

## **TITLE II—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION**

### **Subtitle A—Authorization of Appropriations**

#### **Authorization of appropriations (sec. 201)**

The committee recommends a provision that would authorize the appropriations for research, development, test, and evaluation activities at the levels identified in section 4201 of division D of this Act.

### **Subtitle B—Program Requirements, Restrictions, and Limitations**

#### **Modification of mechanisms to provide funds for defense laboratories for research and development of tech- nologies for military missions (sec. 211)**

Since its establishment in section 219 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (Public Law 110–417), the availability of funding for defense laboratories for the research and development of technologies for military missions has been extremely beneficial for Department of Defense laboratories. Among other things, laboratory directors have been able to use section 219 funding to carry out basic and applied research, transition promising technologies, and perform minor military construction of laboratory infrastructure. To expand the potential and the benefits of this funding mechanism even further, the committee recommends a provision that would raise the limit of section 219 funds authorized to 4 percent of all funds available to a laboratory.

Through various discussions with the Department of Defense, the committee has become aware that while laboratory directors welcome the provision and expenditure of section 219 funds, several have been hampered in using these authorities by policies or regulations of their respective service enterprises. Not only do such policies and regulations, which often restrict the amount of section 219 funds a lab can spend, undermine the purpose of providing this authority, but they also ignore the clear intent of the committee and of Congress as established in this statute. The committee directs all military services to examine policies and regulations impacting the expenditure of section 219 funds and to eliminate any restrictions on their use within 180 days of enactment of this Act.

In addition, the recommended provision would remove the sunset date that is currently imposed on the section 219 provision. After 7 years of implementation, the committee is satisfied that the section 219 program has been used effectively and has led to improvements in the operations of defense laboratories. The committee believes that the sunset provision is no longer necessary.

**Making permanent authority for defense research and development rapid innovation program (sec. 212)**

The committee notes that the Department of Defense has established a Rapid Innovation Program to accelerate the fielding of innovative technologies, as authorized in the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111–383). The committee further notes that the Department has established a competitive, merit-based process to solicit proposals from interested contractors, review and select projects based on military needs and standardized evaluation criteria, and award contracts to execute program projects. The committee is encouraged that the military services and other defense entities participating in the program have practices and tools in place to manage and monitor the execution of projects. In recognition of the success of the program, the committee recommends a provision that would amend Section 1073 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111–383) to repeal the sunset provision of the Rapid Innovation Program and make the authorization of the program permanent.

**Authorization for National Defense University and Defense Acquisition University to enter into cooperative research and development agreements (sec. 213)**

The committee recommends a provision that would amend sections 2165 and 1746 of title 10, United States Code, to authorize the Defense Acquisition University and the National Defense University to enter into cooperative agreements, which involve the provision of grant money, and cooperative research and development agreements with universities, not-for-profit institutions, and other entities to support their designated missions. The committee notes that this kind of engagement can support efforts to promote the rapid transfer of technology from defense research activities to commercial development or deployment in military systems, as well as to develop new acquisition practices, models, and tools to support efforts at continuous acquisition reform.

The committee also recognizes that the National Security Technology Accelerator is an important pilot program making vital contributions in the field of technology innovation. The committee urges the National Defense University to continue to give priority to the work of the National Security Technology Accelerator and, using the authority in the recommended provision, enable it to work through university partners for the execution of its mission.

**Manufacturing Universities Grant Program (sec. 214)**

The committee recommends a provision that would spur the Department of Defense to provide grants to institutions of higher education, including technical and community colleges, for the purposes of enhancing education in manufacturing engineering. The provision would help institutions of higher education strengthen their engineering programs, bolster their efforts to focus on manufacturing engineering and curricula, and meet the growing demands of the 21st century manufacturing.

**Increased micro-purchase threshold for basic research programs and activities of the Department of Defense science and technology reinvention laboratories (sec. 215)**

The committee recommends a provision that would amend chapter 137 of title 10, United States Code, to increase the micro-purchase threshold (MPT) in Department of Defense basic research and laboratories activities from \$3,000 to \$10,000. In raising this limit, this provision would allow appropriate organizations, such as universities, defense labs, and other performers, to authorize personnel, as appropriate, to have higher limits on their government purchase cards to facilitate easy and administratively efficient purchasing of small dollar items. This increase provided in the provision would affect less than one percent of federal contract spending, but could allow hundreds of thousands of transactions to be conducted more efficiently. This proposal would not make changes to the thresholds in the Davis-Bacon Act of 1931 (Public Law 71-798) or the McNamara-O'Hara Service Contract Act of 1965 (41 U.S.C. 351-358). Nor would it change the threshold levels that are authorized during contingency operations or certain other types of emergencies.

The committee believes that government purchase cards give agency end users an efficient tool to make simple purchases themselves and, at the same time, offer a number of additional benefits for both the agency and its vendors. In the two decades since the MPT was established, purchase cards have reduced transaction costs for government payment offices by lowering the number of budgetary/accounting entries that need to be processed in financial management systems, allowed agencies to earn rebates, and helped vendors receive timely payment without the burden of having to process government invoices. Equally important, by putting purchase cards into the hands of properly trained end users to make purchase directly, the burden of making micro-purchases has largely been lifted from the shoulders of contracting officers, allowing them to instead give greater attention to larger, more complex procurements, where their acquisition training and expertise can be put to better use and have greater impact.

The committee notes that the MPT was adjusted for inflation in 2010 from \$2,500 to \$3,000 and that it would be adjusted again this year to \$3,500, pursuant to authority provided in 41 United States Code 1908. While these adjustments will help agencies to leverage the efficiencies of the purchase card for additional small dollar transactions, the committee understands that there are many needs in the defense research enterprise between \$3,000 and \$10,000 that can be more efficiently acquired with a purchase card in the hands of a trained end user. Some of these routine needs did not exist in the 1990s or 2000s and therefore were not envisioned when the MPT level was first established. Such needs include digital services, web applications, application program interfaces, simple cloud services, scalable web hosting services, case management, platforms to support on-line interactive dialogues, IT systems monitoring, and tools to measure and improve digital customer experiences. All of these could be purchased easily by program and IT technical experts through existing government-wide and multi-

agency contracts that include pre-negotiated terms and conditions which are well suited for small dollar purchases.

The committee notes that data from the Council on Governmental Relations show that raising the MPT to \$10,000 will be a fair and safe harbor. In addition, a survey by the Association of Independent Research Institutes showed that setting the MPT at \$10,000 provides coverage for approximately 70 percent of total dollar expenditures while requiring only 3 percent of total transactions to be individually examined, which is highly effective.

The committee notes that purchase card activity must be conducted in accordance with strong financial management controls that help agencies detect and prevent fraud, waste and abuse. In the past 10 years, federal agencies have deployed a number of systems and internal controls to reduce the risk of fraud, waste, abuse, and misuse associated with the purchase card. Also for the Department of Defense, the Office of Defense Procurement and Acquisition Policy (DPAP) maintains a robust website on the purchase card, which includes current policy documents and guides whose purpose is to help department officials establish and manage charge card programs. As required, DPAP publishes policies and procedures used by the department to ensure that the objectives of the purchase card program are realized and that an effective system of internal controls is in place to mitigate the potential for fraud, misuse, and abuse. Additionally, Defense policy requires all cardholders, approving officials, and certifying officials to complete basic purchase card training prior to assuming their official purchase card program roles and responsibilities. Purchase card refresher training is required every two years thereafter. The committee is encouraged that the department has implemented automated oversight systems to provide managers visibility of internal control effectiveness in mitigating the risk of improper purchases.

Finally, the committee encourages the General Services Administration to continue to ensure there is appropriate transparency of purchase card activity so information on use of the purchase card below the micro-purchase threshold is available to the public, consistent with agency security requirements.

#### **Directed energy weapon system programs (sec. 216)**

The committee remains concerned about the Department of Defense's inability to field an operational directed energy system. The committee is aware that the military services and industry partners have developed sufficient directed energy weapon capabilities for specific scenarios—like the High Energy Laser Mobile Demonstrator (HEL-MD) to counter rocket, artillery and mortar for base protection purposes and the Counter Electronics High Powered Microwave Advanced Missile Project (CHAMP) for disabling an adversary's electronics while avoiding collateral damage. These programs, as well as other high energy laser weapon systems, have been tested and demonstrated, but have failed to transition to acquisition programs of record.

The committee notes that directed energy capabilities have the potential to support many operational missions in cost effective and efficient manners. In response to these factors, the committee recommends a provision that would amend section 806 of the Bob

Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107–314) to grant rapid acquisition authorities for directed energy weapon systems to accelerate the development and fielding of this technology and to help offset the gains of potential adversaries.

The committee notes that since 1960, the Department of Defense has invested more than \$6.0 billion in directed energy science and technology initiatives. However, the committee remains concerned that, despite this significant investment, the Department's directed energy initiatives are not resourced at levels necessary to transition them to full-scale acquisition programs. The committee notes with concern that years of investment have not to date resulted in any operational systems with high energy laser capability.

The committee highlights that the Defense Science Board Task Force on Directed Energy Weapon Systems and Technology Applications found that “directed energy offers promise as a transformational ‘game changer’ in military operations, able to augment and improve operational capabilities in many areas.” The task force further concluded that the range of potential applications is sufficient to warrant significantly increased attention to the scope and direction of efforts to assess, develop, and field appropriate laser, microwave, and millimeter wave weapons. Consistent with the findings of the task force, the committee believes that directed energy weapons systems offer significant benefits in terms of cost effectiveness, sustainability, magazine capabilities, and precision targeting.

**Limitation on B-21 Engineering and Manufacturing Development program funds (sec. 217)**

The committee recommends a provision that would prohibit the obligation or expenditure of any fiscal year 2017 funds for the B-21 Long Range Strike Bomber engineering and manufacturing development (EMD) program until the Air Force discloses the value of the B-21 EMD contract award made on October 27, 2015, to the congressional defense committees.

**Pilot program on disclosure of certain sensitive information to contractors performing under contracts with Department of Defense federally funded research and development centers (sec. 218)**

The committee recommends a provision that would establish a pilot program to permit the Department of Defense to provide Defense contractors performing under a Defense federally-funded research and development center contract with access to sensitive information necessary to carry out their assigned functions and duties.

The committee notes that the contractors at such centers are currently prohibited from acquiring timely access to sensitive information, even in instances when performance and advancement could be negatively impacted. The committee also notes that because such contractors are not federal employees, they are not subject to the Trade Secrets Act (18 U.S.C. 1905), and therefore are required to enact non-disclosure agreements with each individual entity responsible for the provision of sensitive information. However, the

committee is concerned that non-disclosure agreements with private sector entities are often not feasible in a timely manner because such entities often do not respond to requests or may no longer exist. Particularly in cases where the federally-funded research and development center is maintaining a large database of sensitive information from many different entities, the committee is concerned that preventing contractors from accessing such information could be hugely detrimental to the work of the center.

