



Mitchell Institute for Airpower Studies

Presentation: "Losing Air Dominance? The Air Force and its Future Roles"
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Rebecca Grant, Director, Mitchell Institute
Loren Thompson, Chief Operating Officer, Lexington Institute

Grant: What Loren and I will talk about today is air dominance. We're going to talk about some very specific issues, about fighters and the fighter force structure. We're also going to talk about some of the larger issues that are facing our nation today.

For me, the starting point for this is the consequences of losing air dominance.

We know that air dominance is not a strictly doctrinal term, and yet it's something that we all understand. We understand that air dominance means the ability to deny the enemy operating in the air, whether that's with fighters or with SAMs. We understand that air dominance means first and foremost being able to clear the airspace. We know that it also means doing that task to enable joint forces, be they on land or at sea, to do their jobs within the joint campaign. So it's not a term in doctrine, but it's something we have become very used to having with the way that America fights its wars. It's something we rely on today. We've relied on in the past.

In fact when the Air Force became independent and was given its first roles and missions assignments in the late 1940s, it was given this mission that we colloquially refer to as air dominance, this air superiority mission. So you'd be well within your rights to ask yourself why we need to talk about this issue today. The point that I'll make is that we are for the first time in a very long time critically on the edge of losing our ability to guarantee air dominance for the joint force.

Where did all this start? I want to go back to the Gulf War of 1991. This picture of F-117s lined up in a row is a terrific symbol of one of the chief lessons of the Gulf War of 1991. That was, of course, the value of stealth. There were those who really doubted that that F-117 could do everything it was advertised to do. And senior commanders at then Tactical Air Command and those planning the air campaign had to make a gut level choice to believe in stealth and send it in to attack the toughest targets in the Operation Desert Storm air campaign. They did, and it did a tremendous job. As a result of that, the Air Force's lesson learned from the Gulf War at the very highest level was that they didn't want to buy any more fighters that weren't stealth fighters.

I wanted to remind us today of this plan that was set in motion so, so many years ago at a time when the Cold War was ending, the defense drawdown was occurring, we were talking about something that seems like a quaint concept today, the peace dividend. At this time the Air Force made a very conscious decision. It did not come back and procure more of the F-16s or F-15s that had done also a tremendous job. It quickly retired the F-111, despite its tremendous tank-

linking record in Desert Storm. This was all in the cause of reducing the size of the tactical air forces and getting ready to really invest in stealth.

In that same year, 1991, the down-select for what became the F-22 was made and just a few years later, after much reconfiguring of long-range plans, the decision was made to initiate research for what became the F-35 Joint Strike Fighter.

Let's put this in context a little bit. The bar chart that you see here looks at total fighter buys from 1963 through the present day. This estimate paints a very graphic picture of how much force structure the Air Force used to have to purchase to do the air dominance mission and how that's tailed off.

Let's take a closer look at the right-hand portion of that chart. What you'll see here is that true to plan the Air Force in the 1990s bought very few aircraft. Typically the ones that did buy were congressional add-ons. So the firm commitment was still in place, to end up with a force that was consisting only of stealth fighters. Now what happened at the same time, of course, was the beginning of the world that we live in today. One that could not have been fully foreseen in 1991. That's the world that has led us to the ongoing global war against terrorism of which air power has been such a central part.

Yet as this began, starting I think we might say with the commitments to the no-fly zones in various regions, including operations in other types of conflict such as those in Bosnia and Kosovo. The plan stayed true. Don't buy more of the same type of fighters. Let's really reach for the future and assure air dominance.

From a fiscal perspective, however, there was a problem brewing all along, and those of you who were in this business in the 1990s remember something called the TacAir bow wave, which was a description of the amount of procurement funding that would be required to finance three major fighter modernization programs all at once. They were the Navy's F-18E/F Super Hornet; the F-22; and what became the F-35.

The bow wave referred to estimates that ran as high as \$10 billion a year just for fighter procurement, and everyone wrung their hands over this and wondered what to do about it and how it would all turn out. How it turned out was just a big different than what we might have thought.

On the right hand side of the chart you see the course of action ultimately taken by Department of the Navy. They moved very quickly to procure the Super Hornet, bringing it along through a somewhat accelerated acquisition process as a derivative of the Charlie, of the F/A-18C/D model.

