

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

Subtitle A—Authorization of Appropriations

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

**Limitation on use of funds for alternative propulsion system
for the F-35 Joint Strike Fighter program (sec. 211)**

The committee recommends a provision that would require that, before spending any additional funds on the F136 engine that is being developed as an alternative propulsion system of the F-35 Joint Strike Fighter program, the Secretary of Defense would have to certify that development of the alternate propulsion system:

- (1) will:
 - (a) reduce the total life cycle-cycle costs of the F-35 Joint Strike Fighter program;
 - (b) improve the operational readiness of the fleet of F-35 Joint Strike Fighter aircraft; and
- (2) will not:
 - (a) disrupt the F-35 Joint Strike Fighter program during the research, development, and procurement phases of the program; or
 - (b) result in the procurement of fewer F-35 Joint Strike Fighter aircraft during the life cycle of the program.

**Limitation on use of funds by Defense Advanced Research
Projects Agency for operation of National Cyber Range
(sec. 212)**

The budget request included \$10.0 million for the Defense Advanced Research Projects Agency (DARPA) in PE 35103E for the National Cyber Range (NCR) in the Cyber Security Initiative. In the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111-84), the conferees noted concern with DARPA that it had not yet identified a transition partner for the NCR, nor were there funds programmed in any other organization's budget to support continued operations of the NCR. The committee remains concerned about the lack of a transition path.

Therefore, the committee recommends a provision to prohibit any expenditure of funds for the NCR until 90 days after the Under Secretary of Defense for Acquisition, Technology, and Logistics submits a report to the Committees on Armed Services of the Senate and the House of Representatives on plans for transitioning the NCR to sustainment and operations. Furthermore, funds expended on the NCR 90 days after the report is submitted can only be for research and development activities to ensure and assess the functionality of the NCR.

This required report should determine the possible options for transition recipients, and for each option described, should clearly articulate the steps that should be taken, proposed milestones, and funding necessary for full transition. Included in the range of options, the report should consider the establishment of a government consortium of the NCR as a government-owned government-operated, or a government-owned contractor operated facility.

Enhancement of Department of Defense support of science, mathematics, and engineering education (sec. 213)

Section 2192 of title 10, United States Code, provides the Secretary of Defense certain authorities in support of improving education in the scientific, mathematics, and engineering skills—commonly referred to as Science, Technology, Engineering, and Mathematics (STEM)—necessary to meet the long-term national defense needs of the United States for personnel proficient in such skills. Pursuant to these STEM-related authorities, the committee commends the Department of Defense for recently developing and releasing a STEM Education and Outreach Strategic Plan Framework, and looks forward to its implementation.

To further the important strategic goal of ensuring that our Nation and the Department has an adequate future talent pool of scientists and engineers for national competitiveness and defense needs, the committee recommends a provision to section 2192 of title 10, United States Code, permitting the Secretary of Defense to carry out these activities through the military departments, which in many cases have close working relationships between their research laboratories and local academic institutions.

The committee also recommends a provision to section 2194 of title 10, United States Code, to authorize the Secretary of Defense to permit the directors of defense laboratories to enter into cooperative agreements with appropriate entities to assist laboratory personnel in STEM-related activities with local academic institutions.

Program for research, development, and deployment of advanced ground vehicles, ground vehicle systems, and components (sec. 214)

The committee recommends a provision that would authorize the Secretary of Defense to carry out a cost-shared program, in cooperation with industry, academia, and other federal agencies, including the Department of Energy, to develop and deploy advanced technology ground vehicles and their component parts. The purposes of this program would be to maximize collective investments in development and deployment of advanced ground vehicle technologies and to identify and support technological advances critical to sustained, long-term development of ground vehicle technologies for use by the Department of Defense (DOD).

In carrying out such a program, the committee recommends that DOD work in close collaboration with federal and non-federal partners to leverage investments in ground vehicle power and propulsion technologies and accelerate technology innovation and commercialization. The committee recommends DOD consider a variety of joint opportunities including research and development initiatives, pilot programs, and establishment of public-private partner-

ships such as research centers, prototype facilities, and test beds. Such a program should include research and development and deployment of technologies including, but not limited to, batteries, advanced materials, power electronics, fuel cells and fuel cell systems, hybrid systems, and advanced engines.

Demonstration and pilot projects on cybersecurity (sec. 215)

The committee recommends a provision that would require the Secretary of Defense, in support of and in coordination with the Secretary of Homeland Security, to develop and conduct pilot demonstrations to determine the potential contribution of commercial technology and capabilities to the defense of government and defense industrial base cyber networks and systems, and various means by which the government can acquire or apply those commercial technologies and capabilities.

The committee strongly supports the potential piloting projects recently developed within the executive branch, and recommends authorization of \$30.0 million to execute the pilots described in this section. The committee is heartened that the administration is finally recognizing the enormous potential role for the private sector in cybersecurity. The funding would be authorized in line 196, Research, Development, Test, and Evaluation, Defense-wide, PE 32019K.

The committee is persuaded that the major telecommunications and Internet Service Providers, collectively, have unparalleled visibility into global networks which would enable them to detect cyber intrusions and attacks as they are forming and transiting towards their targets. These companies also already possess potent tools and techniques for countering these attacks in order to defend their own infrastructure and the networks and applications of their customers. However, while each of the major companies possesses impressive visibility, it is only by combining their collective network visibility that a comprehensive, global warning and assessment capability can be achieved. Furthermore, while these companies already share information about threats and problems, they do so on an ad hoc and non-real-time basis. An integrated attack warning and response capability requires an engineered, real-time exchange and consolidation of threat information and response capabilities.

The committee believes that it is essential for the administration to determine how a commercial consortium could be formed, what the government's role would be in establishing and managing such a consortium, and how the government could and should participate. The committee is aware that there are significant legal and policy issues that would need to be carefully worked through, including possible anti-trust concerns and legal restrictions on the sharing of the content of communications with the government, even if that content is malicious software. The committee's intent is that the administration proceed as far as it can as soon as it can, on a pilot basis, but completely within the confines of existing policy and legal constraints. The administration should not wait to begin those elements of this pilot that can be pursued right away until it has sorted out and resolved all the issues associated with a fully operational commercial consortium that is integrated into government security operations centers.

The committee stresses that this commercial consortium pilot depends on sponsorship from the Department of Homeland Security (DHS), and that the DOD role would be to support DHS.

The committee is also very interested in the potential for commercially outsourced, managed security services to rapidly increase the security of key elements of the Defense Industrial Base. If this pilot is successful, it could provide a model for defending other privately owned critical infrastructure, as well as federal departments and agencies, consistent with the Managed Trusted Internet Protocol Services program executed by the General Services Administration (GSA), which now includes managed security services under the Networx contract vehicle.

This model also could be easily extended to encompass outsourcing of network services and computing, including cloud computing. The committee believes that there is evidence to support the contention that such comprehensive outsourcing would provide better service and far better security, at equal or even reduced cost. The committee notes that GSA achieved precisely these results through its own cloud outsourcing program.

The committee hopes that these two pilots could demonstrate that there are means to dramatically improve the Nation's cybersecurity capabilities rapidly, affordably, and without taxing the limited abilities of DHS and other federal organizations to manage complex systems acquisitions. The models demonstrated through these pilots also could complement, and be integrated with, the Einstein 3 program, and existing defense-in-depth cybersecurity capabilities within the Department of Defense, the Department of State, the Department of Justice, and elsewhere.

A third pilot would involve creating a commercial construct and processes that would permit DOD to rapidly acquire operational or technical cyber capabilities from the private sector, to incentivize commercial investments in technology and capabilities, and to facilitate the transition of these capabilities into both government programs and commercial markets. A major goal would be to achieve agility in exploiting innovations and closing vulnerabilities. The committee expects that this pilot would contribute to the cyber acquisition strategy that would be required by sec. 933 of this Act.

The provision would require DOD to conduct a fourth pilot whose purpose would be to develop a process to enable the evaluation and comparison of commercial cyber security products and services across a common set of standards and a common taxonomy. The committee intends that the Department exploit the work of the private sector's development of the Consensus Audit Guidelines and the security controls developed by the National Institute of Standards and Technology. These guidelines and controls are based on the most significant attack patterns, and could form a framework for organizing and integrating commercial products and services.

The committee understands that these pilots will take some time to initiate and complete, but expects the Department to be aggressive, in keeping with the Department's own declared anxiety about the rising cybersecurity threat and the need for forceful corrective action.

Subtitle C—Missile Defense Matters

Sense of Congress on ballistic missile defense (sec. 231)

The committee recommends a provision that would express the sense of Congress on ballistic missile defense issues, including: 1) that the Phased Adaptive Approach (PAA) to missile defense in Europe is an appropriate response to the missile threat from Iran, and that it is consistent with the guidance from Congress in 2009; 2) that the PAA is not intended to, and will not, provide a missile defense capability relative to Russia's deterrent missile force, or diminish strategic stability with Russia; 3) to support efforts of the U.S. Government and the North Atlantic Treaty Organization to cooperate with Russia on missile defense relative to Iranian missile threats; 4) that the Ground-based Midcourse Defense system currently provides adequate defensive capability against potential future long-range missile threats from Iran; 5) that the United States should continue to improve and deploy missile defense systems to defend itself against limited attack and to strengthen regional stability; 6) that, as part of this effort, the Department of Defense should pursue the development, testing, and deployment of operationally effective versions of all variants of the Standard Missile-3 (SM-3) for all four phases of the Phased Adaptive Approach to missile defense in Europe; 7) that the SM-3 Block IIB interceptor should be capable of addressing potential future long-range missiles from Iran; 8) that there are no constraints contained in the New START Treaty on the development or deployment of effective missile defenses; and 9) that the Department should continue the development and testing of the two-stage Ground-Based Interceptor as a hedge against potential technical challenges with the development of the SM-3 Block IIB interceptor.

Repeal of prohibition on certain contracts by the Missile Defense Agency with foreign entities (sec. 232)

The committee recommends a provision that would repeal section 222 of the National Defense Authorization Act for Fiscal Years 1988 and 1989 (Public Law 100-180). That section prohibits the use of Department of Defense (DOD) funds for entering into a contract with a foreign government or firm for research, development, test, or evaluation in connection with strategic missile defense.

As has been the case in recent years, and as the Ballistic Missile Defense Review of February 2010 made clear, robust international cooperation is an essential component of the U.S. ballistic missile defense program. DOD has a growing number of important cooperative projects with foreign nations, such as the joint U.S.-Japanese development of the Standard Missile 3, Block II A interceptor missile, or the joint U.S.-Israeli development of several ballistic missile defense systems.

Section 222 is now contrary to the policy, practice, and intent of the United States, and it hinders the ability of the Missile Defense Agency to contract directly with foreign governments and entities. Repealing that section would enhance the opportunities for international cooperation on missile defense.

Medium Extended Air Defense System (sec. 233)

The committee recommends a provision that would limit the availability of any fiscal year 2011 funds for the Medium Extended Air Defense System (MEADS) until several conditions are met: 1) the Department of Defense (DOD) has completed the Critical Design Review and the System Program Review for the MEADS program and made a decision on how or whether to proceed with MEADS or an alternative to MEADS; 2) the Secretary of Defense has submitted a report to the congressional defense committees providing a detailed explanation of the decision concerning the future of MEADS; and 3) 60 days have elapsed following the receipt of the Secretary's report. The provision would specify a number of elements to be included in the Secretary's report.

The committee is deeply concerned with the significant uncertainties surrounding the MEADS program, a tri-national development effort between the United States, Germany, and Italy, to develop a next-generation lower-tier air and missile defense system. As the system approaches a Critical Design Review scheduled for August 2010, it is estimated to be about \$1.0 billion over budget and about 18 months behind schedule. There are also concerns that MEADS will not meet all its Army requirements, including the ability to be transported by C-130 aircraft.

Furthermore, the Army and DOD have decided that, in order to meet their needs for integrated air and missile defense in an interoperable fashion with other U.S. systems, the U.S. MEADS command, control, and battle management system must be the Integrated Battle Control System (IBCS), which is not part of the original MEADS program agreement. There is also concern that the interceptor missile for MEADS, the Missile Segment Enhancement (a modification of the Patriot Advanced Capability 3 missile), may have technical or schedule risks associated with an aggressive test schedule, which may delay its availability for MEADS.

In addition, our international partners may have reservations about proceeding with the previously planned MEADS system. The German parliament is seeking information on less expensive alternatives to MEADS, and it appears that Italy may not procure the MEADS system.

All these factors suggest that the program could be on an unstable path, including the possibility of significant modification or even termination. Accordingly, the committee believes that DOD and the Army should proceed cautiously and deliberately with MEADS in order to avoid making decisions that may be unnecessarily costly or that may need to be reversed.

In this regard, the committee cautions the Army against spending fiscal year 2010 funds for MEADS efforts that may be reversed, or that may require additional termination fees if the program is later terminated.

Acquisition accountability reports on the Ballistic Missile Defense System (sec. 234)

The committee recommends a provision that would require the Missile Defense Agency (MDA) to establish and maintain an acquisition baseline for each program element of the Ballistic Missile Defense System, with specified elements, and to provide annual re-

ports to the congressional defense committees on the acquisition baselines, starting in February 2011. The reports would also include a description of the activities of the Missile Defense Executive Board for the preceding fiscal year.

The committee notes that Congress has previously urged the MDA to develop and report acquisition baselines on its program elements to improve management, accountability, and transparency, but MDA has not developed such baselines previously, despite commitments to do so. The Government Accountability Office has also recommended numerous times that MDA should develop and use acquisition baselines for cost, schedule, and performance in order to permit objective assessments of their progress on missile defense acquisition programs. The lack of MDA acquisition baselines has been a significant impediment to adequate oversight of MDA programs, and has made MDA activities much less transparent and accountable than other Major Defense Acquisition Programs.

The committee recognizes that the current leadership of the Missile Defense Agency has taken the initiative to develop acquisition baselines and use them as a central management tool. The committee commends MDA's leadership for taking this important step, and looks forward to receiving the baselines and using them to assess progress on MDA programs. The committee believes it is important to require such baselines in law to ensure that they will be an enduring feature of MDA program management and oversight in the future.

Independent review and assessment of the Ground-based Midcourse Defense system (sec. 235)

The committee recommends a provision that would require the Secretary of Defense to select an entity outside the Department of Defense to conduct an independent review and assessment of the Department's plans for the Ground-based Midcourse Defense (GMD) system. Within 6 months of the date of enactment of this Act, the outside entity would submit to the Secretary and the congressional defense committees a report containing the results of the review and assessment, and any recommendations for how the Department could improve upon its plans for the GMD system.

Budget Items

Army

Army basic research

The budget request included \$406.9 million in Army basic research to develop a foundational scientific and technological understanding to solve Army-unique problems and develop knowledge for an uncertain future. The Army's basic research program makes investments in a number of thrust areas ranging from biotechnology to quantum information science. Consistent with these research thrusts, the committee recommends increases in PE 61102A of \$6.0 million for advanced energy storage research and research into ultracold forms of matter for future navigation systems. In PE 61103A, the committee recommends an additional \$2.0 million for

new lightweight materials for vehicle protection. The committee also recommends an increase of \$2.0 million in PE 61104A for materials processing research.

Army materials technologies

The budget request included \$29.9 million in PE 62105A for applied research on materials technology. The committee notes that the Defense Science Board Task Force on the Department of Defense (DOD) Energy Strategy recommended that DOD continue to invest in mobile, in-theater synthetic fuels processes that would address DOD's fuel problem by reducing battlespace fuel demand. Consistent with that recommendation, the committee recommends an additional \$1.5 million for the research on advanced biofuels.

The Army's current armor development technology objective seeks to develop lightweight, affordable, manufacturable armor protection against a variety of threats. In support of that objective, the committee recommends an additional \$3.0 million for applied composite materials research; \$2.0 million for research on high strength glass fibers for armor applications; and \$1.5 million for lighter body armor technology development. Lastly, the committee recommends \$2.0 million for PE 63005A for advanced multifunctional armor technology, \$1.5 million for PE 63001A for moldable fabric armor, and \$2.0 million in PE 63734A for improved projectile and hardened structure testing.

In addition to armor and other direct warfighting applications, lighter and stronger materials can also improve other logistical and support-related systems. To further these capabilities, the committee recommends \$2.0 million in PE 63005A to advance the development of composite shelters for the maintenance of tactical ground vehicles.

The 2007 report on the Defense Nanotechnology Research Program indicated that the Department is working to increase investments in nanomanufacturing since "this area remains a significant barrier to the commercialization of nanomaterials and nanotechnology-based products." The committee recommends an additional \$4.0 million for PE 62105A for research on manufacturing of nanosensors for military applications.

Unmanned aerial systems research and development

The budget request included \$43.5 million in PE 62211A towards applied research of aviation technologies, both manned and unmanned. Unmanned aerial systems (UAS) have seen dramatically increased utilization during recent operations, but there are shortfalls in higher performing propulsion systems and integration issues that remain to be addressed. In support of these efforts, the committee recommends an increase of \$2.0 million in PE 62211A for unmanned aerial system integration. In addition, the committee recommends an increase of \$8.5 million in PE 63003A for improved UAS engine development, rotorcraft corrosion reduction efforts, and improving capabilities to more rapidly insert new aviation technologies, including enhanced systems to detect hostile fire.

Advanced concepts and simulation

The budget request included \$20.6 million in PE 62308A for advanced concepts and simulation research. The 2006 National Research Council study on “Defense Modeling, Simulation, and Analysis” recommended research investment on video game-based training and simulation to further training and education activities in the Department of Defense. Consistent with that recommendation, the committee recommends an additional \$2.0 million for cognitive modeling and simulation research to support tactical decision-making by military planners in training and operational scenarios.

Ground vehicle research

The budget request included \$64.7 million in PE 62601A and \$89.5 million in PE 63005A for research on combat vehicles and automotive technologies. The Army has established a technology objective to develop advanced survivability systems for the protection of crew and passengers in current and future tactical wheeled vehicles. To support these efforts, the committee recommends an increase of \$12.0 million in PE 63005A for development of advanced ground vehicle survivability technologies including, but not limited to, external armor solutions, threat sensors, and other defensive measures, and \$2.0 million in PE 62105A and \$2.9 million in PE 78045A for research on advanced composite and alloy materials for vehicle armor.

The Army has established a technology objective to develop and demonstrate wheeled vehicle power and mobility technologies, including commercial engines adapted to military requirements that reduce cost, increase efficiency, and improve reliability. To support these efforts, the committee recommends an increase of \$18.0 million in PE 63005A for development of advanced power electronics, improved thermal management, and development of other engine subsystems. To better understand and prevent engine and vehicle wear, the committee recommends \$2.0 million in PE 62601A for research on engine and transmission friction and wear.

Robotic systems

The budget request included \$64.7 million in PE 62601A and \$89.5 million in PE 63005A for research on combat vehicles and automotive technologies. The committee notes the increasing use and value of robotic systems on the battlefield to perform counter-improvised explosive device maneuvers; intelligence, surveillance, and reconnaissance; and other tactical missions. The committee also notes that section 220 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106–398) established a goal that by 2015, one-third of the operational ground combat vehicles acquired through the Army’s Future Combat Systems program will be unmanned. In support of these goals, the committee recommends an increase of \$12.0 million in PE 62601A for the development of robotics systems, vehicle autonomy, and advanced energy and propulsion systems for robotic vehicles. The committee also recommends an increase of \$2.0 million in PE 63005A for the development of autonomous and connected vehicle technologies for logistics, force protection, and other applications.

Vehicle energy and power programs

The budget request included \$64.7 million in PE 62601A and \$89.5 million in PE 63005A for combat vehicle research and development. The committee has been focused on and supportive of efforts to increase the energy efficiency and performance of combat and tactical vehicles through the application of advanced energy technologies. These technologies can also enable capabilities such as silent watch, extended range, and the provision of mobile electric power, all of which serve to significantly enhance the operational capability of warfighters. To support the Army's goals in this area, the committee recommends an increase of \$7.0 million in PE 62601A for hybrid electric vehicle testing and hybrid truck development. The committee also recommends \$1.5 million for applied research on advanced materials for energy storage, conversion, and distribution.

The committee notes that the Army has been experimenting with a variety of hybrid systems to support Future Combat Systems, trucks, and light tactical vehicles. Consistent with the development of hybrid engines and systems to support military applications, the committee recommends an increase of \$7.0 million in PE 63005A for improved auxiliary power, battery systems, and overall power management. The committee recommends \$12.0 million for improvements in vehicle electronics and their underlying architecture for more advanced and efficient systems for the warfighter. The committee also notes that hybrid engines and plug-in technologies hold particular promise for use in theater and recommends an increase of \$6.7 million for development in PE 63005A.

Reactive armor technologies

The budget request included \$60.3 million in PE 62618A for ballistics technologies. The Army has established a technology objective to develop armor and vehicle structure technologies to influence all future generations of combat vehicles. To support this effort and enhance industrial production capacity, the committee recommends an increase of \$3.0 million for research on reactive armor systems.

Advanced detection research

The budget request included \$5.3 million in PE 62622A for applied research towards improving personnel and platform survivability. The committee recommends an increase of \$1.5 million to PE 62622A for development of new technologies for the standoff detection of radionuclides. In addition, the committee recommends an increase of \$2.0 million in PE 62234N for the development of new materials for focal planes in infrared detectors and an increase of \$3.0 million in PE 62712A for improved multispectral imaging technology for explosives detection.

Acoustic sensors systems

The budget request included \$42.6 million in PE 62624A for applied research on weapons and munitions technology. The Army's Sensor and Information Fusion for Improved Hostile Fire Situational Awareness technology objective seeks to develop enhanced acoustic and other sensors to detect, locate, and classify a wide

range of threats. In support of these efforts, the committee recommends an additional \$2.0 million for continued development of gunfire detection and location systems. Similarly, the committee recommends an additional \$2.0 million in PE 63710A for situation awareness research and technology development.

Military engineering technology

The budget request included \$79.2 million in PE 62784A for military engineering technologies. The Army has established a technology objective to improve battlespace and terrain awareness for forces by creating actionable information from terrain, atmospheric, and weather impacts and their effects on Army assets. In support of this objective, the committee recommends an additional \$2.0 million for geosciences and atmospheric research.

Medical and warfighter technologies

The budget request included \$27.7 million in PE 62786A for warfighter technology and \$96.8 million in PE 62787A for applied research on medical technologies. To support development of combat casualty care capabilities, the committee recommends an additional \$2.0 million in PE 62787A for research on explosion blast interactions with protective equipment and personnel. In addition, the committee recommends an increase of \$5.0 million in PE 62787A for new modeling and treatment approaches for traumatic brain and spinal cord injuries, \$3.0 million in PE 64771N for retinal transplant technologies for vision restoration in blast trauma victims, and \$1.0 million in PE 62786A for research to enhance combat ration shelf life and nutrition.

Thermal resistant fiber research

The budget request included \$27.7 million in PE 62786A for warfighter technologies, including those to improve soldier and small combat unit survivability. In order to help address the threat of burn injuries to deployed warfighters, the committee recommends an increase of \$2.5 million for thermal resistant fiber research.

Army advanced medical research and technologies

The budget request included \$71.5 million in PE 63002A for advanced medical technologies. The Army's medical research program on this effort focuses on warfighter medical protection performance standards that demonstrate and transition technologies and tools associated with biomechanical-based health risks, injury assessment and prediction, soldier survivability, and performance during continuous operations. Consistent with these efforts, the committee recommends an additional \$2.0 million for the development of biosensor controller and monitor systems, \$2.5 million for body temperature conditioning technologies, \$2.0 million for enhanced medical training, and \$2.0 million for eye trauma research.

The committee commends the Army and Department of Defense for its work developing advanced prosthetics technologies for use by wounded warriors. In support of these efforts, the committee recommends an additional \$2.0 million for lower limb prosthetics de-

velopment and an additional \$4.0 million for improved prosthetics manufacturing.

Telemedicine is becoming an important area of medical technology in need of further development to continue to deliver quality care to our troops in the battlefield and at home. In support of developing telemedicine tools, the committee recommends an additional \$1.5 million for telemedicine research and \$3.0 million for handheld telemedicine device development.

The committee further recommends an additional \$5.5 million for research on the integration of medical technologies to address combat casualty care issues and \$12.0 million to support research on Gulf War illnesses.

Army weapon systems sustainment

The budget request included \$89.5 million in PE 63005A for research on combat vehicles and automotive technologies. Many of the legacy systems utilized by the Army are decades old and require parts for frequent repairs. As the systems age, often the parts and assemblies are no longer being manufactured, making them expensive and difficult to locate. The committee recommends an increase of \$4.0 million in PE 63005A to help reduce the life cycle costs of legacy Army systems by addressing the costs associated with diminishing manufacturing and material sources through re-engineering, substitute part testing and evaluation, and additional research. In addition, the committee recommends an additional \$1.5 million in PE 62105A for weapon systems repair technologies.

Force projection technology

The budget request included \$89.5 million in PE 63005A for research on combat vehicles and automotive technologies. The committee recommends an additional \$8.0 million in PE 63005A for critical improvements to force projection technologies. Thrust areas include research, development, and engineering support for Army fuels and lubricants, water purification and handling, military bridging, material handling, mechanical counter-mine and counter-improvised explosive device equipment, and other equipment to support Army requirements for the mobilization and support of military personnel in deployed locations. The committee also recommends an additional \$4.5 million in PE 63005A specifically for improved water generation and purification systems.

Training and simulation systems

The budget request included \$15.3 million in PE 63015A for next-generation training and simulation systems. To enhance training for battlefield lifesaving skills, the committee recommends an additional \$1.0 million for combat medic training systems.

Aircraft survivability systems

The budget request included \$18.4 million in PE 63270A for electronic warfare technologies. The Army has established a technology objective to develop and integrate threat warning sensors and countermeasures to protect aircraft against small arms, rocket propelled grenades, man-portable air defense systems, and other threats. Consistent with that objective, the committee recommends an addi-

tional \$3.0 million for development of laser technologies to improve aircraft survivability against missile threats.

Missile artillery advanced technology development

The budget request included \$84.5 million in PE 63313A for missile and rocket advanced technology development.

The committee is aware that after an investment of \$1.5 billion over several years the Defense Department will cancel the Non-Line of Sight Launch System (NLOS-LS) program. This cancellation was due to performance shortfalls, high projected costs for each missile, and the availability of other technologies to meet the Army's precision artillery fire requirements.

The committee notes that ground launched rocket (unguided) and missile (guided) artillery systems have been part of the Army's mix of indirect fire capabilities for generations. Despite the cancellation of the NLOS-LS program, the Army retains an appropriate interest in technology development and experimentation involving modern missile artillery of all sizes, ranges, and targeting capabilities. Additionally, the committee understands that upon termination of the NLOS-LS program the Army will own the technical data rights to that system's container launch unit. This container launch unit could provide the basis for a deliberate, comprehensive, and open development and experimentation effort taking advantage of a variety of technologies with the potential to overcome the performance shortfalls and cost challenges of the cancelled NLOS-LS.

Accordingly, the committee recommends an increase of \$9.5 million in PE 63313A for missile and rocket advanced technology development.

Military engineering systems

The budget request included \$27.4 million in PE 63734A for advanced military engineering technologies. The committee recommends an additional \$1.0 million for permafrost research to enhance the understanding and implications of permafrost-related geophysical phenomenology on defense infrastructure and systems for current and future operations.

Consistent with efforts to improve Department of Defense energy security and efficiency, the committee recommends an additional \$8.0 million in PE 63734A for development of solar cell technologies for use at military installations. In addition, the committee recommends an increase of \$2.0 million in PE 61153N for research using nanomaterials for solar cells.

Adaptive robotic technology

The budget request included \$11.5 million in PE 63305A for Army missile defense systems integration, but no funds for development of adaptive robotic technology to improve integrated missile defense capabilities. The committee recommends an increase of \$3.0 million in PE 63305A for development of adaptive robotic technology for Army missile defense and space mission requirements, including processes, tools, models, and simulations for improved integration of complex functions and operations.

Advanced environmental controls

The budget request included \$11.5 million in PE 63305A for Army missile defense systems integration, but no funds for advanced environmental control systems. The committee recommends an increase of \$3.0 million in PE 63305A for the development of thermal management control systems that can support sensors and electronic systems that operate in the harsh environmental conditions required by missile defense systems. The committee notes that advanced environmental control systems have applicability to a variety of military systems that operate in harsh environments.

Advanced imaging technologies

The budget request included \$11.5 million in PE 63305A for advanced missile and rocket technologies. The Army has a technical objective to develop tactical information technologies for assured network operations and to enable battlefield information sharing. Consistent with that objective, the committee recommends an increase of \$2.5 million for imaging and networking research to enable rapid and precise target discrimination and identification.