The committee notes that the recommended provision would enable the Department to more efficiently and effectively give contractors at such centers access to confidential commercial, financial, or proprietary information; technical data; or other privileged information owned by other defense contractors that is needed to perform mission critical work. The committee also notes that the Federal Acquisition Regulation Part 35 recognizes that to discharge responsibilities to the sponsoring agency, a Defense contractor performing under a federally-funded research and development center contract must have access to government and supplier data, including sensitive and proprietary data, beyond that which is common to a normal contractual relationship.

The committee notes that such contractors are considered “trusted agents” and have the highly-valued ability to provide cutting-edge and objective expert advice. These contractors provide the government with special long-term research and development assistance that cannot be met by either existing in-house or other contractor resources. Additionally, the committee notes that the acquisition regulations make clear that it is not the government’s intent for such contractors to use their status or access to information to compete with the private sector.

The recommended provision would allow such contractors, upon agreement to protect such data, access to sensitive information necessary to carry out their function of providing long-term engineering, research, development, and other analytical needs that cannot be met by other employees or contractors. The provision would also make clear that such contractors are barred from using the information to gain a potential competitive advantage over other contractors.

**Pilot program on enhanced interaction between the Defense Advanced Research Projects Agency and the service academies (sec. 219)**

The committee recommends a provision that would authorize the Secretary of Defense to establish a pilot program to assess the feasibility and advisability of enhanced interaction between the Defense Advanced Research Projects Agency and the service academies.

**Modification of authority for use of operation and maintenance funds for unspecified minor construction projects consisting of laboratory revitalization (sec. 220)**

The committee recommends a provision that would modify the authority to use minor military construction to revitalize antiquated laboratories and to increase the scope of the projects that

are allowed under this provision to \$6.0 million. Additionally, this provision would extend the authorization to 2025.

### **Budget Items**

#### **Materials technology**

The budget request included \$122.1 million in PE 0602105A for materials technology. The committee encourages the Army to continue to develop and rapidly field the Ground Vehicle Coating System (GVCS) that was developed by the Army Tank-Automotive Research Development and Engineering Center (TARDEC) and the Army Research Laboratory (ARL) as an affordable, infrared signature management coating for ground vehicles that is a drop-in enhancement to the current Chemical Agent Resistant Coating (CARC) coating system used on all Army and U.S. Marine Corps assets. GVCS has been evaluated in field trials and provided significant survivability benefits. At less than \$10,000 per vehicle, GVCS provides project managers with an affordable means of improving signature while having zero impact to vehicle space, weight, and power. The committee recommends an increase of \$5.5 million in PE 0602105A to fund the Department of Defense chemical agent resistant coating commodity manager requirements to field ground vehicle coating system material.

#### **Sensors and electronic survivability**

The budget request included \$36.1 million in PE 62120A for sensors and electronic survivability. The committee notes that a major thrust within the Department's Third Offset Initiative is the development and deployment of advanced robotic systems that can work in partnership with warfighters to enhance combat effectiveness. To support continued development of advanced human-robotics interaction capabilities, the committee recommends a general program increase of \$2.0 million in PE 62120A.

#### **Social science research**

The budget request included \$26.0 million in PE 62785A for the manpower, personnel, and training technology program. The committee notes that this program element conducts applied behavioral and social science research to enhance the overall military experience for soldiers. While the committee agrees that understanding performance, behavior, attitudes, and resilience is important for maintaining a strong fighting force, it recognizes that this work is not unique to the Army and furthermore that other organizations both in and out of government are better equipped to carry out social science research. In particular, the committee notes that research into leadership and culture, as well as research on personnel, is duplicative of other efforts. The committee is not convinced that such work is a high priority for the Army. Therefore, the committee recommends a program decrease of \$5.0 million in PE 62785A to reduce duplication while still preserving important portions of this program element, such as research into readiness and methods for reducing sexual harassment.

**Army vehicle prototyping**

The budget request included \$122.1 million in PE 63005A for combat vehicle and automotive advanced technology. The committee notes that the Tank Automotive Research Development and Engineering Center possesses the facilities, procedures, workforce, and leadership to fully develop armored fighting vehicle prototypes and encourages the Army to fully exploit the unique capabilities of the Center. The committee understands that the Center can develop concepts to meet emerging requirements; test developmental concepts with soldier involvement; model, virtually test, and modify designs; integrate new technologies; and manufacture, test, and demonstrate prototypes. The committee believes that if the Center is employed to its full potential, future acquisition efforts would be accelerated and developmental costs would be reduced. Accordingly, the committee recommends an increase of \$50.0 million in PE 63005A for the funding of Project 440: advanced combat vehicle technology for demonstration or prototyping.

**Electronic warfare technology**

The budget request included \$27.9 million in PE 63270A for electronic warfare technology. The committee notes that each of the military services, the Office of the Secretary of Defense, and the Defense Advanced Research Projects Agency have extensive programs and investments with a goal of advancing electronic warfare capabilities. The committee is concerned that these programs are not well-coordinated, nor are they leveraging the best available commercial technologies, particularly in areas such as dynamic spectrum-sharing. In particular, the committee notes that a significant portion of the budget request is for effective electronic warfare countermeasures. However, the committee notes that such countermeasures are not unique to the Army and therefore need coordination with other organization. To encourage the Army to collaborate more fully with others on electronic warfare countermeasures, the committee recommends a program decrease of \$5.0 million in PE 63270A.

**Advanced tactical computer science and sensor technology**

The budget request included \$44.2 million in PE 63772A for advanced tactical computer science and sensor technology. The committee notes that this program element matures and demonstrates technologies that allow soldiers to effectively collect, analyze, transfer, and display situational awareness information in a network-centric battlefield environment. The committee notes that much of the work performed in this program overlaps with efforts by other services. In addition, the committee understands that private sector firms are developing many of the same technologies that this program element is meant to address. Therefore, the committee recommends a program decrease of \$5.0 million in PE 63772A, and encourages the Army to more closely coordinate its efforts with the services and with private sector. The committee notes that the recommended decrease would still allow the Army to continue research into the critical areas of the program element, such as command and control and situational awareness.

**Small Arms Improvement**

The budget request included \$7.6 billion for Research, Development, Test, and Evaluation, Army of which \$10.6 million was for Small Arms improvement in PE 63827A Soldier Systems Advanced Development. The committee recommends an increase of \$9.4 million to accelerate development of new small arms weapons and small arms ammunition improvements.

**Army contract writing system**

The budget request included \$20.7 million in Research, Development, Test, and Evaluation, Army, PE 65047A, for army contract writing system. The committee is concerned that the Army is planning to spend over \$200.0 million on software to write contracts.

The committee recommends a reduction of \$20.7 million in Research, Development, Test, and Evaluation, Army, PE 65047A, for Army contract writing system. The committee urges the Army to analyze lower cost alternatives for this business function.

**Integrated Personnel and Pay System—Army**

The budget request included \$7.5 billion in Research, Development, Test, and Evaluation (RDT&E), Army, of which \$155.6 million was for PE 605013A Integrated Personnel and Pay System—Army (IPPS—A).

The committee is concerned with the significant cost increases to the program for Defense Information Systems Agency (DISA) services. Further, the committee is concerned regarding escalating program management support costs and facility and lease cost increases.

The committee recommends a reduction of \$20.0 million for PE 605013A Integrated Personnel and Pay System—Army (IPPS—A) for Integrated Personnel and Pay System—Army Increment 2.

**Aircraft survivability development**

The budget request included \$114.2 million in PE 0605051A for aircraft survivability development. The committee recommends an increase of \$13.0 million in PE 0605051A.

Additional funding for aircraft survivability development was included on the Chief of Staff of the Army's unfunded priority list.

**Technical information activities**

The budget request included \$33.3 million in PE 0605803A for technical information activities. The committee recommends an increase of \$2.5 million in PE 0605803A. Additional funding for the Army geospatial enterprise will improve the Army's ability to provide needed hardware and software to improve interoperability between mission command systems.

**Aerostat joint project—COCOM exercise**

The budget request included \$45.5 million in PE 0202429A for aerostat joint project-combatant command exercise. Due to operational mishaps the committee recommends a decrease of \$41.0 million in PE 0202429A the aerostat joint project.

**Combat vehicle improvement programs**

The budget request included \$316.8 million in PE 0203735A for combat vehicle improvement programs. The committee recommends an increase of \$12.0 million in PE 0203735A for the integration of active protection systems (APS) on Army armored fighting vehicles. Additional funding for APS was included on the Chief of Staff of the Army's unfunded priority list.

**Army Global Combat Support System Increment 2**

The budget request included \$1,304.1 million in Research, Development, Test, and Evaluation (RDT&E) for RDT&E Operational Systems Development, of which \$25.2 million was for Army Global Combat Support System (GCSS) Increment 2.

The committee is concerned that the Army has not completed Increment 1 of GCSS-Army and that the current plan for Increment 2 software upgrades will cost in excess of \$200 million over five years.

The Committee recommends a reduction of \$25.2 million in RDT&E, line 196, Program Element 33141A, for Army Global Combat Support System Increment 2 and for the Army to provide alternatives to the committee regarding the need for the capabilities provided by Army Global Combat Support System Increment 2.

**Distributed Common Ground/Surface System**

The budget request included \$32.3 million in PE 0305208A for Distributed Common Ground/Surface System. The committee notes changing tactical requirements. Therefore the committee recommends a decrease of \$32.0 million in PE 0305208A.

**Undersea warfare applied research**

The budget request included \$126.3 million in PE 62747N for undersea warfare applied research. The committee notes that undersea warfare is a key tenet of the Third Offset strategy, but that the development of next generation capabilities in this domain is required to address challenges in sensing, signature control, propulsion, and advanced materials. Consequently, the committee recommends an increase of \$10.0 million in PE 62747N.

**Power projection advanced technology**

The budget request included \$96.4 million in PE 63114N for power projection advanced technology. The committee notes that the Navy, Air Force, Defense Advanced Research Projects Agency, Strategic Capabilities Office, and other elements within the Department of Defense are all pursuing advanced power projection technologies and systems. The committee is concerned that these efforts are not well-coordinated and have uncertain pathways for transition to programs of record. In addition, the committee notes that the budget request represents an almost 200 percent increase over the amount enacted for fiscal year 2016. The committee believes that such a large increase in budget is not warranted and is concerned about the ability of the programs to absorb the additional funding. Consequently, the committee recommends a decrease of \$15.0 million in PE 63114N, but directs that this reduction not be assessed against solid state laser maturation efforts.

