

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 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 authority for prizes for advanced technology achievements (sec. 211)

The committee recommends a provision that would modify the authority of the Secretary of Defense to hold prize and challenge competitions to spur advanced technology achievements. The provision would give the Department of Defense (DOD) more flexibility in selecting prize award sizes to better match the awards to the technical challenge being addressed.

Additionally, the provision would permit DOD to combine funding with other federal, state, or local government funding in order to leverage other resources to achieve goals of interest to defense missions and priorities. Finally, the provision would reduce the reporting requirement for the use of the authority.

The March 2014 report to Congress on the prize authority indicated that prizes “have demonstrated the ability to stimulate and incentivize a broad spectrum of individuals to offer solutions to problems of significant interest to our Nation’s Warfighters.” The Army, Navy, Air Force, Defense Advanced Research Projects Agency, and Defense Threat Reduction Agency have all successfully used prize competitions to develop innovative approaches to address technology challenges.

Modification of Manufacturing Technology Program (sec. 212)

The committee recommends a provision that would clarify that the Joint Defense Manufacturing Technology Panel which coordinates manufacturing technology and research programs for the Department of Defense should receive oversight from the Under Secretary of Defense for Acquisition, Technology, and Logistics or his designees. Further, the provision reduces the frequency of mandated updates to the Manufacturing Technology program’s strategic plan, to better synchronize this effort with the Quadrennial Defense Review process.

Limitation on retirement of Joint Surveillance and Target Attack Radar Systems aircraft (sec. 213)

The committee recommends a provision that would prohibit the Air Force from retiring or preparing to retire operational Joint Surveillance and Target Attack Radar System (JSTARS) aircraft until the Secretary of the Air Force submits a report to the congressional defense committees including an update of the results of the analysis of alternatives (AoA) for recapitalizing the current JSTARS capability; an analysis of life cycle supports costs of maintaining the current fleet of JSTARS aircraft versus replacing the current fleet JSTARS aircraft with a new aircraft and radar system employing mature technology; and an assessment of the cost and schedule of developing and fielding a new aircraft and radar system employing mature technology to replace the current JSTARS aircraft.

The budget request included \$73.1 million in PE 37581F for developing a next generation system to replace the current JSTARS aircraft. The Air Force conducted an AoA 3 years ago to review options for modernizing the current E-8C JSTARS capability. That AoA concluded that a combination of Global Hawk Block 40 remotely piloted aircraft and a business class intelligence, surveillance, and reconnaissance (ISR) platform was the least cost, highest performing alternative. The AoA reported that a modern business jet outfitted with fourth generation radar based on existing technology would be the desired capability.

The Chief of Staff of the Air Force also informed the committee 2 years ago that the Air Force could not afford to pursue the business jet alternative when he said, "We simply don't have the resources."

This year, the budget request proposes to retire six of the current E-8C JSTARS aircraft in fiscal years 2015 and 2016, and pursue a standard acquisition program and expend nearly \$2.0 billion on a research and development program to develop and integrate new capability onto existing business jet airframes. This new radar and aircraft would not achieve initial operational capability until fiscal year 2022.

The committee supports a rapid recapitalization program to replace the Air Force's current JSTARS aircraft fleet.

However, the committee has concerns regarding the Air Force's ability to complete that new program due to future budget uncertainties. Given the importance of restoring the capability lost by retiring E-8C aircraft in the near term, the committee believes the Air Force should pursue an effort to integrate existing technology onto an airframe, rather than starting a new research effort to develop a new capability. The committee believes the Air Force should be innovative in its recapitalization approach by using modern, but existing, components and technologies and that this should be an integration effort rather than a research and development effort.

Therefore, the committee denies the Air Force request to initiate a new major research and development program to recapitalize the JSTARS fleet and instead recommends the Air Force pursue a program that pursues integration of existing systems and components onto commercially available airframes. The committee rec-

ommends a total of \$10.0 million to begin that more modest integration and fielding effort.

Limitation on significant modifications of Army test and evaluation capabilities (sec. 214)

The committee recommends a provision that would direct the Secretary of the Army and the Director of the Test Resource Management Center to report on significant reductions or consolidations of major test facilities.

Subtitle C—Reports

Study and reports on the technological superiority of the United States military (sec. 221)

The committee recommends a provision that would require the Secretary of Defense to task the Defense Science Board or other independent group to examine the potential specific challenges to U.S. military technological superiority within the next 10 years, and the specific planned responses by the Department of Defense (DOD) to meet these challenges. The provision also requires DOD to provide an interim report to the committee on current acquisition and development programs, and policy changes that are being undertaken in response to these challenges.

The committee notes that Secretary of Defense Hagel has indicated that “the development and proliferation of more advanced military technology by other nations means we are entering an era where American dominance of the seas, in the sky, and in space can no longer be taken for granted.” Similarly, Under Secretary for Acquisition, Technology, and Logistics Frank Kendall has indicated in public statements that in terms of “technological superiority, the Department of Defense is being challenged in ways that I have not seen for decades, particularly in the Asia-Pacific region.”

The Subcommittee on Emerging Threats and Capabilities held a classified briefing and a series of staff-level briefings in order to better understand these developments and the DOD responses to them. As a result of these briefings, the committee is concerned that DOD has not adequately placed a priority on providing resources to programs that can address situations in which U.S. military capabilities will not be technically superior to those which may be potentially fielded by global peer adversaries. Further, the committee is concerned that only minimal efforts have been made to redirect military service and defense agency programs from legacy efforts into new programs better aligned to meet these near term emerging threats.

Reduction in frequency of reporting by Deputy Assistant Secretary of Defense for Systems Engineering (sec. 222)

The committee recommends a provision that would reduce the reporting requirement related to the systems engineering activities of the Office of the Secretary of Defense. The committee believes this reduction will save resources for use in technical systems engineering work which can lead to system performance enhancements and acquisition cost savings. The committee notes the critical importance of effective systems engineering capabilities and activities in

the development and deployment of complex technical systems. The committee expects that the Secretary of Defense will continue to keep Congress informed of systems engineering activities of interest upon request.

Subtitle D—Other Matters

Pilot program on assignment to Defense Advanced Research Projects Agency of private sector personnel with critical research and development expertise (sec. 231)

The committee recommends a provision that would authorize the Director of the Defense Advanced Research Projects Agency (DARPA) to carry out a pilot program to employ up to five individuals employed by the private sector on rotational assignments to lead research or development projects of the Agency. The committee believes that this authority will allow DARPA to leverage the considerable talent that resides in industry in key technical areas, including cybersecurity, robotics, cloud computing, and biotechnology, where technological leadership often is resident outside the government. The committee notes that this pilot program is modeled on the successful Intergovernmental Personnel Act (IPA) Mobility Program which has been used successfully by federal agencies to exchange specialized personnel with state and local governments, academia, national labs, and other not-for-profit organizations. The committee understands that the Department of Defense has established procedures for monitoring and controlling salaries and expenses for the IPA program, including a limitation on salaries that may be paid or reimbursed for IPAs, and expects that such constraints will be applied to the pilot authorized by this provision.

Pilot program on enhancement of preparation of dependents of members of Armed Forces for careers in science, technology, engineering, and mathematics (sec. 232)

The committee recommends a provision that would authorize a pilot program to enhance the science, technology, engineering, and mathematics (STEM) educational opportunities for children of servicemembers. The committee believes that the Department of Defense (DOD) has a unique responsibility for the well-being of military children. These children are faced with a unique set of pressures and challenges relative to their peers, including the stresses of parental deployments and frequent relocations due to changes of duty station. Any successful effort to improve the quality of STEM education for military children would benefit both the children and their servicemember parents, but also help strengthen the pipeline of future personnel into civilian and military positions into DOD.

