Sustaining and Enhancing the US Military's Technology Edge

The United States has long enjoyed a powerful military with a significant technological advantage, if not superiority, over its competitors and adversaries. The Department of Defense's (DOD) ability to develop and integrate new, cutting-edge capabilities like stealth, precision-guided munitions, and networked command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) has been a vital source of strength, agility, and confidence in our nation's armed forces. Along with the extraordinary quality of the men and women who serve in our all-volunteer force, our technological prowess has long been a distinct advantage that makes the US military the best in the world.

But, the United States can no longer take for granted its decisive technological superiority. Several factors conspire to challenge this traditional source of strength and advantage. Powers like China and Russia are investing heavily in new technologies and military capabilities specifically designed to blunt US strengths and exploit US vulnerabilities. Examples such as precision-guided cruise missiles designed to sink US aircraft carriers and theater ballistic missiles meant to deny the United States use of regional air bases will challenge US power projection in multiple theaters. Advanced networked radars threaten to uncloak our stealthiest aircraft. Electronic warfare, cyber, and space systems promise to degrade or even cripple our C4ISR. Some of these capabilities are coming on line now, while others will appear in the next 5–15 years. Many technologies and capabilities that have given the United States a comparative advantage over potential adversaries in the past are now proliferating to an increasing number of states and nonstate actors, including terrorist groups. These include military-grade unmanned systems, access to Global Positioning System (GPS) data, commercial communications, space capabilities, and networked intelligence, surveillance, and reconnaissance (ISR). The rapid pace of this proliferation is creating a potentially dire situation.

What's more, many technologies that will define the next cutting-edge advancements of the twenty-first century are not being developed within the DOD or even within the US defense industry but in the commercial sector by companies ranging from giants like Google, Amazon, SpaceX, and Apple to start-ups no one has heard of yet. This is

particularly true in the dynamically changing area of information technologies. The problem is, the DOD has yet to determine how to fully leverage the dominance and innovation of the US tech sector in support of sustaining and enhancing the US military's edge.

The battle to sustain and enhance the US military's technological superiority has begun. What happens in the remainder of this administration and the next one will profoundly affect the outcome. The next commander in chief, regardless of political affiliation, should come into office with a proactive agenda to work with Congress and industry to protect and advance the US military's technological superiority. The decisive factor in this quest will be the extent to which the existing system can exploit rapid technology cycles and be made agile enough to field military capabilities faster and more affordably than ever before. Part of this strategy should include the following 10 actions:[1]

1. **Create a sense of urgency and focus across the DOD leadership and workforce**. The department needs a clear vision for sustaining US technological superiority and should approach this objective with an intensity akin to that of the Manhattan Project or the Apollo Program. Building upon recent actions by Congress and DOD leadership, the next secretary of defense should partner with the chairman of the Joint Chiefs of Staff and military services to develop and implement a shared roadmap to this end. Particular priority should be given to recruiting senior political appointees and military leaders with the requisite technology, procurement, and management expertise to drive transformational change. Priority should be given to leaders with proven track records of innovative thinking, risk tolerance, and results. To enhance the agility and responsiveness of acquisition, defense leaders should consider implementing a "team of teams" approach, similar to the successful Joint Special Operations Task Force model. This approach relies upon inculcating a shared consciousness or mind-set for innovation, empowering decentralized decision making, and then being willing to take and reward risk.[2] The DOD should also take stock of the various organizational approaches that different components, such as the Air Force Rapid Capabilities Office, which runs the Long-Range Strike Bomber program, have established for rapid acquisition to identify lessons learned and best practices.[3]

