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THE CURRENT AND FUTURE ROLES, MISSIONS, AND CAPABILITIES OF U.S. MILITARY AIR POWER

HEARING

BEFORE THE

SUBCOMMITTEE ON AIRLAND

OF THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

APRIL 30, 2009

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CONTENTS

CHRONOLOGICAL LIST OF WITNESSES

THE CURRENT AND FUTURE ROLES, MISSIONS, AND CAPABILITIES OF U.S. MILITARY AIR POWER

APRIL 30, 2009

	Page
Bolkcom, Christopher, Specialist in Military Aviation, Congressional Research Service	5
Hawley, Gen. Richard E., USAF (Ret.), Former Commander, Air Force Air Combat Command	13
Nelson, Hon. Bill, U.S. Senator from the State of Florida	17
Watts, Barry D., Senior Fellow, Center for Strategic and Budgetary Assessments	17

THE CURRENT AND FUTURE ROLES, MISSIONS, AND CAPABILITIES OF U.S. MILITARY AIR POWER

THURSDAY, APRIL 30, 2009

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

The subcommittee met, pursuant to notice, at 2:02 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, Burris, Inhofe, Chambliss, and Thune.

Also present: Senator Bill Nelson.

Committee staff members present: Leah C. Brewer, nominations and hearings clerk; and Paul J. Hubbard, receptionist.

Majority staff members present: Madelyn R. Creedon, counsel; Creighton Greene, professional staff member; and William K. Sutey, professional staff member.

Minority staff member present: Pablo E. Carrillo, minority investigative counsel.

Staff assistants present: Mary Holloway and Brian F. Sebold.

Committee members' assistants present: Christopher Griffin, assistant to Senator Lieberman; Christopher Caple, assistant to Senator Bill Nelson; Jon Davey, assistant to Senator Bayh; Michael Harney, assistant to Senator Hagan; David Ramseur, assistant to Senator Begich; Brady King, assistant to Senator Burris; Anthony J. Lazarski, assistant to Senator Inhofe; Sandra Luff, assistant to Senator Sessions; Clyde A. Taylor IV, assistant to Senator Chambliss; and Jason Van Beek, assistant to Senator Thune.

OPENING STATEMENT OF SENATOR JOSEPH I. LIEBERMAN, CHAIRMAN

Senator LIEBERMAN. Good afternoon. The subcommittee will come to order.

In this meeting of the Subcommittee on Airland, we're going to follow on a hearing we held on March 26, in which we talked about our ground forces. There are two hearings intended to broadly explore our country's current and future roles, missions, and requirements for the land- and air-power forces of our military. Today, we turn our discussion to America's military air power.

We are now contemplating a number of major decisions that would affect the organization and capabilities of American military

air power for some time to come. Earlier this month, April 6, Secretary of Defense Gates announced a series of recommendations that he would make to President Obama for the Fiscal Year 2010 Defense Budget, which we'll get in a while. Those included proposals to end production of the F–22 Raptor and the C–17 Globemaster, to add funds to procure unmanned intelligence, surveillance, and reconnaissance (ISR) systems, and to delay the production of a follow-on bomber.

Today, we're privileged to have three informed and experienced witnesses who I look forward to asking to assess the recommendations that Secretary Gates made, and, in particular, to discuss the implications of these recommendations for the operational capabilities of the air-power units of our military.

Many of our colleagues here in the Senate, including myself, have expressed concern about some of the specific proposals, particularly regarding the F–22, the F/A–18 E/F, and the next-generation bomber. I believe it's essential that Congress assess these recommendations against the obvious reality, which is the immediate budgetary constraints, but also the less obvious reality, because it's slightly longer distance, which is the operational requirements for air power in the years ahead.

I also look forward to hearing from the witnesses an assessment of the long-term requirements for air power, in this sense, about how we can better anticipate emerging capabilities that will affect us in the future. I'm particularly interested in our witnesses' thoughts about how we should respond to and anticipate follow-on technologies to the unmanned aerial systems that are now providing full-motion video surveillance over the battlefield, something that could not have been contemplated even a few years ago.

If we look out 10 or 20 years, the composition of our air forces could be dramatically different than it is today. Looking to future threats, I'm concerned about the growing density of anti-access capabilities that are intended to limit the freedom of maneuver that American air power has enjoyed in recent times, and I'm concerned about the apparent vulnerability of U.S. military operations to such threats as the cyber warriors who attack our computer networks.

In short, I hope this afternoon's discussion will inform the subcommittee as we go forward, after the President submits the budget for the Department of Defense (DOD), to make our own authorization recommendations to the full committee and the Senate as to how best to invest in capabilities, near-term and longer-term, that will protect the security of the American people.

I thank the witnesses for being here. I look forward to your testimony.

Now, Senator Thune. Thank you.

STATEMENT OF SENATOR JOHN THUNE

Senator THUNE. Thank you, Mr. Chairman. Thank you for calling this hearing to examine the current and future roles, missions, and capabilities of U.S. military air power. I want to thank our esteemed witnesses, as well, for appearing today. The topic of our hearing today is of the utmost importance to me.

We're here on the occasion of Secretary of Defense Gates' April 6, 2009, press conference on recommendations he's making to the

President on the Fiscal Year 2010 Defense Budget. I'm a strong supporter of Secretary Gates and admire his courage to restructure a number of major defense programs. It's long been necessary to shift spending away from weapon systems that are plagued by scheduling and cost overruns to ones that strike the correct balance between the needs of our deployed forces and the requirements for meeting the emerging threats of tomorrow. I also greatly appreciate that Secretary Gates continues to place the highest priority on supporting the men and women of the U.S. Armed Forces.

Having said that, I do have some fundamental concerns. One question I have in terms of military aviation, and from the standpoint of military necessity, is Secretary Gates' plan on air power modernization too unbalanced in favor of short-range fighters versus long-range strike aircraft?

On October 7, 2001, when Operation Enduring Freedom in Afghanistan started, early combat operations included a mix of air strikes from land-based B–1 Lancer, B–2 Spirit, and B–52 Stratofortress bombers, carrier-based F–14 Tomcat, and F/A–18 Hornet fighters and Tomahawk cruise missiles launched from both U.S. and British ships and submarines. During that war, U.S. aircraft had to operate at far greater distances than they had in past conflicts. U.S. air power may have to do the same in future wars.

Furthermore, during the major combat phase of Operation Iraqi Freedom, B–1s carrying 24 Joint Direct Attack Munitions (JDAMs) provided round-the-clock, on-call, precision-fire support for coalition ground forces. The integration of JDAM and laser-guided bombs on long-range bombers has dramatically increased their effectiveness in conventional operations.

U.S. air forces operating in Asia and the Pacific might well have to travel several times farther than U.S. forces typically had to during the Cold War. The need for aircraft that can loiter over the battlefield for long durations to find emerging, fleeting, or otherwise time-sensitive targets in support of ground forces, for example, appears to be growing. The possibility that, with his proposal, Secretary Gates may have struck an inappropriate balance in favor of short-range systems versus long-range strike aircraft is perhaps no better reflected than in what he wants to do with the next-generation bomber program.

As part of Secretary Gates' plan to modernize our strategic and nuclear-force capability, he proposes to discontinue the development of a follow-on Air Force bomber until we have a better understanding of the need, the requirement, and the technology, and examine all of our strategic requirements during the Quadrennial Defense Review (QDR), the Nuclear Posture Review, and in light of post-Strategic Arms Reduction Treaty (START) arms-control negotiations.

Aside from the position I laid out just a moment ago, I have a couple of other questions here. The first is: How does Secretary Gates reconcile his position on the next-generation bomber with prior statements he recently made on the military need to continue that program? Just a few months ago, he wrote in the Foreign Affairs journal that the U.S. ability to strike from over the horizon will be at a premium in future conflicts and will "require shifts from short-range to long-range systems, such as the next-genera-

tion bomber." He made virtually the same statement during a speech at the National Defense University, and also in the first-quarter edition of the Joint Force Quarterly.

Also, as Secretary Gates urged on April 6, there must be a "better understanding of the need, the requirement, and the technology." The original decision to pursue a next-generation bomber was already fully vetted in the 2006 QDR. Recognizing the importance of the evolving strategic requirement for global strike aircraft based outside the theater, the QDR directed the U.S. Air Force to field a follow-on to the B–2 by 2018. Until the 2009 QDR is completed sometime this summer and released next year, the 2006 document is the only framework we have for judging how well the military's air-power capabilities meet national requirements.

Moreover, Secretary Gates' current position on the next-generation bomber appears undermined by recent statements from several currently-serving combatant commanders, provided in response to questions from me, to the effect that it is important to continue developing that program.

Finally, Secretary Gates' proposal to base decisions on our current strategic and nuclear-force structure, including the next-generation bomber and post-START arms-control talks, appears problematic. While seemingly reasonable on its face, waiting until a new START is negotiated and ratified by the Senate could literally take years. Appearing before the Carnegie Endowment for International Peace last fall, Secretary Gates himself expressed concern about how long the original START negotiations took and what that meant for the follow-on START about to be negotiated. The lead START negotiator, likewise, indicated recently that the follow-on treaty could already be slipping to the right.

Related to my concern on whether Secretary Gates' plan on air-power modernization may be unbalanced in favor of short-term fighters versus long-range strike aircraft are questions I have on his proposal on the F–35 Lightning II Joint Strike Fighter (JSF). Under his plans, Secretary Gates is recommending going from the 14 aircraft bought in fiscal year 2009 to 30 in fiscal year 2010, with corresponding funding increases from $6.8 billion to $11.2 billion. The Secretary's proposed commitment to JSF also requires us to confront serious questions about that aircraft's high cost and affordability. The F–35 variants for the Navy, Marine Corps, and Air Force will cost more to procure than the older tactical aircraft each Service is to replace, and the costs of the F–35 program have increased 47 percent since 2001, from $65 million to $105 million per aircraft.

To sum up, in terms of military aviation, I, as I'm sure other members of this subcommittee and the public, have serious questions about whether we are effectively institutionalizing and enhancing our capabilities to fight the wars we are in today and to address the scenarios we are most likely to face in the future, while hedging against other risks and contingencies.

Mr. Chairman, I look forward to hearing from our witnesses today and look forward to the opportunity to ask some questions.

Thank you.

Senator LIEBERMAN. Thank you, Senator Thune, for that very thoughtful opening statement. I think you framed the questions very well.

Again, thanks to the witnesses. As is the custom of the committee, we're going to start with the more-or-less inside witness, Mr. Bolkcom, a specialist in military aviation at the Congressional Research Service (CRS), where he conducts nonpartisan, objective research and analysis for Congress. Thanks for the work you've done, and we look forward to your testimony now.

STATEMENT OF CHRISTOPHER BOLKCOM, SPECIALIST IN MILITARY AVIATION, CONGRESSIONAL RESEARCH SERVICE

Mr. BOLKCOM. Thank you, sir.

Chairman Lieberman, Senator Thune, and distinguished members of the subcommittee, thanks for inviting me to speak with you today about military aviation. As requested, I'll address DOD's current and projected aviation capabilities and if they'll ensure that U.S. needs are met.

The only effective way to judge military aviation is in the context of strategy. What do we want our aviation forces to do? As you mentioned, sir, on April 6 Secretary Gates stated that he believes that DOD needs to rebalance its spending to make military forces more effective against what he calls "hybrid warfare," a simultaneous spectrum of conventional and irregular conflict. Fighting terrorists, insurgents, and other nonstate actors is challenging, and increasing our competence against threats suggests new tactics and, potentially, new weapons systems. These weapons systems, in many cases, would have different capabilities than today's weapons, and their distinguishing characteristic may be an emphasis on simplicity and low cost.

Some fear that rebalancing the force toward irregular warfare will mean reducing DOD's most capable weapon systems, making us vulnerable to our most proficient adversaries. These same observers fear that DOD is too focused on the current war and not sufficiently mindful of the need to sustain capabilities such as achieving air dominance against modern air forces. Others embrace Secretary Gates's proposal. They note that our air forces have dominated every conventional foe that they've faced over the past 25 years, but have struggled with irregular warfare. Some argue that the country can't afford weapon systems we don't need and that our warfighters deserve weapon systems optimized to the threat that they face.

As a rough blueprint, Secretary Gates suggested that 10 percent of overall defense spending would focus on irregular warfare, 50 percent on state-on-state conflict, and 40 percent on what he called "dual-purpose forces." If one were to rebalance aviation forces, it appears that a different spending ratio may be in order.

Few aviation assets appear to be unique to irregular warfare. Very small or nonlethal weapons are perhaps more germane to irregular than state-on-state conflict. Another example might be an off-the-shelf lightly-armed turboprop aircraft. Also, investing in Special Operations forces that train and advise allied nations on how to better use their air forces against insurgents is another option.

Boosting irregular capabilities might require 10 percent of aviation spending. Similarly, there appear to be few aviation assets unique to state-on-state conflict, and our air power might be rebalanced by spending 10 percent of the aviation budget on these assets. Delivering nuclear weapons, prevailing in aerial combat, and defeating advanced air defenses are clearly relevant to state-on-state conflict, but have little, if any, application to irregular warfare.

It would appear feasible to reduce aviation forces unique to these missions if they were found to be in excess of force levels dictated by the QDR and other strategy guidance. Savings from these reductions could be invested in dual-purpose or counterinsurgency aviation.

Most aviation assets are dual-purpose, and these assets might consume up to 80 percent of aviation spending. Precision strike, close air support (CAS), ISR, and airlift are examples of missions germane to both conventional and irregular warfare.

A review of recent experience in Iraq and Afghanistan shows that commanders in the field have successfully adapted aircraft designed for state-on-state conflict to the counterinsurgency mission.

In conclusion, it appears that the upcoming QDR and attendant congressional oversight offer an opportunity to ground our battlefield commanders' adaptations in a coherent strategy. By considering the projected threat environment and matching air-power capabilities to national goals, a strategy-driven process should yield aviation forces that are both effective and cost-effective.

Mr. Chairman, this concludes my remarks. It's been a pleasure to speak with you today. Thank you.

[The prepared statement of Mr. Bolkcom follows:]

PREPARED STATEMENT BY CHRISTOPHER BOLKCOM

Mr. Chairman, distinguished members of the subcommittee, thank you for inviting me to speak with you today about military aviation. As requested, I will address the Department of Defense's (DOD) current and projected aviation capabilities and whether they will ensure that U.S. needs are met.

INTRODUCTION

As a rule, aviation forces are procured and operated as part of a strategy. Military aircraft are just some of the means, or resources which DOD employs to achieve its goals. When policymakers ask questions such as:

- Should we buy more bombers?
- Is there a fighter gap?
- Is DOD aggressive enough in fielding unmanned aerial vehicles (UAVs)?
- Do we have sufficient long-range cargo and aerial refueling capability?

the answers should depend entirely on what specific needs military aviation is projected to meet.

Today, these needs are expressed in the 2006 Quadrennial Defense Review (QDR). Until the 2009 QDR is completed sometime this summer, the 2006 document (and associated strategy guidance) is the only framework for judging how well DOD's air-power capabilities meet national requirements. Yet it appears foolish to use the 2006 QDR as a rigid template, because the 2009 QDR could include new or different national objectives which would strongly influence military aviation. For example, one potential change in the 2009 QDR that could strongly affect judgments on air-power capabilities is the elimination of the longstanding requirement to successfully fight two simultaneous or nearly simultaneous major theater wars.[1] This require-

[1] Thom Shanker. "Pentagon Rethinking Old Doctrine on 2 Wars." New York Times. March 15, 2009.

