Shelton Announces New Space Situational Awareness Satellite Program

AIR FORCE NEWS SERVICE (FEB. 24, 2014)
Air Force Senior Airman Zachary Vucic

ORLANDO, Fla.—The commander of Air Force Space Command announced a new satellite program during a speech about the importance of space and cyberspace at the Air Force Association Air Warfare Symposium and Technology exposition, Feb. 21, here.

General William Shelton told the audience about the new Geosynchronous Space Situational Awareness Program with two satellites being launched on the same launch vehicle later this year.

"GSSAP will present a significant improvement in space object surveillance, not only for better collision avoidance, but also for detecting threats," Shelton said. "GSSAP will bolster our ability to discern when adversaries attempt to avoid detection and to discover capabilities they may have, which might be harmful to our critical assets at these higher altitudes."

According to a new fact sheet on GSSAP posted on the AFSPC website, the program will be a space-based capability operating in near-geosynchronous orbit, supporting U.S. Strategic Command space surveillance operations as a dedicated Space Surveillance Network sensor. GSSAP will allow more accurate tracking and characterization of man-made orbiting objects, uniquely contribute to timely and accurate orbital predictions, enhance knowledge of the geosynchronous orbit environment, and further enable space flight safety to include satellite collision avoidance.

Shelton announced the program during a speech that conveyed concern about the increasingly complex and contested space and cyber environments. He said space and cyberspace are very much a part of everything we do. The dependence on, and demand for, space and cyberspace is higher than it's ever been, he said, noting the changes that have occurred over the years, with 170 countries now having a tangible interest in space to include 11 countries with indigenous launch capability.

He said there are no mid-term alternatives to the capability provided by space.

"If we're going to be a global power, we want global coverage, we want global access, and we want it at a time and a place of our choosing," Shelton said.

Speaking specifically about space, Shelton said despite the increased dependence, the declining budget creates challenges to meet the rising demand. The demand for space includes surveillance, tracking, and communication.

In addition to the focus and actions the Air Force and the nation are taking on space situational awareness, he discussed need for survivability and resilience of our satellite constellations. With the additional challenge of declining budgets, Shelton said, "What we're really looking for is the nexus of required capability, affordability, and resilience" for the nation's space systems.

"The study work we are doing right now will be effectual for new solutions in the mid 2020 timeframe," he said. "But we've got to get that work done now."

Shelton closed the space portion of his presentation by talking about the Space Security and Defense Program, a vital program that helps find ways to protect the Air Force's spacecraft. SSDP looks at available intelligence and adversary counter space programs, and recommends solutions. He said the program has been a "big plus" for situational awareness and has tangible results in many other areas, even in its early stages.

"[Air Force Space Command] is working very hard to get it right for the future," he said. "[Space] is a vital capability for the nation, for the joint force. We can't let them down, and we won't."

Moving on to cyberspace, the general said it is very different than any other domain as it's man-made and unlike the physical domains people have learned to use over time. Cyberspace more and more defines modern life in the 21st century.

He said cyberspace creates a big advantage in regards to how many people the military has to put in harm's way; however, the country's adversaries know cyberspace is the nation's lifeline. Because of this, high-end operators are constantly threatening U.S. systems.

"We've got a lot of cyber-enabled weapons these days," he said. "If an adversary can get in and make that weapon system ineffective at the worst possible time—think about that.

"As we've grown our dependence on cyberspace for all the right reasons, it has become an increasingly contested environment for all the wrong reasons. The threats have grown in both sophistication and in number.

A laptop, the right skill set, and an Internet connection is all one needs to become a player in cyber warfare, making the low "cost of admission" a major complication.

"We can spend a great deal of treasure on defenses, only to be overtaken by the exquisite talents of a high-end cyber operator who has very little capital invested," Shelton said, noting anonymity makes attribution of these attacks difficult.

Though the cyber domain is different from any other domain, the application of standard military process is doing well to mitigate a lot of the risk, he said. Air Force Space Command is developing several tools to conduct cyberspace operations including the potential for offensive cyber capability.

"Our airmen and industry partners are facing up to these cyber challenges each and every day, and they are ensuring the mission gets done in the 'wild west' of cyberspace," Shelton said. "We've come a long way in space and cyber these last few years. We continue to provide game-changing capabilities to the warfighter … I think the future of warfare really depends on us having the best, most secure, and most capable space and cyber systems."

U.S. Cyber Command recently established a cyber-mission force concept to conduct full-spectrum cyber operations across the Department of Defense, he said. Over the next three years, the Air Force will provide 39 teams—roughly 2,200 airmen—to contribute to this cyber mission force.

"We must be prepared as a nation to succeed in increasingly complex and contested space and cyber environments, especially in these domains where traditional deterrence theory probably doesn't apply," he said. "We can't afford to wait … for that catalyzing event that will prod us to action."

Gen. William Shelton announces the new Geosynchronous Space Situational Awareness Program during a speech about the importance of space and cyberspace at the 30th Annual Air Force Association Air Warfare Symposium and Technology Exposition, Feb. 21, 2014, in Orlando, Fla. Shelton is the commander of Air Force Space Command.
U.S. Air Force photo/Scott M. Ash

Counter-IED Organization to Continue at Smaller Size

C. Todd Lopez

ARMY NEWS SERVICE (FEB. 25,2014)

WASHINGTON—The Defense Department's Joint Improvised Explosive Device Defeat Organization is still relevant and is needed for future conflicts, but its size is expected to shrink significantly, according to its director.

Army Lt. Gen. John D. Johnson said he'd received guidance from then-Deputy Defense Secretary Ashton Carter to "scale JIEDDO down," and to draw up plans for what an "enduring" JIEDDO might look like in the future.

JIEDDO's mission is to help combatant commanders "defeat IEDs as weapons of strategic influence." The IED has been called the "signature" enemy weapon in both Iraq and Afghanistan.

Johnson said he's confident that Carter's guidance, a request to craft a roadmap for JIEDDO's future, is proof enough the organization will endure after Iraq and Afghanistan—the two conflicts that necessitated its creation in 2006.

"There is a full appreciation that JIEDDO functions should endure. The key is that it be scaled to what the nation can afford," Johnson said. "And we have to be smart as to how we structure it so it can be rapidly expanded as necessary based on the nature of the threat and the challenges we are going to face in the future."

The organization stands now at about 3,000 personnel, Johnson said, adding that he'll draw JIEDDO down to 1,000 by the end of this fiscal year. Additional guidance from the deputy secretary of defense could later bring the organization's numbers as low as 400, said the general, speaking at a media roundtable last week at JIEDDO's headquarters in Arlington, Va.