In 2002 they also adopted a very streamlined, and for them very difficult plan, which would adjust Navy and Marine Corps TacAir into a common pool and proceed with a plan for the future that streamlined and reduced their fighter buys.

For the Air Force, although many steps were taken, the commitment to F-22 and F-35 was still very solid. What really had not been resolved in this timeframe, though, was the fact that there would be years where their major procurement dollars overlapped, still creating an issue. And this in a way you can say, referring back to the previous chart, is the investment that was deferred; the investment that was not made in the 1990s was to be made in this decade and slightly beyond into these two new systems.

The Air Force wisely went and procured C-17, finished out the B-2, and took care of some other priorities including training aircraft. But the TacAir bow wave in the somewhat modified form remained out there. Where it really hit the beach and crashed was in December of 2004 with PBD-753. This OSD-level, Comptroller directed action took out probably the single largest chunk ever out of air dominance.

The initial hit for fighter modernization was \$10 billion from the F-22 program, resulting in a program of record at 183. But the follow-on years from that added perhaps \$40 billion or more to the hit. What this meant was that from a financial perspective the Air Force's plan for air dominance, carefully conceived in the days after the Gulf War of 1991, was no longer affordable or executable.

Bad timing, because the threat was beginning to change as well. Hard to notice at first, but some signs were there. This chart talks about what yesterday's environment looked like and I want to point out for you primarily the number of, admittedly largely unguided, uncontrolled SAM launches that occurred during operations in Kosovo in 1999 and also as the chart depicts, in Operation Iraqi Freedom in the year 2003.

This was kind of a lot and I think it underlined a lesson that Airmen in combat had learned many, many times over, whether that was in World War II, Korea, Vietnam, and that was that to a certain point it's hard to be sure that that threat has completely gone away. And we must remember, too, that these were older systems. Soviet air defense systems, some of which had debuted back in the 1960s.

Our air forces, our air dominance force, have never had to face the SA-10 type of threat or the SA-20 type of threat.

On top of this we have a new environment. Of course the newest thing about this environment is our ongoing operations in the Global War on Terrorism, but there are some other things that are very new, really within the last few years. I can sum those up in two words by saying China and Russia.

Granted, many people have been keeping an eye on Chinese military capabilities since about the mid 1990s. A popular way to date that is in fact from the fast high speed transit of the USS Nimitz during a Taiwan Straits crisis over missile firings in the '95 and '96 timeframe.

You may be familiar with developments in China, and I'll talk about them a bit more in the next couple of slides, but I think for all of us one of the big surprises has been the potential resurgence of Russia.

I remember meeting last year at this very conference with the head of the Royal Air Force. I asked him at the end of our meeting what were his top concerns for the future. He listed a few, and then he said, what I'm really concerned about, of course, is the Russians.

At the time I thought that very interesting. I somewhat raised my eyebrows and filed it away. But what we've seen is a potentially resurgent Russia in many domains, and I think what's striking about this too is that with both China and Russia they have some very attractive choices to make. They're able to pay for what they want to buy; they're not involved in a global power projection war; they're not contending with a Global War on Terror; and they very much

recognize, in different ways, the importance of air and space and cyberspace. For China in particular, changes in their doctrine and in the structure of the People's Liberation Army, have made it clear that air, space and cyberspace, or as they call it, the information environment, will be the key areas for contest between great powers in the years ahead.

So we are living with an air dominance plan that has come off the rails and an environment that's changed dramatically.

That red air environment is a truly different one because now we are, for the first time in quite a long time, looking at what it means potentially to deal in an environment of sophisticated adversary aircraft and sophisticated adversary air defenses together.

China's got a kind of attractive problem from their point of view. Their problem is essentially a defensive one. They need to defend the straits, lock out U.S. access, and make sure that the U.S. can't take preemptive actions in that environment.

All this information is from one of those regular DOD reports on Chinese military capabilities, and I particularly like the drawing because it shows you that ring of bases along the coast and also their abilities to move inland and defend.

Someone who didn't want to be quoted by name said to me recently, "But the thing about the Chinese. They're not ten feet tall." That was an old way that people used to refer to estimates of capabilities of the Soviet Union. They're not ten feet tall, this young man said; they're only five feet tall, but they're 40 feet wide. And the depth of this military capability alone is something to take you aback.

