

TITLE II—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Explanation of tables

The following tables provide the program-level detailed guidance for the funding authorized in title II of this Act. The tables also display the funding requested by the administration in the fiscal year 2009 budget request for research and development programs, and indicate those programs for which the committee either increased or decreased the requested amounts.

These tables are incorporated by reference into this Act as provided in section 1002 of this Act. The Department of Defense may not exceed the authorized amounts (as set forth in the tables or, if unchanged from the administration request, as set forth in budget justification documents of the Department of Defense) without a reprogramming action in accordance with established procedures. Unless noted in this report, funding changes to the budget request are made without prejudice.

Title II - RDT&E
(Dollars in Thousands)

<u>Title II -- RESEARCH, DEVELOPMENT, TEST & EVALUATION</u>	<u>Authorization Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
Research, Development, Test & Evaluation, Army	10,524,085	331,125	10,855,210
Research, Development, Test & Evaluation, Navy	19,337,238	104,954	19,442,192
Research, Development, Test & Evaluation, Air Force	28,066,617	255,860	28,322,477
Research, Development, Test & Evaluation, Defense-wide	21,499,229	-574,500	20,924,729
Operational Test & Evaluation	188,772	0	188,772
TOTAL RDT&E	79,615,941	117,439	79,733,380

Subtitle A—Authorization of Appropriations**Subtitle B—Program Requirements, Restrictions, and Limitations****Requirement for plan on overhead nonimaging infrared systems (sec. 211)**

The committee recommends a provision that would direct the Secretary of the Air Force to develop a comprehensive plan to conduct and support research, development, and demonstration of technologies that could evolve into the next generation of overhead nonimaging systems. The plan would also include an explanation of how such systems would be tested, including any flight or on-orbit testing as well as how and when the technologies would transition to an acquisition program. In addition, the provision would prohibit appropriation of more than 50 percent of the funds authorized to be appropriated for the third generation infrared surveillance program until the plan is submitted to the congressional defense committees.

Advanced battery manufacturing and technology roadmap (sec. 212)

The committee recommends a provision that would require the Secretary of Defense to develop a detailed roadmap for the development of advanced battery technologies, and a domestic manufacturing base and assured supply chain to meet current and future military requirements. The committee notes that the Defense Science Board Task Force on DOD Energy Strategy has highlighted the importance of advanced battery technologies in meeting military vehicle power and portable power requirements. The committee also notes that the Department of Defense (DOD) expends significant resources on the procurement of legacy batteries, and makes some investments in next-generation battery technologies.

The committee believes that advanced battery technologies can play a key role in improving system performance and reducing operating and system life cycle costs. However, the committee is concerned about the Department's ability to access reliable, trusted sources of advanced battery technologies, especially given the diminishing domestic manufacturing base for these systems. The committee believes that the roadmap required by this section will serve to better coordinate service and agency efforts in battery technologies and directly tie investments to specific capability gaps, technological opportunities, and military requirements. The committee directs that the roadmap be developed in cooperation with each of the military departments, the defense and automotive industries, academia, and the Department of Energy, to ensure that future investments, programs, and plans are well coordinated and that technological and manufacturing capabilities serve dual-use purposes where applicable and advantageous to the Department.

Availability of funds for defense laboratories for research and development of technologies for military missions (sec. 213)

The committee recommends a provision that would authorize the Secretary of Defense to establish mechanisms through which laboratory directors would be able to set aside up to 3 percent of funding available to their laboratories to support defense missions. The funds would be available for the purposes of investing in innovative in-house research projects, promoting transition of laboratory-developed technologies into operational systems, or for science and engineering workforce enhancement activities. The committee believes that the funds to be used under the authority of this provision should be a portion of those that are currently directly appropriated funds; are funds derived from work for other Department of Defense organizations, other federal agencies, and non-federal organizations; or from other sources of laboratory revenue.

The committee notes that the Department of Energy laboratories have had a similar authority, known as the Laboratory Directed Research and Development program. This authority is generally viewed as a necessary tool to support innovative research at those laboratories and retain and recruit the finest scientific talent, which helps ensure that the laboratories remain world class research institutions. Over the years, a number of independent groups, including the Defense Science Board, National Research Council, and Naval Research Advisory Committee have recommended similar authority for Department of Defense laboratories. The committee feels that this authority, if properly used, can help revitalize the defense laboratories and enable them to better support departmental missions and remain technically on par with their private sector, international, and other federal peers.

Assured funding for certain information security and information assurance programs of the Department of Defense (sec. 214)

The National Security Agency (NSA) and the Assistant Secretary of Defense for Network and Information Integration (ASD/NII) have attempted for a number of years to persuade the Office of Management and Budget to establish a budget line item for information assurance anticipatory development within the Department of Defense (DOD). While these efforts have not been successful, the committee believes that the arguments in favor of such a program are compelling.

The information technology (IT) industry is the most vibrant and rapidly evolving industry in the world. The Department attempts to acquire or make use of these commercial IT advances to achieve efficiencies and improved operational effectiveness. However, DOD cannot effectively adopt this technology if it cannot be used securely, yet the Department has no appropriate mechanism for keeping pace with the march of technology development.

There is, for example, an outstanding requirement for a very high speed Internet Protocol encryption capability, but NSA has almost no resources with which to respond. The executive branch recently had to launch a satellite that lacked encryption for a key wideband downlink. The Advanced Extremely High Frequency Sat-

elite program was delayed because of a belated encryption subsystem development effort. These types of requirements can be anticipated and, with modest funding, security solutions can be developed to match acquisition schedules.

The committee recommends a provision that would impose a permanent 1 percent tax on the Department's information systems security program, other information assurance programs, and the non-National Intelligence Program-funded cyber security initiative to finance this new program.

The committee directs that the program be executed by NSA's Information Assurance Directorate unless otherwise specified by the ASD/NII. The ASD/NII shall review and approve expenditures under this program. The committee urges the administration to vitiate the need for this statute-based funding mechanism by submitting its own budget request for this activity.

Requirements for certain airborne intelligence collection systems (sec. 215)

The committee recommends a provision that would require that, by October 1, 2012, all intelligence collection aircraft that provide data to, or receive tasking from, the joint Distributed Common Ground/Surface System (DCGS) be connected to, and able to fully operate with, the Network Centric Collaborative Targeting (NCCT) network. The provision would provide for waivers on a case-by-case basis. The committee stresses that the RIVET JOINT RC-135 signals intelligence system is considered to be connected to the DCGS system via its satellite-based reachback capability, and therefore would be subject to the requirements of this provision.

The committee believes that NCCT is an important intelligence and targeting capability that has not received adequate resources or management attention. Intelligence budget requests are generally based on inputs from the program managers of the collection platforms and few of them see that allocating scarce resources to connect to the NCCT network is a high priority because doing so benefits consumers in general. The operational utility of universal NCCT participation for commanders is not reflected in the programming process. The committee urges the Office of the Secretary of Defense to impose a joint perspective to NCCT.

Subtitle C—Missile Defense Programs

Review of the ballistic missile defense policy and strategy of the United States (sec. 231)

The committee recommends a provision that would require the Secretary of Defense to conduct a review of the ballistic missile defense policy and strategy of the United States, and to report the results of the review to Congress not later than January 31, 2010. The provision specifies a number of elements to be considered in the review.

The committee believes it is essential for the next administration to conduct a full review of missile defense policy, strategy, and related matters at the outset of its tenure. The previous missile defense policy review was conducted before the United States had deployed any missile defense systems other than the Patriot system.

In order to expedite the deployment of an initial set of missile defense capabilities, the Missile Defense Agency was created and given extraordinary acquisition flexibility and authority, and high levels of concurrency were adopted.

Now that the initial missile defense capabilities have been deployed or are under production, the circumstances warrant a new overarching review to guide the next phase of U.S. missile defense programs and activities.

Limitation on availability of funds for procurement, construction, and deployment of missile defenses in Europe (sec. 232)

The committee recommends a provision that would limit the availability of fiscal year 2009 funds authorized to be appropriated in this Act from being obligated or expended for procurement, site activation, construction, preparation of equipment for, or deployment of major components of a long-range missile defense system in a European country until two conditions have been met: (1) the government of the country in which such major components of such missile defense system (including interceptors and associated radars) are proposed to be deployed has given final approval (including parliamentary ratification) to any missile defense agreements negotiated between such government and the United States Government concerning the proposed deployment of such components in such country; and (2) 45 days have elapsed following the receipt by Congress of the report required by section 226(c) of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181).

The provision would also limit the availability of fiscal year 2009 funds for the acquisition (other than initial long lead procurement) or deployment of operational interceptor missiles for the proposed long-range missile defense system in Europe until the Secretary of Defense certifies to Congress, after receiving the views of the Director of Operational Test and Evaluation, that the proposed interceptor to be deployed as part of such a missile defense system has demonstrated, through successful, operationally realistic flight testing, that it has a high probability of accomplishing its mission in an operationally effective manner.

The provision also makes clear that it would not limit continuing obligations and expenditures of funds for missile defense, including for research and development and for other activities not otherwise limited by the provision, including site surveys, studies, analysis, and planning and design for the proposed missile defense deployment in Europe.

The committee notes that the provision would adopt the same standard that was enacted in section 226 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181) with respect to the availability of funds for the proposed deployment of a long-range missile defense system in Europe. The provision would make clear that if a European host nation provides final approval of a negotiated deployment agreement with the United States, it would be able to proceed without waiting for the final approval of another European nation on any missile defense agreements negotiated with the United States.

The provision would also clarify that initial long-lead procurement of parts for the planned 2-stage interceptors could be acquired. The committee notes that the initial long lead items planned for procurement are 100 percent common with both the 2-stage and 3-stage Ground-Based Interceptors (GBIs). Therefore, they could be used for purposes other than being deployed on operational 2-stage GBIs if necessary, including for flight test and ground test interceptors for either 3-stage or 2-stage GBIs. As described elsewhere in this report, the committee recommends authorizing initial funding for these long lead parts, with the understanding that if there are problems with the 2-stage GBI development program, these long lead parts would be used for other purposes, rather than being wasted or deployed before the 2-stage GBI is certified as ready.

The United States is continuing its negotiations with Poland and the Czech Republic on agreements concerning the proposed deployment of 10 GBI missiles in Poland and a midcourse X-band radar in the Czech Republic. Although the negotiations with the Czech Republic appear to be nearly complete, the negotiations with Poland could still take months to complete, and are conditioned on whether the United States meets Poland's requests for security enhancements. If the negotiations are concluded successfully, it will take additional time for the Polish and Czech parliaments to consider ratification of the agreements. Consequently, it remains unclear whether or when any agreements would be finally approved, a necessary condition before beginning any proposed construction or deployment.

The committee notes that the proposed 2-stage interceptor intended for deployment in Poland is still being developed, and is not scheduled to have its first booster flight test until the fourth quarter of fiscal year 2009. Given that a number of Ground-based Midcourse Defense (GMD) flight tests have been delayed substantially, it is possible that the 2-stage GBI tests will also be delayed.

In an October 2007 report, the Director of Operational Test and Evaluation (DOT&E) noted the "significant differences" between the proposed GMD deployment with a 2-stage interceptor in Europe and the existing GMD system deployed in the United States with a 3-stage GBI. According to the report, "European defense using GMD assets is a completely new mission area for GMD." The report provided DOT&E's initial testing concept for the proposed European deployment, which would include three flight tests, two of which would be intercept tests. The Missile Defense Agency (MDA) was originally planning to conduct only two flight tests prior to deploying the system, one of which would be an intercept test. This planned flight test program would not meet the DOT&E minimum test plan concept. It is difficult to envision the certification required of the Secretary of Defense under these circumstances. However, MDA has recently agreed to conduct three flight tests, in accordance with the DOT&E test concept. The committee views this as a positive development.

The committee notes that, in their Bucharest summit declaration in April, Ministers of the North Atlantic Treaty Organization (NATO) recognized the substantial contribution of the planned deployment to the protection of NATO allies against long-range mis-

siles, and said they were exploring ways to link the planned capability with NATO missile defense efforts. They also said they would develop options for a comprehensive NATO missile defense architecture to provide coverage of the portions of NATO Europe that would not be covered by the planned U.S. deployment, in order to inform any future political decision by NATO on whether and how to provide defensive coverage for the portion of its territory that would not be protected against ballistic missiles, including from the hundreds of Iranian ballistic missiles that exist today.

Airborne Laser system (sec. 233)

The committee recommends a provision that would require the Director of Operational Test and Evaluation (DOT&E) to review and evaluate the testing conducted on the first Airborne Laser (ABL) aircraft and to report to the Secretary of Defense and to Congress, not later than January 15, 2010, his assessment of the operational effectiveness, suitability, and survivability of the ABL system. The provision would also limit the availability of funds for procurement of a second ABL aircraft until the Secretary of Defense, after receiving the assessment of DOT&E, certifies that the ABL system has demonstrated, through successful testing and operational and cost analysis, a high probability of being operationally effective, suitable, survivable, and affordable.

The committee observes that Missile Defense Agency officials indicated in a briefing to staff that the authority to proceed with the second ABL aircraft has been granted on the condition that the planned 2009 first shoot-down demonstration test is successful, and that the budget request included \$15.8 million to begin studies and analysis on a second ABL aircraft. The committee believes that a decision on whether to proceed with a possible second ABL aircraft should only be made after much more information is available about the likelihood that the system could eventually provide an operationally effective, suitable, survivable, and affordable missile defense capability.

As the committee noted last year, the ABL program has many unanswered questions about operational effectiveness, suitability, survivability, and affordability. The committee believes these questions need to be answered before making a commitment to procure a second ABL aircraft.

Annual Director of Operational Test and Evaluation characterization of operational effectiveness, suitability, and survivability of the Ballistic Missile Defense System (sec. 234)

The committee recommends a provision that would require the annual report by the Director of Operational Test and Evaluation (DOT&E) on the testing of the Ballistic Missile Defense System (BMDS) to include a characterization of the operational effectiveness, suitability, and survivability of the BMDS and its elements that have been fielded or tested before the end of the previous fiscal year.

Section 232(h) of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107) requires DOT&E to provide an annual report to Congress assessing the adequacy and sufficiency

of the test program of the Missile Defense Agency (MDA) during the previous fiscal year. Section 234(b)(2) of the National Defense Authorization Act for Fiscal Year 2006 (Public Law 109–163) requires DOT&E to submit a report to Congress providing his characterization of the operational effectiveness, suitability, and survivability of the BMDS at the conclusion of testing of each 2-year block of the BMDS. However, MDA eliminated the previous 2-year block structure and replaced it with functional blocks that respond to specific threats. These new blocks have no timelines associated with them, thus changing the schedule assumptions of section 234(b)(2). This provision would retain the requirement for DOT&E to report to Congress on the characterization of the BMDS, consistent with the new MDA block structure.

The committee notes that the DOT&E annual missile defense testing report for 2007 included the DOT&E characterization of the operational effectiveness, suitability, and survivability of the Block 2006 BMD system and its elements, in fulfillment of the requirements of section 234(b)(2) of the National Defense Authorization Act for Fiscal Year 2006. In testimony before the committee, Dr. Charles McQueary, the DOT&E, stated that he plans to include this characterization information in future annual DOT&E reports on missile defense testing.

Independent assessment of boost-phase missile defense programs (sec. 235)

The committee recommends a provision that would require the Secretary of Defense to enter into a contract with the National Academy of Sciences to conduct an independent assessment of the boost-phase missile defense programs of the United States to consider the extent to which boost-phase missile defense is feasible, practical, and affordable, and whether any of the existing boost-phase missile defense technology programs of the Department of Defense (particularly the Airborne Laser and the Kinetic Energy Interceptor) have a high probability of performing a boost-phase missile defense mission in an operationally effective, suitable, survivable, and affordable manner. Upon completion of its assessment, the National Academy would submit a report on the results of its assessment to the Secretary of Defense and the congressional defense committees, along with any recommendations the Academy considers appropriate.

The committee notes that the Department of Defense will have spent over \$5.1 billion since 1996 on the Airborne Laser (ABL) technology demonstration program to conduct the first proof of principle missile shoot-down demonstration test in 2009, and an additional \$2.8 billion in the 4-year period starting in fiscal year 2010. The Congressional Budget Office provided an initial estimate that a fleet of seven ABL aircraft could cost as much as \$36.0 billion to develop, acquire, and operate. Additionally, the Department plans to spend more than \$3.6 billion over the 7-year period starting in fiscal year 2007 on technology development for the Kinetic Energy Interceptor (KEI) as a possible boost-phase intercept system. Despite these significant past and planned expenditures, there is no assurance that either of these systems will work in an operationally effective, practical, or affordable manner.

As the committee noted last year, the ABL program has a host of significant unanswered questions related to whether it could work in an operationally effective, suitable, survivable, and affordable manner. For example, the ABL concept is to destroy a missile body—not the warhead—while it is boosting. By the time this intercept would take place, the missile could have achieved sufficient velocity to travel well outside the border of the nation that launched it. Thus, the warhead could continue to fly to an unintended location, including possibly an allied country where U.S. forces are deployed, and cause significant damage. Also, for the aircraft to have any possibility of conducting intercepts, it would have to be flying at exactly the right place and the right time, out of range of air defenses, but within range of a boosting missile. Given these constraints, there appear to be practical limits to the ability of an ABL system to operate against most nations that possess ballistic missiles.

In its March 2007 report, “Defense Acquisitions: Missile Defense Acquisition Strategy Generates Results but Delivers Less at a Higher Cost,” the Government Accountability Office recommended an independent evaluation of ABL and KEI “to inform decisions on the future of the two programs.” The statement of managers to accompany the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181) expressed the view that an independent review should be conducted of the ABL and KEI programs.

The committee believes it would be important to have an independent, technically competent review of the feasibility, practicality, and affordability of boost-phase missile defense programs to help inform future decisions on missile defense investments.

Study on space-based interceptor element of ballistic missile defense system (sec. 236)

The committee recommends a provision that would direct the Secretary of Defense to enter into a contract with one or more independent entities to conduct a review of the feasibility and advisability of developing a space-based interceptor element to the ballistic missile defense system. The provision would require that the contract be entered into after consultation with the Chairman and Ranking members of the Committees on Armed Services of the Senate and the House of Representatives, and no later than 75 days after the date this Act is enacted. The committee expects the Secretary of Defense to undertake a thorough consultation with the Committees on Armed Services in advance of selecting the independent entity or entities to conduct the study.

The independent entities could be federally funded research and development centers, including the Department of Energy National Laboratories, recognized scientific and technical organizations such as the National Academy of Sciences, the American Association for the Advancement of Science, the American Physical Society, or drawn from academia such as JASON.

The provision would direct the report be provided simultaneously to the Committees on Armed Services and to the Secretary of Defense and would permit the Secretary a period of 60 days to submit comments or recommendations with respect to the report to the

committees. The report and any comments would be submitted in an unclassified form but may include a classified annex.

The provision would authorize \$5.0 million from funds available to the Missile Defense Agency for the study.

Subtitle D—Other Matters

Modification of systems subject to survivability testing by the Director of Operational Test and Evaluation (sec. 251)

The committee recommends a provision that would ensure that the Director of Operational Test and Evaluation (DOT&E) can perform adequate and necessary oversight over the live fire, survivability, and lethality testing of critical defense systems. The committee has been concerned about the oversight of testing, and the lack of standardized testing for systems fielded to personnel in Iraq and Afghanistan, including personnel protective equipment such as body armor and helmets. The committee attempted to enhance testing and DOT&E oversight authority over testing of these types of systems through statutory changes in section 231 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109–364). Section 231 intended to authorize the DOT&E to perform necessary oversight activities over force protection and non-lethal weapon systems.

The committee feels that the ability of the DOT&E to perform his intended role to ensure that fielded systems are survivable is hindered by lack of statutory authority and limited cooperation by the military services. The committee notes that the DOT&E has worked effectively in partnership with the services in performing testing oversight duties on important rapid development and fielding initiatives like the Mine Resistant Ambush Protected (MRAP) vehicle, which have contributed to improving the survivability and performance of the systems without unnecessary delay in development or fielding of vital combat systems.

The committee directs the secretaries of the military departments to ensure that programs designated for survivability oversight by the DOT&E under this authority cooperate fully with testing oversight officials such that all equipment fielded to deployed personnel is safe, survivable, and of the highest performance possible.

Biennial reports on joint and service concept development and experimentation (sec. 252)

The committee recommends a provision that would modify the existing reporting requirement on joint warfighting experimentation activities. The provision would reduce the reporting requirement from annual to biennial and change the report's focus to better reflect the current state of concept development and experimentation activities in the Department of Defense, and better highlight current and future activities that will enable robust joint warfighting capabilities.

The committee commends United States Joint Forces Command (JFCOM) for its extensive efforts in concept development and experimentation. To date, JFCOM activities have explored a number

of emerging operational concepts, capabilities, and technologies, including addressing future homeland defense, interagency cooperation, urban operations, and multinational operations scenarios. However, it is not clear that JFCOM is placing a high enough priority on experimentation with future concepts and technologies that could be operationally employed in a time frame of greater than 10 years. The committee is also concerned that the efforts of JFCOM in this regard have not had sufficient and wide ranging impacts across the organizational and force structures, doctrine, and materiel development activities of the Department of Defense. The committee also notes that the services continue to pursue their own warfighting experimentation and concept development activities, though often in a manner poorly coordinated with joint efforts. Therefore, the provision's reporting requirements include focused reporting on "futures" experimentation, an assessment of the return on investments in concept development and experimentation activities in terms of specific outcomes and impacts within the Department of Defense, and descriptions of the concept development and experimentation activities of the military departments.

Further, the committee notes that the JFCOM Commander's activities in joint training, provision of joint forces, and position as the North Atlantic Treaty Organization (NATO) Supreme Allied Commander for Transformation may also serve to motivate recommended changes in the Department's organizational and force structure, doctrine, and materiel development efforts, which should also be incorporated into the recommendations included in the report.

Finally, the committee directs the secretaries of the military departments to support the development of this report through coordination, appropriate resources, and supplying required information in a timely manner.

Repeal of annual reporting requirement relating to the Technology Transition Initiative (sec. 253)

The committee recommends a provision that would eliminate the recurring reporting requirement on the Technology Transition Initiative (TTI). The committee originally proposed this initiative in the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107) in order to accelerate the transition of technologies from science and technology programs into operational use. The initiative was codified in section 242 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314).

The committee notes that the TTI is currently successfully transitioning roughly 70 percent of its funded projects into operational use. This committee believes that this success is a result of the initiative's flexible funding, cost sharing requirements, and joint and service participation in the selection and funding of projects. The committee notes that the statute and processes of the TTI have contributed to enhancing the links between technology developers, requirements generators, and operators, and have successfully enhanced transition efficiency and speed. The committee notes that there are now a number of parallel initiatives and programs seeking to accelerate technology transition in the Depart-

ment of Defense, including, but not limited to, the Quick Reaction Fund, the Joint Improvised Explosive Device Defeat Fund, the work of the Joint Rapid Acquisition Cell, many Defense Advanced Research Projects Agency efforts, and the Army Agile Integration and Demonstration program.

The committee notes that some of these programs may be duplicative and others may not be adequately coordinated with partner services, agencies, and operational users, but rather are flexible funds used solely in the discretion of a single organization. The committee notes that the desire for complete flexibility in the use of appropriated funds is a necessary but insufficient condition for enhancing technology transition, and can lead to problems in ensuring adequate oversight and in coordination between elements of the Department. The committee recommends that the Secretary of Defense, working through the Technology Transition Council, continue to review these programs and their relative merits and authorities and recommend any necessary consolidation, expansion, or changes in statutory authorities, or other changes in regulations or execution that would increase their efficiency and effectiveness.

Executive agent for printed circuit board technology (sec. 254)

The committee recommends a provision that would follow the recommendations of the National Research Council and a report of the Deputy Under Secretary of Defense for Logistics and Materiel Readiness and would require the establishment of an executive agent to oversee Department of Defense (DOD) activities related to printed circuit board technologies. The committee notes that the National Research Council's Board on Manufacturing and Engineering Design studied the issue of DOD access to legacy and future generations of printed circuit board technologies to support defense and other missions. The resulting 2005 report made a series of recommendations designed to ensure DOD access to printed circuit board technology and enable the development of new capabilities needed to support emerging requirements.

In March 2008, a Principal Response Team convened by the Navy and Defense Logistics Agency, and consisting of membership from the Office of the Secretary of Defense, the National Security Agency, the military services, and the Departments of State and Energy, reported to Congress that "DOD concurs with comments on all NRC recommendations," and identified current and potential actions to address each one.

The committee notes that printed circuit board technologies are critical components of numerous defense systems, and cost the Department roughly \$500.0 million annually. There are strong and growing concerns related to the development of next-generation capabilities, to preserving assured access to trusted sources of technology due to a diminishing domestic manufacturing base, and even to the trustworthiness of existing supplies of printed circuit board technology being used for military systems. The committee notes that DOD efforts to address these issues have been underfunded and disjointed in the past. The establishment of an executive agent can raise the profile of risk issues related to printed circuit board technological, as well as production and acquisition

issues, and help ensure that these concerns are better addressed in future budgets, plans, and programs. The committee further notes that the March 2008 DOD report recommended a series of possible actions for the executive agent to undertake to address a variety of issues. The committee directs the executive agent to carefully analyze and evaluate these recommendations and act on them as appropriate.

Report on Department of Defense response to findings and recommendations of the Defense Science Board Task Force on Directed Energy Weapons (sec. 255)

The committee recommends a provision that would require the Secretary of Defense to develop specific responses to the findings and recommendations of the December 2007 Defense Science Board (DSB) Task Force on Directed Energy Weapons. The DSB found that directed energy offers promise as a “transformational game changer,” but that “years of investment have not resulted in any current operational high-energy laser capability.” The DSB made a series of recommendations broadly aimed at accelerating the operational use of directed energy weapons, including: better defining concepts of operations for directed energy weapons; better understanding the relative benefits and disadvantages of directed energy systems versus traditional, kinetic systems; and better focusing research and development and science and technology investments on high priority potential operational solutions and on resolving specific high priority technical issues.

The committee directs the Secretary of Defense to coordinate a formal response to the DSB findings and recommendations in concert with appropriate technology development, requirements generation, and operational communities. The committee also directs that the required analysis address the important issue of assuring that the Department of Defense has sufficient testing expertise and infrastructure to adequately perform all necessary developmental and operational tests on directed energy systems.

Assessment of standards for mission critical semiconductors procured by the Department of Defense (sec. 256)

The committee recommends a provision that would require the Secretary of Defense to perform an assessment of existing and emerging technical methods for verifying the trustworthiness of semiconductors procured for use in critical defense applications.

The committee notes that the manufacture of semiconductors has continued to migrate to off-shore foundries, particularly to foundries in China. Since the defense semiconductor market comprises only 1 percent of the overall global semiconductor market, the Department of Defense’s (DOD) ability to procure high end semiconductor technologies is largely dependent on commercial interests, practices, and markets.

The committee notes that the Department is currently depending primarily on a single source for high end semiconductors for defense and intelligence applications through the DOD Trusted Foundry program, which was established in 2004. The February 2005 report by the Defense Science Board Task Force on High Performance Microchip supply stated that the Trusted Foundry Pro-

gram is an interim source of high performance integrated circuits (ICs) and was appropriate for addressing the immediate needs for trusted sources of IC supply. Since that time, the trend of migration of semiconductor manufacturing overseas has continued, making it more urgent to augment the Trusted Foundry by developing a more comprehensive approach for the procurement of trusted parts.

The committee notes that one issue that needs to be addressed by the Department through the required assessment is providing defense programs assurance of dependable, continuous, long-term access to trusted, mission critical semiconductors from both foreign and domestic sources for its potentially vulnerable defense systems. DOD needs for integrated circuits include high end semiconductors, custom Application Specific Integrated Circuits (ASICs), and Field Programmable Gate Arrays (FPGAs). The committee notes that the assurance of trust includes verifying that the semiconductor has not been tampered with or modified in any way, and performs only the functions expected and required. This also requires assurance that the design process, fabrication, packaging, final assembly, and test of semiconductors are also free from tampering.

The recommended provision would require that the Department inventory and possibly implement the best methods currently available for assuring trust. The committee recommends that the Department put in place an overall policy and direction, as well as a plan for the procurement of semiconductors that assures continuous access and trust to support military requirements. The committee believes the Department also needs to monitor and implement new techniques and approaches as they become available through technological advances.

Finally, the committee directs the Under Secretary of Defense for Acquisition, Technology, and Logistics to keep the congressional defense committees informed of the actions taken pursuant to this provision.

Budget Items

Army

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		RESEARCH, DEVELOPMENT, TEST & EVALUATION, ARMY			
		BASIC RESEARCH			
0601101A	1	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	19,832		19,832
0601102A	2	DEFENSE RESEARCH SCIENCES	176,959	7,500	184,459
		Advanced energy storage research		[3,000]	
		Drug resistant infections research		[1,500]	
		Military operating environments research		[1,500]	
		Organic semiconductor modeling and simulation		[1,500]	
0601103A	3	UNIVERSITY RESEARCH INITIATIVES	76,980	9,200	86,180
		Low temperature vehicle performance research		[2,000]	
		Nanocomposite materials research		[2,000]	
		Nanocomposite wireless power systems research		[1,500]	
		Nanoscale biosensor research		[2,500]	
		Urban simulation and training research		[1,200]	
0601104A	4	UNIVERSITY AND INDUSTRY RESEARCH CENTERS	105,622		105,622
		SUBTOTAL, BASIC RESEARCH, ARMY	379,393	16,700	396,093

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0602105A	5	APPLIED RESEARCH MATERIALS TECHNOLOGY Cold spray technology development Composite materials applied research and technology Improvised explosive device blast simulations Magnetic nanosensor development Nanosensor manufacturing research Ultrasonic consolidation research	26,985	9,675 [2,000] [2,000] [475] [2,000] [1,500] [1,700]	36,660
0602120A	6	SENSORS AND ELECTRONIC SURVIVABILITY Hydrogen battery research	46,147	2,000 [2,000]	48,147
0602122A	7	TRACTOR HIP	18,192		18,192
0602211A	8	AVIATION TECHNOLOGY Slowed-rotor technologies	42,013	2,500 [2,500]	44,513
0602270A	9	ELECTRONIC WARFARE TECHNOLOGY	16,611		16,611
0602303A	10	MISSILE TECHNOLOGY	48,174		48,174
0602307A	11	ADVANCED WEAPONS TECHNOLOGY	19,664		19,664
0602308A	12	ADVANCED CONCEPTS AND SIMULATION Photonics research for sniper detection	17,048	3,000 [3,000]	20,048

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0602601A	13	COMBAT VEHICLE AND AUTOMOTIVE TECHNOLOGY Advanced vehicle technology and fuel development Condition based maintenance simulation tools Fuel cell development for medium and heavy-duty vehicles Ground vehicle reliability modeling Hybrid electric vehicle batteries for FCS Lightweight electric drive technologies Military fuels research program	55,234	18,000 [1,500] [4,500] [4,000] [2,000] [2,000] [2,000]	73,234
0602618A	14	BALLISTICS TECHNOLOGY / ROBOTICS	71,550		71,550
0602622A	15	CHEMICAL, SMOKE AND EQUIPMENT DEFEATING TECHNOLOGY	2,295		2,295
0602623A	16	JOINT SERVICE SMALL ARMS PROGRAM	7,531		7,531
0602624A	17	WEAPONS AND MUNITIONS TECHNOLOGY UGV weaponization	30,576	3,500 [3,500]	34,076
0602705A	18	ELECTRONICS AND ELECTRONIC DEVICES Soldier portable power pack technologies	45,278	2,000 [2,000]	47,278
0602709A	19	NIGHT VISION TECHNOLOGY	25,647		25,647
0602712A	20	COUNTERMINE SYSTEMS Standoff IED detection technologies	21,815	3,000 [3,000]	24,815
0602716A	21	HUMAN FACTORS ENGINEERING TECHNOLOGY	17,348		17,348
0602720A	22	ENVIRONMENTAL QUALITY TECHNOLOGY	16,064		16,064
0602782A	23	COMMAND, CONTROL, COMMUNICATIONS TECHNOLOGY Portable compass/positioning/timing device development	24,014	2,000 [2,000]	26,014
0602783A	24	COMPUTER AND SOFTWARE TECHNOLOGY	5,495		5,495

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0602784A	25	MILITARY ENGINEERING TECHNOLOGY Geosciences and atmospheric research	52,066	4,000	56,066
		Nanocomposite panels for blast and ballistic protection		[2,500]	
0602785A	26	MANPOWER/PERSONNEL/TRAINING TECHNOLOGY	16,412	[1,500]	16,412
0602786A	27	WARFIGHTER TECHNOLOGY Ballistic materials for force protection	21,948	3,000	24,948
		Mobile feeding unit development		[1,500]	
0602787A	28	MEDICAL TECHNOLOGY Bioengineering research	75,395	35,500	110,895
		Biomechanics research		[2,500]	
		Blast wave effect modeling		[1,000]	
		Dengue fever treatment research		[5,000]	
		Dried blood technology clinical research		[2,000]	
		Extremity war Injuries research program		[2,000]	
		Genetics research for soldier survivability		[5,000]	
		Military photomedicine program		[2,000]	
		Nanomaterials research for biological processes		[8,000]	
		PTSD research		[2,000]	
		Traumatic brain injury research		[2,500]	
				[3,500]	
SUBTOTAL, APPLIED RESEARCH, ARMY			723,502	88,175	811,677

147

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		ADVANCED TECHNOLOGY DEVELOPMENT			
0603001A	29	WARFIGHTER ADVANCED TECHNOLOGY Biosensor controller systems development	46,793	3,500 [3,500]	50,293
0603002A	30	MEDICAL ADVANCED TECHNOLOGY Advanced fibrin dressings Battlefield tracheal intubation technologies Bioelectrics research Combat wound initiative Electronic vital signs monitoring Gulf War veterans' illnesses research Joint medical logistics modernization program Lower limb prosthetics research Mild traumatic brain injury assessment sensor research Online military medical training program Regenerative medicine research	59,043	46,000 [5,000] [2,000] [2,000] [5,500] [3,000] [13,000] [4,000] [2,500] [2,000] [2,000] [5,000]	105,043
0603003A	31	AVIATION ADVANCED TECHNOLOGY Helicopter vulnerability reduction technologies Tactical integration systems development UAV payload delivery systems	57,277	7,000 [1,500] [3,500] [2,000]	64,277
0603004A	32	WEAPONS AND MUNITIONS ADVANCED TECHNOLOGY	73,697		73,697

