S. HRG. 111–701, PT. 4

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2011

## HEARINGS

BEFORE THE

## COMMITTEE ON ARMED SERVICES
## UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

ON

**S. 3454**

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 2011 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR, AND FOR OTHER PURPOSES

**PART 4**
**AIRLAND**

APRIL 13 AND 15, 2010

Printed for the use of the Committee on Armed Services

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# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2011

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**TUESDAY, APRIL 13, 2010**

U.S. SENATE,
SUBCOMMITTEE ON AIRLAND,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## DEPARTMENT OF THE AIR FORCE AND DEPARTMENT OF THE NAVY TACTICAL AIRCRAFT PROGRAMS

The subcommittee met, pursuant to notice, at 9:35 a.m. in room SR–222, Russell Senate Office Building, Senator Joseph I. Lieberman (chairman of the subcommittee) presiding.

Committee members present: Senators Lieberman, Hagan, Begich, Burris, Kaufman, Chambliss, Thune, and Brown.

Majority staff member present: Creighton Greene, professional staff member.

Minority staff members present: Joseph W. Bowab, Republican staff director; Pablo E. Carrillo, minority investigative counsel; Daniel A. Lerner, professional staff member; David M. Morriss, minority counsel; and Christopher J. Paul, professional staff member.

Staff assistants present: Jennifer R. Knowles and Brian F. Sebold.

Committee members' assistants present: Christopher Griffin, assistant to Senator Lieberman; Patrick Hayes, assistant to Senator Bayh; Gordon I. Peterson, assistant to Senator Webb; Perrin Cooke, assistant to Senator Hagan; Roosevelt Barfield, assistant to Senator Burris; Sandra Luff, assistant to Senator Sessions; Clyde A. Taylor IV, assistant to Senator Chambliss; Jason Van Beek, assistant to Senator Thune; and Scott M. Clendaniel, assistant to Senator Brown.

### OPENING STATEMENT OF SENATOR JOSEPH I. LIEBERMAN, CHAIRMAN

Senator LIEBERMAN. The hearing will come to order.

I want to extend a welcome to the witnesses. Thank you very much for appearing before the subcommittee today.

Also, welcome to our colleague Senator Scott Brown from Massachusetts. I believe this is the first time you've been at one of the subcommittee hearings.

Senator BROWN. That's correct.

Senator LIEBERMAN. It's the first subcommittee hearing we've had this session. So, I don't mean to suggest you've been guilty of absenteeism. [Laughter.]

Anyway, it's a pleasure to welcome you.

Senator BROWN. Thank you, Mr. Chairman.

Senator LIEBERMAN. I look forward to your contribution to our work.

At each of these hearings, I always believe it's important to pause for a moment to acknowledge the service, heroism, and professionalism of the American military; the people who fight our Nation's wars, and do so with such extraordinary valor and effectiveness.

For decades, they have fought with the knowledge that American airmen and aviators control the skies wherever our country sends them. That confidence is, of course, based on the quality of our fighter aircraft, as well, most importantly, as the skill of the men and women who fly those aircraft. So, it's in that context that we convene this session of the Airland Subcommittee to discuss our Nation's military tactical aircraft (TACAIR) programs.

Every year, we have a responsibility to balance competing demands for resources to support our military. The decisions we make in the face of these demands will help to determine whether future generations of soldiers, sailors, airmen, and marines will also know that their brothers and sisters in arms control the skies.

To help inform our committee's decisions, we have an extraordinary group of witnesses today: Lieutenant General Mark Shackelford, Military Deputy to the Assistant Secretary of the Air Force for Acquisition; Major General Johnny Weida, Assistant Deputy Chief of Staff of the Air Force for Operations, Plans, and Requirements; Vice Admiral David Architzel, Principal Deputy to the Assistant Secretary of the Navy for Research, Development, and Acquisition; Lieutenant General George Trautman, Deputy Commandant of the Marine Corps for Aviation; and Rear Admiral David Philman, Director for Air Warfare in the Office of the Chief of Naval Operations (CNO).

I'm happy to see General Shackelford, General Trautman, and Admiral Architzel again. They are recidivists before this committee, but we always like to see them.

We welcome General Weida and Admiral Philman, for their first appearance before the committee.

The most important issue before us is the recently announced cost, growth, and schedule delays for the Joint Strike Fighter (JSF) program, which has breached a critical Nunn-McCurdy baseline, which is to say that program acquisition unit cost and average procurement unit cost have both increased more than 50 percent above the original estimate.

I know that our witnesses know well what this means, because the JSF is the cornerstone of tactical aviation modernization for each of our Services. Excessive cost growth in this program is bound to hurt American air power in the years ahead.

We know that the Department of Navy, for instance, faces large gaps between the forces that the CNO has said he needs and the forces that will be available to his successors. Two years ago, the Department of the Navy estimated that we would face a TACAIR

shortfall in 2017 that could be as high 125 of the fighters needed to outfit our 10 aircraft carrier airwings, and 3 Marine Corps airwings.

Last year, the Navy estimated that the maximum shortfall could be nearly twice that large; almost 250 aircraft. This year, the estimate is that, absent certain actions by the Department of Defense (DOD), the shortfalls could reach 267 aircraft. Those are big numbers.

However, the Navy believes that by taking certain actions that we'll discuss this morning, such as reducing squadron size, conducting service-life extensions on some aircraft, and reducing amount of time that aircrafts spend in the depots, they could reduce the gap to roughly 150 aircraft.

I'm grateful that the Department is trying to manage its shortfall, and I look forward to hearing more about these efforts this morning, but frankly, I'm not satisfied that the steps taken are sufficient.

The Air Force faces similar challenges. In 2008, the Air Force projected a potential shortfall of Air Force tactical fighters in excess of 800 aircraft around 2025. Last year, the Air Force proposed to retire roughly 250 aircraft earlier than planned, to achieve operating savings that would be invested in other areas. All of this amounts to what our witnesses will describe this morning as increased short- to mid-term warfighting risk.

Congress recently received a report to help quantify the nature of that risk, and I hope that our witnesses will discuss that with us today in greater detail. Of course, I also hope that the witnesses will describe the steps the Air Force is taking to make sure that cost growth in the JSF program does not prevent the Service from addressing this shortfall and achieving its modernization goals.

These questions are all subject to pending decisions regarding force structure requirements for the Navy and Marine Corps and Air Force TACAIR programs. I must say that, though the Quadrennial Defense Review (QDR) was supposed to evaluate fighter requirements and capabilities, it didn't reach any firm conclusions on TACAIR force structure requirements. So, we're left to speculate about whether DOD will be recommending changes in requirements at some time in the months and years ahead. If DOD does propose significant changes, particularly those that redefine requirements so as to explain away force structure gaps, our subcommittee, naturally, will expect to receive the analysis behind those changes, and will exercise our own responsibility to review them carefully.

So, this is an unhappy story that repeats itself about our really extraordinary aircraft program, the JSF, which is that it's coming in a lot more expensive and later than any of us hoped. I look forward to discussing, with this very excellent group of witnesses, how we're going to react to those realities.

Thank you very much.

Senator Thune.

**STATEMENT OF SENATOR JOHN THUNE**

Senator THUNE. Thank you, Mr. Chairman.

I want to thank you for holding this important hearing, and also thank our witnesses for their attendance today, as well as, of course, for their selfless service to our Nation.

On the occasion of today's discussion on combat tactical aviation, let me first take a moment to convey my condolences to the family of the three servicemen and one civilian who were killed and all those who were injured during the crash of the Air Force CV–22 Osprey tiltrotor aircraft last Thursday in southern Afghanistan. I would appreciate any update that our Air Force witnesses can provide on its investigation of that casualty.

There can be no doubt that, among the entire defense enterprise, combat tactical aviation presents some of the most significant challenges for all of the Services. Perhaps chief among those challenges are gaps in fighter capability and strike fighter capability that the Air Force and the Navy, respectively, are seeing in the intermediate term.

Important elements of those Services' ability to fill those capability gaps are their efforts to hedge against further slips in schedule and growth and cost in the JSF program by, among other things, extending the service life of their legacy tactical fleets. So, I'd like an update on those efforts, as well.

In that context, the need for DOD and the prime contractor to execute the Department's plan to restructure the JSF program cannot be overstated. The next few months will be very telling for the program. That's because, within that period of time, key milestones must be met, including achieving first flight of the Navy's carrier variant no later than May, delivering Block 1 software to the flight test aircraft, beginning flight training at Eglin Air Force Base (AFB), and completing 400 test flights by the end of the year.

By midsummer, the Department's independent cost estimator will have provided a new cost estimate for the program. From our witnesses today, I would like to hear about any concerns that they may have about the program's ability to execute the restructured plan on time and at cost.

While we're here to discuss combat tactical aviation, I would also like to engage the witnesses briefly on the long-range bomber. From DOD's examination of the requirements supporting the long-range bomber, the Department appears interested in fielding a family of systems, each designed to conduct a specific type of mission originally envisioned for a new deep-penetrating bomber.

With the recently completed Nuclear Posture Review (NPR) and the recently signed Strategic Arms Reduction Treaty (START), I would like today's witnesses to describe what role a next-generation bomber will play in the Air Force's overall strategy for developing long-range strike capability.

Thank you, Mr. Chairman.

Again, I look forward to hearing from our witnesses.

Senator LIEBERMAN. Thank you very much, Senator Thune. I look forward to working with you again this year, as we have in the past, in a real partnership, which obviously goes beyond party.

Admiral Architzel, I think seniority, which, of course, I'm a great believer in, suggests that we call on you first.

**STATEMENT OF VADM DAVID ARCHITZEL, USN, PRINCIPAL DEPUTY, OFFICE OF THE ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT, AND ACQUISITION); ACCOMPANIED BY LT. GEN. GEORGE J. TRAUTMAN III, USMC, DEPUTY COMMANDANT FOR AVIATION, U.S. MARINE CORPS; AND RADM DAVID L. PHILMAN, USN, DIRECTOR, AIR WARFARE, OFFICE OF THE CHIEF OF NAVAL OPERATIONS**

Admiral ARCHITZEL. Thank you, Mr. Chairman.

Chairman Lieberman and Senator Thune, distinguished members of the subcommittee, it's an honor to appear before you today to discuss the Department of the Navy's aviation procurement programs. Joining me today are Lieutenant General George Trautman, Deputy Commandant for Marine Corps Aviation, and Rear Admiral David Philman, Navy's Director for Air Warfare.

With permission of the subcommittee, I propose to keep my opening remarks brief and submit a combined statement for the record.

Senator LIEBERMAN. Without objection.

Admiral ARCHITZEL. Thank you, sir.

The Department of the Navy's fiscal year 2011 budget requests funding to procure 206 aircraft: 103 fixed-wing, 100 rotary, and 3 unmanned aerial vehicles (UAVs). Aviation programs represent the Department's greatest warfare investment. This year's programs continue recent trends, which have steadily increased our aviation procurement.

In formulating our investment strategy, we are mindful to balance cost, schedule, and performance and risk, to ensure our ability to meet the warfighters' needs, both today and in the future.

Specifically, we are leveraging stable procurement in rotary wing programs with continued procurement of the H–60 Sierras and Romeos, H–1 helicopters, and MV–22 Ospreys. We're establishing a strong technical foundation and putting in place the tools to control costs for the P–8A Maritime Patrol Aircraft, E–2D Hawkeye, and the CH–53K Heavy Lift Replacement programs. We're investing in next-generation technologies and opportunities that come from unmanned aircraft systems.

Our commitment to the JSF program is unequivocal. Now, within the framework of the restructured program, it's essential that we delivery the cost and schedule performance that matches our commitment to the program. While we are procuring the F/A–18 E, F, and G series production to include pursuing a multiyear procurement for 124 aircraft in fiscal year 2010 through 2013, we do so with an absolute commitment to the continuing development and ramping-up procurement of the F–35 JSF.

The Department has long recognized that to affordably meet our requirements also relies upon our ability to manage the service life of our aviation fleet. As an example, the P–3's sustainment, with Congress' help, we were able to ensure that those aging aircraft are able to meet our operational requirements while we await the arrival of the more capable aircraft.

Similarly, the Department is aggressively managing service life on the legacy F/A–18 A–D aircraft and AV–8 Harrier, until their replacement by the JSF. To this end, we are initiating further steps to mitigate the impacts of delays associated with the restructured JSF program.

Again, we thank the subcommittee for this opportunity to discuss Navy and Marine Corps aviation programs, and we look forward to your questions.

[The joint prepared statement of Admiral Architzel, General Trautman, and Admiral Philman follows:]

JOINT PREPARED STATEMENT BY VADM DAVID ARCHITZEL, USN, LT. GEN. GEORGE J. TRAUTMAN III, MARINE CORPS, AND RADM DAVID L. PHILMAN, USN

NAVAL AVIATION PROGRAMS OVERVIEW

The fiscal year 2011 President's budget implements a recapitalization strategy for new capabilities and initiatives, reduced operating costs, and sustainment of legacy fleet aircraft that are performing magnificently in current operations. We are always aware that our decisions on programmatics, budgeting and procurement have a direct impact on the young men and women we send overseas to fight and win our Nation's wars, and providing the proper weapons systems for those warfighters is a charge we take very seriously.

We continue to work with industry in seeking ways to reduce costs in production contracting strategies on the F/A–18 E/F, the H–1, the F–35B, and F–35C, the MH–60R/S and the MV–22B. The Department of the Navy (DoN) continues the development and low rate procurement of the F–35 B and C models, E–2D Advanced Hawkeye, CH–53K Heavy Lift Replacement, unmanned aircraft systems and new strike weapons capabilities. In total, with our fiscal year 2011 funding, Navy and Marine Corps aviation will procure 103 tactical and fixed-wing aircraft, 100 rotary-wing aircraft, and 3 MQ–8 vertical takeoff and landing unmanned aerial vehicles (VTUAVs) for a total of 206 aircraft.

TACTICAL AIRCRAFT/TACTICAL AIRCRAFT SYSTEMS

*F–35 Joint Strike Fighter*

The DoN is committed to both the short takeoff vertical landing (STOVL) and carrier variant (CV) of the Joint Strike Fighter (JSF) as they are essential to our long-term Naval and Marine Corps Aviation strategy and the Nation's security. The fiscal year 2011 President's budget requests $1.4 billion in RDT&E and $4.7 billion in Aircraft Procurement, Navy (APN) for 20 JSF aircraft (13 F–35B and 7 F–35C) and associated aircraft hardware and spares. These resource requirements reflect the F–35 program's restructure recently approved by the Secretary of Defense.

The commonality designed into the joint F–35 program will minimize operating costs of Navy and Marine Corps tactical aircraft, and allow enhanced interoperability with our sister service, the U.S. Air Force (USAF) and the eight partner nations participating in the development of this aircraft. The F–35 aircraft will provide combatant commanders greater flexibility across the range of military operations. A true fifth-generation aircraft, the JSF will enhance precision strike capability through unprecedented stealth, range, sensor fusion, radar performance, combat identification and electronic attack capabilities as compared to legacy platforms.

It is important to stress that after the extensive review that led to the recent F–35 program restructure, no fundamental technology or manufacturing problems were discovered, nor were there any changes to F–35 performance requirements. It will also add sophisticated electronic warfare capabilities, as compared to the legacy platforms to be replaced, and will tie together disparate units scattered across the battlefield, in real time. All F–35 variants are projected to meet their respective Key Performance Parameters (KPPs).

The F–35B STOVL variant combines the multi-role versatility and strike fighter capability of the legacy F/A–18 with the basing flexibility of the AV–8B and the potential for electronic warfare dominance of the EA–6B. The Marine Corps intends to leverage the F–35B's sophisticated sensor suite and the very low observable (VLO) fifth-generation strike fighter capabilities, particularly in the area of data collection and information dissemination, to support the Marine Air-Ground Task Force (MAGTF) well beyond the abilities of today's MAGTF expeditionary attack, strike and electronic warfare assets. Having these capabilities in one aircraft will provide the joint force commander and the MAGTF commander unprecedented strategic and operational agility. The F–35C CV complements the F/A–18 E/F Block II and EA–18G in providing survivable, long-range strike capability and persistence in an access denied environment. The F–35B and F–35C will provide the Expeditionary Strike Group and Carrier Strike Group commanders a survivable, "day-one" strike capability in a denied access environment with the tactical agility and stra-

tegic flexibility to counter a broad spectrum of threats and win in operational scenarios that cannot be addressed by current legacy aircraft.

Four System Development and Demonstration (SDD) jets (AF–1, BF–1, BF–2, and BF–3) are now in flight testing, while AA–1 has completed its flight testing requirements and awaits a live fire test at the Naval Air Warfare Center, China Lake. CF–1 is in the run station with an in-service release engine. CF–2 has recently left the production line and is going through system checkout. BF–4 is currently in ground tests in Fort Worth and is expected to ferry to Naval Air Station (NAS) Patuxent River by May 7, 2010. The remaining SDD jets and ground test articles, plus low-rate initial production (LRIP) I, LRIP II, and LRIP III aircraft, are in various stages of production. With regard to the flight test program, the initial conventional takeoff and landing (CTOL) aircraft (AA–1) has demonstrated outstanding performance with 91 sorties (~126 flight hours) flown through March 2010.

BF–1, the first STOVL flight test jet, has flown more than 40 sorties, in preparation to its first vertical landing (VL) last month. It has demonstrated smooth and positive flight characteristics during transitions from conventional flight to slow speed flight and accomplished the first STOVL transition to a vertical landing flight on the 18th of March 2010. BF–2 has ferried to NAS Patuxent River and has completed 20 sorties with more than 34 hours of accumulated test time. BF–3 was ferried to NAS Patuxent River in February 2010 and completed its initial 14 test sorties and BF–4's first flight occurred last week. We have been pleased that the initial STOVL/F–35B test aircraft that have arrived at NAS Patuxent River have required little postflight work, as this demonstrates that the prime contractor is continuing to mature its production line.

The F–35B structural testing that has been completed will enable expansion to the full STOVL envelope—though we have had recent challenges with the STOVL door operations we continue to fly as we investigate and make any required modifications. F–35C full scale drop test was started on March 4 at Vought Aircraft Test Laboratory in Dallas, TX. Structural drop testing of simulated carrier landings has demonstrated sink rates above those experienced during normal carrier landings. Testing continues to investigate variations in aircraft attitude, but data thus far has matched well with predictions. The mission systems testing completed to date has provided us additional confidence in F–35 integrated sensor functionality—and we plan to continue to further mature this fifth-generation integrated sensor performance during the next 12 months. Additionally, we have recently cleared BF–2 to utilize its on-aircraft speech recognition capability for flight test, which, when completed, promises to enhance warfighting capability and reduce pilot workload. The signature testing completed to date has built confidence in the VLO performance as we await the first full signature jet to demonstrate overall operational mission effectiveness.

The DoN has taken special interest in the F–35 air/ship integration. Initial ship suitability testing has been completed and our computational fluid dynamic models are being validated to ensure the effects of F–35 propulsion systems on LH and CVN-class ships and ship systems are well understood and addressed. To date, there are no known air-ship integration issues which we cannot overcome; future test events will refine our integration efforts and validate our initial analysis. With respect to logistic support for test and deployment, dedicated aircraft/ship variant teams are in place, all known logistical risks have mitigation plans, and the test and operational use of our autonomic logistics and global sustainment (ALGS) systems will continue to shape and mature our global sustainment implementation plans with our eight partner countries.

The initial operational capability (IOC) is determined by the Service based on both the program's performance and how the Service defines IOC. For the Marine Corps F–35B, IOC is defined as a squadron of ten aircraft able to execute the full range of TACAIR directed mission sets and to deploy on F–35B-compatible ships and to austere expeditionary sites and is projected to be 2012. The Marine Corps plans to IOC with a multi-mission capable Block 2B aircraft as described in the JSF Operational Requirements Document (ORD) CN–3. For the Navy F–35C, IOC is projected to be 2016 and is based on three items: sufficient aircraft quantities, desired capability to conduct all ORD missions, to include, but not limited to: air interdiction (AI), offensive counter air (OCA), defensive counter air (DCA), close air support (CAS), suppression of enemy air defense/destruction of enemy air defenses (SEAD/DEAD) and CSAR in a denied, near-peer environment better than legacy aircraft; and completion of operational test of that capability. The current aircraft procurement rate is critical to enabling the necessary training requirements to stand up squadrons for both Marine Corps and Navy.

The F135 propulsion system has begun the transition from development to production with the delivery of the first three LRIP I engines. Six additional production

engines are in assembly and deliveries will ramp up to three engines per month by the third quarter of 2010. Notwithstanding this significant progress, we continue to focus on engine cost. The Office of the Secretary of Defense recently chartered a Joint Assessment Team (JAT) to investigate F135 cost and cost objectives. The JAT assessed that the F135 engine cost goals are achievable with the proper investment in cost reduction initiatives. The focus in the coming year will be to ensure the engine manufacturer and the government implement the necessary efforts to achieve the cost goals. The current LRIP IV engine proposal shows that the engine manufacturer has begun to reduce cost in alignment with the JAT assessments and recommendations.

*F/A–18 Hornet*

TACAIR is made up of 1180 total aircraft, of which 88 percent are Navy and Marine Corps Hornets (20 Navy squadrons totaling 400 Super Hornets; 17 Navy and 13 Marine squadrons totaling 635 legacy A–D Hornets). Super Hornets and legacy Hornets have conducted over 130,000 combat missions in support of Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) since September 11, 2001. While deployed both ashore and at sea aboard our aircraft carriers, F/A–18s have brought significant numbers of precision ordnance and laser-guided munitions to the fight, and have employed numerous rounds of 20mm ammunition supporting forces during strafing runs. These aircraft continue to provide vital overwatch and direct support to our troops on the ground in Iraq and Afghanistan.

*F/A–18 A/B/C/D (Legacy) Hornet*

The fiscal year 2011 President's budget request is $258.0 million in APN for the continuation of the systems upgrade programs for the F/A–18 platform. As the F/A–18 program transitions to the F/A–18 E/F and JSF, today's inventory of 635 F/A–18 A/B/C/Ds will continue to comprise more than half of the Navy's strike fighter inventory until 2013. In order to maintain a tactical advantage, we will procure and install advanced systems (Joint Helmet-Mounted Cueing Systems (JHMCS), Multi-Function Information Distribution System (MIDS) and Advance Tactical Forward Looking Infra-Red) (ATFLIR)/LITENING) on selected F/A–18 A/B/C/D aircraft. The requested funds will support the APG–73 radar obsolescence management program and procure APG–79 radars in order to replace APG–73 radars in early Block II Super Hornets, each a vital piece of the TACAIR mission for the near future.

These funds will also procure and install centerbarrel modifications, which will be a major contributor to extending the service life of the F/A–18 C/D fleet from 6,000 to 8,000 hours and beyond. The Service Life Management Program (SLMP) continues to monitor and improve the health of the legacy F/A–18 A–D fleet through analyses of TACAIR inventories and the service life of each airframe.

The Marine Corps will upgrade 56 Lot 7–9 F/A–18As and 30 Lot 10/11 F/A–18Cs to a Lot 21 avionics capability with digital communications, a tactical data link, JHMCS, MIDS and LITENING. The Marine Corps will also upgrade 72 F/A–18D models' APG–73 radars with the Expand 4/5 upgrade, providing an enhanced synthetic aperture radar (SAR) capability. The Marine Corps anticipates these upgrades will enhance the current capabilities of these aircraft with the digital communications, tactical data link and Advanced Tactical Airborne Reconnaissance Systems (ATARS) required for them to remain viable and relevant. The Marines expect the F/A–18 (A++/C/D) to remain in the active inventory until fiscal year 2022 and in the Reserve inventory until fiscal year 2023.

The Marines are also employing the LITENING targeting pod on F/A–18 A+/C/D aircraft in expeditionary operations including OEF. When combined with data link hardware, the LITENING pod provides real-time video to ground forces through Remotely Operated Video Enhanced Receiver (ROVER) and Video Scout ground workstations.

*F/A–18 E/F Super Hornet*

The fiscal year 2011 President's budget requests $1.8 billion in APN–1 for 22 F/A–18 E/F Block II aircraft. The F/A–18 E/F continues to transition into the fleet, improving the survivability and strike capability of the carrier air wing. The Super Hornet provides a 40 percent increase in combat radius, 50 percent increase in endurance and 25 percent increase in weapons payload over the legacy Hornets. The program will complete procurement of the 515 budgeted aircraft in 2013. Production line shutdown will begin in fiscal year 2013 with the final shutdown occurring in fiscal year 2015.

The APG–79 active electronically scanned array (AESA) radar system was installed in all production F/A–18 E/Fs and EA–18Gs beginning with Lot 30, and a retrofit program is modifying 135 Lot 26–29 Block IIs with APG–79 radars. All 458 Block II Super Hornets will be AESA equipped, providing the Super Hornet a sig-

nificant increase in detection range, lethality and survivability over the legacy Hornets. AESA squadrons have been successfully deploying since 2008 and are highly valued by Fleet Commanders.

The Super Hornet uses an incremental development approach to incorporate new technologies and capabilities—the JHMCS, ATFLIR (with shared real-time video), Shared Reconnaissance Pod System and MIDS datalink. The F/A–18 E/F fiscal year 2011 budget request also includes $84.4 million in APN to implement commonality, maintain capabilities and improve reliability and structural safety. The Navy continues to explore the possibility of a multiyear procurement for 124 F/A–18 E/F and EA–18G series aircraft (fiscal years 2010–2013) with the Secretary of Defense.

*AV–8B Harrier*

The fiscal year 2011 budget requests $22.9 million in RDT&E funds to continue development of the AV–8B Readiness Management Plan (RMP), Digital Improved Triple Ejector Racks (DITER), and Engine Life Management Plan (ELMP) to include continued Accelerated Simulated Mission Endurance Testing (ASMET). The DITER effort will increase the digital weapons carriage capability of the Harrier and thereby support combat operations more effectively. The fiscal year 2011 budget also requests $19.4 million procurement funds for ELMP upgrades and the RMP, which addresses aircraft obsolescence and deficiency issues associated with sustaining the Marine Corps' AV–8B fleet.

Today's Harrier—equipped with precision weapons, LITENING targeting pods with a video downlink to ROVER ground stations, and digitally-aided close air support (CAS) (Marine Tactical System (MTS) protocol)—has proven to be an invaluable asset for the MAGTF and joint commander across the spectrum of operations. The AV–8B program continues to address attrition recovery and other inventory sustainment efforts to mitigate significant legacy inventory shortfalls and obsolescence issues. The AV–8B continues to be deployed heavily in support of OEF and for other emerging operational contingencies; each Marine Expeditionary Unit (MEU) that sails does so with embarked AV–8Bs. In 2009 the Harrier ended a highly successful 6-year rotation in Iraq; we then transitioned the aircraft to Afghanistan. There the AV–8B is supporting ground forces with its precision weapons, 25-millimeter cannon and sophisticated sensor suite. The Harrier has a proven combat record, and its weaponry and basing flexibility have been invaluable as we deploy it into the fight from the decks of L-class ship as well as ashore in the austere Afghanistan environment. Planned capability upgrades, obsolescence mitigation and readiness initiatives will ensure the AV–8B remains relevant, healthy and sustained through at least 2022.

Although the LITENING targeting pod is managed by the AV–8B program office, the pod is carried on all three Marine Corps TACAIR platforms. Building on its extensive and proven combat record, the Air Force and Marine Corps are upgrading the LITENING pod to the G4 (fourth generation) standard to support engaged Marine Corps, joint and coalition warfighters. The fiscal year 2011 budget requests $72.1 million in procurement funding for Marine Corps expeditionary LITENING targeting pod upgrades, which include enhanced forward looking infra-red (FLIR) and charge-coupled device (CCD) optics, a laser target imaging processor (LTIP), a more powerful video downlink transmitter, and improved ground moving target and air-to-air target tracking systems.

*TACAIR Inventory Management*

In 2009, we estimated the DoN strike fighter shortfall (SFS) to be 146 aircraft. With the changes in the fiscal year 2011 President's budget, the Strike Fighter Shortfall Analysis was updated and the peak DoN Shortfall rose from 146 to 177 aircraft—primarily due to the F–35 delivery ramp reduction of 55 aircraft and removing the assumption of aircraft reaching 10,000 flight hours. Today, with the application of our management strategies and levers, the peak can be managed to about 100 aircraft in 2018 by performing service life extension program (SLEP) to a number of aircraft.

We are closely managing the flight hours and fatigue life of our tactical aircraft. Since 2004, we have provided guidance and actions to optimize aircraft utilization rates while maximizing training and operational opportunities. The F/A–18 A–D Inventory Management Forecasting Tool is used to project the combined effects of TACAIR transition plans, retirements, attrition and pipeline requirements on the total F/A–18 A–D aircraft inventory. The model is updated with the most recent data and forecasts the strike fighter inventory compared to the existing requirements. Critical model variables include JSF deliveries, force structure, usage rates, life limits, depot turnaround time, fatigue life expended (FLE), catapult launches and arrested landings, and field landings.

Faced with an increased shortfall, the DoN has continued to identify further opportunities to reduce its impact. The Marine Corps has modified it's F–35 transition plan by transitioning some Hornet squadrons earlier and leveraging the service life remaining in the AV–8B fleet. Management "levers" have been identified: accelerating the transition of 5 legacy F/A–18C squadrons to F/A–18 E/F; transitioning 2 additional F/A–18C squadrons to F/A–18 E/F using the remaining attrition F/A–18 E/F Reserve aircraft; reducing the Navy Unit Deployment Program (UDP) and Marine Corps Expeditionary F/A–18 A+/C/D squadrons from 12 to 10 aircraft per squadron. Some of these measures are dependent on reduced demand in Global Force Management (GFM) requirements.

We are continuing to perform high flight hour (HFH) inspections to extend the service life limits of F/A–18 A–D aircraft from 8,000 to 8,600 flight hours. Analysis revealed that extensive areas of the legacy F/A–18 airframe require SLEP inspections and modifications in order to reach the service life goals of 10,000 hours. The F/A–18 A–D SLEP engineering development program will complete in 2012. Together these efforts can extend the F/A–18 A–D service life and reduce the impact of the strike fighter shortfall.

The 146 Marine Corps AV–8B aircraft (in seven squadrons) currently are not challenged by FLE as are the DoN's F/A–18 aircraft. However, continued investment in engine sustainment, in avionics and in managing airframe component obsolescence are critical to ensuring these aircraft remain viable contributors to the TACAIR transition. Continued investment in program related engineering (PRE)/program related logistics (PRL) in the Operation and Maintenance, Navy (OMN) is critical for sustaining the combat relevancy of the DoN's legacy platforms through the TACAIR transition.

The DoN long-term shortfall reduction strategies will be addressed in the fiscal year 2012 President's budget development. Currently, items under review are the F/A–18 A–D SLEP and opportunities for optimizing depot turn around times. We will continue to explore other mitigation alternatives. Applying the mitigation levers available to us and considering long-term strategies such as SLEP, the DoN believes the strike fighter shortfall is manageable.

*Airborne Electronic Attack (AEA)/EA–18G Growler*

The fiscal year 2011 President's budget request is $22.0 million in RDT&E,N for correction of deficiencies and $1.0 billion in APN for 12 full-rate production (FRP) EA–18G aircraft. The program completed operational evaluation in May 2009. The Fleet Replacement Squadron (FRS) has achieved ready for training (RFT) and the first deployable EA–18G squadron achieved safe for flight in September 2009. Initial operating capability (IOC) was achieved in September 2009 and a favorable FRP decision was obtained in November 2009.

The EA–18G began replacing carrier-based Navy EA–6B aircraft in 2009 and is currently programmed to continue these transitions through 2014. A total of 34 aircraft have been procured to date. As directed by the Quadrennial Defense Review (QDR), the Navy will procure an additional 26 EA–18G aircraft across the FYDP to increase joint force capacity to conduct expeditionary electronic attack, increasing the program of record to 114. These additional aircraft will be utilized to fill the Navy's four expeditionary electronic attack squadrons currently using the legacy EA–6B Prowler.

The Navy is completing an analysis of alternatives (AoA) to determine the best path forward for the Next Generation Jammer (NGJ). The NGJ will replace the ALQ–99 pods currently flown on the EA–18G and EA–6Bs and will provide the Office of the Secretary of Defense (OSD) and the Services an opportunity to introduce a comprehensive electronic attack capability to the EA–18G as well as all variants of the F–35 JSF.

*Airborne Electronic Attack (AEA)/EA–6B Prowler*

The fiscal year 2011 President's budget request includes $24.3 million in RDT&E for electronic warfare counter response, $33.8 million in APN for common AEA systems and $29.9 million in APN for all EA–6B series aircraft. Currently there are 92 EA–6Bs in the DoN to support 61 operational aircraft in 14 Active component squadrons and one Reserve component squadron. This includes 76 Navy and Marine Corps ICAP II aircraft and 16 Navy improved capability (ICAP) III aircraft. The replacement of Navy EA–6B aircraft with EA–18G was expected to be completed in 2012; however, the Navy now plans to complete its EA–6B program of record in 2014.

The Marine Corps currently has 20 operational EA–6B ICAP II aircraft in 4 VMAQ squadrons. Overseas Contingency Operations (OCO) funds were used to purchase 16 ICAP III modification kits and installations. The transition to the ICAP

III aircraft began in March 2010 and is planned to complete in 2013. As the Navy transitions ICAP III squadrons to EA–18G, those aircraft will be transferred to the Marine Corps. Once the transition is complete, the Marine Corps will have 32 ICAP III to support its EA–6B program of record through 2019. Aircrew training for the DoN will be conducted at VAQ–129 through 2014. Once the Navy has completed its transition from the EA–6B, the Marine Corps may be required to establish a Fleet Replenishment Squadron (FRS) to support its program of record.

Marine Prowlers have been employing the LITENING targeting pod in expeditionary operations including OEF. When combined with data link hardware, the LITENING pod provides real-time video to ground forces through ROVER workstations. Additionally, the Collaborative On-line Reconnaissance Provider/Operationally Responsive Attack Link (CORP/ORAL) Joint Combat Technology Demonstration (JCTD) is demonstrating the concept of networked, on-demand intelligence, surveillance, and reconnaissance (ISR) and electronic warfare from manned and unmanned platforms utilizing the link capabilities in LITENING pods.

*E–2D Advanced Hawkeye (AHE)*

The E–2D AHE replaces the current E–2C Hawkeye aircraft. E–2D will be a critical enabler of transformational ISR capability and one of the pillars of theater air and missile defense. Its radar will provide enhanced detection and surveillance capability in overland, littoral and open ocean environments.

The fiscal year 2011 President's budget requests $171.1 million in RDT&E,N for continuation of SDD and $937.8 million in APN for four LRIP III aircraft and advanced procurement for fiscal year 2012 LRIP IV aircraft.

A Milestone C decision was achieved in the third quarter of 2009 and a contract awarded for two LRIP I aircraft. In fiscal year 2010 Congress appropriated $742.1 million APN for three LRIP II aircraft and advanced procurement for fiscal year 2011 LRIP III aircraft.

*T–6B Joint Primary Aircraft Training System (JPATS)*

The T–6 is the primary flight training aircraft for Navy and Marine Corps pilots and naval flight officers (NFO), replacing the T–34C. The current requirement is for 315 aircraft, of which 161 aircraft have been procured and 60 aircraft delivered to date. Of those 60 aircraft, 6 are the newer T–6B aircraft which is the upgraded avionics variant of the T–6A. The fiscal year 2011 President's budget request includes $266.1 million to procure 38 aircraft under a USAF contract. The JPATS program delivered the first two T–6B aircraft to the Navy in August 2009. The program is on track for T–6B IOC in April 2010 at NAS Whiting Field, FL. Funding requested in the President's budget will also support the critical sustainment of the TH–57, the training helicopter for Navy and Marine Corps helicopter pilots, and of the T–45, the Navy's training jet for future jet pilots and naval flight officers.

ATTACK/SURVEILLANCE AIRCRAFT

*P–8A Poseidon*

The future of the Navy's maritime patrol force includes plans for sustainment, modernization, and re-capitalization of the force. The P–8A Poseidon is the replacement aircraft for the P–3C Orion. The fiscal year 2011 President's budget requests $929.2 million in RDT&E for development and $1.991 billion in APN for procurement of seven P–8 Poseidon aircraft. Fiscal year 2011 development funding will support the continued development of the P–8A and associated testing. Fiscal year 2011 funds support the procurement of the seven LRIP P–8A aircraft which are scheduled to begin delivery in January 2013 and advanced procurement for the subsequent LRIP. The program is on track for IOC in late 2013 when the first squadron will have transitioned and be ready to deploy forward in support of the combatant commander. The P–8A program is meeting all cost, schedule and performance parameters in accordance with the Acquisition Program Baseline (APB).

The program completed the interim program review in April 2009 and awarded the advanced acquisition contract for LRIP advanced procurement. The first five test articles (three flight test aircraft and two ground test articles) are on schedule for delivery. Boeing has completed fabricating the first five of eight test aircraft. The remaining three flight test aircraft will commence fabrication this year. The first test flight using T–1, the airworthiness test aircraft, occurred on October 15, 2009, in Seattle, WA. After an initial period of flight testing T–1 completed its last phase of installation and check-out for the aircraft instrumentation system. The program is currently undergoing ground testing in preparation for resuming flight tests in April 2010.

*P–3C Orion*

In fiscal year 2011, $228.0 million is requested to sustain the P–3C until transition to the P–8A. More than half of this amount ($153.5 million) is for wing modifications, which will allow airframe sustainment to support the CNO's P–3 Fleet Response Plan, as well as supporting EP–3E requirements, which are executed within the P–3 Airframe Sustainment Program. The P–3 is being sustained to keep the aircraft a viable warfighter until it is replaced by P–8. Results of the P–3 Service Life Assessment Program (SLAP) revealed the need for an aggressive approach to P–3 airframe sustainment. The aircraft is well beyond planned fatigue life of 7,500 hours for critical components, with an average airframe usage of 16,000 hours.

In December 2007, ongoing refinement of the model used to calculate wing stress indicated that the lower aft wing surface (Zone 5) of the P–3 aircraft had fatigue beyond standards for acceptable risk resulting in the grounding of 39 P–3 aircraft. As of March 31, 2010 a total of 49 aircraft have been grounded for Zone 5 fatigue. There have been 15 Zone-5 modifications completed and the aircraft returned to the fleet; there are 34 Zone-5 aircraft in work. Current mission aircraft availability is 62. Key elements of the sustainment approach are strict management of requirements and flight hour use, special structural inspections to keep the aircraft safely flying, and increased use of simulators to satisfy training requirements. In fiscal year 2011, a systems sustainment and modernization budget of $74.5 million is requested to continue to address a multitude of mission essential efforts to replace obsolete components, integrate open architecture technology, and leverage commonality.

The Navy will continue to closely manage the service life of the P–3C as the Maritime and Patrol Reconnaissance Forces transition to the P–8A Poseidon. Until force levels recover, allocations of aircraft must be balanced to meet mission and minimum training while preserving remaining P–3C service life. Currently, P–3Cs are meeting combatant commander allocations for deployed aircraft.

*EP–3 Aries Replacement/Sustainment*

The EP–3E continues to be a high demand ISR asset in current OCO. In fiscal year 2011, the President's budget request is $90.3 million in APN to address EP–3E signals intelligence (SIGINT) and communications obsolescence. This APN request supports the LRIP buy for communications intelligence modifications necessary to pace the evolving threat. The EP–3E program continues to modify aircraft with multi-intelligence capability to meet emergent classified requirements. Modifications are necessary to keep the platform viable until the replacement platform can be fielded.

Navy removed funding for EP–X in PR–11 and terminated the program, based on the high cost in the Program Objective Memorandum (POM) fiscal year 2010 acquisition strategy. Navy and OSD realize the critical capability gaps that exist with legacy systems/sensors, which led to OSD direction to conduct an AoA for this future airborne ISR capability. AoA results are due in April 2010 in order to inform POM–12 decisions on how this necessary and comprehensive ISR capability can be met using either a single material solution or multiple solutions (system of systems). Navy will develop an achievable acquisition strategy to procure known and affordable technology to satisfy future requirements.

As stated in the administration's proposed fiscal year 2011 budget, "Once the Department completes its review, the most efficient and cost effective program for replacing the current surveillance aircraft, the EP–3, can be selected." In the interim, Navy will continue to replace obsolete equipment with mission-critical sensor improvements on board the EP–3 to support US and coalition forces currently engaged in OCO. As a result, the current EP–3 fleet will be capable of performing its mission beyond 2020 while the replacement capability is developed and fielded.

*MH–60R and MH–60S*

The fiscal year 2011 President's budget requests $1.059 billion for 24 MH–60R aircraft including advanced procurement for 24 fiscal year 2012 aircraft, and $55.8 million in RDT&E,N for continued replacement of the Light Airborne Multi-Purpose System (LAMPS) MK III SH–60B and carrier-based SH–60F helicopters with the MH–60R. The $55.8 million is to continue development of the Ku-band data link, automatic radar periscope detection and discrimination (ARPDD) program, which is a fleet-driven capability upgrade to the APS–147 Radar, and Mode V interrogation capability in its identification friend-or-foe (IFF) system. The MH–60R is used in both anti-submarine warfare (ASW) with its dipping sonar, sonobuoys and torpedoes and in the surface warfare (SUW) role with its electronics surveillance measures system, multimode radar with inverse synthetic aperture radar (ISAR), FLIR system and Hellfire missiles. It has demonstrated three to seven times the capability

in the ASW role and significant increases in its SUW capability over legacy systems. The MH–60R program is post-milestone III, having received approval for FRP in 2006. The first operational squadron, HSM–71, returned from a successful deployment in carrier strike group aboard the USS *John C Stennis* (CVN–74) in July 2009. There are currently three operational carrier air wing squadrons and two fleet replacement squadrons operating the MH–60R. Two additional operational squadrons will transition or standup by the end of fiscal year 2011.

The fiscal year 2011 President's budget requests $548.7 million in APN for 18 MH–60S aircraft including advanced procurement for 18 fiscal year 2012 aircraft and $38.9 million in RDT&E, N funds for the MH–60S to continue development of the organic airborne mine countermeasures (OAMCM) (Block II) and the armed helicopter (Block III) missions. The MH–60S is the Navy's primary combat support helicopter designed to support carrier and expeditionary strike groups. It will replace four legacy platforms with one H–60 variant. The basic MH–60S reached IOC and FRP in 2002. Armed helicopter configuration reached IOC in June 2007 and OAMCM is scheduled to reach IOC in fiscal year 2011. HSC–8 completed its first carrier deployment with Carrier Strike Group aboard the USS *John C Stennis* (CVN–74) from January to July 2009. HSC–9 operated eight helicopters, including six aircraft in the armed helicopter configuration which includes the multi-spectral targeting system (MTS) FLIR, Link-16, self defense equipment, two 50 caliber crew-served weapons and 8 Hellfire missiles.

The Army and Navy are executing a joint platform multiyear contract that includes both the MH–60R and MH–60S airframes along with the Army's UH–60M. The Navy is also executing a multiyear contract for integration of mission systems into the MH–60R.

LIGHT ATTACK AND UTILITY AIRCRAFT

*UH–1Y Venom/AH–1Z Viper*

The H–1 Upgrades Program is replacing the Marine Corps' UH–1N and AH–1W helicopters with state-of-the-art UH–1Y and AH–1Z aircraft. The legacy aircraft have proven enormously effective over decades of heavy use, and as these aircraft reach the end of their service lives we look forward to expanding utility and attack helicopter capabilities. The new Yankee and Zulu aircraft are fielded with integrated glass cockpits, world-class sensors and advanced helmet-mounted sight and display systems. The future growth plan includes a digitally-aided close air support (CAS) system designed to tie these airframes, their sensors and their weapons systems together with ground combat forces and fixed-wing aircraft. Low-cost weapons systems currently in development, such as the Advanced Precision Kill Weapon System II (APKWS II), will provide lethality while reducing collateral damage.

The fiscal year 2011 budget requests $60 million in RDT&E,N for continued product improvements and $827 million in APN for 31 H–1 Upgrades aircraft (18 UH–1Y, 10 baseline AH–1Z, and 3 AH–1Z OCO aircraft). The program is a key modernization effort designed to resolve existing safety deficiencies, enhance operational effectiveness, and extend the service life of both aircraft. Additionally, the 84 percent commonality between the AH–1Z and UH–1Y will significantly reduce lifecycle costs and logistical footprint, while increasing the maintainability and deployability of both aircraft. The program will provide the Marine Corps with 123 UH–1Y and 226 AH–1Z helicopter models through a combination of remanufacturing and new production. This represents an increase of 69 aircraft above the previous inventory objective of 280 aircraft. The revised objective was driven by the need to increase our active-duty Marine light attack helicopter squadrons (HMLAs) from six to nine as part of the Marine Corps' directed increase in force structure and manning. This increase in active-duty HMLA squadrons started in fiscal year 2009 and will conclude with the stand-up of HMLA–567 in fiscal year 2011.

The UH–1Y Venom aircraft achieved IOC in August 2008 and FRP in September 2008. The UH–1Y program was given priority status in order to replace the underpowered UH–1N fleet as quickly as possible. AH–1Z testing and LRIP continues, with an operational evaluation (OT–II3C) starting later this month. The AH–1Z Viper's FRP decision is scheduled for the first quarter of fiscal year 2011. 58 AH–1Zs will be built new to support the increased inventory objective, which exceeds the quantity of existing AH–1W airframes available for remanufacture. As of March 2, 2010, a total of 33 aircraft (25 UH–1Ys and 8 AH–1Zs) have been delivered to the Fleet Marine Force, and an additional 36 aircraft are on contract and in production. To date, all fiscal year 2009 and 2010 aircraft deliveries have been 30 days or more ahead of contract date and the program has not shown any significant impacts from the summer 2009 labor strike at Bell Helicopter.

In 2009, the Marine Corps successfully executed the first UH–1Y shipboard deployment, with three UH–1Ys deployed with the 13th MEU. During this deployment, those three aircraft flew over 600 flight hours and posted mission capable rates in excess of 76 percent, while supporting a variety of maritime special-purpose force missions to include the rescue of Captain Phillips of the Maersk Alabama from the Somali pirates.

The second UH–1Y deployment, with nine of these aircraft deployed into combat in Afghanistan, began in November 2009. In the first 3 months of that second deployment, HMLA–367 posted UH–1Y mission capable rates in excess of 77 percent while flying an average of 40 flight hours per aircraft per month. This is more than twice the planned utilization rate of 18.9 hours per aircraft per month. In just 3 months those aircraft lifted over 800 passengers and 15,000 pounds of cargo and responded to more than 650 calls from ground forces for assault support and offensive air support. The crews flying these new aircraft have not missed a single assigned launch to date and played a critical role in providing troop and cargo transport, command and control, aerial and armed reconnaissance, armed escort, and close air support during Operation Cobra's Anger in the Now Zad valley of Helmand Province.

ASSAULT SUPPORT AIRCRAFT

*CH–46E Sea Knight*

The fiscal year 2011 budget requests $17.7 million for CH–46 sustainment targeted at replacing worn equipment and aircraft components that will ensure the health and viability of the airframe as we progress through the transition to the MV–22B Osprey. Our medium lift evolution to the MV–22B is progressing on schedule, with 50 percent of our medium lift fleet having begun or successfully completed the transition. The CH–46E continues to perform well and is prepared to maintain operational relevance through its projected retirement in 2018.

*V–22B Osprey*

The fiscal year 2011 President's budget request includes $2.7 billion for procurement of 35 V–22s and for continued development of follow-on block upgrades. Fiscal year 2011 is the fourth year of the V–22 multiyear procurement contract. Our multiyear procurement strategy supports a continued cost reduction and affordability trend, provides a stable basis for industry, and best supports the needs of the warfighter. The fiscal year 2011 appropriations will fully fund Lot 15 and procure long-lead items for Lot 16 under the V–22 multiyear contract. Over the past 12 months, Bell-Boeing has continued to consistently perform better than required on production contracts, delivering aircraft on or ahead of schedule. The Marine Corps continues to field and transition aircraft on time.

