



Mitchell Institute for Airpower Studies

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► GRANT: Good morning, everyone. I want to thank you for coming out on this foggy morning and welcome you to the Mitchell Institute's panel on Combat Air Forces in Crisis.

I am Rebecca Grant, I am a senior fellow of the Lexington Institute and I'm also director of the Mitchell Institute. And it is my honor to bring you today our wonderful panel, who is going to talk about what is going on with our combat air forces. This is how we will proceed; first, I will introduce my fellow panelists; then, each of us will make remarks for probably about 10 or 15 minutes; following that, we would very much like to take your questions, we ask if possible, please use the microphone over here in the aisle to ask your questions, that way we can get a good audio on everything that we are doing. And so we welcome you to this discussion.

First, let me tell you what the Mitchell Institute is. The Mitchell Institute is sponsored by the Air Force Association. It honors the name of Brigadier General William F. Mitchell. Mitchell was the first man ever to command a joint and combined force of aircraft in a major air and ground operation. He did that in the fall of 1918 with about 1500 aircraft in a World War I battle called St. Mihiel. So the Mitchell Institute honors his combat legacy, his interest in research, and his interest in promoting discussion on air power. As we all know, Mitchell had a rather vivacious and checkered career. What the Mitchell Institute honors is his ability to capture the issues for discussion and to influence the next generation.

Our topic this morning is the Combat Air Forces and I have a simply superb panel here to discuss this topic with me. First of all, I'm going to introduce some -- first to -- immediately here is General Gregory S. Martin. General Martin is a fighter pilot. He flew over 160 combat missions in Vietnam. He retired from the Air Force as commander of Air Force Materiel Command. Prior to that, he was the commander of the United States Air Forces in Europe. He has held several jobs in the Air Force, where he had great responsibility for technology, acquisition and requirements, and there is really just no one more superbly qualified to talk about the status and requirements for our Combat Air Forces than General Martin.

Speaking after him will be Dr. Barry Watts. Dr. Barry Watts is also from this fighter background with combat missions flown in Vietnam. He is currently a fellow of CSBA, he is well-known for his expertise on weapons systems and on the budget. Dr. Watts also served as the director of Program Analysis and Evaluation, better known as PA&E in the timeframe of 2001-2002. So Dr. Watts has, in addition to this, authored a study on long-range strike and I will be expecting some very interesting comments indeed from him.

And finally, to wrap up the formal part of the panel will be Dr. Loren S. Thompson. Loren is my colleague at the Lexington Institute and I'm sure very well known to all of you. He holds a PhD from Georgetown and there is perhaps no one today who is better qualified to speak about the broad range of defense programs and in particular, the impact of national security strategies and air power across our nation. Loren will also be talking a little bit about some of the budget and economic trends that he keeps a very close eye on, and I know you will really enjoy his presentation.

Lucky for me, I get to start this off, and I want you to know, I have just a few slides to begin my talk. But first things first, we need to talk about what is a Combat Air Forces. Well first of all, don't look for a strict definition of the Combat Air Forces or the CAF. This is really not a doctrinal term; it is a term that is used among airmen to refer to that collection of fighters, attack aircraft, bombers and sometimes, ISR as well, that are commandeered at either down at air combat command or in the Pacific air forces or the US air forces in Europe. There is a clear distinction of course between the CAF and the MAF, the mobility forces, which provide air refueling and airlift and in fact, fly about 70 percent of the sorties every day over for Central command.

But today, I will be speaking mainly about fighters, attack aircraft, and bombers. I will be talking primarily also about the active components of the US Air Force. As most of you know, the Air Force is rather unique in having a great synergy between its active component and its guard and reserve forces. It takes all of them to create the kind of air power that the US Air Force provides. And I will be speaking in my remarks primarily about the active.

In a sense, having a really strict definition of the CAF is not too important, because we know that it all leads to the same goal. And a former Air Force Chief of Staff, Gen. Hoyt Vandenberg said in 1951 that the overriding purpose of every plane, whether it is a bomber or a fighter is to win the air battle on which final victory on land or at sea is predicated. I think we would all agree with that statement. And it is in that light that American forces have long depended on the contribution of the combat air forces to control the skies, to deliver firepower from above, to accomplish strategic missions, and to do a range of other things without which our joint forces can't do what we expect them to do.

If you look at our combat air forces in action today, you would say there is no crisis. This picture shows an F-15E simply laden with bombs, pods, fuel, just about everything it needs to perform a wide variety of missions over Afghanistan. As you know, we've had A-10s and F-15Es in theater at Bagram for quite some time performing these missions. And this snapshot here shows the sorties flown for both Iraq and for Afghanistan over

the last several years. There are two interesting trends to note; one is the increase in activity in Afghanistan; and the other one is the extent to which our stability operations in this theater really rely on air power for a variety of missions. The combat air forces piece of this does a tremendous range of tasks that may include over-watch and nontraditional ISR using an infrared pod for example to watch characters on the ground. It may include strafing, low passes, and it includes the expenditure of ammunitions. So these are the kind of things that airmen do for and with the joint force every day.

But we don't only have an air force to do stability operations. We have a lot of emphasis recently, and appropriately so, on adapting the Air Force to do its best in irregular warfare, counter-insurgency missions, and the stability operations which continue to go on in Central command's theater. But there is more to the story than that.

I want to talk for a moment about the threat environment. The airspace in Iraq and Afghanistan at this point is relatively benign. It is not completely without threat, particularly in Afghanistan, but it is relatively benign. And yet, just six years ago, during the major combat operations phase of Operation Iraqi Freedom, we saw a rather different environment. The chart shows SAM surface-to-air missile launches in the period of the major combat off space which lasted from late March through early May of 2003. And what is remarkable about this is that there were 2884 launches in 25 days. And this was from a country that had been under sanctions for 12 years, that had been under the weight of two no-fly zones, and it had for a year or a little bit more prior to this campaign been the subject of a very intensive campaign to find and eliminate surface to air missiles.

The lesson to take from this is that threats can persist for weeks, even when you're looking at over-defenses. A lot of these forces are mobile, a great many of them were unlocated during the period of this conflict, and this is not a one off. We saw a similar trend in Kosovo, doing the air operations there as part of operation Allied Force in 1999. And what I'm really showing you is yesterday's threat environments.

Our US airmen have yet to face the frontier threats that we know are on the world market. Those include particularly the Russian- developed SA-20, a very, very capable surface to air missile, which greatly extends the range of coverage. So this, in addition to a wide suite of tasks ranging from irregular warfare and stability right up to the major combat operations, this environment will be the task for our Air Forces going forward. We want a balanced force that is able to do tasks at all levels of the spectrum, including this one.

But we have a serious problem. This chart shows major fighter aircraft buys by the Air Force over a pretty long period of time. But just look at this graphic in the middle. What you see is that today's CAF, combat air forces, were largely purchased in a particular period of time, a pretty long time ago. This means that this force is aging and it is aging all at the same time. What you see then to the right is a real drop-off in the purchases of fighter and attack aircraft. Now I need to tell you this was done on purpose. There was a decision made to wait for the development of two advanced programs, the F-22 and the

program that became the F-35. The decision was made by the Air Force after the Gulf War, not to simply go and buy a lot more F-16s and F-15s as well as they had done in that conflict, but to wait to reduce the force and to end up with a smaller but much more capable force structured around F-22 and F-35.

Unfortunately, this plan didn't go quite as it was expected and it is this which has created the crisis in the combat air forces. We think of crisis as a period of great danger and instability, a period of great difficulty. We are now entering that period with the combat air forces. From 1990 to the end of 2008, the active components of the US Air Force, and here I must emphasize again, I'm not discussing the guard and reserve forces, both of which and the guard in particular, has very substantial fighter forces. But the active component of the US Air Force shed about 1000 aircraft, this was good, this was part of the plan, but at the same time, a change happened in the mix of that force. The number of legacy aircraft, of older aircraft increased substantially. In 1995, there were only six fighter and attack aircraft in the active duty Air Force that were older than 18 years of age. By the end of 2008, there were 784 of these aircraft.

Now you may wonder, what about the guard? As you know, the guard has a very important role in air sovereignty missions here in the United States. Guard units also deploy regularly overseas and pull full combat missions flying on the ATO. But for the most part, guard aircraft are even older than active component aircraft. And that is why I am focusing this discussion on the active. We begin to see the changes occurring. You might also say, heck, these are some pretty capable aircraft that we are talking about, and that is certainly true. The F-16s and F-15s that remain in the force do a good job despite their age. They are managing with increasing difficulty to maintain their availability rates, maintainers do their best to keep them flying, and they have been upgraded and improved immensely. So in one sense, it is not an easy thing to say that these aging forces are having a drop in capability. It is not exactly that simple, but what we do see is an inexorable trend towards the oldest combat air forces that our nation has ever experienced.