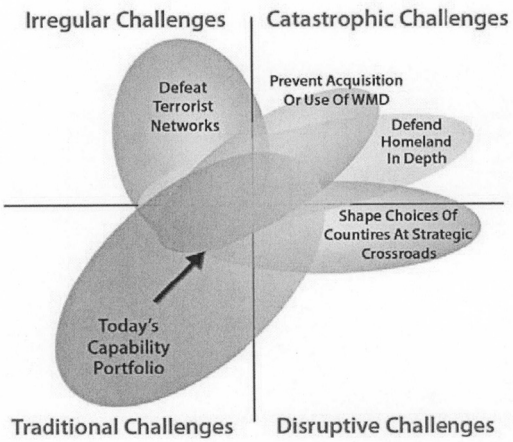
ment predates the QDR process, has been included in every QDR, and has a profound impact on military aviation force structure.[2]

It is difficult, and perhaps not particularly useful to try to predict all of the 2009 QDR's potential findings. One overarching trend, however appears to run through a number of high-level DOD studies and planning documents, and appears highly useful to informing assessments of DOD's airpower portfolio; namely, the need to rebalance military acquisition plans to field forces that are as capable against non-state actors, as they are against conventional foes.

In the spring of 2004, DOD's Strategic Planning Guidance found that the United States is well positioned to deal with a conventional military adversary. Increasingly, however, the United States may find itself facing nonconventional foes, for which it is not well prepared.[3]

The 2006 QDR picked up on this theme. As depicted in Figure 1, below, the 2006 QDR noted that "the Department is shifting its portfolio of capabilities to address irregular, catastrophic and disruptive challenges while sustaining capabilities to address traditional challenges."[4]

Fig. 1: DOD Capabilities



Source: 2006 QDR

In a press conference detailing DOD's key recommendations to the White House on the proposed Fiscal Year 2010 Defense Budget, both Secretary of Defense Robert Gates and Vice Chairman of the Joint Chiefs of Staff Gen. James Cartwright emphasized the concept of "hybrid" warfare, a mixture of both high-end state-on-state conflict, and irregular warfare.[5] DOD's leaders made it clear that they didn't think in terms of fighting either conventional or irregular warfare but in terms of addressing a spectrum of simultaneous conflict. Secretary Gates estimated (admittedly

[2] In 1993, in the aftermath of the fall of the Soviet Union, Secretary of Defense Les Aspin conducted his "Bottom-Up Review" of defense capabilities and found that although the threat from the Soviet Union had largely abated, the United States still faced noteworthy military challenges. Among other requirements, the Bottom-Up Review concluded that DOD must be prepared to defend its Persian Gulf allies without diminishing its ability to also defend South Korea from a North Korean attack. When first recommended, the need to prepare for two simultaneous major theater wars was criticized by many as overly ambitious and unrealistic. (Andrew Krepinevich. "Assessing the Bottom-Up Review." Joint Forces Quarterly. Winter 93–94.) Others believed the two-MTW objective was a rear-guard action to preserve military force structure at a time when much of the country wished to reduce military spending to achieve a "peace dividend." ("Financial Realities Drive Aerospace Consolidation." Aviation Week & Space Technology. May 1, 1995.)

[3] "Building Top-Level Capabilities: A Framework for Strategic Thinking." Briefing to Senior Level Review Group. August 19, 2004.

[4] 2006 QDR, p. 19.

[5] "DOD News Briefing With Secretary Gates From The Pentagon." News Transcript. Office of the Assistant Secretary of Defense (Public Affairs). April 6, 2009.

crudely) that up to 40 percent of DOD's budget would be spent on military forces that are equally pertinent to irregular and conventional warfare—"dual purpose" capabilities in his words. Secretary Gates' and General Cartwright's comments appear to be completely consistent with the 2006 QDR's findings that DOD must be positioned to address an increasingly broad array of military challenges, many of them outside the realm of classic state-on-state conflict. It is within this context—the balancing of military aviation to effectively address "hybrid warfare"—that DOD airpower can be most effectively assessed.

THE CHALLENGES OF IRREGULAR, NON-STATE ACTORS [6]

Combating non-state actors presents a broad array of challenges to U.S. military forces. Planners tend to readily grasp the obvious operational challenges, but shouldn't overlook the need to re-vamp both tactics and doctrine, and while also being aware of the costs involved.

Operational Challenges

Military planners have a number of tools at their disposal to attempt to find, identify, track, capture, or kill terrorists, insurgents and other non-state actors. A survey of counterinsurgency and anti-terrorism efforts indicates that in general, military aviation plays a prominent role in performing these tasks. Airpower has proven very valuable in contemporary (e.g., Iraq, Afghanistan, Philippines) and historical (e.g., El Salvador) counterinsurgencies. The most critical missions appear to be persistent surveillance and reconnaissance, aerial insertion of troops, close air support, combat search and rescue, medical evacuation, and tactical airlift and resupply.[7]

Achieving air superiority and attacking military targets on the ground—missions at which today's aviation forces excel—are also important to counterinsurgency and other non-state actor operations. These missions don't however, typically require the high performance characteristics of the combat aircraft that DOD is currently procuring and developing. Non-state actors do not have the resources to effectively challenge even modest air forces. Thus, aircraft best suited to addressing irregular warfare may emphasize long endurance, slower speeds, and may often, if not typically, be unmanned.

Compared to the armed forces of a nation state, non-state actors are relatively easy to defeat in direct combat. Non-state actors typically lack the equipment, training and discipline that define a state-based military force. Actually engaging in direct combat with non-state actors is, however, the core operational challenge. Non-state actors typically don't wear uniforms. Indeed, they generally strive to integrate themselves into the local civilian population. Thus, target identification is very challenging. Non-state actors rarely mass into easily recognizable formations. They typically lack large infrastructure or obvious logistics processes. Therefore, non-state actors present few "high value" targets for U.S. forces. This challenge has not been lost on DOD leadership. For example a former Commander of Air Force Special Operations notes:

> For many years, though, there's been a concern that intelligence collection capability basically rested in the ability to find a tank or an artillery piece hiding in a grove of trees. The problem now becomes how to find individuals hiding in groups of people. . . This presents a huge problem for us.[8]

The leadership and structure of many non-state organizations are opaque. Such organizations might be diffuse and operate over long distances. Al Qaeda, for example, often operates through partner organizations which might be small and have fluid leadership. One DOD leader has said "When we kill or capture one of these leaders, another one steps in and quickly takes their place."[9]

Once identified, non-state actors are often difficult to engage due to concerns over collateral damage. Even conventional state-on-state conflict presents collateral damage concerns. When one party is actively trying to shield itself behind noncombat-

[6] "Non-state actors" is an umbrella term that refers to a number of armed groups such as political terrorists, narco-traffickers, paramilitary insurgents, and even international organized criminal organizations. These terms are not mutually exclusive. Paramilitary groups can, for example, engage in narco-trafficking, terrorism, and crime. For example: "International terrorism is known to be linked closely with the drug trade and criminal organizations. . ." (Lt. Gen. Gennadiy M. Yevstafyev. "Unmanned Aerial Vehicles in Classic and Terrorist Wars." Moscow Yadernyy Kontrol. July 5, 2004. pp. 77–82.)

[7] A more complete treatment of this topic can be found in CRS Report RL32737.

[8] Lt. Gen. Michael W. Wooley, Commander, Air Force Special Operations Command. "Application of Special Operations Forces in the Global War on Terror." Air & Space Conference 2004. Washington, DC. September 14, 2004.

[9] Ibid.

ants, however, delivering weapons with extreme precision and minimum effects takes on increased importance. A RAND study summed up the operational challenges:

> . . . ferreting out individuals or small groups of terrorists, positively identifying them, and engaging them without harming nearby civilians is an extremely demanding task. Substantial improvements will be needed in several areas before the Air Force can be confident of being able to provide this capability to combatant commanders.[10]

Mindset Challenges

Successfully combating non-state actors and irregular warfare will likely require different training, tactics, doctrine, political strategies, and potentially rules of engagement, than are optimal for conventional military warfare. Collectively, these changes may combine to require a different politico-military mindset for senior decisionmakers.

The U.S. military, policymakers and the general population, desire short conflicts, with clear success criteria, exit strategies, and decisive victories. In a conventional setting, "victory" typically entails an adversary's unconditional surrender. But non-state actors may define victory as not losing; their continued existence is a victory. This mindset characterizes several Palestinian terrorist groups that fought Israel's occupation of Palestinian territories. In most cases, they themselves cannot achieve rapid, decisive victory, so they follow a strategy of protracted war. According to one scholar ". . . insurgent, terrorist and criminal organizations consciously design themselves so that our military and police forces cannot rapidly and decisively defeat them."[11] Others note that "even dying for their cause intentionally or voluntarily is perceived as a victory (for terrorists). It's a different paradigm than the traditional military concern for limiting casualties."[12] This is characteristic of groups such as Hamas and al Qaeda that employ suicide tactics.

In a conventional warfare setting, state-based armed forces guided by the laws of war typically attempt to avoid civilians or shield them from the war's consequences. When combating non-state actors, however, civilians may need to be engaged at an unprecedented level. Winning the "hearts and minds" of the local population, or at least not alienating them could become a large part of the overall counter insurgent, or counter terrorist strategy.

Terrorists and insurgents require at least tacit, if not active, support from the local population to operate effectively. In the words of one British general responsible for counterinsurgency operations "The shooting side of the business is only 25 percent of the trouble. The other 75 percent is getting the people of this country behind us."[13] However, the military activities at which today's Armed Forces excel, such as precisely destroying buildings or vehicles, may work counter to this "hearts and minds" strategy. According to one study "counter terrorist military attacks against elusive terrorists may serve only to radicalize large sectors of the (Muslim) population and damage the U.S. image worldwide."[14]

Cost Challenges

Almost by definition, non-state actors employ weapons and methods that are inexpensive, when compared to training, equipping and employing a military force. However, the cost to defend against non-state actors, or to combat them, can be high. For example, terrorists can acquire manportable, air defense systems (MANPADS) for as little as $5,000. If a terrorist succeeded in shooting down a commercial airliner with this shoulder-fired missile, the immediate cost of losing the airplane would be over $100 million, and the indirect costs much higher. Further, fielding technologies on commercial aircraft to defend against this threat could cost the United States $10 billion in acquisition costs alone.[15] The "cost-exchange ratio" of fighting non-state actors is not in the United States' favor.

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[10] David Ochmanek. "Military Operations Against Terrorist Groups Abroad." RAND. 2003.

[11] Thomas R. Searle. "Making Airpower Effective against Guerrillas." Air & Space Power Journal. Fall 2004.

[12] Wooley. Op. cit.

[13] Lt. Gen. Sir Gerald Templer, the British High Commissioner to Malaya. As cited in David Ochmanek. "Military Operations Against Terrorist Groups Abroad." RAND. Santa Monica, CA. 2003.

[14] The Sociology and Psychology of Terrorism: Who Becomes a Terrorist and Why? A Report Prepared under an Interagency Agreement by the Federal Research Division, Library of Congress. September 1999. P.68.

[15] A more complete treatment of this topic can be found in CRS Report RL31741.

A BALANCING ACT

There is a strong consensus in defense circles that airpower is one of the United States' great military advantages. As mentioned earlier in this testimony, however, many observers are increasingly concerned that military aviation is focused too much on the demands of fighting conventional foes to the detriment of irregular warfare, and that "the challenge for the Air Force is to re-shape its forces to increase their relevance in small wars, while maintaining the capability to win major conflicts."[16] In other words, in this view, a balance must be struck.

Arguments for maintaining the current focus

Supporters of DOD's current modernization plans—which largely reflect forces required for state-on-state conflict—say that the F–22, Joint Strike Fighter, F/A–18E/F, and other "high-end" platforms are still required for state-on-state conflict, despite U.S. preeminence in this area, and that new concepts of operation, new organizational schema, or technology upgrades may increase these systems' applicability to counterinsurgency and irregular warfare challenges. Those who support DOD's current aviation modernization plans could argue that fluid threat environments are nothing new. Platforms with long development timelines and long operational lives often must be modified and used differently than originally intentioned so as to keep pace with new threats and military objectives. It is much more difficult, to take the opposite approach, they could argue. From their perspective, DOD can't develop technologically less sophisticated weapons systems to address unconventional threats, and then improve these systems in the future if more high tech threats arise.

While "low-tech" insurgents and other non-state actors appear to deserve more attention than in the past, the United States shouldn't slight its traditional military strengths, "conventional" aviation supporters argue. DOD has evolved from a "threat-based" to a "capabilities-based" planning framework. Threats can change, but the military capabilities the Nation desires, tend to have a longer life-span. The ability to achieve air dominance is a key military capability the U.S. must maintain, supporters of DOD's current aviation plans say, and the U.S. must be capable of conducting this mission in the most stressing scenarios; such as a potential conflict with China, for example. By preparing for the most stressing case, in this view, the U.S. can more than satisfy lesser included cases, such as air dominance missions against non-state actors.

Russian SA–10, SA–12, and SA–20 surface-to-air missiles (SAMs) (also called "double digit" SAMs) are a concern for military planners due to their mobility, long range, high altitude, advanced missile guidance, and sensitive radars. The Russian SA–20 has been likened to the U.S. Patriot PAC–2 missile, but with an even longer range, and a radar that is very effective in detecting stealthy aircraft. Military planners are concerned that a country with only a handful of these SAMs could effectively challenge U.S. military air operations by threatening aircraft and disrupting operations from great distances. The transfer of such weapons to countries such as Iran, are particularly worrisome.[17]

A variety of new technologies and military systems could exacerbate the "double-digit" SAM challenge. First, commercial information and communications technologies are enabling adversaries to better network the elements of their air defense systems. This allows them to disperse radars, SAM launchers and other associated platforms throughout the battlespace, and to share targeting information among launchers. This, in turn, suggests that radars may be used less frequently and for shorter periods of time, complicating efforts to avoid or suppress them. Second, terminal defenses are being marketed by a number of international defense companies. These radar-guided Gatling guns are designed to protect "double-digit" SAMs or other high value air defense assets. These systems could prove quite effective in shooting down missiles aimed at enemy air defenses. Third, Russia and other countries have developed and are selling Global Positioning System (GPS) jammers. Over varying distances, these low-watt jammers may degrade the GPS guidance signals used by many U.S. precision-guided munitions (PGMs) to augment inertial guidance systems, reducing their accuracy.

If these double-digit SAMs are protected by an enemy air force equipped with advanced Russian or European combat aircraft, the military problem becomes dire, say

[16] Thomas McCarthy. National Security for the 21st Century: The Air Force and Foreign Internal Defense. School of Advanced Air and Space Studies. Air University. Maxwell Air Force Base, AL. June 2004. p.67. And Thomas R. Searle. "Making Airpower Effective against Guerrillas." Air & Space Power Journal. Fall 2004.

[17] David A. Fulghum. "Russia Sells SA–20 to Iran." Aviation Week & Space Technology. December 15, 2008.

supporters of DOD tactical aviation. According to press reports, a joint U.S.-Indian Air Force exercise, called Cope India, illustrates that pilots from non-NATO countries can receive excellent training and execute advanced air combat tactics. When flying advanced combat aircraft such as the Russian-designed SU–30, such well trained pilots could effectively challenge U.S. Air Forces, some say.

Arguments for Rebalancing

Most would agree that DOD still requires advanced aircraft to deter and fight tomorrow's potential conventional conflicts. However, many argue that the efforts and resources expended to develop and produce these aircraft are not balanced with current and foreseeable conventional military challenges. The ability to achieve air dominance is a key capability that DOD must sustain, but against whom? Air dominance was achieved in about 15 minutes over Afghanistan and Iraq, some say, and, for the most part, with aircraft designed 30 years ago (e.g., F–15s, F–16s, F/A–18s).