The MV–22B Osprey is now combat tested and forward deployed supporting combat operations and responding to contingencies around the world. As our premier medium lift assault support platform, the Osprey brings unprecedented range, speed and survivability to the warfighter, in a platform that far exceeds the capabilities of the CH–46E it is replacing. The MV–22B has been continuously supporting our marines, in combat and in contingencies, since October 2007. During three consecutive squadron deployments in support of Operation Iraqi Freedom (OIF) (fiscal year 2008–2009), Osprey squadrons logged over 9,000 flight hours, carried over 40,000 passengers, and lifted over 2 million pounds of cargo while flying every mission profile assigned by the Multi-National Force-West Commander. The MV–22B also completed its first shipboard deployment as part of a marine expeditionary unit (MEU) last November, capping its 6-month deployment by flying 510 nautical miles from USS *Bataan* (LHD–5) to Camp Bastion, Afghanistan. The shipboard squadron conducted a relief in place with another squadron to begin support of OEF.

The Osprey continues to redefine the speed and range at which the MAGTF commander can influence his operational area. The second MV–22B shipboard deployment is currently underway supporting humanitarian relief efforts in Haiti and follow-on presence in the U.S. Central Command area of operations. The CV–22 program has conducted multiple SOCOM deployments, including a successful trans-Atlantic operational deployment in support of operations in Africa and at locations in CENTCOM.

As we continue to explore the tremendous capabilities of tilt-rotor aircraft, we are learning valuable lessons with respect to readiness and operating costs. As of December 2009, the V–22 had exceeded 70,000 total flight hours. More flight hours have been flown on this aircraft in the last 2 years than in the previous 18 years combined. Like other types of aircraft in the early operational phase of their lifecycles, the MV–22 has experienced lower-than-desired reliability of some compo-

nents and therefore higher operations and support costs. Despite our readiness challenges, the MV–22 squadron in Afghanistan continues to meet mission tasking through hard work and aggressive sparing. We are meeting mission, but only at supply, maintenance, and operating costs that are inconsistent with our expeditionary nature and cost-conscious culture.

Fleet wide, our Block B combat deployable aircraft averaged approximately 60 percent mission capable (MC) in Continental United States (CONUS) for 2009. With focused logistical support provided to our deployed aircraft, however, we average nearly 7 of 10 aircraft available on a daily basis in Afghanistan. This compares favorably with the 71.6 percent availability over 18 months of operations in Iraq, and 71.0 percent availability for aircraft in the 22nd MEU. With the cooperation and support of our industry partners, we are tackling these issues head on, with aggressive logistics and support plans that will increase the durability and availability of the parts needed to raise reliability and concurrently lower operating costs of this aircraft.

V–22 capability is being increased and fielded over time via a block upgrade acquisition strategy. MV–22B Block A aircraft are now used predominantly in training squadrons. 61 MV–22B Block B aircraft have been fielded with our operational squadrons and more will continue to be delivered under the current MYP. MV–22B Block C aircraft will provide additional mission enhancements, primarily in the areas of environmental control systems upgrades, weather radar, and mission systems improvements. The targeted delivery for Block C aircraft is Lot 14, in fiscal year 2012.

*CH–53K Heavy Lift Replacement Program*

In fiscal year 2011 the President's budget requests $577 million RDT&E,N to continue SDD of the CH–53K. In the past year, the CH–53K program closed out its preliminary design review (PDR), has begun producing long-lead items in preparation for building test articles under the SDD contract, and is scheduled to conduct critical design review (CDR) in July 2010. In fiscal year 2011, the program transitions to assembly of the static and fatigue test articles and of the ground test vehicle and continues developmental test activities.

During fiscal year 2009, the program encountered a schedule delay (and associated growth to program cost due to the delay), driven primarily by an overly aggressive initial program schedule. It is important to note that these delays were not driven by technical issues, and the program remains on a sound technical footing as it enters CDR later this year. Additionally, the program has corrected the planning issues that caused those delays and is now maintaining cost and schedule performance. This program is not in danger of breaching Nunn-McCurdy thresholds. The requested funds will permit an orderly restructuring of the program leading to IOC in fiscal year 2018.

The new build CH–53K will replace the current legacy fleet of CH–53D and CH–53E helicopters with an aircraft that provides the performance necessary to support our future warfighting requirements. The CH–53D Sea Stallion and CH–53E Super Stallion provide unparalleled combat heavy lift to the MAGTF and are among the Marine Corps most-stressed aviation communities. CH–53s, providing vital lift of heavy equipment, supplies and troops, are currently deployed in Afghanistan, the Horn of Africa and Haiti, and are flying with MEU. Since ramping up operations in Afghanistan in May 2009, these aircraft have flown nearly 11,000 hours, carried more than 62,000 passengers, and moved over 10 million pounds of cargo in support of coalition forces in Afghanistan and the Horn of Africa, while flying well above their programmed rates in austere, expeditionary conditions.

To keep these platforms viable until the CH–53K enters service, the fiscal year 2011 budget requests $62.1 million for both near- and mid-term enhancements, including the Force XXI Battle Command Brigade and Below, Integrated Mechanical Diagnostic System, T–64 Engine Reliability Improvement Program kits and Directed Infrared Countermeasures. While these aircraft are achieving unprecedented operational milestones, they are nearing the end of their service life; the CH–53E is approaching 30 years of service and the CH–53D has been operational for almost 40 years.

Ultimately, these aircraft will be incapable of supporting the Marine Corps' future warfighting concepts and will be replaced by the CH–53K. The new-build CH–53K will fulfill land- and sea-based heavy-lift requirements not resident in any of today's platforms, and contribute directly to the increased agility, lethality, and presence of joint task forces and MAGTF. The CH–53K will transport 27,000 pounds of external cargo out to a range of 110 nautical miles, nearly tripling the CH–53E's lift capability under similar environmental conditions while fitting under the same shipboard footprint. The CH–53K will also provide unparalleled lift capability under

high altitude, hot weather conditions similar to those found in Afghanistan, thereby greatly expanding the commander's operational reach.

Maintainability and reliability enhancements of the CH–53K will decrease recurring operating costs significantly, and will improve aircraft efficiency and operational effectiveness over the current CH–53E. Additionally, survivability and force protection enhancements will increase protection dramatically, for both aircrew and passengers, thereby broadening the depth and breadth of heavy lift operational support to the Joint Task Force (JTF) and MAGTF commander. Expeditionary heavy-lift capabilities will continue to be critical to successful land- and sea-based operations in future anti-access, area-denial environments, enabling seabasing and the joint operating concepts of force application and focused logistics.

EXECUTIVE SUPPORT AIRCRAFT

*VH–71/VXX Presidential Helicopter Replacement Aircraft*

The fiscal year 2011 President's budget includes $94.7 million for the settlement of the VH–71 termination, and $65.1 million for continuing efforts on VXX, the follow-on program for presidential helicopters.

Receipt of the VH–71 termination proposal is anticipated late in fiscal year 2010 with negotiations and the anticipated settlement expected in fiscal year 2011. The Navy is currently working closely with DCMA in a complex effort to disposition all the assets acquired as part of the VH–71 program cancellation. The majority of VH–71 specific tooling has been sold back to Agusta-Westland in Europe. The process to disposition non-aviation related assets is well underway in the United States, and is beginning in Europe. The Navy has begun preliminary negotiations with various operators of the EH–101 and other Federal entities concerning disposition of VH–71 aircraft and parts.

VXX activity will include continuing effort that began in fiscal year 2010, specifically the AoA, capability based assessments, concept of operations development, trade study analysis, specification development, system concept development and threat analysis leading to a successful Milestone A decision. Following Milestone A and beginning the technology development phase, remaining fiscal year 2011 activities will focus on the proposed material solutions, specifically, reducing technology risk by determining and maturing the appropriate set of technologies and demonstrating technology on prototypes.

The VXX AoA will address all feasible options with a holistic assessment of requirements, capabilities, cost drivers, schedule implications, and risks. The requirement for a replacement presidential helicopter was validated by the Joint Requirements Oversight Council; however, the details and specifications on how the requirement will be safely and affordably met have not been finalized. As a first step in the process to determine how best to satisfy the need to transport the President, data will be analyzed and matured by the government study team into executable alternatives. This AoA process is underway and will support the development of an acquisition strategy, at which time cost/capability trades will be made.

*VH–3D/VH–60N Executive Helicopters Series*

The fiscal year 2011 budget requests an investment of $43.4 million to continue programs that will ensure the aging legacy presidential fleet remains viable until its replacement is fielded. Ongoing efforts include the Cockpit Upgrade Program (CUP) for the VH–60N and Communications Suite Upgrade (CSU), Structural Enhancement Program (SEP), and Obsolescence Management Program (OMP) for both the VH–3D and VH–60N. Current service life extension analyses for both VH–3 and VH–60 fleets are underway with results expected in early fiscal year 2011. The Trainer Conversion Program will start in fiscal year 2011 and will reduce training usage significantly on our VH–3D and VH–60N national assets. Future investments in the legacy fleet will be required to ensure continued safe and reliable executive transportation until the replacement aircraft is fielded.

WEAPONS

*Joint Standoff Weapon (JSOW)*

The fiscal year 2011 President's budget requests $12.6 million for continued JSOW–C–1 developmental activity and $131.1 million for production for 333 all-up rounds. While these much needed procurements will help meet the fleet's weapons loadout requirements, JSOW continues to remain below approved non-nuclear ordnance requirements. Development of the JSOW–C–1 variant adds a moving maritime target capability to the highly successful baseline JSOW–C, and adds a data link and guidance software improvements. The combat-proven JSOW family of weapons procurement continues on cost and schedule.

*Small Diameter Bomb II (SDB II)*

The fiscal year 2011 President's budget requests $44.1 million of RDT&E for the continued development of this joint DoN/Department of the Air Force program. SDB II provides an adverse weather, day or night standoff capability against mobile, moving, and fixed targets, and enables target prosecution while minimizing collateral damage. SDB II is of special interest to the DoN, as it will be integrated into the internal carriage of both the Navy (F–35C) and Marine Corps (F–35B) variants of the JSF. SDB II acquisition consists of a competitive development risk reduction phase between two industry teams, with a down-select at Milestone B planned for the third quarter fiscal year 2010.

*Direct Attack Moving Target Capability (DAMTC)*

The fiscal year 2011 President's budget requests $21.7 million for the completion of production acceptance testing and an initial order of 700 weapons. DAMTC was originally initiated as a fiscal year 2007 Rapid Deployment Capability in response to an urgent requirement identified by the combatant commander overseeing operations in Iraq and Afghanistan. DAMTC improves the warfighter's ability to attack and strike moving targets by leveraging highly successful dual-mode systems.

*Advanced Anti-Radiation Guided Missile (AARGM)*

The fiscal year 2011 President's budget requests $7.8 million for the follow-on development and test program and $54 million for production. The AARGM development program transforms the legacy High-speed Anti-Radiation Missile (HARM) into an affordable, lethal, and flexible time-sensitive strike weapon system. AARGM adds multi-spectral targeting capability with supersonic fly-out to destroy sophisticated enemy air defenses and expand upon the traditional anti-radiation missile target set. The program began its formal test program in fiscal year 2007 and was approved for LRIP in fiscal year 2008. Initial operational test and evaluation (IOT&E) is scheduled to begin in the third quarter of fiscal year 2010, with IOC on the F/A–18C Hornet in 2011.

*Advanced Precision Kill Weapon System II (APKWS II)*

The fiscal year 2011 President's budget requests $8.8 million of PAN,MC for procurement of 600 APKWS II precision guidance kits. The DoN assumed program authority for the APKWS II on September 30, 2008. Congress appropriated funding and approved a DoN above-threshold reprogramming (ATR) request in fiscal year 2008 to complete APKWS II SDD. Integrated test completed in January 2010. Milestone-C was completed March 29, 2010. IOC is planned for the second quarter of fiscal year 2011. APKWS II will provide an unprecedented precision guidance capability to our current unguided (and thus less accurate) rockets, improving accuracy and minimizing collateral damage. The program is on schedule and on budget to meet the needs of our warfighters in today's theaters of operations.

*Joint Air-to-Ground Missile (JAGM)*

The fiscal year 2011 President's budget requests $100.8 million of RDT&E to support the continued development of this critical weapons program. JAGM will become the next-generation precision-guided missile launched from Navy and Marine Corps fixed-wing, rotary-wing, and unmanned platforms. The DoN, in conjunction with the United States Army (Executive Service), received formal approval to proceed with the development of the JAGM in January 2008. JAGM is the first weapons program to be developed under the new competition and prototyping strategy, intended to improve program success rates and reduce costs. In September 2008, fixed price incentive contracts were awarded to two industry teams. During a 27-month technology development phase, these two competing contractors will carry their design through a system-level preliminary design review phase and will conduct ground launches of their prototype missiles.

*Hellfire Weapon System*

The fiscal year 2011 President's budget requests $109.5 million, including $66.0 million of OCO funding, for 1,219 Hellfire all-up-round weapons. Hellfire procurements are a mix of thermobaric, blast/fragmentation, and anti-armor warheads, to provide maximum operational flexibility to our warfighters. This procurement quantity will bring the inventory total to approximately 50 percent of the requirement, and will increase our training assets. While the DoN develops the JAGM, we request continued support for legacy Hellfire weapons. Hellfire continues to be a priority weapon for current military operations as it enables our warfighters to attack targets in the caves of Afghanistan as well as to prosecute military operations in urban environments.

*Sidewinder Air-to-Air Missile (AIM–9X)*

The fiscal year 2011 President's budget requests $0.9 million for RDT&E efforts and $55.2 million for production of a combined 155 all-up-rounds and captive air training missiles and missile-related hardware. The joint Navy/Air Force AIM–9X Sidewinder missile is the newest in the Sidewinder family. The Sidewinder is the only short-range infrared air-to-air missile integrated on USN/USAF strike-fighter aircraft. This fifth-generation weapon incorporates high off-boresight acquisition capability and increased seeker sensitivity through an imaging infrared focal plane array seeker with advanced guidance processing. It also uses an advanced thrust vectoring capability to achieve superior maneuverability and to increase probability of intercept of adversary aircraft.

*Advanced Medium-Range Air-to-Air Missile (AMRAAM) (AIM–120)*

The fiscal year 2011 President's budget requests $2.6 million for continuing RDT&E efforts and $155.6 million for production of 101 all-up-rounds and captive air training missiles with associated missile-related hardware. AMRAAM is a joint Navy/Air Force missile that counters existing aircraft and cruise missile threats. It uses advanced electronic attack capabilities at both high and low altitudes, and can engage from beyond visual range as well as within visual range. AMRAAM provides an air-to-air first look, first shot, first kill capability, while working within a networked environment in support of the Navy's theater air and missile defense mission area.

*Tactical Tomahawk BLK IV Cruise Missile*

The fiscal year 2011 President's budget requests $300.2 million for an additional 196 BLK IV weapons and associated support. The Navy supports strongly the continued procurement of this combat-proven, deep-attack weapon in order to meet ship-fill loadouts and combat requirements.

*Theater Mission Planning Center*

The fiscal year 2011 President's budget requests $10.6 million RDT&E and $88.7 million OPN for continued Theater Mission Planning Center (TMPC) development and support. The TMPC is the mission planning segment of the Tomahawk Weapon System. TMPC develops and distributes missions for the Tomahawk Missile; provides strike planning, execution, coordination, control and reporting; and enables maritime component commanders the capability to plan or to modify conventional Tomahawk Land-Attack Missile (TLAM) missions. Under the umbrella of the Tomahawk Command and Control System (TC2S), TMPC has evolved into 5 scalable configurations deployed at 125 sites, to include: cruise missile support activities; Tomahawk strike mission planning cells; carrier strike groups, command and control nodes and labs/training classrooms. TC2S version 4.2 was released in March 2009 and has aligned Navy Tomahawk strike and mission planning with existing decisionmaker operational processes and support tools. Fiscal year 2011 resources will continue the development of TC2S versions 4.3 and 5.0 to improve joint interoperability and system usability.

UNMANNED AVIATION

*RQ–4 Broad Area Maritime Surveillance UAS*

The fiscal year 2011 President's budget requests $529.3 million RDT&E,N to continue SDD of the Broad Area Maritime Surveillance (BAMS) UAS and $42.2 million MILCON to begin construction of test and evaluation facilities at NAS Patuxent River. The Milestone B decision for the BAMS UAS program was achieved on April 18, 2008. The program is on schedule and conducted the systems requirement review (SRR) in January 2009, SFR in June 2009, integrated baseline review in July 2009, and the preliminary design review (PDR) in February 2010. The BAMS UAS program will meet the Navy requirement for a persistent ISR capability as well as providing a communication relay capability. The BAMS UAS is a larger Group-5 system which will be a force multiplier for the fleet commander, enhancing situational awareness of the battle-space and shortening the sensor-to-shooter kill chain. BAMS UAS will work as an adjunct to the new P–8A Multi-mission Maritime Aircraft (MMA) to provide a more affordable, effective and supportable maritime ISR option than current ISR aircraft provide. The Navy also procured two USAF Global Hawk (Block 10) UASs in fiscal year 2003, for demonstration purposes and to perform risk reduction activities for the BAMS UAS Program, known as the BAMS–Demonstrator (BAMS–D) program. One of the two BAMS–D UASs has been deployed to the CENTCOM theater of operations for over a year.

*MQ–8 Vertical Takeoff and Landing Unmanned Aerial Vehicle*

The fiscal year 2011 President's budget requests $10.7 million RDT&E to continue development of the MQ–8, commonly referred to as the Fire Scout UAS and $51.0 million APN for the production of three Fire Scout MQ–8B aircraft and for initial spares. The MQ–8 Fire Scout is an autonomous VTUAV designed to operate from all air-capable ships, carry modular mission payloads, and operate using the Tactical Control System and Line-Of-Sight Tactical Common Data Link. The Fire Scout UAS is a medium-to-large sized Group 4 system that will provide day/night real time ISR and targeting as well as communication relay and battlefield management capabilities to support core Littoral Combat Ship (LCS) mission areas of anti-submarine warfare (ASW), mine interdiction warfare, and anti-surface warfare for the naval forces. The fiscal year 2011 RDT&E budget request included funding to continue integrating a maritime search radar system that will significantly increase surveillance capability of the MQ–8B and support Littoral Combat System (LCS) developmental testing. While in developmental testing, the MQ–8B system is continuing a military utility assessment on the USS *McInerney* (FFG–8) in order to evolve fleet concepts for operation of the system. Deploying this system on the USS *McInerney* has documented lessons learned that will provide valuable insight into continued development and will reduce LCS developmental and operational test risks. However, the program may not be able to complete all operational test objectives prior to the end of the USS *McInerney* deployment. The Navy is investigating additional ship schedules to complete OPEVAL and conduct follow-on operational testing. The Fire Scout program will also continue to support integration and testing as a mission module on LCS. The Navy continues to cooperate with the Coast Guard for their ship-based UAS planning.

*Unmanned Combat Air System (UCAS)*

The fiscal year 2011 President's budget requests $266.4 million RDT&E for the continuation of the Navy Unmanned Combat Aircraft System (NUCAS) efforts to research a large, Group 5, carrier-suitable, long range, low observable, penetrating, persistent, unmanned aircraft system capability to conduct ISR/strike missions in denied access environments. The NUCAS efforts consist of continuation of the UCAS carrier-suitability demonstration (UCAS–D), acquisition planning and associated technology development. The UCAS–D effort will mature technologies associated with unmanned carrier-suitability, including launch, recovery, and carrier-controlled airspace integration, to the technology readiness levels required for a potential follow-on acquisition program. The demonstration will include catapult launch and arrested landings aboard an aircraft carrier. Additionally, the program will demonstrate autonomous aerial refueling using the same unmanned systems from the carrier suitability demonstration. The demonstrations will be complete in fiscal year 2013, though we expect needing additional technology maturation. Northrop Grumman, prime contractor for the UCAS carrier suitability demonstration, is on track to achieve first flight in fiscal year 2010.

*Small Tactical Unmanned Aircraft System*

The fiscal year 2011 President's budget requests $38.9 million in RDT&E ($12.7 million Navy, $26.2 million Marine Corps) and $35.3 million in procurement ($9.0 million APN and $26.3 million PMC) for the Small Tactical Unmanned Aircraft System (STUAS) program that will address Marine Corps and Navy ISR capability shortfalls identified in the OCO and currently supported by service contracts. The Group 3 UAS will provide persistent, ship- and land-based ISR support for tactical-level maneuver decisions and unit-level force defense/force protection. The Milestone B decision to enter engineering and manufacturing development (EMD) is scheduled for the next quarter. STUAS is currently in source selection for a contract award to coincide with the Milestone B decision. An interim commercial off-the-shelf (COTS) solution referred to as STUAS Lite, is budgeted in fiscal year 2011 with $5.4 million in RDT&E and $14.4 million in APN. Fiscal year 2011 PMC is planned to procure STUAS systems as an early operational capability.

*Marine Corps Tactical UAS (MCTUAS)*

The fiscal year 2011 President's budget requests $0.9 million RDT&E and $18.1 million in baseline APN, as well as $8 million in an OCO request for continued product improvement, upgrades, and retrofits. MCTUAS is the same system as the Army's RQ–7B Shadow UAS, and is a Group 3 system procured as an interim replacement for the RQ–2B Pioneer UAS until a suitable Group 4 UAS can be fielded in fiscal year 2016. The transition to the RQ–7B Shadow began in fiscal year 2007 and the Marine Corps procured its thirteenth and final system in fiscal year 2010. The Shadow UAS provides rapid fielding of a capability that meets urgent Marine

Corps operational requirements and brings immediate interoperability and commonality between Army and Marine Corps unmanned aircraft units operating side-by-side in Afghanistan.

SUMMARY

Since 2001, the Navy and Marine Corps have been fighting shoulder-to-shoulder overseas, supporting an extremely high operational tempo in two theaters and in numerous contingencies while growing our force, introducing new aircraft and systems, and looking beyond the current fight to how we will shape the naval aviation structure of the future.

The fiscal year 2011 President's budget reflects the Navy-Marine Corps team's solutions to the challenges we face together. The DoN's aviation programs balance sustaining fielded capabilities, as they are employed in the OCO and continued forward presence worldwide, and a substantive recapitalization effort that will deliver significantly better capabilities to the warfighter. The naval aviation team continues to work aggressively to identify efficiencies in the development, testing, procurement and sustainment of aviation platforms, components, and weapons systems in order to provide the proper tools to the fleet. USD(AT&L) Dr. Carter recently testified that: "I support, as does the Secretary, the initiatives Congress directed when it unanimously passed the Weapon Systems Acquisition Reform Act (WSARA) of 2009. Acquisition Reform is one of the Department of Defense's (DOD) High Priority Performance Goals presented in the Analytic Perspectives volume of the President's fiscal year 2011 budget. The Department is moving out to implement these initiatives." Our recapitalization and efficiency initiatives here are part of and consistent with WSARA implementation and DOD's acquisition reform goal.

We thank you again for the opportunity to testify today regarding the DoN's aviation procurement programs and look forward to your questions.

Senator LIEBERMAN. Thanks very much, Admiral.

Now we'll ask General Mark Shackelford if he would make an opening statement.

**STATEMENT OF LT. GEN. MARK D. SHACKELFORD, USAF, MILITARY DEPUTY, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION; ACCOMPANIED BY MAJ. GEN. JOHNNY A. WEIDA, USAF, ASSISTANT DEPUTY OF STAFF FOR OPERATIONS, PLANS, AND REQUIREMENTS, DEPARTMENT OF THE AIR FORCE**

General SHACKELFORD. Thank you, sir.

Chairman Lieberman, Ranking Member Thune, and distinguished members of the subcommittee, thank you for calling this hearing and for the opportunity to provide you with an update on Air Force modernization efforts.

I'm joined this morning by Major General Johnny Weida, Assistant Deputy Chief of Staff for Airspace and Cyberspace Operations.

Your Air Force is fully engaged in operations across the globe, engaged in overseas contingency operations and providing support to the combatant commanders to enable them to successfully execute their missions.

In the coming year, we will assess how the fiscal year 2011 budget aligns with our standing operational requirements, along with the upcoming needs of the entire Air Force. The 2010 QDR set forth four objectives to guide our current actions and future planning: (1) prevail in today's wars; (2) prevent and deter conflict; (3) prepare to defeat adversaries and succeed in a wide range of contingencies; and (4) preserve and enhance the All-Volunteer Force.

Your Air Force is vectoring to meet these objectives, and we are committed to working together to determine the right procurement, sustainment, and retirement strategies to ensure we are prepared for the current fight, as well as posturing for future demands.

Dominance of airspace and cyperspace continues to be requisite to the defense of the United States.

Major General Weida and I thank the subcommittee for allowing us to appear before you today, and for your continued support of the Air Force.

I request our combined written statement be submitted for the record.

We look forward to your questions.

Senator LIEBERMAN. Thanks very much.

Without objection, it will be submitted for the record.

[The joint prepared statement of General Shackelford and General Weida follows:]

JOINT PREPARED STATEMENT BY LT. GEN. MARK D. SHACKELFORD, USAF, AND MAJ. GEN. JOHNNY A. WEIDA, USAF

I. INTRODUCTION

Chairman Lieberman, Ranking Member Thune, and distinguished members of the subcommittee, thank you for calling this hearing, and for the opportunity to provide you with an update on Air Force modernization efforts and other matters important to our Air Force and to the Nation. Your Air Force is fully engaged in operations across the globe, including overseas contingency operations (OCO) and supporting the combatant commanders (COCOMs) and enabling them to successfully execute their missions. In the coming year, we will assess how the fiscal year 2011 budget aligns with standing operational requirements and future needs of the entire Air Force. The Secretary of Defense, in the recent 2010 Quadrennial Defense Review (QDR), set four objectives to guide our current actions and future planning: prevail in today's wars, prevent and deter conflict, prepare to defeat adversaries and succeed in a wide range of contingencies, and preserve and enhance the All-Volunteer Force. Your Air Force is vectoring to meet these objectives, balancing risk appropriately, and preparing to prevent, prevail, and preserve well into our Nation's future.

We frame our decisions and recommendations using the 2010 QDR and the Air Force's top five priorities, established by the Secretary and Chief of Staff of the Air Force. We understand your focus today is on the Air Force's priority to modernize our air and space inventories, organizations and training. Our rapidly aging aircraft fleet drives our urgent need to balance between acquiring new inventory with sustaining our current fleet. We look forward to discussing how we can match the requirements with available resources in order to execute the National Military Strategy.

II. CONTRIBUTIONS OF OUR AIR FORCE

Today, your Air Force flies and fights in air, space, and cyberspace—globally and reliably—as a valued member of our joint and coalition teams. More than 40,000 airmen are deployed, with over 29,000 in and around Afghanistan and Iraq, as we unwaveringly do whatever it takes to prevail in today's wars. Airmen, soldiers, sailors, and marines who cross outside the wire do so with the asymmetric advantage of armed overwatch, globally integrated intelligence, surveillance, and reconnaissance, combat search and rescue, and aero-medical evacuation. In Afghanistan alone, last year your Air Force flew 26,474 close air support sorties, a 39 percent increase over 2008. Our joint force in the Central Command area of responsibility is sustained by around-the-clock rapid global mobility operations that included, in 2009, 52,905 airlift sorties delivering 264,839 short tons of cargo, over 32 million pounds of air-dropped cargo, and 1.3 million passengers. In addition, sometimes overlooked is the fact that approximately 43 percent of our total force is daily engaged in out-of-theater support to COCOMs; a remarkable contribution enabled by past investments in technology and infrastructure that allow your Air Force to project global vigilance, reach, and power while minimizing vulnerability.

On the home front, since September 11, 2001, your Air Force has flown over 57,942 total sorties under Operation Noble Eagle, including 41,269 fighter sorties, 11,511 tanker sorties, and 1,850 early warning sorties. As a testament to the total force, the Air National Guard has flown more than 70 percent of these sorties and currently operates 16 of 18 air sovereignty alert sites. As we continue to accomplish our current mission sets and plan for future threats, we must remain mindful of

the increasing age and costs of operating our air fleet. Our Air Force leadership is scrutinizing programs and budgets to find acceptable solutions to meet growing demands that are competing for limited funds.

III. FIGHTER AIRCRAFT SHORTFALLS

We constantly assess the combat Air Force structure in relation to the dynamic security environment and the evolving needs of our joint force. At this time, your Air Force does foresee a fighter inventory shortfall when we compare force structure to COCOM plans and requirements.

In April 2008 the Air Force informed Congress of a projected fighter gap of over 800 aircraft in 2024. Since that testimony, three key fighter force structure assumptions have changed. First, during the fiscal year 2010 budget cycle the Air Force elected to accept increased short- to mid-term warfighting risk and a subsequent smaller fighter force in exchange for modernization. Second, the F–35 procurement rate was officially increased from 48 to 80 per year. Third, the approach to fighter service life computations was refined. The combination of these changes significantly reduced the fighter gap. Numerous internal and external assessments of the future security environment, including the 2010 QDR, have determined our current fighter force plans will fulfill COCOM requirements with a moderate amount of risk.

IV. STATUS OF COMBAT AIRCRAFT ACQUISITION

*Fighter Force*

The average age of all combat Air Force aircraft is 21.7 years. In August of this year, your Air Force will have been engaged in combat operations for over 21 continuous years. The assessment of our aircraft's longevity is complicated by the fact that we are currently flying the oldest Air Force fleet in our history and using them longer and more frequently than was envisioned during their design. This presents considerable challenges in a difficult fiscal environment. In response, we have conducted an extensive investigation into the service life of our fighter aircraft. This is an ongoing effort and will be informed by detailed fatigue testing of our A–10, F–15, and F–16 fighters to better understand the life-limiting factors of these aircraft, and the feasibility of extending their service life given the economic and operational environment. The work to date has reinforced our need to recapitalize our aging fleet by acquiring next-generation systems and modernizing selected legacy platforms.

*A–10*

The A–10 provides our Joint Force Commanders lethal, precise, persistent, and responsive firepower for close air support and combat search and rescue. It has performed superbly in Operations Desert Storm, Allied Force (OAF), Enduring Freedom (OEF), and Iraqi Freedom (OIF). However, the A–10's age and high operations tempo have taken a toll on the fleet. The A–10 fleet's aircraft availability rating for fiscal year 2010 is 52 percent.

Your Air Force plans to retain the venerable A–10 fleet beyond 2030, based on implementation of the proper care, investment, and fleet management recommendations specified by the 2006 Fleet Viability Board. In fiscal year 2007 the A–10 fleet began a robust depot-level modification schedule that runs through the Future Years Defense Program (FYDP). This year we begin installing "thick-skin" center wing panels on 233 A–10s—nearly two-thirds of the fleet, and begin improving the fuselage structure. Your Air Force is also modernizing 347 A–10s to the "C" configuration with anticipated completion by April of fiscal year 2011. This upgrade includes precision engagement modifications to integrate targeting pods and digital data links into the aircraft avionics, enabling use of global positioning system-aided munitions such as the Joint Direct Attack Munitions (JDAM) and Wind Corrected Munitions Dispenser. Also, we integrated a digital data link and advanced targeting pods with video downlink and replaced monochrome cockpit displays with color multi-function displays. In addition, we installed new pilot throttle and stick controls, a moving map capability and a mass-memory upgrade. Finally, we integrated beyond line-of-sight radios into the A–10 for faster communication with ground units, forward controllers, and command and control centers. Together, these modifications will allow the A–10 to continue its record of close air support excellence over the next two decades.

*F–15 C/D*

The F–15 C/D is an air superiority fighter with an average age of over 25 years. We project the F–15 C/D fleet is viable until 2025–2030 and will consider the airframe's service life extension requirements following full-scale fatigue testing. This

testing is scheduled to begin this summer and conclude in fiscal year 2014. Your Air Force is managing the fleet through scheduled field and depot inspections under an individual aircraft tracking program. For fiscal year 2010, the F–15 C/D's aircraft availability is 65 percent.

We continue to modernize our long-term F–15 fleet with active electronically scanned array (AESA) radars, infrared search and track capabilities, and a more capable aircraft mission computer to boost the air superiority capabilities of this aircraft. We expect these efforts to successfully enable the 176 F–15 C/D "Long-Term Fleet" to operate safely and effectively through at least 2025, as determined by the full-scale fatigue test.

In addition, in fiscal year 2010 the USAF reduced F–15C/D force structure by 132 permanently assigned aircraft and retired 112 aircraft to the Aerospace Maintenance and Regeneration Group at Davis-Monthan Air Force Base (AFB) in Arizona. This leaves 199 permanently assigned aircraft (250 total active inventory) for fiscal year 2011 and beyond.

*F–15E*

The F–15E fleet, with an average age of over 16 years, continues to provide support for ongoing operations in Afghanistan and Iraq. Like the A–10, the F–15E performed superbly in Operations Desert Storm, OAF, OEF, and OIF. In 2009, F–15Es delivered 54 percent of the 2000 lb. JDAMs and 29 percent of the 500 lb. JDAMs employed in that area of operations. The fiscal year 2010 aircraft availability rate for the F–15E is 59 percent.

Your Air Force works hard to improve the F–15E's ability to rapidly engage and destroy time-sensitive targets. This includes adding secure radios and data links for faster communications with ground units and forward controllers. In addition, we integrated the latest precision weapons to hit targets accurately and reduce collateral damage. Also, your Air Force added a helmet-mounted cueing system that will reduce the F–15E's time to engage a target by up to 80 percent. Finally, we added the state-of-the-art AESA radar system that advances capabilities to identify and engage targets as well as share information with other aircraft. Your Air Force plans for the F–15E to be an integral part of the Nation's force through at least 2035.

*F–16*

Our multi-role F–16 comprises the majority of the fighter fleet. There has been a 3.6 percent drop in the F–16 fleet's aircraft availability since fiscal year 2005. Drivers contributing to this decline are the Falcon STAR (all blocks) structural integrity program, 341 bulkhead repair/replacement (block 40/50), engine inlet ram (all blocks), lower wing skin cracking (blocks 25/30/32), and aft cockpit corrosion for the two seat aircraft. We expect these drivers to continue to impact aircraft availability through fiscal year 2015. The F–16's fiscal year 2010 aircraft availability is 67 percent.

Extensive flight hours and more stressing mission profiles resulted in the need for significant structural modifications to the F–16. This upgrade program, scheduled to complete in fiscal year 2013, replaces known life-limited structural components and will maintain the original design airframe life of 8,000 flight hours. Wing pylon rib corrosion, a known problem with the F–16, is an issue we monitor closely through inspections every 800 hours. This corrosion can prevent the F–16s from carrying pylon-mounted external fuel tanks which limits its effective combat range. In partnership with industry, the Air Force has recently developed and certified a procedure that repairs affected aircraft at the unit in a single day rather than a lengthy overhaul at the depot.

In other inspections, maintainers have found bulkhead cracks in approximately 68 percent (271 of 397) of our Block 40/42 F–16 aircraft. 170 aircraft have been repaired and 49 aircraft had the bulkheads replaced with 13 more in progress. An additional 145 aircraft continue to fly with increased inspection requirements to measure crack growth. We will continue to monitor this situation closely. Similar to the F–15, the Air Force will start conducting a full-scale durability test for the F–16 in fiscal year 2011 todetermine the modifications required to extend the service life of the newer F–16s (Blocks 40–52) beyond 8,000 equivalent flight hours.

The Common Configuration Implementation Program is a top F–16 priority and will enable the maintenance of a single operational flight program configuration on the Block 40/42/50/52 F–16s. The Block 50/52 modification is complete, and the Block 40/42 modification will be complete this year. It combines several modifications including a new mission computer, color displays, air-to-air interrogator (Block 50/52 only), Link-16, and Joint Helmet-Mounted Cueing System. The F–16 is expected to be a capable element of the fighter force well into 2024.

*Fifth Generation Fighters*

Fifth generation fighters like the F–22A and the F–35 are key elements of our Nation's defense and ability for deterrence. Hostile nations recognize that U.S. airpower can strike their vital centers with impunity which enhances all other U.S. Government instruments of power. This is the timeless paradox of deterrence; the best way to avoid war is to demonstrate to your adversaries that you have the capability and will to defeat them.

The F–22A and F–35 represent our latest generation of fighter aircraft. Both aircraft are necessary to maintain a margin of superiority that permits our air and ground forces freedom of maneuver and attack. The F–22A and F–35 each possess unique, complementary, and essential capabilities that provide the synergistic effects across the spectrum of conflict. The Office of the Secretary of Defense (OSD)-led 2006 QDR Joint Air Dominance study underscored that our Nation has a critical requirement to recapitalize TACAIR forces. Legacy fourth generation aircraft simply cannot survive to operate and achieve the effects necessary to win in an integrated, anti-access environment.

*F–22A Future Capabilities and Modifications*

The F–22A Raptor is your Air Force's primary air superiority fighter providing unmatched capabilities for air supremacy and homeland defense for the joint team. The multi-role F–22A's combination of speed, stealth, maneuverability and integrated avionics ensures this remarkable aircraft accesses and survives high-threat environments. Its ability to find, fix, track, and target enemy air- and surface-based threats ensures air dominance and freedom of maneuver for all Joint forces.

Similar to every other aircraft in the U.S. inventory, there is a plan to regularly incorporate upgrades into the F–22A to ensure it remains the world's most dominant fighter in the decades to come. The F–22A modernization program consists of two major efforts that will ensure every Raptor maintains its maximum combat capability: the Common Configuration program and a preplanned product improvement program (Increments 2, 3.1, and 3.2). We are approximately at the mid-point of this effort.

As of 2 April 2010, your Air Force had accepted 158 F–22A aircraft out of a programmed delivery of 187. We will continue to upgrade the F–22A fleet under the Joint Requirements Oversight Council-approved Increment 3 upgrade designed to enhance both air-to-air and precision ground attack capability. Raptors from the production line today are wired to accept Increment 3.1. This upgrades the APG–77 AESA radar for synthetic aperture radar ground mapping capability, provides the ability to self-target JDAMs using on-board sensors and allows F–22As to carry and employ eight Small Diameter Bombs (SDBs). Your Air Force will begin to field Increment 3.1 in fiscal year 2011.

Responding to current threat assessments, the next upgrade will be Increment 3.2 "Accelerated" which will complete development in fiscal year 2013. 3.2 "Accelerated" is a software-only upgrade and provides significant additional electronic protection, Link 16 improvements, and a better combat identification capability. In the future, F–22As will receive the Increment 3.2 full upgrade, which features multi-function advanced data link, improved SDB employment capability, improved targeting using multi-ship geo-location, additional electronic protection and combat identification, automatic ground collision avoidance system and the capability to employ our enhanced air-to-air weapons (AIM–120D and AIM–9X). Increment 3.2 should begin to field in fiscal year 2016. The current F–22A modernization plan will result in 34 Block 20 aircraft used for test and training, 63 Block 30s, 87 Block 35s, and two Edwards AFB-test coded aircraft.

*F–22A Procurement Plans*

The F–22A production program is currently delivering Lot 8 aircraft ahead of scheduled contract delivery dates at a rate of about two per month. Lot 8 Raptors are the second lot of the 3-year multiyear procurement contract awarded in the summer of 2007. The Air Force completed F–22A deliveries to Elmendorf AFB, AK, and is currently delivering to two squadrons at Holloman AFB, NM, with expected completion in January 2011.

When the plant delivers the last Lot 10 aircraft in 2012, we will have completed the program of 187 Raptors. The average unit cost for the 60 aircraft in the multiyear procurement was $142.6 million. The Lot 10 unit flyaway cost is estimated at $153.2 million. This is $10.6 million higher than under the multiyear procurement due to higher material costs for a much smaller lot buy, loss of the multiyear procurement savings in parts and labor and inflation.

*F–35*

The F–35 program will develop and deploy a family of highly capable, affordable, fifth generation strike fighter aircraft to meet the operational needs of the Air Force, Navy, Marine Corps, and Allies with optimum commonality to minimize life-cycle costs. The F–35 was designed from the bottom-up to be our premier surface-to-air missile killer. It is uniquely equipped for this mission with cutting edge processing power, synthetic aperture radar integration techniques, and advanced target recognition. The F–35 also provides "leap ahead" capabilities in its resistance to jamming, maintainability, and logistics support. The F–35 is currently in the 9th year of a 14 year engineering and manufacturing development (EMD) phase.

The F–35 is projected to meet all key performance parameters and as of 17 December 2009, AA–1 completed its 91st and final test flight. The second F–35A, AF–1, completed its first flight test on 14 November 2009. The first short takeoff and vertical landing (STOVL) flight test aircraft, BF–1, successfully completed several flights leading toward the program's first vertical landing, which occurred on 18 March 2010. Currently, there are three STOVL flight test aircraft at Patuxent River Naval Air Station. As of March 2010, 16 of 19 development test aircraft have been produced, including 6 ground test aircraft and 10 flight test aircraft. In addition, the F135 conventional takeoff and landing (CTOL) engine reached initial service release on 5 March 2010, and the first F135 production engine was delivered to the government on 29 January 2010. The Cooperative Avionics Test Bed continues to provide unprecedented risk reduction at this stage in a major weapon system not seen in any legacy program. The F–35 program was restructured and funded to be consistent with the most recent independent estimates, removing $2.3 billion from procurement and adding $1.4 billion to RDT&E across the FYDP. In addition, CTOL quantities were reduced by 67 across the FYDP. The fiscal year 2011 President's budget provided funding for 22 CTOL, 13 STOVL, and 7 CV aircraft, as well as 1 OCO CTOL aircraft.

*Joint Strike Fighter (JSF) Alternate Engine Program*

Your Air Force's position regarding the JSF alternate engine program is that a second engine is unnecessary, too costly, and risks diverting resources from production. The fiscal year 2011 Presidential budget does not request funding for the development and procurement of the F136 alternate engine. The Air Force and Navy continue to execute the funding appropriated by Congress in the previous budgets to continue the F136 program.

The Office of the Secretary of Defense for Cost Assessment and Program Evaluation estimated that the Department of Defense will have to fund approximately $2.9 billion to take the F136 engine to competition in fiscal year 2017, including development, directed buys, and the necessary logistics support. Continued funding for the F136 engine carries cost penalties to both the F135 and F136 engines in the form of reduced production line learning curves and inefficient economic order quantities. The department concludes that maintaining a single engine supplier provides the best balance of cost and risk. We believe the risks associated with a single source engine supplier are manageable due to improvements in engine technology and do not outweigh the investment required to fund a competitive alternate engine.

*Remotely Piloted Aircraft*

*MQ–9A Reaper*

The MQ–9 Reaper is a multi-role remotely piloted aircraft capable of providing battlespace awareness, armed over-watch and light strike against critical, emerging time-sensitive targets with self-contained hard-kill capability. SDD for the first increment began in fiscal year 2005, and additional SDD efforts are currently ongoing. An interim combat capability aircraft deployed to CENTCOM in September 2007 and more have continued to deploy. There are 13 U.S. MQ–9 combat air patrols (CAPs) supporting Central Command's (CENTCOM) area of responsibility (AOR). The MQ–9 has military-standard 1760-based stores management capability, GBU–12/AGM–114 Hellfire weapon and 500-lb. JDAM (GBU–38) capabilities. As of June 2009, the MQ–9 was designated a Major Defense Acquisition Program (MDAP). The fiscal year 2011 President's budget requests increased procurement of MQ–9s to achieve 65 combat air patrols (CAP). Rapid MQ–9 fleet expansion with concurrent development and integration of advanced payloads is stressing its development and testing capacity.

*MQ–1B Predator*

The MQ–1 Predator is a medium-altitude, long-endurance, remotely piloted aircraft for providing battlespace awareness with the ability to provide modest armed over-watch and reconnaissance against critical, perishable targets. When the MQ–

1 is not actively pursuing its primary mission, it acts as the Joint Forces Air Component Commander-owned theater asset for reconnaissance, surveillance and target acquisition in support of the Joint Forces commander. Airmen made history in March 2010 when they surpassed the 700,000 flight hour mark in the MQ–1B. The last 200,000 Predator hours were flown in just over 12 months. There are 28 MQ–1 CAPs supporting CENTCOM's AOR. The MQ–1B is also transitioning to a MDAP. The fiscal year 2011 President's budget extends the lifetime of MQ–1Bs to achieve 65 CAPs and provides funding to continue MQ–1 operations beyond the FYDP.

*Missile Programs*

*Joint Air-to-Surface Stand-off Missile*

The Joint Air-to-Surface Stand-off Missile (JASSM) is the Nation's only stealthy, conventional, precision, launch-and-leave, stand-off missile capable of being launched from fighter and bomber aircraft. The JASSM achieved operational capability on the B–52, B–1, F–16 and B–2 and puts an adversary's center-of-gravity targets at risk even if protected by next-generation air defense systems.

The Air Force postponed the JASSM fiscal year 2009 production contract due to unsatisfactory flight tests of the Lot 5 JASSM production missiles. Of the 10 flight tests, we considered 6 to be complete successes. To address issues discovered during the JASSM test program to date, we paused fiscal year 2009 missile production to incorporate reliability improvements and conducted Lot 7 reliability tests which achieved 15 for 16 successful hits. The fiscal year 2011 President's budget requests funds for the procurement of 171 missiles to include the first order of the extended range variant.

*Legacy Bomber Fleet*

The B–1, B–2, and B–52 remain engaged in today's fight while retaining an ability to meet future challenges. Air Force bombers have been on rotating deployments to Southwest Asia since September 11. The bomber aircraft inventory is 162 and averaged at 33.7 years old. Your Air Force continues its commitment to future long-range strike capabilities as part of a comprehensive, phased plan, valued at $5.5 billion over the FYDP, to modernize and sustain our bomber force.

*B–1*

B–1 aircraft availability rates remained relatively level for fiscal years 2002–2007 with a drop in fiscal year 2008 and fiscal year 2009 primarily driven by modernization efforts. To mitigate manpower shortages and reduced maintenance experience levels, B–1 bases have been augmented by a contract field team which will continue through April 2011. Manning authorizations have been approved but manning will continue to affect the B–1's aircraft availability rating into the distant future while personnel are trained and gain experience.

The B–1s has maintained an unflagging deployed presence since September 11, 2001 in support of OEF and OIF. During that time, the B–1 fleet and its crews have flown more than 6,900 missions and amassed more than 70,000 combat hours. In OEF alone, the B–1 has employed nearly 40 percent of all munitions while flying only 5 percent of all sorties.

Given the B–1's critical contributions to today's fight and its corresponding high operations tempo, your Air Force places great emphasis on sustaining the B–1 fleet. B–1 sustainment efforts address several issues which, if left unchecked, could critically limit aircraft availability and leave a gap in our power projection capability. Although these modifications represent a significant investment, they are critical to supporting our deployed combat forces by ensuring continued B–1 availability.

Your Air Force's primary B–1 modernization effort is the Fully Integrated Data Link (FIDL). FIDL gives aircrew enhanced situational awareness and combat effectiveness by incorporating Link-16 data link and joint range extension beyond line-of-sight capabilities. FIDL also provides the backbone infrastructure for a substantial upgrade to the existing cockpit including modern multi-function color displays that provide aircrew with a new level of fused data.

Your Air Force continues to deploy the highly successful laptop-controlled targeting pod (LCTP) modification for the B–1. Initiated in 2007 in response to an urgent need request and operational since 2008, LCTP provides the B–1 with targeting pod capabilities via the Sniper advanced targeting pod (ATP). The B–1 combined with the Sniper ATP delivers an unprecedented level of payload precision to the fight. Efforts continue to outfit the entire B–1 fleet for Sniper operations and provide a moving target kill capability via employment of laser-guided weapons.

