APRIL 2016

National DEFENSE

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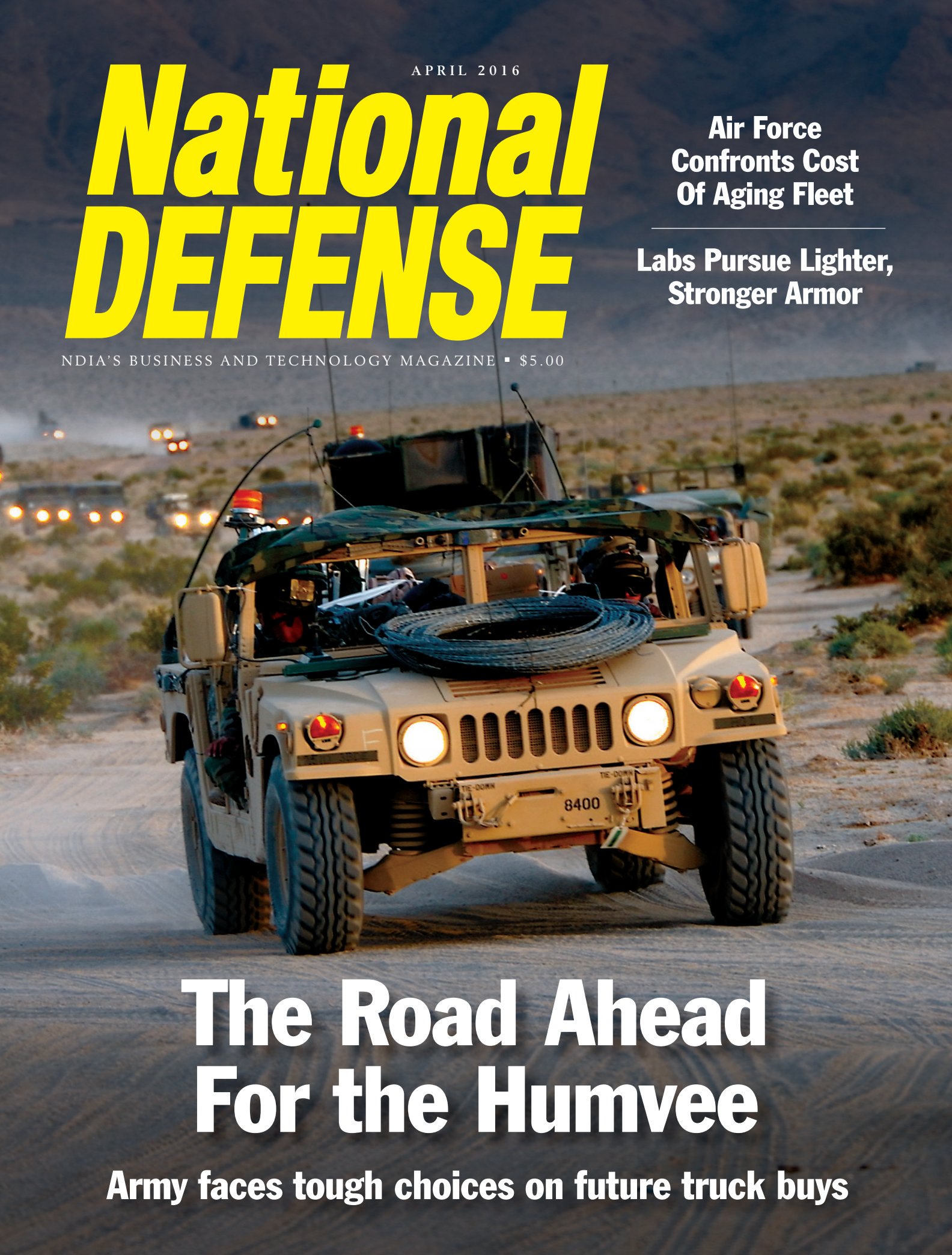

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■ As the Air Force grapples with rising operations and support costs, the service's modernization accounts could take a hit as it prepares to pay for expensive programs such as the F-35 joint strike fighter, KC-46 tanker and the long-range strike bomber.

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■ Despite the loss of a major tactical wheeled vehicle contract worth billions of dollars, AM General is optimistic about the future. With a robust Humvee sustainment market ahead of it, executives say the company will be just fine. **Cover image: AM General**

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The Rocky Path to a Third Offset

In November 2014, then-Defense Secretary Chuck Hagel made a presentation at the Reagan National Defense Forum in Simi Valley, California, and announced what was described as the Pentagon's commitment to a "third offset strategy." Two months later, Deputy Secretary Robert Work provided greater detail during a Center for a New American Security speech.

In very general terms, the United States over the past 60 years had enhanced its security by pursuing two "offset strategies." These were operational and technological initiatives, which improved its capabilities in areas our adversaries would be challenged to compete and fully match.

The first of these was the reliance on nuclear weapons during the beginning of the Cold War, with the second being the development of precision-guided munitions and the required intelligence capabilities needed to deploy them. These were both successful efforts to employ asymmetrical advantages, Work said.

Over time, potential adversaries have responded, which has necessitated the need for the next major offset. The hunt is on. Both industry and government are energetically trying to determine what this next offset will be, where the technology to support it resides and how it will be put to use for our national advantage. Autonomy, processing "big data," quantum science and hypersonic technology have all been mentioned as part of this new age.

As many of our speakers at the recent Women In Defense annual conference said, necessity breeds innovation, and we are rapidly approaching a time of need. Leaders must see innovation as a core behavior, acting Undersecretary of the Air Force Lisa Disbrow said.

There are two factors that come into play here: independent research and development (IRAD) and the Defense Innovation Unit-Experimental (DIUx) that has been positioned in Silicon Valley.

IRAD is funding that companies use for their own technological initiatives. It can result in new products or processes, or significantly enhance existing ones. In essence, such research and development is independent of established military requirements and contracts.

The Pentagon recently has made efforts to guide and direct IRAD, thinking that doing so would enhance the possibility of achieving synergy with its own efforts, while potentially reducing its own R&D budgets. As companies were cool to this thought, the Defense Department sweetened the pot a bit in 2014 by allowing companies to record IRAD as an allowable expense on existing contracts — within certain defined limits.

The problem with this approach is that by "guiding" IRAD into areas where it has an existing requirement or known interest, the Pentagon is reducing the odds that a company will look into truly new and innovative concepts or products. In other words, we are unlikely to discover the third offset by directing — or merely encouraging — research down a known path.

Moreover, several companies have reported that the government, despite the new policies, has been reluctant to make IRAD expenses allowable. Company funding directed by the Pentagon is, therefore, a less than promising avenue for discovering a truly innovative approach leading to the next offset.

Much the same can be said about the DIUx effort. Silicon Valley companies are known for their innovative character; they are also known for closely guarding their intellectual property and for being secretive about the next major "offset" they plan to drop on the IT market. As many have already observed, there are many barriers within the defense acquisition and federal budget processes that are, by nature, unattractive to Silicon Valley.

Making the overture to this great community, as Secretary Ashton Carter did in April 2015, is certainly worth the effort, but we should be realistic about the prospects that it will uncover the next major innovative item in the defense market place. Recently, Carter and Undersecretary for Acquisition, Technology and Logistics Frank Kendall returned to Silicon Valley and conducted a meeting described as being similar to the popular television show, Shark Tank. Several companies came before them with ideas they felt were worth some defense R&D investment.

Of course, whether such funding can be provided within defense acquisition rules remains to be seen, but reviewing the offerings of the five firms that made presentations to the Pentagon leadership does not provide much encouragement that this effort will lead to either a major military enhancement, or the third offset.

Why do I offer such a pessimistic assessment? Mainly because the first two offsets were primarily developed initially as large government programs, or through expansive government support of industry initiatives. Several companies invested their own funds to develop the concept of precision strike only to find the government refining the idea and then contracting the procurement with someone else.

I encourage this effort to find the third offset, and like many I am fascinated to learn what it might be. But to get there, especially in an era with a very diverse set of threats and a large amount of technology residing in commercial firms, the Pentagon likely needs to open up its own thinking on how it views IRAD and how it interacts with the commercial technology base. Trying to guide the former, and trying to entice the latter through a reality-show approach, may be neither helpful nor efficient in achieving the desired goal. In addition, we still have significant government assets available in the military services' research labs, and the Defense Advanced Research Projects Agency. We should not neglect agencies that have provided some impressive offsets in the past.

Fundamentally, finding the third offset requires firms — those already producing great military hardware now in the defense industrial base and those now outside it — to devote time, thought and money to the project. The best way to encourage them to do so is to take more fundamental steps that make the defense market place more attractive than many currently believe it to be.

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Defense Watch By Sandra I. Erwin

Jittery Times for Government Contractors

For all the talk about an improving outlook for the defense industry after a six-year downturn, much anxiety still hangs in the air.

The Pentagon has proposed a budget for 2017 that cuts procurement spending by $7 billion, and contractors will have to wait and see what, if anything, Congress does to beef up that account. In the long term, there are high expectations for new Pentagon investments in technology and changes in its procurement process to step up innovation. And contractors are mapping their competitive positions in hopes of capitalizing on the anticipated new opportunities.

Alas the environment today is quite tense. Things are especially tough for small and medium sized businesses that are finding it more difficult to compete against the larger, more established players.

It has generally been the case in the defense sector that the top-10 prime contractors dominate big-ticket programs, small businesses are guaranteed a share of the work, and mid-size firms move up and down the food chain according to the demand.

The rules of the road are changing, and companies are adapting, either by merging or acquiring competitors, selling off unprofitable businesses or diversifying into civilian markets.

For smaller firms that operate with lower margins for error, the business climate is worrisome, executives and lawmakers assert. Slices of the defense market where upstarts and small businesses have enjoyed success — cybersecurity, information services, data mining — are becoming central elements of the Pentagon's investment strategy. That means everyone, including major defense contractors and Silicon Valley firms, is gunning for the work.

The competition is fierce, says Dolly Oberoi, CEO of C2 Technologies, a federal contractor. "The big boys want to do everything. They got so desperate they started competing with us in our little pond." And the regulatory environment doesn't help, she adds. Government programs that were designed to balance the contracting market and protect small businesses are actually making it worse, Oberoi says during a recent industry conference. A big gripe is the system used by the Small Business Administration to categorize companies by size. This is frustrating, she says, because companies like hers sometimes are disqualified from bids for being too large even though they are substantially smaller than many of their competitors.

"The SBA inhibits growth or kills companies," she says. "Either you have to start acquiring or get acquired."

A case in point is the General Services Administration's contracting vehicle known as OASIS, for "one acquisition solution for integrated services." This consolidated approach to buying services is favored by many agencies, accounting for nearly a billion dollars in professional services spending last year, with the Air Force as the leading user at $233 million in orders, according to Bloomberg Government.

These contracting methods are hailed for making procurement more efficient but they can be devastating to vendors that don't fit within the size parameters set by agencies even if their products and services suit the government's requirement. A contracting vehicle like OASIS favors very large and very small businesses, Oberoi says. She blames the administration for creating a dog-eat-dog atmosphere that doesn't allow for businesses to grow and encourages corporate consolidation.

The Defense Department has made more targeted moves to increase its share of contracts awarded to small businesses, but the defense sector can be fickle. Small firms have pivoted to homeland security and cyber during the military downturn. "Large companies have money but it's harder for them to be agile and cost effective in an LPTA environment," says Oberoi. The government's shift to LPTA contracts, or low price technically acceptable, has upended the industry. "You have to be smarter rather than bigger."

Small business owners and entrepreneurs have been vocal about their struggles in the federal contracting world and Congress over the years has passed copious volumes of legislation aimed at easing these concerns. This legislative season is no different. The Republican chairman and the ranking Democrat of the House Small Business Committee, Rep. Steve Chabot of Ohio and Rep. Nydia M. Velázquez of New York are sponsoring a new bipartisan bill called "Defending America's Small Contractors Act of 2016."

Both are pressing their case to have the bill inserted in the Fiscal Year 2017 National Defense Authorization Act. This is a Pentagon contracting issue that affects national security, Chabot tells the House Armed Services Committee. "When the Defense Department has fewer offers there is less competition, costs go up and choices are limited. Unfortunately, we continue to see that the number of companies competing for federal contracts is declining," he adds. "Within the last three years we've lost over 25 percent of the small firms registered to do business with the federal government."

In the defense sector, the rich are getting richer in part by keeping new competitors out, Chabot notes. The number of small business contracts fell 47 percent from 2011, but the size of the average individual small business contract action has more than doubled.

"It's getting harder for small businesses not easier," says Velázquez. "Over the years we have seen the value of small businesses' contracts go up, enabling agencies to meet their goals, but at the same time the number of contractors has dwindled."

The House Small Business Committee recently marked up the Defending America's Small Business Contractors Act. One of the provisions would create a voluntary pilot program to provide small businesses with performance ratings based on their previously completed work.

"One challenge facing many small businesses competing for larger federal contracting opportunities is that it is difficult for them to gain recognition for their past first-tier work as subcontractors," says Rep. Richard Hanna, R-N.Y.

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Budget Matters

By Jon Harper

DoD Beginning to Tackle Nuclear 'Bow Wave'

The fiscal year 2017 budget request is the first to deal with the looming spike in planned nuclear modernization spending in the 2020s, said the Pentagon's director of cost assessment and program evaluation.

"What the [fiscal year] '21 projection in the future years defense plan lays out is really the start of a ramping back up" in nuclear investment, Jamie Morin said during a recent conference hosted by the Center for Strategic and International Studies.

The budget plan calls for an $11.4 billion increase in the fiscal year 2021 Pentagon topline relative to 2020.

"That was a product of a very serious and deliberate discussions between the leadership of the Department of Defense and the senior staff at the White House all the way up to the president about this upcoming nuclear modernization bow wave," Morin said.

Over the next five years, the Navy plans to spend $13.2 billion on the Ohio replacement ballistic missile submarine, with the first ship procured in fiscal year 2021.

There will be "substantial bills" for the submarine beginning in 2021 and "significant costs" for the Air Force's intercontinental ballistic missile replacement effort and the new stealth bomber, Morin said.

"That bow wave will grow significantly particularly by the time we get to the mid-2020s and the late 2020s," he said. "It's on the order of $12 billion to $18 billion a year above sort of where we were over this last decade, which was a period of very low investment in the nuclear enterprise."

$13.2B

amount the Navy plans to spend on the Ohio replacment submarine

Analysts have estimated that the Defense Department's long-term nuclear modernization plans would cost hundreds of billions of dollars.

Without a big bump in funding, the Pentagon will not have enough money to pay the nuclear modernization bills without cutting into non-nuclear programs, Morin said.

"Unless the department was willing to divest the submarine leg of the triad — which we're not — there is no way to pay for that modernization within the [nuclear forces] budget," he said. "You have to look beyond the portfolio. Even if you chose to do radical things within the portfolio it would not [come] close to paying for that."

In the past, the Pentagon received the money it needed during peak periods of nuclear modernization, Morin said.

"Each of those modernizations in history has been aligned with a period of increasing topline for the Department of Defense," he said. "But obviously that will be a decision the new administration will have to make and maybe even the administration after the next administration … before we really get to FY '21, FY '22 and FY '23," he said.

Political leaders will be tackling a number of looming budgetary challenges in the 2020s such as entitlement spending, noted Pentagon Comptroller Mike McCord.

"It's really a larger national question of how much are we willing to pay for defense when you get to that era and … are we willing to make that investment?" he said.

NAVY

More Procurement Falloffs on the Horizon

■ The Defense Department's fiscal year 2017 budget request would reduce procurement relative to what was planned in the fiscal year 2016 request, and additional cuts are possible after the proposal makes its way through Congress, according to a recent report.

The Pentagon's latest request calls for a $6.8 billion drop in procurement relative to what was enacted in 2016. That would represent a $9.6 billion reduction compared with previous plans for 2017, said the American Enterprise Institute report, "2017 Defense Budget: Offset promising but today's procurement disproportionately pays the bills."

It notes that some high-tech weapons programs — such as advanced munitions — will see larger investments in line with the Defense Department's new "offset" strategy.

These "investments are paid for by procurement reductions not only in 2017, but also throughout the entire five-year future years defense plan," the report said.

A number of programs took a hit, it notes.

"The budget's bill payers are many. They include Navy and Army aviation programs, the new Air Force bomber and airlift, and many small reductions spread across hundreds of line items in the modernization accounts, including procurement and research, development, test and evaluation," it said.

Procurement could take a further hit if anticipated savings in the budget proposal are not realized and topline spending is not increased by lawmakers, the report noted.

"Defense leaders made many rosy assumptions," it said. "In total, the bean counters assumed $9.3 billion of tenuous savings in 2017 — money that will come out of already stripped procurement accounts if the savings do not materialize on time or are rejected by Congress."