The committee notes that (DOD) has a set of educational outreach programs and assets, largely managed by the DOD Educational Activity (DODEA) and science and technology organizations, which could be leveraged to create effective engagements with military children and help improve their STEM educational experiences. The committee recommends that the Under Secretary for Acquisition, Technology, and Logistics, and the Under Secretary

for Personnel and Readiness work in partnership to develop activities under this program. Activities could include internships at defense laboratories, teacher training, curriculum enhancements, or other programs designed to address the challenges facing military children. The committee notes that the Department could also leverage research and development funding, including through the Small Business Innovation Research program, to develop new technologies and practices supportive of the goals of the pilot program.

The committee directs that any educational activities undertaken through this pilot program only be established with metrics that can be used to evaluate the merits and benefits of such activities. The activities should also be closely coordinated with STEM educational activities in the private sector, state and local organizations, and other federal agencies to ensure use of best educational practices, and to limit duplication of efforts.

Elsewhere in this report, the committee recommends an additional authorization of funding to support some of the activities authorized by this provision.

Modification to requirement for contractor cost-sharing in pilot program to include technology protection features during research and development of certain defense systems (sec. 233)

The committee recommends a provision, requested by the Department of Defense, that would modify the cost-sharing provision of section 243 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111-383). The underlying provision requires industry to bear a fixed portion of the cost for the development of features which could enable the exportability of systems, including measures to prevent tampering with export versions of major defense equipment. The recommended provision would allow the Department of Defense to adjust the cost-share requirement for industry partners to levels appropriate for the particular project.

Budget Items

University research initiatives

The budget request included \$69.8 million in PE 61103A, \$113.9 million in PE 61103N, and \$127.1 million in PE 61103F for university research initiatives. The committee notes that the overall basic research program in the budget request has been reduced by roughly \$150 million, or 7 percent, relative to the fiscal year 2014 requested level. In testimony to the Emerging Threats and Capabilities Subcommittee, the Acting Assistant Secretary of Defense for Research and Engineering testified that this would lead to a reduction of between 1,500 to 2,000 grants to university faculty and students.

The committee notes that basic research activities focused in technical areas of interest to Department of Defense missions lay the foundation upon which other technology development and new defense systems are built. These programs fund efforts at universities, small businesses, and government laboratories. These investments also serve to help train the next generation of scientists and

engineers who may work on defense technology problems in government, industry, and academia.

To help address the significant reduction in basic research funding in the request, the committee recommends an increase of \$20.0 million in PE 61103A, \$20.0 million in PE 61103N, and \$20.0 million in PE 61103F. The committee directs that these funds be awarded through the well-established and competitive Multidisciplinary University Research Initiative process. The committee directs the Secretary of Defense to provide a report to the congressional defense committees on the plan to spend these additional resources no later than 180 days after the enactment of this Act.

Indirect fire protection capability

The budget request included \$96.2 million in PE 64319A for indirect fire protection capability. Due to program delays some of the funds requested are early to need, therefore, the committee recommends a decrease of \$30.0 million in PE 64319A for the indirect fire capability.

Infantry support weapons

The budget request included \$27.9 million in PE 64601A for infantry support weapons of which \$7.8 million would be for the XM25 counter defilade target engagement weapon system. The XM25 is a grenade launcher firing a 25mm projectile selectively programmed to detonate in the air at a designated range.

The committee notes that the Army has invested \$183.2 million in development, procurement, and assessment of the XM25 between December 2010 and August 2013. Prototypes of this weapon were acquired, initially tested for safety, and deployed to Afghanistan for a forward operational assessment. Malfunctions during this assessment, and during subsequent testing, have raised questions about the system's safety, reliability, and effectiveness. A March 2014 report by the Department of Defense Inspector General (DOD IG) identified cost, performance, and schedule issues with the system. According to the DOD IG, reliability issues discovered during and after operational assessment have resulted in a program delay of over 2 years, cost growth for technical development and corrections, and Army program evaluators question the weapon's lethality. The program is delayed pending resolution of weapon function and munition effectiveness testing.

Due to the availability of unobligated prior year funds, the committee recommends a decrease of \$5.0 million in PE 64601A only for the XM25 counter defilade target engagement weapon system. Furthermore, given the reliability and effectiveness issues discovered in development and testing of the weapon and munition, the committee designates as a congressional interest item the XM25 counter defilade target engagement weapon system, or any of its derivative weapons or ammunition development or procurement programs, projects, or activities.

Kwajalein Atoll Reagan Test Site space situational awareness operations support

The budget included \$176.0 million for PE 0605301A for Army Kwajalein Atoll. The committee recommends an increase by \$11.0

million to meet a U.S. Strategic Command unfunded requirement for space situational awareness operations support.

Marine Corps assault vehicles

The budget request included \$105.7 million in PE 63611M for Marine Corps assault vehicles. At the request of the Marine Corps, the committee recommends a decrease of \$52.0 million in PE 63611M for the new amphibious vehicle project.

Also, at the request of the Marine Corps, the committee recommends the following increases:

- (1) \$45.0 million in Shipbuilding and Conversion, Navy for Landing Craft, Air Cushion (LCAC) service life extension; and
- (2) \$7.0 million in PE 24413N for surface connector research and LCAC stern ramp testing.

Offensive anti-surface warfare weapon development

The budget request included \$202.9 million in PE 64786N for developing an offensive anti-surface warfare (OASuW) weapon. This follows on an enacted funding level of \$91.0 million in fiscal year 2013. The Navy hopes to use these funds to mature the development of a science and technology development effort of the Defense Advanced Research Projects Agency (DARPA) that is seeking to demonstrate a variant of the Joint Air-to-Surface Standoff Missile (JASSM) in an anti-ship mission set. DARPA has called this variant the Long Range Anti-ship Missile, or LRASM.

In fiscal year 2013, the Navy had planned to release a request for proposal, award one or more competitive prototyping contracts, and establish a government program office team.

In fiscal year 2014, it became clear that the Navy planned to adopt the DARPA LRASM program without competition and to continue development of that missile, leading to fielding of an air-launched version (increment 1) and surface-launched version (increment 2) of LRASM missiles to be delivered initially by B-1 bombers or F/A-18 strike fighters. The Senate report accompanying S. 1197 (S. Rept. 113-44) of the National Defense Authorization Act for Fiscal Year 2014 directed the Navy to present a plan that would pursue a more competitive approach, yield a program proceeding to a technology readiness level 6 before deciding on a particular technical solution.

For fiscal year 2015, the Navy plan would continue that same non-competitive approach, but would field only a limited number of the air-launched version of the missile. The budget request and the future years defense program (FYDP) envision spending roughly \$1.5 billion to acquire roughly 110 missiles.

The committee is concerned that this program was created to respond to an urgent combatant commander need, but was done so with insufficient analyses of other available alternatives, and with insufficient regard for the costs of locking in a long-term commitment under a non-competitive program.

Therefore, the committee recommends a reduction of \$202.9 million for the OASuW program in fiscal year 2015, and directs the Navy to use available funds to conduct more thorough analyses of alternatives for meeting combatant commander needs.

Integrated Personnel and Pay System

The budget request included \$90.2 million in PE 65018F for the Air Force integrated personnel and pay system. The committee notes that a planned contract award for development of an integrated pay system largely based on commercial software has been delayed by two fiscal quarters, relative to the program schedule and associated funding plan proposed in the budget request. As a result, the committee recommends a reduction of \$30.0 million to this program.

F-15 Eagle Passive/Active Warning and Survivability System

The budget request included \$68.9 million in Research, Development, Test and Evaluation, Air Force for the F-15 Eagle Passive/Active Warning and Survivability System (EPAWSS). EPAWSS is expected to significantly improve the F-15's capability to autonomously and automatically detect, identify and locate radio frequency threats, as well as provide the ability to defeat radio frequency, electro-optical, and infrared threat systems.