In fact it reminds me in a way of a Battle of Britain, an air dominance battle par excellence, in which the RAF was successful against the Luftwaffe at great cost, but largely because of some technical advantages and of the tremendous advantages of being the defender in an air dominance battle.

That geographical advantage that accrued to our wonderful ally, Great Britain, in this moment of crisis may now unfortunately accrue to China should another type of crisis occur. So that's kind of the problem that we're dealing with writ large.

That means that we will have to play the access game and play it very well.

What kind of future will we have with China? It's impossible to know. I think we'll have a robust economic relationship, a robust trade relationship, a robust diplomatic relationship. But we are living now in a world far more multi-polar than we've ever seen in our lifetimes. And in this, air access will be key to conventional deterrence.

I think it's very significant that the Commander of the Pacific Fleet who knows a thing or two about China and the threats in his environment has very recently said to a gathering of aviators, "In this environment you will be outnumbered." He went on to say, "The Chinese will think they know how to do better than your airplane, your weapons, and your tactics. You will have to be the best you can ever be to fight in this environment."

I've talked about high end conflict but I want to take just a moment to touch on a different possibility for red air, and that is the worldwide proliferation of UAVs in many, many hands. The

box on the right lists some of the names. They all sound pretty impressive and pretty neat. If you're familiar with the systems, all of them in development outside the U.S., they are that indeed. Some of them purport to be stealthy; all of them aim to have some type of air-to-air, air-to-ground, -sea type of capability. We could in fact see in a future situation a place where air dominance means keeping dominance against concerted, low end, swarming, red UAVs as well as dealing with the traditional tasks. Mix some of those UAVs in with some very sophisticated fourth generation fighters that are out there and in the world market today, you've got a big air dominance challenge.

Why is there a moment of crisis in the air dominance plan? There are a lot of reasons. It goes to force structure. It's time for a more thorough-going analysis of what the Air Force's force structure requirements are. It may be time to get to a smaller fighter force. But the lynchpin of all of this is to get the right number of F-22s. I think we've entered into a period where we're not exactly sure what that right number is. I know there are some people I know, good friends of mine who would maintain it's still 700 or more. I wouldn't disagree in my heart, but there's a fundamental distinction to be made about the F-22. Even if you hold all other things equal, the F-22 has unique advantages in speed and in altitude that make it the only platform that can assure the rest of the force can accomplish the missions.

The lynchpin to any future American air dominance is getting the right number of F-22s, and that to me is a number that's well above 183.

What is the future for our force? We have entered into a point in time where the plan that was made—and it was a good plan—to buy stealth aircraft has now really become at risk. The options to maintain legacy forces are perhaps manageable in the very short run, but due to operating costs and the growth of the threat these quickly become unmanageable just a few years from now. The Commander of Air Combat Command has talked about a threat that really begins to mature in 2015 and to be, as he says, at full flush by 2020.

I think we see a situation where we have not figured out exactly what the 21st Century will demand from us, but we know that in this increasingly multi-polar world it will demand that we have the ability to deter with our best conventional forces, and that will mean assuring that we can establish air dominance in any one, two or more theaters where we have to do it.

I wanted to put in Admiral Mullen's comment made in his guidance back last fall, and reiterated several times by him, that we must plan for aversion of conventional deterrence. We cannot have any of this without air dominance, and that is why I say today that air dominance is at a very, very crucial moment. Now is the time to find a plan that will carry the U.S. Air Force through to carrying out its most fundamental mission for our nation.

Thank you. Now I want to turn the podium over to my colleague of the Lexington Institute, Dr. Loren Thompson.

Thompson: As you know, the topic of today's panel is the waning of American air dominance and what it may mean for the future roles of the Air Force. Since my friend Rebecca has already talked in some considerable detail about the importance of transitioning to fifth generation fighters fairly quickly, I'd like to talk a little more broadly, use maybe a sort of a public or common sense definition of air dominance rather than the technical terminology, and talk about the causes and the consequences of our failure to invest more expeditiously in next generation aerospace technology.

The good news is that America is actually spending about as much as the rest of the world on advanced aerospace technology, but the bad news is we have not spent that money efficiently, and we have now arrived at the end of the fiscal, economic, political, whatever you want to call it period during which we had a lot of money to spend on such things.