**Capable manpower and power and energy**

The budget request included \$249.1 million in PE 63673N for future naval capabilities advanced technology developments. The activities listed under this program element include capable manpower and power and energy. The committee believes that the work plans for fiscal year 2017 on these activities does not warrant the level of funding included in the budget request. For example, the committee notes that the research included in these two projects include development of new personnel and management methodologies, and capabilities in energy security. Both of these efforts could be better coordinated with other organizations performing similar research. Consequently, the committee recommends a decrease of \$10.0 million in PE 63673N to be distributed appropriately from capable manpower and power and energy.

**Large diameter unmanned underwater vehicle**

The budget request included \$165.8 million in PE 63502N for research, development, test, and evaluation of surface and shallow water mine countermeasures. The committee notes the Navy planned to spend \$19.5 million in fiscal year 2016 on large diameter unmanned underwater vehicle product development. In fiscal year 2016, the Navy shifted the acquisition strategy from an industry prime contractor to a government lead system integrator. As a result, the committee recommends a decrease of \$1.5 million to this program due to available prior year funds that were requested for source selection activities.

**Littoral Combat Ship mission modules**

The budget request included \$160.1 million in PE 63596N for research, development, test, and evaluation of Littoral Combat Ship mission modules. The committee notes the Navy planned to spend \$30.9 million in fiscal year 2016 to complete operational testing. Due to developmental test results, the Navy cancelled operational testing. As a result, the committee concurs with a Government Accountability Office finding and recommends a decrease of \$30.9 million to this program due to available prior year funds.

**Amphibious ship replacement LX(R)**

The budget request included \$6.4 million in PE 64454N for research, development, test, and evaluation (RDTE) of LX(R), which is expected to functionally replace LSD-41 and LSD-49 class ships. The committee supports accelerating the construction of LX(R) class ships, provided the ships are competitively awarded. The committee notes the President's budget request reduced LX(R) RDTE funding in fiscal years 2017 through 2019 by a total of \$29.0 million. Navy officials have stated an additional \$19.0 million is required in fiscal year 2017 to maintain an accelerated schedule. Therefore, the committee recommends an increase of \$19.0 million for this program.

**Extra large unmanned underwater vehicle**

The budget request included \$75.6 million in PE 64536N for research, development, test, and evaluation of advanced undersea prototyping. The committee notes the President's budget request

for this program element provides for the prototyping and testing of extra large unmanned undersea vehicles (XLUUV), including procurement of five vehicles and the lease of one vehicle. Based on the Navy budget justification information, the committee supports the procurement of two XLUUVs and the lease of a second similar vehicle. Understanding the operational need, the committee views the risk of developing five XLUUV prototypes concurrently as excessive and supports funding only the two XLUUVs that will begin fabrication in fiscal year 2017. The committee recognizes leasing a commercially available vehicle will enable refinement of tactics, techniques, and procedures. Therefore, the committee recommends a decrease of \$34.4 million for this program.

#### **Marine Corps cyber protection team fly-away kits**

The budget request included \$4.9 million for the Cyber Operations Technology Development program, Navy exhibit R-1, line 162, Program Element 36250M. The committee recommends an increase of \$1.8 million to respond to a Marine Corps Unfunded Priority List (UPL) request for Cyber Protection Team (CPT) “fly-away” kit hardware and software necessary to hunt malicious cyber actors, triage vulnerabilities, and remediate the intrusions and exploitation of compromised computer networks.

#### **Management, technical, and international support**

The budget request included \$87.1 million in PE 65853N of research, development, test, and evaluation, Navy for management, technical, and international support. The committee notes the following projects contain unjustified growth: 2098 (\$4.3 million), 2221 (\$3.9 million), 0149 (\$1.0 million), and 3330 (\$1.6 million). Therefore, the committee recommends a decrease of \$10.8 million to this program.

#### **Aerospace propulsion**

The budget request included \$185.7 million in PE 62203F for aerospace propulsion. The committee notes that the Department is continuing efforts to improve the performance and efficiency of advanced engine technologies to reduce costs and increase operational effectiveness. The committee also notes that the National Research Council’s Air Force Studies Board recently found that “to accelerate the development of new engine technologies, the Air Force gas turbine S&T funding should be increased significantly”, including in areas such as “high-temperature, high-heat-sink fuels for thermal management, lightweight structures, and signature control.” Consistent with this recommendation, the committee recommends an increase of \$5.0 million in PE 62203F to support research on advanced turbine engine technologies.

#### **High energy laser joint technology office**

The budget request included \$42.3 million in PE 62890F for high energy laser research. The committee notes that this program element funds defense high energy laser applied research through the High Energy Laser Joint Technology Office. However, the committee is concerned that the Joint Technology Office has not received sufficient funding in recent years to drive the maturation of

high energy laser technology. As an example, the committee notes with concern that no laser technologies have yet been fielded or deployed, despite promising development and field tests. Given the importance of directed energy weapons systems in general as noted elsewhere in this Act, and of high energy laser systems in particular, the committee is concerned that budget request for this program element will be insufficient for supporting the joint technology office. Accordingly, the committee recommends an increase of \$5.0 million in PE 62890F for the high energy laser joint technology office.

#### **Silicon carbide for aerospace power applications**

The budget request contained \$94.6 million in PE 63216F for aerospace propulsion and power. The committee notes that recent research in aerospace power electronics has concentrated on fundamental materials, devices, and power-handling capability.

The committee believes that the Air Force should look for opportunities to accelerate the development of actual components to go into aircraft electrical systems, especially very high-current silicon carbide power modules. The committee recognizes that the increasing sophistication and energy requirements for new systems like avionics, motor drives, computing, sensors, and even high energy lasers, will place increasing demands on the power architectures available to the constrained size and weight of aircraft. The committee also believes that such advances will have beneficial effects when applied to legacy, as well as future generation, air platforms.

Therefore, the committee recommends an increase of \$5.0 million in PE 63216F, for a total of \$99.6 million, to support the development of application-specific power circuit development using silicon carbide modules.

#### **Electronic combat technology**

The budget request included \$58.3 million in PE 63270F for electronic combat technology. The committee notes that the Office of the Secretary of Defense, Defense Advanced Research Projects Agency, Army, Navy, and Air Force all have new initiatives focused on outreach to Silicon Valley and are all exploring technology development programs related to command and control and networking technologies. The committee is concerned that these efforts are duplicative and not well-coordinated. For example, the committee notes that a significant portion of the budget request is for effective electronic countermeasures. However, such technologies are not unique to the Air Force and therefore need coordination with other organizations. To encourage the Air Force to collaborate more fully with others on electronic warfare, the committee recommends a general decrease of \$5.0 million in PE 63270F.

#### **Battlespace knowledge development and demonstration**

The budget request included \$58.1 million in PE 63788F for battlespace knowledge development and demonstration. While the committee is supportive of this program element in general and understands the importance of making concrete progress in this field, it also notes that the budget request represents a significant increase of over 25 percent above the amount enacted for fiscal year

2016. The committee also notes that the amount enacted for fiscal year 2016 was itself an almost 35 percent increase over the amount enacted for fiscal year 2015. The committee is concerned about the ability of this program element to absorb such a steep ramp-up in funding. Consequently, the committee recommends a general decrease of \$10.0 million in PE 63788F.

#### **B-21 long range strike bomber**

The budget request included \$1.36 billion in PE 64015F for the B-21 long range strike bomber. Due to a lower than expected contract award amount to the selected vendor, the committee recommends a decrease of \$302.3 million in PE 64015F.

#### **Operationally Responsive Space program**

The budget request included \$7.9 million for the Operationally Responsive Space (ORS) program, Air Force exhibit R-1, line 42, Program Element 64857F. The committee recommends an increase of \$10.0 million to accelerate the development of an operational demonstration of a Space Situation Awareness (SSA) satellite. This satellite is necessary for meeting U.S. Strategic Command requirements and will serve as risk reduction for a Space Based Space Surveillance Follow-on satellite. The committee also directs the ORS office to determine if the development of a small synthetic aperture radar satellite constellation could be used to meet any unmet combatant command requirements and to provide the congressional defense committees the results of that assessment no later than April 1, 2017.

#### **Advanced Pilot Training Program**

The budget request included \$12.4 million in PE 65223F for the Advanced Pilot Training (APT) program. The Air Force decided to delay awarding the development contract from the fourth quarter of fiscal year 2017 until the first quarter of fiscal year 2018. Therefore, the committee recommends a decrease of \$7.9 million in PE 65223F due to the availability of prior year funds.

#### **KC-46 aerial refueling tanker aircraft program**

The budget request included \$261.7 million in PE 65221F for KC-46A tanker development. Due to fewer than expected engineering change proposals and lower than expected test support costs, the Air Force will not obligate or expend funds at the budgeted rate.

Therefore, the committee recommends a decrease of \$140.0 million in PE 65221F due to availability of unobligated prior year funds. The committee understands that the reduction of these funds in fiscal year 2017 will not impact the program delivery schedule of the KC-46A tanker aircraft.

#### **Evolved Advanced Extremely High Frequency MILSATCOM**

The budget request included \$228.1 million for the Evolved Advanced Extremely High Frequency (AEHF) MILSATCOM program, Air Force exhibit R-1, line 80, Program Element 65431F, BPAC 657104. The committee recommends a decrease of \$30.0 million as a result of the delayed completion and submission to the congress-

sional defense committees of an Analysis of Alternatives (AoA) for the follow-on capability for secure, survivable anti-jam, anti-scin-tillation communications for strategic and tactical users.

### **B-2 Defensive Management System Modernization**

The budget request included \$315.6 million in PE 65931F for the B-2 Defensive Management System modernization program. The program experienced a contract award delay affecting fiscal year 2016 funds. Therefore, the committee recommends a decrease of \$26.7 million in PE 65931F due to availability of unobligated prior year funds.

### **MQ-9 automatic takeoff and landing control system**

The budget request included \$151.4 million in PE 25219F for MQ-9 Unmanned Aerial Vehicle (UAV). The committee recommends an increase of \$35.1 million in PE 25219F for development and integration of MQ-9 Automatic Takeoff and Landing Control System (ATLCS) capability in support of the provision elsewhere in this Act for the transition to enlisted remotely piloted aircraft (RPA) operators.

