JULY 2016

National DEFENSE

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F-22 Restart Faces Obstacles

Military Truck Market in Slump

Critical Test Ahead for Future Marine One

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■ The good news is that the first batch of Army and Marine Corps joint light tactical vehicles is slated to begin rolling off production lines this fall. The bad news is that military truck makers anticipate few other new-start programs.

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■ The Navy's first stab at replacing the presidential helicopter known as Marine One ended with a cancelation after years of delays and cost overruns. The service says it has learned from its mistakes and a new fleet will begin to be fielded by the end of the decade.

Cover: Sikorsky concept art

The Raptor 36

■ Congress wants to know what it would take to restart the F-22 production line, but analysts say there are many hurdles to overcome. The cost is just one of them.

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BPA WORLDWIDE

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DEFENSE

By Craig R. McKinley

Foreign Military Sales More Vital Than Ever

Recently, the House Armed Services subcommittee on oversight and investigations asked the National Defense Industrial Association to offer its perspective on foreign military sales (FMS).

Senior Fellow in Residence Tom Davis, along with Remy Nathan, vice president of international affairs at the Aerospace Industries Association, appeared before the subcommittee to provide some observations.

As Rep. Vicky Hartzler, R-Mo., chair of the subcommittee said in her opening statement, "It is vital to provide the opportunity for our allies to acquire military equipment and services to bolster their security needs. It's also important to note the benefits the United States realizes from our allies' collective safety, especially as threats to democracy and freedom expand."

As many have observed, the process by which FMS and commercial direct sales of military equipment to international customers are reviewed and approved by the U.S. government has grown complex and cumbersome. In the government itself, there are numerous stakeholders involved in the process including Congress and the Departments of Defense, State and Commerce. Defense and State essentially review items from the perspective of defense capability and strategy, and how a sale would further U.S. interests. Commerce reviews sales from the perspective of the transfer of technology that might have a dual-use capability, essentially a commercial item that could have military applications.

As Hartzler noted, "Some believe the Department of Defense's FMS process is too cumbersome and bureaucratic. Others offer that the process is designed to be deliberately slow and methodical in order to achieve the correct outcome in determining whether or not the U.S. supplies military capabilities that appropriately further U.S. national security interests."

For a company seeking to make an international sale, navigating through this thick undergrowth of rules, regulations and players can potentially take two to three years as the sale is reviewed from numerous perspectives. Not surprisingly, the various review organizations can have very different views on the appropriateness and merits of a potential sale, and although one agency may be signaling to the provider that the sale will be approved, another agency may simultaneously be preparing the case against it, which is sometimes unknown to either the other agency or the company.

Various efforts have been undertaken to make U.S. international sales simpler. Some, including the review of the restrictive Munitions List, have been useful. However, many have reported that the movement of items from the State Department controlled Munitions List to the Department of Commerce controlled Commerce Controlled List has resulted in an increase in the number of controlled items, with some being described in such detail that it is often unclear if a particular product is covered or not.

One effort underway that holds much promise is the Defense Exportability Features Pilot program intended to incorporate technology protection features into items that have a high-probability of appeal in the international market. This pilot was approved in the fiscal year 2011 National Defense Authorization Act, and the Defense Department's undersecretary for acquisition, technology and logistics now has identified 15 programs to participate in it. But the effectiveness of this effort is still to be determined given its "pilot" status.

There are many reasons why this is an important issue deserving of review and procedural restructure. In economic terms, U.S. aerospace and defense sales abroad represent the nation's third largest gross export earner. In short, such items account for considerable foreign earnings, which helps mitigate the trade imbalance that has grown over the years. Efforts that make international sales easier will, therefore, have a most positive effect in economic terms.

Also, from a military perspective U.S. forces are better positioned to operate with other nations in alliances or coalitions when their equipment is interoperable. If partners use American-produced equipment, particularly aircraft and major ground systems, operational compatibility is assured. In certain regions, the United States must be conscious of the local balance of power, and in many cases it will want to be sensitive to providing equipment having the most up-to-date capabilities equal to what it provides its own forces. Having partners who can magnify U.S. capabilities will always be militarily desirable.

Finally, alliance and coalition partners that use major U.S.-made items will inevitably develop closer relations with the American military, its industry, and through them with the American people. The connection enhances both military and personal relationships having secondary — and often tertiary — effects that are positive. And the industrial connection, providing long-term product sustainment has much the same result. In other words, U.S. military equipment sales overseas are like a pebble tossed into a pond: the splash is less important than the wider ripples that emanate from it.

At the hearing, Rep. Martha McSally, R-Ariz., a retired Air Force officer and former fighter pilot, stated that she viewed international sales as a key element of American "soft power." In that regard, I could not agree with her more. But as Davis pointed out, if the United States does not have a process that can quickly meet the often near-term needs of foreign customers, someone else — having a much shorter approval cycle and interests possibly at odds with ours — will step in and meet the need.

International sales of military items are clearly in the national interest, and as the world becomes more complex and volatile, this dimension of U.S. foreign policy will become increasingly important.

In addition — but of secondary concern overall — as domestic budget cuts have reduced U.S. defense modernization efforts, international sales have become relatively more important to the major players of the defense industrial base. Any way one looks at it, this is an area of great importance.

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 By Sandra I. Erwin

DoD Must Explain Why It Needs IP Rights

It's a question that contractors must answer before they compete for Pentagon work: Do I want to risk losing control of my intellectual property?

The battle over "rights in technical data" in defense contracts has been unfolding over many years and all parties are now stuck in a regulatory quagmire. The Pentagon has been blasted by tech executives for demanding unreasonable rights to IP that companies fear will get into their competitors' hands. Defense officials argue that, in order to have competition in the market, they need to be able to build and modify weapons systems without being legally bound to a specific vendor.

Amid the back-and-forth over IP rights, executives and Pentagon officials have pleaded their cases on Capitol Hill, asking Congress to legislate a way out of the impasse. The result has been a succession of IP provisions almost in every one of the past five National Defense Authorization Acts. Some call on DoD to be respectful of private sector rights to data and compensate vendors appropriately, especially as it seeks innovative suppliers to help modernize outdated defense systems. Other provisions seek to protect the government from being fleeced by companies that demand to be paid for intellectual property every time a piece of software is updated.

Nobody knows where things go from here. For now, defense contractors continue to hire more IP attorneys, and the Pentagon continues to rewrite procurement regulations in an effort to keep up with the onslaught of NDAA dictums.

To bring some sanity to the IP debate, the 2016 NDAA directed the defense secretary to convene a group of government and industry experts — including traditional defense contractors and commercial firms — to "review existing laws regarding rights in technical data."

The 16-member group, led by former Pentagon acquisition official Richard Ginman, has to examine current technical data rights law — U.S. Code Title 10, sections 2320 and 2321 — that serves as the legal basis for deciding whether the Pentagon is entitled to technical rights to products that it is buying for military use. One immediate problem with the current law is that it was written more than 20 years ago — when software was an afterthought in military systems. Many, if not most, defense IP disputes today stem from rights to software code.

The panel also has to examine the Pentagon's own regulations for the acquisition of technical data and the rights to use, modify or disclose technical data.

"We owe it to Congress to be clear," Ginman said at the opening meeting of the advisory panel June 7. "We need to articulate what we need technical rights for, and why."

DoD managers often have a hard time explaining the reasons why they must have rights to a company's data, Ginman said. They often ask for the rights to an entire system's technical data even if only portions of it are really needed.

Defense procurement regulations require that programs have an "IP strategy," although that has been difficult to implement, Ginman said. There is little guidance available, and the Pentagon is increasingly under pressure to work with nontraditional tech companies that generally refuse to do business with the Pentagon if IP issues in any way compromise their ability to sell to commercial buyers.

"We do need additional training," said Army acquisition official Roger D. Hamerlinck, a member of the advisory panel. The Pentagon is working with the Defense Acquisition University and other agencies to expand access to training and provide guidance on IP strategy, but it is difficult, he said. "We have found you almost have to be a patent attorney to understand the issues."

The majority of IP concerns now come from maintenance depots, where managers are finding that they cannot compete repair and upgrade contracts because the equipment's original manufacturer will not authorize use of technical data. Part of the IP strategy that DoD wants would set a fair price for that IP so the Pentagon can acquire the rights upfront. A lot of the maintenance work these days is very software intensive. The pressure is on depots to determine what specific rights they need to get the maintenance work done.

In a sector that is dominated by single-source manufacturers, the Defense Department needs "rights in technical data" in order to compete the aftermarket work. When the Pentagon buys a weapon system, it retains unlimited rights to the data if the item was designed with government funds. When a product is financed by a private company, the firm keeps full control of the intellectual property and the government is simply a buyer.

As the Pentagon in recent decades has become more dependent on the private sector for high-tech equipment, it now realizes that many of the existing arrangements restrict the government from seeking competing bids for maintenance or production of that equipment unless the manufacturers grant data rights. For most suppliers, that equates to killing the goose that lays the golden eggs.

"Most of the issues in the field are about software," defense procurement expert and industry consultant Jonathan Etherton told National Defense. When technical data rights laws were written in 1995, he said, software was not a big issue. In a rapidly changing market, DoD and the Hill have "chiseled away at these statutes" to fix problems piecemeal. The question now is whether the statutes still work, "Or do we need to make issues around software more explicit?"

The NDAA language keeps changing in the absence of broader guidance, Etherton said. Congressional staffers hear complaints from Pentagon officials or industry executives and put language in the bill, which sometimes they have to go back and redo. "That's not the way to do this," he said. "We can't have people running to the Hill every time there are disagreements and persuade staffers to slip language into legislation."

The advisory panel's final report and recommendations are due Sept. 30.

Email your comments to serwin@ndia.org

DARPA Innovations

I am writing regarding "DARPA Pursuing Technologies to Help Troops ID Enemies," which appeared in the May edition of National Defense.

When I read about the precision engagement part of the Defense Advanced Research Projects Agency's Squad X Core Technologies initiative, I was, at first, glad to learn more specifics about the program.

Then, I found myself asking, has DARPA chosen the best mix of weapons, and are guided munitions the best approach, or is there another approach that has greater potential to provide more decisive capabilities for an infantry squad? A goal of any precision-guided munition is to achieve the desired effects with minimal expenditure of ammunition.

The M2 is a rapid fire system, so adding guidance would seem to be inefficient, unless one were to change the operating system of the weapon to, say, a single shot or very short burst. Adding guidance to the M3 Carl Gustav would create a Javelin-like system. Could the Army defend such systems with overlapping capabilities?

And 40mm grenades fired from the M320 and other systems are not inherently stable or accurate, and its relatively high angle trajectory is not ideal for precision guidance.

All of these approaches require sophisticated fire control, and one has to wonder if the Army could afford new, costly, guided munitions. Perhaps there are better approaches. The other parts of Squad X, if successful, would provide critical information on location and disposition of "friends."

With angular and distance data from fire control systems, including squad weapons and other sensors, locations of "enemies" could be computed. At that point the squad and elements above the squad could call for fire from such assets as other squad/unit members, precision guided mortars and artillery, manned and unmanned aircraft, etc. The concepts of sharing tactical information and handing off targets are not new. Such concepts were explored in the Rapid Force Projection Initiative and Future Combat Systems. What is new here is the chance to start at the squad level and build up, instead of a top-down approach.

There is also the potential of integrating cutting edge technologies. The XM25, which is scheduled for a production decision just this year, is the first smart, squad-level weapon ever to be fielded. An enhanced XM25 fire control could take target information as described above, to make it even more deadly.

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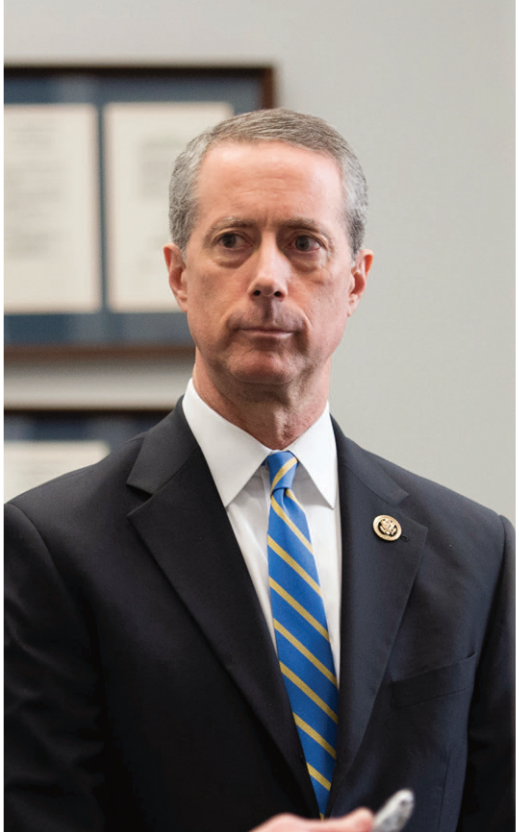
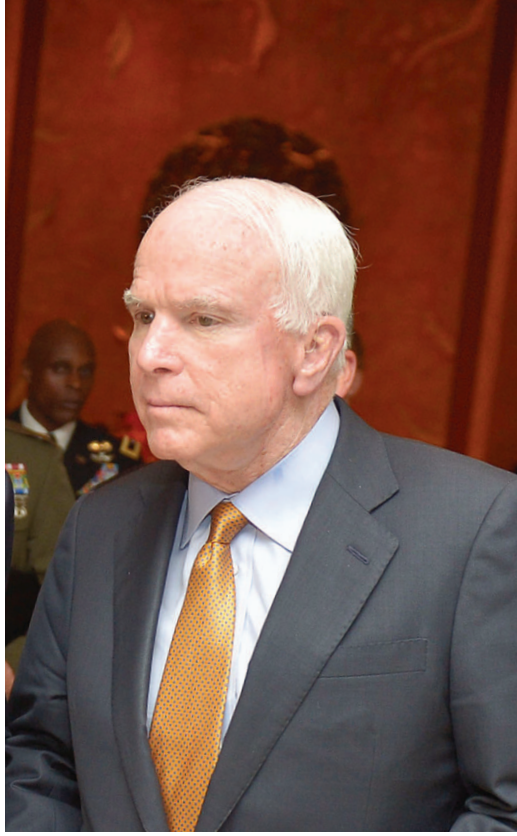
Budget Matters By Jon Harper





War Funding Battle Could Rage Into Next Year

The controversy surrounding overseas contingency operations funds has pitted the White House, Senate and House of Representatives against one another. The political battle over OCO accounts might not be resolved until the next administration takes office in 2017, a leading budget analyst said.

The House version of the fiscal year 2017 National Defense Authorization Act diverted $18 billion in war funds for base budget projects such as readiness, higher force levels and additional weapons procurement.

To adhere to spending levels agreed to during a previous budget deal, the legislation would only fund ongoing war efforts in Afghanistan and elsewhere for seven months. Republicans on the House Armed Services Committee appear to be banking on the assumption that the next president and Congress would be compelled to pass supplemental war funding next spring.

"The legislation seeks to ensure that we do not deploy troops who are not fully trained, whose equipment is worn out and who did not get the resources they needed back home to be ready to face our enemies overseas," HASC Chairman Rep. Mac Thornberry, R-Texas, said in a press release after the full House passed its version of the NDAA in May.

The Obama administration has threatened to veto any NDAA passed by Congress if it includes the House OCO provision.

"By gambling with warfighting funds, the bill risks the safety of our men and women fighting to keep America safe, undercuts stable planning and efficient use of taxpayer dollars, [and] dispirits troops and their families," the Office of Management and Budget said in a statement.

Todd Harrison, director of defense budget analysis at the Center for Strategic and International Studies, said the veto threat is credible, noting that President Barack Obama previously vetoed an NDAA over a disagreement with Congress about OCO funding.

"I don't think this scheme will likely get through and get signed into law by this administration," he said. "But this administration will be gone on Jan. 20."

On the Senate side, Sen. John McCain, R-Ariz., failed to pass his amendment which would have added $18 billion to the Senate version of the NDAA on top of the $59 billion that the Obama administration requested for OCO.

To still have a chance of becoming law, Thornberry's provision would have to survive a conference to reconcile the House and Senate versions of the NDAA. It's unclear how that process would play out, Harrison said.

"In the horse trading that happens during conference, I think it's going to be pretty unpredictable to know what the House gets to keep and what the Senate gets to keep, and this could very well be one of the issues that's traded," Harrison said.

The House and Senate versions of the legislation take different approaches to major policy areas such as acquisition reform and military health care reform.

OCO funding "could get tied into negotiations over many other issues," Harrison said. "There are likely to be a number of big disagreements."

If Thornberry somehow gets his way, it could hand fiscally conservative Republicans a difficult dilemma next year, he noted.

"If it's a Democratic administration and if Democrats control the Senate, that [supplemental war funding bill] will be a must-pass piece of legislation and [Democrats] may decide to tack onto it additional non-defense spending," Harrison said. "That would put Republicans in the House in a really tough position because do they really want to be voting against actual war funding in a bill … because of whatever else the new administration might tack onto it?"

DEFENSE DEPT. PHOTOS

Cargo Screening Costs Could Skyrocket

■ Complying with a mandate to scan all incoming cargo containers at overseas ports before they reach the United States would cost the Department of Homeland Security an estimated $22 billion to $32 billion over a 10-year period, vastly more than current screening procedures, according to the Congressional Budget Office.

Approximately 12 million shipping containers enter U.S. ports each year, CBO noted in a recent report, "Scanning and Imaging Shipping Containers Overseas: Costs and Alternatives."