The fact that this mix has gone from the relative luxury of the mid-1990s to the near-crisis point of today has an impact. One of those impacts is that the air crews flying today are beginning to experiment with tactics for incorporating new aircraft like the F-22 with legacy aircraft. We may see situations where a relatively small number of F-22's use their stealth and superior situational awareness to help out F-15s and F-16s. It is all about tactics and airmen and do those very well, and this may be enough in some threat environments and in some air environments. But what about the more serious threat environments that is here on Russia's borders, here in the Taiwan Strait, and could well appear in many other regions in the world. That is where the problem comes.

The second graph adds two columns of data to the first one. These are estimates based on plans, current production of F-22 and F-35. But the point is, this ratio gets worse before it gets better. By 2014, we will see a situation where about 80 percent of this force is greater than 18 years old. As F-22 buys complete and as F-35 buys swing in, there will be a recovery, perhaps around 20/20 to a situation where you have a 62 percent legacy force. Again, this assumes all current plans. The total inventory declines, guard and

reserve forces steadily begin to age out, and the message here is that this fighter and attack force will be smaller, it will be highly capable, but it may well be limited in the number of joint tasks it can serve. This will mark the first time that the US Air Force has not perhaps been able to provide every combatant commander the level of power that that combatant commander's work plans require.

What is the way ahead? Well, to me, the word crisis always carries a little bit of hope. A crisis is the danger, the difficulty, the instability. It is not always the final resolution. There is a lot of discussion now and I'm sure we will hear more discussion from my panel about the role of the F-35. This tri-service fighter program was designed to move into production quickly at high rates and to be highly affordable for the Air Force, for the Navy, the Marine Corps and for several allied partners as well. The fact is that there is no group that needs the F-35 more than the US Air Force.

But there is risk here as well. Perhaps one of the biggest risks is in the budgeting for the F-35 program. If there something that disturbs the ramp up and the ability of this program to increase to the numbers it needs to deliver, well, one result is that it may slow down, turning the corner on bringing this legacy mix back into a situation that is better for our war fighters. There is also great risk that we will undo the value proposition we have tried to instill that by trying to make the joint strike fighter affordable, if we slow it and delay it and change the program, that could well take out a lot of the affordability of that aircraft.

So what do we need going forward? I would suggest that our balance needs to be able to do about two things. We want to always be able to count our potential adversaries who have the capabilities that we might see from China or from Russia.

With China, for example, we are not talking about irregular warfare or a land war and hopefully, we are not talking about any war at all. But we believe that deterrence is crucial and our combat air forces are essential to that deterrence. The Director of the IA recently testified about advancing Chinese capabilities, their development of a bomber, their development particularly of mobile launcher systems. For US policy, we want forces that can maintain nuclear deterrence and can also deter some of these other launch capabilities that maybe required. We want to be able to play in that top environment.

With Russia, again, we are hoping that we are able to, as has been reported, press the reset button and go into a different period of relations. And yet, we want with our native partners to be able to maintain the forces to defend off an air threat, probably, in perhaps two locations, perhaps a threat to the North, along the Baltic's, perhaps a threat around the South and to do so, simultaneously. All this requires a lot of the combat air forces and we have seen in the clash last summer between Georgia and Russia that Russia has the ability to make things mighty tricky for any international force that might want to intervene, setting up a no-fly zone, perhaps even trying to fly in humanitarian assistance, that can't be done without air superiority and the assessments of many following the Russia and Georgia clash was that American and native ability to achieve

that air superiority is declining and is at risk. We need the F-22 and following that the F-35 to achieve this balance.

So the legacy force mix indicates that there is a need now to address the role of combat air forces, to have a balance that does not overtake risk, that does not give us too risk at the high end. Our combat air forces will always perform their roles in irregular stability operations. We need them to be able to perform their roles at the high-end for all those things that we cannot imagine. And for the Air Force, one of the keys to this is to be able to go forward with F-35. Now the F-35 buys starts out a very, very long time. We don't really know what we will be doing in 2029 and beyond. We don't know if we will be buying F-35s that far into the future, but we know that we need stability in that program now. We need it in the next critical period as it ramps up and attempts to expand production. There is simply no other program in DoD that has the ability to recapitalize this fighter force. There is no reason to try to start a new program that would cost more. We have made a bet on the value of F-35 and we need to stick with it.

This is my analysis of why the combat air forces stand near a period of crisis. We know that our US airmen will always do whatever it takes to prevail, but we need to give them the right force mix so that they have the best chance to do that.

Thanks for listening, now I'm going to turn it over to General Martin.

► MARTIN: Thanks, Rebecca and let me also just thank you for your leadership in the Mitchell Institute. This I think is very important for all of us to have the debate and the discussion on different issues, but in this case, our Combat Air Forces in Crisis, as you have framed it. And your paper, I think is excellent. It does a great job, I think of laying out the issues. For those who have not read it I certainly recommend it to you.

I'm not going to give you the answer and I'm not give you any great pearls of wisdom today, but I will tell you a methodology that I have used and then talk a little bit about where we may have gone astray as a nation in following basic principles of force structure development and force sizing and force structure replacement. And I tend to look at things from big to small and black to white. I found that when you get into the issue, if you start working at the tactical level and you start dealing with a system or a specific capability without thinking about where you're trying to go and re-grounding yourselves and then you can end up fixing this problem over here and then fix it over here and next thing you know, you are tracking the long way to what you are trying to do.

So, I want to talk primarily about some big to small things and also the concept of trying to define things in black-and-white is important because most areas that we deal with in the world are grey. If you don't get your definitions straight, if you don't get yourself grounded in what is right or wrong or what is black and white, then pretty soon you are dealing with grey issues and once again, you find yourself tracking off course.

So let us try to put this, our Combat Air Forces in Crisis in a little different construct and then we will delve into that. May I suggest that perhaps with the exception of our special

operations forces, all of our military combat forces are in crisis today. With a globalized interconnected and immediately responsive world, where economies can change quickly, financial systems, industry and transportation networks, have given individuals, tribes, sects, robes and nations the ability to maneuver, thrust or attack from 360 degrees, 24/7/365. And so the old exercises and the old models and simulations and the derived rules from those may not work or may not produce for those of us that like quantifiable solution sets, they may not produce those quantifiable solution sets that we are used to.

So our force structure decisions, our equiptage formulas and training regimens, all must be framed in a way that recognizes that the cheese has moved, and that many of the people that will be asked to deal with don't survive on cheese and in fact may never have eaten cheese. So let me further suggest that if you look at the recent turbulence that we have seen, let us say within the Navy shipbuilding program, from the EVG, thousands of EVGX to the CGX to the LCS, and the turbulence and perturbations of that program. Or let us go to the Army and take a look at their family of tactical vehicles, take a look at the changes in their Stryker program, or attempts to arm Humvees and then have them (inaudible) great way. The fits and starts we have seen in the Army Aviation with Comanche and ARH now. Or take a look at Marine Aviation, and where they are going with their F-18s and their AVH now that the F-35 has been stretched out. And then take a look at the huge, huge, huge recent issues facing all the services as we deal with the -- what I consider the incredible demands on their current equipment and then the replacement or refurbishment of that as they go about the reset or reconstitution activities that are in the years ahead, while we try and modernize all those forces at the same time. And let's not forget I think that the threats that we got to modernize our forces for have greater capabilities today across the entire spectrum, as Rebecca mentioned a few moments ago.

So now when it comes to the Air Force, before we get into the combat air forces, let us take a look at the Air Force at large. First of all, when you look at our array of battle management systems, and C2 systems, we haven't yet closed the loop on air operability or in that centrality. The various space constellations and stretch-outs and retrenchments that have occurred, the age of our most prized ISR airborne battle management systems, aging air refueling systems, the challenges we see right now today with the venerable C-130 aircraft as we go through yet another mobility study to try and get right the mix of strategic and tactical air lift required in the years ahead, while we burn our strategic assets at about 2 to 3 times the rate that we had intended for them to be used with the global commitments that we have. I think we have to look at that whole picture, and then as we discuss the combat air forces, not be accused as airmen in general or the Air Force specifically for fiddling around with air power while Rome burns.

When we talk about our combat air forces, as Rebecca mentioned, I agree we are talking about fighters, attack aircraft, and bombers. But I think we have to remember that all of those systems are greatly enhanced and enabled by our ISR and battle management systems, our air refueling and airlift systems, and of course, our space systems and oftentimes, we forget the people and equipment it takes to support and sustain our

expeditionary bases and infrastructure that supports those aircraft. All of that has to be thought of, I think as a system of systems, and now you would begin to understand when you look at the Army, the Navy, the Air Force, the Marines, this is a national crisis, not just a combat air force crisis. And I think we all have to keep that in proper perspective.