### **Air Force Cost Estimating Module (CEM)**

The budget request included \$28.1 billion for Research, Development, Test & Evaluation, Air Force of which \$10.5 million was for PE 901538F Financial Management Information Systems Development.

The committee notes that \$4.9 million of this request was for the Air Force Cost Estimating Modeling (CEM). The committee believes this funding is unjustified.

Accordingly, the committee recommends a reduction of \$4.9 million for PE 901538F Financial Management Information Systems Development for research and development of CEM and directs the Air Force to utilize or improve its existing cost estimating software as well as utilize resources from the office of Cost Assessment and Program Evaluation.

### **Air Force Program Budget Enterprise Service (PBES)**

The budget request included \$28.1 billion for Research, Development, Test & Evaluation, Air Force of which \$10.5 million was for PE 901538F Financial Management Information Systems Development.

The committee notes that \$1.9 million of this request was for the Air Force Program Budget Enterprise Service (PBES). The committee believes this funding is unjustified.

Accordingly, the committee recommends a reduction of \$1.9 million for PE 901538F Financial Management Information Systems Development for PBES and directs the Air Force to utilize its existing enterprise research planning software systems as well as legacy systems to meet its budget formulation requirements.

### **Budget request realignments**

The Air Force requested the committee make a realignment in the budget to correct an error in their submission of the Research,

Development, Test, and Evaluation, Air Force (RDTEAF) documentation. The table below reflects this adjustment:

CHANGE TO CORRECT SUBMISSION ERRORS  
(in millions)

Item	Account	Line Item	Amount
ISPAN Inc 5 .....	RDTEAF	124	− \$8.9
ISPAN Inc 5 EMD .....	RDTEAF	124a	+\$8.9
Shared Early Warning Sys .....	RDTEAF	222	− \$5.0
Atmospheric Warning Sys .....	RDTEAF	222a	+\$5.0

**Operational energy capability improvement increase**

The budget request included \$3.4 billion in Research, Development, Test, and Evaluation (RDT&E) Defense-wide, of which \$37.3 million was for the PE 0604055D8Z Operational Energy Capability Improvement.

The committee recognizes the combat requirement to improve operational effectiveness via targeted and competitive operational energy science and technology investments.

Accordingly, the committee recommends an increase of \$4.0 million in RDT&E, PE 0604055D8Z, for Operational Energy Capability Improvement.

**Post intercept assessment acceleration**

The budget request included \$439.6 million in Research, Development, Test, and Evaluation, Defense-wide, PE 63896C, for Ballistic Missile Defense command and control in support of the Missile Defense Agency. The committee recommends an increase of \$10.0 million to allow earlier integration of command and control/battle management with the space-based kill assessment program by two years to field spiral 8.2–5 of increment 6 in fiscal year 2020.

**Israeli cooperative missile defense program**

The budget request included \$103.8 million in Research, Development, Test, and Evaluation, Defense Wide, PE 63913C, for Israeli Cooperative Programs in support of the Missile Defense Agency. The committee recommends an increase of \$135.0 million in PE 63913C to reduce development risk and continue the modernization of Israeli's multi-tiered missile defense systems. The additional funding shall be apportioned as follows: \$25.0 million for the Arrow-3 system; \$50.0 million for the base-line Arrow program; and \$60.0 million for the David's Sling program.

**Ground based interceptor booster acceleration**

The budget request included \$274.1 million in Research, Development, Test, and Evaluation, Defense-wide, PE 64874C, for improved homeland defense interceptors in support of the Missile Defense Agency. The committee recommends an increase of \$30.0 million to accelerate the development and initial fielding of an upgraded ground based interceptor booster to enhance survivability, mitigate current obsolescence and expand homeland defense capa-

bilities against emerging threats. This acceleration would allow for earlier flight testing and accelerate the initial fielding and replacement of older boosters in fiscal year 2021 versus fiscal year 2022.

#### **Redesigned kill vehicle risk reduction**

The budget request included \$274.1 million in Research, Development, Test, and Evaluation, Defense-wide, PE 64874C, for improved homeland defense interceptors in support of the Missile Defense Agency. The committee recommends an increase of \$25.0 million to accelerate the system engineering and risk reduction testing to reduce schedule risks for a critical design review for the redesigned kill vehicle program in late fiscal year 2017 and the first flight test in fiscal year 2018.

#### **Multiple object kill vehicle technology maturation**

The budget request included \$71.5 million in Research, Development, Test, and Evaluation, Defense-wide, PE 64894C, for the Multiple-Object Kill Vehicle in support of the Missile Defense Agency. The committee recommends an increase of \$50.0 million to fund technology maturation and risk reduction for key technologies, including advanced sensors and new propulsion systems critical to enabling the Multiple-Object Kill Vehicle.

#### **High altitude long endurance solar powered unmanned aircraft**

The budget request included \$3.4 billion in Research, Development, Test, and Evaluation (RDT&E) Defense-wide, of which \$10.4 million was for the PE 0603923D8Z Coalition Warfare.

The committee recognizes the combat requirement for more persistent and long endurance unmanned aircraft systems on the battlefield.

Accordingly, the committee recommends an increase of \$1.0 million in RDT&E, PE 0603923D8Z, for high altitude long endurance solar powered unmanned aircraft systems.

#### **Corrosion control and prevention funding increase**

The budget request included \$6.9 billion in Research, Development, Test, and Evaluation (RDT&E) for Advanced Component Development & Prototypes, of which \$3.8 million was for PE 0604016D8Z Department of Defense (DOD) Corrosion Program.

The committee continues to be concerned that the Department consistently underfunds the DOD Corrosion Program. The DOD estimates that the negative effects of corrosion cost approximately \$22.9 billion annually to prevent and mitigate corrosion of its assets, including military equipment, weapons, facilities, and other infrastructure.

Accordingly, the committee recommends an increase of \$5.0 million in RDT&E, PE 0604016D8Z, for the DOD Corrosion Program.

#### **Directed energy systems prototyping**

The budget request included no money in PE 64342D8Z for defense technology offsets. The committee notes with disappointment that the administration did not view it as a priority to request funds through this program element. Particularly with the high-

profile emphasis placed on the Department of Defense's Third Offset Strategy, the committee is disappointed to see this program be unfunded. In addition, as noted elsewhere in this report, the committee is deeply disappointed with how the technology offset funding enacted in fiscal year 2016 was allocated. As noted, none of the money was put towards directed energy, in contradiction to the clear intent of Congress that half of the money be used to bolster directed energy technologies. While the committee does not recommend additional unrestricted funds for the technology offsets program, the committee underscores that directed energy systems are still critical areas of work in need of greater support and attention. The committee believes that the Department needs to focus in particular on the transition from lab development to deployment and fielding. Consequently, the committee recommends a general increase of \$25.0 million in PE 64342D8Z to be used only for the purposes of directed energy systems prototyping.

#### **Development test and evaluation**

The budget request included \$19.5 million in PE 65804D8Z for development test and evaluation. The committee notes that the Department continues to underinvest in developmental test and evaluation activities. A lack of robust developmental testing inevitably results in failures in operational testing. The failures of programs to meet their established testing requirements lead to cost growth and schedule slippage, as the programs make expensive and necessary fixes to systems. The committee feels that more robust development testing, combined with more disciplined and technically realistic requirements generation will improve acquisition program outcomes. Consequently, the committee recommends an increase of \$5.0 million in PE 65804D8Z to support enhanced development test and evaluation capabilities.

#### **Information Systems Security Program at the National Security Agency**

The budget request included more than \$1.1 billion for the Information Systems Security Program (ISSP) in the National Security Agency (NSA), which is approximately one-third of the total ISSP budget for the Department of Defense (DOD). The committee recommends, as follows, a net reduction of \$30.0 million from NSA's ISSP Research, Development, Test and Evaluation (RDT&E), (program element 33140G), and Operations and Maintenance (O&M) budgets, because of higher priorities, duplication of effort, and the need to reduce overhead costs:

- (1) Fusion, Analysis, and Mitigation project:
  - \$5.0 million in RDT&E
  - \$5.0 million in O&M
- (2) Information Assurance project:
  - \$10.0 million in O&M
- (3) Enterprise and Business Management subproject:
  - \$3.0 million O&M
- (4) Strategic Engagement, Integration, and Foreign Affairs project:
  - \$4.0 million O&M
- (5) Cryptographic Platform Engineering project:

- \$3.0 million RDT&E
- \$5.0 million O&M
- (6) Enterprise Trusted Systems for Advanced Cross Domain Solutions project:
  - + \$5.0 million RDT&E

As noted above, the committee recommends an increase for cross-domain solutions because cross-domain systems represent one of the most significant vulnerabilities for classified networks—where they connect to less-secure networks. The committee is concerned that the budget for this NSA program to enhance the security of cross-domain solutions and to modernize them for cloud environments has been disproportionately cut in recent years. In addition to the increase of \$5.0 million, the committee recommends that the DOD Chief Information Security Officer consider transferring resources to this project from the Active Cyber Defense and Cyber Situational Awareness subprojects, as these efforts appear redundant to other DOD programs and compete with commercial solutions and Defense Advanced Research Projects Agency programs.

### **Sharkseer 2.0**

The budget request included unspecified amounts for the Sharkseer program, Defense-Wide exhibit R–1, line 203, Program Element 33140G. The committee recommends an increase of \$16.0 million for research and development to extend the Sharkseer architecture, connections, and information sharing beyond the perimeter defense boundary.

The committee has strongly supported the Sharkseer program since its inception as a novel effort to rapidly acquire and integrate advanced commercial cybersecurity technology for detecting intrusions and malware for which signatures are not already known. Sharkseer is being deployed at all Department of Defense (DOD) perimeter gateways to filter web traffic, and by all accounts is performing well.

The committee has been concerned that DOD’s cybersecurity solutions have tended to be deployed in piecemeal fashion, as isolated, stand-alone capabilities. Perimeter defenses, endpoint/host-based capabilities, continuous monitoring and asset management capabilities, the patchwork of incident response and remediation tools, intermediate-level regional security systems, “big data” analytics of masses of packet and session metadata, and the tools and activities of Cyber Protection Teams and Computer Network Defense Service Providers are not interoperable, are not tied together under overarching concepts of operation and architectures, and cannot seamlessly and instantly share machine-readable indicators of compromise or otherwise tip and cue each other.

The committee is concerned that despite the billions of dollars invested in perimeter defense, the department’s ability to rapidly identify and remediate cyber vulnerabilities remains time and resource intensive. Because of this stove-piped nature of the existing architecture, the committee is concerned that the department’s ability to defend the Department of Defense Information Network against future adversaries will be limited by its ability to network its many sensors to identify malicious activities and rapidly isolate

and remediate that malicious activity in cyber relevant time frames.