2. **Build upon the momentum of current DOD efforts rather than starting with a clean sheet of paper**. The Obama administration and the Pentagon leadership in particular have made important strides toward implementing a third "offset strategy" that is focused on sustaining the US military's superiority, especially global power projection, in the face of adversaries' antiaccess/area-denial strategies.[4] For example, Secretary of Defense Ash Carter created the Strategic Capabilities Office (SCO) to rapidly field new capabilities by primarily leveraging existing weapon systems and is recommending $902 million in the DOD's FY17 budget request for the SCO.[5] The department has begun to scale best practices of the Air Force Rapid Capabilities Office into the US Army and US Navy to accelerate other high-priority acquisitions that are necessary for the strategy.[6] The DOD's FY17 budget request ($12.5B), respresents a 25-percent increase over FY2000, and also proposes $64.9 billion for science and technology (S&T) in the Future Years Defense Program.[7] These research and development initiatives will build upon those started by the FY16 National Defense Authorization Act (NDAA) to develop directed-energy, high-speed munitions, autonomous systems, undersea capabilities, and other technologies to counter adversary advantages.[8] The next leadership team should maintain momentum on the third offset strategy, protect critical rapid acquisition organizations and their programs, and look for ways to accelerate these as a matter of highest priority.

3. **Create a healthy competition of ideas focused on solving the toughest challenges the US military will face in the coming decades**. Too often, the DOD lets "the tyranny of consensus"—the overriding bureaucratic tendency to drive toward lowest-common-denominator answers that everyone can agree on—constrain its efforts to identify promising capabilities and concepts of operations for solving difficult military problems.[9] Fear of unhealthy interservice rivalry can prevent the healthy competition of ideas that drives innovation. At times, the large, complex Pentagon bureaucracy complicates decision making to the point that decisions are delayed or watered down to reach consensus without sufficient opportunity for senior leaders to hear and consider dissenting opinions and alternatives. Instead, DOD leadership should encourage a norm of critical appraisal within the DOD culture and include realistic options and

share dissenting views when seeking a senior leader decision. A good model today is the secretary of defense's deployment orders process, which fully and fairly represents nonconcurrence or the dissent of affected combatant commands and services.[10] Historically, the process George Kennan used to create the Marshall Plan serves as a great example of how to compete ideas and prepare alternatives for a senior decision maker.[11] To further explore competing ideas, the next administration should expand on recent efforts by the Office of the Secretary of Defense (OSD) and the services to incentivize and elevate the use of war gaming, red teaming, and genuine experimentation to generate new options for addressing priority challenges.

4. **Eliminate the barriers between those who define requirements, those who acquire systems, and those who will ultimately use them**. Today, different communities representing force providers, combatant commands, acquisition professionals, and technologists are often isolated from one another in stovepiped organizations and follow sequential decision-making processes. Too often, the artificial separation of these personnel complicates, if not cripples, the department's ability to make smart capability-cost-schedule tradeoffs. This is particularly true for less than fully mature technologies that are still in development as early stage acquisition begins. In these cases, it may make sense to form integrated teams drawn from the requirements, technology, acquisition, and end-user communities to consider trade-offs during program creation and execution. US Special Operations Command (USSOCOM) provides a superb example of how requirements, acquisition personnel, and experienced operators work together to rapidly deliver new capabilities.[12]

   Another key step toward integrating requirements and acquisition processes is the recent move by Congress to strengthen the role of the service chiefs in acquisition. As a result, the service chiefs who are responsible for organizing, training, and equipping and who are the customers of the acquisition process, now have greater responsibilities to balance cost, schedule, and performance along with deciding requirements.[13] Five major independent studies of acquisition oversight and management, including one by the Defense Business Board, recommended greater responsibilities by service chiefs in acquisition.[14] Furthermore, the Government Accountability Office reports a strong correlation between acquisition performance and

strong leadership, especially by top leaders who control requirements growth, stabilize funding, and streamline decision making.[15] Over the next few years, the DOD should assess whether increasing the service chiefs' involvement in the acquisition process translates into better execution of more high-priority programs.