One of the more insidious disruptors to a planning process that we have become comfortable with it during the Cold War has been getting an agreement on which wars we need to be ready to fight, how many of them and worst of all, which systems will be most effective? Because when we move from a threat-based planning process, that used force on force competition methods, comparing our capabilities against or to those of other known and growing adversary, we have serious debates on quantity versus quality, but we have a pretty good framework for understanding how the military needed the provision and posture. Then we moved to the capability-based environment and we have lost our foundation or our rule set, if you will, for how you make analytically-based decisions.

When it comes to irregular warfare environment, where the enemy can use cyber IEDs, strategic communications, unlawful warfare tactics, the force on force models don't work anymore or as we expect them to. The seriousness of attack brought about by the disruptive techniques have created multi-variable problems that seem to defy our past methods and formulas for determining what to buy and how much and how often. So what to do? You know, our boys found that when you are somewhat confused or perhaps the situation looks hopeless, it is useful to just get back to basics. In fact, a good friend of mine says, if you just stick to the basics, you don't have to get back to basics.

And in fact, we have lost the sense of basics I think in the way we go about our computations. We have delved down into the tactical systems and platform business and forgot the four structure implications, the basic rules of force structure provisioning and force structure equipping in my view. And by the way, it is insidious because let us not forget, as airmen, the United States Air Force has been at war for 19 years in August. They went to Desert Shield, they never came home and that takes its toll, not only in your equipage, but in what you focus on and your ability to project some of the capabilities that you would like to produce in the years ahead, because there is a tremendous draining on your resources, not just your people resources, your analytical resources, but your money resources as well.

OK, so get back to basics. Are there perhaps some immutables that we can use to help us better understand what it takes to make the right decisions? I would say yes there are, but we may need to go back with analysis and updates and because the environment is changed. And then actually use them, as we articulate, our needs and make resource allocations. In other words, when you set these rules up, when you use the basics, then you have to actually apply them when you make your decisions. So I guess some of these immutables, let us discount, just for the sake of this discussion, the effects that might occur to our forces by cyber war, just take that way.

What I'm going to do is talk about the basics and then if you lose things due to cyber war or perhaps loss of space systems or (inaudible), is that you can do some analysis to

determine how much more you need, but you certainly can't do with less, all right? The aging capability of our tankers will discount, the aging capability of our ISR and our C2 systems. Let us forget that because as I said, if you assume they are there, then you need this amount. If they are not there, then you can do the analysis to determine how much above that or how much risk you are going to accept.

Now we know from the Air Corps Tactical School that the basic missions for our combat air forces are air superiority and I would add that a part of that is air defense, although sometimes the air defense characteristics are different than you would have with an offensive air superiority force, but let's just say air superiority includes that. Strategic attack, interdiction, close air support, and tactical reconnaissance, the ability to know how you did and see things of importance that you need to take action with. So air superiority, strategic attack, interdiction, close air support, tactical reconnaissance.

Now since then, we have added some modifiers and we have pursued the basic missions into new and elegant terms that only airmen understand and confuse most other people. Still for instance with air superiority, we stand subdivided down into offensive counter air, offensive or defensive counter air, and suppression defenses, but they are all oriented towards the basic mission of clearing the sky of threats so that the rest of your forces, whether it be air, maritime or land forces have the freedom to maneuver. So again, back to basics, those are big words. I think the Air Force tactical school design for a pretty good force. And we will stick with those just for the next few minutes.

Next, we have to have some basic principles on how long we should use aircraft for combat missions. You know, it is kind of neat that our industry can build an airplane like the P-51 that is still beautiful when it flies, usually on the weekend, nearly 70 years after it was built. Now you could put some turbo props on it, you can strengthen the wings, and you could actually fighter and it is not a bad design. But is it really the one you want to take to war? Is the P-51, just because it flies 70 years later, the aircraft you want to take to war? I don't think so.

So if you look at the airlines, you will find some interesting things. They have made their recapitalization decisions based -- some of them have made it based on cycles or takeoffs and landings. One major airline believes that at about 80,000 cycles, they must replace the aircraft. Now you know they don't go out and buy a brand-new stealthy airliner, we are still building the 737. They just have some upgraded model. So they're doing kind of a design and improve mode. And they have stuck to that rule, because they know that after 80,000 hours, their maintenance costs go up and they know that they don't have the best engine technology they can have for efficiency of fuel. So they recapitalize their force at about 80,000 hours.

What is our rule for replacement? It is the top line, not a clock, not cycles, not fatigue, we are proving that we can fly aircrafts as long as we want. That is for people today to think you are just fine with an AC-135. You just don't need a new one. You haven't made a compelling case. Interesting. I would say that our methodology has been based on technology opportunities, we then go into what I call a design and surge mode. You saw the double panel chart from Rebecca, where we were building and buying as many as

300 aircraft in a year, but then we then stopped buying them, which means you got to buy and/or you need to lower force structure or else you are going to fly them well beyond design that they are going to be as good as they should be for your nation.

So we do a design and surge. Airlines tend to do, unless something unusual comes along, what I call a design and improve mode, and the 737 I think is a good example, and I think the Airbus has followed that same model with their A-310s and 319 to 320 series. So design and improve; now every now and then, something will come along that really grabs you, meaning you have to do something or else you will lose the edge. It could be a threat that has caused you to do something or it could be a technological breakthrough. For instance, stealth and super cruise. At that point then, the model changes just a little bit, but not necessarily back to the design and surge, which we are used to, but what about perhaps the design, replace and improve opportunity? Design, replace and improve.

OK, how long should an airplane last? Well, we ought to do the analysis but I think you are going to find for aircraft that does the kind of flying that fighters do, it is probably every 20 or 25 years. And for those aircraft that are not subjecting themselves to that amount of stress, they are flying our profiles for different heavy aircraft generally bombers, perhaps the tankers and the air lifters as well, probably in the 30 to 40 year category. Well, we ought to figure it out. The Navy has done a pretty good job of that and they have replaced based on those timelines. We have not.

We find ourselves on our ability to continue to operate systems that may actually be well beyond economic efficient years. What really drives this is the threat more often than not and a technological capability that gives us an advantage. That is good, but in the design and surge mode, it is unaffordable. So perhaps we need to look at when there is new technology, it is a design, it is a replace and improve and a steady-state flow, and by the way, industry might like that as well. And then you go and get yourself into this crisis where you can't buy your way out of it without tremendous pain to the nation, which is in great stress today.

OK, so now, what is the right number and what is the right mix? If you go back and look at the studies, the analysis will show you that in order to achieve air superiority, you need more aircraft doing air superiority roles at the beginning of a conflict, you need fewer of them doing air superiority, but more doing attack and strike missions. So the analysis shows that in general, for a mix of aircraft, about 20 percent to 25 percent of your Air Force should be air superiority, about 25 percent to 30 percent should be attack, designed to do attack and then you need a multi-role, you need something that can swing and do both acceptably and that has turned out in our analysis in the old days to be F-15s, F-16s, A-10s, F-117s, F-15E, those sorts of things. The multi-role then tended to be our F-16 and our F-15E and that is about 45 percent to 50 percent of your force structure. So now we got the right breakdown.

The next question is, how many do you need? Well, it depends on what your nation says you are going to be asked to do, two major conflicts and three limited conflicts, I don't know. But once you set that framework, it is now a matter of determining what the joint

force commanders operation and team will be, what the air power's allocation will be to destroy the targets to enable the ground forces, the sea forces, or whatever forces they are going to use to take over and figuring the numbers at that point. It is really not that difficult. If you can't afford that, then your national objectives are going to have to back up or you are going to have to accept a certain amount of risk.

So when you think about it, what you're really talking about then, the numbers are going to be set by two things. One, the capability of the system that you have to destroy targets and second, and the number you need to cover the geographic battle space to have the right plane at the right time to do the right thing. Because if you had a F-22, loss ratio of 100:1 and they only have 100 aircraft, then you only need one F-22. No, not true, because it can only fly for 4-6 or maybe 8 hours. That means, the rest of the time, their Air Force will fly with impunity. So you may need 4 for that particular CAF. And now you need 700 miles of CAF, so that is going to be perhaps 16 or perhaps 24 that you need at any one time airborne. And that is a 4:1 rule. That means you need 96, but the point is you can now work the numbers and then your percentages of 20 percent to 25 percent air superiority, 25 percent to 30 percent dedicated attack and 45 percent to 55 percent multi-role makes sense in big context. Once that is done, now you figure out if it is better to be 20-25 year average age, I got to buy X number of aircraft every year of the old type and the new type until the new type can pick up the load for all of that and then the old type goes away, which means we probably should have continued buying F-15s and F-16s during this period of time, while we are ramping up and delaying F-22 and GSL.