While the fiscal year 2016 budget saw a major increase in topline dollars relative to the previous year, that is not the case in the latest budget request, noted Andrew Hunter, director of the defense-industrial initiatives group at the Center for Strategic and International Studies.

"The FY '17 budget levels out again compared to FY '16," he said during a recent panel discussion. "If there's a leveling of the topline, guess what? Modernization once again is in trouble."

"The FY '17 budget is down for modernization … mostly in the procurement accounts," he said. "Almost all of that reduction is in aircraft."

Hunter hopes lawmakers will reach an agreement to boost procurement.

"If there is not a larger budget deal, I am concerned that the increases of FY '16 will be something of a false dawn for the acquisition system," he said.

ISTOCK

Analysts: Next Fiscal Year Likely to Begin With Continuing Resolution

■ Despite the existing agreement on topline spending in fiscal year 2017, budget experts do not expect lawmakers to pass a defense appropriations bill before the start of the next fiscal year.

"I think it's safe to say we'll start the year on a continuing resolution because there's a long track record of doing that," said Todd Harrison, director of defense budget analysis at the Center for Strategic and International Studies, during a recent panel discussion. "It may be a foregone conclusion."

The Bipartisan Budget Act of 2015 set topline defense spending at $610 billion in fiscal year 2017, and the legislation was supposed to provide budget stability and predictability for Pentagon planners.

Roger Zakheim, a visiting fellow at the American Enterprise Institute, noted the dispute between hawkish Republicans — who want more defense spending — and fiscal conservatives in the Freedom Caucus who don't want to boost the Pentagon's budget without cutting other federal programs to offset it.

"The reality is the fights [and] the environment on the Hill really hasn't changed at all even with the Bipartisan Budget Act" of 2015, he said.

"If you look at the House of Representatives right now, they're struggling to pass a budget," he said. "There's about a $30 billion debate between the fiscal hawks and the defense hawks. … What that means is that despite having a majority in the House, [Republicans] are going to struggle to put in a budget that even meets the administration's last budget request."

Election year politics could also diminish the chances of getting a defense budget passed before Sept. 30, the end of this fiscal year. "With the presidential election coming into place … that disincentivizes anybody to move on this request," Zakheim said.

"You'll probably see no action on it until we get to the first quarter of the next fiscal year, in which case I think you'll see an embrace [of what the Obama administration requested] or perhaps even an increase" depending on who is elected, he added.

A continuing resolution would maintain fiscal year 2016 funding levels until a new budget is passed. Starting the next fiscal year in such a way won't have a big impact on overall Defense Department funding levels, but it will complicate acquisitions and delay new programs if it lasts well into 2017, analysts said.

"Because the '17 [topline] levels are essentially the same as the '16 levels, you don't have this problem about a big jump" in spending getting stymied, said Mark Cancian, a senior adviser at CSIS. "The amounts aren't that big of a deal … but when you start going six months or more then that becomes a big deal" because it has an impact on program authorities.

Email your comments to jharper@ndia.org

Hypersonics: Past Failures Not an Option

Retired Air Force Lt. Gen. David Deptula at a Capitol Hill briefing asked the audience for a show of hands: How many were aware that China had conducted six hypersonic vehicle experiments over the past two years — three in 2014 and three in 2015?

Many hands in the relatively knowledgeable crowd went up.

"I would dare say if you went to any other portion of this august building and asked that question, they wouldn't know," said Deptula, now the president of the Mitchell Institute of Aerospace Studies.

For those who have followed his career, Deptula has been a leading proponent of the development of missiles and aircraft that can reach speeds of over Mach 5.

Deptula, along with retired Air Force Maj. Gen. Curtis M. Bedke, made no secret that they wanted congressional staffers in the room to take the institute's new report, "Hypersonic Weapons and U.S. National Security: A 21st Century Breakthrough," and use it as a means of influence. They want a serious program that will lead to fielding hypersonic vehicles in the next decade.

"We wrote this paper primarily with congressional staffers as the readership," said its co-author Bedke. It is a mere 25 pages long and doesn't get bogged down in technical details and the long history of failed programs.

But what they didn't want is for one of the staffers to run upstairs and convince his or her elected representative to "eat the entire elephant all at once."

The history of hypersonic technology is littered with the corpses of failed programs, or vehicles that succeeded in some way, but didn't result in fielded technology.

The X-15, X-30, X-33, X-34, X-43, X-51 and the Blackswift are the ones that come to mind. That has led some to say that hypersonic technology has been the weapon of the future for the past 40 years.

"We try to solve all the problems with one big project often because senior leaders are enamored of this idea, or they are blind to the complexity of the project, or they are unwilling to accept the true costs and risks necessary for success," Bedke said.

The United States needs "a steady and disciplined program and to see that the wasted opportunities of the past are not repeated," he said.

There are U.S. hypersonic research programs being conducted, he acknowledged, and they are doing good work to solve some of the underlying technical problems. The Defense Advanced Research Projects Agency, the Air Force, the Navy and NASA are all devoting research-and-development dollars to hypersonics.

The report recommended bringing all of these efforts under one roof, namely that of the Air Force.

There are two approaches to developing hypersonic weapons.

One is called boost-glide. A rocket lifts a vehicle high into the atmosphere, then releases the glider that reaches Mach 5 plus speeds upon descent. This is the method China is testing.

The other is an air-breathing engine on a cruise missile-type vehicle. This approach, similar to jet engine technology, doesn't require large boosters or a lot of fuel.

The report doesn't favor one approach over the other and Bedke said to drop one of them in the name of budget cutting would be a mistake. Current programs give the impression that everything is fine and there is nothing to worry about. But bringing a program under one roof, with steady funding to tackle the technology challenges in an incremental way, would assure that the program "isn't just being kept on life support," he said.

Deptula had stronger words: "We can't afford to continue treating hypersonics as a science fair project. It's time to stop being a follower in hypersonics and start being a leader."

Russia has announced a program, and has worked on high-speed missiles with India. The two countries want to break Mach 5, Bedke said. The Chinese may have demonstrated complex maneuvers in some of its recent tests.

"They are inevitable for somebody to develop," he added.

There are still many technological hurdles. Hypersonic weapons will need to travel at farther distances for a longer period of time, he said.

"At these speeds the heat is not just intense, it is so incredible the air begins to ionize, individual molecules break apart and start to shed electrons," he said. One of the main problems is simply ensuring that the aircraft doesn't burn up, he added. "We have to figure out how not to melt. It's not a trivial problem to solve and it has frustrated a lot of people for a long time."

> "How do you stop a missile traveling at Mach 8 from striking a U.S. military base in Texas?"

There were reporters in the room asking the tough questions — namely how much do you think this is going to cost and where on Earth is the Air Force — if it is named an executive agent for the program — going to find the funds to pay for it? The earliest tests currently planned don't come until 2019 or 2020. That just happens to be when the service has to pay for a slew of F-35s, B-21 long-range strike bombers, a couple hundred new jet trainers and joint surveillance and attack radar systems recapitalization. Budget hawks look at research-and-development programs as easy pickings.

"I'm a realist," Bedke said. "I understand that there is a lot on people's plates but a good, steady well-disciplined program will not cost a heckuva lot of money."

The other uncomfortable question is defense. Even if the U.S. military dropped everything else it was doing and devoted billions of dollars to a dedicated hypersonic weapons program, it wouldn't necessarily stop the Chinese from fielding its own system. How do you stop a missile traveling at Mach 8 from striking a U.S. military base in Texas?

"That is another topic for another time," said Bedke.

Email your comments to smagnuson@ndia.org

A Simple Equation for Ethics in Action

Everyday actions and decisions, while important in every industry, are especially critical in the defense industry. Even the smallest decisions are irreversible and often have direct and immediate implications on the lives of others. These are facts that none of us take lightly.

This environment of decision making is also critical to an ethical culture for it is only through sound decision making that such a culture will exist. I learned something very important about culture long ago — that culture is what happens when the leader is not physically present. This concept speaks to the importance of a leader's role in creating the environment and framework for an ethical culture.

Creating an ethical environment requires first and foremost a commitment to ethics — a commitment that entails much more than writing an ethics statement or code of conduct. While these are both very important documents, they must exist not for the sake of documentation, but to genuinely guide the daily actions and decisions of each member in an organization toward "doing the right thing." Ethics can mean as much or as little as the actions of the company's leadership and team members determine. Therefore, over time, ethics have the potential to become as integral an aspect of a company's culture as the employees themselves.

Running an ethical business requires employees to recognize they are united as a team working within and toward a common ethical standard. Remembering that culture is what happens when the leader is not around, teammates are left to exhibit the behaviors and make decisions consistent with the environment and framework that the leaders have created. Employees therefore have an obligation to look out for each other and help ensure that they and their teammates are consistent with their ethical actions and decision making.

To achieve our company's ethical culture, as well as our mission and vision, Insitu adopted four pillars that guide us: perform, pioneer, unite and care. These pillars and their messages consistently guide each of us toward making the right decisions, whether at the office, on the road or in the field.

In order to provide customers with on-site support for their operations, portions of our team are often geographically disconnected from the rest of the company. These satellite teams operate in extreme environments and possess a subculture of "getting the job done at all costs." In the heat of a mission, a team's dedication to performing has the potential to cloud Insitu's broader culture of making sound and ethical decisions. The idea that teammates have an obligation to support one another in upholding our ethical standard extends to our fielded teams, who face ethical dilemmas on a regular basis.

To ensure that this support transcends geographic barriers, we provide our deployed teams with a resource called the Operations Action Center, which serves as an accessible, human support system for those in the thick of the action, and a connecting force for those physically disconnected from the company culture back home. Receiving calls at all hours of the day or night, the center responds rapidly, constructively and ethically, helping bridge the geographic disconnect and guide the decisions of our deployed teams. These employees provide a firm foundation of ethics that our satellite teams can rely on when feeling swayed by pressure.

Without the support and dedication of each team member, this ethical culture could not transcend the barriers that it does. These concepts are applicable not only to our team, but to those in any industry that is willing to dedicate itself to maintaining an ethical culture, regardless of the challenges and pressures it may encounter.

The common thread throughout all of this and the key in creating and sustaining an ethical environment is sound decision making, along with the absolute need for an environment and framework within which a culture of ethical decision making is prevalent.

> "It should be no surprise that a firm of engineers often associates mathematical equations with a business context."

It should be no surprise that a firm of engineers often associates mathematical equations with a business context. For example, Perception = Reality + Communication. This means that one's perception is reality with or without communication, and therefore someone's perception can only be correct with proper communication of that reality. We also associate $A = \pi r^2$ with business growth. If any given partner or teammate is a "slice of a pie," by working to grow the area of the entire pie, everyone grows exponentially — a much more efficient strategy than expanding only one wedge of the pie.

As with shaping perceptions and driving business growth, an equation is also considered in our ethical decision-making processes: $P = f(x)$, where P is the probability of an ethical outcome and x is the amount of money involved with the situation. This equation highlights the bias that can occur when financial stakes are high. Our acknowledgement of this bias drives our understanding that P (probability of an ethical outcome) should invariably remain at 1, regardless of the function of x (money involved in the situation).

This equation provides a clear vision of what is right and wrong in conducting ethical business and helps identify the external factors that influence us away from doing the right thing. Despite the perception of ambiguity these pressures convince us of, there is no ambiguity in ethics.

This final concept is a simple one to walk away with — in sound decision making, there is no gray area. While external pressures may attempt to sway our decisions, it is critical to always remember that the probability of an ethical outcome is not an equation to be influenced by variables, but rather is a constant number. The decision of what that number will be is up to the members of a team.

Ryan M. Hartman is president and CEO of Insitu Inc.

New Terrorism Threats Emerging in Asia-Pacific

The advancement of Islamic terrorism to the Indo-Asia-Pacific region will threaten the security of Australia and its neighbors in the coming year, according to Australia's former minister for defence.

"The spread of Islamic terrorism to the Indo-Pacific remains the most significant immediate threat to regional security," said Kevin Andrews, a current member of the Australian parliament. He served as the minister for defence from December 2014 to September 2015.

Recent events indicate that violent extremist ideals are expanding throughout the region. In January, a busy commercial area in the Indonesian capital of Jakarta was racked with gunfire and suicide bombings, killing eight people — four assailants and four civilians. The Islamic State, also known as ISIL or ISIS, claimed responsibility for the assault.

In the coming year, these threats will coincide with other incidents that could aggravate the situation for countries in the Asia-Pacific region, Andrews noted during a discussion at the Heritage Foundation, a Washington, D.C. think tank.

The release of several Jemaah Islamiyah (JI) adherents from Indonesian jails this year could stoke the flames of violent extremism, he said. JI is an Indonesia-based clandestine terrorist network that aims to establish an Islamic state encompassing southern Thailand, Malaysia, Singapore, Indonesia, Brunei and the southern Philippines, according to the national counterterrorism center under the U.S. Office of the Director of National Intelligence. JI operatives began conducting attacks in 1999.

In an essay titled, "From Prison to Carnage in Jakarta: A Tale of Two Terrorist Convicts, Their Mentor Behind Bars and the Fighter with ISIS," published in January by the Brookings Institution, authors Susan Sim and Noor Huda Ismail describe the state of Indonesian jails and their ineffectiveness in reforming radical jihadists.

"Our interviews reveal that for Indonesian jihadists, a spell in prison, rather than being an intervention stage, is seen as a way station to further glory," they said. "Many leave prison not only unreformed, but also more influential in local jihadi circles."

The second incident that will occur simultaneously is the return of foreign fighters from the Middle East to the region, which could bolster support for ISIL, Andrews said.

In the Southern Philippines declarations of allegiance to the Islamic State and its leader Abu Bakr al-Baghdadi by jihadist groups like Ansar al-Khilafah, also augment the threat environment, he noted. According to the Long War Journal, a website that tracks military and terrorism-related issues, ISIL has recognized such pledges of allegiance from several groups, and in December fighters alleging to be affiliated with the terrorist organization released a video showing a training camp in the Philippines.

"The confluence of [these occurrences] … points to what Prime Minister Lee [Hsien Loong] of Singapore identified last year as an emerging hazard," Andrews said. As these factors begin to converge, the most important objective remains defeating Islamic extremism at its source in the Middle East, he added.

Australia has contributed the second largest military presence, after the United States, to the coalition in Iraq, Andrews noted. Its forces are "operating airstrikes, refueling and command-and-control activities in the air, as well as training of Iraqi forces." The U.S. ally currently has about 900 personnel stationed in the Middle East; a rotation of six Super Hornets and Hornets flying daily missions over Iraq and Syria; a Wedgetail command-and-control aircraft; a refueler; and two land force components — both special operations forces and regular forces, Andrews said.

He lauded the United States' decision in December to alter its strategy and use its own special ops forces in a more deliberate way.

"One of the challenges that we've had — that we noticed over the last year or so — is that about two-thirds to three-quarters of our air missions come back without having deployed a weapon," he said. "That's because of the targeting challenges that we face in that area."

Having special operations units on the ground will enable the coalition to better target aerial strikes, he noted.

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WIKI COMMONS

Samsung, Oculus Rift Target Defense Market

■ Samsung, working alongside virtual reality goggle maker Oculus Rift, is looking to make headway in the military training market.

Samsung's Gear VR, a virtual reality headset powered by a Galaxy Notebook smartphone and an Oculus Rift goggle can help the Pentagon with a number of training exercises, said Jamie Wu, senior manager of Defense Department sales for Samsung.

"The thought process is you can take a standard smartphone, load an application on there, and put it in the goggles and you're off and running," he said. "The phone just snaps in and … [uses] the display and processor to provide the content."

While the system has been on the market for more than a year, much of its appeal has been for its entertainment value. However, it is especially useful as a tool for the military, Wu said.

One application is geared toward F-15E Strike Eagle maintainers. For "a mechanic, it's hard often times to get them in the warehouse with the plane to … take it apart," he said.

The system would give a mechanic a 360-degree virtual view of the aircraft, he noted.

While the military has for years used virtual reality for training, Gear VR differs because it is mobile-based, Wu said. A soldier using a Samsung device can check his emails or make phone calls one minute and then snap the

system into the $100 headset to do some training, he said.

"When you move into a desktop solution, it's a little more expensive, a little more robust environment. But being able to take it mobile I think provides a lot of unique advantages," he said.

The U.S. military owns about 75,000 Samsung devices, Wu estimated. Gear VR is compatible with the Galaxy Note 4 and later versions of the smartphone.

It can also be configured for augmented reality using the phone's camera, he said.

Samsung and Oculus Rift have developed their own apps that the military can use, but they also offer the option for the Pentagon to create its own, he said.

The company is currently testing Gear VR with the Navy, Wu said. "SEAL teams are testing some of this for training purposes."