5. **Create "safe space" for deeper dialogue and engagement with industry, both traditional defense industry and commercial companies**. The current litigious environment, in which nearly every major procurement decision begets a protest, has effectively silenced much of the brainstorming and shared problem solving that used to occur between DOD leaders and their counterparts in industry. Ironically, the deep collaboration between the DOD and industry that made the first and second offset strategies possible—with innovations in nuclear, stealth, and precision-guided munitions programs—would not be allowed today.[16] In recent years, it has become increasingly difficult for senior DOD officials to have candid conversations with industry leaders about the problems the US military is grappling with and what the art of the possible might be in terms of the future capabilities industry may be able to offer. When the customer cannot have reasonable conversations about requirements with potential suppliers, both the government and suppliers risk wasted effort at the expense of the US military's technological superiority. The DOD and industry require better mechanisms to enable this absolutely critical conversation to occur without being seen as biasing future procurement decisions. Therefore, the next DOD leadership team should work with the DOD general counsel and key overseers in Congress to carve out more space for communication and collaboration with industry while ensuring fairness in the market place.

6. **Increase investment in basic activities that tend to drive innovation within the DOD.** Priority should be placed on pilot programs, expanded use of prototyping, and funding to transition promising efforts in high-priority areas into either rapid acquisition pipelines or service programs of record. The DOD's primary focus in this regard should be on operational prototyping that cycles more capability into the field for operators to learn what does and does not work.[17] Through large force exercises such as Red Flag and Green Flag, war fighters can drive innovation by trying out prototypes and sharing results with the acquisition community.[18] To make this possible, war

fighters must adopt higher risk tolerance for trying new equipment and concepts in exercises and the field. They must also expedite their fielding processes and, perhaps, create their own rapid fielding organizations to accelerate training and deployment readiness to match the expected pace of innovation. Prototyping and subsequent field upgrades will only get faster once the defense enterprise expands the open systems architecture (OSA) approach proposed in the Acquisition Agility Act of 2016.[19] With higher priority on OSA, a greater number of suppliers are likely to generate more materiel solutions on shorter timelines.[20] Clearly, iterative and operational prototyping will be vital to the DOD's ability to exploit rapid technology cycles for addressing a complex, dynamic operational environment.

7. **Enhance the DOD's ability to work with the most innovative companies in the commercial tech sector.** Secretary Carter deserves high praise for the spotlight he has placed on this issue, as it is absolutely critical to extending and expanding our technological advantage. His successor should aim to build on his efforts, both by enhancing external outreach and tackling obstacles to innovation internal to the department. For example, the vision of the Defense Innovation Unit Experimental's roles as a technology scout and a facilitator of relationships between Silicon Valley firms and potential customers across the DOD should be clarified. The organization should be given the leadership, authorities, resources, and staffing it needs to be successful. Next, the DOD should expand its use of nontraditional mechanisms like prizes, challenge grants, and hack-a-thons to create concrete opportunities for tech companies to use their own problem-solving approaches to help the department solve its toughest problems. The DOD should also make available its significant and often unique resources to the commercial tech sector in the same way it did for Silicon Valley from the 1940s through the 1970s. This means access to the DOD's advanced testing and lab facilities throughout the United States as well as access to government intellectual property for potential commercial and military applications.[21] The defense arena offers the opportunity to solve some of the hardest problems in human history such as in information security, military operations at computer speeds rather than human speeds, and many others. Solutions to these challenges

have the potential to create new product lines beneficial to both the commercial tech sector and to US military superiority.

8. **Increase the use of rapid, more-flexible acquisition authorities to accelerate acquisition.** In the FY16 NDAA, Congress provided the department with several approaches to accelerate DOD acquisition, such as other transaction authorities, rapid acquisition authority, rapid prototyping and fielding authority, use of alternate acquisition paths to acquire national security capabilities, acquisition authority for US Cyber Command, experimental authority, and secretary of defense waiver authority.[22] All of these provisions reflect historical congressional actions, including the 1926 Air Corps Act to energize the nascent aviation industry, the creation of the National Aeronautics and Space Administration to accelerate space capabilities, and granting mechanisms to the Defense Research Projects Agency for addressing strategic surprise.[23] Given this Congress's intent to ensure the United States maintains military-technological dominance, this secretary and the next should identify every opportunity for the DOD to use these authorities. Doing so will almost certainly require more training and clear incentives for government program offices to more fully leverage these authorities. However, too often in the DOD these authorities are not well known or understood, seen as risky to use, or both. Visibly rewarding those who depart from the path of least resistance to take some risk to get better results for the war fighter can be a powerful way to incentivize greater use of these authorities. The FY16 NDAA represents bold action toward a more-innovative defense department. For the next NDAA, the DOD and Congress should consider greater budget flexibility, as needed, for establishing programs faster than the two-year lead time driven by the program of record process.[24]