*B–2*

The B–2 is significant to Pacific Command's (PACOM) continuous bomber presence to assure allies and support U.S. interests in the Pacific. The B–2 Spirit Advanced Technology Bomber provides a lethal combination of range, payload, and stealth. It remains the world's sole long-range, low observable bomber. It is the only platform capable of delivering 80 independently targeted 500-lb JDAMs (GBU–38). While B–2 availability has steadily increased over the past 5 years, in part due to enhancements in low observable maintenance such as the highly successful alternate high frequency material program, it faces increasing pressures to upgrade avionics originally designed over 20 years ago. The extremely high frequency satellite communications and computer upgrade program (EHF SATCOM and computer upgrade) has three increments. Increment 1 upgrades the Spirit's flight management computers as an enabler for future avionics efforts. Increment 2 integrates the family of beyond-line-of-sight terminals (FAB–T) along with a low observable antenna to provide secure, survivable strategic communication, and Increment 3 connects the B–2 into the global information grid. Increment 1 of EHF SATCOM and computer upgrade is in EMD and on track to begin procurement in fiscal year 2011 for fleet installations beginning at the end of fiscal year 2013. The Department is also investing in the B–2's defensive management system to ensure continued survivability. This will allow the B–2 to continue operations in more advanced threat environments while decreasing the maintenance required operating the system.

We will also replace the B–2's original radar antenna, upgrade selected radar avionics and change the radar operating frequency as part of the Radar Modernization Program (RMP). We signed the low-rate initial production (LRIP) contract for the first six production radar kits in December 2008 and contracted the second and final full-rate buy for the remaining seven ship sets in November 2009. Also, we bought 7 radar ship sets during development and are installing in fleet aircraft to round out the 20 aircraft B–2 fleet. The developmental units will be retrofitted to the final production configuration. This program successfully achieved required assets available on 15 March 2010. Thanks in large part to congressional support, the RMP acquisition strategy was modified to include life-of-type component buys to avoid diminishing manufacturing source issues during the production run.

*B–52*

The B–52 Stratofortress is our Nation's oldest frontline long-range strategic bomber with the last airframe entering service in 1962. It amplifies the consistent message of long-range US airpower in a theater like USPACOM where distances drive decisions. Equipped with advanced targeting pods, the B–52s can also provide real-time intelligence, surveillance and reconnaissance with full-motion video, enhanced situational awareness, a demonstrable overwatch presence and precision joint fires in support of USPACOM's objectives. In addition to supporting the continuous bomber presence at Anderson AFB on Guam, the B–52 continues to maintain a high-state of readiness for the nuclear deterrence mission.

Your Air Force has invested in modernization programs to keep the B–52 platform viable and operationally relevant. Major B–52 modernizations include the combat network communications technology (CONECT), EHF SATCOM, strategic radar replacement (SR2), and the 1760 internal weapons bay upgrade programs. CONECT provides an integrated communication and mission management system with machine to machine data link interfaces for weapons delivery. The digital infrastructure provided in CONECT is the backbone for EHF SATCOM and SR2. The EHF SATCOM program integrates the FAB–T providing assured, survivable two-way strategic command and control communications. The SR2 program, starting in fiscal year 2010, integrates modern non-developmental radar to address systemic sustainment issues, replacing the legacy APN–166 radar. Finally, the 1760 internal weapons bay upgrade provides internal J-series weapons capability through modification of common strategic rotary launchers and an upgrade of stores management and offensive avionics software. Updated with modern technology the B–52 will be capable of delivering the full complement of jointly developed weapons and will continue into the 21st century as an important element of our Nation's defenses.

*Long-Range Strike*

The fiscal year 2011 Presidential budget began funding for technology industrial base sustainment in anticipation of a future long-range strike (LRS) platform program. This effort develops and demonstrates LRS technologies and concepts in support of Air Force global strike and global persistent attack concepts of operations. This effort will provide capability improvements in the areas of strike responsiveness, survivability, lethality, connectivity, and affordability. The QDR-directed study will help inform and shape the requirements for LRS.

The fiscal year 2011 Presidential budget adds $199 million in fiscal year 2011 and $1.7 billion over the FYDP for LRS. Fiscal year 2011 investments will reduce technology risk, preserve critical technology industrial base skills and refine requirements for a future long-range strike platform. Investment areas of interest include advanced sensors, electronic warfare and countermeasures, survivability, manufacturing readiness, net-ready communications, open systems and multi-level security architectures, mission management, weapon effectiveness and survivability, and combat identification.

V. CLOSING

Your Air Force stands ready to win today's joint fight and plan for tomorrow's challenges. We are committed to working together to determine the right procurement, sustainment and retirement strategy to ensure we are prepared for the current fight as well as posturing for future demands. Dominance of air, space, and cyberspace continues to be requisite to the defense of the United States. USD(AT&L), Ash Carter recently testified that: "I support, as does the Secretary, the initatives Congress directed when it unanimously passed the Weapon Systems Acquisition Reform Act (WSARA) or 2009. Acquistion reform is one of the DOD's High Priority Peformance Goals presented in the Analytic Perspectives volume of the President's fiscal year 2011 budget. The Department is moving out to implement these initiatives." The Air Force TACAIR Program actions described above are consistent with WSARA implementation and DOD's acquisition reform goal. We appreciate your continued support and look forward to working in concert to ensure our decisions enable us to strengthen our Air Force to meet future requirements.

Senator LIEBERMAN. General Trautman, or any of the others, would you like to make an opening statement?

General TRAUTMAN. No, Senator. I'll combine my verbal and written statement with Admiral Architzel's.

Senator LIEBERMAN. Okay, thanks.

Let's proceed to questioning.

Let me begin with an open-ended question and ask, beginning with Admiral Architzel and General Shackelford and anybody else who wants to get into this, if somebody were walking in here, maybe sitting in the back of the room, not particularly experienced in all the details of military acquisition, development, construction, et cetera, and asked, "Why is this JSF, which all of us acknowledge is an extraordinary program and a great plane, why is it now behind schedule and costing so much more than we thought it would cost?" In my days as attorney general of Connecticut, we used to call this the law in plain language. In other words, if you can explain to us—and through us, to the American people—what's the problem here?

Admiral ARCHITZEL. Senator Lieberman, if I could start.

I would say that the JSF program, unlike any we've ever had before, is a tremendously challenging program technically. It is also one that takes on not one aircraft, but three aircraft types.

Senator LIEBERMAN. Each for the different Services.

Admiral ARCHITZEL. Yes, sir.

Senator LIEBERMAN. Right.

Admiral ARCHITZEL. From the F–35A for the Air Force, the F–35B for the Marine Corps short takeoff, vertical landing (STOVL) variant, and F–35C, which is the carrier variant for the program.

In the process of developing these aircraft and the technology that goes with them, the advancement of the program and the technical risks that were encountered did not meet the schedule and costs. That was clearly pointed out with a Joint Assessment Team (JAT), which was done in 2008, to show that the program needed additional time and investment to meet goals. That action was

taken at the end of 2009 to fund that estimate. The continued pressure of slides in the program or not meeting expectation of delivery, additional efforts were taken to understand the reasons. That was associated with the Joint Estimating Team II, an Independent Management Review Team, which went into the manufacturing and the ability to ramp up on those production areas, as well as an assessment of the 135 engine, which were all conducted in 2009.

At the conclusion of those reviews, Dr. Carter pulled together a group of senior officials, including General Shackelford and myself, to look and analyze, what did we gain from those analyses and where we're headed with the program? Clear indication was that while concurrency in these programs has been there from the beginning, the issue is, do you have too much concurrency? When you have too much, do you need to take and slow that down somewhat to allow you to have the right amount of concurrency?

Senator LIEBERMAN. Define concurrency for this mythical person in the back of the room.

Admiral ARCHITZEL. All right, sir. We are at a point where we are building aircraft, we are testing aircraft, and we're beginning to field aircraft. There starts to be a concurrency not just in that overlap, but also concurrency between the various models I mentioned, the A, the B, and the C, as they come through. So, the program is built on a certain level of concurrency, which is healthy.

What concurrency can bring you is added learning, it can bring you manufacturing stability, it can bring you a lot of things that go forward. But, with too much concurrency, you need to then take a look and say, "do we have this right?" The estimate of the Department was that we needed to take an additional 13 months in the development phase of the program. We needed to put additional funding in that program, which is about $2.8 billion to finish that effort. We also took measures that we wanted to come through that period, and we needed additional test assets that weren't in the plans, so we added an additional carrier variant. We took three additional airplanes from the limited low-rate initial production (LRIP) series, to bring that so we could have additional test assets. We also revised the ramp to have the ramp which was in line with the Independent Management Review Team's recommendation, which is the ramp that we have today in our proposal.

Senator LIEBERMAN. Excuse me, a second.

Let me go back to concurrency, because part of the appeal of the program, obviously, was that this was a JSF, that this was going to be essentially a single plane model. Obviously, there'd be some variants there, but that part of the appeal of it was that there would be a lot of commonality between the planes for the different Services, and so we'd be saving money in a host of different ways, and hopefully achieving a speedier production. But am I hearing you say that that part of the problem is that that didn't work out and that there were unique needs of the various Services that are part of the reason why this program is now behind?

Admiral ARCHITZEL. I think that in order for this program to work effectively, some concurrency had to be built into the program.

Senator LIEBERMAN. Right.

Admiral ARCHITZEL. It's based on that. There's an absolute need. In order for the manufacturer to produce the fifth-generation aircraft we need, we have to have some concurrency just to get the learning and the ramp we would need to produce this in an economical fashion. A certain amount of that is healthy and will get us where we want to go. It's when you end up in a situation with too much; basically the restructuring will be done with an eye towards slowing 13 months in the development phase, and we will then have the ability, with the added test assets I mentioned, and with the funding, to get the program back on track with the right level of challenge to it and with the confidence that both the contractor and we can train and be able to support needs as we go forward.

Senator LIEBERMAN. General, let me ask this question. As you look back, did we underestimate at the beginning? At worst, were we misled or were we misleading ourselves to think that we could turn this plane out more quickly and less expensively than we're getting it now?

General SHACKELFORD. Mr. Chairman, thank you for asking that. DOD acquisition is much about setting expectations. In 2001, when we established the cost baseline for the development program, we had a different set of circumstances than we do now. But, consider that cost estimating, in spite of it being a fairly mature process that we use within the Department, it leaves a great deal of potential to make errors in the estimate. The process that we follow in DOD acquisition sets an expectation with that initial independent cost estimate (ICE) that we're measured against, that results now in the Nunn-McCurdy breach, as you have observed.

I don't think this is a matter of misleading.

Senator LIEBERMAN. Right.

General SHACKELFORD. I think our cost estimating community does the best job that they can do, with the tools that they have and the people they have, to assess what might be the future of a program, when, in reality, they're looking at, in this case, more than a decade out into the future, and judging what reality might be at that time.

A year ago, when I was here testifying before this subcommittee, what I told you was that over the next year we would find out a great deal more about the assumptions that go into, for instance, the cost estimate.

At that time, we were looking forward to having virtually all of the flight-test aircraft delivered during calendar year 2009. That didn't happen. Why might that not have happened? These flight-test aircraft, unlike those that are often built into legacy aircraft programs, were being built on the production line, the same production line that is turning out the LRIP aircraft today. That transition, for a contractor, is a significant event, in terms of changing focus from development into production, and facilitating that production line. It comes down to things like efficiency on the production line, the provision of the parts to go into the aircraft as you go from fabrication into assembly and then final assembly. To the extent that you have changes in the design. These would be small changes—this is some component that doesn't fit, for instance, as they expected it to fit—that result in a certain amount of churn

that now reflects back on incomplete work that now needs to be fixed later in the production line.

The result of all of that—and there was a great deal of change traffic a year ago—is, that production line is very unstable at that point, and its predictability is not as sound as we would like it to be. The result of that is late delivery of aircraft, which, in this particular year would have been the year to start the flight test program and have the flight test aircraft as productive test assets to verify such assumptions that go into a cost estimate as numbers of effective sorties per month, number of effective test points per sortie, how much progress we could make in the developmental test program, that pretty much got stiff-armed by a year.

Senator LIEBERMAN. Right.

General SHACKELFORD. So, we're in the same situation now, where we expect to get all of those flight-test aircraft delivered this year. But, we have found through the production of the flight-test aircraft, and then to the LRIP aircraft, stabilization and change traffic, a higher rate of available parts, and less out-of-station work; in other words, that line is starting to mature. It will take a couple of lots of LRIP to catch up.

But, at this point, we've pretty much turned the corner on that. Now, we just need to get those aircraft active flyers, and that will then help us understand whether the assumptions that we have put in to the flight-test schedule, which is largely what amounts to the cost estimate for engineering and manufacturing and development, to see how valid that's going to be.

Senator LIEBERMAN. Okay, thank you. We'll continue the discussion. My time is up.

Senator Thune.

Senator THUNE. Thank you, Mr. Chairman.

Admiral Architzel and General Shackelford, in its most recent selected acquisition report on the JSF program, DOD warned Congress that the overall costs for buying the JSF aircraft could increase, yet again, after a new ICE comes out in the summer. The magnitude of that revised ICE could raise basic questions about the Department's plans for, and the commitment of the program's international partners to, the program, at least as it's currently envisioned.

Does either the Navy or the Air Force have a fallback plan if schedule slips and cost growth continue in the JSF program? If so, what are they?

Admiral ARCHITZEL. The Department has taken extraordinary measures now to look in detail at the JSF program, and with the restructuring of that program, we firmly believe that we can deliver on the program, avoiding future cost and schedule impacts. That was not taken lightly, moving forward, mentioning all the things General Shackelford has also mentioned, but the idea of revising the ramp and then holding to the testing that we need to get done, and also resourcing the tests that has to happen to go forward. I believe with the maturing of the product line, and the moving forward, we will see ourselves begin to recapture the progress we need to see on the JSF program.

In terms of alternatives, what we have to look for and be mindful of is we do have to maintain a strike fighter base. That gets into

our maintaining of our legacy fleet of aircraft, as well as where we go from there. So, that may be something we want to come back to and address how we manage it. Because, essentially this is a two-fold effort, if you will; it's managing of the fleet aircraft we have today, and it's about also ensuring we do everything we can to bring the JSF on in the numbers we need, which is to recapitalize our fleet.

At the end of the day, we absolutely need requirements brought by the fifth generation and the JSF. So we are committed to that, as we go forward.

General Shackelford?

General SHACKELFORD. Senator, likewise, the Air Force is committed to the F–35 as the fifth-generation solution for recapitalizing our fighter force structure.

The Air Force, likewise, is committed to the JSF as being our solution for recapitalization of our fighter force structure. As such, we are putting the proper pressure, in terms of bringing that program along in as successful a manner as we can, such that we can build a confidence to get the production ramp rate up to something that will flow those aircraft into the inventory as quickly as we're able to.

Regarding our legacy systems, we're primarily modernizing those aircraft—these would be A–10s, F–15s, F–15Es, and F–16s—with avionics. We are putting new wings on a large number of the A–10. That's a structural replacement; likewise, structural repairs on the F–16 fleet, to ensure it can meet its 8,000-hour service life. But, in general, providing state-of-the-art avionics capability with weapons capability to match is how we are approaching the legacy fleet. But, we're focused on that fifth-generation fleet.

Senator THUNE. You touched on it maybe a little bit, but I wanted to follow up on something that the Air Force Chief of Staff, General Schwartz, recently confirmed, and that is that the Air Force has begun stress tests on the fleet of F–16 Falcons to help determine how to keep several hundred of the jets airworthy through the end of the decade, hedge against delays in the delivery of the JSFs. Can you shed some light on that, and maybe give us some additional information on that initiative?

General SHACKELFORD. Yes, sir. We are doing a structural analysis on the F–16, primarily looking at the Block 40 through 52—the newer F–16s—to extend those as far as we can. Those are also the aircraft that have received what's called the Common Configuration Implementation Program that upgrades displays, puts in Link 16 Helmet-Mounted Cueing System, and basically communalizes the avionics architecture across those blocks of aircraft.

The F–16, in particular, is susceptible to bulkhead crack issues, typically at the back landing gear and aft into the engine mounts. That's been an issue with F–16s throughout the life of the fleet. We have a small number of aircraft right now that are in repair to fix what we know to be problems there, as well as into additional inspections to make sure that they're airworthy. But, I'm not anticipating, at this point, an additional major structural upgrade.

Admiral ARCHITZEL. Senator, it's essential that we manage the fleet of aircraft we have today, that we get the most utilization we can out of them, as we begin to ramp up and bring forward the

JSF. That program takes on the call of not just managing the fleet of aircraft, but also extending the life of the legacy aircraft we have today. In managing the fleet of aircraft, we go about looking at things we can do to operationally affect that force. The Navy and Marine Corps, both Services are committed to TACAIR integration, to share that burden for things like productive ratios of aircraft, to the beddown plans for the Marine Corps or, in the case of the Navy, in terms of fleet response plan. About accelerating E/F squadron changeovers from legacy Hornets to E/Fs, there will be approximately five squadrons total; it varies between accelerating existing plans to transition to E/F, and also taking attrition birds, which were aircraft bought when the E/Fs were bought for attrition, which we would transition squadrons earlier to build that capability in those areas.

It's also about actively managing, by bureau number, the fatigue life of every legacy Hornet. We have the ability to do that, and we're doing that now, as well as managing the flight hours for each one of those aircraft.

We also have significant work underway to increase our depot efficiencies to get things through, like planned maintenance availabilities or high flight-hour inspections, so that we can return those aircraft that we do have in the pipeline—which is maintenance or upkeep—back to the fleet and taskable assets.

That is the managing-the-fleet-of-aircraft side. Then, on the the extending-the-service-life side, we have legacy Hornets, a 6,000-hour jet, which, when we brought it on, we knew we could actually, with inspections and with knowing how we flew the aircraft, get that out to 8,000 hours. From 8,000 hours, we're looking now at a series of aircraft to see if we can do what's called high flight-hour inspection, which would give us 600 additional hours on the airplane. That allowed us to take what was a strike fighter shortfall, with the numbers mentioned before and get to around a 177 fighter shortfall in the 2017–2018 timeframe.

We could then apply additional resources to look how we would further mitigate that shortfall. One of those big mitigators would be to actually do a service-life extension program (SLEP) of a limited number of legacy Hornets. That range would be somewhere between 150 and 280; it would depend on what we have. That would allow us to continue to draw down that shortfall, should we need to do it.

These steps are taken across the board by the Navy and the Marine Corps. The commitment is real. We're going to manage this inventory as we go forward, keeping in mind we want absolutely to have the ramp sustainment on the JSF so that we can bring those planes on and then not have to have further reliance on legacy assets as we go forward.

One final piece I'll mention on the E/F is, we are working diligently under our service life assessment program to see about taking the E/F to 9,000 hours. That's a funded program for the assessment of that. We believe that's a very doable objective.

Senator THUNE. Thank you.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Thune.

Let me just say, briefly, that Senator Thune's question is an important one, and your answers are important, too. There has been broad support for the JSF program here in Congress, but the TACAIR shortfalls that the Services are projecting are very unsettling. As you've acknowledged, yourself, in the moves that you're making—and I think you'll hear this much more from Congress, as you already have—there will be pressure to sustain the fourth generation of aircracft, and improve it because the fifth generation is coming on more slowly and more expensively than we hoped for. I understand you're both committed, and the Services are committed, to the fifth generation, but based on the reality that we're facing now, of time delays and increased cost and the very unsettling TACAIR shortfall, which does represent warfighting risk, then I think we have to work with you to do a combination of fourth and fifth generation to keep us where we want to be.

I'm going to just leave it at that for now, and I'll come back to it.

Senator Burris, you're next.

Thank you.

Senator BURRIS. Thank you, Mr. Chairman.

I'd like to welcome our distinguished panel. I'm pleased with the leadership that you've shown over the past years, and I want to continue to support you in your continued leadership for our great country.

Gentlemen, I'm a strong supporter of the Federal contract competition; and, as such, I supported continued funding of the F136 engine last year. This is a fixed-price contract with long-term savings for DOD and the American taxpayers, not to mention its positive effect in TACAIR readiness. What I want to see are savings for the American taxpayers, and competition is the only way to effectively garner such savings. When contractors compete, the taxpayers win. So, we want to make sure that that's a factor.

How are you phasing in the support of infrastructure as a new JSF program without the detriment to the legacy aircraft that it will replace?

Admiral, you want to take a shot first, and then the General?

Admiral ARCHITZEL. Senator, with the reference to the alternate engine, the Secretary has been unequivocal on the position with respect to the alternate engine. The Department of the Navy stands in full support of that position on not having the requirement for the alternate engine. Spending more dollars today on procurement on a second engine for JSF is unnecessary and would divert precious funds, as we've already talked about, from pressing DOD needs.

Since 2007, DOD has recommended termination of the alternate engine program, and if we were to continue that program, estimates are, it would require approximately $2.9 billion up to 2017, to $2.5 billion in the next 5 years. That also would require us to get to the issue; while, in general, the Department of the Navy favors competition, where appropriate, the question would be whether the offset of the procurement investment required to reach that point where we could compete that—and the estimate would be around 2017, best case, before we could—would there be a payback

to the procurement offset, which is significant, at a time when we really need these precious procurement dollars?

We also want to emphasize that we need to improve the performance on the 135 engine, and that has been undertaken with the JAT, which got the assurances and came back and reported feeling there will be assurances to that effect. So, to your point, understanding the desire for competition, we accept and realize there are points when we want to have competition, as well. But, in this case, we believe that the position is not favorable for us to pursue with a second engine.

General Shackelford?

Senator BURRIS. Yes, General?

General SHACKELFORD. Senator Burris, the Air Force supports the Department's position on the alternate engine for the F–35. Based on the Cost Assessment and Program Evaluation's (CAPE) analysis, the program itself has rated its breakeven point, in terms of tipping the scale to go past what's remaining as what we've invested, at about $2.9 billion on either side. The assumptions that go into cost reductions based on competition have changed over time; the change from 2014 to 2017, in terms of when that engine might become competitive, assumptions on the engine entering the production with basically the same cost as the F135, and the same learning curve, are both questionable assumptions.

We believe, as we look out into the future, that the market for two engines will exist, just in the Air Force. We would be the only recipient of F–35s that would actually have both engines. Smaller fleets would drive single-engine configurations for both our foreign partners, as well as, we believe, the Navy and Marine Corps. The Air Force, buying the bulk of the airplanes, would wind up with, potentially, both, which drive additional support costs, training costs, spares costs, and whatnot. So our assessment is that, given the priorities for dollars in today's budget, we're better off spending the money, from an F–35-engine perspective, to continue to refine the F135 engine, and press on with that as the single engine for the F–35 fleet.

Senator BURRIS. Gentlemen, the alternative plans to compensate for delays in the JSF program have been an added cost. What is the projected added cost of alternative plans to compensate for the 24-month delay that we're talking about now? There's an added cost to it.

General SHACKELFORD. Senator, are you referring to the added cost in the F–35 program itself?

Senator BURRIS. That's correct.

General SHACKELFORD. Yes, sir. By flattening the ramp, which we did as part of the restructure of the program, we have taken $2.8 billion out of the production funding inside the program's funding line and placed that onto the development program. So, the dollars themselves are neutral, in terms of affecting other programs. They only come out of the F–35 program, and they are a trade between production dollars and development dollars.

Senator BURRIS. So, there are no added dollars. You're just switching dollars.

General SHACKELFORD. This is switching dollars in the projected funding line of the F–35 program, yes, sir.

Senator BURRIS. Will there be a second round, Mr. Chairman?
Senator LIEBERMAN. I expect there will, Senator Burris.
Senator BURRIS. Thank you very much.
Senator LIEBERMAN. Thank you.
Senator Brown.
Senator BROWN. Thank you, Mr. Chairman.

I had to step out for a quick meeting, but I appreciate the opportunity to stay in order and continue on with the questioning.

The F135, I know it's over budget by about $3 billion, and I believe it's behind schedule. In looking at the F136 program, it's on budget and it's on time and there's a potential to offer a fixed-price contract. I know I'm new here, but even before I got here, I was concerned, being in the military, about pricing and costs. How do I justify, to the people back home in Massachusetts, the fact that we're supporting a program that's over budget and not on time, versus a plan that's a local engine that needs a billion dollars to be finished, is on budget, and offers a fixed price? How do I justify supporting one program over the other? What do I tell them?

Admiral ARCHITZEL. To your first point about the 135 engine, part of the restructuring of the program was done to look at the 135 with a JAT made up of senior experts, to go and look at the progress on that manufacturer to produce that engine and could they achieve stated cost-reduction goals? The report back from that JAT was that they could achieve that. First point.

Senator BROWN. When do they think that'll happen?

Admiral ARCHITZEL. As we progress forward on the 135 engine development and procurement service. There's set goals for the engine to achieve, in terms of learning curve and coming down on cost per engine, and those goals were assessed as achievable by the JAT that went up and evaluated that.

In terms of a second engine procurement, it is approximately 3 to 4 years behind where the 135 is today. The additional $2.9 billion over the span from now until 2017 is a significant amount of money, $2.5 billion in the next 5 years, which could be invested in other investment procurement or other areas needed to be funded.

Senator BROWN. But, you're using the original baseline numbers, correct?

Admiral ARCHITZEL. Yes, sir, those are the numbers that were reported from CAPE to us, and also from the estimates from the engine.

Senator BROWN. I've always been a strong believer that competition is good. When you're dealing with such a program with so many dollars, my concern, with the overruns and the delays, is that it's always good to have competition to keep people focused and moving in the proper direction.

So, for the record, Mr. Chairman, I want to state that I do have those concerns, and I'm doing everything and anything I can to find out more and more information as to why there are delays and why competition isn't good. I have to be honest with you, I haven't found a good reason yet.

I'd like to shift gears, if I may, regarding the CH–53 Echos and Deltas. They've flown beyond their programming date since 2001, due to their continued deployments. That said, the Heavy Lift Replacement Program ran into scheduling delays in 2009. If you could

just give us an update as to whether you're confidant that the 53 Kilo is back on track and will it be capable of replacing the legacy aircraft, starting in 2018.

General TRAUTMAN. Thank you, Senator Brown.

You're exactly accurate with regard to the aged CH–53 Delta, which is now into its fourth decade and still going head-to-tail into Afghanistan, and previously into Iraq. We've been getting marvelous service out of that particular airplane. CH–53 Echo is a newer airplane. That has service life that will enable us to bridge to the CH–53 Kilo. We need the Kilo. The Kilo is going to be a lifter that will carry 27,000 pounds at 110 nautical miles, which really fits into our concepts of operations today, but even more so in the future, as our equipment gets heavier and our need for standoff and deep operations increases in the next decade.

The 53 Kilo program is technically sound. We've worked through some challenges over the past 2 years, with regard to some center-of-gravity issues that we had initially, some staff management issues that we had initially, and I'm pleased to say that, in this budget submit, the program is adequately funded to move forward at a pace that makes us confident that we can bridge to that airplane towards the end of the next decade.

Senator BROWN. Thank you.

Mr. Chairman, do I have time for one more question?

Senator LIEBERMAN. Yes, Senator Brown. The timekeeper will inform you when your time is up.

Senator BROWN. Thank you.

The Hueys are currently being replaced by the Yankees, and the Whiskey Cobras will soon give way to the AH–1 Zulu. How is production and fielding of the Yankee coming along, and where do we stand with the Zulu program? General?

General TRAUTMAN. Senator, the H–1 upgrade program is a poster-child for troubled early years, just like many of our programs are, to include the JSF. But, I'm pleased to say that we've given birth to an extremely capable airplane in the UH–1 Yankee. We declared initial operational capability (IOC) of the Yankee in August 2008. We immediately sent it out in a marine expeditionary unit deployment for 7 months to western Pacific and that detachment did superbly; did so well, in fact, that even before we declared material support date with the Yankee, we deployed a full squadron into Afghanistan in November 2009. That airplane has made a huge difference in Afghanistan.

The Yankee is far, far more capable than UH–1 November that it replaces. We've used it in a variety of mission sets in Afghanistan. It's the first time we've had the Yankee serving side-by-side with the MV–22 and, I'll tell you, we're incredibly pleased with the span of capability sets that the Yankee and the MV–22 give to the aviation combat element commander there in Afghanistan.

The good news about Bell is that they've delivered an average of 57 days ahead of schedule for the last 18 airplanes. Their manufacturing and production process has righted themselves a remarkable way over the past 2 years. The quality coming off the line is near perfect. We entered into operational tests in the AH–1 Zulu, which will be the Yankee's partner, 2 weeks ago, and we have high con-

fidence that they'll finish operational tests and reach a full-rate production decision in the Zulu by the end of this calendar year.

Senator BROWN. Thank you, Mr. Chairman. My time is now up. If there is a second round, I just had one more final question.

Senator LIEBERMAN. Good.

Senator BROWN. Thank you.

Senator LIEBERMAN. Thank you, Senator Brown.

We'll now go to Senator Begich.

Senator BEGICH. Thank you very much, Mr. Chairman.

I have a few questions. I hate to have to keep banging on the 35. But, let me go back, first, to make sure I understand something.

When you said, "$2.8 billion out of the production will move, then, to the development," you're doing two things. Make sure I'm clear on this. One is, you're reducing down the future production, unless you get additional dollars. Am I right about that?

Admiral ARCHITZEL. I'm sorry?

Senator BEGICH. The question that you answered to Senator Burris; you had talked about how you're moving $2.8 billion in production dollars and you're shifting it to development dollars in the same program.

Admiral ARCHITZEL. No, the $2.8 billion is what it would take to finish the research and development. To develop the engine would be another $2.9 billion.

Senator BEGICH. But, you've shifted that from——

Admiral ARCHITZEL. No, if we were to have to fund those, that money would go there, that would not be able to be put for other DOD needs or procurement areas. So, it's dollars spent on a program that we don't believe we need.

General SHACKELFORD. Senator, I think you're after the production dollars moving over to develop not for the engine, but for, how are we paying for the additional development cost of engineering and manufacturing development.

Senator BEGICH. Right.

General SHACKELFORD. By flattening out the production ramp rate——

Senator BEGICH. Let me make sure, because I like to keep things very simple. Flattening the production rate means——

General SHACKELFORD. The progression of numbers of aircraft that are purchased each year.

Senator BEGICH. Right. Less per year.

General SHACKELFORD. A flatter increase, fewer aircraft, in addition to the previous year. For instance, in last year's budget was 30 F–35s. This year is 42. That number would continue to increase on an approximately 1.5-to-1 ratio each year.

Admiral ARCHITZEL. Senator, if I could, the numbers are about the same, one was about development of the alternate engine and the second was about flattening of the production of the JSF so that we could then use that for additional system development and demonstration (SDD) phase costs we have to incur. The number happened to be about the same. I was addressing what it would take research and development to continue and finish the development of the alternate engine. This is on the ramp.

Senator BEGICH. I'm on the F–35.

Admiral ARCHITZEL. Okay. Thanks.

Senator BEGICH. No problem.

I remember last meeting, I think it was maybe 6 months ago, when I was in this room and we had a conversation about the F–35, and it was indicated that there was trouble on the costing of it at that point, but it was not clear. One thing I had there which was a very helpful tool; I don't see it here. Maybe it was submitted. I don't see it in your testimony. But, I want to make sure I understand. The main goal is—and correct me if I'm wrong here—the F–35s replace legacy aircraft over time, but make sure we have capabilities, in essence. Is that a fair statement? I'm trying to keep it simple.

General SHACKELFORD. Yes.

Senator BEGICH. I don't want all the long discussion about it, but that's basically what we're trying to do. But, I have yet to see, in very simple terms now, where you are on schedule—because you're behind—costs more money, which means somewhere, something has given, because, based on what I keep seeing about the deficit, the money isn't there, over the long haul.

The third thing is, and I like to see things as very simple, where the facts are in what we have today, what we're going to have tomorrow, what we're going to have next year, the year after that, in capabilities. Do you have such a document you can share with us? I don't want a 40-page report. It was a very interesting chart. It showed exactly what production was going to be, how much was it going to be tested, when things might come online, and then, at the same time, what you're retiring, because that's a big piece of this equation, because you have, built into your budget, savings on retirements of some of the aircraft. You have modernization that's going on. So, how does that fit? Do you have such a chart that shows it over the 5 and 10 years?

Admiral ARCHITZEL. We can certainly show you the production of the 135 as it goes forward.

Senator BEGICH. I want it all together.

Admiral ARCHITZEL. Okay. We could take that and produce that for you, sir.

Senator BEGICH. Because the 35 is, over time, trying to replace certain types of aircraft, so we have great capabilities, but not diminishing our capabilities. Correct?

Admiral ARCHITZEL. That's correct, sir.

Senator BEGICH. Okay. What I've learned in the Armed Services Committee is everything's in silos. What I want to see is the whole show in a very simple document. Because the last document I saw showed that you had already slipped. I think, as Senator Brown pointed out, months, as well as very costly. What I'm trying to figure out, as we move down the line, how do we keep on the track a very expensive program, and I know there's variations in estimates, but I'm going to use mine: it's doubled in the cost per unit. It could go up more. To be very frank with you, I'm not as new as Senator Brown, but I'm new, and my confidence level on the ability to perform on this aircraft is low, in the cost end. Maybe it will be a great aircraft when it is all completed, but it is very expensive in a time when we have very little money. So, help me produce a flowchart that shows, over the next 10 years, or 20, not the next

year, not the next 2, over a long haul. At the end of each year, what are we going to have as capabilities? What's in test? What's being retired? What does it look like in costing for that program, which includes the modernization of certain ones, the production of certain ones? Can that be done?

Admiral ARCHITZEL. We can certainly produce that for you, Senator.

Senator BEGICH. Do you not do that now?

Admiral ARCHITZEL. No, we have that. I just would put it all in one document for you, the flowchart. I'm saying we can produce that.

Senator BEGICH. Okay.

[The information referred to follows:]

[Deleted.]

Admiral ARCHITZEL. But, the progress on the program, to go where we want to be with the JSF, the restructuring of the program also came with emphasis to the program we want to see or achieve those very goals you're laying out. How do we incentivize the contractor to actually make those goals? There's two things that are also embedded in a restructuring program, which is to take the award fee, a fee that we can take, and then incentivize that to goals and attainable things. What do we need to achieve in 2010? What do we need to achieve in 2011? If you attain those things, then you will be rewarded for that, and if you're not attaining those, then we would look to what would happen. Tying that to also, every time you have something affecting the 135, we have to be closely coupled to what we're doing on the legacy side, to make sure we don't end up aggravating our JSF inventory.

Senator BEGICH. My time is up. Luckily, she dropped it just in time to give me another question. [Laughter.]

I took advantage of that moment.

If you could do that on the chart, that would be appropriate.

The struggle I have, always, with DOD is the silo movements. As the F–35 gets developed, what I want to make sure is, when you make that decision that production is delayed, who then makes the decision on the rest of the aircraft to make sure you're not retiring it as quickly, or you're doing something with it? I want to just understand that, because if I don't have that basis, we're going to bang on your head here for another hour, probably; we'll ask lots of tough questions, then we'll all go away. What I like to see is the whole picture, then how those decisions are made, because what I find is, I will spend half of my time in the Senate, because I sit in these kind of meetings, and then individual meetings with generals about their programs, but they all seem to be not fully linked up, in my opinion. That's my view. Maybe in the Pentagon it's all linked up in some magic box. But, I'll tell you, I don't get that picture, so I'm trying to get that picture, and I need you to help me.

Admiral ARCHITZEL. Senator, we can do that.

To have Admiral Philman comment, I think would be helpful at this point. When we're talking about acquisition and delivering on new aircraft, and we're talking about the legacy and the JSF inventory, the CNO in his role to provide and equip the services we have, takes his existing operations and maintenance money, also is

budgeting to the fact that we want to maintain those legacies, so that is married directly as things happen on the procurement side, they are going to have a direct impact over there. I'd like the N88 to comment on that for you, sir.

Admiral PHILMAN. Yes, sir, glad to.

Senator, we take a holistic view of the whole inventory of our aircraft, along with our Marine Corps brethren who serve with us on the aircraft carriers. So, the F–35, which we are looking forward to, with all the capability it will bring to the battlespace, advanced sensors, advanced communications and connectivity, and the true stealth, to go very deep, early into the fight. We need that. But, until we get there, we will continue to work with our Es and Fs, and then modernize and sustain our legacy F–18 Hornets. So, we looked at that every day, about what aircraft are being retired, which aircraft can be extended, and how we manage, almost by each number aircraft down to the squadron level, how we can extend the life of those things.

It's called the Service Life Management Program, in which the young commanders understand the remaining life on those airplanes, what kind of missions they can fly, and which ones are better suited for separate missions.

I'll give you an example. As a young fighter pilot, I would go out and do high-performance maneuvering as soon as I got into the area. Then we would do some low G or more moderate maneuvering later on. As it turns out, we can get the same training if we reverse those things. We do moderate maneuvering when the aircraft's heavy with fuel, and then, as we get later in the flight, we do more dynamic maneuvering.

Those kinds of things are looked at across the board, the numbers of airplanes that exist, the numbers of airplanes we need to modify through high flight-hour inspections, or potentially SLEP those airplanes, but as well as the airplanes that we're going to potentially purchase in the future, and what that mix is on the aircraft carrier and on the other places we deploy around the world.

Senator BEGICH. Very good. Thank you.

Thank you, Mr. Chairman, for letting me expand there.

Senator LIEBERMAN. Thanks, Senator Begich.

Senator Chambliss.

Senator CHAMBLISS. Thanks very much, Mr. Chairman.

Gentlemen, thanks for your service. Thanks for your leadership.

Admiral Architzel, we've heard reports about the F–35, in testing, breaking cables on the carrier. What kind of report can you give us on that?

Admiral ARCHITZEL. I'm sorry, sir. The F–35 breaking——

Senator CHAMBLISS. Cables on the carriers.

Admiral ARCHITZEL. Sir, I have no knowledge of that report or anything. We have not begun to do any real testing. Where we're at today on the sea variant is confirming the static conditions, the static design of that airplane, which has gone very well in areas where we've actually uncovered some things. Places to restore static margin and fatigue margin have been put in place. That's the recent keel web correction. That has actually been implemented on the CF–5, and will be actually backfitted into 3. Three is actually

in, so you can actually go and see that modification in place, and it will be production-modified as we go forward.

Senator CHAMBLISS. All right. If what I've asked you about is a rumor, and I hope it is, I'd like to put it to bed. Could you just follow up in writing on that and just do whatever needs to be done and give me a response on that?

Admiral ARCHITZEL. Yes, sir, I will tell you that's definitely a rumor but I will follow up, sir.

[The information referred to follows:]

The report that F–35 is breaking arresting cables during test is a rumor. There have been no incidents of F–35 breaking arresting cables during test.

Senator CHAMBLISS. Thank you.

Admiral PHILMAN. Senator, if I could?

Senator CHAMBLISS. Yes, sir.

Admiral PHILMAN. I believe you're referring to the stresses on the keel beam of the aircraft, not the arrested landing, but the catapult. That was determined through modeling, that the transfer of stresses from the catapult stroke on the aircraft carrier would potentially cause some cracking in the main beam of the aircraft. That was determined and learned very early. Just one aircraft is delivered, and that's actually a test model. So, that fix has already been implemented. Any further aircraft that will be delivered will have that repair already installed, sir.

Senator CHAMBLISS. Okay. Thank you.

Admiral ARCHITZEL. Those are the kinds of things, Senator, that we are finding when you have the keel web structure we're talking about. There are other examples that we found in our static testing, which has gone forward very well, on all three variants, but it's the kind of thing you'd expect to find now, and then be able to make adjustments to it.

Senator CHAMBLISS. Okay.

Admiral, I want to go back to your numbers on this gap. Let's talk about how we're going to fill that. I'm concerned about two issues there. Number one, obviously, is the gap itself. My understanding is, in 2008, the Navy projected an optimistic shortfall of 125 strike fighters by 2017. But now, subsequent reports project that may grow to 243 by 2018; 129 for the Navy and 114 for the Marine Corps. That, coupled with the fact that today the Navy, particularly from the very important carrier-based operations, have no first-day capability in any theater where the enemy has sophisticated surface-to-air missiles (SAMs). We know that if we send those airplanes in there, we're going to have significant loss. So, if you will, address that shortfall for me; tell me how you're going to fill that shortfall.

Admiral ARCHITZEL. Senator Chambliss, the Navy had looked at their shortfall numbers, and had reached the numbers you articulated. As we came into the most recent, which was the restructured ramp of the JSF, that put the number back up on the order of what you had there for 243.

I mentioned all the levers that we're looking at doing across the Navy and Marine Corps to manage that inventory. We're committed to managing that inventory. Things like bringing on additional E/F squadrons, productive ratios, changing primary mission authorization on some squadrons that are expeditionary, and also

looking how we manage, as Admiral Philman said, bureau number by bureau number, both in terms of fatigue life, as well as flying hours, to know we can manage that inventory. We're also looking to do things like high flight-hour inspections, which will give us additional hours on the legacy Hornets we have.

Ultimately, when it comes down to it, we can inspect our way so far, to a point where we believe we can get to about 177. Then we're going to need to do some SLEPs, which is a POM–12 issue fund we'll come forward with, to know how many of those aircraft we would have to SLEP to get them to 10,000 hours. To bring our manageable number down in the peak years you mentioned, of 2017 to 2018, of about 100 or less of an inventory management. Even with that number, we believe we can reduce that number some more by further efficiencies, whether it be in the depot or other areas we can comment to.

I would ask General Trautman or Admiral Philman to comment.

Senator CHAMBLISS. Before you comment, General, you haven't mentioned filling it with additional F/A–18s. Is there any proposal to do that?

General, please.

General TRAUTMAN. Senator, I think the current plan is to buy another 124 F–18 E/Fs, which will buy out the proposed operational requirement (POR) of 515. It's important to understand how many airplanes we're talking about here: 635 legacy Hornets, 515 E/Fs, 680 JSFs, and 150 AV–8s. The Nation has spent a lot of money on TACAIR for the Department of the Navy. I think it's incumbent upon us to manage these assets to the best of our ability, and that's what you're hearing when you're hearing us talk about managing these assets. We're trying to do it in a way that gets us to the vitally-needed fifth-generation strike fighter, the JSF, while also taking care of the key issues that face us in the warfighting venues that we may encounter over the next decade.

The reason that these numbers fluctuate so much, sir, is because the model is very susceptible to the kinds of assumptions that you put in the front end. You can manipulate the front end almost any way that you want to manipulate it in order to have the number come out to any specific number that you want. It's almost impossible to predict 8 years from now, how many shortfall airplanes we're going to have, even if the ramp on JSFs stay precisely as we think it's going to occur today, and that's doubtful. Lockheed's been incentivized to beat the ramp that's laid out now, and they think that they can give us more tails between now and 2018.

I'll just give you one more example and then I'll close. In fiscal year 2009, the model predicted we would attrite 15 legacy Hornets. We attrited three legacy Hornets. So, right there we made a plus-12 on the kinds of numbers that had come in to you in previous sessions and with the numbers that you talked about. Believe me, we've spent a lot of time on this over the past several months; and the best that we can do is what Admiral Architzel said, which is, in about 2018, we'll have a shortfall of about 100 jets, given the management levers that we intend to apply, and we can take that even lower by finding some depot efficiencies. I'm incredibly confident that if we can keep the JSF on track, the Department of the Navy can manage their TACAIR inventory successfully.

Admiral ARCHITZEL. Senator Chambliss, if I could, one point. The 124 aircraft that General Trautman mentioned, he indicated E/Fs. Actually, that's a combination of E/Fs and Growlers. That's the electronic attack variant. At the time, we had approximately 89 aircraft in 2009 that we were going to look to continue to finish out with. We ended up with 9 additional E/Fs and 26 additional EA–18Gs, which is electronic variant. That put our number up to 124, as mentioned, to finish the procurement in 2013, sir.

General TRAUTMAN. Admiral Architzel is exactly right. I did make an error on the 124, but the POR is 515 Super Hornets, and that's where we're headed.

Admiral ARCHITZEL. That's true.

Senator CHAMBLISS. I hope that your optimistic view about the F–35 comes to fruition; but with the problems we've seen to date, and the IOC date keeps slipping. General Trautman, I think you've tested your variant on the F–35, and I don't know what kind of confidence you have in that variant right now, but that's probably going to continue to be an issue.

What does concern me is that we're talking about spending tax dollars on a fighter that is second or third generation. I'm not sure that's the best expenditure of our money. As we move forward with this, I hope you're correct that that optimistic view of the F–35 ramp production is going to be there for us.

Senator LIEBERMAN. Thank you, Senator Chambliss.

Senator Hagan.

Senator HAGAN. Thank you, Mr. Chairman.

I too, want to reiterate my thanks for your service and your leadership. Thank you very much.

Recently, the Air Force announced plans to transfer 12 C–130 aircraft from various Air National Guard units to an Air Force Reserve unit in Arkansas. This allocation, I understand, is intended to avoid the cost of purchasing new aircraft, while replacing the older aircraft in an aging fleet. However, the plan was not developed in conjunction with the Adjutants General, and its effect is, I think, to commandeer the aircraft from the Air National Guard without consulting the affected State Governors.

General Shackelford, has the Air Force taken the Air National Guard's homeland security roles and responsibilities into account as part of this decision to reallocate the Air Guard assets? Does the Air Force have a modernization plan that does not sacrifice readiness in one component of the total force in order to achieve readiness in another unit?

General SHACKELFORD. Senator, if I may, I'd like to defer that to my colleague here.

Senator HAGAN. Sure. Thank you.

General SHACKELFORD. It's right down his lane.

General WEIDA. Senator, thank you for asking that question.

First of all, the Mobility Capabilities Review Study that came out certainly tells us that we have some overmatch in the C–130 fleet.

As to the specific issue that you raise, within a week or so we'll have an Air Force position on where to go forward with that. We're taking that issue very seriously. We have it on board, and, if you will, I'll take that for record and give that to you.

[The information referred to follows:]

The Air Force Reserve Component formal training unit (FTU) plan, coordinated with the appropriate TAGs, temporarily transfers 18 C–130H aircraft within the Air National Guard and the Air Force Reserve Command to Little Rock AFB in support of the C–130 FTU. This plan alleviates the aircraft shortfall present with the necessary retirement of Active Duty C–130E model aircraft currently operating in the FTU. New C–130J aircraft, purchased to recapitalize the older C–130 fleet, cannot be used for legacy C–130H FTU training due to significant aircraft differences. With 77 percent of the current C–130H force structure residing in the Air Reserve component (ARC), the ARC has the only available capacity to assume the mission of building and sustaining a qualified C–130H crew force.

Fiscal year 2011 PC C–130 force structure reductions are based on excess capacity identified in MCRS–16, and the Air Force will accelerate planned retirements of the oldest C–130s (E model, average age—46 years) and retire a portion of the next oldest model (H1 Model, average age—36 years) to avoid increasing sustainment and modernization cost. The Air Force has a two-pronged approach for modernizing our mobility C–130 fleet; C–130J procurement to recapitalize the oldest C–130 E and H model aircraft and the Avionics Modernization Program (AMP) to modernize newer C–130Hs. The AMP program currently modifies all 207 ARC mobility C–130Hs plus 14 Active Duty C–130Hs. As the C–130H fleet modernizes, legacy C–130 FTU training requirements will decrease over time and ANG aircraft will transfer back to the home State.

Homeland security and disaster assistance requests will be met utilizing the Global Force Management process to ensure the combatant commander receives the most effective airlift platform supporting the needs of the State (Title 32) and Geographic Combatant Commander (Title 10). ANG homeland security missions will be minimally impacted as States may negotiate State-to-State agreements to augment airlift capabilities as has been done in the past.