For many people inside the Air Force it's hard to understand why our political leaders do not feel a greater sense of urgency about replacing aging air fleets. You could argue that air power is the single most important warfighting tool that we have. However, it's clear that our fleets are aging without most of the political system even noticing.

What I would like to do over the next 15 minutes is explain precisely why the political system has not been responsive to the challenge of aging aircraft and why it will continue to be unresponsive to concerns that I share with many of you about what these fleets are going to look like 10 or 20 years hence. Then I will draw some conclusions about what the slow pace of modernization is going to mean for the future roles of the Air Force. But let's begin by briefly detailing how serious the decay of America's air arsenal has become.

As you probably remember, during the 2006 Quadrennial Defense Review the Air Force simplified its discussion of roles and missions by grouping its key mission areas into three categories — global strike, global mobility, and global awareness.

If we look at each one of those areas we see that age-related decay has now become generalized across the entire force. With regard to strike capabilities, Rebecca has already noted that we have very few stealthy fighters in the force today, and yet we are planning to terminate our most capable next generation stealthy fighter at a number that is probably roughly half of what our future operational requirement will be.

While the service will soon begin receiving a sizeable number of F-35 Joint Strike Fighters, everybody seems to have forgotten—at least everybody in OSD seems to have forgotten—that the F-35 was designed to operate in tandem with the F-22. Therefore, the fact that we're terminating the F-22 at half of the stated requirement does not speak well for the future viability even of the F-35.

The F-15 that the F-22 was supposed to replace but which may now remain in the force considerably longer, well you know what the story with that plane is. It began as a development program in 1969. It has now grown so aged that at least in the case of the F-15C it is on flight restriction during training due to metal fatigue, and in some cases the plane is literally falling out of the sky.

Now those problems are made worse by the inability of the service to afford a next generation escort jammer since electronic warfare is the principal alternative we have to stealth in terms of guaranteeing the survivability of penetrating aircraft.

The situation with the long range bomber force is even worse. There are less than 200 airframes remaining. Only ten percent of the heavy bomber force is fully stealthy. Yet many observers, myself included, don't believe that the service is going to be able to find the money to fund the next generation bomber that's supposed to debut in ten years. Even the nuclear part of the strike mission has begun to erode fairly rapidly.

For example, next year the Air Force will stop, for the first time in 50 years, buying rocket motors for our strategic missiles for the Minuteman III. We've already retired Minuteman II and MX Peacekeeper. As you know, we've been gradually extracting the manned bombers from the strategic deterrence mission. So where does that leave us? Probably with a deterrent force on any given day of about ten Trident submarines and 450 Minutemen III of indeterminate longevity, since we won't have the data to know how long they will last until about 2014.

Turning to global mobility. We see a fairly positive story because we're buying the C-17 and the C-130J, both very capable airlifters. However, we are planning to terminate the C-17 at 205 airframes in the very near future.

The aerial refueling component of the global mobility mission area is an utter disaster. You know what the story is there. We are flying the largest fleet of old aircraft in the world. It is literally the oldest. Fifty years old will be the average for the 90 percent of the fleet that is KC-135s within about two years. We'd like to believe we can fly them until they're about 80 years old because that's what we'll need to do at the rate we're modernizing, but the truth of the matter is nobody's ever flown jets for this long so we don't know if they'll last that long.

After trying for nearly a decade, the Air Force has not managed to award a contract for a next generation tanker and it doesn't look like we're going to be bending metal there any time soon.

Turning finally to global awareness, meaning intelligence, surveillance and reconnaissance, we see there is no plan for replacement of Cold War radar planes; no plan for recapitalizing airborne eavesdropping assets; and nothing especially interesting happening in orbital reconnaissance.

Now there has been progress made in various unmanned strike systems, and awareness systems. Things like Global Hawk and Reaper. The inherent limitations of these systems mean that although we're going to have some new capabilities in the future, particularly against lightly armed forces, we still are facing a crisis in terms of global awareness going forward because we simply don't have the kind of aircraft in the modernization plan that could take the place of AWACS or Joint Stars or Rivet Joint as they age out.