The Air Force plans for fiscal year 2015 to award a pre-engineering and manufacturing development (pre-EMD) contract and prepare for awarding a full EMD contract in late fiscal year 2016. This program plan includes a schedule slip of roughly 15 months since last year's plan. This was due in part to a delay of a year in the analysis of alternatives for EPAWSS.

The committee understands that there have been additional delays in the schedule since the Air Force submitted the budget request, and recommends a reduction of \$19.5 million to reflect that delay.

Airborne Signals Intelligence Payload

The budget request includes \$30.7 million in PE 34260F for development of the Airborne Signals Intelligence Payload 2C (ASIP-2C) for the REAPER unmanned aerial system. The Air Force has decided to sustain other signals intelligence capabilities on the REAPER in lieu of the ASIP-2C and does not require these funds. The committee recommends a reduction of \$30.7 million.

Network Centric Collaborative Targeting

The budget request included \$8.8 million in PE 35221F for Research and Development (R&D) for the Network-Centric Collaborative Targeting (NCCT) program. The budget request also included \$3.0 million in line 14 of Other Procurement, Air Force (OPAF) for NCCT procurement. The committee has long supported the goal of building a capability to create a tracking and targeting network across all of the major airborne intelligence collection platforms, and all sensor types (visible imagery, infrared/spectral imagery, synthetic aperture radar, moving target indicator radar, and all forms of signals intelligence (SIGINT) sensors), utilizing machine-to-machine tipping and cueing. However, the intelligence components supporting our military forces have never been willing to organize around this concept.

The NCCT technology, architecture, and concept of operations were developed a long time ago, but the relevant program offices have not been willing to implement them. The committee reluc-

tantly concludes that it is time to try different approaches to this worthy goal.

The intelligence community is now pursuing the concept known as activity-based intelligence (ABI), which involves inter alia layering or integrating geo-referenced data and metadata from any and all sources about places, events, and activity. It is anticipated that ABI will enable target discovery, correlation, patterns of activity, and cues or tips for further collection.

The National Reconnaissance Office (NRO) is investigating technology and processes for automated, machine-based tipping and cueing across programs and sensor types that it hopes to persuade its mission partners to adopt to support the ABI concept. The Joint Staff is conducting studies of methods and means to use integrated sensor collection operations to track mobile, strategically important targets.

The Air Force Rapid Capabilities Office (RCO) is developing advanced technology for machine-to-machine networking that can support tipping and cueing and other coordinated operations for unmanned aerial systems (UAS) and manned platforms alike under the UAS Command and Control Initiative, Common Mission Control Center, and Open Mission Systems programs.

The Navy is developing advanced machine-to-machine tipping and cueing capabilities under the Minotaur initiative. Minotaur's goals are to detect, locate, and track targets either on the ground, at sea, or in the air. Minotaur is now or soon will be in operation on airborne platforms of the Navy, Coast Guard, SOCOM, and Customs and Border Patrol.

These initiatives appear to be more promising than NCCT in ultimately achieving the original goals of the NCCT program. Accordingly, the committee recommends a reduction of \$8.8 million from the R&D request, and \$3.0 million from the procurement request. The committee strongly encourages the Air Force RCO and the Navy Minotaur programs to collaborate with each other and the NRO.

Cross-program, cross-agency, cross-service, cross-sensor networking, and cooperative operations are essential to modern military operations in large-scale conventional warfare and in irregular warfare and man-hunting operations. However, this goal will require cultural and organizational changes, as well as technological innovation. Just as the military learned how to conduct joint operations after Goldwater-Nichols, the intelligence community at the national and tactical levels must begin to practice jointness in the tasking of collection and the exploitation and analyses of collected data.

The committee directs the Vice Chairman of the Joint Chiefs, and requests the Deputy Director of National Intelligence for Intelligence Integration, to jointly conduct an assessment of the utility of fully integrating the operations of the tasking organizations for imagery collection and signals intelligence at the national level and within the service Distributed Common Ground Systems and Command Joint Intelligence Operations Centers. This assessment shall be briefed to the congressional defense and intelligence committees by June 1, 2015.

Logistics information technology

The budget request included \$109.7 million in PE 78610F for the Air Force Logistics Information Technology (LOGIT) program. The committee recommends a reduction of \$12.5 million to this program. The committee notes that LOGIT is intended to partially replace the planned Expeditionary Combat Support System (ECSS) program, which was terminated. The committee notes that two Department of Defense (DOD) analyses of the failure of the ECSS program, the "ECSS Acquisition Incident Team Final Report" and the "Root Cause Analysis of the ECSS Program Report," both highlighted a number of issues that led to the program's failure. These included: an unclear process for coupling business process changes to planned technology changes; poor program management by government and industry personnel; unrealistic program timelines and expectations; and a lack of senior management attention to program challenges.

The committee is concerned that these and other issues that plagued the ECSS program have not been adequately remedied in the LOGIT program. Therefore, the committee directs the DOD Chief Information Officer, jointly with the Under Secretary of Defense for Acquisition, Technology, and Logistics, and the Secretary of the Air Force, to provide for an independent assessment of the current acquisition and test strategy, funding plan, goals, and schedule of the LOGIT program. The study's focus should be to determine if the lessons of the ECSS program have been adequately incorporated into the LOGIT program. The study should clearly identify specific activities and processes that represent changes in the planning and execution of the LOGIT program as compared to the ECSS program, and are based on an understanding and analysis of that program's deficiencies. Further, the report should make recommendations on improvements to the LOGIT program strategy and execution, or on specific actions the program should take, to improve acquisition program outcomes. The committee directs that the independent study team be provided access to all records, data, and other relevant information as needed to develop the required study. The committee directs that the study be provided to the congressional defense committees no later than March 1, 2015.

Defense Advanced Research Projects Agency programs

The budget request included \$2.91 billion for the research and management activities of the Defense Advanced Research Projects Agency (DARPA). The committee commends DARPA on its efforts to support high risk, high payoff research programs that often can introduce revolutionary capabilities into the technology development programs of Services and agencies. When well-coordinated with Service efforts, DARPA programs often result in significantly enhanced operational capabilities. To support these efforts, the committee recommends two provisions elsewhere in this report which attempt to enhance the quality of DARPA's technical personnel.

The committee notes that funding for DARPA was increased in the fiscal year 2015 budget request, at a time when the overall science and technology program was decreased relative to fiscal year 2014 levels. Further, the request included a decrease of over

\$150 million in basic research programs at universities, small businesses, and government laboratories.

Therefore, the committee recommends that DARPA shift its investments to support increased efforts in basic research that engage universities and other research communities in the unique programs managed by DARPA and recommends an increase of \$20.0 million in PE 61101E for this purpose. The committee recommends that DARPA consider funding efforts that engage a broader set of researchers, including those from non-traditional defense contractors, universities, Department of Defense (DOD) laboratories, and small businesses, in partnership with other funded DARPA initiatives. For example, the committee believes that DARPA-managed basic research activities in cybersecurity, robotics, development of systems engineering and software development tools, advanced learning and training technologies, and modeling and simulation would be of great benefit to supporting the achievement of DOD research and development goals. The committee also believes that DARPA is best enabled to engage the basic research community in addressing fundamental science challenges underlying efforts to develop new systems to address anti-access/area denial capabilities of potential adversaries. The committee directs DARPA to provide the congressional defense committees with a plan for execution of these funds no later than 180 days after the enactment of this Act. The committee reaffirms the requirement by law that all such funding be allocated on the basis of a merit-based selection, pursuant to a broad agency announcement or similar competitive process.

The committee further recommends a reduction of \$20.0 million in PE 63766E. The committee recommends reducing funding for the High Energy Liquid Laser Area Defense System, which has been funded at DARPA for over 10 years, with over \$200 million expended to date. This program history is inconsistent with the traditional DARPA model of successfully proving the technical feasibility and military value of disruptive, innovative technologies in shorter periods of time. The program still has no identified commitments for a transition pathway to a Service program for further development, and seems to have a low probability of transition, even if current technical challenges are overcome.

