HEARING TO RECEIVE TESTIMONY ON MILITARY SPACE PROGRAMS IN REVIEW OF THE DEFENSE ACQUISITION REQUEST FOR FISCAL YEAR 2010 AND THE FUTURE YEARS DEFENSE PROGRAM

WEDNESDAY, MAY 20, 2009

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

The subcommittee met, pursuant to notice, at 2:08 p.m., in room SR–232A, Russell Senate Office Building, Senator Bill Nelson (chairman of the subcommittee) presiding.

Committee members present: Senators Bill Nelson, Sessions, and Vitter.

Committee staff member present: Jennifer L. Stoker, security clerk.

Majority staff member present: Madelyn R. Creedon, counsel.

Minority staff members present: Michael V. Kostiw, professional staff member; and Daniel A. Lerner, professional staff member.

Staff assistants present: Kevin A. Cronin and Brian F. Sebold.

Committee members' assistants present: James Tuite, assistant to Senator Byrd; Christopher Caple, assistant to Senator Bill Nelson; Jennifer Barrett, assistant to Senator Udall; Rob Soopfer, assistant to Senator Inhofe; Lenwood Landrum, assistant to Senator Sessions; and Michael T. Wong, assistant to Senator Vitter.

OPENING STATEMENT OF SENATOR BILL NELSON, CHAIRMAN

Senator BILL NELSON. Good afternoon. Let me turn to our ranking member, Senator Vitter.

STATEMENT OF SENATOR DAVID VITTER

Senator VITTER. Thank you very much, Mr. Chairman. It is great to be here as the ranking member of this subcommittee for the first time. I look forward to working with you and all the other members on these significant issues.

I will submit my full opening statement for the record, but I do want to highlight a number of concerns.

The GAO is here today, and I look forward to hearing from all the witnesses, including them. For sometime, they have highlighted a number of systemic problems associated with our major space acquisition programs. Generally, they have said that competition for

dollars leads to low-cost estimation and unrealistic scheduling, and then that gets us in a bind down the line when the true costs of programs and true schedules come into clear focus. So I would like everyone's reaction to that ongoing critique and what we should do in light of it.

I want to thank Chairman Levin and Ranking Member McCain for their acquisition reform bill, which I am happy to support and would love folks' reaction to what is in that bill, how that can make a difference and what more we need to do.

I am also encouraged with many—not all, but certainly many—of Secretary Gates' strong recommendations to cancel certain programs that were not proving out like the TSAT program and to focus resources and certainly would like folks' detailed thoughts on that and how we move forward in a productive way.

Then finally, I would point out a recent Institute for Defense Analysis report, chartered by DOD, to address significant congressional concerns. One conclusion of the report is an assertion that ″no one is in charge,″ that leadership is fragmented with respect to strategy, budgets, requirements, acquisitions, and it recommends that the President establish and lead the execution of a much more focused national space strategy. It also recommends a top- to-bottom overhaul, and I very much look forward to hearing everyone's reaction to that critique and those recommendations.

But, again, Mr. Chairman, thanks for your leadership and look forward to working with you.

[The prepared statement of Senator Vitter follows:]

[SUBCOMMITTEE INSERT]

Senator BILL NELSON. As is the procedure, each of your statements will be entered in the record.

Senator BILL NELSON. Once Senator Vitter and I get through with our questions, we are going to adjourn to the Senate security room for a discussion on classified matters. So I will start out with just a couple of questions, and then flip it to you, and we will just keep going back and forth.

Ms. Chaplain, GAO recently issued a report about a potential gap in the GPS satellites. Can you explain that gap and what happens in the gap period and the assumptions that you made in determining there is potential for a gap?

STATEMENT OF CRISTINA T. CHAPLAIN, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Ms. CHAPLAIN. Thank you. We recently reported on GPS, and the bottom line, in terms of the gap analysis we did, we did an analysis that replicates what the aerospace corporation does, and we even matched up our results with the aerospace corporation. So we have a lot of confidence in the results of our gap analysis.

With regard to the potential gap in satellite capability, our analysis showed that if both the IIF and the IIIA programs are executed on schedule, there is still just an 80 to 90 percent probability that the constellation will stay above 24 satellites, which is the commitment the U.S. has to provide. If there were a 2-year delay—our analysis in the 2-year delay in the GPS IIIA program, that is—

our analysis showed that the probability would drop to as low as 10 percent.

I have a couple parameters on this. I think our analysis has kind of been exaggerated in some of the recent media reports. They are painting a bit more dire picture than we had in our report. There are also measures that can be taken to extend the life of satellites, such as turning off secondary payloads, but they need to be discussed among all the players involved with that action.

Our concerns are with the issue of aging satellites in the constellation, the delays in the IIF program, and whether that schedule can even be achieved as it is now because they still have some technical problems they are working forward.

And then on the IIIA program, we were very pleased to see the Air Force has taken a lot of actions to prevent mistakes that were made on the IIF programs, and those actions mirror the things that we all want done for all the space programs, including trying to keep requirements manageable, hold more design reviews, follow military design standards, and things of that nature.

