

TRANSCRIPT

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Q: I wanted to start off this morning on the general topic of roles and missions for space. Congress has mandated a new roles study, I guess we have one of these about every ten years. Some of them are more interesting than others, but this one has the potential, I guess, to be fairly interesting. I want to take you back about seven years, when the Rumsfeld Commission on Space declared that, for the moment, we'd let space stay with the Air Force and see how it worked out, but that, somewhere down the line in the great by and by, there would probably have to be some shift of organization. It seems like that kind of talk has largely died out over the last several years. Do you agree that that is off the table, or do you not? Secondly, looking at this roles and missions study coming up, what do you think that portends for Space Command?

A: Thanks. Thanks for the question and thanks to all of you for being here this morning. I really appreciate this. We weren't quite sure it was going to happen with the traffic this morning, given the cherry blossoms and all the stuff that's with that, but we made it, so thanks for taking your time to be here this morning. Just as a reminder I would tell you that the mission of Air Force Space Command is to deliver ... space and missile capabilities to America and its warfighting commands. It's a mission that the United States Air Force has had for almost 50 years. The Air Force actually performs the bulk of the space mission for the Department of Defense. Upwards of almost 90 percent of the resources and activities that are done by the Department are done by the US Air Force. So our airmen have formed for many many years the core of America's space team, so therefore we believe that the space mission is in fact an Air Force, primarily an Air Force responsibility.

I've just come from a joint command, at Strategic Command, where I was the Deputy Commander. So space is clearly a joint activity, no doubt about that, and we provide our forces to US Strategic Command for their use. So we would offer everything about space is joint, all the services participate, but we do see that there's a preponderance of activity here and we believe it's a core competence and a core mission of the US Air Force to perform this space mission.

So as we think about roles and missions, I personally don't see a major change to that as we go toward the future.

Yes, we do still have a number of steps that were implemented as a result of the Rumsfeld Commission. We think we have done a much better job today in terms of developing our space professionals, our airmen who are space professionals. We believe that we have turned the corner in acquisition, although we still have some issues there that we're going to have to be very careful about. But by and large we think that the main thrust of the Space Commission, which was to improve the way that we manage our space programs, the way we are organized to accomplish the space mission, we think that we implemented those.

However, there does remain a question here about the relationship between the space activities that are conducted by the intelligence community and the space activities that are conducted by the Department of Defense. I would also tell you that I believe that we have better cooperation today in many areas than we have had for quite some time that I've been associated with this in the past. That does not mean that we still don't have issues to resolve, but I think that we have a very good operational relationship with the intelligence community. I think there is still more to be done in regards to how we plan together, how we determine our resource allocation together so that we leverage the resources, and how we can look together to the future for those activities that are of mutual concern of course to both the intelligence community and the Department of Defense.

So I guess the summary is, I don't see that there's a major change coming. I do not believe that it is time for us to be thinking about a separate space force. Others have suggested a separate space corps within the Air Force. I don't think it's time for that either. I believe that Air Force Space Command with our focus on this mission is perfectly capable of performing the organize, train and equip mission for the Air Force. Again, I see the Air Force retaining a leadership role here for the department.

Q: Do you think it's time to write that into Title 10 language? Sometime ago there was a move to give the space mission in law to the Air Force and the other services resisted that. Is it time to do that?

A: Certainly that's something that we ought to go look at again. It was looked at some by the Rumsfeld Commission, that there was a piece of one of their recommendations anyway that said we should go look at Title 10. Whether or not we actually reopen Title 10, I think remains to be seen. But I will tell you that regardless of whether or not we adjust Title 10, I think that the fact that the Air Force has had a leadership role for almost 50 years now in the space business would suggest to me that we understand what our responsibilities are here and that that leadership role will continue into the future. I believe that looking at Title 10 is an appropriate thing to do. Whether or not we actually make a change remains to be seen.

Q: I hesitate to ask this because I know every time I mention ASAT everyone starts backing out of the room, but [NK], which is the latest variant of AMRAAM is being developed for anti-ballistic missile work, but when I talked to senior Air Force people they said there is an intrinsic ASAT capability in the design that on a, if you took an F-22, had it at 60,000 feet, going fast, going up at a 45 degree angle, and you shot one of these missiles off you could pretty much put in jeopardy all of the low orbit, low earth orbit satellites.

Given that we had to jury-rig an anti-sat capability for this latest episode, shooting down the satellite. Isn't it somehow incumbent to be able to come up with a faster, cheaper, way of contingency for doing that sort of thing? If so, are you looking at that, or anything of interest? Including this [NK]?