Johnson said he will spell out to the deputy secretary what could be done with 400 personnel, and what risks are associated with it.

"There are certain parts of an organization like this that if you reduce it beyond a point, it could take six months, a year, even longer to re-establish it," he said. "And in that time period, our soldiers and Marines in the field are suffering from the effects of IEDs, and it ends up costing us more to try to fix the problem without necessarily having the sophistication of understanding the entire system of systems."

Some parts of JIEDDO can't be easily scaled. One of the areas he's looking to protect, Johnson said, is the intelligence integration functions of JIEDDO.

"My concern is, right now, we have a fairly persistent look at the organizations that most commonly use IEDs," he said. "If we were to take our eyes off, what are the chances that there would be an adaptation or permutation in the way they use IEDs that we didn't anticipate, and how long for us to catch up?"

"Operational integrators" embedded in combat units also are a critical component of JIEDDO that Johnson said he has marked for retention.

"We have embedded analysis and operational integrators down with most of the tactical units and in the supporting commands," he said. "Those integrators are able to observe the organization they support, understand what their problems are, and transmit those problems all the way back to the capabilities we have here to either go develop a piece of kit or modify a piece of kit or see their situation in a different light."

That capability of integrators in the units is something Johnson said he thinks JIEDDO needs to retain.

"It's that bottom-up feedback that defines very rapidly not only what any one of those particular units need, but helps telegraph what other units may well expect to see on the battlefield," he said.

He also said that JIEDDO will need to maintain its robust relationships with the research and development communities that support it, pointing out that rapid acquisition to defeat emerging threats requires solutions from a full spectrum of innovative sources.

JIEDDO still has an ongoing role to play in Afghanistan. There, Johnson said, the focus is taking care of and protecting forces. He said JIEDDO continues to prepare units with relevant pre-deployment counter-IED training to support their mission.

JIEDDO's mission inside Afghanistan, however, now largely involves advising the Afghan national security forces. "We don't have as much of a direct role in the fight there," said Johnson, referencing the Afghans taking the lead in operations.

In Afghanistan, JIEDDO is training staffs and advisors to help Afghan forces use the assets they have—including equipment and organizations—to protect themselves and take the fight to the enemy, the general said.

In the last six months, he added, there has been additional JIEDDO emphasis on helping the Afghan forces to stand up their own counter-IED skills and capabilities in preparation for the 2014 withdrawal of forces.

"As we have not been as directly engaged in combat operations, the ANSF have picked that fight up, and as a result, the IED casualties are being felt by the ANSF," he said. "By helping train them, by helping them facilitate their own logistics networks and things like that to get their hands on the equipment that is available to them, they are better able to take this fight on."

The term IED largely entered American vernacular as part of the fight in Afghanistan and Iraq, but Johnson said the term has broader application beyond homemade bombs placed along convoy supply routes as part of an insurgency.

The devices responsible for the 1993 World Trade Center bombing, the 1995 Oklahoma City bombing, the 1996 Kho-

bar Towers bombing, the 2000 *USS Cole* bombing, and the Boston Marathon attack in 2013 all were IEDs, Johnson said. While acknowledging that he doesn't have responsibility for law enforcement in the United States, "there is great value in sharing information among the various agencies in our government to make sure we don't miss out on experiences we've had abroad and ... how we have benefitted from that knowledge here," the general said. "We collaborate with the other agencies very closely."

After the attack in Boston, he said, "the discussions ... were really a comparison of experiences to see if there were ways that we could learn from what happened there, and they could learn from anything that we did. One of the most important things we've done is in the investment of the Terrorist Explosive Device Analytical Center that the FBI has."

He said JIEDDO had invested in TEDAC during Iraq and Afghanistan because "we needed the highest level of forensic capabilities to take a look at these IEDs and tell us who was responsible for them and also to help us track if they were flowing from one country to the next." Increasing biometric and forensic capabilities has taken the anonymity from those who plant IEDs and has been a tactical game changer on the battlefield, he added.

Outside collaboration with federal agencies in the United States, Johnson said, JIEDDO is working with partner nations to assist them with standing up their own organizations that are similar to JIEDDO.

The Colombians, for instance, have stood up a JIEDDO-like capability, and Johnson said they recently visited the United States to discuss that organization and their strategy. He said he hopes he can demonstrate to the Colombians how JIEDDO is organized, and help show them how they are successful. JIEDDO also works with other key allies such as Australia, Canada, and New Zealand, he said. He also highlighted NATO's establishment of an IED center of excellence in Madrid.

In Southwest Asia, where operations are still underway in Afghanistan, Johnson said, JIEDDO has developed a partnership with Pakistan to help that country deal with its own IED threat. In particular, he said, JIEDDO is interested in helping to stymie the flow into Afghanistan of IED precursors—the materials, such as ammonium nitrate-based fertilizer, that can be crafted into homemade explosives.

He said JIEDDO is working with industry to find better ways of controlling distribution of materials and "to make sure this very legitimate product is being used in ways it was intended to be used."

JIEDDO has seen a reduction in the amount of ammonium nitrate fertilizer that's being used as homemade explosives, he said, but that "it isn't enough."

With approval in the 2012 National Defense Authorization Act, and a recent re-approval, JIEDDO has been able to use its own money to pay for other U.S. government agencies to use their authorities in Pakistan to help "get after" the JIEDDO mission. Agencies that benefit from that authorization include the Commerce, Treasury and Justice departments, and the FBI, for instance.

The FBI, Johnson said, is training bomb technicians, border police, and customs officials in Pakistan. Additionally, homemade explosive test kits have been provided so border police there can test materials they see moving through their checkpoints.

"There is more work to be done. The Pakistanis are anxious to work with us, and I am excited about the ability to continue to do that," Johnson said.

Obama Announces New DoD-led Manufacturing Institutes

AMERICAN FORCES PRESS SERVICE (FEB. 25, 2014)
John D. Banusiewicz

WASHINGTON—President Barack Obama today announced two new manufacturing innovation institutes led by the Defense Department and supported by a $140 million federal commitment combined with more than $320 million in private-sector commitments.

A consortium of businesses and universities headquartered in the Detroit area will focus on lightweight and modern metals manufacturing, and a Chicago-headquartered consortium of businesses and universities will concentrate on digital manufacturing and design technologies.

"If we want to attract more good manufacturing jobs to America, we've got to make sure we're on the cutting edge of new manufacturing techniques and technologies," the president said. "I don't want the next big job-creating discovery to come from Germany or China or Japan. I want it to be 'Made in America.'"