The stressing air dominance scenario described above may require some of the aircraft currently being developed by DOD. However, how many of these scenarios might realistically emerge in the future? Many would agree that a potential conflict with China could be one such challenge, but other credible examples are very difficult to imagine. Those who seek a rebalancing of military aviation argue that the proliferation of advanced SAMs has not occurred, and will likely not occur in the future, at the rate predicted by DOD.

Despite being on the market for over 25 years, Russia reportedly has only managed to transfer double-digit SAMs to six countries (Bulgaria, China, Czech Republic, Germany, Greece and Kazakhstan), three of which were Soviet client states at the time of the sale. Further, rebalancing advocates would argue, Russia has been threatening to sell double-digit SAMs to Iran since the early 1990s, in part, to increase its leverage vis-a-vis the United States in the region. No deliveries have yet been reported in the open press, and in April 2009, senior Russian defense officials stated that Russia has not delivered SA–20s to Tehran.[18]

While these weapons are clearly dangerous, they are also expensive, and require extensive training to operate effectively. This has arguably slowed the proliferation of these systems, and may also do so in the future. Russia reportedly attempted but failed to sell SA–10 and SA–12 SAMs to Chile, Egypt, Hungary, Iran, Kuwait, Serbia, South Korea, Syria, and Turkey. These countries have opted instead to purchase either U.S. SAMs, or more modest air defense systems. According to one well-known missile analyst

> Russia has traditionally played a significant role in worldwide SAM export. But Russian SAM sales have taken a nose dive since their heyday in the 1970s and 1980s. Particularly disappointing has been the very small scale of sales of the expensive high altitude systems like the S–300P and S–300V. The Russian industries had expected to sell 11 S–300P batteries in 1996–1997, when in fact only about 3 were sold. Aside from these very modest sales to China and Greece, few other sales have materialized. Combined with the almost complete collapse of Russian defense procurement, the firms developing these systems have been on the brink of bankruptcy in recent years.[19]

Those who wish to rebalance military aviation also argue that the proliferation of, and threat from advanced combat aircraft is also overstated. Building, operating, and maintaining a modern air force is much more expensive and resource intensive than fielding advanced SAMs. Few countries have the resources and national will to develop and maintain an air force that could challenge U.S. airpower, they argue. Some say that advanced Russian and European aircraft being developed and fielded today may compare well to 30-year old U.S. combat aircraft, on a one-to-one basis. But aircraft don't fight on a one-to-one basis. Instead, they are part of a much larger airpower system. This system is composed, for example, of combat, intelligence, surveillance, airborne warning and control, aerial refueling, electronic warfare, and mission control assets. The importance of well trained pilots and maintenance personnel, which take considerable time and resources to create, cannot be over emphasized.

No other country has an airpower system on par with the United States, nor is one predicted to emerge.[20] Therefore, some argue, today's DOD's tactical aviation

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[18] "No S–300 Delivery To Iran" Moscow Times (as reported by the Associated Press). April 16, 2009.

[19] Steven Zaloga. World Missile Briefing. Teal Group. Inc. Fairfax, VA. February 2008.

[20] In an April 7, 2009, press conference, Secretary Gates estimated that "the intelligence that I've gotten indicates that the first IOC for anything like a fifth-generation fighter in Russia

Continued

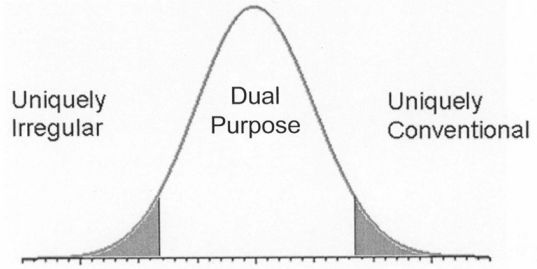
programs can be safely reduced in order to free up funds to address other military challenges, and thus bring scarce resources more into balance. The resources saved from these cuts to DOD's most advanced aviation programs could be used to invest in capabilities more applicable to combating terrorists and insurgents, or to conduct homeland defense.

CONCLUSION: WHAT MIGHT A REBALANCED FORCE LOOK LIKE?

Given the challenges of combating non-state actors, and if it were agreed that aviation forces should be rebalanced toward irregular warfare, what capabilities might such a force posses? As a rough blueprint, Secretary Gates suggested that 10 percent of defense spending would focus on military forces devoted exclusively to irregular warfare, 50 percent of the budget on forces focused on conventional warfare, and 40 percent on "dual capable" forces.

In the case of aviation forces, the ratio of capabilities in each warfare domain might be different than Secretary Gates' suggested 10–50–40 construct. Owing to their inherent flexibility, and the growing relative importance of sensors, communications and targeting technology vis-á-vis aeronautical performance, military aircraft can be effectively used in a number of different roles. Only the most specialized aviation assets are likely to be unique to a warfighting domain, and therefore, a more balanced spending on aviation forces may look more like the classic bell curve depicted in Figure 2 below, with aviation forces spending apportioned in a 10–80–10 percent ratio.

Fig. 2: Illustrative Spending To Re-balance DoD Aviation



Uniquely irregular

A brief review of the use of military aviation against non-state actors suggests that there are few platforms, weapons, or processes unique to irregular warfare. Very small munitions that minimize the chance of collateral damage would arguably be more pertinent to irregular than conventional warfare. Another example would be an off-the-shelf, lightly armed turbo-prop aircraft for attacking non-state actors. Such an aircraft is now being studied by the Air Force's Air Combat Command.[21] Reducing the number of advanced combat aircraft in the Service's inventories and replacing them with some number of these much less expensive aircraft or with armed UAVs could garner considerable life cycle cost savings.

Perhaps the aviation capability most obviously peculiar to irregular warfare is an advisory one: the mission of training and counseling allied and partner nations in the employment of their airpower against insurgents and non-state actors. This mission, called Aviation-Foreign Internal Defense (A–FID) is performed by a single squadron in the Air Force Special Operations Command (the 6th Special Operations Squadron). According to one expert, "One of the most important roles that U.S. forces can play in the fight against terrorist groups is to train, advise, and assist the forces of other nations in counterinsurgency and counterterrorist operations."[22]

would be about 2016, and in China would be about 2020." CRS has conducted numerous studies on the implications of advanced Russian and Chinese fighter aircraft for U.S. forces. See, for example, CRS Report RL30700 for a more comprehensive treatment of this topic.

[21] Marcus Weisgerber. "Air Force Funds Study to Determine Light-Attack Plane Requirement." Inside the Air Force. April 3, 2009.

[22] Ochmanek. Op Cit.

Yet, the 6th Special Operations Squadron is composed of approximately 125 personnel and operates on an annual budget ranging between $2 million and $5 million. Rebalancing DOD aviation capabilities toward a more robust counter insurgency role may entail expanding and strengthening DOD's A–FID capabilities.

Uniquely conventional

There also appear to be few aviation resources unique to conventional, state-on-state conflict. Delivering nuclear weapons, penetrating and defeating advanced air defenses, and defeating modern air forces are missions clearly germane to state-on-state conflict. It would appear feasible to reduce the aviation forces unique to these missions if they were found to be in excess of force levels dictated by the QDR and other strategy guidance, and invest the savings in dual purpose assets or assets optimized for irregular warfare.

Dual Purpose

Most aviation missions that apply to irregular warfare also apply to state-on-state warfare: close air support, precision strike, intelligence, surveillance, and reconnaissance, medical evacuation, stealthy insertion of troops, just to mention a few. For some missions, the requirements for irregular warfare are more taxing than the requirements for state-on-state conflict, and these requirements will set the standard for aviation capabilities. In other instances, the mission requirements for conventional warfare will be the most taxing. A review of recent experience in Iraq and Afghanistan indicates that commanders in the field have been successfully adapting and employing weapon systems designed for state-on-state conflict in their fight against insurgents and other non-state actors. For example, large, "strategic" bombers have conducted close air support missions. Electronic warfare aircraft such as the EA–6B Prowler and the EC–130 Compass Call have been used to detect and jam improvised explosive devices. Air superiority fighters, having no enemy to fight, have been used as mini-Airborne Warning and Control Systems, providing real-time coordination and assembly of strike packages to attack time-sensitive targets.[23]

In conclusion, it appears that an opportunity exists today, through the upcoming QDR and concomitant congressional oversight, to ground battlefield innovation, such as described above, in strategy. This process is designed to match airpower capabilities to meet national goals in the projected threat environment, and field an aviation force structure that is both effective and cost-effective.

Mr. Chairman, that concludes my remarks. It's been my pleasure to address you today. I look forward to any questions you may have.

Senator LIEBERMAN. Thanks, Mr. Bolkcom. That's a good beginning.

Now we'll turn to General Richard Hawley, retired from the U.S. Air Force after serving as commander of the Air Combat Command. Since retirement, General Hawley has served in a variety of advisory capacities, including his work in support of the 2006 QDR.

General, thanks for being here. We look forward to your testimony now.

STATEMENT OF GEN. RICHARD E. HAWLEY, USAF (RET.), FORMER COMMANDER, AIR FORCE AIR COMBAT COMMAND

General HAWLEY. Mr. Chairman, members of the subcommittee, it's my pleasure to be here, and I look forward to this discussion of the future roles, missions, and capabilities of U.S. military air power.

By way of introduction, I am a graduate of the United States Air Force Academy and Georgetown University. I served on Active Duty for 35 years, retiring in 1999, as you mentioned, as commander of Air Combat Command in Hampton, VA. My combat experience is as a forward air controller for the 4th Infantry Division in Vietnam, where I learned something about the application of air power in irregular warfare. I've accumulated about 1,000 hours in a multi-role, multi-service F–4 Phantom II, and a like number of

[23] CRS interviews with Air Force pilots deployed to Iraq. March 2009.

hours in the single-service, single-mission F–15 air superiority fighter, where I learned something of those competing concepts of fighter design and acquisition. I've also flown the A–10, C–130, C–141, C–17, B–52, B–1, and B–2 as a pilot, and I've flown as an observer in most other Air Force airplanes.

I served for 2 years as the Principal Deputy to the Under Secretary of the Air Force for Acquisition, and, as you mentioned, in 2005 as a member of the Defense Acquisition Performance Assessment Project and the DOD Red Team that supported the QDR.

Since 1999, my perspective has been broadened through work as an independent consultant, mostly in support of the aerospace industry and U.S. Joint Forces Command as what they call a senior concept developer. So, I hope that my testimony can be helpful to the committee as you consider the President's proposed budget for 2010.

In my mind, that budget seems to be more noteworthy for what it probably will not contain than for what it will. It will not propose funding, as you mentioned, for additional F–22 air superiority fighters or C–17 strategic airlift aircraft, and it will not propose funding for development of new combat search-and-rescue or long-range strike capabilities. These omissions have major ramifications for the future of U.S. air power, and the first two will be irreversible. Therefore, I would like to focus these few comments on the proposal to end production of the F–22 and the C–17, and hope that your questions will allow me to address the other major issues.

The Air Force is responsible for development of capabilities to gain and maintain air superiority over the battlefield and to provide strategic airlift capabilities that allow our Armed Forces to respond rapidly to global crises. To fulfill those responsibilities, the Air Force conducts rigorous analyses to determine the attributes of these aircraft. They will need to successfully accomplish their missions over their expected 30- to 40-year service lives.

In the case of the F–22 and C–17, these analyses were presented to Congress, and, after long and thoughtful debate, Congress approved funding to develop and subsequently field these aircraft. Both are without peer in their respective mission areas, and are the envy of every air force in the world today.

Having developed these capabilities, the Air Force is then charged with advising the Secretary of Defense and Congress on the number required to successfully support our National Security, National Defense, and National Military Strategies.

The Air Force conducts an equally rigorous analysis to support its conclusions with regard to this important question. In doing so, it is guided by direction from the Secretary of Defense concerning the number and nature of the contingencies for which it must prepare forces for employment by the combatant commands. Although that guidance evolves as the threats to our Nation evolve, it has consistently required forces able to support more than one major regional contingency while still defending the Homeland and deterring other would-be aggressors.

As a participant in those analyses regarding the F–22, I can assure you that the number required to conduct operations in two major regional contingencies against adversaries who are capable

of contesting our control of the air is 381. That number is sufficient to equip 10 operational squadrons with 24 aircraft each, along with the supporting training base, test aircraft, and some attrition reserves.

Others in the Air Force and the Joint Staff have conducted mobility studies that set the number of C–17s required to support our defense strategy at 205. But, those studies did not consider the planned growth in the size of the United States Army and Marine Corps.

To my knowledge, there is no analysis that would call into question these requirements for F–22 and C–17 aircraft, but the recommendation to the President and Congress is to close both production lines after building just 187 F–22s and 205 C–17s.

The recommendation on the C–17 seems to be based on a dated analysis of the requirement, and for the F–22 on no analysis whatsoever. The F–22 recommendation rests on an assertion that we cannot afford to equip our airmen, on whom we rely to gain and maintain air superiority, with the best weapons that our defense industrial base has developed. Rather, we and they are asked to accept the risk of sending them into the fight with weapons designed for an entirely different mission. I find that logic suspect.

Federal outlays in 2010 will be about $3.5 trillion, while keeping the F–22 and C–17 lines open, so that a closure decision could be informed by the QDR, and a review of our national security strategy, would cost less than $4 billion. In my view, these recommendations, if implemented, will preempt the full and open debate that should precede any major change to the force size and construct. A force of 187 F–22s may be sufficient for one major regional contingency where our control of the air is contested by a competent adversary, but there will be no reserve left to help deter an opportunistic aggressor elsewhere in the world. Should the President and Congress conclude that our forces should be sized to deal with only one contingency where our control of the air is contested, that will be an appropriate time to terminate production of the F–22. Until then, in my view, the actual requirement is for 381 aircraft, not 187 or even 243.

As to the C–17, I find it difficult to believe that the requirement can remain stagnant, even as the forces that must be deployed and sustained grow substantially in number.

Thank you for this opportunity to share my views on these important issues, and I look forward to your questions.

[The prepared statement of General Hawley follows:]

PREPARED STATEMENT BY GEN. RICHARD E. HAWLEY, USAF (RET.)

Mr. Chairman and members of the committee, thank you for this opportunity to discuss future roles, missions, and capabilities of U.S. military air power. By way of introduction, I am a graduate of the United States Air Force Academy and of Georgetown University. I served on active duty for 35 years, retiring in 1999 as Commander of Air Combat Command at Langley Air Force Base in Hampton, VA. My combat experience is as a forward air controller with the 4th Infantry Division in the central highlands of Vietnam, where I learned about the application of airpower in irregular warfare. I accumulated about 1,000 hours in the multi-role, multi-service F–4 Phantom II, and a like number of hours in the single service, single mission F–15 air superiority fighter, so I understand the difference between those competing concepts of fighter design and acquisition. I have flown the A–10, C–130, C–141, C–17, B–52, B–1 and B–2 as a pilot, and as an observer in most other aircraft in the Air Force inventory.

I served for 2 years as the principal deputy to the Under Secretary of the Air Force for Acquisition and in 2005 as a member of the Defense Acquisition Performance Assessment Project, studying the problems we face in that area. Also in 2005, I served as a member of a the Department of Defense Red Team supporting the last Quadrennial Defense Review (QDR). Since 1999 my perspective has been broadened through work as an independent consultant, mostly in support of the aerospace industry and U.S. Joint Forces Command as a Senior Concept Developer. I hope that my testimony can be helpful to the committee as you consider the President's proposed defense budget for 2010.

