cover story

# Military

By Bill Kennedy,
Contributing Editor

## Small shops can take advantage of big opportunities by making military parts.

The amount of taxpayer money dedicated to U.S. defense is breathtaking. The Bush Administration requested more than $600 billion for fiscal 2009 defense spending. That request includes $13 billion for aircraft, $11 billion for ships and $7 billion for army equipment. As U.S. manufacturing suffers from slumps in the auto and housing industries and portions of it are moved to other countries, many small shops are looking for new ways to generate revenue. A significant source is making parts for military applications.

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Quality Mould President D.J. Danko (left) and NCDMM Manufacturing Consortium Manager George Blackham discuss machining strategies for a complex mold used to produce a glass lens for an aircraft wing light.

### First Steps

While shops must do some paperwork to manufacture military equipment, there are organizations that can help them make the transition into military part making. One such organization is the National Center for Defense Manufacturing and Machining, Latrobe, Pa. Its employees include George Blackham, manager–manufacturing consortium. Blackham, a retired first sergeant, spent 25 years in the U.S. Marine Corps, initially in repair and maintenance of heavy equipment. Later, he was the senior enlisted marine at a Huey Cobra helicopter unit at Johnstown-Cambria County Airport in Pennsylvania. "I understand the acquisition process and how to get parts and open purchases … all the different red tape that it takes to get things," he said.

The NCDMM works with Department of Defense organizations and their industrial suppliers to develop solutions that boost manufacturing productivity and reduce costs. Part of that effort involves matching small shops with appropriate part making contracts. Blackham works with a consortium of about 75 shops in western and central Pennsylvania, most of which have fewer than 500 employees. "The shops are looking for opportunities in manufacturing and machining for defense, and we try to marry them up with those opportunities," he said. "[The NCDMM is] branching out nationwide. If a shop in Illinois calls, for example, I'll guide them and try to point them in the right direction."

Aside from actually making the parts, shops' biggest challenge is "figuring how to do the paperwork; how the little guys can deal with the big government procurement system," he said.

Getting started involves fulfilling some basic requirements. The first steps include obtaining a DUNS number (Data Universal Numbering System), registering with Central Contractor Registration (CCR) and acquiring a CAGE code number (Commercial And Government

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**Chamfering openings in Humvee bumper on a Mazak machining center at C&C Tooling.**

Entity), which becomes a shop's unique identification for government work. Web links are:

- DUNS number: fedgov.dnb.com/webform
- CCR: www.ccr.gov
- CAGE code: www.dlis.dla.mil/CAGESearch/cage_faq.asp

## Sign Up Assistance

Other organizations that help shops get into military part making include procurement technical assistance centers (PTACs). The centers are funded and administered by the Department of Defense's Defense Logistics Agency, specifically the DLA's Office of Small and Disadvantaged Business Utilization. PTACs act as a bridge between government buyers and parts suppliers.

"If a shop is looking to increase its sales by going to the government marketplace, they come to us and we sit down and talk to them," said Chuck Burtyk, director of workforce development, Private Industry Council of Westmoreland and Fayette Inc., a PTAC in Greensburg, Pa. "We find out what it is they do—manufacture, provide a service—and then try to match them with the appropriate agency that has evidenced a buying history for that particular item."

Shops can search the nationwide network of more than 90 PTACs, with more than 250 local offices, at the Association of Procurement Technical Assistance Centers' Web site, www.aptac-us.org.

PTACs also help shops take advantage of unique aspects of government contracting. For example, federal purchasing offices are required by the Small Business Administration to set aside contracts or portions of contracts for exclusive bidding by small or minority-owned businesses. The SBA defines a small business as "One that is independently owned and operated and is not dominant in its field of operation." Contracts may also be set aside for businesses owned by women, veterans and service-disabled veterans. Shops operating in historically underutilized businesses (HUB) zones, as defined by the SBA, also may be favored as part of an effort to encourage economic development. Also, large contractors are usually required to subcontract a portion of their work to small businesses.

PTACs may offer search services such as keyword-based software that utilizes terms describing a shop's capabilities to find matching bidding opportunities. PTACs also have access to government standards and specifications that may be required to bid on or fulfill a contract. The standards range from material grade to packaging, bar coding and shipping requirements.

Burtyk said the information available at a PTAC can help a shop avoid missteps; "sometimes the meetings end up with the company saying, 'Well, it's not for me.' " He pointed out that fulfilling top-level government contracts requires significant time and effort. "If a shop is to be a subcontractor to Lockheed or Boeing, it has to pass all kinds of stringent quality checks and standards. Normally, this doesn't happen overnight. Because buyers from the government, like buyers from any industry, get comfortable with their suppliers, you've got to be somebody special—not just come in with a lower price. You have to be on time, provide quality and be reliable."