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603005A	33	COMBAT VEHICLE AND AUTOMOTIVE TECHNOLOGY	107,992	100,250	208,242
		Advanced battery development program		[10,000]	
		Advanced digital hydraulic hybrid drive systems		[3,500]	
		Advanced lithium vehicle battery systems		[3,000]	
		Advanced tactical wheeled vehicle electric drive systems		[5,000]	
		Advanced thermal and oil management controls research		[5,000]	
		Antiballistic windshield armor		[4,000]	
		Composite armor cab development		[2,000]	
		Development of logistical fuel processors		[3,500]	
		Diverse threat sensor development		[1,000]	
		Dynamometer facility upgrade		[4,250]	
		Fastening & joining research		[2,000]	
		Ground vehicle integration technologies		[4,000]	
		Hostile fire detection systems		[2,500]	
		Hybrid electric blast protected vehicle technologies		[4,000]	
		Hybrid engine development program		[6,000]	
		Hydraulic hybrid vehicle systems		[3,000]	
		Next generation non-tactical vehicle propulsion technologies		[5,000]	
		Nickel metal hydride battery development		[2,000]	
		Power and energy research equipment upgrades		[12,000]	
		Power management control and integration systems		[2,000]	
		Solid hydrogen storage systems development		[1,000]	
		Unmanned ground vehicle initiative		[12,000]	
		Vehicle prognostics technologies		[3,500]	

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603006A	34	COMMAND, CONTROL, COMMUNICATIONS ADVANCED TECHNOLOGY	9,183		9,183
0603007A	35	MANPOWER, PERSONNEL AND TRAINING ADVANCED TECHNOLOGY	6,853		6,853
0603008A	36	ELECTRONIC WARFARE ADVANCED TECHNOLOGY	50,961		50,961
0603009A	37	TRACTOR HIKE	14,562		14,562
0603015A	38	NEXT GENERATION TRAINING & SIMULATION SYSTEMS Joint fires training systems	18,881	5,500	24,381
		Modeling architectures for battle command experimentation		[3,500]	
0603020A	39	TRACTOR ROSE	11,575	[2,000]	11,575
0603100A	40	IED DEFEAT TECHNOLOGY DEVELOPMENT			
0603103A	41	EXPLOSIVES DEMILITARIZATION TECHNOLOGY Deactivation of military explosives research	10,564	500	11,064
0603105A	42	MILITARY HIV RESEARCH	7,116	[500]	7,116
0603125A	43	COMBATING TERRORISM, TECHNOLOGY DEVELOPMENT	13,064		13,064
0603238A	44	GLOBAL SURVEILLANCE/AIR DEFENSE/PRECISION STRIKE TECHNOLOGY DEMONSTRATION			
0603270A	45	ELECTRONIC WARFARE TECHNOLOGY Laser development for light aircraft missile defense	23,996	2,000	25,996
0603313A	46	MISSILE AND ROCKET ADVANCED TECHNOLOGY Hypersonic interceptor studies	63,998	[2,000]	64,998
0603322A	47	TRACTOR CAGE	12,372	1,000	12,372
0603606A	48	LANDMINE WARFARE AND BARRIER ADVANCED TECHNOLOGY	30,797	[1,000]	30,797
0603607A	49	JOINT SERVICE SMALL ARMS PROGRAM	8,809		8,809

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603710A	50	NIGHT VISION ADVANCED TECHNOLOGY Short range electro-optic sensors	39,916	3,500 [3,500]	43,416
0603728A	51	ENVIRONMENTAL QUALITY TECHNOLOGY DEMONSTRATIONS	15,519		15,519
0603734A	52	MILITARY ENGINEERING ADVANCED TECHNOLOGY Direct methanol fuel cell development Fuel cell technologies for continuity of operations	7,654	3,000 [2,000]	10,654
0603772A	53	ADVANCED TACTICAL COMPUTER SCIENCE AND SENSOR TECHNOLOGY	48,236	[1,000]	48,236
		SUBTOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, ARMY	738,858	172,250	911,108
0603024A	54	ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES UNIQUE ITEM IDENTIFICATION (UID) Unique item ID data management research	649	2,000 [2,000]	2,649
0603305A	55	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION(NON SPACE) Advanced electronics integration Advanced environmental control systems Advanced fuel cell research Radiation hardening initiative	14,005	15,500 [4,000] [5,000] [3,500]	29,505
0603308A	56	ARMY MISSILE DEFENSE SYSTEMS INTEGRATION (SPACE) High-altitude integration testbed	19,986	3,000 [3,000]	22,986
0603327A	57	AIR AND MISSILE DEFENSE SYSTEMS ENGINEERING IAMD architecture analysis program	116,410	3,000 [3,000]	121,410
0603460A	58	JOINT AIR-TO-GROUND MISSILE (JAGM)		5,000 [5,000]	

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603619A	59	LANDMINE WARFARE AND BARRIER - ADV DEV	29,234		29,234
0603627A	60	SMOKE, OBSCURANT AND TARGET DEFEATING SYS-ADV DEV	3,840		3,840
0603639A	61	TANK AND MEDIUM CALIBER AMMUNITION / FCS	45,866		45,866
0603653A	62	ADVANCED TANK ARMAMENT SYSTEM (ATAS) Stryker active protection system	108,012	4,500 [4,500]	112,512
0603747A	63	SOLDIER SUPPORT AND SURVIVABILITY	30,716		30,716
0603766A	64	TACTICAL ELECTRONIC SURVEILLANCE SYSTEM - ADV DEV	12,275		12,275
0603774A	65	NIGHT VISION SYSTEMS ADVANCED DEVELOPMENT	2,588		2,588
0603779A	66	ENVIRONMENTAL QUALITY TECHNOLOGY	5,355		5,355
0603782A	67	WARFIGHTER INFORMATION NETWORK-TACTICAL	414,357		414,357
0603790A	68	NATO RESEARCH AND DEVELOPMENT	5,041		5,041
0603801A	69	AVIATION - ADV DEV	7,455		7,455
0603804A	70	LOGISTICS AND ENGINEER EQUIPMENT - ADV DEV	44,141		44,141
0603805A	71	COMBAT SERVICE SUPPORT CONTROL SYSTEM EVALUATION AND ANALYSIS	17,788		17,788
0603807A	72	MEDICAL SYSTEMS - ADV DEV	26,308		26,308
0603827A	73	SOLDIER SYSTEMS - ADVANCED DEVELOPMENT	36,558		36,558
0603850A	74	INTEGRATED BROADCAST SERVICE	11,238		11,238
		SUBTOTAL, ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES, ARMY	951,822	30,000	981,822
0603808A	75	SYSTEM DEVELOPMENT & DEMONSTRATION CLASSIFIED PROGRAM			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604201A	76	AIRCRAFT AVIONICS Vibration management enhancement research	71,562	3,000 [3,000]	74,562
0604220A	77	ARMED RECONNAISSANCE HELICOPTER (ARH)	135,652		135,652
0604270A	78	ELECTRONIC WARFARE DEVELOPMENT (MIP)	32,325		32,325
0604321A	79	ALL SOURCE ANALYSIS SYSTEM	16,465		16,465
0604328A	80	TRACTOR CAGE	16,807		16,807
0604329A	81	COMMON MISSILE			
0604601A	82	INFANTRY SUPPORT WEAPONS Next generation helmet	42,414	3,000 [3,000]	45,414
0604604A	83	MEDIUM TACTICAL VEHICLES	1,949		1,949
0604609A	84	SMOKE, OBSCURANT AND TARGET DEFEATING SYS	5,603		5,603
0604622A	85	FAMILY OF HEAVY TACTICAL VEHICLES	2,901		2,901
0604633A	86	AIR TRAFFIC CONTROL	14,214		14,214
0604642A	87	LIGHT TACTICAL WHEELED VEHICLES HMMWV modernization research		5,000 [5,000]	5,000
0604645A	88	ARMORED SYSTEMS MODERNIZATION (ASM)-SDD			
0604646A	89	NON-LINE OF SIGHT LAUNCH SYSTEM NLOS-LS anti-tamper research	200,099	2,000 [2,000]	202,099
0604647A	90	NON-LINE OF SIGHT CANNON	89,841		89,841
0604660A	91	FCS MANNED GRD VEHICLES & COMMON GRD VEHICLE	774,257		774,257
0604661A	92	FCS SYSTEMS OF SYSTEMS ENGR & PROGRAM MGMT	1,413,945		1,413,945
0604662A	93	FCS RECONNAISSANCE (UAV) PLATFORMS	34,379		34,379
0604663A	94	FCS UNMANNED GROUND VEHICLES	96,918		96,918
0604664A	95	FCS UNATTENDED GROUND SENSORS	12,967		12,967

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604665A	96	FCS SUSTAINMENT & TRAINING R&D	539,145		539,145
0604666A	97	MODULAR BRIGADE ENHANCEMENT	64,900		64,900
0604710A	98	NIGHT VISION SYSTEMS	44,508		44,508
0604713A	99	COMBAT FEEDING, CLOTHING, AND EQUIPMENT	2,499		2,499
0604715A	100	NON-SYSTEM TRAINING DEVICES - SDD Urban training development	35,424	6,000 [6,000]	41,424
0604741A	101	AIR DEFENSE CZ AND INTELLIGENCE - (C-RAM)	22,415		22,415
0604742A	102	CONSTRUCTIVE SIMULATION SYSTEMS DEVELOPMENT	26,244		26,244
0604746A	103	AUTOMATIC TEST EQUIPMENT DEVELOPMENT	23,582		23,582
0604760A	104	DISTRIBUTIVE INTERACTIVE SIMULATIONS (DIS)	16,095		16,095
0604780A	105	COMBINED ARMS TACTICAL TRAINER (CATT) CORE	29,468		29,468
0604783A	106	JOINT NETWORK MANAGEMENT SYSTEM	676		676
0604802A	107	WEAPONS AND MUNITIONS - SDD Extended range sniper rifle research	52,140	3,000 [3,000]	55,140
0604804A	108	LOGISTICS AND ENGINEER EQUIPMENT	37,718		37,718
0604805A	109	COMMAND, CONTROL, COMMUNICATIONS SYSTEMS	9,795		9,795
0604807A	110	MEDICAL MATERIEL/MEDICAL BIOLOGICAL DEFENSE EQUIPMENT - SDD	34,971		34,971
0604808A	111	LANDMINE WARFARE/BARRIER (FCS)	126,475		126,475
0604812A	112	CLASSIFIED PROGRAM	[]		[]
0604814A	113	ARTILLERY MUNITIONS / XM 982	78,197		78,197
0604817A	114	COMBAT IDENTIFICATION	10,909		10,909
0604818A	115	ARMY TACTICAL COMMAND & CONTROL HARDWARE & SOFTWARE	67,535		67,535
0604820A	116	RADAR DEVELOPMENT			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604822A	117	GENERAL FUND ENTERPRISE BUSINESS SYSTEM (GFEBBS)	60,308		60,308
0604823A	118	FIREFINDER	47,845		47,845
0604827A	119	SOLDIER SYSTEMS - WARRIOR	15,790		15,790
0604854A	120	ARTILLERY SYSTEMS	42,300		42,300
0604869A	121	PATRIOT/MEADS COMBINED AGGREGATE PROGRAM (CAP)	431,270		431,270
0604870A	122	NUCLEAR ARMS CONTROL MONITORING SENSOR NETWORK	6,260		6,260
0605013A	123	INFORMATION TECHNOLOGY DEVELOPMENT	73,740		73,740
0605450A	124	JOINT AIR-TO-GROUND MISSILE (JAGM)	118,517		118,517
		SUBTOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, ARMY	4,981,024	22,000	5,003,024
RDT&E MANAGEMENT SUPPORT					
0603808A	125	CLASSIFIED PROGRAM	[]		[]
0604256A	126	THREAT SIMULATOR DEVELOPMENT	21,416		21,416
0604258A	127	TARGET SYSTEMS DEVELOPMENT	13,498	3,000	16,498
		Fixed-wing aerial target development		[3,000]	
0604759A	128	MAJOR T&E INVESTMENT	64,618		64,618
0604812A	129	CLASSIFIED PROGRAM			
0605103A	130	RAND ARROYO CENTER	16,339		16,339
0605301A	131	ARMY KWAJALEIN ATOLL	174,601		174,601
0605326A	132	CONCEPTS EXPERIMENTATION PROGRAM	28,271		28,271
0605502A	133	SMALL BUSINESS INNOVATIVE RESEARCH			
0605601A	134	ARMY TEST RANGES AND FACILITIES	342,079		342,079

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0605602A	135	ARMY TECHNICAL TEST INSTRUMENTATION AND TARGETS	74,624	3,000	77,624
		LIDAR and modeling improvements		[3,000]	
0605604A	136	SURVIVABILITY/LETHALITY ANALYSIS	41,066		41,066
0605605A	137	DOD HIGH ENERGY LASER TEST FACILITY HELSTF	2,835	15,000	17,835
				[15,000]	
0605606A	138	AIRCRAFT CERTIFICATION	5,054		5,054
0605702A	139	METEOROLOGICAL SUPPORT TO RDT&E ACTIVITIES	8,289		8,289
0605706A	140	MATERIEL SYSTEMS ANALYSIS	17,028		17,028
0605709A	141	EXPLOITATION OF FOREIGN ITEMS	3,530		3,530
0605712A	142	SUPPORT OF OPERATIONAL TESTING	72,942		72,942
0605716A	143	ARMY EVALUATION CENTER	63,382		63,382
0605718A	144	SIMULATION & MODELING FOR ACQ, RQTS, & TNG (SMART)	5,325		5,325
0605801A	145	PROGRAMWIDE ACTIVITIES	73,748		73,748
0605803A	146	TECHNICAL INFORMATION ACTIVITIES	42,905		42,905
0605805A	147	MUNITIONS STANDARDIZATION, EFFECTIVENESS AND SAFETY	20,857		20,857
0605857A	148	ENVIRONMENTAL QUALITY TECHNOLOGY MGMT SUPPORT	5,125		5,125
0605898A	149	MANAGEMENT HQ - R&D	15,665		15,665
0909999A	150	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS			
		SUBTOTAL, RDT&E MANAGEMENT SUPPORT, ARMY	1,113,197	21,000	1,134,197
0603778A	151	OPERATIONAL SYSTEMS DEVELOPMENT			
0603820A	152	MLRS PRODUCT IMPROVEMENT PROGRAM WEAPONS CAPABILITY MODIFICATIONS UAV	59,749		59,749

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0102419A	153	AEROSTAT JOINT PROJECT OFFICE	356,434		356,434
0203726A	154	ADV FIELD ARTILLERY TACTICAL DATA SYSTEM	15,860		15,860
0203735A	155	COMBAT VEHICLE IMPROVEMENT PROGRAMS	141,114		141,114
0203740A	156	MANEUVER CONTROL SYSTEM	37,151		37,151
0203744A	157	AIRCRAFT MODIFICATIONS/PRODUCT IMPROVEMENT PROGRAMS	452,787		452,787
0203752A	158	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	332		332
0203758A	159	DIGITIZATION	9,534		9,534
0203759A	160	FORCE XXI BATTLE COMMAND, BRIGADE AND BELOW (FBCB2)	38,418		38,418
0203764A	161	TACTICAL WHEELED VEHICLE IMPROVEMENT PROGRAM			
0203801A	162	MISSILE/AIR DEFENSE PRODUCT IMPROVEMENT PROGRAM	37,871		37,871
0203802A	163	OTHER MISSILE PRODUCT IMPROVEMENT PROGRAMS	1,527	10,000	11,527
		Javelin modernization		[10,000]	
0203808A	164	TRACTOR CARD	19,601		19,601
0208010A	165	JOINT TACTICAL COMMUNICATIONS PROGRAM (TRI-TAC)	920		920
0208053A	166	JOINT TACTICAL GROUND SYSTEM	1,957		1,957
0208058A	167	JOINT HIGH SPEED VESSEL (JHSV)	2,936		2,936
0301359A	168	SPECIAL ARMY PROGRAM	[]		[]
0303028A	169	SECURITY AND INTELLIGENCE ACTIVITIES			
0303140A	170	INFORMATION SYSTEMS SECURITY PROGRAM	38,090		38,090
0303141A	171	GLOBAL COMBAT SUPPORT SYSTEM	104,934	-40,000	64,934
		GCSS		[-30,000]	
		PLM+		[-10,000]	
0303142A	172	SATCOM GROUND ENVIRONMENT (SPACE)	106,327		106,327
0303150A	173	WWMCCS/GLOBAL COMMAND AND CONTROL SYSTEM	12,922		12,922

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0303158A	174	JOINT COMMAND AND CONTROL PROGRAM (JC2)	15,203		15,203
0305204A	175	TACTICAL UNMANNED AERIAL VEHICLES	50,976		50,976
0305206A	176	AIRBORNE RECONNAISSANCE SYSTEMS	[]		[]
0305208A	177	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	57,704		57,704
0702239A	178	AVIONICS COMPONENT IMPROVEMENT PROGRAM	1,023		1,023
0708045A	179	END ITEM INDUSTRIAL PREPAREDNESS ACTIVITIES	69,084	11,000	80,084
		Castings research for weapons systems		[3,500]	
		Manufacturing metrology research		[3,000]	
		Nanotechnology manufacturing research		[2,500]	
		Near-net shaped body armor plate development		[2,000]	
1001018A	180	NATO JOINT STARS			
		SUBTOTAL, OPERATIONAL SYSTEMS DEVELOPMENT, ARMY	1,632,454	-19,000	1,613,454
	999	CLASSIFIED PROGRAMS	3,835		3,835
		Total, RDT&E Army	10,524,085	331,125	10,855,210

Army basic research programs

The budget request included \$177.0 million in PE 61102A for Army defense research sciences. The committee commends the Army for increasing investments in basic research by over \$75.0 million relative to the fiscal year 2008 budget request. The committee notes that the previous Director of Defense Research and Engineering has called for increases in fundamental research of \$300.0 to \$500.0 million per year to support focused efforts in discovery and innovation on crucial problems for national security. Consistent with that effort, the committee recommends a series of increases to support mission-informed basic research.

The committee recommends an increase in PE 61102A of: \$3.0 million for research on advanced energy storage technologies; \$1.5 million for research on drug resistant bacterial infections; \$1.5 million for research on understanding and forecasting natural environments to support global military operations; and \$1.5 million for modeling and simulation studies of organic semiconductor materials and devices.

The budget request also included \$77.0 million in PE 61103A for university research initiatives. The committee recommends a number of increases in PE 61103A to support Army mission areas, including: \$2.0 million for research on the low temperature performance of military vehicles; \$2.0 million for research on nanomaterials for lightweight composite systems; \$1.2 million for research on training and simulation to support urban terrain operating capabilities; \$2.5 million for nanoscale biosensor research; and \$1.5 million for development of nanocomposite technologies for wireless energy applications.

Network science and technology research center

The budget request included \$10.0 million in PE 61104A for the establishment of a network science and technology research center. The committee commends the Army for its continued commitment to investments in basic research, especially in the face of severe budget constraints due to the current operations and reset of the force. The committee also commends the Army for its new investments in network science and believes that these investments can lead to significant enhancements in operational capabilities.

The committee notes with concern that the current Army plan calls for the majority of funding for this effort to go to the establishment of a single research center. The committee believes that this approach ironically fails to take advantage of many of the benefits of networked, distributed research efforts. The committee believes that these include the ability to have a multitude of geographically diverse, interdisciplinary researchers working collaboratively on military network research issues, using shared or existing resources to reduce overall cost, and exploiting advances in computing, collaboration, and other information technologies to make research and technology development efficient and seamless.

The committee is also concerned that the Army's pre-selection of a site for the center has created a situation in which very few worthy academic institutions can legitimately compete to manage the center, thereby severely limiting the Army's ability to access the highest quality network science research across the nation. The

committee also notes that the Army's management strategy for current university affiliated research centers faces some major problems. These include the fact that the centers and their relatively large basic research funding levels limit the Army's ability to reach out to a broad spectrum of universities to fund innovative research that would supplement investments in the focused centers, as well as a lack of planning for the process of terminating the centers, so that the Army's research programs can remain responsive to military needs and scientific opportunity.

Finally, the committee notes that the National Research Council's 2007 report entitled "Strategy for an Army Center for Network Science, Technology, and Experimentation" concluded that, "based on Army needs, the NSTEC [Network Science, Technology, and Experimentation Center] should be a hybrid operation consisting of two or three centralized facilities having interconnectivity to a variety of distributed supporting elements." The current Army proposed plan and budget is not consistent with this recommended hybrid approach.

Therefore, the committee directs that the network science and technology research center be established as a virtual center, with the majority of funding going to a networked group of investigators selected on the basis of technical merit of proposed research. The committee directs that only up to \$2.0 million of the \$10.0 million authorized in PE 61104A for the establishment of a network science and technology research center shall be available for the purpose of infrastructure and facilities development at the proposed U.S. Army Aberdeen Proving Ground, Maryland location. The remaining funds are to be used for other program purposes, primarily the funding of competitive projects to a diverse group of single investigators and research teams who will participate in the virtual network science center. The committee directs the Secretary of the Army to report to the congressional defense committees on the status of the virtual center, the use of authorized funding, and the methods of selection of industry and academic participants in the virtual center, no later than December 31, 2008.

Army materials research

The budget request included \$27.0 million in PE 62105A for applied research on materials technology. The committee notes that the Army's Vehicle Armor Technology Objective seeks to provide comprehensive solutions to threats that will be faced by the Future Combat Systems ground vehicles. In support of that objective, the committee recommends increases of: \$2.0 million for research on lightweight composites for combat and tactical vehicle applications and \$1.7 million for development of materials processing technologies to support production of lightweight armor systems.

To help reduce life cycle costs of Army ground and aviation assets, the committee recommends an increase of \$2.0 million in PE 62105A for development of cold spray coating technologies for repair applications.

The committee notes that one of the major threats currently facing deployed forces is improvised explosive devices (IED). To support efforts to better technically characterize these threats, the

committee recommends an additional \$475,000 in PE 62105A for development of simulations of IED blast effects.

Finally, in the May 2007 report to Congress on the Defense Nanotechnology Research and Development program, the Director of Defense Research and Engineering indicated that sustained support was necessary to continue development of novel nanotechnology-based systems and devices, and that increased support was needed to further nanomanufacturing efforts. Consistent with that report, the committee recommends an additional \$2.0 million for the development of advanced magnetic nanosensor technologies, and an additional \$1.5 million for the development of advanced nanomanufacturing capabilities for multifunctional sensors.

Advanced Army energy and power technologies

The Defense Science Board (DSB) Task Force on Energy Security highlighted the critical security, cost, and performance issues that currently face and will increasingly handicap the Department of Defense (DOD) due to its overreliance on costly, sometimes unreliable sources of energy. The DSB study noted that increased investments in research on energy and power technologies were warranted in order to address this issue, stating, “. . . technologies with the potential to make incremental improvements often are not significant enough to attract much funding and are disadvantaged in their competition for deployment into programs.” To support Army efforts to address emerging energy and power requirements and enable new operational capabilities, the committee makes a series of increases for energy and power research activities.

The National Research Council’s 2004 report entitled “Meeting the Energy Needs of Future Warriors” noted a number of technical challenges for battery and fuel cell development and commented that “the challenge is to make them smaller, lighter, cheaper, more reliable, and more energy-dense without sacrificing safety.” To support the achievement of this technological goal, the committee recommends increases of: \$2.0 million in PE 62120A for development of hydrogen battery technologies; \$2.0 million in PE 62705A for soldier portable fuel cell technologies; and \$2.0 million in PE 63734A for direct methanol fuel cell development.

The DSB noted that there are a number of executive order and statutory mandates that are driving the Department to improve the energy efficiency of its facilities and to utilize alternative fuels in its non-tactical alternative fueled vehicles. In order to support the development of technologies that could help DOD meet those goals, the committee recommends a number of funding increases for investments in advanced energy power and technologies for vehicle applications. The committee recommends increases for advanced technology development on combat vehicles of: \$6.0 million in PE 63005A for the development of military hybrid engines; \$3.0 million for advanced lithium battery technologies; \$5.0 million to support development of next-generation non-tactical fuel cell vehicle technologies; \$2.0 million for the development of nickel metal hydride batteries for military vehicles; \$10.0 million for an advanced military vehicle battery development and testing initiative; \$3.0 million for the development of hydraulic hybrid vehicle systems; \$4.0 million for development of hybrid blast resistant vehi-

cles; \$3.5 million for the demonstration of hydraulic hybrid retrofit technologies for legacy Army vehicles; \$1.0 million for the development of solid hydrogen storage technologies; \$2.0 million for development of integrated power management and control technologies; \$3.5 million for the development of logistics fuel processors; \$5.0 million for development of electric drive technologies for tactical wheeled vehicles; and \$12.0 million for Army power and energy research infrastructure and equipment.

The DSB task force also called for DOD to address critical infrastructure security issues that result from energy use. To help address these infrastructure issues, the committee recommends an additional \$1.0 million in PE 63734A for the development of fuel cell systems to provide power for continuity of operations missions.

The Future Combat Systems (FCS) program has identified power and energy technologies, especially batteries, and continuing work to leverage commercial technology development, as a top science and technology priority. The committee also recognizes the value of dual-use research and technology research and development in the area of energy and power systems for vehicles. To support these efforts the committee is recommending a series of increases in applied research on dual-use energy and power vehicle systems. The committee recommends increases of: \$1.5 million in PE 62601A for research on next-generation vehicle design and biofuel technologies; \$2.0 million for the development of hybrid electric vehicle battery technologies for FCS; \$4.0 million for development and testing of fuel cells for medium and heavy duty vehicles; and \$2.0 million for advanced lightweight electric drive technologies. Additionally, the committee recommends an increase of \$2.0 million in PE 62601A for research on novel military fuels.

Army aviation technologies

The budget request included \$17.0 million in PE 62211A for applied research for aviation technology. The committee notes that the United States Central Command has identified the development of standoff and persistent observation of the improvised explosive device “kill chain” by advanced sensors using unmanned air systems as a high science and technology priority. To support the development and maturation of that capability the committee recommends an increase in PE 62211A of \$2.5 million for research on slowed rotor technologies for unmanned air systems.

Sniper detection systems

The budget request included \$17.0 million in PE 62308A for advanced concepts and simulation. The committee notes the continued threats that snipers and mortars pose to deployed forces, especially in urban settings. Therefore, the committee recommends an increase of \$3.0 million for the development of wearable sniper detection systems to aid in localizing sniper fire and mortar launches.

Army vehicle reliability technologies

The budget request included \$55.2 million in PE 62601A for applied research for combat vehicle and automotive technologies. The committee notes that reducing the life cycle costs of weapon systems is an important thrust area for the Department of Defense,

especially through enhancements in system reliability in harsh operating environments and at high operating tempos. To support the development of highly reliable systems, the committee recommends increases in PE 62601A of \$4.5 million for the development of computer simulation tools for vehicle design and optimization, and \$2.0 million for modeling of ground vehicle reliability and condition-based maintenance.

Unmanned ground vehicle weaponization

The budget request included \$30.6 million in PE 62624A for weapons and munitions technology. The committee has been supportive of the development of unmanned ground systems to reduce casualties and to enable new operational concepts and capabilities. The committee notes that the Near Autonomous Unmanned Systems Army Technology Objective is developing robotic technologies for future unmanned systems, and working to transition technologies to programs such as Future Combat Systems. To support these efforts, the committee recommends an increase of \$3.5 million to develop remotely controlled unmanned systems with lethal and non-lethal capabilities.

Standoff explosives detection technologies

The budget request included \$21.8 million in PE 62712A for applied research on countermine systems. The committee notes that the standoff detection of explosives is a capability that is of critical concern to the Department of Defense as it seeks to combat the use of improvised explosive devices in Iraq and Afghanistan. Therefore, the committee recommends an additional \$3.0 million in PE 62712A for the development of standoff explosives detection technologies.

Soldier positioning technologies

The budget request included \$24.0 million in PE 62782A for command, control, and communications technologies. The committee notes that the 2003 National Research Council study entitled “Science and Technology for Army Homeland Security” found that “the current system for gaining situational awareness in an urban environment is inadequate,” and recommended the development of robust technologies to address this capability gap. To support this recommendation, the committee recommends an increase of \$2.0 million in PE 62782A for research on portable positioning and timing devices for use in urban terrains.

Military engineering technologies

The budget request included \$52.1 million in PE 62784A for military engineering technologies. The committee notes that the Battle Space Terrain Reasoning and Awareness—Battle Command Army Technology Objective seeks to provide actionable information relating to terrain, atmospheric, and weather impacts on deployed assets. To support this objective, the committee recommends an increase of \$2.5 million for geosciences and atmospheric research.

The committee notes that the Modular Protective Systems for Future Force Assets Army Technology Objective seeks to develop systems that enhance the protection and survivability of personnel

and systems from conventional and asymmetric threats. To support these efforts, the committee recommends an increase of \$1.5 million in PE 62784A for research on low-cost, high-performance nanocomposite panels for enhanced blast and ballistic protection, and an increase of \$1.5 million in PE 62786A for development of ballistic materials for force protection applications.

The committee notes that deployments in Iraq, Afghanistan, and other regions of the world are putting on forward operating bases infrastructure at unprecedented risk. Strategic, tactical, and resource constraints sometimes restrict the nature and scope of construction for these bases, yet the bases must be hardened for long-term use and asymmetric terrorist and insurgent attack.

The committee is aware of a number of efforts at service laboratories, small businesses, and universities developing new force protection technologies that can counter current and emerging threats to bases. Given the long-term need for enhanced and rapidly deployable force protection at bases in volatile operating zones, the committee directs the Secretary of Defense to develop a report outlining a plan for addressing deployable force protection infrastructure technology. The report should address current and emerging capability gaps, specific research and development goals to be accomplished to address those gaps, funding needs to address the gaps and accelerate infrastructure force protection technology deployment, and the value of creating research centers to partner with service laboratories on promising research and technology areas. The report should be delivered to the committee not later than 6 months after the date of enactment of this bill.

Combat feeding technologies

The budget request included \$21.9 million in PE 62786A for applied research for warfighter technologies. The committee notes that reduction in logistics costs is a goal of the Department of Defense and is being pursued through a number of efforts, including the use of alternative energy technologies. To support these efforts, the committee recommends an additional \$1.5 million for the development of energy efficient, high performance mobile kitchen units.

Army medical research

The budget request included \$75.4 million in PE 62787A for applied research on medical technologies. The committee notes that Army medical research and technology protects and treats personnel to sustain combat strength, reduce casualties, and save lives. The committee recommends a number of funding increases in PE 62787A to support these efforts and to help respond to a variety of medical care issues resulting from current operations or to leverage emerging research and technology.

The Army has a stated technology objective to develop fluid resuscitation to reduce injury and loss of life on the battlefield. In support of this, the committee recommends an increase of \$2.0 million to support clinical research on dried blood technologies.

To help military surgeons find new limb-sparing techniques to save injured extremities, avoid amputations, and preserve and restore the function of injured extremities, the committee recommends an increase of \$5.0 million to continue peer-reviewed re-

search efforts on extremity war injuries. To support the treatment of blast injuries, the committee recommends increases of: \$3.5 million for traumatic brain injury research; \$2.5 million for bio-engineering research to enhance soldier survivability; \$2.5 million for post traumatic stress disorder research; \$5.0 million for modeling of blast wave effects; and \$1.0 million for research on injury biomechanics.

The committee notes that Army infectious disease efforts focus on medical countermeasures against naturally occurring diseases of military importance. To support those research efforts the committee recommends an increase of \$2.0 million for research on treatments for dengue fever.

Finally, the committee notes that next-generation technologies will develop medical technologies and enable human performance improvements that could radically transform military operations. To support next-generation research efforts in military medical technologies the committee recommends increases of: \$2.0 million for genetics research to enhance soldier survival in extreme environments; \$2.0 million for research on nanomaterials to improve biological processes such as targeted drug delivery; and \$8.0 million to initiate a military photomedicine program that would fund single investigators and research centers to develop optics and photonics based technologies to perform combat casualty care missions.

Biosensor controller systems

The budget request included \$46.8 million in PE 63001A for development of advanced technologies for warfighters. The January 2008 report to Congress entitled “Efforts and Programs of the Department of Defense Relating to the Prevention, Mitigation, and Treatment of Blast Injuries” identified the development of diagnostics for traumatic brain injury as a blast injury research knowledge gap. To support addressing that gap, the committee recommends an increase of \$3.5 million in PE 63001A for the development of biosensor systems to evaluate treatment response in this and other disorders, as well as to potentially serve to enhance operator-machine interface technologies.

Army medical advanced technology development

The budget request included \$59.0 million in PE 63002A for medical advanced technology development. The committee continues to recognize the critical need to advance military medical technologies to address battlefield injuries. The committee has taken a number of steps to advance these efforts, including the establishment of a Department of Defense (DOD) initiative to prevent, mitigate, and treat blast injuries in section 256 of the National Defense Authorization Act for Fiscal Year 2006 (Public Law 109–163). To support these and similar efforts, as well as to support a number of Army technology objectives in medical technologies, the committee recommends a number of increases in medical research investments.

The committee notes that improvised explosive devices have created a new set of challenges for medical personnel in dealing with soft tissue and bone damage. The committee recommends an increase of \$5.5 million for research on the treatment of combat

wounds. To help address the treatment of blast injuries, in coordination with the Blast Mitigation Initiative, the committee recommends an increase of \$2.0 million for the development of technologies to efficiently detect and assess mild traumatic brain injuries, and an increase of \$3.0 million for remote vital signs monitoring systems.

The committee recognizes the continuing need to develop advanced lower limb prostheses for battlefield amputees. The committee recommends an additional \$2.5 million for the development of advanced lower limb prosthesis technologies.

The committee notes that the Battlefield Treatment of Fractures and Soft Tissue Trauma Care Defense Technology Objective includes a specific challenge to improve tissue viability technologies. In support of this goal, the committee recommends an increase of \$5.0 million for research on novel regenerative medical research to treat battlefield injuries. In addition, to support advances in military capabilities to treat combat injuries, the committee recommends increases of: \$2.0 million for the development of tracheal intubation technologies for use on the battlefield; \$2.0 million for research on bioelectric interactions to support wound healing capabilities; and \$5.0 million to develop advanced combat wound dressings.

The committee notes that the use of information technologies can serve to make military medical operations more successful and efficient, and can potentially lead to considerable cost savings through the use of commercial technologies. To promote the use of advanced information systems and technologies in DOD medical operations, the committee recommends an increase of \$4.0 million to support modernization of joint medical logistics efforts and an increase of \$2.0 million for the development of online medical training programs for military personnel.