For the subject of this hearing, that budget promises to be more noteworthy for what it will not contain than for what it does. It will not propose funding for additional production of F–22 air superiority fighters or C–17 strategic airlift aircraft, and it will not propose funding for development of new combat search and rescue or long range strike aircraft. These omissions have major ramifications for the future of U.S. airpower, and the first two will be irreversible. Therefore, I will focus these opening comments on the proposal to end production of the F–22 and the C–17, and hope that your questions will allow me to comment on the other issues.

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Having developed these capabilities, the Air Force is then charged with advising the Secretary of Defense and Congress on the number required to successfully support our National Security, National Defense, and National Military Strategies. The Air Force conducts an equally rigorous analysis to support its conclusions with regard to this important question. In doing so, it is guided by direction from the Secretary of Defense concerning the number and nature of the contingencies for which it must prepare forces for employment by the combatant commands. Although that guidance evolves as the threats to our Nation evolve, it has consistently required forces able to support more than one major regional contingency at a time while still defending the homeland and deterring other would be aggressors.

As a participant in those analyses regarding the F–22, I can assure you that the number of F–22s required to conduct operations in two major regional contingencies, against adversaries who are capable of contesting our control of the air, is 381. That number is sufficient to equip ten operational squadrons with 24 aircraft each, along with the supporting training base, test aircraft and some attrition reserve. Others in the Air Force and the joint staff have conducted mobility studies that set the number of C–17s required to support our defense strategy at 205, but those studies did not consider the planned growth in the size of the United States Army and Marine Corps.

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I find that logic to be suspect. Federal outlays in 2010 will be about $3.5 trillion, while keeping the F–22 and C–17 lines open, so a closure decision could be informed by the QDR and a review of our national security strategy, would cost less than $4 billion. In my view, these recommendations, if implemented, will preempt the full and open debate that should precede any major change to the force sizing construct. A force of 187 F–22s may be sufficient for 1 major regional contingency, but there will be no reserve left to help deter an opportunistic aggressor elsewhere in the world. Should the President and Congress conclude that our forces should be sized to deal with only one contingency where our control of the air is contested, that will be an appropriate time to terminate production of the F–22. Until then, the actual requirement is for 381 aircraft, not 187 or even 243. As to the C–17, I find it dif-

ficult to believe that the requirement can remain stagnant even as the forces that must be deployed and sustained grow substantially in number.

Thank you for this opportunity to share my views on these important issues. I look forward to your questions.

Senator LIEBERMAN. Thank you, General. That's what, in our world, we tend to call straight talk. I appreciate it, and we'll have some good questions for you.

Senator Bill Nelson has stopped by, which I appreciate. He is a member of the full committee, not a member of the subcommittee, but asked if he could make a statement and leave some questions. I'm happy to recognize you now.

Senator BILL NELSON. I just have two questions, Mr. Chairman. I'll leave them with you, and I appreciate your doing this hearing.

STATEMENT OF HON. BILL NELSON, U.S. SENATOR FROM THE STATE OF FLORIDA

Senator BILL NELSON. The bombers, long-range strike aircraft, fall within the jurisdiction of the Strategic Forces Subcommittee, which I have the privilege of chairing, and we're going to look at this issue of the next-generation bomber and Secretary Gates' decision to postpone or cancel the goal of a next-generation bomber by 2018. We're going to look at it in detail during the course of our Strategic Subcommittee hearings.

So, thank you for letting me come, and thank you for letting me submit a couple of questions to you.

Senator LIEBERMAN. Thanks, Senator Nelson. I think you're technically right about the jurisdiction. Obviously, we may get into the bomber question here because of the expertise of the people who are before us.

Let's turn now to Barry Watts, who's a senior fellow at the Center for Strategic and Budgetary Assessments (CSBA), and served in the United States Air Force and as Director of Program Analysis and Evaluation (PA&E) in the Office of the Secretary of Defense (OSD).

Mr. Watts, thanks for bringing all your experience to the committee today.

STATEMENT OF BARRY D. WATTS, SENIOR FELLOW, CENTER FOR STRATEGIC AND BUDGETARY ASSESSMENTS

Mr. WATTS. Thank you very much, Mr. Chairman and members of the subcommittee.

I'm going to focus my remarks on the subject that was just mentioned, the bomber issue. Perhaps it would be useful to begin with just a historical observation that speaks to context.

When the first President Bush, in 1992, shortly after the end of the Cold War and the dissolution of the Soviet Union, made a decision to end B–2 production at 20 airplanes, as best I can understand the underlying rationale, it was looking at the platform strictly as a nuclear delivery system; and that's, indeed, what it and the B–1 and the B–52 had been designed primarily to do.

The conventional utility of the platform, I don't believe, was really taken into account, and the jurisdictional division between the other subcommittee and this one emphasizes the degree to which bombers tend to fall, conceptually, between the cracks for us.

The B–1, B–52, and B–2 have never dropped a nuclear weapon in anger, but they have been used in every war since Vietnam to deliver conventional munitions. As Senator Thune pointed out, starting in 1999, when we brought the JDAM onboard the B–2 and integrated it for the campaign against Serbia, adding conventional precision to those platforms, it increased their utility, in the long-term, significantly.

Senator LIEBERMAN. So, let me just clarify what you're saying. You're saying that the bombers don't have just strategic value to us, but conventional, as well.

Mr. WATTS. We've used them primarily in a conventional role even though the three that we still have in inventory were designed exclusively for nuclear roles.

Senator LIEBERMAN. Right.

Mr. WATTS. So, it's a very flexible platform. It has, if you will, dual utility. We seem to have trouble making decisions based on both ends of the spectrum, rather than just one or the other.

Senator LIEBERMAN. So, you're making a case that this subcommittee actually does have jurisdiction here.

Mr. WATTS. I think so, sir, yes. [Laughter.]

You should.

Senator LIEBERMAN. Go right ahead.

Senator THUNE. I really like this witness, Mr. Chairman. [Laughter.]

Senator LIEBERMAN. Just based on what you said, maybe both subcommittees have jurisdiction. But, don't spend your time on that. Go right ahead with your statement.

Mr. WATTS. I was just going to go back to the decision to defer a next-generation bomber, and not just production, but even development of the platform.

When I was running PA&E back in 2001 and 2002, I tried to get some traction in the Pentagon for making trades across the Service boundaries that balanced capabilities, in the very sense that Secretary Gates is advocating. I must say that, in a general sense, I can only applaud what he's trying to do, and perhaps add the comment that I think it's about time somebody tried to make those kinds of balanced decisions across a lot of different programs.

With respect to the next-generation bomber, my divergence of opinion with the Secretary has to do with the rationale that was stated on April 6, which was that the need, the requirement, and the technology need to be better understood. My position, simply put, is we've studied that issue to death for the last decade—the Air Force, OSD, and everybody else under the sun—and I think, if you look to a rather stealthy platform that operates at high altitude, high subsonic mach, and perhaps is armed, in addition, to give it the survivability that it might need against advanced air defenses to get in and out, that the need, the requirement, and the technology are all pretty much in hand and reasonably well understood. I certainly can elaborate on all three of those.

With respect to the need, my basic feeling is that this country, because of its global responsibilities, does need a credible capability to hold targets at risk anywhere on the globe. If you give me a platform that has a 2,500- to 3,000-nautical mile combat radius from the last air refueling, you indeed can reach any point on the globe.

If future targets happen to be in defended airspace with advanced air defenses, the only platforms that we have today that have a serious capability of being able to execute those missions would be the 20 remaining B–2s. They are getting a little long in the tooth. They were originally designed back in the early '80s. Steps have been taken to enhance their capabilities. But, I think the time is due to look to a new platform and move ahead.

I just remind you, we actually built 21 B–2s, and we lost 1 on takeoff at Guam last year. That's a reminder of something that I think we've lost track of in our thinking about operational requirements. Attrition occurs even in peacetime, much less in wartime. That suggests that residual 20-airplane fleet is very thin.

With respect to requirements, I've looked at a number of conventional scenarios. Most of them emphasize the need for long reach. For example, you just don't get forward air bases or you encounter the kind of anti-access-area denial capabilities that the People's Liberation Army 2nd Artillery Corps is developing, and those kinds of challenges mean you're probably going to need much longer range than we have with the short-range fighters, even with air refueling.

The other requirement that I want to touch on is the need to deal with time-sensitive targets, targets that are emergent, that are fleeting, that are only there for a short period of time. Our adversaries now understand pretty clearly that if the U.S. forces know where a particular target or aim point is, we can put a precision weapon on it very quickly and efficiently.

So, the name of the hider-finder game in this context becomes, over time, the natural thing for our adversaries to do is to try to deny the precision targeting information to us. So, a classic example would be a hidden mobile missile launcher. You really can't find it until it comes out into the daylight or nighttime, tries to go to a predetermined launch site, launches its missile, and then runs back to hide and rearm. That suggests a need to be able to persist inside defended airspace and wait for those targets to reveal themselves. That's the core design requirement that I have gotten to in trying to think about this weapons system.

Lastly, as far as the technology is concerned, I believe most of it really is in hand. An awful lot of the avionics, the low observability technology, and things like it, can be found in the JSF today, in the F–22, and other fifth-generation platforms that we've been building.

Let me end by just saying I strongly agree with and support Secretary Gates' repeated pronouncements, up until April 6, that we need to begin moving more in the direction of long-range systems and away from short-range systems. But, the obvious point that I think has to be made is, if we are only going to be buying JSFs for the foreseeable future, it's hard for me to understand how we're going to start to make that shift towards longer-range systems. I think the time is really here to go ahead with a new long-range strike system of some sort.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Watts follows:]

PREPARED STATEMENT BY BARRY D. WATTS

INTRODUCTION

On April 6, 2009, Defense Secretary Robert Gates announced eleven programmatic decisions he planned to recommend to the president for inclusion in the Pentagon's fiscal year 2010 budget. These decisions represented an attempt to reshape "the priorities of America's defense establishment" via a "holistic assessment of capabilities, requirements, risks and needs." Gates' stated goal was to shift the Defense Department's strategic direction.

Having failed to generate momentum for a similar rebalancing of priorities across the boundaries of the military Services during my brief tenure directing the Office of Program Analysis and Evaluation in 2001–2002, I applaud what Secretary Gates is trying to do. In fact, I agree with all his programmatic choices save one: the decision not to pursue a development program for a follow-on Air Force bomber at this time. Even in this case, my disagreement is not over the decision itself but the reasons given for it. If Secretary Gates had said that developing a next-generation long-range strike system (LRSS) is simply unaffordable at this time in light of more pressing needs and priorities, I would have been inclined to defer to his judgment. But the rationale Secretary Gates offered was that the Pentagon needed to wait until there is "a better understanding of the need, the requirement, and the technology." My view is that the need, requirement, and technology are all reasonably well understood. Indeed, all three have been quite clear for some years.

THE NEED

What is the need for a new long-range strike system? Since the collapse of the Soviet Union in December 1991, the United States has been—and remains—the world's only global military power. At the core of the U.S. position is the capability to hold at risk, or strike, targets anywhere on the globe within hours-to-days. Currently, this capability is widely understood to mean primarily the capacity to do so with conventional precision munitions. However, it need not be limited to non-nuclear weapons. While the B–2 has, thankfully, only delivered conventional weapons such as the Joint Direct Attack Munition (JDAM), the aircraft also has a nuclear mission.

With regard to conventional long-range strike, the United States first demonstrated a genuine global reach on January 17, 1991, the opening night of the first Gulf War (Operation Desert Storm). As part of the initial Air Tasking Order for the air campaign, 5 B–52s launched from Barksdale Air Force Base (AFB) in Louisiana and delivered 35 Conventional Air Launched Cruise Missiles against targets in Iraq. Since then, the B–2 has demonstrated the same global reach. During Operation Allied Force in 1999, B–2 bombers, launching from and recovering at Whiteman AFB, MO, mounted 45 successful sorties against Serbian targets. These sorties delivered some 1.3 million pounds of precision munitions, mostly JDAMs.

The other significant change in the utility of the older B–52 and B–1 since Allied Force in 1999 has come from equipping both bombers with inexpensive precision munitions. During the major combat phase of Operation Iraqi Freedom, B–1s carrying 24 JDAMs provided round-the-clock, on-call precision fire support for coalition ground forces. The integration of JDAM and even laser-guided bombs (LGBs) on heavy bombers has dramatically increased their effectiveness in conventional operations.

However, for targets located deep in enemy territory—meaning more than 1,000 nautical miles from the last air-to-air refueling—the only air-breathing strike platforms the United States possesses today with reach and survivability to have a chance of successfully executing such missions inside defended airspace are the 20 surviving B–2s. But even with upgrades to their signatures, how survivable will these 20 B–2s be in coming decades against advanced air defenses? The B–2, after all, was designed in the 1980s and achieved initial operational capability (IOC) over a decade ago. Moreover, the crash of the 21st operational B–2 during takeoff at Guam in early 2008 is a reminder that attrition can and does occur even in peacetime.

Global strike is a critical mission for the U.S. military—a strategic "business" in which the United States needs to retain a credible and dominant capability. Long-range, penetrating strike systems provide, among other things: a hedge against being unable to obtain access to forward bases for political reasons; a capacity to respond quickly to contingencies such as the failure of a nuclear-armed state; the ability to base outside the reach of emerging adversary anti-access/area-denial capabilities; and the ability to impose disproportionate defensive costs on prospective U.S. adversaries, as the bomber leg of the nuclear triad did on the Soviet Union

during the Cold War. Addressing these needs constituted much of the rationale behind trying to field a next-generation bomber by 2018. Granted, the 2018 IOC was ambitious. The early or mid-2020s would probably have been adequate. But to end the 2018 bomber development effort at this time appears to be a short-sighted decision.

The need to move ahead with a penetrating, follow-on LRSS to the B–2 has historical roots that reach back to the early 1980s. At White Sands in 1982, the Assault Breaker program demonstrated the feasibility of combining wide-area sensors with missile-delivered terminally guided submunitions to attack tanks and armored fighting vehicles deep in an enemy army's rear echelons. This demonstration argued that, sooner or later, military systems exploiting Assault Breaker technologies—"reconnaissance-strike complexes" as the Soviets called them—would be able to dominate large areas from long ranges with precision fires. This prospect, in turn, posed a long-term challenge to U.S. power projection capabilities based on short-range strike platforms and forward bases. In the hands of prospective U.S. adversaries, reconnaissance-strike complexes offered the possibility of holding at risk American forward bases such as Kadena AFB on the island of Okinawa and even carrier battle groups operating in the Western Pacific.

When the Office of Net Assessment's 1992 preliminary assessment of the late 20th century military-technical revolution—more widely known as the "revolution in military affairs"—appeared in 1992, even the U.S. military could not claim to possess the kinds of reconnaissance-strike complexes Soviet military theorists had been forecasting since the 1970s. Today, however, China's 2nd Artillery Corps is developing area-denial/anti-access capabilities that could compel U.S. power projection forces to operate from distances of 1,000 nautical miles or greater from the Chinese mainland. Granted, from the Korean and Vietnam wars to the current conflicts in Afghanistan and Iraq, the U.S. military has been able to rely primarily on in-theater bases and short-range strike systems to project power in distant overseas theaters. Looking ahead to the second decade of the 21st century, however, it seems clear that the era in which the United States could get away with forward basing for power projection by short-range systems is coming to a close. As Secretary Gates himself stated in an article in the January/February 2009 issue of Foreign Affairs, the Chinese military, among others, is fielding a range of disruptive systems to blunt the impact of U.S. power, narrow the United States' military options, and deny the U.S. military freedom of movement and action.

The force-structure implications of these developments for the United States are also clear. China's growing anti-access/area-denial capabilities will, as Gates wrote in his Foreign Affairs article, "put a premium on the United States' ability to strike from over the horizon . . . and will require shifts from short-range to longer-range systems, such as the next-generation bomber." Moreover, this article does not constitute the only occasion when Secretary Gates articulated the need to shift from short-range to long-range systems. In a speech at the National Defense University in September 2008, he used virtually the same language to support the need for a follow-on LRSS. It is difficult, therefore, to see why, in April 2009, a better understanding is suddenly needed of a "need" that appeared clear as recently as January is suddenly called for.