## Dealing Direct

Many shops service the military market as subcontractors to manufacturers that sell directly to the government. For those that want to sell directly, the DLA's three defense supply centers offer opportunities and resources. A Columbus, Ohio, center handles parts for ground and marine equipment, while a center in Richmond, Va., takes care of aircraft-related components. The third center, located in Philadelphia, focuses on consumables, such as food, clothing and medical supplies. Each center handles its material for all service branches, listing the parts or items under national

## Learn more about making military parts

Get more information on making military parts by viewing videos in an Interactive Report on the home page of www.ctemag.com and by visiting Bill Kennedy's blog in the CTE Community section, also at www.ctemag.com.

stock numbers.

After a shop obtains its DUNS number, CCR registration and CAGE codes, Blackham recommends that its staff take advantage of a training course like the one offered five times a year at the Defense Supply Center Columbus (DSCC). The free Training, Knowledge, Opportunities (TKO) courses teach vendors how to do business with the government. A typical course might deal with registration and bidding procedures, data management issues and inspection requirements. Blackham calls the course "a powerful tool that's an eye-opener for a lot of these folks."

The DSCC also houses buyers assigned to manage the acquisition of parts for specific vehicle platforms or assemblies. Shops are evaluated and contracted to make the parts, which are assigned national stock numbers.

The DSCC arranges meetings between its buyers and shops interested in manufacturing the buyer's parts. Charles Miller, a DSCC small-business opportunity specialist, coordinates these capability briefing programs, which, he said, "enable contractors to present their capabilities to the experts here at DSCC. Their capabilities have to line up with the commodities that we manage here."

APEX Design

**APEX Design President Melissa Fluharty and Vice President Chuck Fluharty examine contract details during an Internet bidding process for a military job.**

## Simple but Steady

No shop is exactly the same as another, so every shop's entry to military markets is unique. Quality Mould Inc., Latrobe, Pa., has seen its markets change and now continues to prosper in part by making military parts. The shop makes molds for glass products. Unlike molds

for plastic injection that are made from tool steel and aluminum, Quality Mould machines complex molds from cast iron and stainless steel. The molds are used to form functional and decorative glass products ranging from spotlight lenses to designer sinks.

Quality Mould has been indirectly involved in defense supply for more than 20 years, machining complex molds for glass lenses and windows on military aircraft, including the F-18 and F-22 fighters, the Chinook helicopter and the Stealth bomber. The shop still handles those complex molds, "but a lot of the other types of glass mold work is going overseas," said D.J. Danko, Quality Mould's president.

To replace the lost work, the shop has moved into general machining and entered the defense industry as a metalcutting company. "We are diversifying into other venues, such as power generation and medical," Danko said. "Recently, we started getting in with second and third tier suppliers doing defense work. We are not dealing directly."


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**These 0.040"-dia. 303 stainless steel parts, machined at APEX Design for a night vision scope system, feature 0.020"-dia. cross-holes and are typical of the high-end, complex military parts that are the company's focus.**

As a subcontractor to shops overloaded with work, Quality Mould is handling military parts such as supplementary "armor-up packages" and axle plates for Humvees. "Now that we are getting familiar with military parts, we are working on getting the proper certifications to go direct to a lot of these companies [such as Tier 1 suppliers to the military].

The shop finds much of its subcon-

## Facebook, meet eBay

**NETWORKING AND COMMERCE**, two of the most popular Internet activities, are being combined to link large contractors with job shops to facilitate military part making opportunities for the latter. VOICe (Virtual Opportunity Information Center) is designed to be an online community of federal agencies, defense contractors and job shops. The goal is to match agencies' and contractors' needs with job shops' capabilities. VOICe is managed by the NCDMM with software support from the Columbia, Md., division of Science Applications International Corp. (SAIC).

Contractors will be able to use the center to post job requirements (including drawings and specifications), define business and quality certification requirements and solicit bids on an open basis or from a specified network of preferred suppliers. Also, shops interested in bidding for work will be able to advertise their capabilities on the site and find requests for proposals and requests for quotes matched to their skills. VOICe's community aspect will allow shops to locate partners and offer complete bids on complex projects and will also permit collaborative development of proposals.

Robert Friday, senior support decision analyst with SAIC, provided a typical operating scenario: "You're an OEM looking for someone who has ISO certification, welding and fabrication capabilities and can work with titanium. You type those specifications in and load in your solicitation." VOICe will send the requirements and solicitation to shops that have registered the specified capabilities. Similarly, a shop with access to the site will be able to look at all bids that are not designated to preferred suppliers, even if the bids don't match the shop's capabilities, to get an idea of the opportunities that would result from adding new capabilities. "You can test your marketing in that way," Friday said.