Senator HAGAN. North Carolina is obviously one of the States that is affected. I'm not sure I understand what you mean by overmatch.

General WEIDA. Capability areas that we have today in excess of the requirement for our warfighting needs.

If I could follow on, virtually everything we do in the Department, we try and take a total-force perspective—Active, Guard, Reserve, and, for that matter, civilian. In the Air Force, we have a process called our Total Force Initiative process, of which we have 142, currently, that our Chief of Staff tracks. We'll give you a specific answer on this issue. As a matter of fact, the last couple of days, we have talked about that in the Department.

Senator HAGAN. I think several of us have sent letters, but it's certainly something that's of concern, I'm sure, to the States that are affected by this.

General WEIDA. I understand, ma'am.

Senator HAGAN. DOD has devoted significant resources, I know, to the development of the fifth-generation strike aircraft that are intended to operate in environments with significant and advanced air defense systems. However, most of the flight hours during Operations Iraqi Freedom and Enduring Freedom have been in environments without those kinds of antiaircraft capabilities, where the performance characteristics of the fifth-generation fighter aircraft aren't necessarily required. Are any of the Department's unmanned aviation programs, such as the RQ–4, the MQ–8, the MQ–9, or the unmanned combat air systems, being developed with the goal of providing a lethal, precise, persistent, and responsive platform that has the ability to perform armed reconnaissance strike in close air support in a manner that could reduce the reliance on the fifth-generation aircraft in these semipermissive environments?

Admiral ARCHITZEL. Senator Hagan, I think it's an excellent question, and it is one that the Department of Navy is pursuing ac-

tively. On the requirement side, if I could, I'll turn to Admiral Philman to address this.

Senator HAGAN. Thanks.

Admiral PHILMAN. Yes, ma'am. We take very seriously how we can get the most capability to the warfighter with the least amount of usage. We don't want a high-end aircraft doing something that we could be doing with something smaller or less expensive, certainly.

We are looking at all those aircraft, vertical aircraft, as well as long-dwell broad maritime sensor bands, which is a variant of Global Hawk for long-dwell sensing over the ocean as well as being a low-hanging satellite to maintain connectivity with the carrier strike groups and other strategic systems. Related to our P–8, our maritime patrol aircraft. So, the program has fewer of those aircraft, with the expectation that the long-staring surveillance will be done by an uninhabited aircraft, then, when the real work needs to be done by humans, can be brought in with the P–8. That's one example.

The Navy Unmanned Combat Air System you mentioned is a demonstration to prove that we can do unmanned aircraft off the aircraft carrier. That demonstration will prove itself by 2013, with launches and recoveries aboard the aircraft carrier, as well as airborne refueling. But, that is a shape; it's not a real program yet. What we learn from that will be transferred into other systems that we could use from the aircraft carrier or ashore that will do just those things.

Everything is to be a multiuse system. Is it a striking airplane with some ISR, or is it mainly a surveillance system that could also have some striking capability? So, we'll look very closely at that. We do procure with some forethought.

Senator HAGAN. Thank you.

Also, on April 2, 2010, a press release from the U.S. Fleet Forces Command announced that various delays have pushed the outlying landing field's timeline to the point that it will now coincide with the commencement of the Environmental Impact Statement (EIS) process for home basing of the F–35C Navy JSF.

Admiral Architzel, when do you anticipate collecting the sufficient testing data from the F–35C in order to conduct the EIS process?

Admiral ARCHITZEL. Senator Hagan, let me begin, then I'll turn it back over to Admiral Philman. We've already begun collecting the environmental data through our testing, both at Fort Worth, and the STOVL aircraft at Pax River. That will feed into the models that will ultimately populate the plan.

I'd like Admiral Philman to talk more about the EIS.

Senator HAGAN. Admiral, let me ask one other question while you're answering this one, too.

Is consideration being given to home-basing the F–35C squadrons in a manner that differs from the current concentration of the F/A–18s in order to address the training capacity limitations at Fentress and obviate the need to establish additional landing fields to support the squadrons based at Oceana and the Chambers field?

Admiral PHILMAN. Ma'am, as was mentioned, we're still gathering the data so we can make a determination on what the impact

to the environment will be, in every combination of existing bases, as well as some others that aren't traditionally master jet bases.

That study is still going on within the Department of the Navy, so that we can bed down our aircraft in the most efficient way, capturing the training ranges, the existing infrastructure, and the logistics that can be most efficiently used.

Regarding the outlying field, if you bring more airplanes or we have to do the carrier landings, we will have to give that some consideration. The Fentress airfield does not meet our complete need in the type of landings that it requires us to do. It's not completely representative of the aircraft carrier landing environment. So, either at Oceana or at another place, there will probably be an additional field needed. That has not yet been determined, but the requirement does exist, ma'am.

Senator HAGAN. Thank you.

Thanks, Mr. Chairman.

Senator LIEBERMAN. Thanks very much, Senator Hagan.

Senator Kaufman, good morning. We have a really outstanding turnout this morning, which, I think, testifies to the interest in, and concern about, our TACAIR programs.

Senator Kaufman.

Senator KAUFMAN. As a brand new member, being here for 2 weeks, I just want to follow up on Senator Hagan's comment to General Weida. I know you're studying this shift to the C–130s right now. I know you understand better than anyone how important that is to our homeland security and what a big portion of our total lift is involved in the Air National Guard. I just wanted to encourage you to take a hard look at that, and talk it over with the Air National Guard folks, which I know you'll do. I look forward to that.

General WEIDA. Absolutely, sir.

Senator KAUFMAN. I want to thank you all for your service. It's hard to come up with new words to express how impressed I am with our armed services today, and what a great job they're doing. I just got back from Afghanistan, Pakistan, and Iraq, and I want to tell you I wish every American could go over there and just spend a day with anything from the lowest ranking officer to the top and just watch what they do—the quality of their work, the courage, the way they follow through, the high morale, and the ability to do their job, just in so many ways. So, as a new member of this committee, I just want to tell you, I'm proud to be on this committee and I'm very, very proud of our armed services.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thanks, Senator Kaufman. Thanks for what you said. I know every member of the committee agrees with that. I appreciate your saying it.

We'll do a second round. Let's try to keep it within 5 minutes, if we can, this time.

I just want to make a statement. There have been a few references to the F136 alternate engine being a fixed-price contract. My own understanding of this is that the F135 and F136 are both developmental cost-plus programs now. Although, I gather GE has offered to make it a fixed-price contract, and I gather that Pratt

Whitney has essentially done the same, as we go after the developmental stage. Am I right?

General Shackelford.

General SHACKELFORD. Senator, those type of development programs invariably, in the past, have started out as cost-plus contracts.

Senator LIEBERMAN. Right.

General SHACKELFORD. As soon as we have confidence in the design baseline and the productability of the engines, we move as quickly as we can to fixed-price.

Senator LIEBERMAN. Got it. That's what we can expect to happen here.

General SHACKELFORD. That's where we are.

Senator LIEBERMAN. Let me focus in on one aspect of time delay for the JSF, and that is the potential delays in the estimated dates for IOC. I thought I'd ask General Trautman, General Weida, and Admiral Philman on this one. If each of you would define what IOC means for your Service. When, under the new plan, do you think your Services will achieve IOC?

General Trautman?

General TRAUTMAN. Senator, I'll go first, since our IOC is projected to occur first, in December 2012, 2 years and 9 months from now. We realize we have a lot of work to do between now and December 2012. We're not naive about what it will take to stand up an IOC of our first squadron.

First and foremost is that our industry partner is going to have to deliver, going to have to come to the fore and deliver the airplanes on time and create the sorties that generate the test points that are demanded of us.

But, as we perceive December 2012 now, we think we'll have a squadron of 10 aircraft in the Block 2B configuration, as described in the JSF operational requirements document. That will give us a STOVL-capable airplane, very low observable capability, which will enable us to go places that none of our airplanes can go today, longer range that the Super Hornet, and with fused computing power and sensors on board that will enable us to operate across the range of military operations, either from sea or from an expeditionary environment.

Now, that's not the final configuration of the Marine Corps F–35B. We intend to do the block upgrades and software right alongside our Navy and Air Force partners as they move into Block 3A, Block 3B, and Block 3C. So, by the time we get to 2014, which is our first planned deployment of F–35B, we'll have a Block 3C airplane, if the program stays on track as currently laid out.

People wonder, why did the Marine Corps' IOC not change when we had the restructuring of the program?

Senator LIEBERMAN. Right.

General TRAUTMAN. The answer to that is that everything that we need for our initial operational squadron was procured in 2008, 2009, and 2010. That includes 5 test airplanes, 15 airplanes for our fleet-readiness squadron, which just stood up last week, and our 10 planes for our initial squadron. What the restructure did do, it slowed down the ramp of our subsequent squadrons beyond that first squadron. For example, our second squadron will now stand

up 6 months later than it originally projected. So, that's where the impact of the restructure hits the Marine Corps.

If we reach December 2012 and we have not accommodated all of the things that we need with regard to training, aircraft capability, logistics support, and shipboard compatibility, we will not declare IOC. We will wait until we attain those objectives.

Senator LIEBERMAN. Okay. I think I'll focus in on my followup question, too, because I'm concerned—and I know you know others are—about risks of declaring that you have IOC before the JSF has received all of the capabilities intended. I want you to come back and respond to that concern, that by accepting the JSF in the Block 2B configuration, as compared to the Navy and the Air Force, which we're going to wait for the Block 3 configuration, are you assuming that they hit the Block 2B capabilities by December 2012, are you accepting a risk that really is forced on you by this process that hasn't worked well and by the fact you want these planes?

General TRAUTMAN. We do want these planes. But, it's the opposite of accepting risk. We're replacing an AV–8 squadron with a far, far more capable platform. The F–35B, at the Block 2B configuration, will be able to carry two AIM–120 missiles and either two 1,000-pound Joint Direct Attack Munitions or two 500-pound laser-guided bombs initially. Then it will grow from there, with external stores becoming capable in the subsequent months. This airplane will be so far more capable than the AV–8 squadron that it replaces that it's an easy decision for the Commandant to make, with regard to standing up this squadron.

We have to have all the testing done. If the testing isn't done, if we haven't validated that all risk is mitigated, we're not going to do something foolhardy, obviously.

Senator LIEBERMAN. Okay. You've answered my question. I was going to ask the question, which you might say is in the extreme, which is whether you're confident that combatant commanders would essentially accept the JSF in the Block 2B configuration. I take it what you're saying is, it's not up to Block 3, but there's no question that they would be happy to have those plane flying.

General TRAUTMAN. It will be the only very low observable airplane that can come off any ship for several subsequent years.

Senator LIEBERMAN. Right.

General TRAUTMAN. The reason we want to do it is precisely the kind of combatant commander need that may prevail subsequent to that standup.

Senator LIEBERMAN. My time is actually up, so I'm going to ask Admiral Philman and General Weida, if you could give a real quick answer to the question of IOC.

Admiral PHILMAN. Yes, sir. For the U.S. Navy with the F–35C, which is a tailhook variant, in December 2016, with the requisite number of aircraft, 10 for the squadron, the Block 3 capability delivered and that capability was then tested and vetted and is ready for deployment.

Senator LIEBERMAN. General?

General WEIDA. Sir, for the Air Force, IOC criteria is spelled out very specifically in Operational Requirements Document (ORD), Change 3, dated August 19, 2008. It's the Major Command, Commander of Air Combat Command, that sets that, and there's a very

specific criteria. The large pieces are Block 3 initial operating test and evaluation complete, 12 to 24 jets capable of conducting anti-access, offensive counter-air SEAD-and-DEAD mission, pilots' maintenance support, logistics, equipment, trained and ready, and mission ready.

As far as a date, our best estimate right now, based on all that we know, is first quarter of 2016 for IOC. But, again, it is the Commander of Air Combat Command taking all into account.

Senator LIEBERMAN. Okay. Thank you.

Admiral ARCHITZEL. Senator Lieberman, if I could, sir. One additional comment, only from the aspect of, how are we going to assume for General Trautman, for example, the confidence that he has? One area we had concern, across all variants, was our development of the software and coming on board with that. Part of the restructured program was actually to add an additional software integration line which reduced some of the risk on our software upgrade as we go forward. In addition, we added that goal in support of looking at this for software Block 2.0 to measure the company against that performance in fiscal year 2011, which would also add to supporting the IOC for the Marine Corps to have that Block 2 capability.

Today, we're flying Block 0.5, and we are testing Block 1. We are coding Block 2, and we're developing Block 3. That's where we are across the board on these software developments. Addressing that very issue is what's been done, sir.

Senator LIEBERMAN. Okay. That's helpful, because it is the software, less than the goal in the software, that was my concern.

Senator Thune.

Senator THUNE. Thank you, Mr. Chairman. Mr. Chairman, I think the great turnout among Senators at the subcommittee this morning is the inspiring leadership of the chairman. [Laughter.]

Senator LIEBERMAN. Yes. Thank you.

Senator THUNE. General Shackelford, the recently released 2010 NPR calls for keeping in place the Nation's so-called nuclear triad, which is comprised of bomber aircraft, intercontinental ballistic missiles (ICBMs), and nuclear-armed submarines. Against that backdrop, what is the Air Force's strategy for developing long-range strike capability? What role in that strategy will a next-generation bomber play, in your view?

General SHACKELFORD. Senator, if I may, I'll defer to General Weida.

Senator THUNE. General?

General WEIDA. Sir, first and foremost, I will tell you that your Air Force has been part of the team looking at both the NPR and its development and has also been integral to the team that has been part of the negotiating of the new START; and so, all along, looking at the Air Force equities to ensure that for two out of the three legs of the triad, we felt we were in a good position to go forward.

To start with, a new START as it pertains to the next-generation long-range strike platform; first of all, the treaty is only a 10-year treaty, with a 5-year extension. The new bomber will be outside that treaty, so it will probably be covered by a different set of circumstances. But, in either case, we'll take a whole family-of-sys-

tems look at that new long-range strike platform, with our other legacy assets, when we make force-structure decisions.

Senator THUNE. What does that family of systems mean, with regard to the follow-on bomber?

General WEIDA. Great question, sir, and thank you for asking it. For QDR–10, the Secretary of Defense asked us to go back and look at this so-called family of systems, and most people think and focus on just the long-range strike platform itself. But, this capability is in a threat scenario, that anti-access, very difficult threat scenario. As we looked at it very carefully during the QDR, in order to be successful in that environment requires a whole set of capabilities, long-range strike being one, some kind of early warning platform, some kind of ISR platform, some kind of standoff missile, and conventional prompt global-strike capability rolled into that concept. Although we have done a lot of previous studies on just the long-range strike platform, this study is a little broader look at how we attack this anti-access problem holistically.

The other thing that I would add, since I have my Navy colleagues here at the table, is, we were also tasked, out of QDR–10, to come up with what we call the air-sea battle concept, to work with our Navy compatriots in that very difficult scenario, and come up with a way we would operate more efficiently to get together as a joint team.

Thank you, sir.

Senator THUNE. Let me ask you, with regard to the START, because my understanding is, right now we have 44 nuclear-capable B–52 bombers, 16 nuclear-capable B–2 bombers, 450 ICBMs based on land, and 336 based on submarines. That gives the United States a total of 846 launchers, and the Treaty permits 800 launchers, but says that only 700 may be deployed. If you add up the ICBM and submarine-based missiles, you have 786 right there. Tell me, if the number of deployed launchers is 700, might there be a tendency to rely more on the most responsive and survivable-type launchers, and less on B–2s and B–52s? How does this impact the triad? Explain to me, if you could, the distinction between deployed- and nondeployed-type launchers.

General WEIDA. Yes, sir. I'd start out answering that question by saying that, all along, during negotiation of the new START, that the Services worked very closely with the negotiating team so that we looked at all options, as it would pertain to force structure and the required capability that the Commander of Strategic Command would ask from the Air Force. As different numbers were proposed and eventually agreed upon, we were part of that team, and we felt comfortable that, going forward, we could maintain our strategic deterrent posture with our nuclear forces and focusing, for the Air Force, on two out of three of those legs.

Now that we finally have an agreement, we'll further refine that to look at the exact force-structure implications that we need to fit in within the 700 deployed strategic vehicles, and then the larger number—800—of nondeployed strategic vehicles. The difference between the two just is how they're postured and ready to go, whether they are mated with weapons or not, and their location and condition.

There are a range of possible courses of actions to get to that final force structure between the three legs of the triad. We're not at that point yet. In the next weeks and months, we'll work very closely with General Chilton, the Commander of Strategic Command, because he has the overall responsibility to set the requirement and do the warfighting analysis to see exactly what we need.

Senator THUNE. You don't see the triad being in any jeopardy?

General WEIDA. From the Air Force perspective, no, sir.

Senator THUNE. That's comforting, from the Air Force perspective, but I'm not sure.

I think that's all. I'm out of time, Mr. Chairman.

Senator LIEBERMAN. Thanks, Senator Thune. Thanks for raising that important question.

Senator Burris.

Senator BURRIS. Thank you, Mr. Chairman.

Gentlemen, I've been sitting, listening to all this great testimony, and I just want to be a little pessimistic here. Because, as I hear all of the excellent testimony, I'm just a little bit concerned about the delays that are involved in the production of the F–35. I hear the testimony on the IOC, that it's going to be put in place on this timetable and on this schedule. I just wondered if we don't have something here that we're asking software or the technology to be so sophisticated that we get to the end of the line and all of this cannot be integrated to replace those other three legacy aircraft that we're talking about. I'm just wondering, what is the backup plan in case we get to the point where the software won't really do what the engineers or all of the planners have anticipated and we run into a problem of trying to scale back or adjust and make adjustments? Have any backup plans been taken into consideration during all of this planning and the delays that we're running into and what venture to say is going to be some cost overruns involved here. Any thought given to that? Admiral, you probably want to take a shot at it; and, General Shackelford, you may want to take a shot at this. But, listening to the testimony, this is just a gut reaction that I'm getting, and want to make sure that we have something in our backup plan, if the F–35 runs into all these other technical difficulties; this is not going to integrate with that and this software piece won't meet in with that, because we're trying to ask this plane to do quite a few things, whether it's (a), (b), or (c). They're going to have to do all of these various functions. I don't want to wish anybody bad luck, but I just wonder. Have you got any backup on that?

Admiral, would you like to take a shot at this?

Admiral ARCHITZEL. Senator Burris, I thank you for that question, and I understand the concern you're raising and appreciate it. We have taken the strides to restructure the program to address a lot of areas within it that have been not performing to expectations. However, there are many, many assets of the program that we have not discussed that are going along extremely well. In the area of seeing how we're matching to our model expectations, in terms of growth, and in terms of developing the systems that will go forward in the future to get us that fifth-generation fighter across the board, as well as the progress on this aircraft, in terms of getting the flight vehicle itself to the point where we're confident

in it being able to sustain and go forward. By that, I mean the greatest risk, in my mind, would be to the flight vehicle. We have seen significant progress and very good, excellent progress, in terms of static-load testing on all three variants. I believe we will continue to see the progress on the mission side, as we go forward.

We do need to get the aircraft into test, no question about it. We need to get into the tests so we can expand the envelope so we can then get into bringing on the software development I mentioned, which was to get additional line that could take an expanded software integration line that would allow us to get to this Block incremental release of software, so we can show that capability to you. That all has to happen. We're going to proceed on the restructured plan to do that.

To your point about a fallback plan, sir, I would just say that we need to maintain our legacy capabilities, through modernization and obsolescence, to make sure that we have that capability to fall back on. I would turn it to General Shackelford.

Senator BURRIS. So, you're going to keep our legacy planes operative.

Admiral ARCHITZEL. We absolutely will ensure we have a combat-ready force as we go forward, with full expectation that we need that fifth-generation capability, but we are going to ensure we maintain the forces that we need today for the Department of the Navy, sir.

Senator BURRIS. General?

General SHACKELFORD. Senator, within the F–35 program, you could generally think of two areas that we need to come to a good understanding. One is the structural capability of the airframe. The other one is the avionics, or the software, as you refer to. We're well along the path of confirming that the structures for all three variants are sound. We have high confidence at this point that we don't have a fundamental flaw in the structure of the airplane itself. We would expect to get that confidence early in the program.

The software comes over time. In order to mitigate the complexity of this software, the program is built around an unprecedented level of software integration laboratories, including a flying test bed that integrates all of those systems together on a flying platform. Granted, it's not in the aircraft, but it's wired true to form for distance, cable lengths, positions of antennas, and whatnot, to what will be in the actual aircraft. As we progress through the software coding, software maturation, through the laboratory infrastructure, through the flying test bed, and finally on to the aircraft itself, it's a matter of verifying the capability by the time we actually get it on the aircraft.

Senator BURRIS. Pardon me, General. My time has expired. But, you said it's going to have to be tested. Is the test period factored into our schedule?

General SHACKELFORD. Yes, sir, by all means. In addition, we have a strong focus on what's called mission systems flight testing, which is the testing of that software.

General TRAUTMAN. Senator, do I have time to add one point to your question?

Senator BURRIS. Sure.

General TRAUTMAN. What's lost in the discussion about the cost growth of the program over the past couple of years is the fact that, after rigorous analysis, everyone who has looked at this program has found no technical, manufacturing, or performance issues associated with these jets. That's a level of confidence that in every other program that I've ever been involved in, we did not have. The STOVL variant of the JSF has been flying since June of last year. Since November of last year, we've had three STOVL variants at Patuxent River. They've been generating sorties since January 1. They've generated test points ahead of the plan. We hovered the airplane, we did a short-takeoff roll of 700 feet last month. We just rolled off the flightline the first mission systems STOVL airplane that's built from the ground up with all mission systems incorporated.

So, there's a lot of optimism on the technical side of this airplane, as we have to press the manufacturer to control costs and meet the production delivery schedules.

Senator BURRIS. You hope they don't cut corners?

General SHACKELFORD. Absolutely. You're right.

There are good quality-assurance measures in place to ensure that doesn't occur.

Senator BURRIS. Thank you.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thanks, Senator Burris. We appreciate it.

Senator Begich.

Senator BEGICH. Mr. Chairman, thank you very much.

Thank you for your willingness to put together something very visual for me, a chart showing the whole schedule, but let me ask you one or two quick questions.

You talked about incentives for the contractor, to make sure they meet the schedule and the quality that you're looking for. Can you describe what those might be?

Admiral ARCHITZEL. Senator Begich, yes, I'd be happy to, sir. For example, in fiscal year 2010 we said we wanted to see the STOVL vertical landing. By the way, that's been accomplished at Pax River. Next was to see the first carrier variant (CV) flight by May, or no later than June. That's on track to go forward with that CV–1 variant. There are 11 test aircraft delivered to Pax River and Edwards, on track to produce that, as well, sir. But, the 1.0 software, which we need to be able to train and fly at Eglin as we go forward; to have 400 test flights accomplished during the course of 2010. We're on a glide slope today of somewhere around 180 already this year, which puts us on that glide slope to meet that requirement. Additional LRIP deliveries to Eglin, at least three for fiscal year 2010. When we go to Eglin, to be able to bring on the Automic Logistic Information System (ALIS) at that time, as well.

There are similar metrics within fiscal year 2011. Some of those involve initial STOVL developmental testing on the L-class ships; land-based catapult and arresting-gear launches at Lakehurst, which is our land-based facility for aircraft launch and recovery equipment; Block 2 software release; completion of the static testing is ongoing on all three variants.

Senator BEGICH. If I can interrupt you, Admiral.

Each stage that you've identified, is it that there's an incentive built in for them to meet that, or that's their requirements, in the scope of the contact, that they must meet this, and if they don't, there's a penalty?

General SHACKELFORD. Senator, we, as part of the restructure, withheld what would become $614 million of available award fee under the previous contracts.

Senator BEGICH. $614 million?

General SHACKELFORD. Yes, sir. Those dollars are being realigned into performance incentives, of which there are 23 items that take place over the remainder of the development contract, that are tied to receipt of those dollars.

Senator BEGICH. Let me make sure I understand that. Within the contract, you have about a $614 million incentive bonus built in for certain achievements metrics that they meet.

When they bid on this, or when they came in for the contract, was that part of the equation at the front end?

General SHACKELFORD. No, sir.

Senator BEGICH. That leads me to the next question, if I could just hold you there, and then you can elaborate from here.

Assuming they said, "Here's what we're going to do. Here's the scope of services we're going to provide. Here's the timetable we'll provide them." Assuming the contractor laid out some of that in early stages, they probably had some timeliness, and if they didn't meet those timelines, put the bonus aside for a second, were there penalties that would reduce the contract? In other words if I'm bidding to provide you this glass of water today, and you say, "provide it," and I say, "I'm going to provide that for $1, a year from now," and, later in the contract, there's a bonus if I provide it in 9 months, I get a little bonus for it, but if I don't provide it in a year, you still pay me. Is there a deduction?

General SHACKELFORD. Yes, sir.

Senator BEGICH. Okay.

General SHACKELFORD. The previous contract was structured as an award-fee contract, which is, by nature, subjective; fee is another word for profit.

Senator BEGICH. Right.

General SHACKELFORD. That's based on a scale of performance that is more subjective in nature, as opposed to the specific performance incentives that we're talking about now.

Senator BEGICH. Go ahead.

General SHACKELFORD. As you came to the end of each award-fee period, which would typically be 6 months or a year long, there would be a potential for some maximum fee, and they would receive a percentage of that, based on the subjective assessment of their performance.

Senator BEGICH. Yes.

General SHACKELFORD. Now there'll be specific events, that are under negotiation right now with Lockheed as part of the restructure, that if they don't achieve those events within a timeline that they negotiate as part of the restructure, they don't get any funding.

Senator BEGICH. Is it fair to say that it's not; I know the word I used was incentive. It was really, "Here's the scope. If you don't make it, we're not paying you this money."

Admiral ARCHITZEL. That's right.

Senator BEGICH. Is that a better way to say it? It is an incentive, but it really is part of the overall contract.

Admiral ARCHITZEL. Yes, sir. It's tied to achievable milestones, I just enumerated some of them, but there could be many more that could be outlined within there. Then the contractor performs to that. If he does, he's eligible to earn fee. If he doesn't, he's not eligible to earn that fee.

Senator BEGICH. So, the restructuring created a different kind of scheduling of the resources you had available to provide to the contractor. You just scoped it out over a period of time, but with these milestones they have to meet, and if they don't meet them, that chunk of money isn't paid to them.

General SHACKELFORD. That's correct.

Senator BEGICH. Or you end up in some negotiations with them, but the idea is that this is a way to hold their feet to the fire in production of the levels you need to get to.

Admiral ARCHITZEL. Right.

Senator BEGICH. For example, the 2012, which is the earliest date. Is that a fair statement?

Admiral ARCHITZEL. Another way to look at it would be a cost-plus environment, we are looking, when we can, to transition to fixed-price contracts.

Senator BEGICH. Which we love.

Admiral ARCHITZEL. But, we have to look for the proper time to execute that. That's part of this, as well, moving from a cost-plus to a fixed-price environment.

Senator BEGICH. Very good. Thank you very much for that explanation.

Thanks.

Senator LIEBERMAN. Thanks, Senator Begich.

I have a few more questions, actually both for General Shackelford.

General, last year, you testified to this subcommittee that paying for the F136 alternate engine program from within the JSF program could force you to buy fewer JSF aircraft over the Future Years Defense Program (FYDP). At that time, you said, "Over the 5-year period—it would be 53." In other words, continuing the F136 program could actually exacerbate the strike fighter shortfall in the Navy in the near term and could have adverse affects on the Air Force inventory posture, as well. I wanted to ask you whether those projections are the same or whether you've in any way updated your estimate about how many JSF aircraft would fall out of the production plan over the FYDP if we continue the F136 alternate engine program?

General SHACKELFORD. Senator, a year ago, as we were looking forward to the potential to fund the remainder of the development program on the F136—our fear was that having those dollars taken out of the F–35 program funding line, to fund that engine, would come at the expense of production assets. Given the dollar figure

a year ago, which escapes me at the moment, that equated to 53 aircraft to go pay for that across the different variants.

We have not looked specifically at a production offset number to compare to that 53. We can take that for the record and estimate that, if you would like.

Senator LIEBERMAN. I'd appreciate it if you would. Thank you.

[The information referred to follows:]

At the time I testified last spring, the program office had estimated that 53 aircraft would have to be forsaken to fund the alternate engine program. Since that time, the Office of the Secretary of Defense Cost Assessment and Program Evaluation (CAPE) has estimated that it would take $2.9 billion to complete alternate engine development and put the alternate engine program in a competitive position for production. CAPE did not estimate how many aircraft would have to be forsaken to fund the alternate engine since the Department has not intention of foregoing aircraft in favor of the alternate engine program.

Senator LIEBERMAN. Second brief question about the Joint Surveillance and Target Attack Radar System (JSTARS). I've been a big supporter of JSTARS, and it's really a workhorse program of the Air Force which the other Services, particularly the Army, depend on a lot. I know that the Air Force is planning to conduct an analysis of alternatives (AOA) on the best ways of achieving moving target indicator (MTI) capability. I wanted to ask you this morning, General, when will the Service be able to provide this committee with the results of that AOA regarding MTI capability?

General SHACKELFORD. Sir, that AOA is just getting underway now and runs out until approximately the middle of next year. I would estimate we might have something preliminary to say about it next spring when we come back here.

Senator LIEBERMAN. Good.

Finally, in that regard, will the Air Force continue the JSTARS re-engineering programs and the Multi-Platform Radar Technology Insertion Program (MP–RTIP) development in the meantime, while you're completing the AOA?

General SHACKELFORD. Yes, sir, we are planning and executing the completion of the development program of JSTARS re-engineering, as well as buying a total of four ship sets under the present budgets. As we look at MP–RTIP, we're continuing with MP–RTIP development for the Global Hawk platform. The drawback to both of those sensors—the size of the Global Hawk platform, as well as the frequency and capability for geolocation of the APY–7 that's in the JSTARS—are what are at question under this AOA to meet today's need for dismount detection and tracking.

Senator LIEBERMAN. Good enough. Thank you. I'll follow those developments with some interest and look forward to working with you on them.

Thank you.

Senator Thune.

Senator THUNE. Just a couple of quick questions, Mr. Chairman.

This is to Admiral Architzel. You talk about milestones to make sure the JSF program in on track. I guess the question I have is, what specific milestones should we, as Members of Congress, expect in this next year in order for us to know that the program is on track and that it's going to be successful? What should be our expectation, as Members of Congress, this year?

Admiral ARCHITZEL. Senator Thune, I appreciate the question. I would look for some very key things that are in fiscal year 2010, which is, we should see the CV variant first flight no later than June. We have put additional test assets, or we will, into the SDD program. We need to start seeing progress; continued movement in the actual flight test to gather the data we need to gather, in terms of flight tests. We really are at the very beginning of that. We need to see that those assets show up at both Patuxent River, which they are, in the STOVL category today, and also at Edwards. I would look to that, and when those aircraft arrive. I'd look at the measures that say we do the software development that's going to allow us to be moving towards Eglin for advanced training in an envelope that allow the pilots to be able to train when they get to Eglin in the future. Those are some very key things. Also, with the ramp for the LRIP, that we want to see in the aircraft, going forward. There's some very discernible things this year that we can see that we should be looking for, and in that aspect, I would say that we're on path for the development of the aircraft, that we have the test program moving along in the profile we need it to be on, that you see the maintenance training for the maintainers that's going forward, that will have to be there to support both, especially at Eglin AFB.

Senator THUNE. Yes.

General Shackelford or General Weida, could you give me, coming back to START for a minute, an example of a nondeployed launch vehicle? I asked General Cartwright, last summer, what was the bare minimum number of launch vehicles that we needed in order to not get below a level that would be harmful. At that time, I think the answer was 800. Now, there's a distinction made in the START, that was signed by us and the Russians, for 700 deployed and 800 nondeployed. Give me an example of a nondeployed launcher and how that sort of distinction was made and the two different numbers arrived at.

General SHACKELFORD. I think the best thing, sir, that I could offer you is, the treaty guys for the Air Force work for me. I think it will be best if we just come and give you a briefing or take, for the record, a specific question and lay that out for you, because there's a specific example for each type of asset. If you'll allow, I'll do that.

[The information referred to follows:]

The new Strategic Arms Reduction Treaty provides three central limits: 1,550 for deployed warheads; 700 for deployed intercontinental ballistic missile (ICBMs), deployed submarine-launched ballistic missiles (SLBMs), and deployed heavy bombers; and 800 for deployed and nondeployed ICMS launchers, deployed and nondeployed SLBM launchers, and deployed and nondeployed heavy bombers. These limits are based on a rigorous analysis conducted by Department of Defense planners in support of the 2010 Nuclear Posture Review. Limits provide flexibility for parties to organize their force structure and provide for maintenance and testing.

Examples for nondeployed ICBM and SLBM launchers include test launchers, training launchers, and launchers at space launch facilities. Additionally, when ICBMs or SLBMs are removed from the launchers for any reason—for example, for maintenance—then both the missile and launcher become nondeployed for purposed of the treaty. Heavy bombers equipped for nuclear armaments, by definition, become nondeployed when they are located at a repair facility or production facility, or if they need the treaty's definition of a test heavy bomber.

Senator THUNE. All right.

One final question, and that is, how does the potential nuclear JSF fit within the new launcher limits in the START?

General WEIDA. Sir, that does not apply, as far as I know. It is a dual-capable aircraft, but it's not a strategic nuclear weapon. I'll take that for the record, and come back to you.

[The information referred to follows:]

Only those bombers with a range greater than 8,000 kilometers or equipped for long-range nuclear Air-Launched Cruise Missiles meet the treaty definition of "heavy bomber," which are subject to the provisions of the New Strategic Arms Reduction Treaty (START). The Joint Strike Fighter (JSF) does not meet either of these criteria. Therefore, the JSF does not count against the limits of the New START treaty, and the requirement to include dual capable aircraft capabilities in the JSF are not impacted by this treaty.

Senator THUNE. Okay. Thank you.

I think that's all I have, Mr. Chairman.

Thank you all very much for your leadership, and for your great service to our country. Thank you for being here today.

Senator LIEBERMAN. Thanks very much, Senator Thune.

My staffer, Creighton Greene, just reminded me that next Thursday—it hasn't actually been noticed yet—we have a full Armed Services Committee hearing on the NPR. I'm sure some of these questions will come up at that time.

I want to thank the witnesses, obviously for your service, but for your testimony this morning. This has been a very informative, productive hearing. I appreciate your direct responses to the questions. As I said earlier, there's obviously a lot of support for the JSF program in the Senate, and particularly on this committee, and there's a lot of concern about the delays and the cost increases, and we appreciate all you're trying to do to close the gap, particularly in the light of the TACAIR shortfall that we're projecting for the Services.

So, I thank you very much.

We look forward to legislating in a way that's constructive this year.

If you have no further statements, the hearing is adjourned.

[Questions for the record with answers supplied follow:]

## QUESTIONS SUBMITTED BY SENATOR JOSEPH I. LIEBERMAN

### JOINT STRIKE FIGHTER AFFORDABILITY

1. Senator LIEBERMAN. Admiral Architzel and General Shackelford, the Independent Manufacturing Review Team (IMRT) that reviewed the Joint Strike Fighter (JSF) program last year observed that, "Affordability is no longer embraced as a core pillar" for this program. Taken at face value, this statement is of course quite stunning. Why should Congress, or the Department of Defense (DOD) for that matter, continue to support a program that has lost the affordability goal upon which it was sold as the solution to modernizing all three components of our tactical fighter force structure?

Admiral ARCHITZEL. A core JSF program pillar is affordability. The context of the IMRT discussion was prior to the recent F–35 program restructure and a change in program management. The IMRT helped shape DOD's decisions with regard to the overall program restructure. I can assure you that understanding and controlling all developmental, production, and support costs is a priority for the Department of the Navy, and we will continue to pursue all methods at our disposal towards making the F–35 air system affordable. F–35 is a core capability required by the joint warfighter and the Department of the Navy fully supports both the F–35B and F–35C variants for deterrence and strike from the sea, and we request continued congressional support for this vital program.

General SHACKELFORD. Affordability does remain a key pillar of the Department, and we remain convinced that close partnership and clear accountability are required with the JSF contractors. We are pursuing a number of items to retain affordability including production improvements, outsourcing to both foreign and domestic low-cost sources, a new wing manufacture line and a new engine final assembly line that will decrease span and touch time, and normal learning curve improvements.

2. Senator LIEBERMAN. Admiral Architzel and General Shackelford, what specific actions has DOD taken, or will take, to restore affordability as a core pillar of the JSF program?

Admiral ARCHITZEL. The Department of the Navy is working closely with independent cost estimating teams from the Office of the Secretary of Defense (OSD) and other groups to balance program office and contractor estimates, which are typically more success oriented. Our objective is to continuously focus on F–35 cost drivers and take the necessary managerial action to lower cost and make the program more affordable. The Department is working collaboratively with the Air Force to pursue the use of fixed-price contracts for F–35 aircraft production; invest in targeted cost reduction initiatives (e.g. F135 engine to reduce propulsion unit production costs); challenge F–35 contractors on their assumptions/current cost estimates to find development and production cost savings; use concurrency as a strategy for affordability without increasing risk; and challenge our technical teams to investigate and bring forth cost avoidance opportunities via redesign and life-cycle support strategy changes.

The Department has also strengthened the Navy's Center for Cost Analysis by increasing its role and visibility within the Department. We have made the cost leadership position a Deputy Assistant Secretary reporting directly to the Assistant Secretary of the Navy for Financial Management and Comptroller and we are adding more professional expertise and oversight to enable more accurate cost estimates early in a program's development, life-cycle support, and upgrade phases.

General SHACKELFORD. Affordability does remain a key pillar of the Department, and we remain convinced that close partnership and clear accountability are required with the JSF contractors. We are pursuing a number of items to retain affordability including production improvements, outsourcing to both foreign and domestic low-cost sources, a new wing manufacture line and a new engine final assembly line that will decrease span and touch time, and normal learning curve improvements.

Additionally, we are restructuring $614 million in system development and demonstration (SDD) award fees, revising the SDD contract structure, and revising the low-rate initial production (LRIP) contract to reward measurable progress against significant schedule events and ensure event-based fees are paid only if the events are accomplished in time to support the restructured schedule. Finally, we are pursuing fixed-price type contracts as soon as is feasible to remove cost uncertainty from the program.

3. Senator LIEBERMAN. Admiral Architzel and General Shackelford, is this lack of focus a major reason for the forthcoming Nunn-McCurdy breach on this program?

Admiral ARCHITZEL. The results of the formal F–35 Nunn-McCurdy root cause investigation and analysis are not yet fully known. After completion of the formal F–35 Nunn-McCurdy process, receipt of the findings from the five statutorily mandated Integrated Product Teams, the results will be presented to Congress by the OSD in accordance with the prescribed Nunn-McCurdy timelines. Currently, DOD is investigating all potential causes for the F–35 Nunn-McCurdy breach, including potential cost control and program affordability lapses, as well all other potential issues that drove the program to this critical breach.

General SHACKELFORD. Contributing factors to the JSF Nunn-McCurdy breach include increased material costs, particularly titanium, underestimation of labor and overhead rates, significant production delays of test aircraft, and decreased commonality among the three variants. In addition, the Office of Performance Assessments and Root Cause Analysis will conduct a root cause analysis of the F–35 program. The root cause analysis will consider the underlying causes for shortcomings in cost, schedule, and performance including the potential role of unrealistic performance expectations; unrealistic baseline estimates for cost and schedule; immature technologies or excessive manufacturing or integration risk; unanticipated design, engineering, manufacturing, or integration issues arising during program performance; changes in procurement quantities; inadequate program funding or funding instability; poor performance by government or contractor personnel responsible for program management; or any other matters.

4. Senator LIEBERMAN. Admiral Architzel and General Shackelford, how soon will we know how much the JSF program has breached its baseline estimates?

Admiral ARCHITZEL. In accordance with Section 2433 of United States Code Title 10, the Chief of Staff of the Air Force reported on March 25, 2010 that the F–35 program exceeded the Nunn-McCurdy critical unit cost breach threshold by more than 50 percent for program acquisition unit cost (PAUC) and average procurement unit cost (APUC) over the original baseline estimate.

In April 2010, the Office of the Secretary of the Defense submitted the F–35 Selected Availability Report (SAR). Details of the breach within the SAR are as follows:

1. Compared to the original APB, the F–35 Program PAUC and APUC increased 57.15 percent and 57.24 percent, respectively.
2. The F–35 increases are partially due to historical increases previously reported in the December 2003 SAR (26.2 percent and 21.7 percent for PAUC and APUC, respectively, including programmatic changes), in the December 2005 SAR (32.8 percent and 31.3 percent for PAUC and APUC, respectively, including programmatic changes), and in the December 2007 SAR (38.38 percent and 38.01 percent for PAUC and APUC, respectively, including programmatic changes).
3. Consistent with Nunn-McCurdy recertification requirements, a complete independent cost estimate is in process. DOD expects this analysis will result in increases to the stated PAUC and APUC estimates.

General SHACKELFORD. The F–35 December 2009 Selected Acquisition Report, which was submitted to Congress on April 2, 2010, states the PAUC and the APUC breached the Milestone B cost estimates by approximately 57 percent.

JOINT STRIKE FIGHTER INITIAL OPERATING CAPABILITY DATES

5. Senator LIEBERMAN. General Trautman, Admiral Philman, and General Weida, there has been much discussion about the potential delays in the estimated dates for initial operating capability (IOC). Would each of you define what IOC means for your Service, and when, under the new plan, your Service will achieve IOC?

General TRAUTMAN. The Marine Corps JSF December 2012 IOC is based on the need for a very low observable STOVL-capable airplane, which will enable us to go places that none of our airplanes can go today either from the sea or from an expeditionary environment. Everything that we need for our initial operational squadron was procured in 2008, 2009, and 2010. If we reach December 2012 and we have not accommodated all of the things that we need with regard to training, aircraft capability, logistics support, shipboard compatibility, we will not declare initial operational capability (IOC); we will wait until we attain those objectives. In general terms the Marine Corps IOC is defined as 1 squadron of 10 F–35B aircraft with required spares, ground support equipment, tools, technical publications, and a functional Autonomic Logistic Information System (ALIS) including peripherals. The squadron is manned with trained and certified personnel capable of conducting autonomous operations. F–35B aircraft in a Block 2B software configuration with the requisite performance envelope, mission systems, sensors, and weapon clearances with the qualifications and certifications required for deploying on F–35B compatible ships and to austere expeditionary sites. The squadron as equipped and trained will have the ability to execute full range of TACAIR directed mission sets.

Admiral PHILMAN. The definition of the Marine Corps F–35B IOC (December 2012) is as follows:

1. One squadron of 10 F–35B aircraft with required spares, ground support equipment, tools, technical publications, and a functional Autonomic Logistic Information System (ALIS) including peripherals.
2. A squadron manned with trained and certified personnel capable of conducting autonomous operations.
3. F–35 aircraft in a Block 2B software configuration with the requisite performance envelope, mission systems, sensors, and weapon clearances documented in Lockheed Martin 6.1 program schedule and JPO V15 test schedule.
4. Home base supporting infrastructure and facilities ready and capable of supporting and sustaining operations.
5. Qualifications and certifications required for deploying on F–35B compatible ships and to austere expeditionary sites.
6. Ability to execute full range of TACAIR directed mission sets.
7. Joint Program Office and F–35 contractor procedures, processes, and infrastructure capable of sustaining operations of the IOC squadron.

The definition of Navy F–35C IOC (early calendar year 2016) is as follows:

1. Sufficient aircraft quantities (10 PAA).
2. Completion of operational test (all mission capabilities).
3. Delivery of all necessary mission planning capability with trainers, spares, support equipment, and publications (ALIS).
4. Trained aircrew, maintainers, and support personnel.
5. Capability to conduct all operational requirements document (ORD) missions, to include air interdiction (AI); offense counter-air (OCA); defensive counter-air (DCA); close air support (CAS); suppression of enemy air defenses/destruction of enemy air defenses (SEAD/DEAD) in a denied, near-peer environment; and combat search and rescue (CSAR).
6. Joint Program Office and F–35 contractor procedures, processes, and infrastructure capable of sustaining operations of the IOC squadron.

General WEIDA. The Air Force's definition for IOC for our planned fleet of F–35As is found in the August 2008 JSF ORD Change 3. In the ORD Change 3, IOC for the Air Force is defined as "being attained when the MAJCOM/CC determines the unit is operationally war ready. IOC planning factors will include sufficient assets to meet the unit DOC [designed operational capability statement], facilities/infrastructure, operations and maintenance trained/equipped personnel, ALIS support for peace time/combat operations, completion of an independent assessment, a verified OFP and verified tech orders and manuals. IOC declaration will be at the discretion of ACC/CC."

What this means is that the Air Force will be able to declare IOC with the F–35As after completion of the program's Block 3 upgrade initial operational test and evaluation, which validates required warfighting capabilities. It's estimated, based on the currently predicted completion timeframe of the Block 3 IOT&E, the Air Force will have its first opportunity to declare IOC with the operational fleet of F–35As in second quarter calendar year 2016.

6. Senator LIEBERMAN. General Trautman, Admiral Philman, and General Weida, what are the risks of declaring IOC before the aircraft may have received all of the capabilities intended? I am particularly concerned in this regard with the Marine Corps' intent to accept the JSF in its Block 2B configuration, when the Air Force and Navy plan to wait for the Block 3 configuration.

General TRAUTMAN. The Marine Corps plans to IOC with a multi-mission support capable Block 2B aircraft as defined in the JSF ORD change 3. With the recent program restructuring, IOC is projected to be December 2012 for the Marine Corps. This is based on operational requirements and the associated metrics that encompass capabilities, equipment, training, and support. We will track and measure the progress of the program to meet the Marine Corps requirements between now and December 2012 and ensure the Marine Corps has all the elements required for operational use of the F–35B. An IOC declaration will be dependent upon meeting these requirements.

The F–35B Block 2B is far superior to any aircraft in the Marine Corps inventory. With VLO survivability, a powerful integrated sensor suite, fused information displays, interoperable joint connectivity, a precision weapon capability, and self protect anti-air weapons it is a total package of capabilities that will revolutionize our expeditionary Marine air-ground combat power in all threat environments while enabling joint interoperability and reducing the reliance on supporting aircraft, tankers, and electronic warfare jammers. It is important to note that subsequent to IOC these aircraft will continue to be upgraded as the Block 3A, B, and C capabilities are released for operational use. The same capabilities that will be resident in the F–35A and F–35C aircraft when the Air Force and Navy reach IOC.

Admiral PHILMAN. The Marine Corps plans to IOC with a multi-mission support capable Block 2B aircraft as defined in the F–35 ORD (Change 3). With the recent program restructuring, the Marine Corps F–35B IOC is still planned for December 2012. This is based on operational requirements and the associated metrics that encompass capabilities, equipment, training, and support. The Department will track and measure the progress of the program to meet the Marine Corps requirements between now and December 2012 and ensure the Marine Corps has all the elements required for operational use of the F–35B. An IOC declaration will be dependent upon meeting these requirements.

The F–35B Block 2B is far superior to any aircraft in the Marine Corps inventory. With low observable survivability, an integrated sensor suite, fused information displays, interoperable joint connectivity, a precision weapon capability, and self protect anti-air weapon it is a total package of capabilities that will revolutionize our expeditionary Marine air-ground combat power in all threat environments.

It is also important to note that following the Marine Corps IOC, initial F–35 aircraft will continue to be upgraded as the Block 3A, Block 3B, and Block 3C capabilities are released for operational use. These Block 3 capabilities will also be resident within the Air Force F–35A and Navy F–35C aircraft when the Air Force and Navy reach their IOC dates.

