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# ***National* DEFENSE**

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# National Security at an Inflection Point

We are currently standing at a crossroads and 2016 may well be remembered as a significant inflection point for U.S. national security. And while we began the year with some positive signs associated with acquisition policy and budgets, we must amplify our efforts to bring about real progress in strengthening the country's defense.

The National Defense Authorization Act of 2016 offers some positive reforms that will improve the acquisition system, and Congress is building on this work with additional efforts this year. Further, after facing five straight years of declines that amounted to a 25 percent reduction in real defense spending, Congress agreed to a budget deal that provides an uptick in funding. These were important first steps toward navigating a world that is growing more complex and dangerous.

Secretary of Defense Ashton Carter continues to emphasize what he calls the "five strategic challenges" that the United States faces. These include the return of great power politics with a resurgent Russia and ever more assertive China, both of which are engaged in major efforts to field new military systems that degrade U.S. technological advantages. A persistent threat of regional conflict with Iran and North Korea continues. Meanwhile, the March terrorist attack in Brussels, along with the preceding attacks in Paris, demonstrate the continued potency of terrorist groups like the Islamic State.

The Defense Department's preferred remedy includes shifting investments toward developing new operating concepts and technologies. In releasing their 2017 plans, defense leaders emphasized a willingness to reduce force structure in order to ensure that U.S. military forces remain ready and equipped with the most capable systems in the world. If the defense strategy and programs the current administration favor continue, the military is likely to undergo significant transition over the next decade, even while remaining actively engaged in combat. However, the permanence of these plans is not guaranteed, and we expect a vigorous debate on many national security priorities during the ongoing political campaign season.

The National Defense Industrial Association will continue to play an active role in this discussion as a trusted and reliable partner in national security. It is in a unique position to represent the broadest cross section of the defense industrial base with over 1,600 member companies across all 50 states. It will continue to bridge the gap between the government and industry to ensure that our companies are able to bring innovative security related technologies and solutions forward.

Yet even as the international security environment grows more complex, new regulations limit and constrain the interaction between government and industry executives. This makes NDIA's role ever more important. Going forward, the association must do more than simply provide a conduit for the exchange of information. We need to create new opportunities to enable deeper collaboration focused on improving the acquisition process to provide the U.S. and partners the right technologies and capabilities.

To this end, NDIA recently began a new meeting series that brings together smaller groups of industry executives and government officials focused on international security cooperation. The aim of these meetings is to create a collaborative forum where industry and government can work on mutually beneficial solutions to improve the international sales process. I expect to build on the success of these events to work on other issues where executive dialogue can improve acquisition and policy outcomes.

Much of the transition we face this year is focused on politics and the outcomes of the presidential and congressional elections in the fall. The current election cycle has only one clear certainty. Next year, the country will have a new president. Many key congressional leadership positions will also transition at the start of 2018. NDIA stands ready to begin work with the new administration and incoming members of

"Much of the transition we face this year is focused on politics and the outcomes of the presidential and congressional elections in the fall."

Congress to provide a source of continuity on national security issues. The end of a demanding political campaign season will bring challenging issues associated with governance. During the transition period for a new presidential administration and Congress, NDIA will play a valuable role promoting national security and the broader interests of the entire industrial base.

The change in administration and new congressional leadership will offer opportunities for us to engage with stakeholders.

NDIA has always been a leader in promoting national security. Moving forward, we will increase the value that we provide to our stakeholders by becoming key thought leaders in the national security conversation. During the past two years, NDIA played an important role in stimulating new acquisition reform ideas. This work will continue and grow to include other national security policy areas with an initial emphasis on the supply chain, the national security workforce and global sales.

Beyond these issues, NDIA will continue to be a strong voice for national security. While the 2016 budget deal provided welcome relief from top line uncertainty, we will continue to advocate that our leaders create a long-term deal that provides stable and adequate defense spending. At a time when some of our technological advantages are waning, the association will participate in the dialogue that brings forward innovative new ideas to support national security.

While there are dangers during times of transition, there are many clear opportunities to strengthen the nation and industrial base. NDIA is embracing these opportunities. We have a seat at the table, and we will use it to promote national security, represent industry and increase the value equation to our stakeholders.





Virginia's Fort Monroe military installation was closed in 2011.

## Base Closure Proposal Faces Uphill Battle

■ The Defense Department's latest push to persuade Congress to authorize another round of base closures is unlikely to succeed this year, according to analysts.

A recent Pentagon report concluded that the Defense Department has 22 percent excess infrastructure capacity. For the Army and Air Force, the excess is 33 percent and 32 percent, respectively.

"Spending resources on excess infrastructure does not make sense," Deputy Secretary of Defense Bob Work said in a recent letter to lawmakers.

Based on historical trends, another round of base realignment and closure could save the Pentagon \$1.5 billion to \$3 billion in annual savings in perpetuity once up front costs are paid for, according to Mackenzie Eaglen, a defense budget analyst at the American Enterprise Institute.

"These savings could make a major dent in the need to reinvest in the U.S. military's combat power," she said in an email. The extra funds would be enough for the Air Force to buy five additional F-35s and eight C-130Js; the Navy to purchase 14 additional F/A-18 Super Hornets; or the Army to restore readiness levels, among other procurement options, she noted.

But BRAC is unlikely to be approved by lawmakers in an election year, analysts said. Beyond that, it will continue to be an uphill battle.

"If a new president isn't interested in spending the political capital at the White House to get this through and the new [secretary of defense isn't able] to berate Congress into submission ... then it just won't happen," Eaglen said.

Pentagon leaders have threatened to act unilaterally and use existing waiver authorities to close down unneeded facilities. But an end-run around lawmakers would be a difficult proposition.

"While DoD could exercise these waivers, you still have to go through the environmental review process, so that's going to slow you down," said Andrew Hunter, director of the defense-industrial initiatives group at the Center for Strategic and International Studies, during a briefing with reporters. "That gives Congress enough time to come in and pass a law prohibiting this specific action you're taking."

Outside Capitol Hill, there is growing unity within the broader national defense community about the need for BRAC, Eaglen noted. Interested parties are tired of "the death-by-a-thousand-cuts" to military construction accounts — the result of efforts to offset the cost of maintaining excess infrastructure, she said.

"The louder their voices become, the more likely Congress is to act," she said. "But again, this is an open question" as to whether that will happen.

Todd Harrison, a defense budget analyst at CSIS, said the next administration should consider pursuing a different path in the face of congressional intransigence.

"Right now it appears that the politics are not supportive of a base closure commission, so let's find another way forward that doesn't have to use a BRAC-like construct," he said.

The Pentagon could propose smaller sets of closures and provide Congress with a list of specific bases that should be shuttered. That could reduce opposition from some lawmakers who fear that an unpredictable BRAC commission could lead to job losses in their districts, he said.

"It could flip the politics here and make this more appealing to members of Congress if you just go ahead and name the losers up front," he said. If you identify "the congressional districts that are going to lose on this, that implicitly makes everyone else a winner and so then you've got some basis of support."



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# Pentagon Budget Shortfall Is Greater Than Advertised

■ The use of war funding accounts to pay for base budget activities has obscured the amount of money that the Defense Department will need in the coming years, a leading budget expert recently revealed.

For fiscal year 2017, the Obama administration requested \$59 billion for overseas contingency operations, also known as OCO. But \$25 billion of the \$42 billion billed for the mission in Afghanistan is actually being used for “enduring” requirements which are not directly related to Afghanistan operations, said Todd Harrison, director of defense budget analysis at the Center for Strategic and International Studies.

“It’s not truth in advertising in DoD’s budget request, saying this is all Afghanistan-related, when ... it’s actually not,” he told reporters at a recent briefing about the budget.

Another \$5 billion included in the overseas contingency operations account is explicitly being allocated for non-war related activities, he noted. “We’ve got about \$30 billion in OCO that’s actually being used for things that belong in the base budget.”

In recent years, lawmakers and Pentagon officials have used war funds to pay base budget bills because they are not subject to the caps imposed by the Budget Control Act and subsequent agreements. The heavy reliance on this legislative gimmick makes it more difficult to recognize the scale of looming budget shortfalls, Harrison said.

Unlike base budget plans, “OCO funding only gets submitted one year at a time, and so we don’t see the five-year plan,” he said. “If they’re continuing to assume they’re going to get this level of OCO funding in the future to support base budget activities, then they are masking the true cost of defense and the cost of our force over the next five years.”

Published spending plans are already \$113 billion over the budget caps in the future years defense program, he noted.



“If ... they are planning to have that same level of OCO funding supplement their budget in the future, that’s another \$120 billion” that would be added to the budget shortfall, he said.

Paying for enduring military requirements will need a major legislative breakthrough regarding spending limits, or the continued exploitation of warfighting accounts, Harrison said.

“In reality, we’re about \$233 billion over these budget caps,” he said. “That’s a big issue for the next administration to handle.”



The Polar Star icebreaker

## Top Coast Guard Programs Receiving Cash Injection

■ The Coast Guard’s polar icebreaker and offshore patrol cutter programs are seeing a boost in funding as the service attempts to modernize its fleet in an era of budget constraints.

For fiscal year 2017, the Obama administration requested \$847 million for the Coast Guard’s acquisition, construction and improvement accounts. Although it is far less than the \$1.5 billion per year Coast Guard officials have said they need for modernization, the money would increase funding for two key programs.

At the urging of President Barack Obama, “this year the big priority ... from an acquisition perspective was for the next heavy polar icebreaker,” said Brian Slattery, a Coast Guard expert at the Heritage Foundation.

The president requested \$150 million for the vessel for fiscal year 2017 to support design activities required to begin production of the ship in fiscal year 2020. The project had previously received only \$15 million in acquisition funding.

But the procurement effort could still face difficulties. The U.S. has not built a heavy polar icebreaker since the 1970s or a medium polar icebreaker since the 1990s, Slattery noted.

“This program is at least four or five years out and so there’s a lot of time between now and then to see what challenges arise,” he said.

The total acquisition cost of the new icebreaker could reach \$1 billion, according to the Government Accountability Office.

“There are some unknowns with respect to this program and ... because it is such a large cost relative to other Coast Guard vessels and acquisition priorities, the United States should be looking at the most cost-effective options possible to fulfill this requirement,” Slattery said.

Foreign shipbuilders could potentially provide the vessel at a lower cost and less technical risk relative to U.S. suppliers, he noted.

For the offshore patrol cutter, which Coast Guard Commandant Adm. Paul Zukunft has identified as the service’s top acquisition priority, the Obama administration requested \$100 million in fiscal 2017. That is \$11 million more than was enacted in 2016 and \$80 million more than was enacted in 2015.

“It is important to get that higher level of funding so that they can move closer to an actual procurement” in fiscal year 2018, Slattery said.

The cutters are needed to replace vessels that are 50 years old in some cases, he noted. “We are looking at a major component of the Coast Guard’s capacity that is replacing a lot of legacy craft. That [program] has already been delayed.”

Unless Congress provides more money, it will be “pretty challenging” to fully fund the offshore patrol cutter along with the polar icebreaker and the service’s other major acquisition programs, he added.

Email comments to [jjharper@ndia.org](mailto:jjharper@ndia.org)





# Facing Up to the True Cost of Defense

Defense Secretary Ashton Carter has appealed to Congress on multiple occasions to pass the president's 2017 budget — a request of \$582.7 billion for the Defense Department that adheres to the top line set in a bipartisan deal last fall. That includes a base budget and additional funds for overseas contingency operations.

From day one, the budget proposal has been slammed repeatedly by congressional hawks as grossly inadequate to support military needs.

"We're in a bigger readiness crisis than I understood," said House Armed Services Committee Chairman Rep. Mac Thornberry, R-Texas. He has sought to make the case that budget cuts have weakened the armed services, forcing them to train in run-down facilities and operating weapons systems from the Reagan administration. "There is more stress on the force than most of us have recognized," Thornberry lamented.

His solution was a creative budget maneuver that surprised even defense insiders. In his markup of the 2017 National Defense Authorization Act, Thornberry stuck with the president's overall topline but shifted \$18 billion from the overseas operations account to the base budget, purposely letting the military run out of OCO funds in April. "This gives the new president a chance to reconcile OCO activities and OCO funding," Thornberry said.

"It would have been better if the president had asked for enough money," Thornberry said. "People are being sent on missions for which they aren't adequately trained or equipped."

The HASC budget gambit impressed many as politically astute — it sets up a fiscal cliff for the Pentagon that will require immediate attention once a new administration is sworn in. This budget tactic also was adopted by the House defense appropriators but faces slim chances in the Senate and eventually the threat of a presidential veto.

Regardless of how disagreements over OCO are resolved as the NDAA moves through the legislative process, these clashes bring into sharp relief the reality that after 15 years of war and numerous studies on the subject, we still don't know how much national defense really costs.

For years there has been a constant drumbeat in Washington in support of a national debate on the country's global security and military posture; and what level of resources that requires. But those policy questions mostly have descended into partisan squabbling.

The administration's \$610 billion request is about \$18 billion short of what the Pentagon planned to request a year ago. It is presumably tens of billions below what defense advocates claim is needed to bulk up the Army and the Air Force to combat emerging threats. And the number does not even include other categories of national security and veterans-related spending that are kept outside the Pentagon's budget.

The controversial OCO budget that started under the Bush administration has now been baked into the military's spending requests, which also helps to obscure the true cost of defense.

Budget analyst Todd Harrison, of the Center for Strategic and

International Studies, noted that defense costs are far bigger than most people realize. He calculated that 2017 defense-related funding, in fact, tops \$905 billion. In addition to \$523.9 billion for Pentagon base expenditures and \$58.8 billion for OCO, there's \$20.5 billion for Department of Energy programs — nuclear weapons and naval reactors used in Navy aircraft carriers and submarines but not funded by the Navy, \$8 billion for FBI bomb forensics done for DoD, \$83.4 billion for the amortization of unfunded liabilities, \$22.8 billion for tax expenditures, and \$179.2 billion for veterans' benefits and services.

"Those are all funded outside the DoD budget," said Harrison. And some of these expenses are soaring. At the beginning of the Obama administration, the Pentagon's costs related to veterans approached \$96 billion, have now ballooned to \$179 billion and are projected to reach about \$212 billion by 2021.

Trying to wrap one's head around defense spending also requires understanding that costs are rising faster than inflation and, unless measures are taken to slow that down, the Pentagon will need hundreds of billions of dollars more than projected — a perennial concern known as the "bow wave."

Harrison pegged the program-resource mismatch at about \$233 billion over the next five years. The president's request already is \$113 billion over the congressionally mandated budget caps. Then there's \$30 billion of OCO funding that DoD appears to be using in part for base budget activities. "If you assume that they are planning to have that same level of OCO funding supplement their budget in the future, that's another \$120 billion that they would be planning over the five-year defense plan," said Harrison. Because OCO is a yearly request, over time it amounts to a significant amount of money that today is not counted as "enduring requirements."

The mismatch between defense programs and resources, Harrison said, should be a "big issue for the next administration to handle." Presidential hopefuls will bicker over whether the United States should have a larger or a smaller force, but they should consider that just to continue the Obama administration's plan, the Pentagon needs another \$233 billion. How that would be paid is the \$64,000 question.

A new budget deal perhaps is the only way out of this, suggests former Defense Department Comptroller Robert Hale, now a senior fellow at the consulting firm Booz Allen & Hamilton. It's a timeless problem at the Pentagon that requirements always exceed budgets, Hale noted. The military needs more resources, Hale said. That could happen in the next administration, but there are no guarantees.

The United States has broad foreign policy and defense commitments and, short of changing that, the nation will have to financially support substantial forces on the ground, in the air and at sea. Hale predicts the Pentagon will remain under continuing pressure to cut wasteful spending, an effort that every administration embarks on but ultimately abandons because they require unpopular reforms that are politically toxic.

Email your comments to [serwin@ndia.org](mailto:serwin@ndia.org)





# Researchers Ponder Navigation Beyond GPS

Way back in 1966, a pair of Aerospace Corporation researchers prepared a report for the commander of the Air Force's Space System Division on how a satellite navigation system might work.