Beta testing of the site began in August, with its launch scheduled for Sept. 30. In full operation, the site will operate on a monthly fee basis. For more information about VOICe, contact corey.kovalcik@ncdmm.org or david.bertieri@ncdmm.org.

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tracting work via networking and referrals. "We went out and solicited, finding shops that are busy and letting them know that we have open capacity," Danko said. Work also has also come through word-of-mouth referrals from tooling salespeople.

"We are dealing with other companies that are certified; that's the way to go for now," Danko said. A disadvantage is that the main contractor claims a percentage of the revenue for the part, reducing Quality Mould's profit margin. Going direct allows a company to avoid such claims against its profits.

Machining molds for aerospace lens applications can be complex work. Consequently, machining some military parts represents a step down in difficulty for Quality Mould. Axle plates for Humvees, for example, are relatively simple but steady work. The parts measure ¾"×53"×17" and are made from A-656 low-alloy steel. The shop drills and taps 12 holes in each plate and machines a curved slot and a large hole.

## Paperwork Repetition

Overseas manufacturing competition also affected C&C Tooling, Leechburg, Pa.; several years ago its diemaking business started to dry up. "We were making carbide stamping dies for electronics and automotive," said Clyde Ross, C&C's owner and president. "We still do diemaking for customers we did it for in the past, but we don't look for that type of work anymore."

Today, C&C machines various military parts, including machine-gun parts and Humvee bumpers, as a subcontractor. "We do have our own CCR number, and we are a HUB zone-certified company," Ross said.

The shop took an unconventional path to gain the bumper work. C&C had manufactured the bumpers in relatively small numbers for another company. When that relationship dissolved, C&C found another company that was making the bumpers. Another subcontracting deal resulted when a company

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CNC operator Trevor Woodhall engraves part and manufacturer numbers on Humvee bumpers at C&C Tooling.

making machine-gun parts contacted C&C about handling overflow.

C&C is working towards supplying military organizations directly, but Ross said his shop must complete "a significant amount of new paperwork" to become a direct supplier. "A lot of companies don't like getting involved with the military because of the paperwork," he added.

A company must complete additional paperwork to become a direct supplier even if it's already an indirect supplier. For example, C&C has made more than 20,000 military bumpers and continues to produce them at a rate of 425 per month, but past and current manufacturing isn't enough. "To go direct to the DLA with the bumper, we have to go through the whole paperwork process again even though they know we are already making the exact same bumper," Ross said.

C&C makes the bumpers from 2"×8"×¼" hot-rolled steel tubing cut to a length of 84⅝" by the supplier. After cutting 45° angles on the tubing ends, the shop machines about 30 holes and other features per side. Four different sizes of steel mounting-bolt sleeves, machined to size by C&C, are then welded onto the bumpers, and the welds are ground flat. The bumpers are sent out for painting and then delivered to the manufacturer for whom C&C performs the subcontracting work.

This subcontracting relationship magnifies C&C's need to control manufacturing costs, so Ross has maximized machining productivity. At first, machining the bumpers required five operations on a ballscrew-driven vertical machining center. Ross later acquired a Mazak 2000L Super Velocity machining center that features linear ways capable of a 4,700-ipm rapid traverse. The machine tool also has a 120" X-axis travel, which permits machining an entire side of the bumper without refixturing. Ross said tolerances for the job aren't tight, but the 0.002" held by the machining center makes it easier to weld in the sleeves. Because the sleeves have to go through holes on both sides of the bumper, closer tolerances mean better alignment so that the sleeves slip into place easily. The sleeves are machined on a CNC lathe now, but Ross intends to move the operations to a bar-fed automatic machine that can produce the sleeves unattended.

Another time-saving upgrade involved engraving part and manufacturer numbers on the bumper, which originally was done on the machining center with an engraving tool. The operation took about 2 minutes per bumper and tools often broke. Now, the machine operator engraves the numbers with a handheld etching unit while another bumper is being machined, and the operation takes less than 30 seconds.

## Military Market Analysis

Chuck Fluharty, vice president of machine shop APEX Design Inc., Atlasburg, Pa., learned about the military procurement system through a PTAC office in Columbus. "When I am evaluating a bid and it calls out a certain military spec that I don't have in my library, I'll send the PTAC an e-mail and they send me a copy," he said. "Then, if we bid that job, I have all the specs on file."

Fluharty was somewhat familiar with the military market—including manufacturing military products and completing their comprehensive documentation requirements—before he started APEX

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Design. His father owned a shop that machined forgings for military applications, and Fluharty worked there as a youngster.