General WEIDA. As you stated, the Air Force intends to declare IOC after the F–35A's Block 3 capabilities have been validated through completion of initial operational test and evaluation. This will ensure the Air Force will have F–35As with the mission essential capabilities outlined in the August 2008 JSF ORD Change 3. These capabilities enable the Air Force to conduct the spectrum of F–35 missions.

DEPARTMENT OF THE NAVY TACTICAL AIRCRAFT SHORTFALL

7. Senator LIEBERMAN. Admiral Architzel, over the past couple of years, we have heard that the potential strike fighter shortfall could be 125 aircraft, or 243 aircraft, or, according to the latest analysis of the various steps the Navy could take, anywhere between about 40 and almost 200. Please describe what changes you have made to get the 243-aircraft shortfall assumed last year down to roughly 150 aircraft assumed most likely this year.

Admiral ARCHITZEL. The latest fiscal year 2011 President's budget Department of the Navy inventory shortfall is 177 aircraft toward the end of the decade. This can be reduced to about 100 aircraft by application of several mitigation options including some service life extension program (SLEP). All options are on the table to manage the shortfall and projections will continue to evolve as analysis is updated.

The Department's TACAIR inventory management initiatives are targeted at preserving the service life of our existing legacy strike fighter aircraft (F/A–18 A–D). The Navy will reduce the number of aircraft available in its squadrons during non-deployed phases to the minimum required. The Department of the Navy expeditionary squadrons and those supporting the unit deployment program (UDP) will be reduced from 12 aircraft to 10 aircraft per squadron on an as-required basis.

The Navy can accelerate the transition of five legacy F/A–18C squadrons to F/A–18 E/F Super Hornets and can also transition two additional F/A–18C squadrons using F/A–18 E/F attrition aircraft, based on available funding. The use of these attrition aircraft expends the service life of the F/A–18 E/F aircraft earlier than programmed. These measures reduce the operational demand on legacy F/A–18s, making more aircraft available for induction into life extension events.

The Department of the Navy is also evaluating depot level efficiency to maximize throughput and return legacy strike fighter aircraft to the fleet. Collectively, these measures can extend the service life of the legacy aircraft and contribute to reducing the impact of the projected shortfall.

8. Senator LIEBERMAN. Admiral Architzel, what are the risk factors that could make those numbers higher?

Admiral ARCHITZEL. The timely delivery of the F–35B and F–35C remains critical to our future strike fighter capacity. The Department of the Navy has the necessary tactical aircraft capacity in the near term to support our Nation's strategic demands. However, ongoing assessments forecast a decrease in our strike fighter capacity during JSF transition, unless further measures are implemented to extend the life of our existing inventory.

Other risk factors would be a sharp increase in our operational demand of these aircraft or the ability to continue sustainment of the existing inventory.

In addition to management initiatives currently in place, we plan on addressing this inventory shortfall through additional aggressive and precise management strategies. The management initiatives being implemented prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements.

9. Senator LIEBERMAN. Admiral Architzel, please describe the costs associated with the various levers that the Navy has described as options for mitigating the shortfall.

Admiral ARCHITZEL. The costs involved in implementing the inventory management "levers" include surging training capacity for aircrew, procuring support and ancillary equipment to outfit transition squadrons. These costs will be submitted during the POM–12 budget development process. These initiatives prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements.

10. Senator LIEBERMAN. Admiral Architzel, have you updated last year's estimates of what it would take to perform a SLEP on the F/A–18 C/D aircraft? If so, what are those estimates?

Admiral ARCHITZEL. The SLEP requirement is being finalized.

Based on SLEP'ing 280 aircraft to 10,000 hours, the cost would be an estimated $15.5 million average per airframe.

$15.5 million average per airframe SLEP (10,000 FH)

- $13.8 million (APN) SLEP & CBR+
  - Kits & Installs
- $1.7 million (OMN) HFH
  - FRC Activity

11. Senator LIEBERMAN. Admiral Architzel, is there specific analysis that has led the Navy to conclude that a squadron of 10 aircraft will be as capable as 12 aircraft? If so, why has DOD decided to make this change now?

Admiral ARCHITZEL. Any reduction in squadron size will be subject to Global Force management demand. A closely monitored reduction in squadron size from 12 F/A–18 A–D aircraft to 10 is a prudent balance of operational risk and inventory requirements. A reduction in squadron size eases demand on the legacy Hornet inventory, preserves service life for a longer period, and frees up more aircraft for induction into life extending events. This decision also considers that carrier based F/A–18C squadrons have been deploying with 10 aircraft for a number of years.

The management initiatives being implemented prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements.

RETHINKING REQUIREMENTS

12. Senator LIEBERMAN. General Weida, there are continuing questions about whether the Air Force has planned for the proper mix of long-range and short-range strike forces within its inventory, given likely ranges at which aircraft would have to operate in certain contingencies. I am thinking here of the Western Pacific, where our air bases and aircraft carriers in the region could be held at risk, and our aircraft forced to operate at significantly greater range than previously assumed.

At the same time, it seems that there are some missions for which the JSF is overmatched. Specifically, I am wondering whether the JSF would be a fitting platform to deliver munitions in such a permissive environment as Afghanistan, today, where there is almost no threat.

At a time when we are facing potentially huge cost increases in the F–35, these considerations give rise to the possibility that, like the Navy, the Air Force should be considering a mix of 5th generation aircraft like the F–35 and some portion of the fleet that would be perfectly capable of operating in wartime scenarios after the first couple of days, like the F–16 or F–15. It also raises the possibility that both the Air Force and the Navy should reassess whether they are now planning for the right balance of short-range and long-range strike aircraft. What studies or analytical efforts within the Air Force are being conducted to look at the proper mix of newer and legacy aircraft, and short-range versus long-range aviation strike platforms?

General WEIDA. The Air Force has been conducting force structure analyses continuously for many years and currently has ongoing mission and campaign level studies to examine force structure composition. These studies are conducted by Air Combat Command, the Headquarters Air Force, and by independent Federally Funded Research and Development Centers (FFRDC) to ensure that any institutional bias is eliminated. The goal is to assure that changes to strategies, scenarios, threats, acquisition programs, and fiscal constraints are considered when developing a force that has the best available mix of legacy platforms, 5th generation fighters, and bombers. Given very real budget constraints, the Air Force is working diligently to ensure the current long-range force plan has the proper mix and size to accomplish the National Military Strategy at moderate risk. Our analytic foundation is continuously being updated using the latest scenarios, threat assessments, Quadrennial Defense Review (QDR), and Nuclear Posture Review (NPR)/Strategic Arms Reduction Treaty (START) guidance to inform fiscal year 2012 budget development.

13. Senator LIEBERMAN. Admiral Architzel and General Shackelford, under the auspices of the Nunn-McCurdy requirements, should we be evaluating such alternatives as a mix of legacy and newer aircraft and a mix of short- and long-range

aviation in deciding whether there are alternatives to the current acquisition program which will provide equal or greater military capability at less cost?

Admiral ARCHITZEL. As part of the Nunn-McCurdy review process we are required to evaluate alternatives and determine if any of the alternatives will provide acceptable capability at less cost.

General SHACKELFORD. The Air Force has been conducting force structure analyses continuously for many years and currently has ongoing mission and campaign level studies to examine force structure composition. These studies are conducted by Air Combat Command, the Headquarters Air Force, and by independent FFRDCs to ensure that any institutional bias is eliminated. The goal is to assure that changes to strategies, scenarios, threats, acquisition programs, and fiscal constraints are considered when developing a force that has the best available mix of legacy platforms, 5th generation fighters, and bombers. Given very real budget constraints, the Air Force is working diligently to ensure the current long-range force plan has the proper mix and size to accomplish the National Military Strategy at moderate risk. Our analytic foundation is continuously being updated using the latest scenarios, threat assessments, QDR, and NPR/START guidance to inform fiscal year 2012 budget development.

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## QUESTIONS SUBMITTED BY SENATOR CLAIRE MCCASKILL

### TACTICAL AIRCRAFT SHORTFALL

14. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, the Navy identified a tactical air shortfall of 243 fighter aircraft during last year's fiscal year 2010 budget hearing. Over the last year, the Navy has bounced back and forth over the size of the shortfall. The Navy briefed in March 2009 that the shortfall was 312 aircraft but later changed to 146 aircraft in May 2009. Secretary Gates told Congress in February 2010 that the shortfall was 100 aircraft. Then, in March, Under Secretary for Acquisition, Technology, and Logistics Ash Carter and other DOD witnesses admitted they did not know what the number was for the projected shortfall. Now, at the April 13 hearing, we again hear it could be a manageable 100 aircraft in 2018, which is about 77 fewer than what was forecast for the fiscal year 2011 budget process. You testified that this number would be achieved in part through the SLEP. I am concerned about how wildly the shortfall estimates have jumped around over the last year. I am also concerned that even a 100-plane shortfall is considered acceptable to the Navy. Why is the goal for the shortfall not zero?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The latest fiscal year 2011 President's budget Department of the Navy inventory shortfall is projected to be 177 aircraft toward the end of the decade. This can be reduced to about 100 aircraft by application of several mitigation options including some SLEP. Optimization of depot throughput is being studied as an additional mitigation method. This is a forecasted shortfall of a very dynamic and complex problem that is almost 10 years away, but requires continuous refinement. Regular revalidation of assumptions driving the analysis and close monitoring of inventory health allows the Department of the Navy to avoid making large investment decisions prematurely. As SLEP matures, cost estimates become more refined and other variables affecting the shortfall come into focus, the Department of the Navy will continue to review all mitigation options to reduce the long-term shortfall.

Whatever management initiatives are implemented, the Department of the Navy intends for them to prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements.

15. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what level of risk is the Navy willing to accept by having a shortfall of 100?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. Management initiatives being implemented by the Department of the Navy prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements. They also allow the Department of the Navy to closely monitor progress toward reducing the shortfall and enable adjustments to the plan before making unnecessary and premature investment or force structure decisions.

16. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, please explain how the new delays in the F–35 program will affect the shortfall total.

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The latest fiscal year 2011 President's budget Department of the Navy inventory shortfall projection is 177 aircraft toward the end of the decade. This shortfall estimate includes the latest reductions in the F–35 program delivery ramp. The Department of the Navy remains committed to the JSF program and the timely delivery of the F–35B and F–35C remains critical to our future strike fighter capacity. The Department of the Navy has the necessary tactical aircraft capacity in the near-term to support our Nation's strategic demands. However, ongoing assessments forecast a potential decrease in our strike fighter capacity during JSF transition, unless further mitigation measures are implemented. In addition to management initiatives currently in place, we plan on addressing this potential capacity decrease through additional aggressive and precise management strategies.

17. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, I understand that the Navy is considering a number of mitigating actions to overcome the shortfall to include changing squadron size from 12 to 10 aircraft. What are the mitigating actions proposed by the Navy to overcome the shortfall?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. Any reductions in squadron size will be subject to Global Force management demand. The Department's TACAIR inventory management initiatives are targeted at preserving the service life of our existing legacy strike fighter aircraft (F/A–18A–D). The Navy will reduce the number of aircraft available in its squadrons during non-deployed phases to the minimum required. The Department of the Navy expeditionary squadrons and those supporting the UDP will be reduced from 12 aircraft to 10 aircraft per squadron on an as-required basis. The Navy is accelerating the transition of five legacy F/A–18C squadrons to F/A–18 E/F Super Hornets. The Navy is also evaluating the transition of two additional F/A–18C squadrons using F/A–18E/F attrition aircraft in the POM–12 budget process. The use of attrition aircraft expends the service life of the F/A–18E/F aircraft earlier than programmed. These measures reduce the operational demand on legacy F/A–18s, making more aircraft available for induction into life extension events. The Department of the Navy is also evaluating depot level efficiency to maximize throughput and return legacy strike fighter aircraft to the fleet. Collectively, these measures will extend the service life of the legacy aircraft and make the projected shortfall manageable.

18. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, have any of these mitigating actions been budgeted for in this year's budget or in the Future Years Defense Plan (FYDP)?

Admiral ARCHITZEL and Admiral PHILMAN. The Service Life Assessment Program (SLAP) for legacy Hornets has been funded and is complete. The center barrel replacement (CBR) program is funded and ongoing. It increases the wing root fatigue life of some older legacy Hornets. The SLEP to extend the service life of legacy F/A–18 aircraft to 10,000 hours is primarily a POM–12 budget development issue.

General TRAUTMAN. The Department of the Navy long-term shortfall reduction strategies will be addressed in the fiscal year 2012 President's budget development. Currently, items under review are the F/A–18 A–D SLEP and opportunities for optimizing depot turn around times. We continue to explore other mitigation alternatives.

19. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, do you expect that a reduction in the squadron size in Marine Corps tactical air units will increase the risks associated with operational capability as a result of warfighting requirements not changing?

Admiral ARCHITZEL and Admiral PHILMAN. Any reductions in squadron size will be subject to Global Force management demand.

General TRAUTMAN. Any reductions in squadron size will be subject to Global Force management demand. A closely monitored reduction in squadron size from 12 F/A–18 A–D aircraft to 10 is a prudent balance of operational risk and inventory requirements. The Department's TACAIR inventory management initiatives are targeted at preserving the service life of our existing legacy strike fighter aircraft (F/A–18 A–D). The Department of the Navy expeditionary squadrons and those supporting the UDP will be reduced from 12 aircraft to 10 aircraft per squadron on an as-required basis. These measures, in combination with other internal management measures and SLEP of some aircraft, will extend the service life of the legacy aircraft and make the projected shortfall manageable. This decision also considers that

carrier based F/A–18C squadrons have been deploying with 10 aircraft for a number of years.

20. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, will the additional risk mean that the operational commanders have less than the required strike fighters to execute their mission?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. Any reductions in squadron size will be subject to Global Force management. These inventory management initiatives will be implemented on an as required basis, prudently balancing the warfighting needs of the COCOMs with future projected capacity and capability requirements.

21. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, when do you anticipate that a decision will be reached on the Navy's discussions for a multiyear procurement (MYP)?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The Navy is actively pursuing the F/A–18 series multiyear as authorized in the National Defense Authorization Act (NDAA) for Fiscal Year 2010 and Defense Department Appropriations Act of 2010. The Secretary of Defense must certify to Congress that all multiyear programs have met statutory requirements.

The Navy is currently working with the OSD to submit all required documentation and budget exhibits to provide the Secretary of Defense the necessary information he will require to certify the F/A–18 series multiyear and then notify Congress. Legislative relief on specific MYP documentation deadlines is still being worked with the appropriate committees.

22. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, is SLEP funded in future spending?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. Although the initial elements of SLEP CBR and high-flight hour (HFH) inspections) are currently funded, the phase of SLEP to take the aircraft to 10,000 flight hours remains a POM–12 budget development issue.

23. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, how much will it cost to add 1,400 hours to older F/A–18 Super Hornets?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The F/A–18 E/F SLAP is currently funded and underway. The F/A–18 E/F has a different airframe from the F/A–18 A–D fleet, and requires a separate service life assessment. The E/F has a design life of 6,000 hours.

There is currently no program and no cost estimate at this time for adding flight hours to F/A–18 E/Fs.

24. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, I am aware that cost benefit analyses were done in the past about how many aircraft should enter a SLEP and whether it becomes more cost efficient to buy new F/A–18s. Please detail past analyses and what their conclusions were.

Admiral ARCHITZEL and Admiral PHILMAN. The Department of the Navy has not chartered or commissioned any cost benefit analysis regarding how many aircraft should enter a SLEP or whether it is more cost effective to buy new F/A–18s.

General TRAUTMAN. Marine Corps defers to the Deputy Assistant Secretary of the Navy (DASN) (Air) for appropriate response.

25. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what has changed in recent SLEP cost-benefit analyses?

Admiral ARCHITZEL and Admiral PHILMAN. There have been no changes to the SLEP technical baseline elements used in the cost analysis conducted by AIR–4.2, the cost estimating branch of the Naval Air Systems Command. The Department of the Navy has not conducted a cost-benefit analysis of the F/A–18 SLEP program.

General TRAUTMAN. Marine Corps defers to DASN (Air) for appropriate response.

26. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, are the same numbers of F/A–18s expected to enter a SLEP as previously determined?

Admiral ARCHITZEL and Admiral PHILMAN. SLEP is not currently funded in PB11. Several analyses have been completed to support the POM–12 development. The number of aircraft identified to enter SLEP will be determined as part of the POM–12 budget development process. Regardless of the funding profile selected in POM–12, the Department of the Navy will have the opportunity to adjust SLEP quan-

tities, based on updated inventory information, in POM–14 because the funding profiles for SLEP of 150 and 280 are nearly identical from fiscal year 2012 through fiscal year 2014.

General TRAUTMAN. The phase of F/A–18 A–D SLEP to take the aircraft to 10,000 flight hours, remains a POM–12 budget development issue and is not currently funded in PB11. Several analyses have been completed to support the POM–12 development. The number of aircraft identified to enter SLEP will be determined as part of the POM–12 budget development process.

27. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what is the current cost to SLEP each aircraft?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The exact cost to SLEP each aircraft is not definitively known until the aircraft is inducted for service. However, the current average cost per aircraft is estimated from AIR–4.2 at:

- $15.5 million average per airframe SLEP (10,000 FH)
  - $13.8 million (APN) SLEP & CBR+
    - Kits and Installs
  - $1.7 million (OMN) HFH
    - FRC Activity

28. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, how many flight hours are added to each aircraft that go through a SLEP?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. The F/A–18 A–D legacy airframe life limit is 8,000 flight hours. HFH inspections will provide an additional 600-hour service extension to a portion of the legacy fleet that receives them. Many of these aircraft would be candidates to be extended another approximately 1,400 flight hours, to 10,000 flight hours, through the SLEP.

29. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what is the cost per flight hour gained, under current projections, for putting F/A–18 through a SLEP?

Admiral ARCHITZEL and Admiral PHILMAN. The Director, Cost Assessment and Program Evaluation (CAPE) has been tasked to conduct an independent analysis of all strike fighter shortfall supply and demand initiatives in order to gain a better understanding of their cost effectiveness and risk. That analysis will address the total ownership cost of extending the life of legacy F/A–18s, including SLEP, and is expected to be completed in time to support the submission of the President's fiscal year 2012 budget request.

General TRAUTMAN. SLEP cost/available flight hours: Based on an average cost estimate of $15.5 million to extend an aircraft 2,000 flight hours (600 flight hours for HFH inspection to 8,600 flight hours, and then SLEP to a total of 10,000 flight hours), average cost per flight hour is $7,750.

30. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what is the cost per flight hour to purchase a new F/A–18?

Admiral ARCHITZEL and Admiral PHILMAN. The Director, CAPE has been tasked to conduct an independent analysis of all strike fighter shortfall supply and demand initiatives in order to gain a better understanding of their cost effectiveness and risk. That analysis will address the total ownership cost of purchasing new F/A–18 E/Fs, and is expected to be completed in time to support the submission of the President's fiscal year 2012 budget request.

General TRAUTMAN. Procurement cost/available flight hours: Based on an average fly away procurement cost of $62.55 million under a single year procurement (currently the program of record) and assuming a design life of 6,000 hours, the average cost per flight hour to procure a new F/A–18F would be $10,420 per hour. Under the proposed MYP III procurement strategy, the procurement cost per flight hour would be $9,330 per hour, based on an average fly away procurement cost of $56 million.

31. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, what are the core differences in capability between a new F/A–18E/F and a SLEP'd aircraft?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. F/A–18 E/F provides a 40 percent increase in combat radius, 50 percent increase in endurance, 25 percent greater weapons payload, three times more ordnance bring-back, and is five times more survivable than F/A–18A/C models. F/A–18 E/F spirals ensure relevancy against emerging and future threats. A Block II Super Hornet includes upgraded

avionics and sensors, some of which cannot be retrofitted to a Legacy Hornet, most notably the APG–79, AESA Radar.

Capability upgrades are not part of the basic F/A–18 A–D SLEP effort—this only extends the service life of the airframe. Capability upgrades are an independent cost associated with extending the service life of the Legacy Hornet.

32. Senator MCCASKILL. Admiral Architzel, General Trautman, and Admiral Philman, are any changes projected to the number of aircraft available in Navy F/A–18 training squadrons? If so, what changes and what will their impact be?

Admiral ARCHITZEL, General TRAUTMAN, and Admiral PHILMAN. Through implementation of inventory management initiatives and service life extension of aircraft, training aircraft inventories will be maintained at appropriate levels.

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## QUESTIONS SUBMITTED BY SENATOR ROLAND W. BURRIS

### JOINT STRIKE FIGHTER SUPPORT INFRASTRUCTURE

33. Senator BURRIS. Admiral Architzel, General Shackelford, General Trautman, Admiral Philman, and General Weida, how are you phasing in a support infrastructure for the new JSF program without detriment to the legacy aircraft that it will replace?

Admiral ARCHITZEL, Admiral PHILMAN, and General TRAUTMAN. The Department of the Navy has management initiatives in-place to retain our readiness posture of legacy platforms while we conduct the transition to the JSF. We are actively managing the transition of the F–35 while we maintain legacy platform support to meet Department of the Navy warfighting/operational needs. The Marine Corps has a longstanding F–35B Transition Task Force and the Navy has an F–35C Lightning II Integration Team. Both teams are under senior leadership oversight and are fully accountable for the successful integration of F–35B/F–35C into the fleets; F–35 lifecycle management (including all seams issues); and interoperability with legacy support systems. In parallel, the Department is maintaining the necessary logistic infrastructure for legacy systems via existing aircraft program office systems/processes under Program Executive Officer leadership. These teams are responsible for coordination of all in-service aircraft readiness activities (afloat and ashore) to maintain the overall aircraft material conditions in the most affordable manner. All teams will remain in place until applicable aircraft are removed from active service.

General SHACKELFORD and General WEIDA. The U.S. Air Force support infrastructure is being maintained for the legacy fleet that the F–35 is replacing at every base. The Air Combat Command will maintain trained airman for the legacy fleet until the last legacy aircraft departs the base. Supply and parts will be maintained as long as there is a flying mission at that base. Training will also be maintained for aircrew and maintainers alike. The Air Combat Command will not put at risk any of our valued assets as we transition a base from legacy to 5th generation aircraft.

### STRIKE FIGHTER SHORTFALL

34. Senator BURRIS. General Shackelford and General Weida, is the Air Force going to consider keeping the F–22 line open for additional procurement to fill a possible fighter gap created by a delay in the JSF delivery?

General SHACKELFORD and General WEIDA. There are no plans to reopen the F–22 production line. The Air Force is proceeding with sustainment-only shutdown planning activities and expects the final F–22 to deliver with Lot 10 in March/April 2012. The Air Force position remains in line with the Department's and executive branch's position to end F–22 production after Lot 10.

35. Senator BURRIS. Admiral Architzel and Admiral Philman, is the Navy considering keeping their F–18 Super Hornet line open to fill a possible fighter gap created by a delay in the JSF delivery?

Admiral ARCHITZEL and Admiral PHILMAN. The Department of the Navy will continue to review all mitigation options to reduce the long-term shortfall.

36. Senator BURRIS. General Trautman, if the JSF remains behind schedule, or experiences further delays, does the Marine Corps have a backup plan to JSF procurement?

General TRAUTMAN. The Marine Corps' commitment to the JSF program is steadfast. The development schedule remains on track with some risk to completing the

test schedule on time. The additional funding budgeted in fiscal year 2010 and PB–11 will help address those risks, and the Corps will review the progress again in preparation for POM–12. The test aircraft are exhibiting unmatched reliability for this stage of testing. The first vertical landing was accomplished on March 18th and exceeded expectations. Though testing is later than anticipated we are starting to see the completion of test points faster than expected. Static and durability testing of ground test aircraft are providing excellent results and the engine performance is providing thrust required to safely conduct flight test. Because of these accomplishments the Corps will forgo the F–18E/F and continue our investment in true a Fifth Generation aircraft.

37. Senator BURRIS. Admiral Architzel, General Shackelford, General Trautman, Admiral Philman, and General Weida, with the fighter gap looming and a backlog of inventory growing, how are you training the pilots and maintenance crews on this equipment?

Admiral ARCHITZEL, Admiral PHILMAN, and General TRAUTMAN. The Navy continues to analyze training capacity requirements and invest in training centers of excellence to meet demand.

General SHACKELFORD and General WEIDA. For pilot training, the Air Force is aware of the challenges associated with transition from legacy fighters to fifth generation fighters and is working to address them. Aircraft delivery dates and rates affect program execution and as such, the Air Force is developing a range of options to address evolving schedules. Pilots who will eventually man F–35 aircraft are currently filling validated pilot requirements, either flying or non-flying. In anticipation of the first deliveries of F–35s to Eglin AFB, the Air Force already has pilots in place for immediate training and will have pilots ready for future deliveries.

The Navy continues to analyze training capacity requirements and invest in training centers of excellence to meet demand.

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## QUESTIONS SUBMITTED BY SENATOR SAXBY CHAMBLISS

### FIGHTER GAP

38. Senator CHAMBLISS. General Shackelford and General Weida, you note in your written statement regarding the Air Force's fighter gap that several things have changed since April 2008 when the Air Force indicated they had a gap of 800 fighters. First, the Air Force has simply agreed to accept more risk. As an aside, I would note that that does not affect the size of the gap at all—it simply is an acknowledgement that you are going to accept that you have one. Second, you note that the F–35 procurement rate was officially increased from 48 to 80 per year. On your second point, I've seen several stories over the past few months about the F–35 costing more and being delayed longer than previously indicated. For that reason, I am hesitant to take much comfort in the increased production rate you mention since it hasn't happened yet, and no one can tell us for sure when it is actually going to happen and to what extent. Do you have any comments?

General SHACKELFORD and General WEIDA. The acceptance of additional risk in fighter force structure was conducted in light of OSD guidance directing that the Air Force increase risk for less relevant force application capabilities. The fiscal year 2011 President's budget reflects a complete review of the Air Force fighter force structure requirement. We do not have a gap of 800 fighter aircraft. After conducting a thorough examination of the current and future strategic environment, and using high fidelity campaign modeling, the Air Force revised its fighter requirement to approximately 1,200 Primary Mission Aircraft Inventory and approximately 2,000 Total Aircraft Inventory. Today we have 1,221 Primary Mission Aircraft Inventory and 2,074 Total Aircraft Inventory.

As to your concerns on the F–35 program's ability to meet its planned production rate, the Air Force remains confident that the production delays experienced early in this program have been aggressively and adequately addressed by the program office and the primary contractor, Lockheed Martin. The current assessment is that the program is turning the corner in achieving planned production rates. As you may be aware, the program recently restructured production ramp rates to meet the OSD/CAPE directed ramp rates of a 50 percent yearly increase in production across the FYDP, with full rate production level of 80 F-35As per year starting in 2016. OSD/CAPE directed this production ramp rate based on the recommendations of the 2009 Independent Management Review Team (IMRT). In addition, the IMRT is actively participating in the current Nunn-McCurdy review of the program to assess if this production rate is achievable. The IMRT will also conduct a more in-depth

second review of the program starting this summer to measure program progress towards achieving this rate. Based on these independent assessments, the Air Force is confident we will maintain clear and unbiased oversight of the production ramp rate of this program, and will be able to address any issues quickly and effectively throughout the development and initial fielding of this critical warfighting program.

FOREIGN MILITARY SALES

39. Senator CHAMBLISS. General Shackelford, the Senate has been discussing the issue of F–22 foreign military sales for several years now. While still prohibiting the sale of F–22 to a foreign government, the fiscal year 2010 Defense Appropriations Act provided authority for DOD to "conduct or participate in studies, research, design, and other activities to define a future export version of the F–22A that protects classified and sensitive information, technologies, and U.S. warfighting capabilities." What can you tell me about the actions DOD plans to take with respect to this new authority?

General SHACKELFORD. The Air Force has provided inputs into the OSD F–22 foreign military sales (FMS) report required by sections 1250 (a) (b) of the NDAA for Fiscal Year 2010. OSD will submit the final report to Congress once staffing is complete. Section 1250(c) directed an additional report on the impact of F–22 FMS on the U.S. aerospace and aviation industries. This study is being conducted by RAND in conjunction with a similar House Armed Services Comittee-directed report to update a 2003 study on the military aircraft industrial base.

40. Senator CHAMBLISS. General Shackelford, we've talked around this issue for several years, and I understand the issues related to F–22 export in relation to the sensitivity of the technology and the current legal prohibition, but let me ask you, in your personal opinion, if the Air Force determined that developing an exportable version of the F–22 that properly protected sensitive technology were possible, and if a trustworthy ally with whom the United States partners with regularly were to express an interest in buying such an exportable version and was willing to pay to develop and purchase it, would it make sense for the United States to consider developing an exportable version of the F–22 and selling it to that ally?

General SHACKELFORD. The Obey Amendment presently prohibits the sale and export of the F–22. Were that restriction lifted, subject to applicable provisions of the 2010 DOD Appropriations Bill (HR 3326) and the 2010 NDAA, as well as sections of accompanying Joint Explanatory Statement and/or Conference Report and a trusted ally willing to fund the design, development, and production of an exportable F–22 that protected U.S. technology, then it would be feasible to export the F–22 to the benefit of the industrial base. Although, current congressional language permits the Department to conduct or participate in studies, research, design and other activities to define and develop a future export version of the F–22A that protects classified and sensitive information, technologies and U.S. warfighting capabilities, the Air Force currently has no plans to do so.

41. Senator CHAMBLISS. General Shackelford, I understand that the Air Force has indicated the F–35 may be available to foreign governments for $50 million apiece. I note that the Selected Acquisition Report that DOD delivered to Congress on April 1 states that the program average unit cost for the F–35 is now $133.59 million and the average unit procurement cost is now $113 million. Some estimates of these costs go as high as $158 million and $136 million respectively. Please provide your best estimate at this time of the price at which the United States will sell F–35s to foreign partners.

General SHACKELFORD. The price of an aircraft that will be purchased by either a foreign partner or the United States will vary based on when those aircraft are purchased. The average unit costs quoted in the F–35 December 2009 Selected Acquisition Report are averages based on a total U.S. buy of 2,443 aircraft and 730 aircraft for the 8 partners. The costs of the aircraft in the early LRIP lots will be higher than the average while aircraft purchased later in the program will cost less than the average.

[Whereupon, at 11:35 a.m., the subcommittee adjourned.]

# DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2011

**THURSDAY, APRIL 15, 2008**

U.S. SENATE,
SUBCOMMITTEE ON AIRLAND,
COMMITTEE ON ARMED SERVICES,
*Washington, DC.*

## ARMY MODERNIZATION

The subcommittee met, pursuant to notice, at 2:04 p.m. in room SR–222, Russell Senate Office Building, Senator Joseph I. Lieberman (chairman of the subcommittee) presiding.

Committee members present: Senators Lieberman, Hagan, Begich, Kaufman, Inhofe, and Thune.

Majority staff member present: William K. Sutey, professional staff member.

Minority staff member present: Paul C. Hutton IV, professional staff member.

Staff assistants present: Brian F. Sebold and Breon N. Wells.

Committee members' assistants present: Christopher Griffin, assistant to Senator Lieberman; Patrick Hayes, assistant to Senator Bayh; Gordon Peterson, assistant to Senator Webb; Tressa Guenov, assistant to Senator McCaskill; Michael Harney, assistant to Senator Hagan; David Ramseur, assistant to Senator Begich; Halie Soifer, assistant to Senator Kaufman; Mark Powers, assistant to Senator Inhofe; Lenwood Landrum, assistant to Senator Sessions; Jason Van Beek, assistant to Senator Thune; and Scott M. Clendaniel, assistant to Senator Brown.

### OPENING STATEMENT OF SENATOR JOSEPH I. LIEBERMAN, CHAIRMAN

Senator LIEBERMAN. The Subcommittee on Airland will come to order with noting the presence of my friend from Oklahoma, Senator Inhofe, and being informed that the Ranking Member, Senator Thune, is outside the door.

Senator INHOFE. 14th Street Bridge. [Laughter.]

Senator LIEBERMAN. When I first arrived at the Senate in much looser times I was told that if I could tell the cloakroom that I could see the Capitol dome they would hold the vote open for me. [Laughter.]

But I didn't have to tell them how far I was from the Capitol. [Laughter.]

Anyway, this hearing is on the very important question of Army modernization. After nearly 9 years of war in Iraq and Afghanistan I must say I continue to marvel at the extraordinary performance of America's Army. Today the Army is battle tested, battle proven, and battle hardened by years of combat in the harshest and most uncertain conditions. The members of our Army have performed with remarkable professionalism, courage, and I would say, idealism.

We find that from the leaders, the soldiers, and from their families. I asked the two leaders of the Army that are with us today whenever you have a chance to please convey our gratitude to all those people who are serving for us. Our Nation is deeply grateful.

The subject of today's hearing, Army modernization, merits particular attention because of the many initiatives begun last year to reorient and restructure the Army's acquisition policies. I'm just paused for the moment to note a kind of irony which is and we'll focus on this as the hearing goes on. There's not been much stability about Army modernization programs over the last several years that I've been on the committee which is regrettable.

Yet, I must say, the Army works. The Army succeeds as I said in my opening remarks. This doesn't mean we should not try to achieve more stability and progress in Army modernization. But it's quite remarkable how our troops have managed to do as well as they have, really extraordinarily well.

The fiscal year 2011 Army budget continues implementation of the major program changes directed by the Secretary of Defense to restructure the Future Combat System (FCS) program; limit the Army's brigade growth to 45 instead of 48 combat brigades; start a new ground combat vehicle (GCV) program; and integrate our 12,000 mine resistant ambush protected (MRAP) vehicles that have been procured into the Army's force structure.

These changes necessarily have an incomplete nature in last year's budget request are, I would say, further clarified in the Army's fiscal year 2011 request that is before our subcommittee now. This hearing therefore is an opportunity for our witnesses to bring the subcommittee up-to-date and to describe how risks facing the Army's modernization program have been addressed in the budget for the next fiscal year.

This year's Army budget request is also guided by the findings and recommendations of the 2009 Quadrennial Defense Review (QDR) that places significant additional emphasis on improving the capabilities of currently fielded technologies to deal with the wars we are in now and at the same time search for next generation capabilities to meet the demands of an uncertain future.

I do want to note two encouraging management initiatives on the part of the Army.

The first, last February Secretary McHugh ordered a year-long comprehensive capability portfolio review to validate the operational value of requirements for new weapons and importantly to inform what he recognizes will be tough decisions the Army will have to make in fiscal years 2012 to 2017 long-range budget plans. That review has already started under the supervision of the Under Secretary of the Army, Joe Westfahl, and the Army's Vice Chief of Staff, General Peter Chiarelli. Initial indications are that

this review process is aggressive, objective, realistic, and demanding and for that I am grateful.

Additionally, General Casey announced in January that the Army plans to use this year to reform the process used to develop requirements for future capabilities. Consistent with the Secretary's capability portfolio reviews these reforms could include a more systematic and disciplined consideration of potential operational value through cost benefit analysis as well as earlier and direct involvement of the Army's most senior leadership in the requirements process. Both of these steps are consistent with our recently enacted Weapons System Acquisition Reform Act (WSARA) of 2009. For this I also commend the Army.

But these initiatives foreshadow that additional changes may be on their way for Army's requirements, priorities, and modernization strategy. Although the Army's fiscal year 2011 budget request includes both continuity and change it remains to be seen if the Army will successfully use this year's request as an opportunity to apply the lessons of the last decade that establishes and maintains control of a stable, achievable, and affordable modernization strategy. Those are some of the overall topics we have to consider.

I welcome our witnesses who are here today.

Lieutenant General Robert P. Lennox is Deputy Chief of Staff of the Army (G–8) responsible for broad staff oversight and recommendations regarding Army current and future requirements, priorities, and resource allocation.

Lieutenant General William N. Phillips is the Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics, and Technology and Director of the Acquisition Career Management. As his title indicates he is responsible for staff oversight and recommendations for the planning and execution of research, development, and acquisition programs necessary to meet the Army's current and next generation requirements.

Although Generals Lennox and Phillips are new to their positions this year they both have exceptional records of service and leadership to the Army and our country. I note also that this is their first appearance before our Airland Subcommittee. I don't know that we have a medal to award you in return for this, but we thank you for being here.

We're also joined today by two witnesses who represent agencies that have closely watched the planning and execution of Army modernization for many years. They will provide the subcommittee with their assessments of Army modernization management, review the main lessons learned over the last decade, and suggest which lessons are relevant and applicable to the Army's current modernization strategy and its next ground vehicle program. In that regard, we welcome particularly Michael J. Sullivan, Director of Acquisition and Sourcing Management at the Government Accountability Office (GAO); joined by David W. Duma, Principal Deputy Director, Operational Test and Evaluation (DOT&E) at the Department of Defense (DOD).

This year's hearing is a little bit different from ones we've had before as we have not previously included the Army's witnesses together on the same panel with the GAO and DOT&E. So this will be a remarkable adventure and experience. But obviously we hope

that this arrangement will allow us a good direct exchange of views that will help better inform the members of this subcommittee as we do our work on the National Defense Authorization Act (NDAA) for Fiscal Year 2011.

Senator Thune, thank you.

**STATEMENT OF SENATOR JOHN THUNE**

Senator THUNE. Thank you, Mr. Chairman. As you mentioned, today's testimony will inform the subcommittee's thinking as we prepare to mark up the NDAA for Fiscal Year 2011. I want to echo what you said and join you in welcoming our witnesses.

General Lennox and General Phillips, thank you for appearing before the subcommittee to explain the Army's modernization efforts and for your many years of distinguished service.

Mr. Sullivan and Mr. Duma, your views as independent auditors and testers will be extremely valuable. We look forward to hearing them.

The need to continuously modernize the Army is self evident. But in practice the modernization can be very difficult. We are in a period of unrelenting technological change, shifting operational requirements and we face an adaptive enemy.

The Army's challenge is with maintaining a technological edge over any adversary while providing a force equipped to meet almost any conceivable threat. This is complex and important work, and we thank you for it.

The Army revised its modernization strategy in 2009 as currently developing and testing technologies that it hopes will provide soldiers with improved capabilities. Two important activities will influence modernization.

The first directed by General Casey is a critical look at the way the Army generates requirements. The time requirements to value is a must, and I'm happy to see this development.

Second, is a broad review of Army technology area portfolios led by the Vice Chief, General Chiarelli.

Both of these activities are ongoing. While they may have a greater impact on future budgets than on this one, I believe they point the Army in the right direction. The committee is interested to know what affect these activities may have on some $3 billion requested for Army modernization in fiscal year 2011.

In practical terms the Army modernizes by upgrading its legacy systems while simultaneously developing and fielding new technologies. The Army's written testimony makes clear the need to do both and the combination helps to balance capability and affordability. Over the coming year the committee will pay close attention to the development of new systems like the suite of technologies designed for infantry and the GCV as well as to programs that upgrade Stryker, Paladin, and others.

Recent testing of some developmental systems has revealed worrisome shortfalls in performance and reliability. The witnesses will be asked to recommend courses of action to mitigate these issues. Additionally, questions of affordability haunt any weapons acquisition, and Army modernization programs are no different.

The Nation is served poorly when capable systems are priced off the battlefield and the committee is keen to know how the Army

plans to reduce development procurement costs. The success or failure of our efforts to modernize and transform the force of the future rests on decisions proposed and implemented today. There is concern among members of the committee which you will hear regarding the recent history of Army modernization efforts.

The challenge of delivering capability amidst technological change and shifting requirements is indeed a difficult one. We are eager to understand the Army's vision for the future and the strategy to achieve it. I should emphasize here that while this hearing may be focused on weapon systems and on the acquisition process the center of gravity has and will always be the soldiers themselves.

Our thanks and gratitude extends to all servicemembers at home or abroad and to the families that support them.

So Mr. Chairman, thank you again for convening this hearing. I look forward to hearing our witnesses' testimony.

Senator LIEBERMAN. Thank you, Senator Thune, and thanks to Senator Inhofe and Senator Kaufman for being here. We'll call now on General Lennox.

**STATEMENT OF LTG ROBERT P. LENNOX, USA, DEPUTY CHIEF OF STAFF, ARMY (G–8)**

General LENNOX. Good afternoon, Chairman Lieberman, Senator Thune, and distinguished members of the Airland Subcommittee. Thanks for your warm welcome for General Phillips and I and for the entire panel in fact. Very kind of you.

Together General Phillips and I today are pleased to represent the Army leadership and members of the acquisition workforce and the more than 1 million courageous men and women who have been serving this Nation at war for the last 9 years as you mentioned, sir. We're proud and honored to have been able to provide them with world class weapon systems and equipment that's enabled their mission success during that time period. We thank you and members of this subcommittee for your steadfast support and for the shared commitment to that very same goal.

This afternoon I'd like to discuss how the Army modernization strategy plans to meet this continuing objective. I'd like to open by talking about the Army modernization strategy and using some of the programs in the fiscal year 2011 budget to illustrate that. The Chief of Staff of the Army has recently approved an Army modernization strategy whose ends include developing and fielding an affordable and interoperable mix of the best equipment available to allow our soldiers and units to succeed in today's fight but also to win tomorrow's full spectrum operations. We plan to do that, sir, by following three lines of operation.

The first is buying new capabilities that address current capability gaps. For example, you'll hear us talk about today the brigade combat team (BCT) modernization strategy. That's one of our key efforts. I'll come back to that in a minute and talk about it.

One of the key things to come out of the QDR is the importance of aviation. The formation of a 12th combat aviation brigade out of the assets that we currently have today, and then the funding of a 13th combat aviation brigade would be part of our fiscal year 2011 proposal.

Today's warfight tells of the importance of intelligence, surveillance, and reconnaissance. The Army is looking to invest heavily in the extended range, multipurpose aircraft, the Sky Warrior, and in the Shadow unmanned aerial vehicle (UAV) to enable our BCTs for the future.

Finally, in this first line of effort we are continuing to equip our Reserve component forces. In fact, since September 2008 to September of this year, we'll have increased equipment on hand in the Reserve component by 11 percent and the modernization of those forces by 12 percent.

Our second line of effort really focuses on being good stewards of the equipment we have now and a path forward to improve them and keep them relevant for the future. An example of that is the OH–58D Kiowa Warrior helicopter that has been used extensively in Iraq and Afghanistan. As most of you know, it is an older aircraft. We are investing now in both cockpit upgrades and sensor and safety measures to keep that aircraft a contributing member of the fleet until 2025.

We also have efforts to lighten the soldiers load. Improvements to the outer tactical vest to lower the weight, fielding plate carriers that are lighter in weight, but give the soldiers in Eastern Afghanistan in particular, better ability to climb the hills and deal with the altitude.

We're finally divesting our oldest equipment. Last December, we finally divested the last UH1 Huey helicopter, a vintage performer from Vietnam. The last one went out of the Active Force and Active units in December. Within 2 years, we'll divest the last M35, a 2½ ton truck, currently known as the deuce-and-a-half. That will be out of the inventory by the end of fiscal year 2011.

The last aspect of our modernization strategy is to field in accordance with Army priorities and the Army force generation cycle. In the past, we used to have two tiered units. So if you were in the Active component you were equipped and armed better than the Reserve component was.

Today, and in this published and approved doctrine that went back to last October, the Army recognizes that Reserve components are doing the same kinds of missions as the Active component. Every unit now is equipped for the mission they're facing. If you're deploying overseas you're equipped the same if you're Active or Reserve. If you have a homeland defense mission you're equipped for that homeland defense mission, and we take that very, very seriously.

Finally, if I could speak for a minute about the BCT modernization strategy. It has four elements, and it's probably the most important part of our modernization strategy.

Those elements include things like incorporating the MRAP vehicles and the MRAP all-terrain vehicles into our fleet. We have a plan to do that, and that's been approved by the Secretary of Defense.

The next step and one of the most important is incremental improvements to our network. We find that the network is a key capability. At a seminar yesterday with multiple brigade commanders they echoed the importance of improvements to the network, getting the network down to commanders on the move, getting wide

band capability down to the individual soldiers and talked repeatedly about how much of a difference that makes. If we can get the network to work amazing things will happen as a result they assured me again yesterday.

The third part is the GCV. We think we need this to provide a versatile range of capabilities that include things like force protection that we currently don't have, off road mobility, urban operational mobility, and the space, weight, and power to deal with the network and other things that we have to load onto vehicles today and the plan for the GCVs to field that in 7 years. We're comfortable explaining the way ahead in that approach.

The very last part of the BCT modernization is the fielding of capability packages to our infantry BCTs. As you mentioned, Senator, these are the FCS technological spin-outs. They were tested last year in the second of a four-stage test.

They were shown to have a number of challenges both in size and weight. Meantime between failure you'll find that we agree with the findings that came from DOT&E and GAO in this regard that there is plenty of work to be done. Where we probably disagree is the way ahead.

We think that there's probably very little risk in proceeding ahead of time. We think this way primarily because we've demonstrated in the past that if a system or capability doesn't meet with our soldiers' need we have willingly taken that off the table. Examples include the class 4 UAV and the Multifunction Utility/Logistics Equipment automated robotic vehicle didn't meet the Army's needs in a cost benefit way and we've taken them off.

We pledge to you that we'll do the same thing. If equipment is not ready to put in the hands of soldiers, we won't put it in the hands of soldiers.

In closing, in support of Army modernization, the Army submitted a research, development, and acquisition budget request of $31.7 billion for fiscal year 2011. We believe that this budget appropriately allocates resources between bridging advanced technologies to our soldiers for the warfight today and to develop new technologies and new capabilities to bring the required capabilities of our soldiers in the future.

Mr. Chairman, Senator Thune, and members of the subcommittee, on behalf of our soldiers and their families we greatly appreciate the tremendous support that we receive from this Congress and the American people. We don't take that for granted. In order to successfully implement the plans we've shared with you today we urge this same continued support in the future. Providing all of America's sons and daughters who serve in our Army the most capable equipment for the battles they are fighting today and are likely to face in the future are the responsibility that the Army takes seriously and is committed to accomplishing.

Thank you for your time.

[The joint prepared statement of General Lennox and General Phillips follows:]

JOINT PREPARED STATEMENT BY LTG ROBERT P. LENNOX, USA, AND LTG WILLIAM N. PHILLIPS, USA

## INTRODUCTION

Chairman Lieberman, Senator Thune, and distinguished members of the Subcommittee on Airland, we thank you for this opportunity to discuss Army Modernization Programs in the fiscal year 2011 budget request. We are pleased to represent Army leadership, members of the Army acquisition workforce, and the more than 1 million courageous men and women in uniform who have deployed to combat over the last 8 years and who have relied on us to provide them with world-class weapon systems and equipment for mission success. We thank the members of this committee for your steadfast support and shared commitment to this goal.

We will open today's statement by providing an overview of the Army modernization strategy, using current program initiatives to illustrate our plan. We will then elaborate on specific systems on which you have asked us to focus, and our testimony will conclude with a discussion of the requirements process.

## WHY THE ARMY NEEDS TO MODERNIZE

The 2010 Army Modernization Strategy is consistent with DOD's High Priority Performance Goals in the President's fiscal year 2011 Budget's Analytic Perspectives volume, and follows the guidance of the Secretary of the Army and Chief of Staff, who have provided us with imperatives and goals to address the two major challenges facing the Army: Restoring Balance to our Force and Setting Conditions for the Future.

Two of the imperatives for restoring balance confer upon us the obligation to modernize our equipment base to ensure victory on today's and tomorrow's battlefields.