To protect against potential nuclear weapons threats, Customs and Border Protection — a DHS agency — scans all containers with a passive radiation monitor. Those deemed high risk — usually about 5 percent — are more closely inspected with X-ray or gamma-ray imaging systems. The agency opens and examines containers if the images suggest that the cargo is potentially dangerous.

To enhance security, lawmakers mandated that DHS use both radiation detectors and imaging systems overseas on all U.S.-bound containers before they leave port. The deadline has been extended multiple times and DHS now has until 2018 to implement the change.

The necessary equipment would have to be installed at the 453 foreign ports in 130 countries that load containers onto U.S.-bound ships. If the number of inbound containers grows at 2.5 percent per year, CBO estimates that implementing and operating such a system would cost between $22 billion and $32 billion in 2015 dollars over 10 years, depending on the type of technology used.

In comparison, if CBP continued to use current procedures to image about 5 percent of inbound containers at U.S. ports, the agency would spend only about $1.3 billion on screening efforts during the same 10-year time period, the report said.

Paying for the comprehensive system implemented overseas would require an increase of 17 percent to 25 percent in the agency's total budget or an increase in fees assessed on shippers, the report said.

The cost of that approach could be much greater if other countries began to require the U.S. government to scan and image all containers leaving the United States, which DHS does not routinely do. Under that scenario, the total costs could roughly double, rising to $37 billion to $63 billion, CBO estimated.

"How much those steps would reduce potential smuggling of nuclear weapons or materials into the United States is not clear," the report said.

The planned security measures do not address other paths that smugglers might use, such as land crossings from Mexico or Canada, tunnels under the border or non-commercial ships, the report noted.

"Those alternative paths could become more attractive if the United States sharply increased scanning and imaging of containers," the report said.

ISTOCK, NAVY

Analysts: More Money Needed to Boost Navy Fleet

■ As the Navy considers whether to increase its force structure requirements, analysts said the service would need billions of dollars in additional funding each year to grow and maintain a fleet sufficient to deal with potential threats.

The Navy's latest assessment calls for a fleet of 308 ships. But the sea service is undertaking a new review to see if that force level would be enough in a different strategic landscape.

"We're on track to meet that number of 308 ships," Adm. John Richardson, the chief of naval operations, said at a conference in February after the fiscal year 2017 budget request was released. "But even that assessment is a little bit old. The last time we did that … we really didn't have to account for a resurgent Russia. We really didn't have to account for [the Islamic State]. And so we're starting again."

The force structure assessment is expected to be completed this summer.

"Some observers believe this new [assessment] will result in an increase in the Navy's force-level goal to a figure higher than 308 ships, in part because it will call for an increased Navy forward-deployed presence in the Mediterranean, a region that was deemphasized … during the post-Cold War era," naval specialist Ronald O'Rourke said in a recent Congressional Research Service report.

Beefing up the fleet to deal with an increasingly assertive China and Russia would require a big boost in the shipbuilding budget, analysts noted.

"The Navy said they needed 308 ships, which is going to require $3 billion or $4 billion more per year [over the next 15 years] than they're receiving today," said Bryan Clark, a senior fellow at the Center for Strategic and Budget Assessments, and a retired Navy officer.

"If you add on these additional requirements from the new great power challenges … that [ship level] requirement is likely to go even higher, which means even more money is necessary if you want to maintain the fleet size that is going to produce sustainable deployments," he said during a recent conference call with reporters.

Retired Navy officer Bryan McGrath, deputy director of the Hudson Institute Center for American Seapower, said the service needs about 350 ships to project power in the Asia-Pacific, Europe and Middle East, and fulfill maintenance needs for vessels that aren't on deployment.

Despite budget constraints, McGrath believes the Navy can get the funding it needs if future administrations push for it.

"The dirty little secret is that the Congress of the United States gives the Navy year in and year out virtually every penny that it asks for," he said. The problem is that administrations, as they try to do their job of balancing all of the other requirements, they hamstring" the Navy.

Email comments to jharper@ndia.org

By Stew Magnuson

Want a Secure Border? Open Up the Coffers

Watching the recent House Homeland Security subcommittee hearing on border technology brought to mind the oft-quoted Yogi Berra axiom: "It's déjà vu all over again."

There sat Mark Borkowski, Customs and Border Protection's assistant commissioner and chief acquisition executive, testifying before the subcommittee on border and maritime security and explaining why the latest program to deploy technology on the Arizona border is behind schedule.

Before him, members of Congress wanted to know why technology — and the billions of taxpayer dollars spent — hasn't stopped illegal migration and drug smuggling in Arizona.

And to be clear, it's Arizona, not the southern border writ large. California, New Mexico and Texas always get the crumbs when it comes to border technology. The idea is to test sensor towers in Arizona, and spread them to the other states after it's a proven technology. There are two problems with that: after 25 years of trying, it hasn't been proven yet, and it will cost billions of dollars to expand it if it ever does.

Borkowski has been at CBP for 10 years now. He was hired in 2006 to clean up the mess known as the Secure Border Initiative and its so-called virtual fence and to replace it with something less expensive and workable. After a decade at CBP, Arizona still doesn't have a proven sensor system that could be expanded to other states.

The latest attempt, the Arizona Border Surveillance Technology Plan and its Integrated Fixed Towers, won't be fully operational in Arizona until 2020 because of "significant funding shortfalls," GAO reported in May at the hearing. That's a telling statement.

Two series of questions from committee members pointed to a major disconnect between lawmakers and the executive branch, and a good reason as to why a virtual fence may never happen. One came from the chair, Rep. Martha McSally, R-Ariz., who came to Congress after serving in the Air Force as a combat pilot. "As I was flying my A-10, I'm actually talking to guys on the ground that are seeing what I'm seeing on my targeting pod, so their situational awareness has increased," she said. She wanted to know why Border Patrol agents didn't have the same kind of common operating picture linking sensors to the boots on the ground.

Rep. Mike Rogers, R-Ala., wanted to know why tethered blimps carrying sensors that are deployed on the Texas border weren't being more widely used. The blimps are Army surplus items and free to CBP, after all.

Both answers came down to funding. Bureaucrats testifying before Congress can never say: "We simply need more money." But that's what it will take to make significant improvements to secure the border. And that's all it will ever be: improvements, never a fully secure, 100-percent airtight border in which no one could ever hope to cross. That's a fantasy.

National Defense has traveled to the southern border four times and the northern border once to investigate how technology is employed there and to witness firsthand the challenges Border Patrol agents face in remote areas. That includes visits to command-and-control centers, fixed towers, crawling into a smuggling tunnel and riding along with the Coast Guard and CBP as they patrolled border waters.

Those demanding that the border be secured should first define what that means and then be realistic about the costs and the results.

Congress in the years following 9/11 clamored for a border wall and fencing that would extend hundreds of miles. Once the GAO produced the cost-per-mile estimates for not only building it, but maintaining it, the clamoring abruptly stopped. The appropriators in Congress never signed that check. And that was when the nation seemed to have an unlimited amount of funds for security. These are different times.

A concurrent idea was to fill in the spots where there was no wall with technology. Plans were made for dozens of Predators to fly along the borders. Then came the DHS inspector general report on the cost-per hour to fly and maintain them. That halted those plans.

A series of integrated fixed towers would also feed a common operating picture to agents in their vehicles. That was known as SBInet. Congress funded it and CBP paid Boeing $1.1 billion to carry it out. That program, after years of delays, eventually produced a few working towers, but it was canceled because expanding the system would cost too much.

That brings it back to McSally's question. Borkowski had to give her a history lesson. SBInet once had aspirations to provide real-time, live streaming video to agents in vehicles, but never could because there was no communications backbone in place in the remote Arizona desert. The Verizons of the world aren't interested in building their 4G networks in such places, and Congress wasn't about to pay for such an expensive undertaking. It's the same issue a decade later: bandwidth, Borkowski said.

As for Rogers' question, there are more free Army surplus blimps available, but it costs $3 million per year to operate each one. There are four in South Texas, costing $12 million per year to run. Chump change for the military, but a lot for CBP.

The U.S. land border with Mexico is 1,989 miles long. How many blimps, fixed towers, mobile towers and Predators will it take to cover every mile of the southern border 24/7? How much territory each can cover is classified, so let's take that $3 million per year, say it's 10 miles, divide the miles and multiply. Rounding up, that's $6 billion per year just to operate and maintain southern border sensors, which is roughly half of CBP's annual budget.

Then there is the building and the O&M costs for a physical wall being proposed — a whole different story — salaries and benefits for more than 61,000 CBP and Border Patrol personnel ($7 billion proposed for 2017), CBP's air and marine operations and its boats and airplanes. And don't forget the northern border — because Congress members from Michigan sure won't. It's easy to see the bill running far beyond the nation's willingness to pay for it.

Borkowski will be back to testify before other committees, and it will be déjà vu all over again.

Email your comments to smagnuson@ndia.org

Ethics Corner By Robertson T. Park and Timothy P. Peterson

Small, Mid-Sized Firms Face Ethics Hurdles

Industries, and the companies which operate within them, adapt to changing market conditions. Companies that fail to heed this central tenet of business management often fail.

The extractive industries adapt to changing consumer demands on their products, and they go wherever the natural resources are to be found. Pharma looks for new markets for its products, which can result in product driven expansion or a movement of sales emphasis more generally to where growth opportunities exist.

Transport looks to newer and growing urban markets, where the investment dollars exist for large transit infrastructure programs. The defense industry is no different, and time has shown that it responds quickly and intelligently to changing market forces and demands. Increasingly, this has required looking into new and often opaque international markets.

The largest defense contractors have significant personnel and administrative resources devoted to meeting changing industry demands. They have people in place to assess changing markets and they have developed methods of redeploying their resources to meet the new demands. They also have legal, compliance and risk personnel who are positioned to navigate these changes and to protect the company from the new risks, which may attach to the new markets or market conditions.

Risk assessment is effectively the genesis of all intelligent compliance programs, and risk must be reassessed when the company and its markets change.

Smaller and mid-sized contractors may not have the luxury of these legal, compliance and risk resources when market conditions change for them, but they face the same potential legal, regulatory and enforcement risks. The risks and associated consequences may even be greater in fact, because while a large company can absorb the costs of regulatory or enforcement inquiries, these costs and the business disruption they create can be critical to a smaller company. They can in fact put the smaller company out of business.

These concerns are ripe for smaller and mid-sized defense contractors as today's markets increasingly move into more and more diverse and challenging overseas markets. Here, the risks of corruption, financing, cybersecurity, privacy and other laws may become more immediate, and it is not good to ignore them or look the other way. Smaller companies must not simply plan for how to take advantage of new international markets, they must also determine how best to position themselves against the new risks.

No amount of effort, whatever the size of a company, can completely insulate it from bad things happening. But regulatory and enforcement authorities expect effort and they will look for best practices. This does not mean that a contractor with 200 employees will be expected to have the same compliance systems and procedures as Lockheed Martin or Raytheon, but there must be a system and it should be right-sized and developed to meet the risks that a small or mid-sized company reasonably expects to face.

The defense industry in particular finds itself midstream in efforts to adapt to the constant evolution of rules and regulations which apply to their markets; to whom can you sell and what can you sell. The new international markets, more and more, are not the traditional and familiar ones, and they are often markets with particular and identifiable risks.

Contractors must show that they have made their own intelligent risk assessment of the challenges they face, and put in place policies and procedures that address those risks. As noted above, this does not mean that the policies and procedures must be burdensome or address every potentiality, but they must be developed to meet a contractor's particular risks.

The simplest steps are the best. Does the company have a code of conduct, and one which addresses the specific risks that it faces? Is it written in plain English, and does it indicate clearly the company's expectation for ethical and honest conduct in all operations? Is that message delivered firmly and transparently by senior management?

If the contractor operates, or expects to operate in markets with substantial corruption risks, are the Foreign Corrupt Practice Act or U.K. Bribery Act proscriptions against making or offering payments to get or retain business spelled out? Is the Code of Conduct translated into additional languages where necessary for non-U.S. employees? Is training on the Code of Conduct routine and freshened when the Code is revised to address new issues? Are there sufficient resources devoted to legal, risk and compliance support?

The difficulty is negotiating an approach to anti-corruption, money laundering, cybersecurity and other risks in light of all the additional concerns facing a contractor. For example, are there systems in place to warn of a cybersecurity breach, and would systems contain such a breach? Do internal controls take into account local data privacy laws? How do such restrictions affect information flow across the contractor's systems? How are suspicious transactions flagged, and who is notified? Is the contractor in jurisdictions where blocking statutes, state secrets restrictions, or other access or data laws would inhibit an internal investigation?

As smaller defense contractors adapt to changing international markets, and in particular look for new customers, it will often lead them to new countries that have increased corruption, money laundering and security risks. They must plan not just for the new personnel they will need to sell or manufacture their product, but also for implementing best practice policies and procedures which address the new risks. Contractors that take the simple steps and create a record of having taken seriously their legal and compliance responsibilities will be best positioned to operate successfully in the new markets.

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End of Vietnam Arms Embargo May Open Doors

President Barack Obama's recent announcement to overturn a decades-long arms embargo with Vietnam has opened speculation about potential business opportunities between U.S. defense contractors and the Asian country.

However, Vietnam may not be rushing to place many American orders despite a burgeoning defense budget, said Ben Moores, a defense analyst with IHS Jane's.

Vietnam's defense expenditures have been steadily on the rise over the past five years, he said.

"Their budget was about $2.4 billion in 2010, and if we look at this year, it's $5.8 billion, and it's going to be increasing," he said. By 2020, the budget will rise to $7.5 billion and by 2026, it will be $9.6 billion, he said.

While that's not all going toward procurement, Moores estimated that Vietnam has about $13 billion of un-awarded contracts to spend over the next decade. Items that the Vietnamese have committed to purchasing over that timeframe include tanks, fighter jets, long-range radars and early warning aircraft.

"Based upon historic precedent, about $10 billion of that will be awarded to foreign companies," but it's unlikely that they would turn to the United States to supply many of those needs, he said.

For example, the United States doesn't have a tank or new fighter jet program that would meet Vietnam's requirements, he said. "But if you look at attack helicopters, long-range radars or maritime patrol aircraft, those could all be good fits for the States."

Vietnam could purchase a refurbished P-3 Orion, Moores speculated. "But they might go European," with a Spanish CN-235 Persuader. Additionally, it could opt for Lockheed Martin's FPS-117 radar system or choose an Italian model.

Tactical helicopters are an area where Vietnam would not be able to afford a new model, but might be interested in refurbished Black Hawks. The country could also reach out to U.S. contractors for missiles, electronic warfare gear or corvette warships, Moores said.

Currently, the nation buys 80 to 82 percent of its equipment from Russian manufacturers. However, it may not want to continue doing so because China also buys systems from Russia.

"They don't want to buy Russian gear, because the Chinese are so familiar with it," Moores said. Recent orders from Russia include frigates, PS-800 Onik anti-ship cruise missiles, Mil Mi-17 helicopters and Kilo-class submarines, he said.

Obama's announcement to lift the ban on lethal military equipment sales to Vietnam came during the president's visit to Hanoi in May. While he emphasized that it reflected a continuing normalization of U.S.-Vietnam relations since the Vietnam War, many see it as a response to China's growing presence in the South China Sea.

Though military sales to Vietnam remain uncertain in the short term, Obama did announce more than $16 billion in new commercial deals. Boeing will sell 100 aircraft to private airline Vietjet, while aerospace company Pratt & Whitney will sell advanced engines and General Electric Wind will partner with the Vietnamese government to develop more wind power technology.

"Deals like these are a win for both of our countries — helping to fuel Vietnam's economic growth and supporting tens of thousands of American jobs," Obama said.

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ISTOCK

Three-D Video Game To Train LCS Sailors

■ Cubic is preparing to deliver a littoral combat ship training video game to the Navy that will give sailors a 3D-view of the ship to help them learn faster, company officials said.

The system — known as the immersive virtual ship environment — includes dozens of missions and can help reduce the time it takes to train a sailor, said Bill Toti, then president of Cubic Global Defense, who recently left the company.

"This is a massive program," he said. "Most video games operate somewhere between 10 and 15 levels. You get to the 10th level and you've mastered the game. If this were a video game, it would have 200 levels."

Training with the program is more efficient than traditional coursework and it is self-paced, Toti said. "The fast learners learn quickly [and] the slow learners who need more time can take more time, and when they are done they have a substantially better level of knowledge than with the traditional methods of training."

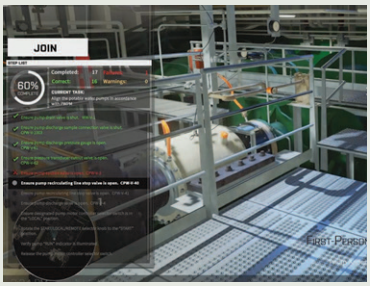
Additionally, the training can be done on a laptop or tablet, reducing the need for brick-and-mortar schoolhouses, he said. On average, it can take sailors a year to learn everything the program teaches using traditional methods. With the immersive environment, it takes six months or less, Toti said.

"It's a no-brainer. This is the way we should be training 21st century sailors," he said.

One lesson, for example, takes sailors on a tour of all of the LCS' engineering spaces.

Cubic will be able to add new missions to the program as needed, said David Buss, the current president of Cubic Global Defense.

"We are constantly updating and changing hardware on ships," he said in May. "One of the biggest training challenges that we've had is when you make an update — you put a new pump in or you put a new electrical panel in or a new piece of equipment — how do you train to that?



"Here it's a couple lines of code and you've already updated your system," he said.

