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ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2009

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

STRATEGIC FORCES SUBCOMMITTEE HEARING

ON

BUDGET REQUEST AND STATUS OF SPACE ACTIVITIES

HEARING HELD
MARCH 5, 2008

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FISCAL YEAR 2009 NATIONAL DEFENSE AUTHORIZATION ACT—BUDGET REQUEST AND STATUS OF SPACE ACTIVITIES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
STRATEGIC FORCES SUBCOMMITTEE,
Washington, DC, Wednesday, March 5, 2008.

The subcommittee met, pursuant to call, at 3:02 p.m., in room 2212, Rayburn House Office Building, Hon. Ellen Tauscher (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. ELLEN O. TAUSCHER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, STRATEGIC FORCES SUBCOMMITTEE

Ms. TAUSCHER. The hearing will come to order.

The Strategic Forces Subcommittee meets this afternoon to receive testimony on national security space activities from General Robert Kehler, the Commander of Air Force Space Command; Mr. Gary Payton, the Deputy Under Secretary of the Air Force for Space Programs; and Mr. Scott Large, the Director of the National Reconnaissance Office (NRO).

I want to thank each one of our very distinguished witnesses for being here today.

This hearing is an important opportunity for the subcommittee to consider the posture of our Nation's space assets, their importance to our warfighters, and to reflect on the fragility of our space systems.

I want to warn everybody this is a long statement—not warn them, because it is not an important statement—but we are at a time now when we believe on the subcommittee, and in the Congress generally, that space is one of the most important issues that we need to be looking at, and understanding, and have oversight for.

I want to congratulate my colleague, Mr. Everett, my Ranking Member, for all of his work over the many years on space; and to make it clear that one of the reasons why this is going to be a long statement is that we really want to highlight the work that is done, not only by our fabulous men and women in uniform, but by the amazing cadre of civilians that have done this work quietly, without a lot of fanfare, without a lot of attention, for decades.

So, as I was saying, we want to reflect on the fragility of our space systems. This fragility was highlighted recently by the failure of an experimental NRO satellite early in its mission, and by the President's decision to destroy that satellite before it reentered the

atmosphere with 1,000 pounds of frozen hydrazine fuel in a titanium tank.

By successfully intercepting the failed satellite about 130 miles above the Earth's surface—just above the upper edge of the atmosphere—our Nation took responsibility for eliminating a risk to human populations that we, ourselves created. At the same time, the United States executed the intercept consistent with international norms discouraging creation of dangerous space debris; the vast majority of debris created by the intercept has already reentered the Earth's atmosphere, or will reenter in the coming days and weeks, and disintegrate.

I also applaud the open and transparent manner in which our military leadership has explained and executed this mission. I know that each of our witnesses today played a key role in this effort, and each of you, as well as your whole team, should be commended for a job very, very well done.

The recent U.S. intercept stands in sharp contrast to the secretive anti-satellite (ASAT) test that the Chinese performed a year ago, last January. Without alerting other spacefaring nations, as required by international norms, they destroyed one of their own aging weather satellites over 500 miles above the Earth's surface, creating a debris field with thousands of lethal objects that will remain in low earth orbit (LEO) and threaten satellites, the Space Shuttle, and the International Space Station for decades to come.

As a Nation critically dependent on space, I would like to ask our witnesses today to address the following question concerning our space posture: If our space assets are attacked, do we have the appropriate contingency plans for closing the intelligence, surveillance, and reconnaissance (ISR) gaps that our warfighters would experience?

Last year, testifying as commander of United States Strategic Command (USSTRATCOM), General James Cartwright, who is currently Vice Chairman of the Joint Chiefs of Staff (JCS), commented that not every problem in space requires a solution in space. He went on to express concern about a possible arms race in space.

Last week, we received testimony from Assistant Secretary of Defense Michael Vickers who stated, "DOD seeks to promote compliance with existing legal regimes, acceptance of international debris mitigation guidelines, and development of additional voluntary guidelines for safe and responsible space operations."

In this context, I would also like to hear what each of our witnesses thinks about the merits and drawbacks of establishing additional international rules of the road to govern operations in space.

Let me be clear: I want to make sure that my subcommittee, as well as the Department of Defense (DOD), is doing everything we can to ensure that our warfighters retain the advantage of space-based systems and that this advantage is not degraded by the Chinese test or any future attacks.

But we must be prepared for more than just the possibility of a direct ascent ASAT. Future attacks may come from a ground-based laser or electronic jammers. An enemy might directly attack the ground-based components used by satellites, or an adversary may use cyberspace to attack vulnerabilities in our satellite systems.

One of the most basic requirements for protecting our satellites, which I am concerned does not receive sufficient attention, is to know their current status and to understand the threats they face. Space Situational Awareness (SSA), as it is known, has not always received the attention it deserves in competition with the desire to field new space systems with improved capabilities.

It was with this concern in mind that our subcommittee advocated for and the National Defense Authorization Act (NDAA) for Fiscal Year 2008 directed the development of a national space protection strategy. The Secretary of Defense, in conjunction with the Director of National Intelligence (DNI), must prepare a strategy focused primarily on protection and space situational awareness requirements by July of this year.

Today, I would like to ask our witnesses to discuss the Administration's progress toward establishing a space protection strategy and, just as importantly, to address this question: Do you think we have struck the right balance in the fiscal year 2009 budget between investing in new systems and efforts to improve Space Situational Awareness?

With an aging generation of systems on-orbit, the national security space community has been struggling to develop and field new systems for the past decade. In that regard, I know our witnesses must be proud of the payloads that were successfully delivered on-orbit this past year, including the last Defense Support Program satellite, the first Wideband Global SATCOM Satellite, and two additional Global Positioning System (GPS) birds.

And I want to congratulate each of our witnesses, today, on the 56th consecutive successful launch of a medium or heavy payload that took place on December 10th last year, launching into orbit a satellite developed by the NRO.

Yet, as we well know, even with these successes, we face potential gaps in key satellite capabilities during the next decade. Many of the replacement systems, such as Spaced Based Infrared System (SBIRS), the Defense Support System (DSP) replacement, have been plagued by inaccurate cost estimates and optimistic predictions of technical maturity.

More generally, I am concerned that the space acquisition system is fundamentally broken and would ask our witnesses to discuss what is being done to fix the process. In particular, how can we be confident that the back-to-basics strategy that you have adopted will result in better acquisition outcomes?

I am well aware of the benefits space-based assets provide to the warfighter, and I am committed to maintaining these capabilities without any gaps. Over the past few years, Congress has slowed the development of selected systems through the budget process due to concerns about the pace of these new programs and the emphasis on transformational systems designed to skip a technological generation.

While the Administration adopted the back-to-basics approach partly in response to congressional concerns, this year we are concerned that you may well have overcorrected by delaying fielding of the transformational communications satellite (TSAT) by at least two years. TSAT will be required to provide the necessary bandwidth to support protected communications on the move for sys-

tems, such as the Army's Future Combat System (FCS). We hope that our witnesses today can help us understand why $4 billion previously designated for TSAT was removed from the five-year defense plan.

While we have many questions, I want to assure you that the Congress is committed to working with the Department and the intelligence community (IC) to put our national security space programs on an affordable, sustainable track; one which accounts for the change in the threat environment and will protect our warfighters and the American people.

Before we proceed, I would like to remind my colleagues and the witnesses that we are in open session and to take care to keep our questions and your answers unclassified.

With that, I would like to thank the witnesses again for being here today, and I look forward to your testimony.

Now, let me recognize my very good friend and colleague, Mr. Everett of Alabama, the Ranking Member of this subcommittee, for any comments that he might have.

Mr. Everett, the floor is yours.

STATEMENT OF HON. TERRY EVERETT, A REPRESENTATIVE FROM ALABAMA, RANKING MEMBER, STRATEGIC FORCES SUBCOMMITTEE

Mr. EVERETT. Thank you, Chairman Tauscher.

I also want to extend a warm welcome to our witnesses for appearing before us today.

Welcome back, General Kehler, and congratulations on your new position.

I am privileged to welcome Mr. Payton and Mr. Large in your first appearances before the subcommittee.

Let me start out by congratulating our witnesses for their successful interception of a disabled NRO satellite last week. This mission was not one you had envisioned or had much time to prepare for, yet you did a great job, and you safeguarded the public from potential harm. I commend the transparent manner in which these plans were executed.

This will continue to be a challenging budget year. We have immense budget pressures and competing defense priorities. However, I cannot stress the point enough that our modern military force is dependent on space, and our investment in space cannot be shortchanged.

A case in point—the chairman mentioned this—TSAT is the only STRATCOM system planned to provide wideband-protected communications. Over the next few years, over 200 Army-Marine units will be reliant on unprotected communications, as will the Army's Future Combat System brigades once they come online.

Each Predator, Reefer, Warrior, Global Hawk unmanned aircraft system (UAS) fielded by the services will be unprotected communications. These forces are the most susceptible to jamming, yet the Department has chosen to cut $4 billion from TSAT. I do not want to take anything away from Wideband Global Satellite (WGS), it is a great capability, but I do want to know why protected communications is not a priority requirement.

I understand that the Department is revisiting this. I would ask you to come back and brief this committee once your analysis is complete.

We are now a year away from the Chinese ASAT test. Last year, this committee asked for a comprehensive space protection strategy to guide the investments. This year's budget should be the Department's first opportunity to make changes in the Space Situational Awareness and space protection budgets. I hope you can discuss efforts in this area.

In addition to capability investments, I also remain concerned about how our military would operate in a space threat environment. For instance, do war games and exercises include space denial, and has there been a deliberate hard look at our war plans?

General Kehler, as you had mentioned last year, if you take away space from the fight, the impact on our forces is a reverse time machine.

Under the chairman's leadership, our committee has continued its strong oversight of space acquisition. I appreciate your assessment of current state-of-space acquisition, and the status of some key programs in this year's budget—GPS III, SBIRS, Space Radar (SR), and Operationally Responsive Space (ORS).

Before closing, I want to thank you again for your service and leadership in the space community. I think space—in particular national security space—is one of the most exciting things this Nation and this Congress does.

I thank you, Chairman. This is an extremely important budget year and hearing to have. So thank you for calling the hearing, and for your leadership.

Ms. TAUSCHER. Thank you, Mr. Everett, very much.

General Kehler, Commander of the Air Force Space Command, welcome; and we appreciate the fact that you have an extensive and comprehensive statement you have submitted for the record. If you could summarize that, the floor is yours.

STATEMENT OF GEN. C. ROBERT KEHLER, USAF, COMMANDER, AIR FORCE SPACE COMMAND, U.S. AIR FORCE

General KEHLER. Madam Chairwoman, thank you very, very much. Congressman Everett. Members of the subcommittee.

Yes, I have appeared before this subcommittee before, a year or so ago, but this is the first time as the commander of really magnificent 39,000-plus men and women who are active-duty airmen. They are guardsmen, they are reservists, they are government civilians, and they are contractors, and they are doing a spectacular job. And I am very, very proud to be associated with them.

So thanks so much for inviting us here today, and thank you for the subcommittee's support of this subject.

Madam Chairwoman, I think you have summarized it very well, and I am not going to say anything more in terms of an opening statement, other than to completely agree with you.

Space is a very, very important place for the United States military, for the national security apparatus, and for the United States of America in general. There is no question that space is an important place for us militarily, economically, and it has really been woven now into the social fabric of how we all conduct our daily

lives; something that should not be lost on any of us as we think about the potential of space as a contested environment in some future conflict.

We believe that the evidence is clear. What we observe today with many, many actors around the world shows to us that there are those determined adversaries out there who will seek to remove the advantages that the United States has with its space capabilities in some future conflict.

We do not just see that in evidence through the Chinese ASAT test of a little over a year ago, but as you pointed out, we have seen jamming all the way back to Saddam Hussein attempting to jam GPS. We have seen the proliferation of jammers for GPS and other communications signals. We know that the jamming activity will be there in a future conflict, just as they have already been in a past conflict.

We have seen the demonstration, in some cases the development, of other potentially troubling anti-satellite kind of things, as well; ground-based things that we have seen, in terms of laser development and other activities, that could serve to blind our assets or otherwise disrupt those, as well as some of the things that we have now seen in evidence with the Chinese kinetic anti-satellite test. These are not necessarily new threats, and certainly the Chinese test, while very troubling, was not a surprise.

So the question now becomes: If this is going to be a contested domain, what do we do about that? And that was the first of the questions that you posed. Do we have gaps? And I would answer, quite frankly, in some cases, we do. We know that there are some of our assets today that are more susceptible to some of these threats than others.

In some cases, our space assets are very well protected today, because we knew during the Cold War that we would face the same kind of a determined adversary—saw the same kind of evidence out of that adversary—and so we prepared ourselves, in some cases, to deal with that kind of an adversary. And the result of that preparation are systems that are on-orbit today that are quite effective against some of the threats that we see developing.

In other cases, that is not true, and we will need to address those. In some cases, we have done that programmatically; and so programs like GPS III, programs like Advanced Airborne Electronic Attack (AEA), Advanced Extremely High Frequency (AEHF), and some of the other activities that we have ongoing are designed to try to deal with some of these threats.

The number one concern that we have is to improve our Space Situational Awareness, and that you will see—although those are not large budget dollars when you consider the overall scope of the budget, in fact—has had a budget increase from fiscal 2008, the budget that you enacted; to the request that we have sitting before you today.

My opinion about Space Situational Awareness is that perhaps the most effective use of the money that we can have this year is to make better use of the sensors that we have. And so you will see a request for some improvement in things that do not sound, on the surface, to be very compelling or appealing, but we think will go a long way toward helping us improve our SSA early on.

Thank you for your comment about the very large joint team that conducted the successful intercept. I will tell you the lesson that I took away from that was the value of high-quality Space Situational Awareness because, if you have high-quality Space Situational Awareness and high-quality space surveillance, we can begin to characterize—in this case, we were able to characterize with very high precision—what was actually going on with an object in space, what it looked like in terms of tumble, et cetera; all things that would be important for us in the future as we look at understanding what is happening to us in space, discriminating whether or not it is a natural event that we have just experienced or a determined attack, and being able to attribute those kinds of differences. All of those are important to us.

And so let me just conclude by, again, thanking you. We look forward to the rest of your questions. I certainly look forward to your questions. I will not try and go down that entire list right now, but you certainly have whet our appetites for a further dialogue.

[The prepared statement of General Kehler can be found in the Appendix on page 21.]

Ms. TAUSCHER. Thank you very much, General Kehler.

Under Secretary of the Air Force Payton, welcome. Your statement is put in the record, and if you could summarize, the floor is yours.

STATEMENT OF HON. GARY E. PAYTON, DEPUTY UNDER SECRETARY OF THE AIR FORCE FOR SPACE PROGRAMS

Secretary PAYTON. Thank you, ma'am.

Ms. TAUSCHER. You are welcome.

Secretary PAYTON. Again, Chairman Tauscher, Mr. Everett, I greatly appreciate the opportunity to talk about military space with the committee today. We have a superb relationship with this committee, and we view it very highly.

Let me answer one of your questions in my opening statement, maybe save a little time that way. You asked about evidence that back-to-basics was working. I would point to the GPS III program, a program that is, at its heart, designed to counteract enemy potential adversary degradation of GPS service. We call it NAVWAR.

The evidence that we have that back-to-basics is working is because a critical part of back-to-basics is what I call a block approach: Incremental deliveries bite off smaller chunks of new capability, build on proven technology before we start full-scale development of the new system.

GPS III is a perfect example of how we have done that in a program. We worked with the combatant commanders, as represented by the Joint Chiefs of Staff, and directly with Strategic Command, and the services, and in the GPS case, even Department of Transportation (DOT), other Federal agencies, because GPS serves such a wide variety of users. We identified those first critical, most important new functionalities that the GPS III constellation should supply. We packaged that into something called Block A of the GPS III program.

This spring, we should be able to award the full-scale development contract for Block A of the GPS III program. We have already defined a tentative Block B that would come after Block A, and

then finally a Block C that is the definitive end state of the GPS III constellation. And so to me, that is evidence that we are making progress in back-to-basics.

We have the proven technology for the GPS III A acquisition. We have been spending two years proving those component technologies. We have competitive bidders with their designs for that spacecraft under evaluation right now, and we should be able to award a full-scale development contract for the GPS III A program this spring.

And so, again, it is an example, a near-term example, of how we think the back-to-basics acquisition strategy is showing success. We are not out of the woods. There are still several programs. I am sure we will turn up rocks with lizards underneath them. But there are some promising signs that back-to-basics is working.

And, again, thank you for the invitation today, and I look forward to your other questions.

[The prepared statement of Secretary Payton can be found in the Appendix on page 47.]

Ms. TAUSCHER. Thank you, Under Secretary Payton.

The Director of National Reconnaissance Office, Mr. Scott Large, welcome. It is your first appearance before the committee.

Mr. LARGE. Thank you. Yes, it is, thank you, ma'am.

Ms. TAUSCHER. Congratulations on your appointment.

Mr. LARGE. Thank you.

Ms. TAUSCHER. Thank you. Your testimony is put in the record, and please summarize. The floor is yours.

STATEMENT OF HON. SCOTT LARGE, DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

Mr. LARGE. Very good.

Madam Chairman, Mr. Everett, other members, thank you very much for the opportunity. As the chairman said, this is my first opportunity to address the subcommittee.

Hopefully, by seeing the three of us up here together, you may get some insight and a good feeling for the state of integration across what I will term national security space. There is a lot going on in the national security space environment, as both General Kehler and Mr. Payton have described.

The NRO is a strong and integral member of that national security space team. And while today's setting is an unclassified setting, and I will not be able to go into great details and particulars to some of the questions you may have, what I would like to stress is that we are what I believe is a vital part of direct support to the warfighters; a member of the team addressing space protection, which of course, is one of the most important topics we are discussing today. But, also, as far as acquisition, the back-to-basics, the NRO is on a path that we have charted over the last year or so to try to move past some of the challenges we have faced in the last several years. And I think we are making progress.

In a future setting with the committee, the subcommittee, I would like to go into great detail on exactly what we are doing to try to recover our position in effective acquisition of space systems.

The other thing that I would leave with you quickly is that, while we talk about space protection, we talk about acquisition. We

also are concerned where we are going in the future, the investments in research and development (R&D), and the fact that we are jointly involved with our other spacefaring agencies within the DOD, and actually the civilian community in pushing forward some of the limits of space R&D.

With that, I look forward to answering your questions. Hopefully, we can address some of the specific issues you have today.

Thank you very much.

[The prepared statement of Mr. Large can be found in the Appendix on page 61.]

Ms. TAUSCHER. Thank you, Director.

I will tell the committee that we are working with our own schedule to have a classified briefing with the director and others. Perhaps General Kehler and Mr. Payton could also attend. It will be as soon as we can find the time, and it will be, as I said, a classified hearing.

I want to get back to one of the questions I asked, because I think it is fundamentally what we really care about the most, and that is about what we would do if our assets were attacked. Do you have appropriate contingency plans for closing the ISR gaps that our warfighters would experience, regardless of who attacks us and what method they use? Do you feel confident that we have an appropriate Plan B?

And, second, how would you judge the process of the Operational Responsive Space program's efforts to develop systems that might fill these potential gaps?

General Kehler.

General KEHLER. Ma'am, thank you.

First of all, let me describe that as the Commander of Air Force Space Command, we are a force provider to the Commander of Strategic Command, who really is the one who deals with the question of operational planning and contingency planning.

Having said that, however, there are operational plans that are certainly contingency plans, not only with U.S. Strategic Command, but across the regional combatant commanders as well, for dealing with a number of potential outcomes here. What I cannot do today is sit here and say that as we look to the future that we always have in place a way to compensate for the loss of space assets.

What I can tell you is we are working on that very hard, and we believe that that is a central piece of our strategic approach to how we would deal with the potential loss of our space assets. In some cases, we are very confident today that we have alternative ways, if not to completely address the loss of a space asset, to certainly compensate for that in warfighting terms.

In other cases, we do not have as much confidence as we look to the future—for example, GPS. I mean, that is why we are looking to improve the GPS constellation in incremental blocks as we go forward, as Mr. Payton described.

In some cases, we think that we have fairly good capability today to accomplish some of our intelligence, surveillance, and reconnaissance missions with air platforms and other things, but that is situationally dependent also. And so what I do not want to leave you

with is the impression that all of our concerns are addressed. They are not.