- Preparing our soldiers for success in the current conflict directs us to identify rapidly and fill those capability gaps identified as critical to the warfighters currently engaged in operations. In this sense, modernization is mandated in support of winning the current fight and directing new capabilities be brought to the current battlefield to close specific capability gaps. Examples of modernization in this sense include:
  - Increasing the quantity and capabilities of our aviation fleet in response to the increasing reliance on those assets in Iraq and Afghanistan. In fiscal year 2011, we plan to begin the investment that will lead to the stand up of the 13th Combat Aviation Brigade (CAB), and;
  - Accelerating Intelligence, Surveillance and Reconnaissance (ISR) programs due to the significant contributions they are making to counterinsurgency fights. We intend to accelerate the Extended-Range Multi-Purpose Unmanned Aerial System (UAS) to capitalize on the power of combining full motion video and signals intelligence, as well as manned-unmanned teaming.
- Transforming to meet the demands of the 21st century requires us to resist focusing completely on the type of warfare we face today—counterinsurgency—and hedge against other potential types of missions awaiting our soldiers in the future. In this sense, modernization is critical in preparing our Army for any mission we might be called upon to do, investing in and developing the required capabilities, and fielding these capabilities to our soldiers through a comprehensive, feasible, and affordable plan. Some examples of modernization in this regard include:
  - The development of the Army Integrated Air and Missile Defense system. This program will enhance the capability of our ground-based Air and Missile Defense units. Enabling us to conduct beyond line-of-sight engagements, allowing us to protect a greater number of defended assets, changing our employment techniques/doctrine by enabling point versus area defense, while improving capability against a wide range of threats. This will be developed as an integral part of the joint air and missile defense architecture, and;
  - The upgrade of the Army's self-propelled artillery fleet, the Paladin, through the Paladin Integrated Management program. This program will increase the capability of the system by replacing the automotive and suspension components with Bradley-like components, which are in common with many of the other combat vehicles in the Heavy Brigade Combat Team (HBCT) formation.

In parallel with these Restoring Balance imperatives, Setting Conditions for the Future provides reinforcing guidance in answering the two fundamental questions of why and how the Army needs to modernize.

Setting Conditions for the Future requires all elements of the Army to be synchronized—organizing, manning, training, and equipping. However, there are some specific elements of that goal that influences Army Modernization. Specifically, as the Army Chief of Staff has said, we want an Army that is, " . . . a versatile mix . . . of networked organizations . . . equipped and ready [for] full spectrum operations to hedge against unexpected contingencies."

To achieve this goal, our Modernization strategy must provide a balanced set of capabilities, ensuring that the most important capability gaps are closed as fast as possible, so an adversary cannot circumvent our relative strengths to exploit a relative weakness.

## HOW THE ARMY WILL MODERNIZE

The Army will accomplish our modernization goals by focusing on three major lines of effort:

The first major line of effort is developing and fielding new capabilities to meet identified capability gaps through traditional and rapid acquisition processes. To maintain our advantage over current, emerging, and future threats, the Army must provide our soldiers with the equipment they need. The Army must accurately identify capability gaps and consequently develop viable solutions for the soldier and incrementally field enduring capabilities across the force.

The primary element of this line of effort is the implementation of the Brigade Combat Team (BCT) Modernization Plan, which was approved by the Secretary of Defense in November of 2009. This plan enables incremental improvements to the network, integrates Mine Resistant Ambush Protected Vehicles (MRAPs) into formations, incrementally fields capability packages to the Infantry Brigade Combat Team, and develops a new manned Ground Combat Vehicle. We will discuss this plan in greater detail later in this statement.

Other elements of this first line of effort include leveraging breakthroughs from the Army's Science and Technology Program and shortening the time between identification of a requirement and delivery of the solution, by optimizing and supporting the Capabilities Development Rapid Transition (CDRT) process.

The second major line of effort in the Army's Modernization Strategy is the continuous modernization of equipment to meet current and future capability needs through upgrade, replacement, recapitalization, refurbishment, and technology insertions. This effort focuses on how we intend to keep Army equipment relevant and capable for the foreseeable future.

The most important element of this line of effort is the development and continuous refinement of a comprehensive investment strategy that integrates affordable portfolio strategies for selected fleets of equipment. These portfolios include Fighting Vehicles; Aircraft; Tactical Wheeled Vehicles (TWV); Battle Command (BC) and Networks; and ISR. Integrated Portfolio Strategies will provide a long-term plan for the management of fleets and resources to achieve Army goals and objectives over time.

Important elements of this second line of effort also include developing processes to make fleet sustainment decisions routinely based on cost benefit analysis and capitalizing on technology base initiatives.

The third major line of effort in our Modernization Strategy is meeting the needs of our force through Army priorities and Army Force Generation (ARFORGEN), the Army's rotational readiness model. This effort allows us to determine the objective levels of modernization within our fleets of equipment, revealing the optimal amount of modernization needed, when it will be needed and by whom.

Supporting elements to this line of effort also include updating the 2009 Army Equipping Strategy, that incorporates lessons learned from combat, including inputs from the field, and taking into account the change to the strategic and fiscal landscapes. Finally, establishing Theater Provided Equipment in Afghanistan will allow us to provide the forces deployed there with the best available equipment, while at the same time reducing the cost and risk involved in the repetitive transportation of unit equipment to and from Afghanistan.

## THE CORNERSTONE OF ARMY MODERNIZATION—THE BRIGADE COMBAT TEAM MODERNIZATION STRATEGY

In April 2009, Secretary of Defense Robert M. Gates provided guidance and directed the Army to "accelerate the initial increment of the program to spin out technology enhancements to all combat brigades" and noted the lack of a clear role for MRAP in the current vehicle programs. The Army was further directed to "cancel

the vehicle component of the current Future Combat System (FCS) program, re-evaluate the requirements, technology, and approach—and then re-launch the Army's vehicle modernization program . . . ." The Army saw this as an opportunity and has shaped the Army's new approach to BCT Modernization.

Following the Secretary of Defense's April 2009 decisions, the Army directed the U.S. Army Training and Doctrine Command (TRADOC) to develop recommendations to modernize our BCTs incrementally and to determine the operational requirements for a new Ground Combat Vehicle. In response, TRADOC established Task Force 120 (TF 120) which evaluated the Army's short- and long-term modernization requirements to ensure proposed solutions mitigated the Army's highest risk capability gaps. TF 120 delivered its recommendations to senior Army leaders in early September 2009, which focused on capability packages, Ground Combat Vehicle operational requirements, and BCT network integrated architecture. These recommendations form the basis for the incremental modernization of all the Army's BCTs.

Subsequently, in November 2009, the Secretary of Defense approved the Army's BCT Modernization Plan which:

- Enables incremental improvements to the Army BC Network;
- Incorporates MRAP vehicles into the force;
- Accelerates the fielding of Capability Packages to all BCTs by 2025;
- Develops a new manned Ground Combat Vehicle within 7 years.

*Battle Command Network Improvements*

The Army BC Network will improve our situational awareness and collaborative planning capabilities by sharing essential information from an integrated platform or a disconnected soldier to their command post. Network modernization utilizes two primary transport programs which will incrementally move the Army to a single and expanding Army BC Network: Warfighter Information Network-Tactical (WIN–T) and Joint Tactical Radio System (JTRS). WIN–T is the backbone for the Army's transport modernization strategy and will be fielded in three increments. increment 1 provides reach-back capabilities to Battalion Command Posts and fielding is almost completed. Increment two provides an initial on-the-move transport capability including real-time imagery to BCT and Battalion Commanders and Beyond Line-of-Sight services to the BCT Company level and is scheduled for initial fielding in fiscal year 2012. Increment three expands on-the-move capabilities and adds an aerial tier vastly improving network reach, redundancy, and management.

*Incorporating Mine Resistant Ambush Protected Vehicles*

The success of the MRAP family of vehicles in Iraq and Afghanistan demonstrates the critical need for integration of these types of capabilities in all of the Army formations and as a part of the overall manned ground vehicle strategy for the future. The Army will establish 20 sets of MRAPs tailored to BCTs and available for their employment while in the available phase of the ARFORGEN cycle, and ensure MRAPs are available for home station training and in the institutional training base. In select enabler units (sustainment brigades, medical, route clearance, and explosive ordinance units) MRAPs will take the place of some organic vehicles. The Army will also maintain MRAPs, including the newest variant the MRAP-All Terrain Vehicle, in operational float and war reserve stocks.

*Accelerating the Fielding of Capability Packages to All BCTs*

Capability Packages are specifically designed to fill gaps and mitigate risk, align with the Program Objective Memorandum, and deliver new capabilities in 2-year increments in support of ARFORGEN. The Capability Package concept recommends BCT modernization priorities, addresses current and expected BCT high-risk capability gaps, and is fielded and funded over specific 2-year timeframes as complete packages or sub-packages based on soldier needs, technological advances, and available resources. The Army's BCT Modernization plan accelerates the fielding of Capability Packages to 29 BCTs through fiscal year 2016 and to all BCTs by fiscal year 2025.

The capabilities scheduled for delivery to the first BCT in fiscal year 2011–2012 are in the final test and evaluation phases, but we acknowledge the process has identified several shortfalls and some reliability issues. We are cognizant of the risks going forward, but also aware of the importance of fielding integrated networked systems to the current warfighter. The program managers along with industry partners are working to correct these issues and integrate fixes for the second round of testing in 2010 and the final round of testing, called the Initial Operational Test and Evaluation, in 2011. The Army, along with OSD, will closely mon-

itor progress toward correcting these problems and continue to assess the program at reviews later this year to ensure these systems meet warfighter needs.

These capabilities will provide commanders with an increased ISR capability in the Class I Unmanned Aerial Vehicle (UAV), Unmanned Ground Sensors, and Small Unmanned Ground Vehicles, and integrated network capabilities that link the soldier to headquarters in Network Integration Kits.

Future Capability Packages will address identified capability gaps across the force, leveraging mature technologies and resources to the soldier. TRADOC's Capability Package development process, beginning with the annual capability needs analysis, ensures the timely identification, analysis, selection, and prioritization of viable solutions for inclusion in incremental capability packages. Future Capability Packages may include upgrades to capabilities scheduled for fielding in fiscal year 2013 and fiscal year 2014, such as a common controller for all unmanned vehicles, both air and ground, as well as a new variant of an unmanned ground vehicle, which will provide additional force protection capabilities. A continuous review of capability needs and an incremental delivery approach of solutions will ensure our units and soldiers are equipped with the most advanced technologies our Nation's resources can provide to meet current operational requirements.

*Developing a New Manned Ground Combat Vehicle*

To inform the Ground Combat Vehicle operational requirements development effort, the Army sponsored a Ground Combat Vehicle Blue Ribbon Panel which received input from Joint-Service partners, retired general officers, think tank analysts, representatives from the Office of the Secretary of Defense, Army soldiers, and leaders with a wide range of operational experience. Additional input from commanders and soldiers with recent combat experience in Iraq and Afghanistan was critical in identifying characteristics and features needed in the new Ground Combat Vehicle.

The new platform will provide a versatile range of capabilities, including the under-belly protection offered by MRAP, the off-road mobility and side protection of the Bradley Fighting Vehicle, and the urban and operational mobility of the Stryker. It will include precision lethality to enable decisive results while maintaining overmatch against like systems, and integrate the network to maintain situational awareness in urban and other operations. While the new vehicle will provide sufficient space and electrical power to accept the network, it will also have growth potential to ensure the ability to integrate upgrades and new technologies. The Ground Combat Vehicle's development approach enables production of the first vehicle by fiscal year 2017, while establishing a basis from which to adapt. Capabilities incorporated in subsequent increments will be based on changes in the operational environment and enabled by maturation of emerging technologies.

PROGRAMMATIC UPDATES

As requested by the committee, we are providing specific updates on several programs. Each of these programs contribute to the intent of Army Modernization—to develop and field an affordable mix of the best equipment available to allow soldiers and units to succeed in both today's and tomorrow's full spectrum military operations. Materiel modernization provides new and improved capabilities to soldiers that enable them to accomplish their missions and maintain overmatch against the enemy.

The Increment 1 Early-Infantry Brigade Combat Team (E–IBCT) completed the fiscal year 2009 Limited User Test (LUT) in September 2009, and completed a successful Milestone C Low Rate Initial Production (LRIP) decision at the December 2009 Defense Acquisition Board (DAB) meeting. The Defense Acquisition Executive approved the initial LRIP procurement of one BCT set of Increment 1 systems. Follow-on DAB In-Progress Reviews are planned for later this year to assess continued development progress, supporting the procurement of second and third BCT sets. Additional technical and operational testing is planned for 2010 to support the December 2010 DAB decision. Technical Testing begins in May 2010 and culminates in a September 2010 LUT. The Army awarded the LRIP contract for the initial Brigade on February 24, 2010. Increment 1 systems included in the LRIP contract are: The Network Integration Kit, Class I Unmanned Arial System, Small Unmanned Ground Vehicle, Urban-Unattended Ground Sensors, and Tactical-Unattended Ground Sensors. The NLOS–LS completed the flight LUT in February 2010. The results of this LUT indicate additional work is needed on the NLOS–LS missile. An evaluation of the NLOS–LS acquisition options is ongoing with a Path Forward decision expected in the third quarter 2010.

The Ground Combat Vehicle is the Army's next-generation Infantry Fighting Vehicle, combining lessons learned from the survivability of the MRAP vehicle, the tac-

tical mobility of the Bradley Fighting Vehicle and the operational mobility of the Stryker. The Army released a Request for Proposals (RFP) on February 25, 2010, for the Technology Development phase of the Ground Combat Vehicle effort. The first combat vehicle designed from the ground up to operate in an Improvised Explosive Device (IED) environment, the Ground Combat Vehicle will have enhanced mobility that will allow it to operate effectively in both urban and off-road environments. It will be designed to host the Army's network. It will have the capacity available to accept future upgrades incrementally as technologies mature and threats change. Because of the pace of change and the operational environment, the Army is pursuing a Ground Combat Vehicle program timeline that provides the first production vehicles in 7 years.

The UH–60 Black Hawk is the work horse of Army Aviation. The current UH–60 fleet is comprised of 1,833 aircraft, including 921 UH–60As (produced between 1978 and 1989), 718 UH–60L/Ks (produced since 1989), and 194 new UH/HH–60Ms. The Black Hawk helicopter is in its 33rd year of production. To date, the Army has employed seven multi-year, multi-service production contracts. The current contract extends from fiscal year 2007 to fiscal year 2011 and includes Navy H–60 aircraft, as well as Foreign Military Sales aircraft. The Army is negotiating a follow on multiservice contract this year.

The ongoing UH–60A to UH–60L recapitalization program extends the service life of the Black Hawk program, while providing the improved capability and safety margin of the UH–60L. The Army plans to induct 48 aircraft in fiscal year 2010 and 240 aircraft between fiscal year 2011 and fiscal year 2016. The UH–60M program incorporates a digitized cockpit for improved combat situational awareness, lift, range, and handling characteristics for enhanced maneuverability and safety. These improvements also extend the service life of the aircraft. The Army plans to improve the safety of the UH–60M platform with a Preplanned Product Improvement technology. Additionally, the Army is pursuing an Improved Turbine Engine Program, currently in Science and Technology, that will be common across the UH–60 Black Hawk and AH–64 Apache fleets.

Stryker has planned procurement of 3,953 vehicles with 3,149 having been accepted as of January 31, 2010. These vehicles support eight Stryker Brigade Combat Teams, with the eighth SBCT being fielded in fiscal year 2011 at Fort Bliss, TX; a Stryker Theater Provided Equipment set supporting the Afghanistan theater; a strategic pool of ready-to-fight systems; Institutional Training Base; Test Articles; a Depot Repair Cycle Float Pool managed by the U.S. Army Materiel Command; and other operational requirements. Stryker vehicles have operated more than 24 million miles in combat while maintaining well above required operational readiness rates. The Stryker program received a Full Rate Production decision on 8 of 10 configuration variants, including the Infantry Carrier Vehicle, Reconnaissance Vehicle, Commander Vehicle, Mortar Carrier Vehicle, Fire Support Vehicle, Anti-tank Guided Missile Vehicle, Engineer Squad Vehicle, and Medical Evacuation Vehicle. The remaining variants—the Nuclear, Biological and Chemical Reconnaissance Vehicle and the Mobile Gun System—are in Limited Rate Production.

The Army has continually improved the survivability of the Stryker vehicle to meet evolving threats. The most current enhancement being evaluated is a Double V hull integrated into the current vehicle platform that could potentially provide MRAP-level protection against Improvised Explosive Devices. A directed requirement has been approved and the Army will build and test a limited number of prototype Stryker vehicles integrating the Double V hull design. Pending independent assessment, a further decision will be made whether to incorporate this design onto Stryker vehicles supporting our operations in Afghanistan.

As mentioned above, the Stryker Mobile Gun System (MGS) is in Limited Rate Production with a Full Rate Production decision expected in April 2011. MGS is designed to provide direct supporting fires to assault infantry in order to destroy or suppress hardened enemy bunkers, machine gun positions and sniper positions in urban, restricted and open, rolling terrain with its 105mm "shoot on the move" turreted gun and autoloader system. The MGS is an essential component of the Stryker Brigade Combat Team and provides the organic combined arms lethality and enhanced operational flexibility necessary in today's fact paced threat environment.

With regard to existing vehicle upgrades, the Army's combat platform modernization program is focused on standardizing 31 HBCT sets with 2 variants of the Abrams tank and Bradley Infantry Fighting Vehicle, 2 of the Army's highest priority combat vehicle recapitalization programs. This modernization will provide 26 operational HBCT equivalents and 5 strategic HBCT equivalents. At present, the Army has nearly completed fielding modularized HBCTs, which gives every brigade a common structure. The short-term modernization goal is to populate these brigades with only two variants of the Abrams and the Bradley—the Abrams

M1A2SEP v2 is being paired with its partner, the Bradley M2A3, and the Abrams M1A1AIM SA is being teamed with the Bradley M2A2ODS SA. The modular HBCT force structure will be equipped with the two variant Abrams and Bradley fleet by the end of 2013. This modernization plan aligns compatible combat platforms with common modular formations.

The Joint Tactical Radio System (JTRS) is a Department of Defense (DOD) initiative to develop a family of software-programmable tactical radios that provide mobile, interoperable, and networked voice, data, and video communications at the tactical edge of the battlefield. JTRS development is 85 percent complete. For the Army, JTRS will provide a tactical radio communications network for Infantry, Heavy, and Stryker Brigade Combat Teams by providing the tactical networking transport capability through scalable and modular networked communications. It will also provide the current force a mobile, ad hoc networking capability using new advanced waveforms—Soldier Radio Waveform and Wideband Networking Waveform. The majority of the radios in the Ground Mobile Radio (GMR) Program and the Handheld, Man-pack and Small Form Fit (HMS) Program will be procured for the Army.

The GMR will provide the Army a multi-channel (up to four channels) operation, allowing full functionality of each legacy radio it replaces. In addition, GMR will include an integrated global positioning system (GPS) capability based on the Selective Availability Anti-Spoofing Module-based GPS receiver with a Precise Time and Time Interval output. Today, GMR production representative systems are being manufactured which will participate in E–IBCT LUT. The GMR will enter LRIP in the second quarter of fiscal year 2011.

The HMS will provide a scalable and modular Software Communications Architecture compliant networked radio frequency communication capability to meet Army Handheld, Man-pack (Mounted & Dismounted) and Embedded Radio requirements. The program will deliver a Handheld (two Channel) radio, a Man-pack (two Channel) radio, and various Small Form Fit radios for various ground sensors, unattended vehicles, and unmanned air vehicles. The HMS will enter LRIP this year and begin delivering to our soldiers in fiscal year 2011.

THE REQUIREMENTS PROCESS AND REFORM INITIATIVES

The Army has developed and refined a dynamic, flexible process to review, validate, resource, and acquire critical warfighting capabilities rapidly to meet operational needs while minimizing risk through due diligence. This accelerated process complements the standard, more deliberate Joint Capabilities Integration and Development System that is generally used for requirements determination. It capitalizes on "real time" feedback from commanders in the field and, through its improved responsiveness, has significantly enhanced operations in Iraq and Afghanistan.

The Army prides itself as a learning organization and continues to make a concerted effort to codify the positive refinements in its processes that we have made during the prolonged conflicts in Iraq and Afghanistan. In keeping with this trend, this accelerated process for validation of operational needs has been documented in the latest update of Army Regulation 71–9, Warfighting Capabilities Determination, published on December 28, 2009.

*Operational Needs Statement and Joint Urgent Needs Statements*

The Chief of Staff of the Army's vision to "build a versatile mix of tailorable and networked organizations, operating on a rotational cycle, to provide a sustained flow of trained and ready forces for full spectrum operations and to hedge against unexpected contingencies at a sustainable tempo for our All-Volunteer Force" is supported by an accelerated requirements review and decision process used for evaluating and fulfilling operational needs statements (ONS) and joint urgent operational need statements (JUONS). This accelerated process provides a high degree of tailorability and increased versatility to our efforts to provide materiel capabilities for deployed and deploying commanders and units.

Following mission analysis based on battlefield experiences, operational commanders use the ONS and JUONS process to identify materiel shortfalls in their current organizations that, if remedied, could correct a deficiency or improve a capability that enhances mission accomplishment. The ONS is particularly useful to support Army units that are assigned "nonstandard" missions for which they are not normally equipped.

The ONS and JUONS requests can be made for either nonstandard capabilities that can be procured from commercially available items or for quantities of standard Army equipment that exceed the organization's authorization. Additionally, the ONS provides a mechanism for commanders to request new capabilities that do not currently exist within the Army.

Army commanders submit ONS through the chain of command to the Army Staff for review and approval, while JUONS are submitted through the chain of command to the Joint Staff for approval. Since the beginning of the current conflicts, 98 percent of urgent operational needs identified by Army commanders have been submitted using ONS, while 2 percent have been submitted using the JUONS. The majority of ONS received from Army commanders are for increases in standard Army capabilities or equipment while the majority of JUONS are for new capabilities or equipment that do not exist in current Army materiel inventories. In 2009, commanders requested more than 6,000 separate types of equipment through approximately 2,500 ONS. The rapid fielding of MRAPS to Iraq and Afghanistan is an example of capabilities provided rapidly through a JUONS. The increase in basis of issue for night vision goggles and the provision of hand held radios to deployed units are examples of capabilities fielded rapidly through ONS.

*Accelerated Requirements*

In addition to streamlining the process for identifying operational needs rapidly, the Army has established procedures to deliver capabilities rapidly to units deployed to Afghanistan and Iraq by modifying the requirements validation, funding, and acquisition processes associated with these urgent needs. As you may suspect, the Army is forced to accept a slightly higher degree of risk regarding system integration when performing these activities in parallel. To mitigate and manage the risk, we have developed and use a senior leader decisionmaking forum known as the Army Requirements and Resourcing Board (AR2B) to inform our actions through this process. The AR2B synchronizes the assessment, validation, resourcing, and sourcing of urgent capabilities within the Department. The AR2B coordinates weekly with theater to prioritize efforts and to insure capabilities being developed meet evolving theater operational needs. The flexibility granted from Congress concerning reprogramming of funds has been instrumental to the success of this forum.

The Army is tackling unique integration challenges responding to urgent needs identified by commanders in Afghanistan. The relatively primitive infrastructure of Afghanistan and the restricted lines of communication through which materiel must flow into the theater is causing us to pay greater attention in synchronizing the delivery of capabilities, logistics, training, and manning considerations of accelerated acquisition programs than we had in the past when dealing with requests originating out of Iraq. For example, in Iraq where we had the advantage of an established infrastructure, the Army was able to rapidly field and integrate into the force more than thirty variants of the MRAPs. A priority of Afghanistan is reducing the number of logistics requirements by having as few variants as possible. For this reason, the staff is being more deliberate in its decisionmaking to ensure that fielded capabilities are supportable.

*Transition of Rapidly Acquired Capability*

To capitalize fully on the accelerated process, the Army developed institutional processes designed to integrate proven wartime capabilities into the Army's standard materiel management system. This work is accomplished through the Army Centers for Lesson Learned and through the CDRT process. The Army uses unit commander feedback and TRADOC assessments to develop recommendations on whether a wartime capability should be transitioned to an enduring Army capability. Examples of capabilities recommended as enduring capabilities through the CDRT process include the Tactical Ground Reporting (TIGR) System and the Green Laser Dazzler. The TIGR system improves situational awareness and facilitates collaboration at the company level by enabling the collection and dissemination of fine-grained intelligence on people, places, and insurgent activity. The Green Laser Dazzler is a non-lethal weapon used to create temporary vision impairment to stop someone from advancing.

*Reform Initiatives for the Deliberate Process*

From a requirements point of view, and consistent with DOD's High Priority Performance Goals in the President's fiscal year 2011 Budget's Analytic Perspectives volume, the Army is implementing the Weapon Systems Reform Act of 2009 through the management of more comprehensive Analysis of Alternatives (AoA), Configuration Steering Boards (CSBs), and Capability Portfolio Reviews (CPRs). The Army is working closely with OSD—Cost Assessment and Program Evaluation to develop AoA guidance, with special emphasis on costs and benefits, and to review AoA products. The Army is conducting CSBs regularly to review requirements and to determine the status of programs. The Army senior leadership is conducting Army-wide, all-component, CPRs to review requirements and priorities holistically and make recommendations to revalidate, modify or drop requirements. The objective is to en-

sure that funds are programmed, budgeted, and executed against validated requirements that are cost and risk-informed.

The Army has demonstrated great flexibility in adjusting its requirements review and development processes to be more effective in the contemporary operating environment. After several years of refinement, the Army has a process that reviews, validates, resources, and acquires critical warfighting capabilities rapidly to meet commanders operational needs while maintaining the good stewardship expected of our institution. We have been able to find the balance in making institutional processes more responsive while minimizing operational risk through due diligence. Lastly, the Army is also ensuring that the investment in materiel for the current conflicts is leveraged and incorporated into its long-term equipping strategy.

IN CLOSING

In support of Army Modernization, the Army has submitted a research, development, and acquisition budget request of $31.7 billion for fiscal year 2011. We believe that this budget allocates resources appropriately between bringing advanced technologies to our soldiers currently in the fight and developing new technologies to bring the required capabilities to our soldiers in the future. As such, we meet our leadership's intent of concurrently preparing our soldiers for success in the current conflict and transforming to meet the demands of the 21st century.

Mr. Chairman, Senator Thune, and members of the committee, on behalf of our soldiers, we greatly appreciate the tremendous support we receive from this Congress and the American people. We urge you to provide full, timely, and predictable funding to implement the plans we have shared with you today successfully. The Army is modernizing, seeking to restore balance while setting conditions for the future. Our goal is to balance current and future requirements and risks to make certain that we can defend the Nation—today and tomorrow.

Senator LIEBERMAN. Thank you, General. Well said.

General Phillips, welcome.

## STATEMENT OF LTG WILLIAM N. PHILLIPS, USA, PRINCIPAL MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS, AND TECHNOLOGY, AND DIRECTOR, ACQUISITION CAREER MANAGEMENT

General PHILLIPS. Sir, thank you. Chairman Lieberman, Senator Thune, and distinguished members of the subcommittee, I do not have an opening statement. But I just have some quick thoughts for you, and I'll echo what General Lennox has said.

First of all, it's an honor for me to be here with this distinguished panel. Sir, on behalf of all our soldiers and their families, I want to thank you for the great work that this committee, and quite frankly, the American taxpayer does to provide our Army and our Armed Forces world-class equipment for our soldiers.

I just came back from a tour in Iraq. I watched our soldiers operate on the field of battle with great distinction and excellence. I would borrow the words that you just said, with great professionalism and extraordinary courage. So I thank you and this committee for what you do for our soldiers.

I look forward to your questions, sir.

Senator LIEBERMAN. Thanks, General. That was very kind of you to say.

Michael Sullivan, welcome.

## STATEMENT OF MICHAEL J. SULLIVAN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. SULLIVAN. Thank you, Mr. Chairman, Ranking Member Thune, members of the subcommittee. It's my pleasure to be here with you today to discuss the current status of the Army's mod-

ernization efforts since the Secretary of Defense's decision to restructure the FCS program back in April. My testimony will focus on current challenges and opportunities for the Army in moving forward with its acquisition plans including its current contracting activity, our views on the status of the initial BCT increments, and our views on the GCV development effort.

For the time being the Army is continuing development of the initial BCT equipment and the supporting network under the modified FCS development contract. It has also awarded a contract to procure long lead items for the BCT equipment procurement and has issued a modification to that contract to begin low rate production.

With regard to the status of the development program for the initial increment, recent testing revealed significant reliability problems during a recent series of tests designed to prove capabilities in the field. Systems proved unable to perform as accepted and fell far short of current reliability thresholds. Five of the systems are currently being redesigned and will undergo further testing over the coming months.

In light of these issues, as General Lennox stated, we are concerned that the Army's production decision that was approved by the Department may be too risky at this time. The Army is proceeding with procurement despite having acknowledged that systems are in some cases immature, still not reliable, and cannot perform as required in the field. The decision to move into production with this risk is a variance with DOD's acquisition policy and best practices that emphasize knowledge based and incremental product development and production.

As a result, we recommended that the Army correct all of the maturity and reliability issues with that initial increment that testing has or will identify before the Department approves any additional production lots after this one and before any of these systems are fielded. The Army did agree with that recommendation as the General stated.

We also looked at the GCV development program, and our views on that are slightly more optimistic at this point. It's very early in that program. I think the key to success on that program at this point will be to keep agreed upon requirements in line with the resources that are available. That being time, of course, 7 years to deliver money and technologies that are available today.

The Department made a material development decision this February. The Army is planning to award multiple contracts to begin technology development September 2010. It's proposing the use of competitive prototyping during technology development which is something we like to see.

We think that reduces risk, and we think that will emphasize mature technologies. It's also planning a preliminary design review that will validate contractor readiness to begin product development sometime in fiscal year 2013.

So we think they're taking their time at the right time to ensure that the requirements can be delivered with mature technologies. Current plans are to deliver the initial GCV in late fiscal year 2017, which is a fairly quick developmental period. But if done

properly and they keep an eye on the requirements and level those with the available technologies, it probably is doable.

Mr. Chairman, as you can see the current post-FCS modernization environment is mixed and still taking form. It's important to note that when added up ongoing development and procurement funding for the BCT increments and development funding for the GCV represents about $24 billion in the Army's planned budget from 2011 to 2015. With that amount of money on the line it's critical to get things right at this time.

That is why we also recommended in our report that was issued in March that the Army report to Congress by the end of this fiscal year the full details of its new modernization acquisition strategy including plans for program management and contracting. Again, the Army agreed with that recommendation and said they would deliver that.

Mr. Chairman, that completes my statement. I'd be happy to answer any questions.

[The prepared statement of Mr. Sullivan follows:]

PREPARED STATEMENT BY MICHAEL J. SULLIVAN

Mr. Chairman and members of the subcommittee:

I am pleased to be here today to discuss some of the Department of the Army's ground force modernization efforts as it moves away from the now-canceled Future Combat System (FCS) program. My statement today is based on the work we conducted over the last year in response to a request from the Subcommittee on Air and Land Forces, House Committee on Armed Services. This statement focuses on the Army's post-FCS acquisition plans. In particular, it emphasizes the December 2009 decision to begin low-rate initial production for Increment 1 of the Brigade Combat Team Modernization. Our recent report on the Army's ground force modernization efforts provides additional information on the Army's efforts.[1]

This statement is based on work we conducted from March 2009 through March 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

BACKGROUND

Since it started development in 2003, FCS has been at the center of the Army's efforts to modernize into a lighter, more agile, and more capable combat force. The FCS concept involved replacing existing combat systems with a family of manned and unmanned vehicles and systems linked by an advanced information network. The Army anticipated that the FCS systems, along with the soldier and enabling complementary systems, would work together in a system of systems wherein the whole provided greater capability than the sum of the individual parts. The Army expected to develop this equipment in 10 years, procure it over 13 years, and field it to 15 FCS-unique brigades—about one-third of the Active Force at that time. The Army also had planned to spin out selected FCS technologies and systems to current Army forces throughout the system development and demonstration phase.

As we reported in 2009,[2] the FCS program was immature and unable to meet the Department of Defense's (DOD) own standards for technology and design from the start. Although adjustments were made, such as adding time and reducing requirements, vehicle weights and software code grew, key network systems were delayed, and technologies took longer to mature than anticipated (see fig. 1). By 2009, after an investment of 6 years and an estimated $18 billion, the viability of the FCS concept was still unknown. As such, we concluded that the maturity of the development

[1] Government Accountability Office (GAO), Defense Acquisitions: Opportunities Exist to Position Army's Ground Force Modernization Efforts for Success, GAO–10–406 (Washington, DC: Mar. 15, 2010).

[2] GAO, Defense Acquisitions: Decisions Needed to Shape Army's Combat Systems for the Future, GAO–09–288 (Washington, DC: Mar. 12, 2009).

efforts was insufficient and the program could not be developed and produced within existing resources.

**Figure 1: FCS Acquisition Program (2003 vs. 2009)**

| | 2003 | 2009 | |
|---|---|---|---|
| Cost estimate (Fiscal year 2009 billions of dollars) | Research and development: $20.9 | Research and development: $29.0 | $8.1 billion increase |
| | Procurement: $68.2 | Procurement: $129.3 | $61.1 billion increase |
| | Total: $89.8 | Total: $159.3 | $69.5 billion increase |
| Schedule (Development start to initial operational capability) | 7 yr 6 mo | 12 yr 3 mo | Over 4-1/2 years added |
| Requirements | Undefined | System-level requirements not matched with emerging designs | Persistent gaps |
| Software lines of code | 34 million | 114 million + | Tripled in size |
| Projected maturity date of critical technologies[a] | 2006 | 2009 | 3 years added |

Sources: DOD (data); GAO (analysis and presentation).

[a]For FCS, the Army projected maturity based on a Technology Readiness Level 6, which is a representative model or prototype that has been tested in a relevant environment, but requires additional work for the appropriate form, fit, and function. Based on our best practices work, technologies that have reached a Technology Readiness Level 7, a prototype demonstrated in a realistic environment, are mature.

In April 2009, the Secretary of Defense proposed a significant restructuring of the FCS program to lower risk and address more near-term combat needs. The Secretary noted significant concerns that the FCS program's vehicle designs—where greater information awareness was expected to compensate for less armor, resulting in lower weight and higher fuel efficiency—did not adequately reflect the lessons of counterinsurgency and close-quarters combat operations in Iraq and Afghanistan. As such, the Secretary recommended:

- accelerating fielding of ready-to-go systems and capabilities to all combat brigades;
- canceling the vehicle component of the FCS program, reevaluating the requirements, technology, and approach, and relaunching the Army's vehicle modernization program; and
- addressing fee structure and other concerns with current FCS contracting arrangements.

In June 2009, the Under Secretary of Defense for Acquisition, Technology and Logistics issued an acquisition decision memorandum that canceled the FCS acquisition program, terminated manned ground vehicle development efforts, and laid out plans for follow-on Army Brigade Combat Team Modernization efforts. DOD directed the Army to transition to an Army-wide modernization plan consisting of a number of integrated acquisition programs, including one to develop ground combat vehicles (GCV).

Subsequently, the Army has been defining its ground force modernization efforts per the Secretary's decisions and the June 2009 acquisition decision memorandum. Although the details are not yet complete, the Army took several actions through the end of calendar year 2009. It stopped all development work on the FCS manned ground vehicles—including the non-line-of-sight cannon—in the summer of 2009 and recently terminated development of the Class IV unmanned aerial vehicle and the countermine and transport variants of the Multifunction Utility/Logistics and Equipment unmanned ground vehicle. For the time being, the Army is continuing selected development work under the existing FCS development contract, primarily residual FCS system and network development. In October 2009, the Army negotiated a modification to the existing contract that clarified the development work needed for the brigade modernization efforts.

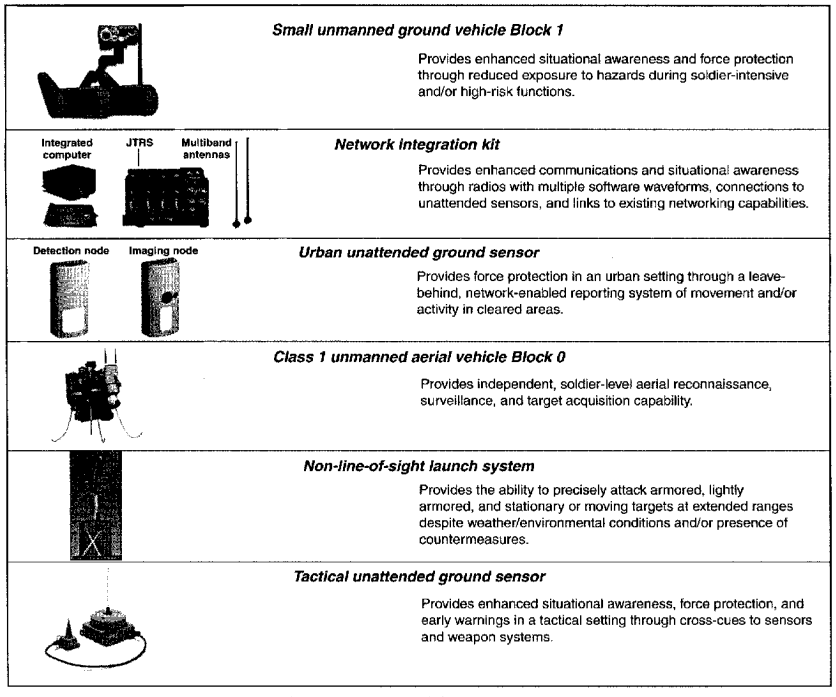
### THE ARMY HAS STARTED A SERIES OF DEVELOPMENT AND FIELDING EFFORTS

The Army is implementing DOD direction and redefining its overall modernization strategy as a result of the Secretary of Defense's decisions to significantly restructure the FCS program. It is transitioning from the FCS long-term acquisition orientation to a shorter-term approach that biennially develops and fields new incre-

ments of capability within capability packages. It now has an approved acquisition program that will produce and field the initial increment of the FCS spinout equipment, which includes unmanned aerial and ground vehicles as well as unattended sensors and munitions, and preliminary plans for two other major defense acquisition programs to define and develop follow-on increments and develop a new GCV. The Army also plans to integrate network capabilities across its brigade structure and to develop and field upgrades to other existing ground force equipment.

- The first program, Increment 1, is a continuation of previous FCS-related efforts to spin out emerging capabilities and technologies to current forces. Of the Army's post-FCS modernization initiatives, Increment 1, which includes such FCS remnants as unmanned air and ground systems, unattended ground sensors, the non-line-of-sight launch system, and a network integration kit, is the furthest along in the acquisition development cycle (see fig. 2). The network integration kit includes, among other things, the integrated computer system, an initial version of the system-of-systems common operating environment, early models of the Joint Tactical Radio System, and a range extension relay.[3] In December 2009, the Army requested and DOD approved, with a number of restrictions, the low-rate initial production of Increment 1 systems that are expected to be fielded in the fiscal year 2011–2012 capability package.[4] The Army will be continuing Increment 1 development over the next 2 years while low-rate initial production proceeds. The projected development and production cost to equip nine brigades with the Increment 1 network and systems, supported by an independent cost estimate, would be about $3.5 billion.

**Figure 2: Increment 1 Systems**




Sources: Army (data and photos); GAO (analysis and presentation).

[3] The system-of-systems common operating environment is the operating environment that serves as middleware between operating systems and software applications.

[4] The Army had developed a concept of continual modernization of ready-to-go capabilities through biennial deliveries of what are called capability packages.

• For the second acquisition program, Increment 2 of brigade modernization, the Army has preliminary plans to mature Increment 1 capabilities—potentially demonstrating full FCS threshold requirements—as well as contributing further developments of the system-of-systems common operating environment and battle command software, and demonstrating and fielding additional capabilities. For example, these may include the Armed Robotic Vehicle Assault (Light)—an unmanned ground vehicle configured for security and assault support missions—and the Common Controller, which will provide the dismounted soldier a handheld device capable of controlling, connecting, and providing data transfer from unmanned vehicles and ground sensors. Army officials indicated that they are currently working to define the content, cost, and schedule for Increment 2 with a low-rate initial production decision planned for fiscal year 2013 and a Defense Acquisition Board review expected later in fiscal year 2010.
• The third acquisition program would develop a new GCV. The Army reviewed current fighting vehicles across the force structure to determine whether to sustain, improve, divest, or pursue new vehicles based on operational value, capability shortfalls, and resource availability. Per DOD direction, the Army also collaborated with the Marine Corps to identify capability gaps related to fighting vehicles. For development of a new GCV, the Army's preliminary plans indicate the use of an open architecture design to enable incremental improvements in modular armor; network architecture; and subcomponent size, weight, power, and cooling. DOD and the Army met in February 2010 to make a materiel development decision on the GCV, and the Army was subsequently authorized to release a request for proposals for GCV technology development.[5] Over the next several months, the Army will be conducting an analysis of alternatives to assess potential materiel solutions for the GCV. The Army expects to follow the analysis with a Milestone A decision review on whether to begin technology development in September 2010.[6] After Milestone A, Army officials are proposing the use of competitive prototyping with multiple contractors—the number of which will depend on available funding—during the technology development phase, which will feature the use of mature technologies and the fabrication and testing of prototype subsystems. In the technology development phase, the contractors will be expected to fabricate and evaluate several subsystem prototypes, including an automotive test rig and a mine blast test asset. The contractors will also be expected to develop a near-critical design review level design for their integrated vehicle and, in the process, inform the GCV concept development document. That document is expected to be finalized at the Milestone A decision point. Competitive prototypes will be fabricated and tested during the engineering and manufacturing development phase. A preliminary design review would be used to validate contractor readiness to enter detailed design at Milestone B in fiscal year 2013. The Army's preliminary plans indicate that the first production vehicles could be delivered in late fiscal year 2017, about 7 years from Milestone A.
• The Army is planning to incrementally develop and field an information network to all of its brigades in a decentralized fashion, that is, not as a separate acquisition program. The Army has defined a preliminary network strategy and is in the process of defining what the end state of the network will need to be, as well as how it may build up that network over an undefined period of time. In the near term, the Army is working to establish a common network foundation to build on and to define a common network architecture based on what is currently available and expected to become available in the near future. Current communications, command and control, and networking acquisition programs will continue and will be expected to build upon the current network foundation and architecture over time. Networking capabilities will be expected to meet specific standards and interface requirements. According to Army officials, the ongoing incre-

[5] A materiel development decision is a review that is the formal entry point into the acquisition process and is mandatory for all programs. After the materiel development decision, the Milestone Decision Authority may approve entry into the acquisition management system at any point consistent with phase-specific entrance criteria and statutory requirements.
[6] Milestone A is the point at which a program enters the technology development phase; Milestone B is entry into the engineering and manufacturing development phase; and Milestone C is entry into the production and deployment phase.

mental network and software development activities and requirements will be dispersed to these acquisition programs, where they will be considered for further development and possible fielding. The only original FCS network development activities that the Army plans to continue under the FCS development contract are those supporting the network integration kit for Increment 1 and whatever additional networking capabilities may be needed for Increment 2. DOD expects the Army to present its network development plans later in 2010. (See table 1.)

**Table 1: Army Budget Requests for Fiscal Year 2011 and Fiscal Years 2012-2015 for Increments 1 and 2 and GCV**

| Dollars in millions | | |
|---|---|---|
| | **Fiscal year 2011** | **Fiscal years 2012-2015** |
| **Research and Development** | | |
| Increments 1and 2 | $1,568.0 | $4,126.0 |
| GCV | 934.4 | 6,245.4 |
| **Subtotal** | **$2,502.4** | **$10,371.4** |
| **Procurement** | | |
| Increments 1and 2 | $682.6 | $9,840.5 |
| GCV | 0 | 876.2 |
| **Subtotal** | **$682.6** | **$10,716.7** |
| **Total** | **$3,185.0** | **$21,088.1** |

Source: Fiscal Year 2011 President's Budget.

As shown in table 1, the Army is proposing to make substantial investments in its post-FCS acquisition initiatives. For fiscal year 2011, the Army is proposing research and development funding of about $2.5 billion and procurement funding of about $683 million. For the following 4 years (fiscal years 2012–2015), the Army plans additional research and development investments of about $10.4 billion and procurement investments of about $10.7 billion.

*Recent Army Contract Actions Related to Its Post-FCS Efforts*

For the time being, the Army is continuing selected development work—primarily that related to Increment 1, Increment 2, and network development—under the existing FCS development contract. In October 2009, the Army negotiated a modification to the existing contract that clarified the development work needed for the brigade modernization efforts. The Army previously awarded a contract for long lead item procurement for Increment 1. A modification to that contract was recently issued to begin low-rate initial production of the Increment 1 systems. The Army has also recently released a request for proposals for the technology development phase of the proposed GCV development effort.

Contractor proposals for GCV are expected to include plans, solutions, or both for, among other things, survivability (hit avoidance system, armor, and vehicle layout) and mobility (propulsion and power generation and cooling). According to the request for proposals, the proposals can utilize prior Army investment in armor recipes, but the contractors will not get an inherent advantage for doing so. Each solution will be based on its own merits. Contractor proposals are to be submitted in April 2010 and contract awards, for cost-plus type contracts, are to be awarded after the Milestone A decision in September 2010.

ACQUISITION DIRECTION AND FCS LESSONS LEARNED OFFER OPPORTUNITIES TO PROMOTE SUCCESSFUL OUTCOMES, BUT DECISION TO PROCEED WITH INITIAL PRODUCTION IS PREMATURE

The challenge facing both DOD and the Army is to set these ground force modernization efforts on the best footing possible by buying the right capabilities at the best value. In many ways, DOD and the Army have set modernization efforts on a positive course, and they have an opportunity to reduce risks by adhering to the body of acquisition legislation and policy reforms—which incorporate knowledge-based best practices we identified in our previous work—that have been introduced

since FCS started in 2003. The new legislation and policy reforms emphasize a knowledge-based acquisition approach, a cumulative process in which certain knowledge is acquired by key decision points before proceeding. In essence, knowledge supplants risk over time. Additionally, DOD and the Army can further reduce risks by considering lessons learned from problems that emerged during the FCS development effort. Initial indications are that the Army is moving in that direction. However, in the first major acquisition decision for the Army's post-FCS initiatives, DOD and the Army—because they want to support the warfighter quickly—are proceeding with low-rate initial production of one brigade set of Increment 1 systems despite having acknowledged that the systems are immature and unreliable and cannot perform as required.

*New Acquisition Reforms Point Way to Lower Risk*

The body of acquisition legislation and DOD policy reforms introduced since FCS started in 2003 incorporates nearly all of the knowledge-based practices we identified in our previous work (see table 2). For example, DOD acquisition policy includes controls to ensure that programs have demonstrated a certain level of technology maturity, design stability, and production maturity before proceeding into the next phase of the acquisition process. As such, if the Army proceeds with preliminary plans for new acquisition programs, then adherence to the acquisition direction in each of its new acquisition efforts provides an opportunity to improve the odds for successful outcomes, reduce risks for follow-on Army ground force modernization efforts, and deliver needed equipment more quickly and at lower costs. Conversely, acquisition efforts that proceed with less technology, design, and manufacturing knowledge than best practices suggest face a higher risk of cost increases and schedule delays.