A: Let me start off by saying there is no question that the importance of our space capabilities has increased, and as we look at how we use space today in terms of our national security, it's clear to us that the importance that we place on that has been noticed by our friends and by our foes, potential foes as well. Someone recently said that our enemies and potential enemies have either recognized or experienced first-hand how America uses its space capability for national security purposes.

So the evidence that we see shows us that our space capabilities will be contested. Now whether they're contested in space or whether they're contested on the ground or whether the links that put them together are contested, or whether our ground facilities are contested, remains to be seen. But we have seen evidence from a number of places around the world that our potential adversaries or others are developing capabilities here that can challenge us in all three of those pieces of our space capability. The space segment, the link segment, and the ground segment. So we have to be mindful of that.

As a result, we are working hard to do two things. One is, we are working very hard to improve our space situational awareness. I would say the prime lesson I took away from the missile defense activity that was used against the US satellite was the value of high

quality, high confidence space situational awareness. It's space situational awareness and space surveillance and precision in that, that actually was the precursor to the successful intercept.

The second thing we're doing is we're taking steps to protect our space capabilities. That goes everything from improving the physical security of our facilities to improving the cyberspace security of our facilities, to making sure that we have taken steps to counter things like jamming. We've seen GPS jammed, of course Saddam Hussein attempted to jam GPS, not successfully, but he attempted. We've seen others developing GPS jammers. It's not a hard thing to do. That technology is out there. We've seen others developing laser dazzlers against some of our surveillance and reconnaissance sensors, and the list goes on. So we are taking prudent steps to protect ourselves.

The next piece of that is what kind of capability do we need to have that would deny others the use of space against US forces and US allies? Our US policy says be prepared. It doesn't say go do. So we are not pursuing an active anti-satellite weapon at this point in time. What you saw was a one-time use of missile defense assets in a very carefully controlled manner that I think has been very well described by others in the department.

In terms of using other assets here, and I'm not familiar with the specific missile that you're talking about.

Q: Raytheon is going to be disappointed. [Laughter].

A: Not surprising, though, from my neck of the woods. However I would say we demonstrated an operational anti-satellite weapon which was a modified SHRAM coming off of an F-15 in the mid 1980s. The old Soviet Union demonstrated an operational anti-satellite weapon. We always have an option to go down that road in the future, but at this point in time we are not actively pursuing that kind of an activity for anti-satellite purposes.

Q: But you would like to have a cheap, fast and very flexible capability if you could do something like that for a million bucks a missile, instead of having to move three Aegis ships from the middle of the Pacific. It might be --

A: I'm not ready to say that, actually. What I think we need to do before we get to operationalizing some kind of an anti-satellite weapon, kinetic kind of a weapon, I think that our interest and our investment these days is certainly in improving our situational awareness and in taking protective steps to make sure that that capability that we rely on is going to be there when we need it.

Q: You mentioned cyber defense. Let me ask about cyber attack. Given that the responsibilities and control of a lot of this stuff is spread out over 8th Air Force and Cyber Command which doesn't have a home yet, and Space Command, how are you dealing with the issue of coming up with a timely tactical decision on such things as cyber attack and IO and those things when you need to go after somebody's network? Up to this point it seems like it's really hard to do, to get agreement on an attack and to carry out an attack. But perhaps that's not correct.

A: Again, I would offer that there is no question that we are being challenged in the cyber domain. We're being challenged from lots of different directions. In some cases these are what we would describe as hackers in the past. In some cases there is some criminal activity that goes on out there. In some cases you see nation states that are interested in trying to be disruptive or gain advantages through cyberspace. So we know there's a threat there in that domain. In fact we've been saying now for some time from an Air Force point of view that our challenges in the air don't stop just with the air. We're going to be challenged in the air, we're going to be challenged in space, we're going to be challenged in cyberspace.

Q: I'm talking about your offensive capability.

A: So what we've done, and I think the Air Force was right in doing this. The Air Force stepped forward and said this is an area that we're going to have to be prepared with more rigor in the future. So we've stood up a provisional cyber command. That's step one. Step one is to stand up a provisional command. Step two, by the way, is to take a look at how we put that command into the rest of the Air Force activities in what we call cross-domain integration. That remains to be seen. And how we employ cyber capabilities, again beginning with defensive capabilities, also needs to be carefully worked out. That's the pathway that we've committed to.