Cubic wants to take the technology developed with the immersive virtual ship environment and apply it to other military platforms, Toti said.

"We hope to penetrate the submarine community [and] the aviation community," he said.

A submarine variant of the program would likely have more levels than the LCS version because it is a larger vessel and has more systems, he said.

The company won a contract for the program in 2013 and final delivery is slated for the end of June.

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CUBIC GLOBAL DEFENSE/SYNTONICS LLC

Tethered Unmanned Aircraft To Boost Radio Networks

■ A prototype for a tethered high antenna unmanned aerial vehicle could offer improved network and communications to service members and public safety officers.

Bruce Montgomery, president of Syntonics LLC, a Columbia, Maryland-based radio frequencies technology company, said the high antennas for radio communications tethered drone would not only benefit combat troops, but could aid in ship-to-shore and search-and-rescue missions.

"It would even work for police and fire departments," he said. "For people that communicate within a line of sight, putting your antenna up 500 feet in the air is a huge deal."

The lightweight UAV is about the size of a basketball and flies an antenna for any ultra high frequency radio as high as 500 feet while troops keep their radio down below, Montgomery said. Tethered to both the ground and a power source via a slim cable containing an optic fiber and electrical conductors, the antenna can remain aloft for days.

An operator would simply have to press the "up" button to send the drone soaring, and the "down" button to bring it back to the ground. And while the tether is designed to withstand high winds, should it snap somehow, the unmanned aircraft will safely lower itself back to the ground, thanks to a built-in battery.

Since communications are transmitted via an optic fiber, the device is jam-proof, and its ability to reach 500 feet could make it more difficult to detect, Montgomery said.

A prototype displayed at the Special Operations Forces Industry Conference in Tampa in May could only reach 100 feet and used a manual tether, but a final product will be able to achieve the optimal height of 500 feet, and have increased frequency options, an automated reel system for the tether and a small camera.

"The camera will let small units survey their immediate vicinity," he said.

Syntonics will demonstrate the system for the Army in July, Montgomery said. The company will begin taking customer orders for the drone later this year, with an anticipated 2017 delivery period.

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NATO States Boost Maritime Security to Counter Russia

As tensions with Russia grow, the United States and its NATO allies are reinforcing their commitment to strategic issues, including maritime security.

In a brief by the Atlantic Council's Brent Scowcroft Center on International Security, titled "NATO's Next Consortium: Maritime Patrol Aircraft," analysts argued that it's time for NATO members to improve their high-end maritime capabilities in order to face multiple security challenges.

Russia's aggressive sub-surface tactics in the High North and Baltic regions — where it has boosted the numbers of submarine and intelligence-gathering ships — are only one part of the challenge, but one that deserves "special attention," the report said.

"NATO's maritime command also recently reported that Russian submarine activity in the North Atlantic now rivals that seen during the height of the Cold War," the report added.

During a May speech at the Center for Strategic and International Studies, Norwegian Prime Minister Erna Solberg said the NATO alliance, and particularly the U.S.-Norway relationship, was key to her country's national security.

"We need those countries that are like-minded to stand together in an insecure world," she said. "In practical terms, this means investing in our common security."

Norway has now increased its defense budget for the third time in three years, she said. The proposed 2016 government budget includes an increase of the defense share of Norway's gross national product to 1.5 percent, up from 1.4 percent in 2015, a near 10 percent increase adjusted for inflation for the country's armed forces.

Magnus Nordenman, an Atlantic Council analyst and deputy director for the Brent Scowcroft Center, said those investments would primarily be in readiness and long-term procurements, including the F-35 Lightning II and new naval strike missiles.

"In Europe, there's a dawning recognition that Russia can act very fast, and it's no longer possible to have this low-state readiness and you can react a month later," he said.

U.S. manufacturers might see opportunities as Norway looks to replace its aging P-3 Orion fleet. Norway's proposed defense budget includes $4.2 million to strengthen its patrols in the High North with P-3C maritime patrol aircraft, and $38.4 million for its Navy maintenance budget.

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Beacons Seen as Undersea Robot Navigation Aid

Unmanned underwater vehicles have become increasingly popular within the military, but finding ways to stealthily navigate undersea has been a perennial issue.

Draper Labs — operating under the Defense Advanced Research Projects Agency's positioning system for deep ocean navigation program contract that was awarded in March — is working in earnest to solve that problem.

The program is "intended to revolutionize navigation underwater like GPS did in terms of revolutionizing navigation above the water," said Neil Adams, director for defense systems at Draper Labs.

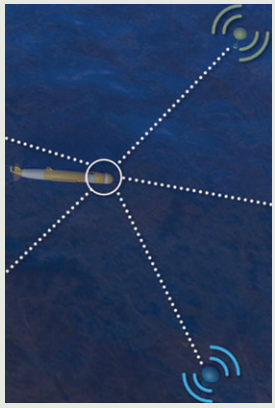
To remain stealthy, UUVs use inertial sensors to navigate underwater. However, during long missions these sensors can accumulate errors, rendering navigation systems inaccurate, Adams said.

"Inertial sensors … come in a lot of different varieties but the one thing they all have in common is that they have systematic biases in them," he said. "Their measurement sources drift over time and you need some external absolute source to discipline an inertial instrument."

Even the best inertial systems can't operate for extended periods of time without having updates to correct the drift, he said.

GPS is one way to bring a system back into line, he said. However, such signals are opaque underwater. "The only way you can use it for underwater operations really is to surface, get a fix and then submerge again," he said.

A potential solution could come in the form of a constellation of underwater antennas that can transmit accurate location data across the ocean using acoustic waves, he said. Sound waves can travel thousands of kilometers underwater and are a natural corollary to what GPS does in the air.



Beacons could serve as underwater GPS for unmanned systems.

"These beacons would be set up around the ocean basins," he said. An antenna would "know their location very precisely and they would be sending out signals much like GPS satellites do."

While Adams did not disclose a specific number, only a small quantity of beacons would be required to cover the globe. "We don't need to blanket the oceans with transmitters to do this," he said.

The first phase of the contract kicked off in April with Draper engineers "developing high-fidelity models of how the positioning signals will travel through the ocean," a company press release said. There will be at-sea experiments in January to verify those models, Adams said.

Phase two will begin in spring 2017 with waveform development. Within two years, Draper will start building a prototype beacon. Sea trials are slated for 2018, he said.

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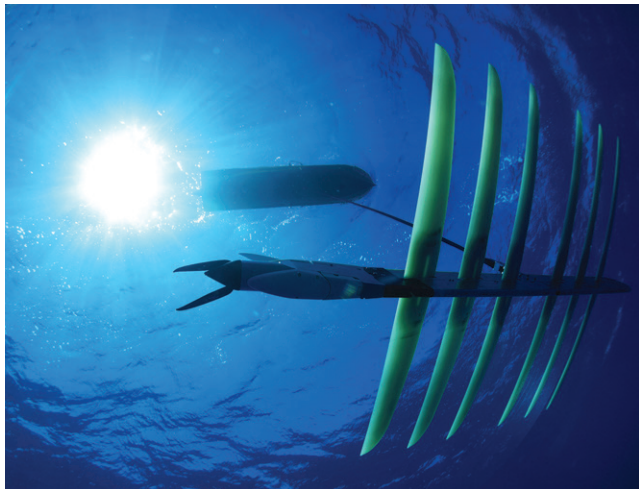
RU.MIL VIA WIKIMEDIA COMMONS/DRAPER

Drone Manufacturer Seeks International Contracts

Liquid Robotics, the maker of an unmanned surface vehicle known as the Wave Glider, is reaching out to countries around the globe for new business opportunities.



The Wave Glider uses renewable energy to stay afloat for a year at a time, said Gary Gysin, president and chief executive officer of the Sunnyvale, California-based company.

It can collect persistent intelligence, surveillance and reconnaissance information and can also connect with underwater drones or unmanned aerial vehicles.

"Our goal … is to be that surface level gateway between what's going on undersea and communicating to other assets, whether that be manned or unmanned assets," Gysin said.

There has been strong interest in the system abroad, he told National Defense.

The company has sold it to 15 countries worldwide and there are plans for expansion, he said.

Currently, many nations patrol their waters using expensive manned aircraft or ships, he noted. "Why not have a robotic fleet that's patrolling and [then] if you find something you send the expensive asset out to interdict?

"The problem is that a lot of these countries don't have the navies [or] the air forces that we have, and yet they have a problem either over fishing or refugees. There are all sorts of different things going on. They want to patrol their waters and know what's happening," he said.

The company has had success in Asia, he noted. It has sold systems to Indonesia, Japan, Thailand and Australia.

Over the last six months the country has increased its efforts in South America, which has homogenous concerns to that of many Asian countries, he said.

"Obviously anybody that has large territorial waters has similar issues," he said. "South America has … been a hot spot of drug running and also illegal fishing."

In April, Liquid Robotics entered into a partnership with Ingenieros Electrónicos Asociados, an Argentina-based supplier of oceanographic electronics and naval communications. The move will help Liquid Robotics reach out to customers in Argentina and Uruguay.

"They're a local reseller and we'll typically work with someone that is in country," Gysin said. IEA will help the company set up meetings and introductions, he said.

Liquid Robotics also has distribution partners in Chile, Colombia, Peru, Ecuador, Panama and Venezuela.

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LIQUID ROBOTICS

By Susan Booth Cassidy

Cyber Rule to Safeguard Contractor Systems

The Defense Department, General Services Administration and NASA issued a final rule May 16 to add a new subpart and contract clause to the Federal Acquisition Regulation "for the basic safeguarding of contractor information systems that process, store, or transmit federal contract information."

The focus of the final rule is on protecting contractor systems rather than specific government information. It imposes a set of 15 "basic" security controls for contractor information systems upon which federal contract information transits or resides.

Federal contract information is defined broadly as information provided by or generated for the government under a contract to develop or deliver a product or service. Federal contract information does not include either information provided by the government to the public, such as that found on public websites, or simple transactional information, such as that used for payment processing.

The vast majority of federal contractors will be subject to these requirements once they accept the new FAR clause.

Contracting officers are required to include this clause in "solicitations and contracts when the contractor or a subcontractor at any tier may have federal contract information residing in or transiting through its information system."

Similarly, prime contractors must flow the substance of this clause to subcontractors — except for commercial suppliers — if that subcontractor "may have" federal contract information residing in or transiting through its information systems. This rule is limited to basic safeguarding of relevant information systems, and there are no requirements to report cyber incidents to the government.

The rule does not excuse other obligations imposed on contractors for the safeguarding of other government information, including controlled unclassified information or covered defense information.

The final rule is only the first step in a number of interrelated regulatory actions being taken in the cybersecurity area. Last summer, the Office of Management and Budget published draft guidance intended to improve and clarify cybersecurity protections in federal acquisitions. OMB proposed direction to federal agencies on "implementing strengthened cybersecurity protections in federal acquisitions for products or services that generate, collect, maintain, disseminate, store, or provide access to controlled unclassified information on behalf of the federal government."

"Controlled unclassified" is defined as information that laws, regulations, or government-wide policies require to have safeguarding or dissemination controls, excluding classified information. The comments preceding the final rule explain that it is "intended to provide a basic set of protections for all federal contract information." A single FAR clause eventually will apply the full set of National Institute of Standards and Technology requirements on contractors that have controlled unclassified information on their systems.

The rule characterizes the 15 security controls as "comparable" to NIST controls. The full set of NIST 800-171 security controls are imposed on Defense Department contractors with "covered defense information" on their systems.

Presumably, contractors that are in compliance with DFARS 252.204-7012 will be in compliance with this new FAR provision. Contractors will need to consult with their info-tech experts and factor in any 800-171 security controls that the company does not presently meet given DoD's December 2017 implementation deadline.

The 15 security controls listed in the final rule are directed at protection of the information system, and none are devoted to perimeter devices, although some are applied at the perimeter of the system. They are:

- Limit access to authorized users.
- Limit information system access to the types of transactions and functions that authorized users are permitted to execute.
- Verify controls on connections to external information systems.
- Impose controls on information that is posted or processed on publicly accessible information systems.
- Identify information system users and processes acting on behalf of users or devices.
- Authenticate or verify the identities of users, processes, and devices before allowing access to an information system.
- Sanitize or destroy information system media containing federal contract information before disposal, release, or reuse.
- Limit physical access to information systems, equipment, and operating environments to authorized individuals.
- Escort visitors and monitor visitor activity, maintain audit logs of physical access, control and manage physical access devices.
- Monitor, control, and protect organizational communications at external boundaries and key internal boundaries of information systems.
- Implement sub networks for publically accessible system components that are physically or logically separated from internal networks.
- Identify, report, and correct information and information system flaws in a timely manner.
- Provide protection from malicious code at appropriate locations within organizational information systems.
- Update malicious code protection mechanisms when new releases are available.
- Perform periodic scans of the information system and real-time scans of files from external sources as files are downloaded, opened, or executed.

This rule represents only one step in a series of regulatory actions expected this year. Although it will apply to most contractors, the government views these requirements only as basic safeguarding that "prudent business persons" would implement on their systems.

Susan B. Cassidy is a partner with Covington & Burling LLP in Washington, D.C., and specializes in government procurement law.

Defense Innovation: Endemic Problem or Echo Chamber of Negativity?

DAVID B. GLEASON

Commentary **By John Kenkel and Andrew Jesmain**

The defense sector has been considered to be at the forefront of innovation. Microwaves, GPS and the internet are just a few examples of technologies incubated in the defense sector prior to widespread commercialization.

This viewpoint has changed dramatically over the years, with many currently pronouncing that defense innovation is dead, or at least on life support. Yet the defense sector's primary customer, the U.S. government, needs creative solutions more than ever. With that in mind, and contract research-and-development funding harder to find, defense executives need to be mindful about their approaches to driving innovation.

Dozens of reports have lambasted the defense industry for a poor track record on innovation. The sector has itself reinforced this view and been critical of itself, ranking low in poll after poll among industries with respect to successful innovation. Indeed, polling for PA Consulting Group's 2015 report, "Innovation as Unusual," demonstrated that defense executives, when asked "Which Industries Have the Most Innovative Leaders?" ranked their sector a distant nine out of nine.

With this in mind, are we facing an endemic problem, or just a negative feedback loop due to preconceptions from a sector-led echo chamber?

According to leading industry reports, the two major failures in the industry are a lack of market insight — including poor understanding of the competitive environment — and poor communication between the customer community and industry as it relates to innovation. As a result, the prevailing wisdom is that the Department of Defense, and by extension, its suppliers, have been ineffective at identifying and cultivating innovation.

Chief among those constraints is the reality that government has been the defense sector's "market maker." Whereas commercial firms can develop and market innovative offerings to create new markets independent of end-user demands, defense firms have little ability to do the same. As such, defense firms tend to view innovation through a lens of what the government wants.

This creates two sets of problems. First, industry has not been incentivized to create new ideas and must deliver solutions defined by the customer, who often lacks awareness or understanding of the array of solutions industry is capable of providing. The result of this paradox is a laundry list of programs and solutions that have been over budget, delayed or canceled outright. Second, this reality creates a sharp contrast in approaches to research and development that differentiates defense firms from their commercial counterparts.

Commercial firms often invest 10 to 20 percent of revenues into IRAD (internal R&D). In comparison, even cutting-edge defense firms spend only about 3 to 4 percent of revenue on IRAD, with many at 1 percent or less — and even that usually focuses on value added to existing capabilities.

Further, Wall Street and the investor community tend to measure return on investment based on large contract wins, rather than risks taken through IRAD. This means that firms seek to drive innovation more through acquisitions or partnerships rather than major internal initiatives. Risk in the industry is typically not rewarded by the City and the Street. This is in sharp contrast to commercial firms, which are often valued based on R&D pipelines or creative demand generation.

Because defense firms lack the ability to create new markets, they tend to chase contracted R&D. When firms have chosen to buck this trend and invest IRAD to advance novel concepts — particularly those not stated as government requirements — the result has often been an inability to generate demand, and thus a lack of realized value.

DoD's Defense Innovation Initiative, launched by Secretary Ashton Carter, aims to address some of these issues by evolving the department's relationships with defense firms while exploring new ones with small, innovative commercial firms on a parallel track. The Pentagon is also advancing its "third offset strategy," which offers a vision to "offset," or effectively neutralize, potential adversary attempts to erode U.S. technological advantage by investing where the defense industry has been overtaken by commercial technologies. Examples include artificial intelligence, man/machine interfaces, cyber

capabilities, wearable technologies and robotics.

DoD has earmarked $18 billion over the next five years to incubate these technologies and hopes to use entities like the Defense Innovation Unit – Experimental (DIUx) to form closer bonds with technology clusters around the United States.

But despite the rhetoric, the president's fiscal year 2017 budget request to Congress represents only 1 percent of funding for research, development, testing and evaluation. This suggests that Pentagon leaders believe they can drive defense sector innovation simply by engaging new players through such venues as the DIUx. While this may occur to some extent, it ignores the variety of issues unique to the defense sector, particularly the challenges faced by defense firms seeking to innovate without access to contracted R&D.

So far, defense firms have tried a number of strategies to innovate, including a desire to add greater commercial exposure where innovation is better rewarded, buy or import innovation through inorganic activities, or simply chase contracted R&D funds. But these strategies are not new, and are typically not enough to drive innovation in a meaningful way.