Each institute serves as a regional hub, officials explained, bridging the gap between applied research and product development by bringing together companies, universities, and other academic and training institutions, as well as federal

agencies, to co-invest in key technology areas that encourage investment and production in the United States.
This type of "teaching factory" provides a unique opportunity for education and training of students and workers at all levels, they added, while providing the shared assets to help companies—most importantly small manufacturers—access the cutting-edge capabilities and equipment to design, test, and pilot new products and manufacturing processes.

The winning Lightweight and Modern Metals Manufacturing Innovation Institute team, led by EWI, brings together a 60-member consortium that pairs the world's leading aluminum, titanium, and high-strength steel manufacturers with universities and laboratories pioneering new technology development and research, officials said. Its long-term goal will be to expand the market for and create new consumers of products and systems that use new, lightweight, high-performing metals and alloys by removing technological barriers to their manufacture.

Noting that car manufacturers now use stronger steel to make lighter cars that use less gas, Obama noted that advanced lightweight metals "can help us build lighter armor for our troops, planes, and helicopters that [carry] bigger payloads without sacrificing safety; wind turbines that generate more power at less cost; prosthetic limbs that help people walk again who never thought they could."

The winning Digital Manufacturing and Design Innovation Institute team, led by UI Labs, spearheads a consortium of more than 70 companies, universities, nonprofits, and research labs—creating a partnership between world-leading manufacturing experts and cutting-edge software companies to enable interoperability across the supply chain, develop enhanced digital capabilities to design and test new products, and reduce costs in manufacturing processes across multiple industries, officials said.

"[This institute] will focus on using digital technology and Big Data to help manufacturers go from ideas on paper to products at loading docks faster and cheaper than ever before," Obama explained. "And it will include training to help more Americans earn the skills to do these digital manufacturing jobs. This is critical—the country that gets new products to market faster and at less cost will win the race for the good jobs of tomorrow."

Frank Kendall, undersecretary of defense for acquisition, technology and logistics, said the innovation institutes will strengthen the nation's advanced manufacturing capabilities, promote the development of cutting-edge products and systems, and attract well-paying jobs to support a growing middle class.

"Both consortia announced today will play commanding roles in the advancement of key U.S. strengths," he said. "The Lightweight and Modern Metals Manufacturing Innovation Institute, or LM3I, represents a potent new capability in the application of high-performing metals and alloys toward forward-looking commercial and military products benefitting a multitude of industries. The Digital Manufacturing and Design Innovation Institute, or DMDI, will push technology development into a new frontier, by harnessing the power of virtual reality to accurately test and prepare high-tech products before they even leave cyberspace."

The Defense Department has a substantial role to play in supporting and growing these organizations, Kendall added, and has made key investments since creating the first institute in Youngstown, Ohio, in 2012.

Each institute's federal funding contribution will be about $70 million across the five years of the cooperative agreement period of performance, White House officials said. Consistent with the president's broader proposal, they added, the institutes will be supported with federal funding through the start-up and initial operational phases, after which they are expected to become fiscally self-sustaining. Each manufacturing innovation institute solicitation required that applicants match the federal investment on no less than a 1-to-1 basis.

The Defense Department's overarching role is to stand up individual institutes through federal acquisitions, including the provisioning of federal funding, officials said, and to provide oversight and stewardship of federal funds. The department also will contribute technical advice and assistance through participation on an advisory board.

Each institute will have substantial autonomy from its partner organizations and institutions, and will have an independent fiduciary board of directors predominantly composed of industry representatives. An institute leader will be in charge of day-to-day operations, officials said.

DoD's $140 million stake in the new institutes is a matter of funding the nation's highest defense and national priorities, White House officials said. The department already is investing in critical additive manufacturing, lightweight and modern metals manufacturing, and digital manufacturing and design needs, they noted. Engaging in sustainable public-private partnerships that build strong innovation capacity

around these manufacturing technologies is the administration's chosen investment strategy, they added.

Kendall said DoD's investment in the new institutes continues the department's support toward the president's goal of establishing a much larger network of up to 45 innovative manufacturing centers throughout the nation. The department is committed to their success, he added, "and will continue to work to maintain and embolden America's innovation and manufacturing advantage."

Kendall Cautions Against Complacency in U.S. Tech Superiority

AMERICAN FORCES PRESS SERVICE (FEB. 25, 2014)
Army Sgt. 1st Class Tyrone C. Marshall Jr.

WASHINGTON—The United States has been strategically dominant since the end of the Cold War, but complacency and distractions could lead to a loss of technology superiority, the Pentagon's top acquisition official said today.

Speaking during the Defense Programs Conference here, Frank Kendall, undersecretary of defense for acquisition, technology and logistics, emphasized there is no guarantee the United States will remain technologically superior in future years.

"Technological superiority is not assured," he said. "You have to work to keep yourself there. It isn't free. It isn't guaranteed."

Coming out of the Cold War in a very dominant position may have contributed to complacency, Kendall said. "We demonstrated that dominance in the first Gulf War [and] Serbia, and when we went into Iraq and Afghanistan," he said. "It's been a long time since the end of the Cold War, and a lot of the capabilities we have are the capabilities we had at that point in time."

Kendall said the United States has been "distracted" by counterinsurgency campaigns over the last 12-plus years. "So that is taking up most of our attention," he added. "So you put those two things together—lack of focus and our lack of investments in modernization to a certain extent—and the third ingredient, of course, is what others are doing."

Technology doesn't stand still, Kendall said, adding that the United States was observed very closely during the first Gulf War.

"We shocked the world [with] how low our casualties were and how quick our victory was in the first Gulf War," he said. "In terms of counting conventional forces, Saddam had a pretty significant conventional military to confront us—particularly on the ground. And we went through it like a knife through butter in just a very, very short period of time."

Demonstrating capabilities such as stealth, precision munitions, and networked forces, Kendall said, the United States dominated the battlefield "in a way no one had done before." Nations such as China and Russia paid close attention to that, he added.

The Pentagon's acquisition chief said the specific areas he is worried about are control of space and precision missiles such as cruise missiles, ballistic missiles, and electronic warfare capabilities.

"We're dominant in some areas, clearly, like stealth and high-performance engines," he said. "But those are only two ingredients in what's a much more complicated picture. So as I watch all these things, I get a bit nervous."

Kendall said he is focusing on the ability to sustain technological superiority over the long term—the next 10 to 20 years.

"The investments that we are making now in technology are going to give us the forces we have in the future," he said. "The forces we have now came out of investments that were made, to some extent, in the '80s and '90s, ... particularly the investment procurements. So I don't think we can be complacent about this. I think we've got to pay much closer attention to this."