Fluharty, who has engineering and business degrees, entered the manufacturing industry after working for 2 decades in technical business development for German chemical maker Bayer AG. In 1997, he and his wife left the corporate world and began a manufacturing business. Fluharty analyzed various options and decided that high-precision, highly automated Swiss-style machining was the technology that best matched present and future manufacturing needs. He bought a Hardinge machine in 2003 and machined his first parts in 2004. Today, APEX Design has $250,000 in annual sales and has three part-time employees—himself, his wife and son. Fluharty said market analysis is key to deciding which parts to machine. "Customers are important, but the right customers are more important," he said. "I am focusing on high-end, precision military parts. About 75 percent of my work is for the military. I don't want to spend a lot of hours working on legacy parts where I'm going to make 20 or 30 and then not make them again for 5 years."

Fluharty said his exposure to German corporate practice at Bayer was good preparation for handling the paperwork involved in military contracting. "Most people see all the paperwork, and they drown in it. My wife and I both worked for Bayer, and Germans love paperwork and documentation. We apply the discipline we learned there."

When bidding government contracts on the Internet, Fluharty said, "You surf through all that noise. You see a government contract and you get the technical data package. You have to figure out how to plate it, finish it and establish timelines. You've got to learn how to package and use RFID [radio frequency identification] tags. All that stuff, it's just another thing to manage." However, he added that "you can't manage all the documents needed to run a high-tech business without the latest information technology."

Regarding overseas competition, he said, "I'm a realist. I've traveled all over

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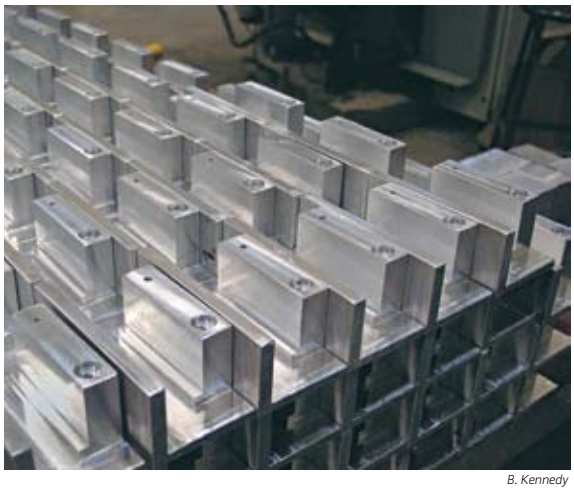
Machinist Paul Musulin (left) and Chris Swank, shop supervisor, inspect mounting brackets at C&C Tooling.



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**These aluminum mounting brackets for machine guns are machined at C&C Tooling.**

the world, know what the Chinese threat really means to manufacturing, how poor the quality is, but also the potential for the quality to be very good. I believe that American manufacturing has to stay on top of its game, especially for the Department of Defense."

## Finding Work

After it learns about the defense procurement system, a shop can figure out ways to find work. For example, Penn State Tool & Die Corp., North Huntingdon, Pa., is a manufacturer of complex military components. Its president and director of operations, Ralph E. Ciacco, checks the Web-based Defense Daily Network to review "bluetops," large contracts placed with companies such as Northrop Grumman, Raytheon and Lockheed Martin. "We'll see a huge contract for some particular piece of equipment and ask ourselves, 'Is there anything there that fits what we do?' Detail is limited due to security purposes, but if they are building another Virginia class submarine, we know what parts are ours, and we know how it works."

Ciacco said contracts vary in their documentation requirements. "We do nuclear-related work that requires history and much paperwork. For everything you do, there are hard, rigid guidelines." Other military work, however, requires less documentation. "The requirement might be just MIL I45208, a certain inspection method," he said. "As long as you have a system and control in your inspection, you are qualified." However, Ciacco added that "ISO is pretty much a prerequisite."

John VanKirk, NCDMM president and executive director, agreed. "A lot of shops will tell you, 'My customers don't require a certified quality system, so I don't need to be ISO certified.' But if you talk to large defense OEMs, they'll tell you they cannot find enough qualified suppliers. Small shops can find work but they are creating a huge blind spot for themselves. Small shops need the latest technology to be globally competitive and should have a certified quality management system to expand their customer base. If you get ISO certified, they will come."

Philosophical and political considerations aside, military part making is a type of manufacturing that will stay in the U.S. "You are always going to have an enemy," said NCDMM's Blackham. "It doesn't matter what generation, there is always going to be somebody that doesn't like us, wants to hurt us and do something to America. We have to be vigilant and ready to defend our freedom." CTE

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