The defense sector sits at the nexus of capitalist market forces — profit, return on investment, revenue — and bureaucratic realities — slow moving acquisition regulations, profit limiting contract vehicles, political agendas. Going back to basic economics, markets work best under conditions of "perfect competition." Defense innovation often fails because the nature of its government customer makes the system inherently flawed. While Apple and Google succeed at innovation because of the same tenets that drive markets in general, the defense sector lacks a large number of buyers — disincentivizing buyers from fully engaging sellers — and "perfect information" between buyers and sellers.

In typical markets, no participant has enough market power to set prices, which is not the case with government acquisition. In fact, most would agree that the government is not a "rational buyer" as many budgetary decisions are based on political demand or programmatic momentum.

Current solutions to the innovation problem are not addressing the fundamental flaws in the system. The increase in dialogue between defense industry and commercial firms is no doubt a step in the right direction, but the government needs to do more to become a better buyer and advocate. To develop a true culture of innovation in the defense sector, the onus is on the government to re-evaluate policies and create channels of innovation that go beyond looking at commercial best practices. This is critical in a sector that is beholden to Federal Acquisition Regulations and operating in an environment where the buyer almost exclusively sets demand.

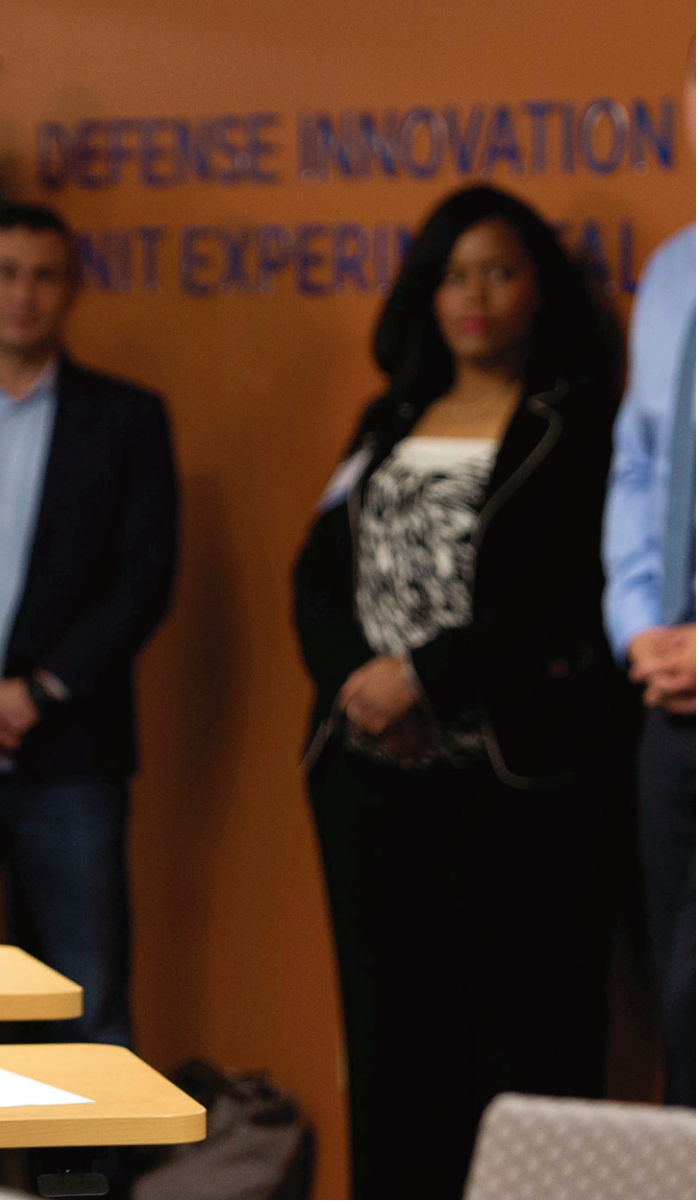
While the U.S. government does need to re-evaluate its role and policy toward innovation, there are examples of success where industry has taken the lead and become its own market maker. SpaceX, which has disrupted a long-standing monopoly in U.S. government space launch by offering a capable and reliable alternative at lower cost, is among the most recent examples.

DEFENSE DEPT.

"Innovation often fails because the nature of its government customer makes the system inherently flawed."

Companies can put innovation at the heart of the firm's culture by making it a subject of conversation internally and especially with customers, and build it into recruitment, training and incentive structures. They can create an innovation strategy founded on a rigorous assessment of the trends shaping customers' operating environments and broader technology trends in adjacent spaces. And they can be innovative in ways that are not solely technology development oriented. They should create mechanisms to track innovation efforts closely and cull those that are redundant, not in alignment with strategy, or are not progressing as planned.

The stereotype of the defense sector as being unable to har-



ness innovation to deliver game-changing capabilities is just that, a stereotype. Continued belief that industry is bad at innovation is becoming a self-fulfilling prophecy. Government surely needs to allow industry to be more flexible and creative as it relates to innovation, whether in the realms of technology, business models, organizational structures, or other novel ideas. However, both government and industry need to take more calculated risks.

While most agree that innovation is something that is both positive and necessary, there seems to be very little emphasis on how the process of defense innovation can itself be more innovative. Today's plans and concepts to foster a more innovative culture rest on a desire to replicate tried and true methods from commercial industry. These initiatives are a good start, but with a foot in government and industry, much more is required to return the defense sector to the cutting edge of innovation where it once operated. ND

John Kenkel and Andrew Jesmain are advisors to the aerospace, defense and security industries at PA Consulting Group.

JIAN KANG

New Rivals Ending Western Defense Market Dominance

Analysis **By Doug Berenson**

Among airborne icons in the global defense market, it is hard to top the F-16 in representing the long history of U.S. export dominance. Some 40 years since its first flight during the Cold War's tumultuous 1970s, the F-16 remains one of the most popular fighters in the world with more than 2,500 aircraft in service with the United States and its allies.

During that time, Western suppliers came to dominate the international defense marketplace. In 2015, they accounted for 59 percent of all sales to accessible markets, divided between U.S. sales at 45 percent and Europe with 14 percent. Yet that position is under threat. Since 2010, the supply of Western-built defense systems has actually been on the decline, according to data from Avascent Analytics, down from just over 62 percent five years ago. If current trends accelerate, the world's most popular aircraft four decades from now — or even much sooner — may not be American or European at all.

Between now and the mid-2020s, Western defense suppliers face unprecedented competition in international markets that they once considered virtually their private hunting grounds. One factor is China's growing technological competence and political clout. In 2013, NATO member Turkey courted Chinese defense suppliers to supply the HQ-9 air and missile defense systems for its T-LORAMIDS program; Ankara has also acquired drones made by Chinese firms. Saudi Arabia, one of America's largest customers of high-end military hardware, also reportedly purchased Chinese Caihong drones built by Chengdu Aircraft Design and Research Institute — including an armed variant.

Other buyers include Iraq, United Arab Emirates and Egypt. Another factor is the desire among many longstanding defense customers in the Middle East and Asia to go it alone rather than depend on occasionally touchy Western governments.

Some of this shift is also Washington's own doing, due to overwrought and complicated export controls that constrain U.S. suppliers. As an example, U.S. officials refused to offer America's cutting-edge systems like the F-35 to any Gulf allies, a policy that also safeguards Israeli military superiority.


HQ-9 air and missile defense system

The larger technological, political and strategic forces reshaping the global defense market, however, are now beyond any one nation's control. An increasing number of customer nations are now able to satisfy defense requirements "internally" from domestic industries, aided by years of technology-transfer deals.

That leaves U.S. and European defense firms in the difficult position of needing to defend relationships with core customers while preparing for a world in which historical supply patterns

may no longer hold.

A case in point is Leonardo-Finmeccanica's recent partnership with Singapore's Nanyang Technological University on next-generation composites and aerodynamics research for helicopters. "This agreement is an exciting opportunity for Leonardo-Finmeccanica to expand the scope of its activities in Singapore, a strategic country where we are fully committed to strengthen a long-term partnership, not just for helicopters but also in other sectors," said Mauro Moretti, CEO of Leonardo-Finmeccanica.

How fast the defense market evolves will depend on a myriad of factors, but the two most important are strategic and economic in character.

Some of the competitive change in the international defense market can be traced to the ability of countries like China or India to grow their own indigenous defense industries with a mix of domestic and foreign know-how. The motivations between strategic or economic grounds can blur, and often it is both. For Israel and Taiwan, which face existential threats and uncertainty about access to the global defense supply chain during military crises, being militarily self-sufficient is an issue of national survival.

This drives these nations toward an export-oriented high-tech and innovative defense technology sector during peacetime, as well. South Korea, for example, can be counted among the nations that will emerge as a more significant exporter of ships, submarines and aircraft during the next decade.

Domestic economics matters a great deal as well. In South America, Brazil is a rising player owing to its Gripen co-production partnership with Saab as well as Embraer's bold steps into the competitive missionized aircraft market. In the Middle East, at the same time that Saudi Arabia is snapping up Chinese drones, Riyadh is also doing something equally disruptive, at least from a Western defense sector point of view: making a concerted political effort to build a domestic defense industry.

In April 2016, Saudi Arabian officials said they intend to source as much as half of the Kingdom's defense procurement needs from domestic suppliers. "We have already begun developing less complex industries such as those providing spare parts, armored vehicles and basic ammunition," Saudi officials wrote in describing the Vision 2030 plan. "We will expand this initiative to higher value and more complex equipment such as military aircraft."

This new policy will help Riyadh take advantage of large public expenditures on national defense as a means of economic development and the establishment of post-petroleum national industries.

To be clear, this desire to develop domestic industry is not limited to Middle Eastern or Pacific nations. The Canadian defense procurement process involves Ottawa not only assessing technical solutions and price, but also the economic "value proposition" companies are offering as part of their proposals.

The legacy of the F-16 is an apt touchstone for exploring the future of the global defense market. It underscores that the cornerstones of a nascent defense sector are the political desire to enforce technology transfer agreements and stringent offset pacts with foreign suppliers in key areas such as advanced avionics or outright platform production. As a weapon system, the single-engine jet is an emblem of American military power. For allies, it has also been a stepping stone to developing defense industrial capabilities derived from the West's premier military power. Countries such as Turkey did not just acquire the aircraft for their air forces but also insisted as a condition for sale that their domestic industries play a substantial role in the supply chain. Beyond the United States, four nations build components of the F-16s they operate: Belgium, Netherlands, South Korea and Turkey.

Western suppliers are not alone in having to juggle economic value, defense technology control and military relationships as they pursue business around the world. Technology sharing is also the price of doing business for Russian and Chinese defense suppliers. India's state-owned Hindustan Aeronautics Ltd., for example, owes much of its capabilities to a series of partnerships with Russian firms. Similarly, ties between Pakistan Aeronautical Complex and Chinese aerospace entities, including the Chengdu Aircraft Corporation that is currently developing China's fifth-generation J-20 heavy fighter, go back to the 1990s when the two nations worked on Pakistan's JF-17 fighter aircraft.

The expectation for Western firms, as well as Chinese and Russian defense suppliers, is that such relationships and transfer agreements will become even more demanding in the years ahead in terms of the share and sophistication of the domestic content requirements. Customer nations will begin to source at home — or sell abroad — their own increasingly sophisticated components and systems. On one hand, it is offered as a way into a market. From another perspective, this risks over time beginning to "crowd out" foreign suppliers looking to make a direct sale to previously accessible markets.

As an example of this crowding out, India's defense industry grew nine percent annually from 2010 to 2015 as spending climbed by double digits and policies such as "Make in

India" took hold. The result is that local sources accounted for more than half of annual defense spending over the past five years. South Korea is another nation that, as of 2015, spends more than half of its budget domestically — up from less than 40 percent in 2010. So too for Japan, which spent 70 percent of its equipment budget on domestic suppliers in 2015.

The future strength of China's overall economy will heavily influence another key variable in the global defense trade: research-and-development investment. Beijing's hearty commitment to military modernization for the People's Liberation Army is yielding an increasingly broad arsenal of equipment being offered for sale on the global market. Down the road, China's own export control policies regarding advanced systems such as stealth fighters will be acutely important for Western defense firms and military leaders assessing the proliferation of technologies to allied and non-aligned nations alike.

The same can be said for Russia's current crop of military capabilities. Recent reinvestment and modernization indicate a refreshed commitment to defense technology as a discriminating strategic advantage. The twist, however, is that these technologies are not retreads of Soviet Bloc systems. Russia's finely calibrated aggression through military interventions in Crimea, Ukraine and Syria depends on newfound competency with unmanned sensor systems, electronic attack equipment, long-range land-attack cruise missiles and precision-guided ground-attack munitions, among other vexing capabilities being operationally tested in some of the most strategically brittle regions today.

Globalization profoundly reshaped sectors such as automobiles and personal technology. As the phenomenon catches up to the defense industry, Western defense companies can be confident their record of supporting their nation's allies around the world is a foundation for the future. That future, however, will be little like their recent past.

Seeing that the world is changing is one thing, but letting go of the comfortable defense export paradigm of the past half century is another. The sensible course is to holistically reconsider fundamental assumptions about what it takes to lead in the 21st century global defense market amid new political-military relationships, intensifying competition and novel commercial tactics.

A recent observation by Secretary of Defense Ashton Carter at the U.S. Naval War College about deriving military advantage from quickly developing and acquiring technologies also applies to defense exporters: "The future is going to go to those who are agile, creative, up to date, competitive."

It is this reworked approach toward innovative industrial relationships that may emerge as one of the most interesting avenues for Western defense firms and allow them to stay one step ahead of the change underway. The tradition of Western technical leadership still has value, even if it is diminished when restrictions can prohibit deep partnerships. The new market leaders will understand that they are no longer engaging in sales but deepening relationships that will, in most cases, also lead to developing a future competitor. In the end, that may be the ultimate legacy of the 40-year history of the F-16. **ND**

Doug Berenson is a managing director at Avascent Analytics where he studies global defense markets. Daniel Yoon and August Cole contributed to this report.

AIR FORCE

Air Force Utility Privatization Saves Real Money

Viewpoint

By Al Krachman and Richard Weston

The Air Force utilities privatization program has realized significant savings for the government, while also encountering some regulatory growing pains. Recent project accomplishments include saving $19.3 million in natural gas costs per year at a $1.1 million transaction cost, reducing water consumption by 28 percent, and reducing electric system outages by almost 40 percent. The program has saved the Air Force an estimated $520 million over the 50-year life cycle of projects, compared to continued government ownership.

With the current Department of Defense focus on energy security, this is good news. But the program still faces some open issues in the areas of labor standards and terminations that will need to be resolved in the future.

There are 270 Air Force utility systems left to evaluate for privatization. Because of the program's success, the Air Force is adjusting the intake of new systems for evaluation so that it can match procurement resources with the number of systems in review.

The Air Force has recognized maintenance, operations and upgrades of the four main utility systems, electric, natural gas, sewer and water, are not a core competency and, where appropriate and cost effective, should be privatized.

The Air Force had approximately 159 "privatized" or owned-by-others utility systems before the Congressional utilities privatization authorization, Title 10 U.S.C. § 2688, in 1998. The majority of these legacy systems are with airport authorities where National Guard bases resided or on overseas installations in host nations under Status of Forces Agreements.

Congress enacted Title 10 U.S. Code §2688 to provide statutory authority for the service secretaries to solicit and transfer ownership of Defense Department utility system infrastructure. It allows the Air Force to transfer ownership of existing utility distribution systems to private, municipal, regional, district, or cooperative utility companies or other entities where such conveyance demonstrates long-term economic benefits. Procurement of the underlying commodity is not part of utilities privatization.

Subsequently, DoD issued direction to the service secretaries to privatize utility systems. These directives were based on two premises: Utility system ownership and its associated operation and maintenance is not a DoD core competency, and utility systems on DoD installations must be restored to, and reliably maintained at, industry standards. Using the various policies and guidance, the Air Force has privatized 68 installations.

To reach a decision to privatize, the Air Force uses a two-step process. The first step is a Federal Acquisition Regulation Part 41 contract process. The second part is a decision to convey (transfer ownership permanently) to the successful offeror based upon economics. The question is whether it is cheaper in the long run to privatize, or to maintain government ownership of a utility system.

> "The program has saved the Air Force an estimated $520 million..."

AIR FORCE

The key metric used under the privatization program is the government's "should-cost" estimate. This is the cost the government would incur to restore and maintain the system to industry standards. The should-cost figure is ultimately compared to the offers the Air Force receives after solicitations are issued through the standard Federal Acquisition Regulation process. The Air Force evaluates the received proposals and makes a determination as to whether or not it's more cost-effective to divest the system.

Currently, there are 64 (out of the 270 left to evaluate) systems in some stage of the privatization analysis. The chart below shows the total number of systems at the various stages of the privatization analysis.

Because of the 2013 budget sequestration, the Air Force has imposed a strategic pause on new utilities privatization starts. The Air Force expects to lift the pause in the near future once funding is realigned to support new awards.

Developing a utilities privatization solicitation is a time-consuming effort because every utility system has unique characteristics totally dependent on where, when and how it was installed. Also, some state laws may require state-specific terms to be included in a request for proposals. The process starts with creating an inventory list of all the components that make up each system. This takes about six months. Then, the utilities privatization project management office works with the Defense Logistics Agency Energy, the centralized contracting office for the Air Force and Army programs, to create a request for proposals. DLA Energy distributes the proposal request using FedBizOpps.

After the proposal release, DLA Energy hosts a kickoff meeting at the base to acquaint

the potential responders to the systems being privatized, to solicit questions about the inventory and the RFP. DLA will answer those questions as a single reply to all interested parties. The interested parties then decide if they want to submit a proposal.