Kendall noted the importance of continuing to conduct research and development. "[It] is not a variable cost," he said. "R&D drives our rate of modernization. It has nothing to do with the size of the force structure. So when you cut R&D, you are cutting your ability to modernize on a certain time scale, no matter how big your force structure is."

Time is critical to the process and cannot be recovered, the undersecretary said.

"If you give up the lead time it takes to get a capability, you are not going to get that back," Kendall said. "I can buy back readiness—it takes a little time to do it, but I can buy back readiness. I can increase the size of the force structure. I can only do so much to shorten the time it takes to get a new product into the field."

The United States fought World War II with equipment that was in research and development before the war started, for the most part, Kendall said.

"If we hadn't done that R&D, we would have had much, much less capability to fight that war," he added. "I don't want us to be a position where we haven't done the R&D necessary to support us in the next conflict."

DoD Enacts Faster, More Agile Technology Acquisitions Process

AMERICAN FORCES PRESS SERVICE (FEB. 27, 2014)
Claudette Roulo

WASHINGTON—Information technology programs represent a considerable portion of all acquisition programs within the Defense Department, the assistant secretary of defense for acquisition said here yesterday.

In fiscal year 2010, the National Defense Authorization Act directed that DoD develop and implement new acquisitions processes for IT systems, Katrina G. McFarland said during a hearing of the Senate Armed Services Committee's readiness and management support subcommittee.

So, based on recommendations contained in the 2009 Defense Science Board Report, the department is working to speed up the route to acquiring new systems by increasing collaboration and improving processes, McFarland said.

"To do this, one must start with the defined requirement or capability," she added.

In the past, once an IT requirement or capability was defined, organizations were able to acquire only that technology which precisely met the predefined parameters.

The introduction of the "IT box" concept is a significant change to the IT acquisition process, McFarland said. The IT box gives organizations the ability to acquire technology that improves on already-approved technology, as long as the changes don't exceed certain parameters.

In addition to the IT box, the department has introduced interim guidance to adopt a "modular, open system methodology, with heavy emphasis on design for change," which will help DoD adapt to the changing IT environment, the assistant secretary said.

"The policy addresses the realization that IT capabilities may evolve, so desired capabilities can be traded off against cost and initial operational capability to deliver the best product to the field in a timely manner," she said.

In accordance with the fiscal year 2011 NDAA, the department chartered the Cyber Investment Management Board, which unites IT policy and operational requirements by identifying gaps in resources and in capabilities, McFarland said. But, she said, finding personnel with the required expertise work in IT acquisitions and development is "challenging."

"The talent pool is small," she noted.

One way the department is working to address these challenges is through the Defense Acquisition Workforce Development Fund, McFarland said, which is supporting training of IT acquisition personnel through the Defense Acquisition University.

In addition, DoD is developing a cybersecurity guidebook for program managers to assist them in understanding what cybersecurity activities are necessary at each point of the acquisition life cycle, she said.

"The department will continue its efforts to operate as affordably, efficiently, and as effectively as possible," McFarland said. "We are evolving our approach to acquisition for IT and recognize the distinct challenges that come with it."

TRANSCOM Commander Discusses Mission Priorities

AMERICAN FORCES PRESS SERVICE (FEB. 27, 2014)
Army Sgt. 1st Class Tyrone C. Marshall Jr.

WASHINGTON—President Barack Obama's mandate to reduce U.S. troop presence in Afghanistan by the end of 2014 is U.S. Transportation Command's top priority, Air Force Gen. William M. Fraser III told Congress here today.

Fraser, commander of TRANSCOM, testified before the House Armed Services Committee on the state of his combatant command and its global mission.

"United States Transportation Command continues to support our force reductions in Afghanistan through our close working relationships with the geographic combatant commanders, other federal agencies, and our commercial partners in various host nations," he said.

"We are postured to achieve the president's directed reduction in Afghanistan by December 2014," Fraser said. "Our transportation command team remains fully committed."

He said his command is focused on supporting U.S. forces worldwide and executing the redeployment from Afghanistan.

Fraser lauded the men and women of his command for their commitment to supporting the troops around the world, noting TRANSCOM's joint forces team is dedicated to providing reliable and seamless logistical support to warfighters and their families around the world.

According to Fraser, TRANSCOM, which is comprised of active duty, reserve and National Guard troops, civil servants, Merchant Mariners and commercial partners, has met the past year's challenges while supporting combat operations, sustainment efforts, humanitarian relief missions, and crisis-action responses.

"From supporting relief efforts following Typhoon Haiyan in the Philippines," he said, "to continuing development of innovative ways to maximize throughput into and out of Afghanistan to meeting the directed 34,000 troop-reduction level by February 2014, the [TRANSCOM] team committed themselves to ensuring our joint force maintains global logistics superiority."

Fraser praised TRANSCOM's people as "world-class professionals" who continue to conduct the nation's business "magnificently" without fanfare, and often, under stressful conditions.

"We are looking towards the future and we're preparing for a different operating environment. Declining [DoD] business for our industry partners requires careful consideration of how we ensure readiness of our organic and commercial air, sea, and surface capabilities into the future," Fraser said. "We will continue to work with Congress, the Department of Defense, the interagency and our commercial partners to find that right balance," he added.

As the global distribution synchronizer, TRANSCOM depends on a worldwide, multi-mobile network of military and commercial infrastructure, Fraser said, to ensure rapid delivery of forces and sustainment for humanitarian and contingency operations.

"This global network provides the strategic reach necessary for any contingency and highlights the need for assured access and delivery capabilities," he added.

In order to support any worldwide contingency or humanitarian event, Fraser said it is essential to preserve and improve partnerships with allied nations, maintain infrastructure, and continue to strengthen commercial partnerships.

"The United States Transportation Command team is committed to working on these relationships and seeking innovation solutions to support our forces around the world," he said.

DoD Releases Fiscal 2015 Budget Proposal and 2014 QDR

DEPARTMENT OF DEFENSE NEWS RELEASE (MARCH 4, 2014)

President Barack Obama today sent Congress a proposed defense budget of $495.6 billion in discretionary budget authority to fund base defense programs in fiscal year 2015.

The request is $0.4 billion less than the enacted FY 2014 appropriation and is consistent with the current budget caps. The Opportunity, Growth, and Security Initiative—a government-wide initiative—requests an additional $26 billion in FY 2015 to address significant readiness and modernization challenges. In the years from FY 2016 to FY 2019, the DoD is asking for funding that exceeds the current budget caps by a total of approximately $115 billion in order to meet defense requirements.