So all three pillars of American air power are in gradual decline. Of course I haven't even mentioned the fact that the Chinese now are able to target our aircraft carriers. You may remember five years ago we were figuring that was going to happen circa 2015. Well, they can do it now. They have put together the combination of overhead and land-based sensors plus new weapons so that they can target our aircraft carriers right now. That's the conclusion of U.S. intelligence.

So we're in a world of hurt here, and most of our political system doesn't even know it. The question is then, why hasn't the political system responded to the erosion in vital warfighting capabilities that we see in the Air Force, especially given the fact that military outlays have actually doubled in this decade and we are greatly outspending every conceivable adversary we will face in the future.

The answer to that question, I'm sorry to say, is in some ways even more disturbing than the actual state of the air fleets. As you'll recall, during the first decade after the collapse of communism there was a great deal of optimism about the future of global security, at least here in America. Maybe not in the Balkans. Defense Secretary Dick Cheney killed the B-2 bomber and

actually bragged about killing 100 other military investment programs, arguing that we probably weren't going to need major new weapon systems any time soon. His successors followed through on Cheney's lead by balancing the federal budget on the back of the military, greatly reducing the size of that budget.

The immediate impact on readiness, on preparedness of all those cuts was not great because the force was still relatively young, owing to the Reagan buildup in the previous decade. But by the end of the century it was becoming pretty apparent that if we didn't start replacing soon we were going to have a degradation in our preparedness due to the technological obsolescence and operational wear that the fleet was incurring.

It was at precisely that moment that the Bush administration took office with an ill-timed agenda to cut taxes and transform the military. The reason it was ill-timed is because within months after taking office, we had a terrorist attack which called into question the entire premise of transformation. The premise of transformation was that we were in a period of diminished danger. Well, 9/11 certainly raised some doubts about that premise, while at the same time greatly increasing the likely future funding requirements of the joint force at a moment when the administration wanted to cut taxes.

So what did we do? Well, what we did for eight years is the President stuck with his priorities. He has now said that his main legacy, looking backward, that he wants people to remember, is that he stuck with his principles. What that meant in practice is that we cut taxes and we did transformation even as we were trying to prosecute a multi-front war against global terrorism. The resulting triptych of tax cuts, transformation and counter-terrorism proved lethal to American air power because the government lacked both the resources and the political will to modernize our aging air fleets. Even though the defense budget increased from \$300 billion when Bush took office to \$700 billion at the end of his second term counting war-related appropriations, the proponents of transformation argued that air power, particularly the type of air power Rebecca was just describing — air dominance through tactical aircraft — wasn't really going to be all that relevant to addressing the asymmetric threats of the future.

It wasn't that air power wasn't useful. It was. But we were fighting adversaries — the insurgents in Iraq, the terrorists in Afghanistan — who didn't have air forces and didn't have air defenses. So it was easy to believe that even our aging air fleet would be adequate to our immediate tactical requirements. With the federal budget growing by leaps and bounds due to the tax cuts, it's going to be half a trillion dollars next year, there was little money left for recapitalization once the higher priorities of counter-terrorism and transformation had been funded.

To make matters worse, Bush's team at the Pentagon turned out to be remarkably poor managers. So even when they got the aerospace part of the transformation story right, like on space or on unmanned systems, the results in terms of execution were disappointing.

When Air Force leaders pushed back against those transformation priorities, they were first ostracized, and then they were ultimately forced down.

As a result, the Air Force today has less influence in the joint command system or in the department's budgeting process than at any other time in its history.

So the Bush years which began so promisingly in the aftermath of air power's victory in the Balkan air war, has turned out to be a chronicle of decay and despair for proponents of air power. Precisely the opposite of what they were expecting when the decade began.

Can you remember back to when Rumsfeld first came in how people, people like me actually, were saying Rumsfeld's going to favor air power over the Navy and the Army.

Well, look where we are.

It would be nice to believe that in November voters are going to select a more competent team to run the government. However, whoever runs that team, whoever gets elected in November is going to inherit such a daunting array of fiscal challenges that it will be almost impossible to fund any significant increase in air power investment. In fact I sometimes feel as though the two major parties are conspiring to create a fiscal environment in which there's nowhere for air power funding to go except down over the next four years. Here's why.