I also do not want to create the impression that we are not working on this and, in some cases, I cannot go into the specific details, but what I can tell you is that a key part of our strategy as we look to the future and we think through how do we address the notion of space becoming a contested domain or space capabilities becoming challenged in one way or another, a large part of this is understanding how we can use the assets in all of the domains in order to bring to the combatant commanders the full range of capabilities that then makes this very difficult for an adversary to address.

We do not want to be one dimensional, for sure. On the other hand, there are some things that we do best, and in some cases, can only do from space for our warfighters. And so in those cases, we are going to have to pay particularly close attention to make sure that we have addressed those needs and have appropriate compensation measures; perhaps even an operationally responsive way to replace or augment those capabilities if, in fact, they are threatened. That is where ORS begins to come in.

Now let me take just a second, if I might, to describe to you that operational responsiveness in our mind is not just about small platforms and small launch vehicles. Operational responsiveness starts on the ground, and we believe that, in many cases, we can get more operationally responsive with changes that we make on the ground using our existing assets, and that is where we always start.

But as we look in the tool bag of things that we would want to have available for the future, one of those tools needs to be a way to put smaller, single-purpose, shorter-lived platforms on-orbit in response to a specific warfighter need, or in response to an augmentation request or in response to a reconstitution request. So we are looking at ORS as if it is a national strategic capability for the future, and today, what we are doing is we are working on the building blocks to make it so.

So, as we work our way through this budget, we are going from fall to walk to, I hope, run by the end of this time period, this five-year time period, so that we can present to the combatant commanders, in our case through the Commander of U.S. Strategic Command, an appropriate way to supplement, or replace, or reconstitute critical assets when those are absolutely necessary.

Ms. TAUSCHER. Okay.

Under Secretary, Director, do you have anything to add to that?

Mr. LARGE. I would suggest the ORS program is doing both enablers for ground control or new sorts of spacecraft, plug-and-play spacecraft in particular. We are continuing the TacSat series; we flew TacSat–2; we are going to launch TacSat–3 within a few months; and we are designing TacSat–5 right now to demonstrate one of the critical enablers, which is that notion of rapidly assembling from flight quality parts already on the shelf, a plug-and-play spacecraft that can be fine-tuned to the combatant commanders' needs. Tentatively, that is one of the objectives of TacSat–5.

Ms. TAUSCHER. Thank you.

Mr. LARGE. So we are making progress.

Ms. TAUSCHER. I appreciate that.

We have just been notified that we are going to have a series of four votes.

Mr. Everett, I am going to go to you, and perhaps we can quickly get through some questions.

Four votes sometimes turns into 45 minutes very quickly, although that is not the way the clock is meant to work.

Mr. Everett.

Mr. EVERETT. Thank you. Chairman, I am specifically going to touch on TSAT.

Ms. TAUSCHER. Sure.

Mr. EVERETT. That is something you have already covered in your opening statement, but it concerns me that—and, General Kehler, we have talked about this—in a few years when TSAT is scheduled to come online, we could have as many as 400 units, Marines, ground folk that would be using unprotected communications, and I am wondering if there is any workaround on that. Should we slow walk some of the stuff like Future Combat Systems, the UASes that would depend on TSAT for protection com work? And, as we know, UASes are becoming extremely important in our warfighters' plans, as well as ISR.

General KEHLER. Sir, I——

Mr. EVERETT. So I guess my first question is: Should we slow walk some of these other systems?

General KEHLER. Sir, I think it is premature to slow walk that. Let me back up here for a second. Military satellite communications, as you all know, are critically important to us, and today, we get satellite communications with a large participating from commercial satellite companies and providers, and they do a spectacular job. In fact, over half support what we do today through satellite communications is done through commercial communications, and so that mixture, we believe, at some level, will have to continue into the future.

At the same time, we have just started to deploy WGS, the first of six satellites, which is going to be critically important for expanded wideband communications, and we are within a year, we believe, of launching the first AEHF. So we are progressing.

The question then becomes: How do we then get to the next most important issue that the warfighters have raised, and that is protected communications. The decisions that we made last year on TSAT, which were made largely in response to the need to purchase a fourth AEHF satellite, rippled through the Future Years Defense Program (FYDP). But, at the same time that ripple occurred, we were asked to participate with a team inside the Department to come back and take a hard look at how this should now go forward, given the fourth AEHF, and how we keep all these pieces together, and address the warfighter needs.

That review is going on as we speak today, and I cannot tell you what the answer is yet about how we intend to address the warfighter needs. What I can tell you is the warfighters are at that table; and as we look to come back to you, we will look to come back to you with a balanced way forward that addresses their needs synchronized with when those needs are and, again, we know that there is growth coming out there, both in terms of bandwidth, and we know that there is growth coming in terms of our

requirement to do protected communications. What we do not have yet is a revised answer in light of the insertion of the fourth AEHF in the net flow, and that answer we owe you.

I think, at this point, sir, it would be premature for us to try to decide that there was some different phasing out there. I think our first objective is to come back and see if we can come up with a plan that continues that phasing the way the other services are requiring it.

Mr. EVERETT. Thank you, Chairman.

Ms. TAUSCHER. Mr. Everett, I think we all have the same concern about TSAT. Perhaps we will ask General Kehler when he has that answer to give us a call, and we will have a small informal meeting.

If you do not mind, sir, we would like to have you come back, and we will gather as many people as possible.

General KEHLER. Yes, ma'am.

Ms. TAUSCHER. But we do think that before the bill that we are writing gets built any further, we need to have an answer to that.

Mr. Larsen of Washington.

Mr. LARSEN. Thank you, Madam Chair.

General Kehler, can I just put a finer point to paraphrase what you just said, see if I understand it? Regarding TSAT, the original launch was scheduled 2016, but since there has been $4 billion or so, at least from our analysis, taken out of TSAT, you do not know what that date is. It might be 2016. It might be later. You just do not know whether this fourth AEHF is going to fill that need until such time we can get to TSAT. Is that——

General KEHLER. Yes, sir. I think that is a good——

Mr. LARSEN [continuing]. I understand? Okay. Thanks.

Regarding international opportunities, I am not sure who to ask. Perhaps I will start with Secretary Payton. Last week—and Madam Chair mentioned this in her testimony. Last week, Mr. Vickers discussed voluntary guidelines and rules of the road. Now, in his answers to questions, someone asked whether or not the Administration at least had a plan in mind for rules of the road in space, or whether this is just some sort of general discussion about rules of the road and there is really nothing yet more behind it.

Do you have any idea, thoughts on the merits of rules of the road in space, or other international regimes, short of treaties, that just sort of discuss the Coast Guard rules like, make sure you have a green light on the right of your boat and a red light on the left of your boat?

Secretary PAYTON. In some regards, there already are tacit agreements amongst most spacefaring nations.

For instance, one of the biggest sources of debris is spent upper stages that still have propellant on board. The United States, Europe, as a routine for that last rocket stage that is in orbit near the satellite, we take that and vent the propellants out of that rocket stage so there is much, much less likelihood of that rocket exploding a few years from now.

Up at geosynchronous (GEO), the geosynchronous belt is a very high-value piece of space real estate. Again, tacit agreements. As upper stages deposit a spacecraft there, that upper stage then moves higher than geosynchronous so that it does not become a

navigation hazard. And also operators of geosynchronous spacecraft, whether they are commercial or government, as the spacecraft runs out of propellant for station keeping, they tend to dispose of them in a higher graveyard orbit, again, so that they do not present a navigation hazard.

So some of the problem becomes convincing all spacefaring entities to abide by those rules. I believe China has just recently bragged about how they can do that with their last uppers, their last stage, from one of their geosynchronous launches.

So those are tacit agreements that have been developed out of best practices and shared amongst the reputable space operators. So there are some valuable, critical rules of the road, if you would, already in place. Now the first step, I would contend, is a function of getting all players to abide by those tacit agreements.

Mr. LARSEN. Thanks.

Another question about international opportunities: In 2007, the Australian Government agreed to invest in the Wideband Global System. Are there other opportunities across the space portfolio for greater international cooperation?

Secretary PAYTON. Yes, sir. In fact, on the AEHF program, we have participation from the Netherlands, and the United Kingdom, and Canada, and then the——

Mr. LARSEN. Can you discuss what they will get out of that, or is that something we need to discuss——

Secretary PAYTON. I believe it is rolled up in conjunction with the North Atlantic Treaty Orgnization (NATO) communications agency, and how those countries contribute to NATO's communications bandwidth, and they do it through AEHF; and we are always looking at other opportunities because geography counts, especially in Space Situational Awareness, geography counts.

Mr. LARSEN. Madam Chairman, that is where I will end here.

Ms. TAUSCHER. Thank you, Mr. Larsen.

Mr. Franks from Arizona.

Mr. FRANKS. Well, thank you, Madam Chair.

Thank you, Mr. Larsen.

I thank all of you for everything that you do. I do not know how the country would survive without your cutting-edge focus, and we really appreciate it.

General Kehler, I might say to you—and carbon copy everyone else that had anything to do with it—this satellite shootdown continues to be a real source of excitement on the part of a lot of us. I do not want to use the word pride because that is when we get in trouble, but——

Ms. TAUSCHER. You can feel proud of it, Mr. Franks.

Mr. FRANKS. I just think that you all did a magnificent job. And I think one of the things it did, in my mind, is that it demonstrated the inextricable and intrinsic relationship between national security space and missile defense. Because, in a sense, we saw a missile defense asset accomplish a space mission. And with all of the things that you have to juggle, as it were, whether it is cyberspace challenges or the missile defense capabilities, could you give us some perspective on the cooperation between the Missile Defense Agency (MDA) and the Air Force Space Command, and why it is important to make sure that there are not only cooperation there,

but you have the flexibility to interact in these areas without us creating any artificial barriers?

General KEHLER. Yes, sir.

First of all, let me say that, again the Air Force Space Command's piece of this activity was a piece of a much larger activity that was a joint activity extended into the Missile Defense Agency, et cetera, under the command of the Commander of Strategic Command. And so, first, I think we should feel very gratified that the joint team did what the joint team we know can do when they come together. It also extended elsewhere in the government. Of course, Mr. Large's organization and others were deeply involved, NASA as well. And so this was a very large team of folks that came together to make this happen.

Our piece of this primarily in Air Force Space Command was space surveillance; and the space surveillance network that we operate on behalf of the Nation, when combined with the sensors that the Missile Defense Agency has put out, in combination with other government sensors, proved to be a decisive advantage for us. And so I would offer that the single largest lesson that I took out of this was the value of us being able to use sensors that were created for different missions together, and that is a model that we are going to try to follow as we get to better, and better, and better Space Situational Awareness.

It really is the combined use of all of the sensors together, being able to display the information from the sensors, and make that useable for decision makers that enabled this to happen, and that does not take anything away from anybody on the team who had many, many, many different roles to play. It certainly takes nothing away from the great United States Navy, but it was a large team.

And what I take away from this, in terms of cooperation with Air Force Space Command and Missile Defense Agency, was the use of the sensors, the command and control, and the networking that was done.

Mr. FRANKS. Well, thank you, Madam Chair.

Just one other question, Mr. Large.

Mr. LARGE. Sir.

Mr. FRANKS. Within the constraints of an open meeting here, I am trying to make sure that I couch this question in a way that does not put you in any awkward position at all.

I have several open letters here from Admiral Keating, from others, that delineate some capability that the Space Radar has that are pretty unique and pretty irreplaceable. With that in mind, you know that Congress made some significant cuts in that regard, and we cited, you know, affordability, and program scope, and technological——

Mr. LARGE. Yes, sir.

Mr. FRANKS [continuing]. And a lot of things. So my question to you is, within the limitations of an open session here, can you discuss the measures that you and the Department of Defense have taken toward defining a Space Radar program that effectively balances cost, risk, and performance? I mean, are we on the right track here, given the importance of this system.

Mr. LARGE. Sir, within the constraints of the situation where we are right now, I would say that between both the Department of Defense and the intelligence community, the DNI, I believe we have mapped out what we believe is an alternative approach that addresses, first of all, the Congress's concerns about affordability, scope, timelines, and so on. We are in the process of socializing that certainly between both communities, the IC and the DOD, so that we are prepared to bring that forward to you.

We believe we have a solution set. We are working with the Air Force acquisition piece, the Department of Defense, other acquisition pieces, and the interests of, certainly, the DNI and his acquisition requirements. But I am uncomfortable going beyond that at this point.

Mr. FRANKS. Close enough.

Thanks, all of you, for what you do.

And thank you, Madam Chair.

Ms. TAUSCHER. Thank you, Mr. Franks.

Director Large, can you give us a sense for when the scoping memo that you are talking about may be prepared and when we could actually get access to it? Are we talking 45 days?

Mr. LARGE. I am hoping that within 45 days we will be able to come back to the committee with more details of what the plan is.

Ms. TAUSCHER. Good. We will see you in 46 days.

Mr. LARGE. Yes, ma'am. I will write that down. [Laughter.]

Ms. TAUSCHER. Gentlemen, thank you so much for your service. Thank you for the leadership you provide to the tens of thousands of people that work in your area of responsibility (AOR) and under your command, and the civilians and the contractors, many people, as I said earlier, who are without thanks, who work very anonymously, and do great service to the American people, and certainly advance our cause protecting the warfighter and making sure that we are safe here at home.

We have four votes. It will take us about 45 minutes. So we are going to relieve you of duty, right now. Thank you very much for being here. We expect to see you in a classified session in 45, 46 days or so.

Thank you very much, again, for your service and thank you for appearing before the committee.

[Whereupon, at 3:48 p.m., the subcommittee was adjourned.]

A P P E N D I X

March 5, 2008

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 5, 2008

NOT FOR PUBLICATION
UNTIL RELEASED BY THE
HOUSE ARMED SERVICES
COMMITTEE STRATEGIC
FORCES SUBCOMMITTEE

STATEMENT OF

GENERAL C. ROBERT KEHLER

COMMANDER, AIR FORCE SPACE COMMAND

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

STRATEGIC FORCES SUBCOMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

ON

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Introduction

Madam Chairwoman, Representative Everett and distinguished members of the subcommittee, it is an honor to appear before you today as an Airman and, for the first time, as the Commander of Air Force Space Command (AFSPC).

I am proud and humble to lead and represent over 39,000 Active Duty, Guard and Reserve Airmen; government civilians; and contractors who deliver space and missile capabilities to America and its warfighting commands 24 hours a day, 7 days a week, 365 days a year. We do this as an integral part of the United States Air Force (USAF)--an Air Force which operates in and through air, space, and cyberspace in order to deliver Global Vigilance, Global Reach, and Global Power for America. Assuring the Nation's access to space, protecting our freedom to operate in space, and providing joint warfighting capabilities from space are core Air Force missions.

The men and women of AFSPC serve around the globe. From AFSPC Headquarters, Fourteenth Air Force (14 AF), Twentieth Air Force (20 AF), Space and Missile Systems Center (SMC), Space Innovation and Development Center (SIDC), and a host of deployed and forward locations, our space professionals are organizing, training, equipping, and providing the space capabilities needed to fight and win the Global War on Terror. Today, I can report confidently that the space and missile capabilities acquired with your help and support and delivered by the Airmen of AFSPC to the Commander, United States Strategic Command (USSTRATCOM) are helping to maintain America's freedom, security and prosperity.

Last month, I visited a number of units and commanders in the United States Central Command (USCENTCOM) Area of Responsibility (AOR). At one stop I received a mission briefing from a B-1B Lancer bomber pilot. He reflected that while preparing for the briefing, he came to realize that space capabilities were embedded throughout the planning, execution and debriefing phases of his mission. His bomber crew planned their missions using Intelligence, Surveillance and Reconnaissance (ISR) terrain mapping and weather data from space systems; the aircraft carried Global Positioning System (GPS)-aided Joint Direct Attack Munitions (JDAMs); when they were flying, real-time updates from a variety of space-based and other sources flowed to them over satellite communications (SATCOM) data links; the tanker and bomber crews coordinated air-refueling operations using GPS; and strike assessment was conducted. This pilot also knew that a combination of space, air, and terrestrial assets would immediately come to his assistance if his crew came down in hostile territory. In effect, space assets would take the search out of search and rescue. In the AOR, I saw first-hand how space plays a crucial role in virtually every mission and every operation. Every commander I visited confirmed this assessment.

Space power gives America's joint forces a decisive advantage and has shaped the "American way of warfare." Today, America's joint forces are interconnected, have global cognizance, and can produce swift and precise effects providing overwhelming and decisive results with minimum collateral damage. Our friends and adversaries alike have noted this decisive advantage. As a result, having witnessed or learned the cost of challenging the United States head-on, would-be adversaries are actively pursuing

asymmetric strategies to challenge our advantages in air, space and cyberspace. The evidence is clear and convincing.

During Operation Iraqi Freedom, we experienced GPS jamming and since then we have witnessed a worldwide proliferation of technology that can be used against our space systems. Our space capabilities face a wide range of threats including radio frequency jamming, laser blinding and anti-satellite systems. The emergence of these threats requires a broad range of capabilities, from diplomatic to military, to protect our interest in space.

Our National Space Policy acknowledges that space is vital to our national security. We are not alone in our use of space. Today, 28 foreign militaries operate in space.

We can no longer take freedom of action in any of our warfighting domains for granted. From this point forward, we should expect to be challenged not only in the air, but in and through space and cyberspace as well. We clearly recognize that no future conflict will be won without the ability to achieve air, space, and cyberspace superiority when and where required and we face significant challenges as we look to the future. Therefore, it is crucial that we develop and resource a strategy that protects our space advantages and ensures we remain a world leader in space.

It is my distinct pleasure to define the strategic way forward for AFSPC and to describe for you our plan to conceive, acquire, employ and execute Air Force space and missile capabilities in an increasingly complex, dynamic and challenging global environment. I will present our mission and vision, affirm the guiding principles that

characterize our approach, highlight some of our recent successes and describe how the Fiscal Year 2009 (FY 2009) budget request supports our strategic way ahead.

As always, AFSPC undertakes our important mission with three USAF priorities in mind--win today's fight, take care of our people and prepare for tomorrow's challenges. We look forward to working with your committee and the Congress to achieve our goals.

Mission

Deliver space and missile capabilities to America and its warfighting commands

Our mission is clear. For over 50 years, the Air Force has led the Nation's military space efforts and AFSPC continues that heritage as we deliver space power to USSTRATCOM, Joint Force Commanders around the globe, the Services, the Intelligence Community (IC), civil agencies, commercial entities and Allies.

Vision

America's space leaders...delivering responsive, assured, decisive space power

The USAF provides air, space and cyberspace power as part of a joint warfighting team. As we look to the future, the military space power element must become more responsive to the warfighter, it must remain assured under stressing conditions, it must contribute decisively as an integral piece of the larger whole, and it must be developed and wielded by space professionals who are recognized leaders in both the space domain and in joint warfighting operations.

Guiding Principles

The following principles shape our approach and underpin our mission and vision.

- *The USAF space mission serves joint forces, our Nation and the world at large.* The Nation has entrusted the Air Force and AFSPC with advocating, acquiring, and operating capabilities that are vital to our National security, economic growth, public safety, and welfare. The men and women of AFSPC help defend our homeland and our global interests abroad with space and ground-based missile early warning systems; connect national leaders and the military with secure global satellite communications; assure access to space for military, intelligence, civil and commercial purposes with medium and heavy space lift and range capabilities; keep watch over the space domain by tracking thousands of space objects; provide planners and commanders with critical environmental information; and deliver persistent position, navigation and timing signals to worldwide users from GPS, which provides multiple military benefits as well as a free, international utility. Many of these space systems are also called upon for help in disaster relief and search and rescue operations, at home and abroad. Additionally, our Nation places trust and confidence in AFSPC to secure, maintain, operate and support America's land based strategic deterrent, the Intercontinental Ballistic Missile (ICBM) force.
- *Nuclear forces underwrite our Nation's security.* Nuclear deterrence remains the ultimate backstop of our security by dissuading our opponents and

assuring our Allies through extended deterrence. Our Nation's security relies heavily on the responsive and stabilizing attributes of AFSPC's ICBM force.