The committee is aware of the productive efforts of joint working groups, composed of experts from the Principal Cyber Adviser's cross-functional team, the Joint Staff, the Under Secretary of Defense for Acquisition, Technology and Logistics, and the Chief Information Officer, to define operational views, requirements, and plans for the foundational building blocks for integrated cyber operations, such as the Unified Platform. Likewise, United States Cyber Command staff are grappling with the same issues and exploring commercial technology solutions. The committee also notes the sustained efforts of the DOD Chief Information Security Officer (CISO) to create an integrated cybersecurity enterprise capability with limited resources and authority.

The committee believes that the Sharkseer team has the vision, technical depth, and connections across the enterprise and in commercial industry to play an effective role in achieving the goal of an integrated cybersecurity enterprise. The committee directs the Sharkseer program to apply additional funding to develop and demonstrate integration of cybersecurity tools and processes across the network layers and systems, under the guidance of the DOD CISO and the Commander of U.S. Cyber Command.

#### **MQ-9 Unmanned Aerial Vehicle**

The budget request included \$17.8 million in Research, Development, Test, and Evaluation, Defense-wide (RDTEDW), PE 1105219BB, for the development, integration, and testing of special operations-unique mission kits for the Medium Altitude Long Endurance Tactical (MALET) MQ-9 Unmanned Aerial Vehicle (UAV). U.S. Special Operations Command (SOCOM) is responsible for the rapid development and acquisition of special operations capabilities to, among other things, effectively carry out operations against terrorist networks while avoiding collateral damage.

The committee understands that the budget request only partially addresses technology gaps identified by SOCOM on its fleet of MQ-9 UAVs. Therefore, the committee recommends an additional \$12.0 million in RDTEDW for the MQ-9 UAV.

The committee strongly supports SOCOM's efforts to accelerate fielding of advanced weapons, sensors, and emerging technologies on its fleet of MQ-9 UAVs. The committee has authorized additional funds above the budget request in each of the last 4 years to enhance these efforts and understands that SOCOM has successfully developed and acquired a number of new capabilities, including improved weapon effectiveness, target location and tracking, image resolution, and video transmission during that time. The committee expects SOCOM to update the committee periodically on its development efforts under the MALET MQ-9 UAV program.

#### **Sharkseer email protection**

The budget request for the Defense Information Systems Agency (DISA) does not include funds to sustain the effort to extend the Sharkseer "zero-day net defense" capability to the email traffic flowing across the gateway boundaries of the Department of Defense (DOD). Sharkseer is already deploying to all DISA Internet

gateway nodes to defend DOD networks against malicious hidden activity in web traffic. The committee believes it makes little sense to filter web traffic for previously unknown threats while leaving email traffic unprotected against the same types of threats. Congress provided additional funds in the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114–92) to assist DISA and the Sharkseer program office in the National Security Agency in getting started on this extension of zero day net defense to email. The committee recommends an increase of \$11.7 million in DISA's Defense-wide Operations and Maintenance account, and \$16.3 million in Defense-wide Research, Development, Test and Evaluation (program element 33140K) to sustain this initiative.

### **Items of Special Interest**

#### **Active protection systems**

The committee encourages the Army, in cooperation with the United States Marine Corps, to rapidly acquire effective active protection systems (APS) to protect ground combat forces and weapon systems from projectiles including rocket propelled grenades and anti-tank, wire guided missiles. Key armored fighting vehicles such as M1 main battle tanks, Bradley fighting vehicles, Stryker vehicles, and armored assault vehicles should be given first priority for APS due to their mission profiles. The committee understands that APS technology is mature and fielded by some of our allies. The committee encourages the Army to acquire non-developmental, mature designs for integration and testing with our vehicles. The committee believes that such an effort will increase both force protection and combat power of our close combat maneuver forces.

#### **Advanced airlift airship technology**

The committee has maintained an ongoing interest in advanced lighter-than-air (LTA) airship technology that has the potential to add much needed cutting-edge capabilities for the Department of Defense. Among other things, airship technology can enhance logistics, Intelligence, Surveillance, and Reconnaissance (ISR), Humanitarian Assistance/Disaster Relief (HA/DR), and Non-Combatant Evacuation Operations (NEO).

The committee is aware that multiple advanced airship technology efforts during the past 20 years have all failed to establish conclusively the value of advanced lighter-than-air technology by not demonstrating clear proofs of technical viability and the benefits of superior operating utility. The National Defense Authorization Act for Fiscal Year 2012 (Public Law 112–81), recognizing that Department of Defense airship development appeared disparate, directed the Secretary of Defense to designate a senior official with responsibility for Department airship programs, to delineate this official's responsibilities and to submit reports on Department hybrid airship operational concepts and future development strategies. The National Defense Authorization Act for Fiscal Year 2014 (Public Law 113–66) further recognized the failure to consolidate a structured path forward and re-affirmed the committee's belief in the transformational potential of advanced technology airships. That legislation noted U.S. Transportation Command's stated opin-

ion that airships possess the nascent capability to enhance mobility substantially.

While some have advanced the idea of waiting for commercial firms to develop airship logistics capability, the committee is concerned that this strategy would allow the Department to evade development responsibility. However, the committee notes that several failed attempts by the commercial sector argue for the involvement of the expertise of the Department. The committee understands that properly identified, the required technologies already exist or are near final states of development. Within the purview of the Department of Defense, these technologies could be demonstrated en route to a successfully executed advanced airship program. Engaged leadership and full program involvement of the Department is essential for advanced airship success.

The committee also understands that there are obstacles to a successful commercial initiative including development risk, fiscal investment requirements, and the potential for disruptive change to existing airlift technologies. Nevertheless, the committee believes that the rewards of exemplar government technology investments are, today, ubiquitous within the commercial arena and clearly show how timely involvement may have later broad-based national benefits.

The committee believes that a new advanced airship program must address two primary risk areas. First, for airship outsize airlift, the most pressing discrete problem remains cargo off-loading without the airship instantly becoming too light for safe operation. Development of a robust, responsive and wide bandwidth buoyancy-ballast system that supports full vertical flight capability is essential and must be demonstrated convincingly and early. Second, a system of systems, involving lift, control and unique lighter-than-air flight technology, represents a demanding integration challenge and should be resolved before committing to final airship design and development.

An incremental early "iron bird" demonstration with proving metrics and appropriate program off-ramps may provide the best way to establish core program viability and a path towards a full airship demonstration. This would be more soundly based than previous program strategies and could resolve the most critical risks before committing to the full flight demonstration.

The committee believes that there is a strong justification to pursue airlift airship concepts and encourages the Air Force, Army, United States Transportation Command, and other appropriate defense organizations to become more proactive in developing advanced airship mobility needs and capability requirements that both lead and stimulate emerging demonstration plans.

The committee directs that no later than 180 days after the date of enactment of this Act, the Secretary of Defense shall:

- (1) Reaffirm leadership and responsibilities for airship technical initiatives within the Department of Defense;
- (2) Develop a strategy for future Department airship technologies that takes ownership of maturation efforts consistent with airship outsize airlift capability to identify:
  - (a) Critical technology challenges (in addition to the aforementioned) and methods to demonstrate viability;

- (b) Development risks and lessons learned;
- (c) Impediments to successful demonstration, including an assessment of in-house understanding of airship technology;
- (3) Develop notional estimates for time, costs and other necessary resources to conduct an incremental demonstration for technical viability with suitable decision points and off-ramps.

#### **Advanced weapons technology**

The committee recognizes the increased risk of exposure to chemical and biological agents faced by deployed U.S. and coalition forces. The committee believes it is critical to have the ability to expedite collection and characterize these agents in near real time. To meet this requirement, the committee encourages the Secretary of the Air Force to accelerate the fabrication, prototyping and testing of capabilities to detect and classify chemical and biological agents that will provide needed battlefield intelligence and increase the protective posture of U.S. and coalition forces.

#### **Assessment of status of little used research and development infrastructure assets**

The committee is concerned that certain research and development infrastructure assets employed by the military services are prematurely decommissioned or otherwise dismantled prior to a general accounting and assessment of the value and utility of such assets to the Department of Defense as a whole. Given the immense expense involved in establishing and standing up infrastructure assets, it is critical that decision on the final disposition of such assets not be made on parochial, short-term considerations. The committee believes that these assets may still have broader defense-wide and national utility and that such utility needs to be assessed before any decisions are made.

To help alleviate this concern, the committee directs the Secretary of Defense to identify such “orphan” assets that support Research and Development and Test and Evaluation. The definition of these assets shall be the same as the definition developed for the study provided to the Congress in October 2010 pursuant to the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111–84) to address “Orphan Assets”. The committee directs the Secretary to submit a list of these assets, along with a description of the need for these assets, to the congressional defense committees no later than one year after the enactment of this Act.

#### **Bradley Fighting Vehicle Transmission Competition**

The committee is aware that the U.S. Army is testing an alternative transmission for the family of Bradley Fighting Vehicles, which includes the Armored Multipurpose Vehicle (AMPV) and Paladin Integrated Management (PIM) programs. Assuming a successful test, the committee understands that the Army will assess the cost and benefits of an alternative transmission and then conduct a full and open competition to integrate a new transmission into the family of Bradley Fighting Vehicles. The committee notes that the Fiscal Year 2017 budget request does not include funding to support the alternative transmission strategy. Therefore, the com-

mittee directs the Secretary of the Army to provide the Committees on Armed Services of the Senate and House of Representatives a report on the full and open competition for the family of Bradley Fighting Vehicle transmissions. The required report must be submitted no later than January 15, 2017, and include details regarding the Army's test report on the alternative transmission, the acquisition strategy and schedule, and the funding plan to support the competition.

#### **Conformal phased array antennas**

The committee notes that there have been recent substantive improvements in antenna technology, providing enhanced capabilities to aircraft and unmanned aerial systems. Additionally, the committee is aware that these same platforms face environments where it would be useful for antennae to operate on different frequency bands and to be reconfigurable in flight. The committee believes that these enhanced capabilities could be critically important in improving sensing in constrained or contested aerial environments. Consequently, the committee encourages the Navy to examine research opportunities to develop the fundamental theory, modeling, demonstration, and control of super-adaptable conformal phased array antennae.

#### **Department of Defense technology offset program to build and maintain the military technological superiority of the United States**

The committee notes that the Department of Defense has undertaken a third offset initiative to help maintain the military technological superiority of the United States. Much like the previous two offset initiatives, the committee is encouraged to learn that the Department recognizes that our adversaries are rapidly developing technologies and strategies that can rival those of the United States and that the Department, in theory, is taking steps to avert such a scenario.