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SAMSUNG, DEFENSE DEPT.


TALOS concept artwork

Exoskeleton Simulator Could Save Army Millions

■ A software tool currently being developed to simulate the effects robotic exoskeletons have on soldiers could save the Army millions, according to the CEO of RE^2 Robotics, the company creating the system.

Exoskeletons have the ability to prevent soldier injuries caused by heavy loads. The Pentagon is currently working on several projects to advance this technology, most notably Special Operations Command's tactical assault light operator suit.

The biomechanical exoskeleton simulator system created by RE^2 — a company known for its development of robotic manipulator arms — will model the impact of load carriage and body-wearable robotic devices on musculoskeletal health and performance.

"It's costly to develop prototypes … so one way to reduce those costs is to model the effects that these prototypes and products would have on the human body before you build it," said Jorgen Pedersen, the president and CEO of RE^2. "Ultimately you could be saving millions of dollars in development costs." Such an approach could also speed up the process for building exoskeletons and getting the gear to soldiers on the battlefield, he said.

The technology is being created as part of a small business innovation research program with the Army. In February, the service awarded the company a $1 million phase 2 contract. During this stage — which will last two years — the company will develop the product and ensure that the simulation tool is producing accurate results, he said. It will do so by first using a physical exoskeleton to create models that reflect realistic sensory data output. Phase 2 builds off initial design and preliminary work completed in phase 1.

The tool itself is a plug-in for an existing software program called OpenSim, which is freely available and modifiable. The program enables users to create models of musculoskeletal structures, Pedersen said.

To create the plug-in, RE^2 is working with several partners on the project. Ekso Bionics, a company that creates exoskeletons for the commercial market, is providing the hardware that RE^2 will use to create its models, Pedersen said. Experts at Stanford University will help the company develop and integrate the plug-in into OpenSim. And the human engineering research laboratories at the University of Pittsburgh will work with the company to design and test the system.

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Intelligence System Moving to the Cloud

■ As more engineers transfer defense networks to cloud computing, developers of a decades-old intelligence system are embracing the move.

The joint deployable intelligence support system, which was created in 1992, connects deployed troops with the military's top-secret network known as the joint worldwide intelligence communications system, or JWICS, said Navy Cmdr. Brian Hoffer, program manager for JDISS.

"It arose after the Gulf War as a need to get intelligence into the hands of the warfighter," he said. "Complementary to that network was the need to get a one-size-fits-all intelligence workstation to hang on the edge of the network."

At the time, JDISS was a physical box or workstation where service members could create intelligence documents and send information from system to system, he said. Now, JDISS — which includes a number of applications — has gone from hardware to software.

Webster Essex, technical director for JDISS, said: "Our customers are relying on us more so today as not necessarily the physical box, but to provide a certified software that they can include on their" systems.

JDISS currently has about 600 different customers, Hoffer said. The largest one is the Air Force's air operations center. The Navy's maritime operations center also uses the system, he noted.

Developers at JDISS' joint program office are now embracing calls to move the system over to a cloud-based system, Hoffer said.

"We're embracing the federal mandate about trying to move our applications into an enterprise environment, essentially into the cloud," he said. "We're focusing on the basics, figuring how to support the best of breed intelligence mission applications."

There are two different ways to do that with the JWICS network, he noted. One is using GovCloud, which was created and is supported by the National Security Agency. The other is through commercial cloud services provided by Amazon, he said.

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U.S. Proceeding with New Strategy to Counter ISIL

■ The State Department is pursuing an alternative approach to counter the Islamic State's online propaganda and in turn stymie the group's recruitment of foreign terrorist fighters, according to a senior government official.

"There is no question we need to do more to counter ISIL's propaganda and online radicalization and recruitment efforts," said Tina Kaidanow, ambassador-at-large and coordinator for counterterrorism at State. "We recognize that the most effective messengers are our partners in majority Muslim countries, and we also understand frankly that governments are not usually the best agents for delivering this kind of content or pushing back on the kind of messaging ISIL utilizes," she said during an event hosted by the Center for Strategic and International Studies, a Washington, D.C., think tank.

Prior to the department's shift in strategy, its efforts focused on directly sending messages to potential ISIL recruits through the Center for Strategic Counterterrorism Communications, which was established by the president and secretary of state, Kaidanow said. However, officials have come to realize that when countering an organization that operates under the notion that Western governments are illegitimate, a message from them might not be the most effective source, she said. "How credible can you be [under those circumstance]?" she asked. "It's very difficult to say."

For this reason, in January the State Department announced the creation of the Global Engagement Center which aims to "shift focus on countering violent extremist messaging away from direct messaging and toward a growing emphasis on empowering and enabling partners, both government and non-government, across the globe," a White House fact sheet said.

The center will work with Muslim communities and non-government entities at home and abroad — providing them with the funding and technical expertise to counter the message of violent extremism, Kaidanow said. "You have to assist those community elements that are looking for those ways to reach into those communities and stop that kind of recruitment or intervene early in that cycle."

Other ways the State Department is looking to stem the flow of foreign fighters to terrorist groups in the Middle East is by partnering more effectively with allies to increase border security and information sharing, she said.

One step toward developing a more collaborative, global response was the United Nations Security Council Resolution 2178 passed in September 2014. "Implementation of this UNSCR involves wide-ranging efforts to increase information sharing among countries; implement counterterrorism legislation; strengthen border security; and increase efforts on counter-messaging and countering violent extremism," Kaidanow said.

The United States now has over 49 information-sharing agreements with international partners; 45 countries have enacted laws or amendments to create greater obstacles for traveling into Iraq and Syria; at least 35 countries have reported arresting foreign terrorist fighters or aspirants; and 12 countries have successfully prosecuted at least one such fighter, she said.

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OFFICE OF NAVAL INTELLIGENCE

Cyber Report: 2015 Was the Year of Collateral Damage

With the Office of Personnel Management hack and other intrusions affecting tens of millions of people last year, a recent cybersecurity report dubbed 2015 the "year of collateral damage."

The annual cyber risk report — which was produced by Hewlett Packard Enterprise and released in February — said breaches affected citizens who never dreamed they would be involved in such an intrusion.

"Folks are seeing that not only do these hacks result in perhaps the theft of your personal data, your identity data, but … [hackers] can do an awful lot of very bad things with it," said Denby Starling, HPE's vice president and account executive for Navy and Marine programs. "They can not only steal your money, they not only can impersonate you online, but they in some cases can embarrass you publicly."

The report found that while organizations such as Microsoft and Adobe released more patches than ever before, that was not enough to stymie some viruses.

"The most exploited bug from 2014 happened to be the most exploited bug in 2015 as well — and it's now over five years old," the report said, referring to a virus known as CVE-2010-2568. "While vendors continue to produce security remediations, it does little good if they are not installed by the end user."

The necessity for users to download patches isn't new, but it still isn't being done, Denby said.

Hewlett Packard Enterprise — which runs the Navy and Marine Corps' Intranet — puts a premium on improving the services' networks with a variety of updates, he said.

Users, in general, sometimes resist installing necessary security patches because they are afraid that the software upgrade will break existing applications, the report found. It called on industry to build more trust with users to "to help restore faith in automatic updates."

Microsoft Windows was overwhelmingly the top platform for malware with 94 percent of such software targeting the platform. Android systems accounted for 3 percent, the report said.

As the report looked toward 2016, it said there would be a focus on metadata, the Internet of Things, encryption and security.

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ISTOCK

By Scott Freling, Kathy Brown and Kayleigh Scalzo

DCAA Backlog: What It Means for Industry

The Defense Contract Audit Agency's audit backlog is old news, but Congress's recent attempt to cure that backlog has garnered industry attention — and more than a few raised eyebrows. In an apparent effort to redirect resources toward alleviating the problem, Congress has prohibited DCAA from providing audit support for non-defense agencies. But what does this mean for contractors?

Section 893 of the 2016 National Defense Authorization Act aims to improve DCAA's audit support function and resolve the backlog by prohibiting it from providing audit support for non-defense agencies until its "backlog for incurred cost audits is less than 18 months of incurred cost inventory."

The provision also attempts to remove any financial incentive for DCAA to flout this restriction; beginning in fiscal year 2017, it reduces the agency's appropriated funding "by an amount equivalent to any reimbursements received by" DCAA for audit support provided to non-defense agencies.

In a Jan. 7 memorandum, DCAA narrowly construed Section 893's reach. As an initial matter, it interpreted the restriction as pertaining only to audit support, concluding that the agency remains available to provide other services such as negotiation support, litigation support, investigative support and non-audit services to civilian agencies.

In addition, DCAA has determined that it may continue performing audits that contain a mix of Defense Department and non-DoD contracts under certain conditions. Audits of indirect cost rates, also known as incurred cost audits, necessarily require auditing of all the indirect costs incurred by the contractor to determine a rate to be charged to all contracts. Because these audits cannot be segregated by a contracting entity, DCAA reasoned that such audits should remain within its purview. And although direct costs can be segregated by contract, the agency further concluded that its auditors may retain that work as long as including the non-DoD contracts in the audit requires only "de minimis additional effort."

In either kind of blended audit, the benefit received by the non-DoD agency will remain reimbursable to the Defense Contract Audit Agency; however, any reimbursement received from the non-DoD agency will reduce the appropriated funds available to DCAA.

While DCAA and procuring agencies figure out how to work with and around Section 893's constraints, contractors are left to wonder what this means for them. Below are some immediate considerations for contractors with Defense contracts, non-Defense contracts, or both.

For contracts with defense agencies, expect more attention from DCAA, which is now under even more pressure to resolve its audit backlog, but with fewer resources to accomplish that goal. Congress is stripping the agency of the revenue it otherwise would generate from its audit services for civilian agencies, leaving it in a circular funding crunch.

DCAA is likely to keep concentrating its limited resources on high-risk, high-value audits and expedite lower-risk, lower-value audits. While this carries the potential of smaller audit matters falling through the cracks, contractors with high-risk, high-value matters should anticipate DCAA's full attention.

For contracts with civilian agencies, expect less attention from DCAA, but not radio silence. Although it already has started terminating its audit services for civilian agencies, it has made clear that it does not plan to cut off those agencies entirely.

DCAA has carved out two areas where it will continue working with civilian agencies: services other than audit support; and audits with a mix of DoD and non-DoD contracts for indirect cost rate proposals, or for direct cost audits.

Thus, contractors that operate largely, but not exclusively, in the defense space should not expect the agency to disappear entirely, even with regard to their non-DoD contracts. Contractors in the inverse situation, however, may encounter dissected audits, with DCAA leaving to civilian auditors the non-DoD portions of audit cases that it historically would have handled.

Be prepared for some growing pains with civilian agencies that have come to rely on DCAA for cost expertise. While civilian agencies are figuring out a new supply chain for their audit support services, there may be a lull in audit activity. Civilian agencies likely will use both in-house staff and private contractors to pick up where DCAA left off.

Pay attention to record retention requirements and statutes of limitations. To the extent that civilian-agency audits slow down as DCAA chips away at its defense-agency audits, contractors on the civilian side should remain particularly vigilant about the Contract Disputes Act's six-year statute of limitations — both in terms of the timeliness of their own claims against the government and as an affirmative defense against any claims the government might assert against the contractor. Contractors also should closely review their record retention requirements in light of any stale contracts or contract years that have not been closed out.

Section 893 is unlikely to be the silver bullet. For the same reason that DCAA likely will continue prioritizing high-risk, high-value audits in an effort to get the most bang for its buck, Section 893 is unlikely to solve its backlog. The agency estimated in 2014 that only 10 percent of its budget was for civilian agency audits, so it is unclear whether sufficient resources will be freed up by the new restriction to make a meaningful impact on the backlog inventory. And even if that theoretical 10 percent could be entirely redirected to the incurred cost backlog, it is similarly uncertain whether the corresponding lack of civilian-agency revenue would undercut the utility of that otherwise available workforce.

Congress may revisit the restriction on non-DoD audit support next year if DCAA successfully eliminates the backlog, the restriction proves ineffective or becomes disruptive to contract administration and payments.

Scott Freling, Kathy Brown and Kayleigh Scalzo are government contracting attorneys at Covington & Burling LLP.

The Ins and Outs of Cyber Liability Insurance

By Thomas H. Bentz Jr.

Losses from cyber events can be staggering for government contractors. Attacks, often from nation-state-sponsored entities, can cause millions of dollars in losses and be devastating for a business.

For example, in 2014, a high-profile provider of background checks to the Office of Personnel Management experienced theft that allegedly exposed the personal information of about 27,000 government employees.

OPM terminated its contract, resulting in $417 million in lost revenue, and the contractor's parent company was forced to file for bankruptcy protections. This was in addition to the cost to notify the employees of the breach, the costs of the related litigation and the damage to the reputation of the contractor.

Cyber liability insurance may offer a lifeline to government contractors to minimize financial losses in the event of a breach. Unfortunately, such policies are both complicated and rapidly changing. There is no standard policy form, which means that the coverage offered by one insurer can — and often does — differ dramatically from that offered by another insurer.

There is also little agreement between insurers on what should be covered, when the coverage should be triggered or even how basic terms should be defined. These differences make understanding what is and is not covered very difficult. It also makes it nearly impossible — or at least foolish — to purchase this coverage based on price alone.

One of the biggest challenges for government contractors trying to purchase cyber insurance coverage is simply knowing what to ask for from an insurer. There are many areas where government contractors should negotiate changes to their cyber liability insurance policies.

A typical prior acts exclusion excludes coverage for any claim based upon wrongful acts that occurred prior to a certain date — often the inception date of the policy. This can be extremely problematic in the cyber context because hackers may install spyware, viruses and other malware long before a breach is discovered. If the policy considers the intrusion date as the date of the wrongful act, a contractor may end up with no coverage for a breach that is discovered after the policy has incepted. For this reason, contractors should make every effort to avoid prior acts exclusions whenever possible.

Many government contractors are surprised to learn that cyber liability policies generally exclude coverage for portable electronic devices such as laptop computers or cell phones. Obviously, this can severely limit the coverage provided by a policy. Fortunately, many insurers will remove this exclusion if a contractor agrees to provide "satisfactory" encryption for any data contained on the portable devices — something most government contractors do already.

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Cyber liability policies often exclude coverage for any claim "arising out of, based upon or attributable to" property damage and bodily injury. This is too broad for many government contractors. Instead, the quoted language should be replaced with the word "for."

This change is important because, although a cyber policy is not intended to cover general liability exposures such as bodily injury or property damage, it must still be able to respond to claims based on the breach that do not involve bodily injury or property damage directly — even if such losses were also caused by the intrusion.

The bodily injury/property damage exclusion should also include a carve back for mental anguish, emotional distress and shock caused by a cyber event. Plaintiffs may allege these types of damages after a breach of their personal information. Many insurers will only provide this coverage upon request.

The mechanical/electrical failure exclusion removes coverage for claims caused by a mechanical shutdown such as when your computer stops working. This exclusion needs to be limited so that if a criminal causes the mechanical failure or shutdown by means of a virus, spam attack, etc., the policy may respond.

Many cyber policies exclude coverage for claims involving acts of war, invasion, insurrection, terrorism, etc. Including terrorism in this exclusion can be problematic in this context as almost all cyber attacks could be considered acts of terrorism whether foreign or domestic. This is especially true for government contractors that may be attacked by a nation-state entity. A strong cyber policy should not reference terrorism in this exclusion.

Cyber liability policies often exclude coverage for employment practices claims. If a cyber policy has this type of exclusion, contractors should make sure that there is a carve back for employment claims alleging privacy violations caused by a data breach.

Similar to the employment practices exclusion described above, a strong cyber liability policy will have a carve

back to the Employee Retirement Income Security Act exclusion for claims alleging damages caused by a data breach of the contractor's employee benefits program.

Most cyber policies include exclusions for fraud, intentional and illegal misconduct. How a policy determines whether a conduct exclusion applies, when that determination may be made, and who gets to make this determination is extremely important.

For this reason, many contractors prefer a "final, non-appealable adjudication in the underlying action" standard. This standard provides individuals with the maximum coverage possible and requires a final, non-appealable adjudication by a court in the underlying action to establish that the alleged wrongful conduct occurred. Without such a final non-appealable adjudication of wrongful conduct, the exclusion does not apply — for instance, when there is coverage available from the policy.

The insured vs. insured exclusion states that the policy will not cover a claim made by one insured against another insured. However, many cyber liability insurers will agree to "carve out" certain insured vs. insured claims for various reasons including for the following: failure to protect confidential information; failure to disclose a breach event in violation of law; the unintentional failure to comply with the insured's privacy policy; and violations of privacy statutes.

Often these carve backs only relate to a specific coverage grant so it is important to review each coverage grant separately.