- *Space is one of three interdependent USAF warfighting domains.* Air Force operations extend across the mutually-supporting and reciprocally-enabling domains of air, space and cyberspace. Thus, Airmen who are experts in the space domain play a key role in integrating capabilities to create a decisive joint military advantage. Cross-domain integration is the key.
- *Space and ICBM forces are global in their effect.* AFSPC delivers capabilities that transcend national and military boundaries and are intrinsically and simultaneously tactical and strategic, local and global. As a result, the men and women of AFSPC have a global perspective that influences the command and control of our forces and the way we provide and present them to USSTRATCOM. At the same time, we recognize the unique space requirements of U.S. Geographic Combatant Commanders around the world, and know that we must provide Joint Force Commanders with the space capabilities they need to see, know, and decisively act.
- *Like air power, space power shapes the U.S. approach to warfare.* Our increasingly net-centric Joint expeditionary force operates with smaller forward footprints and a greater dependence on reachback organizations. Space capabilities are inextricably embedded in an ever-more effective arsenal of modern weaponry and are threaded throughout the fabric of the Joint warfighting network. Without space, military operations would be far

less precise, focused, timely, coordinated or efficient and much more costly in every respect.

- *Space is a challenging, demanding, and contested domain.* Space acquirers, developers, and operators must be technically astute and tactically competent to ensure mission success in the space domain. While necessary, technical competence alone is not sufficient to meet 21st Century challenges. Today, AFSPC people must be adequately prepared to operate space assets and assure space capabilities in an increasingly contested environment.
- *Airmen are the core of America's space team.* The Airmen and civilian space professionals of AFSPC serve a National mission and our skills and expertise are National assets. Since the beginning of the space age, Airmen have contributed significantly to the National space enterprise. While Airmen are serving the military space mission today in AFSPC, many other Airmen are working elsewhere in the government within national security and civil space organizations. Commercial space companies and the space industry also abound with space professionals who gained training and experience while serving our Air Force.

While these principles shape our views, our sights are set directly on supporting the Air Force commitment to provide forces across the range of military operations to protect U.S. interests and values; to assure Allies; to dissuade and deter potential adversaries; and if deterrence fails, to defeat those who choose to become our enemies. In answering this call, with Congressional support, the space professionals of AFSPC last year delivered space and missile capabilities with great success.

A Year of Successes

AFSPC activities in 2007 supported the Expeditionary Air Force, delivered and demonstrated space and missile capabilities, improved relationships across the space enterprise, and cared for our Airmen and their families. We are also optimistic that we have made progress toward solving our systemic acquisition problems with our back-to-basics approach. Here are several of our key accomplishments.

- We forward-deployed nearly 4,000 Airmen--further developing a strong bond between AFSPC and the Airmen, Soldiers, Sailors and Marines who rely on our capabilities.
- The end of 2007 marked five consecutive years without premature failure of any AFSPC on-orbit system--many of our satellites are lasting years beyond their original predicted life spans and are exceeding expectations every day.
- AFSPC added to our all-time record which now stands at 56 successful National security payload launches in a row--we continued a string of excellence with 19 out of 19 successful operational launches using the Atlas V and Delta IV Evolved Expendable Launch Vehicles (EELVs).
- In November, AFSPC conducted the first operational launch of a Delta IV Heavy EELV which carried the last Defense Support Program (DSP) satellite into orbit.
- Without interruption of services, AFSPC completed the transition of the GPS ground control segment to the new Architecture Evolution Plan (AEP) system--replacing a 20-year-old command and control (C2) architecture with one that enables responsive Position, Navigation and Timing (PNT) services.

- Last year, AFSPC launched Glory Trip-193 to certify the use of the Mk 21 Safety Enhanced Reentry Vehicle (SERV) on the Minuteman III (MM III) ICBM. Additionally, this test demonstrated the capability of our ICBM force.
- AFSPC and the National Reconnaissance Office (NRO) further solidified our operational relationship.
- In addition, AFSPC sustained and expanded use of the Total Force. Last year, at Minot Air Force Base, North Dakota, we stood-up the first-ever Air National Guard unit to support intercontinental ballistic missile field security forces. At Schriever Air Force Base, the AFSPC Reserve Forces are growing with the transition of the 310th Space Group to wing status.
- We privatized nearly 2,500 military family housing residences at Peterson, Schriever, Los Angeles and Vandenberg Air Force Bases. Additionally, 351 AFSPC families moved into newly-privatized units at Buckley Air Force Base.
- Finally, AFSPC experienced one of the safest years in its 25-year history--we lost no Airmen in off-duty accidents. Moreover, AFSPC has had zero major weapons mishaps in over four years, zero major flight mishaps in eight years and zero major space mishaps in over two years.

As proud as we are of our success, AFSPC's strategic way forward is to focus on delivering the space and missile capabilities needed today and tomorrow by balancing recapitalization and modernization investments, implementing organizational and cultural changes and maturing our space professionals.

The Way Ahead

To defend America and provide needed capabilities to the joint team, AFSPC solidified over the last year a deliberate approach to confront the challenges of a dynamic strategic environment. The FY 2009 budget request carefully balances a number of critical priorities.

Maintain perfection as the standard for nuclear operations, maintenance, security and support.

In AFSPC, we are absolutely committed to providing a credible, safe and secure strategic deterrent. At any given moment, about 1,200 of the nearly 10,000 Airmen in 20 AF are on duty in the Nation's MM III ICBM missile fields in Montana, North Dakota, Wyoming, Nebraska and Colorado. These young professionals understand the awesome responsibilities entrusted to them and will never take those responsibilities or the Nation's trust and confidence for granted. This year we will continue to sustain the Minuteman ICBM system as we selectively improve security measures and implement any necessary recommendations resulting from various nuclear reviews.

- *Standards*. We have defined perfection for ourselves through tough standards—which have been tested and proven for five decades. We follow these standards to the letter and focus on structured, intensive training for our maintenance, security, and operations personnel.
- *Minuteman Life Extension*. The FY 2009 budget request continues the Congressionally-approved $6.7B life extension programs that will sustain the MM III to 2020 as we work to identify further investments that may be required

to sustain the MM III force to 2030. In January 2008, we completed deployment of the Guidance Replacement Program (GRP) which replaced some of the 1960s generation electronics in the guidance system. Currently the Propulsion Replacement Program (PRP), which replaces aging motors and propellant as well as environmentally unsafe materials and components, is 82 percent complete. The remaining MM III modification programs (the SERV and the Propulsion System Rocket Engine Life Extension Program (PSRE LEP) upgrade) are still on target for completion by 2012 and 2013 respectively. The SERV program enables the use of the Mk 21 reentry vehicle on MM III missiles, providing USSTRATCOM planners with increased targeting flexibility and enhanced safety. The PSRE LEP is extending the design life of this subsystem by replacing components originally produced in the 1970s.

- *Security Modernization*. AFSPC is also continuing to field robust capabilities funded under the ICBM Security Modernization Program (ISMP). Last year, we completed the installation of concrete headwork barriers at all operational launch facilities (LFs) to ensure the safety and security of our nuclear arsenal. In 2008, we are continuing to improve real-time situational awareness for our security forces through the Remote Visual Assessment (RVA) program. AFSPC is also replacing LF access doors with ones that enable our personnel to more quickly secure the silo hatch in case of a security threat during maintenance operations. In addition, we are also increasing the physical protection of our LFs with better technology and more effective

tactics. AFSPC is also taking additional steps within our budget this year to add security surveillance cameras at our Missile Alert Facilities (MAFs) and to add GPS tracking capability to Payload Transporter (PT) vans.

- *Prompt Global Strike (PGS)*. Looking to the future, the FY 2009 budget request responds to USSTRATCOM's PGS needs by developing and demonstrating critical concepts and technologies for a conventional strike alternative. To increase our deterrence and conventional strike capabilities, AFSPC is investing in research and development of technology for guidance, reentry vehicle and propulsion systems with the ICBM Demonstration/Validation (ICBM DEM/VAL) program and are aligning these initiatives with the results of the recently completed PGS Analysis of Alternatives and with the Congressionally-directed DoD-wide investment account.

Ensure mission success while delivering planned capability improvements.

Joint Force Commanders and the forces they lead rely on the capabilities provided by AFSPC and our operational commitment to deliver those capabilities to them every day can not falter. In addition to this operational commitment, we must also meet our aggressive program commitments to field and sustain leading-edge space capabilities on time and on cost. AFSPC is on final approach to deliver several major new Military SATCOM (MILSATCOM); PNT; and ISR capabilities over the next 18 to 24 months.

- *MILSATCOM*. The demand for satellite communications and bandwidth continues to grow. Aged in many cases beyond their design, Milstar and Defense Satellite Communications System-III (DSCS-III) continue to provide critical communications services for much of the Nation's daily secure and unsecure military and diplomatic activities as we deploy the next generation of advanced MILSATCOM capabilities.
  - The Wideband Global SATCOM (WGS) program provides communications capabilities greater than the entire constellation of DSCS-III satellites and increases coverage, capacity and connectivity for deployed tactical forces. In 2007, AFSPC launched WGS-1 and the Air Force negotiated a partnership with Australia to use the constellation and fund the procurement of a sixth WGS satellite. The FY 2009 budget request funds continued operation of WGS-1, on-orbit checkout and operation of WGS-2, and launch technical support and on-orbit checkout of WGS-3. WGS-4 and WGS-5 are currently in fabrication.
  - Our Advanced Extremely High Frequency (AEHF) program affords strategic and tactical users with secure, survivable anti-jamming and anti-scintillation communications. Each AEHF satellite has about ten times the capacity of Milstar II. The FY 2009 budget request supports the launch and on-orbit checkout of AEHF-1; completion of integration and testing of AEHF-2 for launch in 2009; continued assembly, integration and testing of AEHF-3; contracting of AEHF-4; and work on the Mission Control Segment.

- *Position, Navigation, and Timing (PNT)*. AFSPC is delivering PNT capabilities which are providing critical military benefits as well as a free international utility. Our GPS is the centerpiece of global PNT services and the GPS constellation enables an ever-increasing arsenal of precise munitions from the mainstay JDAM to the Air Force's new Small Diameter Bomb (SDB) and from the Army's Guided Multiple Launch Rocket System (GMLRS) to its Excalibur 155mm artillery round. Airmen in C-130 and C-17 aircraft are resupplying ground combat units in nearly impossible-to-reach places in Afghanistan by using the remarkable Joint Precision Air Drop Systems (JPADS) which have steerable parachutes with GPS guidance.
  - Last year, AFSPC launched two modernized GPS IIR-M satellites configured with new signals for increased anti-spoofing and anti-jamming capabilities for military users and more robust capabilities for civil users. With five of eight GPS IIR-M satellites on-orbit, AFSPC is launching the remaining three in 2008.
  - The follow-on block is GPS IIF which will have an extended design life of 11 years, include additional civil signals for improved accuracy and safety-of-life services and increased power to reduce vulnerability to signal jamming. The ground segment includes a master control station and a worldwide network of dedicated antennas and monitoring stations. The FY 2009 budget request supports launch and support of two GPS IIF satellites and delivery of the final architecture evolution plan.

- In concert with upgrades in the GPS space segment, we are also improving the GPS ground segment. AFSPC launched the last two GPS IIR-Ms using the new Launch, Anomaly Resolution and Disposal Operations (LADO) system; replacing an obsolete command and control system with a more modern and sustainable one.

- *Intelligence, Surveillance and Reconnaissance (ISR)*. Our Nation has relied on Air Force space-based missile warning systems since the early 1970s.
  - AFSPC's Defense Support Program (DSP) provides missile warning, missile defense, battlespace awareness and technical intelligence collection capabilities.
  - The SBIRS program provides missile warning, missile defense, intelligence and battlespace awareness capabilities and will replace DSP. The SBIRS constellation will consist of four Geosynchronous Earth Orbit (GEO) satellites and two Highly Elliptical Orbit (HEO) payloads.
  - The first on-orbit SBIRS-HEO payload continues to exceed expectations in its checkout phase resulting in approval for early use in December 2007 and is on track to reach full operational acceptance in mid-2008. Additionally, HEO-2 has been built. On SBIRS GEO-1, AFSPC is correcting a safety issue in the flight software and is planning a launch in 2009. The FY 2009 budget request for SBIRS funds development, integration and test of GEO-1 and GEO-2 satellites and ground system; funds initial HEO operations; fully funds HEO-3 and GEO-3 procurement; funds HEO-4 advanced procurement; and funds HEO ground system

modifications and upgrades. The HEO-3 and HEO-4 payloads are designated as constellation replenishment assets.

- *Launch, Ranges and Networks*. Delivery of space capabilities begins with a successful launch. Our two space launch ranges at Patrick and Vandenberg Air Force Bases continue to be the lynchpin for America's assured access to space.
  - At our Eastern and Western Ranges, AFSPC supported 23 successful military, civil and commercial launches in 2007. The FY 2009 budget request supports sustainment and modernization of our launch ranges.
  - This year, AFSPC is deploying a new Air Force Satellite Control Network (AFSCN) antenna at Vandenberg Air Force Base which will facilitate over 30 satellite contacts per day. The AFSCN continues to be the Nation's backbone for satellite operations. AFSPC is upgrading antennas with the Remote Tracking Station (RTS) Block Change to ensure command and control of on-orbit capabilities is efficient and more accurate. The FY 2009 budget request funds the operation and gradual modernization of the AFSCN.

Increase space protection capabilities.

The USAF and AFSPC play a key role in defending the Nation's military, intelligence, civil and commercial space capabilities. The Air Force is uniquely charged with mission responsibilities to provide forces to defend United States space capabilities. Our strategy and investment approach balances the need for space

situational awareness, protection of space capabilities and protection of terrestrial forces from threats posed by adversary use of space against our interests.

- We must increase space situational awareness (SSA) while we address operational and physical vulnerabilities in our space, ground and link segments. The challenge is to find an affordable pathway to protect space capabilities that strikes the right balance among awareness, hardening, countermeasures, reconstitution and alternate means.
- The Integrated SSA (ISSA) program provides USSTRATCOM, Joint Functional Component Command for Space (JFCC-SPACE) and the joint community with an integrated source of current and predictive space events, threats and space activities. By employing a near real time, net centric construct, AFSPC is achieving higher accuracy space surveillance through fusion of other SSA elements. Funding from the FY 2009 budget request increases our ability to characterize the space domain by focusing on space event processing and analysis to include high accuracy conjunction assessments and rapid maneuver processing.
- AFSPC is also planning to field ground and space based sensors to improve space surveillance capabilities. The Space Fence program provides the capability to find, fix and track small objects in Low and Medium Earth Orbits (LEO and MEO) using three ground sites. The FY 2009 budget request for this program supports development awards to at least two contractors. Additionally, the Space-Based Space Surveillance (SBSS) program offers the ability to detect and track space objects; primarily those in GEO. With the

FY 2009 budget request, AFSPC is completing development of SBSS Block 10, launching the satellite in FY 2009 and working towards development of SBSS Block 20.

- The Rapid Attack Identification Detection and Reporting System (RAIDRS) Block 10 program detects and geolocates satellite communications interference via fixed and transportable ground systems. In 2007, AFSPC activated the 16th Space Control Squadron at Peterson Air Force Base to operate RAIDRS and we deployed one system to the USCENTCOM Theater to protect over 400 SATCOM links. The FY 2009 budget request continues funding for the RAIDRS Block 20 update which is introducing an automated means to characterize anti-satellite (ASAT) and directed energy attacks on space systems and services.
- Building a comprehensive SSA picture includes a fully collaborative, net-centric space command and control architecture that links JFCC-SPACE to the joint fight. AFSPC improved our Nation's global space C2 infrastructure in 2007 when the 614th Air and Space Operations Center, the core of USSTRATCOM's Joint Space Operations Center (JSpOC) transitioned to an expanded facility at Vandenberg Air Force Base, California. This effort modernized the JSpOC, streamlined operations, and more than doubled its physical size allowing for expanded missions and creating a platform for the future. With the FY 2009 budget request, AFSPC is furthering development of a comprehensive SSA picture via the Space C2 program.

- AFSPC is committed to improving protection of ground, link and space segments. While some of our space capabilities are well protected, AFSPC is taking into account that we will likely face a wider range of threats in the space domain and on the ground through links that control these systems. As we move forward to modernize and recapitalize, the nature of these threats means we are going to engineer space protection into our new systems.
- To help us make informed decisions about how best to preserve space capabilities, AFSPC is establishing the Space Protection Program. This program will focus our efforts and provide decision makers with strategic recommendations on how to best protect our space systems and stay ahead of the threat. We are already strengthening and unifying relationships across the defense and intelligence community.

Attract, develop and retain space professionals.

While AFSPC is developing and wielding remarkable capabilities, the source of our tremendous accomplishments is our space professionals. Our challenge is to continue attracting, developing and retaining Airmen with the skills necessary to maintain our competitive advantage. AFSPC is working with our partners in Air Education and Training Command (AETC), academia and elsewhere, to educate, train and cultivate experts in the space domain who are both technically and tactically competent, and who are skilled in integrating with other warfighting domains.

- Since 1996, the United States Air Force Weapons School (USAFWS) has graduated 180 space instructors from a pool of AFSPC's best and brightest.

Last year, AFSPC and the USAFWS continued their partnership in developing and delivering world-class graduates to expertly employ space and missile capabilities and to instruct the next generation of space operators.

- The tactical mindset is also evolving on the nuclear side. AFSPC is operating a world-class center focused on training nuclear security professionals. To ensure we are providing the most secure nuclear deterrent, 20 AF operates the Nuclear Space Security Tactics Training Center (NSSTTC) at Camp Guernsey, Wyoming. In 2007, this facility trained over 1,700 security forces on nuclear security and expeditionary tactics.
- AFSPC's National Security Space Institute (NSSI) is establishing itself as America's premier campus for superior space professional training and education. Last year, the NSSI taught 71 courses to 1,700 students--a 17 percent increase from 2006. Over 350 of those students were from other Services and for the first time, NSSI instructors taught our Allied partners. In 2008, AFSPC is partnering more closely with Air University (AU) as we look to transition more classes to AU in 2009.
- In 2007, AFSPC competitively selected twenty officer and enlisted space professionals for a fully-funded University of Colorado at Colorado Springs (UCCS) Space Certificate pilot program consisting of five courses focused on space and space systems, engineering management, information and communications systems and space policy. This year, AFSPC is selecting our second class and is using this pilot program as a catalyst for a master's degree.

Sustain AFSPC's enduring missions and mature emerging missions.

To better meet 21st Century challenges, AFSPC will recapitalize its force to sustain enduring space force enhancement capabilities while designing a future force to ensure flexible, responsive capabilities in a contested domain. Fully recognizing we do not currently have a capability to perform maintenance or repairs on orbital assets, we are committed to protect and reinvigorate satellite constellations to provide the level of utility expected by users all over the globe. Additionally, AFSPC will work with appropriate government agencies to explore opportunities for enhanced commercial, Allied and international partnerships.

- *Transformational Satellite Communications System (TSAT).* Since last year, the Joint Requirements Oversight Council (JROC) validated requirements for increased worldwide protected communications capabilities to extend the ground-based Global Information Grid (GIG) to deployed and mobile forces and to support Comm-on-The-Move, the Army's Future Force Initiatives, the Navy's ForceNet, and the Marine's X-Net warfighting visions. AFSPC is pursuing transformational communications capabilities and is studying a future MILSATCOM architecture investment strategy in response to Congressional direction to procure a fourth Advanced Extremely High Frequency (AEHF) satellite. The FY 2009 budget request continues technology maturation and design of TSAT.
- *Global Positioning System III (GPS III).* With GPS III, AFSPC is planning to further enhance military and civilian PNT capabilities by providing higher power, increased anti-jamming capability, and compatibility with European

Galileo signals. By implementing a block approach, AFSPC will use the FY 2009 budget request for GPS III Block A development and preliminary design review, capability insertion for Blocks B and C and risk reduction and concept development of the control segment.