9. **Empower professionals in all stages of the process and strengthen accountability for performance in acquisition**. Nearly every acquisition-reform study written in the last several decades has emphasized the importance of increasing performance measures and accountability in the system. Indeed, this is critical to improving the DOD's ability to deliver needed war-fighting capabilities on schedule and within budget. But despite myriad reforms aimed at this very issue, too little progress has been made. The next secretary should consider a number of steps to enhance empowerment

and accountability in the acquisition system, including but not limited to clarifying roles and responsibilities, streamlining decision-making processes, delayering the acquisition oversight staffs within each service and the OSD, decreasing the number of management reviews and reports levied on those who execute programs, eliminating incentives that drive risk-averse behaviors that often add cost and time to programs, and creating clear performance measures and data-driven dashboards to evaluate performance. Measures should also include doubling down on the professionalization of the acquisition corps by more fully leveraging outside business education and exchange tours in industry, increasing deployments to better understand how weapons systems contribute to operations and strategy, lengthening the tours and modifying the career paths of acquisition professionals to enable more stable and accountable program management, aligning incentives to desired behaviors, and basing promotions on clear performance metrics rather than time in grade. For the highest-priority acquisitions, the next secretary should consider significantly streamlining the chain of command.

10. **Support and accelerate Congressional efforts to reform the acquisition system**. The DOD has a rare opportunity to seize a moment of bipartisan and bicameral consensus that the acquisition system can and must be improved. The House and Senate armed services committees, Secretary Carter, and Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall all deserve credit for having taken meaningful steps in acquisition reform to address US military technological superiority. With engaged leaders in both the Senate and the House, the next team of DOD leaders should work intensively with key members to 1) remove remaining obstacles to more rapid and efficient acquisition of the most critical capabilities, 2) give acquisition officials the training and incentives they need to fully leverage a more diverse and appropriate set of authorities and tools adapted to twenty-first-century realities, and 3) eliminate layers of past requirements and reforms that have not worked but create a real drag on the system.

The next president and Congress will inherit a stark and sobering responsibility: their actions (or inaction) will likely determine whether or not the US military keeps its technological superiority in the face of a more-challenging future. In addition to the specific actions recom-

mended above, perhaps the most important step they could take up front would be to conclude a comprehensive budget deal. The basic elements of such a deal are well known: tax reform, entitlement reform, and increased investment in the drivers of American economic growth and competitiveness. The missing piece in this highly polarized political environment is political courage and leadership on both sides of the aisle and at both ends of Pennsylvania Avenue to reach a sensible compromise that will move us forward as a nation. After several years of living under a Budget Control Act that tries to solve the country's debt problem on the back of discretionary spending (half of which is in the DOD) and has brought us government shutdowns, sequestration, and governance by continuing resolutions and two-year mini-budget deals, the damage to our national security enterprise is becoming real. To be clear, we cannot succeed in maintaining our technological edge and our military superiority unless we have a more stable and healthy defense budget along with a more innovative and responsive acquisition system that allow the DOD to invest in the future capabilities needed to protect our interests and sustain our leadership globally. Now is the time for pragmatic compromise to protect our national security, but time is running short. SSQ

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Notes

1. Our Center for a New American Security colleagues Shawn Brimley and Ben FitzGerald reviewed our draft and helped guide our writing—especially with the context of the third offset—and hone our arguments throughout the recommendations.

2. Stanley A. McChrystal et al., *Team of Teams: New Rules of Engagement for a Complex World* (New York, New York: Portfolio/Penguin, 2015), 164.