DLA Energy establishes a proposal submission suspense date. Once proposals are received, it manages the evaluation process with technical support from the utilities privatization office. The agencies then deliver formal presentations to the source selection authority. The SSA is the person responsible for making the final award decision.

Near the end of the evaluation process DLA Energy will ask for final proposal revisions from each respondent. If the SSA decision is to award and the economics are favorable for conveyance, the new system owner, in concert with the base, starts a transition period that can last from six to 18 months. Once a bill of sale is signed, the contract starts and the base and the contractor begin a 50-year relationship to maintain, operate and upgrade the privatized system.

Sometimes, unique issues arise. As the program was beginning, there were unresolved questions on whether the only bidders eligible for privatization awards were holders of the state utility franchises covering the installation's location. Disputes have also arisen over the government's responsibility to compensate the contractor for improvements after a termination. Also, most proposals include exceptions or qualifications that must be negotiated.

The competitive acquisition process can take time before the SSA makes a decision. Since many of these 50-year contracts can be worth over $200 million, the agencies step cautiously through the entire process to ensure best value for the taxpayer.

Historically, the rate of successful awards was only 25 percent of evaluated utilities. Officials are confident that the award rate should go over 60 percent in the next few years. Last year, the Air Force award rate was 50 percent, and it is expected to be the same in 2016.

The application of the Davis-Bacon Act, which requires contractors and subcontractors to pay locally prevailing wages, has been a problem, but efforts are underway to address the issues. The reporting requirements of this law can be a major burden for small entities, such as rural electric cooperatives, resulting in some co-ops having second thoughts about competing.

There are also questions of insurance and liability. Bases have been hit by catastrophic events such as a Hurricane Sandy and Katrina, and responsibility for service restoration or catastrophic loss is an important issue. While privatized utilities have demonstrated faster recovery times from those disasters, working through recovery plans is sometimes a complicated piece of the negotiations.

Termination for convenience exposure is also considered on a case-by-case basis. The Air Force does an upfront cost estimate for convenience terminations based strictly upon the contractual requirements. In case of actual termination due to Base Realignment and Closure or other circumstances, there can be legal issues.

Despite some pre-conceived notions that some contracts may be tailored for the local area utility, there is actually healthy competition in most cases. The Air Force has worked with industry members over the years to improve their processes, and industry has improved their proposals. The Air Force has found that the newer proposals are more realistic and more in line with available budgets, helping to increase the rate of successful awards.

If a competitive award is not made, the Air Force is required to evaluate the local provider for the potential to make a sole source award using a similar FAR-based contract decision and economic conveyance decision.

UP Schedule: FY 16-21

Kickoff/Data Collection	Initial Evaluations	Final Proposal Evaluations	Review/ Approve
Beale	Tinker (S,W)	Academy (S,W)	Eglin (S,W)
ACC/AFGSC TBD	Keesler (E,G,S,W)	Cavalier / Grand Forks	Eglin (E)
Cape/Patrick (E,SW)		(E,G,S,W)	Travis (W)
Arnold (E)		JBSA (E,G)	
Edwards (E,G,S,W)		JBSA (S,W)	
Offutt (G,S,W)		Little Rock (W)	
Vandenberg (E)		McConnell (E,S,W)	
Vandenberg (G)		Wright–Patterson (G,S,W)	
Malmstrom (E,G,S,W)			
E=Electric System; G–Natural Gas System; S=Sewer System; W=Water System			

Capturing data for privatization metrics is a new effort. The Air Force is working on creating metrics to determine improvements in system reliability and evaluate them across the entire Air Force privatized utilities portfolio. **ND**

Al Krachman is a senior partner at Blank Rome LLP, whose practice includes utility privatization transactions and litigation. Richard Weston is the Air National Guard liaison to the Air Force Civil Engineer Center, at Tyndall Air Force Base, Florida. His office evaluates all of the Air Force utility systems for privatization.

Tactical Wheeled Vehicle Market on Downward Slide

By Stew Magnuson

As the Army and Marine Corps prepare to take delivery of their first batches of joint light tactical vehicles this fall, the land services have few other major programs in the works, and truck manufacturers will have to content themselves with upgrade and modernization contracts, officials indicated at a recent industry conference.

"My expectation is that tactical wheeled vehicle investments will focus primarily on incremental modernization opportunities, basically to improve flexibility and maneuverability, but no fundamental change in the capabilities of those assets," James MacStravic, principal deputy assistant secretary of defense for acquisition, said at the National Defense Industrial Association's annual Tactical Wheeled Vehicles conference in Reston, Virginia.

The budget numbers tell the tale.

The services are spending about $25 billion less on tactical wheeled vehicle programs than they did at the height of the Iraq and Afghanistan wars. The only new acquisition program of note that is scheduled to go forward is the Army's ground mobility vehicle, with an anticipated buy of 250 units.

The GMV is envisioned for light infantry airborne forces and would sacrifice protection for speed and mobility and could seat five to nine soldiers. The Army is requesting $5 million to procure 10 GMVs in 2017 with an eye toward eventually buying 250 vehicles.

"The Army has a very real chance of doing something quick and effective and innovative if we are careful in both defining our requirements and not putting too many processes in the way," MacStravic said.

The Army is completing an analysis of alternatives and there is funding in the 2017 budget request if Congress allocates it. However, if there is a continuing resolution that extends into next year, the Army will not be able to proceed until the budget is sorted out.

"That program could be ready to run with no fuel in the tank," he said.

MacStravic said the ground mobility vehicle is relatively safe. "We are not actively looking for programs to cancel at this point. We are trying to make sure not to make new programs that we can't afford in the future," he said.

The Marine Corps has little funding to spend on its tactical wheeled vehicle fleets, service officials said.

"With the preponderance of the fleet in sustainment, the biggest challenge we have in a declining budget situation is maintaining the fleet that is … 14.9 years old and was projected for a 22-year lifecycle," said Steve Pinter, program manager for the Marines' medium and heavy tactical vehicles.

The 22.5-ton logistics vehicle system replacement truck fleet is about five years old, but it is already facing obsolescence issues, he said. And there is no funding projected for the medium tactical vehicle replacement program.

"The challenge becomes with the small budget we have to keep it viable until a replacement comes," he said.

Andrew Rogers, Marine Corps program manager for light tactical vehicles, said the only new program on the horizon is a utility task vehicle, which it is executing in partnership with Special Operations Command. It is a new class of vehicle for the service and envisioned as an ultra-light carrier for transporting up to four Marines, equipment or those wounded on battlefields. The Marine Corps is procuring 144 of them in fiscal year 2017 and they will be distributed to battalions.

As far as upgrades, Pinter said armor and protection, fuel and integrating command control and communications gear are "eating our lunch in terms of costs."

Those are potential areas of investment for both the government and industry sides, he said. With budgets being tight, "I need innovative ideas that give disproportionate payback," he said.

The Marine Corps and Army have a legacy truck in common, the venerated Humvee, which is slated to remain in both services' inventories until 2030, and possibly beyond. The JLTV is not intended to replace the Humvee one for one, so both services must come up with plans to maintain and modernize their fleets.

The Corps has 18,300 Humvees, but that number will steadily decline as JLTVs come online. Meanwhile, funding for new Humvees has been "zeroed out," Rogers said.

"The path forward for the Humvee fleet will be predicated on the availability of funding and anything we can do to sustain the fleet beyond 2020," he said.

Lt. Gen. Michael Williamson, principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology, said "the Humvee has served us well, but with the distribution and the force structure that has changed, what is the number that we need to keep?"

That question has yet to be answered, he said.

The Army will have to decide how to reduce the average age of the Humvee fleet through modernization and upgrades, Williamson said.

"The Army has to start understanding what it wants to maintain in its force.

And those are hard decisions, by the way," he said.

As far as the larger Army tactical wheeled vehicle fleet, reset and sustainment are vital. "We have to be ready for the next fight. You go to war with the Army you have, not the Army you wish you had," Williamson said.

A final decision on how many Humvees the service will retain won't be made until 2018, said Maj. Gen. Cedric Wins, director of force development at the office of the deputy chief of staff, G-8.

Meanwhile, the National Commission on the Future of the Army in its report released earlier this year singled out the service's tactical wheeled vehicles as a cause for concern and called readiness levels "alarming."

ARMY

"Commissioners received numerous reports from soldiers and commanders about tactical wheeled vehicle shortages. These shortages are most pronounced in heavy equipment prime movers. The Army's tactical mobility peaked in 2007 while transitioning to the modular force. Although modular reorganization provided units with increased tactical mobility, the Army determined it could not afford to sustain and modernize the entire tactical wheeled vehicle fleet. The Army thus reduced the number of tactical wheeled vehicles in its inventory to a more affordable level. Some commanders indicated to the commission that tactical wheeled vehicle shortages in their units created significant risk," the report said.

Industry received more bad news when Army officials at the conference announced that — for the time being — there would not be a new design for its upcoming light reconnaissance vehicle program. The LRV will be an off-road platform that will carry a suite of intelligence, surveillance and reconnaissance sensors and be light enough to be carried by a CH-47 Chinook helicopter.

The light reconnaissance vehicle will be a JLTV with additional firepower and perhaps sensors, said Maj. Gen. Robert M. "Bo" Dyess Jr., deputy director of the Army Capabilities Integration Center. He called the JLTV an "interim solution."

Wins said: "There is always the possibility that the Army will begin to evaluate the performance of JLTV in that role and make a determination that a change is necessary." But the decision stands for now, he said.

The JLTV will have to be adapted to "allow scouts to perform the mission of finding and getting information — and at times — fighting to get information," Wins said.

The primary reason stated was the cost to develop a new platform in a time of austere budgets. There were several hopeful vehicle manufacturers looking forward to a competition. The service hosted a light recon vehicle platform performance demonstration at Fort Benning, Georgia, in August 2015. A number of trucks participated, including: Polaris' DAGOR; Rheinmetall's Weasel; Navistar's SOTV-A; Vyper Adamas' V4-X; and Northrop Grumman's Hellhound.

John Bryant, president of Oshkosh Defense, said the JLTV will be able to handle additional missions such as serving as a light recon vehicle.

"Oshkosh had designed the JLTV using a modular design approach so that the vehicle itself is very adaptable, very flexible and very scalable to a wide variety of mission requirements," he said in an interview.

"We have built in significant design margins to handle unknown future growth," he said. It has more engine power and electrical power than current missions require and plug-and-play capabilities for command, control communications and sensor suites. It can host a variety of weapon stations.

"More so than any other tactical vehicle that has ever been designed, Oshkosh has that scalability and flexibility built into the design," he added.

Meanwhile, the JLTV program is progressing at a rapid pace.

Oshkosh is conducting a series of baseline reviews of the JLTV configurations this summer, which will conclude with a product baseline review recently conducted with government, he said. Technical data required under the contract have been delivered to the services.

This is a time when the company finalizes supply base issues. "We engage in two-way conversations with our suppliers where we listen carefully to any good ideas they have on processes or details of particular components," Bryant said. "We review and validate the processes of our suppliers to ensure that all the material we receive meets those exacting government standards."

The first batch of JLTVs will be delivered to the Army and Marine Corps for operational tests at the end of September or early October, Bryant said.

That is 13 months after the contract was awarded, and takes into account a protest that wasn't resolved until February. Oskhosh will eventually deliver 201 JLTVs for the test-and-evaluation phase. The full-rate initial production decision is scheduled for fiscal year 2019.

The Defense Department's MacStravic praised the program. It is "so far a remarkable success."

It relied on stable requirements, mature technologies and "a laser-like focus on affordability," he said.

"The program conducted a competition all the way up to production, which is remarkable in this day and age. That is an extraordinarily expensive activity, but I think it has paid dividends." It will serve as a model for future acquisition programs, he predicted. **ND**

Email comments to smagnuson@ndia.org

Army Sets Out to Replace Vietnam War Era Watercraft

By Stew Magnuson

While many Army modernization programs remain in a state of limbo because of tight budgets, the service is proceeding with a program to replace a fleet of aging logistics boats.

"Watercraft, because of the fiscal challenges, and where the priorities were, have been neglected," said Zina Kozak-Zachary, the Army's product director of watercraft.

The service in July is expected to release a request for proposals for the maneuver support vessel-light, a 100-foot boat designed for intra-theater lift.

"Prior to taking this job, I was one of those people who said, 'The Army has boats? Really?' You still hear that. But you don't hear that as often," Kozak-Zachary said at the National Defense Industrial Association's Tactical Wheeled Vehicles conference in Reston, Virginia.

The National Commission on the Future of the Army in its report released in March singled out watercraft as one of several categories that were suffering "unacceptable modernization shortfalls."

"Those shortfalls cause major concerns across a wide range of potential contingencies, particularly for the homeland, in Europe and on the Korean peninsula," the report said, while leaving details for its classified version.

The strategic shift to the Asia-Pacific and the anti-access/area denial scenarios the Army may find itself in have rendered the Landing Craft Mechanized-8 logistics watercraft all but obsolete, Kozak-Zachary and other Army officials said.

Kozak-Zachary, in explaining how the Army's watercraft became so outdated, noted that 71 percent of the Earth's surface is covered by water. The remaining 29 percent is land. Of that, one-third is desert. "Where has the conflict been for the past two decades? It has been on that 10 percent of the land's surface," she said.

The old landing craft have simply become neglected, she said. The Army has 36 LCM-8s, which are 70 feet long, travel at 9 knots and have a range of 271 miles. They were first fielded in 1967 and have an average age of 44 years.

James MacStravic, principal deputy assistant secretary of defense for acquisition, said the new boats must be more survivable.

"As we think about the fact that we are planning on going places where people don't want us to be — anti-access/area denial environments — we are going to need a different mix of capabilities for those watercraft if we are going to make them relevant in the war fight," he said.

The maneuver support vessel-light, along with being 30 feet longer and nine feet wider than its predecessor, will travel at 15 knots and have a range of 360 miles. It will be able to carry a wider range of payloads including either an M1A2 SEPv3 Abrams tank, or two Strykers, or up to four joint light tactical vehicles. With a five-foot draft or slightly less, it is designed to operate in littorals, rivers and near shorelines.

The new watercraft was expected to complete an Army requirements oversight council review by the end of June, said Col. Steven M. George, Training and Doctrine Command capabilities manager for transportation. Army Vice Chief of Staff Gen. Daniel B. Allyn will then review its findings before the request for proposals is issued sometime in July, he said.

The hulls, by law, must be manufactured in the United States, George said.

As for the other components, the Army will be interested in materials and technology than can make the watercraft lighter. "This is a boat. We want it to carry heavy loads but we want it to have a low draft," he said.

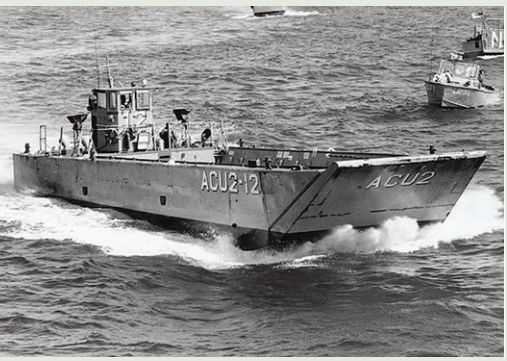
With a longer range, it will need a suite of command-and-control electronics that allows it to operate at greater distances, he said.

He would like industry to respond with new ideas for armor and weapons, "especially now that we are going to maneuver with this. Do I have to look at weapon systems that I can integrate that reach out farther?"

It is intended to operate in a tactical environment "so I need to talk tactically potentially long distances, but then I also have to operate under civil rules and talk with the non-military vessels that are out there."

"We have to balance affordability," he added.

George said the Army requirement



Landing Craft Mechanized (LCM-8)

1967 FIRST FIELDING

AVERAGE AGE **44 YEARS**

Logistics Support Vessel (LSV)

1988 FIRST FIELDING

AVERAGE AGE **21 YEARS**

Landing Craft Utility (LCU) 2000

1990 FIRST FIELDING

AVERAGE AGE **25 YEARS**

is to replace all 36 LCM-8s one for one with the maneuver support vessels, however, there is currently only funding planned for about 28.

"We want 36. And that is what we are going to stick with. However, our acquisition financial team, G-8 folks, have said you may only get so much. But 36 is our target number. … If the magic all comes together and they are cheaper than what we are planning, then maybe we'll get 36," George said.

The LCM-8, while the oldest, is just one of several watercraft the Army operates. There is also a logistics support vessel, average age 21 years, the landing craft utility 2000, average age 25 years, two classes of tug boats and a barge derrick. In addition, there are four types of floating causeways and discharge facilities to aid with unloading.

"Our movement from ship to shore isn't necessarily what you think about in the Marine type category where they have their amphibious assault force and … what they call connectors. We can assist them with that, but it is a different capability," he said. The floating causeways help transfer equipment to shore.

The new vessel will support the waterborne delivery of combat configured forces, he said. Historically, Army watercraft were seen as simply logistics platforms. "Let's put some trucks and cargo on it and get it to shore, at which point they will get configured to get to the fight."

To survive contested environments, the Army wants the "marrying up and configuring" of equipment done before they are placed on the boats "so they can roll right off that vessel and fight," George said.

The shift to the Pacific has heightened the importance of the portfolio, Kozak-Zachary said. "We can't fix it all. We have to put band-aids in places before we get that portfolio to where it needs to be," she said.

Col. Daniel L. Furber, product manager for transportation systems, said, "We are trying to balance a lot in this portfolio. It's an aging fleet. It's old. We do have declining budgets."

Army watercraft in the transportation portfolio is about 7 to 8 percent of the budget. It's a low density fleet, but expensive to maintain, Furber noted.