Finally, in order to make sure that the acts of one insured person do not impact coverage for other innocent insured, a cyber liability insurance policy should contain an exclusion severability provision. An exclusion severability provision states that no wrongful act committed by any one insured shall be imputed to any other insured for purposes of determining the applicability of any of the exclusions.

There are a number of cyber liability insurance policies available today and they are highly negotiable. **ND**

Thomas H. Bentz is a partner at Holland & Knight LLP, Washington, D.C.

New Ecosystem Emerging In Military Logistics

By Graham Grose

The global defense market is emerging from the challenges it faced over the last five years.

In the Asia-Pacific region, sustained economic development and industrial and social maturity is leading to projected increases in defense expenditure. In Western markets, the budgetary cutbacks of recent years have passed their peak, and in some countries, such as the United Kingdom, there are projected increases in defense expenditures.

Major military conflicts are waning, while being counter-balanced by significant increases in terrorist-based, insurgency-type operations.

Without a doubt, the growth in machine-to-machine and connected devices, along with the transformational power of emerging technologies and revolutionary arrivals such as the F-35 joint strike fighter are going to change the military support environment.

We will start to see the growth of demanding ecosystems involving multiple relationships between contractors and manufacturers based on complex contractual agreements and varying levels of capabilities. These "protected" military ecosystems are likely to result in a more concentrated defense manufacturing market. The more protected ecosystems there are, the more competitive it will be for tier-two manufacturers to play roles as suppliers.

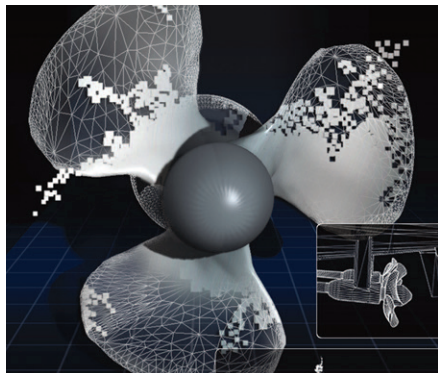
There are some key developments that will change the way defense organizations will operate and, in turn, bring huge changes to military support chains.

First, new technologies offer promising advantages for defense organizations, helping keep control and full visibility at every step in the support chain. Connected devices are now playing a big role in maintenance hangars. The next generation of warplane has arrived in the F-35, and military logistics needs to move with this. An F-35 has internal and external sensors that send real-time data to a ground-based logistics support system, which then seeks to optimize the end-to-end support chain. Hours can be saved in the maintenance bay by making sure the right equipment is available in the right place at the right time, so engineers are prepared for the task in hand and ready with the right part as soon as the aircraft lands.

The emergence of 3D printing, or additive manufacturing, has big potential for military ecosystems, perhaps more than most realize. The most obvious advantage is being able to produce parts when they are needed, meaning organizations can keep control of their support chains and end-to-end manufacturing processes by controlling distribution and quality of parts, affording increased opportunity for tier-two manufacturers.

Producing parts in theater, on what is now increasingly mobile 3D printing technology, means potentially spectacular advantages in the military context and a reduced logistics footprint in terms of not having to ship large, complex assets that are vulnerable to enemy attack over long distances. There is less risk associated with forecasting, less need to hold assets in large logistics parks and less staff involved in managing those assets and in managing the turnover.

For example, the U.S. Navy has adopted 3D printing technology on board the USS Essex to produce custom drones. Data files and models can be sent from land bases to ships hundreds of miles away and can be printed and fully oper-



NAVY

"Technology such as 3D printing has the potential to cause disruption."

ational in a matter of hours.

New technology such as 3D printing has the potential to disrupt military ecosystems. The main concern is quality control: how can defense manufacturers, the military and performance-based logistics service providers adopt 3D printing technology while maintaining quality control and airworthiness standards?

Another question is whether the threat of counterfeit parts will disrupt this change? A report from the Organization for Economic Cooperation and Development put the value of counterfeit goods that crossed international borders at over $250 billion as far back as 2007, while the International Chamber of Commerce expects the value of counterfeit goods globally to exceed $1.7 trillion this year. If linked to the parallel challenge of International Traffic in Arms Regulations and the Export Administration Regulations, organizations need an enterprise approach for the management of underlying software support solutions if the transition to an effective and safe environment is to be achieved.

A second trend is a new and emerging military ecosystem that will continue to become more complex.

As outlined above, this complexity will grow as new technologies emerge and support chains are disrupted. But manufacturing and procurement constitutes only 20 percent of the total cost associated with modern jets, for example, with the remaining 80 percent of costs being spent through its life on in-service support. Effective maintenance and operational support can help produce significant cost savings at a time of changing defense budgets.

Tier-one defense manufacturers will look to protect this 80 percent as a means to boost revenues, creating a "locked-in" and protected ecosystem. For example, a typical defense manufacturer might have a profit margin of just 7 percent, meaning contractors can only realize large revenues from these through-life costs.

The emergence of a "protected ecosystem" means that manufacturers will become involved in the design, support and delivery of their own product. The increasingly direct link between customers and suppliers can lead to fragmented services across the enterprise — services that must be integrated into the wider military ecosystem. The use of defense products — such as engines, weapon systems or military planes — often spans years or decades. The contracts to manage and maintain those products can be long term, adding further to potential fragmentation.

All parties — whether they are the government, systems integrators, top-tier manufacturers, tier-two or component manufacturers — experience the same defense contracts constraints, which can involve a significant level of risk. Tier-two manufacturers can find huge opportunities in this, but only if they can minimize the risk they currently present to the top manufacturers. They must become more cost competitive and be able to demonstrate compliance — a significant part of which will be the need to adopt agile software solutions that are able to adapt to business transformation.

Finally, with increased industry involvement in the support chain — as well as new technology — defense organizations need better control and visibility over increasingly fragmented logistics operations and services. A 360-degree view of defense operations is needed if organizations are to become fully protected and better informed military ecosystems, which is particularly pertinent in today's unpredictable geopolitical landscape.

Defense departments will also have to continue to become more business-like in the way they operate by balancing value for money with operational effectiveness and safety. One of the leading examples of this capability is the Enterprise Operational Intelligence part of IFS applications, which allows defense organizations to map, monitor and manage the entire support chain or defense enterprise.

In 2016 and beyond, organizations will need to embrace new technology and the shifting geopolitical landscape in order to become fully protected military ecosystems, or risk disrupting operational effectiveness.

The future will see a sixth generation of logistical solutions, which will be characterized by several factors.

Soldiers, their equipment and the fully integrated support chain will allow for an increased agile response to changing tactical situations. Simple, precise information delivered effectively to soldiers and commanders will enable real-time, intelligence-led decision making.

Real-time optimization, or end-to-end solutions will emerge but as the "logistics support enterprise," or ecosystem.

In this, access to quality performance data will be critical to the process of continuous equipment improvement.

And there will be fewer military/industry solution islands. They will move toward solutions where data is contractually shared across a project/platform and encompassing a joint strategy.

But the driving theme is that we should consider the soldier in all this prediction and speculation. Military programs have too often imposed functionality-rich solutions onto the soldiers in the field, who don't want, or need, to be bothered with complex functionality and information management.

These new developments must ensure that soldiers have access to the right information, in the right format, at the right time — enabling them to execute their tasks effectively. **ND**

Graham Grose is industry director at the IFS Aerospace & Defense Center of Excellence.

North Korea, Iran's Advances Fuel Demand for Regional Missile Defense

By Jon Harper

Advances in ballistic and cruise missile capabilities among potential adversaries are putting U.S. forces and allies at greater risk. The Pentagon is looking to industry to provide solutions to the growing problem, as it beefs up its theater missile defense shields and invests in new technologies.

One asset the Defense Department is buying is the terminal high altitude area defense system, or THAAD, which is produced by Lockheed Martin. THAAD is intended to shoot down incoming missiles both inside and outside the atmosphere with "hit-to-kill" interceptors.

The Army currently has five batteries, but the Pentagon is increasing that number. Seven are fully funded, and the sixth and seventh batteries are slated to be delivered to the Army by 2018, said Vice Adm. James Syring, commander of the Missile Defense Agency.

In its fiscal year 2017 budget request, the Defense Department is asking for $370 million to procure THAAD equipment, and an additional $270 million for research, development, test and evaluation. The Pentagon plans to continue interceptor procurement over the next five years, for a total of more than 400, Syring said.

In December MDA awarded Lockheed Martin a $528 million contract for production and delivery of additional interceptors.

While seven THAAD batteries have been funded, the Army has set the requirement at nine. "We continue to discuss with the Army that requirement and when it would need to be fulfilled and … what the budgeting year would be for that," Syring said. "It's not off the table in any respect, but [it is] not included in this year's budget."

The system is designed to shoot down short- and medium-range missiles, but the Pentagon is planning to test it against an intermediate range ballistic missile in the 2017 to 2018 timeframe. "That would be similar to what we would expect from either North Korea or Iran," Syring said.

The Defense Department is considering permanently basing a THAAD battery in Guam, Gen. Vincent Brooks, commanding general of U.S. Army Pacific, told reporters at a breakfast in Washington, D.C. in December. "It's first about making sure we have a continuous presence" for readiness and deterrence purposes, he said.

Adm. Harry Harris, commander of U.S. Pacific Command, recently told lawmakers that he expects the rotational THAAD battery currently in Guam to achieve permanent status later this year.

The United States is also interested in potentially stationing THAAD in South Korea in the wake of recent North Korean missile and nuclear tests. Washington and Seoul have agreed to hold formal consultations on the issue. "The goal … is to bilaterally explore the feasibility of THAAD deploying to and operating on the Korean Peninsula at the earliest possible date," U.S. Forces Korea said in a news release in February.

Another key tool in the U.S. arsenal is the Patriot Air and Missile Defense System, developed by Raytheon, which gained fame during Operation Desert Storm for shooting down Iraqi Scud missiles.

The Defense Department requested $423 million in fiscal year 2017 to procure 85 Patriot missile segment enhancements, which are expected to improve the range and capability of Lockheed-built Patriot Advanced Capability-3 interceptors.

Raytheon is developing a gallium nitride-based active electronically scanned array radar as a potential upgrade to the Patriot system. The new technology would give the Patriot 360-degree capability to defend against missiles, manned aircraft and drones, according to a company press release. Raytheon expects to have a full-scale main array prototype operational this year.

The Aegis Combat System, manufactured by Lockheed, is also making advances. Baseline 9.C1 — the first integrated air and missile defense version — was recently certified and has already been deployed on several Navy destroyers. It is also at the Aegis Ashore site in Romania, said Jim Sheridan, director of Aegis U.S. Navy programs at Lockheed.

"We'll continue to field that until 9.C2 in the 2018 timeframe is available for fielding," he told reporters.

The Aegis Ashore system is part of the European phased adaptive approach initiative, a U.S.-led ballistic missile defense project designed to protect Europe from potential Iranian attacks. The site in Romania achieved technical capability declaration in December. The Defense Department has requested $630 million for phase 3 of EPAA, which will include an Aegis Ashore site in Poland. Construction of that site is slated to begin this year, with a technical capability declaration expected by the end of 2018.

The Defense Department is also considering making the Aegis Ashore test site in Hawaii an operational system. Syring recently held talks with Pacific Command's Harris about the possibility.

"This facility was built as a test facility and nothing more," Syring noted. "But the question … [is] a logical one in terms of what could be done? And what could it provide in terms of either sensor or engagement capability? … We've not made any movement or decision on this … [but] we're discussing and considering options."

The Standard Missile-3 interceptor is a key component of the Aegis Ashore system.

It is designed to shoot down incoming missiles outside the atmosphere. An intercept test of the upgraded SM-3 Block 1B in December against a medium-range ballistic missile was "very successful," said Amy Cohen, director of the SM-3 missile program at Raytheon. The first Block 2A intercept is slated for the second half of 2016, with additional tests to follow.

"That will lead us into having the 2A missile present in Poland to support the EPAA phase 3 Aegis Ashore in the 2018 timeframe," she said.

The Pentagon plans to procure 35 additional Aegis SM-3 Block 1B interceptors in fiscal year 2017. It has also requested $106 million for Block 2A development.

Last year Raytheon was awarded a $543 million contract to produce the

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Block 2A. "By the time we get to … the 2018 timeframe we will have rounds from this first lot of production missiles ready to support the [European phased adaptive approach] or to support the fleet — whatever the government decides to do with these missiles," Cohen said.

The company is also developing the Standard Missile-6, which is designed to shoot down enemy warheads inside the atmosphere in their terminal phase.

"If you have both of those [SM-3 and SM-6] … on a ship, you have the ability to have a layered defense," said Thad Smith, manager of SM-6 business development at Raytheon. "If you have multiple raids coming down against a defended asset and they get by the SM-3s … the SM-6 will be able to get that in the terminal phase."

The Defense Department plans to buy 125 SM-6s per year over the next five years. The total program of record is 1,800 missiles, Smith said. Full operational capability is expected in late 2016 or 2017 depending on additional test and evaluation, he added.

Hit-to-kill interceptors are not the only capabilities that the Pentagon is looking at to counter enemy missile threats. The Missile Defense Agency wants to mount a laser weapon on an unmanned aerial vehicle for "boost phase" intercept.

Terminal high altitude area defense system

"The investments that we're making are in the early stages of [determining] how do you get there?" Syring said during recent remarks at the Center for Strategic and International Studies. There is "important work going on at the laboratories and universities and industry down this path, and we have significantly ramped up our program in terms of investment and talking about ... what else needs to be done to mature this capability."

A viable system must be able to direct a laser beam at "much longer ranges and much higher power" than any military laser capability that exists today, he said. "It obviously needs stand-off range because this platform theoretically would not be protected" from enemy air defenses.

The directed energy weapon needs to fit on a small aircraft such as a UAV that could fly at 65,000 feet and stay aloft for days at a time. It also needs a deep magazine, a rapid retargeting capability and a power density of 5 kilograms per kilowatt or less, he said.

"To be able to field a package at those power levels and at a low size, weight and power form — the technical challenge is significant," he noted. "What I'm trying to do is competitively drive towards a decision in 2019 with all these efforts progressing … [to determine] is it feasible to scale this up to a platform? And I think we'll know a lot by the 2019 timeframe."

The missile defense chief hopes to have a laser demonstrator by 2021.

The Pentagon is also pursuing rapid-fire, ground- and sea-based lasers, electromagnetic rail guns and hypervelocity projectiles to protect ships and other assets from saturation attacks.

It would be challenging to build a sufficient number of elaborate interceptors to shoot down waves of incoming missiles, said Michael O'Hanlon, co-director of the Center for 21st Century Security and Intelligence at the Brookings Institution. "For protecting airfields in Okinawa or some place, it's going to be pretty hard to do that against a peer adversary [such as China] unless we have some kind of a game-changer technology."

Gen. Paul Selva, vice chairman of the Joint Chiefs of Staff, said the Defense Department needs less expensive methods of thwarting enemy attacks.

"In this missile defense space, we actually have gone for … the most elegant interceptors that exist to go after individual warheads," he said during remarks at the Brookings Institution in January. "That is the absolute wrong end of the cost and position curve. We are doing a $10 solution for the 10-cent problem. We need a 10-cent solution for the $10 problem."

A laser shot could cost less than $1, according to defense officials, whereas traditional interceptors can cost hundreds of thousands of dollars or more per unit. In December, the Office of Naval Research awarded Northrop Grumman a $53 million initial contract to develop a 150-kilowatt solid state laser for ship defense.

"When you think about directed energy weapons, potentially powdered cannons with hypervelocity rounds and a variety of others, where you can mass a defense against an incoming threat, whether it is [a] cruise missile or ballistic missile … your opponent is actually having to build more and more elegant weapons to try to defeat a relatively inexpensive and relatively certain defense," Selva said. "I think we need to get into that space."

The Pentagon also wants more advanced sensors for tracking, targeting and discrimination. In addition to seeking improvements for Aegis, Patriot, THAAD and other systems, the Defense Department is pursuing space-based kill assessment, or SKA.

The SKA project aims to put a network of sensors on commercial satellites to help detect whether an interceptor successfully hit its intended target. The increased detection capability could make missile defenses more efficient.

An MDA fact sheet on space-based kill assessment said: "The faster we can determine a threatening missile has been eliminated, the fewer the number of interceptors are needed in the fight."

The SKA sensors, built by the Johns Hopkins University Applied Physics Laboratory, are expected to be placed into orbit in 2017. The Pentagon has requested $20 million for the effort.

That experiment "is going to help a lot in terms of informing that mission — the kill assessment information that we need," Syring said. "That will inform what is the long-term end state" of this effort. **ND**

Email your comments to jharper@ndia.org

Air Force Modernization At Risk as Maintenance Costs Continue to Climb

By Allyson Versprille

Rising operations and support costs could affect the Air Force's ability to modernize as it prepares to fund the F-35 joint strike fighter, KC-46 tanker and long-range strike bomber in the mid-2020s, service officials and experts said.