Alternative power technology

The budget request included \$11.5 million in PE 63305A for Army missile defense systems integration, but no funds for alternative power technologies. The committee recommends an increase of \$2.0 million in PE 63305A for development of alternative power technologies for missile defense and other military applications. The Army relies on fossil fuel to generate power for forward deployed missile defense systems, including their sensors, command and control, and communications systems. Such reliance is both expensive and logistically burdensome. Alternative energy sources could provide significant benefits for missile defense and other military applications.

Hostile fire detection for helicopters

The budget request included \$4.9 million in PE 64270A for aircraft survivability equipment development, but included no funds for hostile fire detection. The committee recommends an increase of \$5.0 million in PE 64270A for hostile fire detection development for helicopters.

Non-line of sight launch system

The budget request included \$81.2 million in PE 64646A for the non-line of sight launch system (NLOS-LS). The committee is aware that in April 2010 the Army recommended termination of the NLOS-LS program. This was due to performance shortfalls, high projected costs for each missile, and the availability of other technologies to meet precision artillery fire requirements. Accordingly, the committee recommends a decrease of \$81.2 million in PE 64646A for the NLOS-LS.

XM1125 smoke projectile

The budget request included \$24.3 million in PE 64802A for weapons and munitions engineering and development, but provided no funds for artillery munitions development. The committee rec-

ommends an increase of \$8.0 million in PE 64802A for development of the XM1125 155mm howitzer smoke projectile based upon a new, safer chemical content.

Paladin Integrated Management program

The budget request included \$53.6 million in PE 64854A for Paladin Integrated Management (PIM) system development. The PIM program would upgrade and extend the life of the Army's current M109A6 Paladin self-propelled howitzer system. The committee is concerned that this important artillery system upgrade for the Army's heavy force should have the resources to reduce technical risk and recover from this delay. The committee recommends an increase of \$30.0 million in PE 64854A for PIM technology development.

Trojan Swarm

The budget request included \$3.7 million in Research, Development, Test, and Evaluation, Army, in PE 33032A for the Trojan program. The committee strongly supports the Trojan Swarm initiative and applauds the Army's innovative approach to rapidly fielding substantially greater communications capacity and agile networking capabilities for deployed ground forces in Afghanistan. Theater commanders and the Army leadership understand that this conflict's center of gravity is located where soldiers interact with the people of Afghanistan. Traditionally, the focus for Army communications and intelligence support was on brigade and higher echelons; this counterinsurgency campaign requires that focus to be on battalion and lower echelons. The Army, with support from the Intelligence, Surveillance, and Reconnaissance Task Force, is fielding a robust 3G cellular network for ground forces, for both forward operating bases (FOB) and mobile patrols, connected via airborne and satellite communications nodes.

The committee recommends that the Army work with other Department of Defense organizations, the interagency, and the Afghan Ministry of Telecommunications, to connect its FOBs via spurs to the backbone fiber-optic network nearing completion in Afghanistan. The committee also recommends that the Army incorporate passive electronic surveillance capabilities, both ground- and air-based, into the Trojan Swarm architecture. The committee recommends authorization of an additional \$10.0 million for these activities.

Army test and evaluation programs

The budget request included \$59.0 million in PE 65602A for technical test instrumentation and targets. The committee notes that this account and related accounts fund the operations, sustainment, and modernization of Army test ranges. These ranges are critical to the delivery of operational systems to deployed forces since they provide the facilities and infrastructure for both the developmental and operational testing of defense systems to validate their operational effectiveness, suitability, and reliability.

The committee notes that the Dugway Proving Grounds is the Department of Defense's premier testing facility for chemical and biological defense systems. To support the continued development

of these capabilities, the committee recommends an increase of \$4.0 million for field test equipment improvements.

To help address the integration of test and training activities between Fort Bliss, White Sands Missile Range, and Holloman Air Force Base, the committee recommends an increase of \$1.2 million for tools for frequency management, airspace deconfliction, and real-time monitoring of ranges.

The budget request also included \$4.7 million in PE 65605A for the Department of Defense High Energy Laser Test Facility (HELSTF). The committee notes that the Army planned to use the facility beginning in 2010 for tests associated with the High Energy Laser Technology Demonstrator program. To support these activities, the committee recommends an increase of \$5.0 million for HELSTF.

Enhanced Army energy testing

The budget request included \$59.0 million in PE 65602A for Army technical test instrumentation and targets. The committee recommends an increase of \$5.0 million in PE 65602A to support energy testing that would integrate renewable energy technologies, including solar, geothermal, biomass, nuclear, wind, and waste-to-energy, into a central storage system that routes the energy to a smart distribution and monitoring system.

Unserviceable ammunition demilitarization through chemical dissolution

The budget request included \$61.1 million in PE 65805A for munitions standardization, effectiveness, and safety, but provided no funds for unserviceable ammunition demilitarization through chemical dissolution. The committee recommends an increase of \$2.6 million in PE 65805A to design and construct a prototype chemical dissolution demilitarization system for the disposal of high risk, high cost, unserviceable, or obsolete ammunition.

Advanced ultrasonic inspection of helicopter rotor blades

The budget request included \$61.1 million in PE 78045A for end-item industrial preparedness activities, but provided no funds for ultrasonic inspection of helicopter rotor blades and condition monitoring of helicopter components. The committee recommends an increase of \$2.0 million in PE 78045A for ultrasonic inspection of helicopter rotor blades and condition monitoring of helicopter components to develop advanced ultrasonic techniques to significantly reduce inspection time and increase aircraft availability.

Navy

University research initiatives

The budget request included \$108.7 million in PE 61103N for university research initiatives. The Navy's survivability and self-defense science and technology focus area has a specific objective to develop advanced construction materials for survivable platforms. In support of that objective, the committee recommends an additional \$1.0 million in PE 61103N for blast and impact resistant structures.

Energetics research

The budget request included \$98.2 million in PE 62114N for applied research on power projection technologies. The committee recommends an additional \$3.0 million for research on advanced energetic materials to support efforts to counter new types of asymmetric threats such as chemical-biological weapons as well as increasing capabilities to defeat deeply buried targets.

Advanced energy research

The budget request included \$107.4 million in PE 62123N towards applied research on a broad range of technologies focused on all naval platforms and their protection, including advanced energy and power systems. The committee recommends an increase of \$1.9 million in PE 62123N for advanced wind energy research. In addition, the committee recommends similar increases for energy research in the other services. For the Air Force, the committee recommends an increase of \$3.0 million in PE 62102F for research on advanced heat exchangers. For the Army, the committee recommends an increase in PE 62075A of \$2.5 million for portable solar power generators, an increase of \$2.0 million for silicon carbide devices for quieter power generators, and an increase of \$2.0 million for integrating nanoscale technologies into improved batteries. The committee also recommends an increase of \$2.0 million in PE 61111D8Z for cryo-cooled superconducting systems to improve the efficiencies and integration of thermal management systems.

Navy force protection research

The budget request included \$107.4 million in PE 62123N for applied research on force protection technologies. The Navy's power and energy science and technology focus area has a goal to develop efficient power conversion technologies with a wide range of energy sources to provide reliable power for a range of naval systems. To support this goal, the committee recommends an increase of \$2.5 million for research on integrated power systems for future platforms that have all-electric propulsion and weapon loads.

The Navy's survivability and self-defense science and technology focus area seeks to enhance force protection by using innovative sensors to help detect and defeat incoming attacks. In support of that initiative, the committee recommends an increase of \$2.5 million for the development of port security sensors for under-hull inspection of ships.

Consistent with the Navy's platform mobility technology objectives to develop new advanced platform designs supporting new directions in naval warfare, such as increased agility, the committee recommends an increase of \$2.0 million for improved design and development tools for high-speed boats constructed from advanced composites.

Warfighter sustainment technologies

The budget request included \$113.7 million in PE 62236N for applied research on warfighter sustainment technologies. The committee notes the continued need for optimization of composite materials for use in a range of maritime vessels and equipment. For

this reason, the committee recommends an additional \$1.5 million in PE 62236N for composite material optimization research.

In support of continuing Navy and Department of Defense initiatives to reduce corrosion costs, the committee recommends an additional \$2.0 million for efforts on the development of sustainment and remanufacturing processes, asset health and logistics management techniques, and materials aging and corrosion abatement technologies.

The Department of Defense anti-tamper program seeks to deter the reverse engineering and exploitation of critical technology in order to impede technology transfer, stop alteration of system capability, and prevent the development of countermeasures to U.S. systems. In support of these efforts, the committee recommends an additional \$1.0 million in PE 62236N for research on anti-reverse engineering nanodevices, as well as an increase of \$1.5 million in PE 65790D8Z for research on anti-tamper software.

Advanced unmanned underwater vehicle research

The budget request included \$49.5 million in PE 62435N for applied research on ocean warfighting environments. The Navy's platform mobility science and technology focus area includes the goal of development and delivery of system and equipment technologies to improve autonomous and unmanned vehicle mobility. In support of this goal, the committee recommends an increase of \$3.0 million for advanced unmanned undersea vehicle research. For undersea warfare applied research in PE 62747N, the committee recommends an increase of \$1.5 million for accelerated development of an acoustic search glider.

In order to support Navy efforts to enhance the understanding of optical propagation within challenging ocean environments in support of mine countermeasures and underwater autonomous network communications, the committee recommends an additional \$1.0 million for research on extended range underwater imaging sensors and optical communications networks.

Mobile intelligence and tracking systems

The budget request included \$117.9 million in PE 63114N for advanced technologies for power projection. The Navy has a science and technology objective to develop data fusion and analysis technologies for actionable intelligence generation to defeat adaptive irregular threats in complex environments. In support of that objective, the committee recommends an increase of \$2.0 million for research on data processing and fusion technologies to support multiple simultaneous detections, tracking, identification, and targeting of asymmetric and mobile threats in combat operations.

Formable textiles

The budget request included \$61.9 million in PE 63123N for force protection advanced technology, but included no funding for development of formable textiles for complex shaped aerospace composite applications.

This effort has supported the development of infrastructure necessary to provide a stable, consistent environment to support an aircraft manufacturing program utilizing materials which hold

promise for reducing manufacturing costs of aerospace-grade, complex curved structural composite parts by enabling, via the materials, improved formability, greater utilization of automated manufacturing technologies as opposed to the current labor intensive hand lay-up methods.

The committee recommends an increase of \$3.0 million to enable further development of formable textiles for complex shaped aerospace composite applications.

Mobile repair capability

The budget request included \$61.9 million in PE 63123N for force protection advanced technology, but included no funding to develop advanced coating process technologies for naval aviation platforms and components.

Previous development work has shown that direct metal deposition (DMD) technology may be used to repair of a variety of worn/corroded Navy aircraft components. In fact, the Navy has successfully demonstrated repairs on high-strength steel and various other alloy materials in a laboratory environment using these processes. The committee believes that the Navy should continue developing this DMD technology to expand the repair capability to allow deployments of this repair technology directly on Navy vessels. Such an expansion of the program would allow Navy personnel to make local repairs, thus reducing the demand on shore based maintenance operations and increasing operational availability.

Therefore, the committee recommends an increase of \$3.0 million for developing a mobile capability for making DMD repairs on naval equipment.

Rare earth alternatives

The budget request included \$61.9 million in PE 63123N for force protection advanced technology, but included no funding to develop domestic sources of rare earth materials that could be used to produce permanent magnet motors.

Application of permanent magnet motors has the potential to expand significantly within the Department. At this time, we do not have access to domestic sources of the raw materials for these magnets. The committee believes that the Department needs to identify and develop domestically produced alternative materials, material technology, and manufacturing methods involving rare earth elements. Therefore, the committee recommends an increase of \$3.0 million to support such a program.

Single generator operations

The budget request included \$61.9 million in PE 63123N for force protection advanced technology, but included no funding for development of a lithium battery technology that could replace one of the three generators normally in operation or reserve aboard all large Navy ships.

If lithium battery technology could be scaled up to a capacity of roughly 2.5 megawatts, such a battery would replace one of the three ship service generators normally in operation or in reserve aboard all surface combatants. Such a battery system could provide a lower cost, higher quality source of electrical power that would

replace redundant back-up power sources dedicated to subsystems throughout the ship.

The committee recommends an increase of \$5.0 million to enable the development of such lithium battery technology.

High-Integrity Global Positioning System

The budget request included \$40.9 million in PE 63235N for the High-Integrity Global Positioning System. The committee recommends no funding for this program. The committee notes that there is still no demonstrated user for the concept, moreover the cost of implementing the concept would be very high and require additional expensive user equipment. It is also not clear how the approach is being considered or how the required hardware modifications are being coordinated with the Joint Tactical Radio System open architecture approach.

Hybrid heavy lift logistics vehicle

The budget request included \$98.3 million in PE 63236N for warfighter sustainment advanced technology developments, but included no funding to develop any concepts for providing innovative tools for supporting force and their logistics.

The committee is aware of a proposal to establish a program to engineer, design and test key components, and achieve a critical design review of a very large hybrid aircraft that could be used as a heavy lift transport in wartime. The project could help address the U.S. military's future airlift requirements by providing a highly-efficient hybrid airlifter that will be able to transport a complete combat force (troops, vehicles, helicopters, and supplies) great distances without loss of unit cohesion or physical readiness to fight. Hybrid heavy lift aircraft have the potential of being more fuel efficient than fixed-wing aircraft by burning as little as 40 percent of the fuel as a traditional fixed-wing aircraft, when compared on a fuel consumed on a "per ton/mile" basis.

The committee believes this possible development is worth exploring to increase the options for meeting such logistics requirements in the future, and recommends an increase of \$1.5 million for that purpose.

Lighter-than-air research platform

The budget request included \$98.3 million in PE 63236N for warfighter sustainment advanced technology developments, but included no funding to develop long distance ferry capabilities.

The committee believes that unmanned capabilities will continue to replace functions that currently require an aircrew. The committee is aware of a proposal to conduct further research on such an unmanned lighter-than-air capability, which can also serve as a research platform for the Navy. The committee recommends an additional \$2.5 million to support development of a lighter-than-air research platform.

Advanced actuators for submarines

The budget request included \$608.6 million in PE 63561N for advanced submarine systems development, including \$25.1 million to reduce submarine self noise, \$4.9 million to reduce total ownership

costs, and \$4.2 million for developing new ship concepts. However, the budget request included no funding for developing quiet advanced electrical actuators.

The committee believes that the Navy should develop advanced drive electric motors for use in Navy submarines to reduce noise signature through the use of noise-cancelling and vibration reduction technologies. The goal of such a development would be to enable the Navy to design and build all-electric submarines, or to backfit existing submarines with such systems to make them more electric. In either case, the committee believes that introducing such technology could result in reduced operations and support costs and increased readiness in the fleet.

The committee recommends an additional \$3.0 million to support developing quiet advanced electrical actuators.

Submarine shock mitigation

The budget request included \$608.6 million in PE 63561N for advanced submarine systems development, but included no funding for developing full-scale controllable shock mitigation devices to protect weapons aboard submarines.

The Navy has designed various rafting systems that are intended to mitigate shock and vibrations for major portions of the combat systems and other equipment systems within submarines to make submarines more producible and sustainable throughout their service lives. The committee understands there is available technology that could be applied to mitigating shock and vibration to which Navy submarine weapons are exposed, and reduce the demands for making special ship construction provisions for isolating weapons from shock. If successful, such a shock mitigation system could reduce demands for more expensive future ship design and construction efforts, thereby achieving savings.

Therefore, the committee recommends an additional \$3.0 million to support developing full-scale controllable shock mitigation devices to protect weapons aboard submarines.

Submarine payloads

The budget request included \$608.6 million in PE 63561N for advanced submarine systems development, including \$8.3 million for various submarine payloads and sensors development activities.

The Secretary of the Navy and the Chief of Naval Operations established goals to increase the employment of unmanned vehicles in future operations. Some of our submarines (SSGNs and later Virginia-class submarines) have large volume payload tubes to interface with the ocean. These tubes provide the capacity to carry larger unmanned vehicles. A prototype launch and recovery module for an SSGN tube is being built with delivery planned for December 2010. This is an enabler for the rapid integration of payloads into submarines at a reduced cost. With addition fiscal year 2011 funds, the Navy could demonstrate the use of payloads to conduct various intelligence, surveillance, and reconnaissance missions that have not been possible before.

The Navy needs a more formal program to integrate unmanned payloads into submarines and leverage these capabilities for future requirements. Therefore, the committee recommends an additional

\$20.0 million to support advanced submarine payloads development activities and to allow the Navy to define a more formal plan for this activity.

In addition, the committee directs the Secretary of the Navy to submit a report with the fiscal year 2012 budget submission that defines the Navy's plans for integrating current and future unmanned payloads into submarines.

Ship hydrodynamic test facilities improvement

The budget request included \$1.8 million in PE 63564N for ship preliminary design and feasibility studies, but included no funding for continuing improvements to support the Navy's own ship hydrodynamics test facilities.

The Naval Surface Warfare Center, Carderock Division has implemented a 5-year, five-phase, fixed-price contract to replace the wave-making system in the maneuvering and sea keeping basin with modern systems capable of supporting current and future Navy needs.

Fiscal year 2011 would represent the final year of that effort, but the Navy did not fund the final phase of the contract. The committee believes that the Navy should complete this upgrade effort to support current and future design activities, and recommends an additional \$10.0 million for that purpose.

Common network interface system

The budget request included \$24.3 million in PE 63582N for combat systems integration, but included no funding for continuing development of the common network interface (CNI) system.

The Navy completed funding for the so-called CNI Flight 0 in 2009. The Navy has installed CNI Flight 0 on five of the LHA/LHD vessels, and has planned several spirals into 2013. The Navy partially funded the next spiral of CNI capability ("Flight 0+"), but has chosen now to shift the resources required to finish that development to other programs. The Navy had also intended to outfit the remaining LHA/LHD vessels with either CNI Flight 0 or Flight 0+.

The committee has consistently supported moving the Navy to open architecture in its ship systems.

The committee believes that the Navy should: (1) complete development of CNI Flight 0+; (2) backfit the Flight 0+ capability on the Flight 0 ships; and (3) install CNI on additional LHA/LHD vessels. The committee recommends an additional \$3.0 million for those purposes.

Decision and energy reduction tool

The budget request included \$40.5 million in Research, Development, Test, and Evaluation, Navy, in PE 63635M for Marine Corps Ground Combat/Support System, but no funds for a decision and energy reduction tool to apply computer simulation techniques to model and predict the performance of fuel-efficiency technologies.

The committee recommends an authorization of \$45.0 million, an increase of \$4.5 million for this purpose.

Navy energy research

The budget request included \$30.4 million in PE 63724N for the Navy energy program. This program works to evaluate, adapt, and demonstrate energy related technologies for Navy aircraft and ship operations. In support of these goals, the committee recommends an increase of \$2.5 million for the development of fuel cell technologies for naval applications, and an additional \$3.0 million for improvements to high-density energy storage development.

Flame retardant textile fabric

The budget request included \$4.1 million in PE 63739N for Navy logistics productivity initiatives, but included no funding to develop more cost effective, flame retardant fabrics.

Intumescent materials are materials that undergo a chemical change when exposed to heat or flames, becoming viscous then forming expanding bubbles that harden into a dense, heat insulating multi-cellular char. Previous research showed that intumescent flame retardants generate far higher levels of char than conventional retardants. In doing so, they provide extremely high levels of fire resistance to underlying surfaces (garment). However, a major drawback of using such materials in textile applications, usually as applied coatings, has been that even the most water-insoluble of these intumescent materials do not survive the textile-laundering processes.

The committee believes that the Navy should develop these materials further by investigating: (1) the best fiber combination for treatment with advanced flame retardant chemicals; (2) the best flame retardant finishing agent for treating those textiles; and (3) the best technique for applying that flame retardant finishing agent to the textiles.

The committee recommends an increase of \$1.5 million to develop this important technology.

Optical interconnect

The budget request included \$4.1 million in PE 63739N for Navy logistics productivity initiatives, but included no funding to develop low cost, high quality fiber optic interconnect technology for military aerospace application. The Department of Defense continues to demand increasing data processing, communication, and system control capabilities. The next-generation data and communication management systems needed for weapons systems will depend upon tightly integrated optical fiber solutions, also known as optical interconnect. This solution optimizes space utilization while achieving high bandwidth, decreased weight, immunity to electromagnetic interference, resistance to corrosion, and improved safety and security. The Navy has requirements for next-generation optical interconnect technology for several aircraft platform systems, and anticipates that this technology could be applied to Navy vessels as well. The committee recommends an increase of \$5.0 million to develop this important technology.

Air and missile defense radar

The budget request included \$274.4 million in PE 64501N for advanced above water sensors, including \$228.4 million for the air and missile defense radar (AMDR) program.

The Navy's AMDR program is intended to produce a next-generation radar system designed to provide ballistic missile defense, air defense, and surface warfare capabilities. The fiscal year 2010 budget includes \$113.6 million for AMDR technology development contracts and the fiscal year 2011 budget request includes \$145.3 million for AMDR technology development contracts.

In December 2009, the Navy released a request for proposals for AMDR technology development. The Navy intends to award these technology development contracts after completion of Milestone A, which has been delayed. The Navy had planned to have a Milestone A decision in the third quarter of fiscal year 2010, but the Navy now expects that decision in August, after the Navy completes key analyses.

Based on this delayed decision, the Government Accountability Office has estimated that \$22.5 million of the fiscal year 2010 funds are not needed to fund fiscal year 2010 activities and could be applied to fiscal year 2011 requirements.

Therefore, the committee believes the Navy should use 2010 resources available for AMDR instead of reprogramming them, which obviate the need for \$22.5 million of the funds requested in fiscal year 2011.

TB-33 thinline towed array

The budget request included \$118.9 million in PE 64503N for SSN-688 and Trident modernization programs, including \$11.6 million for making further developments of the TB-33 thinline towed array system.

Since last year, the Navy has restructured the TB-33 program to provide an additional year of development activity, including fabricating a production representative unit for conducting operational testing. After that testing, the Navy plans to begin production of the TB-33 in fiscal year 2012.

The committee believes that the Navy requires additional resources to complete fabrication of that production representative unit and complete special test modules to evaluate the final TB-33 design.

The committee recommends an increase of \$3.8 million to complete development of the TB-33 thinline towed array.

Advanced manufacturing for submarine bow domes

The budget request included \$155.5 million in PE 64558N for new design SSN activities, but included no funding to continue a program to develop advanced manufacturing processes and techniques for fabricating submarine bow domes and rubber boots.

The committee believes that developing the capability to build large structures consisting of composite materials that are cured outside an autoclave will provide manufacturing flexibility, maintain reliability and quality requirements, and could allow fabrication of much larger structures, such as domes and boots for larger submarines.

The committee recommends an additional \$1.3 million to continue this program.

Common command and control system module

The budget request included \$155.5 million in PE 64558N for new design SSN activities, but included no funding for developing a common command and control system module for application to Virginia-class submarines or an Ohio-class replacement program, SSBN(X).

The committee understands that the Navy could design a new command and control module for submarines that could also significantly reduce construction costs on all submarine classes, but certainly would enable rapid reconfiguration of mission equipment in these spaces, reduce the demands on watch standers, and reduce the total ownership costs to the Navy for supporting disparate command and control configurations.

Therefore, the committee recommends an increase of \$9.0 million in PE 64558N to continue these development activities.

Submarine airborne intelligence, surveillance, and reconnaissance capability

The budget request included \$50.5 million in PE 64562N for submarine tactical warfare systems development, but included no funding for developing concepts and technologies that could support a covertly launched, organic submarine intelligence, surveillance, and reconnaissance (ISR) unmanned aerial vehicle (UAV) system.

The committee expects that the Navy will begin development of a submarine-based unmanned aerial vehicle system in fiscal year 2012.

In anticipation of that, the Navy could use additional funding to begin tasks leading to a design of a capsule that could enable a submarine to covertly launch a UAV. These tasks would include selecting final materials, improving reliability, testing for environmental and system safety, and integrating the UAV system with the submarine communications and command and control suites.

The committee recommends an increase of \$4.6 million to further develop this submarine-launched UAV capability.

Submarine artificial intelligence-based combat system software module

The budget request included \$50.5 million in PE 64562N for submarine tactical warfare systems development, but included no funding for developing an artificial intelligence-based combat system software module.

The Navy has begun an effort to develop a mission focused, decision-tailored command decision support system (CDSS) to use within the current submarine open architecture combat system that would introduce intelligent agent-based automation, advanced visualization, and collaboration technologies.

Such a command decision support system should improve decision making by submarine commanding officers and senior staff, leading to improved mission effectiveness with reduced control room manning.

The committee recommends an increase of \$7.0 million to continue development of an artificial intelligence-based combat system software module.

Submarine environment for evaluation and development

The budget request included \$50.5 million in PE 64562N for submarine tactical warfare systems development, but included no funding to continue the submarine environment for evaluation and development (SEED) program.

This program has provided a low-cost test bed for industry and academia to create and evaluate innovative ideas and to integrate their products into currently deployed and conceptual systems. This test bed avoids the complication and expense of testing such ideas and products on more costly shore-based hardware or actual fleet equipment until the Navy can determine whether the ideas merit further development.

The committee supports this activity and recommends an increase of \$5.5 million to continue and expand this activity.

Submarine weapon acquisition and firing system

The budget request included \$50.5 million in PE 64562N for submarine tactical warfare systems development, but included no funding to continue development of an automated weapon acquisition and firing system (WAFS).

An automated WAFS could provide an accurate target solution and aid submarine crews in properly configuring the weapon and executing procedures to acquire the target. The crew could rely on such an expert system to automatically determine optimal ballistic settings, based on the target solutions and weapon tactics best practices, and thereby eliminate the need for crews to rely on reference documents.

The committee recommends an increase of \$3.0 million to continue development of a WAFS capability.

SSGN weapon launcher technology insertion

The budget request included \$50.5 million in PE 64562N for submarine tactical warfare systems development, but included no funding to continue Navy's common weapon launcher program to integrate common weapon launchers on SSGNs.

The Navy plans to complete integration of the common weapons launcher into the Virginia-class combat system in fiscal year 2010. However, the Navy has not funded extending this capability to the SSGN fleet, which will operate as attack submarines throughout much of their mission profiles. This means that the Navy would have to forego the opportunity to achieve savings by consolidating training and logistics for the launcher systems on these boats with that of the Virginia-class submarines.

The committee believes that such an omission is short-sighted, and recommends an increase of \$5.0 million to integrate the common weapon launcher on SSGNs.

Automated fiber optic manufacturing capability

The budget request included \$153.7 million in PE 64567N for ship contract design and live fire test and evaluation activities, but

included no funding for continuing development of an automated fiber optic manufacturing capability.

Last year, the Navy completed production of a fully automated factory work cell that will support aircraft carrier construction/overhaul and Virginia-class submarine programs. The Navy believes that this manufacturing capability will allow the shipbuilding industry to produce factory terminated fiber optic cable assemblies and systems much more efficiently, which should generate millions of dollars in shipbuilding program cost savings. The Navy is also using fiscal year 2009 and 2010 resources to develop portable capabilities for field installation, field repair, and maintenance derived from the technologies of the automated manufacturing line. Such portable capability would be useful both by ship construction personnel during construction and overhaul, and by ship's force personnel in performing maintenance when ships are not in the yards.

The committee believes that the Navy should continue these efforts in fiscal year 2011, and recommends an additional \$4.0 million for that purpose.

Autonomous unmanned surface vehicle

The budget request included \$45.9 million in PE 64755N for ship self defense (detect and control) projects, but included no funding for the autonomous unmanned surface vehicle (AUSV) program. The AUSV program supports the U.S. Navy's anti-terrorism, force protection, and homeland defense missions. The AUSV can protect commercial harbors, coastal facilities such as commercial and military airports and nuclear power plants, inland waterways, and large lakes. The vessel will utilize a variety of advanced sensing and perimeter monitoring equipment for surveillance and detection of targets of interest.

The committee recommends an increase of \$5.7 million to continue this development.

Next-generation Phalanx

The budget request included \$5.9 million in PE 64756N for ship self-defense (engage: hard kill), but included no funding for next-generation Phalanx. The Phalanx weapon system is the Navy's principal close-in weapon system for ship self-defense, and has proven to be extremely adaptive for performance against emerging air and surface target sets. The continually evolving nature of the threat, unique challenges posed by operations in the littorals, increased emphasis on single ship probability of raid annihilation, and fact of life technology obsolescence require continued development effort to sustain the superior performance of this critical ship self-defense system. The committee recommends an increase of \$12.0 million in PE 64756N for the continued development of the next-generation Phalanx.

NULKA anti-ship missile decoy system

The budget request included \$84.5 million for ship self-defense soft-kill systems development in PE 64757N, including \$5.4 million for various development activities related to the NULKA anti-ship missile decoy system.

The Navy has identified a series of development activities associated with the NULKA system that are required to understand and deal with emerging threats:

- (1) develop advanced radio frequency digital circuits enabling wider frequency coverage;
- (2) design an architecture that will ensure seamless operation with a variety of U.S. Navy combat systems;
- (3) integrate NULKA into the Navy's Aegis weapon control system open architecture; and
- (4) provide shipboard test and trial support.