Finally, the committee recommends an increase of \$13.0 million to support the continuing Gulf War Veterans' Illnesses Research Program. The committee directs the Secretary of the Army to utilize the authorized funding for this program to undertake research on Gulf War illnesses. The committee directs that activities under the program should include studies of treatments for the complex of symptoms commonly referred to as Gulf War Illness, and identification of objective markers for Gulf War Illness. The committee recommends that no studies based on psychiatric illness and psychological stress as the central cause of Gulf War Illness be funded under the program. The committee directs that the program be conducted using competitive selection and peer review for the identification of research with the highest technical merit and military value. Further, the committee directs that this program be coordinated with similar activities in the Department of Veterans Affairs and the National Institutes of Health.

Army aviation advanced technology development

The budget request included \$57.3 million in PE 63003A for advanced technology development on aviation systems. The committee continues to be supportive of efforts to use unmanned systems on the battlefield. To support the development of new capabilities for unmanned systems, the committee recommends an in-

crease of \$2.0 million for the development of unmanned systems for the precision delivery of supplies to friendly forces.

The committee notes that the Army's Network-Enabled Command and Control Technology Objective seeks to develop systems that provide network-centric capabilities to the future force. In support of the objective, the committee recommends an increase of \$3.5 million in PE 63003A for technologies to enable rapid tactical integration and fielding of interoperable aviation systems.

Finally, in support of the Army's Rotorcraft Survivability Technology Objective the committee recommends an increase of \$1.5 million in PE 63003A for the development of lightweight armor systems to reduce helicopter vulnerabilities to battlefield threats, and an increase of \$2.0 million in PE 63270A for development of laser systems for aircraft missile defense.

Army combat vehicle technologies

The budget request included \$108.0 million in PE 63005A for advanced technology development on combat vehicles. The committee notes with concern that this is nearly 20 percent lower than the fiscal year 2008 budget request for this account, despite the fact that: current Army operations are heavily dependent on tactical vehicles; the Department of Defense is seeking to make ground vehicles more survivable against a growing number of battlefield threats, including explosively formed penetrators, rocket propelled grenades (RPGs), and improvised explosive devices (IEDs); the Army's primary transformation effort is the Future Combat Systems (FCS) program involving a large number of new vehicle technologies; and the Department is also seeking to develop and field novel energy and power vehicle technologies to reduce costs and improve performance.

The Vehicle Armor Technology Army Technology Objective seeks to provide comprehensive solutions for FCS ground vehicles to address a variety of threats, including mines, RPGs, IEDs, and other threats. Consistent with that objective, the committee recommends a number of funding increases to enhance vehicle survivability. The committee recommends increases of: \$2.0 million for the development of composite armored cabs; \$2.5 million for development of hostile fire detection systems; and \$4.0 million for development of windshield armor systems.

The Prognostics and Diagnostics for Operational Readiness and Condition Based Maintenance Army Technology Objective has a goal to improve near-term and FCS commodity readiness and maintainability through improvements in the capability to detect and predict equipment health status and performance. In coordination with this objective and as part of efforts to improve the readiness of Army forces, the committee recommends increases of: \$5.0 million to support development of advanced thermal and oil management systems to reduce vehicle life cycle costs; \$4.2 million for the development of test facilities to evaluate advanced combat vehicle power train designs; \$4.0 million to enhance Army capabilities for the rapid integration of new technologies onto military vehicles; \$3.5 million for development of advanced vehicle prognostics systems; and \$2.0 million to support ground vehicle fastening and joining research.

Finally, the committee notes that the Army's future force technology thrust in unmanned systems seeks to enhance the effectiveness of unmanned systems through improved perception, cooperative behaviors, and increased autonomy. In support of those efforts, the committee recommends an increase of \$12.0 million to continue the unmanned ground vehicle initiative.

Diverse threat sensor development

The budget request included \$108.0 million in PE 63005A for combat vehicle and automotive technology programs. The committee notes that the Army has a need to develop systems that coordinate unattended, airborne, man-portable, and vehicle-mounted sensor inputs to identify and characterize threats in complex terrain, including urban environments. The committee recommends an increase of \$1.0 million in PE 63005A for development of systems that better combine sensor data to provide enhanced threat warning capabilities.

Army training technologies

The budget request included \$18.9 million in PE 63015A for next-generation training and simulation systems. The committee notes that the Army's Institute of Creative Technologies is working on the development of a variety of simulations to support the training requirements of the Army. The Army's advanced simulation technology thrust area seeks to provide increasingly realistic training and mission rehearsal environments to support military missions. In order to support development of advanced combat training simulators, the committee recommends increases in PE 63015A of \$3.5 million for the development of joint fires training systems, and \$2.0 million for modeling architectures to support battle command simulation and training.

Deactivation of military explosives

The budget request included \$10.6 million in PE 63103A for explosives demilitarization technology. To support continuing efforts to develop environmentally sound methods of disposing munitions, the committee recommends an increase of \$500,000 to support research on the safe deactivation of military explosives.

Army missile and rocket technologies

The budget request included \$64.0 million in PE 63313A for advanced missile and rocket technologies. The committee notes the continuing need for development of advanced high speed, precision strike weaponry. The committee recommends an increase of \$1.0 million to support studies of long range hypersonic interceptor technology, in coordination with the efforts of the Joint Technology Office for Hypersonics, previously established by the committee.

Situational awareness technologies

The budget request included \$39.9 million in PE 63710A for advanced night vision technologies. The Army's intelligence, surveillance, and reconnaissance future force technology thrust area seeks to develop persistent and integrated situational awareness capabilities to provide actionable intelligence to support military oper-

ations. To support these efforts, the committee recommends an increase of \$3.5 million for research on short range electro-optical sensor systems to support Future Combat Systems.

Unique item ID data management research

The budget request included \$600,000 in PE 63024A for the ongoing development of the Army's unique item identification (UID) research. The committee recommends an increase of \$2.0 million for the continued research and development of an enterprise-wide software application to support Army programs that are required to comply with unique item mandates. UID research is permitting the Army to better manage its logistic activities, including accurate, non-intrusive item identification and data collection and enhanced unit-pack level visibility.

Advanced electronics integration

The budget request included \$14.0 million in PE 63305A for Army missile defense systems integration, but no funds for advanced electronics integration. The committee recommends an increase of \$4.0 million in PE 63305A for advanced electronics integration to advance state-of-the-art weapon system electronics, with the goal of reducing the size, weight, and cost of electronic components, while reducing hazardous materials used in such advanced electronics. This effort supports Army needs for research, prototyping, testing, and production technologies that have the potential to produce more efficient, higher performance, less hazardous and lower cost electronics.

Advanced environmental controls

The budget request included \$14.0 million in PE 63305A for Army missile defense systems integration, but no funds for advanced environmental control systems. The committee recommends an increase of \$5.0 million in PE 63305A for the development of thermal management control systems that can support sensors and electronic systems which operate in the harsh environmental conditions required by missile defense systems. The committee notes that advanced environmental controls have applicability to a variety of military systems that operate in harsh environments.

Advanced fuel cell research

The budget request included \$14.0 million in PE 63305A for Army missile defense systems integration, but no funds for advanced fuel cell research. The committee recommends an increase of \$3.5 million in PE 63305A for the development of advanced fuel cell technology for applications in Army space and missile defense systems. The committee notes that lightweight, reliable, and cost-effective power sources are important components of complex weapon systems such as space and missile defense systems. Advanced fuel cells would have applicability to a wide variety of military systems.

Radiation hardening initiative

The budget request included \$14.0 million in PE 63305A for Army missile defense systems integration, but no funds for radi-

ation hardening integration. The subcommittee recommends an increase of \$3.0 million in PE 63305A for a radiation hardening initiative to improve understanding of radiation transport and effects, modeling and simulation tools, and radiation-hardened design approaches. This activity should be coordinated with the Joint Radiation Hardened Electronics Oversight Council.

High-altitude integration testbed

The budget request included \$20.0 million in PE 63308A for Army missile defense systems integration (space), but no funds for continued development of the high-altitude integration testbed. The committee recommends an increase of \$3.0 million in PE 63308A for the Army's high-altitude integration testbed to integrate and test payloads for high altitude airships and unmanned aerial vehicles for long-loiter missions. Such systems could provide enhanced information to military forces.

Air and missile defense architecture analysis

The budget request included \$116.4 million in PE 63327A for air and missile defense engineering, but included no funds for development of an integrated air and missile defense (IAMD) architecture analysis program. The committee recommends an increase of \$5.0 million in PE 63327A for continued development of an IAMD architecture analysis program to improve the integration and coordination of air and missile defense capabilities into a coherent system of systems to defend against aircraft, cruise missiles, and ballistic missiles. The Army has been selected as the lead service for joint IAMD. This effort would support the Army's lead role, and its development of an IAMD Battle Command System.

Stryker active protection system

The budget request included \$108.0 million in PE 63653A for Advanced Tank Armament System (ATAS), but provided no funds for development of a Stryker active protection system. The committee recommends an increase of \$4.5 million in PE 63653A for the Stryker active protection system.

Vibration management enhancement research

The budget request included \$71.6 million in PE 64201A to develop hardware and software improvements for the Army's aviation system. The committee recommends an increase of \$3.0 million to continue research and development of advanced diagnostic tools to measure vibration in the aircraft and develop possible mitigation measures. This research utilizes an embedded condition-based maintenance system developed to detect mechanical faults in transmissions, gearboxes, main and tail rotors, and the entire power train.

Next-generation combat helmet development

The budget request included \$42.4 million in PE 64601A for infantry support weapons, but no funds were provided for next-generation combat helmet development. Funds provided would support the development of a next-generation combat helmet that is safer

and significantly lighter. The committee recommends an increase of \$3.0 million in PE 64601A for combat helmet development.

High Mobility Multi-purpose Wheeled Vehicle modernization research

The budget request included no funding in PE 64642A for advanced technology development for the Army's legacy light tactical wheeled vehicles, including technology enhancements and modernization activities for the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) in the areas of survivability, mobility, and energy and power.

The committee recommends an increase of \$5.0 million in PE 64642A for the HMMWV program manager to continue efforts to develop, test, and integrate advanced technologies into the HMMWV. Previous technology integration activities have included improved cooling systems, seats and seat belt enhancements, gunner restraints, vehicle intercom systems, and fire suppression systems.

Non-Line of Sight-Launch System anti-tamper research

The budget request included \$200.1 million in Research and Development, Army for the Non-Line of Sight-Launch System (NLOS-LS). The committee recommends an increase of \$2.0 million in PE 64646A to continue funding anti-tamper research. Anti-tamper protection of weapon systems is a growing concern in U.S. national security planning. In September 2007, the Defense Science Board issued a report entitled "Mission Impact of Foreign Influence on Department of Defense Software" that found that given the military's increasing dependence on software-based programs, "current systems designs, assurance methodologies, acquisition procedures, and knowledge of adversarial capabilities and intentions are inadequate to the magnitude of the threat." In January 2008, the Government Accountability Office reported that military program managers lack clear guidance on what information they need to protect and are challenged in selecting anti-tamper solutions because they do not have the tools needed to determine how much protection is required. This additional funding will complete ongoing NLOS-LS anti-tamper development activities, including significant test and validation by Red Teams and government agencies.

Future Combat System

The budget request included \$3.6 billion for the Future Combat System (FCS) program, the Army's comprehensive force modernization program. The committee remains committed to the modernization of the Army and is hopeful that the FCS program will provide, as promised, an appropriate and affordable combination of advanced technologies to support operational concepts that will ensure future success across the spectrum of conflict. The ambitiousness, complexity, and risk associated with FCS have resulted in many challenges over the years that the Army must continue to overcome.

Therefore, the committee agrees that this program merits careful, even special oversight. Recognizing this, Congress directed in section 211 of the National Defense Authorization Act for Fiscal

Year 2006 (Public Law 109–163) that the Government Accountability Office (GAO) submit an annual report on the program's progress. Moreover, in section 214 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109–364), Congress directed the Secretary of Defense to conduct a milestone review following FCS's preliminary design review, now scheduled for April 2009. Consequently, fiscal year 2009, as the GAO notes in its March 2008 annual report, is a critical year for this program.

The GAO's March 2008 annual review of the FCS program noted that it will be difficult for the Army to demonstrate firm requirements and technical maturity in time for its preliminary design and Secretary of Defense reviews next year. Consistent with other GAO reports, the committee believes that instability in funding could make that challenge more difficult. The committee remains convinced that FCS merits support and stable funding, and therefore recommends full funding for FCS as requested by the Army.

Urban training development

The budget request included \$35.4 million in PE 64715A for engineering development of non-system training devices. The committee recognizes the importance of training concepts and systems for joint military operations in urban terrain and culture to increase unit effectiveness at reduced operating costs. The committee recommends an increase of \$6.0 million in PE 64715A for development of systems for joint military operations in urban terrain and cultural training.

Extended range sniper rifle research

The budget request included \$52.1 million in PE 64802A for weapons and munitions—system demonstration and development. This program element funds multiple efforts for engineering development of weapons and munitions systems. The committee recommends an increase of \$3.0 million for extended range sniper rifle research.

Army test and target development

The budget request included \$13.5 million in PE 64258A for target simulator development. The committee continues to support Department of Defense (DOD) investments in targets and test and evaluation infrastructure and capabilities, which serve to enhance force readiness, improve systems capabilities, and reduce life cycle costs. The committee recommends an increase of \$3.0 million in PE 64258A to support development of advanced fixed-wing aerial targets to support warfighters facing current and future air defense threats.

The budget request included \$74.6 million in PE 65602A for technical test instrumentation and targets. The committee recommends an increase of \$3.0 million for enhancements in laser and modeling systems to support testing of chemical and biological defense systems.

The budget request included \$2.8 million in PE 65605A for the DOD High Energy Laser Test Facility (HELSTF). The committee is concerned that this level of support will not preserve all of the critical laser test functions that DOD requires, including the Mis-

sile Defense Agency. Further, the lack of funding will force a “mothballing” of test facilities and lead to a loss of technical expertise and huge startup costs when the facility is needed for potential use by the range of advanced high power laser systems under development. The committee also notes that the required analyses and reports on high energy laser testing from the fiscal year 2008 authorization reports have yet to be delivered. Therefore, the committee recommends an additional \$15.0 million in PE 65605A to support the operations of HELSTF.

Javelin modernization

The budget request included \$1.5 million in PE 23802A for other missile product improvement programs, but provided no funds for the modernization of the Javelin anti-armor missile. Funds provided would initiate a Javelin modernization program that would increase the missile’s effective range to beyond line-of-sight. The committee recommends an increase of \$10.0 million in PE 23802A for Javelin modernization development.

Global Combat Support System, the Logistics Modernization Program and Product Lifecycle Management Plus

The budget request included \$104.9 million in PE 33141A for the Global Combat Support System (GCSS), \$82.0 million in Operation and Maintenance, Army (OMA), for the Logistics Modernization Program (LMP), and \$42.4 million in PE 33141A for Product Lifecycle Management Plus (PLM+).

In July 2007, the Government Accountability Office (GAO) reported that the Army would be investing approximately \$5.0 billion over the next several years to develop and implement their Enterprise Resource Programs (ERP). The GAO noted that this significant investment was being made without the benefit of a comprehensive business enterprise architecture, concept of operations, and effective portfolio management. For example, the three logistics systems, GCSS, LMP, and PLM+, utilize separate financial systems and different versions of SAP software, making future consolidation extremely complex. In addition, as the Army itself reports, prior to 2006 the Army’s functional approach to governance led to development of completely disparate ERPs. In a November 21, 2007 Acquisition Decision Memorandum (ADM) the Under Secretary of Defense for Acquisition, John Young, seemingly validates the GAO conclusions, stating that additional work was necessary in synchronizing the separate components of the Army’s enterprise resource planning strategy. While the committee expects the three logistics ERP efforts—GCSS, LMP, and PLM+—to continue development and fielding, synergies should be explored and realized. On March 14, 2008 Secretary Young signed ADMs for two Army ERPs, General Fund Enterprise Business System (GFEBS) and GCSS, mandating one such efficiency by directing the integration on the previously separate financial subset of GCSS with GFEBS. Further efficiencies should be explored across the Army’s logistics ERPs.

The committee recommends decreases of \$30.0 million in PE 33141A for GCSS, \$20.0 million for LMP from OMA, and \$10.0 million in PE 33141A for PLM+. While the committee has historically been supportive of the Department of Defense’s business systems

modernization efforts, it is concerned by the Army's functionally "stovepiped" approach to its ERP systems.

Army manufacturing technologies

The budget request included \$69.1 million in PE 78045A for development of manufacturing technologies. The committee continues to support increasing funding for manufacturing research and technology to support the preservation of the defense industrial base and reduce costs of weapons systems. To enhance Army manufacturing research efforts, the committee recommends increases in PE 78045A of: \$2.5 million for advanced nanotechnology manufacturing research; \$3.5 million for castings research to improve performance and lower the cost of weapons systems; \$3.0 million for research to improve machine tool accuracy and performance; and \$2.0 million for manufacturing process improvements to reduce costs of body armor plates.

Navy

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		RESEARCH, DEVELOPMENT, TEST & EVALUATION, NAVY			
		BASIC RESEARCH			
0601103N	1	UNIVERSITY RESEARCH INITIATIVES	103,707	2,500	106,207
		Automated technology for landmine detection		[1,500]	
		Radiation hardened electronic systems		[1,000]	
0601152N	2	IN-HOUSE LABORATORY INDEPENDENT RESEARCH	17,298		17,298
0601153N	3	DEFENSE RESEARCH SCIENCES	407,271	6,500	413,771
		Energetics research		[1,500]	
		Manufacturing engineering educational outreach program		[2,000]	
		Quantum studies research		[1,500]	
		S&T educational outreach programs		[1,500]	
		SUBTOTAL, BASIC RESEARCH, NAVY	528,276	9,000	537,276
		APPLIED RESEARCH			
0602114N	4	POWER PROJECTION APPLIED RESEARCH	79,913	7,500	87,413
		Free electron laser development		[3,500]	
		High brightness electron source development		[1,500]	
		UAV fuel cell technologies		[2,500]	

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0602123N	5	FORCE PROTECTION APPLIED RESEARCH Composite materials research for high speed craft Energy systems integration research Infrared materials research Novel coating technologies for military equipment Port security technologies SOF combatant signature and weight performance research Towed array systems M&S	131,310	20,500 [3,000] [3,000] [3,000] [3,500] [3,500] [2,000] [2,500] 4,500 [4,500]	151,810
0602131M	6	MARINE CORPS LANDING FORCE TECHNOLOGY Rapid awareness systems	36,480		40,980
0602234N	7	MATERIALS, ELECTRONICS AND COMPUTER TECHNOLOGY	77,054		77,054
0602235N	8	COMMON PICTURE APPLIED RESEARCH	93,862	1,500	95,362
0602236N	9	WARFIGHTER SUSTAINMENT APPLIED RESEARCH Acoustic Research Detachment test support upgrades		[1,500]	
0602271N	10	RF SYSTEMS APPLIED RESEARCH RF power technologies	54,830	1,500 [1,500]	56,330
0602435N	11	OCEAN WARFIGHTING ENVIRONMENT APPLIED RESEARCH	47,278		47,278
0602651M	12	JOINT NON-LETHAL WEAPONS APPLIED RESEARCH	6,084		6,084
0602747N	13	UNDERSEA WARFARE APPLIED RESEARCH	58,658		58,658
0602782N	14	MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	47,869		47,869
		SUBTOTAL, APPLIED RESEARCH, NAVY	633,338	35,500	668,838

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		ADVANCED TECHNOLOGY DEVELOPMENT			
0603114N	15	POWER PROJECTION ADVANCED TECHNOLOGY	60,360	6,000	66,360
		Mobile target tracking technologies		[3,500]	
		Watercraft APS		[2,500]	
0603123N	16	FORCE PROTECTION ADVANCED TECHNOLOGY	55,099	21,500	76,599
		Combined mishap reduction system		[2,000]	
		Integrated vehicle health monitoring system		[3,500]	
		Navy / USMC fuel cell non-tactical vehicle initiative		[5,000]	
		Single generator operations lithium ion battery		[9,000]	
		Wide band gap semiconductor materials		[2,000]	
0603235N	17	COMMON PICTURE ADVANCED TECHNOLOGY	104,578	-61,200	43,378
		High integrity GPS		[-61,200]	
0603236N	18	WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	112,520		112,520
0603271N	19	RF SYSTEMS ADVANCED TECHNOLOGY	37,058		37,058
0603640M	20	USMC ADVANCED TECHNOLOGY DEMONSTRATION (ATD)	100,787	2,000	102,787
		Acoustic combat sensors		[2,000]	
0603651M	21	JOINT NON-LETHAL WEAPONS TECHNOLOGY DEVELOPMENT	11,020		11,020
0603729N	22	WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	12,129		12,129
0603747N	23	UNDERSEA WARFARE ADVANCED TECHNOLOGY	81,490		81,490
0603758N	24	NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS	70,216		70,216
0603782N	25	MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY	33,426		33,426
		SUBTOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, NAVY	678,683	-31,700	646,983

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES			
0603207N	26	AIR/OCEAN TACTICAL APPLICATIONS	66,133		66,133
0603216N	27	AVIATION SURVIVABILITY	5,917		5,917
0603237N	28	DEPLOYABLE JOINT COMMAND AND CONTROL	5,905		5,905
0603254N	29	ASW SYSTEMS DEVELOPMENT	28,799		28,799
0603261N	30	TACTICAL AIRBORNE RECONNAISSANCE	4,298		4,298
0603382N	31	ADVANCED COMBAT SYSTEMS TECHNOLOGY	4,367		4,367
0603502N	32	SURFACE AND SHALLOW WATER MINE COUNTERMEASURES	119,164		119,164
0603506N	33	SURFACE SHIP TORPEDO DEFENSE	49,171		49,171
0603512N	34	CARRIER SYSTEMS DEVELOPMENT	120,511		120,511
0603513N	35	SHIPBOARD SYSTEM COMPONENT DEVELOPMENT	4,003	13,100	17,103
		DDG-51 permanent magnet hybrid electric propulsion		[7,600]	
		High temperature superconducting (HTS) propulsion motor		[5,500]	
0603525N	36	PILOT FISH	86,017		86,017
0603527N	37	RETRACT LARCH	93,078		93,078
0603536N	38	RETRACT JUNIPER	159,175		159,175
0603542N	39	RADIOLOGICAL CONTROL	1,094		1,094
0603553N	40	SURFACE ASW	29,574		29,574
0603559N	41	SSGN CONVERSION			
0603561N	42	ADVANCED SUBMARINE SYSTEM DEVELOPMENT	141,720	15,000	156,720
		Continue SSBN(X) design & study activities		[15,000]	
0603562N	43	SUBMARINE TACTICAL WARFARE SYSTEMS	10,212		10,212
0603563N	44	SHIP CONCEPT ADVANCED DESIGN	31,111		31,111
0603564N	45	SHIP PRELIMINARY DESIGN & FEASIBILITY STUDIES	14,627		14,627

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603570N	46	ADVANCED NUCLEAR POWER SYSTEMS	158,270		158,270
0603573N	47	ADVANCED SURFACE MACHINERY SYSTEMS			
0603576N	48	CHALK EAGLE	352,858		352,858
0603581N	49	LITTORAL COMBAT SHIP (LCS)	371,008		371,008
0603582N	50	COMBAT SYSTEM INTEGRATION	54,401		54,401
0603609N	51	CONVENTIONAL MUNITIONS	8,124		8,124
0603611M	52	MARINE CORPS ASSAULT VEHICLES / EFV	316,052		316,052
0603612M	53	USMC MINE COUNTERMEASURES SYSTEMS - ADV DEV	59,049		59,049
0603635M	54	USMC GROUND COMBAT/SUPPORT SYSTEM / JLTV	115,086		115,086
0603654N	55	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	38,316		38,316
0603658N	56	COOPERATIVE ENGAGEMENT	7,737		7,737
0603713N	57	OCEAN ENGINEERING TECHNOLOGY DEVELOPMENT	19,632		19,632
0603721N	58	ENVIRONMENTAL PROTECTION	5,611		5,611
0603724N	59	NAVY ENERGY PROGRAM	4,086	2,000	6,086
0603725N	60	FACILITIES IMPROVEMENT		[2,000]	
		Hydrokinetic power generator			
0603734N	61	CHALK CORAL	117,543		117,543
0603739N	62	NAVY LOGISTIC PRODUCTIVITY	2,846	4,000	6,846
		Highly integrated optical interconnect for military avionics		[4,000]	
0603746N	63	RETRACT MAPLE	138,091		138,091
0603748N	64	LINK PLUMERIA	60,444		60,444
0603751N	65	RETRACT ELM	139,139		139,139
0603755N	66	SHIP SELF DEFENSE	11,001		11,001
0603764N	67	LINK EVERGREEN	75,995		75,995

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603787N	68	SPECIAL PROCESSES	60,678		60,678
0603790N	69	NATO RESEARCH AND DEVELOPMENT	10,129		10,129
0603795N	70	LAND ATTACK TECHNOLOGY Reflect cancellation of ERGM development	40,028	-30,000 [-30,000]	10,028
0603851M	71	NONLETHAL WEAPONS	46,902		46,902
0603860N	72	JOINT PRECISION APPROACH AND LANDING SYSTEMS	99,929		99,929
0603879N	73	SINGLE INTEGRATED AIR PICTURE (SIAP) SYSTEM ENGINEER (SE)	41,807		41,807
0603889N	74	COUNTERDRUG RDT&E PROJECTS			
0603925N	75	DIRECTED ENERGY AND ELECTRIC WEAPON SYSTEMS Develop directed energy weapons for asymmetric threats			
0604272N	76	TACTICAL AIR DIRECTIONAL INFRARED COUNTERMEASURES	63,244		63,244
0604327N	77	HARD AND DEEPLY BURIED TARGET DEFEAT SYSTEM (HDBTDS) PROGRAM		10,700 [10,700]	10,700
0604450N	78	JOINT AIR-TO-GROUND MISSILE (JAGM)			
0604707N	79	SPACE AND ELECTRONIC WARFARE (SEW) ARCHITECTURE/ENGINEERING SUPPORT	47,518		47,518
		SUBTOTAL, ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES, NAVY	3,440,400	14,800	3,455,200
		SYSTEM DEVELOPMENT & DEMONSTRATION			
0604212N	80	OTHER HELO DEVELOPMENT	58,210		58,210
0604214N	81	AV-8B AIRCRAFT - ENG DEV	29,924		29,924
0604215N	82	STANDARDS DEVELOPMENT	71,920		71,920

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604216N	83	MULTI-MISSION HELICOPTER UPGRADE DEVELOPMENT	70,329		70,329
0604218N	84	AIR/OCEAN EQUIPMENT ENGINEERING	5,750		5,750
0604221N	85	P-3 MODERNIZATION PROGRAM	3,589		3,589
0604230N	86	WARFARE SUPPORT SYSTEM	8,611		8,611
0604231N	87	TACTICAL COMMAND SYSTEM	128,742		128,742
0604234N	88	ADVANCED HAWKEYE	484,159		484,159
0604245N	89	H-1 UPGRADES	3,795		3,795
0604261N	90	ACOUSTIC SEARCH SENSORS	45,790		45,790
0604262N	91	V-22A	68,763		68,763
0604264N	92	AIR CREW SYSTEMS DEVELOPMENT	16,192		16,192
0604269N	93	EA-18	128,906		128,906
0604270N	94	ELECTRONIC WARFARE DEVELOPMENT	106,932		106,932
0604273N	95	VH-71A EXECUTIVE HELO DEVELOPMENT	1,047,835		1,047,835
0604280N	96	JOINT TACTICAL RADIO SYSTEM - NAVY (JTRS-NAVY)	834,650		834,650
0604300N	97	SC-21 TOTAL SHIP SYSTEM ENGINEERING Reduce CG(X) R&D to reflect delay in program decisions	678,936	-87,200 [-87,200]	591,736
0604307N	98	SURFACE COMBATANT COMBAT SYSTEM ENGINEERING	188,500		188,500
0604311N	99	LPD-17 CLASS SYSTEMS INTEGRATION	985		985
0604329N	100	SMALL DIAMETER BOMB (SDB)	19,574		19,574
0604366N	101	STANDARD MISSILE IMPROVEMENTS	234,653		234,653
0604373N	102	AIRBORNE MCM	39,882		39,882
0604378N	103	NAVAL INTEGRATED FIRE CONTROL - COUNTER AIR SYSTEMS ENGINEERING	10,533		10,533

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604501N	104	ADVANCED ABOVE WATER SENSORS Reduce CG(X) R&D to reflect delay in program decisions	153,558	-33,600	119,958
0604503N	105	SSN-688 AND TRIDENT MODERNIZATION Improved towed array handler	143,453	[-33,600] [4,100]	147,553
0604504N	106	AIR CONTROL	8,191		8,191
0604512N	107	SHIPBOARD AVIATION SYSTEMS	42,843		42,843
0604518N	108	COMBAT INFORMATION CENTER CONVERSION	14,792		14,792
0604558N	109	NEW DESIGN SSN Submarine electronic chart updates	167,357	5,300 [5,300]	172,657
0604561N	110	SSN-21 DEVELOPMENTS			
0604562N	111	SUBMARINE TACTICAL WARFARE SYSTEM	58,592		58,592
0604567N	112	SHIP CONTRACT DESIGN/ LIVE FIRE T&E Transfer LHA (R) contract design from NDSF	72,932	5,400 [5,400]	78,332
0604601N	113	MINE DEVELOPMENT	2,008		2,008
0604603N	114	UNGUIDED CONVENTIONAL AIR-LAUNCHED WEAPONS			
0604610N	115	LIGHTWEIGHT TORPEDO DEVELOPMENT	50,732		50,732
0604654N	116	JOINT SERVICE EXPLOSIVE ORDNANCE DEVELOPMENT	10,858		10,858
0604703N	117	PERSONNEL, TRAINING, SIMULATION, AND HUMAN FACTORS	5,263		5,263
0604727N	118	JOINT STANDOFF WEAPON SYSTEMS	22,510		22,510
0604755N	119	SHIP SELF DEFENSE (DETECT & CONTROL)	35,999		35,999
0604756N	120	SHIP SELF DEFENSE (ENGAGE: HARD KILL) Next generation Phalanx	36,238	10,700 [10,700]	46,938
0604757N	121	SHIP SELF DEFENSE (ENGAGE: SOFT KILL/EW) NULKA improvements	57,574	9,000 [9,000]	66,574

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604761N	122	INTELLIGENCE ENGINEERING	13,750		13,750
0604771N	123	MEDICAL DEVELOPMENT	7,833	2,500	10,333
		Composite tissue transplantation research		[2,500]	
0604777N	124	NAVIGATION/ID SYSTEM	49,007		49,007
0604784N	125	DISTRIBUTED SURVEILLANCE SYSTEM			
0604800N	126	JOINT STRIKE FIGHTER (JSF)			
		Fund competitive propulsion system			
0605013M	127	INFORMATION TECHNOLOGY DEVELOPMENT	1,532,748	215,000	1,747,748
0605013N	128	INFORMATION TECHNOLOGY DEVELOPMENT	30,238	[215,000]	
0605172N	129	MULTINATIONAL INFORMATION SHARING (MNIS)	72,497		72,497
0605212N	130	CH-53K RDTE			
0605430N	131	C/KC-130 AVIONICS MODERNIZATION PROGRAM (AMP)	570,484		570,484
0605450N	132	JOINT AIR-TO-GROUND MISSILE (JAGM)	24,407		24,407
0605500N	133	MULTI-MISSION MARITIME AIRCRAFT (MMA)	62,324		62,324
0304785N	134	TACTICAL CRYPTOLOGIC SYSTEMS	1,132,026		1,132,026
			16,678		16,678
		SUBTOTAL SYSTEM DEVELOPMENT & DEMONSTRATION, NAVY	8,682,052	131,200	8,813,252
0604256N	135	RDT&E MANAGEMENT SUPPORT	24,959		24,959
0604258N	136	THREAT SIMULATOR DEVELOPMENT	80,337		80,337
0604759N	137	TARGET SYSTEMS DEVELOPMENT	42,391		42,391
0605152N	138	MAJOR T&E INVESTMENT	8,084		8,084
0605154N	139	STUDIES AND ANALYSIS SUPPORT - NAVY CENTER FOR NAVAL ANALYSES	49,745		49,745

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0605155N	140	FLEET TACTICAL DEVELOPMENT			
0605502N	141	SMALL BUSINESS INNOVATIVE RESEARCH			
0605804N	142	TECHNICAL INFORMATION SERVICES	713		713
0605853N	143	MANAGEMENT, TECHNICAL & INTERNATIONAL SUPPORT	51,568		51,568
0605856N	144	STRATEGIC TECHNICAL SUPPORT	3,597		3,597
0605861N	145	RDT&E SCIENCE AND TECHNOLOGY MANAGEMENT	69,913		69,913
0605862N	146	RDT&E INSTRUMENTATION MODERNIZATION			
0605863N	147	RDT&E SHIP AND AIRCRAFT SUPPORT	195,017		195,017
0605864N	148	TEST AND EVALUATION SUPPORT	356,254	-10,000	346,254
		Unjustified request		[-10,000]	
0605865N	149	OPERATIONAL TEST AND EVALUATION CAPABILITY	12,195		12,195
0605866N	150	NAVY SPACE AND ELECTRONIC WARFARE (SEW) SUPPORT	2,708		2,708
0605867N	151	LINK CRIMSON	25,358		25,358
0605873M	152	MARINE CORPS PROGRAM WIDE SUPPORT	24,687		24,687
0305885N	153	TACTICAL CRYPTOLOGIC ACTIVITIES	1,998		1,998
0804758N	154	SERVICE SUPPORT TO JFCOM, JNTC	5,148		5,148
0909999N	155	FINANCING FOR CANCELLED ACCOUNT ADJUSTMENTS			
		SUBTOTAL, RDT&E MANAGEMENT SUPPORT, NAVY	954,672	-10,000	944,672
0603660N	156	OPERATIONAL SYSTEMS DEVELOPMENT	[]		[]
0604227N	157	ADVANCED DEVELOPMENT PROJECTS	68,214		68,214
		HARPOON MODIFICATIONS			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604402N	158	UNMANNED COMBAT AIR VEHICLE (UCAV) ADVANCED COMPONENT AND PROTOTYPE DEVELOPMENT	275,823		275,823
0101221N	159	STRATEGIC SUB & WEAPONS SYSTEM SUPPORT LINAC	80,120	-19,346 [4,000]	60,774
0101224N	160	Navy RRW	34,131		34,131
0101226N	161	SSBN SECURITY TECHNOLOGY PROGRAM	7,384		7,384
0101402N	162	SUBMARINE ACOUSTIC WARFARE DEVELOPMENT	47,495		47,495
0203761N	163	NAVY STRATEGIC COMMUNICATIONS	34,469		34,469
0204136N	164	RAPID TECHNOLOGY TRANSITION (RTT)	71,232		71,232
0204152N	165	F/A-18 SQUADRONS	54,096		54,096
0204163N	166	E-2 SQUADRONS	26,696		26,696
		FLEET TELECOMMUNICATIONS (TACTICAL)		3,000	
		Warfighter enhanced decision making		[3,000]	
0204229N	167	TOMAHAWK AND TOMAHAWK MISSION PLANNING CENTER (TMPC)	14,212		14,212
0204311N	168	INTEGRATED SURVEILLANCE SYSTEM	20,565		20,565
0204413N	169	AMPHIBIOUS TACTICAL SUPPORT UNITS	2,325		2,325
0204571N	170	CONSOLIDATED TRAINING SYSTEMS DEVELOPMENT	28,017		28,017
0204574N	171	CRYPTOLOGIC DIRECT SUPPORT	1,441		1,441
0204575N	172	ELECTRONIC WARFARE (EW) READINESS SUPPORT	24,276		24,276
0205601N	173	HARM IMPROVEMENT	31,427		31,427
0205604N	174	TACTICAL DATA LINKS	4,247		4,247
0205620N	175	SURFACE ASW COMBAT SYSTEM INTEGRATION	21,720		21,720
0205632N	176	MK-48 ADCAP	15,879		15,879

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0205633N	177	AVIATION IMPROVEMENTS Radio frequency synthetic subsystems for military automated test systems	122,906	4,000	126,906
		Rapid repair structural adhesives		[3,000]	
				[1,000]	
0205658N	178	NAVY SCIENCE ASSISTANCE PROGRAM	3,625		3,625
0205675N	179	OPERATIONAL NUCLEAR POWER SYSTEMS	71,576		71,576
0206313M	180	MARINE CORPS COMMUNICATIONS SYSTEMS	273,696		273,696
0206623M	181	MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYSTEMS	136,080		136,080
0206624M	182	MARINE CORPS COMBAT SERVICES SUPPORT	9,646		9,646
0207161N	183	TACTICAL AIM MISSILES	6,679		6,679
0207163N	184	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	8,556		8,556
0208058N	185	JOINT HIGH SPEED VESSEL (JHSV)	11,960		11,960
0301303N	186	MARITIME INTELLIGENCE	[]		[]
0301323N	187	COLLECTION MANAGEMENT	[]		[]
0301327N	188	TECHNICAL RECONNAISSANCE AND SURVEILLANCE	[]		[]
0301372N	189	CYBER SECURITY INITIATIVE - GDIP	[]		[]
0303109N	190	SATELLITE COMMUNICATIONS (SPACE)	652,463		652,463
0303140N	191	INFORMATION SYSTEMS SECURITY PROGRAM	27,037		27,037
0303158M	192	JOINT COMMAND AND CONTROL PROGRAM (JC2)	2,000		2,000
0303158N	193	JOINT COMMAND AND CONTROL PROGRAM (JC2)	4,148		4,148
0305149N	194	COBRA JUDY	101,114		101,114
0305160N	195	NAVY METEOROLOGICAL AND OCEAN SENSORS-SPACE (METOC)	8,208		8,208
0305192N	196	MILITARY INTELLIGENCE PROGRAM (MIP) ACTIVITIES	4,614		4,614
0305204N	197	TACTICAL UNMANNED AERIAL VEHICLES	45,717		45,717

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0305205N	198	ENDURANCE UNMANNED AERIAL VEHICLES Reflect delay in BAMS program	480,098	-48,200	431,898
0305206N	199	AIRBORNE RECONNAISSANCE SYSTEMS	55,719		55,719
0305207N	200	MANNED RECONNAISSANCE SYSTEMS	13,982		13,982
0305208N	201	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	44,540		44,540
0307207N	202	AERIAL COMMON SENSOR (ACS)	74,604		74,604
0308601N	203	MODELING AND SIMULATION SUPPORT	8,007		8,007
0702207N	204	DEPOT MAINTENANCE (NON-IF)	21,130		21,130
0702239N	205	AVIONICS COMPONENT IMPROVEMENT PROGRAM	1,877		1,877
0708011N	206	INDUSTRIAL PREPAREDNESS Digital direct manufacturing technologies	56,681	1,700	58,381
0708730N	207	MARITIME TECHNOLOGY (MARITECH) National Shipbuilding Research Program		[1,700] 15,000	15,000
		SUBTOTAL, OPERATIONAL SYSTEMS DEVELOPMENT, RDT&E	3,110,432	-43,846	3,066,586
	999	CLASSIFIED PROGRAMS	1,309,385		1,309,385
		Total, RDT&E Navy	19,337,238	104,954	19,442,192

Navy basic research

The budget request included \$103.7 million in PE 61103N for university research initiatives. The committee notes that the 2007 Marine Corps Science and Technology (S&T) Strategic Plan lists the development of advanced robotic systems for ground combat in order to “take humans out of direct involvement in hazardous and exceptionally arduous missions” as a technology objective. In support of achieving that objective, the committee recommends an increase of \$1.5 million for research on automated robotic technologies for landmine detection.