That report, and other efforts, would eventually lead to the Global Positioning System, which became fully operational in 1995.

To say technology has changed radically since the 1960s is a huge understatement. And the same can even be said of 1995.

More than 20 years after GPS' deployment, the El Segundo, California-based nonprofit is taking a second look at precision navigation and timing (PNT) and if it could be made more robust.

David J. Gorney, Aerospace Corporation's executive vice president, challenged a team of researchers to see if the system could be improved upon "in the broadest possible context" and dubbed the effort Project SEXTANT.

"We are not looking for a replacement or substitute for GPS. But really how to take GPS and the other sources of PNT and find a way to improve that capability — and most importantly — the resiliency," Gorney said in an interview on the sidelines of the Space Symposium in Colorado Springs, Colorado.

Gorney and the project lead, Randy M. Villahermosa, came to the symposium as part of a tour to present its findings to the navigation and timing community. That includes the operators, customers and technology developers.

First and foremost in its report was the acknowledgment that there isn't anything better than GPS. "It is really a gold standard," he said.

Yet, there has been a lot of concern about disrupted environments, particularly radio frequency and GPS jamming. Are there ways to be more resilient? he asked.

The answer is "yes," but one must look beyond GPS. There are many more methods to do precision navigation and timing — some date back to before the space-based system — others are newly emerging.

The report concluded that PNT is an "ecosystem," and GPS is only one part of the equation.

Inertial sensors, terrain mapping, machine learning and optical sensors are among the methods used for navigation and timing. They all have their strengths and weaknesses, Villahermosa pointed out. While GPS might be the gold standard, it may not work well in natural or urban canyons, tunnels and so forth, he said.

A consumer may assume that when he looks at a navigation application on his smartphone in a city, that it's employing GPS, but it may actually be using triangulation between cell phone towers to locate itself.

With terrain mapping, there is a database of maps in which the device places itself. Optical sensors take pictures 100 times per second and compares them to what it sees on a map. Smart cars are beginning to use this method.

"With GPS being so powerful in its ability to deliver such great performance, it really drives you to a monolithic model for how that business works — and it works really well — but the question is what if we want to go beyond that. What would that look like?" Villahermosa asked.

The report foresees a time when all or some of the methods for collecting PNT data could stream into one device.

GPS is a vertically integrated system, but the precision navigation and timing world is growing ever more "horizontal" with new technologies being developed, the report said.

Vertically integrated systems tend to be more robust, Gorney pointed out. The original phone system developed by Bell Labs is an example. It can be argued that the quality of the signal hasn't been beat. When cell phones came along, consumers sacrificed clear signals for flexibility, Gorney said.

GPS "is very vertically integrated, and vertically integrated systems give you high performance and give you high reliability but sometimes that can be a challenge for resiliency," Villahermosa said.

GPS can't, and shouldn't be required to do everything. Working in tunnels and canyons is one example of niche applications, Gorney said.

A device should be able to take in different data streams depending on the user's needs. A crop duster may have different needs than a taxi driver in a city with large buildings. Military users operating underwater have different needs than those in a truck or airplane.

GPS can be augmented with these other PNT methods. But there are currently no standards to make that happen dynamically in one device, the project found.

"As long as the provider meets the standard, they should be able to bring their inputs into our system, into our platform and be able to process it," Gorney said.

"But we have to have a way to bring that all together," Villahermosa added.

"We have been getting this idea out there [on the briefing tour], particularly talking to product developers. This concept has been well received so far. And I think the customers see the value in multiplying the capability of any particular technology," he added.

Gorney said PNT needs to grow beyond the GPS architecture and into the broader "ecosystem." It's not a race to see what navigation method is best. The user should have access to variety of data depending on need. Work needs to be done to create the capability for these methodologies to integrate.

The Aerospace Corporation is not a technology developer, but since it runs a federally funded research and development center, it is well positioned as a neutral player to create the standards needed to make this vision happen, Gorney said.

Then "anybody who comes up with new techniques for providing a PNT source can have a way of plugging in with the other providers," he said.

Email your comments to [smagnuson@ndia.org](mailto:smagnuson@ndia.org)





# Ethics Violators May Soon Do 'Perp Walks'

For several decades, the compliance profession has lamented the absence of significant, sustained and meaningful white collar prosecutions of individual executives to serve as a necessary deterrent and strike a dagger through the heart of corporate fraud.

The efforts of corporate ethics and compliance officers to create and sustain a strong ethical culture have been hampered, to some extent, by the absence of any real threat that those responsible for corporate wrongdoing will end up doing the “perp walk.” On the contrary, the costs of companies getting caught engaging in ethical misconduct — fines, penalties and even litigation costs — is often seen as a “cost of doing business” in a highly regulated environment.

Until recently, that is. The Department of Justice issued a memorandum last September to federal prosecutors on Individual Accountability for Corporate Wrongdoing, referred to as “the Yates Memo,” after its author Deputy Attorney General Sally Yates. The memo is widely regarded as the department’s response to criticism that it tends to prosecute companies rather than individuals.

The Yates Memo set out six key steps to strengthen Justice’s pursuit of individual corporate wrongdoing:

- In order to get credit for cooperation with an investigation/prosecution, companies must provide the Justice Department with all relevant facts relating to the individuals responsible for misconduct.
- The department’s criminal and civil corporate investigations should focus on individuals from inception.
- The government’s criminal and civil attorneys handling corporate investigations — Justice Department prosecutors and civil attorneys from various agencies — should be in routine communication with one another.
- In most cases, culpable individuals will not be released from civil or criminal liability when resolving a matter with a company.
- Justice Department lawyers should not resolve matters with a corporation without a clear plan to resolve individual cases, and should formally record the reasons for any decision not to proceed against the individuals.
- Justice’s civil attorneys should consistently focus on individuals as well as the company and evaluate whether to bring suit against an individual based on considerations beyond that individual’s ability to pay.

The subtext of the memo is that only companies that meet the cooperation requirements can qualify for a deferred prosecution agreement. So, what does this memo mean for contractors whose behaviors, and corporate ethics and compliance programs, have been driven by the tenets of the organizational sentencing guidelines? Actually, it means a lot.

First, let’s address what it does not mean. It does not mean that companies no longer need to demonstrate that they have an effective and meaningful ethics and compliance program. This is still of paramount importance to the Justice Department, Securities and Exchange Commission and most regulatory agen-

cies as they determine whether or not to prosecute companies for the ethical misconduct perpetrated by “bad actors.”

It also does not mean the government has diminished its concern about the strength of corporate ethical cultures in preventing and detecting fraud or other misconduct. The government will continue to look at the effectiveness of ethics training, alignment of the right corporate incentives, anonymous reporting hotlines and employees’ comfort level in reporting issues when determining whether to give companies credit, or even prosecute at all, under the organizational sentencing guidelines.

It does not diminish the need for companies to self-report fraud or ethical misconduct to the government. In fact, the self-reporting requirement is more important than ever.

What the Yates Memo does mean is that the quality, sufficiency and professionalism of a company’s internal investigations will be factored into civil and criminal investigations more consistently. At a recent conference, Assistant U.S. Attorney General Leslie Caldwell clarified the purpose of the Yates Memo, stating that it was aimed at correcting situations where some U.S. attorneys’ offices “were quick to resolve cases with corporations without really even investigating individuals,” or attempting to identify who was responsible.

Caldwell also said the memo was intended to press companies under investigation to do more than just “comply with a subpoena,” that is, to give the department the facts, especially about what happened, who did it, who knew, who participated and who said what.

By directing companies to provide all relevant facts in order to qualify for any cooperation credit, Justice is pushing companies to conduct thorough, proactive and timely investigations into the individuals involved. As a result, the memo sends the message that if a company expects leniency, even if it has created a strong ethics and compliance program, it will have to expose the individuals involved in wrongdoing. Yates summarized the essence of her memo when she said, “we mean it when we say, ‘you have got to cough up the individuals.’”

Based on Yates’ Memo and Caldwell’s public statements, contractors must develop a thorough process to triage all serious employee complaints and allegations at the corporate level, rather than permit lower level managers to address misconduct.

They should conduct thorough, proactive and timely investigations into potential, substantial violations of the law.

In addition, corporate ethics and compliance offices will need to be able to demonstrate that they follow appropriate investigative processes, involving use of outside counsel; professionally trained, certified fraud examiners or investigators — internal or external — and other measures indicative of integrity.

Developing and maintaining a substantial and robust ethics and compliance program that prevents and detects employee wrongdoing will help lighten the burden created by this new focus on individuals.

**Eric R. Feldman is senior vice president and managing director of corporate ethics and compliance programs at Affiliated Monitors Inc.**





USS Makin Island

## Navy, Marines Pursuing Energy-Saving Projects

■ The Navy and Marine Corps are pursuing new energy-efficient capabilities that could help save lives and increase resiliency to adversaries' attacks on their power grids, a Navy official said.

The Department of the Navy has two key goals for its energy portfolio: enhancing Navy and Marine Corps combat capabilities and advancing security afloat and ashore, said Dennis McGinn, assistant secretary of the Navy for energy, installations and environment, in written testimony to Congress.

"Using energy more efficiently allows us to go where we're needed, when we're needed, stay there longer and deliver more firepower when necessary," he said in an April hearing before the subcommittee on readiness and management support under the Senate Armed Services Committee.

"Improving our efficiency and diversifying our energy sources also saves lives," he noted. During the height of operations in Afghanistan, one Marine was killed or wounded for every 50 convoys transporting fuel into theater. "Reducing demand at the tip of the spear through energy efficiency, behavior change and new technologies takes fuel trucks off the road."

To improve efficiency, the Marine Corps is working to integrate solar power into unmanned aerial vehicles, allowing them to provide persistent surveillance for longer periods of time before needing to be refueled, he said. The Marines are also working to harvest alternative forms of energy — including kinetic — for an integrated power system that can operate radios and electronic gear.

In 2016 the Navy will begin installing hybrid electric drives in its destroyers "enabling our ships to remain on station longer during low-speed missions and extend time between refuel-

ing," McGinn said. The technology is the same being employed today aboard the amphibious assault ships USS Makin Island and USS America, he added.

Meanwhile, both services are working on projects to improve resiliency to power outages on bases caused by acts of terrorism, adverse weather or mechanical failure.

The Navy is installing eight gigawatts of distributed generation and a microgrid at Naval Submarine Base New London, Connecticut, that will power not only the base but also key parts of the nearby city of Groton in the event of a power outage, McGinn said at an Atlantic Council panel discussion in April. This will include the city's first responders and medical facilities. "It isn't simply a brightly lit, isolated island of electricity on the naval submarine base," he said. "It is that plus the community that we partner with."

At Naval Submarine Base Kings Bay, Georgia, the Georgia Power Company is constructing a 42-megawatt solar-generation facility that the base will have access to during external grid outages, McGinn said in his testimony. Similarly, the Marine Corps Logistics Base Albany, Georgia, will gain access to a 44-megawatt solar-generation facility on its base and a second feeder line from the Georgia Power Company's grid at Kings Bay.

Additionally, the Arizona Power Service recently signed an agreement to develop a microgrid at Marine Corps Air Station Yuma, Arizona, and will provide the base with unlimited access to onsite backup power. That will eliminate the need for up to 41 diesel generators, McGinn said.

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# University Investing in Medical Military Tech

■ From eye transplants to innovative studies in concussions, the University of Pittsburgh is researching new medical technology that can benefit injured soldiers.

Work is being done through the university's Center for Military Medicine Research, said the center's executive director Ronald Poropatich, a retired Army colonel who worked as a pulmonary/critical care medicine physician.

"The whole purpose of that center, established in June of 2012, is to facilitate collaborations between the University of Pittsburgh faculty" and officials in the Departments of Defense and Veterans Affairs, he said. "We focus on some really large research topics that play to the strengths of the university and also play to the needs of the DoD."

Those areas include regenerative medicine, human performance, injury prevention and traumatic brain injury research, he said.

Within regenerative medicine, Pittsburgh is investing research dollars into tissue engineering, medical device development and cell therapy, he said. While the center is only a few years old, the university has been working in the field for more than 10 years, he noted.

Eye transplants are one area of study. Funded through a Defense Department grant worth about \$250,000, the university has examined ways to transplant the eyes of rats, he said. Success with laboratory animals could one day usher in success with human patients.

It is still difficult for researchers to remove the eye and part of the rat's face and transplant it into another rat, he said.

"Hooking up that optic nerve is really a tricky part because when you cut the eyeball out of a rat there are certain cells that die very, very quickly, so you have just moments to really reconnect and continue cell viability there," he said. The center has found some success using a combination of surgical and regenerative medicine techniques.

The university is now using its research in eye transplants to compete for a five-year joint warfighter medical research program worth millions of dollars, he said. It submitted a proposal earlier this spring.

Traumatic brain injury research is another area of investment. The University of Pittsburgh is especially well known for its studies in the area of chronic traumatic encephalopathy because of its work with the NFL and Bennet Omalu, the doctor who in the early 2000s discovered that many American football players were suffering from CTE. Repeated blows to the head cause the progressive degenerative disease, which can often lead to suicide, and is typically diagnosed during autopsies.

"We have some very strong programs in basic science looking at ... brain injury and cell death, taking it through neuroimaging," Poropatich said. "That's a big part of our research capability. We're very strong in imaging the brain and coming up with neurodegenerative diseases before you have to do an autopsy. And once you do an autopsy ... it's too late, the person's dead."

— Yasmin Tadjdeh ■ ytadjdeh@ndia.org



## New App to Alert First Responders to Emergencies

■ During emergency situations, such as those involving active shooters, alerting authorities quickly can result in lives saved. One new app is helping to streamline that process.

Mutualink, a communication and multimedia company, has teamed up with Rave Mobile Safety, a public safety software company, to create a system that can, at the push of a button on a smartphone, alert authorities to emergency situations while connecting them to radio, video streams and building floor plans.

"What's important to recognize with our panic button application is that we are directly integrated into the 911 system," said Todd Miller, vice president of public safety services at Rave. "That means rather than simply notifying first responders and having them self dispatch, we're going to bring this information directly into our local 911 centers which is incredibly important especially when you're dealing with active shooter-type scenarios."

Time is of the essence in such circumstances, he said. Active shooters situations are often finished within five to six minutes, he added.

Rave's panic button is integrated with Mutualink's emergency communication infrastructure that has been in use for years, said Mark Hatten, CEO of Mutualink.

Prior to the partnership with Rave, one "weak link" in Mutualink's product was that its panic buttons were physical and stationary, he said.

"Hardware panic buttons tend to be deployed at a few locations around the school but not in every classroom, not necessarily where the person is that's having the problem," he said. "We looked into the industry and looked at ... wireless type devices, devices that could be put on clients, and it became apparent to us that Rave was by far the leader in this space with the best product."

The panic button can alert first responders, and other users, to a number of situations including shooters, fires and medical emergencies, Miller said. When an organization — such as a school, a hospital or a government agency — adopts the technology it is able to construct a virtual fence around the perimeter of the building.

"The panic button can respond one way when they're on a facility and a different way if they're outside that facility," he said.

The app is compatible with iOS and Android-enabled smartphones.

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## Industry Suggests New Approach to Cybersecurity

■ As federal government agencies work to modernize their aging network infrastructure, officials charged with upgrading systems need to implement a new holistic security strategy, executives from Brocade said.

Brocade, a San Jose, California-based network and data company, is proposing the government adopt a comprehensive security strategy that would consolidate various parts of the network — including encryption and firewalls — into one collective system, said Judson Walker, systems engineering director at the company. This is especially critical as the government moves toward cloud-based computing and adopts more devices, such as smartphones and tablets, he said.

In 1995, there were roughly 100 million devices on the government's networks. In 2015 there were 7 billion. By 2020, there could be more than 20 billion, Walker said. This explosion of devices goes hand-in-hand with the concept of the "Internet of Things" — where more and more objects are connected to cyberspace.

"What that has done is it has opened ... potential security vulnerabilities — places where adversaries can do us harm," Walker said.

Government security engineers have responded to those vulnerabilities by implementing a patchwork of security fixes that are merely "bolted on," he noted. "There's no cohesiveness in what we call a security strategy."