The pre-April 2009 Secretary Gates is right. The U.S. military needs to begin shifting its force structure more in favor of long-range systems. However, investing exclusively in short-range systems such as the F–35 Joint Strike Fighter (JSF) in the near term is not going to bring about the needed shift.

THE REQUIREMENT

What would we want a new long-range strike system to do? What would be its primary mission requirements? In 2008 the Center for Strategic and Budgetary Assessments took another look at these questions. The resulting report identified six generic scenarios for conventional operations that a new LRSS should be able to address. Of these six scenarios, four appear to be the most important in defining the requirements for a new LRSS. They are:

(1) Situations requiring a sufficient radius of action from the last air-refueling point to reach targets deep in defended airspace;

(2) Conflicts in which there is a need to strike targets at intercontinental distances from the continental United States because in-theater bases are not available;

(3) Missions requiring the survivability to persist in defended airspace in order to prosecute emergent and time-sensitive targets; and

(4) Operations in which U.S. forces must have the radius of action to be able to operate from beyond the reach of anti-access/area-denial capabilities.[1]

The first, second, and fourth of these scenarios emphasize the range or reach of the platform. For these scenarios a straightforward design goal would be a combat radius of 2,500 nautical miles from the last air refueling at altitude in benign airspace.

The third scenario, by contrast, arises from the natural responses of intelligent adversaries to U.S. precision engagement capabilities. Since Operation Desert Storm in 1991, American adversaries have become acutely aware that if U.S. strike platforms can locate a target, they can hit it with conventional guided rounds such as JDAM or a LGB. The logical response has been to use hiding, concealment, movement, and relocation to deny U.S. forces the precise targeting information weapons like JDAM require—or at least limit the amount of time their high-value assets would be exposed to American precision fires. A mobile missile launcher that moves rapidly from a concealed location to a firing position, launches its missile, and then returns to a hidden position is a classic example of a time-sensitive or emergent target. It is this problem that leads to the requirement that the next LRSS be able to persist or loiter inside defended airspace so as to be nearby when such targets do expose themselves. Thus, the basic requirements that a new long-range platform should meet for conventional operations do not appear to be particularly mysterious. Without the reach and survivability inherent in the four generic scenarios, one could not justify the likely costs—at least $15 billion—of developing a new LRSS.

Additionally, CSBA's 2008 report argued that the platform should also have some capability for delivering nuclear weapons. The B–52, it is worth remembering, was designed exclusively for nuclear operations. Like the B–2, the B–52 has never delivered a nuclear weapon in anger. Since the late 1960s, however, B–52s have delivered conventional munitions in every major conflict in which the United States has been involved. If the next long-range LRSS can meet the range and survivability requirements for conventional operations outlined above, there seems no compelling reason to make the platform conventional only, so long as the costs of hardening against electromagnetic pulse are kept under control. After all, some electromagnetic hardening of the platform will be needed in any case. Again, the core need that a new LRSS must meet is to be able to hold at risk, or strike, targets anywhere on the globe with whatever weapons the contingency requires.

THE TECHNOLOGY

How mature are the technologies that would be needed to develop a new LRSS able to satisfy the generic scenario requirements just described? If the system is optimized for high-altitude penetration at high subsonic cruise speeds, the requisite aerodynamic, structural, and low-observables technologies already exist in B–2 and fifth-generation fighters such as the F–35. Only the engine technology to achieve both long range and a supersonic dash capability to avoid being run down by enemy interceptors is not yet in hand. This vulnerability to enemy fighters is the main reason why the (now retired) F–117 and B–2 have operated exclusively at night when inside enemy airspace.

How might this vulnerability be addressed in a new LRSS lacking a supersonic dash capability? The logical answer is to equip the platform with advanced air-to-air missiles and the sensors to provide sufficient situational awareness for the LRSS to be able fight its way into, and out of, defended airspace. Much of the required sensors and other avionics already exist in the JSF.

Another major design choice is whether to make a new LRSS manned or unmanned. Given the current state of the art, one suspects that situations could arise in which a manned platform would be preferable. On the one hand, a manned platform would enable strike execution to be aborted right up to the very last moment. On the other, an important vulnerability of an unmanned LRSS would be the possibility that sophisticated adversaries could interfere with the data links used for oversight and remote control of the platform. Such interference has not, so far, emerged as a serious problem with intelligence, surveillance and reconnaissance platforms such as Predator, Global Hawk, and Reaper in Iraq and Afghanistan. However, both the Russians and Chinese are not only well aware of this vulnerability, but have the technical potential to exploit it themselves or sell the capability

[1] Barry D. Watts, "The Case for Long-Range Strike: 21st Century Scenarios," CSBA, 2008, pp. 19–30. This report is available online at http://www.csbaonline.org, as is CSBA's 2005 report on the same subject, "Long-Range Strike: Imperatives, Urgency and Options."

to others. Thus, one would want to think twice about making a new LRSS exclusively unmanned.

CONCLUSION

The need for a need for a new LRSS has been fairly clear for some years. Up until April 6 of this year, this need appears to have been understood by Secretary Gates. Equally clear are the operational requirements that a follow-on LRSS would need to meet and the maturity of most of the requisite technologies. As with a new tanker for aerial refueling, the Air Force and the Office of the Secretary of Defense have, for one reason or another, been unable to reach a firm decision to move ahead with a new LRSS for nearly a decade now. This is a strategic choice that cannot, and should not, be deferred any longer.

Senator LIEBERMAN. Thank you, Mr. Watts. It was very interesting testimony.

Let's do 7-minute rounds of questioning. A vote may go off around 2:45 p.m., but if we do it right, I'll ask my questions and run over and vote, and we'll keep this going.

Mr. Watts, let me ask you to develop the argument for not agreeing with Secretary Gates to really push off investments in a long-range strike-plane bomber. Develop, a little bit more, if you will, as you have somewhat in your testimony, the argument for what Secretary Gates calls hybrid warfare and give us a little history for the extent to which the bombers have been used in hybrid/conventional warfare or as compared to strategic conflicts.

Mr. WATTS. In general, starting with Operation Desert Storm, you had very small numbers of bombers delivering proportionately larger amounts of the ordnance. As we've moved into precision conventional munitions, the weight of the number of tons of ordnance delivered has become less important than the number of aim points you could cover. I've had no success predicting the contingencies that we end up facing as we go into the future. We've spent a lot of time and energy projecting future scenarios and future contingencies, but, in general, long-range platforms, particularly ones with a fair degree of survivability, are just very flexible things. You can use them to support ground forces.

This occurred very dramatically in 2003 during Operation Iraqi Freedom. If you go back and review the 3rd Infantry Division's after-action report, I think it would not be an exaggeration to say that the people on the ground loved the JDAM. It was there, on call, when they needed it, and it provided the kind of precision fire support that the Army did not possess at that point in time.

Now, guided Multiple Launch Rocket System and other precision munitions have finally started to enter the Army's inventory, so they have their own precision organic indirect-fire support, in addition to the airplanes. But, the ability of those B–1s, with 24 JDAMs, to just hang out overhead and drop on Global Positioning System (GPS) aim points on call was really important and impressive. That was high-tempo combat operations, but that capability can be used day-in and day-out, even in hybrid conflicts.

Senator LIEBERMAN. Let me ask you to come at this in a slightly different way. In your testimony you specifically say, "missions requiring the survivability to persist in defended airspace in order to prosecute emergent and time-sensitive targets." What new technologies would have to be developed to make this possible? Are they in reach?

Mr. WATTS. I think the sensing technology and the computational capabilities you would need onboard the platform are being put into the JSF as we speak. So, I don't think there's a great stretch, in terms of the technology that would be required.

If you go back in the history of the JSF, there was a discussion early on about simply relying on offboard sensing for finding targets.

Senator LIEBERMAN. Right.

Mr. WATTS. We ended up going in almost the opposite direction in providing a very sophisticated or all-the-way-around the airplane sensing capability and advanced electronically scanned radar, with the underlying computational capability onboard that airplane and the ability to be able to upgrade that capability incrementally over time. I think the technology's here, sir.

Senator LIEBERMAN. If you were writing the defense budget for next year, understanding that you disagree with the recommendations of Secretary Gates, what would you put in for the long-range strike systems for the bombers?

Mr. WATTS. An amount of money, sir?

Senator LIEBERMAN. No, that's an unfair question. What would be your goal? By when would you like us to be able to do what?

Mr. WATTS. The 2018 goal was very ambitious.

Senator LIEBERMAN. Right.

Mr. WATTS. If you stick with the kind of high-subsonic, high-altitude platform that I've describe, and you run a very disciplined development program, I think in another 10 to 12 years you ought to be able to reach initial operational capability. The problems of mission and requirements creep in the programs are certainly an issue.

One of the alternatives to what I've described, that the Air Force and the Defense Advanced Research Projects Agency have talked about, would be a hypersonic cruise vehicle, mach 6 to 8. There, you are stretching all kinds of technologies—material technologies, engine/propulsion technologies—and at best, people have discussed being able to get there by the 2030s or maybe even as late as 2040. But, if you don't do that kind of development, if you focus on the kinds of mission requirements I've described, I think, by the early- to mid-2020s, you could field something. I have talked to some of the companies about, "Tell me how much the development costs for a very disciplined system might be." Most of the voting seems to be under $10 billion.

Senator LIEBERMAN. Over what period of time?

Mr. WATTS. The development period of the airplane would be 8 to 10 years.

Senator LIEBERMAN. That's very interesting. I invite you to give us more detailed information afterward.

General Hawley, do you have a quick response to this Gates-Watts debate on the bombers?

General HAWLEY. Yes, sir. I would share an anecdote that occurred late in my Active Duty career. I was having a discussion about bombers with the Commander at Training and Doctrine Command, my Army colleague across the river, and he was wondering about their capability to drop these precision-guided munitions we were then calling JDAMs. I said, "Bill, one of these days,

bombers are going to be providing CAS to your troops on the ground." It was not long afterward, in Afghanistan, when bombers were providing CAS to our Army forces on the ground and to that outfit we called the Northern Alliance.

Senator LIEBERMAN. Right.

General HAWLEY. So, this idea that they're only useful in strategic contests is very dated. In my view, we've come full circle. At the beginnings of modern air power in World War II, bombers were the platforms we used to destroy targets on the ground and fighters were the things that got them to the target and back. In between, we went through a period where bombers couldn't survive against terminal defenses; and so, we used fighters to get into the target, destroy the target, and then get out. We've now come full circle. We're at a point where the primary role for our fighter force should be to get the bombers to the target, because of the payload advantages that have already been mentioned, their ability to loiter over the target. As a fact in Vietnam, the most valuable thing I could get was time on station from somebody with a bomb because that's what my forces on the ground needed. They needed the bomb to come down at the right time and the right place. Today's bombers can do exactly that. So, they are certainly high-utility systems across the full spectrum of modern warfare.

Senator LIEBERMAN. Excellent. Thank you very much.

Senator Thune.

Senator THUNE. Thank you, Mr. Chairman.

If I might come at that question a slightly different way, and this would be to Mr. Watts or General Hawley. In your view, is the present bomber fleet sufficient to hold targets deep in defended airspace at risk over the next 25 to 30 years? Because absent a commitment to any kind of a next-generation long-range strike capability, that's what we're talking about doing.

General HAWLEY. Senator, I think your question gets to the heart of the issue that Congress is going to have to wrestle with as they consider these proposals, which is: What kind of a future should we prepare our forces for? You cite the timeframe of 25 or 35 years. That's a long time. As my colleagues have said, we've never been very successful at predicting what kinds of engagements we will find ourselves in, 20 or 30 years hence.

In my view, those 20 remaining B–2s are the only part of the bomber force that is likely to be able to penetrate and do the job that we expect of this class of weapon systems against any serious adversary, 20 or 30 years hence.

The challenge for Congress, I think, and for DOD, is to balance this vision of the future and what kind of adversaries we may face against the cost to mitigate that risk. That's a difficult issue. In my view, we are out of balance in the current proposal, and we are underestimating the seriousness of the threats that we might face in that timeframe.

Senator THUNE. My assumption is that if, in fact, this decision with regard to the next-generation bomber were to stand, we would have to do significant upgrades, probably, to both the B–2 and perhaps the B–1. The Sniper pod that was added to the B–1 has even improved the targeting and the capability of that aircraft to provide the CAS that you talked about earlier to our troops in places like

Afghanistan. But, what kind of investments would you expect to see in all of our current platforms in light of this announced decision on the next-generation bomber? What is our alternative plan to upgrade the existing capabilities that we have? I think what you were probably getting at is the stealth capability of the B–2. But, are there things that can be done to the B–2 and the B–1 that make them capable of survivability into that 25-year timeframe I mentioned?

General HAWLEY. Certainly, there are continuing improvements to the B–2, and my understanding is that Congress and the Air Force have been together on developing programs to continue to modernize the B–2 and the B–1. It's not that these airplanes aren't going to be useful, it's just, will they be what we need against a very competent adversary? The assumption that I think is underlying many of these decisions is that there isn't going to be a really serious adversary out there; therefore, what we have will be useful in the vast majority of contingencies that we're likely to face. There are many things that can be done to make all of those platforms more capable and more survivable in some set of circumstances.

But, if we, as a Nation, believe that we need to be prepared for the more difficult challenge of a serious adversary with well-funded and well-planned forces, then we need something beyond the current bomber force, and that's the next-generation bomber that has just been put on hold.

Senator THUNE. Do you think the assumption is that the threat matrix that we face in the future is going to consist more of a low-end asymmetric type? The assumption underlying this recommendation, if we are going to have a high-end conflict/threat out there in the future, would seem to make a pretty compelling argument for at least the development of this next capability. So, is your view that the assumption that is being made is that we aren't going to need that type of capability because the threat's not going to require it?

General HAWLEY. Yes, sir. In my view, these decisions reflect an assumption that anticipates an outcome of a QDR and a national review of our strategies that forecasts a future in which we will have few, if any, adversaries who are near peer or can field near-peer forces.

Senator THUNE. How does that square with the well-documented belief that countries like China are developing more sophisticated air defense systems? It just seems to me that if you look out there in the future, and I think most of our combatant commanders would tell you the same thing, that we're going to need this long-range strike, because some countries are developing air defenses that are much more sophisticated than anything that we've encountered in the past, and the ability to penetrate those and to have the kind of range and persistence to loiter over targets seems to be almost a given. I guess I'm trying to figure out where are the recommendations coming from, based on what I think most people see over the horizon.

General HAWLEY. You probably have access to even better intelligence than I do on where some of these nations are going with the forces they're developing. So, let me share a little experience with you from my past. Vietnam was the theater in which I was

a participant, and I would just remind the committee that in Vietnam we faced a third-rate adversary fielding an air force of about 200 airplanes at any given time, and we lost over 2,200 fixed-wing airplanes in that contest.

If you go into one of these fights unprepared, you are going to suffer horrendous losses. We suffered horrendous losses in Vietnam, and we did so because we went into that fight ill-prepared, ill-equipped, and ill-trained. As a result, we wound up with a lot of good people who were held as prisoners of war for a long period of time. My fear is that we are so confident of a future absent a serious adversary who is willing to either field those kinds of forces, or sell them to someone else who we wind up being engaged with, that we'll pay that kind of price again.

Senator THUNE. Mr. Watts, anything to add in that discussion?