One cost driver that has been scrutinized in recent months is the extension of aircraft beyond their anticipated life spans. The service's planes average more than 27 years in the fleet, according to Air Force Materiel Command documents.

"Some of the challenge with the rising costs is the fact that the parts aren't available," said Gen. Ellen Pawlikowski, commander of AFMC. She noted that with older platforms many of the companies that once supplied aircraft components have gone out of business.

At the same time, skills that were required to sustain those aircraft decades ago may not be relevant anymore, she said. For example, some systems still use floppy disks, which may not be familiar to modern maintainers, Pawlikowski said.

"As the age of aircraft increase, the amount of maintenance they require goes up," said Todd Harrison, the director of defense budget analysis at the Center for Strategic and International Studies. "That's not much of a surprise. It's like if you have an old car, more things are going to break. That's part of what's happening because the average age of aircraft in the Air Force inventory has been getting older and older. Now it's the oldest it has ever been."

Another contributing factor is the expansion of Air Force missions. Current operations in Iraq and Syria, in addition to increased presence in both Europe and the Asia-Pacific, are putting a lot of stress on the service's fleet, Harrison said. It "is leading to more maintenance costs, and it is forcing the Air Force to make tradeoffs in its modernization programs."

The composition of the force can also increase operations and support costs. The Air Force today has fewer aircraft spread out over many different fleets, Harrison said. When there's a small number of a specific platform, "the maintenance cost per aircraft goes up because you've got all of that overhead of training, maintainers and the equipment that they need … that gets applied to a smaller number of aircraft."

Gen. Herbert "Hawk" Carlisle, commander of Air Combat Command, used the controversial A-10 Thunderbolt II, fondly referred to as the "Warthog," as an example of this phenomenon.

"Keeping legacy fleets around when we've tried to divest them has an impact on modernization," he said at an Air Force Association Conference in February. "If we keep those, we're keeping maintainers, we're keeping [operations and maintenance] costs, we're keeping program depot maintenance. We're doing all of those things for those A-10s and that money can't be put into F-35s."

The A-10 entered into service in the 1970s. The fiscal year 2017 budget request would delay the retirement of the platform to 2022. Previous budget requests sought to divest the fleet but ran into opposition in Congress. Service officials have estimated that it will cost the Air Force $3.4 billion to keep the platform in its inventory over the next five years.

Because the A-10 is being retained longer, the Air Force has been forced to ask Lockheed Martin for contractor logistics support. According to Jeff Babione, executive vice president and general manager of the F-35 program at Lockheed, the company has taken over maintenance of an entire wing at Luke Air Force Base in Arizona to sustain the joint strike fighter. Eventually, Lockheed plans to have 400 technicians working at the base to maintain 47 international F-35s.

When transitioning to modern airframes, the most logical course of action would be to divest entire fleets of older aircraft so that logistical support and

An A-10C Thunderbolt II under repair

training costs can also be saved, Carlisle said.

Gen. Robin Rand, commander of Air Force Global Strike Command, noted a similar problem within the service's legacy bomber fleet. There are currently three bombers in service today — the B-52, B-1 and B-2. As the new long-range strike bomber, officially designated the B-21, comes on line, one of those legacy platforms should be considered for retirement, he said at the AFA conference. The B-52, which entered into service in the 1950s and the B-1, introduced in the early 1980s, are the most likely candidates.

"When we get the LRS-B in production and start delivering it, it will be very, very difficult" to keep all of the bombers in the fleet, Rand said. "We couldn't maintain four bombers if we wanted to."

Meanwhile, both industry insiders and service officials noted that there are some exceptions to the idea that legacy aircraft always have higher sustainment costs.

Scot Oathout, program director for aircraft modernization and sustainment of legacy tankers and B-52s at Boeing, said from a sustainment perspective on their end, operations and support costs for the aging tanker fleets have been stable.

Pawlikowski supported that claim for the KC-135. A shift in culture and the employment of leaner sustainment techniques within the Air Force Sustainment Center at Tinker Air Force Base in Oklahoma has improved throughput for some legacy aircraft, she said.

"The KC-135 is by far a legacy aircraft, right?" she said. Well, "the folks at Tinker have not only maintained the production rate but they have reduced the number of days that those aircraft spend in depot."

Because of that success the Air Force recently sent maintainers to speak with a Northrop Grumman team to discuss applying similar methods to the Joint Surveillance Target Attack Radar System, which has been experiencing longer depot turnaround times, she said.

Oathout said for the B-52, overall O&S costs have also been steady. "There are probably pockets of areas that have risen over the years, but overall that sustainment cost is pretty good." When adjusted for inflation the operational cost per flying hour for the B-52 has grown about $36,000 from 1996 to 2015. However, that rate has remained relatively flat from 2010 to 2015, averaging about $67,000, based on Air Force Materiel Command documents.

One component that the Air Force and Boeing would like to replace in order to decrease operations and support costs is the bomber's engine. The service spent $74.2 million on depot repairs related to engine rework and overhaul for the platform in fiscal year 2015, according to the AFMC documents.

Oathout said there have been indications that the bombers will be in service well into 2040 and beyond. Replacing the current engine to gain more efficiency could save the service money in the long run, especially if the planes are expected to fly for 30-plus more years.

There are "new engines being developed for regional jets that are the exact same size as the B-52 engines, and the fuel efficiency is incredible compared to 1960 TF33" turbofan engines, he said.

There are three main players in these discussions — General Electric, Rolls-Royce and Pratt & Whitney, according to Boeing. Commercial engines used in those medium-sized jets could provide 30 percent more fuel efficiency, range and loiter time, Oathout said.

Pawlikowski — who noted that fuel expenditures often comprise a large proportion of O&S costs — agreed that the service is interested in examining that issue. However, it is having a difficult time fitting the re-engine plans into its tight budget. "Whether it's a complete

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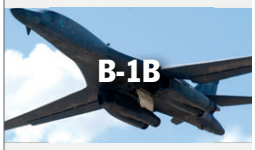
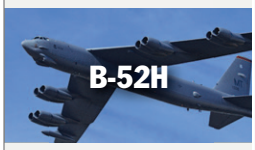
AIRCRAFT	OPERATIONAL COST PER FLYING HOUR (IN THEN-YEAR DOLLARS)
 A-10C	$17,227
 B-1B	$58,488
 B-2A	$128,805
 B-52H	$67,005
 F-15C/D	$38,846
 F-15E	$27,203
 F-16C/D	$20,318
 F-22A	$59,166
 F-35A	$42,169
 KC-10A	$20,416
 KC-135R/T	$19,620

The operational cost per flying hour (CPFH) is calculated by dividing the total operating and sustainment costs (excluding hardware modifications) associated with a weapon system by the total flying hours flown in the same year.

engine replacement or a significant modification to the engines … the fact of the matter is right now when you look at all of the things the Air Force needs to modernize, we haven't figured out a way to put it into our budget," she said.

When it comes to increasing operations and support costs, Harrison noted that it isn't only old aircraft that contribute to the problem.

"As we replace our old aircraft with new aircraft, the new aircraft we're buying are much more expensive to maintain," he said. "And that's because the maintenance costs of aircraft are pretty directly tied to the procurement costs of the aircraft."

For low-rate initial production lot 8, the average cost of the F-35 with its engine was about $108 million, but Lockheed believes its Blueprint for Affordability — which aims to improve the manufacturing process for the plane — will bring that price point down to less than $85 million per jet in then-year dollars by 2019.

One Lockheed executive said its autonomic logistics information system will be a "game changer" for reducing sustainment costs on the modern airframe. ALIS is an information technology system designed for the F-35 joint strike fighter. It tracks data coming off the aircraft, delivering diagnostics reports that inform maintainers when parts need to be replaced and ensure that components are not being removed prematurely, said Mary Ann Horter, Lockheed's vice president for F-35 sustainment support.

The system will assist with mission planning and help to preemptively identify problem areas, which should improve affordability and readiness, she said.

Last summer, the company deployed ALIS 2.0.1 for the Marine Corps to support the initial operational capability of the service's F-35B. Referred to as "expeditionary ALIS," the version included a hardware modification tailored to support the Marine Corps as it uses the fighter on carriers, amphibious ships and forward operating bases. "That software capability is now deployed to all locations … to support all of the services over 10 different sites," Horter said.

Lockheed is focused on completing ALIS 2.0.2 for IOC of the Air Force's F-35A, which is slated for August.

One of the key selling points of ALIS is that, unlike legacy platforms that use multiple information systems to share sustainment data, its software will pull all of those analytics into one system, Horter said. However, in F-35s today, the engine data provided by Pratt & Whitney is still delivered through a separate tool. "ALIS 2.0.2 … will enable us to bring the data for the engine into the same one system," she said.

Even though the company is optimistic about ALIS' potential, Harrison is skeptical that it will have a significant impact on costs. "So far that has not played out in reality," he said. "There are problems with ALIS — that it's not yet up to speed, that it's not yet performing as it's supposed to perform."

He believes the cost of parts replacement for the F-35 will outweigh any savings. "Expensive aircraft are made up of expensive components."

If the Air Force doesn't successfully address the problem of rising operations and sustainment costs, it will continue to affect modernization efforts, Harrison said. "I don't think the Air Force will be able to follow through on its currently planned modernization schedule, particularly the big three programs — the F-35A, LRS-B and the KC-46A," he said. "It's unlikely that they would cut one of the big three. I think it is more likely they would just scale back either the schedule or the planned procurement."

The F-35 program is already experiencing some of those effects. Forty-five fighters were cut over the next five years within the fiscal year 2017 budget request to offset the costs required to keep the A-10 in the fleet.

"They were supposed to ramp up production to 60 aircraft per year in FY '18 and now they've pushed that out. They won't hit 60 … until FY '21," Harrison said. "And then beyond that, they're supposed to eventually ramp up to 80 aircraft per year and I just think it's unlikely that that will ever happen."

Rising operations and support costs could also impact the B-21 program, he said. "What we may see happen is that they'll be forced to slow down the development even though it's not cost effective to do that," he said. But "they may have little choice if they just can't ramp all the way up to $3 billion a year in the development of that program like they're currently planning to." ND

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Navy, Marines Bolster Cybersecurity Defenses

By Yasmin Tadjdeh

Gen. Robert Neller, commandant of the Marine Corps, said cyber is now an established part of warfare.

"We've already mentally accepted the fact that … [cyber is] the fifth domain of the battle space," he said during a February industry conference hosted by the U.S. Naval Institute and AFCEA International. "There's cyber fighting going on right now. … Our networks are under attack."

There needs to be an increased focus on cybersecurity and protecting essential systems that connect warfighters around the globe, he said.

"Because of our adversaries, our potential adversaries' capabilities, what is [today] our critical capability and our center of gravity could … very quickly become our critical vulnerability," he said. "How do we protect the network? How do we protect what we've got and enable ourselves to leverage the communication and the weapons systems that we have?"

The military can no longer assume that the network will always be accessible or safe, he said. "We're going to do everything we can to protect it and make sure it is, but I don't think we can count on it," he said.

The Navy and Marine Corps have subsequently boosted cybersecurity spending in their recent budget request for fiscal year 2017, said Rear Adm. William Lescher, deputy assistant secretary of the Navy for budget.

"The department continues to prioritize funding of cyber capabilities, including continued emphasis on cyberspace operations, training and equipping cyber mission forces, investments in cyber science and technology, and information assurance activities that strengthen [the] defense of our networks," Lescher said.

The Navy established a cybersecurity division that will guide the service's strategy in the domain and manage investments, he noted during a February media briefing at the Pentagon. The budget includes $370 million over the future years defense program "across the spectrum of cyber programs leading to significant improvements in the department's cyber posture," he said.

Budget documents also indicated that funding was added toward increased cyber situational awareness.

The Navy allotted $212 million toward its consolidated afloat networks and enterprise services. CANES merges five of the sea service's legacy networks into one for increased operational effectiveness.

"The FY '17 budget request … provides substantial investments in modernized currently fielded systems in order to continue to overmatch adversaries," Lescher said. "CANES replaces and provides critical improvements to all afloat information networks, including in cybersecurity."

CANES has been installed on 25 ships to date with 12 in progress, he said. The fiscal year 2017 budget funds an additional 10 ships, he added.

Bryan Clark, a senior fellow at the Center for Strategic and Budgetary Assessments, a Washington, D.C.-based think tank, said CANES is "designed to consolidate a lot of the little networks that we have out in the fleet today into a smaller number of networks.

"A lot of the network investment that's being made by the different services is an attempt to reduce the amount of surface area that their networks have to the outside environment," he said.

Smaller networks can often be more vulnerable because they don't have the same level of protection that many of the bigger systems have, he said. Moving to larger networks also allows the services to adopt new forms of information protection, he added.

"In a bigger network I can start using cloud computing. I can start putting information into places where it's going to be harder to find it," he said. "If you go to the cloud … you can actually hide your valuable information among millions of bytes of non-important information."

Going forward, Clark said the Navy and Marine Corps would begin investing in automated systems that could immediately detect when an intruder penetrates a network.

"They want automated features in their software that detect an intrusion and then can immediately isolate that intrusion from other parts of the network and then use the access point that has been gained as a way to respond to the threat and in some ways go and hack the threat immediately," he said. By gaining access to a network, the hacker also makes himself vulnerable because he opened a portal into his own network.

While the government has made significant investments in cybersecurity, more can be done, Clark said.

"The government could spend even more on cybersecurity if you look at it from an infrastructure perspective," he said. "There's been a lot of aspirations in the government to shift to cloud computing to a greater degree and improve security … by protecting … [information] at the data level but it's going to be expensive for the government to do that with its military network just because of the cost of transitioning from all these legacy systems to new systems."

However, there is a limit to how many network improvements the military can make at any one time because such transitions are disruptive to ongoing operations, he said.

Rob Carey, vice president of Navy and Marine Corps programs at Vencore Inc. and the former principal deputy chief information officer at the Defense Department, said legacy networks were never designed to be secure. That means they will require complete security overhauls.

"The networks were built up over time. They were not built to be secure, they were built to … exchange information," he said. The Navy and Marine Corps still need to get their arms around all of their data and begin to assess and consolidate it.

While work still needs to be done, Carey said contracts for cybersecurity services and tools that were budgeted years ago are now coming to fruition.

"Slowly the investments are being made to remedy the vulnerabilities and the networks and the systems that are out there," he said. "The challenge is trying to keep up."

Steven Bucci, a visiting fellow at the Heritage Foundation, a Washington, D.C. think tank, said that while the military has fairly strong cyber defenses, other government agencies do not, and that puts everyone at risk. The Office of Personnel Management breach in 2015, which exposed millions of government workers' personal information, is one example, he said.

"We've got some big gaps between certain organizations and other organizations and that means that bad guys understand now that it's kind of stupid to attack the White House and DoD, but boy, if we could get into some of these other organizations maybe we could slip behind those defenses," he said. "While I think our military and our intelligence agencies and certain other parts of the government do have fairly robust and healthy defense systems — not perfect, but pretty good — there are others that are just abysmal.

"That puts us at risk," he added.

While investments are being made in hardware, more resources are also needed for cyber training, Neller said.

The Marine Corps has been making a push to reach out to computer-savvy Marines who could work in its cyber division, he said. The service is looking for recruits with "the skills and the intellect and the resiliency and the discipline" to work in the cyber field.

The service's cyber division is "under invested" Neller said. Leaders are currently working on formulating what an optimal number of cyber warriors would be.

"There's a group at Quantico right now looking at the entire organization of the Marine Corps to determine what capabilities and in what number we're going to need in 2025," he said. "We know we need more cyber Marines."

Presently, the Marine Corps has enough cyber professionals in its ranks. However, retaining such forces is another matter, Neller said.

"Right now we we're able to find them. The harder part is keeping them," he said. They "are very smart young men and women and they've got a skill set that's available out there that's very marketable in the civilian world." Military leaders have often lamented that they are unable to retain a talented and skilled cyber workforce because private sector companies poach them using high salaries as bait.

Brig. Gen. Dennis Crall, Marine Corps director of command, control, communications and computers and chief information officer said the service needs to work harder at having a more robust cybersecurity force.

While it is important to increase capability and ensure that security software is baked into weapon systems from the start, there is nothing more important than having the right personnel, he said. Over the past six to eight months, the Marine Corps has focused on what it means to build a cyber warrior, not only today, but in the future, he said.

"It's not clear to me, in looking at our own enterprise that we are investing in the right people and the right places at the right time," Crall said. "We have to be very careful to make sure that it's not always about squeezing down dollars … but ensuring that our investment strategy matches the direction that we … [have] as operational warfighters. And it's lacking in some of those areas."