The committee recommends an increase of \$7.0 million for the NULKA development program to continue these efforts.

Composite tissue transplantation for combat wound repair

The budget request included \$12.3 million in PE 64771N for medical development activities, but included no funding to continue the composite tissue transplantation for combat wound repair program.

In 2009, the Navy began an effort to establish a multidisciplinary center for the systematic study of composite tissue transplantation. The Navy intends for this center to conduct mechanistic studies on the immune response and rejection of transplanted tissues and establish a capability to conduct clinical trials in hand transplantation. The program includes a strategy to collect and analyze clinical data and materials to further the knowledge base on composite tissue transplants and will be used to develop novel immunosuppressive treatments.

In 2010, the Navy is expanding these efforts to conduct the actual clinical trials for hand transplants.

The committee believes this effort needs to continue in fiscal year 2011, and recommends an increase of \$2.0 million to do that.

Navy information technology programs

The budget request included \$28.3 million in PE 65013N for information technology development. To support initiatives to improve network centric operations, data fusion, and human systems interfaces, the committee recommends an increase of \$5.0 million for information systems research and technology.

Navy manufacturing technology

The budget request included \$46.2 million in PE 78011N for Navy manufacturing technology programs. The committee notes that in 2006, the Defense Science Board recommended that investments in the manufacturing technology program be increased to a level of 1 percent of the total research, development, test, and evaluation budget. The Board also found that the manufacturing technology program has invested in efforts that have reduced systems cost and improved systems performance. Consistent with those recommendations and findings, the committee recommends an increase of \$5.0 million for integrated manufacturing enterprise development to streamline manufacturing techniques, business practices, and practices to reduce costs of Navy platforms.

Strike study

The budget request included \$81.2 million in Research, Development, Test, and Evaluation, Navy, PE 11221N line 162 for strategic submarine and weapons systems support. The committee recommends a decrease of \$10.0 million. Of the amount requested \$10.0 million was for a study for ambiguity and other issues that associated with conventional and nuclear payloads on strategic ballistic missile submarines. The committee recommends no funds for the study. The committee notes that the National Academy of Sciences conducted an extensive study on this issue and the additional study would be redundant.

Virtual Maintenance Engineering Platform

The budget request included \$81.2 million in Research, Development, Test, and Evaluation, Navy, PE 11221N line 162 for strategic submarine and weapons systems support but no funds for the Virtual Maintenance Engineering Platform (VMEP). The committee recommends an additional \$1.5 million for information assurance certification for the VMEP system so that it can be installed on strategic submarines.

Tomahawk cost reduction initiatives

The budget request included \$10.6 million for various upgrades to the Tomahawk missile and the Tomahawk mission planning center, but included no funding for making changes to the missile to reduce recurring production costs. The largest expense in the Tomahawk missile is the engine. The committee believes that the Navy and contractor team could improve manufacturing efficiencies on key components of the engine to reduce recurring production costs enough to more than pay for any non-recurring investment necessary to design and test those improvements.

Therefore, the committee recommends an increase of \$7.6 million to fund non-recurring engineering to design and implement: (1) manufacturing system improvements; and (2) engine and missile interface improvements.

Aircraft metal alloys

The budget request included \$133.6 million in PE 63123N for various aviation improvement programs, but included no funding for further developing new metal alloys for aircraft applications.

The Navy has funded basic research on new metal alloys that show promise for application to military aircraft components. This has resulted in designing and developing two new ultra-high performance alloys, M54 for airframe applications (primarily landing gear), and C64 for gears. The committee understands that the performance of these alloys far exceeds currently used materials, because they provide substantial cost and weight savings while being virtually maintenance free in service and safer for the environment than using current materials. Current environmental concerns for existing materials arise from the fact that current alloys used in landing gear steels have to be coated in environmentally devastating cadmium. Developing these alloys further could lead to certification and qualification of these alloys and manufacturing of test articles. The committee understands that test articles using

these alloys would then be evaluated according to priorities established in the Defense Department's Environmental Security Technology Certification Program.

The committee recommends an additional \$2.8 million for maturing these alloys.

Aircraft windscreen laminates

The budget request included \$133.6 million in PE 63123N for various aviation improvement programs, but included no funding for developing a sacrificial windscreen laminates that would also provide protection from laser and electromagnetic attacks.

The committee believes that there is an increasing risk in laser and electromagnetic interference (EMI) attacks against Defense Department aircraft. The Navy has been developing sacrificial windscreen laminates that maintain current performance in preventing damage from erosion, but, in addition, provide passive EMI and laser protection. Unlike complicated electronic devices, this passive system is continuously providing protection to aircrews and critical aircraft electronics, such as targeting and communications systems. The committee understands that the Naval Air Systems Command has concluded that this new laminate material could be fielded with only modest additional development, and could provide a long-term solution to this increasing threat.

Therefore, the committee recommends an additional \$1.7 million to develop improved aircraft windscreen laminates.

Tracking helicopter structural life

The budget request included \$133.6 million in PE 63123N for various aviation improvement programs, but included no funding for developing a system to track helicopter structural life.

The Department of the Navy lacks a comprehensive program for tracking the structural life of its helicopters. Implementing such a program would allow the Navy to better track their helicopters and its components based on actual aircraft flight usage. Traditional tracking methods are based on paper records and assume the aircraft flies a predetermined or "design" flight pattern.

With the advent of onboard flight data recorders, the actual flight pattern can be determined by collecting on-board flight recorder data and determining the exact damage caused to the aircraft by each flight. By tracking the components based on actual flight usage, unnecessary and premature component removals could be eliminated. Furthermore, aircrew safety would be enhanced by knowing exactly how the aircraft flies and predicting when a component should be removed to prevent failure of the component and a potential mishap.

The committee recommends an additional \$2.5 million to develop a structural life tracking program for Department of the Navy helicopters.

System for triaging key evidence

The budget request included \$245.3 million in Research, Development, Test, and Evaluation, Navy, in PE 26313M for Marine Corps Communications Systems. The committee recommends an authorization of \$247.1 million, \$1.8 million above the request, to enhance

the capabilities of the System for Triaging Key Evidence (STRIKE). STRIKE is a successful digital media exploitation system in use by a wide variety of organizations and forces. It provides a capability to rapidly determine, in the field, what information is stored on phones, computers, portable media, and other devices; what stripped down information should be extracted and downloaded; and to analyze content. The device can dramatically reduce the amount of material that needs to be transmitted to rear echelons for analysis, and provides immediate, on-scene support to tactical forces.

Marine Corps personnel carrier data management system

The budget request included \$26.8 million in Research, Development, Test, and Evaluation, Navy, in PE 26623M for initial development activities for the Marine Corps Personnel Carrier (MPC). The committee recommends an authorization of an additional \$2.0 million for a performance feedback and assessment system to assist the program manager in acquiring and applying operational data to the design and maintenance of the MPC.

Unique identification web-based tracking and accountability software

The budget request included \$100.4 million in Research, Development, Test, and Evaluation, Navy, in PE 26623M for Marine Corps Ground Combat/Supporting Arms Systems. The committee recommends authorization of \$4.5 million above the request for unique identification data management and tracking software for a web-based, enterprise-wide application with secure mobile computing.

Air Force

Cyber research and training

The budget request included \$351.0 million in Air Force defense research sciences to fund fundamental broad-based scientific and engineering research in areas critical to Air Force weapon systems. In support of research in the growing field of cyber security, the committee recommends an increase of \$2.0 million in PE 61102F for the development of related modeling and simulation training capabilities. Similarly, the committee recommends an increase of \$4.0 million in PE 61101E for research on security for critical and vulnerable control networks.

Air Force materials research

The budget request included \$137.3 million in PE 62102F for applied materials research. The Air Force's Energy Program Policy has a stated objective of increasing renewable resources on Air Force bases. In support of that objective, the committee recommends an increase of \$1.0 million for efforts to design, implement, and test systems and processes capable of producing renewable energy at large scales for military installations.

The committee notes that the 2003 National Research Council study "Materials Research to Meet 21st Century Defense Needs" identified a number of high priority research areas in advanced

materials in order to address defense requirements. The study recommended investing in technologies that would integrate non-destructive inspection and evaluation into the original design of both materials and structures. Consistent with this recommendation, the committee recommends an additional \$2.0 million for the development of health monitoring sensors for aerospace components. The committee also recommends an additional \$1.0 million for light alloy parts development.

The National Research Council recommended that the Department of Defense “make investments in research leading to new strategies for the processing, manufacture, inspection, and maintenance of materials and systems.” Therefore, the committee recommends an increase of \$2.0 million in PE 62102F for research on nano-manufacturing models, analyses, and controls to develop the next-generation of manufacturing processes and systems.

Aerospace vehicle technologies

The budget request included \$144.7 million in PE 62201F for aerospace vehicle technologies. The committee recommends an additional \$2.5 million for unmanned aerial system (UAS) collaboration technologies to support the development of advanced UAS and enhance the ability to integrate UAS pilots, sensor operators, and information analysts, as well as to better coordinate and collaborate their activities.

Reconfigurable electronics and software

The budget request included \$111.9 million in PE 62601F for space technologies. The Department of Defense’s January 2007 “Response to Findings and Recommendations of the Defense Science Board Task Force on High Performance Microchip Supply” highlighted the Department’s need for microelectronic systems, local field programmable gate arrays, with functions that could be changed to support different types of systems. In support of meeting that need, the committee recommends an increase of \$500,000 for research on reconfigurable electronics.

Seismic research program

The budget request included \$111.9 million in PE 62601F for space technologies. The committee remains particularly concerned with ongoing developments in rogue state nuclear programs. Consequently, the committee recommends an additional \$5.0 million for the Air Force seismic research program. This program has and will continue to enable the United States to monitor compliance with the current moratorium on nuclear testing.

Space plasma research

The budget request included \$48.2 million in PE 62601F for space survivability and surveillance applied research focused on developing technologies to protect spacecraft against the harmful effects of the space environment. In support of these efforts, the committee recommends an increase of \$2.0 million in PE 62601F to improve ground testing capabilities to better understand the effects of space plasmas on spacecraft performance and mission life.

Directed energy research

The budget request included \$53.4 million in PE 62890F towards high-energy laser research. In support of these efforts, the committee recommends an increase of \$2.0 million in this account for improved directed energy research and development coordination by the Directed Energy Joint Technology office. The Secretary shall provide to Congressional defense committees no later than February 2011, a long-term plan of the roles and responsibilities of the Joint Technology Office for High Energy Lasers for supporting the overall mission of the Department in directed energy.

Air Force advanced materials research

The budget request included \$33.4 million in PE 63112F for the development of advanced materials for weapon systems. The committee recommends an additional \$10.0 million to support the Metals Affordability Initiative, a joint government and industry consortium aimed at strengthening the metals industrial base through collaborative technology development and transition projects. The overall program helps improve current processing technologies and develop novel techniques for primary metal production, part manufacturing, and weapon system support. The committee also recommends a specific increase of \$1.5 million in PE 62204F in order to accelerate development of gallium nitride materials, a compound in high demand for high performance electronics in the defense realm.

The committee also notes the need to improve the readiness and maintainability of airframes beyond the fiscal year 2010 budget request amount in PE 63112F. In support of this objective, the committee recommends an increase of \$2.0 million for research on non-destructive testing technologies and \$2.0 million for improved composite repair in theater. To improve manufacturing technology and the availability of frequency selective surface structures for a variety of specialized antenna applications, the committee recommends an additional \$2.0 million in PE 63680F.

Finally, to support Air Force efforts to develop cheaper, alternative sources of aviation fuel, the committee recommends an increase of \$3.0 million in PE 63112F for sewage-derived biofuels research.

Advanced fuels and propulsion

The budget request included \$136.1 million in PE 63216F to develop advanced aerospace power and propulsion technologies. The committee recommends an increase of \$2.0 million in PE 63216F for algal biofuel research. In addition, the committee recommends an increase of \$2.0 million in PE 63734A for alternative biofuel research.

Air Force advanced propulsion systems

The budget request included \$136.1 million in PE 63216F for aerospace propulsion and power technology. To support efforts under the High Speed Turbine Engine Demonstrator project as part of the Versatile Affordable Advanced Turbine Engine program, the committee recommends an additional \$4.0 million to develop supersonic turbine engines that can support the development of a

long-range high-speed strike missile. The committee notes that the Department of Defense is continuing its investments in the development of unmanned aerial vehicle (UAV) capabilities for intelligence, strike, and other missions. In support of foundational systems capabilities efforts, the committee recommends an additional \$2.5 million for the development of scalable UAV engines.

Finally, to support continued development of high-temperature power electronics to meet critical needs of the Joint Strike Fighter and other aircraft platform systems, the committee recommends an increase of \$4.0 million for research and development using silicon carbide power modules.

Carbon nanotubes

The budget request included \$83.7 million for advanced spacecraft technology in Research, Development, Test, and Evaluation, Air Force, PE 63401F line 22, but no funds for carbon nanotubes. The committee recommends \$2.0 million for research to support a U.S.-based source of high purity carbon nanotube solutions for space and other defense applications.

Collaboration gateway

The budget request included \$5.0 million in Research, Development, Test, and Evaluation, Air Force, in PE 63260F for Intelligence Advanced Development, but no funds for a collaboration gateway for disseminating, accessing, and sharing video imagery across classified and unclassified networks. The committee recommends an authorization of \$2.0 million above the requested amount for this project.

Global Positioning System operating control segment

The budget request included no funds in Research, Development, Test, and Evaluation, Air Force, PE 63423F line 33. The budget request did include \$381.9 million for the Global Positioning System III (GPS III) operating control segment (OCX) in Research, Development, Test, and Evaluation, Air Force, PE 35265F line 212 with the budget request for the GPS III space vehicle development. The committee believes that the funds for the OCX should remain in PE 63423F line 33, where the funds were appropriated in fiscal year 2010. The committee recommends a \$381.9 million reduction in line 212 and an increase in line 33 to effect the transfer.

Space situational awareness

The budget request included \$61.0 million in Research, Development, Test, and Evaluation, Air Force (RDTEF), PE 63438F for Space Control Technology but not funds to integrate data from the Missile Defense X-band radar or the Sea-based X-band platform into the space surveillance network. The committee recommends an increase of \$6.0 million to integrate this data into the space surveillance network.

Space protection program

The budget request included \$8.3 million in Research, Development, Test, and Evaluation, Air Force, PE 63830F line 40 for the space protection program. The committee recommends an addi-

tional \$5.0 million. The space protection program develops an integrated space protection strategy to support the national security space enterprise to identify and recommend solutions to protect space capabilities. As the threats to space systems continue to grow, improving the ability to identify assess and protect against this wide range of threats is essential.

Next-generation military satellite communications

The budget request included no funds in Air Force Research, Development, Test, and Evaluation (RDTEF), for next-generation military satellite communications to identify technologies that could be used on future military communications satellites. Congress provided \$50.0 million for continued research and development in next-generation military satellite communications, including for protected communications in fiscal year 2010, following cancellation of the Transformational Communications satellite (T-Sat) program. The committee is disappointed that no funds were included in the fiscal year 2011 budget request.

The committee recommends an increase of \$50.0 million in a new program element, PE 64436F line 52. This new PE is created to continue the efforts to explore communications technologies that could be utilized on future blocks of current communications satellite or eventually on next-generation communications satellite. These risk reduction efforts should include continued efforts to reduce the cost, weight, and complexity of current radiation hardening techniques.

One of the many problems with the T-Sat program was that it was started with very immature technologies. In the future when new or evolved communications satellites are needed, the committee wants to ensure that the technologies are sufficiently mature to be fielded with low cost and schedule risk.

Operationally Responsive Space

The budget request included \$94.0 million for Operationally Responsive Space (ORS) in Air Force Research, Development, Test, and Evaluation PE 64857F including \$20.2 million for ORS-1, a small satellite being built at the request of U.S. Central Command (CENTCOM) to satisfy the Command's urgent need number 3. ORS-1 is currently on schedule to launch at the end of 2010, which would demonstrate the ability to design, build, and launch a satellite within 2 years of a decision to start. This is a significant accomplishment.

While ORS continues to make progress in all of its three tiers, the funding for fiscal year 2011 is not adequate to continue the necessary efforts for the crosscutting portions of the ORS office, including modeling and simulation, satellite command and control, future planning and other activities to support the overall ORS partnerships. The committee recommends an additional \$20.0 million to restore funding for this effort to the fiscal year 2010 level. The additional funds will help ORS to continue to identify unique approaches for small responsive satellites and improve responsive capabilities.

The committee commends the ORS Office and the other agencies and military services for participating in this innovative approach

to space. The committee is concerned, however, that the ORS Office has not been able to take full advantage of various streamlined acquisition approaches and directs the Air Force to assist ORS in identifying areas where improvement is needed and to grant ORS the necessary authorities. The committee directs the Secretary of the Air Force to provide a report to the congressional defense committees that would outline a plan for ORS to utilize directly streamlined acquisition authorities no later than February 1, 2011.

The committee supports the ORS efforts to explore flexible payloads for use on responsive satellite buses with common interfaces. These payloads include synthetic aperture radar and other payloads to enhance the ability of the warfighter to monitor the battlespace and to augment conventional intelligence surveillance and reconnaissance assets.

One of the areas that the ORS Office has not focused on is next-generation launch capabilities. At the present there is adequate launch capability but it is expensive. The committee is aware of a different approach to designing launch vehicles that might reduce in the long run the cost of launch, and that might be suitable for small and medium (Delta II) class and below launch. The committee recommends \$15.0 million for the radially segmented launch vehicle for ORS and the Space Test Program to continue concept development and determine the technical validity of the approach.

National Polar-Orbiting Operational Environmental Satellite

The budget request included \$325.5 million in Research, Development, Test, and Evaluation, Air Force, PE 35178F line 58 for the National Polar-Orbiting Operational Environmental Satellite (NPOESS). The NPOESS was a joint Department of Defense, National Aeronautics and Space Administration (NASA), and Department of Commerce (DOC) National Oceanographic and Atmospheric Administration (NOAA) weather satellite program. The committee recommends \$100.0 million, a reduction of \$225.5 million.

Shortly after the budget request for fiscal year 2011 was submitted, the administration decided to dissolve the NPOESS program and directed DOD and NOAA to develop separate programs. As part of this structuring DOD was assigned responsibility for the early morning orbit and the DOC-NOAA was assigned responsibility for the afternoon orbit. Neither DOD nor DOC-NOAA has identified a new program plan to implement the restructuring decision. As a result the fiscal year 2010 funds are available to develop a new follow-on program and all of the fiscal year 2011 funds will not be needed. The committee is disappointed with the decision to dissolve the joint NPOESS program and is concerned that the new, yet to be determined, program may not be able to ensure continuity in weather satellites.

The DOD last launched a weather satellite, the Defense Meteorological Satellite (DMSP) in 2009, and has two more DMSP satellites in storage, DMSP-19 and DMSP-20. These satellites have been in storage for many years and will require a service life extension program before they could be launched to fill any gaps caused by the restructuring of the NPOESS program.

The committee urges the DOD and the Air Force to decide on a follow-on program as quickly as possible to ensure that there are no gaps in weather coverage. The committee does not believe that relying on the DMSP-19 and DMSP-20 as a means of avoiding or delaying a new program is a realistic option. When it was restructured, the NPOESS program was already 6 years behind. On the other hand, the NPOESS program was technically sound and had made substantial investments in a variety of weather and environmental sensors that should be preserved. The committee sees no benefit to be gained from redesigning sensors already designed, and in some cases delivered, under the NPOESS program.

The committee directs the DOD and the Air Force to prepare a program plan designed to launch a first satellite as soon as possible following the planned launch of DMSP-19 in early fiscal year 2013. The program plan for the follow-on should be provided with the fiscal year 2012 budget request. The committee supports a strategy that will result in the first NPOESS successor satellite to be ready to launch as soon as technically feasible. The U.S. cannot tolerate a gap in weather coverage.

Nuclear Enterprise Surety Tracking Initiative

The budgeted request included \$60.5 million for nuclear weapons support Air Force Research, Development, Testing, and Evaluation, PE 64222F line 60 but no fund for the Nuclear Enterprise Surety Tracking Initiative (NESTI). The committee recommends an increase of \$8.0 million for the NESTI to develop secure electronic systems to track the location and status of nuclear weapons and critical nuclear components.

Space-based space surveillance system

The budget request included \$426.5 million in Space Situation Awareness, Air Force Research, Development, Test, and Evaluation, PE 64425 line 70. The committee recommends a reduction of \$30.0 million for the Space-based space surveillance system (SBSS) follow-on. The SBSS block-10 program has been delayed; as a result, \$30.0 million of the \$38.0 million included in the budget request for the follow-on program will not be needed in fiscal year 2011.

Space-based Infrared System

The budget request included \$530.0 million for the Space-based Infrared system (SBIRS) for Research, Development, Test, and Evaluation, Air Force, PE 64441 line 72 including \$175.2 million for ground development. The SBIRS program is a missile early warning, technical intelligence, and battlespace awareness system with Highly Elliptical Orbit (HEO) sensors and Geosynchronous Earth Orbit (GEO) satellites. The committee recommends an additional \$15.0 million for HEO ground integration and data exploitation.

The GEO-1 satellite has been plagued by schedule delays and cost overruns. In previous years additional funds were needed to resolve GEO-1 problems. As a result funds to support ground integration and HEO data exploitation were diverted to resolve the GEO-1 issues. Congress provided additional funds in fiscal year

2010 to increase the analytic efforts to support HEO sensors so that the full capability of the HEO sensors can be understood and exploited including the benefits from HEO stereo applications. More work remains to be done, particularly as additional HEO sensors become available.

Although the delivery and launch schedule for the GEO-1 satellite continues to slip, the committee notes that the Air Force expects the GEO-1 satellite will be ready to ship no later than March 2011, assuming the ongoing software problems are resolved.

The committee directs the Air Force to include adequate funding in the fiscal year 2012 budget request to continue exploitation of the HEO sensors and to ensure a robust exploitation program for the GEO-1 satellite, assuming that it launches in late 2011 or early 2012.

The committee notes that the overhead persistent infrared (OPIR) architecture study, which was due last summer, is still not completed. This study is essential for making decisions with respect to future OPIR requirements including those for SBIRS satellites and sensors and the Precision Tracking Satellite System being developed by the Missile Defense Agency.

Third generation infrared surveillance

The budget request included no funds for third generation infrared surveillance (3GIRS) in Research, Development, Test, and Evaluation, Air Force, PE64443F line 73. The committee recommends an increase of \$25.0 million. The Air Force has no technology development line for next-generation infrared technology. While the Air Force has decided to continue with the Spaced-based Infrared Satellite (SBIRS) system, the committee believes that at some point there will be a need to augment, update or replace the SBIRS system. To ensure that technologies are sufficiently mature when needed, the committee recommends the additional funding to ensure continued focus on next-generation focal plane arrays and other technologies.

Air Force test and evaluation

The budget request included \$61.6 million in PE 64759F for Air Force major test and evaluation investment. The committee notes the importance of preserving the capability to test missiles and their sub-systems, such as sensors and structures, at very high speeds. To support the enhancement of these capabilities, the committee recommends an increase of \$4.5 million for upgrades to the high-speed test track at Holloman Air Force Base.

Space test program

The budget request included \$47.6 million in Research, Development, Test, and Evaluation, Air Force, PE 65864F line 104 for the space test program (STP). The committee recommends an increase of \$15.0 million to support the possibility of increasing small experimental satellite and sensor launches from one every 2 years to one every 18 months and to increase the number of piggyback launches including those using the Evolved Expendable Launch Vehicle secondary payload adapter ring.

B-2

The budget request included \$260.5 million in Research, Development, Test, and Evaluation, Air Force, PE 11127F line 120 for B-2 Squadrons, including \$92.3 million for extremely high frequency (EHF) increment 2 to develop a low observable EHF antenna and radome and install Family of Beyond Line of Sight terminals (FAB-T) on the B-2 aircraft.

At the end of December 2009, the Air Force decided that the previous technical approach using a mechanically steered EHF antenna presented an unacceptably high risk and decided to pursue an active electronically scanned array (AESA) antenna. With this decision the schedule for achieving an initial operational capability for EHF increment 2 has been delayed at least 4 years from fiscal year 2015 to fiscal year 2019. The approach adopted would be the first time an AESA antenna for EHF communications was developed for aircraft. Moreover, the critical elements of the new approach are only at technical readiness levels 3 and 4.

The committee is concerned that this shift may result in even further delays to the ability of the B-2 to have EHF communications capability. The committee is also concerned about the decision making process and the technical rationale underpinning the shift in approach. As a result, the committee directs the Air Force to establish an external independent technical review team to review the technical approach adopted and the Government Accountability Office to review the decision making process utilized by the Air Force. The independent technical review team should specifically examine the Air Force's proposed shift from a mechanically steered EHF antenna to an AESA antenna, and the cost, schedule, and technical risks of this proposed shift. No more than 50 percent of the funds available for the B-2 for EHF increment 2 in fiscal year 2011 may be obligated until the reviews have been completed and submitted to the congressional defense committees.

Cyber operations security institute

The budget request included \$2.3 million in Research, Development, Test, and Evaluation, Air Force, in PE 28021F for Information Warfare Support, but no funds for the Cyber Operations Security Institute (COSI). COSI is a public-private partnership supporting the Air Force Global Strike Command in the area of visualization, video war-gaming, and command and control of cyber tools. The committee recommends an authorization of \$1.5 million above the requested amount for COSI.

Application Software Assurance Center of Excellence

The budget request included \$140.0 million in Research, Development, Test, and Evaluation, Air Force, in PE 33140F for the Information Systems Security Program (ISSP). The budget request did not include funds for the Air Force's Application Software Assurance Center of Excellence (ASACOE) aside from salaries for government personnel.

The Air Force Air Material Command's Electronic Systems Center established the ASACOE in 2005 after a very serious cybersecurity breach resulted in the loss of the personnel records of 33,000 Air Force officers. A vulnerable custom software application was

the avenue for the intrusion. The Air Force realized that it had a major problem with vulnerable software applications that was accelerating as more and more applications and services were becoming web-based and accessible through the Internet. In a far-sighted move, the Air Force established the ASACOE to start to fix that problem. However, the committee understands that the Center has been funded almost entirely from internal sources on an ad hoc basis and will soon enter a “stand by” status due to lack of funding.

The ASACOE’s mission is to (1) foster security into the software development and maintenance life cycle, and (2) enable the defense of software applications against attacks. This Center is unique in the Department of Defense and has received high marks for its work. It has developed best practices and methodologies for securely developing and testing software, including automated tools to discover vulnerabilities and to monitor running applications in real time.

The committee is concerned that the level and manner of funding for the ASACOE is not commensurate with the scope of the software applications vulnerability problem in the Air Force and the rest of the Defense Department. The committee recommends an authorization of \$7.0 million above the requested amount for the Air Force ISSP program to sustain the ASACOE and extend the scope of its work. The committee directs the Secretary of the Air Force, in coordination with the Assistant Secretary of Defense for Networks and Information Integration, to provide a report to the congressional defense committees by February 15, 2011, on the role of the ASACOE in securing software applications for the Air Force and the Department of Defense overall.

Malware research technology demonstration and validation

The budget request included \$140.0 million in Research, Development, Test, and Evaluation, Air Force, in PE 33140F for the Information Systems Security Program, but no funds for malware research technology demonstration and validation. This initiative will provide capabilities for testing, demonstrating, and transitioning technologies for cybersecurity to support Air Force rapid and agile cyber acquisition efforts.

The committee recommends an authorization of \$1.8 million for this project, for a total authorization of \$141.8 million for this program element.

Milsatcom terminals

The budget request included \$186.6 million for milsatcom terminals including \$136.3 million for the family of beyond line of site terminals (FAB–T) Research, Development, Test, and Evaluation, Air Force, PE 33601F line 180. The FAB–T program has been delayed and research and development funds are now needed to continue FAB–T research. The committee recommends that \$116.4 million be transferred from Air Craft Procurement, Air Force line 75.

Environmental awareness for unmanned systems

The budget request included \$169.0 million in PE 35206F for development of advanced airborne reconnaissance systems tech-

nologies, such as sensors, data links, targeting networks, and quick reaction capabilities, in support of both manned and unmanned reconnaissance platforms.

Today, unmanned aerial vehicle (UAV) systems rely almost entirely upon the Global Positioning System (GPS)-based navigation systems. While such navigation systems have worked well for UAVs to this point, there is the risk that future operations could be thwarted by foes using GPS denial techniques. A navigation system that would operate with an awareness of the environment aboard could be relied upon to operate in GPS-denied environments, and could allow UAVs to operate over longer missions by having them automatically adapt their flight profiles to the prevailing conditions.

Therefore, the committee recommends an additional \$5.0 million for developing an architecture for UAV avionics software systems that would permit UAVs to operate with an awareness of environmental conditions and automatically adapt to those conditions.