The Bush prescription, the domestic and economic prescription of tax cuts, deregulation, and free trade, has backfired. It worked very well for Ronald Reagan in the 1980s, I suppose because the highest margin of tax bracket at that time was 70 percent. But it has backfired in this decade and look at the consequence.

The U.S. share of the global economy in eight years has declined from 31 percent to 27 percent; the dollar has lost a quarter of its value; last year we had a merchandise trade deficit of \$847 billion; the federal debt has ballooned 60 percent, over \$9 trillion in eight years; and the income of the average family has actually shrunk.

The performance of the economy under Bush has been so anemic that he is in danger of tying his father's record for the lowest rate of private sector job growth in the entire post-war period. Not surprisingly, voters are clamoring for relief from the high cost of housing, health care, education and energy. Senator McCain's response is to cut taxes even more, while Senator Obama's response is to create new entitlements.

In McCain's case just one of the dozen major tax-cutting proposals he has — just one, the extension of the Bush tax cut to all families permanently, would deprive the federal government of a quarter trillion dollars in revenue every year after 2011. Every single year.

In Obama's case, the plan to make health care a right for all Americans and expand coverage of children, the disabled and those with mental health problems, promises to add a huge new burden to the federal treasury.

Neither candidate has offered a convincing explanation of how their agendas for taxes or for entitlements are going to fit into a federal budget that OMB already says is going to be half a trillion dollars in deficit next year.

So there's little doubt that when we get our new President he's going to spend his first year in office ransacking the federal budget for bill payers that can cover the cost of the promises he made on the campaign trail, and in the process he's going to be eyeing the Department of Defense for savings. In fact I think we can reasonably infer that that process has already begun even before we have a new President. There isn't going to be a space radar. There isn't going to be a transformational satellite communications program. There probably isn't going to be a next

generation bomber. There isn't going to be a Zumwalt Class destroyer. We hope there's going to be more F-22s, but we can't really hold our breath until it happens given the two candidates.

In fact there is good reason to begin to believe that two, three, four years from now maybe the only major military aircraft production line running in the United States, besides the C-130, will be the F-35. All the other ones may be gone. That actually was what PBD-753 would have done. The bottom line is the Bush administration squandered its opportunity to revitalize the Cold War arsenal and now the political system is turning to other issues, principally domestic issues.

Now maybe some huge threat will materialize over the next couple of years to rescue the military modernization plan from oblivion, but don't bet on it. Unless things change in a big way, weapons outlays are headed downward despite the age of our air fleets and despite the emergence of new threats overseas.

That brings me to my final point. What does all that mean for the future roles of the Air Force? I'm going to suggest there are four overarching implications.

First of all, despite its heavy investment in fifth generation fighters, networks and unmanned systems, the Air Force will experience a gradual erosion of global air dominance over the next two decades. I'm using air dominance in a common sense rather than a technical or operational sense.

That will result from four factors. First of all, the probable failure to buy an adequate number of F-22s; the rapid aging of the aerial refueling and airborne sensor fleets; the declining availability of overseas bases; and the proliferation of integrated air defenses in potential adversary states.

I personally don't believe that current developments in air-to-air capabilities in other countries pose an immediate threat to our air dominance. However, the lesson of exercises like Cope India is that if we don't start getting a larger number of fifth generation fighters into our force fairly quickly we're not going to be able to compensate for the geographical and other advantages that our adversaries will have. As Rebecca pointed out, it's a lot easier to defend than it is to make your way across no man's land and actually attack the enemy in his heartland.

Turning to global strike capabilities in particular, the second implication I see is that the Air Force of the future will lack strike systems necessary for attacking the full range of emerging targets. I can see at least five areas where problems have already emerged.

First of all, the failure to fund conventional systems suitable for prompt global strike, rapid global strike.

Second, the failure to fund continued modernization of land-based strategic missile systems.

Thirdly, the failure to fund replacement of aging Cold War bombers.

Fourthly, the failure to recapitalize the tanker fleet which supports all those manned and unmanned strike assets.

Finally, most people wouldn't mention it in this context, I think the failure of the airborne laser to come to fruition in a timely fashion is going to be a big disappointment in terms of the range of possibilities we have for strike in the future.