In the end, I would say we are in a crisis, it is a national crisis, but is also our Combat Air Forces crisis. But I believe it has brought about by not having a rule set that is basic, easy to articulate and in my view, sustain a modernization or recapitalization program. When you don't have a new breakthrough, then you continually approve. The F-16 block program is a perfect example of how to do that as well as the F-15 program.

Those are the kinds of things I think we need to get back to if we are going to get us out of this mess, which will take probably more than a decade and then stay out of it and the nation will have to sign up for that because it believes that air power is that important to the rest of the forces. Again, back to basics, big to small, those are my thoughts. Barry?

► GRANT: Thanks, General Martin. Barry Watts?

► WATTS: Rebecca asked me to talk about long-range strike in part because I have been publishing studies on it in recent years. Probably the way to think about it is a balance or mix issue within the combat Air Forces although I will suggest that when we generically talk about the combat air forces, we are usually thinking primarily about conditional operations and I think in the case of long-range strike, there are some nuclear and nuclear deterrence connections that we shouldn't lose track of.

I would like to approach this by trying to put the whole long-range strike issue in somewhat of a historical context and what I would like to do is take you back to 1992

and remind you of at least three developments events that year that have had long-term consequential implications for the long-range part of our force.

The first one of course was President Bush, the first President Bush in his State of the Union address after Desert Storm, after the Soviet Union collapsed in January of 1992, and you will recall that he basically took the B-2 program and decided to terminate production to 20 aircraft down from 75, which had been agreed to previously under Sec. Cheney in the major aircraft review. Most of you probably remember that Congress eventually provided the money for conversion of one of the test vehicles into a 21 operational aircraft, and then one crashed at Guam on takeoff, I guess a year or so back, and so we are actually down to 20. That is 20 long-range platforms that are capable of penetrating defended airspace, the residual B-52s don't have that capability, we could argue about the B-1s. But in terms of the kind of stealth capabilities that were built into the B-2, you have got a very small number of platforms left.

The comment I want to make about that decision is, I would argue that -- going back and try to look at the record in this area and as far as I can tell, it was made fundamentally on the basis of a reduced strategic nuclear threat from the former Soviet Union. The fact that bombers occasionally drop conventional ammunitions and these days, precision conventional ammunitions, as far as I can tell wasn't taken into account and that is sort of the strategic kind of an issue. I would just remind you, when the Korean War got going, we sent B-29s north and eradicated a good part of North Korea's industry. The B-52, which was built as a strategic bomber for strategic air command, has been used to drop conventional ammunitions in every conflict the United States has been in since Vietnam, when Gen. Barton and I were flying airplanes still. It is possible to remember that far back.

OK, the next event that I want to remind you of in 1992 is we basically we organized the Air Force. We disestablished strategic air command and many of my fighter pilot friends cringe and throw rocks at me when I say this, but the creation of air combat command in many respects within the Air Force was kind of the triumph of the Vietnam era fighter pilots of which I was part over the bomber generals who had founded the Air Force coming out of the Second World War. And some things happened to the strategic nuclear forces you will recall. We had the -- SAC had had control of tankers and control of the ICDM force and had control of the bomber force. And the bombers eventually, well they went to ACC right away. The ICDMs went different places, but eventually have ended up today at space command, and the tankers just most of them went to air mobility command, although some were parceled out to other commands as well.

This is a fairly controversial point, but the broad implication of all this was I would argue the Air Force really lost focus on its nuclear deterrent capabilities and things nuclear. Now the Air Force is not alone in that. My perception of the four services is that none of them have a lot of enthusiasm for persisting to pay sufficient attention for things nuclear. A lot of people were happy to just sort of push that aside and focus on conventional operations and the things that we had known and loved and enjoyed doing a lot more. But one of the longest term consequences that occurred last year, when Sec. Gates essentially fired the Secretary of the Air Force, Mike Wynne (ph) and the Chief,

Buzz Moseley, and while there are a lot of explanations that float around about exactly what the motivations for that were, I will have to say, having set nuclear alert long in my past that some nuclear armed outcome sitting around on the ramp at Barksdale for a while and attended does sound like somebody lost focus on this whole area.

The third event from that year that I will -- and this one may be less familiar. In the OSD, there is a fellow named Danny Marshall who has been running the office of net assessment since 1973. He is still on active duty, the oldest scheduled employee in the US government as far as I know. In the middle of 1992, basically his office began to circulate what was referred to as an assessment of the military technical revolution. Basically, the proposition or the hypothesis that under laid that particular assessment was -- are the Soviets right and they were at about that time they became the Russians. In their hypothesis, as advanced command and control systems began to be integrated with wide area surveillance systems, think of something like JStars or Predators, things like that, and precision guided munitions, what the Soviets or the Russians refer to as reconnaissance strike complexes, wasn't going to lead to some fundamental change in the conduct of war. That was kind of the hypothesis underlying that NTR assessment.

It had I think reasonably long term implications in that it triggered that particular assessment, the entire RMA, Revolution Military Affairs debate that certainly encompassed the Pentagon during most of the 90s and overtimes spread overseas. For example, the Chinese have spent a long time looking at this whole RMA issue. And they have adopted some of the implications of it in fact in where they are going with things like missiles, with precision-guided payloads that can hold a base like Kadena at risk.

The point I want to make about the NTR assessment in 1992 is if you go back and read it very carefully, it has since been published, it is on CSBA's website, you can download it and look at it if you want, it is the only net assessment out of that office that ever got published. And one of the few that was actually unclassified, but in it, you will find actual mention back in the middle of 1992 of the possibilities that other people would begin to develop reconnaissance strike complexes in the context of essentially anti-access aerial denial capabilities which would threaten forward airbases like Kadena.

The Chinese are working very hard to be able to threaten Guam and air bases afloat to whit carrier battle groups and large surface combatants like aircraft carriers. That was just sort of a possibility on the horizon back in 1992, but this has been suggested that it is beginning to look fairly real. It is starting to happen. I mean, one of the ironies to me about my enthusiasm coming out of the Vietnam War having looked at laser-guided bombs and early precision weapons is, I think the US military, in a broad sense, has been inclined to -- we have enjoyed having almost a monopoly on those kind of capabilities and it has been hard to start getting us to think about the possibility of the people on the other side will have them and use them against us but it seems to me that is where it is going.

Where is all this lead me to relative to long-range strike? In a nutshell, as Sec. Gates has written, in for example in his Foreign Affairs article, as he has said in some of his speeches, for example at National Defense University, it looks like the emergence of anti

access series denial capabilities, threats to forward bases, the possibility that an aircraft carrier is going to be at risk if it operates close enough to the Chinese mainland to be useful and so on and so forth, what this leads to is the suggestion that we probably need to give more emphasis to longer-range systems and a little less to the shorter range systems that we have been able to operate with impunity for decades. That is kind of the bottom line on this. Now, I did a report at the beginning of the year we went through in about six different scenarios and generic scenarios looking at the 2018 or next-generation bomber program. I've been thinking that was probably a good thing to go forward with for a long time, I still think it would be prudent for us to do it.

In terms of how you might want to think about that program, I am still persuaded or sort of hung up on the scenario of the six or seven that we looked at in this study we did this year that the goal we would like to be able to achieve with that system is an ability to dwell and persist in defended airspace so that you can deal with time sensitive, emergent, fleeing mobile targets. Most of our adversaries, I would argue have figured out that if the United States military can identify and aim point, they can put a precision weapon on it and take that particular target out. So the name of the game and this goes back to something else that was in that 1992 NTR system was, if you're going to deal with American high-end conventional military forces, you want to make the targeting information that the US military needs to be able to hit those aim points, in other words know where the aim points are in the 1st Pl. you want to deny that as much as possible and that is certainly what seems to have been happening. I mean our adversaries are not stupid.

The one final comments I will make about this whole area is simply to go back to the beginning to the reduction of the B-2 program from 75 to 20 aircraft and remind you that that was made as far as I can tell largely on a strategic nuclear grounds and sort of ignored the conventional dimension of things. I have taken the position people again have thrown rocks at me for being so Cold Wars-ish and dinosaur like on this particular subject but I really do think that if we do go ahead with that bomber and I don't care whether if it is not quite fielded 2018, the early 2020s, we would probably be fine. But I think it should have some nuclear capability. Now, does that mean the kind of nuclear hardening that say, we put into the B-2, probably not quite that much, I mean you will recall that the fundamental mission that SAC envisioned for the B-2 was you start to execute a nuclear exchange with the Soviet Union so there are a lot of mushroom clouds and there's a lot of radiation and the B-2 was supposed to go into the middle deep into the Soviet Union and look for mobilized CBM launchers. You have really got a hardened airplane to deal with that. That is probably -- we don't need quite that level of hardening I believe probably in this mix platform, but I think it would be shortsighted to build as a conventional platform.