This DoD budget request supports the strategy in the 2014 Quadrennial Defense Review (QDR), which is being released in conjunction with the budget request. The 2014 QDR builds upon and updates the strategy submitted in January 2012, "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense," preparing for the future by rebalancing our defense efforts in a period of fiscal challenges.

The DoD budget request reflects a balance between readiness, capacity, and capability. It seeks efficiencies, including another round of base realignment and closure, and slower growth in military compensation in order to free up funds to minimize cuts in force size and readiness. Even with these initiatives, the force gets smaller and modernization programs are streamlined under this budget—with changes made in a manner that reflects the new QDR. The net result is a military force that can fulfill the defense strategy, but with some increased levels of risk. The department can manage these risks under the President's 2015 Budget plan, but risks would grow significantly if, as current law requires, sequester-level cuts return in 2016, if proposed reforms are not accepted, or if uncertainty over budget levels continues.

Commenting on the DoD request for FY 2015, Defense Secretary Chuck Hagel said, "This is a budget that recognizes the reality of the magnitude of our fiscal challenges, the dangerous world we live in, and the American military's unique and indispensable role in this country and in today's volatile world."

For Overseas Contingency Operations (OCO) operations in FY 2015, the budget only includes a placeholder of $79

billion, an amount equal to the request for FY 2014. Once conditions permit a decision about the scope of the enduring U.S. presence in Afghanistan, a formal budget amendment will be proposed to specify and fund OCO needs in FY 2015.

The QDR advances a broader strategic framework emphasizing three pillars—to protect the homeland, to deter and defeat threats to the United States, and to mitigate the effects of potential attacks and natural disasters; to build security globally, to preserve regional stability, to deter adversaries, to support allies and partners, and to cooperate with others to address common security challenges; and to project power and win decisively, to defeat aggression, to disrupt and destroy terrorist networks, and to provide humanitarian assistance and disaster relief.

The QDR highlights the imperative for institutional reform to implement this strategy. Controlling cost growth and generating greater efficiencies will allow the DoD to maximize its readiness and combat power over the long term.

"This QDR defines the historic transition unfolding throughout our defense enterprise. As we move off the longest continuous war footing in our nation's history, this QDR explains how we will adapt, reshape, and rebalance our military for the challenges and opportunities of the future," said Hagel.

"Today's world requires a strategy that is neither budget-driven nor budget-blind. We need a strategy that can be implemented with a realistic level of resources, and that is what this QDR provides," said Hagel.

The QDR establishes DoD's force planning construct to ensure U.S. forces are sized to conduct key types of operations in overlapping timeframes.

"We have throughout my 40-year career always adapted to changes in the security environment and changes in the budget environment," said Chairman of the Joint Chiefs of Staff, Gen. Martin Dempsey.

"This QDR is a pragmatic reflection of who we can and must be for the nation. We must do more than talk about institutional reform. We must do more than seek innovation in organizational designs, concepts, strategies, and plans. We must do more than prioritize our commitment to the development of our people. We must actually achieve these things," said Dempsey.

Given the major changes in our nation's security and fiscal environment, the QDR requires that DoD rebalance the joint force in several important areas to prepare for the future, specifically shifting the focus toward greater emphasis on the full spectrum of possible operations; sustain our presence and posture abroad to better protect U.S. national security interests; and adjust the balance of capability, capacity, and readiness with the joint force.

Highlights of the proposed DoD budget are outlined below. The entire fiscal 2015 budget proposal is available at http://www.budget.mil. The department's "FY 2015 Budget Request Overview Book" can be downloaded there as well. Key highlights of the DoD 2014 QDR are outlined in the attached summary and fact sheets. For more information and to view the entire fiscal 2014 QDR and budget proposal, please visit http://www.defense.gov.

SUMMARY OF THE DOD FISCAL 2015 BUDGET PROPOSAL

Principal Objectives

The Fiscal Year (FY) 2015 budget proposal supports the Department's 2014 Quadrennial Defense Review (QDR) that is being released in conjunction with the budget. The 2014 QDR updates the Defense Strategic Guidance released in January 2012. This updated strategy focuses on defending the homeland against all strategic threats including violent extremism, building security globally, and remaining prepared to project power to win decisively against any adversary should deterrence fail.

This budget seeks $495.6 billion in funding for the Department of Defense in FY 2015, an amount consistent with the current discretionary budget caps. In addition, the budget for FY 2015 includes a fully paid-for Opportunity, Growth, and Security Initiative that totals $56 billion government-wide. Of that amount $26 billion is for DoD and will be used to address readiness and modernization challenges, and to increase base sustainment and military construction. In the years beyond FY 2015, funding under this request grows from $535 billion in FY 2016 to $559 billion in FY 2019. During these years, the requested funds exceed the current discretionary budget caps by a total of approximately $115 billion in order to meet defense requirements.

Balancing Readiness, Capability, and Capacity

The FY 2015 request places a priority on balancing readiness, capability, and capacity in both the short- and long-term. The objective is to ensure that no matter their size, America's Armed Forces are properly trained, equipped, compensated, and prepared to accomplish their mission.

Approximately two-thirds of the requested budget ($336.3 billion) pays for the Department's day-to-day operations,

including pay and benefits for 1.3 million active military personnel, 0.8 million Reserve and Guard personnel, and 0.7 million civilian personnel, as well as healthcare benefits for over 9 million beneficiaries, both active and retired. Also included are funds for training, logistics, fuel, maintenance, service contracts, administration, family housing, and much more.

The remaining third of the budget ($159.3 billion) pays for investments in future defense needs, including modernization and recapitalization of equipment and facilities. The budget includes $90.4 billion for procurement, $63.5 billion for research and development, and $5.4 billion for military construction.

Organizationally, most of the funding is divided between the military departments: 24.2 percent ($120.3 billion) for the Army, 29.8 percent ($147.8 billion) for the Navy/Marine Corps, and 27.8 percent ($137.8 billion) to the Air Force. The rest of the requested budget—18.1 percent ($89.8 billion)—funds the Defense-wide account, which includes the Defense Health Program, intelligence agencies, Missile Defense Agency, Defense Advanced Research Projects Agency, and the many smaller DoD agencies.

In addition to the base budget request, the department seeks $26.4 billion in FY 2015 under the government-wide initiative known as the Opportunity, Growth, and Security Initiative. These added funds would be used to improve readiness (including additional funding for Army operating tempo, Navy aviation logistics, and Air Force training). Modernization would be enhanced through programs such as the purchase of additional Joint Strike Fighters and P-8 aircraft,and more spending on the Army Blackhawk program. Base sustainment and military construction funding would also be increased. The initiative will be paid for with a balanced package of mandatory spending reductions and tax reforms.