"We need to develop an end-to-end security strategy from the device, whatever that device might be, to the data center where the information resides," Walker said. "Along the way there's going to be various point products that you're going to use but they should be working cooperatively together, not in stovepipes."

Further, security systems must have greater automation, flexibility and scale in order to be effective. Last year, Brocade commissioned a study of 60 government agencies and found that a large portion of employees were unsatisfied with their security systems, he said.

During the study, 200 individuals were interviewed. Seventy-five percent of them felt that their current cybersecurity infrastructure was not secure or was only marginally secure.

Additionally, 32 percent said they had in the past turned off their security protocols because the systems could negatively affect their computer's performance.

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## Army Developing Robot With Deployable Shield

■ The Army Research Laboratory is creating a robot that deploys a shield to protect soldiers from bullets. The technology could serve as an alternative to robotic exoskeletons such as Special Operations Command's tactical assault light operator suit, said a lab official.

"A lot of people associate robotics with lethality but what we're looking at is ... [using] these robotics in a purely protective manner to deploy a shield away from the soldier," said Shawn Walsh, team lead for agile manufacturing in the Weapons and Materials Research Directorate at ARL. The lab refers to this concept as robotic augmented soldier protection, or RASP.

The drone, which would be completely decoupled from the soldier, would shadow him or her and then quickly move into action once a projectile is detected, Walsh explained. ARL is looking at both unmanned aerial and ground vehicles for this project.

The technology could be used to minimize civilian casualties as well, he said. "The robots could actually be used to help protect non-combatant civilians too because they can get there faster [and] they can put up barriers."

One of the benefits to using this human-robot teaming approach as opposed to the exoskeleton approach is that RASP can be multi-functional, Walsh noted.

A robot with a detachable shield opens up a lot of possibilities because "we can use it to mule stuff — water, candy for the inhabitants of a village, supplies — but when it needs to be it can become a protective device," he said. "I don't want to denigrate exoskeletons because they are definitely worth doing. But this just provides an alternative space that we should explore."

RASP has the potential to be a less expensive option because the Army could use "attritable," low-cost unmanned systems, compared to a human or an expensive ground vehicle, Walsh said.

A few working prototypes have been developed under RASP, he said. The personal upgradable protection-experimental, or PUP-E, uses a commercial iRobot as an autonomous mobile platform to deploy a "ballistically protective ultra-high molecular weight polyethylene shield," an ARL spokeswoman told National Defense. Another prototype, referred to as "smart trailer" can connect with an unmanned ground vehicle. It can be used for transport and is also an "on demand" ballistic shield, she said in an email.

RASP is a long-term concept, she added. It will be anywhere from 10 to 20 years before soldiers get their hands on this type of technology.

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PUP-E concept



# Company Using Artificial Intelligence to Improve Security

■ Through the use of artificial intelligence, Armorway, a Venice, California-based company, is predicting when terrorists or adversaries will attempt to strike a target, giving security professionals the chance to take preventative action.

Armorway provides its customers with “intelligent adaptive solutions,” said Zaré Baghdasarian, co-founder and CEO of the company. Adversaries “learn and adapt. So as a security [precaution], we have to be the same way, adaptive, and stay one step ahead of them.”

The company currently offers two products: Trust is tailored for insider threats. Sentinel is designed for law enforcement and campus security. The Departments of Defense and Homeland Security, airports and police departments are currently using Armorway’s technology.

The company uses game theory to predict when an adversary may try to breach an organization’s security, Baghdasarian said.

“You cannot provide 100 percent security. Your security breaks down when adversaries predict what you’re doing,” he said. “You have to be unpredictable so they never know where you’re going to have security officers. ... Basically you keep the enemy guessing by providing more intelligent, adaptive solutions.”

For example, the Coast Guard uses the technology for port security in New York, Boston and Los Angeles, he said. If a terrorist wanted to attack a port, they would study patrols and try to find a time where there was less security.

“Because we have limited resources, we cannot do 24/7 protection,” he said. “They see when the patrol patterns of the Coast Guard ... [are] and they try to attack when there are no patrols or there is no protection. They find a hole ... [and] as soon as they figure out where are the holes in the system, they penetrate.”

Using Armorway’s software, the Coast Guard is able to schedule patrols in a way that can deter and disrupt such plans, Baghdasarian said. “They’re not able to predict when the Coast Guard is going to be there or not.”

The system is also used at Los Angeles International Airport to help schedule security checkpoints, he noted.

LAX has eight roads that lead to

the airport and checkpoints are set up periodically along the way to check cars for things such as explosives. If a terrorist knows that there is police presence every day between 10 a.m. and 5 p.m., then he



will come at 7 p.m., Baghdasarian said.

“When do you set up the checkpoints? Do you [do it] 24/7? Do you check every single car? Physically, that’s not possible. You don’t have the resources to do that. The cost is too high,” he said.

Armorway, using intelligence data that draws on everything from passenger load numbers to traffic changes, creates a schedule that makes it difficult for a terrorist to predict when there will be increased police presence. “Now you assume when you go to LAX there is a checkpoint.”

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# DoD's Antitrust Battle Ends Peacefully

Since late last September, defense industry observers have witnessed an unusual public display of discord between the Department of Defense and the antitrust enforcement agencies, the Department of Justice and the Federal Trade Commission, over the standards for determining whether a merger of defense contractors should proceed.

The clash became public when Undersecretary of Defense for Acquisition, Technology and Logistics Frank Kendall announced that the department would seek independent authority to approve or disapprove mergers involving the defense industrial base for national security reasons, thus introducing a review process separate from that of the antitrust enforcement agencies.

Kendall's announcement followed Lockheed Martin's acquisition of Sikorsky Aircraft, the helicopter division of United Technologies Corp. Kendall stated that a review focused exclusively on the competitive impact of a transaction does not guard against other potential harms caused to the industrial base by the absorption of a smaller company into one of the major prime contractors.

He noted that while the absorption of a smaller platform provider into a larger company may not technically reduce competition, the transaction may not be in the best interests of the Defense Department or U.S. taxpayers. He expressed concern that the largest companies in the defense industrial base use their size and accompanying clout to their economic advantage, which he reasoned may reduce competition and innovation, limit sources of supply, increase barriers to entry for newcomers to the market and result in increased costs to the taxpayers.

Kendall stated that to address these concerns, the department would pursue legislation to obtain express authority to block transactions if it found them to have a negative impact on national security.

Not surprisingly, many in the defense industry reacted negatively to Kendall's suggestion. However, DoD did indeed draft a legislative proposal that — while never made public — was reportedly designed to create such a DoD-controlled national security review in addition to the review performed by the antitrust enforcement agencies.

The draft legislative proposal was then submitted to the Office of Management and Budget for the required interagency clearance before being transmitted to Congress. This interagency process includes review by the Justice Department.

In a surprise move, and as an apparent collective response to the legislative proposal, the Department of Justice and the Federal Trade Commission April 12 issued a joint statement explaining the standard of review that the antitrust enforcement agencies use when evaluating proposed transactions in the defense industry. The agencies asserted that by protecting competition, they are in fact protecting national security by maintaining multiple sources of products and services and the most innovative technologies to support our military personnel, all at competitive prices. In other words, the joint

statement confirmed that the separate review sought by the Defense Department would be redundant.

The antitrust agencies further explained that during a merger review, they account for all the factors about which Kendall has expressed concern, "such as high barriers to entry, the importance of investment in research and development, and the need for surge capacity, a skilled workforce and robust subcontractor base."

Indeed, they point out that based on their "substantial experience applying the [DOJ/FTC 2010 Horizontal Merger] guidelines to defense industry mergers and acquisitions," they are very capable of addressing all the issues that Kendall has cited as requiring new Defense Department authorities, including "ensuring that defense mergers will not adversely affect short- and long-term innovation crucial to our national security and that a sufficient number of competitors, including both prime and subcontractors, remain to ensure that current, planned, and future procurement competition is robust."

After the release of the statement, the Defense Department withdrew its controversial legislative proposal. Its decision to withdraw it appears to signal that the department is willing to continue working within the current antitrust review structure, providing its insights and concerns to Justice and the FTC as part of the standard antitrust review.

Commentators differ on the importance of this chain of events. Some see the joint statement as an implicit capitulation by the antitrust agencies to the DoD concerns, while others speculate that it and the concomitant withdrawal of the DoD draft legislative proposal are the bureaucratic equivalent of a negotiated truce.

What is clear, however, is that DoD will continue to play an active role in merger activity by the defense industrial base. Further, it will need to express its national security concerns about transactions in antitrust terms, for example, by explaining the impact the transactions will have on competition, innovation and maintenance of the defense industrial base.

The relationship between Defense and the antitrust enforcement agencies has been largely symbiotic since its inception in the mid-1990s. As examples, DoD provides the agencies access to subject matter and market experts in transactions involving the defense industry, and the antitrust enforcement agencies define markets and competitive timelines in a manner consistent with the federal budgeting process and the many restrictions on DoD's ability to purchase.

The resolution of this interagency spat indicates a recognition that by working together, the agencies can continue their long-standing practice of preserving a competitive landscape in the defense industry that protects innovation, industrial capacity and cost competition into the future, which in turn protects national security.

**Scott Freling is a partner in the government contracts practice at Covington & Burling LLP. Kathy Brown is a special counsel in the government contracts, CFIUS and antitrust practices at the firm.**



# Contractor Mergers and Acquisitions: Issues to Watch

## Legal Brief

By John Chierichella  
and Keith Szeliga

Mergers, acquisitions and investments involving government contractors and subcontractors present unique challenges. The risks can be mitigated but first they must be understood.

Government consent is required to transfer government contracts through asset purchases and mergers, but not stock purchases. Consent is usually obtained through a novation agreement. Novations require submission of detailed information and typically take between two and six months after closing.

The process can be burdensome and time consuming, and the government can withhold consent and terminate the contracts. The novation agreement

contains unfavorable provisions, such as requiring the seller to guarantee the buyer's performance of the contract after closing. But structuring a deal as a stock sale avoids these risks.

The False Claims Act allows the government to recover up to three times its actual damages, plus fines and penalties, if a contractor knowingly or recklessly submitted a false claim, which is often an invoice. Common FCA triggers include knowingly or recklessly invoicing for work not performed, delivering work that does not meet contract requirements and making false certifications — for example, regarding product testing. The mere threat of an FCA suit can extract a sizable settlement. Thus, buyers should require disclosure of FCA actions or investigations, evaluate

the seller's policies and procedures to ensure they are not reckless or indifferent as to compliance, and obtain representations relating to the absence of potential FCA liabilities.

Other risks are audits and investigations. Government contractors are audited and investigated by an alphabet soup of agencies — the Defense Contract Audit Agency, the Defense Contract Management Agency, the Department of Justice, the Government Accountability Office, the office of the inspector general, the office of federal contract compliance programs and the Small Business Administration.

Contractors must file a mandatory disclosure where they have credible evidence of an FCA violation or certain crimes relating to government contracts. Government audit reports and mandatory disclosures are valuable tools for identifying and quantifying risk. Sophisticated buyers typically request these documents as well as representations and warranties regarding the seller's





knowledge of pending audits investigations and FCA actions.

Intellectual property is another concern. The government generally obtains broad license rights in technologies developed under government contracts. Contractors can limit the government's rights in technical data and computer software pertaining to privately developed technologies, but this requires planning and discipline, including, for example, using prescribed restrictive legends and maintaining records of development at private expense. Similarly, contractors can forfeit patent rights by not disclosing subject inventions in a timely manner.

The buyer should analyze the IP clauses included in each government contract, what technology was developed under that contract, and whether the seller has taken adequate steps to protect its rights. Some buyers also seek representations and warranties specific to government contracts IP issues.

Organizational conflicts of interest (OCI) rules generally prohibit a contractor from competing for a procurement if it has an unfair competitive advantage, if it set the ground rules for the procurement, such as by preparing specifications or a statement of work, or if the contractor's objectivity may be impaired, for instance, by evaluating its own products or services. Some contracts include OCI mitigation plans or other preclusions on future work. Organizational conflicts of interest restrictions often apply to a contractor and its affiliates.

Thus, purchasing a target that advises the government on procurements or evaluates products or services for the government could preclude the buyer as a whole — not just the target — from competing to supply those same products or services. The buyer should evaluate not only whether the target has any organizational conflicts of interest but also whether acquiring the target will create any problems for the buyer's other business interests. Some buyers also require OCI representations and warranties.

Cost, pricing and accounting issues must be taken into account. Cost-reimbursement contracts and contracts awarded on a non-competitive basis impose more risk than commercial item contracts. Depending on the dollar value, the contractor may need to com-



**"Acquiring or even making an investment in a small business can trigger an affiliation and result in a loss of size status."**

ply with the Truth in Negotiations Act, which requires disclosure of detailed information during price negotiations, or with complex cost accounting standards that govern the allocation of costs to contracts.

Cost reimbursement contracts are subject to principles that limit the types of costs the government will reimburse. Failure to comply with these requirements can result in significant liability, including cost disallowances and potential False Claim Act violations. The buyer should determine whether the seller has contracts that are subject to Truth in Negotiations Act, cost accounting standards or the cost principles and, if so, assess the target's policies, procedures and systems for complying with these requirements.

Another consideration is small business rules. Some procurements are set aside for small businesses and others provide preferential evaluation credit for small businesses. Prime contractors often prefer small business subcontractors because their size status enables primes to meet their small business goals. A contractor qualifies as small based on its revenue or number of employees plus the revenue or number of employees of all "affiliates."

Acquiring or even making an investment in a small business can trigger an affiliation and result in a loss of size

status. The buyer should identify how much of the target's business depends on its size status and how the loss of small business size status will affect the target's prime contracting and subcontracting opportunities.

Adverse past performance ratings can impact the ability to obtain future work. Buyers should request a contractor performance assessment reporting system for material contracts and representations and warranties regarding adverse past performance. It is also advisable to request any termination, "cure" or "show cause" notices and to analyze the level of risk they present to the business.

The buyer also should consider the target's present responsibility. Contractors that fail to comply with their contractual or regulatory obligations or engage in other conduct that calls into question their integrity can be suspended or debarred from government contracting. This is often referred to as the "death penalty" for a government contractor.

Security clearance issues need to be examined as well. It can be difficult or impossible for the buyer to gain access to classified contracts. This limitation can be mitigated somewhat by obtaining robust representations and warranties. The existence of classified work is more problematic, however, if the buyer is subject to foreign ownership, control, or influence. The government will require that this be mitigated, which can involve a simple board resolution to "wall off" foreign interests from classified contracts or more invasive measures that can deprive the owners of most day-to-day management prerogatives.

The contractor also must consider whether filing a "voluntary" notice of the transaction with the Committee on Foreign Investment in the United States is necessary.

There are many other issues to consider when buying or selling a government contractor, but these are solid places to start. **ND**

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# The Promise of Technology

## Navy could save billions of dollars sending robots to patrol the oceans

**By Sandra I. Erwin**

One of the defense industry's most secretive technology developers — Boeing's Phantom Works — is making a big bet on commercial robots it believes are better suited to military needs and cheaper than anything the Pentagon could ever invent.

Seeing an obvious need in the U.S. Navy and motivated by the Pentagon's rhetoric that it intends to buy innovative products from the commercial industry, Boeing executives decided to depart from the traditional defense business model and spend company funds to develop a family of autonomous mini-submarines.

Boeing has worked on maritime robots for decades but in recent years, Phantom Works — known for designing stealth fighters and high-concept vehicles — has “really stepped up its investment in autonomous underwater vehicles,” said Lance Towers, director of advanced technology programs at Boeing's Electronic & Information Solutions division.

The market for robots has been booming in the defense sector since the military began to use unmanned systems for missions viewed as too dangerous for human operators. Boeing's autonomous underwater vehicles would be poised to patrol waters in areas where the Navy might not want to risk sending manned submarines.

But the company is not just offering this system on that basis alone. Another big selling point: These robots would be real money savers — unlike other unmanned systems used by the military that require massive crews and support infrastructure to operate.

“We were interested in trying to help our customers to break the cost curve,” Towers said during a presentation at Boeing's corporate office in Arlington, Virginia.