As the committee expressed in the Senate report accompanying S. 1376 (S. Rept. 114–49) of the National Defense Authorization Act for Fiscal Year 2016, since World War II, the United States has never faced a more sophisticated and comprehensive array of challenges that threaten to undermine the integrity of the global security that the United States has underwritten for seven decades. Without rapid innovation and bold commitment to technology development and deployment, the committee believes that the United States could be in danger of ceding its authority as the unparalleled military leader in the world today. This concern is made all the more stark by the fact that our adversaries seem to be able to innovate advanced technologies more quickly and efficiently than the Department of Defense, which continues to be hampered by outdated practices and regulations. The committee believes that the ability and foresight necessary to pivot to critical technologies and bring them to development and deployment in an expedited manner is critical to maintaining the status of the United States in global security.

In recognition of these issues, to express support for the Department's third offset initiative, and to assist the Department in accel-

erating the program as much as would be reasonable, the Congress established a technology offset program in section 218 of the National Defense Authorization Act for Fiscal Year 2016 (Public Law 114-92). This program, as laid out in the authorizing legislation, would provide the Department of Defense with additional funds on an annual basis to carry out research, development, prototyping, deployment, and rapid fielding of critical offset technologies. In developing this initiative, the committee authorized the Secretary of Defense up to \$400.0 million for use towards technology offsets. While the committee ultimately gave the Secretary latitude to determine the most critical technologies on which to expend these funds, it also recommended that the Department focus on six technologies that the committee believes to be most vital for maintaining our military technological superiority. In particular, the committee noted its clear intent that approximately half of the authorized funds be used for technologies related to directed energy.

Although the level of funding was ultimately reduced to \$100.0 million through the Defense appropriations process, the committee believed that the program could still serve as a test case to determine the Department's commitment to and understanding of the technology offsets initiative. Despite the lower level of funding, the committee had intended to ramp up available funds in subsequent years as the Department demonstrated its ability to use the money wisely and effectively for technology offset activities.

The committee is alarmed to learn that this initial \$100.0 million funding has been allocated by the Defense Department to activities that are tangential, at best, to the technology offset initiative. In fact, of the \$100.0 million, the committee believes that only \$6.0 million has been put toward true offset technologies. With such a breakdown, the committee is unfortunately left to conclude that the Department has used money to pay its bills, rather than focus on technologies that are vital to the military technological superiority of the United States. Most distressingly, the committee was disappointed to learn that none of the money was put toward directed energy technologies, thereby showing a comprehensive lack of regard for the clear intentions laid out by the committee and by the Congress as a whole. Taken together, the committee is concerned that the Department is not focusing on strengthening the core mission capability of our military in terms of offensive and defensive weapons systems. Directed energy can fundamentally change warfare, much like precision-guided weapons did when developed during the second offsets efforts.

In addition, the authorizing legislation clearly lays out a procedure whereby the funds should be competed internally with clear criteria and identifying purposes and priorities for the use of the funds. The legislation also directs the Secretary to solicit applications from across the defense research and development enterprise for use of the funds. The committee was concerned to learn that unfortunately none of this occurred before the money was allocated.

Given these circumstances, the committee has no choice but to refrain from providing additional funding authorization for the technology offset program. Given the Department's clear disregard for the intent of the committee and of Congress in providing the technology offset funding, the committee is unable to justify further

expenditure. Without some sort of assurance or demonstration from the Department that it can manage technology offsets funding in a responsible manner, the committee believes that any additional funding for this program would be similarly misused.

The committee notes that the Department has said publicly that up to \$18.0 billion is being devoted to offset technology. Despite repeated requests for a breakdown of this claim and an accounting for where this funding is being applied, the committee remains unaware of the specifics of how the technology offset program is being carried out. Given the Department's performance regarding the authorized offset funds, the committee remains wary of the Department's ability to truly carry out a third offset program and see it through to fruition.

### **Digital polarimetric radar development**

The committee notes that there have been major advances in the field of radar development with respect to incorporating both polarimetric and phased array radar technology into an all-digital design. The committee considers the development of this technology as a critical enabler for the Navy in the development of increased sensing, discrete object tracking (especially small unmanned aerial vehicles), interference avoidance, spectral dominance, electronic warfare, dynamic aperture sharing, and multi-function/multi-objective capabilities. Consequently, the committee encourages the Navy to examine research opportunities to create an all-digital polarimetric phased array radar for future use in small object sensing and tracking, and dynamic aperture tasking for spectrally-contested and dense-target electronic warfare environments.

### **Expedited hiring at Department of Defense laboratories**

The committee is concerned that it takes unreasonable amounts of time to hire experienced individuals at defense laboratories, sometimes exceeding over a year. As a result, a sizeable percentage of authorized billets at DOD laboratories remain vacant due to lengthy delays as well as competition from the private sector. This committee notes that these delays occur despite expedited authorities authorized by this committee in a series of provisions in previous National Defense Authorization Acts.

Given the Department's "Third Offset" strategy and the fact that these laboratories play a critical role in driving the key technologies of that strategy, the committee directs the Comptroller General to conduct an assessment of the different hiring structures at military laboratories across the services, compare the time it takes to hire personnel, assess whether certain laboratories are using existing expedited hiring authorities effectively, and what recommendations it has to enable laboratories to accelerate the hiring process.

### **Human augmentation technology for industrial operations**

The committee commends the Office of Naval Research (ONR) Manufacturing Technology (ManTech) Program for its renewed efforts toward understanding the benefits of human industrial operations augmentation technology that improves the health and safe-

ty of the workforce and reduces the total ownership cost (TOC) of Naval assets.

The committee notes that the Navy Metalworking Center (NMC) and ManTech recently highlighted cost and labor savings on projects such as the DD 51 of over 20–30 percent through the use of exoskeleton-based human augmentation technologies. The committee continues to be interested in technological advances that help reduce the labor component of TOC by increasing productivity, improving quality, and reducing costs associated with workplace injuries related to repetitive motions.

Following the success of this initial program, the Committee urges the Secretary of the Navy to continue to develop these technologies with a goal of broad implementation of commercially-available human industrial operations augmentation technologies for the construction, maintenance, repair, and disposal of Navy assets.

#### **Hypersonic wind tunnel capabilities**

The committee notes that a key element of the Third Offset strategy is the development of high speed and hypersonic capabilities to support defense missions such as global and precision strike; intelligence, surveillance, and reconnaissance (ISR); and access to space. The committee notes that advanced research and development in this area depends on world class testing facilities, including high speed wind tunnels, as well as world class technical and engineering talent. Recently, in its "Hypersonic Weapons and US National Security: A 21st Century Breakthrough" report, the independent Mitchell Institute for Aerospace Studies found that Congress and DOD must adequately support continued operation and upgrading of the national hypersonic technology infrastructure, particularly unique test tools and research facilities for undertaking both ground-based and full-flight testing and research. The committee notes that this bill authorizes a significant increase in support for hypersonics test capability, as requested by the President. Further, the committee recommends that the Department of Defense, working through the Defense Advanced Research Projects Agency, the Test Resource Management Center, and the Air Force, continue to explore the development of wind tunnel test capabilities to support development of hypersonic military systems.

#### **Immunosuppression associated with Anthrax Prophylaxis**

Historic scientific literature has noted that certain compounds when combined with anthrax inhibit the immune response effecting the ability of a prophylaxis drug to effectively treat exposure or vaccines to protect from exposure. Unknown at the present is whether naturally occurring compounds such as aflatoxins when combined with anthrax causes such a suppression. The committee directs the Secretary of the Army to conduct a peer-reviewed study to assess the efficacy of such a combination or other such immunosuppression agents and, where applicable, develop a controlled experimental regime to assess the applicability of these combined agents. The peer-reviewed study and experimental plan shall be due to the congressional defense committees no later than February 28, 2017.

**Integration of nanoscale techniques for improved battery technology**

The committee supports the efforts of the Department of Defense, including those of the military services, to improve battery technology. In addition, the committee recommends continued research and development of nanoscale techniques to improve battery technology as it relates to improving military capabilities on the battlefield.

**Laser weapon system demonstrator**

The Committee commends the Navy for initiating and funding the Laser Weapon Systems Demonstrator (LWSD) and believes that this is an important step toward maturing technologies that could ultimately enable the deployment of a shipboard maritime laser weapons system. While the Committee understands that the Navy envisions transitioning laser weapons to a formal Program of Record in the 2020s, it appears that the Navy has not programmed funding beyond the LWSD sea-based tests to support the installation of LWSD on a DDG or for the design and procurement of a formal maritime laser program.

The committee expects that the Secretary of the Navy will keep the congressional defense committees updated on its plan to seamlessly transition the LWSD to a shipboard weapons system following sea-based testing and to a formal maritime laser Program of Record, technical progress toward developing the capability, and programmatic steps being taken to move to demonstration and deployment of advanced laser systems.

**Littoral Combat Ship propulsion and machinery control test capability**

The committee notes the operational benefits and cost savings that propulsion and machinery control test capabilities have provided the Navy, including for *Arleigh Burke*-class destroyers, *Zumwalt*-class destroyers, and *Whidbey Island*-class dock landing ships. The committee is concerned by a series of recent significant and costly engineering casualties on Littoral Combat Ships (LCS), including: mechanical failures contributing to USS *Freedom* being underway for just 35 percent of its deployment in the 7th Fleet area of responsibility in 2013, a fuel valve and combining gear failure on the USS *Milwaukee* in 2015, and a combining gear casualty on USS *Fort Worth* in 2016. The committee believes establishing a LCS propulsion and machinery control test capability would provide the Navy with a critical resource that is currently lacking to troubleshoot issues, identify root causes of casualties, and provide in-depth training to sailors. The net effect of such a test capability would be to reduce the time, cost, and inexperience associated with LCS propulsion and machinery control casualties.

Accordingly, the committee strongly encourages the Secretary of the Navy and Chief of Naval Operations to consider establishing an LCS propulsion and machinery control test capability for both the *LCS Freedom* and *Independence* classes.

**Long-range threat detection**

The Committee is aware of advances the Department of Defense (DOD) is making in long-range threat detection to safely detect explosives and explosive constituent chemicals from long distances. The Committee encourages DOD to engage with industry and academia to pursue further innovation in this field, including the development of cost effective threat sensor systems to support defense missions.

The Committee notes that DOD should emphasize capabilities that can provide real-time detection, with the greatest possible standoff and lowest false alarm rates, and which are portable enough to be used with mobile, aerial, and sea-based platforms.