- *Third-Generation Infra-Red Surveillance (3GIRS)*. In addition, AFSPC is planning to continue the critical space-based infrared warning systems into its third generation. With the FY 2009 budget request, we will continue wide field of view sensor testing and technology maturation activities along with development of an integrated test bed.
- *Upgraded Early Warning Radar (UEWR)*. AFSPC is also embracing emerging missions such as missile defense. Last year, our UEWR program achieved several milestones when USSTRATCOM operationally accepted two UEWRs. As a key player in a recent Missile Defense Agency (MDA) flight test, the Beale UEWR and its crew acquired and tracked a flight-test target reentry vehicle launched from Alaska; enabling the successful destruction by an interceptor launched from Vandenberg Air Force Base. The FY 2009 budget request supports sustainment and operation of the Beale and Fylingdales UEWRs.
- *Operationally Responsive Space (ORS)*. Last May, AFSPC successfully teamed with our sister services and interagency partners to stand up the ORS Office. AFSPC is working closely with the ORS Office to develop innovative acquisition approaches and capabilities to prepare the United States to respond to a contested space domain, to better respond to urgent warfighter

needs and to deploy small satellites and associated launch and control systems. AFSPC is continuing to work with the ORS Office to develop ORS as a national strategic capability and to export concepts to the broader Air Force space enterprise. The FY 2009 budget request supports the launch of TacSat-4 and continues the development of the first ORS spacecraft and enabling capabilities.

Improve the strategic acquisition, delivery and sustainment of space capabilities.

In today's world of rapid technological advancement and proliferation, we cannot afford to do business as usual when it comes to delivering space capabilities. We require a new strategy for how we develop, deliver and sustain space systems that is more than an incremental progression of acquisition processes and management methods. Such a strategy requires a paradigm shift with an end-state that deploys needed space capabilities more quickly than in the past while still executing efficient, business-like acquisition practices.

- To effect organizational and cultural changes, AFSPC is reviewing and adjusting our organization construct and processes. At the beginning of 2008, we reorganized Headquarters AFSPC activities, functions and relationships to enhance our ability to act as a single, integrated organization.
- Our next step is fostering external relationships. AFSPC is clearly articulating our needs for science and technology, research and development, acquisition, sustainment and training to Air Force Materiel Command (AFMC) and AETC. We are also intensifying collaboration with Air Combat Command

(ACC), including the USAF Warfare Center (USAFWC). Furthermore, AFSPC is supporting other major commands with space expertise and analysis.

- We are also working on proper alignment of development, acquisition and sustainment activities. We continue to build a more powerful and effective partnership with AFMC and SMC through better definition of roles, responsibilities and authorities.
- Finally, we have chartered a special study group to examine alternative acquisition strategies and recommend ways to shorten the time it takes to put space capabilities in the hands of the warfighter.

Improve integration across the air, space, and cyberspace domains.

Integration across air, space and cyberspace is more than combining and disseminating data among interrelated architectures. If air, space and cyberspace power each have a value of one, the sum of these capabilities is far greater than three. AFSPC is working with the other Air Force major commands and domain experts to develop shared strategic plans, operational concepts and architectures, doctrine, as well as tactics, techniques and procedures for the next conflict—one where emerging technologies in air, space and cyberspace domains can be leveraged and mutually supported within a joint construct.

- AFSPC is teaming extensively with the USAFWC and USSTRATCOM to increase space scenarios across the full spectrum of exercises. In March 2007, AFSPC conducted the most comprehensive space wargame to date

with 470 participants, including 74 flag officers or equivalents and 38 Allied partners. This wargame focused on the future and explored global space system architectures, technologies and C2 relationships; tackled concepts for integrating space with other warfighting domains; and examined potential policy trends and their implications. We look forward to the next game in 2009.

Conclusion

The Total Force AFSPC team plays an important role in delivering space and missile capabilities to America and its warfighting commands. These capabilities provide a decisive advantage for our national security and prosperity. With the continued support of the Congress, AFSPC is postured to continue to maintain a crucial leadership role as we realize our vision of *delivering responsive, assured and decisive space power.*

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE HOUSE ARMED SERVICES COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

SUBCOMMITTEE ON STRATEGIC FORCES

SUBJECT: NATIONAL SECURITY SPACE POSTURE

STATEMENT OF: MR. GARY E. PAYTON

DEPUTY UNDER SECRETARY OF THE AIR FORCE FOR

SPACE PROGRAMS

March 5, 2008

NOT FOR PUBLICATION UNTIL RELEASED
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UNITED STATES HOUSE OF REPRESENTATIVES

INTRODUCTION

It is an honor to appear before this Committee as the Deputy Under Secretary of the Air Force for Space Programs, to discuss with you our National Security Space activities. I support the Secretary of the Air Force with his responsibilities as the Service Acquisition Executive for Space Programs and the Department of Defense (DoD) Executive Agent for Space, where his role is to "develop, coordinate, and integrate plans and programs for space systems and the acquisition of DoD space Major Defense Acquisition Programs to provide operational space force capabilities to ensure the United States has the space power to achieve its national security objectives."

The U.S. relies upon space capabilities not only to meet the needs of Joint military operations worldwide, but to underpin our nation's diplomatic, informational, and economic strengths as well. Because of this, it is important to ensure that our National Security Space (NSS) systems and our space professionals are integrated across our peacetime and wartime operations--providing robust and responsive space capabilities around the globe--particularly in Iraq and Afghanistan.

Americans also rely on the access and use of space capabilities in many areas of everyday life. Whether using satellites for navigation, communications, or the forecasting of severe weather, America increasingly depends on its space systems. To ensure the availability of these systems, the National Security Space community continues to program, and provide, for continuity in key mission areas, while simultaneously working to modernize and recapitalize our aging satellite constellations and supporting infrastructure.

At the same time, the global rate of change for technology and the number of nations directly engaged in space continues to increase. As a result, the ability of an adversary to contest our space capabilities is growing. In such an environment, we must improve our space situational awareness (SSA)--enabling a better understanding of objects and their activities in space.

We must ensure mission continuity in several key space capabilities, such as: Strategic Communications; Missile Warning; Launch; and Positioning, Navigation, and Timing (i.e., the Global Positioning System or GPS), while pursuing increased Space Protection. Over approximately a two year period, beginning with the Wideband Global SATCOM (WGS) launch in October 2007, we will deliver five "first of" satellites. These include: WGS; Advanced Extremely High Frequency (AEHF); Space Based Space Surveillance (SBSS); GPS IIF; and Space Based Infrared System (SBIRS) geosynchronous earth orbit (GEO) satellites.

Always seeking ways to improve, we look forward to the recommendations of the Congressionally directed Independent Review and Assessment of DoD Organization and Management for National Security in Space. In the interim, I offer that the Secretary of the Air Force should remain the DoD Executive Agent for Space, and that this position has been critical in aligning space efforts across the DoD and other government agencies.

BACK TO BASICS IN SPACE ACQUISITION

We continue to institutionalize our "Back to Basics" acquisition philosophy, which emphasizes increased discipline in the development and stabilization of requirements, resources, engineering practices, and management. It also promotes a more deliberate

acquisition planning strategy, firmly focused on mission success and delivering on our commitments.

Our acquisition philosophy can be viewed as a continuous process with five distinct but interdependent stages. The first stage is Science and Technology (S&T), where we conduct basic research and explore the possibilities of new technologies. In the second stage, Technology Development, we mature technologies into proven components and subsystems exploiting discoveries made in the S&T stage. The third stage is Systems Development. Here, we take the most promising technologies and mature them to higher technical and manufacturing readiness levels as part of integrated systems which can be produced in operational platforms in the fourth stage, System Production. Thus, technology is matured through the first three stages. We are emphasizing early technology development to ensure mature component technology is available for our production systems. Entering the system production phase with mature technology reduces cost, schedule, and performance risk. This allows confidence in predicting which new capabilities can be delivered when. The fifth stage is Sustainment, where the goal is increasing systems availability while reducing Operations and Support costs. Integration of acquisition and sustainment early in life-cycle development is key to achieving these goals.

A block approach acquisition strategy delivers systems through discrete, value-added increments which reduces production risk, delivers incremental capabilities to the warfighter sooner, and maintains continuity of service. This concept is consistent with current policy specifying "evolutionary acquisition as the preferred strategy" for DoD acquisitions. Specific capability increments are based on a balance of warfighter needs,

delivery timeline, technology maturity, and budget. Well-defined increments help reduce many of the potential instabilities in requirements, budget, and workforce. An overarching goal is increased confidence, both in terms of cost and schedule, for our space acquisition programs. Therefore, I ask for your continued support, not only for the current generation of satellites and supporting technologies, but for the next generation technology development and the generation after next science and technology, to ensure that we are able to continue this block approach strategy.

UPDATE ON SPACE

Today, I would like to briefly discuss some of the achievements we have had over the last year and some of our National Security Space initiatives.

LAUNCH

Over the past year, we launched the last Defense Support Program satellite, our first Wideband Global SATCOM satellite, two additional GPS IIR-M satellites and extended our string of consecutive, successful National Security Space launches.

The December 10, 2007 launch of a National Reconnaissance Office (NRO) satellite marked the 56th consecutive, successful launch of a National Security Space Medium or Heavy payload--extending an incredible record. This unprecedented string of launch successes, which started in 1999, is a testament to the knowledge, skill, and commitment of our space professionals--particularly in the areas of Mission Assurance and attention to detail.

MISSILE WARNING

Our nation continues to rely on space-based missile warning--and for over 35 years, our legacy space-based sensors, in conjunction with ground-based radars, have

done an excellent job of meeting the nation's missile warning needs. On November 11, 2007, the 23rd, and final, Defense Support Program satellite (DSP-23) was successfully launched. This legacy constellation, however, continues to age, while threats such as the proliferation of theater ballistic missiles (TBMs) and advanced technologies continue to grow. These threats are driving the need for the increased coverage and resolution that will come with the Space Based Infrared System (SBIRS).

SBIRS supports four mission areas: missile warning, missile defense, technical intelligence, and battlespace awareness, and will be comprised of both geosynchronous earth orbit (GEO) satellites and highly elliptical orbit (HEO) payloads. The first HEO payload was launched in 2006, and its on-orbit performance is exceeding expectations. Launches of the first SBIRS GEO satellite and the second HEO payload are both scheduled in fiscal year (FY) 2009.

Our funding request supports the procurement of three GEO spacecraft, two additional HEO payloads, plus the necessary ground elements. We continue to work with our industry partners to resolve challenges on the SBIRS GEO-1 spacecraft, specifically with respect to the Flight Software Subsystem, to ensure the successful launch of this critical capability. Our budget request also funds the Third Generation Infrared System program to develop Wide Field-of-View (WFOV) technologies. This is the technology development necessary reduce cost, schedule, and performance risks for the next generation of missile warning satellites.

COMMUNICATIONS

Satellite Communications (SATCOM) is another critical space capability for which we must ensure mission continuity. The U.S. military is a highly mobile and dispersed

force that relies heavily on wideband, protected, and narrowband satellite communications for command, control, and coordination of forces. SATCOM also enables forces to receive real-time images and video of battlefield and targets, thereby accelerating decision-making from the strategic to the tactical levels. These images and video often come from Unmanned Aerial Vehicles (UAVs) controlled via SATCOM links, allowing the UAVs to fly far beyond the line of sight and to collect information without endangering U.S. forces.

On October 11, 2007 we successfully launched the first Wideband Global SATCOM (WGS) satellite as part of the Department's constellation of wideband satellites, significantly increasing the on-orbit capacity--a single WGS satellite has greater capacity than the entire legacy Defense Satellite Communications System (DSCS) III constellation. This success represents the first step in the Department's transition from its aging DSCS satellites to an increased capability for the effective command and control of U.S. forces around the globe. The Department also signed a Memorandum of Understanding with the Department of Defence of Australia on November 14, 2007, forming a partnership for the production, operation, and support of the WGS constellation. Our funding request supports the launch and on-orbit check out for two WGS satellites in FY 2009.

In the protected SATCOM portfolio, this year we are scheduled to launch the first Advanced Extremely High Frequency (AEHF) system--the follow-on to the Department's current Milstar satellites. This initial AEHF launch will complete the worldwide Medium Data Rate (MDR) ring, increasing the data-rate for these low probability of intercept/detection and anti-jam communications from tens-of-kilobytes per second to

approximately a megabyte per second. Our funding request supports the procurement of four AEHF satellites.

The next generation of SATCOM satellites, the Transformational Satellite Communications System (TSAT), will support both wideband and protected requirements. We are continuing with TSAT technology development and risk reduction efforts, and this past year we completed the Systems Design Review (SDR). In 2007, an independent Technology Readiness Assessment determined the program is prepared to enter the next phase of development. With the addition of the fourth AEHF satellite, the Department is currently conducting a MILSATCOM investment review to ensure the program's overall affordability and synchronization with user platforms.

POSITIONING, NAVIGATION AND TIMING

The U.S. Global Positioning System (GPS) continues to be the world standard for positioning, navigation, and timing (PNT). As a result, GPS has been incorporated into military, commercial, and civilian applications, to include navigation, agriculture, banking, cartography, telecommunications, and transportation. Last year the GPS Program Office seamlessly implemented the Architecture Evolution Plan (AEP) upgrade to the existing GPS Operational Control System (OCS). This upgrade increased sustainability and provided the ability to control the new GPS IIF satellites. Perhaps most notably, these upgrades were implemented with no impact to day-to-day operations and did not require any modifications to existing user equipment.

Later this year, there are three GPS IIR-M launches scheduled and we will begin to launch the next generation, GPS IIF, satellites in FY 2009. These satellites, along with their ground control system and associated user equipment, continue to ensure

constellation sustainment, increase the number of on-orbit M-code capable satellites, and introduce the "L5" civil signal. At the same time, the Air Force is developing the next generation of PNT satellites through the GPS III program.

GPS III will offer significant improvements in navigation capabilities by improving interoperability and jam resistance. The procurement of the GPS III system is planned for multiple blocks, with the GPS IIIA portion currently underway. GPS IIIA includes all of the GPS IIF capability plus up to a ten-fold increase in signal power, a new civil signal compatible with the European Union's Galileo system, and a new spacecraft bus that will allow a growth path to future blocks. As for the development of the ground infrastructure, we recently awarded two contracts for the System Definition and Risk Reduction phase for the associated ground segment, OCX. These two OCX contracts will each deliver prototypes and lead to a competitive selection of a single contractor in late FY09.

SPACE SITUATIONAL AWARENESS

Mission continuity is critical for persistent space based PNT, intelligence, surveillance and reconnaissance, strategic communications, and global environmental monitoring. As nations, and non-nation state actors, demonstrate both the capability and will to disrupt our space operations, we risk losing that continuity. Anti-jam SATCOM technologies, higher power GPS M-Code navigation signals, radiation hardened technology, on-orbit reconstitution, and dispersed ground segments are all part of our improved space survivability. We must also account for the possibility that new capabilities to deny, damage, or destroy our on-orbit assets will be arrayed against us. We are expanding our Space Situational Awareness (SSA) to provide the ability to

fully characterize and understand these new threats as they mature, as well as clearly discriminate between a hostile act and a naturally occurring event. In parallel, we are developing the organizational, operational, and technical enablers that will allow us to react swiftly and decisively when these threats materialize.

New systems that will contribute to SSA include the Rapid Attack Identification Detection and Reporting System (RAIDRS) program, the Space Fence, Space Based Space Surveillance (SBSS), and the Integrated Space Situational Awareness (ISSA) program.

RAIDRS develops ground based systems that rapidly detect, locate, characterize, identify, and report interference with DoD-owned and DoD-used space assets, and it is being developed via a block approach. In the next year, Block 10 will provide initial capabilities that detect and geo-locate satellite communication interference via fixed and mobile ground systems. Future development of the Block 20 system will provide automated data access/analysis, data fusion, and detection support capabilities.

The Space Fence is planned to replace the aging Air Force Space Surveillance System (AFSSS) with a higher radio frequency system to detect and track smaller sized space objects, and provide worldwide coverage for the first time. It expands the terrestrial based detection and tracking capability, supporting Space Situational Awareness while working in concert with other networked sensors.

The SBSS program is planned to deliver optical sensing satellites to search, detect, and track objects in earth orbit--particularly those in geosynchronous orbit--building upon the success of the Space-Based Visible (SBV) technology demonstration.

Surveillance from space will augment our ground sensors, and the initial SBSS Block 10 will replace the aging SBV sensor in 2009.

To combine all of the various inputs and provide a single picture for decision makers, we are also pursuing the Integrated Space Situational Awareness (ISSA) program. When delivered, ISSA will have the capability to acquire, process, integrate, and fuse SSA data to create the awareness we need, with an ability to attribute actions. Currently, our operators and warfighters must assemble an understanding of the global space picture from many disparate sources, including telephone calls, classified chat rooms, intelligence web sites, and imagery feeds. We have acknowledged this shortcoming and have initiated programs to bring data together, filter it for relevance, and aid the commander in making a timely decision that could attribute an attack or malfunction, preserve health of a constellation, or re-task sensors to track a new launch. The cornerstone program for this is the Integrated Space Situational Awareness (ISSA) program, which will interact with the space command and control (C2) system to provide automated decision tools supporting decision making on a timescale appropriate for today's and tomorrow's challenges in space. The space operating environment is becoming increasingly complex; we need to equip our Nation's space operators with the tools necessary to characterize space activities and accurately attribute actions.

OPERATIONALLY RESPONSIVE SPACE

Another key initiative is Operationally Responsive Space (ORS), and I thank you for your continuing support for this program. On May 21, 2007, the Operationally Responsive Space Office was stood up at Kirtland AFB, New Mexico, to develop, acquire, and deploy a tiered capability consisting of responsive spacecraft, launch

vehicles, and ground equipment. The ORS Office is a jointly manned entity that reports to the DoD Executive Agent for Space, and will have representation from the defense, intelligence, civil, and international communities--to include Air Force, Army, Navy, and Marines, personnel from NASA, NSA, NRO, and Sandia National Laboratory--and we are pursuing allied partner representatives. Many other organizations, while not providing direct staff in the office, are planning to establish liaison relationships with the ORS Office to ensure synergy and close coordination.

Through a series of TacSat operational experiments, we are exploring affordable and responsive launch, checkout, and theater integration of space systems to better support the needs of the Combatant Commanders. TacSat experiments will test concepts such as common interfaces, subsystems, new payloads, and new concepts of operations. The 2009 request for the ORS program element funds the TacSat-4 launch and development of TacSat-5, a plug and play spacecraft bus. Additionally, responding to urgent warfighter requirements, vetted by US Strategic Command, the ORS office is initiating communications and SSA programs in 2008 and 2009.

WORKFORCE

Our DoD space professional workforce includes our military Active, Reserve, and Guard components, and our civil service personnel. We are currently coordinating a new DoD Directive that will clearly outline responsibilities within the Office of the Secretary of Defense (OSD) and the Services for the education, training, and management of these critical space professionals.

Looking beyond the DoD, a healthy space industrial base is one of our top priorities. The Space Industrial Base Council (SIBC) which is co-chaired by Secretary

Wynne, as the DoD Executive Agent for Space, with the Director of the NRO, Mr. Scott Large, brings together stakeholders from across government and industry to coordinate actions on critical space industrial base issues. The SIBC has taken a quantitative look at the health of U.S. companies and how they are balancing competitiveness and security concerns. We are all committed to protecting sensitive space technology while allowing our companies to compete internationally. We will continue to strengthen our understanding of the U.S. space industrial base to ensure that it remains viable in the future--we cannot afford to lose this national capability.

I would also like to thank the Committee for its support of the National Defense Education Program (NDEP), which supports scholarships in Math, Science, Engineering, and Foreign Language, with a focus on critical skills for clearable people. The NDEP began in FY06 with $10M, and is funded at $44M in FY08. The Department is requesting $69M for this program in FY09, and I solicit your continued support to ensure we can continue to attract and retain these professionals.

CONCLUSION

We must ensure continuity of service for critical missions such as Missile Warning, Strategic Communications, Launch, and Positioning, Navigation and Timing; while improving our Space Situational Awareness. Our strategy over the recent years is showing promising results, as we continue toward securing the world's best space capabilities today and ensuring the same for our Nation's future generations.

Our Nation prefers to deter or dissuade potential adversaries, and space systems are critical to this strategy. When deterrence and dissuasion are not adequate, we too often must employ our military--and our space systems are even

more critical then. Fortunately, our systems are the envy of the world. Our infrared surveillance satellites are able to detect missile launches anywhere in the world. Our strategic communications systems allow the President precise and assured control over our nuclear forces in any stage of conflict, and our wideband SATCOM systems rapidly transmit critical information between the continental U.S. to our front line forces. Our weather satellites allow us to accurately predict future conditions half a world away as well as in space, while our GPS constellation enables position knowledge down to centimeters and timing down to nanoseconds. These sophisticated systems make each deployed Soldier, Sailor, Marine, and Airman safer, and more capable.