Boeing analysts crunched the numbers. For the Navy, the only way to save real money in ocean surveillance is by deploying autonomous vehicles that don't require labor-intensive surface ships or submarines for launch and recovery. “You needed something that could be launched from port, operate for a long time without humans

needed to maintain or recharge,” Towers said.

The company in March unveiled a 51-foot hybrid diesel Echo Voyager submarine that is completely autonomous. On the surface of the water, it raises a mast, turns on the diesel generator, recharges the batteries, lowers the mast and submerges to 11,000 feet.

The vehicle can be launched and recovered from any commercial port in the United States, he said. As far as electronics add-ons, it's up to each customer, Towers said. It's the same approach that Boeing has pursued in the defense aviation market with military derivatives of its 737 commercial airframe. “The vehicle was designed for multiple customers so they all share the infrastructure costs.”

The Echo Voyager will be tested at sea in Southern California this summer. Four buyers already have signed up, but Towers would not disclose their identities.

The biggest prize would be a Navy contract. Boeing doesn't expect that to happen immediately but is confident the Navy will look at the numbers and realize that conventional maritime surveillance is financially unsustainable. There are simply not enough people, surface ships or submarines to keep up with the demands.

“We looked at the trends,” said Towers. “We noticed that average days at sea are dropping every year. Budgets are flat. Personnel costs are going up,” he said. “They can either get to the point where you're doing one or two days at sea with the current, very expensive assets or do some of the dull and dirty work with other assets that are much cheaper.”

Even if the Navy paid tens of millions of dollars for an autonomous submarine, the long-term savings from support costs and crews add up to billions, Boeing calculated. The vehicle leaves from the pier so there is no support staff. One



person can manage 20 vehicles at sea.

Another piece of Boeing's grand plan to bring commercial technology to the Navy is a partnership with a Silicon Valley-based maker of autonomous vehicles, Liquid Robotics. Its renewable energy powered wave glider grabbed Boeing's attention in 2012. "When we first found Liquid Robotics they were doing one of these X-prize challenges to cross the Pacific. We read about it, I think, in *Popular Science*," said Egan Greenstein, senior director of autonomous maritime systems at Boeing Military Aircraft. "We said, 'We have to get to know these guys.'"

Boeing helped Liquid Robotics perfect the SHARC (sensor hosting autonomous remote craft) for use as a collector of real-time maritime data. The SHARC is propelled by energy generated by ocean waves, and its electronics are solar powered, so it needs no fuel. It has been sold to oil and gas companies and other civilian industries for ocean exploration.

"When you put it at sea, it's good for six months without a human touching it," Greenstein said in an interview. "We thought it had promise to solve hard Navy problems." Its close-to-the-surface low signature makes it "very hard to locate unless you know where to look."

Liquid Robotics has built about 350 gliders that have traveled more than a million nautical miles and penetrated 17 tropical storms. "This is a solution that Boeing didn't have to come in and engineer," he said. "It is literally a platform on which we're attaching things."

Boeing got the Navy to test the SHARC in a tactical exercise last year. "We proved we could detect speed boats and slow boats," Greenstein said. "We used a hydrophone to detect the sound of approaching ships. If it detected a threat it would call home over satellite communications to tell decision-makers something is going on."

During a U.S.-Australia joint exercise last summer, the SHARC served as an intelligence, surveillance and reconnaissance node in the ocean. Based on that performance, Boeing saw promise for more complex missions. "We stepped up to antisubmarine warfare which is a very large problem," he said. The Navy wants freedom of navigation in the Pacific, the South China Sea, big areas where targets are quieter. The SHARC can deploy an acoustic towed array, wait until it hears the signature of a submarine, and call home.

With devices in the water to provide early warnings, the Navy would not have to keep P-8 Poseidon surveillance aircraft continuously patrolling in case something happens. A cluster of SHARCs, for instance, could be forward deployed, close to the threat. P-8s would be spared from 24/7 duty and would only respond when there's real danger. The vehicles in the water, further, would be able to talk to unmanned aircraft overhead, said Greenstein.

The underwater vehicle Echo Voyager and the SHARC, he said, "were pursued with an understanding that creating a manned and unmanned seafloor-to-space network is a vital part of the future of maritime surveillance." SHARC is the communications gateway that enables that network, he explained. "It can 'talk' not only with manned and unmanned assets in the air, but also with manned and unmanned subsea and seafloor assets like submarines and UUVs." SHARC is



interoperable with the Echo Ranger, he said, and connecting it with larger platforms like Echo Voyager is the next step."

This "machine-to-machine collaboration" has become a holy grail in the Defense Department. "We have tried to figure out how we get platforms to cross-cue each other," he said. "If a SHARC detects an event, it can task a ScanEagle autonomously, without a human in the loop." The next step is to teach ScanEagle to recognize ships at sea and identify them as friendly or hostile. "I can send unmanned platforms into an area and let them drive around and find everything without bothering human decisions-makers."

Advanced target identification technology is widely available, said Greenstein. "We all walk around with image recognition technology in our phones. The trick is getting it into unmanned aircraft. That's just months away."

At the recent Navy League technology exposition in Washington, D.C., Boeing streamed live data from SHARCs off the coast of Hawaii. The idea is to give Navy leaders a taste of what is possible, he said. "What does it mean to have awareness of every airplane that is flying? And how would you use that information?" Four SHARCs now swimming near Hawaii are tracking every aircraft and ship coming out of Honolulu.

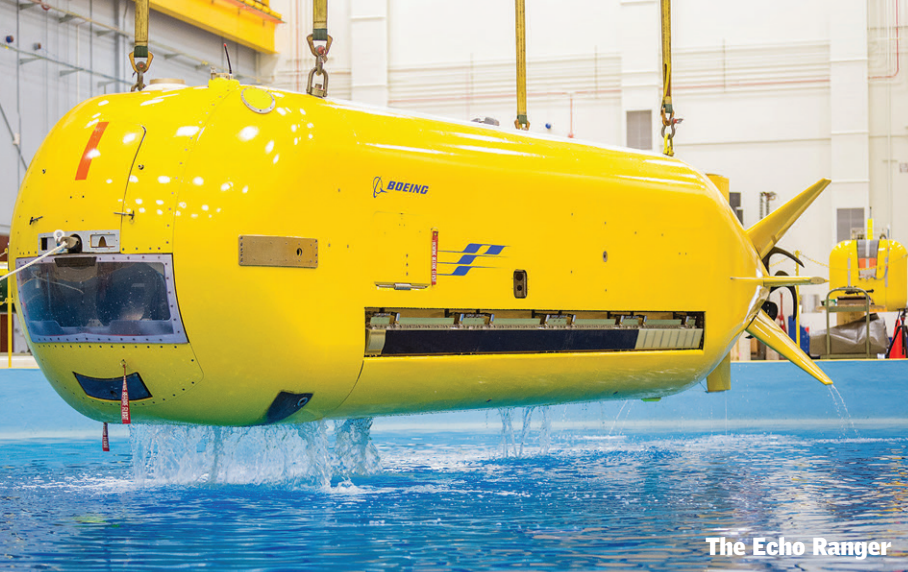
Crewless ocean vehicles such as Echo Voyager and SHARC are so new that governments have yet to write rules for how they should be handled. Collision regulations haven't been defined yet to address autonomous underwater or surface vehicles, so they are currently categorized as debris.

Boeing is pitching these commercial systems to military leaders even as the Navy continues to pursue its own in-house development of a "large displacement" unmanned underwater vehicle, or LDUUV. Boeing built a similar 18-foot Echo Ranger autonomous vehicle that operates on batteries for two to three days at 10,000 feet below the surface, said Towers. "You program it, you release it and once it goes submerged, you're no longer talking to it."

The first vehicle in the Echo family was the Ranger, which was built in the early 2000s for the oil industry. There were hiccups. Engineers found that, from a cost perspective, if the weather is great, using an autonomous vehicle was extremely cost effective, said Towers.

"However when the weather was bad, a surface ship would have to send an acoustic command to Echo Ranger telling it to surface, the crew would have to recover the vehicle, put it on the deck of the ship, go into port and ride out the storm." The





The Echo Ranger

lesson was that the technology required further development for vehicles to operate independently under any conditions.

Many of the features added to the gliders and submarines were in response to what executives heard in meetings with Pentagon officials, said Greenstein. "As far back as three years ago, if you weren't a 'program of record' the reaction would be, 'What are you doing here talking at the Navy League?'" he said. "Now everybody wants innovation. They have funds for experimentation in the budget. I see the Navy and the Defense Department making that adjustment. There's more opportunity to do experimentation, so we see a different environment for this kind of thing." The Navy did sign a cooperative research agreement with Boeing to share some of the cost of the robots' sensor packages.

The focus now is on "reuse of commercial technology," he said. "DoD is realizing they're being left behind."

Even if the LDUUV is the program of record, Boeing believes the Navy wants to see a "different and cheaper way to solve the problem." After the company started showing the commercial vehicles to Navy officials, "We very quickly attracted the right attention so now we're having detailed conversations."

There is a similar culture shift going on among traditional defense contractors that for decades thrived on developing proprietary platforms with closely held designs and interfaces. "Everybody is open architecture now," said Towers. "Before, the attitude was that nobody could put stuff on 'my platform,'" he said. "That cripples our customers, though. That's not the world anymore. It isn't the best thing to hold the keys to everything. Open it up, let everyone use it. You may not get everything you want out of it. But it has a better chance of going forward."

Greenstein said he and other Phantom Works executives had to persuade the company's top leadership that this project was worth investing in. It's a risk, he said, but "we believe industry will be rewarded for taking those steps."

Boeing sees the partnership with Liquid Robotics as a preview of how defense business is going to be done in the future. "We understand the cycle of defense. It's a bigger challenge for a startup. They don't have the base that we do. That's where we can help bridge the two worlds," he said. "Boeing and other primes can do this, be a mentor. I love working with those companies. But the defense primes do have their own portion of innovation that is required for military systems. There's a

certain rigor that has to go into a defense product."

The next step for Boeing is to prove that the "big data" approach to maritime surveillance can work in a complex naval scenario. Sensors are cheap and when they are connected, the effects are powerful, said Greenstein.

"If I can put 50 SHARCs out there near where the enemy is, with zero fuel and zero operator dollars for six months at a time, I can enable a different form of information. It's a different way of thinking," he said. "We feel we have to go do it to prove it."

How many vehicles would the Navy need to patrol the oceans? It varies. Some sensors can see 10 miles away, he said, "so you can space them very far apart. It depends on the mission and the area."

The Navy wants global reach, Greenstein noted. "They need to clear areas that are very large where they can be safe. That's a hard problem." Today, Navy crews drop sonobuoys in the water to look for submarines. These are expendable sensors that only last about eight hours.

"They drop 50 to 60 at a time," he said. "I can see a similar application with SHARCs covering the same area, but you don't have to replace them every eight hours. They hold for six months. That kind of scale would be a huge cost savings for the Navy. Buoys have to be replaced and you also need airplanes or ships to drop them in the ocean. It's a very expensive way to get sensors in the water. Wouldn't it be great if they just swim themselves?" **ND**

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# Pentagon Looks to Industry For Cyber Tools and Talent

**By Jon Harper**

The Pentagon intends to lean on commercial industry as it beefs up its cyber capabilities in the face of growing threats.

The Defense Department is investing heavily in information technology. Its budget plan calls for spending \$38.2 billion on IT in fiscal year 2017, including \$6.8 billion on cyberspace operations.

Going forward, Defense Department officials want to enhance ties with non-traditional industry to bring new technologies and experts into the force.

"Much of the innovation today being driven in the cyber and IT business is coming from the commercial sector," Defense Department chief information officer Terry Halvorsen told members of the House Armed Services Committee in March. "That partnership that we continue to strengthen is a key to us getting the right innovation and getting it on time."

As part of this effort, Cyber Command has established a "point of partnership" in Silicon Valley within the Defense Innovation Unit-Experimental outpost that Secretary of Defense Ashton Carter established last year. The command plans to expand this outreach effort to other tech hubs, including Boston, Cybercom commander Adm. Michael Rogers told lawmakers.

Defense officials hope to create a revolving door type of environment where cyber experts from the private sector can come work for the U.S. military for a fixed period of time before returning to their companies.

"We really want to be able to bring them in and have them sit in a position for a year, being able to execute some decisions within the department, and then go back to industry, just like I think there's a market space today for us to have some of our civilian employees go to industry," Halvorsen said.

"We want more of an in and out, back and forth. And you could really see the career path in cyber IT changing so that it's not an all-civilian or all-government career path, but a much more combined career path," he added.

To facilitate that, Congress needs to act, he told lawmakers. "I do think we will need some legislation that probably changes slightly the rule sets about what we're allowed to do with the industry people."

When it comes to IT, the Defense

**\$38.2 billion**

Amount of money requested for information technology in fiscal year 2017

Department's science and technology spending is heavily influenced by what the private sector is doing, Halvorsen said.

"I want to focus our S&T dollars around the areas the industry isn't going to focus on, and that's going to be on the weapons systems and top-level security systems where there is not yet much play in the commercial sector," he said. "I think our budget reflects that that's where our emphasis is."

In a constrained fiscal environment, there won't be much spending on technology that the private sector is already developing, he said.

"I think I can get that same innovation ... by strengthening our relationships with commercial industry," Halvorsen told lawmakers.

The Pentagon and other federal agencies are looking for a range of cyber-relative technologies. A General Services Administration solicitation to industry published in April identified the following areas of interest: network mapping, vulnerability scanning, penetration testing, phishing assessments, proactive adversary hunt, reactive adversary hunt, incident response and security engineering services including post-incident or post-assessment remediation.

For its computer operating systems, the Defense Department is moving toward a Windows 10 baseline.

"Right now, when you try to look at the visibility of the networks, while we're making improvements you're doing that across multiple operational systems, multiple baselines," Halvorsen





said. "It's impossible to do well."

Getting to a single baseline for Windows — which is present on 80 to 85 percent of Defense Department computers — will streamline the process, he said. "Windows 10 is the first operating system that really thought about security right from the beginning and has built-in features that we will take advantage of."

Adopting Windows 10 across the force will enable the Pentagon to better exploit cloud computing technology, he noted. Halvorsen is hopeful that within five years, most Defense Department systems will use a virtual cloud environment similar to what is offered by Windows 365.

"We will have private clouds, which are completely private within segments of DoD," he said. "We will have private clouds that are DoD and other parts of the federal government. And then we will have hybrid [government]/public clouds."

To achieve the best combination of security and financial savings, the hybrid clouds should be hosted in commercial centers, he said.

If the Windows 10 transition goes well, the Defense Department could announce this summer that it has decided to move toward "a more complete cloud environment," he told lawmakers.

The Pentagon wants to tap talent from the private sector as it embraces the cloud.

"The best cloud engineers today are not in the government," Halvorsen said. "The best ones today are in industry."

The Defense Department needs to bring them in to work for the government on a temporary basis, he said. "I ought to be able to ... say, 'OK, you're the lead cloud engineer for this year that you're doing this work with us,' and give them the authority to make decisions and ... expend dollars."

It is difficult to do that with the authorities that are in place now, he told lawmakers.

Defense officials need to address security concerns before moving to the cloud, Halvorsen noted. "How do you achieve virtual separation so that you don't get the effect of everything being loaded in one spot and it can be exfiltrated? And if it does get penetrated, how do you quickly shut that off and isolate it? And we are spending a lot of time working with the industry experts

in how to do that."

Pentagon IT systems are increasingly under attack from state and non-state adversaries.

"They are kicking in the doors," said Army Lt. Gen. Alan Lynn, the commander of Joint Force Headquarters-Department of Defense Information Networks, who also serves as director of the Defense Information Systems Agency. "It's fast. It's snatch and grab."

The Defense Department is looking for new tools from industry to improve situational awareness.

"We need analytics," Lynn told members of industry at a recent AFCEA cyber symposium. "If you come up with a good idea of seeing the network better or seeing anomalies on the network,

if you have that [technology] that we could plug into our system, that would be great."

The Defense Department might consider paying for analytics as a service, he said.