Science, technology, engineering, and mathematics education for military children

The budget request included \$45.5 million in PE 61120D8Z for the National Defense Education Program (NDEP), but no funding for pre-kindergarten through 12th grade (PK–12) Science, Technology, Engineering, and Mathematics (STEM) education activities, which have been traditionally funded at approximately \$10.0 million per year. In support of a provision described elsewhere in this report, the committee recommends an additional \$10.0 million for support of activities that enhance the STEM educational opportunities for military children. The committee reaffirms the requirement by law that all such funding be allocated on the basis of a merit-based selection, pursuant to a broad agency announcement or similar competitive process.

The committee notes that the NDEP has historically funded three activities related to STEM education: (1) The Science, Mathematics, and Research for Transformation (SMART) scholarship program, established in the National Defense Authorization Act for Fiscal Year 2006 (Public Law 108–375); (2) the National Security Science and Engineering Faculty Fellowship (NSSEFF); and (3) PK–12 STEM education activities. In the fiscal years 2014 and 2015 President’s budget requests, in response to an administration initiative to consolidate STEM educational activities, the NDEP’s PK–12 STEM education program was terminated, with much of the funding transferred to the NSSEFF. The committee notes that the Department of Defense (DOD) has a unique responsibility for the well-being of military children and responsibility to their service-member parents, and believes that DOD is well-positioned to help enhance their STEM educational opportunities.

The budget request included \$44.6 million in PE 61110D8Z for Basic Research Initiatives. The committee recommends a reduction of \$10.0 million for the NSSEFF program to return the program back to historical funding levels.

Historically black colleges and universities and minority serving institutions

The budget request included \$24.4 million in PE 61228D8Z to support basic research at Historically Black Colleges and Universities and Minority Serving Institutions (HBCU/MI). The committee recommends an additional \$10.0 million to support activities that enhance efforts to increase the numbers of HBCU/MI students and graduates working in defense laboratories and defense industry; increase the number of research partnerships established between HBCU/MI research staff and faculty and their counterparts in government laboratories, industry, and academia; support the development of advanced research infrastructure at HBCU/MI schools, especially facilities that can be leveraged by other research universities; and increase the number of undergraduates funded who graduated with degrees in STEM fields and who will continue to pursue graduate degrees in STEM fields. The committee reaffirms the requirement by law that all such funding be allocated on the basis of a merit-based selection, pursuant to a broad agency announcement or similar competitive process.

The committee notes that this program had been historically funded at a level of approximately \$35.0 million per year, but was reduced without sufficient justification. In testimony to the Subcommittee on Emerging Threats and Capabilities, witnesses highlighted the value of this program in performing valuable basic research, as well as in training the next generation of scientists and engineers who may work in defense laboratories or defense industry.

Applied research for the advancement of science and technology

The budget request included \$42.0 million in PE 62251D8Z for applied research for the advancement of science and technology priorities. The committee recommends a decrease of \$10.0 million.

Office of the Secretary of Defense Cyber Security Research

The budget request included \$15.0 million in PE 62668D8Z for Cyber Security Research. The committee is concerned that the proliferation of cyber security research programs in the Department of Defense (DOD), intelligence community, and other federal agencies, both in classified and unclassified programs, has created inefficient redundancy and duplication of efforts. Therefore, the committee recommends a reduction of \$7.5 million in PE 62668D8Z. Further, the committee directs that this program prioritize investment in activities that support research by university centers, small businesses, and non-traditional defense contractors, so as to help promote a diversity of innovative concepts and ideas into the set of programs striving to address DOD and national cyber security challenges.

Foreign technology testing

The budget request included \$30.0 million in PE 63133D8Z for comparative testing of foreign technologies. The committee recommends a reduction of \$10.0 million in this program to reduce growth. The committee directs that efforts under this program reflect testing of technologies in the advanced technology development stage, given the realignment of this account into the defense science and technology budget. Further, the committee notes that the Department of Defense should invest similar resources in programs that ensure that domestically-produced technologies which may provide superior capabilities to existing or developmental systems are comparatively evaluated and develop policies to ensure that if appropriate, these technologies are adopted.

Science and technology analytic assessments

The budget request included \$12.0 million in PE 63288D8Z for science and technology analytic assessments, \$60.0 million in PE 63289D8Z for advanced innovative analysis and concepts, and \$4.9 million in PE 65798D8Z for defense technology analyses. The committee recommends a reduction of \$7.5 million in PE 63288D8Z, a reduction of \$15.0 million in PE 63289D8Z, and a reduction of \$4.75 million in PE 65798D8Z for these efforts. The committee supports analyses that can better inform research and technology efforts that will address Department of Defense concerns related to a reduction in military technological superiority of global peers, but notes that robust funding in program offices, military services and defense agencies, and in federally funded research and development centers can be used for these purposes.

Concept and technology demonstrations

The budget request included \$132.0 million in PE 63648D8Z for the Joint Capability Technology Demonstration (JCTD) program. The committee is concerned over the limited transition success rate of past JCTD programs and recommends that the Department of Defense focus efforts on a smaller number of programs which represent revolutionary and disruptive technology capabilities and operational concepts that would otherwise not be funded in service development and acquisition programs. Therefore, the committee

recommends a reduction of \$20.0 million in this program to reduce the number of new-start efforts.

Advanced sensor applications program

The budget request included \$15.5 million in PE 63714D8Z for the Advanced Sensor Applications Program (ASAP). This represents a reduction from the level funded in fiscal year 2014 of \$19.2 million.

The committee believes that this reduction will cause the program to postpone important testing and experiments. The committee believes that these efforts are too important to postpone or cancel, and therefore, recommends an increase of \$4.0 million for ASAP.

Terminal High Altitude Area Defense system

The budget request included \$299.6 million in Research, Development, Test, and Evaluation, Defense-Wide, PE 63881C, for continued development of the Terminal High Altitude Area Defense (THAAD) system, including for development of the THAAD 2.0 concept. The committee believes the concept for the THAAD 2.0 is not sufficiently defined to warrant the level of funding requested. Therefore, the committee recommends a reduction of \$15.0 million in PE 63881C for development of THAAD 2.0 as early to need.

Ground-based Midcourse Defense reliability and maintenance funding

The budget included \$1.0 billion in Research, Development, Test, and Evaluation, Defense-wide, PE 63882C, for the Ground-based Midcourse Defense (GMD) system that provides homeland ballistic missile defense. However, the committee is aware that a recent independent assessment of the GMD system indicated that a number of important reliability and maintenance functions are not included in the current GMD program of record. Therefore, the committee recommends an increase of \$30.0 million in PE 63882C for the following activities: (1) Failure mitigation actions and upgrades for the Capability Enhancement II Exo-atmospheric Kill Vehicle; (2) Upgrades to the Command Launch Equipment and the GMD Fire Control System; and (3) Improvements to the GMD Stockpile Reliability Program, including rocket motor life assessments.

The committee believes these are necessary functions for the GMD program to work effectively and be sustainable for the planned life of the system. Therefore, the committee directs the Missile Defense Agency (MDA) to develop a plan for executing these funds, and for completing the remainder of the work required to accomplish these functions within the GMD program of record. The committee further directs the Director of MDA to report to the congressional defense committees on this plan by no later than November 15, 2014. As part of this planning process, the committee expects MDA to consider the full range of funding options, including re-prioritization of funds, reprogramming actions, and adjustments to budget plans for fiscal year 2016.