Well, that is pretty much all I have got to say. I was this close with one general comment. Underlying a lot of the things I have said is the issue of coherent strategic choice on the part of both our civilian leaders and our military leaders. And another thing that has been driven home for me in recent years is it is not clear that we are quite as good in making those kinds of strategic choices. And anticipating where they are going to lead. The poster trails in mind for this was to recent struggles suggestion apparently

emanating from OMB that we defer the tanker recapitalization for another five years and just piss off this next generation bomber. As I think back about programmatic history as long as I have been involved in these issues, the combination of those two look about as shortsighted as any I can recall and I will leave you with that strategic thought and hand it over to Loren.

► GRANT: Thank you. Loren Thompson?

► THOMPSON: That is actually a good place for me to pick up. You can get a very good idea of what the future holds for US air power by looking at that so-called OMB pass back document the White House's suggestion of program cuts that was provided to the department of defense in January 29. Now many of you read in CQ or in the Washington Post that it recommended that we delay the tanker program we cancel the next generation bomber. What you may not know, is that it also suggested terminating the airborne laser, terminating the joint air to ground ammunition, terminating the transformation of communication satellites, delaying the C-130 air , delaying the joint tactical radio and delaying the Navy's new Ford class of aircraft carriers.

Now please note that those were just the suggestions for fiscal 2010. In 2011, after the quadrennial Defense review is completed, the White House will recommend the termination of the Air Force's F-22 fighter, the termination of the Navy's FA-18 Super Hornet and cuts to the F-35 joint strike fighter. So these are exciting times for US air power in much the same way that December 7 was an exciting day at Pearl Harbor.

I'm not going to review what each of these cuts might mean for the future of four combat air forces, but obviously the impact would be fairly devastating. You know when you are the fourth person on a four person panel, there's two things you can count on; first of all, most of the interesting topics have already been covered and second, the audience doesn't want you to run long. So I'm going to resist Rebecca's invitation to speak for 15 minutes and instead speak for only half that time on the subject defense analyst don't usually discuss, which is the state of the economy. More specifically I want to explain to you why the decline of our economy and the resulting weakness in federal finances will do air power modernization plans unless China suddenly becomes much more aggressive or Al Qaeda suddenly becomes much more imaginative. You will find a more detailed treatment of the same subject in my cover story in this month's Air force armed forces Journal.

You know, the most important thing to understand about Air Force procurement plans is that they depend on tax revenues that are generated by the economy. If the economy is weak, that so our tax receipts and components of air power will tend to lose out in the competition for scarce federal dollars because other claimants have more political clout. That is especially true today since terrorist attacks has receded, station has a very imposing domestic agenda, and the Air Force's political influence is at a low ebb.

So the fact that the economy is in worse shape today than any time since the 1980s and maybe since the 1930s, spells big trouble for US air power. Many of our politicians and policy makers do not grasp how bad the economic situation is. They think that we are in

a severe cyclical downturn, but the reality is that the US economy was actually in decline before the most recent downturn. Let me give you a few facts to confirm that point. America's share of global economic activity has fallen each year in this decade for nearly 1/3 of global output to barely a quarter. Mean household income has also declined during the decline even as the cost as everything from housing to healthcare to higher education has skyrocketed. The rate of private sector job creation is at the lowest levels since the end of World War II and most of the new jobs we are creating in the private sector are in the alias like education, health care would require. Finally, the US trade deficit has doubled in recent years to \$700 billion annually, the biggest negative trade balance ever recorded any time anywhere. When you have an economy that goes through two recessions in a single decade with only modest growth in the intervening years, the impact on federal tax receipts is devastating. If you then deficits don't matter, you fairly quickly by the government in a straitjacket of financial obligations to limit its options to do anything new in the future.

So now consider a second set of facts, these about the federal budget. The accumulated federal debt has doubled in only eight years, from 5.4 trillion when Bill Clinton left off to \$11 trillion dollars. It reached \$11 trillion this week. If you divide the debt by the number of households in the United States, it works out to \$150,000 per household. That is more than the average household savings in the United States. This year alone, the federal government will spend over \$1 trillion more than it takes in from taxes. The cause of sustaining that federal debt, in other words, the interest payments now exceeds \$1 billion a day, and with foreigners providing 80 percent of the money to finance the debt, any resistance on their part to more Treasury IOUs could quickly push interest rates and debt payments much higher.

So, to put it simply the federal government is out of money, and as a result, we find ourselves sustaining the nation's current military posture by borrowing money from the same country we are saying we're getting ready to fight. Now, how crazy is that? I wish I could tell you that the election of Pres. Obama have is a return to fiscal sanity, but the opposite appears the case. Despite inheriting an \$11 trillion debt, and unfunded obligations and entitled programs over four times that amount, President Obama proposes to continue to Bush pattern in spending vast amounts of money that the government does not have. Which means the search will be on for bill payers and the side from raising taxes the biggest target appears to be weapons programs. In fact, the current fiscal crisis leads directly to the Air Forces procurement account, not only because of the present priority, but also because of the way in which the federal government is structured -- as far as the federal budget is structured. You see 55 percent of the federal budget is formally driven mandatory spending.

Things like social security, Medicare Medicaid things that are virtually impossible to change on capital health. Defense penny falls within the remaining 45 percent of the federal budget that we call discretionary, but within that category it has to compete with the domestic items like criminal justice, transportation, education, the environment, general science, and so on.

Even within the defense budgeted self the record shows that it is nearly impossible politically to cut paying benefits for war fighters, while cuts to operational outlays have immediate consequences in the field.

Thus we have this cascading political legal structural effect within the budget that we as an administration immediately to the military investment accounts when needs money, regardless less of what its ideology is. So, the bottom line for the Air Force is this, there isn't going to be a transformation satellite communications program.

There isn't going to be a joint tactical radio system. There isn't going to be a next generation bomber. And there isn't going to be production of the F-22 fighter beyond 2011.

Now, personally I think we will regret losing those programs in the years ahead. So, when the political system realizes that it must raise taxes or reduce entitlements in order to have such weapons it will gag and give up.

So, there you have the real threat to our combat Air Forces, doesn't come from Russian fighters or Chinese air defenses it comes from our own unwillingness to make the sacrifices required to afford those forces.

Prior to be encouraged by Secretary Gates, the previous leadership of the Air Force argues that it needed \$20 billion more each year just to modernize its weapons. But with all the economic and political forces now converging to drain military investment accounts, it is likely that proponents of air power will soon be describing Bush years as the good old days. Thank you.

► GRANT: Loren and everyone on the panel thank you very, very much. We have a little bit of time to take questions, if any one in the audience is not in a shell shocked state after listening to my extremely cheerful panelist, make their extremely cheerful remarks about the Wynne (ph). If there are any questions, we will be happy to talk for few moments.

► QUESTION: (OFF-MIKE)

► MARTIN: No it is not, but it is based on bad decisions and failure to maintain a consistent story with respect to how you go about modernizing forces. Buying a 180 a year F-16s is what we were doing versus -- let me give you a more current example, now certainly we are fighters but the same methodology.

I recall when I was on the joint staff Admiral Owens (ph) was arguing against raising the annual buy rate of the C-17 come 15, but keep it at eight, why? He said, you are going to buy it out too fast and then you are going to fight just close the line and it is going to take money as they add more in.

If you keep it at eight you will keep doing like C130 to maybe 40 and 50 years and you will have a steady flow of modern aircraft that you can modify and improve. So, if our

plan is to improve to design and surge and then you run into an economic situations as Loren pointed out there is no opportunity to surge and everything you got is what you are going to have for the next 20 or 30 years.

So, the basic procurement strategy that I am suggesting is a continuing procurement of the right number and the right number is usually about five air craft or five to six per year for every one you have.

Now the win should come down, if your capability goes up to the physics of the geographical balance base that I described, but you should continue that then when you decide a new aircraft like an F-12 almost doesn't matter how long it takes because you are continually buying but the minute that ramp rate has come up on the new system now you are into the design replacing improved model, which is (inaudible) goes down.

But we used to having the buying at somewhere at around 200 or 300 a year and then we don't buy anymore and then we buy two or three above, it is on a 40 percent. So, the idea is perhaps our strategy should be to continue to buy at a rate that sustains the force until the next income is along and we have been to the (inaudible) for years.