Being More Efficient

To free up funds for defense mission needs, the FY 2015 budget continues the recent emphasis on improved efficiency across DoD. Institutional reforms in the budget will save $18.2 billion in FY 2015 and an estimated $94 billion through FY 2019. Efficiency actions include a 20 percent cut in headquarters operating budgets, reduced contractor funding, targeted reductions in civilian personnel, reductions in funding for defense support agencies, savings in military health care, and savings from deferred military construction projects and family housing.

The department will also continue to monitor ongoing cost-savings efforts that were launched in recent years. Anticipated savings by 2017 or before include $150 billion in cost reductions from the FY 2012 budget, $60 billion in the FY 2013 budget, and $35 billion in the FY 2014 budget. In addition, DoD will continue to make progress towards auditability, with a goal of being fully audit-ready by 2017 and achieving audit-ready budgets by this fall. DoD will also aggressively pursue its Better Buying Power initiatives aimed at increasing acquisition efficiency.

The FY 2015 budget also includes a request for another round of Base Realignment and Closure (BRAC) to begin in FY 2017. Delays in approving this request will mean that funds needed for investments in readiness and modernization will be spent instead on unneeded infrastructure.

Compensation Changes

In another effort to free up funds to support high-priority readiness and modernization needs, this budget proposes slowing the growth of military compensation. Men and women in uniform certainly deserve the best support possible, and taxpayers have provided substantial increases in military compensation in recent years. Now there is a need to slow that growth to free up funds for training and modernization.

Slowing military compensation must be governed by several core principles—full support for the All-Volunteer Force, assurance that compensation is and will remain generous enough to recruit and retain needed personnel, and a guarantee that current service members will not see their pay and benefits cut. All of the savings realized will be used to close shortfalls in training, maintenance, and equipment, helping to ensure that our troops are well-equipped and well-trained.

Based on these principles, and with the full consent of the Secretary of Defense and the Joints Chiefs of Staff, DoD makes several specific proposals in this budget. For most military personnel the increase in basic pay in FY 2015 will be limited to 1 percent, with some limits in future years as well. General and flag officer basic pay will not increase at all in FY 2015.

The FY 2015 request also slows the growth in the Basic Allowance for Housing (BAH) until out-of-pocket costs average 5 percent. In addition, the budget eliminates reimbursement for renters' insurance from BAH rates.

The budget reduces DoD's commissary subsidies, saving $200 million in FY 2015, $600 million in FY 2016, and $1 bil-

Robert F. Hale, the Defense Department's comptroller; Christine E. Wormuth, deputy undersecretary for strategy, plans and force development; and Air Force Lt. Gen. Mark F. Ramsay, Joint Staff director for force structure, resources and assessments, respond to questions from reporters about the department's fiscal year 2015 budget request at the Pentagon, March 4, 2014. Wormuth also discussed the 2014 Quadrennial Defense Review.

DoD photo by Glenn Fawcett

lion a year thereafter. The remaining subsidy of about $400 million will go to overseas commissaries and those in remote locations. It is important to note that no commissaries will be directed to close. They will continue to be exempt from rent or taxes and so should be able to provide shoppers with discounts.

The FY 2015 request simplifies and modernizes the TRICARE healthcare plans. The three largest plans are to be consolidated into one plan. Modest increases to deductibles and co-pays will be used to guide beneficiaries to the most affordable and effective health care. The department is also resubmitting changes proposed last year affecting pharmacy co-pays and military health care enrollment fees for retirees age 65 and older in the TRICARE-for-Life program.

Sustaining a Ready and Capable Force–Now and in the Future

Despite efforts to become more efficient and to slow growth in compensation, the current budget limits require that the military get smaller and streamline its modernization programs. The military must also seek to recover from readiness problems caused by 13 years at war and exacerbated by last year's sequestration cuts. As indicated below, each of the military services is confronting these significant challenges.

Air Force

Under the President's budget, the Air Force will receive funding to support 59 Active, Reserve, and Guard combat-coded air squadrons, with an emphasis on meeting emerging threats. The Air Force emphasizes its modernization program in this budget request. Budget requests include $4.6 billion for 26 Joint Strike Fighters in FY 2015 and $31.7 billion for 238 planes over the Future Years Defense Program (FYDP). The Long Range Strike Bomber is funded at $0.9 billion for FY 2015 and $11.4 billion over the FYDP. The budget requests $2.4 billion for seven KC-46 Tankers in FY 2015 and $16.5 billion for 69 aircraft over the FYDP. In addition, the budget invests $1 billion over the next five years in a next-generation jet engine.

These investments required tradeoffs. The A-10 Warthog is being phased out. The 50-year-old U-2 is being retired in favor of the unmanned Global Hawk system. The growth of

Predator/Reapers forces is being slowed, and plans for the new combat rescue helicopter are being reviewed.

Navy
Under the President's budget, the Navy will have funds to support a fleet of 288 ships in FY 2014, rising to about 309 ships by FY 2019. The President's budget plan protects investments in attack submarines, guided missile destroyers, and afloat staging bases to confront emerging threats.

The budget includes $5.9 billion for two Virginia-class attack submarines in FY 2015 and $28 billion for two submarines a year through FY 2019. Also requested is $2.8 billion in FY 2015 and $16 billion over the FYDP to acquire two DDG-51 guided-missile destroyers per year through FY 2019. The budget also includes a request for $1.5 billion in FY 2015 to buy 3 Littoral Combat Ships and $8.1 billion over the FYDP to buy 14 LCS.

The Navy is also requesting $3.3 billion in FY 2015 for 8 Joint Strike Fighters – 2 for the Navy and 6 for the Marine Corps – and $22.9 billion for 105 aircraft over the FYDP.

Offsets are, however, required. The Navy will put 11 cruisers in long-term phased modernization. These ships will be placed in reduced operating status while they are modernized; they will eventually be returned to service with greater capability and a longer lifespan. The Navy will also re-examine its Littoral Combat Ship program.

Marine Corps
The budget requests $22.7 billion to support end strength of 182,700 Marines for FY 2015, including funds to support 900 Marines for increased security at American embassies overseas. Funds will also support a geographically distributed force posture in the Asia-Pacific, which will be increasingly important as U.S. forces are rebalanced to that region.

Army
The FY 2015 request will support 32 Active Army brigade combat teams and 28 Army National Guard brigade combat teams. Since DoD strategy will no longer size the force for large and prolonged stability operations, the Army will accelerate the pace of its post-war drawdown, attaining a range of 440,000 to 450,000 Active Duty soldiers. When combined with the Marine Corps, these end strength numbers will be sufficient to meet the needs of the President's defense strategy, including capability to decisively defeat aggression in one theater, while defending the homeland and supporting air and naval forces in a second theater. There will, however, be somewhat higher risks at these force levels, particularly for missions involving multiple and simultaneous conflicts.