Defense officials are also seeking industry's help with "software defined networking" to lower costs, improve defensive capability and enhance resiliency.

"If you build out a big enough network that's providing capabilities for you, imagine ... you don't just make one copy of it but you make multiple copies of it," Lynn explained. "Let's just say you get attacked in that one network and it's severe enough it makes you say, 'OK, I'm going to take my applications [and]



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my users and I'm going to move it over to the exact same copy of that network over here and run it or just keep moving it.' So now you have a hard time attacking that surface because it's constantly in motion."

Lynn compared the concept to troops' use of frequency hopping when communicating on radios.

The Defense Department has been investing in software defined networking for a little over a year and it recently began working with more industry partners on the effort, he noted.

"I see it as something that is going to be part of our networks until we build networks differently in the future," he said. "I see us continually investing in that and building that capability."

Attributing attacks and identifying hostile actors in cyberspace has long been a challenge for the U.S. government as well as private industry. The Pentagon is looking for ways to prevent spoofing.

"One of the troubling spots with the network and with the internet right now is ... you can pretend to be somebody else and move on that network," Lynn said.

If defense officials had technology that would provide 100 percent assured identity, they could block foes from accessing the network or boot them off after they were detected and prevent them from returning, he said.

Right now, civilian and military personnel use common access cards, or CACs, to log into Defense Department networks. But Pentagon officials are looking to create a more secure method.

"We really need to take a look at doing identity differently," Lynn said. What comes after the CAC card is a critical question facing cyber officials, he added.

Encryption is another key tool for thwarting malicious actors. As comput-

ing power increases, so does the difficulty of securing classified systems. That's why the Defense Department wants to acquire better tools to protect its information.

"Every day it's easier and easier for people to break the encryption we have out there and we've got to get better at it," Lynn said.

While technology development is moving fast, the Pentagon's acquisition rules make it difficult to push new IT into the force quickly. The prevalence of legal challenges to contract awards isn't helping either, Lynn said.

It is especially difficult for the Pentagon's information technology components to do business with startups, he noted. Visits to DIUx and discussions with business leaders in the tech sector gave him insights into some of the challenges on this front.

"They've got to make money fast," he said. "A new paradigm for those startup companies is something that we're trying to work right now. How do we get them in the door and provide some use to the department when their burn cycle is about nine months?"

To better take advantage of innovation, Lynn's command is also seeking opportunities to reach cooperative research-and-development agreements with industry.

Technology isn't the only concern for the Defense Department when it comes to IT. Personnel issues also pose challenges. In recent years, Cybercom has been beefing up its force. All 133 of the planned cyber mission teams are supposed to achieve full operating capability by the end of September 2018. As of February, the command was not on track to meet that goal, Rogers said.

Training throughput is "probably the single greatest limiting factor," he said. Among the services, the Air Force is having the most trouble in this regard,

he added.

When queried by lawmakers, the cyber chief said hiring more contractors to fill out the force isn't necessarily the right solution. About 25 percent of Cybercom personnel are contractors, he said.

"I'm a little bit leery of becoming over reliant on contractors," he told lawmakers.

In accordance with the law of armed conflict, military operations in the cyber domain need to be conducted by military personnel, Rogers explained.

"I'm not trying to minimize the role of contractors," he said. "We've got to step back and ask ourselves what's the right allocation. I'm pretty comfortable right now."

However, industry could potentially play a greater role in training cyber warriors, he said. "I'm open to ... the options that are out there. And clearly academia and the private sector are part of that solution set."

While Defense officials see the commercial sector as an important partner in the development and acquisition of cutting-edge IT, the two sides are also competitors when it comes to recruiting and retaining experts. The Pentagon is at a disadvantage in this battle, Halvorsen noted.

"Google announced they're raising the pay for cybersecurity [professionals] by another 20 percent," he said. "That's going to keep impacting our ability to attract talent. If you ask me about the budget [and] what keeps me up more at night, that's probably the answer."

When it comes to the recruiting pool, the Defense Department could also be hampered by the fact that science and engineering programs at U.S. universities are not producing enough cybersecurity experts.

According to the findings of a recently published report by CloudPassage, only one of the top 36 U.S. computer science programs (as ranked by U.S. News & World Report last year) requires a security course for graduation.

Robert Thomas, CEO of CloudPassage said: "With more than 200,000 open cybersecurity jobs in 2015 in the U.S. alone and the number of threat surfaces exponentially increasing, there's a growing skills gap between the bad actors and the good guys." **ND**

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# Acquisition Process Undermining Silicon Valley Outreach Efforts

**By Jon Harper**

The Defense Department's notoriously slow acquisition system is creating headaches for commercial technology firms, as Pentagon leaders try to court non-traditional industry.

Last year, Secretary of Defense Ash Carter established a new U.S. military outpost in Silicon Valley known as the Defense Innovation Unit-Experimental, or DIUx. Its purpose is to connect the Pentagon with commercial innovators to help warfighters maintain their technological edge over potential adversaries.

Although they view the establishment of the new office as a positive step, Silicon Valley executives have nonetheless expressed continued frustration when it comes to doing business with the Pentagon.

"We have no problem with DIUx," said John De Santis, chairman and CEO of security software firm HyTrust. But "we have a serious, serious problem with the contracting officers and with the purchasing process and the acquisition process."

While DIUx offers opportunities to pitch products and ideas, funding decisions are still slow in coming, Silicon Valley CEOs said during a recent panel discussion hosted by the Atlantic Council. That frustrates executives who are used to doing business at a much faster pace.

"When you have something sit there ... for nine months you start to say, 'What are we doing here? Why are we even talking about this anymore? It's a waste of time'" because there are other

projects that the company could be working on that would yield profits faster, De Santis said.

Officials from DIUx did not respond to an interview request.

If the Pentagon wants to draw in more commercial tech companies, it needs to speed up decision-making and acquisition timelines, the executives said.

"My fellow CEOs look at me and go, 'You are so stupid/brave to be doing work with the federal government because what a risk it is from a timing perspective,'" De Santis said.

Venture capitalists that are bankrolling many of the Silicon Valley firms are even more impatient, the executives said.

Investors in the healthcare field consider a nine to 18-month sales cycle to be too long, noted Mylea Charvat, founder and CEO of Savonix, a technology company that focuses on neuro-cognitive assessment and brain health. They aren't interested in hearing about





# DEFENSE INNOVATION UNIT EXPERIMENTAL

efforts to land contracts with the slow-moving Pentagon bureaucracy, she said.

"VCs just go, 'Oh, forget it' ... when we start talking about something that might happen six to eight to 10 years" down the road, she said. "We don't even talk about [our government business] when we're pitching the company to investors."

Defense officials and lawmakers are trying to reform the acquisition system, but there is pessimism among commercial tech companies that have an interest in doing business with the U.S. military.

"The majority of CEOs I know in Silicon Valley are ... very skeptical of whether or not any real change can be made in the process the way it is," Charvat said. Executives are looking for "other injection points" or mechanisms by which technologies can be sold to the U.S. military more quickly, she said.

De Santis said it is much easier to do business with war-focused components such as Special Operations Command and Central Command, which have more streamlined acquisition processes.

SOCOM, which has a knack for putting equipment through the procurement cycle in months and not years, is often held up as a model for what industry would like to see from the rest of the Defense Department.

"There's not a lot of ... nonsense going on," De Santis said. "It's just like, 'Hey, we've got a job to do, we've got to get it done and get it done now.'"

Some defense officials want to use a funding mechanism known as "other transaction authority," or OTA, to get commercial technology into the pipeline faster.

"We have a lot of authorities that we just don't use, we have a lot of flexibility that we don't actually take advantage of," said Camron Gorguinpour, director of transformational innovation in the office of the assistant secretary of the Air Force for acquisition.

For some projects, his office is targeting a three-week timeline between the due date for industry responses to solicitations and the awarding of contracts. That can be accomplished through the use of OTAs, Gorguinpour said at a recent acquisition forum hosted by the National Defense Industrial Association.

"Absolutely it can be done," he said. "We're doing it. We're scaling it up."

Some in industry see problems with the Pentagon's contracting workforce, which isn't as accustomed to dealing with startups and non-traditional firms.

"I don't think that your [contracting officer] that deals with General Dynamics or Raytheon is the guy who should be dealing with my company ... because it's a completely different way of thinking," Charvat told National Defense after her panel remarks. "I think you need to hire completely different people."

Concerns about intellectual property also deter tech companies from working with the Defense Department, analysts and CEOs said.

Charvat recently walked away from a business opportunity with the military after she was asked to write a detailed white paper.

"There's no way that I'm going to expose my IP in a process like this," she told the audience at the panel discussion. Doing so would be irresponsible

"While DIUx offers opportunities to pitch products and ideas, funding decisions are still slow in coming..."

to her employees and her investors, she said.

The problem is especially acute when it comes to sole sourcing, she noted.

"In order to justify a sole-source contract you have to write down why what you do is so unique and they want you to go into the kind of detail that would make a patent officer blush," she said. "That's a huge IP concern because then what they also want to do is ... show this to all these other companies and see if they can do it too."

Roger Zakheim, a government affairs lawyer at Covington and Burling, said the Defense Department's intellectual property rules are essentially closing the door on many of the potential entrants that Pentagon leaders want to do business with.

The Pentagon may have an easier time attracting startups and other small companies, rather than firms that are already household names, analysts said. There is less financial incentive for commercial technology behemoths to endure the pains of the Defense Department's acquisition process, especially when the profit margins are comparatively low, they noted.

"If you're Google, if you're Apple, if you're Facebook, then the market at DoD is actually quite small, almost laughably small," said Andrew Hunter, director of the defense-industrial initiatives group at the Center for Strategic and International Studies. "For the big players, it's hard to see what would compel them to work real hard at it."

But even small contracts could be a boon for some companies.

"If there's a quarter million dollars [or] a half a million dollars, that's significant to a startup. ... That's enough to get you going," De Santis said. "It's not like you need a lot of money [to entice companies], you just need some speed at which you can deploy that."

But creating a more streamlined acquisition process for commercial tech firms could lead to contract award



disputes, analysts noted. Such legal challenges would undermine efforts to speed up the acquisition system.

The defense industry is worried that “traditional suppliers are going to be stuck in the slow lane of acquisition and the cool kids from Silicon Valley are going to get to go into the fast lane,” Hunter said.

Frank Kendall, the undersecretary of defense for acquisition, technology and logistics, said the Pentagon has no intention of sidelining companies.

“We know that you defense industry firms are aware of those technologies and are trying to bring them in,” he said recently at the 32nd Annual National Logistics Forum, hosted by the National Defense Industrial Association. If “we can buy those products and services [from] non-traditional sources ... that adds to competition, which is all good.”

Hunter said the outreach to commercial industry is already pushing defense contractors to up their game, even if the Pentagon hasn’t doled out many big contract awards to Silicon Valley firms since the creation of DIUx.

“I think you’re seeing the traditional suppliers really react quite markedly to stress and advance their own innovation,” he said. “You’re seeing a lot of behavior by the traditional primes to be [and] to look more innovative.”

Going forward, analysts expect to see more partnering between old and new players, including mergers and acquisitions.

“There’s a real business opportunity for the traditional defense company that actually has the ability and the knowledge of having business with DoD, and then they can leverage that innovation” from commercial companies, Zakheim said.

Gary Gysin, president and CEO of Liquid Robotics, participated in a business roundtable with Carter during one of the secretary’s trips to Silicon Valley. His company, which builds unmanned maritime vessels for oil and gas firms as well as the Navy, is already partnering with larger defense industry firms.

“For us, you know the prime contractors are our lifeblood,” he said.

Liquid Robotics builds the unmanned platforms, leaving the job of adding sensors and other military gear to other companies.

“We’re not trying to attack that ... large program procurement process

directly, because it’s a fool’s errand,” Gysin said.

Loren Thompson, a defense industry consultant and the chief operating officer of the non-profit Lexington Institute, sees teaming as the most effective way of getting new commercial technology into the force quickly. There’s no reason why a company like General Dynamics can’t help Apple adapt its technology to meet Army needs, he said.

As a complement to its Silicon Valley outreach, the Defense Department is also pursuing new relationships with industry and academia in other tech hubs such as Boston, Austin and Seattle. Carter and other high-ranking officials have been making pilgrimages to these innovation hotspots to meet with business leaders and entrepreneurs.

The effort is starting to bear fruit, according to the Pentagon’s acquisition chief.

“There’s a lot of ... transactions that are pending out there,” Kendall said during a discussion with reporters after his NDIA speech. “We’re flowing technology money to some of these [companies]. Essentially we’re paying for development, but it’s an investment as far as they are concerned.”

DIUx officials have already met with representatives from more than 500 companies, according to a Defense Department fact sheet.

“We’re really building the relationship, building the dialogue,” Kendall said. “Overall it’s moving in the direction we want it to go.”

But Carter clearly sees that the outreach effort is falling short.

“We need to admit when we need to change,” he told reporters in May during a visit to DIUx headquarters in Mountain View, California, where he announced the launch of “DIUx 2.0.”

The next iteration “will be a test bed for new kinds of contracting with startup firms,” Carter said in his speech. “They’ll work quickly to execute time-sensitive acquisition programs. And they’ll move at the speed of business. We know how fast companies run here and in other tech hubs around the country, and we expect DIUx 2.0 to run alongside of them.”

As part of the organizational restructuring, he is bringing in a new leadership team comprised of individuals who have both U.S. military and Silicon Valley business experience and understand

the different cultures. The Defense Department plans to set up a similar unit in Boston and potentially in other tech centers across the country.

For fiscal year 2017, the Defense Department requested \$30 million in new funding to direct toward non-traditional companies with emerging commercially-based technologies that meet Pentagon needs. “With co-investment from the military services, this number is really just a starting point,” Carter said.

Although the Obama administration will be out of office next year, industry analysts expect the Pentagon’s outreach to Silicon Valley and other commercial innovation hubs to continue. The need for cutting-edge technology and faster acquisition cycles is not going away anytime soon, they noted.

“A new administration is going to see the same underlying factors,” said Byron Callan, managing director of Capital Alpha Partners. “I’m trying to just tell people, ‘Hey, pay attention to this,’ because I don’t know how it’s going to play out, but I think it’s a shift and it’s an important shift.” **ND**

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# Nature of Conflict Informs Operational Energy Strategy

**By Stew Magnuson**

The Defense Department can find little comfort with low prices at U.S. gas pumps. It must fill most of its fuel requirements overseas, and a strategic shift to the Asia-Pacific region will make securing supply lines even more complicated, the Pentagon's 2016 Operational Energy Strategy report said.

While the effects of the strategic shift on the services' energy consumption have yet to truly manifest themselves, there will be long-term implications as aircraft and ships must cover longer distances, said Amanda Simpson, deputy assistant secretary of defense for operational energy, whose office is responsible for producing a new strategy every five years.

This isn't about being "green," she told National Defense.

"We're not worrying about conservation other than worrying about whether we have energy available where we need it, when we need it and in the form we need it so we can conduct operations in an overmatch situation," she said.

The Asia-Pacific's "tyranny of distance," as the report calls it, will force combatant commanders to consider their fuel sources when conducting operations.

One of the strategy's goals is to identify and minimize vulnerabilities in the military's supply lines. History is rife with examples of armies that were stopped dead in their tracks because they didn't receive the fuel they needed at the right place and time, she noted.

"It is part of what we do and how we project our military power, so let's be serious about it. ... This is something we rely upon. And with reliance comes dependence and with dependence comes ... risk," Simpson said.

The strategy warned of a future where energy on the battlefield is not guaranteed. Anti-access/area denial weapons such as mines, ballistic and cruise missiles, and advanced air defenses "threaten the assured

delivery of energy across air, land and sea," it said.

New platforms designed to counter these weapon systems will require more energy. "The ability of these new systems to meet their performance parameters frequently assumes an assured supply of energy, despite larger operating areas, flat or declining fuel logistics capacity, and increasing threats to energy infrastructure," the report said.

Simpson added that the shift to the Asia-Pacific brings up other complications. "We have designed a lot of weapon systems to work in an arid environment and now we're putting them in a humid environment. What happens to air conditioning systems and generators and tents?" she asked.