3. Randy Walden, "Rapid Prototyping: Leapfrogging into Military Utility" (presentation, 9th Annual NDIA Science & Engineering Technology Conference, 16 April 2008), http://www.dtic.mil/ndia/2008science/Day2/03Walden.pdf. Established in 2003, the Air Force Rapid Capabilities Office (AFRCO) utilizes a number of best commercial practices and novel organizational paradigms for rapid acquisition. The AFRCO employs iterative prototyping, empowers small teams with decision-making authority, and responds directly to high priority combatant command and Air Force requirements. The Air Force provides the AFRCO with streamlined reporting to a board of directors comprised of the secretary of the Air Force, the chief of staff, and the under secretary of defense.

4. The first offset refers to President Dwight Eisenhower's New Look Strategy in the 1950s, which relied on investments in and fielding of nuclear capabilities to deter the Soviet Union.

The second offset refers to Secretary of Defense Harold Brown's strategy in the 1980s, which proposed technology, such as stealth and precision weapons, as the answer for the Soviet Union's numerical superiority in conventional forces. The third offset refers to US investments in technology to preserve its conventional military superiority in the face of proliferating antiaccess/area-denial capabilities. See Robert Work, "Deputy Secretary of Defense Speech: The Third U.S. Offset Strategy and Its Implications for Partners and Allies" (speech, Willard Hotel, Washington, DC, 28 January 2015), http://www.defense.gov/News/Speeches/Speech-View/Article/606641/the-third-us-offset-strategy-and-its-implications-for-partners-and-allies.

5. Comptroller, *Defense Budget Overview: Department of Defense Fiscal Year 2017 Budget Request* (Washington, DC: Department of Defense, 2016), 5–6.The DOD budget request proposes seven Red Flag and 18 Green Flag exercises. Red Flag enables USAF to train for major air combat by integrating large numbers of aircraft and joint force capabilities. Similarly, Green Flag provides training for air-to-ground integration. Both can provide significant data and lessons learned for requirements and acquisition recommendations.

6. Robert Work, "Deputy Secretary of Defense Speech: China Aerospace Studies Institute" (speech, RAND Corporation, Arlington, VA, 22 June 2015), http://www.defense.gov/News/Speeches/Speech-View/Article/606683/china-aerospace-studies-institute.

7. Stephen Welby, Assistant Secretary of Defense for Research and Engineering, *Accelerating the Development of Military Capability through Innovative Defense Research and Development, Testimony before the Subcommittee on Emerging Threats and Capabilities, Armed Services Committee, House of Representatives*, 114th Cong., 2nd sess., 24 February 2016, http://docs.house.gov/meetings/AS/AS26/20160224/104518/HHRG-114-AS26-Wstate-WelbyS-20160224.pdf.

8. OSD Comptroller, *Defense Budget Overview*, 49.

9. Michèle A. Flournoy, CEO and Cofounder, Center for a New American Security, *The Urgent Need for Defense Reform, Testimony before the Senate Armed Services Committee*, 114th Cong., 1st sess., 8 December 2015, http://www.cnas.org/sites/default/files/publications-pdf/Flournoy_SASC-Written-Statement-Dec-2015.pdf.

10. Ibid.

11. Irving L. Janis, *Groupthink: Psychological Studies of Policy Decisions and Fiascoes*, 2nd ed. (Boston: Houghton Mifflin, 1982), 166–67.

12. The USSOCOM acquisition organization demonstrates agility through a number of best practices. Acquisition personnel routinely and significantly interact with requirements and operational personnel while establishing and executing acquisition programs. The organization also uses information technology to provide transparency about program status, shattering the typical information barriers that exist between stakeholders. Leadership sets high expectations for and fosters a mind set throughout the special operations acquisition force. James Geurts's briefing asserts acquisition performance at less cost, less time, and at a fraction of the personnel as compared to conventional acquisition programs. See James "Hondo" Geurts, "Special Operations Research, Development, & Acquisition Center" (presentation, Armed Forces Communications and Electronics Association, 2014), http://www.afceaboston.com/documents/documents-briefings/SOCOM%20AFCEA%20Brief%202014.pdf.