**Mid-Tier Networking Vehicular Radio**

Modernizing battlefield communications is a critical priority for the Army. The Mid-Tier Networking Vehicular Radio (MNVR) provides the backbone for the Army's tactical network, connecting lower-echelon radios those at the brigade and battalion level. These two channel networking radios reduce reliance on satellite communications for the Army's command and control capability. The Committee fully funded this program and encourages the Army to maintain its testing schedule in order to meet fielding requirements.

**Military medical photonics**

The committee notes that military medical photonics research improves battlefield patient care using photomedicine technologies and exemplifies how mission-oriented research can benefit both military and civilian populations. The committee is encouraged by recent breakthroughs in this research, including major technology advances in burn and wound management, tissue imaging and bonding for vascular and reconstructive surgery, diagnosis and treatment of major eye diseases and trauma, critical care sensors and monitors, early assessment of inhalation airway injury, rapid imaging of coronary artery disease, and normalization of severe scarring from wounds of war.

The committee notes that funding for military medical photonics research decreased significantly in the Department of Defense's budget planning for fiscal years 2015 and 2016, but was subsequently restored to \$6.0 million by the Department in each of those years in accordance with congressional guidance. This program has made great progress in the development of important, innovative technologies for battlefield medicine. The committee expects that the Department will continue to fund this important work at an appropriate level.

**MQ-XX**

The committee believes the Navy needs to rapidly introduce a carrier-launched unmanned aircraft into the carrier air wing. While the committee continues to believe that the Navy should develop a penetrating, air-refuelable, unmanned carrier-launched aircraft capable of performing a broad range of missions in a non-permissive environment, the committee believes the MQ-XX moves the Navy

in the right direction while filling critical tanking and intelligence, surveillance and reconnaissance missions for the carrier air wing.

The committee notes that on February 26, 2016, Chief of Naval Operations Admiral John Richardson stated, “I like this way forward for carrier-based unmanned aircraft to be sort of a poster child for how we should do acquisition. We’re going to get something on deck as soon as we can that will fulfill a valid need—tanking and ISR—on that aircraft carrier and for that air wing.”

The committee is concerned that despite the service chief’s emphasis on this program, current plans will require 10 years to field the MQ-XX. According to Navy budget documents, the first MQ-XX land-based flight will not occur until fiscal year 2022 and the initial operational capability will not occur until fiscal year 2026. Given the years of effort and millions of dollars of investment already spent to bring an unmanned aircraft to the carrier, including the successful demonstration of the capability with the X-47B, the committee believes this timeline is unacceptably long and does not meet the CNO’s intent for a model acquisition program done at speed. Therefore, the committee directs the Secretary of the Navy to provide a report to the Committees on Armed Services of the Senate and House of Representatives with the President’s budget request for fiscal year 2018, which includes: (1) a detailed MQ-XX program schedule through initial operational capability, and (2) detailed options to accelerate MQ-XX.

#### **Night Vision Device Reset**

The committee believes night vision systems are an essential capability for successful conventional military and counterterrorism operations, and one in which the United States must keep its qualitative advantage.

The committee is concerned that more than half of the approximately 480,000 fielded AN/PVS-14 monocular night vision devices provide significantly lower level performance than those possessed by potential adversaries-leaving U.S. forces at a capability mismatch given the access of potential adversaries to more advanced French, Russian, and Chinese night vision devices. In addition, extensive delays in developing and fielding a digital image intensified alternative are being experienced by Special Operations Command and the Night Vision and Electronic Sensors Directorate, thus extending the anticipated use of the AN/PVS-14 to fiscal year 2030.

The Report on the National Defense Authorization Act for Fiscal Year 2016 (Report 114-49) encouraged the Secretary of the Army to develop and implement a comprehensive night vision systems research, development, acquisition, reset maintenance, and sustainment strategy that improves readiness, identifies and delivers promising new or emerging technologies, and ensures the affordability of night vision systems by managing cost throughout their life cycle. The committee is troubled that the Army has not followed this recommendation, and is not taking appropriate action to provide necessary performance and reliability improvements for the legacy fleet of AN/PVS-14 systems, commensurate with the threat and extended service life.

Therefore, the committee directs the Secretary of the Army to request funding as part of the fiscal year 2018 budget request to

begin a performance reset of fielded AN/PVS-14 systems through the component upgrade of the image intensifier tubes or explain in writing why such an upgrade is not needed to meet combatant commander requirements and ensure U.S. service members possess night vision devices superior to their potential adversaries.

#### **Night Vision Reset**

The Senate report accompanying S. 1376 (S. Rept. 114-49) of the National Defense Authorization Act for Fiscal Year 2016 acknowledged that night vision systems are an essential capability for successful military and counterterrorism operations. With increased proliferation around the world of high performance night vision technologies, U.S. forces may face a capability mismatch as adversaries acquire higher performance level technology. The committee believes it is crucial that the Department of Defense maintains and, where possible, extends its technological advantage in night vision systems.

The committee is aware that the Army is working to address the technological opportunities, operational requirements, and industrial base challenges associated with current and future night vision systems. Therefore, the committee continues to encourage the Secretary of the Army to develop and implement a comprehensive night vision systems research development, acquisition, reset maintenance, and sustainment strategy that improves readiness, identifies and delivers promising new technologies, and ensures affordability of night vision systems by managing cost throughout their life cycle.

#### **Plan to reduce the footprint of aged chemical and biological weapons facilities at Aberdeen Proving Ground**

The southern end of Aberdeen Proving Ground contains the laboratories for the Edgewood Chemical and Biological Command (ECBC). While many laboratories are new and state of the art, the ECBC contains a number of 50-year-old laboratories that are inactive but still must be fenced and have their ventilation systems functioning given the trace amounts of agents that are present in them. The result is a cost of several hundred thousand dollars each year to keep some of these laboratories in a warm status, which includes other activities such as ensuring they are structurally sound and do not leak. Because the cost of maintaining the laboratory each year is less than the 1 year tear down cost, they remain standing for a period of time such that the accumulated cost over the outyears would pay for their removal. Similar parallels exist at the Department of Energy with abandoned nuclear weapon production facilities. The committee directs the Corps of Engineers to report no later than February 28, 2017 on a plan to tear down these hazardous facilities, which ultimately will save taxpayers money over the long run.

#### **Review of balance between Department of Defense developmental and operational test and evaluation**

The committee notes that Congress has now re-established a developmental test and evaluation organization within the defense research and engineering enterprise. With this development, the com-

mittee believes it is necessary to examine the functions and resources between the organizations of the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DT&E) and the Director of Operational Test and Evaluation. To improve test and evaluation results for the Department's acquisition programs in the most efficient manner, particularly given that DT&E will now be reporting to the Director Operational Test and Evaluation as directed elsewhere in this act, the developmental and operational test and evaluation organizations must maintain a balance of resources and oversight activities.

The committee notes that during the 2000s, the resources and influence of the developmental test and evaluation organization declined while operational test and evaluation assumed a more comprehensive role, including absorbing resources and functions formerly within the purview of the developmental test and evaluation organization. For example a number of programs were transferred to the Director of Operational Test and Evaluation, such as Joint Test & Evaluation, the Center for Countermeasures (CCM), munitions effectiveness, and aircraft survivability. In addition, the Operational Test and Evaluation organization co-opted developmental test and evaluation aspects of acquisition programs.

When the developmental test and evaluation organization was almost non-existent, this enlargement of responsibilities under operational test and evaluation was essential. However, that role needs to be re-examined in light of a stronger developmental organization. As a result, the committee believes it would be useful for the Department of Defense to review the roles and resources of the current developmental and operational test and evaluation organizations to address a number of issues and questions.

The committee directs the Secretary of Defense to form a study panel to review the appropriate balance between developmental and operational test and evaluation activities and the resources required to accomplish related activities within the Office of the Secretary of Defense. The panel will develop recommendations for alternative approaches and resource levels and such recommendations should be completed no later than one year after the enactment of this Act.

The committee recommends that the panel address the following questions:

(a) How can the Director, Operational Test and Evaluation (DOT&E) with duties established in section 139 of title 10, United States Code, and the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD (DT&E)) with duties established in section 139b of title 10, United States Code, at the Office of Secretary of Defense (OSD) level approach oversight within the weapons development cycle to avoid overlap but be mutually supporting without sacrificing the independence of either organization?

(b) Does participation and assessments of program progress during phases prior to operational test and evaluation bias the independent objectivity of the operational test and evaluation organization?

(c) Are staffing and other resources between the two test and evaluation oversight organizations commensurate with the ef-

fort of each relative to the portion of the programs that their oversight entails?

(d) Are there programs under the purviews of the Department of Defense Test Resource Management Center with duties established in Section 196 of Title 10, United States Code, or the DASD (DT&E) that should be managed within operational test and evaluation, such as the Resource Enhancement Program and Joint Mission Environment Test Capability?

(e) Are there programs under the purview of the DOT&E or the DASD (DT&E) that should more appropriately be under the purview of other Office of Secretary of Defense organizations?

(f) Overall are the DASD (DT&E) and the DOT&E organizations effectively carrying out the missions as described in title 10, United States Code, and are there impediments to meeting those responsibilities. In addition are they engaged in activities outside their mission areas?

(g) Are the activities of the test and evaluation organizations complementary, not duplicative or disruptive, to the activities of the military departments?

(h) What are the implications for the balance between the two organizations now that DT&E will be reporting to the Director of Operational Test and Evaluation?

### **Silicon Carbide Technology**

The Committee supports the Army's investment to advance power and energy technology to meet requirements for higher electric power loads at forward operating bases through efficient generators, extend silent watch capabilities for ground vehicles, and improve vehicle performance. Silicon Carbide MOSFET based high performance power modules have been identified as an enabling technology that meets Army requirements for power distribution and management as part of generator and battery systems. The Army is encouraged to increase support for demonstration and deployment of silicon carbide power electronics under the Research, Development and Engineering Command Tank Automotive Research, Development and Engineering Center.

### **Simulation training**

The Committee supports the Department of Defense's continued expansion of the full range of simulation training as a cost-effective means by which military units can improve tactical decision-making skills through training in realistic scenarios otherwise only found in theater combat operations. Well-trained units ultimately save lives when deployed to combat situations. The Department of Defense should continue to ensure the most efficient and effective training programs are available through a combination of both government-owned and operated simulators, as well as simulation support from a dedicated commercial activity capable of providing frequent hardware and software updates.

### **Single appropriation for developmental test and evaluation and test resources**

The committee notes that prior to 1999, the Department of Defense had a strong developmental test and evaluation organization with a single appropriation for development test and evaluation support (including test resources) with all related program elements included within one appropriation. The committee understands that in 1999, developmental test and evaluation was reorganized and downsized and the appropriations were transferred to other program elements, primarily to the operational test and evaluation office.