► GRANT: If I could just add on to that for a minute. You know, part of the problem that you both touch on is we don't really know where we are going. One, the Air Force is probably is to reevaluate and lower its fighter requirement base on just what General Martin was talking about the increased capability of these platform, but we don't know what the measure is, is it valuing equivalents, is it squadrons, you don't know what the measure is, we need to see that evaluations done by the Air Force.

We need to see a commitment from the Air Force, what do they want to do with the F-22, Admiral Mullen Chairman of the Joint Chiefs said about 16 more ended about 243, we actually have not heard officially from the Air Force on acquisition and as following that we need to hear what do they want to do with F-35.

So, what is their desired in state based on requirement and procurement possibilities. So, we know that, we don't know the way out of this and we don't know the answer on continuing to buy legacy systems.

► THOMPSON: Thought if I could add just one further agenda to that. Boeing doesn't expect so many SFTC Air Force and the Air Force doesn't expect to buy any. I think you (inaudible) but I am sure Boeing's goal is to try to come up with a more attractive version of the F-15 through export. All right.

You know most companies can afford the F-22. The would like a little more staff than they have today since they got enough. OK and a version of the F-15 with some low observables would fit the deal especially since we are willing to export the F-22 anyway at this point, but I don't think anybody at Boeing expects to be selling F-15 to the Air Force, why would they want to they make a third of the F- 22.

► GRANT: We take the next question, we take the gentlemen at the microphone first.

► QUESTION: Kind of stepping down from just the idea of the platforms, there has been a lot of conversation about capitalizing on some of the technological developments of the next generation fighters F-22, F-35 particularly for things like EW systems, ISR systems rolling those into legacy air craft, is that considered technologically a possibility or basically even reasonable?

► THOMPSON: There is a plan that is in progress to do that. Putting a lot of these technologies into the legacy fighters because many of them will remain in the force for another 10, 15, 20 years. I think the less of the less of the (inaudible) in which we didn't do as well as we might have hoped with our F-15 is that other countries can do much the same thing.

They can take all the war fighters. They can introduce digital electronics, now they are relatively new innovations into the planes and then through number superiority and tactical imagination they can actually give us quite a fight over -- at least in their air space.

So, we better do that because a lot of the fighters we have today are non-sales fighters going to be in the force for quite a while the rate we are going.

► MARTIN: Along that, I want to make sure I understand your question there, I got the idea you are talking about, you know on traditional ISO? OK, it goes back to a point I made earlier, which is we do have to close the loop both on your operability and on net - - what people talk about as net centrality, what that really means is, is that you have an ability to harvest information that the whole network is able to produce.

So, if you happen to be in an airplane that is in a specific place and you have a capability to sense something then what we won't be able to do is harvest that and perhaps even without your knowledge or certainly a UAD be able to take your radar and for the milliseconds it takes to go take a look at some of the information back, be able to use that in such a way that you gain knowledge of the battle space from every node that is out there that has the ability to produce some sort of sensing capability.

I won't say we are a long way away, I would just say that is a goal less an objective, but it is going to take a while to get there.

► GRANT: Next question.

► QUESTION: Between our fiscal crisis, our strategic crisis, and all the other crisis we want to through at them, how do we fix this problem in the next five years?

► THOMPSON: It took 30 years to create it, so five years is probably a little ambitious especially were the president has so many other things he wants to do, like changing the entire economy. I think we are going to have to face reality here that 5 percent of the world's population can continue to provide nearly 50 percent of this military outlays.

They are going to be very substantial cuts in the US defense budget over the years ahead and by the way I am carrying the same message to the Sea Power Subcommittee next week, I am not just saying this to people who are proponent to air plane, but we may find at the end of the Obama year as Congress and Barry Frank is proposing a cut by 25 percent it looks pretty optimistic at least for the procurement accounts.

Because we are really out of money, I mean really out of money and then the system works in such effects that investments get cut long before consumption does. Now, in terms of the Air Forces plan I do think that Rebecca alluded to one of the key things here.

We clearly don't need to buy as many fighters as we are planning to buy, we do need to buy more F-22s. We are headed for a ratio of one F-22 to 10 F-35s when these planes are supposed to operate in tandem and that doesn't make much sense.

It would make more sense to buy 400 F-22s and cut the F-35 by 600 at the end of the production run, which is pretty close to what the Air Force proposed in fiscal 2006 and the concept called Beacon Force, which never saw the light in day (inaudible) were we are headed.

But on a lot of these other programs, we view the next generation volume, but we are not going to have in 2018 and we are not going to have it in 2025 because the money is going to be taken back.

► GRANT: Do the other panels what to answer the question, what do we do to fix it?

► MARTIN: I think we have to look at it from both ends, the objective that I talked about and then second the short-term fix. I agree with Loren, what you don't want to do is cut the most capable systems in the world to remain with the arctic (ph) and aging systems because they are cheaper today then buying new and they only then variable left is going to be the number and so you have to go and take a look with the analysis of given the greater and capability that I have with things like the B1 carrying Sniper pot and delivering huge amounts of ordnance.

I don't need quite as many attack aircraft as perhaps the model showed I did for that kind of an environment and I am not talking about the high end necessarily, but I am talking about what your rotational forces will be you then begin to take a look a the whole picture and give yourself what I consider to be the same destructive capability with fewer assets and the Air Force is looking at that, but you have to be very careful about giving up those systems that advantage everything, so that you can preserve things that are rapidly being overrun by other nations technology.

There are some analysis there and I think you will see that coming out from the Air Force in their force structure considerations in the next iteration of the budgeted program, but that is short-term fix and then you got to get into a long-term sustainable plan and the question is going to be whether there is going to be any stunning for with the economy and their financial crisis that we have.

That doesn't mean that you shouldn't plan that way, that shouldn't have a strategy to do that, the question is when you will be able to execute it as we outline for (inaudible).

► THOMPSON: Just like to add one point going back to what I suggested earlier about strategy. The current number of F-22s sort of program of record that we are supposed to get that was never based on any kind of -- as far as I could see sensible four sighting criteria that dealt with the needs of the Air Force and air power and air dominance, it was strictly a fiscally driven Secretary Roche when he was the secretary of the Air Force was basically told this is how much money you have got, you can buy as many F-22s within that part of money as you can get and that's where he left with 183.

This is not the only area in which we have been making strategic choices based on rather strange criteria that have nothing to do with the overall requirements of US Military. If you go back and look at the nuclear post review conducted at the beginning of the last administration, you actually find some sections in there that are entitled for sizing criteria and if you read those sections what do they say, we think we can get down to the number of war heads the 1,700 to 2,200 that we agreed to with the Russians.

Is that a fore sizing criteria? Of course not, it is arms control when you look. There are some serious issues about the -- in my view is our ability to make strategic choices on sensible strategic grounds has been deteriorating in recent decades and I would also suggest from what I have done in digging into this historically that if the president is absolutely uninterested in this and you are going to have to wait over the next administration, I mean it sort of boils down to being that simple unfortunately.

► WATTS: If I could please add a small portion of the cap and that is our dedicated comments in rescue force and most specifically our comments coming out in some part of the pentagon question of the need have a dig at force for that mission. Will that be the younger parts of the pentagon?

► MARTIN: There are a lot of people that know much about see saw (ph). And those that are in positions of authority know even less. I happen to have commanded to seize our forces and understand a little bit about that mission and if you are interested in creating more survivors to rescue then you shouldn't have a dedicated see saw (ph) force. If on the other hand you are interested in rescuing people who have been shot down then you need a dedicated force.

Now that is not to say that the equipment they use has to be greatly different than equipment that is used for other missions. Some of them in the special operations area, but you need a dedicated force that is trained equipped and properly sized to be available to rescue those people that are shot down or in one way or another become isolated behind enemy lines, you don't know where you will go, you have to go into the mouth of the tiger as opposed to shooting it and hoping the guy will get to that rescue point, you will have to go into arms way and you have to be equipped and trained and ready to do that and it is a very specialized force.

Now what we have to deal with now is wanting the right numbers in order to give ourselves a force that will not attrite due to off tempo problems, which we had in the early '90s. So, my view is it is a special capability that we must have unless we don't care. Now all the creeds say we do, it is the American military ethos do not leave people behind, but we can change that and then you don't need that at all.

But if we believe that's what we should be doing for our troops and you need a force that is ready to do it. It can't be a pick up then, now there may be times where you might be successful by having an alternative capability go in there, but in many cases that will not be successful.