13. National Defense Authorization Act for Fiscal Year 2016, 158, https://www.congress.gov/bill/114th-congress/house-bill/1735/text.

14. Michael J. Sullivan, *Defense Acquisitions: Observations on Whether or Not the Service Chief's Role in Managing and Overseeing Major Weapons Programs Should Be Expanded* (Washington, DC: Government Accountability Office, May 2014), http://www.gao.gov/products/GAO-14-520.

15. Michael J. Sullivan, *Report to the Committee on Armed Services, U.S. Senate: Strong Leadership Is Key to Planning and Executing Stable Weapon Programs* (Washington, DC: Government Accountability Office, May 2010), http://www.gao.gov/new.items/d10522.pdf.

16. The first offset refers to the threat of massive, offensive striking power from nuclear weapons to deter the numerically superior, in military terms, Soviet Union. See James S. Lay Jr., *National Security Council Document 162/2* (Washington, DC: National Security Council, 1953), 6–8. The second offset refers to use of technology, particularly stealth and precision weapons, to offset numerically superior military forces. See pages ix–x in Harold Brown, *Department of Defense Annual Report Fiscal Year 1982* (Washington, DC: Defense Technical Information Center, 19 January 1981), http://www.dtic.mil/dtic/tr/fulltext/u2/a096066.pdf.

17. Bill Greenwalt, interview by Robert P. Lyons III, 19 February 2016. Mr. Greenwalt and Lt Col Lyons exchanged electronic correspondence about the importance of operational prototyping in this latest round of acquisition initiatives. Greenwalt suggested getting more prototypes to the war fighters for learning and product refinement. The validity of this approach is supported by historical examples such as the US Air Force's experience with fielding the first air force gunships during the Vietnam War and Lt Gen George Kenney's experience with innovation during the Pacific Campaign in World War II.

18. OSD Comptroller, *Defense Budget Overview*, 3–11.

19. Cong. Mac Thornberry (R-TX) introduced a bill, titled the Acquisition Agility Act of 2017, to the House Armed Services Committee. The bill includes language mandating open systems architecture (OSA) in acquisition strategies and during program execution. OSA is a set of published interface standards or open standards for building systems or components. OSA should allow more rapid replacement of obsolete hardware and software as a weapons system ages. See pages 1-9 in Acquisition Agility Act, 2nd.

20. Katherine Blakeley, "Thornberry's 'Bold' Bill May Speed, Improve Buying Weapons," *Breaking Defense*, 15 March 2016, http://breakingdefense.com/2016/03/thornberrys-bold-bill-may-speed-improve-buying-weapons/.

21. Greenwalt interview. Greenwalt is a professional staff member of the Senate Armed Services Committee. He brought over 34 years of experience to help the Senate prepare the FY16 National Defense Authorization Act.

22. National Defense Authorization Act for Fiscal Year 2016, 159–76.

23. Richard Dunn, interview by Robert P. Lyons III, 19 February 2016. Mr. Dunn served as the first general counsel of the Defense Advanced Research Projects Agency and previously as a general counsel at NASA and as an USAF judge advocate. He explained the history of acquisition provisions since the Air Corps Act of 1926 through the FY16 NDAA.

24. Bill Greenwalt, personal communications with Robert P. Lyons III, 25 February 2016. Greenwalt's correspondence with Lt Col Lyons described the benefits of budget flexibility to transitioning capabilities. Without the flexibility, the defense program of record process requires a two-year lead time to get any new effort into the defense budget. Colonel Lyons's experience as a program manager also reveals the importance of budget flexibility. The DOD budget process does have annual OSD-level reprogramming actions, below-threshold reprogramming, above-threshold reprogramming, and New Start processes when necessary. However, sometimes urgent requirements emerge due to changes in the operational environment. Important changes also occur in the commercial market with advancements in technology or unexpected obsolescence. Sometimes the traditional budget authorities are not fast enough to reduce the two-year lead time.

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