With that in mind, a second objective spelled out in the report is to "include energy throughout future force development," Simpson said.

"We're not about reducing demand or trying to be the most green, efficient warfighting machine, because that doesn't make any sense," she said.

The fact is that every platform the U.S. military has deployed has consumed more energy than the one it replaced. And that's OK. It may mean it has longer range or endurance, she said. Yet energy consumption is now being ingrained into every major weapon development program. It is a key performance parameter and every program must have an "energy supportability analysis" document accompanying it.

Simpson's office is at the forefront of prodding combatant commanders and the services to consider energy when conducting operations.

Part of that is ensuring that the lessons of the past are not forgotten. It was only a decade ago when fuel and water convoys became a prime target for insurgents in Iraq. Service members and civilians alike lost their lives and limbs as improvised explosive devices became a weapon of choice. Subma-

rines have been called "the IEDs of the seas" because they too remain hidden from view and threaten vital supply lines, she said.

"There is always a risk for forgetting the lessons that we have learned. ... We are taking that knowledge and employing it and pushing it back into those operational plans and working with the warfighters at a variety of different levels," she said.

The cost for fuel goes beyond the price per barrel. In fact, for the military, that cost is negligible. "If fuel were free, we would still be paying quite a cost for fuel on the battlefield," she said. For example, if fuel has to be protected in a convoy with unmanned aerial vehicles and guards, that requires troops that aren't out engaging the enemy so there is a loss of capability, she added.

The 2017 budget proposal has some \$2.4 billion for programs addressing operational energy spread out across the services. While the operational energy office does not administer these funds, it serves as an advocate for them to lawmakers and their staffs. It does have about \$38 million per year of its own to spend on new technologies. "It's not a tremendous amount but it is enough to selectively place a little bit of funding in places where we think it will make the most difference across the services," she said.

This year, the office is spending those funds on improving wargames and simulations and making sure energy is part of the equation when constructing models for battlefields.

The Synthetic Theater Operations Research Model is a major tool for wargaming, but it didn't include energy considerations, she said. The office paid for modifications so energy is a limiting factor and a consumable that can be measured. Participants can't always assume that energy will always be available, she added.

The operational energy office is learning from those wargames as fuel factors are inserted into the scenarios. "We've got some very surprising results," she said.

"We review all operational plans for all of our contingencies around the world. How is energy planned for and are there issues that need to be addressed? And quite frankly, we found some. But the good news is that they are being addressed and we are dealing with



**\$2.4B**

Amount in the 2017 budget proposal for programs addressing operational energy





**A convoy of fuel tankers during a training exercise**

them today,” Simpson said.

Other programs it has funded include efforts to reduce dismounted soldier battery demands by 30 percent and another that increased portable air-conditioning unit efficiency by 50 percent. It also funded a program to make portable hardwalls for temporary buildings less leaky and therefore more energy efficient.

Additionally, it is working with the Army Tank Automotive Research Development and Engineering Center to see what it can do to make tactical vehicles more fuel efficient, including the tankers that haul the fuel itself.

“We’re spending so much energy moving energy, maybe we can be more efficient in that as well,” she said.

As far as alternative fuels for the commonly used JP-8 and F-76, the Defense Department has not changed its tune, she said. Any such fuel must “drop-in” and work in existing engines. It also shouldn’t cost any more than traditional fuels. With low petroleum prices, that makes it even more challenging for those wanting to sell the Defense Department substitutes for traditional diesel. The Defense Logistics Agency is spearheading alternative fuel efforts, and despite the hardline, it has made some progress. Last year, the agency bought 77.6 million gallons of replacement fuel from a company that used a blend of F-76 and fuel made from animal fats.

“We didn’t pay any more than what we would have paid for traditional fuel,” Simpson said.

The 2016 strategy avoids setting fuel efficiency goals. Installations do have mandates to reduce energy consumption, but that shouldn’t be the case for those who are asked to train and fight in operations, Simpson said.

The 2011 strategy focused on reducing consumption and being more efficient but that was a means, not an end, she said. “The end game is to be more capable and effective,” she added. Once fuel consumption mandates are in place, a unit may start to scale back on training, which may result in a lack of readiness. That is counterproductive.

One of the goals outlined in the strategy is to obtain a better understanding of how ground forces use energy. “We have really good visibility on how operational energy is consumed on the sea and in the air,” she said. “The Navy can break it down to type of ship, and what they are being used for. The Air Force does the same.”

They operate large systems from a relatively small number of locations. And in doing so, it’s more straightforward to have visibility into how they are consuming energy, she said.

“Conversely, our ground forces are thousands of small pieces of equipment that consume energy. And they are not deployed out of large bases but numer-

ous contingency bases and outposts throughout the world. It’s just much more of a measurement challenge,” she said. The office is working with the Army and Marines to get a better understanding of how they consume fuels.

“Knowing how we use energy in an operational and tactical unit will help us understand the risks and opportunities, and thus we can use that information to make better decisions in the future as we procure new equipment,” she said. The knowledge could also be useful to local commanders as they are employing their forces and making decisions, she added.

The strategy’s primary audience is combatant commands and the four services, she said. To ensure that the strategy isn’t ignored, the Defense Operational Energy Board — comprising representatives from logistics communities, operational leads, all the global commands and the assistant secretaries of the services — meets regularly to keep tabs on progress being made.

“The services are really the ones going out and saying, ‘This is what I need.’ We set the direction, but it’s up to the services to actually go out and make the connections,” Simpson said. **ND**

Email comments to [smagnuson@ndia.org](mailto:smagnuson@ndia.org)

# Lockheed Seeking More International F-35 Sales To Reduce Cost of Fighter

**By Allyson Versprille**

Lockheed Martin is looking to reduce the cost of the \$400 billion joint strike fighter program by targeting sales abroad.

The biggest problem right now is that the price of the aircraft is too high for many countries involved, said Richard Aboulafia, vice president of analysis at the Teal Group. "But the good news is there are enough people that still want it that will allow the unit price to come down as production rates go up," he said.

In order for the cost to decline enough to appeal to a greater number of export customers, Lockheed needs its production rate to remain at its current level of at least 100 aircraft per year, Aboulafia said. "You just look at what's in the pipeline for Australia, for Italy, for Britain, for Japan and South Korea, you get most of the way there."

The F-35 has been characterized as the Defense Department's most costly acquisition program. Though the Pentagon's 2015 F-35 Selected Acquisition Report — which was delivered to Congress in March — reflected a reduction in overall program acquisition costs of \$12.1 billion in then-year dollars, a government watchdog warned that the fighter continues to face affordability challenges.

"DoD plans to begin increasing production and expects to spend more than \$14 billion annually for nearly a decade on procurement of F-35 aircraft," Michael Sullivan, director of acquisition and sourcing management at the Government Accountability Office, testified before the Senate Armed Services Committee in April. "Currently, the program has around 20 percent of development testing remaining, including complex mission systems software testing, which will be challenging."

At present, there are nine international customers outside of the United States that have decided to purchase the aircraft — six of the original nine partner countries and three foreign military sale customers. The partner customers are Australia, Italy, the Netherlands, Norway, Turkey and the United Kingdom, and the FMS customers are Israel, Japan and South Korea.

Gen. Frank Gorenc, commander of U.S. Air Forces in Europe, said the F-35's presence at European air shows should drum up greater international interest. The fighter is scheduled to fly at both the Farnborough International Air Show and the Royal International Air Tattoo in the United Kingdom this summer.

"I think what it's going to do for the European allies is reinforce the idea that we're talking about a real piece of



The first  
Australian  
F-35 unveiled

**INTERNATIONAL  
CUSTOMERS**



Australia



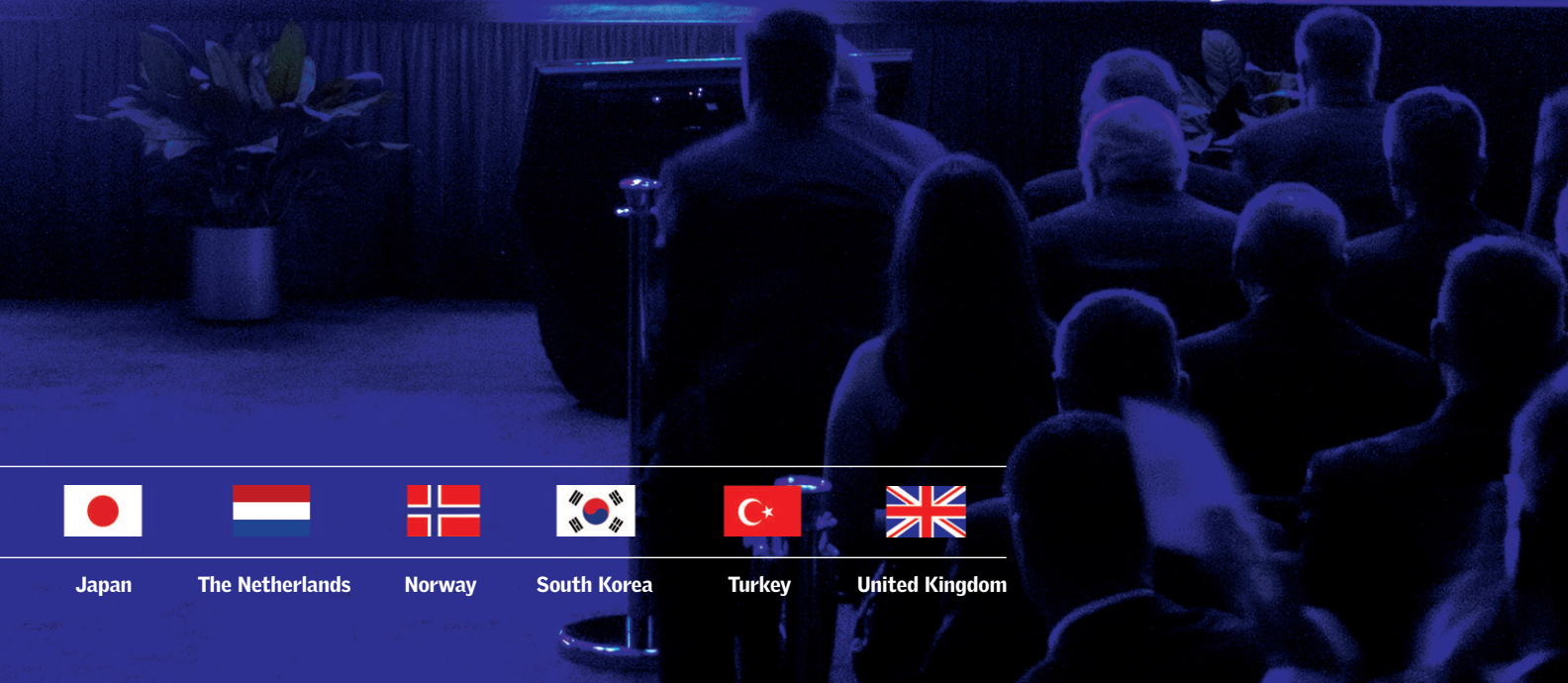
Israel



Italy

LOCKHEED MARTIN





Japan



The Netherlands



Norway



South Korea



Turkey



United Kingdom



equipment,” Gorenc told reporters at a breakfast in April. “We talk about some of these platforms always in concept. To actually see it I think is an important step in the procurement of that airplane and a reinforcement that what we have is real.”

Four F-35B short-takeoff and vertical landing variants were originally supposed to debut at the 2014 Farnborough air show. However, the Pentagon canceled the appearance after the engine in one of the Air Force’s F-35As caught fire while preparing to take off at Eglin Air Force Base, Florida, in June of that year.

China’s efforts to build its own fifth-generation stealth fighter could drive additional F-35 sales, Aboulafia said. “There is little doubt that China’s air power efforts are the F-35 salesperson’s best friend,” he said in an email. “Australia already has a large F-35 order for 85; in the long run, China’s efforts could make them buy a few more.”

Other foreign customers that Lockheed is targeting in the near term are Canada and Denmark. Both countries continue to participate as partners on the F-35 program, manufacturing and supplying parts for all three variants of the aircraft, but neither has confirmed whether or not they will purchase the fighter.

The program received good news in May when Denmark tentatively chose the F-35 to replace the Royal Danish Air Force’s fleet of F-16 Fighting Falcons. A nine-page analysis produced by the government had the joint strike fighter beating out the Eurofighter Typhoon and Boeing’s F/A-18 Super Hornet in four different categories: strategic, military, economic and industrial.

The Danish Ministry of Defence’s decision to purchase 27 aircraft, however, is pending a debate in the country’s parliament, which should last approximately one month, according to a Lockheed Martin statement.

“Lockheed Martin is pleased that Denmark has reaffirmed its commitment to the F-35 program with the down select of the F-35 in this fair and open competition,” the statement said. “The F-35 Lightning II will help ensure Denmark’s national security, and also positions Danish industry to capture long-term work throughout the life of the program.”

As far as the industrial impact for Denmark, the analysis found that choosing the joint strike fighter over its competitors will inject into the economy 26.5 billion Danish krone, or a little more than \$4 billion, consisting of 26 initiatives. That is about \$2 billion more than if the country had chosen either the Super Hornet or the Typhoon.

The price tag for the 27 F-35s will be about \$3 billion, according to the Danish government.

Prior to the decision, the ministry’s project office laid out several options including procurement numbers of 24, 30 and 36 fighters. The original requirement in 2005 — when the replacement program began — was for 48 fighters but that figure was amended in 2010 to reflect a shift in operational goals and requirements, as well as dwindling resources, wrote Dan Darling, international military markets analyst at Forecast International, in an April blog.

“I very much expect there to be heated debate and plenty of scrutiny involving the proposed 27-aircraft purchase,” Darling said. “There is a worry that funding the F-35 buy through the base defense budget will seriously undermine the effectiveness of other military service branches and crowd-out funding



**\$10B**

Estimated amount that the Canadian defense industry could garner if Canada purchases the F-35

for other projects. So there will be some politicians arguing for a larger overall defense budget in order to balance out the military’s costs, others who will argue the planned procurement is in fact too small and push for more jets, and still others arguing for a smaller unit purchase.”

In Canada, the question remains whether or not the Liberal Party will make good on its campaign promise to scrap the F-35 program and opt for a less expensive fighter. Prime Minister Justin Trudeau vowed to redirect the savings to the country’s navy.

Since winning the election in October, Trudeau has been less vocal about opposing an F-35 buy, resulting in confusion regarding the country’s future fighter replacement program. In December, Harjit Sajjan, Canada’s minister of national defence, said the competition would be an “open process,” indicating that the F-35 would not be excluded.

David Perry, a senior analyst at the Canadian Global Affairs Institute, said it is not clear when Canada would launch such a competition and the government so far has kept most of those details under wraps.

In the meantime, “I think there has definitely been a change and shift in tone from the government,” he said. “They — during the campaign and after the campaign — had quite strongly said that they would not be buying that aircraft, but subsequently and over time they haven’t been nearly as categorical.”

The Canadian government announced that it planned on purchasing the F-35 in 2010, but since then issues centering around the government’s perceived lack of transparency on the real cost of the program and negative press stemming from the aircraft’s developmental issues, have soured public opinion of the platform, Perry said. Those issues, in addition to the new government’s shifting focus away from high-end offensive capabilities toward a more defensive posture, have shaped Trudeau’s stance, he noted.

“There is sort of a question about whether or not we should be flying an aircraft that’s perceived to be built towards working in that kind of air-to-ground context and high-threat environment rather than a more widely considered continental defense / defense of Canada kind of mission set,” Perry said.

Even though the minister of national defence has stated that the fighter competition will be open to anyone, there are other ways that Trudeau could ensure his campaign promise remains





**A wooden mockup of the F-35 at the Canada Aviation and Space Museum**

intact, he said.

One tactic is to change policy directives so that the F-35 doesn't align with the Royal Canadian Air Force's requirements, Perry said. An example would be "deciding that our international contributions would no longer be able to do air-to-ground missions at the same level," he said. "Or saying that there was less money available on that project to buy aircraft in the hopes that that would eliminate certain competitors."