Q: I wanted to just kind of play off Dave's question about the F-15 and the missile. There were two of those missiles. One of them destroyed a satellite. The other one, I think, is in the Air Force museum. Wouldn't it be possible without doing any more research and development, if you really needed a fast ASAT capability you could just pull the plans off for that one and build some and use them with F-15s?

A: I think the question of, it isn't a question of can we, I think it's a question of should we, and that's a national policy question.

Q: But you wouldn't have to go through a long R&D effort to come up with a useable weapon. I guess that's what I'm asking.

A: I don't think so. I think the technologies have certainly been demonstrated in the

past. WE understand those technologies. Having said that, I think the missile defense folks would tell you there are a number of technical challenges about intercepting these kinds of objects at these kinds of speeds that you can't trivialize. So I can't sit here today and say gosh, this is not a problem. If the nation decided it wanted an anti-satellite weapon, we could go do that tomorrow. I can't say that because there are some significant technical challenges here. Having said that, we have demonstrated some technology in the past. Everything has advanced since then to include the satellites and to include the other technologies involved. So I don't want to trivialize that either.

The key question is, I think a "can we" question, which is a technology question. The other is a "should we" question which is a national policy decision. We'll see what national policy wants to do.

Q: Back to cyberspace. The Air Force, I know you just talked about this and the Air Force has made it clear that there must be cyberspace elements to have air dominance and space dominance. So can you talk me through a little bit, how the cyberspace piece affects the ability for joint forces to have space dominance? We've heard a lot about the air side, but less about the space side.

A: First of all, yes. The Air Force has said, in fact the Chief has published a white paper here within the last couple of months that talks about the relationship between air, space and cyber. We believe that those three pieces actually must be viewed as an integrated, interdependent whole. And when you do that, the relationship would suggest that if you lose control in any one of those areas, you are risking control in all three. So we have looked at this as, in fact from Air Force Space command's perspective, what we tend to say is every space platform operates in two domains. It operates in space and it operates in cyberspace.

Where the boundaries are in cyberspace we are still working our way through. You can see physical boundaries in the air and you can see physical boundaries in space. Where are the cyberspace boundaries? That's one of the issues that the provisional Cyberspace Command is starting to try to address.

So when we look at this, we don't see a separation of space and cyberspace in terms of the way the platforms have to be integrated. So it's important for us to understand that cyberspace can be used against us also.

The Army has a wonderful saying, and when we separated from the Army there are some sayings I wish we had brought with us. One of them is if the enemy's in range, so are you. [Laughter]. There's something about that here in cyberspace. We need to be mindful that for space platforms that I would offer operate both in space and cyberspace, we've got to be very mindful that there is a cyberspace defense element to

this that we have to pay attention to. That extends into our ground systems as well. It may be that the biggest cyberspace threat that we face in our space business is on the ground and in the ground sites. So taking the appropriate protective measures and the steps that are very important to us is something we're working on very hard.

I think all of you know that in the unclassified networks we find that those challenges come pretty frequently. We know there are folks out there, it's been public knowledge that there are folks out there that are penetrating our unclassified networks, trying to penetrate our unclassified networks, so there is a constant update going on here between the people who are responsible for providing and defending those networks and those that are trying to penetrate them for their own purposes. We've got to be very very careful here that we take that into account as we look at our space capability.

However you would act to remove our space capability, you have impacted the way America fights. What we also say at Air Force Space Command is, space capabilities have shaped the way America fights today. I believe that's true when you look at how we use space for precision strike, how we use space for information sharing and global vigilance and situational awareness, how we use space to do reachback so we don't have to send as many people forward, et cetera, et cetera, et cetera. So wherever the threat comes from regarding our space capabilities, and there is clearly a very real cyberspace threat there, we need to be mindful of it and protect ourselves from it.

Q: General, I was wondering if you might talk to us a little bit about the Air Force DARPA work on hypersonic technology and the [inaudible] associated with those. [Inaudible] demonstrate. Do you envision that as a [inaudible] technology as part of Prompt Global Strike, or is that more of a demonstration [inaudible]?

A: The Air Force and DARPA are working together on some advanced technology that we've been asked to look at. Congress within the last year has established a defense-wide account to make that a joint activity among the services. We're pursuing that with our joint partners. One of the features of that is work on hypersonics.

We would expect to fly a hypersonic test vehicle of some kind or another, and we're on schedule to do that within about the next year or so. I'll get you the specifics of when that is but it's within about the next year or so and it looks like that's on track. But that's a demonstration. And like any other technical demonstration, the question will be what do we learn from that demonstration, how quickly do we learn it, and where do we find ourselves benchmarked in terms of actual flight activity, and what that would mean for the future.