To maintain a balanced force, the Army National Guard and Reserves will also draw down, reducing to 335,000 Guardsmen and 195,000 Reservists.

The Army's Ground Combat Vehicle program has been terminated and alternative options are being evaluated. Changes are also planned for the helicopter force. Aging Kiowas will be retired and replaced with National Guard Apaches and Lakotas. In return, the National Guard will receive the more versatile Blackhawks.

Defense-Wide
The FY 2015 request includes $7.5 billion for the Missile Defense Agency and $5.1 billion to fully fund cyber operations, which will enable both offensive and defensive capabilities across the full range of cyber contingencies.

U.S. Special Operations Command is allocated $7.7 billion, a 10 percent increase over the appropriated level in FY 2014, which will support a Special Operations force of 69,700 personnel. At this level, SOCOM will have the resources for full-spectrum training, global capabilities, and regional expertise.

Effects of Sequester-Level Budgets
Prolonged funding at sequestration levels would starve the department of funds needed for maintenance and training and for support of cutting-edge capabilities that provide the U.S. military with its technological edge. Taken together, the impact of further sequestration-level funding would hollow the force. Overall our ability to carry out the defense strategy would be significantly reduced.

Under sequester-level cuts, the Navy would need to eliminate one aircraft carrier starting in 2016, and the Air Force would have to retire 80 more aircraft, including the entire KC-10 tanker fleet and Global Hawk Block 40 fleets. Flying hours would also be reduced, and F-35 buys necessarily would be cut. The Army would decline in size to 420,000 active duty troops and about 500,000 Guard and Reserve personnel. The Marines would shrink to 175,000 active-duty personnel.

Official Encourages Dialogue Between Pentagon, Industry

AMERICAN FORCES PRESS SERVICE (MARCH 5, 2014)
Amaani Lyle

ARLINGTON, Va.—To ensure on-time, on-cost delivery of quality products and services to the warfighter, a Pentagon official encouraged clear and ongoing dialogue between Defense Department decision makers and industry leaders in a conference here yesterday.

James Russell, acting director of the Defense Contract Management Agency, told participants in *Aviation Week's* Defense Technologies and Requirements conference that finessing the supply chain and deliverable war-product process is relatively easy to accomplish on a programmatic basis, but is more challenging on a broader scale for industry.

"[We want] to be able to understand what's going on within that industrial base, take the information back [to] the decision makers, and figure out ways jointly to drive out cost, improve reliability, and incentivize [everyone]," said Russell, whose organization oversees quality assurance, cost, schedule, and supply chain predictability while managing about 335,000 contracts totaling more than $1.65 trillion.

Defense Contract Management Agency officials set up sector groups across industrial areas such as rotary and fixed-wing aircraft, naval sea systems, and ground Army combat systems to get a pulse on cost-saving avenues, Russell explained.

"We have a group focused on industrial-based capabilities and fragility at lower levels within industry," he said, adding that some discoveries were surprising, particularly in less-prominent industries.

"What appear to be rather mundane but important systems [aren't] getting the flashlight view and investment dollars in a downturned economy," Russell said. "This is causing a real fear that some of the engineering talent, and research and development things that go on, just don't have the opportunity to exist."

As a result, DoD officials are trying to better understand where there may be risk, particularly in losing a capability that might no longer be replicable in an uncertain budgetary environment.

"We want to look for ways that we can incentivize [industry] to have that communication back and forth so we know the risks and what the impacts will be," he said.

Program Executive Officer Describes F-35 Progress

AMERICAN FORCES PRESS SERVICE (MARCH 6, 2014)
Amaani Lyle

WASHINGTON—Progress remains steady in the F-35 Lightning II Joint Strike Fighter's operational testing, reprogramming, fueling, and stand-up training, the F-35 program executive officer told an audience at *Aviation Week's* Defense Technologies and Requirements Conference here March 4.

Air Force Lt. Gen. Christopher C. Bogdan said software development is a key factor as the program progresses.

Software is, by its very nature, difficult to develop, the general said, especially when adding to it the complexities of multiplatform fusion, one of the main modification goals for the aircraft.

Even the smallest change to the software can have a big effect, Bogdan said, so repeated testing is required to ensure any software modification works properly.

Interim capability currently allows the F-35s to survey the battle space, absorb information, and give the department a clear picture from an individual perspective, the general said. Meanwhile, he added, the software development aims to ensure not only that two jets can assess and fuse the information, but also that multiple systems can share and process the data—systems such as F-22 Raptor fighters, Airborne Warning and Control System aircraft, B-2 bombers, satellites and ground stations.

Bogdan explained that finishing interim capability as quickly as possible with the resources at hand will help the program move to the next development phase. So far, he said, airframe and engine production schedules are stable and predictable, measuring milestones in days and weeks, not months and years.

"It's more important to know when those lines will come out so we can get them to those bases and start that stand-up," the general said.

The developmental test program is 50 percent complete for 28 F-35s, Bogdan said. At this time last year, he added, the program office delivered about 36 airplanes, with plans this year to deliver 36 to 38.

"In the next two years, that'll go up to about 43, and then up into the mid-60s and then three years from now, over a hundred," the general said. Most of the 58 operational F-35s in the field are in use for training at Eglin Air Force Base, Fla. Operational units are at Marine Corps Air Station Yuma, Ariz.; Nellis Air Force Base, Nev.; and Edwards Air Force Base, Calif.

Affordability continues to be critical, Bogdan said, as officials devise plans to drive costs down in research, development, technology, and engineering without requesting any further funds from Congress or the Defense Department. "The enterprise simply cannot tolerate us asking for more money," he added.

EDWARDS AIR FORCE BASE, Calif.—Secretary of the Air Force Deborah Lee James greets Lt. Col. Mark Massaro, 461st Flight Test Squadron director of operations, after arriving at the Joint Strike Fighter Integrated Test Force March 7. She visited Edwards AFB for an F-35 Orientation visit where she was briefed on the test programs with the fifth generation fighter. James is the 23rd Secretary of the Air Force and is responsible for the affairs of the Department of the Air Force, including the organizing, training, equipping, and providing for the welfare of its more than 690,000 active duty, Guard, Reserve, and civilian airmen and their families. She also oversees the Air Force's annual budget of more than $110 billion.