There are some bright spots. Obviously the F-35 is a major bright spot in terms of our future strike capabilities. Also we've greatly improved the networking of multi-source intelligence, the futures of multi-source intelligence for targeting. And we have the advent of unmanned hunter-killer vehicles such as Reaper. Other promising innovations are on the way. Raytheon, for example, is developing a version of the AMRAAM missile that actually can be used to kill ballistic missiles in their boost or ascent phase, which is an interesting possibility if our other more ambitious missile defense concepts don't work. In addition, as most of you know, we've made some significant progress in terms of non-kinetic approaches to strike such as cyber attacks, electromagnetic pulse and so on. Nonetheless, it appears that the sinews of Air Force global strike capability are gradually aging out and that the service cannot count on being able to address the full range of perspective targets expeditiously in the future.

The third implication I see is that the Air Force's future mobility assets are unlikely to be adequate to satisfy the needs of the joint force. I think this idea to terminate the C-17 at 205 airframes is just insanity. You'd think that we weren't planning to move divisions home from Europe and that the Army wasn't investing in something called the Future Combat System.

I always wonder where the Army is when this discussion of how many C-17s occurs because I don't see any way the Future Combat System can work in the future with the number of C-17s we're going to have available to us.

You know what the story is on tankers, I won't belabor that point. But I will also point out that if you're counting on the C-5s for inter-theater airlift as we seem to be 20 years out, you're probably counting on the wrong thing.

The good news is that the C-130J Super Hercules has proven to be a huge improvement over the legacy Hercules and promises to remain in production for decades to come. After all, what have we got? Three hundred legacy Hercules that are over 40 years old. But it makes very little sense to terminate the C-17 in the environment that we're going into.

I personally think a more reasonable goal, if we actually had an inclusive concept of what our lift requirements would be and what aging means for the C-5 fleet, it's approximately twice the number of airframes we're actually planning to buy.

My fourth and final finding regarding future Air Force roles concerns global awareness. There I detect what many of you probably detect which is a gradual migration out of orbital and manned air breathing solutions and into unmanned systems. Look at some of the trends that are unfolding.

First of all, we know that our low earth orbit reconnaissance satellites are endangered in a way they were not in the future.

Secondly, something probably many of you did not know is that our efforts to develop a new generation of more flexible, reliable reconnaissance satellites has largely failed.

Thirdly, funding has not materialized to recapitalize our manned airborne reconnaissance assets. Things like Joint Stars, things like AWACS, things like Rivet Joint. Meanwhile, we have discovered that unmanned reconnaissance systems such as Global Hawk are proving to be uniquely useful in this new threat environment.

The problem I always have with systems like Global Hawk and Predator is they are wonderful systems. The problem I have, though, is they're a wonderful system in an environment where nobody's shooting at you. You just wonder down the road whether our great faith in unmanned reconnaissance assets isn't going to turn out to be misplaced because of some surge in the threat, maybe facing somebody a little more capable than Saddam Hussein. For me, emblematic of the decline in our ISR capabilities is the failure of the Air Force not only to build the E-10, but also even to put the radar technology that would have been on the E-10 onto the legacy Joint Stars aircraft. That fleet is going to start falling apart in the next decade and it's certainly not going to have the resolution, the granularity we need for some of the threats we're facing, and yet I can't find anybody in the Air Force who has identified the money to keep it relevant.

One of the things we can do in global awareness to compensate for this problem is to put a lot more money into the horizontal integration of all of our various intelligence systems. All those collection systems, some of which we never talk about, can be fused together into a better picture than anybody possesses today. But there are a lot of bureaucratic barriers. Anybody who's been out to NRO lately knows that it's chaos out there right now because they're trying to do that and that's just one agency.

I think, in sum, five, ten, twenty years from now military historians are going to look back on the Bush era somewhat wistfully, talk about what might have happened and wonder where all the money went. One thing they will conclude pretty early in their analysis is that wherever it went, it did not go into a focused plan for preserving American global air dominance.

Grant: Thank you very much. We have time for one or two quick questions.

Question: In our fiscally constrained environment, I guess the U.S. has invested a lot in stuff [inaudible]. What's been [inaudible]? [Inaudible] platforms that have limited capabilities and [inaudible] weapons. You've got other things out there, jammers and everything else, [inaudible]. What's our return on investment in stealth technology? That's driving up the price of fighters right now and everything else. [Inaudible] didn't have nearly as much [inaudible], if we didn't put nearly as much in stealth, put a little less in procurement, drive the cost down, is that [inaudible]?