Funding for Iron Dome and U.S.-Israeli cooperative missile defense programs

The budget request included \$96.8 million in PE 63913C for the Missile Defense Agency (MDA) for U.S.-Israeli cooperative missile defense programs, including \$10.7 million to improve the existing Arrow Weapon System; \$54.4 million for continued development of the Arrow-3 upper tier interceptor missile; and \$31.7 million for continued co-development of the David's Sling short-range ballistic missile defense system. These systems are part of Israel's layered defenses against missiles and rockets of varying ranges, from longer-range missiles from Iran or Syria, to short-range missiles and large-caliber rockets such as those fired from Lebanese territory, to the very short-range rockets and artillery fired from Gaza. The United States is jointly developing and co-managing these systems to ensure they are compatible and interoperable with U.S. missile defense systems.

The budget request also included \$175.9 million in Procurement, Defense-wide for the MDA, for Israel to procure additional Iron Dome short-range rocket defense systems, including co-production of Iron Dome parts and components in the United States by U.S. industry in accordance with the U.S.-Israel Iron Dome production agreement signed on March 15, 2014. The Iron Dome system, which was developed by Israel, proved highly effective at defending against hundreds of short-range rockets launched from Gaza in 2012, and has been provided Israel with an alternative to launching large-scale military offensives to counter such rocket attacks.

The Government of Israel has requested an additional \$175.0 million for Iron Dome in fiscal year 2015. The committee is supportive of the Iron Dome program and is aware that short-range rocket attacks are a continuing threat to Israel's security. The committee also supports the three cooperative missile defense programs, and recognizes that Israel may determine that it is a higher national security priority to use additional funding for these programs, given the continuing threat of rockets and missiles that could be launched from Iran, Syria, and from Lebanese territory.

Therefore, as provided in a legislative provision described elsewhere in this report, the committee recommends an increase of \$175.0 million in PE 63913C for Israel to produce Iron Dome systems, including co-production of Iron Dome parts and components in the United States by U.S. industry, in accordance with the terms, conditions, and co-production targets for fiscal year 2015 in the U.S.-Israel Iron Dome production agreement. However, if Israel determines that it would be a higher priority for its national security, it may use part or all of the additional \$175.0 million for the three U.S.-Israeli cooperative missile defense programs: the Arrow System Improvement Program; the Arrow-3 upper tier interceptor missile development program; and the David's Sling short-range ballistic missile defense system.

Corrosion control and prevention funding increase

The budget request included \$6.0 billion in Research, Development, Test, and Evaluation (RDT&E) for Advanced Component Development & Prototypes, of which \$2.9 million was for the Department of Defense (DOD) Corrosion Program.

The committee continues to be concerned that DOD has consistently underfunded the Corrosion Program since fiscal year 2011. DOD estimates that the negative effects of corrosion cost approximately \$20.8 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, line 101, PE 0604016D8Z, for the DOD Corrosion Program.

Defense research and development Rapid Innovation Program

The committee notes that the Department of Defense (DOD) Rapid Innovation Program (RIP) has been funded at decreasing levels over the last few fiscal years, dropping from a high of \$439.0 million in fiscal year 2011, to \$175.0 million in fiscal year 2014. The committee recommends an authorization of \$75.0 million in PE 64775D8Z to continue activities under this program. This decrease from previous levels of authorization reflects the need for the DOD and the Government Accountability Office to complete reviews of the program and its effectiveness, while balancing the need to maintain the program continuity and maintaining engagement with industry and acquisition program offices. The committee notes that the DOD has increased the number of organizations participating in the program, while streamlining management processes, enabling earlier solicitation of proposals from small businesses and other potential contractors. The committee further notes that preliminary evaluation of program results have identified a number of RIP-funded technologies which have transitioned into acquisition programs.

The RIP is a competitive, merit-based program established by section 1073 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111–383) that is designed to fund innovative technologies, reduce acquisition or life-cycle costs, address technical risks, improve the timeliness of test and evaluation outcomes, and rapidly insert technologies needed to meet critical national security needs. The committee notes that \$175.0 million was appropriated for the RIP in the DOD Appropriations Act for Fiscal Year 2014 (Public Law 113–6); however, no funds were requested in the budget request for fiscal year 2015.

In the 3 fiscal years during which the program has been executed, 17 defense components (including U.S. Special Operations Command, the military services, the Missile Defense Agency, U.S. Transportation Command, and others) have used the additional funding through 12 different open calls for industry proposals. The competitions resulted in over 8,600 technology-concept white papers and over 500 full proposals for funding, which were evaluated for their responsiveness to defense technology requirements and their ability to effectively transition technologies to acquisition program offices, depots, logistics, contractors, or other relevant organizations. Investments in the program have prioritized proposals that have the ability to: deliver nearer-term emerging technologies to current military operations in areas such as electronic warfare, cybersecurity tools, robotics, and dismounted force protection; con-

tribute to breakthrough technologies for future military capabilities in areas such as countering weapons of mass destruction, space systems, and hypersonics; or improve the affordability of defense operations through technologies that reduce the cost of energy and other logistical items or increase interoperability across platforms and systems.

Through this rigorous process, in fiscal years 2011 and 2012, 263 awards of less than \$3.0 million each were made to innovative companies, over 90 percent of which were made to small businesses, and a majority of which leveraged previous investments made by the Small Business Innovation Research (SBIR) program. DOD estimates that 90 to 100 projects will be awarded through the fiscal year 2013 competitive process. Successful projects to date include, but are not limited to: enhanced ground vehicle protection, lightweight ground fire detection systems for combat outposts, automated intelligent training systems, low cost missile launchers, advanced body armor, and intrusion detection systems for port security missions.

DOD has reported that the program has increased the effectiveness of technology development activities in a number of ways, including: allowing acquisition program managers to have the flexibility to develop, test, and possibly incorporate higher performance and lower cost capabilities into programs that traditionally are unable to fund or evaluate disruptive and novel technologies; creating competitive pressures on existing defense contractors through the potential introduction of new technologies; enhancing the return on investment on the roughly \$1.0 billion DOD SBIR program; and providing a new avenue for commercial industry, small businesses, and other non-traditional contractors to develop solutions to defense technology challenges.

The committee reaffirms the requirement by law that all such funding be allocated on the basis of a merit-based selection, pursuant to a broad agency announcement or similar competitive process. The committee directs the Secretary of Defense to continue to refine and enhance program management and industry engagement practices to maximize the ability of the RIP to deliver new technologies to acquisition programs and operational units that would otherwise not be funded or evaluated, given resource constraints and traditional program management processes.

Chemical and Biological Defense Program under-execution

The budget request included \$345.9 million in PE 64384BP for the Chemical and Biological Defense Program engineering and manufacturing development. The committee notes that this program funding line received an increase of \$158.0 million—nearly 60 percent—from fiscal year 2013 to fiscal year 2014, and with this substantial increase the program execution rate for the fiscal year 2014 funds is slower than expected.

Therefore, the committee recommends a reduction of \$10.0 million for PE 64384BP for prior year under-execution delays.

Combatant Command exercise engagement and training transformation funding decrease

The budget request included \$887.8 million in Research, Development, Test, and Evaluation (RDT&E) for RDT&E Management Support, of which \$44.0 million was for Combatant Command Exercise Engagement and Training Transformation (CE2T2).

The committee is concerned that historical under-execution has occurred in the CE2T2 program with respect to the percentage of validated combatant command joint exercise transportation requirements executed in support of the joint exercise training program.

Accordingly, the committee recommends a decrease of \$4.0 million in RDT&E, line 174, Program Element 0804767D8Z, for CE2T2.

Sharkseer zero-day cybersecurity program

The budget request included \$125.9 million for research and development (R&D) for the National Security Agency's (NSA) Information Systems Security Program (ISSP) in PE 33140G, conducted by the Information Assurance Directorate (IAD).