The 2007 Naval S&T Strategic Plan identifies a specific technology objective of adapting defense systems to the environment, especially with respect to space environmental effects. To help address this concern, the committee recommends an increase of \$1.0 million in PE 61103N for research on novel radiation hardened microelectronics.

The budget request included \$407.3 million in PE 61153N for defense research sciences programs. The committee recommends an increase of \$1.5 million in PE 61153N for research on quantum computing and quantum mechanics that can support efforts to enhance Navy sensor and communications systems. The 2004 National Research Council study entitled “Advanced Energetic Materials” characterized the U.S. effort on research and development of energetic materials as “suboptimal,” but stated that the materials are “a key component of the nation’s defense strategies.” To help address this identified gap, the committee recommends an increase of \$1.5 million in PE 61153N for basic research on energetic materials.

To support efforts to enhance math and science education nationally and develop the next generation of clearable scientists and engineers to work on national security issues, the committee recommends an additional \$1.5 million in PE 61153N for science and technology educational outreach efforts.

Manufacturing engineering training

The budget request included \$407.3 million in PE 61153N for defense research sciences. The committee notes that National Science and Technology Council’s March 2008 report entitled “Manufacturing the Future: Federal Priorities for Manufacturing R&D” highlighted the role that federal investments could play in enhancing the domestic manufacturing base through improvements in workforce training and education. The report cited a 2005 National Association of Manufacturers skills gap survey of more than 800 manufacturing businesses, which found that 81 percent were experiencing “severe” (13 percent) or “moderate” (68 percent) shortages of skilled workers overall, and 90 percent reported shortages of skilled production employees. These shortages lead to deficiencies in the defense industrial base and therefore weaken the Department of Defense production and supply chain. To help address this issue, the committee recommends an increase of \$2.0 million in PE 61153N for manufacturing engineering educational outreach programs.

Navy power projection research

The budget request included \$79.9 million in PE 62114N for applied research on power projection technologies. The committee notes that the 2007 Defense Science Board Task Force on Directed Energy Weapons noted that science and technology (S&T) funding for laser weapons should be focused on concentrated development of free electron lasers for ship defense. In support of that recommendation, the committee recommends an increase of \$3.5 million for high power free electron laser development. To support the Naval S&T Strategic Plan objective of developing energy storage technologies, the committee recommends an increase of \$2.5 million in PE 62114N for the development of fuel cells for unmanned aerial vehicle applications. Finally, the committee recommends an increase of \$1.5 million for research on advanced electron sources for use in next-generation radar systems.

Navy force protection research

The budget request included \$131.3 million in PE 62123N for applied research on force protection technologies. The 2007 Naval S&T [science and technology] Strategic Plan identifies the development of advanced materials in platform construction to support the production of more survivable platforms as a key technology objective. In support of that objective, the committee recommends an increase of \$3.0 million for composite materials research for high speed craft, and an increase of \$2.0 million for research to reduce the structural weight and improve signature characteristics of special operations combatant craft through the use of lightweight composite materials.

The Naval S&T Strategic Plan also has a technology objective of enhancing homeland and port defense monitoring. In support of this effort, the committee recommends an additional \$3.5 million in PE 62123N for development of deployable, under hull inspection technologies. Consistent with the Navy's High Energy and Pulse Power Technology Objective, which seeks to develop energy storage power system architectures and pulsed power control systems, the committee recommends an additional \$3.0 million to develop energy delivery technologies for advanced naval weapons systems.

In support of Office of Naval Research efforts to improve towed sonar array reliability and enhance situational awareness, the committee recommends an additional \$2.5 million for modeling and simulation efforts on towed sonar array system reliability. In support of Navy objectives to reduce the cost of high-resolution infrared focal plane arrays for missile seekers and other applications, and in conjunction with ongoing related Army and Missile Defense Agency efforts, the committee recommends an increase of \$3.0 million for infrared materials research.

Finally, consistent with Navy efforts to identify new coating technologies for military equipment, the committee recommends an increase of \$3.5 million in PE 62123N for development of novel surface coatings to improve performance and reliability of defense systems.

Situational awareness processing technologies

The budget request included \$36.5 million in PE 62131M for applied research on Marine Corps landing force technologies. The committee notes that one of the Marine Corps' science and technology objectives is the development of "improved situational awareness for warfighters at all echelons." Consistent with that objective, the committee recommends an additional \$4.5 million for applied research on the distribution of tactical information to individual warfighters.

Acoustic research and test capabilities

The budget request included \$93.9 million in PE 62236N for applied research on warfighter sustainment technologies. The committee notes that the 2007 Strategic Plan for DOD (Department of Defense) T&E (Test and Evaluation) Resources stated that "improved acoustic and radio frequency (RF) signature measurement capability is necessary to adequately conduct T&E on new hull forms." In support of the development of that capability, the committee recommends an increase of \$1.5 million in PE 62236N for upgrades to Navy acoustic research and test equipment.

Navy electronics research

The budget request included \$54.8 million in PE 62271N for radio frequency systems applied research. The committee notes that next-generation Navy radars, communications, and electronic warfare systems will all depend on advanced high power microelectronics. The Navy's Power and Energy Science and Technology Focus Area includes the specific objective of developing new materials to increase the efficiency and power density of Navy systems. To complement these efforts, the committee recommends an increase of \$1.5 million for research on advanced semiconductor radio frequency power technologies.

Advanced technologies for power projection

The budget request included \$60.4 million in PE 63114N for advanced technologies for power projection. The committee notes that the capability to support detection, tracking, and identification of mobile targets, including to support maritime interdiction and land attack of high value targets, is a high priority based on several fleet and combatant commands assessments of current operational capability gaps. The Defense Advanced Research Projects Agency and Office of Naval Research science and technology programs are currently supporting these science and technology development efforts with planned transitions in fiscal year 2012. To accelerate the development and reduce the risk of these efforts, the committee recommends an additional \$3.5 million in PE 63114N for development of mobile target tracking and identification technologies.

The committee notes that the Naval Expeditionary Command recommendations to the Office of Naval Research for high priority capability gaps to be addressed with science and technology investments included "fires detections and engagement systems for incoming direct and indirect fires." To support efforts to address that gap, the committee recommends an increase of \$2.5 million in PE

63114N for the development of watercraft active protection systems.

Force protection advanced technology

The budget request included \$55.1 million in PE 63123N for force protection advanced technology. This program addresses applied research associated with providing force protection capability for all naval platforms.

The budget request included no funding for continuing the development of wide band gap semiconductor substrate materials. These materials offer capability for higher power and higher frequency operation in high temperature environments across a broad spectrum of applications. The committee recommends an increase of \$2.0 million for the continued development of wide band gap semiconductor substrate material.

The budget request included no funding for any initiative to leverage rapidly developing ongoing advances in hydrogen-powered fuel cell vehicle technology to enable revolutionary changes in the Department of the Navy non-tactical vehicle fleet. Fuel cells powered by hydrogen could totally change the present dependence on petroleum as the logistics fuel and could offer the ability to run systems silently and with significantly reduced thermal signatures for missions requiring low probability of detection. In previous years, the Department of the Navy conducted several short-term demonstrations of hydrogen fuel cell powered vehicles. The committee recommends an increase of \$5.0 million for an expanded demonstration of fuel cell vehicles, to include an extended vehicle range refueling capability enhancement to include testing that could establish the basis for a potential full qualification of a hydrogen-powered fuel cell vehicle for fleet operations.

The budget request 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 battery would also eliminate the possibility of a ship experiencing a catastrophic loss of power ("going dark") due to a cascading failure of generators and an inability to restart the main engines following a loss of main power. The committee recommends an increase of \$9.0 million to enable the development of such lithium battery technology.

The budget request included no funding for development of a combined mishap reduction system. The committee is aware that the private sector has developed web-based information management systems that enable managers at all levels in an organization to prevent avoidable accidents among their personnel. These systems identify high-risk practices, procedures, conditions, and attitudes before accidents occur and provide paths to mitigate them. The Department of Defense has long collected data about the causes of accidents after they occur. Using this information alone,

however, has proven insufficient for reducing accident rates below recent historical levels. The committee recommends an increase of \$2.0 million to enable the development of a combined mishap reduction system.

The budget request included no funding for an integrated vehicle health monitoring program. Such a program could determine the value of adopting commercial automotive standards as a baseline for a set of open standards as part of an open system vehicle electronics architecture. This program could also achieve reductions in the demand for space, weight, power, and cooling, as well as reduce the time and cost needed to develop new vehicle applications. The committee recommends an increase of \$3.5 million to enable the development of a prototype of an integrated health monitoring system for proof-of-concept evaluation and demonstration.

The committee recommends a total authorization of \$76.6 million in PE 63123N for force protection advanced technology.

High-integrity Global Positioning System

The budget request included \$104.6 million for common picture advanced technology in PE 63235N, Research, Development, Test, and Evaluation, Navy, including \$61.2 million for high-integrity Global Positioning System (GPS). The committee recommends no funds for high-integrity GPS.

Ground sensor networks

The budget request included \$100.8 million in PE 63640M for Marine Corps advanced technology demonstrations. The committee notes that small arms fire accounts for a large number of coalition casualties in Iraq and Afghanistan, and that a number of services and defense agencies are pursuing technological solutions to meet urgent needs of deployed forces. To support these efforts, the committee recommends an increase of \$2.0 million for the development of ground sensor networks that can detect and locate hostile fire.

Shipboard system component development

The budget request included \$4.0 million in PE 63513N for shipboard system component development, but included no funding for high temperature superconductor alternating current (HTS-AC) synchronous marine propulsion motor development or for developing a permanent magnet hybrid propulsion system for the DDG-51 Aegis destroyer.

The Navy has been developing and testing a 36.5 megawatt prototype HTS-AC synchronous propulsion motor. Funds are required to complete preliminary design and risk reduction of the tactical motor in order to initiate detailed design and fabrication of the motor in 2010. HTS propulsion motors could support current and future Navy needs, either as an upgrade to the DDG-1000, or for the CG(X) next-generation cruiser. Successful development of the HTS motor will allow much greater flexibility in regards to space and weight considerations on Navy warships. The committee recommends an increase of \$5.5 million to continue development and testing of the HTS-AC synchronous marine propulsion motor.

The budget request included no funding for continued development and testing of the permanent magnet motor (PMM). Congress

has provided funding for several fiscal years to mature the PMM technology for main propulsion motor applications. The team developing this system has developed a plan to design and build a smaller PMM that would support a hybrid electric drive system for DDG-51 Aegis destroyers. The contractor claims that such a system installed on a DDG-51 would pay back the investment in approximately 3 years, based only on fuel savings of approximately 13,000 barrels of fuel per ship per year. The committee recommends an increase of \$7.6 million to design and build a hybrid electric drive system based on PMM technology.

The committee recommends a total authorization of \$17.1 million in PE 63513N for shipboard system component development.

Advanced submarine system development

The budget request included \$141.7 million in PE 63561N for advanced submarine systems development. The design and development efforts in these programs are to evaluate a broad range of system and technology alternatives to directly support and enhance the mission capability of current submarines and future submarine concepts.

The budget request included no funding to begin studies that would lead to developing a replacement for the *Ohio* class strategic missile submarine program which was designed in the 1970s. The Navy has begun studies under a program called the Undersea Launch Missile Study (ULMS). The efforts within ULMS will involve exploring new technologies, conceptual design of ship configurations, supporting ship systems, consideration of strategic payloads, and development of other payloads.

However, there appears to be insufficient work to maintain the skill set among submarine designers until the Navy would otherwise start designing a replacement for the *Ohio* class. A previous report by the RAND Corporation evaluating the submarine design industrial base concluded that it would be less expensive to sustain some number of workers in excess of those needed to meet the residual design demands during such a gap. One means of achieving this goal would be to begin the more extensive design activities earlier than the Navy would otherwise start them to support a specific date to start building the next class. The committee believes that the Navy should continue that effort in fiscal year 2009 and recommends an increase of \$15.0 million for that purpose.

Facilities improvements

The budget request included \$4.1 million in PE 63725N, but included no funding for a program to develop a hydrokinetic power generator. This technology uses the phenomenon of vortex-induced vibrations to extract useful kinetic energy from ocean and other water currents. Researchers claim that it is highly scalable and could produce energy over a wide range of current speeds, starting as low as 1 knot. This energy extraction technology is non-obtrusive, environmentally compatible, and modular. Such generating systems could be very useful for supporting various Navy power needs, including coastal naval bases, instrumentation stations, battery recharging, off-shore stations, and ships not under way.

The committee recommends an increase of \$2.0 million to support development and testing of this power generation approach.

Optical interconnect

The budget request included \$2.8 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 \$4.0 million to develop this important technology.

Land attack technology

The budget request included \$40.0 million in PE 63795N for land attack technology, including \$38.8 million for the naval surface fire support development activity. Most of the funding within this activity would have been applied to development of the extended range guided munition (ERGM).

Based on continuing development problems, and capped by recent test failures, the Navy decided to terminate the ERGM program after submitting the fiscal year 2009 budget request.

The committee strongly supports making improvements in naval surface fire support capability. However, the Navy cannot usefully spend all of the funds requested in this program until it decides on a path forward.

Therefore, the committee recommends a decrease of \$30.0 million in land attack technology. The remaining funds should be sufficient to support Navy efforts to mature other technologies and develop a new plan for meeting surface fire support requirements.

Directed energy

The budget request included \$108.6 million PE 62114N and PE 63114N for directed energy and continued development of an electromagnetic rail gun. No funding was requested in PE 63925N, directed energy and electric weapons systems. Neither was there any funding included for a laser weapons system (LAWS), which is a top research and development priority on the Chief of Naval Operations' unfunded priorities list, or for the Guillotine program. LAWS is under development as a rapid prototype to serve as an adjunct laser weapon for the Navy's Close-In Weapon System (CIWS) to counter rockets, artillery, mortar, and unmanned aerial vehicles for ship and expeditionary base defense. Additional funding would accelerate development by 2 years. Guillotine would provide commanders with a non-lethal capability to disrupt threats and terrorist operations.

The committee agrees with the Navy's objectives, outlined in Joint Vision 2020, to develop directed energy weapons that provide unique capability against emerging asymmetric threats. The committee recommends an increase of \$10.7 million in PE 63925N in support of LAWS and Guillotine development and related directed energy and laser weapon systems research and development, including high power free electron and high brightness electron laser technology.

Next-generation cruiser

The budget request included \$172.1 million in PE 64300N and \$140.4 million in PE 64501N for development efforts in support of a next-generation cruiser, CG(X). CG(X) is planned to be the replacement for the CG-47 class cruiser, with primary missions including air and missile defense. The Navy's long-range shipbuilding plan proposes to procure the first ship of the CG(X) program in 2011.

The John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364) required that the Navy include nuclear power in its Analysis of Alternatives (AoA) for the CG(X) propulsion system.

Section 1012 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110-181) further requires that CG(X) be nuclear powered, unless the Secretary of Defense submits a notification that inclusion of an integrated nuclear power system is not in the national interest. The statement of managers accompanying that act directed the Secretary of the Navy to submit a report with the budget request for fiscal year 2009 providing information regarding CG(X) design, cost, schedule, industrial base considerations, and risk assessment; that would reflect the results of the CG(X) AoA and provide evidence that the Navy is on schedule for procuring the first ship of the class in 2011.

The Secretary of the Navy has delayed submission of the CG(X) report because the CG(X) AoA, which was scheduled to be complete by third quarter fiscal year 2007, remains under review by the Navy. Fundamental considerations regarding the cruiser's requirements, characteristics, technology readiness levels, and affordability continue to be studied, making it likely that milestone A, which was targeted for September 2007, will slip into 2009. By all measures, there is no reasonable path for the next-generation cruiser to meet the current schedule for milestone B and award of a ship construction contract in 2011.

Pending completion of the AoA, determination of radar requirements, ship characteristics, propulsion system, and an executable program schedule, and in view of the delay to program major milestones, the activities planned for fiscal years 2008 and 2009 cannot be executed per the schedule reflected in the fiscal year 2009 budget request. Therefore, the committee recommends a decrease of \$87.2 million in PE 64300N and a decrease of \$33.6 million in PE 64501N. These recommended decreases would maintain the cruiser development activities at the same level as was funded in fiscal year 2008.

Improved towed array handler

The budget request included \$143.5 million in PE 64503N for SSN-688 and Trident submarine modernization, but included no funding for developing or testing improved handling gear for submarine towed arrays. One continuing problem area involves the mechanisms for deployment of the towed array from the submarine's hull. The current system attempts to "push" the flexible array out of the submarine using multiple rollers which often results in damage to array elements and deployment failure. A new system that "pulls" the array out could reduce the number of rollers which are the source of array damage and allow for other improvements and increased reliability.

The committee recommends an increase of \$4.1 million to complete further development of the new handling system and testing of a prototype to demonstrate improved thin-line towed array system reliability from better array handlers.

Submarine electronic chart updates

The budget request included \$143.5 million in PE 64558N, but included no funding for a program to update electronic charts for submarines.

Navy instructions mandate the use of electronic chart display products across the Navy. This requirement was conceived in stand-alone, display workstation applications, which no longer represent the state-of-the-practice of net-ready, web-service environments. The committee is aware that the Navy conducted a Small Business Innovative Research effort that focused on the demonstration of net-ready, web-service updates of electronic charts for submarines. Funding is needed to:

- (1) enhance the current voyage management system/enhanced control display unit capabilities on the attack submarines;
- (2) establish an interim chart update repository ashore to support the Navy until formal transition to National Geospatial-Intelligence Agency production;
- (3) develop and evaluate potential bandwidth reduction options for vector data products, and establish related certification requirements and procedures;
- (4) demonstrate navigation task reduction through automated chart updates by data consumers; and
- (5) complete operational testing of developed services and web clients for release to the fleet.

The committee recommends an increase of \$5.3 million to support these activities.

Next-generation Phalanx

The budget request included \$36.2 million in PE 64756N for ship self-defense (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 tech-

nology obsolescence require continued development effort to sustain the superior performance of this critical ship self-defense system. The committee recommends an increase of \$10.7 million in PE 64756N for the continued development of the next-generation Phalanx.

NULKA anti-ship missile decoy system

The budget request included \$57.6 million for ship self-defense soft-kill systems development in PE 64757N, including \$3.0 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) an improved payload that would provide radio frequency coverage of more than one band of the spectrum to deal with anti-ship missiles;
- (2) better countermeasures techniques for advanced anti-ship cruise missiles with advanced seekers;
- (3) an improved guidance and propulsion system to allow more precise positioning of the decoy during operations;
- (4) increased duty cycle; and
- (5) additional systems engineering and software support.

The committee recommends an increase of \$9.0 million for the NULKA development program to continue these efforts.

Combat wound tissue transplantation technologies

The budget request included \$7.8 million in PE 64771N for medical development. The committee notes the continuing and growing need for combat casualty care technologies including tissue and organ replacement and transplantation. The committee recommends an increase of \$2.5 million in PE 64771N for composite tissue transplantation research.

F-35 Joint Strike Fighter competitive propulsion system

The budget request included \$1,532.7 million in PE 64800N and \$1,524.0 million in PE 64800F for the F-35 Joint Strike Fighter (JSF) program. In section 213 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110-181), Congress explicitly directed the Department of Defense to (1) develop a competitive propulsion system for the JSF aircraft; and (2) continue competition for the propulsion system throughout the production phase of the JSF program.

The committee is disappointed that the administration chose to ignore the law by failing to fund the competitive propulsion system. Accordingly, the committee recommends an increase of \$215.0 million in PE 64800N and \$215.0 million in PE 64800F for development of the F-35 JSF competitive propulsion system.

Navy test and evaluation support

The budget request included \$356.3 million in PE 65864N for test and evaluation support. The committee commends the Navy for the growth in this line, and urges the Navy to continue to sustain and modernize test capabilities to support current and emerg-

ing service and joint requirements. However, the committee is concerned that test and evaluation accounts are often used to deposit discretionary funds that are then transferred for use for other purposes.

The committee recommends a reduction of \$10.0 million in PE 65864N for the activities described in budget presentations as “PBD P19—COTF Balancing.” The committee was later informed that the Office of the Secretary of Defense transferred the funds to the Navy without sufficient explanation, so the amount was placed into a test and evaluation account for the purposes of the budget request until clarification was received. The committee has not received any clarification for the purpose of the funds and feels that this is insufficient justification for the request.

Advanced LINAC facility

The budget request included \$80.1 million in PE 11221N, Research, Development, Test, and Evaluation, Navy (RD TEN), but included no funding for the Crane linear accelerator facility (LINAC). The committee recommends an increase of \$4.0 million for the LINAC to simulate the high radiation environment in space. The committee directs the Navy to develop and use these additional funds in conjunction with the Joint Radiation Hardened Electronics Oversight Council.

Navy support of the reliable replacement warhead

The budget request included \$23.3 million in PE 11221N Research, Development, Test, and Evaluation, Navy (RD TEN) for support to the reliable replacement warhead (RRW). The committee recommends no funds for Navy support to phase 3 RRW activities and a reduction of \$23.3 million. This effort anticipated that the National Nuclear Security Administration would be moving to the phase 3 of the RRW study process in 2009. No funds were provided for RRW phase 2A in fiscal year 2008, as a result funding for phase 3 is premature.

Warfighter enhanced decision making

The budget request included \$26.7 million in PE 24163N for fleet communications, but included no funding for a warfighter enhanced decision making and mobile networking applications initiative (WEDM).

Two years ago, Congress directed the Navy to establish a laboratory to address information technology (IT) challenges facing local and regional commands. The laboratory’s focus on emerging technologies offers a unique opportunity to develop and test a joint operational proof-of-concept WEDM. This initiative would be aimed at fielding leading edge applications that could shorten the operational “kill chain” and enhance information flow to the warfighter. WEDM would also provide an opportunity for the academic community to work with the Department of Defense to develop and rapidly deploy training curricula for emerging technologies.

The committee recommends an increase of \$3.0 million to establish the WEDM pilot program to provide modeling and simulation, lab testing, live testing, and training on equipment prior to shore site acquisition to ensure that the C4I systems programmed for in-

stallation on Navy ships are compatible with shore facilities and are of appropriate capacity to support fleet deployments worldwide.

Aviation improvements

The budget request included \$122.9 million in PE 25633N for aviation improvements, but no funds to develop next-generation automated test systems (ATS) instrumentation for aircraft avionics or to develop rapid repair structural adhesives for aircraft applications.

Current ATS are large and numerous. The Navy finds it difficult to keep the commercial hardware used in test equipment modernized on a schedule similar to advanced and evolving aircraft avionics. The Navy specifically, and the Department of Defense broadly, require technology that is easily upgradeable and flexible to conduct complex tests on a variety of fielded systems. Therefore, the committee recommends an increase of \$3.0 million to develop new technology for ATS to reduce the size and increase the versatility of test equipment through software upgrades.

The Navy has been pursuing efforts to develop structural adhesives that cure in the presence of ultraviolet light, reducing required maintenance equipment while retaining required strength. This would permit rapid repair of structures, such as damaged military aircraft and radomes. Present technology only supports either room temperature curing for several days or high pressure and temperature cycles in autoclaves. Developing adhesives that cure rapidly, store at room temperature, last on the shelf for a year, and are environmentally safe would have great benefits to Navy logistics. Therefore, the committee recommends an increase of \$1.0 million to develop structural adhesives that exhibit these properties.

The committee recommends a total authorization of \$126.9 million in PE 25633N for aviation improvements.

Broad Area Maritime Surveillance Unmanned Aircraft System

The budget request included \$480.1 million in PE 35205N for the Broad Area Maritime Surveillance Unmanned Aircraft System (BAMS UAS). The BAMS UAS program development contract, which the Navy had expected to award in October 2007, was delayed until late April 2008. As a result, development activities originally planned for fiscal year 2008 will inevitably move to fiscal year 2009. For example, an updated BAMS UAS program schedule indicates that system engineering activities such as the system functional review have slipped to fiscal year 2009.

Therefore, the committee recommends a reduction of \$48.2 million in PE 35205N for BAMS UAS to reflect this delay.

Digital manufacturing technologies

The budget request included \$56.7 million in PE 78011N for Navy manufacturing technology programs. The committee notes that the Director of Defense Research and Engineering and the Defense Science Board have both identified significant shortfalls in manufacturing research and development funding in the Department of Defense. To help address these shortfalls and strengthen

the defense industrial base, the committee recommends an increase of \$1.7 million in PE 78011N for the development of advanced direct digital manufacturing technologies to support the rapid prototyping of defense materiel.

National Shipbuilding Research Program—Advanced Shipbuilding Enterprise

The budget request included no funding in PE 78730N for maritime technology. The National Shipbuilding Research Program—Advanced Shipbuilding Enterprise (NSRP–ASE) is a collaborative effort between the Navy and industry which has yielded significant productivity improvements for Navy ship construction and repair. Under this program the Navy provides funding that is matched and exceeded by industry investment. Using this approach, the Navy has achieved a high return on investment by providing near-term savings and avoiding significant future costs. The committee believes that continuation of the NSRP–ASE effort is a vital element of the overarching objective of improving the affordability of naval warship construction and maintaining a healthy, innovative shipbuilding industrial base.

The committee recommends an increase of \$15.0 million in PE 78730N for the NSRP–ASE.