The space constellations that deliver these capabilities are a critical asymmetric advantage. We must ensure the recapitalization and health of these constellations. While these systems are expensive, not having these space capabilities could be even more expensive, both in terms of lives lost and our national defense.

I look forward to continuing to work with this Committee and thank you for your continued support of National Security Space.

Statement for the Record

Mr. Scott Large

Director, National Reconnaissance Office

Before the House Armed Services Committee

Subcommittee on Strategic Forces Joint Hearing:

Fiscal Defense Authorization Act Budget Request and

Status for Space Activities

5 March 2008

Introduction

Good afternoon, Madame Chairman and Distinguished Members. Thank you for the opportunity to discuss the National Reconnaissance Office (NRO) plans and accomplishments. It gives me great pleasure to join two of our mission partners, the Honorable Gary Payton, Deputy Under Secretary of the Air Force and General Robert Kehler, Commander, Air Force Space Command. The NRO's close relationship with our mission partners is central to our Nation's commanding lead in space. We are all fully aware other countries are striving to challenge our space advantage or render our systems vulnerable. It is this knowledge that provides the sense of urgency, fueling our initiative as a team, to seek ways to smartly develop and protect our space systems. To do this, the NRO must foster these close and continuing partnerships, not just with my colleagues here today, but with virtually every U.S. Government entity with significant investment, or reliance on space capabilities. Unfortunately, the unclassified nature of today's hearing precludes me from talking about some of our greatest successes; however, I welcome the opportunity to meet in another setting to help you fully understand the breadth and depth of our capabilities, partnerships, and the value of space-based architectures.

Today I will describe a few recent developments and steps we are taking as an integrated space community to protect

today's systems. Most importantly, I will discuss the tremendous military and civil space community alliance and the expertise and extensive capabilities they provide warfighters. Today, we provide unprecedented levels of support never imagined when the NRO was created in 1962. When the NRO was formed, our primary role was strategic intelligence. The latency inherent to those systems did not provide the tactical intelligence our warfighters need today. This emphasized the need to develop a means to rapidly deliver information and the requisite training and doctrine for their use. Today, in addition to the traditional roles of these systems, NRO systems are used extensively to support the warfighter. In many ways, integration into our mission partner plans and strategies is nearly seamless. The idea that our Nation might have to go to war without our national systems is an alarming prospect and one reason why we are so committed to our close partnerships.

SUPPORT TO WARFIGHTER

The first topic I want to touch upon is support to the warfighter, a critical mission for the NRO. This past year, NRO systems provided critical mission support to warfighters across the globe. With an expanding arsenal of sensing capabilities, multi-intelligence fusion methods, and a commitment to collaboration across communities, NRO systems and secure

networks have ensured the timely delivery of accurate, insightful, life-saving intelligence to our nation's defenders.

Tremendous innovations resulted from the integration of the NRO with other elements of the Department of Defense (DoD) and the IC. The NRO has facilitated great improvements to the quality and timeliness of information and the IC's ability to deliver actionable intelligence to the warfighter. During 2007, the NRO implemented a new enterprise-wide information sharing management process. This new process not only improved communication to users in theater, but also improved the efficiency of system tasking, reducing demand on other national systems. Two information sharing tools are now in use by troops as a direct result of the new management process.

The first of these information sharing tools developed by the NRO, the Analyst Support Architecture (ASA), is a multi-intelligence correlation, display and analysis software tool designed to allow rapid integration of multi-source data into a scalable collaborative analysis environment. The ASA revolutionized the way DoD and IC analysts collaborate, share data, and see a common operating picture. It provides a correlated operational picture for the analyst to validate new and unusual activity. The ASA-detected events are displayed both graphically, textually and conveyed in the context of the

organization being monitored. In addition, the system contains numerous interactive tools which allow ad-hoc manipulation of the data to support user-driven analysis activities. The ASA system is currently being used aboard the U.S.S. Boxer and U.S.S. Nimitz. The Navy has praised the tool, citing improved efficiency and increased situational awareness since implementation. The Air Force is also actively using ASA in the National Air and Space Intelligence Center (NASIC) Operational Watch Center. Analysts at NASIC pass relevant information to tactical users in-theater. The success of ASA resulted in the Air Force decision to add ASA to its Electronic Systems Center (ESC) at Hanscom Air Force Base in Massachusetts.

The second information sharing tool also developed by the NRO, the Threat Human Intelligence Reporting Evaluation Analysis and Display System (THREADS), is a multi-intelligence analytical tool that builds on human intelligence reports. THREADS takes individual human intelligence reports and autonomously searches correlating databases of NRO system data to find coincident information, allowing analysts to build case files and make judgments in support of operations. Forward-deployed units have successfully used THREADS to piece together information leading to the capture or death of enemy forces in Iraq and Afghanistan. The Air Force has also requested THREADS for use at the ESC.

We continue to work closely with our mission partners to address challenges elevated by the changing threat landscape. Specifically, the NRO has coordinated with multiple agencies to help ensure warfighters have access to a broad spectrum of intelligence to support forces overseas. This collaboration has resulted in focused, meaningful intelligence for decision makers, analysts, and others in harms way.

We've also made critical information technology investments to significantly decrease the time required to activate current and future cross-community networks. This new cross-cutting communications service provides a cost-effective solution for implementing current and future communications requirements for the NRO and IC partners. Perhaps one of the biggest lessons our nation learned from the tragedy of 9/11 is the need for communication across services and communities. Major efforts have been underway to accelerate information sharing, not just to the DoD, but across all our users. The NRO is playing a pivotal role in enabling information sharing between government and military organizations. This year, the NRO broke new ground to provide non-traditional intelligence users with capabilities to access national data. Similarly, the NRO has provided solutions for the Secret Service and National Guard Bureau to satisfy unmet information requirements. The NRO's efforts to enable information sharing are making it possible for Government

agencies and military organizations to work together as they protect our Nation.

SPACE PROTECTION

Threats to our space systems are growing. This requires a new way of thinking and a new way of addressing the challenges facing our community. It also requires we realize the threat exists end-to-end and any protection approach must take this into account. One significant step in space protection is the key role the NRO is taking, in concert with U.S. Strategic Command (USSTRATCOM) and Air Force Space Command, in laying the foundation for defensive space capabilities. Such capabilities, while vital to our survival, have also helped establish a framework for further cooperation. For example, as a result of operating as an integrated space community, the National Reconnaissance Operations Center now also serves as a back-up facility for elements of USSTRATCOM's Joint Space Operations Center. This allows us to share the wealth of space situational awareness information we collect across multiple domains and provide a back-up capability with little additional cost.

The complete protection picture also requires we take a careful look at the vulnerabilities on the ground as well as those in space; these vulnerabilities take many forms. As the NRO plays an increasingly visible role in the defense of our

Nation, we can also expect to increasingly become a target as well. The NRO is committed to protecting the information and assets that help us maintain our Nation's freedom and security.

REVOLUTIONIZING SPACE - ON THE GROUND

The NRO's satellites provide critical support to policymakers, analysts, and front-line warfighters in the global war on terror. We are working to maintain these systems that have served us faithfully, many serving more than 25 years, as we proceed with acquisition of new, technologically advanced systems that can respond to evolving threats, and ensure the success of the United States against future adversaries.

Before we can operate satellites that deliver critical support to the warfighter, we must design, develop, and procure those systems. Once procured, we must then launch, operate, and maintain each satellite to ensure accurate, timely, relevant intelligence is available to users when, where, and how they need it.

In April 2006, the seeds of change were planted with the publication of the NRO's Strategic Framework. The NRO recognized the challenges it faced and acknowledged the need to have better integration with our mission partners and customers, and a need to better emphasize the role of our ground systems.

The Strategic Framework defined two key goals for the NRO: *Be the Foundation for Global Situational Awareness*, and *Deliver Information to Users on Timelines Important to Their Needs*. While the NRO recognized the need to move in this direction, we were not organizationally aligned to do so at the time. Therefore, as part of the transformation process, I am implementing a transformation of the NRO's structure. This is perhaps the most fundamental transformation ever undertaken by the NRO. It requires focused discipline and diligence to succeed, but I am convinced the risk of not doing so is even greater. This transformation involves significant managerial and organizational changes. It will facilitate a common mission management, establish a common services layer across our ground enterprise, consolidate operations, continue our focus on space system acquisition excellence, and create an enterprise-wide system engineering acquisition structure. This new framework will allow us to better manage our acquisitions and develop and operate our systems as a single, integrated architecture focused on sensor-agnostic solutions to intelligence problems. This, in turn, will help us use our systems more effectively to deliver value-added information where, and when it is needed most.

This transformation has already begun to change our organizational, personnel, and business processes. In turn, these new processes are creating a better, more responsive organization; one that is meeting the challenges we face now,

and into the future. The NRO's restructuring efforts are designed to make the best use of limited resources in the face of evolving threats. We are rebuilding our architecture with more integrated intelligence solutions in mind. Instead of the traditional INT-centric approach, the NRO is working to create a fundamentally integrated architecture that will bring together the data from all sensors in ways that will refine products, streamline delivery, and create more value added content to improve the entire process for analysts and warfighters alike.

INTEGRATED GROUND

The NRO builds complete satellite systems, but an often under-appreciated aspect of this is the importance of the ground portion of these systems. Many of our newest capabilities are ground-based. Through ongoing algorithm development and processing improvements, we are providing quick-turnaround solutions to urgent user needs. This makes it clear that our most flexible "system" is not in space, but on the ground. Therefore, the key is to build a functional flexibility on our satellites which enables us to be operationally responsive on the ground. Responsive ground-based solutions are critical to the continued success of NRO systems against our Nation's most daunting adversaries.

Recognizing the importance of the ground element to the entire NRO system architecture, one significant and foundational step in response to the strategic framework, has been the stand-up of the Ground Enterprise Directorate (GED). The GED is responsible for delivering a ground architecture integrated across the organization based on a multi-intelligence, ground system-of-systems that can provide near real-time responsiveness to pressing intelligence problems. By standing up the GED, we are taking the first vital step to ensure effective, flexible, seamless solutions to our customers needs across the IC, and to ensure that we have processes and systems that enable common tasking, timely cross-cueing, and a synergy that allows for immediate response.

MULTI-Intelligence FUSION

One of the many ground-based initiatives currently underway, with greatest impact on our customers, is multi-intelligence fusion. This involves combining multiple sources of data from various collectors to develop new products yielding intelligence few sources could provide on their own. Recent activities have focused on efforts with both the National Security Agency and the National Geospatial-Intelligence Agency (NGA) to combine geospatial products with other intelligence sources to create fused products for users. These products are generated using automated computer processing and information

integration techniques, accessed via a user-friendly interface. This valuable capability significantly improves analysts' ability to accurately describe and assess areas of interest. For example, the combination of geospatial intelligence and signals intelligence has resulted in a comprehensive, integrated product of particular value when applied to border protection and Maritime Domain Awareness (MDA).

The NRO is currently working closely with the U.S. Navy and the Department of Homeland Security to find effective ways to assist them with border security. In seeking to address this challenge, many technologies, processes and procedures have been applied that combine several sources of intelligence to track sea-going vessels. Each of these intelligence sources provides information useful for tracking commercial vessels. Ship itineraries, port arrival and departure information available from open sources are combined with Signals Intelligence and Geospatial Intelligence data to yield visually detectable locations and identifiable features of the vessels.

Alongside our mission partners, the NRO has helped lead the way in demonstrating how multiple sources of data brought into a multi-intelligence domain yield far more intelligence. Large quantities of positional data on ship locations, traffic patterns and activity within certain areas of interest may

provide a few data points on a screen, but when fused with imagery and signals intelligence, analysts can quickly and easily determine false data sets and provide added-value to products more typically derived from single intelligence sources. Simply put, fusing multiple types of traditional data in non-traditional ways can exponentially increase the value of the intelligence the user receives.

In addition to our multi-intelligence capabilities supporting MDA, the NRO is providing operational support to Lt. General Metz at the Joint Improvised Explosive Device Defeat Organization. We have established a functional team within the NRO, dedicated to providing our warfighters with a number of multi-intelligence capabilities focused on detecting and tracking our enemies engaging in developing and deploying these lethal devices. To date, we have made notable progress addressing this challenge.

RESEARCH AND DEVELOPMENT COLLABORATION

The NRO operates as part of a larger research and development (R&D) community, working with mission partners, members of the DoD, and the IC to determine the best path forward for our national reconnaissance and broader ISR efforts. This community is not limited to a small group of scientists. As intelligence problems grow and as new threats emerge, we are

committing to work even more closely as a community to harness our great innovative capabilities to overcome challenges together.

In an effort to combine our broad intellectual assets to solve these difficult problems, in fiscal year 2007 (FY 07) and FY 08 the NRO played a key role in providing services to facilitate collaboration across several international R&D organizations.

Perhaps the most significant achievement in 2007 was the instantiation of the Virtual Laboratory (VL) network. The VL, a shared communication network, is the first of its kind, and has quickly become the primary collaboration tool for international R&D initiatives. The objectives of R&D organizations using the VL include demonstrating the technologies and techniques necessary to support federated exploitation in a collaborative environment. Currently, over 20 active classified R&D projects between two or more of the partners are being worked over the VL. Since its inception, the VL has been under NGA management as an R&D project.

This year the NRO has accepted NGA's request, supported by the VL partners, to assume the executive agent management and oversight role for the VL transport segments and network

security, certification and accreditation functions. In this role, the NRO is now responsible for providing leadership and technical support across many R&D organizations to facilitate the exchange of new technology information. By upgrading the VL into a professionally run network designed with future growth in mind, the NRO has put into place the foundational infrastructure for present and future international R&D collaboration.

CONCLUSION

While I am confident the NRO is headed in the right direction to meet the needs of the warfighter and the IC, there will always be new challenges that require our vigilant attention. I will continue to work these areas aggressively during my tenure as Director of the National Reconnaissance Office.

I appreciate the continued strong support of Congress, and this Committee. This support is vital to our continued delivery of critical capabilities today, and meeting the warfighter needs of tomorrow. I look forward to working with you as we continue to develop, produce, launch, and operate critical space systems and ground systems vital to our Nation's warfighters and the intelligence community.

Scott F. Large

QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

MARCH 5, 2008

QUESTIONS SUBMITTED BY MS. TAUSCHER

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, how would you describe the rationale for the February 20th intercept of the failed U.S. satellite?

Secretary PAYTON and General KEHLER. The President directed the satellite intercept to mitigate risk to human life from the 1,000 pounds of toxic hydrazine fuel onboard the non-controllable U.S. satellite that was about to reenter the Earth's atmosphere. In a controlled satellite reentry, risk is managed by causing the reentry to occur over the ocean or sparsely populated areas. This satellite was non-functional and unable to be commanded or controlled, making it impossible to predict the exact time or location of satellite reentry/impact.

Modeling and analysis gave high confidence that the intercept would be successful. The time, location and geometry of the intercept were carefully chosen to maximize the success of fragmenting the hydrazine fuel tank, minimize the risk of reentering debris hitting populated areas, and to minimize the risk of debris to other space objects.

Ms. TAUSCHER. Mr. Payton and General Kehler, Please describe Air Force Space Command's role in the February 20, 2008 satellite intercept.

Secretary PAYTON and General KEHLER. Air Force Space Command (AFSPC) operators provided high quality space surveillance and space situational awareness (SSA) information to USSTRATCOM via the Joint Functional Component Commander-SPACE (JFCC-SPACE) Joint Space Operations Center (JSpOC).

AFSPC's Space Surveillance Network provided tracking and characterization data that enabled prediction of the satellite's location and relative position. This data was fused with other sensor data and forwarded to the Missile Defense Agency (MDA) and Navy to support the engagement.

AFSPC Overhead Non-imaging Infrared sensors provided information during engagement and reentry to include IR detection of the hit/kill and prediction of potential earth impact for any large pieces of debris.

After the satellite intercept, the Space Surveillance Network tracked the resulting debris and provided both piece count and positional data to support analysis of the debris field. Data was used to predict potential hazards to active satellites, perform conjunction analysis for satellite owner operators (to include commercial and foreign entities), and monitor decay of debris reentering the earth's atmosphere. That tracking continues today.

Finally, the 30th Space Wing's (Vandenberg AFB) HAZMAT team was on standby to support potential recovery operations as part of the Consequence Management Response Team.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the Pentagon's annual China military modernization report will be released March 3rd and is expected to build upon last year's report that China continues to develop a multi-dimensional counterspace program. What implications do these developments have on our national security space posture?

Secretary PAYTON and General KEHLER. The number of space faring nations is growing and it should be noted China is not the only country to possess counterspace capabilities. We now operate in a contested space domain and, therefore, Space Situational Awareness and Space Protection are high priorities for National Security Space (NSS) systems. While some of our space capabilities are protected, we realize that we will likely face a wider range of threats to not only the satellites, but also their ground infrastructure and the links that control/connect these systems

The most recent National Space Policy reinforces our commitment to the peaceful use of space, yet acknowledges the fact that we have a right of self-defense. Because of the growing number of threats, we need an integrated National space protection strategy that synchronizes the many disparate vulnerability assessment and protection activities across the NSS and that addresses these multi-dimensional threats through a holistic and systematic process across all NSS capabilities.

To address these issues, Air Force Space Command and NRO established a Space Protection Program (SPP) on 31 March 2008, to help make informed decisions about how to best preserve our space capabilities via comprehensive vulnerability assess-

ments, protection strategies and concepts, protection technologies investment, and protection capstone requirements definition with roadmaps to define integration of protection capabilities into future systems. Additionally, we are increasing our efforts to develop Operationally Responsive Space (ORS) capabilities to allow us options in the future to quickly replace or augment existing satellite capabilities.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, how should the investment strategy be restructured across the Air Force and NRO space portfolios to avoid single-point vulnerabilities as highlighted by the Chinese ASAT test last year? Does the 2009 budget request reflect any programmatic or operational changes?

Secretary PAYTON and General KEHLER. We recognize space is a contested environment and considered this in our investment strategy. The Air Force is exploring what methods we need to ensure survivability of space capabilities. In the FY09 budget request, we have programs like Operationally Responsive Space (ORS) which seeks to develop the capability to rapidly augment, replenish or replace space capabilities, when necessary. Additionally, Air Force Space Command formed a Space Protection Office in conjunction with the NRO that is dedicated to mapping a way ahead for this effort. We also increased our investment in space situational awareness, especially in areas that will help make better use of existing sensors and their supporting systems. Additionally, the FY09 budget request includes funding for a vulnerability assessment center and additional intelligence analysts to provide more timely support to space operations centers.

Outputs of these efforts will be reflected in integrated space architectures produced by the National Security Space Office (NSSO) as well as in future budget requests for the DOD and the IC. Integrated Space Architectures, which cover the next 10 to 20 years, are intended to optimize investments across the National Security Space Community, while the National Security Space Plan (NSSP) will identify those investments required in the near term to achieve the architecture vectors.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, we understand the Chinese ASAT test was a good example of how intelligence was "operationalized" to provide near real-time support to military users. As threats to space increase, so too will the demand for greater space intelligence support and resources. How does the Department plan to address this requirement?

Secretary PAYTON and General KEHLER. This question properly falls to the NRO and we defer to Mr. Large.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the FY 2008 National Defense Authorization Act directed the Secretary of Defense and Director of National Intelligence to develop a space protection strategy. What do you see as the key challenges in this area? Are they material or non-material?

Secretary PAYTON and General KEHLER. We see several challenges and opportunities, both material and non-material. The key challenges to developing a National Space Protection Strategy will be in integrating the DOD and Intelligence Community requirements, establishing the minimum space capabilities that need to survive and operate through an attack, and prioritizing protection requirements and investment decisions. A key element will be to remain agile and responsive to emerging threats, while maintaining the proper balance between the space, ground, and communication link segments. This will require integrating the capabilities across the National Security Space (NSS) Community, both DOD and Intelligence Community (IC), in new and in some cases unprecedented ways.

Another key element, will be fostering collaboration among the military and intelligence organizations within the NSS, as well as ensuring civil, commercial and Allied representation. To enable this, Air Force Space Command and the NRO have established a Space Protection Program (SPP), which in addition to developing the Congressionally directed Space Protection Strategy, will serve to consolidate multiple protection efforts, conduct comprehensive NSS vulnerability assessments, and identify alternatives for senior leadership to consider. The recommended options from the SPP will span both materiel and non-materiel capabilities. These could include changes in space system designs or changes in the way these systems are operated.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what is the Department's overall protection strategy for assured access to space? How does DOD examine and analyze the benefits and cost of different strategies? Given the historical experience during the Cold War, can space systems be cost-effectively protected?