There are other Army watercraft opportunities for industry in the near future, Furber said. The Landing Craft Utility boats, first fielded in 1990, are slated for major electronic upgrades as part of a service life extension program. A competition for that contract is expected to kick off at the end of fiscal year 2017. The PEO is also short two tugboats and it is currently studying whether it will need to buy two more, or put the fleet through a service life extension program, Furber said.

Long term, "We are potentially going to be replacing the [logistics support vessel] and [landing craft utility]. That is on the back of the success of MSVL. So we have to get the maneuver support vessel-light right. … We can't botch this thing," he warned.

There are long-term plans to add a maneuver support vessel-heavy in the fiscal year 2025 timeframe and a maneuver support vehicle-medium around 2031, according to presentations at the conference. They would replace the LSV and LCU, respectively.

The PEO is also studying the creation of a performance-based logistics contract for the logistics support vessel in late fiscal year 2018 or 2019, Furber said.

MacStravic cautioned that the maneuver support vessel-light may face delays as a "new start" program. Kicking off the acquisition will depend on Congress passing a budget for fiscal year 2017.

He predicted that Congress will put a continuing resolution in place, which means those funds would be put on hold. "I strongly expect that we are going to get a continuing resolution for FY 2017, more than the traditional three months. We could have a year-long CR based on the results of this election," he added.

A panel of congressional staffers at the conference also sounded a pessimistic note on the prospects of a budget being passed by the end of the fiscal year. While none mentioned a continuing resolution lasting as long as a year, two out of three said the impasse may last until April. The staffers declined to be named.

Meanwhile, the aging portfolio of Army watercraft continue to perform, Thurber said.

"Be assured that the soldier-mariners out there today manning these [platforms] are accomplishing the mission and doing what needs to be done to keep them operational," he said.

Kozak-Zachary was more blunt about the service's watercraft: "Operationally irrelevant. That's what our watercraft fleet is. They still run. They still function. They do still what they can do, but in the case of the LCM-8, they can't carry today's Army." ND

Email comments to smagnuson@ndia.org

DEFENSE DEPT. PHOTOS

Large Tug (LT)

1994 FIRST FIELDING

AVERAGE AGE **22 YEARS**

Small Tug (ST)

1998 FIRST FIELDING

AVERAGE AGE **15 YEARS**

Barge Derrick (BD)

1999 FIRST FIELDING

AVERAGE AGE **16 YEARS**

Navy Sees Future Combat Power in Information Networks

By Jon Harper

Concerned about the growing capabilities of potential adversaries, the Navy and Marine Corps see platform networking, automation and multi-mission payloads as ways to stay ahead of emerging threats. But more technology development and adoption will be required before the vision can be fully realized.

With a limited amount of platforms and dollars at their disposal, the sea services are looking to create "kill webs" — networks of sensors, data links and weapons that would give U.S. forces a more powerful punch, defense officials said at a recent industry conference hosted by the Navy League.

The Navy's aviation component is focused on the idea of "integrated warfare" to project power over and from the sea, said Secretary of Defense Ashton Carter. "At the heart of this concept are the F-35, P-8 and other air assets that are critical nodes, which capture and disseminate information in an unprecedented manner, ultimately improving lethality across the battlespace."

Hopes for greater platform linkages are not limited to air assets. The Navy wants to throw ships and submarines into the mix.

"What if I start to draw lines between the sensors, the weapons and the shooters in those different domains?" said Rear Adm. Michael Manazir, the new deputy chief of naval operations for warfare systems.

"If we can connect those nodes, now you have a resilient kill web that we can use to target different entities, ... share data across advanced networks" and improve information quality, he said.

The Marine Corps also wants in on the action. The service aims to make "every one of our platforms a sensor, a sharer and a shooter," said Lt. Gen. Jon Davis, deputy commandant for aviation.

Rear Adm. Jon Hill, program executive officer for integrated warfare systems, said the Navy is "sensor poor" right now but is looking for new capabilities in this area to foster better situational awareness across the battlespace.

The number of platforms in the inventory is less important than how well they are linked, Manazir said. "I don't as much care about, 'Buy me this many [joint strike fighters] or this many Super Hornets or this many littoral combat ships or this many DDG Flight IIs. It's what are we going to do to connect those platforms."

But networking technology components built by different manufacturers is no easy task.

"It is an engineering challenge to take a Boeing product in the front of an F-18 and align it with a Northrop Grumman product in the back of an E-2 so that we get a weapons-quality track share across the network," Manazir said.

"My challenge right now … is trying to take programs that were developed sort of proprietarily under a set of requirements and figure out how to put them together," he added.

Much of the Navy uses the Link-16 tactical data-sharing network, but it has "limitations," Manazir noted. The service needs to develop a new waveform and take greater advantage of computing technology, he said.

Industry also needs to take responsibility for ensuring that greater networking will be viable, Davis said. "Make sure that the gear that you sell us plugs and plays with everybody else's gear. It does us no good if you have a standalone system out there that's not interoperable with everything else."

Another way for the sea services to get more bang for their buck is to make individual platforms capable of performing multiple types of missions.

"Our investments reflect an emphasis on payloads over platforms," Carter said.

An example of this approach is the Marine Corps' MV-22 Osprey troop transport aircraft. The tilt-rotor asset currently has little more than a navigation system in its nose. But the service plans to add long-range communications equipment and data link compatibility, as well as a sensor package to give it an intelligence, surveillance and reconnaissance capability.

"It should be contributing from an ISR perspective and a collection perspective," Davis said.

The Marine Corps is examining different industry technologies in this area.

"I won't get into some proprietary stuff [but] we've got a little bit of a flyoff going with a nose sensor right now," he said. "Flying at medium altitude we want it to be able to look down at the landing zone."

Such technology could support the employment of weapons launched from the aircraft. "We're looking at really the same kind of systems we have on our Cobras, on our UH-1Ys," Davis said.

The Marine Corps intends to weaponize the MV-22. The service has done experiments with a laser designator in the nose of the aircraft. Such a capability could potentially enable the Osprey to fire Hellfire, Griffin or Viper Strike missiles, Davis said.

The service is also considering adding an Intrepid Tiger II jamming system for electronic warfare purposes, he added.

"Really any platform we have — ground or air — we want to put more technology on it," said Lt. Gen. Robert Walsh, Marine Corps deputy commandant for combat development and integration. "We don't want just single platforms that can do one thing."

The Navy and Marine Corps will need more autonomous machines equipped with artificial intelligence if they are to fully take advantage of information flows, officials noted.

The Defense Department is working on autonomous self-driving boats that can network together to do a range of missions, from fleet defense to close-in surveillance without putting sailors at risk, Carter said.

The Marine Corps recently conducted an experiment where a ground robot was partnered with an unmanned aerial system on a simulated intelligence-gathering operation. When the robot ran into obstacles, it made the decision to launch the UAS. The service wants these types of autonomous systems to be able to search villages or other areas and look for high-value targets using biometric data. Once the target is located, the machines could pass that information on to decision-makers, Davis said.

More sophisticated big data management tools will be required for that type of mission and others, officials noted.

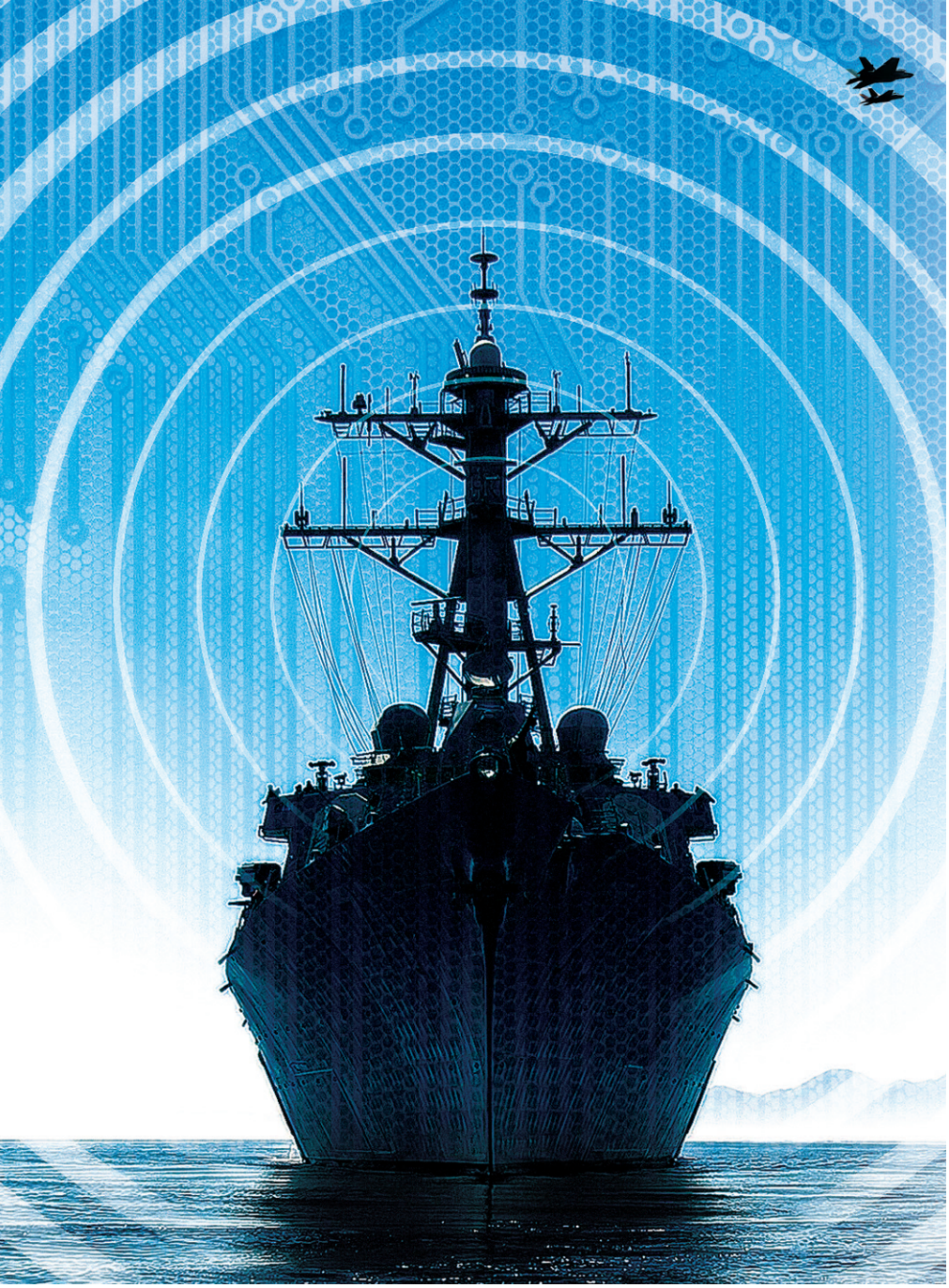


PHOTO-ILLUSTRATION / ISTOCK; NAVY PHOTOS

"The way that we analyze data now I think is kind of a 20th century mindset," said Lt. Gen. Michael Dana, Marine Corps deputy commandant for installations and logistics. "Instead of having human beings doing mountains of data crunching, you [should] create some type of algorithm or a computer that actually analyzes."

He noted the advances in computing and artificial intelligence that are emerging from tech hubs like Silicon Valley and Boston. "Some of the things that they're coming up with are truly revolutionary, and I think we benefit by kind of tapping into some of the things the private sector is doing."

The Pentagon needs "Siri on steroids," he said.

"If you took that to the next level and it could answer questions and kind of data mine … that fast, I think that would be incredible," Dana said.

Like Tom Cruise's character in "Top Gun," Navy officials feel the need for speed — in this case, for crunching and analyzing data gathered and transmitted by the multitude of sensors and information-sharing technologies that are out there.

"We know that we have to move at a faster speed," Hill said. "Big data algorithms are very interesting to me because they can take lots of different … formats and data types and put them into something that we can actually use" in combat.

J.D. McCreary, the head of disruptive technology programs at the Georgia Tech Research Institute, used "Star Wars" terminology to paint a picture of how intelligent robots could coach warfighters in the future.

"What if … R2-D2 is linked to all the other R2-D2s out there and you have instantaneous networked knowledge across the battlespace?" he said. "They are providing you feedback on where to optimize your weapons employment, how to align your systems and how to make those smart decisions."

"AI is what's driving Google's search algorithms these days," he added. "That is where industry is going."

Some observers see buying from the commercial sector as an opportunity for the Defense Department to save funding on research and development.

"So much of the advances that are taking place in the information age are taking place in the commercial world," said retired Marine Corps Lt. Gen. George Flynn, who now works as a defense analyst and consultant.

"Why not leverage the fact that they're doing the R&D?" he said. "You can save money there and … take what's already out there and apply it" to military systems.

Lt. Gen. Ronald Bailey, Marine Corps deputy commandant for plans, policies and operations, expects further investments in big data management technologies as the demand for information increases along with computing power.

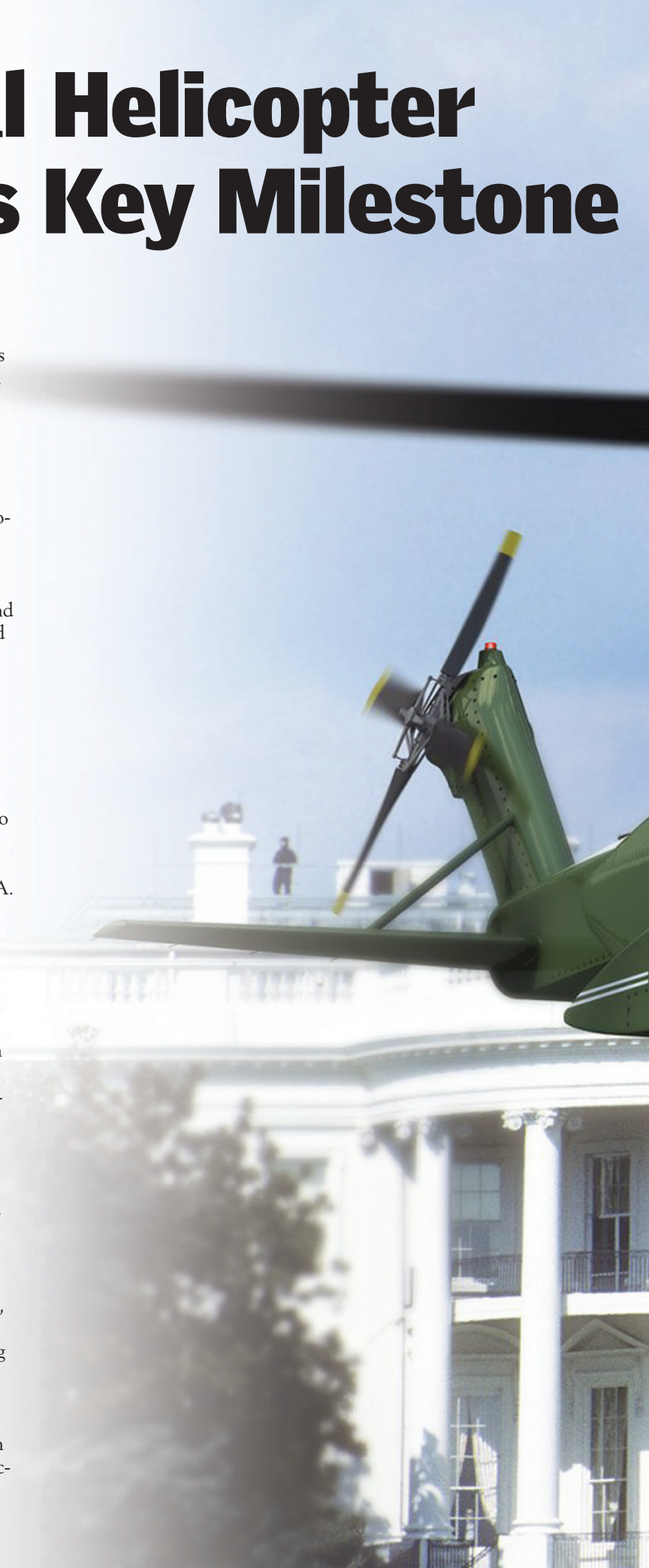
"This is something that we're working towards and will continue to work towards because we're not there yet," he said. "When we start talking about industry, this is where I think we can work together and work towards a solution set that helps us analyze large amounts of data."

But Flynn sounded a note of caution about becoming overly reliant on networked warfighting in an age of cyber attacks, electronic warfare and unanticipated technical glitches.

"What happens when … the network goes down?" he said. "Are you going to have the capabilities on the individual ships or platforms or units to be able to defend themselves and to be able to continue to operate? That's the larger debate in this because you can field a lot of expensive capabilities but you're not going to have capacity." **ND**

Email comments to jharper@ndia.org

Presidential Helicopter Approaches Key Milestone



By Yasmin Tadjdeh

After years of delays, the Navy and Marine Corps are on the cusp of replacing the service's aging fleet of presidential transport helicopters.

The services' effort, which has been more than a decade in the making, is now on track to meet key program milestones, officials said.

"The program is moving on or ahead of schedule," said Marine Corps Col. Robert Pridgen, program manager for Naval Air Systems Command's presidential helicopters program office.

For years, the Marine Corps has been attempting to replace aging presidential rotorcraft — known as Marine One — that have been in the inventory since the 1970s and 1980s. Former Secretary of Defense Robert Gates canceled a previous Lockheed Martin/AgustaWestland program — known as the VXX — after costs ballooned and requirements spiraled out of control, analysts said.