**Table 2: Comparison of Controls Used in Best Practices Model and DOD Policy**

| Commercial best practices model | May 2003 DOD policy | December 2008 DOD policy |
|---|---|---|
| **Knowledge point 1:** Occurs as programs begin the engineering and manufacturing development phase (Milestone B). Match exists between requirements and resources. Technologies needed to meet essential product requirements have been demonstrated to work in their intended environments and the producer has completed a preliminary design of the product. | | |
| Demonstrate high technology readiness levels | X | X |
| Ensure product requirements are informed by the systems engineering process | X | X |
| Establish cost and schedule estimates for product based on knowledge from preliminary design using systems engineering tools | | X |
| Conduct decision review for program launch | X | X |
| **Knowledge point 2:** Occurs at the critical design review between integration and demonstration. Design is stable and has been demonstrated through prototype testing. Ninety percent of engineering drawings are releasable to manufacturing organizations. | | |
| Complete 90 percent of design drawings | | [a] |
| Complete subsystem and system design reviews | | X |
| Demonstrate with prototype that design meets requirements | X | X |
| Obtain stakeholder concurrence that drawings are complete and producible | | [b] |
| Complete failure modes and effects analysis | | X |
| Identify key system characteristics | | X |
| Identify critical manufacturing processes | | X |
| Establish reliability targets and growth plan based on demonstrated reliability rates of components and subsystems | | X |
| Conduct design review to enter system demonstration | X | X |
| **Knowledge point 3:** Occurs at low-rate initial production commitment. Product is ready to be manufactured within cost, schedule, and quality targets. All key manufacturing processes are under statistical control and product reliability has been demonstrated. | | |
| Demonstrate manufacturing processes | | X |
| Build production-representatives prototypes | | X |
| Test production-representative prototypes to achieve reliability goal | | [c] |
| Test production-representative prototypes to demonstrate the product in a realistic environment | | X |
| Collect statistical process control data | | X |
| Demonstrate that critical processes are capable and under statistical control | | X |
| Conduct decision review to begin production | X | X |

Sources: DOD (data); GAO (analysis and presentation).

[a]DOD criteria do not specify the percentage of drawings to be completed at the critical design review.

[b]DOD's revised policy includes the post-critical design review assessment, which is the Milestone Decision Authority's assessment of the program manager's critical design review. However, we could not determine whether stakeholder concurrence was necessary to proceed.

[c]DOD criteria establish reliability goals, but do not specify testing on production-representative prototypes.

As shown in table 2, the cumulative building of knowledge consists of information that should be gathered at three critical points over the course of a program:

Knowledge point 1 (at the program launch or Milestone B decision): Establishing a business case that balances requirements with resources. At this point, a match must be made between the customer's needs and the developer's available resources—technology, engineering, knowledge, time, and funding. A high level of technology maturity, demonstrated via a prototype in its intended environment, indicates whether resources and requirements match. Also, the developer completes a preliminary design of the product that shows that the design is feasible and that requirements are predictable and doable.

Knowledge point 2 (at the critical design review between design integration and demonstration): Gaining design knowledge and reducing integration risk. At this point, the product design is stable because it has been demonstrated to meet the customer's requirements as well as cost, schedule, and reliability targets. The best practice is to achieve design stability at the system-level critical design review, usually held midway through system development. Completion of at least 90 percent of engineering drawings at this point provides tangible evidence that the product's design is stable, and a prototype demonstration shows that the design is capable of meeting performance requirements.

Knowledge point 3 (at production commitment or the Milestone C decision): Achieving predictable production. This point is achieved when it has been demonstrated that the developer can manufacture the product within cost, schedule, and quality targets. The best practice is to ensure that all critical manufacturing processes are in statistical control—that is, they are repeatable, sustainable, and capable of consistently producing parts within the product's quality tolerances and standards—at the start of production.

The Army did not position the FCS program for success because it did not establish a knowledge-based acquisition approach—a strategy consistent with DOD policy and best acquisition practices—to develop FCS. The Army started the FCS program in 2003 before defining what the systems were going to be required to do and how they were going to interact. It moved ahead without determining whether the FCS concept could be developed in accordance with a sound business case. Specifically, at the FCS program's start, the Army had not established firm requirements, mature technologies, a realistic cost estimate, or an acquisition strategy wherein knowledge drives schedule. By 2009, the Army still had not shown that emerging FCS system designs could meet requirements, that critical technologies were at minimally acceptable maturity levels, and that the acquisition strategy was executable within estimated resources.

With one notable exception, there are initial indications that DOD and the Army are moving forward to implement the acquisition policy reforms as they proceed with ground force modernization, including the Secretary of Defense's statement about the ground vehicle modernization program—to "get the acquisition right, even at the cost of delay." In addition, DOD anticipates that the GCV program will comply with DOD acquisition policy in terms of utilizing competitive system or subsystem prototypes. According to a DOD official, a meeting was recently held to consider a materiel development decision for the GCV, and the Army is proposing to conduct a preliminary design review on GCV before its planned Milestone B decision point. Additionally, a configuration steering board is planned for later in 2010 to address reliability and military utility of infantry brigade systems.

*Army's Decision to Proceed with Low-Rate Initial Production for Increment 1 Increases Risk*

In the first major acquisition decision for the Army's post-FCS initiatives, DOD and the Army—because they want to support the warfighter quickly—are proceeding with low-rate initial production of Increment 1 systems despite having acknowledged that systems are immature, are unreliable, and cannot perform as required. In December 2009, the Under Secretary of Defense for Acquisition, Technology and Logistics approved low-rate initial production of Increment 1 equipment for one infantry brigade but noted that there is an aggressive risk reduction plan to grow and demonstrate the network maturity and reliability to support continued Increment 1 production and fielding. In the associated acquisition decision memorandum, the Under Secretary acknowledged the risks of pursuing Increment 1 production, including early network immaturity; lack of a clear operational perspective of the early network's value; and large reliability shortfalls of the network, systems, and sensors. The Under Secretary also said that he was aware of the importance of fielding systems to the current warfighter and that the flexibility to deploy components as available would allow DOD to "best support" the Secretary of Defense's direction to "win the wars we are in." Because of that, the Under Secretary specified

that a number of actions be taken over the next year or more and directed the Army to work toward having all components for the program fielded as soon as possible and to deploy components of the program as they are ready. However, the Under Secretary did not specify the improvements that the Army needed to make or that those improvements are a prerequisite for the Under Secretary approving additional production lots of Increment 1.

The approval for low-rate initial production is at variance with DOD policy and Army expectations. DOD's current acquisition policy requires that systems be demonstrated in their intended environments using the selected production-representative articles before the production decision occurs. However, the testing that formed the basis for the Increment 1 production decision included surrogates and non-production-representative systems, including the communications radios. As we have previously noted,[7] testing with surrogates and non-production-representative systems is problematic because it does not conclusively show how well the systems can address current force capability gaps. Furthermore, Increment 1 systems—which are slated for a fiscal year 2011–2012 fielding—do not yet meet the Army's expectations that new capabilities would be tested and their performance validated before being deployed in a capability package. As noted in 2009 test results, system performance and reliability during testing was marginal at best. For example, the demonstrated reliability of the Class I unmanned aerial vehicle was about 5 hours between failure, compared to a requirement for 23 hours between failure. The Army asserts that Increment 1 systems' maturity will improve rapidly but admits that it will be a "steep climb" and not a low-risk effort.

While the Under Secretary took current warfighter needs into account in his decision to approve Increment 1 low-rate initial production, it is questionable whether the equipment can meet one of the main principles underpinning knowledge-based acquisition—whether the warfighter needs can best be met with the chosen concept. Test reports from late 2009 showed conclusively that the systems had limited performance, and that this reduced the test unit's ability to assess and refine tactics, techniques, and procedures associated with employment of the equipment. The Director, Operational Test and Evaluation recently reported that none of the Increment 1 systems have demonstrated an adequate level of performance to be fielded to units and employed in combat. Specifically, the report noted that reliability is poor and falls short of the level expected of an acquisition system at this stage of development. Shortfalls in meeting reliability requirements may adversely affect Increment 1's overall operational effectiveness and suitability and may increase lifecycle costs. In addition, in its 2009 assessment of the increment's limited user test—the last test before the production decision was made—the Army's Test and Evaluation Command indicated that the Increment 1 systems would be challenged to meet warfighter needs. It concluded that, with the exception of the non-line-of-sight launch system, which had not yet undergone flight testing, all the systems were considered operationally effective and survivable, but with limitations, because they were immature and had entered the test as pre-production-representative systems, pre-engineering design models, or both. Additionally, the command noted that these same systems were not operationally suitable because they did not meet required reliability expectations.

In recent testimony before a House subcommittee, the Director, Operational Test and Evaluation stated that flight testing of the non-line-of-sight launch system was conducted in January and February 2010. In that testing, two of six missiles fired achieved target hits and four missed their targets. The Army informed the Director that Failure Review Board investigations of the flight failures are underway.

## CONCLUDING REMARKS

Army and DOD officials made a very difficult decision when they canceled what was the centerpiece of Army modernization—the FCS program. As they transition away from the FCS concept, both the Army and DOD have an opportunity to improve the likely outcomes for the Army's ground force modernization initiatives by adhering closely to recently enacted acquisition reforms and by seeking to avoid the numerous acquisition pitfalls that plagued FCS. As DOD and the Army proceed with these significant financial investments, they should keep in mind the Secretary of Defense's admonition about the new ground vehicle modernization program: "get the acquisition right, even at the cost of delay." Based on the preliminary plans, we see a number of good features, such as the Army's decision to pursue an incremental acquisition approach for its post-FCS efforts. However, it is vitally important that each of those incremental efforts adheres to knowledge-based acquisition principles

[7] GAO–09–288.

and strikes a balance between what is needed, how fast it can be fielded, and how much it will cost. Moreover, the acquisition community needs to be held accountable for expected results, and DOD and the Army must not be willing to accept whatever results are delivered regardless of military utility.

We are concerned that in their desire for speedy delivery of emerging equipment to our warfighters in the field, DOD and the Army did not strike the right balance in prematurely approving low-rate initial production of Increment 1 of brigade modernization. Although the Army argues that it needs to field these capabilities as soon as possible, none of these systems have been designated as urgent and it is not helpful to provide early capability to the warfighter if those capabilities are not technically mature and reliable. If the Army moves forward too fast with immature Increment 1 designs, then that could cause additional delays as the Army and its contractors concurrently address technology, design, and production issues. Production and fielding is not the appropriate phase of acquisition to be working on such basic design issues.

In our recent report, we made recommendations intended to reduce the risk of proceeding into production with immature technologies.[8] In that regard, we recommended that the Secretary of Defense mandate that the Army correct the identified maturity and reliability issues with the Increment 1 network and systems prior to approving any additional lots of the Increment 1 network and systems for production. Specifically, the Army should ensure that the network and the individual systems have been independently assessed as fully mature, meet reliability goals, and have been demonstrated to perform as expected using production-representative prototypes. We also recommended that the Secretary of the Army should not allow fielding of the Increment 1 network or any of the Increment 1 systems until the identified maturity and reliability issues have been corrected.

In response, DOD concurred with our recommendations and stated that the need to correct those issues has been communicated to the Army. DOD also asserted that Increment 1 systems will be tested in their production configuration, and performance will be independently assessed against capability requirements prior to DOD approving production of any additional lots of Increment 1 systems. The Army has many Increment 1 development and testing activities planned for the coming months and we intend to monitor their progress closely. DOD also stated that Increment 1 systems would not be fielded until performance is sufficient to satisfy the warfighter's capability requirements. It is essential that: (1) Increment 1 network and systems clearly demonstrate their ability to fully satisfy the needs of the warfighter; and (2) DOD and the Army not be willing to accept whatever acquisition results are delivered regardless of their military utility. Again, we intend to follow the Army and DOD's activities and actions in the coming months.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions you or members of the subcommittee may have.

Senator LIEBERMAN. Thanks very much, Mr. Sullivan. I appreciate the ongoing dialogue you have with the Army.

Mr. SULLIVAN. Yes.

Senator LIEBERMAN. Mr. Duma, welcome.

**STATEMENT OF DAVID W. DUMA, PRINCIPAL DEPUTY DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE**

Mr. DUMA. Thank you, Mr. Chairman, Senator Thune, distinguished members of the subcommittee, thank you for the opportunity to provide the DOT&E assessment of the early infantry BCT increment 1 and Army modernization programs. My written testimony has been submitted for the record so my opening remarks will be brief.

Regarding the increment 1 of the early infantry brigade combat team (EIBCT), the DOT&E operational assessment of the EIBCT performance is based upon the results of a September 2009 limited user test (LUT) and the non-line of sight (NLOS) launch system flight LUT conducted in February 2010. That assessment also used

[8] GAO–10–406.

data from developmental testing wherever appropriate. Each of the EIBCT systems requires further development prior to conducting the initial operational test and evaluation (IOT&E) or making a fielding decision.

All of the systems have notable performance deficiencies and the operational reliability for each of the systems falls significantly below the stated requirements. The Army is addressing the reliability problems, and will test the system improvements in the LUT to be conducted in September 2010 and again in the IOT&E scheduled for 2011.

Regarding the Stryker double-V hull, the Army is investigating using a double-V hull design in the Stryker. Testing of prototype vehicles must be adequate to assure vehicles built with the double-V hull provide improved protection to the soldiers. We are working with the Army to determine the numbers and types of prototypes required for testing. This testing will inform decisionmakers prior to a production decision.

Regarding the Stryker mobile gun system, we have reviewed the Army's update to Congress on the status of actions taken to mitigate the Stryker mobile gun system deficiencies. We assess the following remaining deficiencies as being the highest priority for correction.

First, improving the mission equipment package reliability; second, developing the long-term solution for rocket propelled grenade and anti-tank guided missile protection; and third, increasing the gun pod protection level.

Regarding the GCV of the Army BCT modernization, the Army's GCV is in the earliest stages of acquisition. In preparation for a milestone A decision later this year our office is working closely with the Army to develop a test and evaluation strategy for that program. Our office will be involved in the test and evaluation of any future capability increments to the Army BCT modernization. Once the Army defines the acquisition strategies the test and evaluation program will be tailored to support those acquisition programs.

Regarding two specific radios of the joint tactical radio system (JTRS), the ground mobile radio (GMR), and the handheld man pack and small form fit (HMS) radio, both the JTRS, GMR, and HMS radios are schedule driven programs working to complete system development prior to operational tests scheduled to start in November 2010. Readiness for operational testing is dependent upon the completion of user requirements, the development of supporting wave forms, and the success of developmental testing.

Mr. Chairman, Senator Thune, distinguished members of the subcommittee, this completes my opening remarks. I'll be happy to answer your questions.

[The prepared statement of Mr. Duma follows:]

PREPARED STATEMENT BY DAVID W. DUMA

Mr. Chairman, Senator Thune, distinguished members of the Committee, thank you for the opportunity to provide the DOT&E assessments of the Early Infantry Brigade Combat Team (E–IBCT) Increment 1, the Stryker Double-V Hull Upgrade and Mobile Gun System, the Ground Combat Vehicle, the UH–60 Blackhawk Helicopter, and the Ground Mobile Radio and Handheld, Manpack, Small Form Factor variants of the Joint Tactical Radio System (JTRS) program.

ASSESSMENT OF E–IBCT TEST RESULTS

The DOT&E operational assessment of the Early Infantry Brigade (E–IBCT) Increment 1 performance is based upon the results of the E–IBCT Limited User Test (LUT 09) conducted in August-September 2009 and the Non-Line of Sight Launch System (NLOS–LS) Flight LUT conducted in January-February 2010. That assessment is supplemented with data from developmental testing, as appropriate.

Each of the E–IBCT systems requires further development prior to conducting an Initial Operational Test and Evaluation (IOT&E) in fiscal year 2011 or fielding. All of the systems have notable performance deficiencies. The demonstrated operational reliability for each of the systems falls significantly below requirements.

LUT 09 was the first operational test of the E–IBCT systems. It was conducted at Fort Bliss, TX, and consisted of an infantry company and scout platoon equipped with E–IBCT systems executing full spectrum operations against a threat force composed of conventional mechanized forces and paramilitary forces with civilians present on the battlefield. The force-on-force test consisted of 4 96-hour scenarios with the test unit executing 14 offensive, defensive, and stability missions. Operations were conducted both day and night. Live firing of the NLOS–LS was conducted during the NLOS–LS Flight LUT at White Sands Missile Range, NM, in January-February 2010.

Many of the systems tested in LUT 09 were not in the same configuration as the systems intended for purchase. The Small Unmanned Ground Vehicle used a production radio, the remaining five systems used pre-production radios and waveforms. Numerous changes to be implemented in the E–IBCT systems to be produced (as compared to those tested in LUT 09) had been identified prior to LUT 09. The program manager has informed DOT&E that additional changes will be made to address the reliability problems discovered during the LUT. The first opportunity to test the effects of these changes and any others made to address performance problems identified in LUT 09 will be the E–IBCT LUT to be conducted in August-September 2010 (LUT 10). The E–IBCT systems have not been tested against electronic warfare or computer network attack threats. E–IBCT operations in an electronic warfare and computer network attack environments will be assessed in LUT 10.

The DOT&E key findings with respect to the performance of the individual E–IBCT systems are summarized below.

*Non-Line-of-Sight Launch System*

Non-Line-of-Sight Launch System (NLOS–LS) requires further developmental and operational flight tests to demonstrate improvement in missile reliability and the performance of the missile's infrared (IR) seeker. The demonstrated missile reliability is 61 percent, below the 85 percent requirement. Missiles using the IR seeker in developmental and LUT flight tests hit 5 of 11 targets. The program needs to conduct additional testing and allocate adequate time to demonstrate performance and implement fixes to improve reliability. The NLOS–LS Container Launch Unit (CLU) met its reliability requirement during LUT 09, demonstrating a 259-hour mean time between system abort versus a 125-hour requirement. However, during the February 10 Flight LUT, problems with the NLOS–LS navigation system caused six of the seven total system aborts that occurred during testing, resulting in a mean time between system abort of 12 hours. This was the first test using a new software version for the NLOS–LS navigation system. Soldiers received numerous fault codes from the navigation system when they initialized the CLU. Failure review is ongoing. In our view, the effectiveness of fixes to the navigation system and other failure modes should be tested in the E–IBCT LUT 10 conducted later this year.

NLOS–LS is making progress in some performance areas. Missiles using the laser-designate mode demonstrated success in operational and developmental testing, hitting five of seven targets. The missile warhead can kill armored vehicles when it hits vulnerable areas. In LUT 09, the NLOS–LS Container Launch Unit was interoperable with the fire support network and was effective in processing electronic fire commands. During LUT 09, the test unit effectively engaged armored targets with the NLOS–LS in simulated fire missions. When simulated and evaluated to be successful, NLOS–LS had a significant impact on the battle by destroying threat armored vehicles.

The NLOS–LS Flight LUT was the first operational flight test of the system. Soldiers from the Army Evaluation Task Force Fires Battalion fired six missions at operationally representative threat targets. Forward observers their tactical sensors and target designators acquired actual threat tanks, armored combat vehicles, and a commercial truck. The tanks and armored combat vehicles had realistic threat countermeasures. The Precision Attack Munition and the Container Launch Unit

(CLU) were production representative. During the Flight LUT, two of six missiles fired achieved target hits and four missed their targets. Two of the missiles impacted 14 or more kilometers short of the target. The cause of one miss is known: the CLU misinterpreted temperature data sent by the Advanced Field Artillery Data System. This caused the missile to safe the warhead and ignore the laser designation, thereby missing the target. The Army has identified potential causes for two other misses involving the motor in the precision attack munitions and a circuit board failure.

The Army has informed DOT&E that the program is completing Failure Review Board investigations of the developmental and operational flight failures. We recommend the Army conduct additional developmental and operational flight testing once all of the necessary corrective measures have been identified and applied.

*Network Integration Kit*

In LUT 09, the Network Integration Kit (NIK) demonstrated a capability to receive sensor data from the Tactical Unattended Ground Sensor and Urban Unattended Ground Sensor Gateways and to interoperate with the Force XXI Battle Command Brigade and Below battle command network by passing messages and still images. The NIK operated with pre-production pre-Engineering Development Model Joint Tactical Radio System Ground Mobile Radios which are not certified to pass classified traffic. The NIK did not meet its reliability requirement, demonstrating a 33-hour mean time between system abort versus a requirement of 112 hours. The NIK had a lengthy boot up time of 30–35 minutes versus a 10 minute requirement for a warm start reboot. The capability of the NIK to pass classified data using low probability of intercept waveforms will be evaluated in LUT 10.

*Class I Block 0 Unmanned Aircraft System*

The Class 1 UAS meets most of its air vehicle flight and sensor performance requirements. This system was heavily used by the test unit to perform intelligence, surveillance, and reconnaissance tasks. However, the UAS was not employed as the back-packable company-level and platoon-level asset envisioned by the user. Due to poor system reliability, the unit consolidated these systems under centralized battalion-level control to achieve system redundancy. The UAS does not have the range or endurance necessary to conduct missions within a larger battalion area of operations. An assessment cannot be made of the effectiveness of the UAS employed in the platoon/company role for which it is designed.

The Class 1 UAS is not reliable, demonstrating a mean time between system abort of 1.5 hours versus a 23-hour user threshold requirement.

*Small Unmanned Ground Vehicle Block 1 (SUGV)*

During LUT 09, the SUGV demonstrated a capability for remote investigation of potential threats. The test unit successfully demonstrated the capability to transmit still images from the SUGV to the Network Integration Kit via an Unattended Ground Sensor Gateway. The SUGV sensor performs satisfactorily in daylight, providing images that can identify personnel at 100 meters, achieving the user requirement. The SUGV does not meet the user requirement for recognizing personnel at night. The most significant SUGV operational deficiency is the limited communications range between the operator and the SUGV. The SUGV user requirement calls for a 1,000 meter line-of-sight tele-operation range. This range allows the operator to employ the robot at a safe distance while conducting reconnaissance of potentially hazardous locations. During LUT 09, much shorter ranges were achieved. Typical tele-operation ranges were 125–150 meters in open terrain and 50–75 meters in and around buildings. These short tele-operation ranges exposed SUGV operators to hostile fire. Several operators were evaluated as killed during the LUT.

During LUT 09, the SUGV demonstrated a 5.2-hour mean time between system abort versus a requirement of 42 hours.

*Urban Unattended Ground Sensor*

The Urban Unattended Ground Sensor (U–UGS) demonstrated little contribution to unit situational awareness, providing limited actionable intelligence. Images were often blurry or blank and not readable. During LUT 09, the Local Display and Control Device was not used by the unit, although it is essential to providing local unit leaders U–UGS alerts and images. The U–UGS has demonstrated a capability to transmit images to the NIK via a gateway device. The U–UGS is not reliable, demonstrating a mean time between system abort of 25 hours versus a requirement of 105 hours.

*Tactical Unattended Ground Sensor*

The Tactical Unattended Ground Sensor (T–UGS) provided little contribution to unit situational awareness. During LUT 09, it provided no actionable intelligence to the test unit, with half of its photo images blank or blurry. The T–UGS demonstrated a capability to transmit images to the NIK. The T–UGS is not reliable, demonstrating a mean time between system abort of 52 hours versus a requirement of 127 hours.

*Reliability*

The Army Test and Evaluation Command calculated reliability growth potentials for the NIK, U–UGS, T–UGS, SUGV and Class 1 UAS that are all below the reliability thresholds associated with each system. Thus, the reliability desired for these systems is not achievable by IOT&E without an extensive design-for-reliability effort by the Army.

STRYKER DOUBLE-V HULL

Recently, the Army leadership decided to investigate using the Double-V Hull design developed under the Stryker Modernization effort for vehicles to be deployed to Afghanistan. Testing of prototype vehicles must be adequate to assure vehicles built with the Double-V Hull provide improved protection to soldiers relative to existing vehicles. We are working with the Army to determine the numbers and types of prototypes required for testing and to develop a test plan that the Director will approve.

Operational and Live Fire Testing for the Stryker Double-V hull design will focus on evaluating crew survivability throughout the expected threat spectrum. Testing will also assess whether vehicle mobility is adequate. This testing will inform decisionmakers prior to a production decision.

STRYKER MOBILE GUN SYSTEM

Overall the program has mitigated, by either material fixes or changes to tactics, techniques, and procedures (TTP), 10 of the 23 deficiencies identified in the 2008 Secretary of Defense Report to Congress.

We have reviewed the Army's semi-annual report to Congress updating the status of actions taken by the Army to mitigate Stryker Mobile Gun System (MGS) deficiencies. Based on that review, we assess the following remaining deficiencies as being the highest priority for correction:

- Mission Equipment Package (MEP) Reliability—The MEP demonstrated 53 Mean Rounds Between System Abort (MRBSA) during the October 2007 Initial Operational Test (IOT) versus the requirement of 81 rounds. To validate the effectiveness of actions taken to improve MEP reliability, the Army must conduct an operational gunnery event using qualified crews firing a sufficient number of rounds.
- Develop Long-Term Rocket-Propelled Grenade (RPG) and Anti-tank Guided Missile (ATGM) Solution—There has been no change to the DOT&E assessment that the proposed Stryker Reactive Armor Tile (SRAT II) configuration for the MGS is in early development and the effectiveness of the SRAT II has yet to be demonstrated. While the Army approved the plan for the area of the vehicle to be covered by SRAT II in December 2009, the integration of SRAT II on the MGS has not yet occurred. Once the Army defines how SRAT II will be applied to the MGS, the Army must conduct live fire testing to demonstrate the tile's effectiveness in defeating RPGs and ATGMs.
- Increase Gun Pod Protection Level—The Army has eliminated the requirement that the MGS be transportable on the C–130. Given the relief from this weight constraint, DOT&E reiterates the recommendation that the Army increase gun pod protection. The existing gun pod can be easily disabled, and when that occurs the MGS is not operationally effective.

DOT&E will approve the Operational Test Plan for MEP Reliability and a Live Fire Test and Evaluation Plan for RPG protection. All full-up system-level survivability tests should be completed and test results documented prior to the full-rate production decision.

GROUND COMBAT VEHICLE AND ARMY BRIGADE COMBAT TEAM MODERNIZATION

The Army's Ground Combat Vehicle (GCV) is currently in the very earliest stages of acquisition. In preparation for a Milestone A decision anticipated for September of this year, our office is working closely with the Army to develop a Test and Eval-

uation Strategy for the GCV program. At this point, the initial concept for GCV operational testing consists of a Limited User Test (LUT) prior to MS C and an Initial Operational Test (IOT) prior to the Full Rate Production decision. The LUT would be conducted by a mechanized infantry company with one platoon each of the two competing GCV prototypes and one platoon of current force Bradley Fighting Vehicles. This test structure would provide performance data to inform the source selection decision as well as providing the basis for a performance comparison between the GCV and the current Bradley, which the GCV is intended to replace. The IOT would be conducted with a full mechanized infantry company consisting of production representative GCV's.

With regards to Army Brigade Combat Team Modernization, our office will be involved in test and evaluation of any future capability increments to the Army Brigade Combat Team, once the Army defines the associated acquisition strategies. Our level of involvement will be similar to our involvement with the testing of E–IBCT Increment 1.

### UH–60 BLACKHAWK HELICOPTER

The UH–60M Baseline aircraft completed its Initial Operational Test (IOT) in November 2006. The IOT was a 6-week, 216 hour test conducted by 4th Squadron, 3rd Armored Cavalry Regiment utilizing 5 production aircraft. The test demonstrated the aircraft was operationally effective, suitable, and survivable. In May 2007, DOT&E reported its test results, and in June 2007 the aircraft was approved for full rate production. Reports from units receiving the UH–60M Baseline confirm DOT&E's assessment. The UH–60M Upgrade was planned as a follow-on to the UH–60M Baseline. In January 2010, the Defense Acquisition Executive approved the Army's request to continue UH–60M Baseline production and not pursue production of the UH–60M Upgrade configuration. DOT&E will continue to monitor and report on the UH–60 program.

### ASSESSMENT OF THE JOINT TACTICAL RADIO SYSTEM (JTRS) GROUND MOBILE RADIO (GMR) AND HANDHELD, MANPACK, SMALL FORM FACTOR (HMS) TEST PLANS

The Joint Tactical Radio System (JTRS) Handheld, Manpack and Small Form Fit (HMS) and Ground Mobile Radio (GMR) are schedule-driven programs working to complete system development prior to operational tests scheduled for November 2010. Readiness for and successful completion of these operational tests are dependent upon the success of developmental testing, development of supporting waveforms and network management tools, and the completion of user requirements such as radio network architectures and plans for network management.

The JTRS HMS program completed the Rifleman Radio Limited User Test (LUT) in April 2009. This test highlighted deficiencies in reliability, battery life, range and an immature Concept of Operations. The Rifleman Radio reliability, battery life, and transmission range were each no better than 50 percent of the user requirements. The Concept of Operations did not provide sufficient radio discipline during combat. The program will conduct a series of tests from April through June 2010 to verify correction of deficiencies. The results of these tests will support a Milestone C review in August 2010. The program is scheduled to conduct the Rifleman Radio Initial Operational Test (IOT) in November 2010, in conjunction with the JTRS HMS Manpack LUT.

The JTRS HMS program is executing Manpack radio developmental testing leading to the Manpack LUT in November 2010. This LUT will be conducted in conjunction with the Rifleman Radio IOT. Completion of planning for these tests awaits JTRS HMS Manpack user requirements.

The JTRS GMR program is experiencing an 8-month delay in developmental testing due to late delivery of hardware and software. Because the schedule for conducting the GMR LUT in November 2010 has remained unchanged despite the delay in development, this shift in schedule has reduced the time available to develop corrective actions for deficiencies discovered during developmental testing prior to conducting the LUT.

The JTRS GMR LUT is dependent upon the delivery of a functional Wideband Networking Waveform (WNW) and network management tools. WNW version 3.1 demonstrated low throughput and poor message completion rates during the April 2009 WNW 30–Node Test. The JTRS Network Enterprise Domain (NED) has conducted production qualification testing on JTRS WNW version 4.0.1 and has made this version available for integration into GMR. The National Security Agency identified security issues with WNW 4.0.1 and will reassess an updated WNW 4.0.2 for corrections.

The JTRS GMR is a critical component of the NIK and provides transfer of data, imagery and voice communications within the E–IBCT. Delays in the GMR program could affect plans for fielding the E–IBCT.

The Army's ability to execute the overall JTRS test schedule leading to the three scheduled operational tests (Rifleman Radio IOT, Manpack LUT, and GMR LUT) in November 2010 is of great concern due to a lack of time to address corrective actions, the dependence upon supporting waveform and network management success, and the need to complete user requirements.

Senator LIEBERMAN. Thanks very much, Mr. Duma. We'll have 7-minute rounds of questions. Let me begin with a look back and a broader look question for the four of you.

As I mentioned briefly in my opening statement, as you look back over the last period of time the Army's largest modernization programs have not really been successful and stable. In some ways you have to, over the years, watch the bouncing ball. We went from digitization to Force 21 to the Army after next to the interim force to the objective force to FCS and modularity.

Well, it wasn't all lost. Some things were gained from some of those investment programs. As I said before, we have an extraordinary Army in the field. But still I don't think it's the desired course.

So I want to ask each of you to answer basically two questions.

First, what do you think have been the greatest sources of instability for the Army modernization programs over the years?

Second, essentially have we learned the lessons? Are the current efforts underway sufficient to stabilize Army modernization? Maybe we'll give you the first shot at that, General Lennox.

General LENNOX. Senator Lieberman, thanks. There have been an awful lot of failed efforts in the past. My experience really goes back to the most recent one, so I'll speak from that if you don't mind. It's the FCS.

Senator LIEBERMAN. Great.

General LENNOX. I think what we did in that and one of the challenges we faced in that was we overreached. We thought that we'd rely on systems and technologies that would develop over a certain period of time. They didn't. Their technology levels were relatively low and I think we were counting on a series of, not miracles, but important things to happen, technologically, in order for that system to develop and develop on time.

Senator LIEBERMAN. So that's important. Excuse me for interrupting. But are you talking about technological overreach, not financial overreach, for instance?

General LENNOX. I'm probably not experienced enough to talk about it in these terms, sir.

Senator LIEBERMAN. No, but the terms you're talking about may be the decisive terms, so.

General LENNOX. I think with how we're addressing that though, in particular with the GCV is we're looking specifically at technologies that are much more mature.

Senator LIEBERMAN. Right.

General LENNOX. Looking at much more of an incremental rather than revolutionary kind of approach as we deal with the GCV, for example.

Senator LIEBERMAN. In other words, technologies that are mature out in the commercial marketplace.

General LENNOX. In many ways, yes, sir.

Senator LIEBERMAN. General Phillips, do you want to add to that?

General PHILLIPS. Sir, I have just a couple of comments. The one program that comes to mind for me is Comanche.

Senator LIEBERMAN. Right.

General PHILLIPS. What we did on the Comanche program, I think we've learned valid lessons from that. The Army essentially put much of its resourcing and strategy and the growth of requirements into Comanche. Then we realized that somewhere around 2003–2004 we made the Comanche decision and decided to reinvest into Army aviation. I think the results of that program today have borne great fruit for the Army and also for Army aviators and soldiers both in Iraq and Afghanistan.

We've also learned the lessons from looking at how we grow requirements. I believe the Reno study is one of those recent ones that has been of great value to the Army. The capability portfolio reviews that you and Senator Thune have mentioned have also helped us get our hands around requirements and more to come on that.

I'll turn to contracting and acquisition reform real quick. Some other members of the panel talk about GCV and acquisition reform. We've heard the lessons of Congress and we are implementing acquisition reforms within GCV and other programs as well and also focusing on contracting and fixing contracting within the Army as a result of the Gansler Study.

Sir, I guess that would leave it with we've heard what you and others have said. We've taken those hard lessons and we're working hard to apply them.

Senator LIEBERMAN. So go back to Comanche. I appreciate what you said about the resources that were going to be given to Comanche being used in other ways that have been effective. Was that a budget overreach or was that also a technological overreach?

General PHILLIPS. Sir, from my knowledge on the program at that point about 2003 we had about $14 billion, just over in the Comanche program.

Senator LIEBERMAN. Right.

General PHILLIPS. If you looked at Apache, Black Hawk, Kiowa, and other systems, those programs didn't really have the funding that they needed to make sure those programs were modernized in a way that the Army could benefit from that. So the Army, in my opinion, made the right decision. They took the $14 billion and they put it back into those programs to include about $2 billion into Army survivability equipment which went directly into aircraft flying in Iraq and Afghanistan.

The Army looked at its requirements, holistically, and I think made the right decision on the Comanche program to reinvest in Army aviation.

Sir, I hope that answers your question.

Senator LIEBERMAN. It does.

Mr. Sullivan, Mr. Duma, from your perspective being outside the Army, how do you explain the instability in the Army modernization programs and do you think we've learned some lessons from it now?

Mr. SULLIVAN. I think General Phillips pointed out one lesson we learned was when they terminated Comanche and used it to upgrade existing systems. I think that was a good use of funds. My perspective on the Comanche is it was a technological overreach.

It was a program that started in the late 1980s and was finally terminated in the mid-2000s as a result of not being able to achieve the requirements they had set. Some of the mission equipment package that they were trying to get on the Comanche was just not achievable given the space, power, cooling, and weight. There were a lot of contradictory requirements there.

Senator LIEBERMAN. From your perspective how are those, I call them mistakes made, is it kind of too much optimism at the outset? Reaching for too much?

Mr. SULLIVAN. I think what we have found consistently over 15 years of looking at these programs and I would say this now, there does seem to be some reason for optimism with the acquisition reforms that are in place.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. There seems to be a more serious effort in the Pentagon today to try to achieve these. I think everybody is feeling the budget crunches these days. But to get back to it, I think it is optimistic. You know there's an optimistic tone when you want to set requirements for a weapons system.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. That goes back to almost an unhealthy competition that goes on to begin weapon systems because in order to get a weapon system started, you have to be the best. It has to be better than anything else that's going. It has to be cheaper than anything else so you tend to come in with very low, optimistic cost estimates based on very little knowledge since it has to do so much you usually have to tie requirements to technologies that, in some cases, haven't even been invented yet.

So, yes, it's due to very optimistic requirements at the outset that require technologies that haven't been invented. I think part of that goes to all this talk about portfolios. The overall portfolio across all three Services for major weapon system acquisitions is today not managed very well.

I think the Secretary of Defense made some big leadership decisions and got some attention last year. I think a lot of the focus that you've talked about and the generals have talked about these portfolio management exercises that are going on now are crucial to getting that under control.

Senator LIEBERMAN. Thanks.

Mr. Duma, my time is up, but I'd like to hear an answer anyway.

Mr. DUMA. I think that the programs that you've described were large and complex so when it came under a technological problem it rippled through the program. That showed up not only in the technological challenge but in a schedule slip and a cost overrun. So I think technology readiness drives cost and schedule.

Senator LIEBERMAN. Right.

Mr. DUMA. I also think that once that happens the programs get into a reactive mode and the requirements change as a result of real world facts of where they are and they become reactive and not carrying out a planned out event.

Senator LIEBERMAN. Ok, those are helpful answers. My time is up, but I'm going to come back and ask you about Secretary Gates' 80 percent solution idea which seems to respond to some of what all four of you said that we should be satisfied with an 80 percent solution to a weapons system requirement rather than continuing the chase, what I think he called exquisite technologies that are costly, and going back to you, General Lennox, immature.

Thank you.

Senator Thune.

Senator THUNE. Mr. Chairman, if there's no objection I'd like to yield my place in the order to Senator Inhofe.

Senator LIEBERMAN. I'd like to object, but I can't take his place. [Laughter.]

Go ahead.

Senator INHOFE. I have three very brief questions. Thank you very much, Senator Thune.

First of all, we've heard from a lot of different sources, I'd ask the two generals this, that there's a disagreement between DOD and the Army about the Army's GCV. Reuters specifically said "U.S. Army Pentagon at odds over new vehicle." Can you share with us what the disagreement is?

General PHILLIPS. Sir, I'll answer that. I'm not aware of any disagreement. Dr. O'Neil, who is brand new as the Army Acquisition Executive has been here for a month or so, and I both met with Dr. Carter. I just met with him last week and met with Frank Kendall, his right hand, talking about GCV and the way ahead.

I think we're in sync with the Office of the Secretary of Defense (OSD). We have had the review back in February where they approved through the milestone decision A to go forward with the program.

Senator INHOFE. That's fine. You don't need to explain. I just thought there was something you were going to share with us there.

Second, I thought the question that Senator Lieberman was going to ask when he started off talking about the platforms, the armored gun system, the Comanche, then the Crusader, and then FCS, and I've been through this. I can remember so well, and certainly this is not a partisan thing because it was President Bush that axed the Crusader system, right? Actually we were in markup when that happened. I didn't know anything about it, and I thought that was very bad.

Then there was the FCS, and we went through that. General Shinseki was kind of a driver there, and that was terminated.

By the way, I heard you use two characterizations, Mr. Sullivan. You said restructuring the FCS and modernizing FCS. I haven't heard that before. I think that was terminated.

The question I'd ask any of you who want to answer is, why do you think that the GCV won't meet the same fate? What is different about this, because we don't want that to happen.

General LENNOX. Senator, I'll try first. I think that the different approach is the fact that the technological readiness levels of what we think the GCV will look like is much more mature than the manned ground vehicle and some of the other things we and the other panel members have talked about. So I think we're farther

along technologically so we won't run into surprises or as many surprises that would cost overruns and delays.

I think additionally the approach that the acquisition team is taking—I'll let General Phillips talk more specifically about it but the prototyping, the multiple vendors involved, I think that will keep us both innovative and on the right track. So I'll pass this over to General Phillips.

General PHILLIPS. Sir, just a couple comments I would add to that.

Number one, we have learned from FCS and we've taken a number of FCS technologies and we've offered that them to industry. We're not asking the industry to really go off and invent something. In the case of armor solutions that we might put on a GCV we're offering what the Army and our research scientists have already developed to be able to put into that solution.

Sir, we've listened to acquisition reform as well. You've heard the panel talk about the strategy going forward for the GCV. It's in line with weapons system acquisition reform. I think it gives the Army the greatest opportunity to execute this program and deliver in 2017.

Senator INHOFE. Ok. I didn't mean that critically when I said that. It was just an observation because I hadn't heard that characterization before.

The last thing I wanted to ask about is having to do with something that we're all familiar with or those of us who spend some time in the field and in some of the depots and that has to do with the vehicles left behind, the reset program. I know it's created some home station training problems. I think there's $10.8 billion in this budget. I think it was around $8 billion last year.

Do you think that's adequate?

Number two, do you want to say anything at all about the reset problems that are out there?

General LENNOX. First of all, I think the funding that we have is adequate for the reset program. The depots and our Army Materiel Commander have done a remarkable job at meeting the demand to reset vehicles as they come back from combat. I think we're in a period of time here where we're going to be challenged.

Quite frankly I think it has to do with the ramp-up in Afghanistan while we're waiting for things to ramp down in Iraq. So they'll be a little bit of a period of time that we'll probably have a bubble at some of our depots and some of the capability getting the equipment through. I think that will have a short-term impact on home station training, for example.

Senator INHOFE. Thank you very much, and thank you, Senator Thune.

Senator LIEBERMAN. Thank you, Senator Inhofe. Thanks for your questions.

Next is Senator Begich.

Senator BEGICH. Thank you very much, Mr. Chairman. I have a couple of questions.

I'm not sure you can answer this, but I want to put it on the record and if you can answer it that would be great. I sent a letter to Secretary Gates back on March 8. It was regarding the adding

of two combat aviation brigades and the status of that. What is going to happen?

That's going to be made up of some assets inside Alaska as well as the lower 48 States, obviously that concerns me a great deal of what will happen with those assets. How will Alaska be treated with the two combat aviation brigades and what impact that will have on Alaska? Can you give me any update on what's happening or not happening?

Then to be very, very parochial, what are you doing to Alaska?

General LENNOX. Those are great concerns, Senator. We acknowledge that. The final decision hasn't been made specifically about the 12th combat aviation brigade, where the flag will be. But believe me the concerns of the soldiers and the needs in Alaska are a big part of that decision.

We have to make sure that we have the right kind of aviation there to conduct training to respond to the Governor and the Homeland Defense needs in the State. I think when the final decision is made, you'll see that those concerns were addressed.

Senator BEGICH. I appreciate that. I know there are some impacts and we recognize the restructuring that's going on and the efforts. But you know better than I do the important strategic component of the position of where Alaska is and some of its assets especially up in the Fairbanks region, Fort Wainwright area.

As you move forward, we want to be kept well in tune to what's going on, but also the timetable is, to us, important to understand that. But it seems every time I hear about this there's always no decision yet which to be very frank, makes me nervous. Because then someday I might be in some meeting and the decision is made, and I don't know about it, so if you could keep us well informed.

I understand through your own documents and work that the importance has been laid out of the strategic location of Alaska with these units. I just want to make sure that's all part of the equation when finally decided.

General LENNOX. Senator, I can assure you that that is absolutely part of the equation, that and the fact that we have to get the soldiers there that are deploying trained and ready and integrated with aviation. It's all part of the factors.

Senator BEGICH. Excellent. We really haven't talked about this yet, on the industrial base of what we're doing and what we're not doing in certain components to support the military mission. Last year, Congress provided to the Secretary of Defense the authority to expand a small arms production industrial base.

Can you give me just any update of what's happening, and what's not happening there? My issue is that it's for everything from small arms to large facilities. As we're constantly restructuring and we have financial constraints, what are we doing to make sure the industrial base is still strong enough to support that which we need to do in a competitive nature?

Can you respond to this? Specifically on the small arms end, if you want to expand and be broader that's fine with me.

General LENNOX. I'll start, Senator. In the area in particular for us and force a critical concern the way ahead. I'm sure you're fa-

miliar with the fact that we're taking a two-prong approach to addressing the M–4.

Senator BEGICH. Right.

General LENNOX. That's both incrementally improving the capability we have today and then we're going to compete a new requirement for a carbine in the future. As with almost every other area we do, the industrial base is a concern, especially in these kind of key capabilities. So I think that will be a factor in the decision.

General PHILLIPS. Sir, I agree. I would only add a couple of things. A healthy industrial base within the United States is incredibly important because without that I don't think we would be able to provide that world class equipment to our soldiers that are serving in Iraq and Afghanistan in particular.

General Lennox just hit the nail on the head. The M–4 and the industrial bases for small arms are incredibly important. I would add munitions to that as well.

Senator BEGICH. That's a good point.

General PHILLIPS. Because without the munitions and the industrial base that supports that we wouldn't have the ammunition that our soldiers and servicemembers need in the field. We're going to work hard to sustain and to keep that capability for our Nation and for our servicemembers.

Senator BEGICH. Will there be an opportunity, I don't know if it's through your office or even from GAO, is there some process that you'll be able to report back to this subcommittee on where you are and if you're having success to maintain that? Because again this is something you just can't turn on a dime and turn it back on. If it's starting to degrade or diminish it becomes a bigger problem down the road.

Is there a process you have implemented or will you implement to keep us informed on how you're moving forward? Maybe I just asked for that process, I'm not sure.

General PHILLIPS. Yes, sir. I would answer like this. We team with the Defense Contract Management Agency who sustains or has the ability to look at the industrial base.

Senator BEGICH. Ok.

General PHILLIPS. To come back to DOD, because they serve under DOD and then eventually, I would assume, report to Congress on the health of that industrial base. Working through our Defense Contract Management Agency partners, I think we could, as we see gaps in the industrial base, come back and make sure that Congress and DOD are aware of that.

Senator BEGICH. That would be great. I appreciate that. Does GAO do any kind of analysis on industrial base? I'm just curious.

Mr. SULLIVAN. We have some teams that look at things like that. We don't have any one looking at this particular thing, but it's something we can talk to your staff about.

Senator BEGICH. Ok, that would be great. Thank you. Thank you very much.

Thank you very much for your ability to comment on these questions. Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Begich.

Senator Thune.

Senator THUNE. Thank you, Mr. Chairman. Gentlemen, the Army is developing a suite of systems for the infantry including a robot, a UAV, digital radios, and wireless sensors that are collectively called increment 1. Mr. Duma, in your written testimony you state that the liability desired for increment 1 is not achievable by the time of the operational test without an extensive redesign. I'd be interested in knowing, General Lennox and General Phillips, do you agree or disagree with this assessment?

General LENNOX. Senator Thune, we've looked at this extensively too. First of all we agree completely with the assessment that's been done. This is an assessment of the test that the Army had set up last September. We put the equipment in the hands of some soldiers hopeful to find these kinds of things: Can they shake out? Do they meet requirements? In this case, many of them failed and they failed in a variety of different ways.

The minute that test was over the PM started to work on a path that had improved the systems. I'll let General Phillips talk to you about some of those specifics. But we're starting to see the improvements show up.

For example, during last year's test, we used a pre-engineering design model radio, the GMR. Now the engineering design model radio is being fielded to soldiers at Fort Bliss.

There were problems with the robot. You throw it through a window and the robot would break. The robot has now been replaced with titanium in certain parts of it. It's much more durable.

I think what we're asking for is the patience to test this again. It's in the hands of soldiers. They're the ones that will tell us whether or not this works or not.

When we talked to the brigade commander, he said we would take two of the systems today. If we're going to war today, we'd take the Class 1 UAV, the hovering vertical UAV and we'd take that small robot. The other ones, we'd like to see some more work done.

I think what we're asking for is the patience to let us keep that in the hands of soldiers. Keep working along our time and the trust and confidence that we won't do the wrong thing if it doesn't measure up; just like the other systems that didn't measure up. We won't put any soldiers in jeopardy by putting this in their hands.

We think the risk of putting soldiers in jeopardy is very, very low by continuing this process.

Senator THUNE. General Phillips, do you see the Army redesigning any of the systems in that increment?

General PHILLIPS. Sir, that's certainly the potential. But I'd like to just reiterate, sir. We totally agree with GAO and DOT&E. We've taken the results of the limited user test in September 2009 and learned from those lessons. We have 100 percent of the reliability issues that came out of that Limited User Test (LUT) and we're implementing them in fixes.

I would just add that about 10 days ago I went out to Fort Bliss with the Vice Chief of Staff for the Army, General Chiarelli. He and I sat and watched soldiers using the systems. The Class 1 UAV in particular we saw one soldier that had flown over 100 flight hours with the Class 1 system and said he would take it in the theater today.