I believe we're not to the point where we can say we will demonstrate that and then it will become operational. I don't know what will happen after the demonstration.

DARPA tells us they are very very confident in the demonstration. I'm very confident in the demonstration as well. But that's why you fly. We're going to go find out and we'll see where we go from there.

At this point in time the Prompt Global Strike activity is really a technology demonstration kind of an activity. Having said that though, the Commander of Strategic Command has continued to look to us and the other services to provide him with a global strike capability that would be a conventional capability that he could apply to targets located in the world within about an hour from being told to do so. That's not something that is, conceptually that's not an overly ambitious kind of a goal because we've had that sort of capability in both, well in the land-based strategic deterrent force, in the ICBM force, for many many many years -- the ability to reach long distances in a very short time. The difference is what you put on the end of that to make it an effective weapon that's far less than the nuclear threshold.

Q: So do you see this technology demonstration as feeding into a potential first Prompt Global Strike conventional weapon? Or do you see something else like [inaudible]?

A: We'll see. We have both of these activities underway, under the auspices of this defense-side technology development. The missile piece of this we know how to do. We have missiles that are available today that do this kind of a mission. The real question is what do you put on the front end of this thing and how quickly can you do that? There are some things short of hypersonic that we think we can do. It's a matter of demonstrating, testing the pieces, and then going back through the department to the policymakers and finding out where it is they want us to go.

We don't think. in the near term there are ways we can do this that we think are not a technological stretch. We think we can do this. Hypersonics, that's the next step and we'll see where that takes us.

Q: General, you mentioned that a number of potential foes are developing capabilities to challenge us in space. Can you do a little bit of a threat assessment in terms of who are the main state players, the non-state players that are developing these capabilities? What sort they are?

A: Again, starting back in the Cold War really, we saw the Soviet Union demonstrated a number of technologies, anti-satellite weapons, et cetera, et cetera, that have carried forward. So I'm not, by the way, assigning any particular assessment here of any country, whether they're an enemy or not, just what we see in terms of demonstrated capability.

We certainly have seen the Chinese demonstrate a kinetic kill anti-satellite weapon. But

beyond this, the proliferation of jamming technology is fairly wide. Without naming specific countries where we see activity, it's not hard to go buy GPS jammers. It's not hard to go buy communications jammers. It's not hard to go buy sufficient laser capability, at the low end, that would allow you to potentially dazzle sensors that would either be in the air or in space or wherever.

It also is pretty clear to us that we see folks out in cyberspace and a number of cases have been documented about that.

So as we look around the world it's a combination of those countries that have a pretty healthy indigenous space effort underway in some cases, pretty healthy counter-space effort underway, that then extends into the proliferation of what is becoming an easier thing to do in terms of jamming or dazzling or other things.

So the evidence is there, that given the importance we place on this, we've got to be mindful of this.

Q: In the case of jamming, have we seen evidence of small or non-state actors, terrorist groups and so forth trying --

A: We have, as a matter of fact several years ago there was a terrorist group in the Pacific that jammed some communication satellites there. We've seen and have publicly reported on some activity out of the Libyans where they jammed some satellite or communications as well when it's been counter to their purposes, or at least their perceived purposes.

So the commercial satellite providers that we work with, and we work with them very carefully, are experiencing some of these issues.

Q: You said it's not that difficult to go out and buy this stuff. You don't go to Wal-Mart to buy it. Who's selling this kind of equipment?

A: There are a number of countries that produce GPS jammers, for example.

Q: Which ones?

A: Certainly the Russians sell GPS jammers on the open market. And I want to say the Chinese do as well. In both of those cases it is not a very technologically hard thing to do. My technical friends tell me that it is not a stretch to suggest that you can go purchase the things yourself if you have some technical competence to actually build your own jammers here. As you well know, GPS, for example, is not a very high power kind of a system, so it is not impossible to jam GPS. Having said that, we're working very

hard to counter that. Increasing the power of the systems. And we're heading towards GPS-3 which will give us a platform to be able to deal with this more robustly in the future.

Q: General, getting back to situational awareness for a minute, I wanted to ask you something I heard about Cybers. Is the Air Force planning on a series of micro-satellites, geosynchronous, to keep an eye on that constellation?

A: You mean to go observe, watch, sense --

Q: Travel with them?