Even President Barack Obama famously criticized the program.

"The helicopter I have now seems perfectly adequate to me," he said in 2009. He called the program "an example of the procurement process gone amok. And we're going to have to fix it."

After recompeting the program, Sikorsky's S-92 aircraft was chosen in 2014 for what is now known as the VH-92A. The Marine Corps is equipping the system with proven, mature technologies, Pridgen said.

When "we went into the 92, we were looking for stable requirements — things that we understood. This was not going to be an S&T" project, he said. "We're developing more mature capabilities."

Under the contract, Sikorsky — which Lockheed Martin recently acquired from United Technologies Corp. — will provide the Marine Corps with 23 helicopters. Initial operating capability is slated for 2020. Production will end in fiscal year 2023.

The next milestone for the program is the VH-92A's subsystem critical design review at the end of July, he said. "[Our] engineers come up and they show that they understand not only the design, but that the design meets the requirement and that requirement is in keeping with the specs that we had laid out," he said.

The review is occurring earlier than originally scheduled, he noted.

From there, "you start cutting metal," Pridgen said during a briefing with reporters in May. "You start solidifying the final drawings and we start moving out and modifying the aircraft."

By spring 2017, the Marine Corps will have either flown or will be preparing to fly its first engineering and manufac-

Sikorsky's VH-92A concept artwork

turing development helicopter, he said.

"If you look at the schedule that's a pretty impressive move," he said. "After we get the first flight going the government will take delivery of that aircraft for a government test a year later."

Under direction from Undersecretary of Defense for Acquisition, Technology and Logistics Frank Kendall, if a change in a requirement affects cost, schedule or performance, Pentagon leaders would be notified, Pridgen said.

"There … [isn't] going to be a surprise," he said.

So far, the program has been free of requirements creep, he said.

"One of the enablers here that keeps us on schedule is we have seen zero requirements churn on this aircraft from the moment we signed the contract to right now," he said. "I'm not seeing any of that going on between now and the time when we deliver the aircraft."

That being said, he noted that it was not unreasonable to assume that technology could change. The Marine Corps could, for example, consider procuring a new radio or capability, but that would require approval from Defense Department leadership, he added.

The success of the current program stands in stark contrast to the previous attempt.

"There's a regular desire to compare," Pridgen said. "What did we do different? I will tell you from a program manager's perspective, the program has been set up with a level of discipline. … The way that the … spec works were written down were very achievable. We recognized the timeline that needed to be accomplished. We looked at the technology that was out there."

The VXX program, which was canceled in 2009, was plagued by delays and requirements creep, said Richard Aboulafia, vice president of analysis at the Teal Group, a Fairfax, Virginia-based defense and aerospace market analysis firm.

"The last time requirements spiraled out of control," he said. "Basically everyone was given carte blanche to change requirements and ultimately turn it into a machine that had very little in common with the off-the-shelf design that it was based on."

The project became a "hideous combination" of White House, Secret Service and Marine Corps requirements, he added. Unrealistic requests included the ability to survive a nuclear blast and being able to fly higher than any aircraft besides a Lockheed-built U-2 Dragon Lady high-altitude intelligence, surveillance and reconnaissance aircraft.


1987

2015

"To be fair, they had a lot of space to work with. It was a very big helicopter. They had a very big budget to work with," he said. "Hopefully … [the VH-92A] will be more of an art-of-the-possible machine."

Calling the VXX an "abject failure," Aboulafia said it will be hard for the Marine Corps not to learn from it.

What brought down the VXX was the Nunn-McCurdy Amendment, said Raymond Jaworowski, a senior aerospace analyst at Forecast International, a Newtown, Connecticut-based market consulting firm. Under the legislation — which was introduced in the 1980s — if cost growth in a program exceeded 25 percent that would constitute a "critical breach" and the Pentagon would have to notify Congress.

"The original VXX effort … did exceed the limit," he said. "Bob Gates, who was the defense secretary at the time, recommended canceling the project. … Besides cost overruns he also mentioned that it was six years behind schedule and it ran the risk of not delivering the requested capability."

Lockheed and AgustaWestland — which is now known as Leonardo-Finmeccanica — pushed back after the cancelation, he said.

"At the time, they made a lot of noise [saying] that there was requirement creep and that led to a lot of the issues — both the cost overruns and the schedule delays," he said. They said "that the Pentagon kept coming back and adding new capabilities and new bells and whistles onto the helicopter."

VH-92A hasn't run into many issues so far, Jaworowski said.

"It's still fairly early in the effort," he said. "Essentially Sikorsky's task right now in regards to VH-92 is program execution. They have to be careful about cost overruns and schedule delays and technical difficulties."

While some delays are likely, they must keep them to a minimum because the program is being closely watched, he added.

"It's a highly visible program essentially because of what it is. Some people call the presidential transport helicopter the most photographed helicopter in the world," he said.

It is also important for the company because Sikorsky is the incumbent manufacturer of legacy presidential helicopters, he said. Sikorsky is approaching the project carefully and hoping to avoid the pitfalls of previous programs, he said.

"This time around they're trying to institute kind of a low-risk approach hoping to keep costs down. They're going to use existing technology rather than developing new technology. They're using government-defined mission systems into an existing air vehicle," he said. "They realize what happened the first time around and they are trying to learn from those lessons."

While the program is relatively small,

DEFENSE DEPT.

it is very prestigious and helps Sikorsky's S-92 brand, Jaworowski said. It is especially critical because low petroleum prices are driving oil and gas operators to curb their helicopter spending.

"Because of what is happening in the oil industry, it's especially important for the S-92 program," he said. "Oil and gas operators — which are a big segment for S-92 — are postponing their helicopter acquisition plans, and that part of the civil market is down."

A recently released Government Accountability Office report found that the VH-92A program was in good shape.

"Since 2014, the VH-92A presidential helicopter program has generally progressed as planned," the April report said. "The program is currently on track to accomplish key development milestones as planned."

As of November 2015, Sikorsky had accomplished $239 million, or 22 percent, of development work leaving $863.9 million, or 78 percent, of remaining work over the next five years, it said.

As of December, it had accomplished most of the program's developmental tasks at "only slightly greater cost than anticipated," the report said.

The program does face some technical challenges, it noted.

"As to be expected with a major system development effort, as the program has progressed it has faced a number of design, integration and technical challenges, some preexisting and others realized during the course of development," it said. "Examples of the challenges the program is currently managing include design of the passenger doors, incorporation of titanium framing in the two initial aircraft, and meeting requirements relating to electromagnetic environmental effects and electromagnetic pulse (EMP) and cybersecurity."

The design of forward and rear doors has been more challenging than anticipated, the report found. To meet requirements, the doors were designed to be larger, increasing their weight.

"The increase in the doors' weight in combination with a requirement for a single-person manual open-and-close capability necessitated an unanticipated redesign of the doors' counterbalance systems and also complicated latch design," the report said. It required extensive design and structural analysis to resolve the issue.

Program office officials are also working on new ways to harden the aircraft from the effects of an electromagnetic pulse, it said. Testing is currently underway to determine which measures would be appropriate, such as increased shielding or additional EMP limiters that protect electronics, the report said.

There is some concern that limiters selected for the helicopter may not provide enough protection, although program officials believe they have found a solution, the report noted.

System developers also need to update the aircraft's cybersecurity infrastructure in order to meet new requirements. A revised Pentagon cybersecurity policy and risk management framework was released after the aircraft's test-and-evaluation master plan was approved in 2013.

"The program has subsequently been working to address the changes necessitated by the revised policy and framework including actively pursuing a contract change to migrate from the certification required under the contract to the current certification standard," the GAO report said.

The office — which has been following the program since 2011 — made no recommendations for the program in its report. **ND**

Email comments to ytadjdeh@ndia.org

Marine Corps Moves Forward On King Stallion Program

By Yasmin Tadjdeh

As major program milestones loom, the Marine Corps is working in earnest to develop and test the CH-53K King Stallion.

The heavy lift helicopter, which is being built by Sikorsky, will replace the service's fleet of aging CH-53E aircraft.

"Why is the Marine Corps buying the 53K? Very simple. Our gear has gotten a lot heavier," said Marine Corps Col. Henry Vanderborght, program manager for H-53 at Naval Air Systems Command in Pax River, Maryland.

When he started flying CH-53s, the Marine Corps was lifting Humvees that weighed 5,500 pounds. However, to counter the improvised explosive device threat that emerged during the wars in Iraq and Afghanistan, the military uparmored vehicles, more than doubling their weight. When the Marine Corps acquires the joint light tactical vehicle, loads will only grow heavier, he said.

"The vehicle of the future is the JLTV. It's even heavier. It's in the 16,000-pound range, depending on what configuration it's in, and that's why the Marine Corps is buying 53K because we have to be able to move that equipment from ship to shore," he said.

The program has been plagued with delays — mostly because of unrealistic requirements, one analyst said — but that is in the past and the government and Sikorsky are looking forward to reaching major milestones, said Mike Torok, the company's vice president of the CH-53K program.

"We're basically on track for a Milestone C decision on or about this time next year," he told reporters during an industry conference in May. "Once we achieve that Milestone C, that will be the big thumbs up to go to production and after that it's a footrace all the way to initial operating capability in 2019."

After Milestone C is reached, the Marine Corps will begin low-rate initial production of 26 aircraft. IOC for the program is defined as having four CH-53Ks ready for deployment, Vanderborght said.

The King Stallion has single, dual and triple external cargo hook capability, allowing the aircraft to transfer three loads to separate landing zones during a single sortie.

The aircraft will offer a marked increase in capability over its predecessor, as it will more than triple the payload to 27,000 pounds while traveling at 110 nautical miles under "high hot" ambient conditions, Vanderborght said.

"It's a significant … increase in capability for the Marine Corps," he said.

The King Stallion also includes a modern glass cockpit, fourth-generation rotor blades and upgraded engines.

The Marine Corps intends to purchase 200 aircraft. The service will stand up eight active duty squadrons, one training squadron and one reserve squadron, Vanderborght said.

The King Stallion flew for the first time in October 2015. Since then, the program has reached a number of additional milestones, Torok said.

"We've really had a significant transition over the last 12 months on the program," he said. "The program has really taken a pivot to a production environment in its status as well as how we're structuring the program."

The first four aircraft are on the final assembly line at Sikorsky's West Palm Beach, Florida, factory, he said.

Naval Air Systems Command announced recently that the aircraft had completed its first external load flight test carrying 20,000 pounds. The test occurred May 26 at Sikorsky's development flight center in West Palm Beach. The service will continue to test the 20,000-pound load at varying speeds and then move on to a 27,000-pound load test, NAVAIR said.

Recently, Frank Kendall, undersecretary of defense for acquisition, technology and logistics, gave the Marine Corps the green light to purchase long-lead material for low-rate initial production, Vanderborght said.

"That was all based on progress that the program had made so far," he said.

The CH-53K program has in the past been blighted by schedule slippages. The reason was because of "impossible goals," said Richard Aboulafia, vice president of analysis at the Teal Group, a Fairfax, Virginia-based defense and aerospace market analysis firm.

Compared to the E-variant, the Marine Corps wanted "twice the performance at half the price and built and designed in no time basically. It was just completely unrealistic, and [because of] a combination of budget reasons and technical reasons it has taken a lot longer than expected," he said. "Anyone could see that coming."

The service is more clear-eyed now and its expectations are more reasonable, Aboulafia said.

IOC "can't come soon enough" for the Marine Corps, said Jesse Sloman, an analyst at the Center for Strategic and Budgetary Assessments, a Washington, D.C.-based think tank.

"CH-53s are the only helicopter in the Corps' inventory capable of carrying out the heavy-lift mission. And the K-model's predecessor, the CH-53E, has the worst mission capable rate of any Marine aircraft," he said.

"This is partly because the Marine Corps underfunded restorative maintenance for the CH-53E after the drawdown in Afghanistan, spending less than 10 percent per helicopter than the Army did for its transport aviation refurbishment," he said.

Additionally, the service is only this year embarking on an extensive and overdue three-year maintenance program that will overhaul the CH-53E fleet, Sloman said.

Even with higher availability rates as a result of the overhaul, the service will be short 50 helicopters of the total 200 aircraft needed to meet its heavy-lift requirement, he said.

"It is imperative that the Corps stick to its timeline for transitioning to the K-model between fiscal year '19 and fiscal year '31 or the limited remaining CH-53Es will have to soldier on even longer, forcing the Marines to sink more money into a legacy platform and potentially grapple with increasingly challenging maintenance problems caused by the

"CH-53s are the only helicopter in the Corps' inventory capable of carrying out the heavy-lift mission..."

CH-53K

E-model's age," Sloman said.

There is broad awareness that aging CH-53Es must be replaced soon after more than a decade of intense wear and tear because of the wars in Afghanistan and Iraq, Aboulafia said.

"They are in terrible shape," he noted. "Because of Iraq and Afghanistan they were worn out at a much faster rate than expected."

The Stallion's heavy lift capability is essential for the service. The Marine Corps has the UH-1Y Venom and V-22 Osprey for lift, but neither platform offers enough, he said.

"If you're looking for something that actually lifts, especially external things, then they really need this machine," Aboulafia said.

The Marine Corps has had to recall CH-53Es from storage, said Raymond Jaworowski, a senior aerospace analyst at Forecast International, a Newtown, Connecticut-based market consulting firm.

"The requirement to replace these helicopters is fairly dire at this point," he said.

For the Marine Corps, there is no real alternative to the King Stallion, Jaworowski said.

The Army's CH-47 heavy lift Chinook could be a possible replacement. "It would be something they would look at, yes, but I don't see the Marine Corps going to Chinook for that," he said.

The delays that the King Stallion program have faced in the past are to be expected, Jaworowski said. For example, there were issues with the aircraft's gearbox that have now been resolved, he noted.

Israeli CH-53

"Some delays, some minor technical issues are common to any new program," he said. Jaworowski did not see any future challenges on the horizon.

Besides working with the Marine Corps, Sikorsky is eyeing international opportunities, Torok said.

"The Germans have started to communicate the need … [to] replace the 53Gs in their heavy lift program, so we are certainly engaged in discussions to facilitate how we can best meet the needs of the German government," he said.

Additionally, the company has been in talks with countries such as Israel, which owns Stallions.

"We actually have gotten some requests from some … countries who are not traditionally 53 drivers," he added.

Germany is Sikorsky's best chance at a near-term sale, Jaworowski said.

The country is currently evaluating the King Stallion against the Boeing-made CH-47F Chinook, he noted. He estimated that a contract could be awarded in 2018 with deliveries starting in 2022.

Japan and Israel, as owners of older CH-53 platforms, could also be potential buyers, he said.

"There's no firm requirement right now, but if you look at the age of the aircraft it's something that you can certainly expect within the next few years for them to start getting serious about," he said.

That could be a lucrative deal for Sikorsky, he noted.

"If you look at those three countries you could be looking at 90 to 100 helicopters if the K is chosen for all three of those options," Jaworowski said. "If they are only chosen say for two — if Germany goes with Chinook but Israel and Japan stay with CH-53 — you could be talking about 30-35 helicopters maybe total."

Countries that currently operate Chinooks but may want to explore other options could include South Korea, Spain, Egypt and Morocco, he said.

Neither Qatar nor Saudi Arabia operates the Stallion or Chinook, but they are interested in a heavy lift helicopter, Jaworowski noted.

"Both [countries have] expressed some interest in the CH-47F, so Sikorsky could do well to jump in there and say, 'Hey, we got the CH-53K,'" he said.

The CH-53K weighs nearly 40,000 pounds more than the Chinook. It can also lift a third more weight, he said.

However, the CH-53K is more costly than the Chinook. It also has three engines as opposed to two. "This is more of a factor on the civil side of the market, but to operate and service a three-engine helicopter is more costly than with a twin-engine helicopter," he said.

Lockheed Martin's recent acquisition of Sikorsky from United Technologies Corp. could bode well for Sikorsky's international sales prospects, Jaworowski said.

"The acquisition by Lockheed Martin … does give Sikorsky access to Lockheed Martin's sales infrastructure," he said. "Lockheed Martin has had considerable international success and experience. That's certainly a factor that Sikorsky can leverage." ND

Email comments to ytadjdeh@ndia.org

SIKORSKY, OREN ROZEN

F-22 Restart Might Not Be Beneficial for Lockheed Martin

By Jon Harper

Congress recently tasked the Air Force to study the cost and feasibility of restarting the F-22 Raptor production line. But building more of the stealthy jets might not make good business sense for prime contractor Lockheed Martin. And practical and political hurdles stand in the way of such an endeavor, according to analysts.

Early in the Obama administration, then-Secretary of Defense Robert Gates succeeded in his effort to kill the F-22 program. The assembly line was shut down after the last Raptor was delivered in 2012. Some air power advocates believe that capping production at 195 planes was a big mistake.

"We don't have enough F-22s," said Gen. Herbert "Hawk" Carlisle, commander of Air Combat Command, at a conference last year. "That's a fact of life. We didn't buy enough."

Other experts hold similar views.

"There are many people out there, including me, who think it was killed prematurely," said Richard Aboulafia, vice president of analysis at the Teal Group, a Fairfax, Virginia-based aerospace and defense market consulting firm.

"It's sort of got a kind of James Dean/JFK died-too-young thing going on," he said. "That's sort of a sinkhole tragedy of the industry."

Carlisle said he dreams that someday the Air Force will buy more Raptors.

Lawmakers could be on the path to making Carlisle's wish come true, having recently directed the Air Force to complete a cost and feasibility analysis for doubling the size of the F-22 fleet.