Air Force

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		RESEARCH, DEVELOPMENT, TEST & EVALUATION, AIR FORCE			
		BASIC RESEARCH			
0601102F	1	DEFENSE RESEARCH SCIENCES	309,926		309,926
0601103F	2	UNIVERSITY RESEARCH INITIATIVES	125,949	8,100	134,049
		Advanced design technologies for hypersonics research		[2,000]	
		Diamond substrates for microelectronics research		[2,500]	
		Information security research		[2,000]	
		Military decision cycle time research		[1,600]	
0601108F	3	HIGH ENERGY LASER RESEARCH INITIATIVES	13,425		13,425
0301555F	4	CLASSIFIED PROGRAM	[]		[]
0301556F	5	SPECIAL PROGRAM	[]		[]
0305172F	6	COMBINED ADVANCED APPLICATIONS	[]		[]
		SUBTOTAL, BASIC RESEARCH, AIR FORCE	449,300	8,100	457,400
		APPLIED RESEARCH			
0602015F	7	MEDICAL DEVELOPMENT			
0602102F	8	MATERIALS	117,143	8,500	125,643
		Advanced carbon fiber research and testing		[2,500]	
		Fire and blast resistant materials research		[2,000]	
		Health monitoring sensors for aerospace components		[1,500]	
		Thermal protection systems for hypersonics		[2,500]	

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0602201F	9	AEROSPACE VEHICLE TECHNOLOGIES Optical connector research	122,870	1,500	124,370
0602202F	10	HUMAN EFFECTIVENESS APPLIED RESEARCH Joint theater air-ground simulation system Satellite control system training technology	82,091	4,500	86,591
0602203F	11	AEROSPACE PROPULSION Hybrid bearing development X-51B scramjet research	218,049	[2,500]	225,049
0602204F	12	AEROSPACE SENSORS Information quality research	109,048	4,500	113,548
0602601F	13	SPACE TECHNOLOGY Wideband electronic sensing technologies Seismic research program	117,519	[3,000]	130,519
0602602F	14	CONVENTIONAL MUNITIONS	55,963	[13,000]	55,963
0602605F	15	DIRECTED ENERGY TECHNOLOGY	62,871		62,871
0602702F	16	COMMAND CONTROL AND COMMUNICATIONS Cyber attack mitigation technologies	109,492	2,500	111,992
0602890F	17	HIGH ENERGY LASER RESEARCH	49,449	[2,500]	49,449
		SUBTOTAL, APPLIED RESEARCH, AIR FORCE	1,044,495	41,500	1,085,995
0603112F	18	ADVANCED TECHNOLOGY DEVELOPMENT ADVANCED MATERIALS FOR WEAPON SYSTEMS Metals affordability initiative	41,926	5,000	46,926

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603203F	19	ADVANCED AEROSPACE SENSORS Reconfigurable secure computing technologies	56,916	2,000 [2,000]	58,916
0603211F	20	AEROSPACE TECHNOLOGY DEV/DEMO	44,918		44,918
0603216F	21	AEROSPACE PROPULSION AND POWER TECHNOLOGY Assured aerospace fuels research	170,856	9,000 [3,000]	179,856
		HISTED supersonic/hypersonic cruise missile engine		[6,000]	
0603231F	22	CREW SYSTEMS AND PERSONNEL PROTECTION TECHNOLOGY	26,630		26,630
0603270F	23	ELECTRONIC COMBAT TECHNOLOGY	21,056		21,056
0603311F	24	BALLISTIC MISSILE TECHNOLOGY			
0603401F	25	ADVANCED SPACECRAFT TECHNOLOGY Thin film amorphous solar arrays	80,958	2,000 [2,000]	82,958
0603444F	26	MAUI SPACE SURVEILLANCE SYSTEM (MSSS)	4,838		4,838
0603601F	27	CONVENTIONAL WEAPONS TECHNOLOGY Integrated targeting devices	11,813	3,000 [3,000]	14,813
0603605F	28	ADVANCED WEAPONS TECHNOLOGY	44,507		44,507
0603680F	29	MANUFACTURING TECHNOLOGY PROGRAM	39,729		39,729
0603789F	30	C3I ADVANCED DEVELOPMENT Optical interconnects research	30,103	2,000 [2,000]	32,103
0603801F	31	SPECIAL PROGRAMS			
0603924F	32	HIGH ENERGY LASER ADVANCED TECHNOLOGY PROGRAM HEL directed energy weapons	4,013	5,000 [5,000]	9,013
		SUBTOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, AIR FORCE	578,263	28,000	606,263

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES			
0603260F	33	INTELLIGENCE ADVANCED DEVELOPMENT	4,988		4,988
0603287F	34	PHYSICAL SECURITY EQUIPMENT	477		477
0603421F	35	NAVSTAR GLOBAL POSITIONING SYSTEM III			
0603423F	36	GLOBAL POSITIONING SYSTEM III - OPERATIONAL CONTROL SEGMENT	2,975	304,360	307,335
		GPS III-OCX		[304,360]	
0603427F	37	GPS OPERATIONAL CONTROL SEGMENT - BACKWARDS COMPATIBILITY	304,360	-304,360	0
		GPS III-OCX backwards compatibility		[-304,360]	
0603430F	38	ADVANCED EHF MILSATCOM (SPACE)	388,041		388,041
0603432F	39	POLAR MILSATCOM (SPACE)	237,749		237,749
0603438F	40	SPACE CONTROL TECHNOLOGY	76,845	5,000	81,845
		Space situational awareness		[5,000]	
0603742F	41	COMBAT IDENTIFICATION TECHNOLOGY	29,400		29,400
0603790F	42	NATO RESEARCH AND DEVELOPMENT	4,334		4,334
0603791F	43	INTERNATIONAL SPACE COOPERATIVE R&D	627		627
0603845F	44	TRANSFORMATIONAL SATCOM (TSAT)	842,974	350,000	1,192,974
		TSAT		[350,000]	
0603850F	45	INTEGRATED BROADCAST SERVICE	21,105		21,105
0603851F	46	INTERCONTINENTAL BALLISTIC MISSILE	65,629		65,629
0603854F	47	WIDEBAND GLOBAL SATCOM RDT&E (SPACE)	12,422		12,422
0603858F	48	SPACE RADAR			
0603859F	49	POLLUTION PREVENTION	2,877		2,877
0603860F	50	JOINT PRECISION APPROACH AND LANDING SYSTEMS	7,479		7,479
0604015F	51	NEXT GENERATION BOMBER			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604796F	52	ALTERNATIVE FUELS	28,464		28,464
0604830F	53	AUTOMATED AIR-TO-AIR REFUELING	9,889		9,889
0604856F	54	COMMON AERO VEHICLE (CAV)			
0604857F	55	OPERATIONALLY RESPONSIVE SPACE ORS	110,032	10,000 [10,000]	120,032
0305178F	56	NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS)	289,469		289,469
		SUBTOTAL, ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES, AIR FORCE	2,440,136	365,000	2,805,136
		SYSTEM DEVELOPMENT & DEMONSTRATION			
0603840F	57	GLOBAL BROADCAST SERVICE (GBS)	18,790		18,790
0604222F	58	NUCLEAR WEAPONS SUPPORT	20,166		20,166
0604226F	59	B-1B	128,871		128,871
0604233F	60	SPECIALIZED UNDERGRADUATE FLIGHT TRAINING	7,462		7,462
0604240F	61	B-2 ADVANCED TECHNOLOGY BOMBER B-2 Radar (Transfer to APAF 24)	351,417	-18,500 [-18,500]	332,917
0604261F	62	PERSONNEL RECOVERY SYSTEMS			
0604270F	63	ELECTRONIC WARFARE DEVELOPMENT	54,995		54,995
0604287F	64	PHYSICAL SECURITY EQUIPMENT	52		52
0604329F	65	SMALL DIAMETER BOMB (SDB)	125,067		125,067
0604421F	66	COUNTERSPACE SYSTEMS	74,918		74,918

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604425F	67	SPACE SITUATION AWARENESS SYSTEMS SBSS 10	210,501	10,000 [10,000]	220,501
0604429F	68	AIRBORNE ELECTRONIC ATTACK	34,279		34,279
0604441F	69	SPACE BASED INFRARED SYSTEM (SBIRS) HIGH EMD SBIRS operations and training	529,771	30,000 [30,000]	559,771
0604443F	70	THIRD GENERATION INFRARED SURVEILLANCE (3GIRS) Third generation infrared surveillance	149,064	-30,000 [-30,000]	119,064
0604602F	71	ARMAMENT/ORDNANCE DEVELOPMENT	2,095		2,095
0604604F	72	SUBMUNITIONS	1,730		1,730
0604617F	73	AGILE COMBAT SUPPORT	5,790		5,790
0604618F	74	JOINT DIRECT ATTACK MUNITION			
0604706F	75	LIFE SUPPORT SYSTEMS	10,998		10,998
0604735F	76	COMBAT TRAINING RANGES	28,047		28,047
0604740F	77	INTEGRATED COMMAND & CONTROL APPLICATIONS (IC2A)	177		177
0604750F	78	INTELLIGENCE EQUIPMENT	1,488		1,488
0604762F	79	COMMON LOW OBSERVABLES VERIFICATION SYSTEM (CLOVERS)			
0604800F	80	JOINT STRIKE FIGHTER (JSF) Fund competitive propulsion system	1,524,016	250,000 [215,000]	1,774,016
0604853F	81	EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM (SPACE) Technology development for F135 engine	33,719	[35,000]	33,719
0605011F	82	RDT&E FOR AGING AIRCRAFT	13,828		13,828
0605221F	83	NEXT GENERATION AERIAL REFUELING AIRCRAFT USAF-requested transfer from APAF 10	831,759	61,660 [61,660]	893,419

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0605277F	84	CSAR-X RDT&E	305,062	-40,000	265,062
		Reflect delays in acquisition program		[-40,000]	
0605278F	85	HC/MC-130 RECAP	11,692		11,692
0207434F	86	LINK-16 SUPPORT AND SUSTAINMENT	186,213		186,213
0207450F	87	E-10 SQUADRONS	42,215		42,215
0207451F	88	SINGLE INTEGRATED AIR PICTURE (SIAP)	66,909		66,909
0207701F	89	FULL COMBAT MISSION TRAINING	135,152		135,152
0401138F	90	JOINT CARGO AIRCRAFT (JCA)	26,777		26,777
0401318F	91	CV-22	18,562		18,562
0401845F	92	AIRBORNE SENIOR LEADER C3 (SLC3S)	1,992		1,992
		SUBTOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, AIR FORCE	4,953,574	263,160	5,216,734
		RDT&E MANAGEMENT SUPPORT			
0604256F	93	THREAT SIMULATOR DEVELOPMENT	34,568		34,568
0604759F	94	MAJOR T&E INVESTMENT	61,818	4,000	65,818
		High speed test track		[-4,000]	
0605101F	95	RAND PROJECT AIR FORCE	28,676		28,676
0605502F	96	SMALL BUSINESS INNOVATION RESEARCH			
0605712F	97	INITIAL OPERATIONAL TEST & EVALUATION	29,537		29,537
0605807F	98	TEST AND EVALUATION SUPPORT	787,737		787,737
0605860F	99	ROCKET SYSTEMS LAUNCH PROGRAM (SPACE)	14,895		14,895
0605864F	100	SPACE TEST PROGRAM (STP)	48,072		48,072

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0605976F	101	FACILITIES RESTORATION AND MODERNIZATION - TEST AND EVALUATION SUPPORT	46,234		46,234
0605978F	102	FACILITIES SUSTAINMENT - TEST AND EVALUATION SUPPORT	28,898		28,898
0804731F	103	GENERAL SKILL TRAINING			
1001004F	104	INTERNATIONAL ACTIVITIES	3,910		3,910
		SUBTOTAL, RDT&E MANAGEMENT SUPPORT, AIR FORCE	1,084,345	4,000	1,088,345
		OPERATIONAL SYSTEMS DEVELOPMENT			
0604263F	105	COMMON VERTICAL LIFT SUPPORT PLATFORM	3,868		3,868
0605024F	106	ANTI-TAMPER TECHNOLOGY EXECUTIVE AGENCY	20,987		20,987
0605798F	107	ANALYSIS SUPPORT GROUP	[]		[]
0101113F	108	B-52 SQUADRONS B-52 CONECT	38,651	9,500 [9,500]	48,151
0101120F	109	ADVANCED CRUISE MISSILE			
0101122F	110	AIR-LAUNCHED CRUISE MISSILE (ALCM)	396		396
0101313F	111	STRAT WAR PLANNING SYSTEM - USSTRATCOM	17,553		17,553
0101314F	112	NIGHT FIST - USSTRATCOM	5,299		5,299
0101815F	113	ADVANCED STRATEGIC PROGRAMS ISSO	[]	[-10,000] [-10,000]	[]
0102326F	114	REGION/SECTOR OPERATION CONTROL CENTER MODERNIZATION PROGRAM	23,858		23,858
0102823F	115	STRATEGIC AEROSPACE INTELLIGENCE SYSTEM ACTIVITIES	15		15

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0203761F	116	WARFIGHTER RAPID ACQUISITION PROCESS (WRAP) RAPID TRANSITION FUND	20,807		20,807
0205219F	117	MQ-9 UAV	43,557		43,557
0207131F	118	A-10 SQUADRONS			
0207133F	119	F-16 SQUADRONS	123,979		123,979
0207134F	120	F-15E SQUADRONS	184,213		184,213
0207136F	121	MANNED DESTRUCTIVE SUPPRESSION	5,585		5,585
0207138F	122	F-22A SQUADRONS	700,305		700,305
0207141F	123	F-117A SQUADRONS			
0207161F	124	TACTICAL AIM MISSILES	5,748		5,748
0207163F	125	ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM)	54,239		54,239
0207170F	126	JOINT HELMET MOUNTED CUEING SYSTEM (JHMCS)	3,192		3,192
0207247F	127	AF TENCAP	11,578		11,578
0207248F	128	SPECIAL EVALUATION PROGRAM			
0207253F	129	COMPASS CALL	4,670		4,670
0207268F	130	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	150,956		150,956
0207277F	131	CSAF INNOVATION PROGRAM			
0207325F	132	JOINT AIR-TO-SURFACE STANDOFF MISSILE (JASSM)	13,035		13,035
0207410F	133	AIR & SPACE OPERATIONS CENTER (AOC) Delay AOC, increment 10.2	118,834	-40,400	78,434
0207412F	134	MODULAR CONTROL SYSTEM		[-40,400]	
0207417F	135	AIRBORNE WARNING AND CONTROL SYSTEM (AWACS)	60,590		60,590
0207418F	136	TACTICAL AIRBORNE CONTROL SYSTEMS	126,300		126,300
0207423F	137	ADVANCED COMMUNICATIONS SYSTEMS	1,530		1,530
			29,782		29,782

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0207424F	138	EVALUATION AND ANALYSIS PROGRAM	794,036		794,036
0207433F	139	ADVANCED PROGRAM TECHNOLOGY			
0207438F	140	THEATER BATTLE MANAGEMENT (TBM) C4I	19,437		19,437
0207445F	141	FIGHTER TACTICAL DATA LINK	62,788		62,788
0207446F	142	BOMBER TACTICAL DATA LINK	11,702		11,702
0207448F	143	C2ISR TACTICAL DATA LINK	1,727		1,727
0207449F	144	COMMAND AND CONTROL (C2) CONSTELLATION	32,151		32,151
0207581F	145	JOINT SURVEILLANCE/TARGET ATTACK RADAR SYSTEM (JSTARS) Improve maturity of MP-RTIP sensor suite for larger aircraft	97,641	98,000 [98,000]	195,641
0207590F	146	SEEK EAGLE	21,645		21,645
0207591F	147	ADVANCED PROGRAM EVALUATION			
0207601F	148	USAF MODELING AND SIMULATION	28,981		28,981
0207605F	149	WARGAMING AND SIMULATION CENTERS	3,870		3,870
0207697F	150	DISTRIBUTED TRAINING AND EXERCISES	7,137		7,137
0208006F	151	MISSION PLANNING SYSTEMS	97,560		97,560
0208021F	152	INFORMATION WARFARE SUPPORT	12,220		12,220
0208161F	153	SPECIAL EVALUATION SYSTEM	1,077,970		1,077,970
0301310F	154	NATIONAL AIR INTELLIGENCE CENTER	[]		[]
0301314F	155	COBRA BALL	[]		[]
0301315F	156	MISSILE AND SPACE TECHNICAL COLLECTION	[]		[]
0301324F	157	FOREST GREEN	[]		[]
0301386F	158	GDIP COLLECTION MANAGEMENT	[]		[]
0302015F	159	E-4B NATIONAL AIRBORNE OPERATIONS CENTER (NAOC)	[]		[]
0303112F	160	AIR FORCE COMMUNICATIONS (AIRCOM)	4,069		4,069

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0303131F	161	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK (MEECN)	70,995		70,995
0303140F	162	INFORMATION SYSTEMS SECURITY PROGRAM	187,933		187,933
0303141F	163	GLOBAL COMBAT SUPPORT SYSTEM	4,320		4,320
0303150F	164	GLOBAL COMMAND AND CONTROL SYSTEM	3,218		3,218
0303158F	165	JOINT COMMAND AND CONTROL PROGRAM (JC2)	3,234		3,234
0303601F	166	MILSATCOM TERMINALS	337,098		337,098
0304111F	167	SPECIAL ACTIVITIES	[]		[]
0304260F	168	AIRBORNE SIGINT ENTERPRISE	173,631		173,631
0304311F	169	SELECTED ACTIVITIES	[]		[]
0304348F	170	ADVANCED GEOSPATIAL INTELLIGENCE (AGI)	[]		[]
0305099F	171	COMMUNICATION, NAVIGATION, SURVEILLANCE	6,275		6,275
0305103F	172	CYBER SECURITY INITIATIVE	2,083		2,083
0305110F	173	SATELLITE CONTROL NETWORK (SPACE)	16,758		16,758
0305111F	174	WEATHER SERVICE	47,347	6,000	53,347
		Integrate all terrain, weather & risk assessment information into one display		[6,000]	
0305114F	175	AIR TRAFFIC CONTROL, APPROACH, AND LANDING SYSTEM (ATCAL)	6,867		6,867
0305116F	176	AERIAL TARGETS	34,777		34,777
0305124F	177	SPECIAL APPLICATIONS PROGRAM	[]		[]
0305127F	178	FOREIGN COUNTERINTELLIGENCE ACTIVITIES	[]		[]
0305128F	179	SECURITY AND INVESTIGATIVE ACTIVITIES	786		786
0305142F	180	APPLIED TECHNOLOGY AND INTEGRATION			
0305146F	181	DEFENSE JOINT COUNTERINTELLIGENCE ACTIVITIES	39		39

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u> []	<u>Senate Change</u> []	<u>Senate Authorized</u> []
0305159F	182	DEFENSE RECONNAISSANCE SUPPORT ACTIVITIES (SPACE) FINDER Phased Array Program reduction Program reduction	[]	[-404,000] [25,000] [27,000] [-50,000] [-406,000]	[]
0305160F	183	DEFENSE METEOROLOGICAL SATELLITE PROGRAM (SPACE)			127,513
0305164F	184	NAVSTAR GLOBAL POSITIONING SYSTEM (USER EQUIPMENT) (SPACE)	127,513		91,277
0305165F	185	NAVSTAR GLOBAL POSITIONING SYSTEM (SPACE AND CONTROL SEGMENTS)	91,277		[]
0305172F	186	COMBINED ADVANCED APPLICATIONS	[]		[]
0305173F	187	SPACE AND MISSILE TEST AND EVALUATION CENTER	1,985		1,985
0305174F	188	SPACE WARFARE CENTER	3,003		3,003
0305182F	189	SPACELIFT RANGE SYSTEM (SPACE)	12,376		12,376
0305193F	190	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	1,237		1,237
0305206F	191	AIRBORNE RECONNAISSANCE SYSTEMS Blacksniff testbed	149,752	-10,000 [-10,000]	139,752
0305207F	192	MANNED RECONNAISSANCE SYSTEMS	12,819		12,819
0305208F	193	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	107,834		107,834
0305219F	194	MQ-1 PREDATOR UAV UAV sense and avoid	24,773	10,000 [10,000]	34,773
0305220F	195	GLOBAL HAWK UAV	284,292		284,292
0305221F	196	NETWORK-CENTRIC COLLABORATIVE TARGETING	8,807		8,807
0305265F	197	GPS III SPACE SEGMENT	420,342		420,342
0305887F	198	ELECTRONIC COMBAT INTELLIGENCE SUPPORT	5,438		5,438

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0305906F	199	NCMC - TW/AA SYSTEM			
0305913F	200	NUDET DETECTION SYSTEM (SPACE)	41,292		41,292
0305924F	201	NATIONAL SECURITY SPACE OFFICE	10,797		10,797
0305940F	202	SPACE SITUATION AWARENESS OPERATIONS	16,166		16,166
0307141F	203	INFORMATION OPERATIONS TECHNOLOGY INTEGRATION & TOOL DEVELOPMENT	15,726		15,726
0308699F	204	SHARED EARLY WARNING (SEW)	3,152		3,152
0401115F	205	C-130 AIRLIFT SQUADRONS	172,560		172,560
0401119F	206	C-5 AIRLIFT SQUADRONS	125,063		125,063
0401130F	207	C-17 AIRCRAFT	236,047	-48,000	188,047
		Reduce growth in performance improvement program		[-48,000]	
0401132F	208	C-130J PROGRAM	52,354		52,354
0401134F	209	LARGE AIRCRAFT IR COUNTERMEASURES (LAIRCM)	32,100		32,100
0401218F	210	KC-135 AIRCRAFT	7,133		7,133
0401219F	211	KC-10 AIRCRAFT			
0401221F	212	KC-135 TANKER REPLACEMENT			
0401314F	213	OPERATIONAL SUPPORT AIRLIFT			
0401839F	214	AIR MOBILITY TACTICAL DATA LINK			
0408011F	215	SPECIAL TACTICS / COMBAT CONTROL	5,728		5,728
0702207F	216	DEPOT MAINTENANCE (NON-IF)	1,531		1,531
0702806F	217	ACQUISITION AND COMMAND SUPPORT	34,428		34,428
0708011F	218	INDUSTRIAL PREPAREDNESS			
0708012F	219	LOGISTICS SUPPORT ACTIVITIES			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0708610F	220	LOGISTICS INFORMATION TECHNOLOGY (LOGIT)	189,679	-50,000	139,679
		Expeditionary combat support system (ECSS)		[-50,000]	
0708611F	221	SUPPORT SYSTEMS DEVELOPMENT	8,145		8,145
0804757F	222	JOINT NATIONAL TRAINING CENTER	3,214		3,214
0808716F	223	OTHER PERSONNEL ACTIVITIES	116		116
0901202F	224	JOINT PERSONNEL RECOVERY AGENCY	5,768		5,768
0901212F	225	SERVICE-WIDE SUPPORT	3,016		3,016
0901218F	226	CIVILIAN COMPENSATION PROGRAM	8,123		8,123
0901220F	227	PERSONNEL ADMINISTRATION	18,625		18,625
0901538F	228	FINANCIAL MANAGEMENT INFORMATION SYSTEMS DEVELOPMENT	31,782	-15,000	16,782
		DEAMS		[-15,000]	
		SUBTOTAL, OPERATIONAL SYSTEMS DEVELOPMENT, AIR FORCE	7,211,815	-39,900	7,171,915
999		CLASSIFIED PROGRAMS	10,304,689	-414,000	9,890,689
		Total, RDT&E Air Force	28,066,617	255,860	28,322,477

Air Force basic research programs

The budget request included \$125.9 million in PE 61103F for university research initiatives. The committee commends the Air Force for increasing its investments in basic research in the fiscal year 2009 budget request. This is consistent with the National Research Council's 2005 report entitled "Assessment of Department of Defense Basic Research," which recommended that "the Department of Defense should redress the imbalance between its current basic research allocation, which has declined critically over the past decade, and its need to better support the expanded areas of technology, the need for increased unfettered basic research, and the support of new researchers."

Consistent with the need to fund more basic research efforts in areas of technological interest to the Air Force, the committee recommends increases in PE 61103F of: \$2.0 million for research on advanced hypersonic technology designs; \$2.0 million for information security research; \$1.6 million for research on reducing military decision making cycle times; and \$2.5 million for research on diamond substrates for microelectronics.

Air Force materials research

The budget request included \$117.1 million in PE 62102F for applied research on materials. The committee notes that the National Research Council's 2005 report on "High Performance Structural Fibers for Advanced Polymer Matrix Composites" highlighted the need for the Department of Defense to reduce costs and improve its understanding of the manufacture and properties of advanced carbon fibers. Consistent with those recommendations, the committee recommends an increase of \$2.5 million in PE 62102F for research on advanced carbon fiber materials for Air Force applications. The committee notes that the Naval Studies Board's 2007 report on "Conventional Prompt Global Strike (CPGS) Capability" noted that "the boost glide and high-speed cruise missile concepts as CPGS options require advanced technologies, especially in the areas of thermal protection and management . . ." The committee recommends an increase of \$2.5 million for the development of thermal protection systems for global strike hypersonic vehicles.

The Director of Defense Research and Engineering's 2007 Strategic Plan identified advanced materials as an enabling technology for a number of desired military capabilities, including protection against improvised explosive devices and air dominance. The committee recommends an increase of \$2.0 million in PE 62102F for development of fire and blast resistant materials for force protection missions.

Finally, the committee notes that the Air Force Research Laboratory strategy has a strategic goal to "accurately diagnose the current state and predict the future state of aerospace systems" by 2015. To support that effort, the committee recommends an increase of \$1.5 million for development of health monitoring sensors of aerospace components.

The budget request included \$41.9 million in PE 63112F for advanced materials technology development for weapons systems. The committee recommends an increase of \$5.0 million to develop

and transition metals and process technologies for fielded and future Air Force systems.

Optical components for air vehicles

The budget request included \$122.9 million in PE 62201F for applied research on aerospace vehicle technologies. The committee notes that the National Research Council's 2006 study on "Future Air Force Needs for Survivability" noted the need to reduce electronic emission signatures on aircraft. The committee recommends an additional \$1.5 million in PE 62201F for research on optical components to replace electrical components for use in onboard aircraft communications systems.

Air Force training technology

The budget request included \$82.1 million in PE 62202F for applied research on human effectiveness. The committee notes that in a 2007 memorandum to the Secretary of Defense, the Director of Defense Research and Engineering highlighted the need to significantly increase investments in research on adaptive, interactive full immersion training. To enhance Air Force and joint training capabilities, the committee recommends increases in PE 62202F of \$2.0 million for advanced satellite operator training systems development and \$2.5 million for development of immersive tools for enhancing theater air-to-ground command and control coordination modeling and simulation.

Air Force aerospace propulsion technology

The budget request included \$218.0 million in PE 62203F for applied research on aerospace propulsion. The 2006 National Research Council report entitled "A Review of United States Air Force and Department of Defense Aerospace Propulsion Needs" concluded that Air Force investments in propulsion science and technology need ". . . to be increased if technical gaps are to be filled." The report focused on a variety of space, tactical air, and engine technology gaps that need to be addressed.

To enhance Air Force propulsion technology efforts, the committee recommends an increase in 62203F of \$2.0 million for development of high temperature, corrosion resistant bearings for advanced propulsion systems.

The committee continues to support Department of Defense efforts to develop technologies to support time-critical strike missions. The committee recommends an increase of \$5.0 million in PE 62203F for robust scramjet research activities leading to flight tests and demonstration of an alternate engine to support the Air Force X-51 testbed program.

Aerospace sensor technologies

The budget request included \$109.0 million in PE 62204F for applied research on aerospace sensors. The committee notes that the Air Force Research Laboratory (AFRL) science and technology (S&T) strategy highlights the need for development of "novel data mining and advanced relevance assessment technologies" to support establishment of "universal situational awareness." To help address this need, the committee recommends an increase of \$1.5

million for research on enhancing information quality to support persistent surveillance missions.

The AFRL S&T strategy has set a strategic goal of demonstrating “layered and flexible sensing architecture that respond to the Commander’s intent” by identifying and precisely locating high value difficult targets by 2015. To support the development of this architecture, the committee recommends an increase of \$3.0 million in PE 62204F for development of wideband system components to support electronic intelligence systems.

Air Force seismic research

The budget request included \$117.5 million in PE 62601F Research, Development, Test, and Evaluation, Air Force for space technologies including \$6.8 for seismic technologies to support national requirements for monitoring nuclear explosions. The committee recommends an increase of \$13.0 million to improve operational seismic capability.

Cyber attack mitigation technologies

The budget request included \$109.5 million in PE 62702F for applied research on command, control, and communications technologies. The September 2007 Defense Science Board study entitled “Mission Impact of Foreign Influence on DOD Software” highlighted the need for “programs to advance the state-of-the-art in vulnerability detection and mitigation in software and hardware.” In support of this finding, the committee recommends an increase of \$2.5 million for the development of systems to detect and defeat malicious software on military networks and information systems.

Reconfigurable securing computing

The budget request included \$56.9 million in PE 63203F for development of advanced aerospace sensors. The Air Force and Department of Defense have set cybersecurity as a high technology priority. To support these efforts at the tactical level and reduce the costs for the development of security systems, the committee recommends an increase of \$2.0 million to develop reconfigurable secure computing technologies for advanced sensor systems.

Propulsion technologies

The budget request included \$170.9 million in PE 63216F for aerospace and propulsion and power technology development. The Defense Science Board Task Force on DOD Energy Strategy recommended investing “in energy efficient and alternative energy technologies to a level commensurate with their operational and financial value.” The committee believes that the development of alternative sources of fuel for Air Force missions could result in huge cost savings for the Department of Defense, and therefore recommends an increase of \$3.0 million in PE 63216F for research on assured aerospace fuels to assess alternative fuels from sources such as coal, biomass, and shale, while minimizing environmental impact.

The committee continues to support development of hypersonic technologies to enable high speed, precision strike capabilities. The committee recommends an additional \$6.0 million in PE 63216F for

development of supersonic and hypersonic cruise missile engine technologies, as part of the Versatile Affordable Advanced Turbine Engine (VAATE) High Speed Turbine Engine Demonstrator (HiSTED) program.

Thin film amorphous solar arrays

The budget request included \$81.0 million in PE 63401F for advanced spacecraft technology. The committee recommends an increase of \$2.0 million for thin film amorphous solar arrays for space systems. Fiscal year 2009 will be the last year of this successful research and development program of advanced solar arrays for space systems using thin film amorphous substrate. These solar arrays are 10 times cheaper, three to five times lighter, and significantly more efficient than current solar arrays. After the successful demonstration flight on the Tac-Sat2 satellite, the committee believes that the Air Force should work with industry to explore future opportunities to transition these solar arrays to future Tac-Sat satellites or other satellite programs of record. Fiscal year 2009 funds would be used to finish the analysis of the experimental and demonstration data and complete the project.

Integrated targeting devices

The budget request included \$11.8 million in PE 63601F for development of conventional weapons technology. The Air Force Research Laboratory science and technology strategy states that “an important aspect of universal situational awareness is the advancement of sensor technologies.” In order to support the development of enhanced sensor technologies to support improving precision strike capabilities, the committee recommends an increase of \$3.0 million for lightweight, targeting device development to integrate multiple sensor types.

Optical interconnect for battlefield communications

The budget request included \$30.1 million in PE 63789F for advanced development of command, control, communications, and intelligence technologies. The Director of Defense Research and Engineering’s 2007 strategic plan highlights networks and communications, including technologies to address airborne networks, as an enabling technology that should receive the highest level of corporate attention and coordination. To support these efforts the committee recommends an additional \$2.0 million for development of optical interconnects to support data communications onboard unmanned aircraft systems and satellites.

High energy laser weapon systems

The budget request included \$4.0 million in PE 63924F for the high energy laser advanced technology program managed by the high energy laser joint technology office. The committee notes that the Defense Science Board Task Force on Directed Energy Weapons recommended that “the Director of Defense Research and Engineering should give high priority to science and technology activities addressing high power solid state laser development and accompanying beam quality and beam control development.” To support this effort, the committee recommends an increase of \$5.0 mil-

lion in PE 63924F for optimization of solid state laser technologies and acceleration of the transition of operational systems to warfighters.

Global Positioning System III operational control segment

The budget request included \$734.7 million in Research, Development, Test, and Evaluation, Air Force (RDTEAF) for the Global Positioning System III (GPS III) in three separate budget lines: \$420.3 million for the GPS III space segment; \$3.0 million for the GPS III operational control segment; and \$304.4 million for the backwards compatibility for the operational control segment. Previously all three GPS activities were in a single GPS III program element. While the committee recognizes some value in separating the ground and space segments, the committee believes that separating the ground segment into two different budget lines needlessly removes program management flexibility.

The committee recommends combining RDTEAF line 37 with line 36 into a single budget line and program element, PE 63423F, for the GPS III operational control segment.

If the continued separation of the space and operational control segments introduces additional cost or management difficulty into the GPS III program, the committee would support recombining both segments into a single program element.

Space situational awareness

The budget request included \$76.8 million in PE 63438F for space control technology. The committee recommends an increase of \$5.0 million to utilize Missile Defense Agency X-band and UHF-band sensors for additional space object tracking to improve space situational awareness.

Transformational Communications satellite

The budget request included \$843.0 million in Research, Development, Test, and Evaluation, Air Force (RDTEAF) for the Transformational Communications satellite (TSAT). This amount is \$384.8 million less than was projected for TSAT just last year. The committee recommends an increase of \$350.0 million for TSAT.

The Air Force and the Department of Defense (DOD) reduced the TSAT program by \$3.6 billion over the future-years defense program (FYDP), delaying the first launch of TSAT until fiscal year 2018 or beyond, a delay of 4 years. The committee is very disappointed in the decision to delay TSAT. For the last several years the Air Force and the DOD executive agent for space have asserted that TSAT is one of its highest priorities for the Department and the core of the protected satellite communications architecture.

TSAT would provide protected, high data rate, wideband communications with many times the capability of the Advanced Extremely High Frequency (AEHF) and the Wideband Global System (WGS) that it will replace. The significantly enhanced capabilities provided by TSAT are required to support a broad range of modernization programs, including the Army Future Combat System and the many existing and future unmanned aerial vehicle (UAV) programs. In addition, TSAT will provide a networking capability

based on Internet protocols that will substantially increase the number of users and the way information is shared.

The TSAT program started with an overly aggressive schedule, significant technical risks, and significant cost uncertainty, but with substantial management attention the technical and other risks are being addressed. The key technologies for TSAT are all at a technical readiness level 6 and the independent program assessment found that TSAT is ready to move to the preliminary design phase.

Nevertheless, the Department has initiated a review to revalidate the TSAT program requirements as part of a military satellite communications investment strategy study. The committee is concerned that some of the options being discussed as part of the study will, if adopted, further delay delivery of the TSAT capabilities to the broad user community, waste money in the long run, and generate a significant communications gap in the future. Many of the options under consideration will so reduce the capability of TSAT that the committee questions why such a substantially downgraded TSAT is worth the effort, time, and expense. TSAT as originally envisioned would dramatically increase data throughput and, through the introduction of an Internet protocol approach, fundamentally change the way in which satellite communications are utilized.

The committee recognizes the critical need for the full scope TSAT, but will not support TSAT under the circumstances as currently presented to the committee by the Air Force and DOD. At this juncture the committee would support funding for TSAT only if the Air Force and DOD return TSAT to a meaningful technology and schedule path. This is a difficult decision given the superb management of the program by the TSAT program office.

Once again the committee questions the senior level Air Force commitment to being a space force.

Operationally Responsive Space

The budget request included \$110.0 million in PE 64857F for Operationally Responsive Space (ORS). The committee recommends an increase of \$10.0 million for increased work on approaches to standardized bus designs with common interfaces, additional satellite launches to support both technology demonstrations and operational concepts, and additional launch capabilities including a resource study to look at block buys for launch vehicles.

The committee commends the work of the ORS office since it was formally established last year, and appreciates the effort required to establish a multi-service, multi-agency, functioning program office. To support the multi-service, multi-agency nature of the office the committee supports the concept of rotational directors and deputy directors.

The committee urges the ORS office to continue to maintain a balanced program including launch, bus development, sensor development, and developing fully integrated satellites. In addition, the launch of the Tac-Sat2 satellite demonstrated that many issues remain to be resolved in the development of operational concepts for the Transformational Communications Satellite (TSAT).

B-2 radar modernization program

The budget request included \$351.4 million in PE64240F for the B-2 bomber, including \$83.1 million for radar modernization. The committee recommends a transfer of \$18.5 million from PE6420F to Aircraft Procurement, Air Force line 24 to facilitate the management of the radar modernization program.

Space-based space surveillance block 10

The budget request included \$210.5 million for space situational awareness systems in PE 64425F including \$210.5 million for space-based space surveillance block 10 (SBSS 10). SBSS 10 is a spacecraft to improve deep space situational awareness by finding, fixing, and tracking space objects that is scheduled to launch in early 2009. The committee recommends an additional \$10.0 million for SBSS 10 to allow for timely development of training materials, technical orders, and a simulation environment to train Air Force SBSS 10 operators, thereby reducing the time between launch and transition to Air Force operations.

Space-based Infrared Satellite system

The budget request included \$529.8 million in PE 64441F for the Space-based Infrared Satellite system (SBIRS). The committee recommends an increase of \$30.0 million for SBIRS operations and training.

The SBIRS program is suffering from the same problem that is becoming increasingly apparent in several space systems—a disconnect between the ground and space segments. Because of the technical, cost, and schedule issues that have surrounded the SBIRS space segment, the Air Force has had to divert funds slated for ground related activities to the space segment for at least the last 3 years. As a result, the ground activities associated with SBIRS have been underfunded. The committee notes that for both fiscal years 2008 and 2009 funding for the ground segment has appeared on the Chief of the Air Force's unfunded priorities list.

Now that the first HEO sensor is on orbit, with excellent initial performance, and the second HEO sensor is close behind, the lack of ground funding is a growing problem. The unfunded requirement in fiscal year 2009 is \$71.2 million and includes funding for such basic items as the wideband data transmission requirements needed for the payload on-orbit test station to exploit and utilize the capabilities of the new HEO sensors, and crew training. Also included on the unfunded list is completing the hardware and software to allow the mission control station and the backup station to control, track, task, and process the data from both the legacy and the SBIRS systems. Moreover, on the current schedule the backup station will be certified for full operations before the main mission station.

The committee also notes that the Air Force has now decided not to include the Space and Atmospheric Burst Reporting System (SABRS), part of the U.S. nuclear detonation system, as part of the payload on the SBIRS-GEO 3 satellite. The committee directs the Air Force to either reinstate the SABRS on the SBIRS-GEO 3 satellite or find an equally capable alternative host and report its deci-

sion to the congressional defense committee no later than August 30, 2008.

Third Generation Infrared Surveillance satellite system

The budget request included \$149.1 million in PE 64443F for the Third Generation Infrared Surveillance (3GIRS) satellite system. The committee recommends a reduction of \$30.0 million.