A: No. Although we are looking at a lot of different ways to protect ourselves. At this point in time the specific answer to your question is we're not planning on doing something like that for Cybers. We are, however, looking across the board at how we protect these high value assets. In some cases these assets are very well protected, were designed to operate through a nuclear exchange. Some of our communications at the high end are still intended to operate through nuclear activities and of course our early warning satellites are designed at some length with some amount of inherent survivability in them.

At some level protection is a design issue. At some level protection is a maneuver issue. At some level protection can be other things as well, and we're off looking at that to see whether or not we can protect ourselves in smart ways, in a balanced way, which is really what's needed here. Because protection isn't just about the satellites, it's a balanced activity that we're going to be careful that we maintain that balance.

Q: General, it's about a year now since the Chinese anti-sat test. What actions, concrete actions have you taken in the last year to try and protect [inaudible]? What plans have you put in motion, first?

Second of all, just on cyberspace, what kind of work has been done and the legal implications of defensive cyber?

A: Let me take them in sequence here.

First of all, for the Chinese anti-satellite, that was not a surprise to us. What that demonstration did was it added a sense of urgency to us. Specifically, and the concrete actions, really begin with us some years ago and go prior to the Chinese ASAT test. In fact 9/11 showed us the implications of critical infrastructure vulnerabilities and asymmetric attacks. So beginning then really, we began to improve the physical security and the redundancy of our ground sites. That's something that has gone on at a

relatively low key way, but it's gone on nonetheless.

The second thing we did was we told ourselves that we must increase our awareness of what is going on on orbit. Because our space surveillance network was largely built during the Cold War for the Cold War, and so quite honestly we have some coverage gaps. We have some issues about the fidelity that we can put to observing objects that are on orbit. So fixing, upgrading, updating our space situational awareness capability is important.

The most concrete step, though, in addition to the obvious steps to fix the sensors, upgrade the sensors, has been addressing the issue of using the sensors that we have better. And so it's not as big an investment total as you would see with some of the sensor projects, but using the existing sensors more effectively is at the top of our list and has gotten increased investment here over this last year or so.

Where we see that that is really a good strategy is in the result of the NSA activity against the US satellite, where linking together existing sensors in a different way showed us that there is an opportunity here for high value, high confidence space surveillance.

So I tell folks on Capitol Hill this, it's not a huge number of dollars in the budget, but my view is using the existing sensors more effectively is at the top of our priority list. How do we share the data better, et cetera, et cetera, et cetera? That's another concrete step we are taking.

The final step about protective measures extends not just through the links but through the on-orbit assets. Here I would tell you that much of this is an engineering issue for us. When you look at the satellites that are on orbit today and you look at the length of time it takes us to actually physically replenish those satellites, this is not an overnight solution that we can engineer protection solutions in and have them up there tomorrow. It's going to take us some amount of time here. That doesn't mean we're not looking at this with some sense of urgency, but there's a practical reality here about how quickly we can put things on orbit.

Having said that, those things that are going onto orbit, for example advanced EHF which we have yet to launch the first one, will have improved protection on it because of its jam resistance, because of the way the system has been engineered. So we will address some of these issues in an engineering sense, and infuse the technology as we go forward and then we're also looking at operationally responsive space as a national strategic capability to give ourselves the ability on a relatively short timeframe to either augment a constellation or replenish it if we have issues either from technical reasons or from some kind of an attack. So it's a package of things that we are getting at, I believe,

all of which are concrete, some of which will take longer than others because of the nature of this business, and in some cases don't require huge investments that are being done under the surface so that the appearance is that not much is changing when in fact I would tell you much is changing.

The final final piece is exercises and games and all of the activities that we will do to involve the joint warfighting team in looking at alternatives here as well if in fact we have impacts on space capabilities. In some cases the most effective way to counter a loss of a space capability may be with a non-space activity. It might be an aircraft. It might be a ground system of some kind. It might be a UAV. It might be a tethered balloon, and we are looking our way through that as well. It isn't about the space things, in our mind, it's about the capability that the warfighters need. And as long as we can preserve that, and you've got to do that through a package of things, then we think we're getting at this the right way. The wrong way to go about this would be to knee-jerk this and go off and invest a lot of money in certain things that we ought to be a little more thoughtful about before we go invest.

Q: On the cyber issue? Researching on the offensive capabilities.