Increasing the Navy's cyber workforce is also important for the service, said Chief of Naval Operations Adm. John Richardson.

The sea service has already begun recruiting sailors and setting them up with cyber mission teams that have a variety of focus areas, he said. "We're starting to deploy those.

"At the end of the day, that force may or may not look like the folks that are manning other parts of the Navy but we have to be open to all these possibilities because it's absolutely vital that we have … an effective force there," he said. **ND**

Email your comments to ytadjdeh@ndia.org

Key Military Comms Satellite About to Become Operational

By Yasmin Tadjdeh

After years of delays, the military's Mobile User Objective System — which includes a constellation of satellites, ground stations and radio terminals — is nearing primetime.

"MUOS really is operational today," said Navy Cmdr. Peter Sheehy, principal assistant program manager and contracting officer's representative at program executive office space systems.

MUOS will provide troops with narrowband tactical communications that will give them access to secure, high-quality voice, video and data transfer via handheld radios. However, the program has been plagued with delays and developmental hiccups.

MUOS is now "on the precipice of going to full initial operational capability," said Bill Ross, vice president at General Dynamics Mission Systems, the manufacturer of MUOS-compatible PRC-155 Manpack radios.

A spokesperson for Space and Naval Warfare Systems Command said a firm date for IOC has yet to be announced, but noted that it would be in 2016. Ross said he expected it would take place in late spring or early summer.

MUOS is a constellation of Navy satellites. The fifth and final spacecraft is slated to be launched in May. It will provide enhanced communications to tactical radios such as the Army's two-channel Manpack via ground terminals and an advanced new waveform known as the wideband code division multiple access. It is expected that WCDMA will provide users with 10 times more capacity than the legacy ultra-high frequency system.

The developmental waveform recently caused the program's schedule to slip after it was discovered that it had trouble integrating with the radios and the four Earth-based ground stations.

Last April, Cristina T. Chaplain, director of acquisition and sourcing management at the Government Accountability Office, testified before the Senate Armed Services Committee's strategic forces subcommittee that 90 percent of the spacecrafts' capacity was going unused as problems with the waveform were being worked out.

"As a result, the Army's plans to field its MUOS-compatible radios have now slipped from 2014 to 2016, roughly four years since the first MUOS satellite launched," she said.

The WCDMA issue caused MUOS' operational test and evaluation to be pushed back from 2014 to the end of 2015, Sheehy said during a February panel discussion at an industry conference hosted by the U.S. Naval Institute and AFCEA International.

"We did spend about a year doing additional integration tests to make sure that the waveform terminal and the … ground system and the satellites were all operating in concert," he said. "It took probably about 100,000 hours of over-the-air time to really bang it out."

Those issues are now in the past, he said. WCDMA performed "as expected" during recent tests, he added.

Ross agreed that the issues that once plagued the system have now been resolved.

"The MUOS waveform is inherently a complex waveform to provide increased capacity and global coverage and the cell phone-like voice quality. It's a pretty complex endeavor and we put thousands and thousands of test hours onto the waveform and onto the radio itself," he said. "As a result of that extensive testing, under enormously complex test scenarios, we've wrung this thing out and I would say very empathically and with confidence that the waveform is ready for primetime. It's solid."

The service has begun the initial operational capability transition, said Sheehy. "It's a very exciting time. We're in the home stretch and folks are really excited to push this out."

Now that MUOS is nearly ready for formal operations, General Dynamics is expecting there to be a "ground swell" of interest from customers and users who want the system to fill their own operational needs and gaps.

"We're going to expect a considerable uptick in the number of demonstrations and interest now that the whole end-to-end system is ready," he said. "MUOS is going to get a lot of attention from a lot of people given the unique capabilities it provides over the next six to 24 months."

Already General Dynamics has used its experience developing the WCDMA waveform and incorporated it into other products to create a more robust architecture and radio capability, Ross said.

Joe Welch, chief of the technical management division at project manager tactical radios at the Army's program executive office for command, control and communications-tactical, said the system will provide the service with a significant increase in capability.

It will be an "order of magnitude increase in the number of simultaneous access we can get with users," he said. "What that means for an Army unit [is] where previously maybe the division, maybe brigade might have access to legacy [waveforms] … we anticipate that with MUOS that we'll be able to push that forward" to lower levels.

As the military prepares for IOC, it is continuing to test MUOS, including in the U.S. Pacific Command region.

"The Army in partnership with the Navy is aggressively working network material solutions to enable PACOM forces to have connectivity and communications while conducting small unit operations over geographically dispersed regions," said Mary Woods, deputy program executive officer at PEO C3T.

The service recently completed a demonstration in the Asia-Pacific. During a February exercise, the Army equipped logistic support vessels — which are used to transport equipment such as tanks and trucks — with Manpack radios, said Col. Jim Ross, project manager for tactical radios at Army PEO C3T.

Traditionally, when those ships are in operation in that region leaders will have to use expensive satellite phones to communicate, or systems that only cover a portion of the ocean.

"There are cases where those ships, in effect, would be out of communication with anyone that needs to track them or speak to them other than possibly through a satellite phone that they are paying exorbitant amounts for," he said.

The ships traversed between Oahu and Hawaii's main island. Soldiers were able to successfully communicate with land units 200 miles away, he said. Additionally, leaders were able to track the vessel's location.

Soldier conducts data and chat communications via the Mobile User Objective System.

"That's the power, really, of what we're bringing in terms of the radios and the waveforms — to be able to provide our soldiers the means to communicate over vast distances using their organic equipment that we field to them," he said. That "is a big deal for the Pacific theater."

The Asia-Pacific provides challenges to military communication systems because of its sheer size as well as potential adversaries in the area, Bill Ross said.

"You really need in that region to be able to support what we call waveform diversity," he said. "You never can tell when an adversary may take action to deny you specific access to a waveform or a part of the spectrum."

Because the PRC-155 is a two-channel device, it can bridge from one waveform to another providing "connectivity pretty much anywhere globally through the MUOS constellation," he said. The system is essentially a global gateway, he added.

Currently, the Army has 5,326 Manpack radios, Jim Ross said. The systems can connect with waveforms such as the soldier radio waveform, single channel ground and airborne radio system and ultra-high frequency satellite communications. Roughly half of them can connect to MUOS.

The radios connect to MUOS via what is known as a high-powered amplifier. "That is a small little box. If you were looking at the radio you probably wouldn't even notice it unless … I pointed it out to you," he said. "That's the only piece that goes on the radio to enable it to work."

The Army's inventory of more than 5,000 radios was procured through a low-rate initial production contract with General Dynamics via its Handheld, Manpack and Small Form Fit program. In February, the service announced that it had chosen three vendors to compete for full-rate production of the radios.

General Dynamics, Harris Corp. and Rockwell Collins each have 60 days to provide 30 radios at no cost to the government for qualification testing, Jim Ross said. Following that, soldiers will operate the radios during a customer test phase.

Testing will occur over the next several months. "We'll be looking at some limited things in terms of evaluating the capability of the radios and the performance of the radios," he said.

Additionally, the service requires that vendors bring down the weight of the radio in order to increase the battery life and range of the device. The Army wants the system to weigh 14 pounds or less by fiscal year 2025; current LRIP radios weigh 19.3 pounds.

Overall, the service intends to purchase more than 60,000 radios. The entire cost of the program, including hardware, field support, warranties and training is $12.7 billion.

The service wants to ensure that healthy competition is at the forefront of the program, Jim Ross said.

"Our acquisition strategy is derived from trying to keep the most competition throughout the process as we can because we believe that the competition yields many good benefits. Mainly it yields a good price, but really it yields the best in innovation across the board so that we're not [relying] on any one vendor in terms of being able to hopefully get the best solution possible," he said.

It is possible that the Army could decide to go with two vendors, he added. The timeline for a decision is still in flux, but the radios will have to go through an operational test and evaluation, he added.

In the meantime, following the initial qualification and customer tests, there is a chance that the service could procure a small number of systems depending on its needs at the time, he said. **ND**

Email your comments to ytadjdeh@ndia.org

ARMY

AM General Puts JLTV Defeat in Rearview Mirror

By Stew Magnuson

AM General is going to be just fine.

Thanks for the concern.

That sums up the attitude of the South Bend, Indiana-based maker of the venerable Humvee in the wake of the hotly contested competition to field a new light tactical wheeled vehicle, which it lost last year to rival Oshkosh Corp.

After the loss, some analysts predicted its owner — billionaire businessman Ron Perelman's diversified holding company, MacAndrews & Forbes Inc. — would sell off the company. That has not come to pass yet.

"We have got great visibility of a deep pipeline of Humvee sales into the future," said Chris Vanslager, the company's executive vice president for defense programs.

Along with sales of new vehicles, the company plans on sustaining and modernizing older models for decades to come. It also has two non-military businesses to keep its plants humming: a subsidiary making purpose-built wheelchair accessible cars and a contract to build station wagons for Mercedes-Benz.

"We're very bullish about where we are at right now," Vanslager said in an interview.

The joint Army-Marine Corps program's original goal was to field a replacement for the Humvee, which went into service in 1985. For starters, it will be quite some time before the JLTV supplants the Humvee, Vanslager said. It will be in the inventory through at least 2048, and perhaps longer.

"According to the DoD's vehicle strategy, the JLTV does not and will not replace the Humvee. Additionally, the program's acquisition strategy calls for several years of testing before a full fielding decision is made. At that point, it's projected the program will take almost 10 years to complete full fielding," he said.

The JLTV program of record calls for 17,000 units to be delivered in the first five years of the contract. That is in contrast to the 230,000 Humvees that have been fielded globally since 1985. About 160,000 of those are in U.S. forces, he noted.

And the Defense Department continues to be a customer, both domestically and for foreign military sales. Shortly after it lost the JLTV competition, it announced a six-year $428 million contract for up to 3,000 new M997A3 Humvee ambulance vehicles intended for National Guard, Army Reserve and

Army domestic disaster relief missions.

Another big contract for new-build Humvees signed in 2015 included $372 million in foreign military sales to Afghanistan, Iraq, Kenya, Lebanon, Ukraine and Tunisia totaling 2,082 vehicles. More recently, the company announced that it had secured $57 million in contracts and vehicle parts for Iraq, Serbia, Argentina, and the U.S. National Guard and Reserve.

The company is "rolling new vehicles off our production line, driving them to an airport and loading them on to a C-17 to deliver right into a theater of operations. That's happening today," Vanslager said.

Overseas, "there is an ongoing significant critical operational need for the Humvee," he said. There are 17 different models and 26 variants with more than 100 different configurations, operating in about 60 countries, he noted.

"Strong global demand demonstrates the ongoing critical need for the Humvee and how AM General remains the unmatched leader in building, modernizing and maintaining the premiere light tactical vehicle fleet in the United States and the world," he said.

That leaves a robust global business in supplying parts, providing training, modernizing and refurbishing the aging models, he said.

"As long as the fleet is in demand and out in the world, we have a continuous demand for spare parts and training for U.S. and foreign customers," Vanslager said.

AM General is beginning its fourth year of a public-private partnership with Red River Army Depot in Texas to recapitalize National Guard Humvees. It has modernized more than 1,300 vehicles so far, he said. And "the Guard has thousands more Humvees that need the recapitalization to maintain their high state of readiness," he said.

The Army and Marine Corps have repeatedly emphasized the need to modernize and maintain their Humvee fleets and ensure the vehicle can meet the requirements of missions through at least 2050, he noted.

The company, however, will have competition for future modernization contracts. The Army has already announced that it will be competing the recapitalization of its fleet.

"Our customers believe in competition and we're going to be ready to compete. We're not going to stand by. We've got the product. We've got the innovation. We know how to do this. We are demonstrating recapitalization at Red River with our partnership. We are modernizing this vehicle right now," he said.

"We have not stopped innovating, investing, which is what we have done for the past 30 years," he said.

The Humvee has changed considerably, and the vehicles that come to the Red River depot leave with significant upgrades. They weighed about 7,700 pounds in 1985 and now come in at about 12,900 pounds. The original 160 horsepower engine now ranges from 190 up to 240 horsepower. Suspensions have kept pace with the higher weight as well as with improved shocks and struts, he noted.

There is a new state-of-the-art transmission, a tank that can hold 13 additional gallons of fuel and a high-volume air conditioning unit.

"We're going to continue investing and we are very focused on looking to the future to modernize and improve the capa-

AM GENERAL

AM General has invested in non-military businesses: a contract to build Mercedes-Benz station wagons and a subsidiary making wheelchair accessible cars.

bility and making sure we have the high standard of readiness for our customers," he said.

Vanslager said there remains a possibility that customers will emerge for its entrant into the JLTV competition, the BRV-O.

"There is a high interest from multiple countries overseas and there is definitely a possibility for offering it. It is just another one of our tactical vehicle offerings for customers who have specific needs and requirements," he said.

M997A3 Humvee ambulance vehicle

The company is also diversifying.

"We have a very robust commercial automotive business," Vanslager said.

Mobility Ventures LLC, a subsidiary owned by AM General, is manufacturing and selling the MV-1, a wheelchair accessible, purpose-built car that meets the guidelines of the Americans with Disabilities Act. It has a side-entry ramp and seating for five, which includes two wheelchairs.

Taxi fleets are early customers. The company sees opportunities for sales to consumers, Veterans Administration hospitals and retirement homes. Vanslager declined to say how many of MV-1s it has sold so far, but they are currently on the streets.

AM General also owns a 675,000-square-foot commercial assembly plant in nearby Mishawaga, Indiana, where it once manufactured the now discontinued consumer version of the Humvee — the Hummer H1 and H2 models.

That space is now being used for the contract manufacturing of Mercedes-Benz R-class wagons that are sold in China. It's the only non-Mercedes-Benz manufacturing facility in the world, he said.

"And we have room for additional contract manufacturing customers. … This is a very robust and expanding segment of our business … and we're very bullish on it," he said.

Analysts interviewed shared AM General's optimism.

"I'm sure short term it hurt them to lose JLTV, but let's face it, the Humvee isn't going anywhere," said Dean Lockwood, a weapons systems analyst at Forecast International.

Even without major Humvee procurement on the part of the U.S. military, the sustainment piece of the business will keep the company busy for another 20 years, he predicted.

The fact that military officials have backed off the idea that the JLTV will be a one-for-one replacement for the Humvee is telling, he said. "The Humvee is still going to be the primary utility vehicle and I can see why AM General feels optimistic. … That revenue stream is not going away, at least not in the foreseeable future."

The Defense Department for years monopolized Humvee production, he noted. Now that domestic orders are winding down, the company has the capacity to sell to customers overseas.

"AM General now has the capacity to meet export demand, which is growing and growing and growing," he said. It's a demonstrably good vehicle that does what it is intended to do, which is be a light utility vehicle for missions that don't require heavy armor, he said.

"All these customers overseas have seen Humvees and now they can finally get their hands on them," he added, and not just "American hand-me-downs," he added, but new ones.

Other countries manufacture light military vehicles, but the Humvee has that brand-name recognition. "It almost has become a generic term," he said. "When your brand name has come to represent a whole class of vehicles, your advertising is done for you at that point," Lockwood added.

He didn't believe that the JLTV, once it is opened up to exports, will be a direct competitor to Humvee sales. But there might be some synergy when foreign customers see that the new vehicle is being used as a supplement, rather than a replacement for the Humvee. Countries may buy a mix of the two, he added.

And there will also be a big gap in the price, he noted, with the Humvee selling at about $100,000 to $195,000 per copy and the JLTV at around $250,000 to $306,000 depending on the amount of armor.

AM General's loss to Oshkosh "is not an ideal situation. But they are busy and they should stay busy," said Brad Curran, an analyst at Frost & Sullivan. He rattled off a list of foreign military sales, including a December 2014 contract for 2,200 Humvees and contractor-unique spare parts, totaling $245 million for Mexico.

"They're staying busy. And the Hummer isn't going anywhere with the U.S Army and Marine Corps. We've got an awful lot of them and they have to be maintained, and need a spare parts base," he said. "I would say they are in good shape for the next few years."

The JLTV is much more heavily armored and sophisticated. "You're still going to have your more routine functions … when you don't need a full-size family of medium tactical trucks," he said.

As for a future when Oshkosh's JLTV is competing with the Humvee, Curran doesn't see it. The JLTV "is so expensive. It's really expensive for us. I wouldn't be surprised if we don't buy as many as we think we're going to buy."

Plans call for the Army to procure 49,100 JLTVs and the Marines 5,500. The Marine Corps in the 2017 budget request already reduced by 77 the number of its initial planned buy.

Other countries sell military vehicles in the same class as the Humvee, but at a much lower price, Curran said. Canada is seeking to spend $9 billion on light trucks, but is looking at BAE Systems and Patria, a Finnish-German company, rather than AM General. But that program is closer to a heavier JLTV, he said.