Wide-Area Airborne Surveillance Program of Record

The budget request included \$78.7 million in Research, Development, Test, and Evaluation, Air Force, in PE 35206F for the Wide-Area Airborne Surveillance Program of Record (WAAS POR).

The administration plans to issue the request for proposals (RFP) for the WAAS POR in the fourth quarter of fiscal year 2010, and to award a development contract in the third quarter of fiscal year 2011.

The committee concludes that this schedule is premature for the following reasons. The Department of Defense (DOD) has operational experience with WAAS imagery systems only through early versions of the Army Constant Hawk and Marine Corps/Air Force Angel Fire programs. These systems' limitations are significant in the areas of resolution, frame rate, area of coverage, night time performance, and timeliness. In addition, the analytic tools, communications, storage and retrieval capabilities to support these and subsequent quick-reaction capabilities (QRC) remain limited. Operations research studies sponsored by the Under Secretary of Defense for Intelligence and the Joint Staff have concluded that the benefits of these early WAAS systems are limited. These studies suggest the possibility that substantially improved WAAS systems could be more valuable for the "find-fix-finish," forensic analysis, and force overwatch missions could be more valuable, with larger coverage areas, resolution, frame rate, and so forth, but this has not been demonstrated.

DOD will soon deploy several additional WAAS QRCs that, if properly resourced and supported, will answer the questions about value and illuminate requirements for any future program of record. Forward-deployed commanders and senior DOD officials are eager to see these QRCs deployed. These include the first increment of Gorgon Stare, the Blue Devil block I, the second version of Constant Hawk, and a very capable, small form-factor WAAS camera for the Army and Marine Corps Shadow unmanned aerial vehicle (UAV). In addition, soon after these deployments, DOD will deploy the second increment of Gorgon Stare and Blue Devil Block II, each with the Defense Advanced Research Projects Agency

(DARPA) Autonomous Realtime Ground Ubiquitous Surveillance (ARGUS) camera, which will approach or match the draft requirements for the WAAS POR in the visible spectrum.

DARPA has initiated two additional rapid development projects directly relevant to the WAAS mission. One is Wide-Area Network Detection (WAND) that will pair the ARGUS camera with real-time signals intelligence and geolocation capabilities. The other is an advanced infrared sensor that will match the daytime capabilities of the current ARGUS camera.

The Blue Devil Block I QRC will also test the operational value of real-time WAAS imagery coupled with precision SIGINT and high-resolution full-motion video, and networked with other sensors. Block II will attempt to field capabilities similar, and derived from, the DARPA WAND project.

Whereas the ARGUS-like area coverage may be necessary for sizable urban areas, it is "overkill" for operations in rural areas, and may well be too expensive to proliferate anyway. The smaller, lighter, and cheaper Wide Focal Plane Array Camera that the Navy is developing for the Shadow UAV appears to be better suited for operations in rural areas and where there is a potential need for large numbers of systems.

In light of this large number of innovative, near-term WAAS programs heading for trial in Afghanistan, and the considerable uncertainties remaining about WAAS requirements and benefits, the committee is not willing to commit to a near-term locking in of WAAS POR requirements. Indeed, the QRC efforts of the Army, Air Force, Navy, and DARPA appear likely to continue to innovate and to meet the evolving needs of forces deployed in Afghanistan and elsewhere. The committee is more inclined to buttress and enhance these ongoing QRC efforts to ensure that deployed forces are adequately supported.

In that regard, the committee notes that the Gorgon Stare Increment II program is short of funds for the National Geospatial Intelligence Agency (NGA) to provide necessary processing, exploitation, and dissemination (PED). The same is true for the Blue Devil Block II.

Accordingly, the committee recommends an authorization of \$15.0 million for the WAAS POR, a reduction of \$63.7 million from the request. Elsewhere in this report, the committee recommends an increase of \$22.5 million in PE 35102BQ, line 213, for NGA WAAS PED. The committee's recommendation would defer issuance of an RFP and contract award for the WAAS POR for at least 1 year.

Global Positioning System augmentation

The budget request included \$446.3 million in Research, Development, Test, and Evaluation, Air Force, for the Global Positioning System III space vehicle in PE 35265F line 212. The committee recommends an additional \$10.0 million to study the idea of using mini-GPS satellites to augment the coverage of GPS III and heritage GPS satellites. The committee believes that there is a possibility that a mix of 24 GPS III satellites and 6 or more mini-GPS satellites could provide additional coverage in areas where it is difficult to acquire a GPS signal such as mountainous areas and

urban areas. It is also possible that additional mini-GPS satellites could fill any gaps in GPS coverage caused by on-orbit failures of a GPS satellite.

The mini-GPS satellites would be small satellites using one of many existing small commercial satellite buses with L1, L2, and L5 signals only, and no additional capabilities. The committee directs the Air Force to review the possibility of using mini-GPS satellites and to submit a report to the congressional defense committees setting forth the results of the review no later than December 1, 2010. The report should include an estimate of the cost of each mini-GPS satellite.

Global Positioning System operating control segment

The budget request included \$828.2 million in Research, Development, Test, and Evaluation, Air Force, PE 35265F line 212 for Global Positioning System III (GPS III) including \$381.9 million for the operating control segment (OCX).

The committee believes that the funds for the OCX should remain in PE 63423F line 33, where the funds were appropriated in fiscal year 2010 and separate from the funds for development of the GPS III space vehicle. The committee recommends a \$381.9 million reduction in line 212 and an increase in line 33 to effect the transfer.

Joint Space Operation Center System

The budget request included \$132.7 million for the Joint Space Operation Center (JSpOC) system in Research, Development, Testing, and Evaluation, Air Force, PE 35614F line 213. The JSpOC system is focused on upgrading the ability of the JSpOC to track, monitor, predict, and to respond in real time to events in space. The committee recommends an additional \$6.0 million to continue the Karnac study, which is a joint Air Force and Department of Energy National Laboratory effort to utilize and modify existing capabilities developed to support the nuclear weapons program to improve the JSpOC capabilities, including using nontraditional data and three dimensional modeling and simulation capability. This is the second of a 2-year program. The committee urges the Air Force to include funds for the last year of Karnac in the fiscal year 2012 budget request.

Nuclear detonation detection system

The budget request included \$72.2 million in Research, Development, Test, and Evaluation, Air Force, PE 35913F line 215 for the nuclear detonation (NUDET) detection system to detect, locate, and report any nuclear detonations in the atmosphere or in space. The committee recommends an additional \$30.0 million to integrate the Space and Atmospheric Burst Reporting System (SABRS) on the fourth Space-based Infrared System Geosynchronous satellite (SBIRS GEO-4). SABRS is the follow-on to the NUDET system currently on the Defense Satellite Program satellites. The SABRS NUDET sensors were to be on all SBIRS GEO satellites. Although there are plans for initial SABRS sensors to be on other satellites there is no plan for the fourth SABRS sensor. In 2007, the Air Force committed to integrating the third SABRS sensor on the

GEO-3 satellite but later decided not to fund integration of any SABRS sensors on any SIBRS GEO satellites. The additional funds will ensure the SABRS NUDET sensor is integrated on the SBIRS GEO-4 satellite.

Defense-wide

Cognitive computing

The budget request included \$90.1 million in PE 62304E for cognitive computing, including \$9.0 million for the development of a social networking site for veterans. The committee recommends a reduction of \$9.0 million to terminate this specific project since its activities do not appear to align themselves with the Defense Advanced Research Projects Agency's vision of addressing challenging problems. Furthermore, such activities, if truly deemed necessary, should be undertaken by either a service or an appropriate agency that has the necessary policy and legal expertise to ensure personal privacy and the confidentiality of health data on such a site.

Advanced chem-bio protective materials

The budget request included \$169.3 million in PE 62384BP for chemical and biological defense applied research, but no funds to develop advanced non-woven chemical and biological protective materials. The committee recommends an increase of \$1.5 million in PE 62384BP for development of non-woven advanced materials that are capable of protection and defeat against airborne chemical and biological agents and toxins. Such materials would have application for both individual and collective protection missions.

Chemical and biological infrared detector

The budget request included \$169.3 million in PE 62384BP for chemical and biological defense applied research, but included no funds to develop miniaturized infrared detection technology. The committee recommends an increase of \$3.0 million in PE 62384BP to continue development and miniaturization of an advanced infrared detection system for chemical and biological agents. The objective is to demonstrate a functional prototype that operates at high speed and sensitivity with low false alarm rates. Such a system could reduce the logistical burden compared to other technologies.

Department of Defense Research & Engineering Cyber security activities

The budget request included two new budget lines for cyber security activities within Department of Defense Research & Engineering (DDR&E): \$10.0 million in PE 62668D8Z for Cyber Security Research and \$10.0 million in PE 63668D8Z for Cyber Security Advanced Technology Development. The committee notes the broad range of cyber security-related activities in the Department, including the services and the Defense Advanced Research Projects Agency (DARPA), and the lack of more coordination across these entities.

The committee is concerned that DDR&E perceives the need to develop its own funding lines instead of working with the Department of Defense Office for Networks and Information Integration

to coordinate and influence the services' and DARPA's activities in this arena. Hence, the committee recommends a reduction of \$5.0 million in each of the above program element lines.

Weapons of mass destruction analysis reachback tool

The budget request included \$212.7 million in PE 62718BR for research and development of weapons of mass destruction defeat technologies. The committee recommends an increase of \$3.0 million in PE 62718BR for development of a decision-making and analysis tool for the Defense Threat Reduction Agency to provide rapid analysis of chemical, biological, or radiological events to combatant commanders. The number of such reachback requests from combatant commands has increased significantly over the past several years, and there is a need for improved analysis and planning capabilities.

Non-lethal weapons technology

The budget request included \$26.5 million in PE 1160401BB for Special Operations Technology Development. However, no funding was included for development of non-lethal weapons technology. Non-lethal weapons provide increased capabilities to special operations forces to engage and immobilize personnel and vehicles with minimal risk of significant injury or damage to the target. The Commander of U.S. Special Operations Command has identified a \$3.0 million shortfall in funding for development of non-lethal weapons technologies for special operations specific missions and target sets.

The committee recommends an increase of \$3.0 million for the development of non-lethal weapons technologies for the U.S. Special Operations Command.

Combating terrorism technologies

The budget request included \$85.3 million in PE 63122D8Z for combating terrorism technology support. The committee notes that improvised explosive devices continue to be a primary weapon of choice in attempted and successful acts of terrorism in the United States, against its friends and allies, and against our uniformed and civilian personnel in theater. In order to promote the development of advanced blast resistant construction materials and buildings, the committee recommends an increase of \$2.5 million for impact and blast loading laboratory testing technologies.

Foreign language correlation and translation

The budget request included \$85.3 million in PE 63122D8Z to develop and deliver capabilities that address needs and requirements with direct operational application to combating terrorism. Part of these efforts include technologies to capture, translate, and correlate information in multiple foreign languages. The committee recommends an increase of \$1.0 million in this account for activities related to these efforts.

Reconnaissance and data exploitation system

The budget request included \$85.3 million in PE 63122D8Z for development of technologies to support combating terrorism, but in-

cluded no funding to continue development of a reconnaissance and data exploitation system.

The Department of Defense (DOD) needs improved intelligence, reconnaissance, and surveillance (ISR) tools. With the rapidly increasing and pervasive deployment of unmanned, limited payload ISR platforms such as unmanned aerial vehicles (UAV), the need for minimal size, weight, and power ISR sensor systems is paramount.

DOD has been developing a reconnaissance and data exploitation (REX) system that will allow sensors systems to fuse the output of hyperspectral imaging sensors and other electro-optic (EO) sensors and achieve integrated real time target detection capability. Because of its limited demands on platforms for space and weight, the REX payload promises to be able to integrate into a wide variety of airborne and ground-based platforms whose limited payload capacities have precluded such an option. In particular, REX will allow the rapidly expanding fleets of small military UAVs to: (1) take advantage of the powerful automated target detection inherent in multispectral sensors; and (2) enable sensor operators to cue high resolution EO sensors to support target identification. Completing development of the REX system should permit DOD to take better advantage of existing technologies, which should reduce the time needed to deploy capabilities to support the combatant commanders and also reduce the costs of doing so.

Therefore, the committee recommends an additional \$7.0 million for developing the REX system.

Plant-based vaccine development

The budget request included \$177.1 million in PE 63384BP for chemical and biological defense advanced development, but no funds for using plants to produce vaccines against biological threats. The committee recommends an increase of \$3.0 million in PE 63384BP for plant-based vaccine development, including a potential vaccine against multiple threat agents. The committee is aware of significant progress made by the Defense Advanced Research Projects Agency in demonstrating the rapid production of candidate vaccines using plants. Advancing this potential could permit production of vaccines quickly after a biological threat or disease first appears.

Defense Logistics Agency energy research

The budget request included \$20.5 million in PE 63712S for generic logistics technology demonstrations. The Defense Logistics Agency (DLA) is responsible for acquiring and managing all of the fuel required by the military. The DLA energy readiness research and development program has thrust areas that include research on alternative energy, including fuel cells and the conversion of waste and biomass into fuels. Noting the strategic importance of reducing the military's dependency on fossil fuels and in support of these objectives, the committee recommends an additional: \$4.0 million for biofuels research, \$1.5 million for research on the conversion of biomass into logistics fuels, \$8.0 million to continue the vehicle fuel cell and logistics program, and \$2.0 million to accel-

erate the evaluation process of green products, primarily in the biofuel sector.

The committee also recommends an additional \$1.0 million to continue to improve the use of radio-frequency identification technology for better tracking across the DLA supply chain.

Printed circuit board industrial assessment

The budget request included \$402.8 million in PE 63890C for ballistic missile defense enabling technologies, including \$36.6 million for the Producibility and Manufacturing Technology project, but it included no funds to support the Department of Defense (DOD) Executive Agent for Printed Circuit Board Technology. This Executive Agent position was created pursuant to section 256 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 (P.L. 110–417) and is part of a partnership between the Missile Defense Agency (MDA) and the Navy. The Executive Agent is intended to support the needs of DOD for assured high quality printed circuit boards in a variety of critical weapon systems. The committee directs that, of the funds available in PE 63890C, MDA use up to \$2.0 million to support the Executive Agent to conduct an industrial capabilities assessment of the printed circuit board industrial sector, including the supply chain, to meet future DOD technology needs. The Executive Agent shall provide the industrial capabilities assessment to the congressional defense committees within 180 days after the enactment of this Act.

U.S.-Israeli short-range ballistic missile defense

The budget request included \$121.7 million in PE 63913C for U.S.-Israeli cooperative ballistic missile defense programs, including \$46.7 million for co-development of a short-range ballistic missile defense system called “David’s Sling Weapon System.” This system is intended to provide an affordable defense of Israel against short-range missiles and long-range rockets of the type fired by Hezbollah from Lebanese territory in the summer of 2006. The United States is co-managing the development of the system to ensure that it is compatible with U.S. missile defense systems and to provide an option for the U.S. military to procure the system in the future, if needed. The committee recognizes that the threat to Israel from such short-range missiles and rockets has increased. Therefore, the committee recommends an increase of \$25.0 million to accelerate the development of the David’s Sling short-range ballistic missile defense system.

The budget request included no funds for the Israeli “Iron Dome” short-range rocket defense system. However, in mid-May of 2010, the Department of Defense requested that Congress approve \$205.0 million of fiscal year 2011 funds to accelerate and expand Israeli procurement of the Iron Dome system. The committee recommends an increase of \$205.0 million in PE 63913C for the Israeli Iron Dome system.

Corrosion control research

The budget request included \$4.8 million in PE 64016D8Z for corrosion programs. In support of Department of Defense efforts to reduce maintenance costs due to corrosion, the committee rec-

ommends an additional \$3.0 million for corrosion research activities.

Chem-bio defense system development and demonstration

The budget request included \$407.1 million in PE 64384BP for chemical and biological defense system development and demonstration, but no funds to continue developing a don/doff upgrade to the Joint Service Aircrew Mask (JSAM). The committee recommends an increase of \$2.0 million in PE 64384BP to continue developing a don/doff in-flight upgrade to the JSAM to permit aircrews to put on the mask quickly in flight if there is a chemical or biological threat present. This would obviate the need for aircrews to wear the mask when it is not needed.

The committee understands from the Department of Defense that there is a funding imbalance in Budget Activity 5 for the Transformational Medical Technologies Initiative program. This results in requested funds that are excess to need and also in the wrong funding lines. Therefore, the committee recommends a decrease of \$15.0 million in PE 64384BP, and a transfer of a total of \$50.0 million to funding lines for Budget Activities 1, 2, and 3, as reflected in the funding tables, and as indicated by the Department.

Defense Technical Information Center unjustified growth

The budget request included \$61.1 million in PE 65801KA for the Defense Technical Information Center. This budget request represents an increase of \$11.8 million over last year. The committee notes that the budget justification material does not adequately explain an increase of this amount and therefore recommends a decrease of \$10.0 million.

Center for Intelligence and Security Studies

The budget request for PE 301301L for Research, Development, Test, and Evaluation for the Defense Intelligence Agency (DIA) within the General Defense Intelligence Program is classified. The committee recommends authorization of \$3.0 million above the requested amount to sustain DIA's program at the Center for Intelligence and Security Studies to improve the capability and quality of intelligence analysts and arranging internships with security clearances in the intelligence community.

Technology development for tactical unmanned aerial systems

The budget request included \$16.3 million in PE 34210BB for the development of new capabilities for intelligence, surveillance, and reconnaissance, including technology upgrades for tactical unmanned aerial systems (UAS). Tactical UASs are used heavily by special operations personnel for situational awareness and target acquisition. The committee recommends an increase of \$4.0 million to continue development of technologies to improve the capabilities of tactical UASs by increasing payload, reducing noise signature, and improving engine performance.

Wide-area aerial tactical situation awareness

The budget request included \$16.3 million in Research, Development, Test, and Evaluation, Defense-wide, in PE 34210BB for Special Applications for Contingencies for the Special Operations Command (SOCOM). The committee recommends an authorization of \$1.7 million above the requested amount to assist SOCOM in integrating a new 413 megapixel wide-area airborne surveillance (WAAS) camera system on SOCOM's Viking 400 unmanned aerial vehicle (UAV) system. This camera and the Viking 400 would provide a WAAS capability in between that which is being demonstrated by the Navy on the Shadow UAV and by the Defense Advanced Research Projects Agency and the military services on the Reaper UAV and other large platforms.

Center of excellence for geospatial science

The budget request included classified amounts in Research, Development, Test, and Evaluation, Defense-wide, in PE 35102BQ for the Defense Geospatial Intelligence Program. The committee recommends authorization of an additional \$1.0 million to continue funding for the Center of Excellence for Geospatial Science, which provides scientific support for the National Geospatial Intelligence Agency as well as education and training for students seeking careers in the intelligence community.

Industrial Base Innovation Fund and supply chain

The budget request included \$21.8 million in PE 78011S for Defense Logistics Agency (DLA) manufacturing technology efforts. A February 2006 report by the Defense Science Board regarding the Department of Defense's Manufacturing Technology Program points out that manufacturing technology plays a critical role in addressing development, acquisition, and sustainment problems associated with advanced weapons programs and recommended increased funding in this area.

The committee recommends an additional \$30.0 million to continue the Industrial Base Innovation Fund program. The committee directs that DLA, jointly with the Deputy Under Secretary of Defense for Industrial Policy, continue to make investments in manufacturing research that address defense industrial base shortfalls especially related to surge production requirements and diminishing sources of defense material. In addition, the committee also recommends an additional \$2.0 million in support of the Northwest manufacturing initiative.

Furthermore, to improve supply chain efficiencies, the committee recommends \$1.5 million to PE 62705A to improve radio frequency identification tracking devices.

Lithium ion battery safety research

The budget request included \$13.9 million in PE 1160483BB for the development of technologies for underwater systems used by special operations forces. Lithium ion technology has shown promise for reducing the size of batteries while also improving their performance characteristics. However, lithium ion battery technology needs additional development to improve safety for use in under-

water systems. The committee recommends an increase of \$1.6 million for lithium ion battery safety research.

Defense Advanced Research Projects Agency execution issues

The budget request included \$3.1 billion for the research and management activities of the Defense Advanced Research Projects Agency (DARPA). A key change in the portfolio was a 59 percent increase in basic research funding activities compared to a 4 percent decrease in advanced technology development. The committee notes that while an increase in basic research is beneficial and reverses a trend that has affected the broader national science and technology enterprise, it is concerned that the ability to transition technology will be adversely impacted unless there is a more appropriate balance between basic research and advanced technology development. The committee will be monitoring the impacts of this portfolio adjustment over the coming year.

In addition, while DARPA's fiscal performance has notably improved, the committee is still concerned about the timeliness of sustained funding execution. The committee recommends a reduction of \$143.4 million from DARPA's overall budget to reflect continuing concerns about timely and effective execution of funds by the agency.

Items of Special Interest

Aegis Ballistic Missile Defense

The budget request included \$1.5 billion in PE 63892C for Aegis Ballistic Missile Defense (BMD) research and development, and \$94.0 million in Procurement, Defense-Wide, for the procurement of eight Standard Missile 3 (SM-3) Block IB interceptors for the Aegis BMD system. In addition, the budget request includes funding in two new Aegis BMD-related funding lines to support the new Phased Adaptive Approach (PAA) to missile defense in Europe: \$281.4 million in PE 64880C for development of land-based SM-3 capabilities and \$318.8 million in PE 64881C for co-development, with Japan, of the SM-3 Block IIA interceptor.

The Aegis BMD system is the centerpiece of the PAA to missile defense in Europe, which will involve the deployment, at sea and on land, of four increasingly capable variants of the SM-3 interceptor (Blocks IA, IB, IIA, and IIB) over the four phases of the PAA from 2011 to 2020. Given its inherent mobility and flexibility, as well as its evolving capability to defend against all ranges of ballistic missiles from nations like Iran and North Korea, Aegis BMD will also be the core of other regional missile defense architectures, for example in the Middle East and East Asia.

The committee strongly supports the development, testing, production, and deployment of operationally effective Aegis BMD and SM-3 capabilities in sufficient numbers to support the needs of regional combatant commanders and to implement the PAA in Europe. However, the committee has several concerns relating to the Aegis BMD program.

First, the committee notes that the Missile Defense Agency (MDA) is focused on production of the SM-3 Block IB, and is not

planning production of more SM-3 IA interceptors. Consequently, the supplier base for unique SM-3 IA components will soon no longer be qualified to supply those components if needed in the future. If there is a problem or delay with the development of the SM-3 IB, a delay in the planned first flight test of the SM-3 IB, or the test is not successful, it would create a situation where no operational SM-3 interceptors (Block IA) can be produced, at a time when increasing the interceptor inventory is essential. The committee directs the Department of Defense (DOD) to consider what actions could be taken to mitigate this risk and expects DOD to take appropriate actions to keep SM-3 IA suppliers qualified and able to produce additional SM-3 IA if necessary, including the possibility of a reprogramming action with fiscal year 2010 funds. The committee is aware that MDA has studied a variety of such options and that there are near-term mitigation options available, including procurement of Block IA kill vehicle kits or additional Block IA interceptors, if action is taken before the suppliers go out of qualification.

Second, the committee notes that the planned production schedule for the SM-3 IB has a steep increase between fiscal year 2011 with 8 interceptors and fiscal year 2012 with 66 interceptors, an eightfold increase. Although the committee supports the objective of fielding adequate numbers of SM-3 Block IB interceptors after testing has demonstrated their capability, this will be a challenging ramp-up in the production rate. The committee is concerned that this planned production increase may cause unanticipated production problems, including production delays, similar to the experience with far lower production rates for the Block IA interceptor. The committee urges MDA to consider risk mitigation options for this steep production increase, including the possibility of budgeting some research and development funds to cope with production challenges.

Third, the committee is concerned that the development effort for the SM-3 Block IIB missile is not currently being managed by the Aegis BMD program office, but rather within the MDA technology development program office. The significant milestones and capabilities achieved to date with the Aegis BMD program have resulted in large part from the close collaboration between the Aegis BMD program office and the Navy, which has more than 30 years of experience in the development, testing, fielding, and operation of the Standard Missile series and the Aegis Weapon System. The committee believes it is essential for this collaborative relationship to continue with respect to the SM-3 Block IIB program, and directs MDA to ensure that the Aegis BMD program office has the central role in the management of the Block IIB program.

Finally, the current plan for deployment of the SM-3 Block IIB interceptor would be limited to deployment on land because of shipboard safety concerns related to the anticipated use of hypergolic fuels in the Block IIB interceptor. The committee directs MDA and the Navy to conduct an analysis of options for alternative technologies or practices that would permit the deployment of the SM-3 Block IIB on Aegis BMD ships, as well as on land, and to report to the congressional defense committees on the results of this analysis not later than April 30, 2011.

Ballistic missile defense overview

The budget request included \$9.9 billion for ballistic missile defense, including \$8.4 billion for the Missile Defense Agency (MDA), and \$1.5 billion for Army and related missile defense programs. This represents an increase of nearly \$700.0 million over the amount appropriated for fiscal year 2010.

The committee commends the administration for several important recent initiatives in ballistic missile defense, all of which are consistent with previous guidance from Congress.

In September 2009, President Obama announced his decision to accept the unanimous recommendation of the Secretary of Defense and the Joint Chiefs of Staff to pursue the Phased Adaptive Approach (PAA) to missile defense in Europe. This approach, centered on the Aegis Ballistic Missile Defense (BMD) system and its Standard Missile-3 (SM-3) interceptor, will provide timely defensive capability against the existing and evolving Iranian ballistic missile threat to Europe and the potential threat to the United States in the future. (Several Aegis BMD program management concerns are described elsewhere in this report.)

In February 2010, the Department of Defense released the report of the first-ever Ballistic Missile Defense Review (BMDR), which was required by section 234 of the Duncan Hunter National Defense Act for Fiscal Year 2009 (Public Law 110-417), initiated by the committee. The BMDR provided a comprehensive review of U.S. missile defense strategy, policies, plans, and programs.

The BMDR established six policy priorities that are guiding the current and planned missile defense program: 1) the United States will continue to defend the Homeland against the threat of limited ballistic missile attacks; 2) the United States will defend against regional missile threats to U.S. forces, while protecting allies and partners and enabling them to defend themselves; 3) before new capabilities are deployed, they must undergo testing that enables assessment under realistic operational conditions; 4) the commitment to new capabilities must be fiscally sustainable over the long-term; 5) U.S. BMD capabilities must be flexible enough to adapt as threats change; and 6) the United States will seek to lead expanded international efforts for missile defense.

As Secretary of Defense Gates stated in his letter of transmittal of the BMDR report, "If fully implemented in coming years, the plans reflected here will significantly improve the security of the United States and its allies while also enhancing international stability." The committee shares this view.

Consistent with the BMDR, and in order to implement the PAA and to fulfill the missile defense needs of regional combatant commanders, the budget request included funds to increase the planned inventory of SM-3 and Terminal High Altitude Area Defense (THAAD) interceptors, as Congress had previously directed. The current plan is for 436 SM-3 Block IA and IB interceptors by 2015 and for 9 THAAD batteries with 431 interceptors by 2015, an increase of nearly 250 interceptors above plans announced for fiscal year 2010. This represents a significant enhancement in the capacity to defend our forward deployed forces, allies, and partners against the existing threat of short- and medium-range missiles

and against the evolving regional missile threat. According to Secretary Gates, this effort is a “top priority.”

The budget request also included funds for new sensor programs to enhance the performance of the Ballistic Missile Defense System (BMDS) against missiles of all ranges. One such initiative is the Airborne Infrared (ABIR) program, which seeks to develop unmanned aerial vehicles with the ability to provide early and accurate missile tracking data to regional missile defense systems like Aegis BMD at sea and on land. Such an ABIR capability could permit early intercepts of missiles in their ascent phase of flight, before they can deploy countermeasures. It would also improve defense against attacks with numerous missiles, such as those practiced in recent years by North Korea and Iran.

Another new sensor initiative is the Precision Tracking Space System (PTSS). The MDA concept is that an operational low-earth orbit (LEO) infrared satellite, such as PTSS, would improve significantly the ability to track, throughout their post-boost flight, missiles from countries such as Iran and North Korea. The precision tracking capability that could be provided by such a LEO satellite constellation could enable earlier interceptor launches and earlier intercepts of missiles in flight, including against numerous missiles, thus improving defensive capability significantly.

The MDA has adopted a novel approach to developing prototypes for the PTSS that should ensure mature technical readiness levels are achieved before any decision is made to procure operational satellites. This approach includes support from government laboratories and the Air Force Space and Missile Systems Center. Since an operational PTSS system would have to be part of the overhead persistent infrared architecture operated by the Air Force, an early and close relationship with the Air Force is necessary to ensure a smooth transition to the Air Force, and MDA appears to be planning such a relationship. The committee expects an operational PTSS to be compatible with the Air Force multi-mission space operation center protocols. The committee believes MDA and the Air Force should explore concepts wherein the MDA would control the prototype payloads and the Air Force would control the prototype satellites.