A: That entire issue about cyberspace and boundaries to include legal boundaries, is all under review. All I can tell you is there are some very difficult and very interesting legal issues that go along with cyberspace in terms of boundaries, and whether or not we're talking about the 12 year old in the basement next door, whether we're talking about criminal activity, whether we're talking about determined national security activity here that we would classify as hostile, all of those issues are on the table and we're trying to work our way through all of this.

Q: Is there a constant review, or is there actually a product that's going to come out at some point in the near future?

A: I'm not aware that there's any one product. This is a constant review that is going on to try to help define what the parameters of this really are, to include the definition of cyberspace itself. What is it? That's one of the reasons why the US Air Force stood up a Cyber Command was to put these issues into the hands of someone who comes to work every day worrying about it, as opposed to others who aren't worrying about that exclusively.

Q: [Inaudible], can you talk about that a little more? [Inaudible] satellite, [inaudible]? Also when the [inaudible]?

A: Let me take it that way. We expect the launch will occur within the next year. I have high confidence that we're going to get there.

Let me take a step back for just a second and remind all of you that we're entering an interesting period here in Air Force Space Command where we will be deploying over the next 24 months a number of new capabilities. The launch tempo is going to go up. The good news is that we've now had 58 successful launches in a row and we've had five years without a premature on-orbit failure. I believe that's a testament to the very very hard work that's gone on. You all have talked to Mike Hamel and his team from the Space and Missile Systems Center, so we're very pleased, cautiously. I am cautiously optimistic that we have turned a corner here in our ability to put these things on orbit and to make them work when they get there.

Having said that, AEHF is a piece of what is about to be a quantum increase in capability in the military satellite communications constellation. The first WGS has been launched. There are five more of those to go, one of which has been at least partially funded by the Australians. So we've got an allied participation in WGS. That's going to be enormous increases in the amount of bandwidth we're going to make available for the warfighters.

Then to replace MILSTAR we've got first, the AEHF satellites about to come within the next year, and then three more after that.

The original plan was, way back when, was to do four. Then we went to three plus TSAT. Then Congress said we think that's too much risk between AEHF and TSAT, got to a fourth AEHF. So that's what we've done. The cost breach is really an issue of now coming back in and having to upgrade some parts and do some other things since we had not planned on going to a fourth satellite.

I think, again, the increases in protected communications that will result from AEHF are expected to be phenomenal. I believe that program is in good shape, heading toward a first launch. We will do what Congress told us to do last year which is deploy a fourth, and that is now in the plan.

Q: What's the cost breach? Fifteen percent? Is that where it was? Do you know how much?

A: I don't remember. I will get you the specific answer.

Q: It sounds like you're thinking it may not reach the percentage that would trigger a Nunn/McCurdy review. Are you positive that --

A: I am not confident in giving you that answer. I don't know what the answer is, but I will get it for you. I have had this conversation with General Hamel more than once. We've talked about this issue. To tell you the absolute truth, I'm just having a little

difficulty calling that up from my senior memory here. But I will get you the answer.

Q: Two ORS questions. The Operationally Responsive Space office has been opened. Can you give us some concrete examples of what it has done for you, number one? And number two, on a similar topic, DARPA Orville Express program that demonstrated that successful. Is there any movement to start incorporating some technologies of that into your own [inaudible]?

A: The most important thing the ORS office has done for us is to bring focus to ORS. It has pulled together in one place the, or it is pulling together in one place the expertise and the strategy and the specifics of a road map for a way forward to give us this national strategic capability. As a practical matter, we've said there's not much difference sometimes between small but mighty and mighty small, and I will tell you that up until now the ORS office has been mighty small. They are just starting to hit their stride, I believe.

We linked the ORS office to the Space Development and Test Wing that is an SMC asset at Kirtland, and I think that has paid us great dividends. What we find is that that has given us a natural link between the ORS office and the ORS activities, and what we are capable of bringing to this from the Space and Missile Systems Center in Los Angeles.

They have already looked on behalf of Strategic Command at some specific activities. They've come back to Strategic Command with some recommendations on ways forward. That is shaping both the road map, if you will, that they are constructing and also showing us I think some potential here in terms of a way forward for various activities. At the same time they're still conducting the TACSAT activities and I will tell you that I believe that the first TACSAT that was launched and has now gone past its useful life, told us more about operating concept and what's possible in the way of small satellite operations than it did convince us that there was a specific technical advantage to that platform. It wasn't as much about the technology as it was about the process and the concept. My view was that it was very successful from that standpoint.

More TACSATs are planned and built, as a matter of fact. There's one that's been waiting for a ride for quite some time and it's still planned to fly with Elon Musk and his team, so I'm very encouraged by what I see out of ORS.