So, sir, I would simply say the Army has taken this very seriously. I'll reiterate what General Casey said, "We're not going to field one system that is not effective for our soldiers in theater. If it doesn't meet the mission, sir, we're not going to field it. It means that we go out and find something different, then we'll go out and seek the right solution to give our soldiers the right capabilities."

So, sir, I agree with your question.

Senator THUNE. Mr. Sullivan, in your written testimony you indicated that increment 1 may not meet the most important justification for its acquisition. You seem to doubt that it will meet warfighter needs. I would ask you if you could elaborate on some of those concerns.

Mr. SULLIVAN. Yes, I think one of the things that we look at is they just went through acquisition reform and reestablished a lot of really good policies for establishing a business case for the warfighter which really includes that that's at a time when you go and you meet with your customer. You say, "how many do you need and when do you need them?" That usually happens at milestone B before you start development.

It's a solid business case that's based on knowledge. Where the Army is right now on increment 1 is they're at milestone C which is really entering in the production much later than when that business case should be set. What you have now is a loosening of the policy, so to speak, to say the business case is this. We have a certain amount of money. We're far along on some of these, not on all. But we will deliver you what we can get to you.

The business case was we're going to deliver all these things within a certain period of time. If the warfighter understands that all those things aren't going to be delivered, I guess that's ok. But it wasn't the deal that was made originally according to policy.

So I guess our take on it right now is they're not following the tenants of their basic policies on increment 1 specifically at this point.

Senator THUNE. Do either one of you gentlemen want to respond to that?

General PHILLIPS. Sir, I would simply say that once again we're not going to field something that's not ready. If one of those increments, like the unmanned ground sensors, isn't ready then we're not going to ask to take that and field that to our soldiers. We're going to look for the right solutions.

Sir, I would also add that we just started the third year of a 4-year test. We've done limited user tests last year. We learned a lot from that. GAO and DOT&E have helped us understand that better.

We're implementing those fixes. The technical test is ongoing right now out at Fort Bliss. We will do another limited user test in the August/September timeframe. We will learn from that as we drive toward another milestone decision to buy more of these increments.

So, we're still going through the test-fix-test scenario to make sure that we can get these systems right to include the network that General Lennox described as being so important to the sensors and for situational awareness. Again, we're not going to field something that's not ready.

Senator THUNE. One element of the Army modernization is the NLOS launch system referred to informally as rockets-in-a-box. The Army briefing document suggests the cost of each of these launch systems during low rate, initial production (LRIP) will be about $466,000. General Phillips and General Lennox, could you have concerns about the affordability of this system?

General LENNOX. Senator, the short answer is: yes. It's very expensive. It's part of our capability portfolio reviews right now. We're looking at it in light of the limited user test where it failed to hit four times out of six.

So we're taking it very seriously. We're looking at the cost and benefit of it right now.

Senator THUNE. Is the Army considering other technologies as alternatives to that? There are some other ones, I'm told, Excalibur artillery rounds, guided Multiple Launch Rocket System rockets that also deliver precision munitions. Are those things that would be alternatives or options?

General LENNOX. That's exactly the purpose of the portfolio review, sir. We're going through and saying, "What gap does this fill?" Then we're looking at the cost of it and looking at the benefit for soldiers. That's exactly the process we're going through.

Senator THUNE. My time is up, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Thune.

Senator Hagan.

Senator HAGAN. Thank you, Mr. Chairman. I think it was General Phillips in your opening statement, in response to a question, you mentioned that we needed a healthy industrial base as well as a healthy munitions base. I think those are extremely important and not only for our Nation, but certainly for our servicemembers. So I appreciate those comments.

We are also discussing how in April of last year Secretary Gates directed the Army to cancel the vehicle component of the FCS program, reevaluate the requirements for technology and approach, and then relaunch the Army's vehicle modernization program. General Phillips, I was wondering as part of the Army's next-generation infantry fighting vehicle development, has consideration been given to the inclusion of fuel-efficient, hybrid-engine technology in an effort to reduce the petroleum demands when we're operating in these other environments?

General PHILLIPS. Yes, ma'am, great question. That is a key concern for that program, but also for the Army as a whole. When you look at Afghanistan and Iraq and the fuel requirements that it takes to support our Armed Forces and in this vehicle in particular we have a key performance parameter (KPP) that is associated with energy efficiency.

So how can we drive efficiency inside the vehicle to get the greatest mileage per ton for the fuel that it will use? We're asking industry to take a look at that and propose innovative solutions to drive fuel efficiency inside the program.

Ma'am, the Joint Light Tactical Vehicle (JLTV) has a similar requirement, not a KPP, but it has a requirement for fuel efficiency. It's called tons per mile. For that system in particular, which is still going through technology development, we are working with industry partners, to be able to put energy efficiency inside that ve-

hicle, because I think that's going to be important to the Army in the future.

With our Army Materiel Command partners, General Dunwoody, underneath materiel enterprise, we do look at our industrial base very strongly. That should have been a part of my answer earlier as well.

Senator HAGAN. When you were talking about the KPP and the vehicle, what's been done so far? Are you seeing any progress at this point? Is anything out there that needs to be tested?

General PHILLIPS. Ma'am, under GCV we have not gotten any feedback from industry. The request for proposal is still on the street. We expect industry to come back to us at the end of this month with some of those answers.

The source selection process for the JLTV, it's really a good news story. The threshold requirement is 60 tons per mile. That sounds like a strange requirement, but that's tons per mile depending on how big the vehicle might be. Industry has shown already with variance we can achieve beyond even the objective requirement around 76 tons per mile.

So we think that we have an opportunity to increase the energy efficiency of our vehicles.

Senator HAGAN. Along those same lines when we're talking about energy efficiency, how about mobile alternative power systems? As the Army moves forward with its modernization program it's apparent that the proliferation of electronic equipment that you've been talking about, communication systems, and robotic platforms increases the Army's reliance upon deployable power systems. My question is what research and development programs and initiatives are included as part of the Army's modernization program that will address an increasing reliance upon petroleum fuel supplies?

General LENNOX. We're looking at each other to see who could do a better job at answering that, Senator.

Senator HAGAN. You got it.

General LENNOX. I'm not sure either of us will be that good. We may have to take this for the record, if my answer doesn't apply. It's very critical and we're looking at it in a number of different ways.

For the GCV, for example, it's very, very important that we build the capability for growth. It seems like we never get less power or we never end up with extra power on a vehicle. We always seem to grow and expand to absorb all the capability of that vehicle and then more. We're in that condition of a number of different vehicles.

We're also looking at systems that can reduce the demand on the vehicle using a network integration kit that we have it four-plus now in a very preliminary fashion. But later on, hopefully that will help us reduce routers and reduce interfaces and things like that. So with industry's help we might be able to reduce the demand on the given vehicle today.

Now I don't think that gets to your answer on the mobile capabilities unless you have something?

General PHILLIPS. Ma'am, I just have one other area to add and that would be in soldiers. When we look at soldiers and what

weight they carry is important. For mobile power and batteries that our soldiers are carrying on the equipment and the systems, we are looking for industry.

I know we're looking at that. I don't have any specific answers for you today. We'll get back with you. But we're looking at ways to reduce the amount of pounds that soldiers carry and a piece of that is batteries to power the systems on the soldier.

[The information previously referred to follows:]

Managing energy supply and demand is critical to sustaining Army readiness. Recognizing this challenge, the Army's science and technology community is actively researching a broad range of technologies to improve energy efficiencies, reduce energy demand, and provide alternative or renewable energy sources. Our goal is to reduce the risks associated with energy supply and demand while maintaining needed operational capabilities.

Ongoing efforts include the development of light-weight structural materials, armor, and composites. These efforts not only reduce the overall vehicle weight, but they also result in better fuel efficiency and allow for more technologies to be incorporated. These incorporated technologies can include high efficiency energy storage, efficient motors, exportable power, reliable power, and thermal management system for ultimate application in hybrid vehicles. The Army is also evaluating a number of currently fielded engines for their ability to perform in an operational environment while using alternative fuels. While these fuels alone are not expected to increase the vehicles fuel efficiency, their widespread use could reduce the Army's overall dependence on petroleum.

Additionally, the Army currently has applied research programs leveraging fuel cell technology for both ground vehicle and soldier applications. Fuel cell research programs in ground vehicle applications include JP–8 reformation for a hydrogen rich fuel source and fuel cell component development and integration. Research in fuel cell technology for soldier power includes systems based on proton exchange membranes, solid oxide, direct methanol, and reformed methanol technologies.

The Army is investing in promising basic research in a number of fundamental technology areas that may result in increased fuel efficiencies. This research is in areas such as the conversion of cellulosic materials into hydrocarbons, understanding the chemical kinetics of hydrocarbon combustion, spray and combustion diagnostics, and new hydrocarbon spray methodologies. These basic research investments have the potential to enable the use of alternative fuels and ultimately improve gas mileage.

In addition to work related to fuel efficiency, the Army also has investments in both solar power and battery technologies. Solar technology investments include work on solar array efficiency (to get increased power output) and light weight and flexible materials to build solar arrays that are easier for soldiers to carry. Battery research is focused on new chemistries, materials, and designs to extend operational temperature ranges, improve recharge rates, and increase the number of recharge cycles.

Senator HAGAN. I just got back from Afghanistan, Iraq, and Pakistan while we were over there. They certainly do carry quite a bit.

The Stryker vehicle has a planned procurement of nearly 4,000 vehicles with, I understand, probably about 80 percent of those vehicles having been delivered by January of this year. Reports indicate that the newly designed double-V hull being integrated into the current vehicle platform has the potential to provide MRAP-level protection against the improvised explosive devices.

General Phillips, can the existing fleet of Stryker vehicles be retrofitted with the double-V hull? If you think that's a good idea, what's the projected cost associated with refurbishing the fleet? Are there plans underway to execute this upgrade?

While I was in Afghanistan we actually had the opportunity to go in a Stryker, go to a forward-operating base and actually go out with the soldiers. It was very interesting for me.

General PHILLIPS. Ma'am, great question. I would start to answer this way. There's been 12 rotations of Stryker to Iraq and Afghani-

stan and they put over 24,000 miles on those vehicles. It is an extraordinary capability that helps our soldiers in their BCT.

I hope I answer your question correctly. We cannot take the current Stryker vehicle and retrofit it with a double-V hull. It is a brand new hull.

As we build this vehicle, it will come off the production line from our industry partner as a brand new hull. Then we can put the equipment back on it, much of that will be currently in existence. We're optimistic about what that hull might do to provide added protection for our soldiers. But before we invest in the production dollars in a significant way, we want to make sure that we work with our DOT&E partners and our test community to understand what level of protection it does provide.

Our initial simulation and some shots that we've done already with the basic hull gives us a certain level of confidence that it will protect us up to an MRAP-like capability. But the test that we will conduct with U.S. Army Test and Evaluation Command, our test community, and DOT&E will inform us that it does provide this level of protection up to MRAP, potentially higher, potentially lower. We'll be very disciplined as we make that decision, ma'am.

Senator HAGAN. My time is up. Thank you.

Senator LIEBERMAN. Thanks very much, Senator Hagan. Good questions. We'll do a second round of 5 minutes each as the members want to stay.

Mr. Sullivan, I want to draw you out a little bit on your feelings about the increased risk that you believe result from the Army's decision to go with the LRIP of the EIBCT, increment 1 at this point. Talk a little bit more about what your specific concerns are. Then I'm going to ask the Army to respond.

Mr. SULLIVAN. The concerns that we look at have to do with following the rules. One of them is, when you have a business case that establishes a set delivery time and number of quantities of things to deliver and you're spending money that has been budgeted to do that, $682 million will be budgeted this year.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. To accomplish increment 1, you're basically spending money on all of these things you may not be able to deliver. If the warfighter needs the capability and that has been established then that's the deal more or less. This is a case where these are spin-outs.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. From a program that had a lot going on. I don't know how much the warfighter has weighed in since they terminated FCS and started this up. But that's the thing, the warfighter is expecting increment 1 brigade equipment that is the six or seven things that they've outlined here and they may not get them. So there's risk there.

Senator LIEBERMAN. Is the concern you have about the fact that we're putting a lot of money in, and the systems are not going to be able to be delivered on time, ready on time, or are not going to be able to be purchasable on time, or is it that they are going to arrive and they're not going to be up to what the warfighter needs?

Mr. SULLIVAN. I think both of those things.

Senator LIEBERMAN. Both.

Mr. SULLIVAN. I think there's risk. There's risk that you're losing the bang for the buck.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. You're investing a set amount of money, and you may not get what you asked for in the end. Therefore, it becomes more expensive. The reliability testing that they did most recently showed that some of these may not be deliverable.

I don't know. There's still too much risk in knowing whether they'll ever be deliverable. I think that they've now done a technology readiness assessment on the components in increment 1 that the program had set at somewhere around a TRL–6 or –7 which means ready to go.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. The science and technology community went in and looked at that and they reset some of those technology maturities at TRL–4 which means still being invented.

Senator LIEBERMAN. So what would you do if you were Secretary of the Army today with this program?

Mr. SULLIVAN. I would probably establish a business case based on the knowledge of what I could deliver today.

I would ask the warfighter if that were acceptable; if there's an urgent need.

Senator LIEBERMAN. Right.

Mr. SULLIVAN. If we can deliver it, we'll get it to you.

Senator LIEBERMAN. So in other words, you'd acquire fewer now because you don't have that full confidence.

Mr. SULLIVAN. Yes. I think right now you could set a business case for what you know you'll be able to deliver and spend money on that.

Senator LIEBERMAN. General Phillips or General Lennox, why don't you respond?

General PHILLIPS. Sir, I'll start first and then let General Lennox weigh in. I want to assure you and the subcommittee that we are following the Federal Acquisition Regulations (FAR). It's a FAR-based contract.

The oversight of the EIBCTs is from the Assistant Secretary of Defense, Acquisition, Logistics, and Technology, Dr. Carter. He has provided us the authority today for one brigade set. That's what we're buying to make sure that we can do the testing and determine what the reliability standards are.

We haven't gone through an IOT&E yet. We still have that to do with one more limited user test as we drive toward that decision point. So I think the Army's position is this is a key part of our modernization strategy.

Senator LIEBERMAN. Right.

General PHILLIPS. I would just add that it's important for the EIBCT and Bill Phillips, speaking from my time being in acquisition, this is a great opportunity for the Army to really provide the EIBCT a significant capability over what they have today.

A network sensor capability that provides soldiers all the way up to the brigade commander the ability to see the battlefield, to have true situational awareness and to increase their combat capability. But, sir, I assure you that I believe we're following the rules as set out by Dr. Carter, OSD, and others.

Senator LIEBERMAN. Go ahead, General.

General LENNOX. Sir, I just wanted to address the concern about, have the warfighters asked for this?

When the FCS program was terminated last spring, we asked the Training and Doctrine Command to do an assessment based on lessons learned in combat. What kinds of capabilities we ought to put in these capability packages? They undertook that study over last summer.

They presented to us in the fall a series of items that they thought were both beneficial and technologically mature enough to be spun out to the EIBCTs. That was our basis. But, the best way I think to determine that these systems are ready is putting them in hands of soldiers and letting them play with this kind of equipment, evaluate it, and tell us what works and what doesn't work in a series of tests and let them help us make the decision.

As we mentioned earlier, two systems in particular they said they'd take to war today, the Class 1 UAV and the small robot. With the improvements they may choose other ones, but I think we've learned as a result of this process whether or not these are really valued by soldiers.

Senator LIEBERMAN. That's a really interesting answer because in a way it's a variant on Secretary Gates' 80 percent solution. I don't know whether part of the problem here is that the Army wanted 100 percent and maybe should have settled for 80 percent. But I think you're saying you have confidence, General Lennox, that these systems are good enough that if you put them in the field the warfighter will tell the manufacturer essentially how to make them good enough to meet their needs.

General LENNOX. Put them in the field for test purposes, Senator. Not in combat yet.

Senator LIEBERMAN. Right.

General LENNOX. They're not ready for that.

But allow us to mature them in the hands of soldiers and find out if they are or not. They'll sink or swim on their own.

Senator LIEBERMAN. Right, thank you.

Mr. SULLIVAN. Senator, if I could, just to follow up on that.

Senator LIEBERMAN. Please.

Mr. SULLIVAN. I think that's a good strategy during development, but they are in procurement with these now.

I think that's the risk that we're talking about is they're spending dollars to procure the items when they're still trying to understand the growth of the reliability.

Senator LIEBERMAN. Yes, understood. I know, Mr. Duma, the DOT&E did not agree that increment 1 provided an increased operational capability. Am I right?

Mr. DUMA. That was very difficult to determine because the LUT that occurred last September was a company and scout platoon level LUT. That was a small scale test. The LUT that we are going to do this September will involve two companies and a scout platoon so you will see comparisons able to be made on the distances that are operationally realistic that we could not look at in the initial LUT.

For instance, the communications distances that we looked at were small and the soldiers were able to do things with the equip-

ment that they won't be able to do in the LUT in September because it's more realistic to what they'll find in theater. So there are some comparisons that we will be able to make in this summer's LUT that we were unable to do there. So to say that shows a measureable improvement over what we have, that was not available to be determined last year. It will be part of the assessment this summer.

Senator LIEBERMAN. Thank you.

Senator Thune.

Senator THUNE. Thank you, Mr. Chairman.

Mr. Duma, I want to come back to the Stryker for just a moment. The industry claims to have already conducted its own testing on this double-V hull. My question is, did that testing provide sufficient data, in your judgment, for the Army to make a decision about production?

Mr. DUMA. Certainly not for production. I'm not aware of what that data looks like personally. However, industry often does things under research and development in their own companies and proposes something to the military. That's a typical way to approach and provide a technological upgrade to the system.

That's exactly where the Army is right now in my opinion. There's a theory that this is going to help. That needs to be verified. That's exactly the case that the Army is in right now to procure some vehicles with the double-V hull protection and then to evaluate the performance through Army testing.

Senator THUNE. General, do you want to add to that?

General PHILLIPS. We agree. We have not asked for production. But we have asked for long lead items associated with production. We've asked for a number of vehicles to go out to procure in order to do the testing that was just described.

If it does not provide the protection that we think it will for our soldiers that are going into battle, we don't want to procure this vehicle. The testing that we'll do in the next several months will answer that question, sir.

Senator THUNE. If that testing is successful, will all the future Strykers have it?

General LENNOX. Senator, our plan is to build one brigade aimed at Afghanistan. Put that brigade in theater-provided equipment and then rotate, and have enough equipment for soldiers to train on back here and then rotate in on that one brigade set of equipment as of right now. Because as General Phillips mentioned, this is a complete new build. It's not something that you retroactively fit to our existing Strykers.

Senator THUNE. Right.

General LENNOX. It will be something that we're going to have to make our decision on in the future.

If I could go back to one of the testing comments. Our key concern is for those soldiers in Afghanistan today and getting the right amount of testing to make sure we're not harming soldiers in any way, but at the same time not testing until every question is answered so that you can get it in the hands of those soldiers. Our goal is to put it in the hands of the soldiers that will be rotating in during the summer of 2011.

There's going to have to be some really good planning and team work here between the testing community to have the equipment in the hands of soldiers so they can train with it sufficiently; maybe go through evaluations before they deploy.

Senator THUNE. Ok. I think everybody probably on the panel today is aware that body armor is one of the most closely watched budget items on Capitol Hill. The Army's interceptor system has been thoroughly tested and upgraded and has saved countless lives I think to the credit of the program officer, Brigadier General Fuller and DOT&E for their good work which has ensured that the best products have been delivered to our troops.

The question I have has to do with section 141 of the 2010 NDAA, which requires that body armor be budgeted for in discreet research and procurement accounts so that Congress can ensure that sufficient resources are being put toward improving body armor. That being said, the President's 2011 budget request contains funding for body armor in a lump sum operations and maintenance account which effectively limits the ability of Congress to conduct oversight. Are we reading that 2011 budget material correctly, and could you explain or add some perspective to that?

General LENNOX. Yes, Senator. We took the direction very clearly that we need to do that. That came out after the Army had finished their program for 2011. We submitted our program to OSD in the June/July timeframe last year. The law came out afterward.

We're taking that very seriously. I think you'll see that in the submission for 2012.

Senator THUNE. Ok. Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Thune.

Senator Begich.

Senator BEGICH. My understanding is that the Army has received, at least from the 1/25 Stryker brigade in Alaska, an urgent operation need for the Land Warrior or some additional equipment.

If you could give me an update on what's happening with the Land Warrior and the Ground Soldier System, where we are in this transition or not transitioning. We have folks that are going to be deployed in June who are now nervous a little bit. So help me understand where we are.

General LENNOX. Thank you, Senator. The Land Warrior system is a program that was killed several years ago.

Senator BEGICH. Correct.

General LENNOX. Because of operational needs statements, we fielded it with several brigades and the intent really is to assess it and see how it informs our program of record, the Ground Soldier System. We have fielded it with a number of units.

I'll take that for the record, what the status is for the brigade that's in Alaska right now. I believe it's getting fielded with a retrofitted set, not a complete brand new one. Frankly, we've probably bought all the Land Warrior systems that we need today in order to assess it and give us guidance for the future as of this time.

Senator BEGICH. I would like to get, for the record, what's going to happen. They're planning to deploy in June of this year. So, if you could get that, that would be fantastic.

[The information referred to follows:]

The Army's objective for fielding materiel solutions in support of Operational Needs Statements is to get the equipment to units in sufficient time to train first with it a home station before deployment. Headquarters, Department of the Army (HQDA), has not formally received a Land Warrior Operational Needs Statement from 1/25 Stryker Brigade Combat Team. We understand that the request is currently being reviewed by U.S. Army Central Command. If approved, it would then be forwarded to HQDA for validation of the requirement. Approval of this requirement is projected to occur in approximately 90 days.

Specific units have not yet been identified for the Ground Soldier System fielding beginning in fiscal year 2012.

Senator BEGICH. Mr. Chairman, that's all I really have except one general question. It seems like as we've walked through today there's been some good discussion on some of the systems that have gone through testing as well as some that have had some problems in the testing process. What do you do in the organizational structure when you have a system that has had cost overruns or questionable testing that's not working as well as you thought?

What happens to the people who are managing those programs that are under your command or whose ever command? I know in the private sector what would happen, but tell me how it works in your system?

General PHILLIPS. The first thing that we would do is do the forensics on the program itself. We would probably bring in a team to take a look at why that program is in the status that it is today. We have a number of venues where we continue to look at programs, Army systems acquisition review councils.

We have milestone decision sessions with OSD Acquisition, Technology, and Logistics and we have configuration steering boards. Much of that comes out of the WSARA that we do today. We have capability portfolio reviews that continue to look at the performance of our programs. It relates to three areas: cost, schedule, and performance.

We have to do the forensics to figure out what happened because the individual that's in charge of that program, it may have been completely out of their control. It may have been something related to technology that never could have been developed. So the system was never able to reach its milestone.

So it's difficult to say what would happen to the people inside the program. They may be managing that program to the best extent that they possibly could. They were not able to execute the program.

I would also argue that part of the paradigm that we need to look at inside the Army is some of the most successful people that are program managers are those that are managing the most challenging programs that may have cost, schedule, and performance issues. I'm going to work on my time in the Army as a part of acquisition reform. How do we manage that inside our Army related to those three things—cost, schedule, and performance—and how are our people inside our programs executing along that strategy.

I hope that answers your question.

Senator BEGICH. It does in general. Do you feel if you see personnel needs, that is, needs in the sense of change, that the support is there within the system to do that in a rapid pace?

An example I give only because every time I come to this room we're dealing with Airland and some other things, and F35s was

Tuesday. That was a dramatic change in personnel in order to move forward.

I want to hear from you that when it's necessary to make those changes you can do them and you get the support to do it because if you don't make those changes it just perpetuates the problem into the future if it's a personnel issue.

General PHILLIPS. Sir, very good question. I want to say this before I answer your question. There are extraordinary people that are managing our programs. Our acquisition workforce I would put up against anybody in any Service because they are doing extraordinary work. I've been a part of this acquisition work since 1985, and I'm proud to lead them.

To answer your question, we have made changes and when it is quite evident that we have people that aren't executing their programs, and I won't give examples.

Senator BEGICH. No, I'm not asking that.

General PHILLIPS. But I've been in the job for 75 days and we have made a number of changes in personnel related to program execution. We take that very seriously because that's our contract with the Army and with our soldiers to deliver that equipment.

Senator BEGICH. Very good. Thank you very much. Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Begich. Thanks for bringing up the Land Warrior program. I'm proud to say that I believe it was this subcommittee that brought the program back from the dead. We really believed in it in a totally bipartisan basis. I'm glad you're using it and continuing to test its utility. It's really a remarkable combination of capabilities for the individual soldier.

Thanks to all of you. It's been a very useful hearing. I appreciate the dialogue between you in good spirit, maybe you set an example for the Senators here. You can disagree without having partisan attacks against one another. [Laughter.]

The record of this hearing shall be held open until Tuesday, April 20, at 5 p.m., to allow Senators to submit additional statements or questions for our witnesses.

I would ask our witnesses to respond in as timely a way as they can, about a month from now maybe a little bit more. I know that Chairman Levin and Senator McCain intend to go to full committee markup, so the sooner the better.

Senator Thune.

Senator THUNE. Mr. Chairman, I think that Senator Begich, in a very diplomatic way, was asking if anybody ever gets fired. [Laughter.]

But thank you all very much for being here today.

Senator LIEBERMAN. Thank you. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

## QUESTIONS SUBMITTED BY SENATOR ROLAND W. BURRIS

### ACQUISITION PROCESS

1. Senator BURRIS. Lieutenant General Lennox, Lieutenant General Phillips, and Mr. Duma, the Secretary of Defense has stated that the Department of Defense's (DOD) acquisition goal is to "get the acquisition right, even at the cost of delay." However, the Army has made a decision to proceed with low-level production of increment 1 systems that are not ready, in the name of getting equipment to the warfighter quickly. It appears that equipping policy goals and your acquisition pol-

icy goals are not aligned. Have you or do you plan to revise your policies, regulations, or priorities to better align them within the Army and with those of DOD?

General LENNOX and General PHILLIPS. The Army and DOD policies concerning equipping and acquisition are aligned and we do not anticipate revising policies, regulations, or priorities. The Army recognizes the goals of equipping and acquisition policies and believe that they are synchronized to provide our soldiers with the best materiel solution when the systems are ready for fielding. Therefore, while the Milestone Decision Authority has authorized production of the increment 1 systems in accordance with the deliberate acquisition procedures in DOD Instruction 5000.02, Operation of the Defense Acquisition System, the Army may field systems that are proven and verified by testing in concert with Army Test and Evaluation Command. We pursue a rapid process to identify emerging technologies and systems and field them quickly to support soldiers engaged in current operations. We need to stay responsive to the immediate requirements that continue to emerge from the field. We will continue to identify those situations where we can accelerate the fielding of certain systems to give our soldiers every advantage in ongoing operations.

Mr. DUMA. The Director, Operational Test and Evaluation (DOT&E) will continue to adhere to the existing statutory and DOD regulatory direction in the conduct of our test and evaluation oversight responsibilities. DOT&E reports objectively and independently to the Secretary of Defense and Congress its evaluations of the results of operational and live-fire testing. DOT&E does not set acquisition policy nor does it evaluate whether decisions made by acquisition or other officials are aligned with policy.

STRYKER DOUBLE-V HULL VEHICLES

2. Senator BURRIS. Mr. Duma, from your written statement, it looks as though DOD believes the Stryker Double-V Hull vehicle shows some promise. You are working with the Army to develop a test plan. When do you expect the test plan to be complete?

Mr. DUMA. The Army presented their concept for testing the Stryker Double-V Hull on May 3, 2010. In accordance with the Acquisition Defense Memorandum dated April 6, 2010, the Army Test and Evaluation Command (ATEC) will submit a completed test plan by June 1, 2010.

3. Senator BURRIS. Mr. Duma, how long do you anticipate testing will take?

Mr. DUMA. Duration of testing is dependent on the availability and arrival of production representative prototypes from the contractor. Based on the schedule presented to DOT&E during the test concept brief, I anticipate testing on ballistic hulls to begin in July 2010. Testing on full prototypes is expected to begin in October 2010 and is planned to be completed by ATEC by May 2011.

4. Senator BURRIS. Mr. Duma, when will this system be ready for fielding?

Mr. DUMA. The Secretary of Defense and the Secretary of the Army determine the readiness for fielding. Depending upon the availability of the agreed-upon test assets, DOT&E could provide an assessment of the survivability characteristics of the Stryker Double-V Hull, as well as the ability of units to accomplish combat missions using the Stryker Double-V Hull, to the Secretaries as early as June 2011.

MANAGED GROUND VEHICLES

5. Senator BURRIS. Lieutenant General Lennox and Lieutenant General Phillips, part of the revision of the Future Combat System program included the cancellation of the planned Manned Ground Vehicles (MGV). Do you have a plan for recapitalization of combat vehicles that the cancelled MGVs were intended to replace, such as the M–11 Abrams tank, M–2 Bradley Fighting Vehicle, and M–109 Paladin?

General LENNOX and General PHILLIPS. The Army does not currently have a plan for recapitalization of combat vehicles that the cancelled MGVs were intended to replace. The M–1 Abrams tank and the M–2 Bradley Fighting Vehicle, as a result of investments during the period fiscal years 2006–2012, have been recapitalized to the latest configurations, and will, by fiscal year 2013, have an average fleet age of 3.5 and 4.5 years respectively. The Army is, however, currently evaluating its Combat Vehicle Fleet requirements as part of the ongoing Ground Combat Vehicle (GCV) Analysis of Alternatives (AoA) and the Vice Chief of Staff Army's GCV Portfolio Review. Future decisions on recapitalization for current systems are dependent on the results of these reviews.

6. Senator BURRIS. Lieutenant General Lennox and Lieutenant General Phillips, do these vehicles meet the Army's needs now and in the foreseeable future?

General LENNOX and General PHILLIPS. Existing combat vehicles such as the M1 Abrams and M2 Bradley meet the Army's current warfighting needs. However, we remain proactive in our analysis and planning to ensure the Abrams and Bradley continue to provide our soldiers the best possible lethality and protection against an adaptive enemy in the Irregular/Hybrid Combat Operations anticipated as the most likely national security environment for the next decade. In this regard, Army modernization planning is focused on standardizing the Heavy Brigade Combat Team (BCT), by end of fiscal year 2013, with the two most modern variants of the Abrams Tank and the Bradley Infantry Fighting Vehicle.

For the future Infantry Fighting Vehicle, the Army is designing a new GCV. The GCV will provide a versatile range of capabilities, including the under-belly protection offered by mine resistant ambush protected vehicle, the off-road mobility and side protection of the Bradley Fighting Vehicle, and the urban and operational mobility of the Stryker. The GCV's development approach enables production of the first vehicle by fiscal year 2017, while establishing a basis from which to adapt.

The Stryker combat vehicle has performed brilliantly in combat. Eight of the 10 Stryker variants are in full rate production (FRP) and the remaining two, the Stryker-Nuclear, Biological, and Chemical Reconnaissance Vehicle has completed Milestone C and the Stryker Mobile Gun System is expected to meet Milestone C FRP in the third quarter of fiscal year 2011. The Army is executing a Stryker modernization program as an integrated solution to provide survivability upgrades, synergy-size, weight, power mitigation, and future technologies integration in two increments.

The M109A6 Paladin Howitzer is currently being upgraded as part of the Paladin Integrated Management program. This program provides a low-risk and affordable life-cycle solution that addresses obsolescence and ensures long-term sustainment of the system through 2050.

Ultimately our finals plans for manned GCVs will be informed by the ongoing GCV AoA and the Vice Chief of Staff, Army's GCV Portfolio Review. Both of these efforts are paramount to scoping and integrating our current combat vehicle modernization efforts, such as for the Abrams, Bradley, Stryker, and Paladin, with the development and production of the GCV.

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## QUESTIONS SUBMITTED BY SENATOR JAMES M. INHOFE

### CARBINES

7. Senator INHOFE. Lieutenant General Lennox, the Army has briefed Congress on a dual-path strategy of upgrading and enhancing the M4 carbine while also completing a new requirement for the eventual replacement of the M4. While I am pleased there is a plan, I am disappointed that so little progress has been made on either the upgrade or the new weapon. It has been, for example, more than 18 months since then-Secretary Geren directed the development of a new requirement. My understanding at the time was that the Secretary directed that the new requirement would be completed in 2009. More recently, the Vice Chief of Staff, General Chiarelli, briefed that a new requirement and upgrade contract were both advancing with the objective of having a competition for the upgrade announced in March 2010. The slow progress and continued missed dates, even those dates directed by the Army's leadership, concern me because it appears that the Army bureaucracy is unable or unwilling to improve the most basic piece of equipment that a soldier in Afghanistan requires—their individual weapon. Where in the process is the requirement for the M4 upgrades and the new rifle?

General LENNOX. Upgrades to the M4 are currently being considered and staffed for implementation by Army Headquarters.

As far as a new rifle, there is a new requirement for the Individual Carbine that has successfully completed Army staffing and is being prepared for joint staffing. The Army cannot move forward in implementation of a new weapon system until that requirement has fully completed staffing and is approved. The Army will initiate a full and open competition once the requirement document is approved.

8. Senator INHOFE. Lieutenant General Lennox, which command or staff section currently has the requirements for action?

General LENNOX. The Army G–3 is preparing the Individual Carbine requirement for joint staffing and is coordinating the staffing of the planned improvements to the current carbine fleet.

9. Senator INHOFE. Lieutenant General Lennox, what is the timeline for completing both requirements?

General LENNOX. Once the Individual Carbine requirement enters joint staffing, the staffing time is usually 3 to 6 months.

The requirement for improvements to the M4 will be staffed and initiated much more quickly.

10. Senator INHOFE. Lieutenant General Lennox, why can the Army not keep a schedule for small arms requirements even when the Secretary and the Vice Chief make the commitments?

General LENNOX. Small arms requirements affect every soldier in the Army. In validating a requirement, there are many different staff sections that must be included in order to come to a consensus of what the Army needs to equip soldiers for the next decade or more. The Army takes great pains to get it "right." In doing so, it often takes longer than initially anticipated to thoroughly research and investigate all issues associated with a given small arms requirement. As such, we are doing our very best to provide a capability to our soldiers that will carry them well into the next decade and provide them a distinct advantage over our adversaries.

ARMY AMMUNITION

11. Senator INHOFE. Lieutenant General Lennox, our soldiers in Afghanistan and Iraq are complaining that the current M855 round does not have the stopping power it they need. According to media reports, the Army has denied the use of improved 5.56mm ammunition in Afghanistan because it is waiting for the adoption of the M855A1 green bullet. This bullet, despite being in development since 1996, has still not been approved for use due to development problems. From an article in the Army Times:

> "Jason Gillis, a former Army staff sergeant, first witnessed the M855's shortcomings in 2004 on the streets of Baghdad. He was a squad leader with 2nd BCT, 82nd Airborne Division, on patrol when a vehicle began speeding toward his unit. After several warnings, 'both of our M249s opened up instantly, forming a crisscross pattern of tracer that met at the vehicles' engine compartment and windshield. Within seconds, riflemen and grenadiers were executing magazine changes while the vehicle kept rolling and finally stopped 10 meters from my lead troops,' Gillis recalled in an e-mail to Army Times. He is now a free-lance writer who often focuses on military small-arms issues. 'Assuming the driver was most likely riddled beyond recognition, we were all astounded to see the driver emerge from the vehicle completely unscathed,' Gillis wrote. 'Closer inspection revealed that the M855 ammunition had failed to effectively penetrate the vehicle's windshield despite the fact that over 400 rounds were expended at extremely close range and on target.' Other soldiers say they like the M855 because it is lightweight, but wish it had more punch. 'The idea of being able to carry 210 rounds [basic load] is quickly overshadowed by the fact that it takes more than one and even more than two rounds to drop the enemy,' Staff Sgt. Charles Kouri, 82nd Airborne Division, told Army Times."

Our Special Operations Forces and Marine Corps are using a newer, improved round, the Special Operations Science and Technology (SOST) round. Marines have noted that it is available now and is deadlier than the current M855 round. From the Army Times:

> "Despite the popularity of the SOST, the Army isn't backing away from its goal to perfect its green M855A1 round. 'SOST is a good round, but SOST is not a lead-free slug,' said Lt. Col. Tom Henthorn, Chief of the Small Arms Branch at the Soldier Requirements Division at Fort Benning, GA. The Army will continue to develop an environmentally friendly 5.56mm, as well as a lead-free 7.62mm bullet, Henthorn added, 'because we care about the environment.'"

Are environmental concerns an obstacle to the Army fielding the best round possible for the current fight?

General LENNOX. Environmental concerns are not an obstacle to fielding the best round to our soldiers. While there were unexpected delays in the M855A1 program, those problems have been resolved. The SOST round does not meet the Army's requirement for a lead-free slug or for performance. Our testing indicates that the M855A1 ammunition will be ready to field this year and will have significant im-

provements over the M855 and SOST rounds. At this point, we could not field the SOST round as an interim solution any faster than we will field M855A1.

12. Senator INHOFE. Lieutenant General Lennox, why can't the Army purchase the SOST round for use now while awaiting the results of the green ammo testing?

General LENNOX. The SOST cartridge does not meet the Army's 5.56mm ammunition performance requirement against hard targets. The Army will begin fielding the new M855A1 Enhanced Performance Round cartridge in June 2010. The Army could not procure and field SOST cartridges prior to that date, even if it met our requirements due to solicitation and production ramp-up times required to purchase the SOST round.

13. Senator INHOFE. Lieutenant General Lennox, how does the lethality of the SOST round compare to the lethality of the new M855A1 green round?

General LENNOX. Although both the M855A1 Enhanced Performance Round (EPR) and SOST cartridges provide more consistent performance than the currently fielded M855 cartridge against soft targets and battlefield barriers, the M855A1 EPR consistently performs better in testing. The SOST cartridge does not meet the Army's requirement for penetrating hard targets. The M855A1 EPR cartridge has better hard target performance against mild steel and concrete masonry compared to the currently fielded M855 cartridge.

### M4 TECHNICAL DATA PACKAGE

14. Senator INHOFE. Lieutenant General Lennox, one of the impediments that the Army had regarding upgrades to the M4 carbine was that Colt owned the Technical Data Package (TDP) for the M4 carbine. However, last summer those rights reverted to the Government, which can now use the TDP as it sees fit to open up any upgrades to the M4 to other companies other than Colt. Reports have surfaced that there are some legal challenges to this reversion of rights. In regards to the enhanced M4, I'm told that there may be a dispute over the M4 TDP, previously owned by Colt, now owned by the Army that could cause significant delays in fielding an improved weapon.

Is there a dispute regarding the M4 TDP? If so, will this dispute delay procuring and fielding of the M4 carbine modification kits?

General LENNOX. Colt's Manufacturing Company never relinquished its proprietary rights in the M4 Carbine TDP to the Government. After June 30, 2009, the Government obtained the rights to utilize the M4 TDP in a competition for production of the M4 carbine and M4 unique spares within the United States and territories, for U.S. military use. The Army has developed an acquisition strategy to improve the M4, which will not be impeded by data rights issues involving Colt.

15. Senator INHOFE. Lieutenant General Lennox, are there any other barriers or impediments to full and open competition of an enhanced carbine?

General LENNOX. At this time, the Army can only conduct a limited competition utilizing an M4 TDP due to the restrictions imposed by 10 U.S.C. 2473, Procurements from Small Arms Production Industrial Base. This statute restricts competition for critical repair parts to firms in the small arms production industrial base. The Army, in anticipation of a robust competition, intends to seek a waiver of this restriction that would allow full and open competition.

### SMALL ARMS PRODUCTION INDUSTRIAL BASE REPORT

16. Senator INHOFE. Lieutenant General Lennox, the report on the small arms requirements of the Armed Forces and the Industrial Base of the United States is required by the National Defense Authorization Act for Fiscal Year 2009, which passed October 2008. To date, this report has not been received by Congress. When can Congress expect this report?

General LENNOX. The report on the DOD's Small Arms Requirements and the Industrial Base of the United States responding to section 143 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, was signed by the Secretary of the Army for DOD on March 25, 2010, and transmitted to the defense committees.

M9

17. Senator INHOFE. Lieutenant General Lennox, a 2006 Center for Naval Analyses (CNA) study of our soldiers and marines in Afghanistan and Iraq showed that 48 percent of the respondents were dissatisfied with the M9 pistol, with 26 percent requesting a larger caliber weapon. The fiscal year 2011 DOD budget includes new start authority for a handgun to replace the M9 and that the requirement may already be Joint Requirements Oversight Council-approved. What progress has the Army made toward replacing M9 with a more powerful and modern sidearm?

General LENNOX. The Army does not currently have a documented requirement for a new pistol.

18. Senator INHOFE. Lieutenant General Lennox, when is the timeline for procuring a new handgun release for proposal, contract award, and procurement?

General LENNOX. At this time, the Army does not have an approved requirement for a new handgun and therefore is not planning to issue a request for proposals.

M249

19. Senator INHOFE. Lieutenant General Lennox, the CNA issued a report stating that more than a third of all soldiers using the M249 squad automatic weapon (SAW) in combat in Iraq and Afghanistan were dissatisfied with its reliability. Over 30 percent of these soldiers experienced stoppages with their M249 while engaging the enemy in combat. What actions has the Army taken since the December 2006 report to replace or upgrade the M249 SAW?

General LENNOX. Early in the war it was recognized that the M249 fleet was old and worn out, creating many of the problems you mentioned. The Army Materiel Command instituted a Repair-and-Return program that overhauled 100 percent of deploying unit M249s, and then upon return from theater, all machine guns, to include the M249, were returned to Anniston Army Depot under the Small Arms Readiness and Evaluation Team program to be brought to a high operational standard before being shipped back to the unit. The combined effect of these programs has been to provide units with well-maintained weapons and to eliminate the oldest, most worn-out weapons that were causing units the most problems. The CNA study you mentioned is only one data point the Army uses to assess the satisfaction of its weapons with soldiers. More timely data comes from post combat surveys conducted with each redeploying unit that assess weapon reliability and soldier satisfaction. In addition, a team recently deployed to theater to independently assess weapon reliability. In both cases the reliability of the M249 was extremely high. In fact, the reliability data from government testing shows the M249 to be over 33,000 mean rounds between stoppages, well beyond the requirement of 2,800 rounds. In addition there have been numerous improvements and upgrades made to the baseline M249 to increase its effectiveness as well as reliability. Examples are the addition of a collapsible buttstock, short barrel, 200-round soft ammo pack, accessory rail kit, improved bipod and light weight charging handle and top cover, and optics. The Army currently has no requirement to replace the M249. Also, as part of the Army's effort to lighten soldiers' load we are evaluating a limited number of MK48s, the Light Weight Machine Gun, in Operation Enduring Freedom; however, we recognize that, while lighter, the MK48 does not meet Army reliability or range requirements.

20. Senator INHOFE. Lieutenant General Lennox, is there any planned replacement for the M249 in the Future Years Defense Program?

General LENNOX. No. The Army currently has no requirement to replace the M249.

BODY ARMOR

21. Senator INHOFE. Lieutenant General Lennox, given that the weight of body armor directly affects soldiers' agility, what is being done to give commanders in the field the ability to tailor their soldiers' level of armor to a specific threat level?

General LENNOX. The Army provides soldiers with the Improved Outer Tactical Vest (IOTV), a modular system that commanders can tailor to specific threat levels. Additionally, the Army is fielding the Soldier Plate Carrier System (SPCS), a modular light weight body armor alternative to the IOTV, to soldiers operating in the mountainous terrain of Afghanistan.

22. Senator INHOFE. Lieutenant General Lennox, are there any body armor programs in development that allow for scalability or modularity?

General LENNOX. Yes, the fielded IOTV is a scalable and modular body armor system that includes individual components for thorax, shoulder, and groin protection, allowing soldiers the option to increase areas of coverage when desired. The IOTV may be worn with or without the Enhanced Small Arms Protective Insert (ESAPI) front, back, and side plates to provide fragment only protection or fragment and rifle round protection. Additionally, the Army is fielding the SPCS, a modular light weight body armor alternative to the IOTV, to soldiers operating in the mountainous terrain of Afghanistan.

Additional research on emerging threats and injury data is ongoing to quantify trade-offs between increased protection and soldier mobility with the goal to improve or develop new modular and scalable components. This research along with applied research on novel polymers, fibers, and ceramics will enable the development of materials and systems with optimum load transfer, energy absorption, and durability characteristics.

23. Senator INHOFE. Lieutenant General Lennox, given the intense terrain in Afghanistan that our troops are patrolling and the high weight carried in body armor and other equipment, are you examining new, lighter-weight body armor systems being offered by industry today? If so, are you pursuing acquisition of these systems?

General LENNOX. Yes, the Army evaluated, through the competitive bid process, industry ideas for lighter body armor and selected the SPCS for procurement. The SPCS, a lighter weight body armor system is currently being fielded to soldiers operating in the mountainous terrain of Afghanistan.

24. Senator INHOFE. Lieutenant General Lennox, do you anticipate budgeting for the next generation of body armor in the next budget?

General LENNOX. We anticipate that research, development, test, and evaluation (RDT&E) funding for personal protective equipment, to include plates, soft armor, helmets, and eye protection, will compete for funding in the next budget cycle. The RDT&E funding will be programmed in separate project codes within the existing Budget Activity 6.4 and 6.5 lines to support further development of promising technology emerging from science and technology efforts. Funding within the applied research areas of novel polymers, fibers, and ceramics will enable the development of next generation protection for the soldier utilizing materials and systems with optimum load transfer, energy absorption, and durability characteristics.

25. Senator INHOFE. Lieutenant General Lennox, this committee understands that all the Services are concerned about weight and are challenging industry to develop a lightweight solution. Absent supplemental funding, how will future systems be paid for?

General LENNOX. The Army will compete for available base funding if supplemental funding is not provided for procurement of future body armor systems. For the development of future body armor systems, the Army plans to program RDT&E funding in the next budget cycle.

26. Senator INHOFE. Lieutenant General Lennox, last year's National Defense Authorization Act required the Services to include budget lines for body armor in procurement and for RDT&E. None of the Services did so. Can you tell me why the Army failed to follow the law?

General LENNOX. The Army did not create separate body armor funding lines in RDT&E and procurement in the fiscal year 2011 budget because we were awaiting guidance from the Office of the Secretary of Defense (OSD) on how to implement the National Defense Authorization Act for Fiscal Year 2010 language. Previously, body armor has been an expendable and not an investment item, and therefore purchased with Operation and Maintenance, Army funding. The Army is exploring options with OSD for subsequent fiscal years and will implement in accordance with OSD guidance.

27. Senator INHOFE. Lieutenant General Lennox, how much money has the Army budgeted for RDT&E of body armor and how have you coordinated with the other Services on body armor research and development?

General LENNOX. The Army budgeted $5.36 million in fiscal year 2010 and $1.1 million in fiscal year 2011 for RDT&E for body armor.

The Army coordinates, on a quarterly basis, with other Services on body armor RDT&E through the Cross-Service Warfighter Equipment Board (CS–WEB). The

CS–WEB is comprised of the Navy, Marine Corps, Air Force, Coast Guard, and U.S. Special Operations Command to coordinate joint warfighter equipment investments which ensure the most effective solutions are acquired and fielded by all Services. The forum provides a dialogue on all aspects of life cycle acquisition management: science and technology plans; technology transition planning; system design and development; initial production; procurement strategies; raw ballistic fiber/material usage forecasts and shortage issues; ballistic testing protocols; production rates; and operational support concepts. The group makes recommendations on technology investments in order to minimize duplication and maximize joint investments.

[Whereupon, at 3:32 p.m., the subcommittee adjourned.]