The committee supports the approach adopted by MDA for establishing requirements and developing PTSS prototypes, and believes that MDA should consider taking advantage of the platform potential that a PTSS prototype would provide and explore the option of including a technically mature visible-band surveillance sensor, in addition to the infrared sensor, as part of the prototyping effort—as long as it would not delay or otherwise interfere with the PTSS prototype development effort.

As stated in the BMDR, because of the Ground-based Midcourse Defense (GMD) system deployed in Alaska and California, “the United States is currently protected against the threat of a limited ICBM [intercontinental ballistic missile] attack.” In addition to the 30 operational Ground-Based Interceptors (GBIs) planned for the system, the Department is planning to complete installation of 7 spare silos in Missile Field 2 at Fort Greely, Alaska, as a hedge against the potential future expansion of a long-range missile threat from a country such as North Korea or Iran. The Depart-

ment does not intend to procure operational interceptors for these silos, but would have the option of emplacing stockpiled test or spare interceptors in them in the future, as a contingency operational capability, in case the need should arise.

As part of Phase 1 of the PAA, the Department is planning to deploy a forward-based THAAD-type radar, designated AN/TPY-2, in southern Europe in the 2011 timeframe. In addition to enhancing the European regional defensive capability of the PAA systems, this deployment will provide substantially improved and earlier missile tracking information of potential future long-range Iranian missile launches. This improved information would enhance the performance of the GMD system against such a potential future Iranian missile threat to the United States and could permit the GMD system to operate in a “shoot-look-shoot” mode, rather than firing two GBIs at each target missile. This could effectively double the number of potential Iranian threat missiles that the existing GMD system could engage.

The committee notes that section 232 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111-84) required the Department to submit to the congressional defense committees, at the time of the fiscal year 2011 budget request, a report containing an assessment and plan for the GMD system. This report was to provide information on the Department’s plans for maintaining and sustaining the GMD system through its service life. The committee is disappointed that the required report was not submitted on time and still has not been received as of mid-May. The intent of Congress in requiring the report at the same time as the budget request was to ensure that the report would be available for consideration during deliberations on the fiscal year 2011 budget request. By failing to submit the report, even within 3 months of the deadline, the Department has not only failed to meet the intent of Congress, but has prevented the committee from being able to consider the results of the report. The committee expects more timely responses to requirements in law.

One of the major policy initiatives of the BMDR is the requirement for operationally realistic testing to demonstrate the capability of missile defense systems before they are deployed. This “fly before you buy” approach is long overdue and is consistent both with longstanding congressional direction and normal acquisition practice for Major Defense Acquisition Programs. In order to ensure adequate testing of its systems, MDA has created a new Integrated Master Test Plan (IMTP) that takes the evaluation-based testing approach long recommended by the Director of Operational Test and Evaluation. This approach seeks to provide the specific information needed to validate and verify models and simulations necessary to understand and have confidence in the performance of the BMDS. For the first time, the IMTP includes plans for dedicated operational tests to demonstrate the capability of missile defense systems. The committee believes this is an important and necessary step in fielding effective missile defense systems.

The committee notes that the MDA targets program is still a major concern for the missile defense test program, and for the successful development of effective missile defense systems. A number of notable target failures, such as the air-launched target for

THAAD flight test 11, have been very costly and have caused significant delays. The committee believes that MDA needs to further improve the quality, reliability, and affordability of its targets.

The committee notes its serious concern with contractor quality control problems experienced by MDA. The committee commends MDA for focusing on quality problems and encourages MDA to continue taking a strong approach to demanding and enforcing quality control with its contractors, including seeking defects clauses and warranties in any new contracts, and any other appropriate means of holding contractors accountable for their performance. The committee believes it is unacceptable for contractors to produce components and systems that do not meet the quality standards required to provide effective defense against ballistic missiles, and that the government should not pay for defective or inferior products.

Coordination of the Minerva Program, the Human Social Cultural Behavior Modeling Program, and Strategic Multi-layer Assessment efforts

The committee commends the Department of Defense for investing in research activities related to improving its basic understanding of the social, cultural, behavioral, and political forces that shape regions of the world of strategic importance to the Nation, as well as understanding the dynamics of terrorist and other irregular warfare actors. Currently, activities related to this area that are being pursued include the Minerva Program, the Human Social Cultural Behavior Modeling Program, as well as Strategic Multi-layer Assessment efforts.

However, the committee notes that given the broad range of activities and the importance of this work, it is not clear that appropriate coordination and collaboration is occurring to maximize synergies between various research communities and to avoid unnecessary duplication. Furthermore, it is not clear how the results of these efforts will directly inform and impact broader counterterrorism and counterinsurgency strategies, psychological operations and other counter influence activities and efforts to counter violent extremism.

Hence, the committee requests that the Under Secretary of Defense for Policy and the Director of Defense Research and Engineering submit a report by September 1, 2011, to the congressional defense committees describing coordinating mechanisms between the above mentioned activities and plans for how the results of the Department's research efforts will be used to aid counterterrorism and counterinsurgency strategies, psychological operations and other counter influence plans, and efforts to counter violent extremism.

Defense Science Board study on cyber research and development

Section 931 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111-84) required that the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) provide a report by March 1, 2010, which has not yet been delivered, on a strategy for organizing the research and development or-

ganizations within the Department of Defense to develop “leap-ahead” cyber operations.

The committee directs that the Defense Science Board (DSB) conduct an independent assessment for the USD (AT&L) of this strategy and its implementation over the course of fiscal year 2011, and report to the USD (AT&L) by February 1, 2012. The committee directs that the DSB also examine the research budgets and plans for cyberwarfare and cybersecurity of the military services and the defense agencies and evaluate whether the level of investment and the planned activities will meet the future needs of the Department. The committee intends that this report shall be available for congressional review no later than March 1, 2012.

Director of Operational Test and Evaluation personnel issues

The committee is aware that test and evaluation activities have increased in complexity and scope over the past several years. As the demands of these test and evaluation activities have increased, the demands have also increased on the activities of the Office of the Director of Operational Test and Evaluation (DOT&E).

The committee is concerned that, as test and evaluation demands have increased on DOT&E, their personnel capabilities have not kept pace with the demands. Therefore, the committee directs DOT&E to submit a report to the congressional defense committees not later than January 15, 2011, containing a DOT&E strategic workforce plan, including DOT&E personnel requirements, allocations, resources, and plans, to manage the increased complexity and demands of test and evaluation activities performed by DOT&E.

High speed encryption

Both the National Security Agency (NSA) and the National Reconnaissance Office (NRO) are developing very high-speed encryption technology. The NSA approach is significantly less expensive and will be fielded soon. The more expensive and longer-term NRO approach would provide on-demand protocol agility. The committee’s examination thus far of this issue casts doubt on the need for such agility and therefore the need for the large NRO investment. The administration has assured the committee that a joint NRO-NSA study is underway to determine what capabilities are required in the future. The committee directs that the Assistant Secretary of Defense for Networks and Information Integration, in coordination with the Office of the Director of National Intelligence, assume oversight of this study and provide a report to the congressional defense and intelligence committees by February 1, 2011.

Integrated Sensor is Structure

The budget request included \$303.1 million in PE 63286E for Advanced Aerospace Systems. Of that amount, \$103.4 million supports persistent or responsive intelligence, surveillance, and reconnaissance (ISR) programs, including Vulture and Integrated Sensor is Structure (ISIS). As noted last year, the committee is concerned that the Defense Advanced Research Projects Agency (DARPA), the

Office of the Secretary of Defense, and the military departments have numerous persistent or responsive ISR capabilities in development and transition plans for a number of DARPA programs to the services are not clear.

In particular, the committee is concerned about the future direction of ISIS. While the committee understands the vital need for a long-duration, large aperture capability, the transition plan for ISIS is being called into question with recent Air Force funding actions. Hence, the committee will continue to monitor the progress of this program in order to ensure that this operational gap is addressed in the most cost-effective manner.

In addition, the committee notes that the Department of Defense (DOD) is pursuing a wide variety of air vehicles, classified as aerostats, airships, and rigid aeroshell variable buoyancy vehicles, and directs DOD to provide the congressional defense committees with a report by March 1, 2011, that reviews the status and future plans of these programs to ensure that the most cost-effective systems are being pursued and that the highest priority science and technology challenges for persistent unmanned capabilities are being addressed.

Multi-mission Maritime Aircraft prognostics

The budget request included \$929.3 million in PE 65500N for the Multi-mission Maritime Aircraft (MMA) program that is developing a replacement for the P-3 maritime patrol aircraft. In the MMA program, the Navy is developing the P-8A aircraft, a derivative of the commercial B-737 aircraft.

As a part of the overall P-8 development program, the Navy is funding prognostics and health management technologies that are included in a performance based service specification contract.

Development of the overall P-8 program appears to be proceeding well, but the committee is concerned that the Navy may be giving insufficient attention and funding to the prognostics and health management technologies for this aircraft. The committee has heard allegations that the Navy may have diverted funds budgeted for these programs to solve other emerging problems. If the Navy were to forego embedding such technologies in the new production aircraft, it will have little opportunity to add them later.

The committee believes that diverting funds from prognostics and health management development activities would be incredibly short-sighted. Such a diversion may help solve near-term problems with other parts of the development program, but that runs the risk of saddling the fleet with an aircraft that would be more difficult and more expensive to maintain for decades to come. The Navy should take action to ensure that the MMA program and other new aircraft programs adopt advanced preventative and predictive technologies to the maximum extent practicable, in order to promote safety for our aircrews and enhance mission readiness of the aircraft.

Multiple User Objective System

The budget request included \$405.7 million for the Multiple User Objective System (MUOS) in Research, Development, Test, and Evaluation, Navy, PE 33109N line 194. The MUOS provides

narrowband ultra high frequency (UHF) satellite communications capability to a wide variety of users. The committee notes that the MUOS program is more than 2 years behind schedule and that several of the current UHF satellites on orbit have lost capability and capacity or failed earlier than expected. The committee has been concerned for several years that there will be a gap or decreased availability of UHF communications.

Congress has supported efforts to develop additional on orbit UHF capacity including the idea of hosted payloads. Although the Navy started a hosted payload program in 2008 to provide additional UHF capacity, it was cancelled in 2009. As a result the Navy was forced to look at ways to augment UHF capability using existing satellite systems. While this exercise has been productive there is still not enough UHF capacity. As a result the Navy finally decided to explore again commercial options for UHF capability and recently issued a request for sources to provide that capability. The committee fully supports long-term UHF augmentation not only to protect against further slips in the MUOS program but also to protect any additional unforeseen failures of existing capacity.

If, in reviewing the responses to the sources-sought notice, the Navy determines that it needs additional authority or other assistance the committee urges the Navy to inform it promptly.

Report on implementation of industry standardized hardware and software interfaces

The committee is interested in exploring opportunities to ensure that various aerospace and other systems adopt and use industry standard interfaces. This would include common hardware and software modules to increase compatibility and move to more plug and play like concepts. The committee directs the Air Force to review options for implementing a modular, scalable, and rapidly deployable avionics standard for aerospace vehicles and report to the Committees on Armed Services of the Senate and the House of Representatives no later than March 1, 2011, on the feasibility and affordability of such an approach.

Test Resources Management Center

In fiscal year 2010, the committee recommended increases to PE 64759A and PE 64759F to strengthen the Department of Defense's test and evaluation capabilities. The committee understands that the Test Resources Management Center (TRMC) is performing a review of the service's test and evaluation investments and looks forward to the results of such a review with the submission of the fiscal year 2012 budget. The committee also encourages the TRMC to discuss any issues with its workforce that may be associated with increased testing and evaluation requirements across the Department. The committee continues to encourage the services to continue to work more closely with the TRMC in order for them to perform their responsibilities regarding oversight and management of the Department's test and evaluation enterprise that is critically important for the successful fielding of weapon systems.

TITLE XLII—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

SEC. 4201. RESEARCH, DEVELOPMENT, TEST, AND EVALUATION.

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION (In Thousands of Dollars)					
Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
RESEARCH, DEVELOPMENT, TEST & EVAL, ARMY					
BASIC RESEARCH, ARMY					
0601101A	1	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	21,780		21,780
0601102A	2	DEFENSE RESEARCH SCIENCES	195,845	6,000	201,845
		Advanced energy storage research		[4,000]	
		Ultracold matter system for navigation		[2,000]	
0601103A	3	UNIVERSITY RESEARCH INITIATIVES	91,161	2,000	93,161
		Accelerate lightweight vehicle protection materials		[2,000]	
0601104A	4	UNIVERSITY AND INDUSTRY RESEARCH CENTERS	98,087	2,000	100,087
		Materials processing research		[2,000]	
		TOTAL, BASIC RESEARCH, ARMY	406,873	10,000	416,873
APPLIED RESEARCH, ARMY					
0602105A	5	MATERIALS TECHNOLOGY	29,882	15,500	45,382
		Advanced renewable jet fuels		[1,500]	

		Applied composite materials research		[3,000]	
		High-strength fibers for ballistic armor applications		[2,000]	
		Lighter-weight body armor research		[1,500]	
		Magnesium armor manufacturing for ground vehicles		[2,000]	
		Nanosensor manufacturing research		[4,000]	
		Weapon systems repair technologies		[1,500]	
0602120A	6	SENSORS AND ELECTRONIC SURVIVABILITY	48,929		48,929
0602122A	7	TRACTOR HIP	14,624		14,624
0602211A	8	AVIATION TECHNOLOGY	43,476	2,000	45,476
		Integrated unmanned aerial systems sustainment and supply chain		[2,000]	
0602270A	9	ELECTRONIC WARFARE TECHNOLOGY	17,330		17,330
0602303A	10	MISSILE TECHNOLOGY	49,525		49,525
0602307A	11	ADVANCED WEAPONS TECHNOLOGY	18,190		18,190
0602308A	12	ADVANCED CONCEPTS AND SIMULATION	20,582	2,000	22,582
		Cognitive modeling and simulation research		[2,000]	
0602601A	13	COMBAT VEHICLE AND AUTOMOTIVE TECHNOLOGY	64,740	22,500	87,240
		Advanced materials research for alternative energy and transportation		[1,500]	
		Hybrid electric vehicle reliability research		[3,000]	
		Hybrid truck development		[4,000]	
		Tribology research		[2,000]	
		Unmanned ground vehicle initiative		[12,000]	
0602618A	14	BALLISTICS TECHNOLOGY	60,342	3,000	63,342
		Reactive armor research		[3,000]	
0602622A	15	CHEMICAL, SMOKE AND EQUIPMENT DEFEATING TECHNOLOGY	5,324	1,500	6,824
		Standoff detection of radionuclides		[1,500]	
0602623A	16	JOINT SERVICE SMALL ARMS PROGRAM	7,893		7,893
0602624A	17	WEAPONS AND MUNITIONS TECHNOLOGY	42,645	2,000	44,645
		Acoustic gun detection systems		[2,000]	
0602705A	18	ELECTRONICS AND ELECTRONIC DEVICES	60,859	8,000	68,859
		Nanoscale technologies for batteries		[2,000]	
		Portable solar power generator		[2,500]	
		Silicon carbide devices for power systems		[2,000]	
		Supply chain demonstration using radio frequency identification		[1,500]	
0602709A	19	NIGHT VISION TECHNOLOGY	40,228		40,228

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0602712A	20	COUNTERMINE SYSTEMS	19,118	3,000	22,118
		Multispectral imaging technology optimization for explosives detection		[3,000]	
0602716A	21	HUMAN FACTORS ENGINEERING TECHNOLOGY	21,042		21,042
0602720A	22	ENVIRONMENTAL QUALITY TECHNOLOGY	18,364		18,364
0602782A	23	COMMAND, CONTROL, COMMUNICATIONS TECHNOLOGY	25,573		25,573
0602783A	24	COMPUTER AND SOFTWARE TECHNOLOGY	6,768		6,768
0602784A	25	MILITARY ENGINEERING TECHNOLOGY	79,189	2,000	81,189
		Atmospheric research		[2,000]	
0602785A	26	MANPOWER/PERSONNEL/TRAINING TECHNOLOGY	22,198		22,198
0602786A	27	WARFIGHTER TECHNOLOGY	27,746	3,500	31,246
		Combat rations enhancement research		[1,000]	
		Thermal resistant fiber research		[2,500]	
0602787A	28	MEDICAL TECHNOLOGY	96,797	7,000	103,797
		Blast protection for ground soldiers		[2,000]	
		Moderate hypothermia treatment for traumatic brain and spinal cord injury		[4,000]	
		Traumatic brain injury modeling research		[1,000]	
		TOTAL, APPLIED RESEARCH, ARMY	841,364	72,000	913,364
		ADVANCED TECHNOLOGY DEVELOPMENT, ARMY			
0603001A	29	WARFIGHTER ADVANCED TECHNOLOGY	37,364	1,500	38,864
		Moldable fabric armor		[1,500]	
0603002A	30	MEDICAL ADVANCED TECHNOLOGY	71,510	36,500	108,010
		Advanced medical training platform		[2,000]	
		Biosensor controller systems development		[2,000]	
		Body temperature conditioner systems		[2,500]	
		Eye trauma and vision enhancement research		[2,000]	
		Gulf War illness research		[12,000]	
		Handheld telemedicine device development		[3,000]	

		Improved advanced prosthetics manufacturing		[4,000]	
		Integrated medical technology program		[5,500]	
		Lower limb prosthetics research		[2,000]	
		Telemedicine research		[1,500]	
0603003A	31	AVIATION ADVANCED TECHNOLOGY	57,454	8,500	65,954
		Enhanced gun fire detection		[2,000]	
		Improved aviation technology insertion capability		[2,500]	
		Next generation unmanned aerial vehicle engine		[2,000]	
		Rotorcraft galvanic corrosion reduction		[2,000]	
0603004A	32	WEAPONS AND MUNITIONS ADVANCED TECHNOLOGY	64,438		64,438
0603005A	33	COMBAT VEHICLE AND AUTOMOTIVE ADVANCED TECHNOLOGY	89,499	78,200	167,699
		Advanced auxiliary power unit development		[2,000]	
		Advanced lithium ion battery systems		[3,000]	
		Advanced thermal management systems		[6,000]	
		Alternatives to improve weapon systems sustainment		[4,000]	
		Applied power management controls		[2,000]	
		Autonomous and connected vehicle development		[2,000]	
		Composite shelter		[2,000]	
		Force projection technology development		[8,000]	
		Forward water purification		[2,000]	
		Ground system power and mobility enhancement		[12,000]	
		Hydraulic hybrid vehicles for the tactical wheeled fleet		[2,700]	
		Improved ground system survivability		[10,000]	
		Mobile water generation		[2,500]	
		Multifunctional self-sensing vehicle armor		[2,000]	
		Plug-in hybrid electric vehicle program		[4,000]	
		Threat cue research		[2,000]	
		Vehicle electronics and architecture development		[12,000]	
0603006A	34	COMMAND, CONTROL, COMMUNICATIONS ADVANCED TECHNOLOGY	8,102		8,102
0603007A	35	MANPOWER, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY	7,921		7,921
0603008A	36	ELECTRONIC WARFARE ADVANCED TECHNOLOGY	50,359		50,359
0603009A	37	TRACTOR HIKE	8,015		8,015
0603015A	38	NEXT GENERATION TRAINING & SIMULATION SYSTEMS	15,334	1,000	16,334
		Combat medic training systems		[1,000]	

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0603020A	39	TRACTOR ROSE	12,309		12,309
0603103A	40	EXPLOSIVES DEMILITARIZATION TECHNOLOGY	0		0
0603105A	41	MILITARY HIV RESEARCH	6,688		6,688
0603125A	42	COMBATING TERRORISM, TECHNOLOGY DEVELOPMENT	10,550		10,550
0603270A	43	ELECTRONIC WARFARE TECHNOLOGY	18,350	3,000	21,350
		Laser systems for light aircraft missile defense		[3,000]	
0603313A	44	MISSILE AND ROCKET ADVANCED TECHNOLOGY	84,553	9,500	94,053
		Missile artillery advanced technology development		[9,500]	
0603322A	45	TRACTOR CAGE	9,986		9,986
0603606A	46	LANDMINE WARFARE AND BARRIER ADVANCED TECHNOLOGY	26,953		26,953
0603607A	47	JOINT SERVICE SMALL ARMS PROGRAM	9,151		9,151
0603710A	48	NIGHT VISION ADVANCED TECHNOLOGY	39,912	2,000	41,912
		Enhanced situation awareness		[2,000]	
0603728A	49	ENVIRONMENTAL QUALITY TECHNOLOGY DEMONSTRATIONS	15,878		15,878
0603734A	50	MILITARY ENGINEERING ADVANCED TECHNOLOGY	27,393	13,000	40,393
		Enzymatic biofuel production research		[2,000]	
		Improved projectile and hardened structure testing		[2,000]	
		Permafrost tunnel		[1,000]	
		Photovoltaic technology development		[8,000]	
0603772A	51	ADVANCED TACTICAL COMPUTER SCIENCE AND SENSOR TECHNOLOGY	24,873		24,873
		TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, ARMY	696,592	153,200	849,792
		ADVANCED COMPONENT DEVELOPMENT, ARMY			
0603024A	52	UNIQUE ITEM IDENTIFICATION (UID)	0		0
0603305A	53	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION(NON SPACE)	11,455	10,500	21,955
		Adaptive robotic technology		[3,000]	
		Advanced environmental controls		[3,000]	
		Alternative power technology		[2,000]	

		Discriminatory imaging research		[2,500]	
0603308A	54	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION (SPACE)	27,551		27,551
0603327A	55	AIR AND MISSILE DEFENSE SYSTEMS ENGINEERING	0		0
0603619A	56	LANDMINE WARFARE AND BARRIER—ADV DEV	15,596		15,596
0603627A	57	SMOKE, OBSCURANT AND TARGET DEFEATING SYS-ADV DEV	2,425		2,425
0603639A	58	TANK AND MEDIUM CALIBER AMMUNITION	42,183		42,183
0603653A	59	ADVANCED TANK ARMAMENT SYSTEM (ATAS)	136,302		136,302
0603747A	60	SOLDIER SUPPORT AND SURVIVABILITY	18,556		18,556
0603766A	61	TACTICAL ELECTRONIC SURVEILLANCE SYSTEM—ADV DEV	17,962		17,962
0603774A	62	NIGHT VISION SYSTEMS ADVANCED DEVELOPMENT	0		0
0603779A	63	ENVIRONMENTAL QUALITY TECHNOLOGY	4,695		4,695
0603782A	64	WARFIGHTER INFORMATION NETWORK-TACTICAL	190,903		190,903
0603790A	65	NATO RESEARCH AND DEVELOPMENT	5,060		5,060
0603801A	66	AVIATION—ADV DEV	8,355		8,355
0603804A	67	LOGISTICS AND ENGINEER EQUIPMENT—ADV DEV	80,490		80,490
0603805A	68	COMBAT SERVICE SUPPORT CONTROL SYSTEM EVALUATION AND ANALYSIS	14,290		14,290
0603807A	69	MEDICAL SYSTEMS—ADV DEV	28,132		28,132
0603827A	70	SOLDIER SYSTEMS—ADVANCED DEVELOPMENT	48,323		48,323
0603850A	71	INTEGRATED BROADCAST SERVICE	970		970
0305205A	72	ENDURANCE UAVS	93,000		93,000
		TOTAL, ADVANCED COMPONENT DEVELOPMENT, ARMY	746,248	10,500	756,748
		SYSTEM DEVELOPMENT & DEMONSTRATION, ARMY			
0604201A	73	AIRCRAFT AVIONICS	89,210		89,210
0604220A	74	ARMED, DEPLOYABLE HELOS	72,550		72,550
0604270A	75	ELECTRONIC WARFARE DEVELOPMENT	172,269	5,000	177,269
		Hostile fire detection for helicopters		[5,000]	
0604280A	76	JOINT TACTICAL RADIO	784		784
0604321A	77	ALL SOURCE ANALYSIS SYSTEM	22,574		22,574
0604328A	78	TRACTOR CAGE	23,194		23,194
0604601A	79	INFANTRY SUPPORT WEAPONS	80,337		80,337
0604604A	80	MEDIUM TACTICAL VEHICLES	3,710		3,710
0604609A	81	SMOKE, OBSCURANT AND TARGET DEFEATING SYS-SDD	5,335		5,335

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0604611A	82	JAVELIN	9,999		9,999
0604622A	83	FAMILY OF HEAVY TACTICAL VEHICLES	3,519		3,519
0604633A	84	AIR TRAFFIC CONTROL	9,892		9,892
0604642A	85	LIGHT TACTICAL WHEELED VEHICLES	1,990		1,990
0604646A	86	NON-LINE OF SIGHT LAUNCH SYSTEM	81,247	-81,247	0
		Program termination		[-81,247]	
0604647A	87	NON-LINE OF SIGHT CANNON	0		0
0604660A	88	FCS MANNED GRD VEHICLES & COMMON GRD VEHICLE	0		0
0604661A	89	FCS SYSTEMS OF SYSTEMS ENGR & PROGRAM MGMT	568,711		568,711
0604662A	90	FCS RECONNAISSANCE (UAV) PLATFORMS	50,304		50,304
0604663A	91	FCS UNMANNED GROUND VEHICLES	249,948		249,948
0604664A	92	FCS UNATTENDED GROUND SENSORS	7,515		7,515
0604665A	93	FCS SUSTAINMENT & TRAINING R&D	610,389		610,389
0604666A	94	SPIN OUT TECHNOLOGY/CAPABILITY INSERTION	0		0
0604710A	95	NIGHT VISION SYSTEMS—SDD	52,549		52,549
0604713A	96	COMBAT FEEDING, CLOTHING, AND EQUIPMENT	2,118		2,118
0604715A	97	NON-SYSTEM TRAINING DEVICES—SDD	27,756		27,756
0604741A	98	AIR DEFENSE COMMAND, CONTROL AND INTELLIGENCE—SDD	34,209		34,209
0604742A	99	CONSTRUCTIVE SIMULATION SYSTEMS DEVELOPMENT	30,291		30,291
0604746A	100	AUTOMATIC TEST EQUIPMENT DEVELOPMENT	14,041		14,041
0604760A	101	DISTRIBUTIVE INTERACTIVE SIMULATIONS (DIS)—SDD	15,547		15,547
0604778A	102	POSITIONING SYSTEMS DEVELOPMENT (SPACE)	0		0
0604780A	103	COMBINED ARMS TACTICAL TRAINER (CATT) CORE	27,670		27,670
0604783A	104	JOINT NETWORK MANAGEMENT SYSTEM	0		0
0604802A	105	WEAPONS AND MUNITIONS—SDD	24,345	8,000	32,345
		XM1125 155mm smoke round development		[8,000]	
0604804A	106	LOGISTICS AND ENGINEER EQUIPMENT—SDD	41,039		41,039
0604805A	107	COMMAND, CONTROL, COMMUNICATIONS SYSTEMS—SDD	90,736		90,736
0604807A	108	MEDICAL MATERIEL/MEDICAL BIOLOGICAL DEFENSE EQUIPMENT—SDD	34,474		34,474

0604808A	109	LANDMINE WARFARE/BARRIER—SDD	95,577		95,577
0604814A	110	ARTILLERY MUNITIONS	26,371		26,371
0604817A	111	COMBAT IDENTIFICATION	29,884		29,884
0604818A	112	ARMY TACTICAL COMMAND & CONTROL HARDWARE & SOFTWARE	60,970		60,970
0604822A	113	GENERAL FUND ENTERPRISE BUSINESS SYSTEM (GFEBS)	13,576		13,576
0604823A	114	FIREFINDER	24,736		24,736
0604827A	115	SOLDIER SYSTEMS—WARRIOR DEM/VAL	20,886		20,886
0604854A	116	ARTILLERY SYSTEMS	53,624	30,000	83,624
		Paladin integrated management program		[30,000]	
0604869A	117	PATRIOT/MEADS COMBINED AGGREGATE PROGRAM (CAP)	467,139		467,139
0604870A	118	NUCLEAR ARMS CONTROL MONITORING SENSOR NETWORK	7,276		7,276
0605013A	119	INFORMATION TECHNOLOGY DEVELOPMENT	23,957		23,957
0605018A	120	ARMY INTEGRATED MILITARY HUMAN RESOURCES SYSTEM (A-IMHRS)	100,500		100,500
0605450A	121	JOINT AIR-TO-GROUND MISSILE (JAGM)	130,340		130,340
0605455A	122	SLAMRAAM	23,700		23,700
0605456A	123	PAC-3/MSE MISSILE	62,500		62,500
0605457A	124	ARMY INTEGRATED AIR AND MISSILE DEFENSE (AIAMD)	251,124		251,124
0605625A	125	MANNED GROUND VEHICLE	934,366		934,366
0605626A	126	AERIAL COMMON SENSOR	211,500		211,500
0303032A	127	TROJAN—RH12	3,697	10,000	13,697
		Trojan swarm		[10,000]	
0304270A	128	ELECTRONIC WARFARE DEVELOPMENT	21,571		21,571
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, ARMY	5,021,546	-28,247	4,993,299
		RDT&E MANAGEMENT SUPPORT, ARMY			
0604256A	129	THREAT SIMULATOR DEVELOPMENT	26,158		26,158
0604258A	130	TARGET SYSTEMS DEVELOPMENT	8,614		8,614
0604759A	131	MAJOR T&E INVESTMENT	42,102		42,102
0605103A	132	RAND ARROYO CENTER	20,492		20,492
0605301A	133	ARMY KWAJALEIN ATOLL	163,788		163,788
0605326A	134	CONCEPTS EXPERIMENTATION PROGRAM	17,704		17,704
0605502A	135	SMALL BUSINESS INNOVATIVE RESEARCH	0		0
0605601A	136	ARMY TEST RANGES AND FACILITIES	393,937		393,937