Photo by Matt Short/Lockheed Martin

Cost-cutting ideas include an integrated master schedule to synchronize and manage tasks, assess risk assessments, and determine critical paths, the general said. He cited examples including the Marine Corps' initial operational capability, scheduled for flight testing completion in October and for developmental testing completion in November 2015.

"The [integrated master schedule] has shown us the critical path to both of those events is not software, … but modifications to the airplanes," Bogdan said. This requires balancing aircraft availability with the need to take jets off the line for modifications.

Progress in a program as complicated as the F-35 requires discipline in the business model, Bogdan said.

"We simply cannot afford to have to do things twice on this program," he told the conference audience. "We don't have the time, and we don't have the money. We know what our commitments are, and we're going to do everything we can to deliver them."

DoD Official Discusses Nuclear Deterrence in Congress

AMERICAN FORCES PRESS SERVICE (MARCH 7, 2014)
Amaani Lyle

WASHINGTON—The Defense Department's nuclear deterrent is the ultimate protection for the United States while also assuring distant allies of their security against regional aggression, a senior Pentagon official told Congress yesterday.

Elaine Bunn, deputy assistant secretary of defense for nuclear and missile defense policy told the Senate Armed Services Committee's strategic forces subcommittee that while Defense Department modernization goals largely have not changed since 2010, some adjustments are on the horizon. One such change, she reported, involves the new Strategic Arms Reduction Treaty force structure.

"The administration is considering how to reduce nondeployed strategic delivery vehicles to comply with the limits of the new START treaty by February 2018," she said, "and we will make a final force structure decision and inform Congress prior to the start of fiscal year 2015."
Bunn expressed concern about Russian activity that appears to be inconsistent with the Intermediate Range Nuclear Forces Treaty. "We've raised the issue with Russia," she told the senators. They provided an answer that was not satisfactory to us, and we told them that the issue is not closed."

With regard to recent ethical issues involving Air Force and Navy nuclear personnel, Bunn noted that Defense Secretary Chuck Hagel has created both internal and external special review panels. "Those reviews are not about assigning blame," she said. "They're about identifying, assessing, and correcting any systemic deficiencies that we may uncover, and in applying the best practices for carrying out our nuclear mission across the nuclear force."

Bunn also said the recently released 2014 Quadrennial Defense Review makes clear the key role of nuclear forces in the DoD strategy.

"It … supports our ability to project power by communicating to potential nuclear-armed adversaries that they cannot escalate their way out of failed conventional aggression," Bunn said. The department's budget request for fiscal year 2015 supports DoD's nuclear policy goals as laid out in the 2010 nuclear posture review, in President Barack Obama's June 2013 nuclear employment strategy, and in the 2014 QDR, she added. As a result, Bunn reported, Pentagon officials will continue to ensure that the current and future administrations have suitable options for deterring, responding to, and managing a diverse range of situations, including regional deterrence challenges.

"We continue to work closely with our allies, some of whom live in very dangerous neighborhoods, to ensure continuing confidence in our shared national security goals, including assurance of our extended nuclear deterrence commitments," she told the Senate panel.

Critical to maintaining a safe, secure, and effective force is the preservation of the nuclear triad: strategic bombers, intercontinental ballistic missiles, and submarine-launched ballistic missiles, Bunn said.

Pentagon Official: Research, Development No Place to Cut Costs

AMERICAN FORCES PRESS SERVICE (MARCH 18, 2014)
Claudette Roulo

SPRINGFIELD, Va.—At a time when technological development is flourishing in countries such as China and North Korea, the United States is at risk of falling behind due to budgetary constraints, the acting assistant secretary of defense for research and engineering said here today.
"Although we're budgeting this way, research and development is not a variable-cost activity," Alan R. Shaffer told attendees at the 2014 Precision Strike Annual Review. Regardless of force size, he explained, the nonrecurring engineering costs of developing a new system are the same.

Cuts to research and development accounts will slow technological advancement, and lost time is lost for good, Shaffer said.

"If we take much of a strategic pause in developing new systems, it will take a long time to get those restarted," he said. And, Shaffer noted, given the speed of technological development, it doesn't make sense to do so.

"The pace of technology maturation is accelerating at the same time that we're starting to have some weakness in our technology accounts," he said. "That's not a comfortable place to be."

Research and engineering in the Defense Department is about three things, Shaffer said: addressing present and future threats, enabling new and extended capabilities in current systems, and developing technological surprise.

But, he noted, high-tech fields such as space are evolving so quickly that "by 2020, I do not believe we will have any space asset now in orbit that cannot be denied or degraded [by an adversary]."

This means alternatives must be found for ubiquitous systems such as GPS and satellite communications, Shaffer said.
As the budget environment looks as if it will be constrained for at least the next decade, the department won't be buying as many finished systems, he said. This will place additional emphasis on prototyping and developing capabilities, Shaffer said, even if they are never fielded.

At these early stages of research and development, he said, failures are part of the process. However, Shaffer noted, the department can't afford to fail in acquisitions.

"We … can afford failure if we've only spent 12 months' worth of money," he said, but it becomes a lot harder to justify if the department has invested eight years in a failed project.

One sign of the changing culture within the department's research and development office is a name change, Shaffer said. The Rapid Fielding Office is now the Emerging Capabilities and Prototypes Office. The office is now focused on delivering capabilities that can be developed and prototyped for and with warfighters, he explained.

Shaffer noted the example of the X-1 development process as a model for the department to emulate as it moves forward. The Air Force and NASA partnered to develop hypersonic vehicles that were never intended to become operational systems, he said.

"It was intended to demonstrate we could have controlled flight through the sound barrier," Shaffer said. Each subsequent X-plane version was focused on solving increasingly difficult aeronautical engineering problems, he said, and the outcome was explosive development in aviation technology.

"Aviation … went from, effectively, no jet planes—unless you want to count the Messerschmitt 262—at the end of World War II, to supersonic controlled flight by the late '50s. That was a 15-year period," Shaffer said.

The program continues today, and the X-35 is the lone exception to the prototype-only model, entering production as the F-35 Lightning II Joint Strike Fighter.

Similar revolutions are most likely to come in three areas, Shaffer said: autonomous systems, hypersonic weapons, and electronic warfare.

More than any other area of technology, Shaffer said, the loss of U.S. dominance in electronic warfare makes him unhappy.
"Between digital signal processing, advanced electronics [and] advanced microelectronics … people are expanding the electronic warfare envelope," Shaffer said. "Simply, this becomes a point-counterpoint game that's very hard to play."

Now is a great time to be a technologist, Shaffer said. The department remains committed to science and technology and future system development, he noted, and there are plenty of challenges waiting for inventive people to solve them.