Advocates for building more advanced aircraft have identified high-tech fighters developed by China and Russia as challenges that must be addressed.

"With threats to America's air superiority growing, it is time for Congress to consider resurrecting the [F-22] or finding a suitable replacement," Rep. Randy Forbes, R-Va., and former secretary of the Air Force Michael Wynne said in a press release.

The Raptor "still outclasses everything else in air-to-air combat," they said.

House Armed Services Committee chairman Rep. Mac Thornberry, R-Texas, said he would wait for the results of the study before passing judgment on whether the production line should be reopened.

"I don't know that [building more] is the answer, but in my town hall meetings I get asked about this," he said at a recent breakfast with defense reporters.

"I think enough members were getting the question that the decision was made [to] see what [the Pentagon] says about that," he added.

In an official statement provided to National Defense, a Lockheed spokesman said the company would give the Air Force any data that it needs to conduct the assessment.

Perhaps counterintuitively, the resumption of F-22 production might not be beneficial for the manufacturer, analysts said.

One reason is that in the current fiscal environment, the plane would likely compete for dollars with the F-35 Lightning II joint strike fighter, another stealthy jet built by Lockheed.

The F-22 is a more maneuverable aircraft designed primarily for air-to-air combat, whereas the F-35 has greater ground-strike potential, said Andrew Hunter, director of the defense-industrial initiatives group at the Center for Strategic and International Studies.

"Given the capability that the F-22 has, if that's the capability you value the most … there could be a way to

make room for it" in the budget, he said. "The logical tradeoff of course would be probably coming out of the F-35 program, and that's one reason why I'm not sure Lockheed is wildly enthusiastic about this idea."

The F-35 is a multi-service acquisition program, with the Air Force, Navy and Marine Corps planning to procure more than 2,400 aircraft. At least 10 foreign countries have also signed on or expressed interest in buying the joint strike fighter. In contrast, the F-22 is solely an Air Force platform, and current law prohibits the aircraft from being exported.

"The F-35 has a much bigger market," Hunter said. "If I were in [Lockheed's] shoes it's pretty clear that it's a poor tradeoff to move resources out of the F-35 program and possibly damage that program and its future prospects in order to restart an F-22 line which is only going to run for a few years probably, and then shut down again.

"That's not to say that it would necessarily be wrong for the nation, but from Lockheed's perspective I'm not sure it looks like a great deal," he added.

Even if Congress lifted the export ban, which was put in place due to concerns that the sophisticated technology on the F-22 could fall into the wrong hands, not many countries would be lining up to buy it, analysts said.

Japan, Israel and Australia are the only allies that have expressed interest in the fighter and would be in a position to purchase and operate it effectively, Aboulafia said. However, those nations also have limited resources to spend on stealthy aircraft.

"They're F-35 customers," he noted. "For every F-22 you sell to them you probably could take away at least one F-35."

The F-35 joint program office is counting on international sales to reduce the unit cost of the plane for U.S. taxpayers. A decision by overseas partners to buy Raptors instead of joint strike fighters would undermine that goal without significantly benefitting Lockheed or the defense industry, Aboulafia said.

"That would probably damage the economics of the F-35 program," he said. "There's sort of a broad awareness that this is not a huge new business generator that enhances U.S. competitiveness. It's just the rebirth of a plane."

Hunter said the only way that restarting F-22 production would be a boon for Lockheed is if Congress beefed up the Defense Department's aviation budget to pay for it. "If one were to assume that the money could come completely from somewhere else and that you wouldn't reduce F-35 production, then it would obviously be a great deal for Lockheed."

But he doesn't see that happening in the current fiscal environment. "The way government budgets are built, the two would inherently be in competition with one another," he said. "It kind of boils down to this question of do you think we're going to enter in the next few years an era where defense budgets are dramatically increasing? Personally I don't see it as terribly likely."

A communications officer for Lockheed's integrated fighter group did not respond to multiple requests to interview company executives about the F-22.

From a financial, industrial and political perspective, there are a number of hurdles to reopening the F-22 line and building 194 additional planes. One is the price tag.

Such an effort would cost about $40 billion including the costs of getting the production pieces back into place and modernizing outdated components, Aboulafia said. A 2010 study by the RAND Corp. yielded similar cost estimates.

On the industrial side, a restart would be difficult but doable, analysts said.

"There is absolutely no space or facility shortfall," Hunter said.

The disassembled Raptor tooling was placed in storage, and every F-22 assem-

AIR FORCE

195

Number of F-22s produced for the Air Force

2,400

Number of F-35s planning to be procured by the Air Force, Navy and Marine Corps

bly process was videotaped, photographed and recorded in case production ever needed to be resumed, according to a Lockheed news release from 2012.

Aboulafia said: "It's just a question of [readying] the onboard building blocks, from the fan blades to the gallium arsenide" semiconductor material.

Hunter noted that the F-22 has titanium cast parts that normally require long lead times to acquire. There could also be problems at the subcontractor level.

"It's quite possible that the limitations there would be more significant because … that production … may have been at a more commercial facility that, once the line was done, they stood it down" and stopped producing the components, he said. "There could be many more bottlenecks in those subsystem suppliers."

A highly skilled workforce would also have to be reassembled.

"It will take some time," Hunter said. But for "a lot of those folks that were on the F-22 program before, you can find them again and they are probably [going to be] happy to have the job back."

None of the industrial hurdles are insurmountable, he said.

"The real kicker to this thing is the money and … a question of time," he said. "How long would it really take to get the line up and running? Probably longer than you might like or think."

It would likely take years to start cranking out new aircraft, Hunter said.

"It could theoretically be as few as two years if one were really, really motivated and really [well] funded to do this aggressively," he said. But "we don't really know the answer of how long it would take" until the Air Force completes its study.

Pentagon leaders are not exactly clamoring to reopen the F-22 assembly line.

Secretary of Defense Ashton Carter is firmly opposed. During a recent press conference at the Air Force Academy in Colorado Springs, Colorado, National Defense asked the Pentagon chief about his position on the issue.

"I'm concerned" that it could take money away from other high priority programs, he said. "Restarting the F-22 — that's an inefficient way to proceed. It's not something the Air Force has recommended to me."

Air Force officials have also thrown cold water on the idea, saying it would be too expensive.

"Congress asked us to look into the option to restart the F-22 production line, and we are looking at it in more detail as a result, although we believe it would be cost prohibitive," Air Force spokeswoman Ann Stefanek said in an email.

F-22 Raptor production line

The Obama administration — and presumably Carter and James — will be out of office next year, but Aboulafia doesn't expect a groundswell of political support for restarting F-22 production after the White House changes hands.

"It's unlikely you're going to find an administration that champions this," he said. "It's very unlikely that the contractors involved, particularly Lockheed, champion it. Unless the Air Force works with Congress directly and aggressively, it's not going to happen. You have to get Congress to get on it [and] you've got to get the Air Force to decide this should be a priority."

Still, a restart is not a political impossibility, Hunter noted.

"There have been some very confusing and vague things said about defense budgets by the presidential candidates, and so you can't completely rule out the possibility that a defense buildup of the nature of, for example, the Reagan buildup" could happen in the coming years, Hunter said.

"That would change the equation" for the F-22, he added.

Down the road, the prospects for more Raptor production could increase as the Air Force considers acquiring a next-generation fighter.

"What do you have in mind for sixth-gen planes?" Aboulafia said. "If there really is something amazing coming down the pike, then [building more Raptors] would be foolish. But if you believe that … a sixth-gen plane would probably look like a reinvented F-22, if our top scientists and technology development people are telling us that, then all of a sudden this becomes a really good idea."

Air Force Chief of Staff Gen. Mark Welsh III, who is slated to retire in July, said that reopening the F-22 manufacturing line may cost less than developing a whole new fighter.

"Rather than thinking of a sixth-generation fighter, can you modify the F-22 and reopen the line cheaper?" he said at a recent conference.

"The airplane is exactly what everybody hoped it would be," he said. "Its potential is really, really, really remarkable."

The Air Force has indicated that it will assess the F-22's ability to fill the role in the coming decades. Next year the service is planning to conduct a formal analysis of alternatives for a future "offensive counter-air capability," Stefanek said.

"Consistent with the agile acquisition mindset designed to deliver capability sooner, our focus is less on generational leaps and more on options to leverage rapid development and prototyping in order to keep ahead of the threat," she said.

Regardless of future production decisions, technology upgrades will continue to be made on the Raptor.

"We value the F-22s we have," Carter said. "We're busy upgrading them and making sure that their avionics and so forth are state of the art."

Aboulafia estimated that the upgrade effort would likely cost about $5 billion or $6 billion.

Hunter said the changes could be incorporated into new builds.

"The assumption that I would have is if you did restart the production line you wouldn't build the F-22 versions that we're flying today, you would build the upgraded versions that Carter is referring to," he said.

Future upgrades could create new business opportunities for subcontractors with advanced technologies, he said. "The subsystems … added to the aircraft may end up being different from some of the original subsystems in some cases" and those modifications might be open to competition. **ND**

Email comments to jharper@ndia.org

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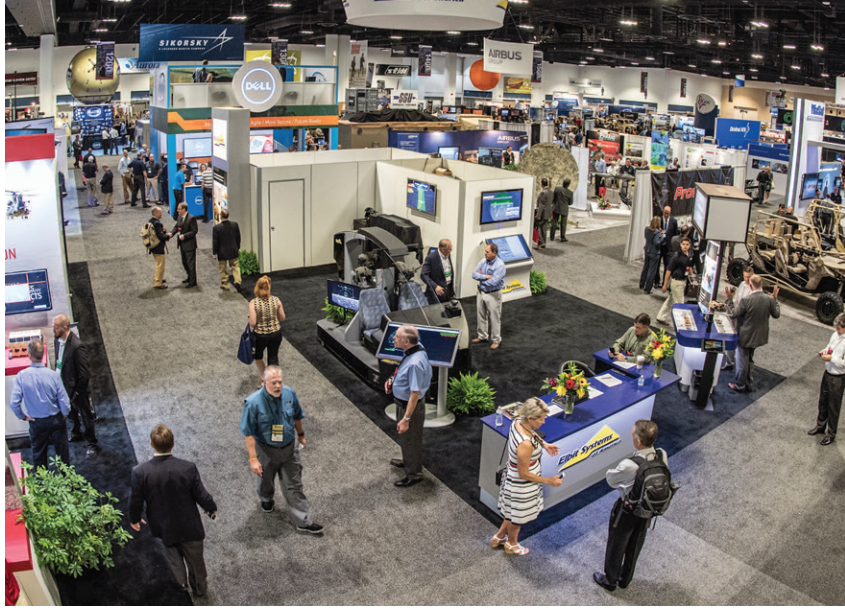

The exhibit hall at the 2016 Special Operations Forces Industry Conference in Tampa, Florida

The 2016 Special Operations Forces Industry Conference hosted well over 10,000 attendees and featured 400 exhibiting companies May 23–26 at the Tampa Convention Center.

The conference provided a forum for military, government, academia and industry stakeholders to network, collaborate and discuss current and future initiatives for supporting special operations forces.

Army Gen. Raymond Thomas III, SOCOM commander, and Acquisition Executive James F. Geurts provided perspectives on requirements, initiatives, future needs and how industry partners can contribute solutions and new capabilities.

The conference included panels of component and theater Special Operations Command commanders, and senior military leaders who provided overviews of acquisition requirements, operations and technology needs in the context of SOF's global missions.

"The industrial base is an indispensable SOF partner that continues to innovate and develop new technologies that will give our forces the advantage to decisively win," said Thomas. "This week was an opportunity to gather all the components of the special operations force enterprise to share collective ideas and explore our future together."

Geurts added: "SOF requirements have grown substantially, as has the demand for the best equipment and technological advances. This week gives our operators, acquisition specialists, logisticians, industry and partner nations the opportunity to come together in one place, at one time to discuss issues, review challenges and examine new opportunities and solutions so we can rapidly field technology, provide better protection and better capability for our forces operating around the globe."

SOFIC also provided updates on the tactical assault light operator suit, and included a marketplace, where command experts provided overviews of the specific areas where they could use assistance.

An international special operations forces capabilities demonstration took place during the conference to display interoperability between foreign partners. The exhibit hall featured new technologies, training systems, vehicles, aircraft and individual equipment, all designed to support the SOF community.

Plotkowski Earns 2016 Red Ball Express Award

The National Defense Industrial Association's Tactical Wheeled Vehicle Division presented Patricia E. Plotkowski, Army deputy project manager for transportation systems, with its 2016 Red Ball Express Award.

The award is presented to individuals who have made significant contributions to strengthening national security by developing, introducing or supporting tactical wheeled vehicles. Plotkowski's leadership and expertise has led to a legacy that includes enhancing the warfighter's maneuverability on the battlefield. She was instrumental in the implementation of the Headquarters, Department of the Army Tactical Wheeled Vehicle Strategy through execution of a fleet plan presented to Congress. Additionally, her work has included the execution of acquisition and total life management of numerous key vehicle fleets.

Patricia Plotkowski accepts the Red Ball Express Award May 10 from Barry Bates, National Defense Industrial Associations vice president of operations, at the Tactical Wheeled Vehicles conference.

"We are pleased to present Ms. Patricia Plotkowski with the 2016 Red Ball Express Award," said Ronald W. Johnson, chairman of NDIA's Tactical Wheeled Vehicles Division. "Ms. Plotkowski's superior leadership and performance in a broad range of transportation assignments throughout her 32-year career exemplifies the spirit of the award."

The Red Ball Express Award was presented to Plotkowski May 10 during the Tactical Wheeled Vehicles Conference in Reston, Virginia.

JULY

7 Army Cyber Innovation Challenge IV
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7 Capitol Hill Modeling & Simulation Expo
Washington, DC
www.trainingsystems.org

11-13 Procurement Division Meeting
Washington, DC
www.ndia.org/meetings/6PC5

14 7th Annual Integrated Air and Missile Defense Symposium (Classified)
Laurel, MD
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20 C4ISR Luncheon Featuring Mr. Douglas Dawson, PMA-207
Patuxent River, MD
www.ndia.org/meetings/692O

22 Michigan Chapter Black Tie Dinner Meeting
Grosse Pointe, MI
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27-28 How Washington Works® – Navigating the DOD
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28 Cyber Security Threats and the Implications for Defense Industry
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2 Space Policy and Architecture Symposium
Chantilly, VA
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2-3 Global Explosive Ordnance Disposal (EOD) Symposium & Exhibition
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2-4 Michigan Chapter Ground Vehicle Systems Engineering & Technology Symposium (GVSETS)
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www.ndia.org/meetings/687C

16-18 Tennessee Valley Chapter 19th Annual Space & Missile Defense Symposium
Huntsville, AL
www.smdsymposium.org

23-24 San Diego Chapter Navy Gold Coast Conference
San Diego, CA
www.navygoldcoast.org

30-31 IPM Division Meeting
East Hartford, CT
www.ndia.org/meetings/6PM3

29-Sept 1 DLA Land And Maritime Supplier Conference and Exposition
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SEPTEMBER

1 S&ET Executive Breakfast Featuring Dr. Jason Matheny, Director, IARPA
Washington, DC.
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9 Rocky Mountain Chapter 33rd Annual Ball & Senior Executive Forum
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12-15 Insensitive Munitions and Energetic Materials Technology Symposium
Nashville, TN
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12-16 2016 SIW (Simulation Innovation Workshop)
Orlando, FL
www.trainingsystems.org

15 CyberForward
Washington, DC
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19-21 Joint Undersea Warfare Technology Fall Conference
Groton, CT
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OCTOBER

6 U.S.-UK-Australia-Canada Quadrilateral Conference
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11-13 21st Annual Expeditionary Warfare Conference
Portsmouth, VA
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12 TRIAD
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19 San Diego Chapter Fall Industry Day
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24-27 19th Annual Systems Engineering Conference
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25-27 Precision Strike Technology Symposium (PSTS-16)
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31-Nov 2 28th Annual Integrated Program Management Workshop
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NOVEMBER

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3 Picatinny Chapter Annual 36th Firepower Awards Luncheon
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Arlington, VA ▪ October 6, 2016
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Next Month

SPECIAL MEGA DIRECTORY ISSUE

■ The Mega Directory is a valuable resource that includes a directory of defense industry companies and defense procurement agencies.

Minuteman III

■ The Boeing Co., after 51 uninterrupted years of building and maintaining the U.S. Air Force's stock of land-based intercontinental ballistic missiles, will be in a competition with industry rivals Northrop Grumman and Lockheed Martin for the contract to swap out key Minuteman III components and ground systems. With 450 missiles in the arsenal, the stakes are high.

Global Positioning System, the Next Generation

■ The troubled GPS III program has been plagued by cost overruns and is years behind schedule. The issue is the Next Generation Operational Control System, or OCX, the enterprise's ground-control segment. Without it, the updated satellites cannot function to their full capability. Lawmakers are growing impatient with the Air Force and prime contractor Raytheon.

Stealth Motorcycles

■ There are stealth bombers and stealth frigates, and soon, we may add stealth motorcycles to the list. Two DARPA-led projects have introduced prototype electric motorcycles with two-wheel drive and a "silent" mode, aiming for a low-observable vehicle that if developed, could shift the way soldiers and special forces conduct military operations.

Special Operations Aircraft

■ Special Operations Command is testing directed energy weapons on board its aircraft, including the AC-130J Ghostrider gunship and the Apache attack helicopter. Such technology could offer operators precision accuracy with low collateral damage all at an affordable price per shot.

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