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0605602A	137	ARMY TECHNICAL TEST INSTRUMENTATION AND TARGETS	59,040	10,200	69,240
		Common regional operational systems		[1,200]	
		Dugway field test improvements		[4,000]	
		Enhanced Army energy testing		[5,000]	
0605604A	138	SURVIVABILITY/LETHALITY ANALYSIS	41,812		41,812
0605605A	139	DOD HIGH ENERGY LASER TEST FACILITY	4,710	5,000	9,710
		Program increase		[5,000]	
0605606A	140	AIRCRAFT CERTIFICATION	5,055		5,055
0605702A	141	METEOROLOGICAL SUPPORT TO RDT&E ACTIVITIES	7,185		7,185
0605706A	142	MATERIEL SYSTEMS ANALYSIS	18,078		18,078
0605709A	143	EXPLOITATION OF FOREIGN ITEMS	5,460		5,460
0605712A	144	SUPPORT OF OPERATIONAL TESTING	68,191		68,191
0605716A	145	ARMY EVALUATION CENTER	61,450		61,450
0605718A	146	ARMY MODELING & SIM X-CMD COLLABORATION & INTEG	3,926		3,926
0605801A	147	PROGRAMWIDE ACTIVITIES	73,685		73,685
0605803A	148	TECHNICAL INFORMATION ACTIVITIES	48,309		48,309
0605805A	149	MUNITIONS STANDARDIZATION, EFFECTIVENESS AND SAFETY	53,338	2,600	55,938
		Unserviceable ammunition demilitarization		[2,600]	
0605857A	150	ENVIRONMENTAL QUALITY TECHNOLOGY MGMT SUPPORT	3,195		3,195
0605898A	151	MANAGEMENT HQ—R&D	16,154		16,154
0909999A	152	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS	0		0
		TOTAL, RDT&E MANAGEMENT SUPPORT, ARMY	1,142,383	17,800	1,160,183
		OPERATIONAL SYSTEM DEVELOPMENT, ARMY			
0603778A	153	MLRS PRODUCT IMPROVEMENT PROGRAM	51,619		51,619
0102419A	154	AEROSTAT JOINT PROJECT OFFICE	372,493		372,493
0203347A	155	INTELLIGENCE SUPPORT TO CYBER (ISC) MIP	2,360		2,360
0203726A	156	ADV FIELD ARTILLERY TACTICAL DATA SYSTEM	24,622		24,622

0203735A	157	COMBAT VEHICLE IMPROVEMENT PROGRAMS	204,481		204,481
0203740A	158	MANEUVER CONTROL SYSTEM	25,540		25,540
0203744A	159	AIRCRAFT MODIFICATIONS/PRODUCT IMPROVEMENT PROGRAMS	134,999		134,999
0203752A	160	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	710		710
0203758A	161	DIGITIZATION	6,329		6,329
0203759A	162	FORCE XXI BATTLE COMMAND, BRIGADE AND BELOW (FBCB2)	3,935		3,935
0203801A	163	MISSILE/AIR DEFENSE PRODUCT IMPROVEMENT PROGRAM	24,280		24,280
0203802A	164	OTHER MISSILE PRODUCT IMPROVEMENT PROGRAMS	0		0
0203808A	165	TRACTOR CARD	14,870		14,870
0208010A	166	JOINT TACTICAL COMMUNICATIONS PROGRAM (TRI-TAC)	0		0
0208053A	167	JOINT TACTICAL GROUND SYSTEM	12,403		12,403
0208058A	168	JOINT HIGH SPEED VESSEL (JHSV)	3,153		3,153
0303028A	170	SECURITY AND INTELLIGENCE ACTIVITIES	0		0
0303140A	171	INFORMATION SYSTEMS SECURITY PROGRAM	54,784		54,784
0303141A	172	GLOBAL COMBAT SUPPORT SYSTEM	125,569		125,569
0303142A	173	SATCOM GROUND ENVIRONMENT (SPACE)	33,694		33,694
0303150A	174	WWMCCS/GLOBAL COMMAND AND CONTROL SYSTEM	13,024		13,024
0303158A	175	JOINT COMMAND AND CONTROL PROGRAM (JC2)	0		0
0305204A	177	TACTICAL UNMANNED AERIAL VEHICLES	54,300		54,300
0305208A	178	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	103,002		103,002
0305219A	179	MQ-1 SKY WARRIOR A UAV	123,156		123,156
0305232A	180	RQ-11 UAV	1,599		1,599
0305233A	181	RQ-7 UAV	7,805		7,805
0307207A	182	AERIAL COMMON SENSOR (ACS)	0		0
0307665A	183	BIOMETRICS ENABLED INTELLIGENCE	14,114		14,114
0702239A	184	AVIONICS COMPONENT IMPROVEMENT PROGRAM	0		0
0708045A	185	END ITEM INDUSTRIAL PREPAREDNESS ACTIVITIES	61,098	4,900	65,998
		Advanced ultrasonic inspection of helicopter rotor blades		[2,000]	
		Titanium alloy armor development		[2,900]	
99999999	999	CLASSIFIED PROGRAMS	4,447		4,447
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, ARMY	1,478,386	4,900	1,483,286
		TOTAL, RDT&E, ARMY	10,333,392	240,153	10,573,545

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
ACCOUNT		RESEARCH, DEVELOPMENT, TEST & EVAL, NAVY			
		BASIC RESEARCH, NAVY			
0601103N	1	UNIVERSITY RESEARCH INITIATIVES	108,679	1,000	109,679
		Blast and impact resistant structures		[1,000]	
0601152N	2	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	17,979		17,979
0601153N	3	DEFENSE RESEARCH SCIENCES	429,767	2,000	431,767
		Nanomaterials for solar cells		[2,000]	
		TOTAL, BASIC RESEARCH, NAVY	556,425	3,000	559,425
		APPLIED RESEARCH, NAVY			
0602114N	4	POWER PROJECTION APPLIED RESEARCH	98,150	3,000	101,150
		Energetics research		[3,000]	
0602123N	5	FORCE PROTECTION APPLIED RESEARCH	107,448	8,900	116,348
		Electro-kinetic wind energy research		[1,900]	
		Energy systems integration research		[2,500]	
		Port security technologies		[2,500]	
		Special operations forces combatant research		[2,000]	
0602131M	6	MARINE CORPS LANDING FORCE TECHNOLOGY	43,776		43,776
0602234N	7	MATERIALS, ELECTRONICS AND COMPUTER TECHNOLOGY	0	2,000	2,000
		Expanded infrared focal plane array technology and availability		[2,000]	
0602235N	8	COMMON PICTURE APPLIED RESEARCH	70,168		70,168
0602236N	9	WARFIGHTER SUSTAINMENT APPLIED RESEARCH	113,724	4,500	118,224
		Anti-reverse engineering technologies		[1,000]	
		Asset lifecycle program		[2,000]	
		Composite material optimization for watercraft		[1,500]	

0602271N	10	ELECTROMAGNETIC SYSTEMS APPLIED RESEARCH	83,902		83,902
0602435N	11	OCEAN WARFIGHTING ENVIRONMENT APPLIED RESEARCH	49,491	4,000	53,491
		Advanced unmanned underwater vehicle research		[3,000]	
		Laser underwater imaging and communications research		[1,000]	
0602651M	12	JOINT NON-LETHAL WEAPONS APPLIED RESEARCH	6,002		6,002
0602747N	13	UNDERSEA WARFARE APPLIED RESEARCH	69,186	1,500	70,686
		Acoustic search glider		[1,500]	
0602782N	14	MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	36,833		36,833
		TOTAL, APPLIED RESEARCH, NAVY	678,680	23,900	702,580
		ADVANCED TECHNOLOGY DEVELOPMENT, NAVY			
0603114N	15	POWER PROJECTION ADVANCED TECHNOLOGY	117,908	2,000	119,908
		Mobile target tracking technologies		[2,000]	
0603123N	16	FORCE PROTECTION ADVANCED TECHNOLOGY	61,877	14,000	75,877
		Formable textiles		[3,000]	
		Mobile repair capability		[3,000]	
		Rare earth alternatives for permanent magnet motors		[3,000]	
		Single generator operations		[5,000]	
0603235N	17	COMMON PICTURE ADVANCED TECHNOLOGY	96,720	-40,911	55,809
		High-Integrity Global Positioning System		[-40,911]	
0603236N	18	WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	98,261	4,000	102,261
		Hybrid heavy lift logistics vehicle		[1,500]	
		Lighter-than-air platform		[2,500]	
0603271N	19	ELECTROMAGNETIC SYSTEMS ADVANCED TECHNOLOGY	82,143		82,143
0603640M	20	USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)	115,089		115,089
0603651M	21	JOINT NON-LETHAL WEAPONS TECHNOLOGY DEVELOPMENT	11,131		11,131
0603729N	22	WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	18,076		18,076
0603747N	23	UNDERSEA WARFARE ADVANCED TECHNOLOGY	49,276		49,276
0603758N	24	NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS	53,177		53,177
0603782N	25	MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY	21,941		21,941
		TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, NAVY	725,599	-20,911	704,688

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ADVANCED COMPONENT DEVELOPMENT, NAVY					
0603207N	26	AIR/OCEAN TACTICAL APPLICATIONS	123,331		123,331
0603216N	27	AVIATION SURVIVABILITY	9,480		9,480
0603237N	28	DEPLOYABLE JOINT COMMAND AND CONTROL	4,275		4,275
0603254N	29	ASW SYSTEMS DEVELOPMENT	8,249		8,249
0603261N	30	TACTICAL AIRBORNE RECONNAISSANCE	6,452		6,452
0603382N	31	ADVANCED COMBAT SYSTEMS TECHNOLOGY	1,658		1,658
0603502N	32	SURFACE AND SHALLOW WATER MINE COUNTERMEASURES	81,347		81,347
0603506N	33	SURFACE SHIP TORPEDO DEFENSE	57,796		57,796
0603512N	34	CARRIER SYSTEMS DEVELOPMENT	93,830		93,830
0603513N	35	SHIPBOARD SYSTEM COMPONENT DEVELOPMENT	51		51
0603525N	36	PILOT FISH	81,784		81,784
0603527N	37	RETRACT LARCH	142,858		142,858
0603536N	38	RETRACT JUNIPER	134,497		134,497
0603542N	39	RADIOLOGICAL CONTROL	1,358		1,358
0603553N	40	SURFACE ASW	21,673		21,673
0603561N	41	ADVANCED SUBMARINE SYSTEM DEVELOPMENT	608,566	26,000	634,566
		Advanced actuators		[3,000]	
		Shock mitigation devices		[3,000]	
		Submarine payloads development		[20,000]	
0603562N	42	SUBMARINE TACTICAL WARFARE SYSTEMS	5,590		5,590
0603563N	43	SHIP CONCEPT ADVANCED DESIGN	17,883		17,883
0603564N	44	SHIP PRELIMINARY DESIGN & FEASIBILITY STUDIES	1,796	10,000	11,796
		Ship hydrodynamic facilities improvement		[10,000]	
0603570N	45	ADVANCED NUCLEAR POWER SYSTEMS	366,509		366,509
0603573N	46	ADVANCED SURFACE MACHINERY SYSTEMS	5,459		5,459
0603576N	47	CHALK EAGLE	447,804		447,804
0603581N	48	LITTORAL COMBAT SHIP (LCS)	226,288		226,288
0603582N	49	COMBAT SYSTEM INTEGRATION	24,344	3,000	27,344

		Common network interface system		[3,000]	
0603609N	50	CONVENTIONAL MUNITIONS	5,388		5,388
0603611M	51	MARINE CORPS ASSAULT VEHICLES	242,765		242,765
0603635M	52	MARINE CORPS GROUND COMBAT/SUPPORT SYSTEM	40,505	4,500	45,005
		Decision and energy reduction tool		[4,500]	
0603654N	53	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	25,873		25,873
0603658N	54	COOPERATIVE ENGAGEMENT	52,282		52,282
0603713N	55	OCEAN ENGINEERING TECHNOLOGY DEVELOPMENT	13,560		13,560
0603721N	56	ENVIRONMENTAL PROTECTION	20,207		20,207
0603724N	57	NAVY ENERGY PROGRAM	30,403	5,500	35,903
		Fuel cell and hydrogen generation technologies		[2,500]	
		High-density energy storage development		[3,000]	
0603725N	58	FACILITIES IMPROVEMENT	3,746		3,746
0603734N	59	CHALK CORAL	71,920		71,920
0603739N	60	NAVY LOGISTIC PRODUCTIVITY	4,139	6,500	10,639
		Fiber optic interconnect technology		[5,000]	
		Flame retardant textile fabric		[1,500]	
0603746N	61	RETRACT MAPLE	219,463		219,463
0603748N	62	LINK PLUMERIA	58,030		58,030
0603751N	63	RETRACT ELM	183,187		183,187
0603755N	64	SHIP SELF DEFENSE	4,385		4,385
0603764N	65	LINK EVERGREEN	41,433		41,433
0603787N	66	SPECIAL PROCESSES	36,457		36,457
0603790N	67	NATO RESEARCH AND DEVELOPMENT	9,196		9,196
0603795N	68	LAND ATTACK TECHNOLOGY	905		905
0603851M	69	NONLETHAL WEAPONS	43,272		43,272
0603860N	70	JOINT PRECISION APPROACH AND LANDING SYSTEMS	159,151		159,151
0603879N	71	SINGLE INTEGRATED AIR PICTURE (SIAP) SYSTEM ENGINEER (SE)	0		0
0603889N	72	COUNTERDRUG RDT&E PROJECTS	0		0
0603925N	73	DIRECTED ENERGY AND ELECTRIC WEAPON SYSTEMS	0		0
0604272N	74	TACTICAL AIR DIRECTIONAL INFRARED COUNTERMEASURES (TADIRCM)	51,693		51,693
0604653N	75	JOINT COUNTER RADIO CONTROLLED IED ELECTRONIC WARFARE (JCREW)	56,542		56,542
0604659N	76	PRECISION STRIKE WEAPONS DEVELOPMENT PROGRAM	25,121		25,121
0604707N	77	SPACE AND ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT	34,793		34,793

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0303354N	78	ASW SYSTEMS DEVELOPMENT—MIP	2,161		2,161
0303562N	79	SUBMARINE TACTICAL WARFARE SYSTEMS—MIP	4,253		4,253
0304270N	80	ELECTRONIC WARFARE DEVELOPMENT—MIP	663		663
TOTAL, ADVANCED COMPONENT DEVELOPMENT, NAVY			3,914,371	55,500	3,969,871
SYSTEM DEVELOPMENT & DEMONSTRATION, NAVY					
0604212N	81	OTHER HELO DEVELOPMENT	44,329		44,329
0604214N	82	AV-8B AIRCRAFT—ENG DEV	22,867		22,867
0604215N	83	STANDARDS DEVELOPMENT	45,667		45,667
0604216N	84	MULTI-MISSION HELICOPTER UPGRADE DEVELOPMENT	55,792		55,792
0604218N	85	AIR/OCEAN EQUIPMENT ENGINEERING	5,735		5,735
0604221N	86	P-3 MODERNIZATION PROGRAM	3,574		3,574
0604230N	87	WARFARE SUPPORT SYSTEM	3,733		3,733
0604231N	88	TACTICAL COMMAND SYSTEM	89,955		89,955
0604234N	89	ADVANCED HAWKEYE	171,132		171,132
0604245N	90	H-1 UPGRADES	60,498		60,498
0604261N	91	ACOUSTIC SEARCH SENSORS	64,834		64,834
0604262N	92	V-22A	46,070		46,070
0604264N	93	AIR CREW SYSTEMS DEVELOPMENT	8,689		8,689
0604269N	94	EA-18	22,042		22,042
0604270N	95	ELECTRONIC WARFARE DEVELOPMENT	80,819		80,819
0604273N	96	VH-71A EXECUTIVE HELO DEVELOPMENT	159,785		159,785
0604274N	97	NEXT GENERATION JAMMER (NGJ)	120,602		120,602
0604280N	98	JOINT TACTICAL RADIO SYSTEM—NAVY (JTRS-NAVY)	687,723		687,723
0604300N	99	SC-21 TOTAL SHIP SYSTEM ENGINEERING	0		0
0604307N	100	SURFACE COMBATANT COMBAT SYSTEM ENGINEERING	193,933		193,933
0604311N	101	LPD-17 CLASS SYSTEMS INTEGRATION	1,373		1,373
0604329N	102	SMALL DIAMETER BOMB (SDB)	44,091		44,091

0604366N	103	STANDARD MISSILE IMPROVEMENTS	96,186		96,186
0604373N	104	AIRBORNE MCM	45,885		45,885
0604378N	105	NAVAL INTEGRATED FIRE CONTROL—COUNTER AIR SYSTEMS ENGINEERING	21,517		21,517
0604501N	106	ADVANCED ABOVE WATER SENSORS	274,371	-22,500	251,871
		Air and missile defense radar execution		[-22,500]	
0604503N	107	SSN-688 AND TRIDENT MODERNIZATION	118,897	3,800	122,697
		TB-33 thinline towed array		[3,800]	
0604504N	108	AIR CONTROL	5,665		5,665
0604512N	109	SHIPBOARD AVIATION SYSTEMS	70,117		70,117
0604518N	110	COMBAT INFORMATION CENTER CONVERSION	5,044		5,044
0604558N	111	NEW DESIGN SSN	155,489	10,300	165,789
		Advanced manufacturing for bow domes		[1,300]	
		Common command and control system module		[9,000]	
0604562N	112	SUBMARINE TACTICAL WARFARE SYSTEM	50,537	25,100	75,637
		Artificial intelligence-based combat system software module		[7,000]	
		SSGN weapon launcher technology insertion		[5,000]	
		SSN airborne ISR capability		[4,600]	
		Submarine environment for evaluation and development		[5,500]	
		Weapon acquisition and firing system		[3,000]	
0604567N	113	SHIP CONTRACT DESIGN/LIVE FIRE T&E	153,686	4,000	157,686
		Automated fiber optic manufacturing		[4,000]	
0604574N	114	NAVY TACTICAL COMPUTER RESOURCES	4,443		4,443
0604601N	115	MINE DEVELOPMENT	5,455		5,455
0604610N	116	LIGHTWEIGHT TORPEDO DEVELOPMENT	25,282		25,282
0604654N	117	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	10,489		10,489
0604703N	118	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS	10,759		10,759
0604727N	119	JOINT STANDOFF WEAPON SYSTEMS	12,567		12,567
0604755N	120	SHIP SELF DEFENSE (DETECT & CONTROL)	45,930	5,700	51,630
		Autonomous unmanned surface vessel (AUSV)		[5,700]	
0604756N	121	SHIP SELF DEFENSE (ENGAGE: HARD KILL)	5,860	12,000	17,860
		Next-generation Phalanx		[12,000]	
0604757N	122	SHIP SELF DEFENSE (ENGAGE: SOFT KILL/EW)	84,525	7,000	91,525
		NULKA upgrades		[7,000]	
0604761N	123	INTELLIGENCE ENGINEERING	6,820		6,820

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0604771N	124	MEDICAL DEVELOPMENT	12,337	5,000	17,337
		Composite tissue transplantation for combat wound repair		[2,000]	
		Vision restoration		[3,000]	
0604777N	125	NAVIGATION/ID SYSTEM	66,636		66,636
0604800M	126	JOINT STRIKE FIGHTER (JSF)—EMD	667,916		667,916
0604800N	127	JOINT STRIKE FIGHTER (JSF)	707,791		707,791
0605013M	128	INFORMATION TECHNOLOGY DEVELOPMENT	22,783		22,783
0605013N	129	INFORMATION TECHNOLOGY DEVELOPMENT	28,280	5,000	33,280
		Information systems research		[5,000]	
0605018N	130	NAVY INTEGRATED MILITARY HUMAN RESOURCES SYSTEM (N-IMHRS)	27,444		27,444
0605212N	131	CH-53K RDTE	577,435		577,435
0605430N	132	C/KC-130 AVIONICS MODERNIZATION PROGRAM (AMP)	0		0
0605450N	133	JOINT AIR-TO-GROUND MISSILE (JAGM)	100,846		100,846
0605500N	134	MULTI-MISSION MARITIME AIRCRAFT (MMA)	929,240		929,240
0204201N	135	CG(X)	0		0
0204202N	136	DDG-1000	549,241		549,241
0304231N	137	TACTICAL COMMAND SYSTEM—MIP	1,318		1,318
0304503N	138	SSN-688 AND TRIDENT MODERNIZATION—MIP	1,415		1,415
0304785N	139	TACTICAL CRYPTOLOGIC SYSTEMS	17,019		17,019
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, NAVY	6,852,468	55,400	6,907,868
		RDT&E MANAGEMENT SUPPORT, NAVY			
0604256N	140	THREAT SIMULATOR DEVELOPMENT	18,755		18,755
0604258N	141	TARGET SYSTEMS DEVELOPMENT	66,066		66,066
0604759N	142	MAJOR T&E INVESTMENT	37,522		37,522
0605152N	143	STUDIES AND ANALYSIS SUPPORT—NAVY	8,149		8,149
0605154N	144	CENTER FOR NAVAL ANALYSES	49,165		49,165
060502N	145	SMALL BUSINESS INNOVATIVE RESEARCH	0		0

0605804N	146	TECHNICAL INFORMATION SERVICES	662		662
0605853N	147	MANAGEMENT, TECHNICAL & INTERNATIONAL SUPPORT	58,329		58,329
0605856N	148	STRATEGIC TECHNICAL SUPPORT	3,451		3,451
0605861N	149	RDT&E SCIENCE AND TECHNOLOGY MANAGEMENT	72,094		72,094
0605863N	150	RDT&E SHIP AND AIRCRAFT SUPPORT	95,332		95,332
0605864N	151	TEST AND EVALUATION SUPPORT	376,418		376,418
0605865N	152	OPERATIONAL TEST AND EVALUATION CAPABILITY	15,746		15,746
0605866N	153	NAVY SPACE AND ELECTRONIC WARFARE (SEW) SUPPORT	4,013		4,013
0605867N	154	SEW SURVEILLANCE/RECONNAISSANCE SUPPORT	19,700		19,700
0605873M	155	MARINE CORPS PROGRAM WIDE SUPPORT	17,721		17,721
0305885N	156	TACTICAL CRYPTOLOGIC ACTIVITIES	1,859		1,859
0804758N	157	SERVICE SUPPORT TO JFCOM, JNTC	4,260		4,260
0909999N	158	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS	0		0
		TOTAL, RDT&E MANAGEMENT SUPPORT, NAVY	849,242	0	849,242
		OPERATIONAL SYSTEM DEVELOPMENT, NAVY			
0604227N	160	HARPOON MODIFICATIONS	0		0
0604402N	161	UNMANNED COMBAT AIR VEHICLE (UCAV) ADVANCED COMPONENT AND PROTOTYPE DEVELOPMENT	266,368		266,368
0101221N	162	STRATEGIC SUB & WEAPONS SYSTEM SUPPORT	81,184		72,684
		Strike study		[-10,000]	
		Virtual maintenance engineering platform		[1,500]	
0101224N	163	SSBN SECURITY TECHNOLOGY PROGRAM	34,997		34,997
0101226N	164	SUBMARINE ACOUSTIC WARFARE DEVELOPMENT	6,815		6,815
0101402N	165	NAVY STRATEGIC COMMUNICATIONS	10,331		10,331
0203761N	166	RAPID TECHNOLOGY TRANSITION (RTT)	35,120		35,120
0204136N	167	F/A-18 SQUADRONS	148,438		148,438
0204152N	168	E-2 SQUADRONS	19,011		19,011
0204163N	169	FLEET TELECOMMUNICATIONS (TACTICAL)	26,894		26,894
0204229N	170	TOMAHAWK AND TOMAHAWK MISSION PLANNING CENTER (TMPC)	10,587	7,600	18,187
		Cost reduction initiatives		[7,600]	
0204311N	171	INTEGRATED SURVEILLANCE SYSTEM	23,464		23,464
0204413N	172	AMPHIBIOUS TACTICAL SUPPORT UNITS (DISPLACEMENT CRAFT)	4,357		4,357

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0204571N	173	CONSOLIDATED TRAINING SYSTEMS DEVELOPMENT	50,750		50,750
0204574N	174	CRYPTOLOGIC DIRECT SUPPORT	1,519		1,519
0204575N	175	ELECTRONIC WARFARE (EW) READINESS SUPPORT	39,398		39,398
0205601N	176	HARM IMPROVEMENT	14,207		14,207
0205604N	177	TACTICAL DATA LINKS	28,854		28,854
0205620N	178	SURFACE ASW COMBAT SYSTEM INTEGRATION	32,877		32,877
0205632N	179	MK-48 ADCAP	26,234		26,234
0205633N	180	AVIATION IMPROVEMENTS	133,611	7,000	140,611
		Aircraft metal alloys		[2,800]	
		Improved aircraft windscreens laminates		[1,700]	
		Structural life tracking program for helicopters		[2,500]	
0205658N	181	NAVY SCIENCE ASSISTANCE PROGRAM	3,535		3,535
0205675N	182	OPERATIONAL NUCLEAR POWER SYSTEMS	74,229		74,229
0206313M	183	MARINE CORPS COMMUNICATIONS SYSTEMS	245,298	1,800	247,098
		System for triaging key evidence		[1,800]	
0206623M	184	MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYSTEMS	100,424	6,500	106,924
		Marine Corps personnel carrier data man system		[2,000]	
		Unique identification tracking software		[4,500]	
0206624M	185	MARINE CORPS COMBAT SERVICES SUPPORT	19,466		19,466
0206625M	186	USMC INTELLIGENCE/ELECTRONIC WARFARE SYSTEMS (MIP)	20,316		20,316
0207161N	187	TACTICAL AIM MISSILES	912		912
0207163N	188	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	2,633		2,633
0208058N	189	JOINT HIGH SPEED VESSEL (JHSV)	3,586		3,586
0303109N	194	SATELLITE COMMUNICATIONS (SPACE)	422,268		422,268
0303138N	195	CONSOLIDATED AFLOAT NETWORK ENTERPRISE SERVICES (CANES)	63,563		63,563
0303140N	196	INFORMATION SYSTEMS SECURITY PROGRAM	25,934		25,934
0303158M	197	JOINT COMMAND AND CONTROL PROGRAM (JC2)	0		0
0303158N	198	JOINT COMMAND AND CONTROL PROGRAM (JC2)	0		0
0303238N	199	CONSOLIDATED AFLOAT NETWORK ENTERPRISE SERVICES (CANES)—MIP	8,375		8,375

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0305149N	201	COBRA JUDY	36,527		36,527
0305160N	202	NAVY METEOROLOGICAL AND OCEAN SENSORS-SPACE (METOC)	63,878		63,878
0305192N	203	MILITARY INTELLIGENCE PROGRAM (MIP) ACTIVITIES	4,435		4,435
0305204N	204	TACTICAL UNMANNED AERIAL VEHICLES	35,212		35,212
0305205N	205	ENDURANCE UNMANNED AERIAL VEHICLES	0		0
0305206N	206	AIRBORNE RECONNAISSANCE SYSTEMS	0		0
0305207N	207	MANNED RECONNAISSANCE SYSTEMS	19,263		19,263
0305208M	208	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	8,377		8,377
0305208N	209	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	16,665		16,665
0305220N	210	RQ-4 UAV	529,250		529,250
0305231N	211	MQ-8 UAV	10,665		10,665
0305232M	212	RQ-11 UAV	512		512
0305233N	213	RQ-7 UAV	934		934
0305234M	214	SMALL (LEVEL 0) TACTICAL UAS (STUASL0)	26,209		26,209
0305234N	215	SMALL (LEVEL 0) TACTICAL UAS (STUASL0)	18,098		18,098
0307207N	216	AERIAL COMMON SENSOR (ACS)	0		0
0307217N	217	EP-3E REPLACEMENT (EPX)	0		0
0308601N	218	MODELING AND SIMULATION SUPPORT	8,158		8,158
0702207N	219	DEPOT MAINTENANCE (NON-IF)	18,649		18,649
0702239N	220	AVIONICS COMPONENT IMPROVEMENT PROGRAM	3,250		3,250
0708011N	221	INDUSTRIAL PREPAREDNESS	46,173	5,000	51,173
		Integrated manufacturing enterprise		[5,000]	
0708730N	222	MARITIME TECHNOLOGY (MARITECH)	0		0
99999999	999	CLASSIFIED PROGRAMS	1,284,901		1,284,901
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, NAVY	4,116,711	19,400	4,136,111
ACCOUNT		TOTAL, RDT&E, NAVY	17,693,496	136,289	17,829,785
ACCOUNT		RESEARCH, DEVELOPMENT, TEST & EVAL, AF			
		BASIC RESEARCH, AIR FORCE			
0601102F	1	DEFENSE RESEARCH SCIENCES	350,978	2,000	352,978