► THOMPSON: You know by my calculation we saved about 500 war fighters a year using search rescue helicopters, numbers have gotten inflated by 9/11, but I think it is around 500, you are not just pilots, but everybody including that was -- you do have to make an assessment as to whether you need \$10 billion, \$11 billion fleet to save 500 people a year, you start doing a math there and it does look a little pricy, but I guess I would ask this and if we really care so much about retrieving people who were down behind enemy line and are in dangerous circumstances why are we buying conventional helicopter at all?

Why are we buying a tail rotor which seems to be much faster, much further? I mean on having the little bit under difficulty understanding why if we care so much about rescuing people we are buying helicopters that aren't anywhere near escapable as other readily available alternatives?

► QUESTION: (OFF-MIKE)

► THOMPSON: Price Exactly.

► WATTS: There was a hope that you might be able to do that with the V-22. The challenge was that it served -- it was sized and built to serve other missions which made it larger and perhaps more costly than you could achieve with a rotary-wing system for see saw (ph) and one other issue that was our concern that was the down wash of the two blades.

The downwash over the survivor could have been a problem in the water or on land, but it was primarily a cost issue as I recall.

► THOMPSON: You know I don't spend a lot of time in helicopters, but I have heard more bad information about downwash out of the US Air Force over the last five years and in the previous rest of my life and they make it sound like you beat into the ground it couldn't be rescued anyway by the downwash. I wonder whether most of this information is even true.

► WATTS: Well, the analysis that has been done on Loren talks about the -- basically through our times of purposes the miles per hour of downwash you could have without

going rest away without beginning to cause war challenge to the rescue then without it. So, there are analysis and requirements that are developed that.

It was not in my view as much the downwash because the way people work around is as much as it was that machine was built in cost for a different mission and more so then what you needed to see saw (ph). Now we invite that, but that was (inaudible).

► GRANT: Thank you for an excellent question. May I request the gentlemen from the Royal Air Force.

► QUESTION: Thank you to the panel for a very interesting chat and as we are all talking (inaudible) I would like to see if we can get even more depressed. Being British is in our nature of course, but we talked about how long it took to get into this problem and it is not just the US come Air Forces as I am sure you are well aware.

There are studies up to 2030 to talk a few trends of security effected by resource rules, famine, droughts, and the migration problems that might bring it out -- bringing on new security challenges, and I just wonder if they are talking so long to resolve and actually identify before we can resolve a problem how far forward are we looking for those types of challenges from the Air Forces point of view and the DOD in general, i.e. is it completely different set of threats challenges to the once that we face now.

We see some of that a little bit now in Afghanistan and then in the narcotics problem that we are trying to deal with Afghanistan is providing a different security challenge to what we were expecting to see.

► MARTIN: Let me just take a quick stand there, because if you go back to the discussion that I was indicating in my comments you have to look at the spectrum of conflict and you have to take a look at the capabilities necessary to deal with that.

If I got your question right, is it whether we are going to have to be careful about how much high end stuff we can now afford, but we particularly in view of the fact that there seems to be a very large and growing threat in the irregular warfare and perhaps those areas that don't require quite so much high-end equipment.

There is a balance issue and I think that was really the point that the secretary was making because I have to tell you pirates aren't a serious threat unless you don't fly them. If you decide you are going to after them they are gone, OK you mean trafficking you are not using the high-tech very, very robust military type of equipment, but now the question is how much capability do we have to go after that business and what are the implications to the more expensive high end stuff.

I would just say that it appears to me that it is not a US only problem and that more of our resource need to go into the partner -- building partnership capacity, building coalitions, building alliances so that teams of nations work this problem as opposed to the US only.

Without doing that the bills we are trying to create a fore structure to handle all those emerging problems is worse than the high end bills that we were just talking about in my view. It has to be a consortium; it has to be alliances, it has to be a group of world community that comes together with the capabilities that each of them can offer.

We may end up with specific capabilities, but we don't have to do all of them. We found that as we went into Iraq, as went into Afghanistan, with the Poll's with Lithuanians with many of the other new NATO countries they couldn't do some things, but they did other things very well and we tried to manage that.

I think that's where we have to go because it could become unaffordable otherwise to anybody.

► WATTS: I was just going to add since you touched on the drug problem coming out of Afghanistan. There was a recent economist issue arguing one more time again just like I have argued time and again for long range a little more in the way of long range strength systems that if the western democracies were willing to legalize drugs you can make the whole criminal enterprise things coming apart down in the border in Mexico, you can make that go away.

There, you know when people up on the hill think about what if it is my daughter, especially if you legalize drug you can understand why it is so politically difficult to make that kind of choice, but I think logically the voice of the economist have got a good argument. That's not something we are willing to do.

► THOMPSON: Apparently not, apparently we seem prohibition was a great model for the future. Speaking to your question, I gathered some of the administrations global warming experts to maybe will soon be able to claim that 80 percent of the globe is covered by water rather than 70 percent and according to people like Robert Caplin (ph) we are going to spending a lot of time in the Indian Ocean rescuing people from Bangladesh and Indonesia.

I do think as was suggested a moment ago that this is a mission that would be well suited to many of our allies they are a mixed blessing in places like the Bacons or Afghanistan when we were fighting a war, but there is not question they have the capabilities to participate these humanitarian relief and -- humanitarian systems and disaster really missions.

I think we are looking, because I would like to leave you once again for the up tick time with this message. We are really out of money, we can't do a lot of this stuff anymore and the public won't be willing to pay for in the future because of we are not getting up there social security and Medicare and the bargain.

So, the world has to get used to taking care of itself to a greater degree than it has been in the past.

► QUESTION: And from the same point to the US military that takes me back to a question that I think the services just have a hard time dealing with and that is sort of a fundamental question about what businesses as we look out into the future should we really continue to be in and which ones perhaps should we divest ourselves of?

The divestiture issue is one of the most difficult for the pentagon to deal with. And I suspect it is probably the same in (inaudible).

► MARTIN: And an example along the lines of your question is, if you are worried about piracy human trafficking and other problems in the modest rate as an example you would think that a group of nations there who are effected by this and concerned about it would as NATO was trying to do right now through their resources to buy some air lifters and operate them in exertion or in this case some surveillance assets that when queue the law enforcement agencies from the different countries.

It is very costly for one nation it is not so costly for five to do something like that. So, those are the kinds of things -- the thought really is this if the terrorist, if the pirate, if the Nortel (ph) is able to operate union global network against nations that are regional and city focused they will continue to be successful.

If on the other hand the globe becomes united against them, then they have no sanctuary and no place to operate. Right now they have lots of sanctuary because we were sectionalized into nations, cities, counties, regions that are not acting in an interactive and cooperative way.

► QUESTION: (inaudible) on the deviation week, you are talking about long raider and ability to do penetration and to places like china, you haven't talked about UAVs or webniser (ph) it like the UCAB is that a possibility to replace if you are canceling next generation bomber and more money wise a little smarter.

► GRANT: Let me talk a little on that one if I may before the rest of my panels have a start. You can look at a reaper and say there is light weight fighter, you have weapons you have sensors and I believe that that the Air Force needs to do analysis of what it is (inaudible) requirement really is, it needs to take into account the abilities of the reaper and the limitations which are limitations in certain threat environments and it needs to look forward to what we expect that requirement to be begin the future, we may need more survivable on their systems, we may need to understand as we will with bombers exactly what contribution we get from those systems.

So, they absolutely much be starting to really be treated as part of the Combat Air Forces for purposes of analysis. Sure Martin.

► MARTIN: I was only saying and I don't think manned or unmanned is -- I was not just -- the rules I was laying out had nothing to do with whether manned or unmanned had to do with capability to strike targets to be able to secure air space and strike targets in support of joint force commands objectives and the mix between unmanned and manned is (inaudible). I think you go that way.

The thing you have to remember thou is that properly the most demanding scenario, the most demanding mission for which we much have the best equipment the best training and the best capability is (inaudible) because in that case you were going against systems that were operated by either great algorithms or fields that have trained to a degree and therefore they -- if you are going to try and beat somebody's Air Force then you need to have systems that are -- they will out think them, out maneuver them, out smart them and eventually kill them first. Whether it is manned or not doesn't matter.

The one area you have to be concerned about is, in the cyber area and in the development of the algorithms it will be, it could be my computer software writer against your computer software writer and they are both in India. So, we have to make sure that we have the capability to overcome the threats to that system and the threats may very well be of the cyber nature or track doors or whatever. We just have to make sure that we do that in balance, but I was really manned to unmanned diagnostic.

► THOMPSON: You know, I think you raised a very important question. I was one of those people who was skeptical at unmanned systems at the beginning of the decade and I was wrong. Clearly has turned out to be more than just a niche capability and very important, but in direct response to your questions, the best option we have in that regard has enabled this unmanned Combat Air System.