Mr. WATTS. To go back to your earlier question, which was, "Do you think the existing bomber force can be confidently relied upon to carry us through the next 20 or 30 years?", my answer would be no, I don't think so.

Senator THUNE. Okay. My time is up, thank you.

Senator HAGAN [presiding]. I know we all need to scoot and vote in a minute, but I did want to ask a question along the same line. I agree with Secretary Gates' insight to leverage the capabilities that are conducive to our ever-changing operational environment; specifically, counterinsurgency operations, the high- and low-intensity asymmetric warfare, and the other types of irregular warfare. We need to continue to augment ground operations with effective air support, unmanned aerial and ground vehicles, and reconnaissance capabilities that are flexible to conduct across the full spectrum of operations.

General Hawley, going forward, what air platforms do you think are best suited for the operational requirements that we're talking about, now and in the future?

General HAWLEY. You need a range of platforms, in my view. We have always fielded a mix in forces with capabilities to allow us to accomplish our missions in a variety of scenarios. We've never had the luxury of saying, "We're only going to fight one kind of war." So, we've fielded a mix of systems, and I think we should field a mix of systems, going forward. We need some that are optimized for that ground fight, Air Force support of the ground fight, which is the role I played as a forward air controller in Vietnam. That's the role of the A–10 today. That's what we buy Predator airplanes for, in order to provide the forces on the ground with that staring view of the target that has proven so valuable in the current fights. Then you need another set of capabilities to guard against the war that you hopefully want to deter.

I would put a high premium on conventional deterrents. I think we're in a pretty good place today. We've been through the years when we were threatened with nuclear annihilation. We are now at a point where no serious country is willing to take on our military, because of our dominant conventional capabilities. The only people who can threaten us are terrorists on the ground with roadside bombs. In my view, that's a pretty good place to be. I'd like to not reverse our course and get back to the point where people

are willing to take us on in a conventional fight, because that's the most expensive kind of fight we can get into.

Senator HAGAN. Mr. Watts and Mr. Bolkcom, any thoughts?

Mr. BOLKCOM. I agree with the General. We clearly want to field a range of forces. I want to point out, relative to the conversation we just had about bombers, I think the important thing is replacing the capability, augmenting the capability, sustaining the capability, and not necessarily a particular platform. We do tend to forget about the Navy in these sorts of discussions. I don't understand why we aren't seriously looking at a long-range naval-based airplane. Bombers fly from this great sanctuary called the United States. Fighters are vulnerable, as we heard this morning in the full committee, to this anti-access threat. Certainly, carriers may be vulnerable as well, but they have the freedom of movement and standoff.

As we think about long-range airplanes, one advantage of a long-range naval aircraft is a higher sortie generation rate than flying all the way from the contiguous United States to combat.

So, I'm not advocating that, but just trying to plant the seed in your mind as we think about these long-range standoff anti-access capabilities, it's not necessarily just fighters versus bombers, but maybe fighters and bombers and carrier-based aviation.

Mr. WATTS. If I could just add to that, Steve Kosiak, one of my CSBA colleagues, and myself looked at the JSF, in particular, a few years ago, and with respect to the carrier version or the carrier variant, it really wasn't going to extend the legs off the deck of the strike capability by adding an F–35. Something like that in the Unmanned Combat Air Systems program looked very attractive to me on the ground, so that if you could get 1,500 nautical miles out and back, as opposed to 500. That would preserve the value of those large aircraft carriers and all of the supporting ships that go with it a lot more than just fielding another short-range fighter that's more low-observable, certainly, than the FA–18E/F.

So, there are clearly options on the Navy side that could be very usefully explored.

Senator HAGAN. Thank you.

Senator LIEBERMAN [presiding]. Thanks, Senator Hagan.

That worked well. I'll proceed until someone else comes back.

General Hawley, you made a very strong case against the recommendations to basically terminate production of the F–22s and the C–17s. It seemed to me that you were making two big points. First, is that those recommendations are not supported by the analysis presented. Second, it would be more advisable to wait until the QDR was completed before making those judgments. Go back, if you would, and just spend a little more time making the case that there's not really analysis that Secretary Gates presented, at least on April 6, that supports the termination of the production of the F–22 and C–17.

General HAWLEY. Yes, sir. As I told you, I participated in the original analysis that arrived at the 381 figure; 381 is the number that would equip 10 squadrons with 24 airplanes each, and it would provide a sufficient force to deploy for 2 nearly simultaneous major contingencies where we faced an adversary with a significant

air-to-air and surface-to-air capability. That was the threat that we were supposed to plan for at the time.

Since that time, there have been a lot of studies that looked at how many F–22s we needed. I know the committee is aware of many of them. I think the most recent one was done by W.W. Brown; and I believe that number came out at 260. Clearly, that's less than my 381 number, but they had different assumptions. As the Chairman knows, the outcome of any study is dependent upon the assumptions upon which it was undertaken. But the lowest number, that I'm aware of, that anyone has arrived at through serious threat-based analysis is 260, well in excess of the 187 that we're being asked to accept.

That's why I say there is no analytical underpinning to the number. As you say, I think it preempts any subsequent analysis that will be done in support of the QDR, which is just beginning, for delivery to Congress about this time next year. So, we're making an irrevocable decision in advance of the analysis that Congress requires DOD to undertake each 4 years in order to support our ongoing strategy for the new administration, and it occurs in advance of what I'm sure will occur over the next number of months as the new administration's review of our National Security Strategy and the supporting National Defense Strategy and National Military Strategy. To make an irrevocable decision which does not rest on any known analysis appears to me to be imprudent. It would be prudent to continue production and give ourselves the option to make that decision a year hence, when it will be much better informed by both analysis and a new strategic formulation.

Senator LIEBERMAN. Do you assume, in light of what you've just said, that the decision on the F–22 and C–17 were really made for budgetary reasons?

General HAWLEY. I do think that's a major part of it, that there was a budget ceiling that people had to live within. Of course, we've all been part of that drill.

Senator LIEBERMAN. Right.

General HAWLEY. I certainly have. But, I do think there's a little more to it. I think there's also an issue involved in these escalating prices for all the things we buy, our acquisition problems, where we have encountered a total failure to be able to develop and deliver weapon systems on time, within budget. I think DOD has concluded that, in order to make the F–35 affordable to three Services, it must be produced in large quantities, and that every F–22 that we buy is an F–35 or so that we won't buy, and that that will increase the unit cost. So I think we're sacrificing operational capability for acquisition efficiency.

Senator LIEBERMAN. Thank you. I have more questions, but I welcome Senator Chambliss back, and I call on him at this time.

Senator CHAMBLISS. I kind of like that line of questioning you were on, Mr. Chairman.

Senator LIEBERMAN. I just was setting it up for you. [Laughter.]

Senator CHAMBLISS. General Hawley, what priority would you give to the ability of the United States Air Force to maintain air superiority and air dominance for our ground troops?

General HAWLEY. Given my background, I'm probably biased, but, in my view, it is the top requirement for the Air Force. It is

the first thing that the Air Force is asked to do for the Joint Forces Commander. In any contest that we were involved in, in my Active Duty career or since, the first things that are required to go forward are air superiority platforms. The last time we faced an adversary where we thought we might encounter a serious air-to-air threat, I was in the Pentagon as the Deputy Director for Operations. The first platforms we sent forward were F–15s, which were only capable of air superiority. Why? Because that's what the Joint Forces Commander asked for. Central Command Commander wanted to make sure that he could defend his airspace.

So, it is the highest-priority mission that the Air Force can do for Joint Forces Command.

Senator CHAMBLISS. Has the F–22 been pointed to, over the last decade, as the next-generation fighter that was going to allow us to maintain air dominance and air superiority?

General HAWLEY. People call the F–22 program a Cold War relic. The program began in 1991, coincident with the first Gulf War and after the collapse of the Soviet Union. DOD and Congress supported development fielding of this program throughout the post-Cold War period. It is the platform that was designed to assure this country's ability to provide air superiority over any battlefield, and it is the envy of every air force in the world, at this point in time.

Senator CHAMBLISS. Was not the JSF intended to complement the F–22, rather than replace the F–22?

General HAWLEY. I was also involved in the decisions to design the F–35 and establish its requirements, and that's exactly right, sir. The F–35 was conceived as a complementary system to the F–22, with the F–22 providing the capabilities to ensure that the F–35 could penetrate, survive, accomplish its mission, and return to base.

Senator CHAMBLISS. Mr. Watts, you're a former fighter pilot. You were PA&E in, I guess, 2000, when you left there?

Mr. WATTS. It was 2002, sir.

Senator CHAMBLISS. Excuse me, 2002. That was the point in time when the F–22 buy was set at 183. Do you know of any analytical reason that that 183 number was arrived at then, or was it purely budget-driven?

Mr. WATTS. My understanding was that it was purely budget-driven. The Air Force was essentially told, "Given the cap on the program, the total acquisition program, you can produce as many as you can under that cap." Early on, they thought they were going to get a lot more, up in the 220 range, but it's turned out to be 187. So, yes, sir, it had nothing to do with requirements.

Senator CHAMBLISS. Okay.

General Hawley, do you know of anything, based upon your contact with DOD during your years on Active Duty, which I understand ended around 1999, but you've remained in close contact with the Pentagon since that time; has there been any discussion or confirmation, from an analytical standpoint, with reference to arriving at the military requirement of 183 aircraft, now 187, for the F–22?

General HAWLEY. No, sir.

Senator CHAMBLISS. Now there appears to be another budget-driven question about the termination of the line. Is it not normal to have some analysis for terminating a line, versus deciding to terminate the line and then do your analysis after the fact, which appears to be what the Secretary is doing here?

General HAWLEY. In my experience, when we have terminated a production line, it has always been the result of some kind of analysis. Seldom has it been purely a budget-driven decision.

Senator CHAMBLISS. Are you familiar with the Secretary of the Air Force's continual statement over the last several weeks and months that the new military requirement for the F–22 is 243?

General HAWLEY. Yes, I am.

Senator CHAMBLISS. Do you know of any analysis that went into arriving at that number?

General HAWLEY. I know that the Air Force arrived at that number because they thought they could support the current strategy with 243 airplanes at a moderate risk level, as the current chief of staff has described, but it provides no attrition reserve capability. So, over time, that capability would erode to a high-risk force.

Senator CHAMBLISS. Dr. John Hamre, whom all of you know, testified this morning in another hearing that with a contingent of 187 F–22s, by the time you take out planes for testing, by the time you consider planes that are in depot maintenance, you're going to wind up with combat-coded airplanes roughly in the range of 125 to 135. Is that a fair assessment, General Hawley and Mr. Watts?

General HAWLEY. The formula for sizing the force is, it takes about 100 airplanes to field a wing of 72 operational airplanes, so that's a pretty close number.

Senator CHAMBLISS. Okay. He also said that, over the course of the next 30 years for which this plane is going to be called on to give us air superiority and air dominance, we're going to lose about a plane a year. That's the norm that you can expect. So, we're looking at, long-term, having somewhere around 100 F–22s that are going to be combat-coded, that are going to be expected to fill the role within the air expeditionary units. What kind of risk is that going to place us in?

General HAWLEY. In my view, it's a high risk. Given that that's likely the number, about 100, we must understand that you never are able to deploy all of those airplanes. In my experience, you shouldn't expect to be able to have more than about 75 percent of that force available in a surge basis to support a combatant commander who faces a serious threat. So, it's even less than 100.

Senator CHAMBLISS. Okay.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you very much, Senator Chambliss. Good line of questioning.

Senator Burris, welcome back. Do you want to proceed now?

Senator BURRIS. Give me a couple of minutes, Mr. Chairman.

Senator LIEBERMAN. I had a few minutes left over, so I'm going to tide over.

Let me approach this F–22 decision from this point of view. We've been talking the terms that insiders, people who live with this, talk about whether this is a wise decision, to terminate the

line, or not. But, I think, in terms of the large canvas and the broad paintbrush, the explanation given, or at least heard from Secretary Gates' decision, was put in the larger context of we have to support the fight we're in. The fight we're in is irregular, it's a hybrid, we can't do everything, and we have some pretty good tactical air fighters, and we have the F–35 coming on. The F–22 isn't really related to the hybrid fight. Give me your reaction to that. Maybe we'll start that argument, Mr. Watts. In a sense, we've touched on it, but I wanted to just clarify and ask you to respond.

Mr. WATTS. A comment that has circulated around Washington about the F–22 is, "Well, we haven't deployed it in any of the current fights."

Senator LIEBERMAN. Right.

Mr. WATTS. The implication is, that shows that it just is irrelevant to the current fight. But, I don't think we're building it to deal with nonexistent air forces in Afghanistan, for example. I think we're looking further downstream into the future, at emerging threats. There was an Air Force exercise called Cope India, a few years back, where we took some of our better F–15s out there to do some training against the Indians and discovered that they had taken some older Soviet airplanes, made some local improvements to them that were very effective, and they had really trained their pilots up to a very high level of proficiency. My impression—I'm sure General Hawley could add to this—was that we were surprised at how good they turned out to be in that particular exercise. It's those higher-end problems that I think we ought to be thinking about and focusing on when we discuss both the F–22 and the F–35.

Senator LIEBERMAN. Is it an investment we are making now primarily against the rise of a high-end or major peer competitor like China or a resurgent Russia?

Mr. WATTS. The Russians have done an awful lot to incrementally improve the Flanker over the years, and it's a fairly formidable adversary, right now, today if you had to face it.

Senator LIEBERMAN. General Hawley, how about this, fit the F–22 decision into what seems to be the overview that Secretary Gates presented us about the budget recommendations he made.

General HAWLEY. It's clear that the F–22 isn't going to be very useful in an irregular-warfare fight.

Senator LIEBERMAN. Right.

General HAWLEY. But, while we're in the irregular-warfare fight, we also need to maintain our deterrent posture to make sure that somebody doesn't take advantage of our preoccupation with that fight to threaten our interests elsewhere. That's where the F–22 comes into play. By the way, the F–22 isn't the only thing we buy that isn't suitable or tailored to an irregular fight; there are lots of other things, as well. We need those things to make sure that we continue to maintain a credible deterrent posture to keep people from taking advantage of us when we're preoccupied with situations like Iraq and Afghanistan.

We are a global power, and we have global interests, and that means we have global vulnerabilities. These investments in systems like the F–22, in my view, are investments in deterrents, just like we invested in our nuclear capabilities throughout the Cold

War that successfully deterred adversaries from ever attacking us with nuclear weapons or engaging our interests with nuclear weapons around the globe. It is the same equation.

Senator LIEBERMAN. Mr. Bolkcom, do you want to get into this?

Mr. BOLKCOM. Yes, sir, I'd love to, thank you. I think that, in terms of the risk question and trying to keep it at a big-picture level, General Hawley outlined what he sees as an operational risk of not buying more airplanes. Others share that view. I think there are a couple other risks, and actually, Senator Chambliss touched upon one. Another risk is creating another high-demand/low-density asset. If we have only 100-odd of these airplanes, do they become another very expensive aircraft to operate and maintain? The Air Force is trying to avoid small fleets of expensive airplanes.

This morning we heard at the full committee, another risk, as Dr. Krepinevich sees it, of wasting assets. On the other side of the equation, do you potentially risk buying more airplanes that are overdesigned for the threats you face? He saw that as, potentially, a strategic risk.

Senator LIEBERMAN. Thank you.

Senator Burris.

Senator BURRIS. Thank you, Mr. Chairman.

General Hawley, are you also saying that we should not complete the C–17?

General HAWLEY. To the contrary, I think that the C–17 requirement, as stated, which is 205 aircraft, may be based on an outdated analysis. The analysis that came to the 205 number predates the currently planned expansion of both the Army and the Marine Corps. I find it hard to believe that, with a far bigger Army and Marine Corps to deploy and sustain, that wouldn't affect the outcome of a mobility requirements study; and hence, the 205 number is probably very conservative.