3GIRS is a technology development program to develop the next generation of infrared early warning satellite. The committee supports further development and on orbit testing of new technologies to support the follow-on to the Space Based Infrared Satellite system (SBIRS). The last SBIRS GEO satellite will probably launch in fiscal year 2016 depending on the final decision as to the full size of the SBIRS GEO constellation. In its budget justification material for 3GIRS, the Air Force plans to freeze the technology for the follow-on to SBIRS and make a decision to proceed to build an operational satellite at the end of fiscal 2010 even though the first launch of the follow-on would not be until 2019. The committee is concerned that the Air Force plan would prematurely lock in a technology without completing needed sensor development and without fully understanding the performance of the two approaches currently funded. The committee notes that there is a third unfunded option as well. As a result, the committee urges the Air Force to complete development of the focal plane arrays and to consider short-term on orbit demonstrations of both approaches. The committee encourages utilizing the Operationally Response Space Office to explore opportunities to conduct on orbit experiments.

F135 engine

The budget request included \$1,524.0 million in PE 64800F for the F-35 Joint Strike Fighter (JSF) program. Over the past 2 years, Congress has added \$820.0 million to continue funding of the F136 engine, a competitive propulsion source, to ensure there is fair and full competition for the propulsion system of the JSF.

The Department of Defense froze the technology baseline of the F135 engine several years ago when the JSF and the engine began system development and demonstration (SDD). To ensure that both engines incorporate the best configuration and most recent technology available, the Department should invest in and direct a program for the F135 and F136 engine programs that would drive technology insertion and provide potential customers with the best performing, most efficient engines possible. For example, the committee believes that the potential application of new composite materials in the F135 engine program could result in life cycle cost savings. Because no funds were set aside for the F136 engine in the administration's budget request, elsewhere in this report the committee has recommended an increase of \$430.0 million for the development of the F-136 engine.

In order to maintain a level playing field, the committee recommends an increase of \$35.0 million in PE 64800F for F135 engine technology development.

Combat Search and Rescue Replacement Aircraft

The budget request included \$305.1 million in PE 65277F for development of the Combat Search and Rescue Replacement Aircraft (CSAR-X) and \$15.0 million in Aircraft Procurement, Air Force (APAF) for advanced procurement for CSAR-X. The Air Force anticipated awarding the development contract for the CSAR-X in the spring of 2008, but the award has been delayed until the first quarter of fiscal year 2009 due to successful protests by losing offerors, development of additional data about the program, as well as the offerors' schedules.

On April 11, 2008, the Air Force released Amendment 6 to the Request for Proposal for the CSAR-X. Amendment 6 modifies the development funding required in fiscal year 2009, lowering the amount, according to the Air Force, to \$265.1 million. These delays and the new program profile associated with Amendment 6 also remove the need for programming any advance procurement funds in fiscal year 2009.

Therefore, the committee recommends a reduction of \$40.0 million in PE 65277F for CSAR-X and a reduction of \$15.0 million in APAF for CSAR-X advance procurement.

High speed test track

The budget request included \$61.8 million in PE 64759F for major test and evaluation investments. The committee continues to be concerned about the Air Force's downsizing of its test and evaluation infrastructure and workforce. The committee believes that a shortsighted reduction in Air Force testing capabilities will inevitably increase technical risk, life cycle costs, and potentially reduce operational performance of future Air Force acquisition programs. The committee recommends an increase of \$4.0 million to support development of high speed test track technology for use on testing of critical missile, propulsion, and sensor subsystems.

B-52 bomber

The budget request included \$38.7 million in PE 11113F for B-52 squadrons, including \$35.2 million for combat network communications technology (CONNECT). The committee recommends an additional \$9.5 million for CONNECT. The Air Force failed to include adequate funding in the budget request to meet the requirements of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110-181) to maintain 76 B-52 bombers in a common configuration and included this funding on the Air Force unfunded priorities list.

Air Operations Centers

The budget request included \$118.8 million in PE 27410F for Air Operations Centers, including \$40.4 million for integration and development of Air Operation Centers (AOCs), increment 10.2. The Air Force has not finished fielding increment 10.1 of the AOCs, yet has launched into development of increment 10.2. Increment 10.2 will rely, in part, on the Defense Information Systems Agency's Net-enabled Command and Control (NECC). However, both the Director of Defense Research and Engineering's technology readiness assessment and the Director of Operational Test and Evaluation's

ongoing oversight of the NECC program have raised concerns regarding technical risk, aggressive and optimistic scheduling, and unclear testing and deployment strategies.

Until technical risk, testing, and program schedule issues are addressed in a coordinated and joint fashion for both NECC and AOCs, the committee believes that continuing development of AOCs, increment 10.2 would be premature. Therefore, the committee recommends a reduction of \$40.4 million in PE 27410F for the development of AOCs, increment 10.2.

Joint surveillance target attack radar system research and development

The budget request included \$97.6 million in PE 27581F for research and development projects for the E-8 joint surveillance target attack radar system (JSTARS).

The E-10 aircraft was supposed to be a test bed for the multi-platform radar technology insertion program (MP-RTIP). The Air Force intends to field this MP-RTIP sensor suite on a number of air vehicles, including the Global Hawk unmanned aerial vehicle (UAV).

Last year, the Air Force decided to cancel the E-10 program. However, the Air Force realized that canceling testing and development of the large MP-RTIP would leave a void in its capability to defend the U.S. homeland as well as U.S. and coalition forces against cruise missile attacks. The JSTARS (E-8) was the original platform designated for MP-RTIP. That makes the current JSTAR aircraft a prime candidate as the Air Force investigates a path forward. The Air Force could transfer the radar back to JSTARS with minimal risk. Installation of MP-RTIP could provide nearly the same capability as the E-10 while saving scarce defense dollars.

The committee believes that the Air Force should pursue another path, whether that would be the E-8 JSTARS or some other platform, and field the better capability than can be achieved with the Global Hawk. Therefore, the committee recommends an increase of \$98.0 million in PE 27581F for maturing the MP-RTIP sensor suite.

Weather service research and development

The budget request included \$47.3 million in PE 35111F for research and development projects for the Air Force weather weapon system (AFWWS), but included no funding to develop software toolkits for operations risk management (STORM) upgrades for the system.

AFWWS and its warfighter application are charged with providing regional and tactical weather observations and forecasts to Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems used by commanders, planners, and operators throughout the world. The Air Force needs to upgrade AFWWS to provide commanders and mission planners with a better appreciation of the uncertainty of weather forecasts and observations. Such an upgrade should enable them to better determine the risk of ongoing and planned operations. The AFWWS is currently capable of calculating the needed

uncertainty but is unable to provide computer-to-computer transfer of such information.

Therefore, the committee recommends an increase of \$6.0 million to upgrade the AFWWS and integrate all vital information (terrain, weather, risk assessment) into one visual display.

C-17 research, development, test, and evaluation

The budget request included \$236.0 million in PE 41130F for C-17 research, development, test, and evaluation (RDT&E), including \$150.8 million for performance improvement development and testing. The funding for performance improvement development and testing represents a 50 percent increase over the fiscal year 2008 amount.

The committee believes that the Air Force should continue to seek improvements in existing weapons systems, and therefore is not recommending elimination of all funding. However, given the superb performance and operation of the C-17 fleet over the past several years, the committee sees no justification for increased RDT&E funding for C-17s at this time.

Therefore, the committee recommends a reduction of \$48.0 million in PE 41130F for C-17 performance improvement development and testing.

Expeditionary Combat Support System

The budget request included \$189.7 million in PE 78610F for the Expeditionary Combat Support System (ECSS). The committee is encouraged by the recent progress ECSS has made towards achieving Milestone B certification in the fall of this year. Also encouraging is the Air Force strategy briefed to the committee for better coordination and integration of ECSS with another information technology initiative, the Defense Enterprise Accounting and Management System (DEAMS). However, significant concerns remain. Current plans show that over the next 3 years the Air Force has underfunded the ECSS by over \$500.0 million. Additionally, the committee has learned that the program office is significantly understaffed. While the committee has been given assurances that the funding concerns will be reconciled in future years, the current schedule of concurrently developing and fielding Release 1 and Release 2 appears high risk. Until the Air Force fully funds the ECSS and provides sufficient manning, the current schedule appears overly optimistic. Therefore, the committee recommends a decrease of \$50.0 million in PE 78610F for ECSS, Release 2.

Defense Enterprise Accounting and Management System

The budget request included \$27.3 million in PE 91538F for the research, development, test, and evaluation activities related to the Defense Enterprise Accounting and Management System (DEAMS). The committee has historically been supportive of the Department of Defense's business systems modernization efforts, but is concerned by the Air Force's functionally "stovepiped" approach to its Enterprise Resource Planning (ERP) financial systems. Current Air Force strategy designates DEAMS as the Air Force financial system of record for working capital fund accounting, requiring the Expeditionary Combat Support System (ECSS) financial trans-

action to be provided to DEAMS. Current strategy increases the number of interfaces between DEAMS and ECSS, increases long-term costs, and greatly complicates the Air Force movement to a fully integrated information technology environment.

The committee notes that the Air Force has recognized the weaknesses of the current “stovepiped” strategy and, under a proposed new strategy, plans to migrate working capital fund financials to ECSS. Supported by the Office of the Secretary of Defense’s Business Transformation Agency, this proposal will provide the foundation for the Air Force’s evolution to a single enterprise resource program. Under the new strategy, the committee believes that the development funding requested for DEAMS is excess to need.

Therefore, the committee recommends a reduction of \$15.0 million for DEAMS. The committee directs that the Air Force preserve funding for testing activities related to DEAMS when allocating the reduction.

Defense-wide

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
		RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE			
		BASIC RESEARCH			
0601000BR	1	DTRA BASIC RESEARCH INITIATIVE	18,000		18,000
0601101E	2	DEFENSE RESEARCH SCIENCES	195,657		195,657
0601111D8Z	3	GOVERNMENT/INDUSTRY COSPONSORSHIP OF UNIVERSITY			
0601114D8Z	4	DEFENSE EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH	2,833	8,000	10,833
		Program increase		[8,000]	
0601120D8Z	5	NATIONAL DEFENSE EDUCATION PROGRAM	68,972		68,972
0601384BP	6	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	53,191	4,000	57,191
		In-vitro models for biodefense vaccines		[1,000]	
		Superstructural particle evaluation		[3,000]	
		SUBTOTAL, BASIC RESEARCH, DEFENSE-WIDE	338,653	12,000	350,653
		APPLIED RESEARCH			
0602000D8Z	7	JOINT MUNITIONS TECHNOLOGY	15,254		15,254
0602227D8Z	8	MEDICAL FREE ELECTRON LASER			
0602228D8Z	9	HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU) SCIENCE	15,156		15,156
0602234D8Z	10	LINCOLN LABORATORY RESEARCH PROGRAM	31,340	2,800	34,140
		Next generation OTHR risk reduction		[2,800]	
0602303E	11	INFORMATION & COMMUNICATIONS TECHNOLOGY	254,009		254,009

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0602304E	12	COGNITIVE COMPUTING SYSTEMS	145,262		145,262
0602383E	13	BIOLOGICAL WARFARE DEFENSE	66,291		66,291
0602384BP	14	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	203,731	18,500	222,231
		Agent fate response tool		[2,000]	
		Chem-Bio IR detector		[3,000]	
		Multivalent Marburg/Ebola vaccine		[4,500]	
		Rapid response chem-bio countermeasures		[4,000]	
		Therapeutics against botulism		[5,000]	
0602670D8Z	15	HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) APPLIED RESEARCH	7,685		7,685
0602702E	16	TACTICAL TECHNOLOGY	371,481	-4,500	366,981
		Laser guided bullet		[-4,500]	
0602715E	17	MATERIALS AND BIOLOGICAL TECHNOLOGY	285,264		285,264
0602716BR	18	WMD DEFEAT TECHNOLOGY			
0602716E	19	ELECTRONICS TECHNOLOGY	211,457	2,500	213,957
		Three dimensional integrated circuit research		[2,500]	
0602717BR	20	WMD DEFENSE TECHNOLOGIES			
0602718BR	21	WEAPONS OF MASS DESTRUCTION DEFEAT TECHNOLOGIES	211,078	6,000	217,078
		Blast mitigation and protection		[2,000]	
		National incident management system		[4,000]	
0303153K	22	JOINT SPECTRUM CENTER			
1160401BB	23	SPECIAL OPERATIONS TECHNOLOGY DEVELOPMENT	23,104	2,000	25,104
		FOPEN radar technologies		[2,000]	

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
1160407BB	24	SOF MEDICAL TECHNOLOGY DEVELOPMENT Portable TBI diagnosis systems	2,459	1,500 [1,500]	3,959
		SUBTOTAL, APPLIED RESEARCH, DEFENSE-WIDE	1,843,571	28,800	1,872,371
		ADVANCED TECHNOLOGY DEVELOPMENT			
0603000D8Z	25	INSENSITIVE MUNITIONS - ADVANCED DEVELOPMENT	15,970		15,970
0603121D8Z	26	SO/LIC ADVANCED DEVELOPMENT	32,832		32,832
0603122D8Z	27	COMBATING TERRORISM TECHNOLOGY SUPPORT TBI threshold research	79,970	2,000 [2,000]	81,970
0603160BR	28	COUNTERPROLIFERATION INITIATIVES - PROLIFERATION PREVENTION AND DEFEAT	211,325		211,325
0603175C	29	BALLISTIC MISSILE DEFENSE TECHNOLOGY	118,718		118,718
0603225D8Z	30	JOINT DOD-DOE MUNITIONS TECHNOLOGY DEVELOPMENT	23,727		23,727
0603286E	31	ADVANCED AEROSPACE SYSTEMS A160	107,857	-3,000 [-3,000]	104,857
0603287E	32	SPACE PROGRAMS AND TECHNOLOGY Blacksniff testbed	287,009	-50,000 [-40,000]	237,009
0603384BP	33	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM - ADVANCED DEVELOPMENT Engineered biological detectors Improved CBR filters Raman chemical ID system	337,927	7,200 [2,700] [2,000] [2,500]	345,127

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0603618D8Z	34	JOINT ELECTRONIC ADVANCED TECHNOLOGY	9,320		9,320
0603648D8Z	35	JOINT CAPABILITY TECHNOLOGY DEMONSTRATIONS C2 Gap Filler JCTD	206,337	22,800 [22,800]	229,137
0603662D8Z	36	NETWORKED COMMUNICATIONS CAPABILITIES	39,923		39,923
0603665D8Z	37	BIOMETRICS SCIENCE AND TECHNOLOGY	10,579		10,579
0603670D8Z	38	HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) ADVANCED DEVELOPMENT	9,381		9,381
0603680D8Z	39	DEFENSE-WIDE MANUFACTURING SCIENCE AND TECHNOLOGY PROGRAM	11,981	10,000	21,981
0603711D8Z	40	High performance defense manufacturing technology program JOINT ROBOTICS PROGRAM/AUTONOMOUS SYSTEMS	8,449	[10,000]	8,449
0603712S	41	GENERIC LOGISTICS R&D TECHNOLOGY DEMONSTRATIONS Biofuels research program Emerging critical interconnection technology program Mobile microgrid research Vehicle fuel cell & hydrogen logistics program	19,375	19,000 [4,000] [2,000] [3,000] [10,000]	38,375
0603713S	42	DEPLOYMENT AND DISTRIBUTION ENTERPRISE TECHNOLOGY	30,000		30,000
0603716D8Z	43	STRATEGIC ENVIRONMENTAL RESEARCH PROGRAM	69,038		69,038
0603720S	44	MICROELECTRONICS TECHNOLOGY DEVELOPMENT AND SUPPORT Superlattice nanotechnology research		3,000 [3,000]	3,000
0603727D8Z	45	JOINT WARFIGHTING PROGRAM	11,098		11,098
0603739E	46	ADVANCED ELECTRONICS TECHNOLOGIES	201,146		201,146
0603745D8Z	47	SYNTHETIC APERTURE RADAR (SAR) COHERENT CHANGE DETECTION (CDD)	7,984		7,984

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603750D8Z	48	ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS			
0603755D8Z	49	HIGH PERFORMANCE COMPUTING MODERNIZATION PROGRAM	208,079		208,079
0603760E	50	COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS	338,964		338,964
0603764E	51	LAND WARFARE TECHNOLOGY			
0603765E	52	CLASSIFIED DARPA PROGRAMS	196,697		196,697
0603766E	53	NETWORK-CENTRIC WARFARE TECHNOLOGY	156,733		156,733
0603767E	54	SENSOR TECHNOLOGY	226,470		226,470
0603768E	55	GUIDANCE TECHNOLOGY	110,572		110,572
0603769SE	56	DISTRIBUTED LEARNING ADVANCED TECHNOLOGY DEVELOPMENT	13,538		13,538
0603781D8Z	57	SOFTWARE ENGINEERING INSTITUTE	31,244		31,244
0603805S	58	DUAL USE TECHNOLOGY			
0603826D8Z	59	QUICK REACTION SPECIAL PROJECTS Special warfare domain awareness	113,924	2,000	115,924
		JOINT EXPERIMENTATION		[2,000]	
0603828D8Z	60	WMD exercises	114,947	1,500	116,447
		WMD exercises		[1,500]	
0603832D8Z	61	JOINT WARGAMING SIMULATION MANAGEMENT OFFICE	38,147		38,147
0603941D8Z	62	TEST & EVALUATION SCIENCE & TECHNOLOGY	94,672		94,672
0603942D8Z	63	TECHNOLOGY TRANSFER	2,170		2,170
1160402BB	64	SPECIAL OPERATIONS ADVANCED TECHNOLOGY DEVELOPMENT	28,930		28,930
1160472BB	65	SOF INFORMATION AND BROADCAST SYSTEMS ADVANCED	10,990		10,990
SUBTOTAL, ADVANCED TECHNOLOGY DEVELOPMENT, DEFENSE-WIDE			3,536,023	14,500	3,550,523

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603161D8Z	66	ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT RDT&E ADC&P	38,758		38,758
0603228D8Z	67	PHYSICAL SECURITY EQUIPMENT			
0603527D8Z	68	RETRACT LARCH	22,945		22,945
0603709D8Z	69	JOINT ROBOTICS PROGRAM	11,847		11,847
0603714D8Z	70	ADVANCED SENSOR APPLICATIONS PROGRAM ASAP		20,000 [20,000]	20,000
0603851D8Z	71	ENVIRONMENTAL SECURITY TECHNICAL CERTIFICATION PROGRAM	31,600		31,600
0603881C	72	BALLISTIC MISSILE DEFENSE TERMINAL DEFENSE SEGMENT Short-range ballistic missile defense THAAD long lead (Transfer to new MDA procurement line) Upper-tier follow-on to Arrow	1,019,073	-7,000 [28,000] [-65,000] [30,000]	1,012,073
0603882C	73	BALLISTIC MISSILE DEFENSE MIDCOURSE DEFENSE SEGMENT	2,076,662		2,076,662
0603883C	74	BALLISTIC MISSILE DEFENSE BOOST DEFENSE SEGMENT Program reduction	421,229	-45,800 [-45,800]	375,429
0603884BP	75	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM Real-time viral agent detectors	51,291	4,000 [4,000]	55,291
0603884C	76	BALLISTIC MISSILE DEFENSE SENSORS Mobile sensor network concept Premature funds	1,076,983	-59,800 [5,000]	1,017,183
0603886C	77	BALLISTIC MISSILE DEFENSE SYSTEM INTERCEPTOR Premature funds	386,817	[-64,800]	341,817
0603888C	78	BALLISTIC MISSILE DEFENSE TEST & TARGETS	665,445	[-45,000] [-45,000]	665,445

23
32

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0603890C	79	BALLISTIC MISSILE DEFENSE SYSTEMS CORE	432,262	-30,000	402,262
		BMD systems core		[-30,000]	
0603891C	80	SPECIAL PROGRAMS - MDA	288,315	-100,000	188,315
		MDA special programs		[-100,000]	
0603892C	81	AEGIS BMD	1,157,783	23,000	1,180,783
		Aegis BMD/SM-3 enhancements		[80,000]	
		SM-3 long lead (Transfer to MDA procurement line 1A)		[-57,000]	
0603893C	82	SPACE TRACKING & SURVEILLANCE SYSTEM	242,441	-50,000	192,441
		Premature funds		[-50,000]	
0603894C	83	MULTIPLE KILL VEHICLE	354,455	-50,000	304,455
		Excess funds		[-50,000]	
0603895C	84	BALLISTIC MISSILE DEFENSE SYSTEM SPACE PROGRAMS	29,771	-10,000	19,771
		Space test bed		[-10,000]	
0603896C	85	BALLISTIC MISSILE DEFENSE COMMAND AND CONTROL, BATTLE MANAGEMENT AND COMMUNICATIONS	289,277		289,277
0603897C	86	BALLISTIC MISSILE DEFENSE HERCULES	55,955		55,955
0603898C	87	BALLISTIC MISSILE DEFENSE JOINT WARFIGHTER SUPPORT	69,982		69,982
0603904C	88	MISSILE DEFENSE INTEGRATION & OPERATIONS CENTER (MDIOC)	96,404		96,404
0603905C	89	BALLISTIC MISSILE DEFENSE DISTRIBUTED MULTI ECHELON TRAINING SYSTEM (DMETS)			
0603906C	90	REGARDING TRENCH	2,978		2,978
0603907C	91	SEA BASED X-BAND RADAR (SBX)			
	91X	Missile Defense Agency undistributed reduction		-268,700	-268,700
0603920D8Z	92	HUMANITARIAN DEMINING	14,373		14,373

23
33

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0603923D8Z	93	COALITION WARFARE	14,030		14,030
0604016D8Z	94	DEPARTMENT OF DEFENSE CORROSION PROGRAM Asset lifecycle program	5,102	6,500 [3,500]	11,602
0604648D8Z	95	Corrosion control, prevention and prediction research			
0604670D8Z	96	JOINT CAPABILITY TECHNOLOGY DEMONSTRATIONS HUMAN, SOCIAL AND CULTURE BEHAVIOR MODELING (HSCB) RESEARCH AND ENGINEERING	14,962		14,962
		COMPOEX	5,991	2,500	8,491
0604787D8Z	97	JOINT SYSTEMS INTEGRATION COMMAND (JSIC)	19,643	[2,500]	
0604828D8Z	98	JOINT FIRES INTEGRATION AND INTEROPERABILITY TEAM	16,906		19,643
0605017D8Z	99	REDUCTION OF TOTAL OWNERSHIP COST	24,765		16,906
0303191D8Z	100	JOINT ELECTROMAGNETIC TECHNOLOGY (JET) PROGRAM	3,524		24,765
0604400D8Z	100X	UAS AIRSPACE INTEGRATION UAV modeling and simulation		15,000 [15,000]	3,524
		SUBTOTAL, ADVANCED COMPONENT DEVELOPMENT & PROTOTYPES, DEFENSE-WIDE	8,941,569	-595,300	8,346,269
0604051D8Z	101	SYSTEM DEVELOPMENT & DEMONSTRATION DEFENSE ACQUISITION CHALLENGE PROGRAM (DACF)	30,363		30,363
0604161D8Z	102	NUCLEAR AND CONVENTIONAL PHYSICAL SECURITY EQUIPMENT RDT&E SDD	4,355		4,355

Title II - RDT&E
(Dollars in Thousands)

Program Element	Line	Program Title	FY2009 Request	Senate Change	Senate Authorized
0604165D8Z	103	PROMPT GLOBAL STRIKE CAPABILITY DEVELOPMENT Biconic vehicle manufacture Hypersonic boost glide vehicle	117,572	30,000 [-15,000] [45,000]	147,572
0604384BP	104	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	299,373		299,373
0604709D8Z	105	JOINT ROBOTICS PROGRAM	5,725	5,725	5,725
0604764K	106	ADVANCED IT SERVICES JOINT PROGRAM OFFICE (AITS-JPO)	13,770	13,770	13,770
0604771D8Z	107	JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)	20,600	20,600	20,600
0605000BR	108	WEAPONS OF MASS DESTRUCTION DEFEAT CAPABILITIES	15,946	15,946	15,946
0605013BL	109	INFORMATION TECHNOLOGY DEVELOPMENT	11,611	11,611	11,611
0605018BTA	110	DEFENSE INTEGRATED MILITARY HUMAN RESOURCES SYSTEM	37,400	37,400	37,400
0605020BTA	111	BUSINESS TRANSFORMATION AGENCY R&D ACTIVITIES	148,958	148,958	148,958
0605021SE	112	HOMELAND PERSONNEL SECURITY INITIATIVE	400	400	400
0605140D8Z	113	TRUSTED FOUNDRY	42,360	42,360	42,360
0605648D8Z	114	DEFENSE ACQUISITION EXECUTIVE (DAE) PILOT PROGRAM	5,883	5,883	5,883
0303129K	115	DEFENSE MESSAGE SYSTEM			
0303141K	116	GLOBAL COMBAT SUPPORT SYSTEM	18,604		18,604
0303158K	117	JOINT COMMAND AND CONTROL PROGRAM (JC2) NECC	147,339	-90,000 [-90,000]	57,339
SUBTOTAL, SYSTEM DEVELOPMENT & DEMONSTRATION, DEFENSE-WIDE			920,259	-60,000	860,259
0603757D8Z	118	RDT&E MANAGEMENT SUPPORT TRAINING TRANSFORMATION (T2)	38,729		38,729

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0604774D8Z	119	DEFENSE READINESS REPORTING SYSTEM (DRRS)	11,385		11,385
0604875D8Z	120	JOINT SYSTEMS ARCHITECTURE DEVELOPMENT	14,310		14,310
0604940D8Z	121	CENTRAL TEST AND EVALUATION INVESTMENT DEVELOPMENT (CTEIP)	133,852	8,500	142,352
		SAM hardware simulators		[5,000]	
		Range network enterprise technologies		[3,500]	
0604943D8Z	122	THERMAL VICAR	9,658		9,658
0605100D8Z	123	JOINT MISSION ENVIRONMENT TEST CAPABILITY (JMETC)	8,834		8,834
0605104D8Z	124	TECHNICAL STUDIES, SUPPORT AND ANALYSIS	34,520		34,520
0605110D8Z	125	USD(A&T)--CRITICAL TECHNOLOGY SUPPORT	4,007		4,007
0605117D8Z	126	FOREIGN MATERIAL ACQUISITION AND EXPLOITATION	62,816		62,816
0605126J	127	JOINT THEATER AIR AND MISSILE DEFENSE ORGANIZATION	55,282		55,282
0605128D8Z	128	CLASSIFIED PROGRAM USD(P)			
0605130D8Z	129	FOREIGN COMPARATIVE TESTING	34,910		34,910
0605161D8Z	130	NUCLEAR MATTERS-PHYSICAL SECURITY	4,475		4,475
0605170D8Z	131	SUPPORT TO NETWORKS AND INFORMATION INTEGRATION	14,723		14,723
0605200D8Z	132	GENERAL SUPPORT TO USD (INTELLIGENCE)	4,379		4,379
0605384BP	133	CHEMICAL AND BIOLOGICAL DEFENSE PROGRAM	100,082		100,082
0605502BR	134	SMALL BUSINESS INNOVATION RESEARCH			
0605502C	135	SMALL BUSINESS INNOVATIVE RESEARCH - MDA			
0605502D8Z	136	SMALL BUSINESS INNOVATIVE RESEARCH			
0605502E	137	SMALL BUSINESS INNOVATIVE RESEARCH			
0605502S	138	SMALL BUSINESS INNOVATIVE RESEARCH			

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0605790D8Z	139	SMALL BUSINESS INNOVATION RESEARCH/CHALLENGE Anti-tamper software systems	2,165	3,000 [3,000]	5,165
0605798D8Z	140	DEFENSE TECHNOLOGY ANALYSIS	11,040		11,040
0605798S	141	DEFENSE TECHNOLOGY ANALYSIS			
0605799D8Z	142	FORCE TRANSFORMATION DIRECTORATE Program reduction	20,701	-15,000 [-15,000]	5,701
0605801KA	143	DEFENSE TECHNICAL INFORMATION CENTER (DTIC)	52,696		52,696
0605803SE	144	R&D IN SUPPORT OF DOD ENLISTMENT, TESTING AND EVALUATION	25,435		25,435
0605804D8Z	145	DEVELOPMENT TEST AND EVALUATION	20,396		20,396
0605897E	146	DARPA AGENCY RELOCATION	28,000		28,000
0605898E	147	MANAGEMENT HQ - R&D	52,700		52,700
0606100D8Z	148	BUDGET AND PROGRAM ASSESSMENTS	5,878		5,878
0301555G	149	CLASSIFIED PROGRAM	[]		[]
0301556G	150	SPECIAL PROGRAM	[]		[]
0303166D8Z	151	SUPPORT TO INFORMATION OPERATIONS (IO) CAPABILITIES	30,039		30,039
0303169D8Z	152	INFORMATION TECHNOLOGY RAPID ACQUISITION	5,254		5,254
0305103E	153	CYBER SECURITY INITIATIVE Program reduction	50,000	-25,000 [-25,000]	25,000
0305193D8Z	154	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	17,625		17,625
0305193G	155	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	[]		[]
0305400D8Z	156	WARFIGHTING AND INTELLIGENCE-RELATED SUPPORT	831		831
0901585C	157	PENTAGON RESERVATION	19,734		19,734
0901598C	158	MANAGEMENT HQ - MDA	86,453		86,453

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0901598D8W	159	IT SOFTWARE DEV INITIATIVES	599		599
		SUBTOTAL, RDT&E MANAGEMENT SUPPORT, DEFENSE-WIDE	961,508	-28,500	933,008
		OPERATIONAL SYSTEMS DEVELOPMENT			
0604130V	160	DEFENSE INFORMATION SYSTEM FOR SECURITY (DISS)	11,533		11,533
0605127T	161	PARTNERSHIP FOR PEACE (PFP) INFORMATION MANAGEMENT SYSTEM	2,496		2,496
0607384BP	162	CHEMICAL AND BIOLOGICAL DEFENSE (OPERATIONAL SYSTEMS DEVELOPMENT)	10,274		10,274
0607828D8Z	163	JOINT INTEGRATION AND INTEROPERABILITY	49,371		49,371
0204571J	164	JOINT STAFF ANALYTICAL SUPPORT	8,030		8,030
0208043J	165	CLASSIFIED PROGRAMS	1,728		1,728
0208045K	166	C4I INTEROPERABILITY	76,226		76,226
0301011G	167	CRYPTOLOGIC ACTIVITIES	[]		[]
0301144K	168	JOINT/ALLIED COALITION INFORMATION SHARING	19,073		19,073
0301301L	169	GENERAL DEFENSE INTELLIGENCE PROGRAM	[]		[]
03011318BB	170	HUMINT (CONTROLLED)	[]		[]
0301371G	171	CYBER SECURITY INITIATIVE - CCP	[]		[]
0301372L	172	CYBER SECURITY INITIATIVE - GDIP	[]		[]
0301555BB	173	CLASSIFIED PROGRAMS	[]		[]
0301555BZ	174	CLASSIFIED PROGRAMS	[]		[]
0301556BB	175	SPECIAL PROGRAM	[]		[]
0301556BZ	176	SPECIAL PROGRAM	[]		[]
0302016K	177	NATIONAL MILITARY COMMAND SYSTEM-WIDE SUPPORT	615		615

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0302019K	178	DEFENSE INFO INFRASTRUCTURE ENGINEERING AND INTEGRATION	16,054		16,054
0303126K	179	LONG-HAUL COMMUNICATIONS - DCS	8,508		8,508
0303131K	180	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS NETWORK (MEECN)	9,685		9,685
0303135G	181	PUBLIC KEY INFRASTRUCTURE (PKI)	15,577		15,577
0303136G	182	KEY MANAGEMENT INFRASTRUCTURE (KMI)	49,578		49,578
0303140D8Z	183	INFORMATION SYSTEMS SECURITY PROGRAM	13,459		13,459
0303140G	184	INFORMATION SYSTEMS SECURITY PROGRAM	394,074	1,000	395,074
		Software assurance education		[1,000]	
0303140K	185	INFORMATION SYSTEMS SECURITY PROGRAM			
0303148K	186	DISA MISSION SUPPORT OPERATIONS	2,181		2,181
0303149J	187	C4I FOR THE WARRIOR	3,662		3,662
0303149K	188	C4I FOR THE WARRIOR			
0303150K	189	GLOBAL COMMAND AND CONTROL SYSTEM	36,374	-2,000	34,374
		SORTS		[-2,000]	
0303153K	190	JOINT SPECTRUM CENTER	19,319		19,319
0303170K	191	NET-CENTRIC ENTERPRISE SERVICES (NCES)	429		429
0303610K	192	TELEPORT PROGRAM	2,060		2,060
0304210BB	193	SPECIAL APPLICATIONS FOR CONTINGENCIES	16,225		16,225
0304345BQ	194	NATIONAL GEOSPATIAL-INTELLIGENCE PROGRAM (NGP)	[]		[]
0305102BQ	195	DEFENSE GEOSPATIAL-INTELLIGENCE PROGRAM	[]		[]
0305103D8Z	196	CYBER SECURITY INITIATIVE	1,000		1,000
0305103G	197	CYBER SECURITY INITIATIVE	[]		[]
0305103K	198	CYBER SECURITY INITIATIVE	12,800		12,800

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0305125D8Z	199	CRITICAL INFRASTRUCTURE PROTECTION (CIP)	12,700		12,700
0305127BZ	200	FOREIGN COUNTERINTELLIGENCE ACTIVITIES	[]		[]
0305146BZ	201	DEFENSE JOINT COUNTERINTELLIGENCE ACTIVITIES	2,947		2,947
0305183L	202	DEFENSE HUMAN INTELLIGENCE (HUMINT) ACTIVITIES	[]		[]
0305166D8Z	203	POLICY R&D PROGRAMS	8,237		8,237
0305193G	204	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	[]		[]
0305193L	205	INTELLIGENCE SUPPORT TO INFORMATION OPERATIONS (IO)	[]		[]
0305199D8Z	206	NET CENTRICITY	12,716		12,716
0305202G	207	DRAGON U-2	[]		[]
0305206G	208	AIRBORNE RECONNAISSANCE SYSTEMS	[]		[]
0305207G	209	MANNED RECONNAISSANCE SYSTEMS	[]		[]
0305208BB	210	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	3,165		3,165
0305208BQ	211	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	[]		[]
0305208G	212	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	[]		[]
0305208K	213	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	3,227		3,227
0305208L	214	DISTRIBUTED COMMON GROUND/SURFACE SYSTEMS	[]		[]
0305219BB	215	MQ-1 PREDATOR A UAV	[]		[]
0305229G	216	REAL-TIME ARCHITECTURE DEVELOPMENT (RT10)	13,679		13,679
0305866L	217	DIA SUPPORT TO SOUTHCOM INTELLIGENCE ACTIVITIES	[]		[]
0305880L	218	COMBATANT COMMAND INTELLIGENCE OPERATIONS	[]		[]
0305883L	219	HARD AND DEEPLY BURIED TARGET (HDBT) INTEL SUPPORT	[]		[]
0305884L	220	INTELLIGENCE PLANNING AND REVIEW ACTIVITIES	[]		[]

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
0305885G	221	TACTICAL CRYPTOLOGIC ACTIVITIES Final e-Curfew	[]	[25,000] [25,000]	[]
0305889G	222	COUNTERDRUG INTELLIGENCE SUPPORT	[]		[]
0307141G	223	INFORMATION OPERATIONS TECHNOLOGY INTEGRATION & TOOL DEV	[]		[]
0307207G	224	AERIAL COMMON SENSOR	[]		[]
0708011S	225	INDUSTRIAL PREPAREDNESS Industrial base innovation fund	20,480	30,000 [30,000]	50,480
0708012S	226	LOGISTICS SUPPORT ACTIVITIES	2,846		2,846
0902298J	227	MANAGEMENT HEADQUARTERS (JCS)	3,401		3,401
1001018D8Z	228	NATO JOINT STARS	27,756		27,756
1130435BB	229	STORM			
1160279BB	230	SMALL BUSINESS INNOVATIVE RESEARCH/SMALL BUS TECH TRANSFER PILOT PROG			
1160403BB	231	SPECIAL OPERATIONS AVIATION SYSTEMS ADVANCED DEVELOPMENT	43,977		43,977
1160404BB	232	SPECIAL OPERATIONS TACTICAL SYSTEMS DEVELOPMENT	13,263		13,263
1160405BB	233	SPECIAL OPERATIONS INTELLIGENCE SYSTEMS DEVELOPMENT	39,125		39,125
1160408BB	234	SOF OPERATIONAL ENHANCEMENTS	48,137		48,137
1160421BB	235	SPECIAL OPERATIONS CV-22 DEVELOPMENT	38,229		38,229
1160425BB	236	SPECIAL OPERATIONS AIRCRAFT DEFENSIVE SYSTEMS			
1160426BB	237	OPERATIONS ADVANCED SEAL DELIVERY SYSTEM (ASDS) DEVELOPMENT	7,090		7,090
1160427BB	238	MISSION TRAINING AND PREPARATION SYSTEMS (MTPS)	4,052		4,052
1160428BB	239	UNMANNED VEHICLES (UV)	1,527		1,527
1160429BB	240	MC130J SOF TANKER RECAPITALIZATION	4,659		4,659

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
1160477BB	241	SOF WEAPONS SYSTEMS	2,759		2,759
1160478BB	242	SOF SOLDIER PROTECTION AND SURVIVAL SYSTEMS	3,190		3,190
1160479BB	243	SOF VISUAL AUGMENTATION, LASERS AND SENSOR SYSTEMS	3,495		3,495
1160482BB	244	SOF ROTARY WING AVIATION	3,822		3,822
1160483BB	245	SOF UNDERWATER SYSTEMS	3,142		3,142
1160484BB	246	SOF SURFACE CRAFT	5,206		5,206
1160488BB	247	SOF PSYOP	15,554		15,554
1160489BB	248	SOF GLOBAL VIDEO SURVEILLANCE ACTIVITIES	14,686		14,686
1160490BB	249	SOF OPERATIONAL ENHANCEMENTS INTELLIGENCE	8,729		8,729
		SUBTOTAL, OPERATIONAL SYSTEMS DEVELOPMENT, DEFENSE-WIDE	1,152,127	29,000	1,181,127
999		CLASSIFIED PROGRAMS	3,805,519	25,000	3,830,519
		Total, RDT&E Defense-Wide	21,499,229	-574,500	20,924,729

Title II - RDT&E
(Dollars in Thousands)

<u>Program Element</u>	<u>Line</u>	<u>Program Title</u>	<u>FY2009 Request</u>	<u>Senate Change</u>	<u>Senate Authorized</u>
		OPERATIONAL TEST & EVALUATION, DEFENSE			
0605118OTE	1	OPERATIONAL TEST AND EVALUATION	53,196		53,196
0605131OTE	2	LIVE FIRE TEST AND EVALUATION	11,572		11,572
0605814OTE	3	OPERATIONAL TEST ACTIVITIES AND ANALYSES	124,004		124,004
		Total, Operational Test & Evaluation, Defense	188,772	0	188,772
		TOTAL RDT&E	79,615,941	117,439	79,733,380

Defense Experimental Program to Stimulate Competitive Research

The budget request included \$2.8 million in PE 61114D8Z for the Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The committee notes that this program was funded at \$16.9 million in fiscal year 2008 and, according to military service program managers, has funded meritorious basic research programs that have contributed to defense capabilities. The program is currently undergoing a congressionally directed independent assessment that will serve to improve the management and execution of the program. The committee recommends an additional \$8.0 million for the DEPSCoR program.