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		Cyber training capability in modeling and simulation		[2,000]	
0601103F	2	UNIVERSITY RESEARCH INITIATIVES	136,297		136,297
0601108F	3	HIGH ENERGY LASER RESEARCH INITIATIVES	13,198		13,198
		TOTAL, BASIC RESEARCH, AIR FORCE	500,473	2,000	502,473
		APPLIED RESEARCH, AIR FORCE			
0602102F	4	MATERIALS	137,273	9,000	146,273
		Advanced aerospace heat exchangers		[3,000]	
		Energy efficiency, recovery, and generation systems		[1,000]	
		Health monitoring sensors for aerospace components		[2,000]	
		Improved nanomaterials and nanomanufacturing methods		[2,000]	
		Light alloy aerospace and automotive parts development		[1,000]	
0602201F	5	AEROSPACE VEHICLE TECHNOLOGIES	144,699	2,500	147,199
		Unmanned aerial system collaboration technologies		[2,500]	
0602202F	6	HUMAN EFFECTIVENESS APPLIED RESEARCH	87,452		87,452
0602203F	7	AEROSPACE PROPULSION	207,049		207,049
0602204F	8	AEROSPACE SENSORS	157,497	1,500	158,997
		Accelerated development of gallium nitride materials		[1,500]	
0602601F	9	SPACE TECHNOLOGY	111,857	7,500	119,357
		Reconfigurable electronics research		[500]	
		Seismic research program		[5,000]	
		Space plasma research		[2,000]	
0602602F	10	CONVENTIONAL MUNITIONS	61,330		61,330
0602605F	11	DIRECTED ENERGY TECHNOLOGY	103,596		103,596
0602702F	12	COMMAND CONTROL AND COMMUNICATIONS	0		0
0602788F	13	DOMINANT INFORMATION SCIENCES AND METHODS	117,283		117,283
0602890F	14	HIGH ENERGY LASER RESEARCH	53,384	2,000	55,384
		Directed energy research and development coordination		[2,000]	

		TOTAL, APPLIED RESEARCH, AIR FORCE	1,181,420	22,500	1,203,920
		ADVANCED TECHNOLOGY DEVELOPMENT, AIR FORCE			
0603112F	15	ADVANCED MATERIALS FOR WEAPON SYSTEMS	33,414	17,000	50,414
		Composite repair in theater		[2,000]	
		Metals affordability initiative		[10,000]	
		Sewage-derived biofuels program		[3,000]	
		Sonic infrared imaging technology development		[2,000]	
0603199F	16	SUSTAINMENT SCIENCE AND TECHNOLOGY (S&T)	2,935		2,935
0603203F	17	ADVANCED AEROSPACE SENSORS	44,677		44,677
0603211F	18	AEROSPACE TECHNOLOGY DEV/DEMO	53,588		53,588
0603216F	19	AEROSPACE PROPULSION AND POWER TECHNOLOGY	136,135	12,500	148,635
		Algal biofuel production research		[2,000]	
		Long range supersonic engine for high speed strike		[4,000]	
		Power module materials research		[4,000]	
		Scalable unmanned aerial vehicle engines		[2,500]	
0603231F	20	CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY	0		0
0603270F	21	ELECTRONIC COMBAT TECHNOLOGY	16,992		16,992
0603401F	22	ADVANCED SPACECRAFT TECHNOLOGY	83,705	2,000	85,705
		Secure supply of carbon nanotubes		[2,000]	
0603444F	23	MAUI SPACE SURVEILLANCE SYSTEM (MSSS)	5,899		5,899
0603456F	24	HUMAN EFFECTIVENESS ADVANCED TECHNOLOGY DEVELOPMENT	24,814		24,814
0603601F	25	CONVENTIONAL WEAPONS TECHNOLOGY	15,755		15,755
0603605F	26	ADVANCED WEAPONS TECHNOLOGY	17,461		17,461
0603680F	27	MANUFACTURING TECHNOLOGY PROGRAM	39,701	2,000	41,701
		Improved production of frequency selective surface structures		[2,000]	
0603788F	28	BATTLESPACE KNOWLEDGE DEVELOPMENT AND DEMONSTRATION	32,382		32,382
0603789F	29	C3I ADVANCED DEVELOPMENT	0		0
0603924F	30	HIGH ENERGY LASER ADVANCED TECHNOLOGY PROGRAM	1,847		1,847
		TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, AIR FORCE	509,305	33,500	542,805
		ADVANCED COMPONENT DEVELOPMENT, AIR FORCE			

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0603260F	31	INTELLIGENCE ADVANCED DEVELOPMENT	5,019	2,000	7,019
		Collaboration gateway		[2,000]	
0603287F	32	PHYSICAL SECURITY EQUIPMENT	3,576		3,576
0603423F	33	GLOBAL POSITIONING SYSTEM III—OPERATIONAL CONTROL SEGMENT	0	381,867	381,867
		OCX transfer from line 212		[381,867]	
0603430F	34	ADVANCED EHF MILSATCOM (SPACE)	351,817		351,817
0603432F	35	POLAR MILSATCOM (SPACE)	164,232		164,232
0603438F	36	SPACE CONTROL TECHNOLOGY	45,012	6,000	51,012
		Space situational awareness		[6,000]	
0603742F	37	COMBAT IDENTIFICATION TECHNOLOGY	26,172		26,172
0603790F	38	NATO RESEARCH AND DEVELOPMENT	4,372		4,372
0603791F	39	INTERNATIONAL SPACE COOPERATIVE R&D	635		635
0603830F	40	SPACE PROTECTION PROGRAM (SPP)	8,349	5,000	13,349
		Program add		[5,000]	
0603845F	41	TRANSFORMATIONAL SATCOM (TSAT)	0		0
0603850F	42	INTEGRATED BROADCAST SERVICE	20,580		20,580
0603851F	43	INTERCONTINENTAL BALLISTIC MISSILE	66,745		66,745
0603854F	44	WIDEBAND GLOBAL SATCOM RDT&E (SPACE)	36,123		36,123
0603859F	45	POLLUTION PREVENTION	2,534		2,534
0603860F	46	JOINT PRECISION APPROACH AND LANDING SYSTEMS	13,952		13,952
0604015F	47	NEXT GENERATION BOMBER	198,957		198,957
0604283F	48	BATTLE MGMT COM & CTRL SENSOR DEVELOPMENT	0		0
0604327F	49	HARD AND DEEPLY BURIED TARGET DEFEAT SYSTEM (HDBTDS) PROGRAM	22,389		22,389
0604330F	50	JOINT DUAL ROLE AIR DOMINANCE MISSILE	9,799		9,799
0604337F	51	REQUIREMENTS ANALYSIS AND MATURATION	34,339		34,339
0604436F	52	NEXT-GENERATION MILSATCOM TECHNOLOGY DEVELOPMENT	0	50,000	50,000
		Next-generation MILSATCOM		[50,000]	
0604635F	53	GROUND ATTACK WEAPONS FUZE DEVELOPMENT	32,513		32,513
0604796F	54	ALTERNATIVE FUELS	24,064		24,064

0604830F	55	AUTOMATED AIR-TO-AIR REFUELING	85		85
0604857F	56	OPERATIONALLY RESPONSIVE SPACE	93,978	35,000	128,978
		Crossecting capabilities		[20,000]	
		Radially segmented launch vehicle		[15,000]	
0604858F	57	TECH TRANSITION PROGRAM	12,260		12,260
0305178F	58	NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS)	325,505	-225,000	100,505
		Program reduction		[-225,000]	
		TOTAL, ADVANCED COMPONENT DEVELOPMENT, AIR FORCE	1,503,007	254,867	1,757,874
		SYSTEM DEVELOPMENT & DEMONSTRATION, AIR FORCE			
0603840F	59	GLOBAL BROADCAST SERVICE (GBS)	18,171		18,171
0604222F	60	NUCLEAR WEAPONS SUPPORT	60,545	8,000	68,545
		Nuclear enterprise surety tracking		[8,000]	
0604226F	61	B-1B	0		0
0604233F	62	SPECIALIZED UNDERGRADUATE FLIGHT TRAINING	8,066		8,066
0604240F	63	B-2 ADVANCED TECHNOLOGY BOMBER	0		0
0604270F	64	ELECTRONIC WARFARE DEVELOPMENT	89,966		89,966
0604280F	65	JOINT TACTICAL RADIO	631		631
0604281F	66	TACTICAL DATA NETWORKS ENTERPRISE	102,941		102,941
0604287F	67	PHYSICAL SECURITY EQUIPMENT	50		50
0604329F	68	SMALL DIAMETER BOMB (SDB)	153,505		153,505
0604421F	69	COUNTERSPACE SYSTEMS	40,276		40,276
0604425F	70	SPACE SITUATION AWARENESS SYSTEMS	426,525	-30,000	396,525
		SBSS follow-on early to need		[-30,000]	
0604429F	71	AIRBORNE ELECTRONIC ATTACK	25,937		25,937
0604441F	72	SPACE BASED INFRARED SYSTEM (SBIRS) HIGH EMD	530,047	15,000	545,047
		HEO ground and data exploitation		[15,000]	
0604443F	73	THIRD GENERATION INFRARED SURVEILLANCE (3GIRS)	0	25,000	25,000
		OPIR technology development		[25,000]	
0604602F	74	ARMAMENT/ORDNANCE DEVELOPMENT	6,693		6,693
0604604F	75	SUBMUNITIONS	1,622		1,622
0604617F	76	AGILE COMBAT SUPPORT	37,987		37,987

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0604706F	77	LIFE SUPPORT SYSTEMS	10,650		10,650
0604735F	78	COMBAT TRAINING RANGES	36,905		36,905
0604740F	79	INTEGRATED COMMAND & CONTROL APPLICATIONS (IC2A)	10		10
0604750F	80	INTELLIGENCE EQUIPMENT	1,364		1,364
0604800F	81	JOINT STRIKE FIGHTER (JSF)	883,773		883,773
0604851F	82	INTERCONTINENTAL BALLISTIC MISSILE	71,843		71,843
0604853F	83	EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM (SPACE)	30,245		30,245
0605011F	84	RDT&E FOR AGING AIRCRAFT	0		0
0605221F	85	NEXT GENERATION AERIAL REFUELING AIRCRAFT	863,875		863,875
0605229F	86	CSAR HH-60 RECAPITALIZATION	12,584		12,584
0605277F	87	CSAR-X RDT&E	0		0
0605278F	88	HC/MC-130 RECAP RDT&E	15,536		15,536
0605452F	89	JOINT SIAP EXECUTIVE PROGRAM OFFICE	0		0
0207434F	90	LINK-16 SUPPORT AND SUSTAINMENT	0		0
0207451F	91	SINGLE INTEGRATED AIR PICTURE (SIAP)	1,832		1,832
0207701F	92	FULL COMBAT MISSION TRAINING	57,393		57,393
0305176F	93	COMBAT SURVIVOR EVADER LOCATOR	0		0
0401138F	94	JOINT CARGO AIRCRAFT (JCA)	26,407		26,407
0401318F	95	CV-22	18,270		18,270
0401845F	96	AIRBORNE SENIOR LEADER C3 (SLC3S)	15,826		15,826
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, AIR FORCE	3,549,475	18,000	3,567,475
		RDT&E MANAGEMENT SUPPORT, AIR FORCE			
0604256F	97	THREAT SIMULATOR DEVELOPMENT	21,245		21,245
0604759F	98	MAJOR T&E INVESTMENT	61,587	4,500	66,087
		Holloman high-speed test track		[4,500]	
0605101F	99	RAND PROJECT AIR FORCE	26,752		26,752
0605502F	100	SMALL BUSINESS INNOVATION RESEARCH	0		0

0605712F	101	INITIAL OPERATIONAL TEST & EVALUATION	20,665		20,665
0605807F	102	TEST AND EVALUATION SUPPORT	759,868		759,868
0605860F	103	ROCKET SYSTEMS LAUNCH PROGRAM (SPACE)	23,551		23,551
0605864F	104	SPACE TEST PROGRAM (STP)	47,623	15,000	62,623
		Small launch class mission		[15,000]	
0605976F	105	FACILITIES RESTORATION AND MODERNIZATION—TEST AND EVALUATION SUPPORT	46,327		46,327
0605978F	106	FACILITIES SUSTAINMENT—TEST AND EVALUATION SUPPORT	27,579		27,579
0606323F	107	MULTI-SERVICE SYSTEMS ENGINEERING INITIATIVE	18,901		18,901
0702806F	108	ACQUISITION AND MANAGEMENT SUPPORT	24,968		24,968
0804731F	109	GENERAL SKILL TRAINING	1,544		1,544
0909999F	110	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS	0		0
1001004F	111	INTERNATIONAL ACTIVITIES	3,764		3,764
		TOTAL, RDT&E MANAGEMENT SUPPORT, AIR FORCE	1,084,374	19,500	1,103,874
		OPERATIONAL SYSTEM DEVELOPMENT, AIR FORCE			
0603423F	112	GLOBAL POSITIONING SYSTEM III—OPERATIONAL CONTROL SEGMENT	0		0
0604263F	113	COMMON VERTICAL LIFT SUPPORT PLATFORM	0		0
0605018F	114	AIR FORCE INTEGRATED MILITARY HUMAN RESOURCES SYSTEM (AF-IMHRS)	43,300		43,300
0605024F	115	ANTI-TAMPER TECHNOLOGY EXECUTIVE AGENCY	42,255		42,255
0101113F	117	B-52 SQUADRONS	146,096		146,096
0101122F	118	AIR-LAUNCHED CRUISE MISSILE (ALCM)	3,631		3,631
0101126F	119	B-1B SQUADRONS	33,234		33,234
0101127F	120	B-2 SQUADRONS	260,466		260,466
0101313F	121	STRAT WAR PLANNING SYSTEM—USSTRATCOM	28,441		28,441
0101314F	122	NIGHT FIST—USSTRATCOM	5,359		5,359
0102325F	124	ATMOSPHERIC EARLY WARNING SYSTEM	0		0
0102326F	125	REGION/SECTOR OPERATION CONTROL CENTER MODERNIZATION PROGRAM	23,732		23,732
0102823F	126	STRATEGIC AEROSPACE INTELLIGENCE SYSTEM ACTIVITIES	15		15
0203761F	127	WARFIGHTER RAPID ACQUISITION PROCESS (WRAP) RAPID TRANSITION FUND	10,580		10,580
0205219F	128	MQ-9 UAV	125,427		125,427
0207040F	129	MULTI-PLATFORM ELECTRONIC WARFARE EQUIPMENT	15,574		15,574
0207131F	130	A-10 SQUADRONS	5,661		5,661
0207133F	131	F-16 SQUADRONS	129,103		129,103

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0207134F	132	F-15E SQUADRONS	222,677		222,677
0207136F	133	MANNED DESTRUCTIVE SUPPRESSION	12,937		12,937
0207138F	134	F-22A SQUADRONS	576,330		576,330
0207142F	135	F-35 SQUADRONS	217,561		217,561
0207161F	136	TACTICAL AIM MISSILES	6,040		6,040
0207163F	137	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	62,922		62,922
0207170F	138	JOINT HELMET MOUNTED CUEING SYSTEM (JHMCS)	2,407		2,407
0207224F	139	COMBAT RESCUE AND RECOVERY	944		944
0207227F	140	COMBAT RESCUE—PARARESCUE	2,921		2,921
0207247F	141	AF TENCAP	11,648		11,648
0207249F	142	PRECISION ATTACK SYSTEMS PROCUREMENT	3,017		3,017
0207253F	143	COMPASS CALL	20,652		20,652
0207268F	144	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	147,396		147,396
0207277F	145	ISR INNOVATIONS	0		0
0207325F	146	JOINT AIR-TO-SURFACE STANDOFF MISSILE (JASSM)	20,000		20,000
0207410F	147	AIR & SPACE OPERATIONS CENTER (AOC)	93,102		93,102
0207412F	148	CONTROL AND REPORTING CENTER (CRC)	58,313		58,313
0207417F	149	AIRBORNE WARNING AND CONTROL SYSTEM (AWACS)	239,755		239,755
0207418F	150	TACTICAL AIRBORNE CONTROL SYSTEMS	0		0
0207423F	151	ADVANCED COMMUNICATIONS SYSTEMS	67,532		67,532
0207431F	153	COMBAT AIR INTELLIGENCE SYSTEM ACTIVITIES	3,310		3,310
0207438F	154	THEATER BATTLE MANAGEMENT (TBM) C4I	15,170		15,170
0207445F	155	FIGHTER TACTICAL DATA LINK	85,492		85,492
0207446F	156	BOMBER TACTICAL DATA LINK	0		0
0207448F	157	C2ISR TACTICAL DATA LINK	1,584		1,584
0207449F	158	COMMAND AND CONTROL (C2) CONSTELLATION	24,229		24,229
0207581F	159	JOINT SURVEILLANCE/TARGET ATTACK RADAR SYSTEM (JSTARS)	168,917		168,917
0207590F	160	SEEK EAGLE	19,263		19,263
0207601F	161	USAF MODELING AND SIMULATION	21,638		21,638

0207605F	162	WARGAMING AND SIMULATION CENTERS	6,020		6,020
0207697F	163	DISTRIBUTED TRAINING AND EXERCISES	2,863		2,863
0208006F	164	MISSION PLANNING SYSTEMS	79,112		79,112
0208021F	165	INFORMATION WARFARE SUPPORT	2,294	1,500	3,794
		Cyber operations security institute		[1,500]	
0208059F	166	CYBER COMMAND ACTIVITIES	1,117		1,117
0301400F	173	SPACE SUPERIORITY INTELLIGENCE	10,006		10,006
0302015F	174	E-4B NATIONAL AIRBORNE OPERATIONS CENTER (NAOC)	12,532		12,532
0303131F	175	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK (MEECN)	78,784		78,784
0303140F	176	INFORMATION SYSTEMS SECURITY PROGRAM	140,017	8,800	148,817
		Application software assurance center of excellence		[7,000]	
		Malware research technology demonstration		[1,800]	
0303141F	177	GLOBAL COMBAT SUPPORT SYSTEM	3,393		3,393
0303150F	178	GLOBAL COMMAND AND CONTROL SYSTEM	3,055		3,055
0303158F	179	JOINT COMMAND AND CONTROL PROGRAM (JC2)	2,157		2,157
0303601F	180	MILSATCOM TERMINALS	186,582	116,400	302,982
		FAB-T transfer from APAF 75		[116,400]	
0304260F	182	AIRBORNE SIGINT ENTERPRISE	149,268		149,268
0305099F	185	GLOBAL AIR TRAFFIC MANAGEMENT (GATM)	5,708		5,708
0305103F	186	CYBER SECURITY INITIATIVE	2,030		2,030
0305105F	187	DOD CYBER CRIME CENTER	279		279
0305110F	188	SATELLITE CONTROL NETWORK (SPACE)	21,667		21,667
0305111F	189	WEATHER SERVICE	32,373		32,373
0305114F	190	AIR TRAFFIC CONTROL, APPROACH, AND LANDING SYSTEM (ATCAL)	33,268		33,268
0305116F	191	AERIAL TARGETS	63,573		63,573
0305128F	194	SECURITY AND INVESTIGATIVE ACTIVITIES	469		469
0305146F	196	DEFENSE JOINT COUNTERINTELLIGENCE ACTIVITIES	40		40
0305164F	198	NAVSTAR GLOBAL POSITIONING SYSTEM (USER EQUIPMENT) (SPACE)	165,936		165,936
0305165F	199	NAVSTAR GLOBAL POSITIONING SYSTEM (SPACE AND CONTROL SEGMENTS)	34,471		34,471
0305173F	201	SPACE AND MISSILE TEST AND EVALUATION CENTER	4,572		4,572
0305174F	202	SPACE WARFARE CENTER	2,929		2,929
0305182F	203	SPACELIFT RANGE SYSTEM (SPACE)	9,933		9,933
0305193F	204	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	1,254		1,254
0305205F	205	ENDURANCE UNMANNED AERIAL VEHICLES	0		0

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0305206F	206	AIRBORNE RECONNAISSANCE SYSTEMS	168,963	-58,700	110,263
		Environmental awareness for unmanned systems		[5,000]	
		WAAS program of record		[-63,700]	
0305207F	207	MANNED RECONNAISSANCE SYSTEMS	15,337		15,337
0305208F	208	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	93,398		93,398
0305219F	209	MQ-1 PREDATOR A UAV	28,913		28,913
0305220F	210	RQ-4 UAV	251,318		251,318
0305221F	211	NETWORK-CENTRIC COLLABORATIVE TARGETING	7,267		7,267
0305265F	212	GPS III SPACE SEGMENT	828,171	-371,867	456,304
		OCX transfer to line 33		[-381,867]	
		Small satellite augmentation		[10,000]	
0305614F	213	JSPOC MISSION SYSTEM	132,706	6,000	138,706
		Karnac		[6,000]	
0305887F	214	INTELLIGENCE SUPPORT TO INFORMATION WARFARE	5,512		5,512
0305913F	215	NUDET DETECTION SYSTEM (SPACE)	72,199	30,000	102,199
		SABRS integration on GEO-4		[30,000]	
0305924F	216	NATIONAL SECURITY SPACE OFFICE	10,630		10,630
0305940F	217	SPACE SITUATION AWARENESS OPERATIONS	43,838		43,838
0307141F	218	INFORMATION OPERATIONS TECHNOLOGY INTEGRATION & TOOL DEVELOPMENT	21,912		21,912
0308699F	219	SHARED EARLY WARNING (SEW)	2,952		2,952
0401115F	220	C-130 AIRLIFT SQUADRON	113,107		113,107
0401119F	221	C-5 AIRLIFT SQUADRONS (IF)	58,990		58,990
0401130F	222	C-17 AIRCRAFT (IF)	177,212		177,212
0401132F	223	C-130J PROGRAM	26,770		26,770
0401134F	224	LARGE AIRCRAFT IR COUNTERMEASURES (LAIRCM)	17,227		17,227
0401218F	225	KC-135S	20,453		20,453
0401219F	226	KC-10S	56,669		56,669
0401314F	227	OPERATIONAL SUPPORT AIRLIFT	4,988		4,988
0401315F	228	C-STOL AIRCRAFT	1,283		1,283

0401839F	229	AIR MOBILITY TACTICAL DATA LINK	0		0
0408011F	230	SPECIAL TACTICS / COMBAT CONTROL	7,345		7,345
0702207F	231	DEPOT MAINTENANCE (NON-IF)	1,514		1,514
0702976F	232	FACILITIES RESTORATION & MODERNIZATION—LOGISTICS	0		0
0708012F	233	LOGISTICS SUPPORT ACTIVITIES	0		0
0708610F	234	LOGISTICS INFORMATION TECHNOLOGY (LOGIT)	227,614		227,614
0708611F	235	SUPPORT SYSTEMS DEVELOPMENT	6,141		6,141
0804743F	236	OTHER FLIGHT TRAINING	667		667
0804757F	237	JOINT NATIONAL TRAINING CENTER	9		9
0804772F	238	TRAINING DEVELOPMENTS	0		0
0808716F	239	OTHER PERSONNEL ACTIVITIES	116		116
0901202F	240	JOINT PERSONNEL RECOVERY AGENCY	6,107		6,107
0901212F	241	SERVICE-WIDE SUPPORT (NOT OTHERWISE ACCOUNTED FOR)	0		0
0901218F	242	CIVILIAN COMPENSATION PROGRAM	7,811		7,811
0901220F	243	PERSONNEL ADMINISTRATION	11,179		11,179
0901538F	244	FINANCIAL MANAGEMENT INFORMATION SYSTEMS DEVELOPMENT	49,816		49,816
99999999	999	CLASSIFIED PROGRAMS	12,406,781		12,406,781
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, AIR FORCE	18,919,248	-267,867	18,651,381
		TOTAL, RDT&E, AIR FORCE	27,247,302	82,500	27,329,802

ACCOUNT

RESEARCH, DEVELOPMENT, TEST & EVAL, DW

BASIC RESEARCH, DEFENSE-WIDE

0601000BR	1	DTRA BASIC RESEARCH INITIATIVE	47,412		47,412
0601101E	2	DEFENSE RESEARCH SCIENCES	328,195	4,000	332,195
		Information security research		[4,000]	
0601111D8Z	3	GOVERNMENT/INDUSTRY COSPONSORSHIP OF UNIVERSITY RESEARCH	0	2,000	2,000
		Superconducting systems cooling		[2,000]	
0601114D8Z	4	DEFENSE EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH	0		0
0601120D8Z	5	NATIONAL DEFENSE EDUCATION PROGRAM	109,911		109,911
0601384BP	6	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	49,508	15,000	64,508

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		DOD requested transfer from Line 116		[15,000]	
		TOTAL, BASIC RESEARCH, DEFENSE-WIDE	535,026	6,000	556,026
		APPLIED RESEARCH, DEFENSE-WIDE			
0602000D8Z	7	JOINT MUNITIONS TECHNOLOGY	22,448		22,448
0602228D8Z	8	HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU) SCIENCE	15,067		15,067
0602234D8Z	9	LINCOLN LABORATORY RESEARCH PROGRAM	32,830		32,830
0602303E	10	INFORMATION & COMMUNICATIONS TECHNOLOGY	281,262		281,262
0602304E	11	COGNITIVE COMPUTING SYSTEMS	90,143	-9,000	81,143
		Program termination		[-9,000]	
0602305E	12	MACHINE INTELLIGENCE	44,682		44,682
0602383E	13	BIOLOGICAL WARFARE DEFENSE	32,692		32,692
0602384BP	14	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	169,287	9,500	178,787
		Advanced chem-bio protective materials		[1,500]	
		Chemical and biological infrared detector		[3,000]	
		DOD requested transfer from Line 116		[5,000]	
0602663D8Z	15	JOINT DATA MANAGEMENT ADVANCED DEVELOPMENT	3,261		3,261
0602668D8Z	16	CYBER SECURITY RESEARCH	10,000	-5,000	5,000
		Lack of coordination		[-5,000]	
0602670D8Z	17	HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) APPLIED RESEARCH	9,499		9,499
0602702E	18	TACTICAL TECHNOLOGY	224,378		224,378
0602715E	19	MATERIALS AND BIOLOGICAL TECHNOLOGY	312,586		312,586
0602716E	20	ELECTRONICS TECHNOLOGY	286,936		286,936
0602718BR	21	WEAPONS OF MASS DESTRUCTION DEFEAT TECHNOLOGIES	212,742	3,000	215,742
		Weapons of mass destruction analysis reachback tool		[3,000]	
1160401BB	22	SPECIAL OPERATIONS TECHNOLOGY DEVELOPMENT	26,545	3,000	29,545
		Non-lethal weapons technology		[3,000]	
1160407BB	23	SOF MEDICAL TECHNOLOGY DEVELOPMENT	0		0