Senator BURRIS. I was down at Scott Air Force Base, are you familiar with that?

General HAWLEY. I am very familiar with Scott Air Force Base.

Senator BURRIS. It was a little, small country town, a suburb of my hometowns of Centralia and Belleville, IL, just by way of fun. It was just a little Air Force landing field. I went down to Scott Air Force Base the other day, and it is a major development down there. So, were you ever at Central Command (CENTCOM) down at Scott?

General HAWLEY. I have visited Scott. I've spent time with the commanders at Scott. I've also flown the C–17. I took delivery of a C–17 at Long Beach and flew it to Charleston, some years ago. It is a marvelous airplane.

Senator BURRIS. It's a major expansion, Mr. Chairman. We're so pleased to see what they're doing. General McNabb is down there as commander for U.S. Transportation Command (TRANSCOM), and, I tell you, I had a great experience in visiting that base and looking at the expansion that's going on there, and I hope there's something in the budget to keep Scott up and running. I haven't seen all of the budget, but we have to make sure that Air Force operation stays there because that's where all the sorties have flown from for TRANSCOM, coming out of there.

General HAWLEY. Right.

Senator BURRIS. I want to ask a question to Mr. Bolkcom, in your opinion, should we be using some of our other threats as baseline for the design or for our defense posture? There is concern that military aviation is focused too much on the demand of our fighting conventional forces, is that a problem?

Mr. BOLKCOM. Sir, I think that what Secretary Gates is trying to do is position our current and future military, as he sees it, against the threat environment, as he sees it. He makes it clear he sees it as a spectrum of simultaneous threats that require rebalancing, potentially away from conventional state-on-state conflict towards more irregular conflicts. So, I think that is a clear direction by the Secretary.

Senator BURRIS. Would any of that include this high-tech-type warfare that we're moving to? Is that where we're headed now, to a technological warfare arrangement?

Mr. BOLKCOM. Sir, I think that's not a bad way of phrasing it. The proliferation of off-the-shelf commercial technology, like GPS and cell phones and the like, make unmanned aerial vehicles (UAVs) accessible, not only to state actors, but also paramilitary groups like Hamas. As General Hawley pointed out, we've driven even our state actors away from fighting us force-on-force, and they're resorting to anti-access sort of threats, trying to keep us out, which oftentimes might include systems like you're describing.

Senator BURRIS. So, are we to start budgeting? Are any of those requests in this 2010 budget that we're looking at?

Mr. BOLKCOM. I think all of us are trying to extrapolate with very little information, but I think the tea leaves suggest what Secretary Gates called a rebalancing towards some of these irregular capabilities.

Senator BURRIS. Thank you.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thanks, Senator Burris.

We're a little out of order, but, Senator Begich, you've not had a chance yet, and then we'll go back to Senator Thune.

Senator BEGICH. Thank you, Mr. Chairman.

If these questions have been answered, I apologize. I'll start with the refuelers.

There is some discussion of having the air refuelers as kind of multi-role aircraft; some call it "floors and doors and everything else included." Can you give me just some comments on that? Are we overbuilding for those refuelers? In conjunction with that, under Secretary Gates's proposal, we will not continue adding to the C–17s; is it wise then to have these kind of multifaceted facilities, or should we be doing the C–17s and have a more streamlined refueler? These are some of the multiple questions around those issues. I'll look to the General and Mr. Bolkcom and Mr. Watts, in that order, if you don't mind.

General HAWLEY. Our refuelers have always had multiple capabilities. They've been able to evacuate medical patients, and they've been able to carry pilots. To my knowledge, the Air Force has never paid a lot for those capabilities; they're relatively modest add-ons to an airplane that is configured and designed to be a refueler. They're valuable capabilities, they're very useful in some cir-

cumstances, and they can augment the airlift capabilities that our primary designed airlifters, like the C–17 and the C–5, give to us.

If we constrain our airlift force to 205 C–17s, augmented by the surviving C–5s that are going to be modified, then these multi-role capabilities of the new tanker, if we ever get a new tanker, will probably prove to be very valuable.

The challenge for our airlift operators has always been to figure out the operational concept to use the tankers' multi-role capabilities for those medical evacuation or airlift purposes. But, the current commander at Scott says that they're working on that, they know how to do it, and they want these tankers to have those multi-role capabilities so that they'll be there to augment their airlift capability.

Senator BEGICH. But it shouldn't be a substitute for C–17s.

General HAWLEY. It is not envisioned to be a substitute; it is strictly a complement, a reserve capability, if you will, when you're operating in extremis, and your C–17 and C–5 capabilities are completely committed elsewhere.

Senator BEGICH. Okay.

Mr. BOLKCOM. I'd echo almost everything I just heard. They are different platforms. The C–17 and C–5 provide an outsize/oversize carrying capability for oddly shaped, large things we need, like helicopters or small artillery pieces, or even a tank. There's no way anything else is going to carry that but the C–17 or the C–5. So, our aerial refueling capabilities provide a great augment, as the General just mentioned. I think it's on the order of about 3 percent of our organic million-ton-mile-per-day capability, so it's a twofer, and it makes sense.

One thing I just want to point out, and I think the General made this point, about expanding the Army and the Marine Corps, and how that could put increasing stress on our C–17 force. I think that makes a lot of intuitive sense, except I would like to point out that I don't think the purpose of increasing our ground forces is because we want to deploy more of them faster, but to relieve the personnel tempo by creating a larger pool of these foot soldiers who need to deploy. So, I don't think the operations plans have changed. I don't think that we are planning now, because of the growth of the Marines and the Army, to get them there faster. But, that might be something worth looking into.

Senator BEGICH. Thank you.

Mr. Watts, do you have anything to add to this?

Mr. WATTS. The only comment I'll make is Jim Roche, who was Secretary of the Air Force from 2001 into early 2005, is a former colleague and a long-time friend, and, while he was Secretary of the Air Force, one of his recurring nightmares was, "What if I have to ground the C–135 fleet or the KC–135 fleet?" All the Services depend on that air-refueling capability. So, I guess I'm less concerned with the additional capabilities you might get with those platforms than the fact that, over the last decade, we have not started recapitalizing the tanker fleet. I really just think that's an important issue.

Senator BEGICH. On the issue of the refuelers and the whole idea of split purchasing; any feedback that you want to give on that?

I'll start with Mr. Bolkcom, because he looked anxious, it was like a test; he pulled out his pen, he's already writing the answer. So, you're first.

Mr. BOLKCOM. Thank you, Senator.

The administration has been pretty consistent that they're against a split buy. The argument against a split buy is that it costs more money upfront. You may get savings down the road through competition. But, you definitely will incur more operations and support costs by fielding a heterogeneous fleet with two different kinds of airplanes.

I have heard some interesting arguments for a split buy. One, of course, is potentially an industrial-base issue.

Senator BEGICH. You mean in preserving the industrial base?

Mr. BOLKCOM. Yes, sir.

Senator BEGICH. Okay.

Mr. BOLKCOM. I think maybe an argument with a little more traction is that, "Well, if you're in a hurry, you can have two lines running and procure them faster that way." CRS doesn't take a position, of course, but those are some of the arguments.

Senator BEGICH. The arguments.

Mr. BOLKCOM. Yes, sir.

Senator BEGICH. General?

General HAWLEY. We've operated a multiple number of tankers for a long time in the strategic role. We have the KC–10 and the KC–135. The Air Force's tanker plan is to eventually repeat that. They envision this current round of competition to fill the kind of medium-sized tanker with a subsequent buy, later on, of another kind of tanker, which would do the KC–10 end of that mission. So, there are multiples already. Most of these things are maintained under contract or logistics support, so I don't think the argument that they're going to cost more to support holds a lot of water, because mostly we just use the existing support capabilities that these things are capable of in their commercial variants. Both of them have commercial variants.

To me, the argument for a split buy is merely, "Hey, we need to get on with this." There seems to be a political obstacle to getting a tanker in the field, and this would allow us to get past that political obstruction and begin to build anything, the warfighter needs these things, and they need them now. Our tankers are 50 years old. They'll be 75 or 80 years old before we get to retire them, even if we start building a tanker today.

The downside of a split buy is that it requires you to fund two lines of production over a long period of time, and that's a lot of money each year, because there's a minimum production quantity. That would require a commitment from DOD and Congress to maintain that kind of funding support to buy 25 up to maybe 30 tankers a year in order to maintain the 2 production lines. I think that would be the biggest challenge.

Senator BEGICH. Thank you very much.

I've run out of time, but if you have a very quick comment?

Mr. WATTS. No, sir.

Senator BEGICH. Thank you very much. Thanks for your answers.

Senator LIEBERMAN. Thank you, Senator Begich.

Senator Thune, back to you.

Senator THUNE. Thank you, Mr. Chairman.

Let me ask a little bit about fighters. In a limited defense budget, would buying more quantities of legacy aircraft, such as your F/A–18s, F–15s, and F–16s help mitigate a strike fighter shortfall in our tactical aviation wings?

General HAWLEY. As you might expect, during my time on Active Duty, particularly as Air Combat Command Commander, we examined that a lot. I think, if we had addressed this question 10 or 15 years ago, the answer might be yes. Today, I think it's no. We're too far down the road. The F–35 is going to be a great airplane for all three Services. I think it would be a serious mistake to undercut that program by trying to fill holes in the forest today with legacy airplanes.

Senator THUNE. They're retiring F–16s already, though, and they're going to be retiring them at an accelerated rate, here in the next few years. F–35s are probably not going to be rolling out soon enough to replace those, and we have lots of installations out there that are going to be probably missing a mission for a while until the F–35s are there to replace the F–16s. I guess that was the context of my question; does that, in your view, not make sense to have that kind of bridge between the current technology and the legacy aircraft in the next generation with the F–35?

General HAWLEY. In my view, the problem is that when you buy one of these airplanes, you're going to have it for 30 years, maybe 40. It's a very long-term commitment. If we buy three or four or five or six squadrons of these things, that means they're going to be in the force in 2050. I don't think they're the right airplanes to have in the force in 2050.

Senator THUNE. Mr. Bolkcom?

Mr. BOLKCOM. Sir, I understand the Air Force and the Navy's calculations for their projected fighter gap. I'll point out that it's based on some assumptions. One assumption is that we continue the current utilization rate of the fighter force. That may or may not come to pass. Another assumption is that the UAVs that we're buying in large numbers now aren't included in that mix, when they've mixed those numbers. If one does believe that Reapers and Predators provide some air-to-ground capability that would otherwise be provided by fighters, perhaps the gap would be a little less.

That said, I agree with what the General said about the length of time in the fleet. I'll just point out that the fighters we fly today tend not to have active electronically scanned array (AESA) radars, joint helmet-mounted queuing systems, and some of the latest-generation countermeasures. Certainly, adding those to some already very good platforms would increase capabilities.

Senator THUNE. Digressing, for a moment, to the next-generation bomber; I had an extensive discussion with General Hawley about that but Mr. Watts, you've written extensively on that subject, about the need to develop a long-range strike capability. If I could get you to give your take on the direction that the President wants to take on that next generation bomber capability. You mentioned that you didn't think that the current generation of bombers could fill that 25-year timeframe we talked about earlier. But, maybe just your view of why they are coming to the conclusions and making

the assumptions they are about delaying the development of this new aircraft.

Mr. WATTS. My impression is that there is still considerable disagreement about whether to go forward, particularly within portions of OSD. If I think back about a lot of the studies that have been done over the last decade, there seems to be, on the part of some involved in thinking through what you might really wish to develop and procure, a tendency to get mesmerized by technology promises further out on the horizon.

My focus, to go back to the beginning, is that those 20 platforms you have left—the B–2 force—it's just hard for me to believe that those are going to satisfy, in the long-term, our requirements to be able to hold targets at risk, even in defended airspace, over the next 2 to 3 decades.

You did touch on the issue of things that could be done to improve the existing platforms. I would just add, in the case of the B–2, the computational capability onboard the airplane is something that's been debated back and forth, and that would really provide a significant increase in the capability of that airplane. The processors that were originally put into the airplane were basically 286 IBM processors. If you had a 286 laptop and took it to your local lending library, and asked them if they wanted it, they wouldn't, because it won't even run Windows. So, that kind of a capability, which you do see in the JSF is one of the paths in which you could really improve the utility of that platform, going forward, if you wished.

Senator THUNE. Thank you, Mr. Chairman.

Again, I want to thank the panel for their great testimony.

Senator LIEBERMAN. Thanks, Senator Thune.

I have a couple more questions, and if my colleagues, Senator Begich or Senator Burris, want to, we can go until about 4 o'clock.

As I indicated briefly in my opening statement, one of the more important developments in recent years has been the demand for and capability to provide persistent full-motion video surveillance to ground commanders from the air. It's quite remarkable. Some of those systems have not even completed the normal research and development cycles, although that's happened before, remembering the contribution that fielding the Joint Surveillance Target Attack Radar System (JSTARS) made in the first Persian Gulf War, even though that technology had not yet fully completed development at the time it as pressed into service.

I wanted to ask you, are there broader implications from these technological developments for the contribution of aviation to irregular warfare? Related to that, are there systems that you think we should be developing and fielding that would take greater advantage of the ability to persistently see the battlefield?

General Hawley?

General HAWLEY. You mentioned JSTARS. In addition to full-motion video being of great value in the theater, we're also finding, more and more, that the forces on the ground really appreciate the ground-moving-target indicator capability and the synthetic aperture radar (SAR) capability, the high-resolution SAR that some of these airborne radars, like the JSTARS, can provide. They're of great value, both in the realtime application and in the forensic

analysis of the product as they try to track down some of these bomb layers back to their lairs so that they can get the bombmaker rather than just the bombplanter. Those capabilities are extraordinarily valuable to the forces on the ground.

One thing we could do is continue to modernize these wide-area surveillance platforms, the JSTARS being the primary one in our inventory today, although the Navy has some very capable platforms, as well, with upgraded radars and sensors, communications, and that onboard computational power that Barry mentioned for the B–2, because these modern radars, the AESA radars that are now available, form the heart of the F–22 and the F–35. Those same technologies hold great promise to provide enhanced capability for our forces on the ground in these areas of high-resolution SAR, not only for the take that provides, both the ground-moving target indicator and the radar pictures that they provide, but also the ability to increase and gain leverage from these other systems that look at a much smaller area, like the Predator, because you can provide that broader situational awareness so that they can be better targeted.

So, that is an area where I think we could focus.

Senator LIEBERMAN. Good.

Mr. Bolkcom, do you want get into that one?

Mr. BOLKCOM. Thank you, sir.

The one thing I'd like to add is, over time, in conventional state-on-state conflict, we have seen some friction between the Army and the Air Force over some aviation capabilities. CAS is one area where there has been some friction. What I see is, when we need to engage these nonstate actors, irregular forces, oftentimes the observe, orient, decide, and act loop is very tight and compressed. I see the Army moving pretty aggressively towards fielding their own UAVs that are organic to their small units, that they can control, and that they can use all the time; they don't have to wait for an air tasking order. I don't know yet how much encroachment or friction we'll see with the Air Force, who likes to control some of the larger UAVs, but I see that a potential area where Congress might want to keep an eye on that.

Senator LIEBERMAN. Okay, thank you.

Mr. Watts?

Mr. WATTS. I certainly support what General Hawley said on the growing utility of these systems. It really does hinge increasingly on, for example, AESA radars and things of that sort, and the ability to pull the information into central command-and-control facilities so you can really integrate it.

We have come a long way over the last decades. Indeed, the use of UAVs for surveillance and persistent reconnaissance is really one of the areas in which you could argue Dr. Krepinevich's revolution in military affairs. The Services really have gone forward fairly smartly and done what needed to be done.