This is another one of those areas, by the way, where I think that we could pick the wrong way forward here. I am more comfortable with this crawl, walk, run approach that they have had where I have defined going from crawl to walk around the '10 timeframe because there are a number of enabling technologies and enabling conceptual advances that have to go on here to make this real. That's what the ORS office is working on, and I'm glad they are. I am very encouraged by what I see in ORS and I am a big

supporter of ORS. I believe that is again, a strategic capability for us that we need to have on the shelf.

Q: The ORS Express?

A: Same thing. I think there's a lot of potential there, and DARPA did there what DARPA does. They have handed over some things to us with great potential and I see as we look to the future here an element of how we ought to go about our protection and our investment strategy, and it might include some of the things that Orville Express showed.

Q: I have a related follow-up on that. My first question was the GAO last week released a report regarding DoD and the intelligence community not yet having a national security space strategy. They also reported concerns of not having that strategy leading to possible capability gaps or redundancies. I was just wondering what is the current status of that strategy? And are you concerned for now or the future of the capability gaps or redundancies they mentioned?

A: We do have a national space policy that of course was issued by the President. Then there are a number of supporting policies. There was one on GPS, there's one on access to space, et cetera, et cetera. So it isn't that we don't have some strategic way forward here in the United States. But it's true that in terms of an overarching national security space strategy, there's been one in the works for quite some time. In fact I participated in crafting one two assignments ago when I was in the Pentagon working for then the Under Secretary of the Air Force Director of the NRO when that was one person wearing both of those hats.

There is some military strategy efforts underway and I think all of these, the sum total of all of these things will be very helpful to us as we look to the future in terms of strategic planning and strategic thought. Having said that, we haven't been waiting for the publication of a strategy to try to work together more effectively. I believe that any steps that we can take to work together more effectively between the intelligence community and the department in terms of space are all positive. I do believe that we ought to have, if not an integrated strategy, we certainly need a collaborative strategy. We ought to have a collaborative investment strategy. And by the way, that doesn't just extend between the DoD and the intelligence community. I believe that that extends into commercial activities. I think it extends to our allies. I think it extends in lots of different directions that we haven't looked before to make sure that we are all taking advantage of the investments that we are making and we're not being duplicative. I think there's a way forward for us and the intelligence community to have collaborative architectures as well. And what we find, of course, it's very difficult to say that this one space thing is only for the use of the intelligence community or the department. The fact of the matter

is they're used by both, almost all of them.

GPS, for example, and by the way GPS is provided as a free international utility, something that we put on orbit. So we are very careful in a strategic sense about how we shape the GPS of the future. GPS is used by the intelligence community. GPS is used by the Department of Defense. Surveillance and reconnaissance collection assets used equally by the Department of Defense and very critical to warfighting activities. So it only makes sense for us, I believe, as we look to the future, to have a collaborative strategy, to have a single viewpoint about how to get to the future so that we can leverage the investments that we're making and I think we've made great progress here. We've made more progress on the operational side in terms of pulling ourselves together, and there's certainly progress to be made yet in terms of an integrated or collaborative strategy.

Q: My follow-up was the SMC on the 15th, we'll have an industry day related to needs for space situational awareness, offensive and defensive counter-space. I was wondering in your command what you believe or would you hope the industry is working on in terms of technology that would enhance your capabilities in the future?

A: The first thing I hope they're working on is data exposure and fusion, and that's like talking to fighter pilots about spare parts. It just doesn't get a lot of play. But again, I would hope they're helping us use the existing things more effectively. That would be the number one issue that I would be interested coming out of industry.

The second thing that I would be interested in, though, are all of the potential protective measures that we might be looking at, both technology things to infuse into the constellations as we look to the future, and also technology things that we can do to help ourselves on the ground. Some of my colleagues argue, and I think they're probably right, that again the most effective, the most rapid improvements we can make are probably on the ground.

Q: General, [inaudible]. It was not that long ago the Air Force was pretty happy with [inaudible], modernization issues [inaudible] extend the service life of the Minuteman III. I read some things recently that gave me the impression that [inaudible] long term.

A: Thanks for the question. Let me say that our nuclear deterrent remains the foundation of our defense strategy and our national security strategy. We are committed to a safe, secure, assured, land-based strategic deterrent. The first thing I looked at when I came into the command was our stewardship of the nuclear weapons that we have been entrusted with, and I came away from that review confident that we understand what our standards are. And by the way, my comments to our command has been that perfection remains the standard when we are talking about these weapons in

the land-based strategic deterrent. We've defined protection for ourselves, which is standards that we have had in place for a little over 40 years now. And continuing to uphold those standards is important to us.