		TOTAL, APPLIED RESEARCH, DEFENSE-WIDE	1,774,358	1,500	1,775,858
		ADVANCED TECHNOLOGY DEVELOPMENT, DEFENSE-WIDE			
0603000D8Z	24	JOINT MUNITIONS ADVANCED TECHNOLOGY	20,556		20,556
0603121D8Z	25	SO/LIC ADVANCED DEVELOPMENT	44,423		44,423
0603122D8Z	26	COMBATING TERRORISM TECHNOLOGY SUPPORT	85,299	10,500	95,799
		Foreign language correlation and translation		[1,000]	
		Impact and blast loading laboratory testing program		[2,500]	
		Reconnaissance and data exploitation system		[7,000]	
0603160BR	27	COUNTERPROLIFERATION INITIATIVES—PROLIFERATION PREVENTION AND DEFEAT	295,163		295,163
0603175C	28	BALLISTIC MISSILE DEFENSE TECHNOLOGY	132,220		132,220
0603200D8Z	29	JOINT ADVANCED CONCEPTS	6,808		6,808
0603225D8Z	30	JOINT DOD-DOE MUNITIONS TECHNOLOGY DEVELOPMENT	22,700		22,700
0603264S	31	AGILE TRANSPORTATION FOR THE 21ST CENTURY (AT21)—THEATER CAPABILITY	750		750
0603286E	32	ADVANCED AEROSPACE SYSTEMS	303,078		303,078
0603287E	33	SPACE PROGRAMS AND TECHNOLOGY	98,130		98,130
0603384BP	34	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM—ADVANCED DEVELOPMENT	177,113	33,000	210,113
		DOD requested transfer from Line 116		[30,000]	
		Plant-based vaccine development		[3,000]	
0603618D8Z	35	JOINT ELECTRONIC ADVANCED TECHNOLOGY	8,386		8,386
0603648D8Z	36	JOINT CAPABILITY TECHNOLOGY DEMONSTRATIONS	206,917		206,917
0603662D8Z	37	NETWORKED COMMUNICATIONS CAPABILITIES	30,035		30,035
0603663D8Z	38	JOINT DATA MANAGEMENT RESEARCH	6,289		6,289
0603665D8Z	39	BIOMETRICS SCIENCE AND TECHNOLOGY	11,416		11,416
0603668D8Z	40	CYBER SECURITY ADVANCED RESEARCH	10,000	-5,000	5,000
		Lack of coordination		[-5,000]	
0603670D8Z	41	HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) ADVANCED DEVELOPMENT	11,510		11,510
0603680D8Z	42	DEFENSE-WIDE MANUFACTURING SCIENCE AND TECHNOLOGY PROGRAM	18,916		18,916
0603711D8Z	43	JOINT ROBOTICS PROGRAM/AUTONOMOUS SYSTEMS	9,943		9,943
0603712S	44	GENERIC LOGISTICS R&D TECHNOLOGY DEMONSTRATIONS	20,542	16,500	37,042
		Biofuels program		[4,000]	
		Biomass conversion research		[1,500]	

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		Green product evaluation and implementation		[2,000]	
		RFID technology exploitation		[1,000]	
		Vehicle fuel cell and hydrogen logistics program		[8,000]	
0603713S	45	DEPLOYMENT AND DISTRIBUTION ENTERPRISE TECHNOLOGY	29,109		29,109
0603716D8Z	46	STRATEGIC ENVIRONMENTAL RESEARCH PROGRAM	68,021		68,021
0603720S	47	MICROELECTRONICS TECHNOLOGY DEVELOPMENT AND SUPPORT	26,878		26,878
0603727D8Z	48	JOINT WARFIGHTING PROGRAM	10,966		10,966
0603739E	49	ADVANCED ELECTRONICS TECHNOLOGIES	197,098		197,098
0603745D8Z	50	SYNTHETIC APERTURE RADAR (SAR) COHERENT CHANGE DETECTION (CDD)	0		0
0603750D8Z	51	ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS	0		0
0603755D8Z	52	HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM	200,986		200,986
0603760E	53	COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS	219,809		219,809
0603765E	54	CLASSIFIED DARPA PROGRAMS	167,008		167,008
0603766E	55	NETWORK-CENTRIC WARFARE TECHNOLOGY	234,985		234,985
0603767E	56	SENSOR TECHNOLOGY	205,032		205,032
0603768E	57	GUIDANCE TECHNOLOGY	0		0
0603769SE	58	DISTRIBUTED LEARNING ADVANCED TECHNOLOGY DEVELOPMENT	13,986		13,986
0603781D8Z	59	SOFTWARE ENGINEERING INSTITUTE	30,910		30,910
0603805S	60	DUAL USE TECHNOLOGY	0		0
0603826D8Z	61	QUICK REACTION SPECIAL PROJECTS	78,244		78,244
0603828D8Z	62	JOINT EXPERIMENTATION	111,946		111,946
0603832D8Z	63	DOD MODELING AND SIMULATION MANAGEMENT OFFICE	38,140		38,140
0603901C	64	DIRECTED ENERGY RESEARCH	98,688		98,688
0603941D8Z	65	TEST & EVALUATION SCIENCE & TECHNOLOGY	97,642		97,642
0603942D8Z	66	TECHNOLOGY TRANSFER	23,310		23,310
1160402BB	67	SPECIAL OPERATIONS ADVANCED TECHNOLOGY DEVELOPMENT	30,806		30,806
1160422BB	68	AVIATION ENGINEERING ANALYSIS	4,234		4,234
1160472BB	69	SOF INFORMATION AND BROADCAST SYSTEMS ADVANCED TECHNOLOGY	4,942		4,942

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TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, DEFENSE-WIDE 3,412,934 55,000 3,467,934

ADVANCED COMPONENT DEVELOPMENT, DEFENSE-WIDE

0603161D8Z	70	NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT RDT&E ADC&P	32,132		32,132
0603527D8Z	71	RETRACT LARCH	21,592		21,592
0603709D8Z	72	JOINT ROBOTICS PROGRAM	9,878		9,878
0603714D8Z	73	ADVANCED SENSOR APPLICATIONS PROGRAM	18,060		18,060
0603851D8Z	74	ENVIRONMENTAL SECURITY TECHNICAL CERTIFICATION PROGRAM	30,419		30,419
0603881C	75	BALLISTIC MISSILE DEFENSE TERMINAL DEFENSE SEGMENT	436,482		436,482
0603882C	76	BALLISTIC MISSILE DEFENSE MIDCOURSE DEFENSE SEGMENT	1,346,181		1,346,181
0603883C	77	BALLISTIC MISSILE DEFENSE BOOST DEFENSE SEGMENT	0		0
0603884BP	78	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	277,062		277,062
0603884C	79	BALLISTIC MISSILE DEFENSE SENSORS	454,859		454,859
0603886C	80	BALLISTIC MISSILE DEFENSE SYSTEM INTERCEPTOR	0		0
0603888C	81	BALLISTIC MISSILE DEFENSE TEST & TARGETS	1,113,425		1,113,425
0603890C	82	BMD ENABLING PROGRAMS	402,769		402,769
		Printed circuit board industrial assessment (non-add)		[2,000]	[2,000]
0603891C	83	SPECIAL PROGRAMS—MDA	270,189		270,189
0603892C	84	AEGIS BMD	1,467,278		1,467,278
0603893C	85	SPACE TRACKING & SURVEILLANCE SYSTEM	112,678		112,678
0603894C	86	MULTIPLE KILL VEHICLE	0		0
0603895C	87	BALLISTIC MISSILE DEFENSE SYSTEM SPACE PROGRAMS	10,942		10,942
0603896C	88	BALLISTIC MISSILE DEFENSE COMMAND AND CONTROL, BATTLE MANAGEMENT AND COMMUNICATI	342,625		342,625
0603897C	89	BALLISTIC MISSILE DEFENSE HERCULES	0		0
0603898C	90	BALLISTIC MISSILE DEFENSE JOINT WARFIGHTER SUPPORT	68,726		68,726
0603904C	91	MISSILE DEFENSE INTEGRATION & OPERATIONS CENTER (MDIOC)	86,198		86,198
0603906C	92	REGARDING TRENCH	7,529		7,529
0603907C	93	SEA BASED X-BAND RADAR (SBX)	153,056		153,056
0603908C	94	BMD EUROPEAN INTERCEPTOR SITE	0		0
0603909C	95	BMD EUROPEAN MIDCOURSE RADAR	0		0
0603911C	96	BMD EUROPEAN CAPABILITY	0		0
0603912C	97	BMD EUROPEAN COMMUNICATIONS SUPPORT	0		0
0603913C	98	ISRAELI COOPERATIVE PROGRAMS	121,735	230,000	351,735

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		Israeli Iron Dome program		[205,000]	
		Short-range ballistic missile defense		[25,000]	
0603920D8Z	99	HUMANITARIAN DEMINING	14,735		14,735
0603923D8Z	100	COALITION WARFARE	13,786		13,786
0604016D8Z	101	DEPARTMENT OF DEFENSE CORROSION PROGRAM	4,802	3,000	7,802
		Corrosion control research		[3,000]	
0604400D8Z	102	DEPARTMENT OF DEFENSE (DOD) UNMANNED AIRCRAFT SYSTEM (UAS) COMMON DEVELOPMENT	49,292		49,292
0604648D8Z	103	JOINT CAPABILITY TECHNOLOGY DEMONSTRATIONS	0		0
0604670D8Z	104	HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) RESEARCH AND ENGINEERING	7,459		7,459
0604787D8Z	105	JOINT SYSTEMS INTEGRATION COMMAND (JSIC)	19,413		19,413
0604828D8Z	106	JOINT FIRES INTEGRATION AND INTEROPERABILITY TEAM	16,637		16,637
0604880C	107	LAND-BASED SM-3 (LBSM3)	281,378		281,378
0604881C	108	AEGIS SM-3 BLOCK IIA CO-DEVELOPMENT	318,800		318,800
0604883C	109	PRECISION TRACKING SPACE SYSTEM RDT&E	66,969		66,969
0604884C	110	AIRBORNE INFRARED (ABIR)	111,671		111,671
0605017D8Z	111	REDUCTION OF TOTAL OWNERSHIP COST	20,310		20,310
0303191D8Z	112	JOINT ELECTROMAGNETIC TECHNOLOGY (JET) PROGRAM	4,027		4,027
		TOTAL, ADVANCED COMPONENT DEVELOPMENT, DEFENSE-WIDE	7,713,094	233,000	7,946,094
		SYSTEM DEVELOPMENT & DEMONSTRATION, DEFENSE-WIDE			
0604051D8Z	113	DEFENSE ACQUISITION CHALLENGE PROGRAM (DACP)	24,344		24,344
0604161D8Z	114	NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT RDT&E SDD	7,973		7,973
0604165D8Z	115	PROMPT GLOBAL STRIKE CAPABILITY DEVELOPMENT	239,861		239,861
0604384BP	116	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	407,162	-63,000	344,162
		DOD requested transfer to Line 6		[-15,000]	

		DOD requested transfer to Line 14		[−5,000]	
		DOD requested transfer to Line 34		[−30,000]	
		Excess to need		[−15,000]	
		Joint Service Aircrew Mask upgrade		[2,000]	
0604709D8Z	117	JOINT ROBOTICS PROGRAM	4,155		4,155
0604764K	118	ADVANCED IT SERVICES JOINT PROGRAM OFFICE (AITS-JPO)	49,364		49,364
0604771D8Z	119	JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)	20,954		20,954
0605000BR	120	WEAPONS OF MASS DESTRUCTION DEFEAT CAPABILITIES	7,307		7,307
0605013BL	121	INFORMATION TECHNOLOGY DEVELOPMENT	11,937		11,937
0605018BTA	122	DEFENSE INTEGRATED MILITARY HUMAN RESOURCES SYSTEM (DIMHRS)	11,800		11,800
0605020BTA	123	BUSINESS TRANSFORMATION AGENCY R&D ACTIVITIES	184,131		184,131
0605021SE	124	HOMELAND PERSONNEL SECURITY INITIATIVE	391		391
0605027D8Z	125	OUS(D) IT DEVELOPMENT INITIATIVES	5,000		5,000
0605140D8Z	126	TRUSTED FOUNDRY	35,512		35,512
0605648D8Z	127	DEFENSE ACQUISITION EXECUTIVE (DAE) PILOT PROGRAM	0		0
0303141K	128	GLOBAL COMBAT SUPPORT SYSTEM	17,842		17,842
0303158K	129	JOINT COMMAND AND CONTROL PROGRAM (JC2)	0		0
0807708D8Z	130	WOUNDED ILL AND INJURED SENIOR OVERSIGHT COMMITTEE (WII-SOC) STAFF OFFICE.	1,590		1,590
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, DEFENSE-WIDE	1,029,323	−63,000	966,323
		RDT&E MANAGEMENT SUPPORT, DEFENSE-WIDE			
0603757D8Z	131	TRAINING TRANSFORMATION (T2)	0		0
0604774D8Z	132	DEFENSE READINESS REPORTING SYSTEM (DRRS)	5,113		5,113
0604875D8Z	133	JOINT SYSTEMS ARCHITECTURE DEVELOPMENT	8,052		8,052
0604940D8Z	134	CENTRAL TEST AND EVALUATION INVESTMENT DEVELOPMENT (CTEIP)	162,286		162,286
0604942D8Z	135	ASSESSMENTS AND EVALUATIONS	2,500		2,500
0604943D8Z	136	THERMAL VICAR	8,851		8,851
0605100D8Z	137	JOINT MISSION ENVIRONMENT TEST CAPABILITY (JMETC)	10,287		10,287
0605104D8Z	138	TECHNICAL STUDIES, SUPPORT AND ANALYSIS	49,282		49,282
0605110D8Z	139	USD(A&T)--CRITICAL TECHNOLOGY SUPPORT	4,743		4,743
0605117D8Z	140	FOREIGN MATERIAL ACQUISITION AND EXPLOITATION	95,520		95,520
0605126J	141	JOINT INTEGRATED AIR AND MISSILE DEFENSE ORGANIZATION (JIAMDO)	94,577		94,577

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0605128D8Z	142	CLASSIFIED PROGRAM USD(P)	0		0
0605130D8Z	143	FOREIGN COMPARATIVE TESTING	32,755		32,755
0605142D8Z	144	SYSTEMS ENGINEERING	29,824		29,824
0605161D8Z	145	NUCLEAR MATTERS-PHYSICAL SECURITY	6,264		6,264
0605170D8Z	146	SUPPORT TO NETWORKS AND INFORMATION INTEGRATION	15,091		15,091
0605200D8Z	147	GENERAL SUPPORT TO USD (INTELLIGENCE)	6,227		6,227
0605384BP	148	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	120,995		120,995
0605502BP	149	SMALL BUSINESS INNOVATIVE RESEARCH—CHEMICAL BIOLOGICAL DEF	0		0
0605502BR	150	SMALL BUSINESS INNOVATION RESEARCH	0		0
0605502C	151	SMALL BUSINESS INNOVATIVE RESEARCH—MDA	0		0
0605502D8Z	152	SMALL BUSINESS INNOVATIVE RESEARCH	0		0
0605502E	153	SMALL BUSINESS INNOVATIVE RESEARCH	0		0
0605502S	154	SMALL BUSINESS INNOVATIVE RESEARCH	0		0
0605790D8Z	155	SMALL BUSINESS INNOVATION RESEARCH (SBIR)/ SMALL BUSINESS TECHNOLOGY TRANSFER (S)	2,189	1,500	3,689
		Anti-tamper software systems		[1,500]	
0605798D8Z	156	DEFENSE TECHNOLOGY ANALYSIS	13,858		13,858
0605799D8Z	157	FORCE TRANSFORMATION DIRECTORATE	19,701		19,701
0605801KA	158	DEFENSE TECHNICAL INFORMATION CENTER (DTIC)	61,054	-10,000	51,054
		Unjustified growth		[-10,000]	
0605803SE	159	R&D IN SUPPORT OF DOD ENLISTMENT, TESTING AND EVALUATION	64,737		64,737
0605804D8Z	160	DEVELOPMENT TEST AND EVALUATION	18,688		18,688
0605897E	161	DARPA AGENCY RELOCATION	11,000		11,000
0605898E	162	MANAGEMENT HQ—R&D	56,257		56,257
0606100D8Z	163	BUDGET AND PROGRAM ASSESSMENTS	6,099		6,099
0606301D8Z	164	AVIATION SAFETY TECHNOLOGIES	10,900		10,900
0204571J	165	JOINT STAFF ANALYTICAL SUPPORT	23,081		23,081
0303166D8Z	168	SUPPORT TO INFORMATION OPERATIONS (IO) CAPABILITIES	31,500		31,500

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0303169D8Z	169	INFORMATION TECHNOLOGY RAPID ACQUISITION	5,135		5,135
0305103E	170	CYBER SECURITY INITIATIVE	10,000		10,000
0305193D8Z	171	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	21,272		21,272
0305400D8Z	173	WARFIGHTING AND INTELLIGENCE-RELATED SUPPORT	845		845
0804767D8Z	174	COCOM EXERCISE ENGAGEMENT AND TRAINING TRANSFORMATION (CE2T2)	92,253		92,253
0901585C	175	PENTAGON RESERVATION	20,482		20,482
0901598C	176	MANAGEMENT HQ—MDA	29,754		29,754
0901598D8W	177	IT SOFTWARE DEV INITIATIVES	278		278
99999999	999	CLASSIFIED PROGRAMS	61,577		61,577
		TOTAL, RDT&E MANAGEMENT SUPPORT, DEFENSE-WIDE	1,213,027	-8,500	1,204,527
		OPERATIONAL SYSTEM DEVELOPMENT, DEFENSE-WIDE			
0604130V	178	DEFENSE INFORMATION SYSTEM FOR SECURITY (DISS)	5,522		5,522
0605127T	179	REGIONAL INTERNATIONAL OUTREACH (RIO) AND PARTNERSHIP FOR PEACE INFORMATION MANA	2,139		2,139
0605147T	180	OVERSEAS HUMANITARIAN ASSISTANCE SHARED INFORMATION SYSTEM (OHAIS)	290		290
0607384BP	181	CHEMICAL AND BIOLOGICAL DEFENSE (OPERATIONAL SYSTEMS DEVELOPMENT)	6,634		6,634
0607713S	182	DEPLOYMENT AND DISTRIBUTION ENTERPRISE TECHNOLOGY	0		0
0607828D8Z	183	JOINT INTEGRATION AND INTEROPERABILITY	44,139		44,139
0204571J	184	JOINT STAFF ANALYTICAL SUPPORT	0		0
0208043J	185	CLASSIFIED PROGRAMS	2,288		2,288
0208045K	186	C4I INTEROPERABILITY	74,023		74,023
0301144K	188	JOINT/ALLIED COALITION INFORMATION SHARING	9,379		9,379
0302016K	195	NATIONAL MILITARY COMMAND SYSTEM-WIDE SUPPORT	467		467
0302019K	196	DEFENSE INFO INFRASTRUCTURE ENGINEERING AND INTEGRATION	16,629	30,000	46,629
		Cybersecurity pilot projects		[30,000]	
0303126K	197	LONG-HAUL COMMUNICATIONS—DCS	9,130		9,130
0303131K	198	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK (MEECN)	9,529		9,529
0303135G	199	PUBLIC KEY INFRASTRUCTURE (PKI)	8,881		8,881
0303136G	200	KEY MANAGEMENT INFRASTRUCTURE (KMI)	45,941		45,941
0303140D8Z	201	INFORMATION SYSTEMS SECURITY PROGRAM	14,077		14,077
0303140G	202	INFORMATION SYSTEMS SECURITY PROGRAM	388,827	5,000	393,827
		NSA ISSP classified cybersecurity pilot		[5,000]	

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

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Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
0303148K	204	DISA MISSION SUPPORT OPERATIONS	0		0
0303149J	205	C4I FOR THE WARRIOR	2,261		2,261
0303150K	206	GLOBAL COMMAND AND CONTROL SYSTEM	26,247		26,247
0303153K	207	DEFENSE SPECTRUM ORGANIZATION	20,991		20,991
0303170K	208	NET-CENTRIC ENTERPRISE SERVICES (NCES)	3,366		3,366
0303260D8Z	209	JOINT MILITARY DECEPTION INITIATIVE	1,161		1,161
0303610K	210	TELEPORT PROGRAM	6,880		6,880
0304210BB	211	SPECIAL APPLICATIONS FOR CONTINGENCIES	16,272	5,700	21,972
		Technology development for tactical unmanned aerial systems		[4,000]	
		Wide-area aerial tactical situation awareness		[1,700]	
0305103D8Z	214	CYBER SECURITY INITIATIVE	501		501
0305103K	216	CYBER SECURITY INITIATIVE	2,251		2,251
0305125D8Z	217	CRITICAL INFRASTRUCTURE PROTECTION (CIP)	10,486		10,486
0305186D8Z	221	POLICY R&D PROGRAMS	9,136		9,136
0305199D8Z	223	NET CENTRICITY	29,831		29,831
0305208BB	227	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	1,290		1,290
0305208K	230	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	3,513		3,513
0305219BB	232	MQ-1 PREDATOR A UAV	98		98
0305387D8Z	234	HOMELAND DEFENSE TECHNOLOGY TRANSFER PROGRAM	2,988		2,988
0305600D8Z	235	INTERNATIONAL INTELLIGENCE TECHNOLOGY ASSESSMENT, ADVANCEMENT AND INTEGRATION.	1,416		1,416
0708011S	245	INDUSTRIAL PREPAREDNESS	21,798	32,000	53,798
		Industrial Base Innovation Fund		[30,000]	
		Northwest manufacturing initiative		[2,000]	
0708012S	246	LOGISTICS SUPPORT ACTIVITIES	2,813		2,813
0902298J	247	MANAGEMENT HEADQUARTERS (JCS)	2,807		2,807
0909999D8Z	248	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS	0		0
1001018D8Z	249	NATO AGS	93,885		93,885

1105219BB	250	MQ-9 UAV	98		98
1160279BB	251	SMALL BUSINESS INNOVATIVE RESEARCH/SMALL BUS TECH TRANSFER PILOT PROG ..	0		0
1160403BB	252	SPECIAL OPERATIONS AVIATION SYSTEMS ADVANCED DEVELOPMENT	68,691		68,691
1160404BB	253	SPECIAL OPERATIONS TACTICAL SYSTEMS DEVELOPMENT	1,582		1,582
1160405BB	254	SPECIAL OPERATIONS INTELLIGENCE SYSTEMS DEVELOPMENT	23,879		23,879
1160408BB	255	SOF OPERATIONAL ENHANCEMENTS	62,592		62,592
1160421BB	256	SPECIAL OPERATIONS CV-22 DEVELOPMENT	14,406		14,406
1160423BB	257	JOINT MULTI-MISSION SUBMERSIBLE	14,924		14,924
1160426BB	258	OPERATIONS ADVANCED SEAL DELIVERY SYSTEM (ASDS) DEVELOPMENT	0		0
1160427BB	259	MISSION TRAINING AND PREPARATION SYSTEMS (MTPS)	2,915		2,915
1160428BB	260	UNMANNED VEHICLES (UV)	0		0
1160429BB	261	MC130J SOF TANKER RECAPITALIZATION	7,624		7,624
1160474BB	262	SOF COMMUNICATIONS EQUIPMENT AND ELECTRONICS SYSTEMS	1,922		1,922
1160476BB	263	SOF TACTICAL RADIO SYSTEMS	2,347		2,347
1160477BB	264	SOF WEAPONS SYSTEMS	479		479
1160478BB	265	SOF SOLDIER PROTECTION AND SURVIVAL SYSTEMS	593		593
1160479BB	266	SOF VISUAL AUGMENTATION, LASERS AND SENSOR SYSTEMS	0		0
1160480BB	267	SOF TACTICAL VEHICLES	1,994		1,994
1160482BB	268	SOF ROTARY WING AVIATION	14,473		14,473
1160483BB	269	SOF UNDERWATER SYSTEMS	13,986	1,600	15,586
		Lithium ion battery safety reseah		[1,600]	
1160484BB	270	SOF SURFACE CRAFT	2,933		2,933
1160488BB	271	SOF PSYOP	4,193		4,193
1160489BB	272	SOF GLOBAL VIDEO SURVEILLANCE ACTIVITIES	5,135		5,135
1160490BB	273	SOF OPERATIONAL ENHANCEMENTS INTELLIGENCE	9,167		9,167
99999999	999	CLASSIFIED PROGRAMS	3,832,019	39,000	3,871,019
		Center for geospatial science		[1,000]	
		Center for intelligence and security studies		[3,000]	
		Classified initiative		[35,000]	
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, DEFENSE-WIDE	4,983,838	113,300	5,097,138
		DARPA execution adjustment	0	-143,400	-143,400

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		TOTAL, RDT&E DEFENSE-WIDE	20,661,600	208,900	20,870,500
ACCOUNT		OPERATIONAL TEST & EVAL, DEFENSE			
0605118OTE	1	OPERATIONAL TEST AND EVALUATION	59,430		59,430
0605131OTE	2	LIVE FIRE TEST AND EVALUATION	12,899		12,899
0605814OTE	3	OPERATIONAL TEST ACTIVITIES AND ANALYSES	122,581		122,581
		TOTAL, OPERATIONAL TEST & EVAL, DEFENSE	194,910	0	194,910
		TOTAL, RDT&E	76,130,700	667,842	76,798,542

SEC. 4202. RESEARCH, DEVELOPMENT, TEST, AND EVALUATION FOR OVERSEAS CONTINGENCY OPERATIONS.

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION FOR OVERSEAS CONTINGENCY OPERATIONS (In Thousands of Dollars)					
Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
RESEARCH, DEVELOPMENT, TEST & EVAL, ARMY					
ADVANCED COMPONENT DEVELOPMENT, ARMY					
0603747A	60	SOLDIER SUPPORT AND SURVIVABILITY	57,900		57,900
TOTAL, ADVANCED COMPONENT DEVELOPMENT, ARMY			57,900	0	57,900
SYSTEM DEVELOPMENT & DEMONSTRATION, ARMY					
0604270A	75	ELECTRONIC WARFARE DEVELOPMENT	5,400		5,400
0604321A	77	ALL SOURCE ANALYSIS SYSTEM	8,100		8,100
TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, ARMY			13,500	0	13,500
OPERATIONAL SYSTEM DEVELOPMENT, ARMY					
0303140A	171	INFORMATION SYSTEMS SECURITY PROGRAM	63,306		63,306
0305208A	178	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	16,200		16,200
TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, ARMY			79,506	0	79,506
TOTAL, RDT&E, ARMY			150,906	0	150,906
ACCOUNT	RESEARCH, DEVELOPMENT, TEST & EVAL, NAVY				

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION FOR OVERSEAS CONTINGENCY OPERATIONS
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		ADVANCED TECHNOLOGY DEVELOPMENT, NAVY			
0603271N	19	ELECTROMAGNETIC SYSTEMS ADVANCED TECHNOLOGY	14,100		14,100
		TOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, NAVY	14,100	0	14,100
		ADVANCED COMPONENT DEVELOPMENT, NAVY			
0603654N	53	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	1,000		1,000
		TOTAL, ADVANCED COMPONENT DEVELOPMENT, NAVY	1,000	0	1,000
		SYSTEM DEVELOPMENT & DEMONSTRATION, NAVY			
0604771N	124	MEDICAL DEVELOPMENT	300		300
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, NAVY	300	0	300
		RDT&E MANAGEMENT SUPPORT, NAVY			
0605866N	153	NAVY SPACE AND ELECTRONIC WARFARE (SEW) SUPPORT	5,200		5,200
		TOTAL, RDT&E MANAGEMENT SUPPORT, NAVY	5,200	0	5,200
		OPERATIONAL SYSTEM DEVELOPMENT, NAVY			
0305233N	213	RQ-7 UAV	6,900		6,900
99999999	999	CLASSIFIED PROGRAMS	32,901		32,901
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, NAVY	39,801	0	39,801
ACCOUNT		TOTAL, RDT&E, NAVY	60,401	0	60,401

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ACCOUNT	RESEARCH, DEVELOPMENT, TEST & EVAL, AF				
	ADVANCED COMPONENT DEVELOPMENT, AIR FORCE				
0603438F	36	SPACE CONTROL TECHNOLOGY	16,000		16,000
		TOTAL, ADVANCED COMPONENT DEVELOPMENT, AIR FORCE	16,000	0	16,000
	SYSTEM DEVELOPMENT & DEMONSTRATION, AIR FORCE				
0604281F	66	TACTICAL DATA NETWORKS ENTERPRISE	30,000		30,000
		TOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, AIR FORCE	30,000	0	30,000
	OPERATIONAL SYSTEM DEVELOPMENT, AIR FORCE				
0208006F	164	MISSION PLANNING SYSTEMS	4,443		4,443
0305221F	211	NETWORK-CENTRIC COLLABORATIVE TARGETING	6,100		6,100
0408011F	230	SPECIAL TACTICS / COMBAT CONTROL	10,325		10,325
99999999	999	CLASSIFIED PROGRAMS	199,373		199,373
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, AIR FORCE	220,241	0	220,241
		TOTAL, RDT&E, AIR FORCE	266,241	0	266,241

ACCOUNT	RESEARCH, DEVELOPMENT, TEST & EVAL, DW				
	OPERATIONAL SYSTEM DEVELOPMENT, DEFENSE-WIDE				
0303126K	197	LONG-HAUL COMMUNICATIONS—DCS	23,125		23,125
0303140G	202	INFORMATION SYSTEMS SECURITY PROGRAM	750		750
1160405BB	254	SPECIAL OPERATIONS INTELLIGENCE SYSTEMS DEVELOPMENT	9,440		9,440
99999999	999	CLASSIFIED PROGRAMS	123,925	25,500	149,425
		Valiant angel		[3,000]	
		WAAS exploitation		[22,500]	
		TOTAL, OPERATIONAL SYSTEM DEVELOPMENT, DEFENSE-WIDE	157,240	25,500	182,740

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION FOR OVERSEAS CONTINGENCY OPERATIONS
(In Thousands of Dollars)

Program Element	Line	Item	FY 2011 Request	Senate Change	Senate Authorized
		TOTAL, RDT&E DEFENSE-WIDE	157,240	25,500	182,740
		TOTAL, RDT&E	634,788	25,500	660,288