractor partnerships looking for new materiel to replace dwindling resources and looking at innovative technologies to reduce production cost and increase quality and flexibility in production rates.

How we provide our warfighters with ammunition is more critical than ever before. The new Ammunition Enterprise formed by PEO Ammo brings together the acquisition management

skills and expertise of PMs, ARDEC engineers and JMC munitions logistics experience to provide strong potential for improvements in ammo production for years to come. The resulting benefits in munitions quality, effectiveness and timeliness make a direct contribution to combat success and the survivability of America's warfighters wherever they deploy.

LTC MATTHEW C. BUTLER is the PM for Small and Medium Caliber Ammunition. He holds a B.S. in agriculture from the University of Maryland-Eastern Shore and an M.B.A. from Monmouth University. He is a graduate of the Army Program Managers Course and Army Command and General Staff College. Butler is Level III certified in program management and contracting and has been certified as a Professional Contract Manager by the National Contract Management Association. He is also an Army Acquisition Corps (AAC) member.

TONI MCNEAL is the Chief of the Bombs and Energetics Division at JMC. She has a B.S. in industrial engineering from the University of Illinois and an M.B.A. from St. Ambrose University. She is also an AAC member and is Level III certified in systems planning, research, development and engineering.

RENE MEDINA is a Project Officer with PM CCS. He has a B.S. in electrical engineering from New Jersey Institute of Technology and an M.S. in technology management from Stevens Institute of Technology. He is an AAC member and is Level III certified in manufacturing, production and quality assurance and Level II certified in program management.