In-vitro models for biodefense vaccines

The budget request included \$53.2 million in PE 61384BP for chemical and biological defense basic research, but no funds for development of lung models to improve vaccines. The committee recommends an increase of \$1.0 million in PE 61384BP for development of an in-vitro lung model to support biodefense vaccines against aerosolized pathogens. The committee notes that there is insufficient understanding of the interaction between human lung immune cells and aerosolized biological agents. In order to design effective vaccines against such threats, it would be important to improve this understanding.

Superstructural particle evaluation

The budget request included \$53.2 million in PE 61384BP for chemical and biological defense basic research. This basic research improves the understanding of the scientific processes for protection against chemical and biological agents. The committee recommends an increase of \$3.0 million in PE 61384BP to continue efforts in superstructural particle evaluation and characterization with targeted reaction analysis. This program shows potential as an enabling technology for other efforts in the chemical and biological defense area.

Next-generation over-the-horizon radar

The budget request included \$31.3 million for the Lincoln Laboratory Research Program in PE 62234D8Z, but no funds for next-generation over-the-horizon radar development (OTHR). The budget request did include \$1.0 million in PE 63648D8Z to begin a Joint Capability Technology Demonstration (JCTD) of a next-generation OTHR. The Department of Homeland Security (DHS) is expected to contribute funds to this JCTD in fiscal year 2009 as well.

The Joint Requirements Oversight Council has validated a Joint Capabilities Document for homeland air and cruise missile defense of North America, which documents significant surveillance gaps in the approaches to the United States. The OTHR JCTD is intended to address these vulnerabilities. U.S. Northern Command and North American Aerospace Defense Command (NORTHCOM/NORAD), the sponsors of the JCTD, submitted a high-priority requirement to augment funding for the OTHR JCTD to conduct technology risk reduction activities.

This JCTD will capitalize on the large investment of the Australian Ministry of Defense in OTHR technology. The risk-reduction initiative would procure a copy of a brass board next-generation radar design developed by Australia. This brass board would be used to develop and test technology to enhance performance.

The committee believes that this project merits support and applauds the joint efforts of the Department of Defense and DHS to find innovative solutions for securing U.S. airspace. The committee recommends an increase of \$2.8 million in PE 62234D8Z, and \$1.9 million in Other Procurement, Air Force, line 24, General Information Technology, for OTHR JCTD risk reduction.

Chemical agent fate response planning tool

The budget request included \$203.7 million in PE 62384BP for chemical and biological defense applied research, but included no funds to develop analytic tools to plan appropriate responses to chemical exposures. The committee recommends an increase of \$2.0 million in PE 62384BP to develop an appropriate response planning tool that uses the chemical agent fate database and supports consequence management and operations effects assessments. Such a response planning tool would fulfill a requirement of the Joint Operational Effects Federation.

The committee notes that the chemical agent fate program is a joint service program that focuses on the acquisition and use of chemical warfare agent persistence data to improve the ability of U.S. forces to protect themselves and their equipment while operating in a chemically contaminated environment. It also has applications to domestic consequence management planning and response.

Chemical and biological applied research

The budget request included \$203.7 million in PE 62384BP for chemical and biological defense applied research. The committee recommends an increase of \$5.0 million in PE 62384BP to develop advanced processes for the production of molecular therapeutics against botulism, with the goal of advancing to Phase I clinical studies. The committee notes that there is no vaccine approved and licensed by the Food and Drug Administration against the botulism toxin, and therapeutic approaches may hold significant potential.

The committee also recommends an increase of \$4.0 million in PE 62384BP for rapid response countermeasures for chemical and biological threats. This effort is intended to provide a low-cost sensor that can be widely distributed and networked to provide early warning capabilities. This effort would address issues related to sensitivity, selectivity, miniaturization, manufacturability, and low-cost production. The committee notes that progress in these areas would permit a significant improvement in chemical and biological sensors.

Chemical and biological infrared detector

The budget request included \$203.7 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 minimal false alarm rates. This technology may provide an end product with significantly lower logistical burden than other technologies.

Multivalent Marburg and Ebola vaccine

The budget request included \$203.7 million in PE 62384BP for chemical and biological defense applied research, but included no funds to advance Marburg/Ebola vaccine candidates into clinical trials. The committee recommends an increase of \$4.5 million in PE 62384BP to help move candidate vaccines against Marburg and Ebola viruses into Phase I clinical trials, including clinical lot production for human injection, human safety trials, and human dose escalation studies. The Department of Defense is currently evaluating five different vaccine technologies for Marburg and Ebola, and this additional funding would permit progress toward selecting the most promising candidate for advanced development.

DARPA technology transition

The budget request included \$371.5 million in PE 62702E, \$107.9 million in PE 63286E, and \$287.0 million in PE 63287E for Defense Advanced Research Projects Agency (DARPA) science and technology projects. The committee recommends reductions of \$4.5 million in PE 62702E for laser guided bullet research; \$3.0 million in PE 63286E for the A160 program; and \$10.0 million in PE 63287E for the Integrated Sensor is Structure program. The committee is concerned that these programs do not have clearly delineated transition paths in place, or programmed funding in place, so that they will be adopted by any service program of record or science and technology activity.

The committee commends DARPA's efforts to invest in high risk, high payoff technologies, but believes that scarce science and technology resources should be used in a manner well coordinated between the science and technology executives of the military services and DARPA.

Three-dimensional integrated circuit technologies

The budget request included \$211.5 million in PE 62716E for applied research in electronics technology. To support efforts to miniaturize defense technologies, the committee recommends an additional \$2.5 million for research on three-dimensional integrated circuits for use in sensors and other defense applications.

Blast mitigation and protection

The budget request included \$211.1 million in PE 62718BR for technologies to defeat weapons of mass destruction. The committee recommends an increase of \$2.0 million in PE 62718BR for blast mitigation and protection analysis and software development to improve the Vulnerability Assessment and Protection Option analytic tool used by the Defense Threat Reduction Agency to predict the effects of explosive blasts on buildings, and to design protection and mitigation options for military facilities. Given the threat of terror-

ists using high explosives, this analytic capability is an important component of force protection assessment and planning.

Comprehensive National Incident Management System

The budget request included \$211.1 million in PE 62718BR for technologies to defeat weapons of mass destruction (WMD). The committee recommends an increase of \$4.0 million in PE 62718BR for the Comprehensive National Incident Management System being developed by the Defense Threat Reduction Agency to improve national capabilities to analyze potential catastrophic events such as pandemic influenza and terrorist attacks using WMD. This technology has the potential to significantly improve the ability of the Department of Defense and U.S. Northern Command to analyze, model, and plan for such catastrophic events, including the ability to provide support to civil authorities for consequence management of such events.

Special operations technologies

The budget request included \$23.1 million in PE 116401BB for special operations technology development. The committee notes that the United States Special Operations Command (SOCOM) has highlighted “tagging, tracking, and locating” as a key technology challenge. To support development of tracking technologies, the committee recommends an additional \$2.0 million in PE 116401BB for the development of multi-sensor data fusion systems to enhance detection and discrimination of targets hidden in foliage.

The budget request included \$2.5 million in PE 1160407BB for special operations forces medical technology development. The committee recommends an increase of \$1.5 million for the development of portable devices to diagnose traumatic brain injuries.

Blast trauma research

The budget request included \$80.0 million in PE 63122D8Z for technology support for combating terrorism. To help address issues of traumatic brain injuries suffered by military personnel, the committee recommends an increase of \$2.0 million for development of threshold blast-induced traumatic brain injury data that will provide safe weapons operations guidelines, safe standoff distances for the use of explosions in combat training and operations, and inform engineering design considerations of force protection equipment. The committee directs that this work be performed in coordination with the activities of the Department of Defense Blast Injury Research Program Coordinating Office.

Blackswift

The budget request included \$70.0 million in PE 63287E and \$50.0 million in PE 35206F for the Blackswift Test Bed. The Blackswift program seeks to develop “an extended duration hypersonic test bed which will allow for the study of tactics for a hypersonic airplane.” The committee recommends a reduction of \$40.0 million from PE 63287E for the Blackswift program. The committee directs the Defense Advanced Research Projects Agency (DARPA), Director of Defense Research and Engineering (DDRE),

the Air Force, the Prompt Global Strike Office, and the newly established Joint Technology Office for Hypersonics to review the program to ensure that it is focused on addressing the highest priority hypersonics technological gaps in order to operationally field hypersonic capabilities in the future. The committee recommends that the remaining \$30.0 million requested for Blackswift in PE 63287E be used to continue the program.

The committee notes that the 2006 National Research Council report, "Future Air Force Needs for Survivability", states:

Hypersonic missiles with ranges comparable to those of current missiles could increase targeting timeliness and flexibility and thus increase operational utility in the 2018 time frame. It is not clear, however, whether a hypersonic cruise aircraft (other than a missile) designed for long-range flight and recovery offers unique capability and operational utility. Furthermore, it is unlikely that such an air-breathing hypersonic platform, other than a missile, will be available in the near term.

The committee notes that although it is widely agreed that the best opportunity for near-term transition of hypersonics technology will be in cruise missile or conventional strike systems, especially to support time critical and prompt global strike missions, sufficient resources for research, development, or testing of the systems has never been focused, coordinated, or sustained within the Department of Defense. Examples of these programs include the DARPA Falcon Hypersonic Technology Vehicle (HTV-2), the Air Force's X-51 program and the now terminated HyFly and Revolutionary Approach to Time Critical Long-Range Strike Project (RATTLRS) programs. The committee feels that these programs have all suffered from a lack of investment in addressing fundamental technical issues and insufficient resources for required flight test and demonstration activities.

The committee further notes that many fundamental research and technology challenges related to hypersonics flight were identified by both the DDRE National Aerospace Initiative and the 2004 National Research Council's "Evaluation of the National Aerospace Initiative," including air-breathing propulsion and flight test, materials, thermal protection systems, structures, integrated vehicle design and multidisciplinary optimization, and integrated ground testing and numerical simulation/analysis remain insufficiently funded. In addition, there is still no set of approved requirements for any hypersonic missile or aircraft.

Finally, the committee notes that the Blackswift program has been projected to cost at least \$800.0 million, with DARPA and the Air Force sharing the cost according to a recent memorandum of understanding. Given the severe constraints on the Air Force budget, especially in science and technology and test and evaluation, the committee is not convinced that the Air Force will be able to provide the resources necessary to keep this ambitious program on schedule or on budget, especially since it is not tied to any specific requirement. The committee notes that one of the drivers of the technical program is the need to have the aircraft perform typical aircraft maneuvers, such as an aileron roll, although it is not clear

why that will necessarily enhance the program's probability of transition into formal acquisition. The committee also directs that the Air Force and DARPA work to ensure that the flight test program is consistent with the projected goals of the program.

Further, the Air Force (AF) budget request included \$50.0 million in PE 35206F to "provide a temporary repository for AF funds supporting DARPA Blackswift unmanned, hypersonic ISR [intelligence, surveillance, and reconnaissance] and strike vehicle." The committee recommends a reduction of \$10.0 million for this effort. The committee directs that the remaining funding be invested in addressing the highest priority technological challenges to meet Air Force needs in hypersonics technology.

Engineered biological detectors

The budget request included \$337.9 million in PE 63384BP for chemical and biological defense advanced technology development, but included no funds to develop engineered biological warfare agent detectors. The committee recommends an increase of \$2.7 million in PE 63384BP for development of a prototype biological sensor for assessment and testing as a spiral upgrade of current generation systems. Effective detection of biological warfare agents is the key to contamination avoidance and force protection in a biologically contaminated area.

Improved chemical, biological, and radiological filters

The budget request included \$337.9 million in PE 63384BP for chemical and biological defense advanced technology development, but included no funds for developing improved chemical, biological, and radiological (CBR) filtration capabilities. The committee recommends an increase of \$2.0 million in PE 63384BP for design, engineering, and prototyping of CBR filters. Improved filters would fill a requirement for enhanced collective protection capability against a wide spectrum of threat agents. Such filters would be multi-use and multi-platform configurable, for use in buildings, ships, and shelters.

Raman chemical identification system

The budget request included \$337.9 million in PE 63384BP for chemical and biological defense advanced technology development, but included no funds to develop a miniaturized Raman chemical agent identification system. The committee recommends an increase of \$2.5 million in PE 63384BP for development of a handheld chemical agent identification system that is smaller and more reliable than existing systems, in order to improve the ability of U.S. forces to rapidly identify unknown chemical agents and substances for force protection purposes.

Command and control gap filler joint capabilities technology demonstration

The budget request included \$206.3 million in PE 63648D8Z, Research, Development, Test, and Evaluation, Defense-wide, for Joint Capability Technology Demonstrations (JCTD). While \$4.0 million of these funds will be allocated for the command and control for North American surveillance gap filler JCTD, U.S. Northern Com-

mand (NORTHCOM) testified that the JCTD is underfunded by \$22.8 million. This JCTD is the number one unfunded priority for NORTHCOM.

As identified in the National Strategy for Aviation Security, the National Strategy for Maritime Security, and the Joint Requirements Oversight Council-validated Homeland Air and Cruise Missile Defense of North America Joint Capabilities Document, there are significant airspace surveillance deficiencies and gaps—7 years after September 11, 2001.

The gap filler JCTD will remedy many of these deficiencies by integrating feeds from all the disparate surveillance systems operated by government departments and agencies, including classified systems, and sustain development of new technology for extending air surveillance based on the utilization of ambient radio waves from such sources as television and radio station broadcasts.

The committee recommends an authorization of \$26.8 million for this gap filler JCTD, \$22.8 million above the requested amount.

High performance manufacturing technologies

The budget request included \$12.0 million in PE 63680D8Z for the manufacturing science and technology program. The committee recommends an increase of \$10.0 million for efforts on the development of high performance manufacturing technologies as authorized by title II, subtitle D of the National Defense Authorization Act for Fiscal Year 2006 (Public Law 109–163). The committee directs that the funding be used for development of test beds and prototypes of advanced manufacturing technologies, diffusion of advanced manufacturing processes throughout the industrial base, and the development of technology roadmaps to ensure that the Department of Defense can access required manufacturing and technology capabilities in critical defense technologies.

Defense Logistics Agency technology programs

The budget request included \$19.4 million in PE 63712S for generic logistics research and development and technology demonstrations. Following the recommendation of the Defense Science Board Task Force on DOD Energy Strategy, the committee recommends a series of investments designed to address defense energy requirements using lower cost, reliable, alternative fuel sources. The committee recommends an increase of \$4.0 million for research on advanced biofuels to support military operations, \$10.0 million to continue efforts to develop advanced vehicle fuel cell technologies and demonstrate the use of hydrogen technologies for defense operations, and \$3.0 million for the development of deployable microgrid systems that can utilize a variety of energy sources to produce installation and vehicle power.

The committee notes that the National Research Council Committee on Manufacturing Trends in Printed Circuit Technology recommended that the Department of Defense “should ensure access to new printed circuit board (PrCB) technology by expanding its role in fostering new PrCB design and manufacturing technology.” DOD recently concurred with the recommendations of that report, but has yet to make any significant changes in investment level in this area. In support of that recommendation, the committee rec-

ommends an increase of \$2.0 million for the development of emerging critical interconnect and printed circuit board technology.

Superlattice nanotechnology

The budget request included no funding in PE 63720S for microelectronics technology development and support. The committee notes that the 2007 report on the Defense Nanotechnology Research and Development Program states a goal “to utilize breakthroughs in nanotechnology to provide revolutionary devices and systems to advance warfighter capabilities and battle systems capabilities.” Consistent with that goal, the committee recommends an increase of \$3.0 million in PE 63720S for research on superlattice nanotechnology to develop high power, high temperature devices for defense applications.

Special warfare domain awareness technologies

The budget request included \$113.9 million in PE 63826D8Z for quick reaction special projects. The committee notes that the 2007 Naval Science and Technology (S&T) Strategic Plan’s asymmetric and irregular warfare focus area has a specific objective of enhancing riverine surveillance capabilities through development of “common and persistent” maritime pictures. To support this objective, the committee recommends an increase of \$2.0 million in PE 63826D8Z for development of augmented reality systems to support special warfare situational awareness needs.

Weapon of mass destruction exercises

The budget request included \$114.9 million in PE 63828D8Z for joint experimentation programs. The committee notes that the United States Joint Forces Command’s joint experimentation program funds concept development and experimentation efforts and leads the development, exploration, and assessment of new joint concepts, organizational structures, and emerging technologies. A focus of committee attention this year has been the threat of domestic use of weapons of mass destruction (WMD) by terrorist groups, and the capabilities of the Department of Defense to participate in actions to detect and defeat or mitigate the effects of such an event. Therefore, the committee recommends an increase of \$1.5 million in PE 63828D8Z to support experimentation activities related to the potential use of WMD against critical domestic infrastructure, and directs that such activities involve the participation of other appropriate Federal, local and State entities so as to better inform planning and coordination efforts.

Arrow missile defense program

The budget request included approximately \$1.0 billion for terminal defense programs in PE 63881C, of which \$74.3 million is for the U.S.-Israeli cooperative program of development and procurement for the Israeli Arrow missile defense system. The Arrow Weapon System provides Israel defense against regional ballistic missiles, including against Iran’s Shahab-3 missile. Israel is interested in an upper-tier follow-on to its Arrow system in order to provide more capable protection against missiles with possible weapons of mass destruction warheads.

There are several options under consideration for an upper-tier follow-on to the Arrow system. One would be to develop a new Israeli Arrow-3 interceptor, which would also require the development of a new long-range radar for the system to be effective. Other options include the possibility of using existing U.S. missile defense technologies, such as the Terminal High Altitude Area Defense (THAAD) system or a land-based version of the Standard Missile-3 interceptor, which is used by the Aegis Ballistic Missile Defense (BMD) system, to provide highly effective upper-tier defense for Israel. The committee believes that developing a new Israeli interceptor missile and long-range radar would be very expensive and would duplicate existing U.S. capabilities. Therefore, the committee encourages the full consideration of U.S. systems as potentially the most effective and cost-effective approach to providing an upper-tier missile defense capability for Israel.

The committee recommends an increase of \$30.0 million in PE 63881C for the Missile Defense Agency to fully evaluate the potential of existing U.S. missile defense systems and technologies—particularly a land-based version of the Standard Missile-3 interceptor used in conjunction with a THAAD radar—to provide an operationally effective, timely, and cost-effective upper-tier missile defense capability for Israel. Such an option would be fully interoperable with deployed U.S. missile defense systems, which could reinforce and support the Israeli upper-tier system.

Short-range ballistic missile defense

The budget request included approximately \$1.0 billion for terminal defense programs in PE 63881C, of which \$44.9 million is for cooperative U.S.-Israeli development of a short-range ballistic missile defense system called the David's Sling Weapon System. This system is being developed in response to short-range missile and rocket attacks against Israel from Lebanon. The United States is sharing the development of the system in order 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 recommends an increase of \$28.0 million in PE 63881C to accelerate the development of the David's Sling Weapon System in order to permit timely fielding of the system.

Terminal High Altitude Area Defense

The budget request included approximately \$1.0 billion for terminal defense programs in PE 63881C, of which \$864.9 million is for the Terminal High Altitude Area Defense (THAAD) program. The committee recommends a transfer of \$65.0 million from the budget request, and an increase of \$75.0 million, to a new defense-wide procurement line for long lead procurement of interceptors and ground equipment for THAAD Fire Units 3 and 4. This would permit awarding the long lead contract for both Fire Units 3 and 4 together, and would lead to a more efficient and economical production plan. It would also permit a production rate of three interceptors per month, which would reduce the cost of each interceptor while delivering the capability sooner than the current plan.

The committee is deeply disappointed that the budget request for the THAAD system would delay the delivery of interceptors for

Fire Units 3 and 4 by a year and cause a production gap of 18 months. This delay would be wholly inconsistent with the need to provide our regional combatant commanders with the near-term effective defenses they need to defend our forward-deployed military forces, allies, and friends against the many hundreds of short- and medium-range ballistic missiles that exist today. As specified in section 223 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364), the THAAD system is a high priority near-term system, and the committee believes that delaying its production for budget reasons is unacceptable.

The committee notes that after the budget was submitted and congressional objections were raised to the planned delay, the Missile Defense Agency (MDA) acknowledged that the delay would be unacceptable and indicated that it plans to change the allocation of fiscal year 2009 funding within the funds requested for THAAD, and to use an inflation adjustment, to provide \$65.0 million for long lead procurement of interceptors for Fire Unit 3, to avoid the delay and the production gap. The committee believes MDA should not have planned for the delay and the production gap in the first place.

A number of new requirements were placed on the THAAD program by the Army, including requirements to meet new insensitive munitions standards, and to use a 5-ton truck instead of a High-Mobility Multipurpose Wheeled Vehicle (HMMWV) for the fire control vehicle. Given the extraordinary acquisition authority and flexibility granted to the MDA, the committee is disappointed that MDA did not budget the funds from lower priority programs outside of THAAD to meet these new requirements while keeping the THAAD production schedule on track.

Furthermore, the committee is disappointed that MDA is only planning and budgeting to procure four THAAD Fire Units and 96 THAAD interceptors. As the Commander of the Joint Force Component Command for Integrated Missile Defense told the committee in April 2007, the Joint Capabilities Mix study, conducted by the Joint Staff in association with the combatant commands and the military departments, concluded that the United States needs about twice as many THAAD and Standard Missile-3 interceptors as the number currently planned, just to meet the minimum inventory needs of the combatant commanders to provide protection against existing short- and medium-range missile threats. That minimum number does not include the normally required spare, reserve, and reload missiles.

The committee observes that the United Arab Emirates has expressed an interest in purchasing three THAAD fire units and 144 THAAD interceptors for defense of its territory, which is about the size of Maine. Their purchase would be 50 percent larger than the number of interceptors currently planned by MDA for all U.S. forces, and would include twice as many interceptors per fire unit as MDA is currently planning for U.S. forces.

The committee believes that MDA's current plan for THAAD acquisition is wholly inadequate and needs to be changed to meet the current needs of our combatant commanders. The committee believes that MDA should focus on meeting at least these minimum inventory upper-tier requirements as its highest acquisition pri-

ority, and directs MDA to report to the congressional defense committees by no later than December 1, 2008 on its plans to meet the inventory requirements identified in the Joint Capabilities Mix study.

Additionally, the committee notes that section 223(b) of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181) required the Department of Defense to request any long lead procurement for THAAD Fire Units 3 and 4 in the fiscal year 2009 budget request using procurement funds, rather than research and development (R&D) funds. In addition, section 223(c) of that act prohibits the use of fiscal year 2009 R&D funds for procurement of long lead items for Fire Units 3 and 4. Therefore, the committee recommends that all \$140.0 million in long lead procurement funds for THAAD Fire Units 3 and 4 be provided in a new defense-wide procurement line, as described elsewhere in this report and displayed in the funding tables in this report.

Finally, the committee is concerned that MDA has not planned or budgeted any funds in fiscal year 2009 for procuring a THAAD radar. This would create a gap in THAAD radar production and cause a schedule disconnect between fire unit delivery and radar delivery. Therefore, the committee also recommends an increase of \$40.0 million in the new missile defense procurement funding line for long lead procurement of the THAAD radar for Fire Unit 3, to avoid a production gap and a schedule disconnect. The committee urges MDA to synchronize the THAAD fire unit and radar production and delivery schedules.

Ground-based Midcourse Defense

The budget request included \$2.1 billion in PE 63882C for the ballistic missile defense midcourse element, which is the source of funds for the Ground-based Midcourse Defense (GMD) system deployed in Alaska and California, and for the proposed deployment of the GMD system in Europe.

The budget request included \$19.2 million for long lead procurement of operational 2-stage Ground-Based Interceptors (GBIs) intended for European deployment, “pending successfully meeting the criteria described in Section 226 of the FY08 National Defense Authorization Report [sic].” Section 226 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181) prohibits the use of fiscal year 2008 funds to acquire or deploy the planned operational European 2-stage GBIs until the Secretary of Defense, after receiving the views of the Director of Operational Test and Evaluation (DOT&E), certifies that the system has a high probability of working in an operationally effective manner. The committee recommends a similar provision for fiscal year 2009, as described elsewhere in this report.

The committee notes that the proposed 2-stage interceptor intended for deployment in Poland is still being designed and developed, and is not scheduled to have its first booster flight test until the fourth quarter of fiscal year 2009, and the first planned intercept test in the second quarter of fiscal year 2010. Given that a number of GMD flight tests have been delayed substantially, it is possible that these 2-stage GBI tests will also be delayed.

In an October 2007 report, DOT&E noted the “significant differences” between the proposed GMD deployment with a 2-stage interceptor in Europe and the existing GMD system deployed in the United States with a 3-stage GBI. According to the report, “European defense using GMD assets is a completely new mission area for GMD.” The report provided DOT&E’s initial testing concept for the proposed European deployment, which would include three flight tests, two of which would be intercept tests. The Missile Defense Agency (MDA) originally planned to conduct only two flight tests prior to deploying the system, one of which would be an intercept test. This planned flight test program would not meet the DOT&E minimum test plan concept. It is difficult to envision the certification required of the Secretary of Defense under these circumstances. However, MDA has recently agreed to conduct three flight tests, in accordance with the DOT&E test concept. The committee views this as a positive development.

The committee notes that the long lead items planned for procurement with the \$19.2 million are 100 percent common with both the 2-stage and 3-stage GBIs. Therefore, they could be used for purposes other than being deployed on operational 2-stage GBIs if necessary, including for flight test and ground test interceptors for either 3-stage or 2-stage GBIs. Consequently, the committee recommends authorizing the requested \$19.2 million, with the understanding that if there are problems with the 2-stage GBI development program, these long lead assets would be used for other purposes, rather than being wasted or deployed before the 2-stage GBI is certified as ready.

The committee notes that MDA has changed its GMD test plans to accelerate the testing of the 2-stage GBI intended for European deployment. As part of this change, MDA merged the objectives of two previously planned tests (FTG-06 and FTG-07) into one test (FTG-06), so that the next test could be the first Booster Verification Test (BVT-01) of the 2-stage GBI. Consequently, the target originally planned and budgeted for FTG-07 is no longer needed for that test, since that test’s objectives are being merged into FTG-06. The committee directs MDA to inform Congress of any significant changes in its test and target plans on a timely basis.

The committee notes that the political process toward negotiation and ratification of agreements with Poland and the Czech Republic on the proposed deployment of a missile defense system on their territory will take additional time to resolve itself, possibly through fiscal year 2008. This additional time may delay the ability of MDA to obligate or expend fiscal year 2008 funds into fiscal year 2009, which would presumably delay its ability to obligate and expend fiscal year 2009 funds. The committee is concerned that MDA will have difficulty executing funds requested for fiscal year 2009 for the proposed European deployment.

For example, Congress appropriated \$28.0 million in fiscal year 2008 for site activation activities, but those funds cannot be obligated or expended until the governments of Poland and the Czech Republic give final approval to the proposed deployments on their respective territories. This raises concerns that the funds requested in fiscal year 2009 for site activation will be premature or

unexecutable. The committee directs MDA to keep the congressional defense committees informed regularly of the plans and schedule for executing funds for the proposed European deployment, and of any delays in the planned execution of funds.

Airborne Laser

The budget request included \$421.2 million in PE 63883C for the Airborne Laser (ABL) technology demonstration program. The committee notes that the budget request for ABL included \$15.8 million for planning and analysis related to a possible second ABL aircraft. Since the first planned proof of principle shoot-down demonstration test is not scheduled until the fourth quarter of fiscal year 2009, and since even a successful test will not provide answers to the many questions about whether the ABL technology could be made into an effective, suitable, survivable, and affordable weapon system, the committee believes it is inappropriate to provide any funds in fiscal year 2009 related to a potential second ABL aircraft.

Any decision on whether to proceed with a possible second ABL aircraft should only be made after much more information is available about the likelihood that the system could eventually provide a militarily useful, operationally effective, and affordable missile defense capability, when balanced against other missile defense programs, capabilities, and needs, and also balanced against other Department of Defense priorities and needs. As described elsewhere in this report, the committee recommends a provision that would limit the availability of funds for procurement of a second ABL aircraft until the Secretary of Defense certifies that it has a high probability of accomplishing its mission in an operationally effective, suitable, survivable, and affordable manner.

The Government Accountability Office has noted that the ABL program has a history of significant cost increases and schedule delays. When the program was originally proposed in 1996 it was estimated that the technology demonstration program would cost \$1.0 billion and be completed in 2001. However, after numerous cost and schedule delays, it is now estimated that the technology demonstration program will cost more than \$5.1 billion and be completed in 2010, a 500 percent cost growth and 9-year delay. In 2007, because of integration issues and technical challenges, the program increased its costs by \$253.0 million and added a year to the program schedule.

As the committee noted last year, the ABL program remains a far-term, high risk technology development and demonstration program. If the technology could be made to work in a militarily useful and operationally effective manner, it would not produce an operational capability before 2018. The committee believes there are higher priorities for missile defense funds, particularly the near-term capabilities currently needed by our combatant commanders to defend our forward-deployed forces, allies, and other friendly nations against many existing short- and medium-range ballistic missiles.

Therefore, the committee recommends a reduction in PE 63883C of \$15.8 million, the funds requested for work related to a second ABL aircraft, and a reduction of \$30.0 million for work not related

to maintaining the schedule for the planned proof of principle shoot-down demonstration test in 2009.

Real-time non-specific viral agent detector

The budget request included \$51.3 million in PE 63884BP for chemical and biological defense advanced component development and prototypes, but included no funds for development of a mobile non-specific viral agent detector. The committee recommends an increase of \$4.0 million in PE 63884BP for development of a mobile real-time non-specific viral agent detector that would improve current detection capabilities. The committee notes that this effort could provide a significant upgrade to the Joint Biological Agent Identification and Diagnostic System (JBAIDS). This technology, which would add the capability to detect infectious diseases, would be useful both for forward-deployed forces and for potential domestic consequence management missions.