The budget request includes no funds in fiscal year 2015 for the Sharkseer program. Sharkseer has been funded in previous years at the direction of the Office of the Chief Information Officer (CIO) and has been identified by the CIO as among the highest priority cybersecurity initiatives under its purview. The committee is informed that the CIO intends in future budget submissions to transition this initiative to a permanent program of record. Sharkseer is the first concerted attempt by the Department of Defense (DOD) to buy advanced commercial technology to defend DOD networks against cyber attacks that have not been seen before—for which no signatures are available to block against. These attacks, popularly called zero-day attacks, are increasingly prevalent as adversaries employ simple morphing techniques to mask the appearance of malware that is already well-known.

The first generation of commercial products for enterprise-level zero-day detection and response capabilities that the Sharkseer program office has assembled has been deployed to a DOD Internet Access Point (IAP) for demonstration and testing. By all accounts, it has performed very well. Funds on hand, authorized and appropriated in prior years, are sufficient to deploy these capabilities operationally to three IAPs. Neither NSA nor the Defense Information Systems Agency has followed through to make funding available to deploy this capability to all the other IAPs, or for beginning work with other vendors on next-generation capabilities, or to extend capabilities to hosts.

The committee recommends an additional \$30.0 million for Sharkseer to extend deployments to additional IAPs and further develop a closed-cycle concept of operations and technical capabilities to quickly translate detections at network boundaries into blockable signatures, rapidly disseminate them, and directly interact in near real-time with endpoints/hosts. The committee expects the newly forming Cyber Protection Teams to rely heavily on Sharkseer tools and capabilities.

The committee encourages the CIO to establish Sharkseer as a sustained activity to procure innovative commercial cybersecurity products and to refresh them with new products and capabilities in the same way that the DOD routinely programs funds for technology refresh on network equipment like routers, switches, and load balancers.

Defense Information Systems Agency cybersecurity research and development

The budget request included \$3.2 million in PE 35103K for research and development (R&D) of cybersecurity solutions by the Mission Assurance Directorate of the Defense Information Systems Agency (DISA). The DISA Information Systems Security Program PE 33140K has no R&D funds requested at all.

A strategy of procuring only mature commercial or government cybersecurity solutions is sound, but DISA has multiple, high-priority unfunded needs, and needs some R&D funding to work with industry to identify, test, and integrate commercial security solutions. In past years, the committee provided funds for the Chief Information Officer (CIO) through DISA to conduct pilot programs with advanced technology cybersecurity companies, which were very productive and valued by the CIO. This funding, too, has not been sustained.

The committee urges the DISA Director, the CIO, and the Principal Cyber Advisor to assess the lack of R&D funding for cybersecurity at DISA, and include appropriate amounts in future budget submissions. The committee recommends an authorization of \$9.4 million in PE 33140K for one of DISA's highest priorities, building out the analytic platform for cyber situational awareness at the community data center. This analytic platform, analyzing a diversity of big data sources, such as full packet capture, netflow, and log data, will be a critical tool for the Cyber Protection Teams coming on line at U.S. Cyber Command. In addition, the committee recommends transferring the \$3.2 million R&D request from PE 35103K to PE 33140K.

MQ-9 Unmanned Aerial Vehicle

The budget request included \$9.7 million in Research, Development, Test, and Evaluation, Defense-wide (RDTEW), for the development, integration, and testing of special operations-unique mission kits for the 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 \$5.2 million in RDTEW 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 through the MQ-9 Medium Altitude Long Endurance Tactical program of record utilizing the Lead-Off Hitter rapid acquisition process. The committee understands this

process has successfully fielded MQ-9 UAV capabilities at greatly reduced timelines when compared to traditional acquisition processes and such capabilities have significantly improved the accuracy and lethality of MQ-9 UAVs in “find, fix, and finish” operations. The committee encourages SOCOM to continue to look for other opportunities to accelerate combat capability development through the Lead-Off Hitter approach.

Items of Special Interest

Advanced training technologies

The committee believes that the appropriate application of advanced technologies can help improve the effectiveness of training, while reducing overall costs. The committee notes that the Department of Defense has made significant progress in the development of augmented reality and augmented virtuality technologies to enhance training experiences through the use of advanced computer simulation techniques. These technologies are used to mix virtual and real-world experiences, so as to improve training outcomes. Continuing work in these areas holds the promise of developing increased virtual training capability, with resulting enhanced force readiness at reduced cost. The committee is unaware of any independent study comparing the benefits of live, virtual, augmented, and mixed reality training systems.

To help determine the value and possible need for increased emphasis on these technical areas, the committee directs the Secretary of the Army to provide for an independent review to assess the effectiveness, in terms of cost and performance, of augmented reality and augmented virtuality training methods and tools. In particular, the study should examine the ability of these deployed or developing systems and methods to enhance the acquisition and retention of skills needed to complete critical missions, as compared with exclusively live or virtual training exercises. The report should be delivered to the congressional defense committees no later than 180 days after the enactment of this Act.

Air Force Office of Scientific Research

The committee notes that the Secretary of the Air Force announced the decision to not relocate the Air Force Office of Scientific Research (AFOSR) in testimony. The committee commends the Secretary on the decision. AFOSR plays a vital role in the development of new Air Force capabilities, by funding basic research programs at universities, small businesses, and government laboratories in areas including advanced materials, cybersecurity, hypersonics, robotics, and computer science. AFOSR investments in the past have led to a range of deployed and commercial systems ranging from the computer mouse to lasers to stealth materials used on tactical aircraft. The committee notes that AFOSR has funded research by 73 scientists and engineers who have earned Nobel Prizes in physics, chemistry, medicine, or economics. Further, AFOSR plays a leading role in Air Force engagement with the global scientific community, and in supporting the training of the next generation of scientists, engineers, and technology entre-

preneurs through science, technology, engineering, and mathematics (STEM) education and graduate fellowship programs.

The research community collaborates with AFOSR at its present location, and has expressed concern to the committee about the potential adverse impact of relocation on both the mission of AFOSR and on its current federal and non-federal partners. The committee notes that AFOSR moved to its present location in the late 1990s, specifically to be physically close to other key federal research offices, including the National Science Foundation (NSF), Defense Advanced Research Projects Agency (DARPA), and Office of Naval Research (ONR). This co-location was endorsed as a Center of Excellence by the 2005 Base Realignment and Closure (BRAC) Commission. The Commission further cautioned that placing AFOSR onto a military installation could restrict access by key partners.

The committee is concerned that any relocation could risk the Air Force losing the advantages of AFOSR's current location, which likely enhance the effectiveness and efficiency of the organization in the performance of its Air Force-designated missions. Finally, the committee has yet to receive any detailed budget information justifying a potential move on the basis of cost savings. Accordingly, the committee directs the Air Force to put on hold any further plans for the relocation during fiscal year 2015.

Further, the committee directs the Air Force to report to the committee on AFOSR programs and activities, no later than 180 day after the enactment of this Act. The report should include information on planned activities to maintain and strengthen AFOSR's basic research function, policies, and activities being developed to ensure AFOSR can shape a workforce best-qualified to manage the Air Force basic research portfolio, activities intended to continue and expand AFOSR outreach to universities and the U.S. and global scientific community to support Air Force missions, and specific examples of coordinated research and other activities with peer federal research agencies.

Airborne signals intelligence enterprise

Due to the importance of the mission, the Air Force continues to invest heavily in signals intelligence (SIGINT) collection capabilities for multiple platforms. SIGINT is a key component of airborne collection systems that exploit multiple phenomenologies in contested and denied environments. As the Air Force moves forward with system modifications and upgrades of its SIGINT assets and capabilities, the Air Force needs to be able to leverage investments made by programs across the Department of Defense (DOD) to reduce life cycle costs of these systems.

As discussed elsewhere in this report, DOD is pursuing a number of efforts to apply open systems architecture principles for modernization and sustaining existing systems, as well as for new developments. Implementation of open systems architecture standards should enable just such sharing and help achieve the best value to the warfighter through ensuring competition throughout the lifecycle of defense acquisition programs, as directed by the Weapon Systems Acquisition Reform Act of 2009 (Public Law 111-23).