Secretary PAYTON and General KEHLER. The National Security Space Office's (NSSO) architecture process includes analysis of various alternative architectures, including assessments of performance benefits and costs. The NSSO has worked with stakeholders to produce the Protection for Space Mission Assurance (PSMA) architecture. PSMA identified a number of steps (classified) the U.S. could take in the near-, mid-, and far-terms to cost effectively protect space systems. The Air

Force Space Command and NRO Space Protection Program (SPP) and other initiatives have begun incorporating PSMA findings and recommendations into their efforts.

For cost effectiveness, it is not only space systems that require survivability, but more importantly the space capability architectures. Through an architectural combination of protection features (safeguard, avoid, preempt, suppress, restore) and an intelligent strategy for the assumption of acceptable risk, sufficient mission assurance can be achieved in a relatively cost effective manner. In this regard, Operationally Responsive Space efforts are working to provide the ability to rapidly augment or reconstitute space capabilities. Because of the evolving nature of the threats, protection architectures must also be flexible and adaptable. As a result, protection features will not always be unique to the individual systems but must be considered part of the NSS enterprise.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, historically, SATCOM requirements exceed the capacity of our government systems. To make up the difference, the military spends over $400 million a year for commercial SATCOM. In Operation Iraqi Freedom over 80% of our military SATCOM requirements were met by commercial carriers. Does national security require the development of a Commercial Satellite Communications Policy much like the National Remote Sensing Policy? What are we doing to ensure our warfighters are getting the necessary communications capability in a timely and cost effective manner?

Secretary PAYTON and General KEHLER. Additional policy is not needed at this time. Our SATCOM needs require varying levels of protection and security based on the information being transmitted and the mission being supported. Much of that need can be, and has been, satisfied by commercial providers.

To ensure timely and cost effective communications capabilities are provided to the warfighter, we are currently fielding Wideband Global SATCOM (WGS) satellite, and will begin launching Advanced EHF satellites in FY09. WGS provides DOD-controlled wideband communications, while AEHF will provide a 10-times increase in bandwidth for secure, anti-jam, Low Probability of Intercept/Detection (LPI/LPD) communication to replace the Milstar constellation. At the same time, we are working to reduce risk in preparation for the development of the next-generation Transformational Satellite Communications (TSAT) satellite.

These systems will continue to be augmented with commercial satellite communications, where the Assistant Secretary of Defense, Networks, and Information Integration (ASD(Nll)) provides acquisition policy and oversight and the Defense Information Systems Agency provides acquisition procedures, lifecycle oversight, and a qualified workforce to acquire quality products and services that satisfy our warfighters' needs at fair and reasonable costs to the government.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what is your assessment of the synchronization between the launch of military SATCOM systems and the fielding of compatible user terminals? How are you ensuring that user terminals are fielded to keep pace with new capabilities introduced on WGS (already on-orbit), AEHF (1QFY09), and the Navy's MUOS (FY 2010)?

Secretary PAYTON and General KEHLER. The majority of AEHF, WGS, & MUOS users will initially utilize the backwards compatibility services found on these new satellites to bridge the transition period from the legacy systems to the new networks.

— Since the first WGS launch last year, over 885 currently fielded terminals, including Ground Multi-band Terminal (GMT) and the Air Force Wideband Enterprise Terminals (AFWET), are able to use the system's legacy X-band capability. At the time of the sixth and final WGS launch, 4,586 joint terminals capable of using the new WGS Ka-band capability are programmed to have been fielded.

— At the time of the first AEHF launch, over 1,290 currently fielded, joint terminals will be able to use the system's legacy MILSTAR-like capabilities. The first Air Force terminals to start using the Extended Data Rate (XDR) capability from AEHF will be the Secure Mobile Anti-Jam Reliable Tactical Terminals (SMART-Ts) in FY10. At the time of the fourth AEHF launch, 83% of programmed joint terminals utilizing the new AEHF waveform are programmed to have been fielded.

— At the time of the first MUOS launch, over 61,000, currently fielded, joint terminals will be able to take advantage of the system's legacy UHF Follow-on (UFO)-like capabilities. At the time of the fifth MUOS launch, 1,300 Joint Tactical Radio System (JTRS) terminals, capable of UHF SATCOM, will have been fielded. These JTRS terminals will be able to take full advantage of the new MUOS capability.

Ms. TAUSCHER. Mr. Payton and General Kehler, how are space assets modeled in warfighter operational plans (OPPLANS) and contingency plans (CONPLANS)? How do OPPLANS and CONPLANS account for scenarios where our space assets are attacked or denied?

Secretary PAYTON and General KEHLER. United States Strategic Command (USSTRATCOM) has primary responsibility for the mission of space protection and works with all combatant commanders on the use of space assets in various OPPLANS and CONPLANS; Air Force Space Command (AFSPC) provides space forces to USSTRATCOM for inclusion in USSTRATCOM OPPLANS and CONPLANS. USSTRATCOM models space assets within its OPPLANS in accordance with the Joint Doctrine for Space Operations, dividing space forces into four types; Space Control, Space Force Enhancement, Space Support, and Space Force Application. USSTRATCOM then goes on to identify several capabilities available for each type of space force and generally how they will be used in each phase of an operation. Detailed planning of the use of space forces and how they will be used to support the Combatant Commanders is done by USSTRATCOM in their CONPLANS. USSTRATCOM CONPLANS, through the Joint Force Component Commander for Space, plan for three types of space control operations; defensive operations, offensive operations, and space situational awareness (SSA) operations. SSA capabilities allow U.S. forces to be knowledgeable of ongoing activity in space and the location of various assets which provides us with the knowledge and battlespace awareness needed to more clearly identify when our space assets are threatened or attacked. SSA operations provide the foundation for effective action in defensive and offensive operations. SSA information directly feeds activities under USSTRATCOM CONPLANS to account for the threat of attacks or denial of freedom of action through the use of a Space Threat Conditions system. Additionally CONPLANS include possible course of actions (COAs) for dealing with GPS jamming, communications link jamming, laser attacks on satellites, attacks on our ground stations, and various types of ASAT weapons. Taken together these plans provide USSTRATCOM, the Combatant Commander, and the President or SecDef with multiple COAs for ensuring freedom of action for U.S. and friendly nations for operations in and through space.

Ms. TAUSCHER. Mr. Payton and General Kehler, to what degree do current military exercises and wargames incorporate scenarios where our space assets are neutralized or attacked, and scenarios where redundancies or alternatives are exercised?

Secretary PAYTON and General KEHLER. Air Force Space Command (AFSPC) units and personnel participate in approximately 35 exercises and wargames annually. In these exercises and wargames, we support Chairman of the Joint Chiefs of Staff (CJCS), United States Strategic Command (USSTRATCOM), other Combatant Commanders (COCOMs), Air Force, other Services and our own AFSPC training objectives. We undertake these exercises and wargames both in the Continental United States (CONUS) and in other Combatant Commanders areas of responsibility (AORs) because AFSPC is specifically charged to communicate its mission and provide support to all military Services and Combatant Commands.

Let me give you some examples from some recent exercises and our most recent Schriever series wargame. In exercises TERMINAL FURY 08 and in BLUE FLAG 07-2 our space events included: Global Positioning System (GPS) jamming, satellite communication (SATCOM) system interference and jamming, laser dazzling of optical surveillance satellites, an attack by an anti-satellite system, satellite anomalies requiring the use of other capabilities, space weather effecting space capabilities and other space control missions. We also relocated our forces in order to be able to continue operations as we demonstrate annually during the USSTRATCOM GLOBAL Series exercises. All of these actions are taken by our forces in the field and obviously some of these events were simulated.

Schriever wargames postulate actions that could be taken by an adversary; we then determine available countering courses of action. Our most recent example from the Schriever IV Wargame, set in 2025, explored U.S. and Allied reaction to space attacks by a near-peer space power. These space attacks attempted to take away U.S. and Allied space capabilities. We responded with an Operationally Responsive Space concept to preserve and restore lost space capabilities. The findings from Schriever IV are being used to further develop concepts for defense of space. This includes exploring expanded cooperation with Allies, investigating senior-level policy and decision-making in response to space attacks, and developing a Space Campaign Plan to ensure a proactive, unified response to space attacks.

Ms. TAUSCHER. Mr. Payton and General Kehler, what is our military's response posture and options for various attack or denial scenarios? For example, what ac-

tions and response would the military take if its SATCOM system, Wideband Global System (WGS), were jammed?

Secretary PAYTON and General KEHLER. United States Strategic Command has primary responsibility for the mission of space operations and protection and works with all Combatant Commanders on the use of space assets. Air Force Space Command (AFSPC) provides space forces through 14th Air Force (14 AF) to USSTRATCOM. The 14th AF is also the Joint Functional Component Command for Space and manages day-to-day operations of joint space forces provided to USSTRATCOM. Working with the various Combatant Commanders, joint space forces continue to identify ongoing denial of service problems; not only communications, but also Global Positioning System, and warning data. Space forces have developed tactics, techniques and procedures to overcome these situations. The first action is determining the source and who is responsible. Next, we take into account the strategic situation, whether the jamming is hostile or non-hostile, if it was intentional or unintentional and the source. Based on this understanding and the impact of the jamming, the Combatant Commander recommends the best response option.

Ms. TAUSCHER. Mr. Payton and General Kehler, what are the warfighters' capability needs and priorities in space and how are these shaping the Air Force and NRO space investment strategies?

Secretary PAYTON and General KEHLER. At Air Force Space Command, we are focused on meeting the warfighters' ongoing and future needs. We do this through a delicate balance of sustaining and maintaining our enduring capabilities, and fielding new or emerging capabilities as early as possible. The warfighting commands express their needs in several mission areas to include: intelligence, surveillance, and reconnaissance; precise position, navigation, and timing; military communications; space situational awareness; and nuclear deterrence to name a few. The Air Force provides all of these on a daily basis. Every year, the Combatant Commanders develop an Integrated Priority List stating what capabilities need focus or attention. We utilize these documents heavily in determining our overall investment strategy as we leverage and integrate space capability across the National Security Space enterprise, to include organizations within both the Department of Defense and the Intelligence Community. Today, our investment strategy follows three basic principles: win the war; take care of our people; recapitalize for the future.

Ms. TAUSCHER. Mr. Payton and General Kehler, what plans do you have to meet these needs and how are they reflected in the FY 2009 budget request?

Secretary PAYTON and General KEHLER. Our Integrated Planning Process (strategic planning process) is the methodology we use to focus our capabilities on the warfighter needs. These needs are identified by our COCOM (USSTRATCOM) in the form of an Integrated Priority List, Operations Plans and Joint Capability Documents. We analyze the COCOM requests and assess what current and future programs are required to provide the desired capabilities. This is communicated back to USSTRATCOM for consideration in their Function Solutions Analysis, which is submitted to the JROC.

One of the products generated through this process is the Warfighter Required Force. This document provides an unconstrained force structure view in satisfaction of COCOM priorities. We understand this view is fiscally un-attainable; however it is used as a guide for POM development. Ultimately, we aim to provide the required capabilities within the constrained resources available.

The FY 2009 budget request optimizes our investment to support COCOM priorities and to provide those required capabilities to the warfighter. For example, among other capabilities, the budget request supports missile warning, through plus-up of the Space-Based Infrared System (SBIRS) program; warfighter positioning, navigation and timing requirements, through additions to Global Positioning System (GPS) programs; and warfighter communications requirements, through investment in the Wideband Global SATCOM (WGS) and Advanced Extremely High Frequency (AEHF) programs. Let me assure you, Air Force Space Command is focused on delivering space capability to the warfighter.

Ms. TAUSCHER. Mr. Payton and General Kehler, last year's defense authorization bill added $125.0 million for advanced procurement of AEHF–4 to mitigate the risk of a protected communications gap. The FY 2009 request contains no funds to complete procurement of AEHF–4. Why were no funds requested?

Secretary PAYTON and General KEHLER. Gap analyses on Milstar and AEHF 1–3 showed there was no urgency to procure SV4 in FY09. Funding AEHF-4 in FY10 allows the Department to meet Congressional intent to produce the 4th AEHF and maintain communications capability. There is an on-going study within the Department of Defense to determine the MILSATCOM way-ahead within fiscal constraints.

Ms. TAUSCHER. Mr. Payton and General Kehler, TSAT is a keystone system in the DOD's future communications architecture providing wideband protected communications and communications-on-the-move capabilities. However, this year, the DOD and the Air Force have removed $4.0 billion out of the TSAT program and delayed the launch date from FY 2016 to FY 2018.What has changed in the Air Force portfolio that TSAT is no longer a critical program? What were the higher priority needs that required the funds from TSAT? Describe the planned users of TSAT. What impact do the $4 billion cut and schedule delays have on planned users of TSAT? Given the proliferation of SATCOM jamming systems, how important are the protected communications features of TSAT? Can these features be incorporated into other SATCOM systems?

Secretary PAYTON and General KEHLER. The Department remains committed to acquiring the communications capabilities required to achieve the 21st Century net-centric warfighting vision. Responding to Congressional direction, the FY09 President's Budget Request provides full funding for AEHF-4 in FY10 while remaining committed to providing future TSAT capabilities. The on-going MILSATCOM study will provide us with a roadmap to address future communication requirements, especially as the needs of the planned users continue to evolve. The planned users include all Services—Army ground forces, Navy and Marine forces and airborne ISR.

While the reduction to the TSAT baseline delays first launch until the 2018 timeframe, strategic users requiring survivable and endurable communications have worldwide coverage until 2021 using the Milstar and AEHF constellations. The transformational capabilities provided by TSAT, including communications on the move, more protected communications, greater number of and higher rate communications paths and finally net-centric capabilities, will be delayed. However, the MILSATCOM study continues to evaluate various options to address these issues.

Today's commercial SATCOM systems plus DOD assets such as the WGS system are susceptible to intentional jamming by relatively unsophisticated, inexpensive means. Ensuring the DOD satellite communications capabilities are endurable and survivable have long been a requirement of strategic SATCOM users. These users require systems that provide anti-jam communications, nuclear survivability, and Low Probability of Intercept/Low Probability of Detection communications. These capabilities are built into the Milstar satellites on orbit today and the AEHF system planned for 2009 first launch. TSAT will provide continuity beyond Milstar and AEHF for these users and also significantly increase the quantity and capability of protected SATCOM links to strategic and tactical users. Incorporating the features planned for TSAT onto the WGS or AEHF satellites would be very expensive and result in delays to deployment of these next generation systems as both systems are far beyond the design phase.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, please describe the problems encountered on the Space-based Infrared System (SBIRS)-High program. What are the plans to resolve these problems and what are the schedule and cost impacts? Would a schedule delay increase the risk of a missile warning gap?

Secretary PAYTON and General KEHLER. In late summer 2007, shortcomings in the SBIRS flight software subsystem (FSS) were identified, requiring a realignment of functions between two flight computers and software code rework. Additionally, both internal and independent teams determined that streamlining the code logic, i.e. deleting code not required for the operation of the SBIRS satellite, could improve the efficiency and timeliness of code execution.

The flight software subsystem (FSS) recovery plan is divided into two blocks. Block I code was delivered on May 17, 2008 and is currently in test. An Interim Design Review for the Block II code was completed on April 2, 2008 and the development team is now proceeding with Block II coding. Block II code delivery is scheduled for August 28, 2008.

With regard to the schedule and cost impacts, the FY2009 President's Budget (PB) projects launch of the first GEO satellite for December 2009, which is an approximate one year delay to the previous launch date. As a result, the FY2009 PB includes approximately $400M across the FYDP (FY09-13) to account for this one year delay to the overall program completion.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the planned launch for the first GPS–III satellite has slipped one year from FY 2013 to FY 2014. What caused this delay and what is the risk of a potential GPS gap between the last GPS–IIF launch and first GPS-III launch?

Secretary PAYTON and General KEHLER. The first launch for GPS IIIA has slipped from FY13 to FY14 due to a delay in the GPS IIIA contract award to May 15, 2008 (first launch is scheduled 72 months following contract award). Key factors were the finalizing requirements for the incremental acquisition and resolution of a potential contractor dispute regarding the prior MUOS source selection.

The risk of a PNT gap between the last GPS IIF and first GPS IIIA is low. The launch of the first GPS III satellite is currently scheduled approximately 6 months after the launch of the last GPS IIF satellite in October 2013 and Air Force Space Command has developed Tactics, Techniques and Procedures (TTP) that could be employed to further mitigate risk.

Ms. TAUSCHER. Mr. Payton and General Kehler, last year the Air Force proposed acquiring GPS III capability in three blocks. Has the acquisition approach been finalized and agreement reached with the user community on the capabilities in each block?

Secretary PAYTON and General KEHLER. The GPS III program of record, as approved by OSD(AT&L), is based on acquiring three blocks of satellites. GPS III requirements are documented in the GPS III Capabilities Development Document (CDD) approved by the Joint Requirements Oversight Council (JROC) in July 2007, as updated by the interim CDD (iCDD) which the JROC approved in October 2007. These documents validate requirements for GPS IIIA and define the desired capabilities for GPS Blocks IIIB and IIIC.

Requirements for GPS Blocks IIIB and IIIC will be reviewed prior to initiating development on each respective block and, if necessary, the Air Force will update the CDD to reflect any required changes and bring the new/modified requirements to the JROC for validation.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the committee understands the Space Radar program has been restructure in response to Congressional concerns about affordability, requirements, technology maturity, and concepts of operation (CONOPS). Please describe your view of the restructure, the level of commitment from the DOD and intelligence community, and the status of the analysis of alternatives study requested in the FY08 defense authorization bill.

Secretary PAYTON and General KEHLER. We are working closely with our Intelligence Community (IC) partners to leverage the lessons learned and the solid technology maturation performed to date. Any Joint Future Overhead Radar Program must meet the requirements of the DOD, IC, and coalition partners, while being acquired in affordable increments of capability. Additionally, we must ensure that the system can provide the high-quality and timely information needed to support senior leaders.

The Intelligence Collection Architecture (ICA) process we are participating in offers a vehicle to analyze user needs and acquisition options to include the possibility of a tiered architecture similar to the one recently recommended for Electro-Optical systems. A tiered approach works best when all tiers are synchronized. Each element provides commonly accessible information while appropriately optimizing (or focusing) on the primary consumer of that tier.

The jointly led ICA, co-chaired by USD(I) and ODNI, plans to report the results of this radar needs study this summer. These inputs will inform an analysis of the available alternatives to satisfy the identified and revalidated user needs. The results of the analysis of alternatives are scheduled to be finalized before the end of FY08.

We are committed to developing this capability, as are our IC mission partners.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, please describe the potential operational concepts and value that "operationally responsive" space (ORS) solutions provides to the joint forces. What is your assessment of the ORS program office implementation and its responsiveness to warfighter needs?

Secretary PAYTON and General KEHLER. The ORS Office is developing architectural and system concepts to enable rapid reconstitution or augmentation of space capabilities, to support the warfighter. For example, the ORS Office is developing a modular, open systems architecture for spacecraft that should greatly reduce the cost and time required to integrate new space capabilities. The ORS Office is also maturing the supporting ORS enabling capabilities, including launch systems, ranges, payloads, satellite buses, and Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) that are critical components in delivering responsive space capabilities to warfighters.

The current ORS office structure is well suited to performing dual missions of: 1) responding to current Joint Force Commander's needs, as prioritized by Commander, U.S. Strategic Command; and 2) building a national strategic capability to responsively provide a robust space reconstitution and augmentation capability by 2015.

Ms. TAUSCHER. Mr. Payton and General Kehler, do you believe the current management reporting chain for the ORS program office provides the greatest flexibility or should they be moved under Air Force Space Command to better reflect the warfighter's requirements?

Secretary PAYTON and General KEHLER. The current management reporting chain for the joint ORS Office provides great flexibility as well as a clear tie to warfighter requirements. As Congress intended, the ORS Office operates under the authority, direction, and control of the Department of Defense (DOD) Executive Agent (EA) for Space, with the Director of the ORS Office reporting directly to the DOD EA for Space. Additionally, the ORS Office works closely with United States Strategic Command (USSTRATCOM), whose Commander is responsible for validating and prioritizing the ORS requirements of all Combatant Commanders.