"Most countries just don't need an expensive platform [such as the JLTV]. Or even if they want one, for budget reasons, they can't do it," Curran said.

The day when the two vehicles are competing may be far off. There are currently no foreign military sales planned for the JLTV, noted a Feb. 18 Congressional Research Service report written by Andrew Fiekert, military ground forces specialist.

Vanslager added: "There is a world out there that has changed and there is demand out there for additional deployments. So it's all about readiness of the vehicles and assuring that readiness for our customers." ND

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New Research Holds Promise for Lighter, Tougher Vehicle Armor

By Stew Magnuson

The Army Tank Automotive Research Development and Engineering Center continues to invest millions to improve the vehicle armor that protects troops from small arms and explosives. And universities are pitching in by inventing new life-saving materials.

Gen. Robert "Bo" Dyess, deputy director of the Army Capabilities Integration Center at the Army Training and Doctrine Command, recently identified "advanced protection" as one of the Army's top eight acquisition priorities.

One of the service's ultimate goals is to produce better protection, but at an affordable price, said Chip Filar, deputy associate director of ground systems survivability and ballistic protection at TARDEC.

"Much research has been done by the Army — along with industry and academia — on advanced materials and their application to advanced armor designs, however, armors using advanced materials have typically been too costly to meet system goals," he said in an email.

It's unrealistic to find a material less expensive than regular steel, he said. Some ceramic composites can run anywhere from three times to 40 times the price of steel.

"The cost of these systems is important, and … we want to work to make them as affordable as possible, however, realistically they will never be as cheap as steel and aluminum armor simply due to the raw material costs," he said.

"We are working with the ceramic industry and with composite material developers to reduce both the cost of the constituent materials through improved processing efficiency, as well as to reduce the armor system manufacturing cost through automation," he added.

TARDEC is aiming for fiscal year 2019 for an "optimized system demonstration of new protective systems," he said.

The command recently awarded Alcoa Defense a $50 million, five-year research-and-development contract for various projects including a monolithic hull to bolster troop protection, and improved welding processes.

The latter is important because the seams in armored vehicles are the most vulnerable areas, Filar said.

When it comes to ceramics, plates that need to be joined create real challenges. The more complex the interface between two plates, the harder it is to confine the explosion's effects, Filar said. It requires complicated shapes, which adds to the weight and negates some of the benefits ceramics provide. It also adds to the expense, he said.

Eric Roegner, president of Alcoa Defense, said there are similar complexities when it comes to welding the alloys that comprise vehicle armor. The first task order under the company's contract with TARDEC will tackle this problem.

"The weakest parts of any armor solution are the welds. They are less strong. They are more brittle. And if you're going to get hit by an [improvised explosive device], for example, the two issues you've got to manage is dynamic deflection — you deflect most at the weld. And the second is rupture – you rupture the weld," he said.

A weld wire made of a particular alloy is used to help join two plates. It starts off solid, is turned to liquid, then becomes solid again.

"That can change the mix of the alloyed elements in that little zone," he told National Defense.

It's similar to a snowball and an icicle, which are both frozen water, but have different crystal structures. Their creation depends on the rate of cooling.

As for welds, how much heat is applied and how quickly it is cooled can make the weld stronger, or more brittle, depending on what is done, he said. "All of that will change the microstructure of the material at the weld," Roegner said. If there is any change to the alloy, that will completely change the whole equation.

We are "developing the weld wire and processes to make that weld as strong as possible, and there is a huge amount of R&D that has to go into that," he added.

The contract also calls on Alcoa to build on the work it did on a previous program to create a monolithic hull.

The company at its Cleveland plant has a 50,000-ton forge, the

A soldier completes the final part of welding on an up-armored truck.

ARMY

largest in the world, which is capable of making complex, large, one-piece components for aircraft, ships and vehicles.

Its first customer was the Airbus A380 commercial airliner. Then the joint strike fighter used the forge to drastically reduce the weight and complexity of the aircraft's bulkhead. The previous bulkhead began with a large piece of metal, which had to be machined, flanged and bolted together. It had 100 separate parts.

Now, there is only one piece, the weight was reduced by 400 pounds and there is no longer a need to have a supply chain for those other 99 pieces, he said.

"That is the same concept that we want to take for the [vehicle] hull," he said.

In a partnership with BAE Systems and the Army Research Laboratory, Alcoa created the largest monolithic component with the forge to date, when it made a hull — the underside of a truck — that roughly matched the size of a Bradley Fighting Vehicle.

A Bradley or a Paladin M109A6 cannon artillery system has about nine large plates underneath that need to be welded, which takes time and money.

If there is only a need for four inches of thickness at the bottom and two inches at the top, the excess metal needs to be machined off. Other parts have to be bolted on, he noted.

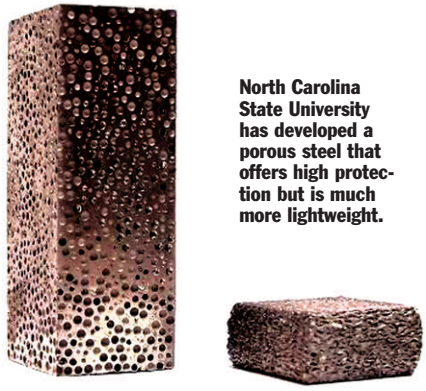
"Think about the complexity of making an understructure. Now, imagine making it in one piece, where you've got exactly the right amount of metal, exactly where you want it. You've got all the bracketing from engine mounts to axle collars already baked into the shape and you've gotten rid of the welds," he said.

The savings don't necessarily come from raw material costs, but the reduced amount of manufacturing time and the simplification of the logistics tail, he said.

"It provides a radical improvement in performance, while reducing the installed costs," he added.

While he could not share the test specifications, Roegner said the hull was blasted twice "with something more than any vehicle is going to see in the field." The hull showed no discernible damage.

The next step will be to take layers off the hull and continue to run blast tests to see at what point it will finally rupture. Then the program will identify specific vehicles the hull could be placed under, he said.



North Carolina State University has developed a porous steel that offers high protection but is much more lightweight.

DR. AFSANEH RABIEI

The exact same technology can be used for side panels, top panels or any structure where plates are welded, he said. It can't, however, make an entire vehicle shell.

"The Holy Grail of armor is: get rid of the welds," he said.

Meanwhile, basic and applied research on stronger materials continues at universities.

A team at the University of California at Los Angeles made a splash in December when the journal Nature announced a new metal comprising magnesium, ultra-hard ceramic silicon and carbide nanoparticles.

Magnesium has several desirable properties, said Xiaochun Li, Raytheon endowed chair in manufacturing at UCLA's Henry Samueli School of Engineering and Applied Sciences. It is light, yet strong, found in abundance on Earth and has high plasticity, which means it can better absorb the impact of bullets and blasts, he said in an interview.

It took about 10 years to figure out how to make the three elements disperse in a uniform manner without clumping. Without that, the metal would lose its plasticity and become too brittle, Li said.

The research was conducted without the benefit of military funding, but since the article was published, he has received eight inquiries from military agencies and defense contractors.

One company will help scale up production of the material in order to make body armor plates. "First we will work on smaller body armor applications, but then there are no limitations on us to push forward for even larger structures like vehicle armor," Li said.

Afsaneh Rabiei, professor of mechanical and aerospace engineering at North Carolina State University, has developed a porous steel that offers high protection against bullets and blasts, but is much more lightweight.

"The material is basically like a bubble wrap, or Styrofoam, but in a metallic version," she said.

Normally, an air bubble in steel would make the metal weaker. But when dispersed in a uniform manner, it becomes stronger. It's no different than the thin layer of Styrofoam in cartons that manages to protect eggs, or the skull, also made of a porous material, which protects the most vital human organ.

"It provides a cushioning ability that can absorb impacts," she said.

"She could not reveal specifics, but the material in tests was able to completely stop "heavy" caliber armor piercing bullets using about one inch thickness." She is now working on optimization of the armor for protection against both blast and ballistic.

She continues to collect more test data against larger threats, and hopes that Army vehicle programs take notice. More recently, she has received funding from the Defense Department's joint aircraft survivability program.

TARDEC's Filar said there are other ongoing projects to make vehicle armor more effective.

Additive manufacturing, better known as 3D printing, is being looked at, but it is still in the basic research phase.

"Additive manufacturing has the potential to reduce the cost of armor systems that require complex geometries or require substantial machining/processing," he said. But the materials used in this method simply aren't strong enough. Both the Departments of Defense and Energy are sponsoring the basic research looking into stronger 3D printing materials, he said.

There is also work on armor that can adapt and react to its environment.

"The concept is to use as much information as possible about the surrounding environment — threat likelihood, temperature, humidity, terrain, etc. — to optimize the armor response in a way that increases its performance in a given engagement," he said.

He declined to give further details as much of that work is classified. ND

Email your comments to smagnuson@ndia.org

Tactical Wheeled Vehicle Programs at Critical Juncture

By Jon Harper

The U.S. military is trying to modernize its ground vehicle fleet after more than a decade of war by buying new trucks and upgrading or divesting older models. Procurement priorities include the joint light tactical vehicle and the ground mobility vehicle, while the Humvee and the mine-resistant ambush protected vehicles are getting a facelift.

Meanwhile, concerns have been raised about the state of the fleet. The National Commission on the Future of the Army, an independent panel created by Congress to examine the service's plans and needs, released its final report in January.

"The plan for readiness in tactical mobility is one area that is alarming," the report said. "Commissioners received numerous reports from soldiers and commanders about tactical wheeled vehicle shortages."

The commission called on the Army to provide Congress with an assessment of risks in current and planned tactical mobility, including the costs and potential tradeoffs for closing significant readiness gaps.

The service will comply with that request, Lt. Gen. John Murray, deputy chief of staff, G-8, told lawmakers.

"Our numbers don't necessarily agree with the commission's report," he said. "For both the light, the medium and the heavy we're showing excess wheeled vehicles. … We've got some work to do to figure out where the disconnect is, and we're looking at that right now."

Production work on the joint light tactical vehicle was paused for three months last fall after competitor Lockheed Martin protested the Army and Marine Corps' decision to award the lucrative contract to Oshkosh. In December, the Government Accountability Office lifted the work stoppage order and Lockheed decided to take its protest to the Court of Federal Claims.

Lockheed backed down after the court denied the company's request for a preliminary injunction in February. In a short press release on Feb. 17, Lockheed said: "After careful deliberation, Lockheed Martin has withdrawn its protest of the JLTV contract award decision in the Court of Federal Claims."

When asked why the decision was made, Lockheed spokesman John Kent said in an email: "We're not currently in a position to discuss this issue beyond the information contained in our statement."

In a press release following Lockheed's announcement, Oshkosh noted that it is now "clear of the legal challenge."

The joint light tactical vehicle is the Army's top truck procurement program. In fiscal year 2016, the Defense Department is buying about 800 of them for the Army and Marines, and the Pentagon expects to procure more than 2,000 JLTVs in fiscal year 2017. Over the next five years, the services plan to buy more than 17,000 at an expected cost of $6.9 billion.

The delivery schedule for the next tranche of vehicles has slipped due to Lockheed's protest and the government-ordered work stoppage.

"We'll be beginning to deliver vehicles at the end of the summer instead of in the middle of the summer," said John Bryant, senior vice president of defense programs at Oshkosh Defense.

The program is in a position to recover from the delay, he said.

"The overall schedule of the JLTV program … represents a fairly slow ramp up to a full-rate production and to full-rate production quantities," he said. "There are a number of opportunities within the fairly deliberate overarching program schedule to save schedule and to save time, and there are many opportunities to accelerate."

In its latest budget request, the Marine Corps cut 77 joint light tactical vehicles from the planned buy in fiscal year 2017 — a 29 percent reduction — in order to protect funding for the amphibious combat vehicle and other capabilities.

The service is still committed to the program, said Marine Corps program executive office land systems spokesman Manny Pacheco.

"The Marine Corps made some adjustments to ensure affordability across its modernization portfolio," he said in an email. "The 77-vehicle reduction will be realigned later in the procurement cycle to ensure that the Marine Corps fully fields its objective of 5,500 vehicles. … It remains a priority for the Marine Corps to fill a critical capability gap."

Oshkosh isn't worried about the cut, Bryant said.

"We're not concerned," he said. "They haven't reduced their commitment to the program … [and] the overall quantities that they seek have not changed."

In its 2017 budget request, the Army asked for about 1,000 more vehicles than they had

Selected JLTV vehicle

OSHKOSH

planned to buy when the previous budget request was released, Bryant noted. "The slight reduction in Marine Corps quantities was way more than offset by an increase in Army quantities."

The JLTV is a troop transport that is expected to be more heavily armored than the high mobility multi-purpose wheeled vehicle, or Humvee. The Pentagon plans to buy 55,000 of them for the Army and Marine Corps, and the program has an estimated value of about $30 billion.

James Hasik, a military vehicle expert at the Atlantic Council, is skeptical that the U.S. military will end up procuring the planned number of joint light tactical vehicles because the requirement for well-armored trucks has been overstated.

"I don't think they're ultimately going to get to [55,000]," he said. "If you can cover 150,000 troops [in Iraq and Afghanistan] with 10,000 blast-protected 4x4s, then why would you buy 50,000? The reason you would buy 50,000 is because you were going to invade China or fight the Russians in Poland or something like that, and if you do that, landmines are probably not going to be your number one problem."

Another truck project shifting into higher gear is the Army's ground mobility vehicle, an ATV that would sacrifice armor for speed and mobility to close what Army officials have identified as a capability gap for light infantry airborne forces. The Army is requesting $5 million in fiscal year 2017 to procure 10 GMVs. Over the next four years, the service plans to buy 120 at a cost of $30 million. Current plans call for the Army to ultimately buy 250.

The analysis of alternatives is ongoing and should wrap up this summer, said Jennifer Johnson, the Army's provisional deputy product lead for the ground mobility vehicle.

A number of companies have expressed interest in pursuing the GMV contract and have participated in platform performance demonstrations hosted by the Army. The service expects to award a contract in the second half of fiscal year 2017.

"We are looking at multiple capabilities, so from a 5-man to a 9-man [truck] and even some Humvee changes in this analysis of alternatives," Johnson said.

The 10 vehicles procured in 2017 will be for low-rate initial production and they will be used for production qualification testing, she said.

The Army aims to equip units with the vehicles in fiscal year 2019.

Despite its relatively low price tag, Hasik said the program could still be at risk going forward. "I would not actually say, 'Oh, it's small therefore it will survive,'" he said. "I think that the budget people could go through and kill lots of little stuff in order to try to free up a couple extra bucks for something."

While procurement is slated to ramp up for the JLTV and GMV, there is no new procurement funding for the Humvee in the Army's 2017 budget request. The service also did not budget for maintenance of the vehicle above the field level, Army spokesman Dov Schwartz said in an email.

"Field level sustainment is funded through operations tempo … dollars provided to units, and is not discernable [in budget documents] by equipment type or vehicle," he added.

The Marine Corps' Humvee sustainment modification initiative procurement program has already been canceled as the service waits for JLTV to come online.

But the U.S. military still possesses more than 100,000 Humvees in its vehicle fleet, and manufacturer AM General has existing contracts with the Army and international partners for procurement of trucks and parts.

The company has been working with the National Guard and Red River Army Depot in the refurbishment and upgrade

of older models that are expected to remain in the fleet for decades. Congress appropriated $100 million in fiscal year 2016 for the Army National Guard's Humvee modernization program.

"We've been able to do a recap … and do an upgrade to the suspensions, the powertrain in order to bring those vehicles up" to the condition they need to be in, said Lt. Gen. Michael Williamson, principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology, during a recent House Armed Services subcommittee on tactical air and land forces hearing. "As I look at '16, '17 and '18, that funding [provided by Congress] has given us a great ability to upgrade over 400 vehicles in the Reserve and about 1,000 in the National Guard."

The effort is "a great example of the public partnership that we've had with industry and with our organic industrial base," he added.

In September, the company was awarded a six-year $428 million contract for new Humvee ambulance chassis vehicles intended to support Army National Guard and Reserve domestic disaster relief efforts.

Despite the lack of new procurement in the Army and Marine Corps' 2017 budget plans, Hasik sees a bright future for AM General's Humvee business because of the vehicle's wide international use in about 60 countries.

"There are a hell of a lot of Humvees in the world," he said. "If you operate in places where you're not rolling over lots of landmines, there are a lot of happy customers. … They're the one producer, so they've got this ginormous installed base."

Another U.S. military truck program that is not seeing much new procurement is the mine-resistant ambush protected vehicle, or MRAP. The Army decided to keep 8,500 trucks — roughly 3,000 Navistar-built MaxxPros and 5,500 Oshkosh-made M-ATVs — while divesting itself of the rest of its inventory.