The committee encourages the Air Force to continue its efforts to move to open systems architectures that will facilitate open competition at all levels for future system modifications and upgrades.

Anti-submarine warfare research and development

The committee notes that continued advancements in submarine technology present significant challenges for the United States and the international community. The Navy's Maritime Strategy lists the proliferation of submarines, both advanced diesel-electric and nuclear-propelled submarines, as potentially the principal threat to future maritime security.

Modern diesel-electric submarines are increasingly capable and lethal. Advanced air independent propulsion (AIP) systems have exponentially increased diesel submarines' underwater endurance, which provides greater survivability and freedom of movement. Additionally, diesel-electric submarines allow for smaller submarine designs, which permit greater access to littoral areas than their larger nuclear-powered counterparts. Finally, many of these submarines are capable of carrying advanced torpedoes and cruise missiles, which could threaten maritime commerce and civilian shore installations. These advanced capabilities, coupled with diesel submarines' relatively low-cost, have resulted in rapid expansion of submarine programs in nearly every region around the world.

The committee commends the Navy's proactive approach to this growing challenge, including specific training exercises designed to address modern diesel-electric submarines' unique capabilities. However, the committee also encourages the Navy to continue to pursue new technologies that could provide the next generation of undersea warfare advantages, including detection of sea-floor scarring and other non-acoustic signature.

Cargo unmanned aerial system

The committee is aware of ongoing efforts to demonstrate the military utility of a cargo unmanned aerial system (UAS) to support intra-theater operational logistics where the use of manned aircraft or ground convoys to resupply troops is uneconomical or dangerous. The committee understands that since December 2011, the Marine Corps has been conducting a Military User Assessment (MUA) of cargo UAS helicopters for supply missions in Afghanistan. The committee believes that sufficient information should be available to support the analysis associated with a formal requirements development process and decision on whether or not to transition cargo UAS helicopters to a program of record.

Accordingly, the committee directs the Secretary of Defense to provide a briefing to the congressional defense committees no later than April 1, 2015, on the results of the MUA and the Department's plans, if any, for establishing a program of record for the development, procurement, fielding, and sustainment of cargo UAS helicopters.

Clear technical communications

The committee is concerned with the limited ability of the Department of Defense (DOD) in communicating the values, goals, successes, and impacts of its science and technology programs to

external audiences, including Congress, the public, and government policy and decision makers. Communication of these science and technology (S&T) developments is vital to an external understanding of innovations within the DOD. Clear descriptions of support for military missions and measurable reductions in operational and acquisition costs should be key goals of communication.

The committee commends the DOD for its efforts in its “Armed With Science” blog. The web site highlights S&T developments within the DOD and is dedicated to making these developments relevant to internal and external audiences alike. “Armed With Science” operates under the mission of making science matter to everyone, and the committee believes that the DOD needs to dedicate more resources to this goal.

Combat rescue helicopter

The Air Force has announced an intention to move forward with the combat rescue helicopter (CRH) program to replace existing HH-60 helicopters that fulfill the combat search and rescue function in the Air Force. The Air Force also has informed the committee that the future years defense program (FYDP) plan for the CRH program includes a shortfall of \$436.0 million needed to execute the CRH program.

The committee recognizes the importance of replacing the aging HH-60 airframe, a heavily used helicopter whose readiness rates are persistently low. The committee commends the Air Force on moving forward with the CRH program, but remains concerned that the Air Force properly budget for the program in the out-years. The committee directs the Air Force to provide a report to the congressional defense committees not less than 90 days after enactment of this Act on how it will correct that funding shortfall for the CRH program in the FYDP.

EC-130H Compass Call aircraft

The committee is concerned about the plans of the Air Force to retire almost one half of the EC-130H Compass Call fleet starting in fiscal year 2016. The EC-130H Compass Call is an airborne electronic attack (AEA) platform which has proven its value in every major combat operation since Operation Just Cause in 1989 through today’s conflict in Afghanistan.

The EC-130H Compass Call provides an unparalleled capability for our combatant commanders to disrupt enemy command and control communications and limit adversary coordination essential for enemy force management. As a manned platform, Compass Call is able to operate independently in a communications degraded environment. The Compass Call is also flexible since the crew includes electronic warfare officers and linguists who can make real-time decisions in the execution of electronic warfare.

To ensure support for combatant commander needs, the committee directs the Secretary of the Air Force to develop a plan, including milestones and resource requirements, to replace, modernize, or rehost the current Compass Call capabilities. The Secretary’s plan will include a detailed assessment of what the new objective system or systems should be, what upgrades or enhancements of existing Compass Call aircraft systems will be pursued for

those aircraft remaining in the force, and how the Air Force will meet combatant commander requirements until a new objective system achieves full operational capability. The Secretary should deliver this plan to the congressional defense committees not later than September 30, 2014.

Electronic warfare threat emitters

The committee notes that the Department of Defense has initiated development and fielding of new electronic warfare testing and operational training capabilities to ensure that weapon systems and aircrews, including the F-35, are able to be appropriately tested and trained against emerging threats. The committee notes that both the Director of Operational Test and Evaluation (OT&E) and the Director of the Test Resource Management Center (TRMC) are funding efforts to develop and field realistic electronic warfare threat simulators for use in developmental and operational testing. The committee also understands that the Air Force is currently fielding the Joint Threat Emitter that can simulate the multiple threat scenarios of modern integrated air defense systems to support operational training missions. The committee supports the appropriate and realistic testing and operational training of weapon systems and aircrews to meet current operational requirements, as well as emerging threats. The committee is concerned however that these well-intentioned efforts may be duplicative, not well coordinated, and not aligned with the schedule, testing, and operational training requirements of currently fielded weapons systems and the F-35.

Therefore, the committee directs that the Deputy Secretary of Defense develop a coordinated plan, among the OT&E, TRMC, Air Force, Navy, and relevant program offices and organizations, for the development and fielding of a usable set of electronic warfare threat simulation capabilities that meet current and future operational training and testing requirements and program schedule needs that sufficiently simulate all realistic threat scenarios. The plan should identify actions that promote the rapid development, fielding, and leveraging of test and operational training assets to support the most efficient deployment of capabilities on current and future weapon systems to defeat existing threats and mitigate impact of emerging threats. Further, the plan should also identify a lead agency for this coordinated effort. The committee directs that this plan be submitted to the congressional defense committees before fiscal year 2015 funds are expended on further development of these test capabilities. This restriction does not prohibit funding of threat emitters being fielded to meet current weapon system operational training requirements.

Improved turbine engine program

Over the last 3 years the committee has consistently expressed its support for the Army's Improved Turbine Engine Program (ITEP). The committee recognizes that ITEP faces the same challenges and fiscal risks impacting all Army research, development, and acquisition programs under the Budget Control Act of 2011. The committee understands that the Army would prefer to take ITEP competitive prototyping beyond the technology development

phase and into engineering and manufacturing development, however, future resources may not be available to do so. Nonetheless, providing adequate and stable funding for ITEP sufficient to carry at least two engine developers over the next few years and through completion of the technology development phase is important to reduce risk, achieve appropriate technology maturity, and set the conditions for ultimate program success. The committee supports the current program funding profile and schedule and encourages the Army to maintain stability and therefore momentum in the program as resources and technical progress allow.

Inter-agency coordination on medical countermeasures development

The committee is aware that the Department of Defense (DOD) has a robust research and development (R&D) program to provide bio-defense medical countermeasures for military and civilian personnel to protect them against biological threats. The Department of Health and Human Services (DHHS) also conducts significant R&D of bio-defense medical countermeasures for public health. The committee understands that the two departments have established an interagency process for coordination and collaboration on bio-defense medical countermeasure development, to ensure that the bio-defense needs of both military and civilian populations are met while avoiding duplication of effort and maximizing the benefits of limited resource allocation.