Senator LIEBERMAN. I agree. We were talking earlier about how you can't predict what the next generation of conflict is going to be; where the enemy's going to be, or the nature of conflict. But, obviously it was not so long ago, in the 1990s, when some people were saying that all we needed was air power to win wars, right? I know that none of you, at this table, would say that. It was an overstate-

ment. Now, of course, there's a danger that people will say, "Oh, this is all boots-on-the-ground." But the truth is that it really is joint warfighting.

I can tell you, just having heard your answer to this last question, General, a couple of us went down to visit General Petraeus in Tampa, CENTCOM, just for a whole review of his area of responsibility. He went back and showed us a fascinating diagram of the battle for Sadr City and the different elements that were involved; U.S. ground forces, Iraqi ground forces. It was quite fascinating to see. Overhead, there was the JSTARS aircraft, and there were some drones there, too, that played a very critical role in a remarkably diverse series of assets that achieved a great victory for us.

So, I don't know if you want to comment on that.

General HAWLEY. Well, it is. It wasn't just Fallujah, but it's increasing since Fallujah, the ground forces' reliance on these systems, because it gives them the thing that, as a fighter pilot, I craved most, which was situational awareness.

Senator LIEBERMAN. Right.

General HAWLEY. It's hard to appreciate how valuable it is to know what's going on around you.

Senator LIEBERMAN. Right.

General HAWLEY. These systems give those troops on the ground the ability to have situational awareness about what's going around, who's moving where, and in the forensic sense, who moved where, so that they can then go do their job better on the ground and eliminate some of these threats to the civilian populations that we're trying to protect, and to our own forces.

Senator LIEBERMAN. Yes.

I agree. I think, too, probably one of the more prominent conclusions today, and I think you made the case well, is the role of the long-range strike forces in irregular warfare, larger than most people would intuitively think. Then, of course, this tremendous role of ISR on aircraft in the irregular wars that we're fighting now.

Senator Begich, that's all that I have.

Senator BEGICH. Thank you very much, Mr. Chairman. I have one other area. Let me make sure I do this right.

I'm going to have to flip back and forth between the report, Mr. Bolkcom, that you had prepared and determined that it's the Joint Striker Fighter, the F136 alternative engine. I'm a new member, so I don't know if I'm enjoying the reading or finding it interesting, but in this one I'm trying to figure out on the F135, which is the replacement that's been selected by DOD, from your review, is that engine capable of doing everything we need, as the replacement? Then it's going to lead to a couple more questions, so I want to kind of prepare you. So, keep that answer simple so I can go to the next.

Mr. BOLKCOM. The answer is yes.

Senator BEGICH. Okay. Thank you.

Now, I'm going to lay out what I think I understand of the facts, and correct me if I'm wrong, then again it leads to questions. The F136, back in 1996 or 1997, Congress said, "We want to have an alternative, we want to have some competition." They funded some development, over $2.5 billion. DOD's never been a big fan of that, but it's been in there to create another alternative. Now DOD has

made the decision that we're going with the F135, but we've now invested in this alternative. Is it fair to say that when you add alternatives or you have competition like this, of two engines that have the capacity to do the job, isn't it going to drive down the price? What was Congress's original purpose in 1996? Wasn't that part of it?

Mr. BOLKCOM. Yes, sir. There's a number of arguments for the engine. One is the idea that if the fleet is grounded because of a problem with one engine, you have another. That may or may not be a strong argument, in one's mind. But the economic argument has to be the dominating one. You hope, over time, you will recoup the savings of your upfront investment. There's been a number of analyses done about how many engines we're going to buy and how much the upfront investment is going to be, how much we're going to save through this competition, and all these thing depend on exactly how we couch the competition. Is it just for procurement only, or, as in the Great Engine War, as they call it, do you also compete the operations and support contracts?

So, a lot of it has to do with how you orchestrate this competition.

Senator BEGICH. What's the predominant future utilization of which engine type by the Europeans and our allies?

Mr. BOLKCOM. I don't know if I can answer that authoritatively. I believe, as the only engine that's part of the program of record, they plan on acquiring the F135.

Senator BEGICH. I'm interested in what they're planning now, but what they're really planning into the future.

These are my words, so you can acknowledge them or just ignore them, but the way I read this is, Congress set a course of competition; DOD didn't do it. They did all the money for planning. They basically said to Congress, "We're doing that. We're doing that research." But, at the end of the day, they stuck with the F135 without even competing the development of it or the building of it. Is that how I read your report, or am I missing something?

Mr. BOLKCOM. No, sir. I think that's exactly the rub. I think it's the law that they fund this airplane with funds that are appropriated, and they have not requested that money over the last couple of fiscal years.

Senator BEGICH. Okay.

I'll leave it at that, only to say thank you. It's a very interesting read, and I guess, Mr. Chairman, that's one before my time. You were here in those years, and I'm just thinking it seems that, at some point, the competition would make so much sense, especially on a simple engine design. I say simple, and it's not simple. But, I mean in the sense that it's an engine, especially when Congress gave direction, not just 1 year, because they authorized money throughout the process. It's not just a 1-year quirk; it's a multiple-year desire by Congress. It just seems odd that they would just ignore that and do what they want to do.

So, I'll just leave that. But, I appreciate the information. This is very good information for me. Thank you very much.

Thank you, Mr. Chairman.

Senator LIEBERMAN. Thank you, Senator Begich.

Thank you, gentlemen. I want to mention that Senator Bill Nelson came in and he left two questions. One, we really covered, which is a comment on your current state of technology maturity, need, and requirement for long-range bombers. Second, he talks about the fact that bomber aircraft are the only recallable nuclear capability. Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles when launched, cannot be recalled, and he wanted a comment on that issue, and, generally, your views on maintaining a nuclear-capable bomber.

If it's okay with you, I think we'll submit that formally to you, General Hawley and Mr. Watts, and ask for a short statement, in writing, which we'll add to the record.

[The information referred to follows:]

General HAWLEY. The concept of a nuclear deterrent force based on a triad of Intercontinental Ballistic Missiles (ICBMs), Submarine-Launched Ballistic Missiles (SLBMs), and manned bombers has been one of the most enduring and successful strategies ever developed for our Nation's defense. When combined in a balanced way, the unique characteristics of each leg of this deterrent triad make it nearly impossible for any adversary to launch a nuclear attack on the United States without suffering from a disabling retaliatory strike. The manned bomber contributes several unique capabilities to this triad, one of which is the ability to be recalled after launch. Bombers can also be placed on various levels of alert, to include airborne alert, an attribute that proved of enormous value during diplomatic confrontations with the former Soviet Union. Bombers are also able to locate and attack mobile or movable targets, an attribute that may be of growing importance when dealing with emerging threats such as those posed by a nuclear armed Iran or North Korea. Department of Defense proposals regarding development of a next-generation bomber are likely to be heavily influenced by the outcome of strategic arms limitation discussions with Russia. Should those discussions result in a significant reduction in our nuclear warhead inventories, there may be no requirement for a nuclear delivery capability in a next-generation bomber, so long as the B–2 continues to be sustained and modernized.

Mr. WATTS. The most obvious situation would be nuclear strike. ICBMs and SLBMs are not recallable, whereas with a manned bomber the President could call off the strike within the last few minutes. The additional time that would be provided for a change of mind is, of course, limited. For an ICBM it would be a maximum of 20–25 minutes. But in the latest Center for Strategic and Budgetary Assessments bomber paper, I argued that these few minutes might be psychologically desirable even if the extra decision time they might buy the President is actually quite limited.

A related observation is that senior military leaders are still reluctant to unleash armed robots in the battlespace. That's why the Air Force insisted on adding a data link to the Low Cost Autonomous Attack System, which was a small lethal unmanned aerial vehicles that used laser radar to identify targets and attack them on its own with a conventional warhead within a limited area (roughly 50 to 100 square kilometers depending on the range to the search area). The idea of a robotic bomber flying around with a nuclear weapon will probably be even more discomforting and unacceptable to both military and civilian leaders. These reservations are cultural and psychological, but they are real nevertheless.

In the case of an unmanned long-range strike system (LRSS) carrying conventional precision weapons, a data link enabling human operators to tell the system whether or not to attack a given target would be highly desirable. Naturally, a lot of sensor information from the platform would have to be available before the human could make a go/no-go decision. Therefore, even this modest step beyond Predator. Reaper, et cetera, would involve vulnerabilities inherent in the data links between the remote operator and the vehicle. On the other hand, there would be no pilots lost if an unmanned LRSS happened to be shot down.

Senator LIEBERMAN. I thank you very much. It's been a very helpful hearing, from the subcommittee's point of view. As I said at the outset, I think it will inform our work here on the authorization bill.

We'll leave the record of the hearing open for 10 days for additional statements that you may want to submit to the record and any questions that any other members of the committee have.

You've done us a real service today, and I thank you for that.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR SAXBY CHAMBLISS

F–22 AND C–17 PRODUCTION

1. Senator CHAMBLISS. General Hawley, you comment in your written statement that, "Should the President and Congress conclude that our forces should be sized to deal with only one contingency where our control of the air is contested, that will be an appropriate time to terminate production of the F–22. Until then, the actual requirement is for 381 aircraft, not 187 or even 243." Do you agree that both F–22 and C–17 production should be continued until the Quadrennial Defense Review (QDR) properly analyzes the future requirement for these systems, in light of our national security and military strategy?

General HAWLEY. In my view, ending production of the F–22 and C–17, when coupled with recommendations to terminate programs to modernize our long-range strike and combat search and rescue capabilities, and to cancel the second airborne laser development aircraft, represent a major change to our national defense strategy. Such major strategic shifts have historically occurred only after a vigorous public debate and with concurrence of Congress in execution of its oversight responsibilities. These decisions do not appear to have been informed by any public debate. Instead, they are the product of deliberations conducted entirely within the Department of Defense (DOD) by a small group of senior officials sworn to secrecy. Notably absent were those senior military officers currently responsible for executing the affected missions. Moreover, we should not expect the pending QDR to produce an objective analysis Congress can use to judge the wisdom of these changes. It will, after all, be guided by the very same officials who developed the recommendations you are discussing. Therefore, I hope Congress will seek a much broader range of opinion and analysis than that produced by the QDR as it considers these issues.

While some of the changes being contemplated could be reversed in time, the option to fully secure our ability to provide air superiority and strategic mobility will vanish when the F–22 and C–17 production lines are shut down. Therefore, it seems prudent to extend production of both systems until Congress and the public have had an opportunity to debate the wisdom of these de facto changes to our national defense strategy.

UNMANNED AERIAL VEHICLES AND INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE PLATFORMS

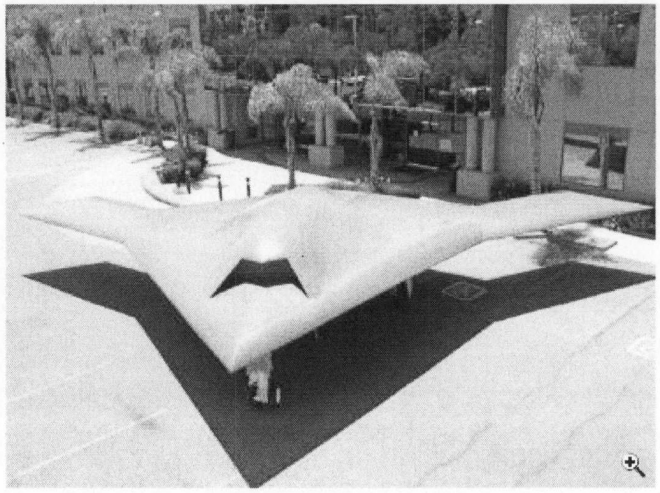
2. Senator CHAMBLISS. General Hawley and Mr. Watts, there is a real and growing concern that hostile air space could deny access to our manned and unmanned airborne intelligence, surveillance, and reconnaissance (ISR) platforms. As we saw in Georgia recently and as is the case in numerous other countries, air defenses are robust enough to preclude the use of non-stealth unmanned aerial vehicles (UAVs). Even against older surface-to-air missiles (SAMs) and 3rd and 4th generation fighters which most all developed nations possess—as well as some undeveloped nations—most every UAV we have in the inventory is completely vulnerable. Now and for at least the next several years, only the F–22 has the ability to ensure access to this type of airspace and allow our UAVs to operate freely. Both the fiscal year 2009 supplemental and proposed fiscal year 2010 budget request contain additional funds for UAVs and manned ISR platforms on the order of billions of dollars. Of the platforms that these budgets would procure, none of them will be full-fledged stealth platforms comparable to the stealth capability of the F–22 and F–35.

In your judgment, does the "UAV surge" that Secretary Gates is recommending we undertake make sense given that these systems may very likely be denied access to key locations outside of our ongoing operations in Afghanistan and Iraq, and how does this inform the need for 5th generation stealth fighter aircraft to ensure access for our manned and unmanned airborne ISR platforms?

General HAWLEY. I fully support DOD's proposals to improve our ability to provide surveillance and reconnaissance of the battlefields. In fact, they probably do not go far enough in some areas, such as modernization of our Joint Surveillance and Target Attack Radar System (JSTARS). But as you point out, none of these systems

that have proven so critical to the success of our forces on the ground can operate effectively against even modest air defenses. That is why production of the F–22 should not be terminated until Congress has had an opportunity to examine the implications for our defense strategy and accepts the assumption that we will not be tested by more than one adversary capable of seriously contesting our control of the air. In examining that assumption, I hope Congress will recall our experience in Vietnam, where we lost more than 2,200 fixed wing aircraft to a fairly modest deployment of surface-to-air and air-to-air defenses.

Mr. WATTS. The current inventory of wide-area, high-end ISR platforms—primarily Predator, Global Hawk, and Reaper—are not particularly stealthy platforms. So far as I know, none of the three just mentioned incorporate low-observables technologies. Consequently, they are quite vulnerable to modern SAM systems such as the Russian S–300 and S–400 SAMs. If the United States hopes to be able to operate these kinds of ISR systems inside airspace defended by current and future SAMs, there are two options.



First, we could begin moving toward stealthy unmanned ISR platforms. Northrop Grumman claims that its X–47B drone (pictured above) will begin initial flight tests in the fall of 2009. In other words, DOD is already developing low-observable UAVs. A possible action for Congress in this regard would be to accelerate fielding these sorts of ISR platforms. In the long run, it seems likely that the United States will need to pursue these kinds of ISR platforms in any event.

Second, one could consider using F–22s—or later, F–22s and F–35s—to eliminate advanced SAMs, thereby enabling U.S. forces to employ non-stealthy UAVs such as Predator and Global Hawk in enemy airspace, or to operate manned ISR platforms such as JSTARS close enough to enemy targets to be useful. My sense is that the appetites of the combatant commanders for more ISR is insatiable. They will always want more than they have. Hence, Secretary Gates' "UAV surge." But to use a temporary, hypothetical "window of vulnerability" for non-stealthy UAVs as an argument for buying more F–22s strikes me as a weak argument given the ongoing development of UAVs like the X–47B. Frankly, given all the other priorities, I am inclined to argue that the most sensible response would be to fully fund programs like the X–47B and ensure that the Navy presses ahead with the Unmanned Combat Air System (UCAS) program. UCAS would provide the Navy's carriers with a survivable ISR platform having much longer legs than F/A–18E/Fs, thereby beginning to address emerging anti-access/area-denial systems aimed at holding U.S. carrier battle groups at arms' length. So I would recommend patience rather than trying to solve the vulnerabilities of current ISR UAVs in the fiscal year 2010 defense budget.

[Whereupon, at 3:53 p.m., the subcommittee adjourned.]

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