Another likely scenario is that the government decides to defer making a decision or delays the decision until after the next election, he said.

However, if Canada doesn't purchase the F-35, there could be negative consequences, experts said.

Canadian aerospace firms that develop and build F-35 components have won more than \$637 million worth of contracts with estimates that the country's defense industry could garner somewhere around \$10 billion worth of work on the F-35 over the next several decades.

Over said Canada continues to remain a partner in good standing on the program and that its government has assured the United States that it will continue to make its partner payments.

While Canada can still compete for F-35 work, Aboulafia said there is an implicit threat that other countries that have purchased the aircraft would be given priority.

"No one really knows the actual fallout from a decision to leave the program," he said. "Most likely, you'll just see [Lockheed saying], 'Oh yeah, you still can do work. It's just that it's not you, it's us. We also want to see other people.' And you start seeing some of that work being gradually transferred to other companies in customer countries."

Shaun McDougall, a North America market analyst at Forecast International, said Canada canceling the F-35 program could result in industry losses in the long term.

The country's defense firms would still benefit from work on a platform like the Super Hornet if Canada chose that aircraft, but "it's possible that they might lose out on future F-35 sustainment work ... because you figure 10, 20 years down the road when nobody is flying Super Hornets anymore, everyone's going to be flying F-35s," he said.

Other countries that Lockheed is targeting for F-35 sales include Belgium and Finland, Over said. Both are expected to hold competitions to replace their current fighter fleets, he said. Belgium currently flies F-16s and Finland operates Super Hornets.

"We're happy to get out there and compete against other fourth-generation airplanes, and are very optimistic at the conclusion of those competitions that discriminating customers will see ... [that] they can have a unique fifth-generation capability at less than or equal to the price of any competing fourth-generation airplane," Over said. The company's goal is to have the cost of the aircraft under \$85 million per jet in then-year dollars by 2019 through improved manufacturing processes and larger orders.

Over said Lockheed isn't getting too caught up in individual annual orders, noting that as long as the company offers the best capability while reducing the fighter's cost, the orders should roll in. He likened the F-35 to the F-16. "Our view is colored by our history with the F-16 program," he said.

"In the late 1970s when the F-16 was first launched, it was a program for the United States Air Force and four participating European air forces. And the total planned buy of F-16s at the time was less than 1,000 airplanes," he said. "Here we sit 42 years later, and 28 nations or services have purchased the airplane, and we've either delivered or have under contract roughly 4,600 aircraft."

Gorenc also drew a comparison between the F-35 and F-16. "I think that the F-35 is going to do for NATO what the F-16 did in the sense that many of the partners and many of the allies were flying it and so we're going to share common tactics, techniques, procedures, concepts of operations," he said. "I think that's going to go a long way to provide interoperability that we strive for in the NATO concept."

Aboulafia, however, refrained from comparing the two airframes.

"The F-16 was never expensive. It was always a lightweight, moderately-priced fighter," he said.

"The first thing that happened in 1976 was they very competitively and very aggressively swept in and won a pan-European fighter competition among basically the four EPG [European participating governments] countries, which were Belgium, Denmark, Netherlands and Norway," Aboulafia said. "You just don't see that kind of commercial aggression at Lockheed these days," and the F-35's high price tag could be precluding that type of aggression, he said.

While he expects the joint strike fighter program to be successful, he noted that the airplane's high cost puts it at risk of staying trapped in a high-end market niche. There are dozens of countries in the mid-priced global fighter market such as Portugal and Morocco that were able to purchase the F-16 but would not consider a plane in the F-35 price class, he said.

"Beyond that, one of the fundamental problems is that the bulk of the export market for high-end fighters outside of these F-35 partner countries is the Middle East. And other than Israel, they simply can't do much there right now," he said. "We won't do anything that threatens Israel's military qualitative edge," which prevents selling to countries like Qatar and the United Arab Emirates until at least the next decade, Aboulafia said. **ND**

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# State Department Coming to End of Export Control Reform

**By Stew Magnuson**

The Obama administration in August 2009 made a goal of revamping and streamlining the International Traffic in Arms Regulations and the Export Administration Regulations, which control weapon sales and the sharing of technical data overseas.

In the waning months of the administration, companies and analysts interviewed generally gave the administration high marks for its efforts over the past seven years, but say there is still work to be done to clarify some of the new policies.

Former Secretary of Defense Robert Gates proposed overhauling the system at the outset of the Obama administration. He eschewed the overly broad, catch-all system that was both failing to keep sensitive technologies from making their way to overseas rivals and putting restrictions on those that were no longer cutting edge, which in turn made U.S. industries less competitive.

"We were wasting our time and resources tracking technologies you could buy at RadioShack," he said in an April 2010 speech.

Officials at the State Department have been deliberately moving through the munitions list category by category in order to "rationalize" the system. Reforms also include the sharing of technical data and the signing of agreements with foreign partners.

The latest update released by the State Department directorate of defense trade controls centered on technical assistance agreements, manufacturing license agreements and warehouse and distribution agreements.

Data on the directorate's website showed that of the 21 categories on the highly restrictive U.S. Munitions List (USML), 15 have completed the process. That includes a built-in six-month grace period when industry is given time to absorb the new rules and adjust to them.

The reform process has not been completed for six categories.

David McKeeby, a spokesman for the State Department's bureau of political-military affairs, said three of those six

remaining categories are close to being completed. They are: fire control/sensors/night vision; toxicological agents; and directed energy weapons. It is the department's "plan and hope" that the remaining three will have the new rules published for comments by the end of the calendar year, he said.

"This is the most comprehensive rebuild of the USML since it was created in the 70s," he said.

The goal was "rationalizing the export control system to better, and more effectively protect sensitive U.S. technologies — first and foremost — and second reprioritize the control to streamline things so we have higher walls around a smaller number of genuinely technologically sensitive items," he said.

The main task was to "scrub" the list of items that were once considered sensitive and now are not: "the spare parts, nuts, bolts, windshield wipers of the world that do not require the same level of control," he said.

Another less talked about reform was ensuring the list never again becomes outdated, he added.

"We have institutionalized a continual review process, so the first couple categories that we finalized, we are already at the point where we are starting to re-review those," McKeeby said.

When a request for a new technology comes in, it will initially be subject to inter-agency review regardless of what category it is placed in, he said. The Defense Department is consulted in the process, but does not issue the licenses.

Two new phrases have been introduced to the export lexicon. One is "specifically designed." If a company submits an item for review, and it is determined to be designed specifically for military use, then it remains under State Department, or ITAR, review. If the review finds that it is not a sensitive item, then it is sent to the Department of Commerce and falls under Export Administration Regulations (EAR). This system is called "catch and release" and is described under Paragraph X of the regulations in each of the categories.

Items that are released to Commerce

go into a special category: series 600.

"There is a canard out there that somehow shifting things to Commerce means that it is less scrutinized, which is completely false," McKeeby said.

Several categories were moved entirely off the munitions list and transferred to the less restrictive commerce control list, meaning they do not need State Department approval for an export license unless they are intended to be incorporated into or used as a weapon system. They are such items as aircraft, vessels, submersibles, gas turbine engines, training equipment and electronics. They still require Commerce Department licenses.

An exception is exporting to China, Cuba, Iran, North Korea, Russia, Sudan, Syria and Venezuela.

McKeeby said there has been a 56 percent reduction in license volume in the 15 implemented USML categories for State's directorate of defense trade





controls, allowing it to enhance efforts to safeguard against illicit attempts to procure sensitive defense technologies.

Craig R. Cooning, president of network and space systems at The Boeing Company, gave the administration a favorable rating for its efforts to revamp the system.

"Since they were the first administration to take it on, I give them an A-plus for that. For the speed of implementation, probably an A-minus," he said at a recent press briefing.

"I think the rules are still being put in place and the process is still being put in place. ... I think it was a major step in the right direction," Cooning said.

The satellite industry in particular had clamored for reforms for years.

In the wake of a scandal when satellite manufacturer Space Systems/Loral passed to China sensitive information that may have helped improve

"Reforms also include the sharing of technical data and the signing of agreements with foreign partners."

its rocket program, Congress in 1999 placed spacecraft, rockets and their components in the highly restrictive munitions list. The law made selling satellites and components to the overseas market extremely difficult, and foreign competitors stepped in to grab the business. Satellites and launch vehicles were moved off the munitions list in 2014.

"What I saw in the past was a frustration on behalf of our potential customers on the inability to do the appropriate technical exchange prior to the purchase of a satellite. I personally have not experienced a difference on that yet," Cooning said.

Dan Hart, vice president of government satellite systems at Boeing, said, "We are having dialogue with our international customers. We are making strides because they are not seeing these big walls that they saw several years ago. There is still caution where there needs to be for appropriate reasons, but I think we are working with the government on how to implement the laws."

He added: "There is still some unhappiness at times, but much less than it used to be."

Joseph D. Gustavus, senior principal at the Miller Canfield law firm in Troy, Michigan, said he would give the administration a B-minus for its efforts.

There is still some confusing language in Paragraph X. The law has also brought some unintended consequences, said Gustavus, who specializes in helping clients with ITAR issues.

"The U.S. government strove to make the USML an objective list; however notwithstanding that, some subjective elements in an export control analysis still remain," he said in an interview. "The 'specially designed' defini-

tion under ITAR § 120.4, and catch-and-release provisions within Paragraph X of the Export Administration Regulations could have more been clearly stated, and to this day, they remain unclear to some non-export control professionals," he added.

The unintended consequences are with the companies that once only had to contend with the State Department and ITAR controls, but now have some items in their catalogues that have been shifted to Commerce. The two regimes have different processes.

"Now post-reform, many clients find themselves subject to two U.S. export control regimes, ITAR and EAR, which have differing classification, authorization and licensing schemas to this day. As a result, there was a little bit of a disillusionment of some clients that we represent, as it has increased the cost of their compliance," he said.

Items that were once on the munitions list and have been kicked over to Commerce don't necessarily face an easier path to gain a license, he said.

"Clients are faced with complying with a complex set of license exceptions under EAR. For some, this is now the predominant activity in their export control compliance efforts. EAR license exception compliance can be a fastidious exercise, and if you run afoul of the exception requirements, then an EAR export control violation may occur."

Gustavus praised the administration for not moving down the list in numeric order. For example, categories I, II and III — firearms, artillery, and ammunition respectively — have been saved for last. Instead, popular items such as ground vehicles, aircraft and related articles, and gas turbine engines and associated equipment were the first to be scrubbed.

"By doing so, they caught almost 80 percent of the export authorization requests. I give them credit for focusing on these areas first," he said.

Gustavus added: "Despite the drawbacks noted, I do recognize that export control reform is a complex and necessary undertaking by the U.S. government and that more ... resources need to be focused on fewer articles of greater national security interest. Even more reform though is necessary in order to fully achieve the original goals." **ND**

Email comments to [smagnuson@ndia.org](mailto:smagnuson@ndia.org)



ISTOCK

# U.S. Defense Companies Eye Partnerships in India

**By Yasmin Tadjdeh**

As India pours billions of dollars into upgrading its military, U.S. defense contractors are looking to establish partnerships in the region to grab a piece of the pie.

India — a country of more than 1.2 billion people — is currently in the midst of a major public relations campaign to encourage foreign companies to partner with Indian companies or build offices in the region. Known as “Make in India,” the campaign has been a tenet of Indian Prime Minister Narendra Modi’s administration.

“The intention is to boost production of defense hardware that is made in India. A 20 to 25 percent reduction in imports can result in up to 120,000 skilled jobs in India,” said Janesh Janardhanan, Frost & Sullivan’s associate director of consulting for the Middle East, North Africa and South Asia public sector and defense division.

Make in India has led to major contracts, he said.

“The Indian Ministry of Defense has already issued licenses and cleared deals worth several billions of dollars,” he told National Defense in an email.

That includes a \$700 million contract for BAE Systems’ M777 howitzers; \$2 billion for an Airbus-Tata transport plane manufacturing deal that would provide the Indian Air Force with 56 planes; and a \$700 million contract with Russia’s Kamov to establish a partnership with Reliance Defence to build 200 light helicopters for the Indian Army, Janardhanan said.

It is expected that the Indian government will spend \$620 billion by 2022 on defense, he said. The country needs to upgrade nearly 50 percent of its equipment.

As India bolsters its military, it is also strengthening its relationship with the U.S. government.

During an April trip to India, Secretary of Defense Ashton Carter said: “The U.S.-India relationship is destined to be one of the defining partnerships of the 21st century.”

The two countries plan to strengthen their ties. One example is through the

expansion of the Defense Technology and Trade Initiative, Carter said. The initiative was established in 2012 “to leverage the convergence between our industrial and technological capabilities in an unprecedented way,” he said. Programs that came out of that included

work on a new Indian aircraft carrier, he noted.

Carter announced during the trip that the two countries had agreed to initiate two new DTTI Pathfinder co-development projects, including a digital helmet mounted display and a joint biological tactical detection system.

Additionally, India and the United States would be collaborating on more science and technology programs, he said. The governments are finalizing four projects that are worth nearly \$44

**Secretary of Defense Ashton Carter visits New Delhi, India.**





million, with both countries sharing the investment equally, he said.

These include a project on atmospheric sciences for high-energy lasers; another on cognitive tools for target detection; a third on small, intelligent, unmanned aerial systems; and a project on blast and blunt trauma brain injury, Carter said.

Both countries also plan to work together in the maritime area, he said. There are plans for more complex exercises. Further, India and the United

States agreed to launch a bilateral maritime security dialogue, Carter said.

Analysts interviewed by National Defense agreed that India would be a source of business opportunities for U.S. defense contractors.

"India's mid-term positioning would be to be a valuable part of the global supply chain for defense majors," Janardhanan said. "India is a very large defense market, and several U.S.-based companies are looking to gain [a] share of this market. Similarly, Indian companies

wish to form partnerships not only to address the Indian opportunity, but also be part of the international value chain."

Jon Grevatt, IHS Jane's Asia Pacific defense industry analyst, agreed that there were opportunities to be had.

"In terms of funding, we only see that India's defense market will expand over the next few years," he said. While the economy has struggled in the past, India's defense spending has been strong and is projected to remain so through the 2020s.

The time is ripe for robust defense spending not only because the economy is now strong, but also because there are significant strategic drivers in place. "India sees significant threats from Pakistan and increasingly from China," he said.

IHS estimates that India will spend \$10.4 billion on defense procurement in 2016. That will increase to about \$15 billion by the end of the decade. "That's a billion a year increase in defense procurement spending over the next few years," Grevatt said. "The market will continue to expand for the foreseeable future and that will remain the case ... for certainly the next decade."

India has massive military requirements, he said. Its current inventory is aging and many pieces of equipment are obsolete. It currently has in place a naval modernization program until 2027.

"They're aiming for a 200-ship fleet by 2027 and ... they need certainly many, many more ships in order to achieve that ambition," he said. "In order to have those ships in place by 2027 they need to start building them very soon."

There is a requirement for surface and subsurface ships and that will lead to many opportunities for contracts, he said. U.S. companies may not provide surface ship or submarine hulls to the Indian navy, "but where they can supply certainly is through the tier two contracts for ... combat systems, mission systems, electronic systems, all these areas where U.S. industry has capability."

While there has been some success with the Make in India campaign, Grevatt said he had some reservations.

"The Modi government has been very successful in promoting Make in India," he said. "But I am slightly skeptical about the whole thing because ... when you analyze it, there is no policy. It's just, 'Come and build in India.' Which







**The Indian Ministry of Defense has a \$700 million howitzer contract with BAE Systems.**

to be honest with you, is something ... India has been doing for decades" in the defense market.

Foreign companies that want to do business with the country will have to grapple with its notoriously slow and cumbersome military acquisition system, Grevatt noted.

"The defense procurement system ... takes so long sometimes in India," he said. "Patience is certainly required."

Companies also need to do their due diligence when researching with which companies to partner, he said.

"You need to be sure that the Indian company can deliver what it says it can deliver," Grevatt said. "In the past, foreign companies have found that ... hasn't [always] been the case and has sometimes led to foreign companies moving out of the partnership."