Ballistic missile defense sensors

The budget request included \$1.1 billion in PE 63884C for radars and other sensors for the Ballistic Missile Defense System (BMDS), including sensors for different missile defense elements.

The committee notes that there is no funding requested in fiscal year 2009 to begin production of the THAAD radar for Fire Unit 3, designated AN/TPY #8, and is concerned that this would result in a production gap and a schedule disconnect with Fire Unit 3. The committee recommends an increase of \$40.0 million in a new defense-wide missile defense procurement funding line for long lead procurement of AN/TPY #8 for THAAD Fire Unit 3, as described elsewhere in this report.

The committee is concerned that the consolidation of all sensor work in one program element may have the unintended consequence of reducing focus on and responsiveness to the needs of the individual elements for the timely production of sensors for the element weapon systems, such as THAAD radars to accompany THAAD fire units. The committee expects the Missile Defense Agency (MDA) to ensure that funding and production of radars for THAAD will be synchronized with the production schedules for their associated fire units.

The committee notes that the budget request included \$26.5 million for the site activation and deployment of a forward-based X-band radar, designated AN/TPY-2 #3, to an undecided location, and \$18.0 million for overseas site security for this radar. Since the MDA has not decided where to deploy such a radar, has not begun negotiations with any foreign nation for such a deployment, and there is no agreement with any foreign nation to deploy such a radar on its soil, the committee believes this funding is premature. Therefore, the committee recommends a reduction of \$26.5 million in PE 63884C for costs related to site activation and deployment of AN/TPY-2 #3 radar to an undecided foreign location, and a reduction of \$18.0 million for overseas site security of AN/TPY-2 #3.

The budget request included \$20.3 million to operationalize the External Sensors Lab boost-phase capabilities. Since there are no boost-phase missile defense systems within a decade of deployment,

the committee believes this funding is premature. The committee recommends a reduction of \$20.3 million in PE 63884C.

The committee is aware of a proposal to enhance the BMDS sensor system by deploying additional shipboard radars to increase the coverage and availability of mobile radar networks, while potentially producing significant cost savings. This mobile sensor enhancement concept is worth evaluating to determine if it would provide a significant improvement to the capability of an integrated BMDS. The committee recommends an increase of \$5.0 million in PE 63884C for the MDA and the Navy to evaluate this concept and determine whether it merits further development.

Kinetic Energy Interceptor

The budget request included \$386.8 million in PE 63886C for the Kinetic Energy Interceptor (KEI) program. This is \$172.8 million more than requested in the fiscal year 2008 budget request for KEI, \$46.7 million more than appropriated, and a very large sum of funds for a program at such an early stage of development. The committee notes that the KEI program was originally conceived as a boost-phase risk reduction alternative to the Airborne Laser (ABL) program because of the high risks associated with the ABL technology development effort.

However, the KEI program is no longer considered primarily a boost-phase program; it is being managed as a technology development program for a mid-course follow-on to the Ground-based Interceptors (GBIs) being deployed as part of the Ground-based Midcourse Defense (GMD) program. The GBIs are scheduled to be deployed through 2013, and will have many years of useful operational life following deployment, so there is no urgent need to develop a follow-on now to a system that will not complete its deployment for another 5 years.

The fiscal year 2008 budget request for KEI focused on developing the technology for a high-performance silo-based interceptor, rather than as a mobile system, with a flight test in 2008. That flight test has now been delayed until 2009 because of technology problems with the development program.

The budget request for KEI represents another significant change in direction and a significant increase in program funding at a time when the program has lost focus and direction, and when the long-range midcourse defense capability is being addressed by the GMD system with its GBI interceptors. The committee is concerned that this level of funding is more than can be effectively executed during fiscal year 2009. The committee believes there are higher priority needs in the missile defense program, such as near-term defenses against existing short- and medium-range missiles, and that the KEI program can and should take more time to develop technologies that may be useful in the decades to come when the GBIs reach the end of their useful operational life, if there is not another capability that is more suitable. Therefore, the committee recommends a reduction of \$45.0 million to PE 63886C for the Kinetic Energy Interceptor development program.

Ballistic missile defense reductions

The budget request included \$432.3 million in PE 63890C for the Ballistic Missile Defense (BMD) Systems Core program; and \$288.3 million in PE 63891C for Missile Defense Agency (MDA) Special Programs. The committee recommends a decrease of \$30.0 million in PE 63890C for BMD Systems Core; and a decrease of \$100.0 million in PE 63891C for MDA Special Programs to partially offset the additional funding needed for the Aegis Ballistic Missile Defense (BMD) program and its Standard Missile-3 (SM-3) interceptor, the Terminal High Altitude Area Defense (THAAD) program, and other high priority near-term missile defense programs described elsewhere in this report. The committee notes that the proposed funding reductions are for projects that are of lower priority than the near-term capabilities provided by the Aegis BMD, SM-3, and THAAD programs, which meet the needs of combatant commanders to defend our forward-deployed forces, allies, and other friendly nations against the existing threat of many hundreds of short- and medium-range ballistic missiles. The Joint Capabilities Mix study concluded that we need about twice as many THAAD and SM-3 interceptors as currently planned just to meet the minimum operational requirements of our regional combatant commanders.

Aegis Ballistic Missile Defense (BMD)

The budget request included \$1.2 billion in PE 63892C for the Aegis Ballistic Missile Defense (BMD) program, including \$57.0 million for long lead procurement of Standard Missile-3 (SM-3) Block IA interceptor missiles. The committee notes that the Aegis BMD system with its SM-3 interceptor is the only midcourse defense system currently being deployed to provide defense against short- and medium-range ballistic missile threats to our forward-deployed forces, allies, and other friendly nations. The Aegis BMD system has had an impressive record of successful tests against short- and medium-range targets, including a multi-mission test against a ballistic missile and an air-breathing threat, and a multiple target intercept against two ballistic missile targets.

The SM-3 missile is being developed to have increasing capability with each successive version, from Block IA, to Block IB, to the Block IIA version being developed jointly with Japan. The Aegis BMD system and its SM-3 interceptor have the potential to provide a significant measure of defensive capability in various regions of the world, and to increase its capability to conduct intercepts based on radar tracks from offboard sensors, known as "engage on remote," and to engage missiles early in their midcourse flight, including in the ascent phase.

The committee notes that the Joint Capabilities Mix (JCM) study, conducted by the Joint Staff, concluded that U.S. combatant commanders need about twice as many SM-3 and THAAD interceptors as currently planned to meet just their minimum operational requirements for defending against the many hundreds of existing short- and medium-range ballistic missiles. The committee is deeply disappointed that the Missile Defense Agency (MDA) has not planned or budgeted to acquire more than a fraction of the SM-3 interceptors needed to meet the warfighters' minimum oper-

ational needs. The committee believes that achieving at least the JCM levels of upper tier interceptors in a timely manner should be the highest priority for MDA, and expects the Agency to modify its plans and budgets to meet our combatant commanders' current operational needs. In section 223 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364), Congress specified the Aegis BMD system and its SM-3 interceptor as a high priority near-term program for the Department of Defense to focus on. As the JCM study makes clear, the Department has failed to do so.

Section 223(b) of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110-181) requires that any long lead or advance procurement for SM-3 Block IA missiles in the fiscal year 2009 budget be requested in procurement funds, rather than in research and development (R&D) funds. Section 223(c) of that act prohibits the use of fiscal year 2009 R&D funds for procurement of long lead items for SM-3 Block IA missiles. The Department chose not to comply with the law, and requested R&D funds for procuring long lead items for the SM-3 missiles. This is not acceptable. The committee notes that the Department is obliged to comply with the law, and expects the Department to do so.

To be consistent with the law, and to correct the Department's failure to comply with the law, the committee recommends that all long lead funds for SM-3 missiles be authorized and appropriated in a new defense-wide procurement line described elsewhere in this report. Accordingly, the committee recommends a transfer of \$57.0 million from PE 63892C to the new procurement line for long lead procurement of SM-3 Block IA missiles. The committee also recommends an increase of \$20.0 million in that new procurement line for the procurement of long lead items for an additional 15 SM-3 interceptors, to begin the process of increasing the inventory of SM-3 missiles toward the JCM levels. The committee notes that MDA does not plan any procurement of SM-3 Block IB missiles after fiscal year 2010, which is inconsistent with the JCM study conclusions concerning the need for about twice as many SM-3 and THAAD missiles as are currently planned. The committee expects MDA to modify its plans and budgets for the fiscal year 2010 budget submission to address the inventory levels indicated by the JCM study.

To address these numerous concerns, the committee recommends an increase of \$80.0 million in PE 63892C for the following projects: \$20.0 million for facilitating an increase in SM-3 production capacity to four missiles per month; \$20.0 million to reduce schedule risk for the Block IB missile; and \$40.0 million for accelerated development of enhanced Aegis BMD capability for "engage on remote" and ascent-phase engagement.

Space Tracking and Surveillance System

The budget request included \$242.4 million in PE 63893C for the Space Tracking and Surveillance System (STSS). The committee notes that the Missile Defense Agency (MDA) has again changed the approach to the STSS program for fiscal year 2009, but the program is out of phase with the schedule of related events.

The committee notes that the launch of the two STSS demonstration prototype satellites has been delayed until November 2008. MDA plans to gather on-orbit data from these demonstration satellites through 2010. These data will be necessary to determine further changes in design of the objective follow-on STSS satellites. The committee is concerned that MDA plans to issue a Request for Proposals for the objective follow-on satellites in August of 2008, several months before the demonstration satellites are launched, and well before actual orbital data are available to help determine the final design parameters of the follow-on satellites.

Furthermore, the committee notes that MDA and the Air Force are just beginning to obtain actual on-orbit data from the initial Space-based Infrared System (SBIRS) satellites, and the results appear both promising and important for understanding what our current capabilities are and what our future requirements will be for the STSS system. Before MDA finalizes its design for the follow-on STSS satellites, the committee believes it should work closely with the Air Force to fully evaluate the data available from the SBIRS system, and evaluate the data provided by the two STSS demonstration satellites. Only then will MDA be in a position to determine the final design for the STSS system. The STSS program schedule is ahead of need, and ahead of the data it will need to determine the final requirements and design for the objective STSS satellites.

Consequently, the committee recommends a decrease of \$50.0 million in PE 63893C, to allow more time to evaluate on-orbit data from SBIRS and from the two STSS demonstration satellites before proceeding with the final design of the objective STSS satellites.

The committee also urges MDA to coordinate with the Air Force to use the SBIRS ground stations for STSS residual operational capability and for the STSS objective system.

Multiple Kill Vehicles

The budget request included \$354.5 million in PE 63894C for the Multiple Kill Vehicle (MKV) program. This is nearly a three-fold increase from the fiscal year 2007 funding level, and an increase of nearly \$125.0 million from the fiscal year 2008 funding level, which represents large budget growth in the MKV program.

The committee notes that the MKV program is at an early development stage, with the preliminary design review not expected until the third quarter of fiscal year 2010 and the first substantive knowledge point not expected until mid-2011. The committee is concerned that the program cannot effectively execute the large amount of funding requested for a program at such an early stage of development. Therefore, the committee recommends a decrease of \$50.0 million in PE 63894C.

The committee believes that, although the MKV program is pursuing a laudable technical goal, there are higher priorities for current missile defense funds, including providing our regional combatant commanders with near-term capabilities to defend our forward-deployed forces, allies, and other friendly nations against the many hundreds of short- and medium-range ballistic missiles that exist today.

The committee also notes that the Missile Defense Agency (MDA) plans to fund two contractor teams with competing technology approaches, but does not plan to have a competitive selection of the best technology in the future. Although MDA is pursuing development of MKV technologies for long-range midcourse defense interceptors and for the Standard Missile-3 Block II interceptor, keeping two contractor teams for the indefinite future is both expensive and possibly unnecessary. The committee urges MDA to consider a competitive selection process to determine which of the two contractor teams has the best technology, and to select that team as the only team to fund in the future.

The committee is also concerned that the consolidation of all kinetic kill vehicle technology development in one office may have the unintended effect of removing continued focus on developing or improving existing and planned unitary kinetic kill vehicles, such as the unitary kill vehicle planned for the Standard Missile-3 Block IIA missile being developed jointly by the United States and Japan.

As the Director of Operational Test and Evaluation has reported, there are still no validated or accredited models and simulations available to provide confidence in the performance of the Exoatmospheric Kill Vehicle deployed on the Ground-Based Interceptors of the Ground-based Midcourse Defense system. It is essential to fully demonstrate and improve the capability of this system, which will likely be deployed for at least 20 years.

The committee urges MDA to consider whether it needs to take mitigating actions to ensure that the unitary kill vehicle programs have sufficient focus and resources, particularly in the event that the MKV efforts do not yield effective or affordable results.

Space test-bed

The budget request included \$29.7 million in PE 63895C for Ballistic Missile Defense System space programs, of which \$10.0 million is for a "space test-bed." The committee recommends a decrease of \$10.0 million in PE 63895C, the entire amount requested for the space test-bed.

As the committee noted last year, the proposed space test-bed is intended to be the initial step toward deploying space-based interceptors. There is no need or justification to deploy space-based interceptors, and therefore no justification to create the proposed space test-bed. The committee notes that Congress denied all funding requested for the proposed space test-bed in fiscal year 2008.

There are, however, numerous real missile threats in existence today for which near-term missile defense capabilities are needed. The Joint Capabilities Mix study has concluded that there is a need for about twice as many Standard Missile-3 and Terminal High Altitude Area Defense interceptors just to meet the minimum operational requirements of the regional combatant commanders against the hundreds and hundreds of short- and medium-range ballistic missiles that currently can target our forward-deployed forces, allies, and other friendly nations. As Congress made clear in section 223 of the John Warner National Defense Authorization Act for Fiscal Year 2007 (Public Law 109-364), the committee believes it is a high priority to fund these near-term effective systems

that meet current combatant commander needs against existing threats.

Missile Defense Agency funding reduction

The budget request included \$9.3 billion for the Missile Defense Agency (MDA) in research, development, test, and evaluation funds. The committee recommends an undistributed reduction of \$268.7 million in MDA funding.

Corrosion control technologies

The budget request included \$5.1 million in PE 64016D8Z for the Department of Defense Corrosion Program. The committee notes that corrosion damage to Department of Defense (DOD) assets has been estimated to lead to a \$20.0 billion annual cost to the Department. The committee supports the research efforts of the DOD Corrosion Program, which seeks to develop and demonstrate new technologies to mitigate the effects of corrosion. To support these efforts the committee recommends an additional \$3.0 million for research on the use of polymer materials and coatings to enhance corrosion prevention and mitigation. The committee also recommends an increase of \$3.5 million to develop comprehensive technical, maintenance, and training systems to reduce asset life cycle costs related to corrosion damage.

Conflict modeling technologies

The budget request included \$6.0 million in PE 64670D8Z for human, social, and cultural behavioral research and engineering. The committee supports enhancing Department of Defense capabilities to model and anticipate future conflicts and better understand political-social systems and their interactions. The committee recommends an increase of \$2.5 million in PE 64670D8Z to continue conflict modeling, planning, and outcomes experimentation activities.

Prompt global strike

The budget request included \$117.6 million in PE 64165D8Z for prompt global strike. The committee recommends an increase of \$30.0 million in PE 64165D8Z and \$45.0 million for the advanced hypersonic boost glide vehicle.

The budget request for prompt global strike included \$40.0 million for the alternative re-entry system/warhead engineering and delivery vehicle options/development, which would support work on various aspects of a biconic re-entry vehicle for use as a possible prompt global strike option. The committee believes that work on the biconic vehicle is premature and therefore recommends that no funds be made available for the manufacture of the biconic vehicle. Work on technologies to support prompt global strike systems generally, such as command destruct, fuze development, and similar generally applicable technologies, however, should continue. The committee notes that the Defense Advanced Research Projects Agency (DARPA) hypersonic glide vehicle HTV-2 is scheduled for testing in fiscal year 2009, and that if these tests are successful, there would be no need for the biconic vehicle.

The committee recommends that of the funds that were included in the budget request for the biconic vehicle, approximately \$15.0 million shall be available for the advanced hypersonic boost glide vehicle in addition to the \$30.0 million for a total of \$45.0 million. The committee notes that funding for the advanced hypersonic boost glide vehicle was previously included in PE63305A. The committee believes that all prompt global strike activities, with the exception of the DARPA funded work on HTV-2, which will terminate at the end of fiscal year 2009, should be consolidated in one budget account.

Net-enabled command and control

The budget request included \$147.3 million in PE 33158K for the Joint Command and Control Program for Net-enabled command and control, as well as \$8.0 million in Procurement, Defense-wide (PDW) Line 21 and \$35.7 million in Operation and Maintenance, Defense-wide (OMDW) Line 120 for the same program. This is out of a total investment of \$227.4 million for the program and nearly \$675.0 million between fiscal years 2007 and 2010 to develop and begin to field the program. The committee recommends decreases of \$90.0 million in PE 33158K, \$25.0 million from OMDW, and \$7.9 million from PDW.

The committee notes that both the Director of Defense Research and Engineering's (DDRE) technology readiness assessment and the Director of Operational Test and Evaluation's ongoing oversight of the Network enabled command and control (NECC) program have raised issues regarding technical risk, aggressive and overly optimistic scheduling, and unclear testing and deployment strategies. The DDRE assessment noted a lack of definition of the program as to requirements or agreement on program definition with stakeholders. The committee understands that these and other NECC program issues could lead to a delay in the Milestone B decision approval for the program.

In addition, the committee notes that the services are currently developing information systems under the Global Command and Control System Family of Systems (GCCS-FOS), which are planned for eventual integration into a single NECC architecture. The committee is not aware of any service that has a well articulated and coordinated transition strategy and deployment and integration schedule for this complex system of systems. Finally, the committee notes that GCCS-FOS technologies have not yet been fully fielded, nor will users and testers have significant operational experience with the newest versions of the GCCS-FOS for a number of years. Since NECC is designed to be the follow-on program for the GCCS-FOS, the committee recommends a reduction in its funding growth until technical risk, testing, and program schedule issues are addressed in a coordinated and joint fashion amongst all stakeholders, and a set of operational lessons learned and capability gaps from GCCS-FOS deployments is developed and analyzed.

Central Test and Evaluation Investment Program

The budget request included \$133.9 million in PE 64940D8Z for the Central Test and Evaluation (T&E) Investment Program man-

aged by the Test Resource Management Center, originally established by the committee in section 231 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107-314). The 2007 Strategic Plan for DOD T&E Resources noted that “outdated threat missile fly-out models reduced the effectiveness of both active and passive countermeasures testing.” To help address this shortfall, the committee recommends an additional \$5.0 million for development of surface-to-air missile hardware simulators. The strategic plan also commented that “the expanded computing capability being deployed in the upcoming C4ISR [command, control, communications, computers, intelligence, surveillance, and reconnaissance] systems will need to be replicated at the (test) ranges by upgrading existing or acquisition of new hardware and software systems.” Consistent with addressing that need, the committee recommends an increase of \$3.5 million for development of range network enterprise systems to support distributed testing.

Anti-tamper technologies

The budget request included \$2.2 million in PE 65790D8Z for Small Business Innovation Research program activities. The committee notes that the 2007 Defense Science Board study, “Mission Impact of Foreign Influence on DOD [Department of Defense] Software,” found that “software deployed across the DOD continues to contain numerous vulnerabilities and weak information security design characteristics.” To address these weaknesses the committee recommends an increase of \$3.0 million for the development of anti-tamper software systems.

Force transformation directorate

The budget request included \$20.7 million in PE 65799D8Z for the force transformation directorate. The committee recommends a reduction of \$15.0 million from this account, and directs that the remaining requested funds be used to transition programs to other activities within the Department of Defense. The committee notes that the disestablishment of the Office of Force Transformation (OFT) has diminished the role that this program plays in driving transformative defense technologies and operational concepts. The committee acknowledges that OFT has made significant contributions to the development of active protection systems and operationally responsive space capabilities, but feels that the Department of Defense needs to reconsider the totality of programs that all seemed to be aimed at a common, laudable purpose of driving force transformation.

The committee believes that the efforts of the Defense Advanced Research Projects Agency, United States Joint Forces Command, and the Joint Capability Technology Demonstration program, among others, can be coordinated to serve the role that was intended for the research and development programs of OFT at its inception. The committee notes that all these efforts are under the oversight or direct control of the Director of Defense Research and Engineering (DDRE), and so directs the DDRE to strongly consider merging force transformation program activities with these other efforts.

Software assurance education and research

The budget request included \$394.1 million in PE 33140G for the Information Systems Security Program, but no funds for the development and integration of secure software design practices in curricula of higher education institutions that teach computer science and software engineering.

The committee recommends an increase of \$1.0 million for this purpose at one of the institutions designated as a National Center of Academic Excellence in Information Assurance Education by the National Security Agency.

Status of Operational Readiness and Training Systems

The budget request included \$36.4 million in PE 33150K for the Global Command and Control System (GCCS). The committee notes that this program includes funding to continue the development, testing, and fielding of the legacy Status of Operational Readiness and Training Systems (SORTS) that is currently being replaced by the Department of Defense's objective system, the Defense Readiness Reporting System. The committee recommends a decrease of \$2.0 million in PE 33150K for SORTS.

Industrial Base Innovation Fund

The budget request included \$20.5 million in PE 78011S for industrial preparedness programs. The committee notes that the 2006 Defense Science Board Task Force on the Manufacturing Technology Program called for increased investment in manufacturing research and technology over a 5-year period to a level of "one percent of the RDT&E budget," to align the Department of Defense with the level of manufacturing technology investments in the early 1980s. The committee notes that for the fiscal year 2009 budget request this would be \$796.0 million. The actual Manufacturing Technology (Mantech) budget request is only \$198.0 million.

The committee further notes that the Director of Defense Research and Engineering called for an increase in funding for "manufacturing science technology" in the range of \$50.0 to \$70.0 million per year. The committee notes that the fiscal year 2009 Mantech budget request is only an increase of \$4.6 million over the fiscal year 2008 budget request and a decrease of \$80.4 million relative to fiscal year 2008 appropriated levels.

The committee notes that investing in innovation in the defense industrial base can only serve to help address many of the issues facing the Department of Defense. For example, the committee believes that the development of innovative manufacturing capabilities can lead to lower cost, more efficient production of defense systems, potentially lead to spin-off commercial technologies that can support national manufacturing and industrial base needs, and address critical manufacturing assured supply chain issues that limit the Department's capability to acquire critical defense equipment and technologies, such as body armor, production of advanced aerospace materials, and electronic components.

Therefore, the committee recommends an increase of \$30.0 million in PE 78011S to continue the Industrial Base Innovation Fund. The committee directs that the funds be executed jointly with the Deputy Under Secretary of Defense for Industrial Policy,

to ensure that critical shortfalls in the defense industrial base are addressed. The committee directs that the highest priority on investments be made in areas that support accelerating the surge production of items likely to be required in near-term military operations and in areas to preserve or expand diminishing critical defense industrial base.

Items of Special Interest

Aegis Ballistic Missile Defense funding

The committee notes that the Aegis Ballistic Missile Defense (BMD) system was used in February for a one-time mission to intercept and destroy a decaying U.S. satellite before it re-entered the earth's atmosphere. This mission, which cost more than \$90.0 million, used considerable Aegis BMD assets and funding. The committee is concerned that the Aegis BMD program will not be fully reimbursed for its expenses in preparing for, testing for, and conducting the mission, as well as for restoring the system's components to their normal missile defense configuration, and replacing the Standard Missile-3 interceptor used for the mission. If the Aegis BMD program is not reimbursed for these expenses, it would not be able to perform some \$90.0 million worth of planned and budgeted activities that have been approved by Congress. This would not be acceptable.

The committee directs the Missile Defense Agency (MDA) and the Department of Defense to ensure that the Aegis BMD program is fully reimbursed for all expenses related to the one-time satellite intercept mission, so that all previously planned, funded, and approved Aegis BMD work will proceed without delay. The committee directs MDA to report to the congressional defense committees by no later than October 1, 2008 on the status of the full reimbursement of the Aegis BMD program.

Agency relocation

The budget request included \$28.0 million in PE 65897E for Defense Advanced Research Projects Agency (DARPA) relocation costs, and another \$45.0 million is programmed for this purpose in fiscal year 2010. The committee believes that the request and budget plan have not yet been adequately justified and directs the Secretary of Defense to develop a report on the plan for DARPA's relocation, as described below. The committee notes that current plans for the relocation call for the Department of Defense (DOD) to lease a new facility for DARPA and to provide funding for the building's outfitting to meet mandated force protection requirements.

The plans also call for the Department to provide funding for other DARPA requirements, including facilities to handle classified information, specialized heating, ventilation, and air conditioning (HVAC) equipment, and specialized information technology requirements. The committee is unclear as to whether the Department will be responsible for restoring the building's specialized modifications at the end of DARPA's new lease to the satisfaction of the building owner and what that cost will be to the government.

The committee is unclear as to the rationale and cost implications for selecting a commercial lease requiring extensive upgrades

over government facilities, which government facilities were evaluated as alternatives to leasing, what cost-benefit analyses were performed, and what criteria were used to finally select an option. The committee understands that the DARPA leasing plan has been approved through the General Services Administration and by the relevant congressional committees of jurisdiction. Nonetheless, the committee notes that upon expiration of its current lease in 2010, DARPA could potentially be relocated onto other existing government property, which may more cost-effectively meet force protection, classified facility, and information technology requirements and therefore save valuable resources.

The committee notes that research agencies like DARPA need to be able to attract the finest technical talent to perform their critical mission for DOD. The committee notes that DARPA has had some difficulty attracting appropriate talent, despite special personnel flexibilities available to the organization, and has plans to use commercial executive search firms to enhance recruiting efforts. The committee understands that an agency's location plays a role in its ability to attract talent, and further notes that some organizations with similar hiring challenges, like the Office of Naval Research and Air Force Office of Scientific Research are located in commercially developed areas, while others, such as the Naval Research Laboratory, the Defense Threat Reduction Agency, the National Security Agency, and the Army's Night Vision Laboratory are not.

The committee directs the Secretary of Defense to provide a report to the congressional defense committees detailing the justification for the agency relocation plans and requested funding, no later than September 1, 2008. The report shall include a cost-benefit analysis comparing the leasing of commercial property and upgrading those facilities to meet DARPA requirements to alternative options; describe which government properties, buildings, and facilities were evaluated as alternatives to commercial leasing; detail the costs that will be incurred to the government to restore the building to the lessor's requirements at the end of the lease; describe the criteria that were finally used to select an option; and include certifications that to perform its mission efficiently, DARPA must maintain a headquarters in the Washington, DC region, that no commercial or government facilities currently exist within that region to meet DARPA's unique requirements, and that the selected plan for relocation represents the best value for the Department.

Executive helicopter program (VH-71A)

The budget request included \$1,047.8 million in PE 64273N for continued development of the executive helicopter, VH-71A. The VH-71A program is intended to provide the replacement helicopter for transportation of the President and Vice President of the United States, heads of state, and other dignitaries. The administration established challenging performance requirements and an aggressive fielding schedule for the program, reflecting an elevated level of urgency to field this new capability for post-9/11 operations. In an effort to manage programmatic risk and meet the stressing demands for this new capability, the program adopted an incremental fielding strategy for the 23 aircraft to be placed in

service. The first portion of the program, called Increment One, would deliver five aircraft, with four of these aircraft used to provide an initial limited capability to fulfill immediate presidential transport requirements. The second portion of the program, called Increment Two, would deliver 19 aircraft to complete all of the presidential support requirements.

The committee is aware that the VH-71A program has encountered significant challenges associated with modifying the selected commercial aircraft to meet the cost and schedule requirements for Increment One. As a result, the Navy plans for only limited employment for Increment One aircraft due to expectations that service life of these helicopters will be limited.

The Navy has found that Increment Two, which was originally planned for concurrent development with Increment One, is beyond the reach of the cost, technical, and schedule baseline established for the program. Faced with this realization, the Department of Defense has restructured the program with a focus on validating requirements, establishing realistic cost and schedule estimates, eliminating concurrency, and developing a new baseline for future budget requirements.

Recognizing that the fiscal year 2008 budget would have been inadequate to support concurrent efforts on both Increment One and Increment Two, the Department issued a "stop work" order on Increment Two. Although the program continues to refine an independent cost assessment in support of future budget decisions, initial estimates point toward a cost overrun of at least 70 percent. This level is well in excess of the percentages that would trigger a breach of the Nunn-McCurdy limits for major acquisition programs.

While it is evident that the VH-71A program will require a Nunn-McCurdy certification in order to proceed with Increment Two, the Department has apparently chosen to wait until submission of the annual Selected Acquisition Report to initiate the certification process. This delay appears to be based on a technical interpretation that, since the government has stopped all work on Increment Two and has neither finalized cost assessments nor revised the program's baseline to reflect the cost growth, it is premature to declare that thresholds have been breached. Under this scenario, the Navy would potentially receive fiscal year 2009 funding and be in a position to sign a contract modification for Increment Two prior to declaring a Nunn-McCurdy breach. Subsequent to signing such a contract, they would then declare a Nunn-McCurdy breach and, thereby, trigger the certification process that this provision of law requires.

The committee realizes that the administration has spent significant time conducting senior level analysis and review of this critical program's requirements, cost, and schedule, in conjunction with the ongoing restructure and deliberations on the fiscal year 2010 budget. However, the committee is concerned that program cost and schedule may be further impacted by potential delays associated with meeting the requirements for Nunn-McCurdy certification, and encourages the Department to initiate proceedings in accordance with section 2433 of title 10, United States Code. The committee notes that the Secretary of the Air Force did not wait

until either the Air Force had signed a contract or had received additional funds before declaring a Nunn-McCurdy breach on the C-5 reliability enhancement and re-engining program.

Because of all these concerns, the committee directs the Secretary of the Navy to submit a VH-71A report to the congressional defense committees outlining VH-71A program:

- (1) performance requirements;
- (2) revised cost estimates;
- (3) causes for cost growth;
- (4) detailed breakout of cost growth related to under-estimated requirements; and
- (5) actions being implemented to reduce and control development and production costs.

Additionally, the committee directs the Secretary to identify alternatives for extending the service life of Increment One aircraft and increasing their utility in the effort to provide greater return on this investment.

The committee directs that, of the amounts authorized for fiscal year 2009 for VH-71A Executive Helicopter Development (PE 64273N), the Secretary may obligate no funding for Increment Two efforts until: (1) the Defense Department completes VH-71A unit cost reporting requirements as prescribed by section 2433 of title 10, United States Code; and (2) the Secretary of the Navy submits the VH-71A report described above to the congressional defense committees.

Expeditionary Fighting Vehicle

Military threats to amphibious operations have forced the Navy and Marine Corps to develop a concept of operations, referred to as Operational Maneuver from the Sea, for launching an amphibious assault from over the horizon. The Navy and Marine Corps are fielding the full capability required to launch amphibious assaults from 25 miles at sea—with one critical exception: the Expeditionary Fighting Vehicle (EFV). Designed to rapidly transport marines ashore and maneuver to inland objectives, the EFV is the missing component of the Marine Corps' amphibious assault triad, which also includes the Landing Craft Air Cushion and the MV-22 Osprey.

Under current plans, the EFV will not achieve Initial Operational Capability (IOC) until 2015 and Full Operational Capability (FOC) until 2025—about 35 years after the EFV program entered development. Without the EFV, amphibious assault operations would require the Navy to bring amphibious ships and escorts close to shore to disembark the aged Advanced Amphibious Vehicles, exposing the ships and the marines to anti-access threats. The committee is very concerned that the EFV program plan places the Marine Corps' primary mission capability—amphibious operations—at risk for an unacceptably long duration.

The committee understands that the EFV program has experienced serious developmental delays and cost growth, which have added years to the schedule. The program is emerging from a critical Nunn-McCurdy cost breach, and the restructured program has added 4 years of further development prior to a full-rate production decision. The program's cost challenges, however, are compounded

by the protracted production schedule planned for the vehicle. The Marine Corps projects that its budget will permit a production rate limited to 55 vehicles per year once full-rate production begins in 2016. This low rate of production will delay full fielding while discarding potential cost benefits afforded by more economic rates of procurement.

The committee believes that greater priority must be given to achieving EFV Full Operational Capability within the Department of Defense's equation for balancing requirements with developmental risk and budget constraints. Accordingly, the committee directs the Secretary of the Navy to evaluate cost and risk for alternatives that would improve upon current EFV Initial Operational Capability projections, and accelerate Full Operational Capability to meet the 2020 threat baseline. The Secretary shall report the results of this evaluation to the congressional defense committees with submission of the fiscal year 2010 budget request. The report shall include an assessment of total program cost, annual budget requirements, and technical risk for the accelerated program, and compare these results with the program of record. Additionally, the report shall provide an assessment of the operational impact and risk to amphibious assault capabilities associated with delaying FOC to 2025.

Global Positioning System

The committee is concerned that the space, ground control, and user equipment segments of the Global Positioning Satellite system (GPS) program are not well synchronized. The committee notes that the ground control needed to utilize the M-code on the GPS IIR satellites will not be fully available until after the last of the GPS IIR satellites is launched and the user equipment will not be fully fielded until after the first of the M-code GPS IIR satellites reaches the end of its useful life. The first M-code GPS IIR satellite was launched in September 2005. The M-code is a special code to allow military users to continue using GPS signals in an area of operation while jamming other signals.

Looking ahead to the GPS III satellites, the committee notes that the possibility for a similar disconnect among space, ground control, and user equipment is significant. The Air Force reduced anticipated funding in the early years and the GPS schedule is compressed with very little margin. Moreover, the contract award is late, with the space segment originally scheduled for award in 2007. The committee is concerned that adequate management attention be paid to the GPS program to minimize additional risks to the program.

Improved commercial imagery integration

The committee notes that the government is investing substantial funds in the commercial imagery industry to meet important operational requirements of the combatant commands and the intelligence community. However, the tasking, processing, exploitation, and dissemination (TPED) systems for commercial imagery and imagery collected by government-owned assets are not integrated, which causes commercial imagery resources to be underutilized and other inefficiencies. The government needs to be able

to task commercial imagery collection against specific areas without revealing that fact to the world, to be able to share commercial imagery within the national security community freely, and to routinely and automatically task commercial satellites when they are the logical choice to satisfy a requirement. These needs will become critical if the administration and Congress decide to shift a larger proportion of imagery collection requirements to the commercial sector.

Accordingly, the committee directs that, as feasible within available funding, the National Geospatial Intelligence Agency and the National Reconnaissance Office complete the tasking prototype effort, including an integrated constellation optimization tool; integrate commercial imagery data streams into the existing national dissemination network; and begin systems engineering and development to enable SECRET-level operations within the commercial-data provider facilities and networks.