The Navy's unmanned Combat Air System and the Navy is basically getting ready to kill it. Because they think the technology is not mature and they want to come back circuit 2017 and try to revive both. I think this is a big mistake. First of all because the ability of our carrier aviation to get close to places like china is clearly diminishing and secondly because of their scenario that Dr. Watts mentioned about being able to go in and later do search and destroy, look for targets of opportunity and so on.

You can't really do that in any manned aircraft that we are going to have. You can do it with an UCAS, so I really think the Navy should give this more thought.

► WATTS: Frankly I would prefer to have that in UCAS to F-35 so I'm carrier deck as we look out in the future personal because of the reach and the ability to penetrate and you maybe able to get out of the systems, but predominantly the reach because you know lot more reach out of that kind of assistant feature just kind of rate.

► QUESTION: There has been talk related buying later tax plane, I was wondering just to get your opinions on that whether or not that is good idea and it could actually be in a niche capability that can help payment for Afghanistan for just opening a new current (inaudible) another supply chain is getting up more people on that type of platform et cetera.

► WATTS: Are you (inaudible) maybe a propeller driven?

► QUESTION: Right, like OEX propeller driven.

► MARTIN: There are also some on the drawing board some general air craft that could suffice. The question you have to ask is, I am not sure for US airmen buying a OAX type of aircraft to use for US missions is necessarily going to be better than using systems that we already have our ability.

Alright, but if you are trying to build a partnership capacity with countries that can afford that and you are trying to help them establish some opportunity to rule ungoverned areas and prevent payments for mischief and criminal as well as terrorist activity that is a very important concept.

Now how much of the Air Force and Navy or Marines or Army would you have involved in this IW partnership building capacity mission is we need to determine. And we have to figure our ways to measure the value and success because the -- you can't prove negative the fact that something does occur doesn't mean that wouldn't have occurred and you may prevent for 9/11's then you are able to measure, but you also begin to get the problems that we were just talking about because it is not just against Harris it could be against traffickers it could be against the (inaudible) it could be against all kinds of folks.

So, I believe that that (inaudible) the lower cost ISR systems and developing a light attack fighter that meets needs not just because there is already (inaudible) out there, but one that actually meets the needs and I think at that point you start to look at what you want from management, what you want for senses, what you want for power, what you want for take off and landing performance and altitudes, so you have to go through that whole business and not gold plated.

I think there are some out there that are doing including one that is one the drawing room right now that is (inaudible) but I think it is useful to explore and I think the demonstrations and particularly Mr. Young's construct of competitive prototyping lends itself to this very easily and something that we should look at and begin to determine the right sizable.

► THOMPSON: I would just add to that, we are to ask our selves why we aren't doing is because we think of one work because it is problems with the way in which we separate the rules, emissions and the ways in which the services define their identities and all that, even people in the Air Force I think would be useful to have a propeller driven light attack plane.

So, if we don't do it is probably we are intake or institutionally adjusting to what the thread environment requires.

► GRANT: Great, any further questions?

► QUESTION: You are hearing this from (inaudible). The question is primarily for General Martin and whoever else who wants to answer, but the GAO came with a report the other day and joined strike fighter not here was surprising they have been critical of this concurrency issue during the flight testing right so developing the air plane, but

they also the kind of the new thing, which they came out and said they didn't like the idea that is fully around the pentagon to do an accelerated buy because they saw like there was too much risk involved.

And the reason I want to ask you General Martin about that was because you had kind specifically kind of mentioned having that steady state of production overtime versus doing it all in big one comp-up front and I guess the counter of the VD economies is scale, you know if you do it fast maybe you can bring down those unit cost, So I was wondering when you look at the JF-7 particular what you thought about maybe kind of doing more up front versus spreading it out.

► MARTIN: I did -- I haven't seen the GAO report, I am sorry I haven't seen their criticism so I am really not able to comment on that. I mean it is not unusual for every program to be attacked on to the currency, we are trying to maintain that delivery and timeline would you have this last several capability in years ahead because we don't replace them fast enough, so there is clearly a desire to get this thing feel that thing is possible, but it needs to be filled incorrectly.

What I was proposing wasn't necessarily to be implemented today and particularly since you didn't implement it over the past several years you now do have a that sort of, that somehow you need to reconcile you need to reconcile it by doing away with four structure as the new capability comes on board or you accelerate to buy. And so that is where that argument really is. I think you are going to find a desire for the Air Force to do both. I think they are going to probably bring down the force structure and I think they are going to try and get the accelerated buyer to make up for the years they have lost as it stretched out and by the way the Navy has the same problem in terms of a fighter gap.

So, the idea is you may have to do that to prevent critical system failures, 10 or 15 years from now as aircraft that are beyond their useful way or failure of capability with higher risk and combat. So, I think that when you find yourself in this situation you probably don't have to -- you probably can't take the long-term strategy approach right way, you have to do a short-term fix and then you have to work your way into the strategy that looks the same.

► QUESTION: Alright.

► GRANT: I need to comment on GAO and F-35 and one reason I think a lot of '07 senior report necessarily is it is the fifth '05 annual reports on JSF and it doesn't say anything particularly new. You already know about JSF is this, is designed to be a big program to sort of multiple customers and it meets the military requirements of many services and allies all by the way it is also a superb export product.

Now the JSF program because it is designed to be big and produce a very high production rate as it matures has already made significant investment in reducing technology risk. It has adopted many lessons from F-22, it has an engine that is

derivative of and learning from an F-22 engine by the same manufacturer. There are investments in testing and flying the Avionics on other platforms prior to their insertion.

The production line was not built with, let's build one line for test air craft, it was built to go directly into full production, it is now at a place where it is going to ramp up to that. If we want to have a successful affordable F-35 program we need to not unravel it now. We have made a bet on big production extensive early testing in the lab and an airborne platforms and we need to trust that strategy.

► QUESTION: Mike (ph) (inaudible). How would you envision or your comments on the LA contribution to solving the cap in crisis problem among other specifically Britain and Japan and in light of our expert panel the F-22 technology.

► GRANT: I am really glad you mentioned the allies that we have been bothering me sitting here and I want to say from the prospective of the Mitchell Institute, the initial was successful because in those small parts he won the confidence of then the major air power nations Britain, France, and also the contributions from Italy.

And airmen have always had a tradition, a US airmen work with allies of a deploy firm and work in allied nations that our connection is absolutely center, you see it reflective in everything we do and we need to have that continue for air power to be successful in the future.

► WATTS: It is a really important question in addition to the models being a bit behind and the methodology having atrophy, we didn't usually in our procurement decisions and in our fore structure sizing develop them based on the allied contribution per say except as it was built into a war plan. So, if it was built into the plan and the numbers that we would use were based on what the US contribution would be and I am talking primarily about the cold war mentality and the things that we did in the NATO war plants.

But in the absence of a full war plant that has a time phased forced deployment list with it -- and contributions from allies that are signed up for, the Air Force and I believe most services built their fore structure based on what the joint force commander needs done primarily by using US military. Should we do otherwise? In some cases we should. We do in NATO. We do have a defense planning question there.

NATO signs up for forces and that's the way the plans go. Should we do that other places? We should probably head your best because not every nation that we are allied with or aligned with will contribute in an event that we may feel we need to take. So, we have to hedge your best, but it turns out that in some cases you can mitigate the risk, you need this amount but you can only afford this amount but you know that you are going to have some allies so I am going to count on that and that will soon become lower than moderate.

OK so, but I don't think you will find our fore structure models other than in a alliance where forces are actually prescribing to signed up takes into account the coalition

contribution in the way we go about procurement. It does take into account other services system. That's very important and that's what (inaudible) with the joint staff to make sure we are buying everything that the Air Force thinks it needs without regard for everybody else over time integrate that.

► THOMPSON: I just want to add to that, I think it is really foolish that we don't sell the F-22 and won't sell it to Japan as you know the main legal barrier was basically a bit of critical posturing by congress men or be (inaudible) doesn't even care that much about anymore. But when you look at the F-22 and you look at the Japanese requirements three things stand out.

First of all, they are most reliable ally in Asia. Secondly, the F-22 is uniquely suited for some specific to less that they face. Thirdly, they are emerging capabilities for the F-22 will allow if it was stationed in the home islands to help address the North Korean missile threat to the United States and now I guess finally there is a non-military consideration, which is that these source events are just typical of the kinds of foolishness that the country is rolling in money does like throwing away \$5 billion in export earnings for no good reason, but we are going to have to start to changing the way we think about those things.

► GRANT: Excellent. Well thank you very much to my panelist and to the audience and this concludes the panel this morning. Thank you.

END TEXT