While the Indian defense market is large, money allocated to the military isn't always spent efficiently, said Daniel Darling, senior military markets analyst for Europe, Asia and the Pacific Rim at Forecast International.

"Last year, they failed to spend between \$1.5 billion and \$2 billion of their capitalization earmark which is money for procurement, which is just incredible when you think about the amount of requirements they have," he said. "I do think the government is now trying to hold the military's feet to the fire by saying, 'Why when we've allocated this money are you not spending

it year after year?'"

Part of the reason India invests so much in its military is because of regional drivers, he said. For example, India has a large requirement for combat aircraft because it bases its requirements on the possibility of fighting on two fronts at one time. That could happen if China and Pakistan combined their forces.

"Now that may be farfetched in more realistic terms, but nonetheless they do prepare for any and all possible scenarios," he said.

India also wants to safeguard the Indian Ocean, which it looks at as its territory, he said.

"If you think of the way Rome viewed the Mediterranean Sea as Mare Nostrum [a Latin term meaning "our sea"], that's roughly analogous to the Indian view of the Indian Ocean, although they are aware of international trade and international norms so it's not something where they would ... be like China in the South China Sea and try and exclude foreign shipping," he said. "It's just more of, 'This is our strategic interest. This is our backyard and we need to be a dominant navy within those waters.'"

U.S. industry has already begun reaching out to Indian companies for new business opportunities.

In March, AM General announced that it was entering into a partnership with Bharat Forge Ltd., an Indian company, to bid on the country's light

specialist vehicle program using AM General's Humvee as the base platform.

"AM General is pleased to be teamed with The Kalyani Group's Bharat Forge to bring our proven light tactical vehicle solutions to India for military and paramilitary requirements," said AM General President and CEO Andy Hove in a statement. "Bharat Forge has proven to be a world-class manufacturer, and we look forward to working together with them to deliver combat-proven mobility solutions to customers in India."

While the Humvee will be the base vehicle, the final build and production will take place in India. The vehicle will be used for reconnaissance and patrol missions and is required to operate in a variety of terrains and altitudes, an AM General press release said.

Swedish defense manufacturer Saab is one foreign company that is making investments in the Indian defense market, said Jan Widerström, chairman and managing director at Saab India Technologies.

"India is extremely important to Saab — both as a market for our products and solutions, but also as a country with some excellent capabilities in the defense and aerospace industry," he told National Defense in an email.

"We have a large footprint in India, including a joint venture with Aequs, an R&D center at Tech Mahindra's Hyderabad campus, a naval combat management system development center in Greater Noida with Reliance Defence and many collaborations and sourcing agreements — and we are constantly looking at expanding our presence here," he said.

The company is keen on working jointly with Indian companies to take advantage of their strengths in manufacturing and its pool of skilled manpower, Widerström said. "It's a win-win scenario."

The country has expertise in machining, defense electronics and optics, he said. "In the last few years, we've visited many large and small Indian companies, and we've seen some excellent capabilities and commitment to quality in many areas."

Partnerships with Indian defense companies can be a gateway to other markets, he said. "Not just Asia — even beyond that." **ND**

Email comments to [ytadjdeh@ndia.org](mailto:ytadjdeh@ndia.org)



# U.S. Southern Command Seeks Tech to Monitor Crime Networks

**By Yasmin Tadjdeh**

U.S. Southern Command — with an area of responsibility that covers the Caribbean, Central and South America — is searching for new surveillance technologies to help U.S. allies and partner nations.

While the United States is not involved in any wars in Southcom's area of operations, that doesn't mean that it should be disregarded, said Adm. Kurt W. Tidd, commander of U.S. Southern Command.

"Because no nation in the region poses a direct, conventional military threat to the United States, Latin America tends to rank fairly low on force allocation priorities. This is understandable — but often requires what is, in my view, an unfortunate trade-off. Our attention to other parts of the world should not come at the expense of the significant gains made in our own hemisphere," he said.

Tidd, speaking during a hearing before the Senate Armed Services Committee in March, noted that over the past two decades the United States has played an integral role in supporting democratic governances and economic development in the region.

"As criminal networks threaten the integrity of institutions and jeopardize citizen security, we must help countries build on the considerable progress achieved to date and continue working towards our shared priorities," he said. "Positive and persistent U.S. engagement remains essential to advancing a Western Hemisphere that is prosperous, stable and secure."

Currently, Southcom is under resourced, Tidd told legislators. When asked by Sen. Bill Nelson, D-Fla., if the command has adequate funds to efficiently go after drug and human trafficking networks, Tidd said: "The simple fact of the matter is we do not. I do not have the ships, I do not have the aircraft to be able to execute the detection and moni-

toring mission to the level that has been established for us to achieve."

Southcom officials are unable to maintain a persistent view of activities going on within their area of responsibility, he said.

"The established requirement in order to interdict at the established target level of 40 percent is up to 21 surface platforms," he said.

On any given day, the command has between five and six surface ships patrolling, he said. These are largely made up of Coast Guard cutters but also include one to two Navy vessels, he said.

Currently, only 11 percent of the command's intelligence, surveillance and reconnaissance requirements are being



Sailors and Coast Guard personnel inspect a vessel containing illegal drugs.

met, he said.

To equip Southcom with more ships would come at the expense of other higher-priority theaters, he said.

Additionally, the command is still suffering from the effects of sequestration because of delayed maintenance on ships and aircraft, Tidd noted.

"Those ships are not available now ... to operate in our theater. Any future sequestration would be catastrophic," he said.

To beef up patrols and collect ISR, officials are leveraging the assets of partner nations, he said.

"Their intercept capability and interdiction capability has made a significant improvement," he said. "As it stands right

now, about half of the interdictions that occur, occur with the help of partner nations."

Southcom officials not only face challenges from transnational organized crime networks, but also from nations such as Russia and terror groups like the Islamic State, Tidd said.

"Whether Sunni or Shia extremists would wittingly collaborate with criminal groups to accomplish their goals is up for debate. Many people are quick to dismiss the possibility of these groups working together in this part of the world. They believe the absence of evidence of a relationship is evidence of its absence," he said. "We at U.S. Southern Command can't be that certain."

Both criminal organizations and terror groups operate in the world of weapons trafficking, illicit finance and fraud, he said. But "Southern Command lacks ... the intelligence necessary to identify,

monitor and fully illuminate and understand these networks and the resources necessary to significantly disrupt, degrade and ideally dismantle them."

The command is also concerned about foreign fighters — people who leave their native country to join the Islamic State, Tidd said.

"Since 2013, we have seen a small number of individuals and their families leaving the region to join ISIL in Syria or Iraq. The appeal of violent extremist ideology to some Caribbean citizens and their subsequent travel to Iraq and Syria remains a concern; not just for us, but

for our friends and partners across the region," he said. "As in other parts of the world, the potential return of violent extremists is a threat. These individuals could be well positioned to spread ISIL's poisonous ideology and potentially inspire or execute acts of terror against U.S. or partner nation interests."

Partner nations in the region are often unable to efficiently monitor these foreign fighters and lack robust counterterrorism resources, he said.

Russia is also a cause for concern. The country has maintained a presence in Latin America and has collected information about the United States and its regional partners, he said.

"Since mid-December 2014, Moscow

has deployed an oceanographic and a hydrographic research ship to Nicaragua; an intelligence collection ship to the U.S. East Coast and Caribbean; and an additional oceanographic research ship to the Caribbean,” Tidd said. “This is four naval deployments to Latin America in less than 12 months, all of which involved data or intelligence collection.”

Russia’s aim, he said, is to prove that the country is a “global power capable of challenging U.S. leadership.” This requires that Southern Command deepen its security cooperation with partners in the region, he said.

The command is currently looking for a variety of technologies to help partner nations, said Juan A. Hurtado, science and technology advisor deputy director for Southern Command’s technology, innovation and solutions theater engagement division.

“We’re looking to field a range of technologies to meet current and emerging requirements,” he said. “Specifically, airborne capability to improve detection and monitoring ... [and] we’re also exploring technologies to facilitate information sharing, remote communications, all domain awareness, environmental security and cyber capability.”

Southern Command is looking for new sensors that can provide it with enhanced capabilities, he said. “We have a slew of sensors that we’re working on to see which one of those can help us not only on the detection and monitoring [missions] but also to provide support ... [for] disaster response [and] environmental security.”

The command currently uses synthetic aperture radars to see through cloud cover, which is critical in monitoring natural disasters like hurricanes where standard imaging sensors don’t work as well, he added.

The command is also looking for ways to improve communication in the region. Vast jungles and waterways characterize South America’s topography. That remoteness can make it difficult for radios and communication systems to connect, Hurtado said. Satellites could be one way to bridge the gap, he noted.

“Right now we are looking at nanosatellite technology in order ... to see if they have military utility,” he said.

The command — which is working alongside NASA, the U.S. Army, Brazil and Colombia — has launched five nanosatellites to provide voice, text and



**U.S. Southern Command nanosatellites are launched on board an Atlas V rocket in October 2015.**

data information for military operations, he said. Each satellite is about the size of a loaf of bread, he said. The systems will be a less expensive way to communicate, he added.

“It’s very expensive ... to synchronize the various radios that are being used by the partner nations and us,” he said. With nanosatellites — which cost about \$500,000 each — there will be better interoperability, he noted.

Nanosatellites are less complex and expensive than traditional systems. “That has given access to many partners that didn’t have access to space,” he said.

In May, the command tested the constellation of satellites in Colombia. In June, it plans to test them in Brazil, he said. Southern Command expects to release a report on the study around September.

Partner nations are also keen on experimenting with new technology, Hurtado said.

“We have conducted testing in all the various regions — the Caribbean, Central America, South America,” he said. “They are always very willing. ... We have a partnership in which we bring the technology and the scientists and they provide in many cases the forces and the sites and the mission sets.”

Shaun McDougall, a defense analyst at Forecast International, a Newtown, Connecticut-based marketing consulting firm, said the biggest acquisition priorities for Southcom are maritime security and interdiction, air domain awareness, counterterrorism and ISR gathering.

“When it comes to equipment, the focus will be on ISR assets [such as] surveillance aircraft and particularly UAVs; interdiction platforms, namely small boats and helicopters; communications systems as well as intelligence and biometrics capabilities,” he said. “Any technologies that can aid in multi-national operations will be welcomed as well.”

There are numerous opportunities for U.S. defense contractors to sell equipment to Southcom but the command faces prioritization issues, he said.

“While Southcom partnerships are a key component of the broader U.S. defense strategy, the higher funding priorities are European Command, Central Command and Pacific Command,” he told National Defense in an email. “Those commands also require much more advanced systems, whereas Southcom requirements are more low-end in nature, and so do not offer the same big-ticket opportunities that exists elsewhere.”

Latin American countries traditionally do not spend heavily on defense, said William Ostrove, an aerospace and defense analyst at Forecast International. “Compared to other regions of the world, only African nations spend less on defense. In terms of purchasing equipment, Latin America invests even less, since the majority of defense spending in the region goes towards salaries.”

However, there are some exceptions. Brazil, which has the largest economy in the area, spends more than most South American countries. Brazilian defense investment was 39 percent of the regional total, he said.

“The Latin American defense market has been small but steady over the past few years,” Ostrove said. “For years, economies in Latin America grew rapidly, driven by demand for commodities like copper and oil in China. In addition to economic growth, continued fighting against drug cartels and guerilla groups have created strong opportunities to sell military equipment.”

But over the next year or two, that market is at risk because of economic problems in Brazil and Venezuela, he said. “As commodity prices drop and economies enter recession, governments will be faced with large deficits and may be forced to cut defense spending.”

Most countries in the region purchase their military equipment from foreign suppliers, but there has been increased interest in forming partnerships, he said.

One example includes a contract that Chile recently signed with German shipbuilder Fassmer to provide the nation with offshore patrol vessels. Chilean company ASMAR will do the construction work, Ostrove said. **ND**

Email comments to [ytadjdeh@ndia.org](mailto:ytadjdeh@ndia.org)



## Outstanding ROTC Officers Honored With Codd Award

■ The National Defense Industrial Association announced the winners of the Col. Leo A. Codd Memorial Award, which recognizes the three Reserve Officer Training Corps (ROTC) junior officers from each service.

The 2016 recipients are: Army Capt. James R. Carroll, University of South Florida at Tampa; Air Force Capt. David Richardson, Embry-Riddle Prescott University; and representing the Navy, Marine Corps Capt. David L. Wood, Vanderbilt University.

This award is given annually in memory of Ret. Army Col. Leo A. Codd, who devoted his life to the principle that “the best guarantee of peace is a strong United States.”



Carroll



Richardson



Wood

For 40 years, from 1923 until his retirement in 1963, Codd was a guiding force in the development of the American Ordnance Association, which was devoted to peace through industrial preparedness for defense. The AOA was eventually renamed the American Defense Preparedness Association, and then in 1997, it merged with the National Security Industrial Association to form NDIA.

Codd, who was a ROTC graduate himself, was a strong supporter of the program until his death in 1971.



■ National Defense Industrial Association Chair of the Board Sid Ashworth presented the Forrestral Award to Marillyn Hewson, chairman, president and CEO of Lockheed Martin on May 12 at The Ritz-Carlton, Tysons Corner. The Forrestral Award is named in honor of James Forrestral, former secretary of the Navy and the first secretary of defense. It is bestowed annually on a defense industry executive who has made unmatched contributions to the defense and aerospace industry. Hewson is the first woman to receive the NDIA James Forrestral Industry Leadership Award.

## Small Arms Committee Recognizes Parks, Dater

■ The National Defense Industrial Association's Small Arms Committee — at its Armament Systems Forum in Fredericksburg, Virginia, in April — recognized two individuals who have served as leaders in the arms community.

The committee presented W. Hays Parks with the Hathcock Award in recognition of the significant contributions he has made in operational employment and tactics of small arms weapons systems, which has had a positive impact on the readiness and capabilities of the U.S. military.

Parks, who joined the Marines in 1961 and eventually served as a special assistant to the U.S. Army judge advocate

general, is a renowned expert in small arms, and has trained and qualified as a sniper. Throughout his career, Parks has ensured that warfighters have had accurate, reliable and effective am-

munition. He encouraged innovation, and provided careful guidance to those responsible for development.

In addition, the committee presented the Chinn Award to Phil “Doc” Dater, who has been a designer, innovator, writer, mentor and explorer in the world of small arms. Over the last half-century, Dater has shared the knowledge he's distilled of principles, history and technology and has made numerous contributions to the advancement of small arms.



NDIA Executive Vice President Barry Bates presents W. Hays Parks with the Hathcock Award.

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## Military Rotorcraft

■ Sikorsky's CH-53K helicopter has long been plagued with delays. But Marine Corps officials recently said the tide has turned and the program — which is meant to replace its aging fleet of heavy lift helicopters — is back on track. In our next issue, National Defense looks at the state of the program and challenges ahead.

## Presidential Helicopter

■ The Navy and Marine Corps learned tough lessons from a previously canceled program and are ready to procure a replacement for the presidential helicopter. With initial operating capability scheduled for in fiscal year 2020, officials are relying on commercial-off-the-shelf systems to procure a new system.

## Ships for the Army

■ Yes, the Army does have ships. One of the few new-start acquisition programs on the service's horizon is the maneuver support vehicle-light, a watercraft designed for the intra-theater movement of troops and equipment. Officials say the Vietnam War-era boats it will replace are outdated and wouldn't survive in contested battle-grounds.

## Tactical Vehicle Market

■ The Defense Department is spending about \$25 billion less than it did at the height of the Iraq and Afghanistan wars on tactical wheeled vehicle programs. 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. Contractors will have to settle for programs that will incrementally modernize existing fleets.

## The Return of the F-22?

■ At the urging of then Secretary of Defense Robert Gates, lawmakers in 2009 voted to stop funding procurement of the costly F-22 Raptor. But with China and Russia advancing their military capabilities, airpower advocates on Capitol Hill and elsewhere are pushing the Pentagon to buy more of the stealthy jet fighters. Would restarting the F-22 production line be practical or cost-effective? And is there enough political support in Washington to get it churning again?

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