The committee believes such coordination and collaboration are essential, and believes it is important to understand the mechanism and process by which the two departments manage this process with other interagency partners. Therefore, the committee directs the Secretary of Defense to provide to the congressional defense committees an unclassified report, not later than November 1, 2015, describing the process and mechanisms by which the DOD coordinates its bio-defense medical countermeasures development with those of the DHHS. The report should describe the roles of the various interagency partners in deciding R&D priorities and responsibilities, and how the process avoids duplication of effort.

National Security Agency cybersecurity research and development

The budget request included \$125.9 million for research and development (R&D) for the National Security Agency's (NSA) Information Systems Security Program (ISSP) in PE 33140G, conducted by the Information Assurance Directorate (IAD), a reduction of one-third from the \$181.6 million appropriated in fiscal year 2014.

This steep R&D reduction resulted in part because of the NSA IAD's insistence, despite the recommendation of the Office of the Chief Information Officer (CIO) and the Office of Cost Assessment and Program Evaluation, on maintaining the level of funding in its operations and maintenance budget to protect its government workforce.

The committee urges the Principal Cyber Advisor and the CIO to review the IAD cybersecurity R&D budget and to augment that budget, as appropriate, through reprogramming actions. The committee also urges the CIO and NSA's leadership to determine IAD's

sustainable government workforce levels in connection with future budget submissions.

Supporting commercialization of defense laboratory technologies

The committee notes that the Department of Defense (DOD) executes a number of activities to promote the transfer of technology from DOD laboratories or agencies to commercial entities, for potential further technology development or commercialization. These activities can support the development of new military capabilities that can be incorporated into acquisition programs, and also enhance the return on taxpayers' investments in defense research programs, while creating jobs and stimulating the economy. The committee notes that the administration has established a major technology transfer initiative, "Lab-to-Market," with a goal of establishing policies and programs that streamline the ability for the private sector to leverage the inventions and innovation that occur inside federal laboratories to support national missions. Further, the committee notes that the recent Institute for Defense Analyses study, "Exemplar Practices for Department of Defense Technology Transfer," identified a number of best practices that enhance the efficiency of technology transfer processes, including the establishment of partnerships between labs, universities, and industry, marketing laboratory technologies and capabilities to industry, and using existing technology transfer mechanisms and authorities to full potential. Finally, the committee notes that DOD recently established a "Technology Transfer Center of Excellence," which will help DOD transfer technologies developed at its defense laboratories to the commercial marketplace. Consistent with these efforts and findings, the committee recommends that DOD continue to expand its technology transfer activities, including through the use of expertise in university centers, industry associations, and government organizations to identify and proliferate best technology transfer practices.

Technology transition of successful research initiatives

Since its inception more than 55 years ago, the Defense Advanced Research Projects Agency (DARPA) has invested in a number of groundbreaking new technology advances, some of which have resulted in significantly enhanced military capabilities as well as commercial products that benefit the nation. DARPA has a unique role within the Department of Defense (DOD) and is intended to be a specialized technological engine for pursuing radical innovations and high-payoff research projects that can transform military capabilities beyond near-term needs and requirements.

The committee fully supports the important role that DARPA fills in pursuing cutting edge concepts and technologies that improve military capabilities. The committee believes that continued investment in high-risk, high-payoff research and development projects is critical, given the broad and complex range of current and emerging security threats facing our nation. In addition, with current fiscal constraints driving reductions in force structure, readiness, and modernization in DOD, it is essential that we sustain a robust science and technology enterprise to support military

readiness and to deliver advanced technologies and capabilities to operational forces.

Based on the nature of research endeavors, it is expected that some technology projects may not achieve their intended goals and objectives or are just the first steps towards proof of concept and development. However, the committee is concerned that some technology projects may be successfully completed, but fail to transition into acquisition programs of record or directly into operational use. This may be because of administrative, funding, cultural, and/or programmatic barriers that make it difficult to bridge the gap from science and technology programs to acquisition programs, as well to the expected users of the technology. As the Government Accountability Office (GAO) and others have previously reported, transitioning technologies from defense science and technology organizations to military users has been a long-standing challenge for DOD. These reports have found that sometimes technologies are not ready to transition when needed because they may still be too risky or too costly to adopt or have not been adequately demonstrated. In other cases, promising technologies are not taken advantage of because of insufficient processes and mechanisms to expedite their transition to users. These transition barriers and failures reduce the return on investment for science and technology funding, and create severe funding challenges for research performers in industry and government, who must strive to sustain a skilled workforce, and specialized equipment and facilities, during periods of funding discontinuities.

The committee further notes that the Office of the Secretary of Defense (OSD) and defense agencies manage over \$2.0 billion in science and technology programs aside from those in the DARPA budget. The committee is concerned that these programs are facing the same technology transition challenges that DARPA faces.

The committee directs the GAO to review DARPA, OSD, and the defense agencies technology transition processes, practices, and results. In conducting this review, GAO should assess: (1) The policies, processes, and mechanisms that have been established to plan for and facilitate the transition of technologies to users; (2) The extent to which organizations use existing DOD and military department technology transition programs and initiatives such as the Rapid Innovation program, Joint Capability Technology Demonstrations, and the Small Business Innovation Research program; (3) DARPA projects considered technically successful that were not transitioned, directly or indirectly, into operational use or service acquisition programs and the underlying reasons for those transition failures; (4) How organizations track and measure technology transition; and (5) The factors that hinder the transition of promising technologies.

The committee further directs that the GAO submit a report on this review to the congressional defense committees no later than 180 days after enactment of this Act.

Unmanned underwater vehicles and the public shipyards

In the House report accompanying H.R. 1960 (H. Rpt. 113–102) of the National Defense Authorization Act for Fiscal Year 2014, the Committee on Armed Services of the House of Representatives ex-

pressed its belief that in order “to maintain undersea dominance in maritime regions of significant economic and military importance to the United States, the Navy requires disruptive technologies that can be rapidly developed, demonstrated, evaluated, and fielded to counter expanding undersea capabilities by peer and near-peer maritime nations and to extend the Navy’s reach and persistence.” The committee expressed its concern that, under the Navy’s acquisition plan, the Navy would not have the new technologies it needs to meet these requirements until after 2020.

The Committee on Armed Services of the Senate agrees with the views expressed by the House. Unmanned underwater vehicles (UUV) will be critical to the protection of U.S. economic and national security interests. Integrating them and other autonomous undersea technologies and payloads into the undersea warfare mission area will expand the technology base and more rapidly provide warfighting options that are not currently achievable.

The committee remains concerned that the Navy may not be able to develop the necessary capabilities to achieve its goal of deploying large displacement UUV (LDUUV) from an operational UUV squadron on independent missions by 2020. Further, the committee believes that budget constraints may further hamper the development of these critical capabilities. For these reasons, with respect to the development of UUVs, the committee believes that the Navy should look for opportunities to capitalize on existing resources and assets within the Navy enterprise to expedite the development of these vehicles and their technology at the lowest possible cost.

Particularly with respect to the LDUUV project, the committee encourages the Navy to take full advantage of existing expertise and infrastructure at the public shipyards. The committee believes that the public shipyards may be able to assist the LDUUV project with engineering, configuration management, acquisition support, technical problem solving, and operations and logistics support, including life-cycle maintenance and mission package support.

Therefore, no later than September 30, 2014, the committee directs the Navy to provide a report to the congressional defense committees detailing how the Navy is currently utilizing, and plans to utilize, the public shipyard infrastructure and expertise for UUV research, development, engineering, configuration management, acquisition support, technical problem solving, and operations and logistics support, including life-cycle maintenance and mission package support. In addition, the report should identify all funding by fiscal year, appropriation, and line item/program element budgeted in support of this effort.