The committee further notes though, that in 2009, the Weapon Systems Acquisition Reform Act (Public Law 111–23) re-established a strong developmental test and evaluation organization. Unfortunately, the related issue of resources was not addressed in the legislation and, as a result, developmental test and evaluation programs and projects remain scattered throughout defense-wide appropriations.

To correct this oversight, the committee directs the Secretary of Defense to include in the budget transmitted to Congress pursuant to section 1105 of title 31, United States Code, for each fiscal year a separate statement of estimated expenditures and proposed appropriation for the fiscal year for the activities of the Deputy Assistant Secretary of Defense for Developmental Test & Evaluation (DASD (DT&E)) and the Director, Test Resources Management Center (TRMC) for carrying out assigned duties and responsibilities. The Secretary of Defense shall re-establish a separate Research, Development, Test and Evaluation appropriation for Development Test & Evaluation and Test Resources as existed in the Department prior to fiscal year 1999. The reestablished appropriation will include all Program Elements currently administered by the DASD (DT&E) and the Director, TRMC including the Central Test and Evaluation Investment Program and Department of Defense Test and Evaluation Science and Technology. This reestablished development test and evaluation appropriation will be administered by the DASD (DT&E) and the Director, TRMC.

This change would consolidate the developmental test and evaluation-related resources in a single appropriation similar to what existed prior to 1999, which would allow for better congressional oversight and more efficient execution. This change would also provide Congress better visibility on resources being directed to developmental test and evaluation and test infrastructure. This change would also increase efficiency and minimize the possibility that resources can be realigned between program elements without congressional approval.

### **Study on best practices for laboratory management techniques**

In previous years, the committee has taken many steps to unshackle the Department of Defense laboratories from federal rules and regulations that the committee believed to be overly burdensome and to be having a deleterious effect on the abilities of the laboratories to carry out the critical mission with which they are charged. Among other things, the committee has granted the lab-

oratories greater autonomy and authority to make their own decisions regarding personnel, workforce, funding allocation, and general laboratory administration and management.

The committee has undertaken these efforts because it believes that the Department of Defense laboratories, along with the scientific and technical experts that they employ, are a unique national resource carrying out work that is vital to the national security interests of the United States. In recognition of the special status that the laboratories and employees occupy in terms of service to the Nation, the committee felt an obligation to ensure that all necessary tools were made available as necessary.

To be sure, while the committee has taken many steps, many more remain. As an ultimate goal, the committee hopes to ensure that laboratories and lab employees have the desired flexibility to experiment and innovate in a supportive environment on an accelerated timescale that meets the needs of the defense services and of those engaging in the Nation's conflicts.

As the committee has carried out its reforms in this arena, it has discovered that the Department has scientific organizations that are managed under a number of different governance models. For instance, the traditional service laboratories, such as the Army Research Lab, the Navy Research Lab, and the Air Force Research Lab, are all government owned and operated, meaning that all employees are direct federal employees. As a contrast, institutions like Lincoln Lab and the Applied Physics Lab are federally funded research and development centers, paid for by the government, but run by institutes of higher education. In addition, the committee is aware that laboratories of other federal agencies are managed under completely different models. For instance, the laboratories of the Department of Energy are government-owned, but operated by private companies, meaning that all employees are private sector contractors.

While the committee appreciates that different missions and different objectives often require different management and governance, it also recognizes that with the launch of the Department of Defense's third offset initiative, greater pressure is being placed on the defense laboratories, indeed the entire defense research enterprise, to be more innovative and quicker in bringing new technologies to production and deployment. The committee is struck that it seems unreasonable to expect such increased output and efficiency from the laboratories without a commensurate overhaul of management and governance structures.

At the same time, the committee has yet to see a comprehensive accounting of best practices for government laboratory governance. As a result, the ability of the committee to move forward smartly with additional reforms, designed to fully unleash the inherent capabilities of the lab in an efficient manner, is somewhat hampered. As much as the committee would like to undertake comprehensive defense lab governance reform, it remains wary of doing more harm than good.

To remedy this gap in the committee's knowledge and expertise, the committee directs the Comptroller General of the United States to complete a study of the various laboratory governance models employed at federal government laboratories, both defense and

non-defense. This study should identify all different governance models used across the government, the benefits and drawbacks of each model, and how successful each governance model has been at fostering efficiency and innovation. The study should also compare the relative autonomy given to each of the different lab directors, and conclude with recommendations on best governance practices. The committee directs the Comptroller General to submit this study to the congressional defense committees no later than 1 year after the enactment of this Act.

#### **Subsurface threat detection systems**

The committee notes that the Navy has requested \$45.7M in PE 0603123N for force protection advanced technologies, including funding for sensors and countermeasures for use against unmanned underwater threats and divers. The committee expects the Navy to continue and expand these efforts, commensurate with these growing threats.

#### **The improved turbine engine program (ITEP) for Army rotary wing aviation**

The committee recognizes the importance of more efficient fuel consumption and enhanced power benefits that collectively increase the combat capability under the improved turbine engine program (ITEP) for Army rotary wing aviation. For example, the committee understands that the ITEP will increase the combat range of Black Hawk and Apaches by at least 85 percent. However, the committee also understands that underfunding ITEP will result in a program schedule delay that could defer engine fielding to Black Hawk and Apache units. Therefore, the committee strongly encourages the Army to review the program funding profile for the key preliminary design phase of this competitive program to ensure resources are properly allocated across the future years defense program. Additionally, the committee strongly encourages the Army to examine all possible options to accelerate development and fielding of the engine so that the increased capabilities can be realized sooner.

#### **Third offset technology—industrial base concerns**

The Committee acknowledges the critical role that the Third Offset strategy plays in assuring long-term national security but to date, has not received a clear interpretation of what this strategy consists of. Without a clear explanation from the Department of Defense, the Committee is concerned about the viability of the U.S. industrial base to support the Third Offset strategy. Therefore, the Committee directs the Secretary of Defense to submit to the Committee a report on the Third Offset strategy, including how Third Offset programs will overcome capability or capacity challenges posed by U.S. adversaries, as well key capability shortfall areas that 3rd offset does not address. It will further submit its top five acquisition priorities, how they fit into the Third Offset strategy and to what extent the Department believes the U.S. industrial base can fill gaps in ability to support the strategy. The committee directs the Department submit both the strategy report and its acquisition findings and views to the Senate Armed Services Committee no later than one year after the enactment of this Act.

### **Troposcatter Systems**

The committee is concerned that warfighters lack needed communication capability in environments where satellite communications are degraded or denied. The committee is aware of the Army's effort to leverage advances in troposcatter systems in order to close this strategic gap. Given current budget constraints, the committee urges the Army to assess the ability of off-the-shelf, non-developmental solutions to meet Army requirements while reducing cost and risk.

### **United States Special Operations Command, Airborne High Energy Laser**

The committee notes that United States Special Operations Command (SOCOM) has identified an unfunded requirement for fiscal year 2017 to accelerate the exploration of tactics, techniques and procedures, and concept of employment of an Airborne High Energy Laser (AHEL) on an AC-130 aircraft. The committee agrees that directed energy capabilities, potentially including the AHEL, may offer possible tactical and operational advantages over conventional capabilities for certain missions requiring clandestine activities and the ability to disable vehicles, infrastructure, weapons, and other equipment. Such capabilities may also offer advantages in terms of cost effectiveness, sustainability, and precision.

The committee supports the experimentation proposed by SOCOM and understands that defense research laboratories and industry are currently working to advance directed energy systems for integration on various types of military aircraft. The committee directs SOCOM to fully coordinate its activities with the High Energy Laser Joint Technology Office in order to avoid duplication of efforts and encourages the Department to pool resources from relevant offices in support of this unfunded requirement.

### **Working capital fund efficiencies**

The committee understands that the Department of Defense and other federal government organizations will continue to experience constrained budgets for several years in the near-term, and that under such circumstances, federal organizations cannot afford to duplicate capabilities that may exist in other government organizations.

The committee also notes that working capital funded organizations are uniquely capable of managing within their budgets while supporting other organizations since the organizations being served pay for the services received. In addition, the committee notes that an increased client base for working capital funds results in a larger base upon which to spread overhead cost, which in turn can reduce cost for all customers.

The committee notes with concern that the leadership of some Department of Defense organizations may choose to reduce the flexibility allowed for working capital organizations to expand their base beyond the work for their parent organization. Such policies could necessitate other organizations to acquire duplicate capabilities.

As a result, the committee directs the Secretary of Defense to ensure that all working capital funded facilities within the Depart-

ment of Defense are allowed to provide services to all other Department of Defense organizations and all other federal organizations that request such services. The committee expects that, to the extent allowed by budget limitations, these services will be provided regardless of which organization operates the working capital funded facility and regardless of workforce staffing levels. The committee expects that such direction will be given to working capital funded facilities no later than 180 days after the enactment of this Act.

### **TITLE III—OPERATION AND MAINTENANCE**

#### **Subtitle A—Authorization of Appropriations**

##### **Authorization of appropriations (sec. 301)**

The committee recommends a provision that would authorize the appropriations for operation and maintenance activities at the levels identified in section 4301 of division D of this Act.

#### **Subtitle B—Energy and the Environment**

##### **Modified reporting requirement related to installations energy management (sec. 302)**

The committee recommends a provision that would amend subsection (a) of section 2925 of title 10, United States Code, by significantly reducing the contents of the Department of Defense's Annual Energy Management Report.

Additionally, the committee clarifies that the intent for reporting of all commercial utility outages caused by threats and hazards should include all four categories of utility service: electrical, potable water, wastewater, and natural gas. Accordingly, the committee believes the Department should appropriately revise the data collection template's instructions to capture such disruptions and outages.

##### **Report on efforts to reduce high energy cost at military installations (sec. 303)**

The committee recommends a provision that would require the Under Secretary of Defense for Acquisition, Technology, and Logistics, in consultation with the assistant secretaries responsible for energy installations and environment for the military services and the Defense Logistics Agency, to conduct an assessment of the efforts to achieve cost savings at military installations with high energy costs.

##### **Utility data management for military facilities (sec. 304)**

The committee recommends a provision that recognizes the importance of energy management for improving resiliency and achieving the Department of Defense's Federal energy reduction goals. Therefore, to reduce energy costs, the committee directs the Department of Defense, in consultation with the Department of Energy, to develop a pilot program to investigate the utilization of utility data management services to perform utility bill aggregation, analysis, third-party payment, storage and distribution.