"Right now their main focus is getting the vehicles back and resetting them to a common configuration," said John Akalaonu, senior program manager for the MaxxPro family of vehicles at Navistar.

The company's MaxxPro revenues from the U.S. government over the past few years have been tied to doing the reset and upgrades, he said.

Mine-resistant ambush protected vehicle MaxxPro

For fiscal year 2016, lawmakers appropriated more than $400 million for Army MRAP modifications. Navistar is on contract to reset another 785 MaxxPros and the company is pursuing another potential deal, Akalaonu said.

"There's still roughly 800 trucks unallocated between us and Red River as to who is going to reset those," he noted. "Right now we're working on a contract with the government to add roughly half of those trucks to our scope of work."

If Navistar lands that award, it expects to complete its reset work by the middle of next year. If not, it will be finished this summer, Akalaonu said.

The company is also pushing forward with other MRAP activities.

"We continue to have very strong parts sales to support the fleet of trucks that are still sitting out there and running around in theater," Akalaonu said.

Navistar is supporting the Army's transition of the MRAP to a program of record. The company is creating manuals and carrying out sustainment efforts necessary for the service to be able to provision parts and order spare parts in the Army system, Akalaonu said. "I call it cleaning up after the parade a little bit, getting all those things in place."

The company is also courting international customers. Some of the trucks that the Army chose not to keep have been transferred to foreign allies as part of the excess defense articles process. "There have been opportunities there as these different countries are getting new vehicles, or new-to-them vehicles … for providing support, spare parts, training, different things like that," Akalaonu said.

Pakistan is buying new MaxxPros through the U.S. government foreign military sales process, he noted. The company is also helping the United Arab Emirates conduct a MRAP reset similar to that of the U.S. Army, he said.

"There's still a lot out there from an FMS perspective," he said. Meanwhile, the company continues its work with the Army.

"It's not … the billion dollar contract every other month that you maybe saw back in 2009, but still significant numbers and it's a lot of smaller opportunities that are cumulatively very lucrative," Akalaonu said.

Oshkosh is performing reset work on its M-ATVs. The 1,260 vehicles the company is on contract for will be completed this fiscal year, Bryant said.

"They come to Oshkosh in varied condition and Oshkosh inspects them, tears them apart, replaces all the parts that need to be replaced, and returns them to issuable condition and delivers them back to the customer," he said.

Like Navistar, Oshkosh is looking overseas. The company has delivered 750 M-ATVs to UAE through a combination of foreign military sales and direct commercial sales, Bryant noted.

"We've delivered a few hundred vehicles to other customers and we're in the process of finalizing orders for significantly larger quantities for a Middle Eastern customer that I can't actually name," he said.

The Islamic State terrorist group's use of improvised explosive devices has created more demand for M-ATVs in the region, he said. "When you look at what the M-ATV offers it's really tailor made for that threat and that environment."

In its MRAP modernization roadmap, U.S. Army Training and Doctrine Command envisioned upgrading the trucks that remain in the fleet in the coming years as threats evolve.

"There's a great opportunity for the integration of additional capabilities and kits because we designed the M-ATV with the capacity for growth and we also designed it to be modular and scalable," Bryant said.

Potential upgrades include: protection packages; weapon suites; command-and-control, communications and computer capabilities; and intelligence, surveillance and reconnaissance suites.

A modular integrated command post capability could be added to the MaxxPro to power and support mobile Army command posts in the field, Akalaonu noted.

"I think there's definitely interest and opportunity there in the long term for continuing to upgrade the truck," he said. But "it's definitely not going to be at the speed that we've seen in the past." ND

Email your comments to jharper@ndia.org

ARMY

Georgia Chapter Recognizes McNeill for Contributions To Defense Industry

Left to right: Barry Page; Sheila McNeill; retired Lt. Gen. Lee McFann, NDIA VP chapters and membership; Chuck Hunsaker; Steve Howard and John Olds.

The National Defense Industrial Association-Georgia Chapter recognized four outstanding individuals and companies that have made significant contributions to the state's defense and industry communities during its annual awards dinner.

"The defense industry in Georgia is vitally important to the economy of our state and an important cornerstone in the defense of our country," said Chuck Hunsaker, president of NDIA-GA. "It is people like [our awardees] that provide the point of the spear in Georgia. All citizens of Georgia should be proud that we have people like this serving our state and our defense interests."

NDIA-GA's most prestigious award, the Citizen-Soldier Award, was presented to Sheila McNeill of Brunswick. McNeill has been a key player in defense issues for many years and continues to be one of Georgia's most influential defense voices at both the state and national levels.

McNeill served as the president of the Navy League of the United States from 2003-2005, the only woman to have held this position, and still serves on the national advisory board. Additionally, she served as vice chairman of the executive committee for the Defense Advisory Committee on Women in the Services, an advisory committee to the secretary of defense and other Defense Department officials.

"Every state with a military presence, and every military community should have a Sheila McNeill as a member of their team," said Hunsaker.

Barry Page, president of C4S2 Global, was presented with the Volunteer of the Year Award for his outstanding contributions to NDIA-GA as a board member and chairman of the small business committee.

The Small Business Award was presented to SpaceWorks Enterprises Inc. and its founder, John Olds. Based in Atlanta, SpaceWorks is an aerospace engineering concept design and systems analysis firm that focuses on next-generation space transportation systems, future technologies, human and robotic exploration of space, and emerging space markets and applications. Its subsidiaries include Generation Orbit, Terminal Velocity and Blink Astro.

The Gen. James Oglethorpe Space Award was presented to Steve L. Howard of St. Marys. The award recognizes the significant strides Howard made during the previous year to support and grow a space program within the state.

National Nuclear Security Administration Garners AFEI Award

National Defense Industrial Association affiliate the Association for Enterprise Information presented its Excellence in Enterprise Information Award to the National Nuclear Security Administration for its state-of-the-art program management information system G2.

NNSA, established by Congress in 2000, is a semi-autonomous agency within the Department of Energy responsible for enhancing national security through the military application of nuclear science.

"The enterprise contribution is impressive. From congressional leaders who set budgets to facility operators, NNSA's G2 system drives risk-based decisions at the enterprise level. Defensibility, traceability and risk-based decision-making are now the norm at NNSA," said James McConnell, associate administrator for the office of safety, infrastructure and operations. "We are proud to receive the AFEI excellence award."

G2 collects data used to manage infrastructure risks at NNSA sites, including information on the condition of infrastructure and the consequence of potential loss of assets to the NNSA mission. This information is used to perform network analysis to evaluate the interconnection of dependent assets and provide visualization for data-driven, risk-informed decision-making.

WID HORIZONS Scholarship Applications Due in July

National Defense Industrial Association affiliate Women In Defense is taking applications for its annual HORIZONS scholarship.

WID encourages women to pursue careers related to the national security and defense interests of the United States and to provide development opportunities to women already working in national security and defense fields. The scholarship is designed to provide financial assistance to further educational objectives of women who are U.S. citizens either employed or planning careers in defense or national security areas.

The amount of the scholarships varies each year. Completed applications, essays, recommendations and transcripts must be received postmarked no later than July 15. Visit www.womenindefense.net/horizon for eligibility criteria and to download the application.

NDIA Calendar

For more information and online registration, visit www.ndia.org or call our operations department at (703) 247-9464

APRIL

NEW!
5-6 Insider Threat Workshop
Springfield, VA
www.ndia.org/meetings/6800

8 Michigan Chapter 58th Annual ROTC Awards Banquet
Troy, MI
www.ndia-mich.org

11-13 Joint Undersea Warfare Technology Spring Conference
San Diego, CA
www.ndia.org/meetings/6260
See our ad on p. 42

12-14 17th Annual Science & Engineering Technology Conference
Tampa, FL
www.ndia.org/meetings/6720
See our ad on p. 42

18-20 32nd Annual National Logistics Forum
Washington, DC
www.ndia.org/meetings/6730
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18 DoD Medical R&D 101
Ellicott City, MD
www.ndia.org/meetings/631B

19-20 Medical Research, Development and Acquisition in Support of the Warfighter
Ellicott City, MD
www.ndia.org/meetings/6310
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19 *New Date*
FITARA Implementation Symposium III
Arlington, VA
www.afei.org/events/6A41

25-28 2016 Armament Systems Forum
Fredericksburg, VA
www.ndia.org/meetings/6610
See our ad on p. 43

26-28 MODSIM World 2016
Virginia Beach, VA
www.trainingsystems.org

27-28 Michigan Chapter Defense Exposition (MDEX)
Warren, MI
www.ndia-mich.org

MAY

3 US-Japan Defense Industry Conference
Arlington, VA
www.ndia.org/meetings/6470

3-4 Procurement Division Education Symposium (Formerly Annual Acquisition Educational Seminar)
DETAILS COMING SOON
Washington, DC

3-5 59th Annual Fuze Conference
Charleston, SC
www.ndia.org/meetings/6560

9-11 Annual Tactical Wheeled Vehicles Conference
Reston, VA
www.ndia.org/meetings/6530
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9-13 29th International Symposium on Ballistics
Edinburgh, Scotland
www.ndia.org/meetings/6210

10-11 Agile in Government
Washington, DC
www.afei.org

12 2016 NDIA Annual Award Dinner & Eisenhower Award Presentation (Black Tie)
McLean, VA
www.ndia.org/meetings/6130
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16 Washington, D.C. Chapter Benefit Golf Outing for USO-Metro
Suitland, MD
www.ndia.org/washdc

16-18 2016 Joint Annual NDIA/AIA Spring Industrial Security Committee Conference
Scottsdale, AZ
www.ndia.org/meetings/6ISS

23-26 2016 SOFIC
Tampa, FL
www.ndia.org/meetings/6890
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24-26 Iowa-Illinois Chapter Midwest Small Business Government Contracting Symposium
Moline, IL
www.ndia-ia-il.org

JUNE

1-2 DI2E Plugfest
Fairfax, VA
www.di2eplugfest.org

8-9 Tennessee Valley Chapter Missile Defense Agency Small Business Programs Conference
Huntsville, AL
www.ndiatvc.org

9 WID Service to The Flag Award Program & Reception
Arlington, VA
www.womenindefense.net

JULY

14 Integrated Air & Missile Defense Symposium
Laurel, MD
www.ndia.org/meetings/6100

22 Michigan Chapter Black Tie Dinner Meeting
Grosse Pointe, MI
www.ndia-mich.org

AUGUST

1-4 2016 Warheads & Ballistics Symposium (Classified)
Monterey, CA
www.ndia.org/meetings/6480

2-3 Global Explosive Ordnance Disposal (EOD) Symposium & Exhibition
Bethesda, MD
www.ndia.org/meetings/6950

2-3 Michigan Chapter Ground Vehicle Systems Engineering & Technology Symposium (GVSETS)
Novi, MI
www.ndia-mich.org

3-5 Joint CBRN Conference and Exhibition DETAILS COMING SOON
Edgewood Arsenal, MD
www.ndia.org/meetings/6300

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

17-18 Joint Missions Symposium (Classified) DETAILS COMING SOON
NSWC Crane, IN

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

SEPTEMBER

12-15 Insensitive Munitions and Energetic Materials Technology Symposium
Nashville, TN
www.ndia.org/meetings/6550

19-21 Joint Undersea Warfare Technology Fall Conference
Groton, CT
www.ndia.org/meetings/6240

OCTOBER

24-27 19th Annual Systems Engineering Conference
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  www.ndia.org/meetings/643C
- July 27-28
  Reston, VA
  www.ndia.org/meetings/643D
- November 2-3
  Reston, VA
  www.ndia.org/meetings/743A

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Use #NDIATWV to follow updates on this event on Twitter.

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Next Month

Special Operations Innovation

■ With a relatively small force that specializes in clandestine missions, Special Operations Command has the ability to field innovative gadgets more quickly than other services. National Defense looks at how SOCOM innovates in the service of its operators and gives tips on how those with good ideas can put them before acquisition officials.

SOF Aviation

■ The Air Force Special Operations Command is seeking to expand its fleet of CV-22 Ospreys, and intends to upgrade the aircraft with advanced equipment. The V-22 Osprey, a multi-mission aircraft that combines speed and vertical lift, is used by special operations forces, the Marine Corps and soon the Navy. With the services forced to make tradeoffs due to budget constraints, the program could face reductions over the next five years. Officials tell National Defense what lies ahead in this important military aviation program.

Special Ops Sensors

■ Air Force Special Operations Command is looking for new tools to improve its intelligence, surveillance and reconnaissance capabilities. To improve targeting, AFSOC officials want to acquire untethered, aircraft-deployable sensors that can go beneath the clouds and see enemy forces on the ground in obscured environmental conditions. The command is looking to industry to provide solutions.

Social Media

■ Special Operations Command is investing in new tools to detect patterns and trends in open source information such as social media. The head of SOCOM said such technology will give warfighters the ability to sense, understand and respond to changes in the information environment in real time.

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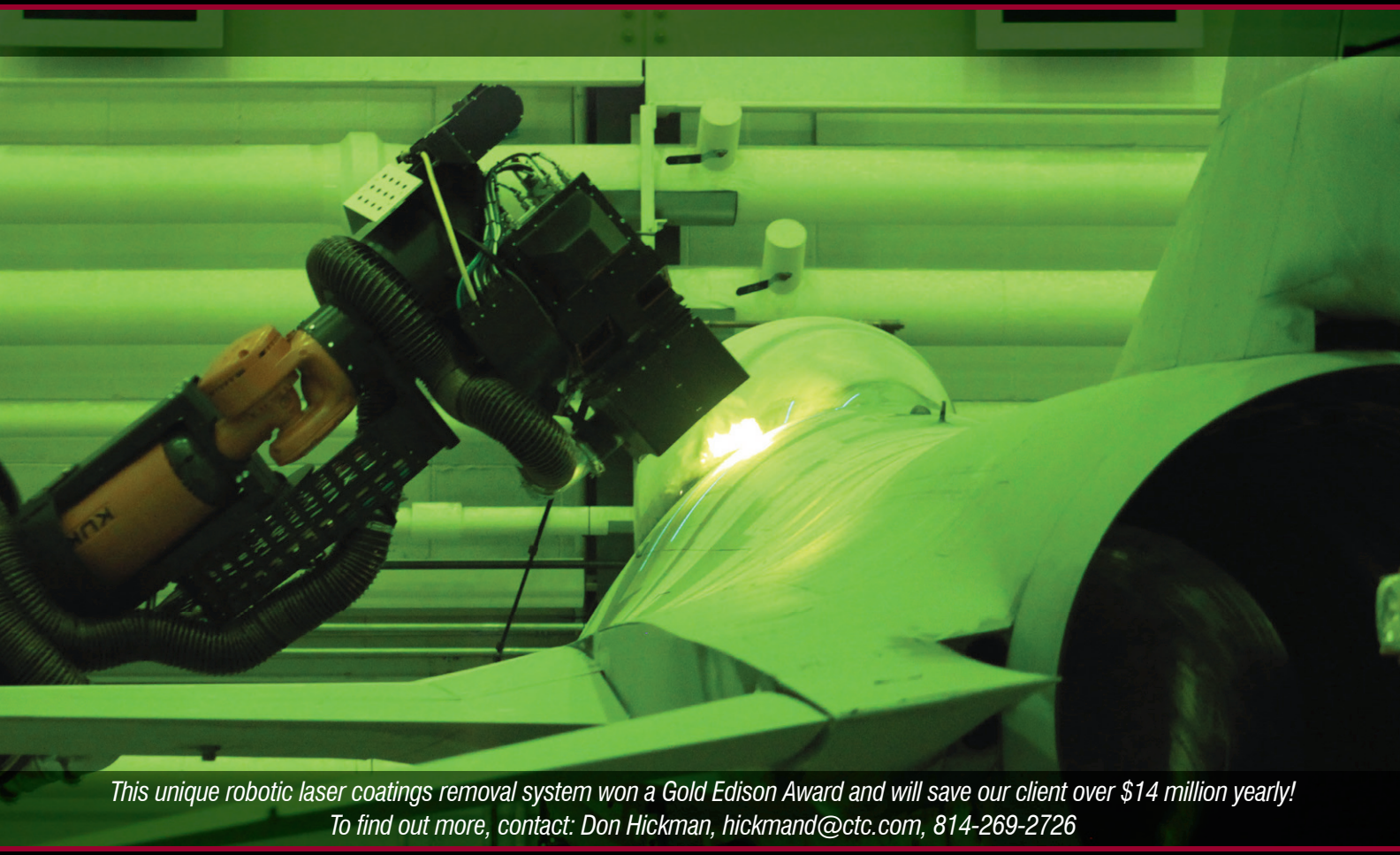

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