The focus of ORS is on developing architectural concepts and enabling technologies to responsively provide a robust national space reconstitution and augmentation capability by 2015. The joint office with an abbreviated chain of command provides the opportunity to maximize the contributions of the services and agencies. At the same time, the ORS Office continues to provide support to USSTRATCOM in identifying alternatives and actions required to support the Urgent Operational Needs of the warfighters.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, space acquisition has a poor history of performance. What is your assessment of the current state of space acquisition and what indicators do you use to make this assessment?

Secretary PAYTON and General KEHLER. The state of space acquisition is improving. Over the last 12 months, we have several demonstrated successes: a new record of 58 consecutive successful Medium and Heavy National Security Space (NSS) launches; deployed the first Wideband Global Satellite (WGS) for operational use; and launched and begun operations on two GPS IIR–M satellites. In October 2007, we implemented a new GPS ground segment with no impact to PNT services.

We recognize challenges remain with cost growth and schedule impacts in some areas of space acquisition and are actively pursuing solutions. Our efforts are guided by a Back-to-Basics philosophy identifying clear requirements and applying disciplined systems engineering and effective management/planning, while providing the program manager the appropriate resources to ensure success.

Historically, programs perform better when they have clear, stable requirements, technology at the appropriate level of maturity, and high-confidence cost estimates early in the acquisition process. We continue to focus on these areas, and are starting to see indications that this approach is working. For example, GPS IIIA and FAB-T recently completed independent technology assessments supporting their transition to Preliminary Design Phase.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, affordability and executability of space programs is a bipartisan committee concern. Do you think the National Security Space programs have adequate funding to make sure they can be executed in a timely manner in support of the various missions?

Secretary PAYTON and General KEHLER. Yes, the funds requested for National Security Space programs in the FY09 President's Budget reflect our commitment to ensuring continuity of mission across the entire portfolio. Specifically, the FY09 budget request supports the near-term delivery of additional capabilities in Missile Warning, MILSATCOM, Position, Navigation, and Timing (PNT), and Space Situational Awareness. Simultaneously, the FY09 budget request continues investment in transformational MILSATCOM and next-generation PNT to ensure we can meet growing joint warfighter demand for these services.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what do you see as the limiting technology in future conflict scenarios? How are space science and technology investments addressing this need?

Secretary PAYTON and General KEHLER. Air Force Policy Directive 61–1, "Management of Science and Technology," requires Air Force Space Command (AFSPC) to provide requirements and recommended program guidance/direction to the Air Force Research Laboratory (AFRL) for consideration in planning and programming for Space Science and Technology (S&T) investments. To meet this requirement, AFSPC produces a Space S&T guidance document that identifies the limiting technologies needed to acquire the warfighting capabilities necessary to meet AFSPC's vision and also prioritizes technologies for AFRL consideration. AFSPC's most recent Space S&T guidance identified key limiting technologies in space situational awareness (SSA); the ability to provide rapid, responsive space capabilities; strategic deterrence; and next-generation pervasive space technologies. As AFRL's proposed Space S&T investments ultimately make their way forward for Air Staff consideration and incorporation into the annual President's Budget request, AFSPC, Space and Missiles Systems Center (SMC), and Air Force Materiel Command (AFMC) all have an opportunity to assess how these planned investments address future technology needs as identified by AFSPC.

Currently, Air Force S&T investments provide for a range of technologies to find, fix, characterize, and track new and existing space objects in support of SSA; con-

centrate on plug-and-play technologies, spacecraft autonomy, and automated design tools closely integrated with the Operationally Responsive Space vision to enable responsive space capabilities; focus on developing and demonstrating more reliable, more accurate, and less expensive guidance components/systems, coupled with research in advanced propulsion, plasma effects and mitigation, and seismic data, to provide for strategic deterrence; and support a variety of pervasive technologies to include radiation-hardened electronics/processors, solar cells, focal plane arrays and cryocoolers, high-temperature materials, and guidance, navigation, and control.

Ms. TAUSCHER. Mr. Payton and General Kehler, the Space and Missile Systems Center is looking at standing up an organization with new acquisition processes that will focus on technical and operational demonstrations while emphasizing innovation and flexibility. Please describe this organization further, the expected value and benefits, and tell us where you intend to put this organization.

Secretary PAYTON and General KEHLER. The Space and Missile Systems Center (SMC) is actually consolidating early demonstration activities into the existing Development Planning (SMC/XR) office at Los Angeles AFB and the Space Development and Test Wing (SDTW) at Kirtland AFB, New Mexico, rather than standing up a new organization. SMC/XR and the SDTW will leverage current and future efforts, to include the Space Test Program and Operationally Responsive Space (ORS) efforts. The acquisition processes these offices will follow are not new, but represent a disciplined, structured approach of complete, up-front concept and systems engineering prior to program initiation.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, in 2007, the Australian Government agreed to invest in the Wideband Global System (WGS). Where are there other opportunities across the space portfolio for greater international cooperation?

Secretary PAYTON and General KEHLER. Historically, Australia (AUS), United Kingdom (UK) and Canada (CAN) have all been involved with the Air Force in many facets of the space mission, dating back to the late 1950s, early 1960s. These Allies, along with others, participate in missile warning; space situational awareness; positioning, navigation and timing (PNT); and communications systems.

The U.S. has a long history of missile warning cooperation with all three partners. We have mutual defense cooperative agreements covering existing Defense Support Program and Space-based Infrared Systems and Integrated Tactical Warning/Attack Assessment agreements.

In addition to the success of the Wideband Global SATCOM System arrangement with Australia, we have active Allied participation with the UK, CAN and the Netherlands regarding the Advanced Extremely High Frequency (AEHF) communication system. Additionally, over the years the U.S. and the UK have shared capacity on the UK SKYNET and the U.S. Defense Satellite Communications System (DSCS) programs.

Positioning, navigation and timing are extremely critical and GPS is the world standard. To foster further collaboration on this essential capability, we have integrated officers from AUS, CAN, Germany and France into GPS Program Office. Additionally, there are numerous efforts underway in the area of GPS equipment development and CONOPS cooperation, with interoperability and coalition warfighter support as key ingredients.

Finally, regarding Space Situational Awareness we have longstanding relationships with several of our key Allies (UK, CAN) and are building the foundations with others to cooperate and integrate resources in this mission area.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what are the merits of "rules of the road" in space or other international regimes to promote the safe and responsible use of space?

Secretary PAYTON and General KEHLER. The U.S. carefully upholds its obligations under the four principle international agreements on space—the Outer Space Treaty, the Rescue and Return Agreement, the Liability Convention and the Registration Convention. In fact, we have advocated universal adoption of these measures. We believe that there is no need for any additional treaty on space and do not see any problems for arms control to resolve. Given that the use of space is growing and likely will continue to grow, we believe there is value in exploring ways that the various users can act responsibly in space. Rather than using the term "rules of the road," which implies legally binding terms, we instead support efforts being considered through the UN Committee on the Peaceful Use of Outer Space (UNCOPUOS) to look at "best practice guidelines" for safe space operations. We believe that the community of space-faring nations could constructively share their "best practices" and together a set of voluntary guidelines would serve the broad interests of all nations.

While we are determined to keep sufficient flexibility to protect national security interests, we also recognize that some emerging challenges to space activities can require new forms of international cooperation with allies, friends, and other responsible space-faring nations to preserve the principle of unhindered access to, and operations in and through, space by all nations for peaceful purposes. We are witnessing a period of unprecedented cooperation in space. As a result, we believe that the establishment of best practice guidelines is the appropriate tool.

Pursuing best practice guidelines avoids the rigid and drawn out negotiation processes that are often characterized by undercurrents of differing political agendas. A notable success in the establishment of best practice guidelines is in the area of debris mitigation. This stands in sharp contrast to difficulties in international negotiating settings like the Conference on Disarmament where for years the progress on key objectives has been held hostage by a small number of countries linking unrelated issues. There is considerable dynamism in space operations as a result of the inexorable march of technology. The best practice guidelines approach has the flexibility to evolve in step with technical advancements.

Today there is a rich array of space operators from individual nations, international consortia to commercial operators large and small. Pursuing best practices guidelines provides a setting within which all participants who have something to offer can contribute.

Ms. TAUSCHER. Mr. Payton and General Kehler, the Missile Defense Agency (MDA) is developing the Space Tracking and Surveillance System (STSS) and has other ongoing space activities. How is your office involved in coordinating MDA's space programs with the rest of the Department?

Secretary PAYTON and General KEHLER. The Air Force has a close relationship with the Missile Defense Agency on multiple levels. The Under Secretary of the Air Force is the Air Force principal at the Missile Defense Executive Board, the senior DOD body on ballistic missile defense. The Under Secretary of the Air Force is also a co-chair, along with the Assistant Secretary of the Air Force for Acquisition, the Air Force Deputy Chief of Staff for Air, Space, and Cyber Operations, and the MDA Director, on the AF-MDA Board of Directors (BoD). The BoD keeps the Air Force leadership fully informed of MDA activities and serves as a forum for addressing AF-MDA issues.

AFSPC is engaged with MDA in preparing STSS experimentation plans for space situational awareness, technical intelligence, and battlespace awareness, and annual AFSPC/MDA focus days further promote collaboration on space activities.

Ms. TAUSCHER. Mr. Payton and General Kehler, MDA has developed or plans to develop several land, sea, and space-based sensors, such as the Sea-Based X-band (SBX) radar, Upgraded Early Warning Radars, and STSS. What utility might these sensors have for providing space situational awareness?

Secretary PAYTON and General KEHLER. The new MDA X-band radars have the ability to enhance the space situational awareness (SSA) mission. In particular, the Sea-Based X-band radar has two possible benefits for SSA; it is well-suited toward characterizing space objects and it can be positioned geographically where we currently have no SSA ability.

Additionally, the Upgraded Early Warning Radar (UEWR) program is upgrading both the PAVE Phased Array Warning System (PAVE PAWS) and the Ballistic Missile Early Warning System (BMEWS) radars that currently support the SSA mission. The UEWR program adds the potential for improved space object characterization, while also adding multi-mode flexibility which will enable those radars to perform their missile defense and SSA missions simultaneously. Used in conjunction with the Global Sensor Integrated Network (GSIN) initiative and a MDA net-centric architecture, the UEWR sites could inject data directly into the AFSPC net-centric services to tie legacy and non-traditional sensors together in an interoperable unified framework. AFSPC is currently funding the SSA sensor fusion, data dissemination, and command and control efforts through the Integrated Space Situational Awareness (ISSA) and Space C2 programs. The end goal is to evolve current SSA fusion demonstrations into tailored products for end users.

MDA is also developing the Space-based Tracking and Surveillance System (STSS) to track, surveil and self-cue space events, enabling us to gain custody of new launches very early in the process and alert/cue other sensors sooner.

To aid future system development, AFSPC is constructing a National SSA Roadmap to be used as an interim SSA architecture in response to National Space Policy guidance. This effort includes MDA and the contributions their sensors will bring to an integrated solution.

Ms. TAUSCHER. Mr. Payton and General Kehler, the Air Force is undergoing a "force shaping" effort to downsize its personnel by 40,000 by the end of Fiscal Year 2009. Operations personnel will see a nine percent reduction and Acquisition per-

sonnel will see a four percent reduction. How does this personnel reduction impact the space operations and acquisition missions? To what extent will your contractor support workforce be affected?

Secretary PAYTON and General KEHLER. We were able to mitigate the impact of Program Budget Decision (PBD) 720 reductions to the Command's operations and acquisition missions. Air Force Space Command (AFSPC) reduced active duty end strength by 1,670 positions, and incurred a civilian reduction (180 positions) and a contract dollar reduction in excess of $1.03B across the Future Years Defense Plan (FYDP). We mitigated the impact to the operations and acquisition missions by shifting the reductions to other career fields. Only eight percent of our active duty manpower reduction were incurred in the operations/acquisition specialties—100 space operator positions and 55 acquisition officer and civilian billets were deleted. While only 55 Space and Missile Systems Center (SMC) acquisition billets were cut, 124 acquisition-qualified officers accepted voluntary separations.

The dollar reductions also impacted our contractor workforce. Advisory and Assistance Services and Systems Engineering Technical Advisory contracts were particularly impacted at SMC locations. Our AFSPC wings also suffered, as they rely on Operations and Maintenance contracts for base operating and mission support.

While this drawdown does cause temporary turmoil, it is necessary to ensure resources are available to recapitalize our air and space systems.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, how would you describe the rationale for the February 20th intercept of the failed U.S. satellite?

Mr. LARGE. The satellite in question failed shortly after its launch in December 2006, an uncontrolled reentry was inevitable. The rationale for the 20 February 2008 intercept of the satellite was always to mitigate the potentially harmful effects of the 1,000 pounds of hydrazine propellant aboard the spacecraft. There was a significant concern that the titanium propellant tank and much of the full load of toxic fuel would survive the uncontrolled reentry, posing a very real danger to human life across much of the inhabited portions of the Earth. For that reason the President of the United States decided to take proactive action, appropriate for a responsible space-faring nation, to reduce the risk to people and property by ordering a missile intercept of the non-functioning, decaying satellite under strictly controlled conditions.

Ms. TAUSCHER. Mr. Large, what you can tell us about the failure of the satellite? Has DOD been able to ascertain why it failed so quickly after reaching orbit?

Mr. LARGE. No. After an exhaustive formal failure investigation, and three different independent review team investigations, the cause of the failure and what failed was not determined. The failure signature suggested that abrupt, multiple failures occurred. The formal investigation was conducted over a ten month period and included over 30 different organizations from government, industry, national labs and academia.

Ms. TAUSCHER. Mr. Large, do you see technical and/or design problems associated with the recently destroyed U.S. satellite that can be fixed in future satellite system designs?

Mr. LARGE. Although our exhaustive analysis of the spacecraft design and test program did not identify the root cause of the failure, it did identify several opportunities to make improvements in mission assurance standards which have been addressed in the requirements for current and future satellite programs.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the Pentagon's annual China military modernization report will be released March 3rd and is expected to build upon last year's report that China continues to develop a multi-dimensional counterspace program. What implications do these developments have on our national security space posture?

Mr. LARGE. Space capabilities have become integrated into our daily lives and are vital to our national security and the global economy. At the same time, potential adversaries continue to seek means to counter the advantages we obtain from space and to use space capabilities against us. Our space capabilities face a wide range of growing threats including radio frequency jamming, laser blinding and anti-satellite systems. The threat exists end-to-end and requires a new way of thinking and a new way of addressing the challenges facing the space community.

The maturation of these threats, including China's anti-satellite capability, require a broad range of capabilities, from diplomatic to military, to protect our interest in space. We are working with the interagency to assess the strategic implications of China's maturing counterspace capabilities in the context their overall military modernization effort. The recommendations from this on-going assessment are carefully factored into our space systems architecture planning and resulting investment priorities. Our investment strategy for space and space-related activities is a balanced approach to achieving these capabilities. Our space control investment

strategy, for example, balances the need for space situational awareness, protection of our space capabilities and protection of terrestrial forces and the homeland from threats posed by adversarial use of space.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, how should the investment strategy be restructured across the Air Force and NRO space portfolios to avoid single-point vulnerabilities as highlighted by the Chinese ASAT test last year? Doe the 2009 budget request reflect any programmatic or operational changes?

Mr. LARGE. The operational and programmatic implications of China's anti-satellite (ASAT) test and other counterspace capabilities require thorough and deliberate examination. Our space capabilities face a wide range of threats including radio frequency jamming, laser blinding, as well as ASAT systems. The maturation of these threats, including China's anti-satellite capability, require a broad range of capabilities, from diplomatic to military, to protect our interests in space. Such a manifest approach to address counterspace threats requires a national-level strategy.

For our part, the National Space Policy acknowledges that space is vital to U.S. National security and directs the Department of Defense (DOD) to develop capabilities, plans, and options to address these threats to our national security space systems. The National Reconnaissance Office (NRO) is working with U.S. Strategic Command (USSTRATCOM) and the Intelligence Community (IC) to better understand the nature of the threat to our space systems. The assessment of the strategic implications of China's maturing counterspace capabilities is currently on-going. Once complete, the recommendations of this assessment will be carefully factored into the national security space systems architecture—including both Air Force and NRO programs—and their associated investment priorities.

Ms. TAUSCHER. Mr. Large, what type of space situational awareness (SSA) and space protection capabilities do you think will be needed in the future to combat threats to space?

Mr. LARGE. A broad range of capabilities, from diplomatic to military are required to protect our interest in space. The National Space Policy directs the DOD to develop capabilities, plans, and options to ensure freedom of action in space. In implementing this National Policy, the DOD will continue to:

— Encourage all nations adhere to established principles outlined in current treaties and international agreements for the peaceful use of space by all nations;

— Promote responsible behavior and safe space operations by supporting space situational awareness needs of all peaceful space users; lead efforts to develop guidelines for responsible behavior in space such as guidelines for debris mitigation and collision avoidance; and cooperate with other counties on the peaceful uses of outer space;

— Modernize space situational awareness capabilities to ensure ample waning of hostile acts and improve protection plans to ensure required capabilities are available in a contested space environment—includes the use of ground-based radars, optical telescopes, low Earth orbiting systems with capability to detect small objects out to geosynchronous orbit; and means of making each satellite its own sensor and capable of monitoring its health and status and detecting any anomalous activity;

— Develop architectural solutions, including Operationally Responsive Space concepts, to ensure capabilities are available when needed;

— Establish an operations posture, to include appropriate planning and exercises, to respond to attacks on U.S. space interests and to ensure required space capabilities are available in a contested environment; and

Ensure capabilities are available to deny adversaries the use of space advantages to ensure our terrestrial forces and homelands remain safe.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, we understand the Chinese ASAT test was a good example of how intelligence was "operationalized" to provide near real-time support to military users. As threats to space increase, so too will the demand for greater space intelligence support and resources. How does NRO plan to address this requirement?

Mr. LARGE. One significant step in space protection is the key role the NRO is taking, in concert with USSTRATCOM and Air Force Space Command, in laying the foundation for defensive space capabilities. Such capabilities, while vital to our space systems survival, have also helped establish a framework for further cooperation.

The complete protection picture also requires we take a careful look at the vulnerabilities on the ground as well as those in space; these vulnerabilities take

many forms. As the NRO plays an increasingly visible role in the defense of our Nation, we can also expect to increasingly become a target as well. The NRO is committed to protecting the information and assets that help us maintain our Nation's freedom and security.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the FY 2008 National Defense Authorization Act directed the Secretary of Defense and Director of National Intelligence to develop a space protection strategy. What do you see as the key challenges in this area? Are they material or non-material?

Mr. LARGE. Our nation currently is completing a comprehensive protection and survivability strategy for space—one that spans the defense and intelligence communities and addresses policy and strategy, architecture planning, system acquisition and requirements definition, science and technology development, and training and operations—and is to be delivered to Congress in July 2008. The implementation actions for this strategy cover material and non-material initiatives.

— The key challenges in the development of a space protection strategy include:
— Balancing all appropriate elements of national power (diplomatic, informational, military, and economic)—to reduce risks in all domains (land, sea, air, space, and cyber) and deter the deployment of threatening capabilities; (Material & Non-material)
— Lack of funded requirements for protection of all essential National space assets; (Material)
— Congressional oversight over this issue is fragmented among the Science, Defense, International Relations, and Intelligence Committees; and (Non-Material)
— New or additional legal regimes or arms control agreements related to space "weaponization" may complicate our ability to protect U.S. national security interests. (Non-Material)

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what is the Department's overall protection strategy for assured access to space? How does DOD examine and analyze the benefits and cost of different strategies? Given the historical experience during the Cold War, can space systems be cost-effectively protected?

Mr. LARGE. A. What is the Department's overall protection strategy for assured access to space?

Defer to Air Force Space Command

B. How does DOD examine and analyze the benefits and costs of different strategies?

Benefit and cost analyses are based on capabilities derived from user needs, technical maturity/viability, and the analytical community's assessments of the threats that must be mitigated. These recommendations are done at the architectural level and shared with the Joint Requirements Oversight Council and Mission Requirements Board and then implemented by the appropriate program offices.

C. Given the historical experience during the Cold War, can space systems be cost effectively protected?

Cost effectiveness is related to national security consequences that are realized if no protection action is taken.