Thompson: Since I covered the fiscal part of this more than Rebecca, I guess I would start by observing that I wouldn't want to be flying a Super Hornet anywhere near China 20 years from now. Right? I probably wouldn't be coming back if it was a hostile moment.

It's a little hard to precisely state what the value of stealth is because you would have to understand the way in which your actions are influencing or deterring the behavior of your adversaries. But if you just look at the huge penalty that a handful of F-22s can impose on China in terms of what it would need to do to defend itself, you can see how this actually is a very high leveraged technology if it is correctly applied.

Rebecca used the example of unmanned aerial systems. Systems maybe like the Navy's UCAV system that could actually loiter over Chinese airspace because it can't be detected.

Why do I need to invest a ton of money in a highly controversial prompt global strike capability if I can reliably penetrate Chinese airspace and be a short distance from critical, time sensitive assets by virtue of the survivability of my airframe rather than its speed? There are all sorts of ways in which I think stealth gives you advantages. But I think you put your finger on maybe

what the problem is in our political environment. It's hard to prove them. You only discover them for real when you get into a real war.

Grant: That was such a good question I just want to add two points.

One, I remember in June of 1999 after the Operation Allied Force air campaign had ended, and a reporter asked the B-2 wing commander, who was General Leroy Barnage, if he really thought that these \$2 billion for each bomber, were these \$2 billion bombers really worth it? And General Barnage said to her, "Ma'am, I think they're worth \$10 billion apiece because they brought my pilots home." I think that's the first and key investment in stealth.

We also know that in that case the integration of stealth and precision enabled them to carry out missions that other aircraft couldn't.

I think another key point that you raised is about the ROI, as Wall Street would have it. There I think we've missed an opportunity. Certainly we have invested a lot of money in developing the technologies of stealth. I think our investment has been really pretty substantial. But in nearly every case we have failed to then purchase out at a rate that would really give us a good ROI on those aircraft, the B-2 being a very particular example and unfortunately perhaps F-22 heading in the same direction. But I'd still put my money on it.

Question: [Inaudible] from Air Staff. Two big concerns we've been looking at long term are one, that adversaries will likely develop capabilities to counter our stealth pretty effectively. And number two, that foreign nations [inaudible] under extreme danger from [inaudible]. I just wanted your comments on those, and whether that might change or your analysis [inaudible].

Grant: Both very interesting and timely questions. I'll take your point on counters to stealth first of all.

My personal view of that is that stealth has long been known to be a series of engineering and tactical tradeoffs. I think even those gentlemen who brought us the SST and [Have Blue] and the first early stealth aircraft, and the principles have not changed all that much in some ways. Manufacturing has, but not the principles. They knew they were making tradeoffs. It was never a cling-on cloaking device. What's interesting to me is that even 30 and close to now 40 years on from the initial concepts, we still see the warfighting value of stealth. So to me I think it's still the right path to take on.

Thompson: I agree with that. We keep running into these little problems with stealth we hadn't anticipated. The problems with the dimension of the B-2 relative to the long range search radars; the problems with reflectivity on some of our tactical sensors, and that sort of thing. But I think the thing to keep in mind isn't just the immediate tactical consequences of your stealth not being complete. It's to think about what kind of a penalty it imposes on your adversary. Okay, so he figures out some way of tracking you, but what does he have to do to find you and to track you and to target you given the fact that you've got a radar return the size of an aluminum marble, right? Even if he figures out a technical solution, the cost is so onerous most adversaries couldn't afford it anyway.

On the basing thing, you're exactly right. I personally, I think one of the reasons why the Navy doesn't like its UCAV even though it's paying the money to develop it, is because they figured out that a system like that doesn't really need an aircraft carrier. It can attack from far, far away and

stay in the air for days. So in the process of making the aircraft carrier more relevant it also makes it more irrelevant. You can fly from almost anywhere.

There are longer range solutions to our problems.

I would say though that the point you raise does in my mind make me reflect on why I would want to buy a medium range bomber in this environment.

Grant: Same thing here. It makes you absolutely think why we need to have a 2018 bomber. Absolutely. Thank you all very much for attending.

END TEXT