We've made a lot of improvements to Minuteman. We've certainly don't a lot to extend the life of Minuteman. We know the investment we've made which has been around a \$7 billion investment, has taken Minuteman to 2020. We've been asked by Congress to look at extending it to 2030. We are in the process of doing that. I believe we can extend it to 2030. What I don't know yet, though, is how much more investment will be required to do that. So that gets back to another one of these, can you do it, should you do it kind of questions.

If the question is can you do it, I believe the answer to that is yes, but it will take some amount of investment to do it. Then the question is, depending on what the size of that investment is, is should you? And should this drive us in the direction of looking at a land-based strategic deterrent alternative. I think it's probably time for us to start looking at that, to see what other alternatives might be out there.

We've looked at that in the past, then we committed to extending Minuteman. We are still committed to service life extension for Minuteman. We're just about, within the next couple of years, to complete the programs that have been underway. A sizeable investment. At the same time, by the way, we've also done a lot to improve the security of Minuteman. The concrete around the launch facility head works, what we call a fast-rising V plug which is basically a way to secure an open site very very quickly in case a threat develops while people are in the launch facility. We've improved the security with remote cameras that we're installing at the sites. The list goes on.

We've also redone how we perform the security mission. We've now reorganized. We're in the process of reorganizing our security people into what we call tactical response forces. By the way, we're going to have to go buy a new helicopter and we're going to try to fund that. We're flying 1960s era Hueys in the missile complexes and we need to get into a different helicopter and we need to do that as soon as we can get it funded.

So that sum total of things has convinced me that we've got a safe, assured, secure Minuteman system out there that we can take to 2020 for sure with the investment that Congress has approved. 2030, I believe we can get there. I don't know how much investment that's going to require. And depending on the answer to that investment question, it is time for us even if we go to 2030 with the Minuteman, given the lead time here, it's time for us to tart looking at what's the follow-on to Minuteman. The Navy's doing a similar thing, by the way, with Trident. It's time for us to get there. And then we will go through the appropriate reviews, national reviews, and policymakers will make decisions about what they're looking for out of that deterrent force for the future.

Another feature of that, by the way, is I believe that a deterrent force of the future needs to include from the beginning a conventional alternative.

Q: General, with TSAT, there seemed to be comments last month on the Hill especially that the program was being significantly reconsidered, or if not rebaseligned, rethought as to when the first satellite would be launched, who exactly it will serve. Can you update us on what the latest thinking is and when the next step will be taken?

A: I can. What happened as a result of the decision to add the fourth AEHF satellite was a review of TSAT. With the insertion of a fourth AEHF into the constellation came a series of questions regarding the pace of TSAT. Also when Congress directed us to insert the fourth AEHF they also expressed some concern about the pace of the technology for TSAT and the cost of the program. So all of those things together led us, led the department to make a decision to come back this spring, do another assessment of TSAT, whether or not the program is structured correctly, whether the timing of the program is right, and how this should now fit together in light of the insertion of the fourth AEHF. We owe those answers to Congress this spring. We've been asked to provide those answers prior to the time that they mark up. We're working our way through that, and we are participating with a DoD study in order to provide the answers that the Department of Defense is looking for here with RETSAT.

I can't tell you what that will result in. I can tell you that there is a lot of new ground being plowed here. What we know for sure is that the warfighter needs the TSAT remain. So the most important of those in my mind is protected communications on the move. Again, we are dramatically increasing the capability of our MILSATCOM constellation with WGS and AEHF, the first of which we have just started to launch. 1- WGS with five more to follow; with four AEHFs that come behind that. This is not a trivial increase in warfighter capability. It's an enormous increase in warfighter capability. But what remains an issue with the warfighters isn't just protected communications, but it's protected communications on the move. So getting protected communications farther and farther and farther forward and farther and farther down in the echelons that could be out there and compact them. That's what TSAT was supposed to deliver, along with what they're calling internet in the sky. So we are mindful of that. We understand that that's a warfighting concern, and that remains our number one issue as we walk into this review. So there's more to follow on TSAT until we go back through, do this review, and then the department is ready to step up again and say in light of the fourth AEHF this is where we see TSAT being.

Q: Thanks very much. We appreciate you coming in.

A: Happy to do it.

END TEXT