A broad range of protection options covering diplomatic, information, military, and economic actions can be employed in cost-effective manner. Experience shows that if a design requirement is added to a system at the earliest stages of concept design costs are manageable; however introduction late in development results in cost increasing dramatically.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, historically, SATCOM requirements exceed the capacity of our government systems. To make up the difference, the military spends over $400 million a year for commercial SATCOM. In Operation Iraqi Freedom over 80% of our military SATCOM requirements were met by commercial carriers. Does national security require the development of a Commercial Satellite Communications Policy much like the National Remote Sensing Policy? What are we doing to ensure our warfighters are getting the necessary communications capability in a timely and cost effective manner?

Mr. LARGE. To provide additional communications capability to the warfighter, we are building and launching secondary payloads on our National Systems to transmit critical intelligence information directly to deployed forces. Using this approach, we can deliver the communications capability in a very cost-effective manner.

NRO/COMM provides Tactical Communications to warfighter with use of the Exercise and Operational Communications System (XOCOMM) and Integrated Broadcast Service Simplex (IBS–S).

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what is your assessment of the synchronization between the launch of military SATCOM systems and the fielding of compatible user terminals? How are you ensuring that user terminals are fielded to keep pace with new capabilities introduced on WGS (already on-orbit), AEHF (1QFY09), and the Navy's MUOS (FY 2010)?

Mr. LARGE. Defer to General Kehler and/or Mr. Payton.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, please describe the problems encountered on the Space-based Infrared System (SBIRS)-High program. What are the plans to resolve these problems and what are the schedule and cost impacts? Would a schedule delay increase the risk of a missile warning gap?

Mr. LARGE. We respectfully defer to the Air Force.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the planned launch for the first GPS–III satellite has slipped one year from FY 2013 to FY 2014. What caused this delay and what is the risk of a potential GPS gap between the last GPS–IIF launch and first GPS–III launch?

Mr. LARGE. Defer to Air Force Space Command.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, the committee understands the Space Radar program has been restructure in response to Congressional concerns about affordability, requirements, technology maturity, and concepts of operation (CONOPS). Please describe your view of the restructure, the level of commitment from the DOD and intelligence community, and the status of the analysis of alternatives study requested in the FY08 defense authorization bill.

Mr. LARGE. The NRO is working closely with the Under Secretary of Defense for Acquisition, Technology, and Logistics, the Under Secretary of Defense for Intelligence and the Office of the Director of National Intelligence on the Space Radar restructure. Support for the restructured way ahead has been strong within both the DOD and the IC.

This restructure includes standing up a Joint Future Overhead Radar (JFOR) program office within the NRO, examining application of commercial and international radar data and/or systems meeting some DOD requirements and other near-term efforts. The JFOR activity is being defined through ongoing efforts including the Integrated Collection Architecture (ICA) and Radar Analysis of Alternatives (AoA) studies.

The ICA GEOINT Balance Team (GBT) will be providing interim results and data that will enable us to kick-off the Radar AoA in May. The remainder of the GBT activity and the AoA are expected to provide results in September 2008.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, please describe the potential operational concepts and value that "operationally responsive" space (ORS) solutions provides to the joint forces. What is your assessment of the ORS program office implementation and its responsiveness to warfighter needs?

Mr. LARGE. The Implementation Plan (approved by DepSecDef 28 Apr 2008) identifies the DOD processes and staffing resources for operationally responsive space (ORS) and serves as the initial charter for the ORS Office. To make an assessment on the ORS Office's implementation and responsiveness maybe be a bit premature. Since its establishment and standup in FY 2007, the ORS Office has been engaged with the IC, DOD, and the Services on ORS proposals to develop space based solutions to support the Warfighter's urgent needs. Over time, the Warfighter will be able to truly assess ORS Office's effectiveness and its ability to rapidly respond to the Combatant Commanders (COCOM's) needs as well as facilitating integrated ORS concepts and solutions.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, space acquisition has a poor history of performance. What is your assessment of the current state of space acquisition and what indicators do you use to make this assessment?

Mr. LARGE. The era of Acquisition Reform is over. It has left the NRO in a fragile state with a poor history of performance.

Recently the space community has recognized its shortcomings and has pulled together to set new standards and strengthen acquisition execution, with emphasis on gated processes, mission assurance, and test-like-you fly verification. As these measures take effect, we will monitor the number of problems that surface after the control gate that should have caught them and focus on further process improvements to discover and resolve issues earlier in the acquisition lifecycle.

In addition, the NRO has taken action to internally establish a strong corporate governance model to support critical business processes. The first priority was our acquisition management and the system engineering processes. This process definition is coupled with clearly defined leader roles, responsibilities, authority, and ac-

countability. These actions will begin to reverse the damage brought by acquisition reform. Clearly our recovery from ten plus years of acquisition reform will take time, but I'm confident that our people and contractors will meet this challenge.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, affordability and executability of space programs is a bipartisan committee concern. Do you think the National Security Space programs have adequate funding to make sure they can be executed in a timely manner in support of the various missions?

Mr. LARGE. The NRO operates under the DNI guidance by funding programs to the DNI Cost Analysis Improvement Group Independent Cost Estimate (ICE). For current NRO programs, adequate funding is available to cover the ICEs. The current FY 2009 President's Budget also contains programs in early acquisition stages where an ICE has not yet been performed. Emerging programs are adequately funded in the request and will be subsequently addressed when ICEs are performed.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what do you see as the limiting technology in future conflict scenarios? How are space science and technology investments addressing this need?

Mr. LARGE. History cautions us to be wary of defining future conflict scenarios. If there is one thing we can be sure of, it is the fact future conflicts will take unexpected paths. For this reason, our space science and technology investments are structured to anticipate the unexpected and to produce capabilities that will serve the broadest needs of our warfighters, civil agencies, and national decision makers in the widest range of contingencies.

As uncertain as the future may be, we can anticipate several technology challenges. Among these challenges will be the evolution to more cyber, more wireless, and more encryption—along with the continuing demand for more bandwith. All of this will occur at a pace of more rapid evolution/revolution against a backdrop of less defined actors, targets that are more agile and more deeply imbedded, less predictable threats, and less sanctuary in space.

To address these challenges, we have developed a science and technology investment strategy that emphasizes the development of capabilities embracing fundamental attributes that will allow us to deliver timely, accurate information in an adaptive, secure and survivable environment. Our portfolio includes technologies to increase overhead persistence, enhance area coverage and crate value-added preprocessing. Our Science & Technology (S&T) investment program establishes the framework for integration of the entire intelligence, surveillance and reconnaissance enterprise in a service oriented architecture that fosters multi-INT collaboration and processing, while providing user access to required content with necessary security and confidence levels on timelines that support mission objectives.

Some examples of these technology thrusts include investments in information technologies multi-INT services, the development of light weight optics and electronically steerable arrays. These capabilities could improve collection access, help the integration of multi-INT virtual mission centers to connect our expanding base of customers, and enhance collaboration with mission partners to solve the largest and most difficult intelligence problems.

In summary, we're preparing for a challenging, unpredictable future by developing technologies to transform our processes from individual collection stovepipes to a services oriented architecture delivering timely, accurate information in an adaptive, secure and survivable environment, and enabling insertion of new capabilities on rapid timelines.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, in 2007, the Australian Government agreed to invest in the Wideband Global System (WGS). Where are there other opportunities across the space portfolio for greater international cooperation?

Mr. LARGE. Defer to National Strategic Space Office within OSD.

Ms. TAUSCHER. Mr. Payton, General Kehler, and Mr. Large, what are the merits of "rules of the road" in space or other international regimes to promote the safe and responsible use of space?

Mr. LARGE. Our National Space Policy (NSPD–49) sets out specific policies which guide our use of space. Inherent within the policy are principles for safe and responsible space operations established by treaties to which the U.S. is a signatory. These international regimes include the Outer Space Treaty which sets a number of general operating principles for signatory countries that operate within space, and the Liability Convention which establishes specific rules for assessing damages within space and as a result of interference. These treaties are familiar to the countries which operate within space, and they generally abide by them. However, outer space has become a more complicated operating environment and we have learned a great deal about safe operating practices since those treaties were established nearly four decades ago.

Today globalization is driving nations to modernize technologically and connect with the international community to achieve commercial and security goals. Space capabilities are seen as a means for states to benefit from commercial growth, improve national security, and obtain global prestige. As the "space club" grows there will be an inevitable increase in the amount of "space traffic" generated over time leading to a need among international stakeholders to conduct their space operations while ensuring that people, property, and goods are adequately protected. Satellites are generally costly and delicate instruments subject to interference both natural and man-made.

'Rules-of-the-Road' can help reduce the prospect of operational misunderstandings arising between nations from instances where apparently provocative or threatening actions are observed but not readily explained. Similarly, rules can help reduce the possibility of on-orbit collisions and proliferation of deadly space debris.

Ms. TAUSCHER. Mr. Large, despite being originally set up for national-level users, today more than 80% of the data that comes from the systems built by the NRO provide direct support to the warfighter. That is unlikely to change anytime soon. How does NRO ensure that its national intelligence satellites are integrated with the military's tasking, processing, exploitation, and dissemination (TPED) infrastructure and processes to ensure timely support for battlefield intelligence? How does NRO ensure that warfighter requirements are met and receive sufficient advocacy and funding during the development of new systems?

Mr. LARGE. Since the lessons learned from the first Gulf War, the NRO has focused on delivering its data and data products to the Warfighter on responsive timelines. These efforts accelerated dramatically with beginning of the global war on terrorism following 9/11, first through the fielding of more operational prototypes, followed by the Strategic Framework published in 2005, and now through the effort to transform the entire NRO focused on improving the content, access to, and timeliness of what we deliver.

Our Mission Partners, National Geospatial-Intelligence Agency (NGA) and National Security Agency (NSA), have also had transformational efforts underway focused on the same goals delivering intelligence to that tactical user on more responsive timelines. We are working in close partnership with them to move toward an increasingly integrated ground system for tasking, collection, processing, exploitation, and dissemination, following guidelines, standards, and policies handed down from the joint efforts between the DNI and USD(I). Throughout these efforts, we are working across multiple systems engineering activities to ensure that our systems join seamlessly and securely to the DOD architectures (DCGS and the GIG) in which they are investing billions of dollars to deliver data worldwide to Warfighters.

Regarding requirements for acquisition of systems, we work continuously with NSA's and NGA's community efforts to understand, document, and validate (through the IC's and DOD's processes) the requirements for each acquisition before it is approved. We also carry out extensive user engagement to educate the Warfighter on our capabilities, and understand the context in which they use our data.

Ms. TAUSCHER. Mr. Large, do you think that the current joint space programs with the intelligence community are supporting the warfighter's intelligence requirements? How would you change the investment strategy to better support the warfighter in theater?

Mr. LARGE. Yes. While we are not in a position to speak for the Joint Staff or STRATCOM as to how well their intelligence requirements are being met or what changes they recommend, I defer to the aforementioned entities to answer these questions. In response to the second question, NRO is now doing all things possible to invest in those programs that will deliver to the Warfighter continuously improving access, content and timeliness.

QUESTIONS SUBMITTED BY MR. EVERETT

Mr. EVERETT. General Kehler and Mr. Large, I understand the Chinese ASAT test was a good example of how intelligence was "operationalized" to provide near real-time support to military users. As threats to space increase, so too will the demand for greater space intelligence support and resources. How does the Department plan to address this requirement?

General. KEHLER. The space intelligence community coalesced to meet the operational challenges presented by the Chinese ASAT test. There remain a number of materiel and non-materiel measures that are being taken or considered in order to meet the future threat.

Several initiatives have been taken to address the need for more and better qualified space intelligence analysts. Recent billet additions at AFSPC, NASIC, DIA and CIA have taken place through internal reallocations and external over guidance approval. NSA has reprioritized for better space analysis and USSTRATCOM J2 is reestablishing space analysis. Overall analytic resources will remain insufficient, despite the improvement cited above, and will require active efforts to increase efficiency and collaboration.

AFSPC is hosting an interagency forum to review/refine intelligence shortfalls and to seek interagency solutions. AFSPC has also conducted a review of its sensors and capabilities to provide Space Situational Awareness (SSA) and has created a road map for improvement. Studies are underway to determine all potential contributors that will provide information and intelligence to support the characterization portion of SSA.

A number of efforts are underway to make space collection and analysis more efficient. The Defense Intelligence Space Threat Committee under NASIC leadership has been established to oversee and coordinate a wide variety of complex space/counterspace analytical activities. The Air Force Intelligence, Surveillance and Reconnaissance Agency has begun the process of incorporating Air Force Space Command sensors and capabilities into an intelligence master plan. In addition, processes to automate space intelligence preparation of the battlespace and to transition to predictive battlespace awareness are well underway. Space/counterspace intelligence requirements have been revaluated and are now being reprioritized and rewritten to more clearly focus the intelligence community.

Training is also a critical element of Air Force efforts to address adversary space threat. AFSPC recently expanded the Space Professional Development Program to include the Air Force intelligence community. The National Space Security Institute (NSSI) has begun a comprehensive review and expansion of Air Force Space Command's space professional training courses in close cooperation with the HQ AFSPC/A2 (ISR Directorate) and intelligence community at large.

Mr. EVERETT. Mr. Payton and General Kehler, describe the planned users of TSAT. What impact do the $4 billion cut and schedule delays have on planned users of TSAT?

Secretary PAYTON and General KEHLER. The $4 billion reduction to the TSAT baseline delays initial launch capability approximately two years. Users requiring survivable, anti-jam, strategic communications will continue to have worldwide coverage through the Milstar and AEHF constellations through 2021, while the fielding of the Wideband Global SATCOM (WGS) constellation will greatly increase DOD's organic wideband communication capability. Particular impacts from the delay of TSAT's additional capabilities, including high data rate protected communications (XDR+) and protected Comm On The Move (COTM) for ground forces, are being assessed as part of the Deputy Secretary of Defense-directed MILSATCOM Investment Strategy study. This study was initiated to reassess when the specific communication capabilities planned for TSAT are needed by the user community and to determine if there are solutions available to realistically deliver these capabilities in a more affordable manner than the current TSAT program. The Services and Combatant Commands are involved in this study, and findings and recommendations are expected to be briefed to the Deputies Advisory Working Group in June 2008.

Mr. EVERETT. Mr. Payton and General Kehler, given the proliferation of SATCOM jamming systems, how important are the protected communications features of TSAT? Can these features be incorporated into other SATCOM systems?

Secretary PAYTON and General KEHLER. Critically important. Proliferation of SATCOM jammers and the understanding of their value in warfare is a growing threat. For relatively little money an unsophisticated adversary can put much of our unprotected communications at risk, with potentially grave consequences. Our most essential communications must be protected from jamming and, as our warfighting forces' information dependence grows, the requirement for anti-jam communications grows with it. Next year, the Advanced EHF system will begin supplanting Milstar to provide an order of magnitude increase in protected SATCOM capability. However, even that will fall short of needs within a decade and we must do more. TSAT will be sized and phased according to results of the ongoing DOD MILSATCOM investment strategy study to meet that greater need and to enable a leap forward in net-centric warfighting concepts. That study is considering whether some portion of the protected SATCOM mission can be satisfied by other programs. The Air Force will continue to meet warfighter requirements for protected communications via the SATCOM architecture the Department determines to be optimum.

Mr. EVERETT. Mr. Payton and General Kehler, space acquisition has a poor history of performance. What is your assessment of the current state of space acquisition and what indicators do you use to make this assessment?

Secretary PAYTON and General KEHLER. The state of space acquisition is improving. Over the last 12 months, we have several demonstrated successes: a new record of 58 consecutive successful Medium and Heavy National Security Space (NSS) launches; deployed the first Wideband Global Satellite (WGS) for operational use; and launched and begun operations on two GPS IIR–M satellites. In October 2007, we implemented a new GPS ground segment with no impact to PNT services.

We recognize challenges remain with cost growth and schedule impacts in some areas of space acquisition and are actively pursuing solutions. Our efforts are guided by a Back-to-Basics philosophy identifying clear requirements and applying disciplined systems engineering and effective management/planning, while providing the program manager the appropriate resources to ensure success.

Historically, programs perform better when they have clear, stable requirements, technology at the appropriate level of maturity, and high-confidence cost estimates early in the acquisition process. We continue to focus on these areas, and are starting to see indications that this approach is working. For example, GPS IIIA and FAB–T recently completed independent technology assessments supporting their transition to Preliminary Design Phase.

Ms. TAUSCHER. Mr. Payton and Mr. Large, the Pentagon's 2008 China military modernization report finds that China continues to develop a multi-dimensional counterspace program, "China's space activities and capabilities, including ASAT programs, have significant implications for anti-access/area denial in Taiwan Strait contingencies and beyond." What implications do these developments have on our national security space posture? Do our military operational and contingency plans account for these potential space-based "anti-access/area denial" scenarios and their implications for surface, air, and other forces? Do military war games and exercises include such scenarios and are potential redundancies or alternative capabilities exercised?

Secretary PAYTON. The number of space faring nations is growing and it should be noted China is not the only country to possess counterspace capabilities. We now operate in a contested space domain and, therefore, Space Situational Awareness and Space Protection are high priorities for National Security Space (NSS) systems. While some of our space capabilities are protected, we realize that we will likely face a wider range of threats to not only the satellites, but also their ground infrastructure and the links that control/connect these systems

To address these issues, Air Force Space Command and NRO established a Space Protection Program (SPP) on 31 March 2008, to help make informed decisions about how to best preserve our space capabilities via comprehensive vulnerability assessments, protection strategies and concepts, protection technologies investment, and protection capstone requirements definition with roadmaps to define integration of protection capabilities into future systems. Additionally, we are increasing our efforts to develop Operationally Responsive Space (ORS) capabilities to allow us options in the future to quickly replace or augment existing satellite capabilities.

Combatant Commands (COCOMs) consider space based "anti-access/area denial" scenarios and implications in their military deliberate/contingency planning. COCOMs are required by their Unified Command Plan and other Strategic Guidance to consider employment in all domains (to include space) as they develop their operational concept(s).

Multiple war games include exploration of concepts associated with space vulnerabilities. Examples include: Unified Engagement, the Air Force Future Capabilities Wargame, and the Schriever Wargames (held by Air Force Space Command, with Joint and Coalition partners). These war games specifically look at space vulnerabilities and impacts of denied capability. A common theme of all these activities is the absolute criticality of bolstering fidelity of space situational awareness.

Mr. EVERETT. Mr. Payton and Mr. Large, the Pentagon's 2008 China military modernization report finds that China continues to develop a multi-dimensional counterspace program, "China's space activities and capabilities, including ASAT programs, have significant implications for antiaccess/area denial in Taiwan Strait contingencies and beyond?" What implications do these developments have on our national security space posture? Do our military operational and contingency plans account for these potential space-based "anti-access/area denial" scenarios and their implications for surface, air, and other forces? Do military wargames and exercises include such scenarios and are potential redundancies or alternative capabilities exercised?

Mr. LARGE. Note: This response is broken into three parts below.

Part 1: Space capabilities are vital to our national security. At the same time, potential adversaries continue to seek means to counter these advantages. Our space capabilities face a wide range of growing threats. The threat exists end-to-end and requires a new way of thinking and a new way of addressing the challenges facing the space community.

The recommendations from on-going assessments are carefully factored into our space systems architecture planning and resulting investment priorities. Our investment strategy for space and space-related activities is a balanced approach to achieving these capabilities. Our space control investment strategy, for example, balances the need for space situational awareness, protection of our space capabilities, and protection of terrestrial forces and the homeland from threats posed by adversarial use of space.

Part 2: The complete protection picture requires that we take a careful look at the vulnerabilities on the ground as well as those in space; these vulnerabilities take many forms. The NRO is committed to protecting the information and assets that help us maintain our Nation's freedom and security from any threats. Unfortunately, the unclassified nature of this forum precludes me from discussing any specific details. Any further details must be discussed in a closed session.

Part 3: Our military wargames and exercises have developed and matured over decades resulting in a robust capability that includes a wide variety of scenario. Any further detail must be discussed in a closed session.

Mr. EVERETT. General Kehler and Mr. Large, I understand the Chinese ASAT test was a good example of how intelligence was "operationalized" to provide near real-time support to military users. As threats to space increase, so too will the demand for greater space intelligence support and resources. How does the Department plan to address this requirement?

Mr. LARGE. I respectfully defer to General Kehler.

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