But even with that, the schedule, in our view, will be challenging, given the nature of satellite development, the fact that they want a bigger satellite bus on the IIIA program, they are increasing the signal by a power of 10. It is a lot of challenges for the contractor to meet and maybe not enough room in the schedule to accommodate problems that could come up. So that is where we had a concern on the IIIA program.

[The prepared statement of Ms. Chaplain follows:]

Senator BILL NELSON. Mr. Secretary and General, what is your assessment of a probability of a gap, and how can you mitigate it?

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

Mr. PAYTON. Yes, sir. The GAO concerns are the same concerns that we had initially going back 3 years ago as we were architecting the IIIA program, the GPS III program. That was the first program where the Air Force applied what we call ″back to basics″ in our space acquisition. Back to basics includes intense conversations with the warfighter to understand their needs. It includes evolutionary block deliveries of new capabilities and GPS III, for example, has three separate blocks, and each one delivers more capabilities for the warfighter as opposed to trying to leap dramatically to a brand new, almost Battle Star Glactica kind of a delivery.

So additionally, we have gone through independent cost estimates. We went through 4 years of systems engineering and technology risk reduction in a competitive industrial environment to buy down the risks on the program and to better understand how different designs can satisfy the warfighters' needs. So we have much more confidence in the acquisition of GPS III due to these back to basics fundamentals that we are implementing compared to the systemic problems that prior space programs had suffered. So GSP III, IIIA, IIIB, IIIC, is the first and currently still successful implementation of the back to basics philosophy in our space acquisition.

To date, it has IIIA. The GPS III design work has been progressing faster than schedule. In fact, today is the first major design review on the IIIA spacecraft, and the program is progressing much faster and with much higher confidence simply because of those 4 years we spent before we settled on a particular industry team and before we settled on a particular spacecraft design.

[The prepared statement of Mr. Payton follows:]

Senator BILL NELSON. General, do you have anything to add?

STATEMENT OF GENERAL C. ROBERT KEHLER, USAF, COMMANDER, AIR FORCE COMMAND

General KEHLER. Sir, just a couple of things. First of all, thank you for inviting us today—you and Senator Vitter both. We appreciate the committee's attention and concern on all the space issues. I would just add a couple things to what Secretary Payton has said.

First, the world depends on GPS. We know it. We are responsible for it. We take that responsibility seriously and we are committed to keeping the level of service and actually improving the level of service that the world has come to expect out of us.

The second thing I would point out to you is that today we have the largest, most capable GPS constellation on orbit that we have ever had. There are over 30 satellites on orbit today, and they are performing well. They are not all in the same state of health. Some are older than others. Some have some problems that others that are newer do not have, but it is a large and very robust constellation on orbit today.

That gives us a little bit of breathing space, if you will. We understand where the problems are here. We know and believe that we have worked through the problems on the IIF satellites. We are not disagreeing with GAO over the nature of the problems that have arisen, but we are ready by the end of the summer/early fall to put the first GPS IIF satellite on orbit. We believe, as Mr. Payton said, that GPS III is progressing very well. There are other steps that we can take and will take to work through the gap if this gap arises.

And by the way, it is not a gap in terms of coverage. It is a reduction in sort of the global coverage. It is hard to explain, but characterizing it as a gap I think is a little bit of a mischaracterization.

But having said that, we are not pushing back on where the issues have been. We do think that we have measures in place to work our way through this time period. We are looking forward to GPS III because we have brought forth the very acquisition improvements that have been suggested to us into that program and believe that that will be very helpful for us.

I think as we look at this today and we look at IIF now getting ready to launch, III going through its acquisition cycle, and us having committed the right people, the right funding, the right cost estimates, et cetera, sir, as you had mentioned earlier on, the fact that we have got new signals entering into the constellation, the fact that we have got some ways to manage power and other things, we think that we can manage our way through this.

[The prepared statement of General Kehler follows:]

Senator BILL NELSON. Senator Vitter?

Senator VITTER. Thank you.

Just to follow up directly on that, Mr. Secretary, in general, what would be your bottom line on this in terms of, A, what do you think the probability is of any sort of gap, however broadly defined developing, and B, is there, in fact, a backup plan besides just the rollout of what you have scheduled? If that slows, if that fails to continue to meet targets, what is the backup plan to mitigate or avoid any so-called gap?

Mr. PAYTON. Senator, I would suggest we push that question to General James because he is the operator of the constellation, the warfighter that delivers that GPS capability, and he has those sorts of operational mitigations that you referred to.

STATEMENT OF LIEUTENANT GENERAL LARRY D. JAMES, USAF, COMMANDER, 14TH AIR FORCE, AIR FORCE SPACE COMMAND AND COMMANDER, JOINT FUNCTIONAL COMPONENT COMMAND FOR SPACE, UNITED STATES STRATEGIC COMMAND

General JAMES. Yes, sir. Just to address that, there are several things that we look at. First of all, we manage the constellation in totality, as General Kehler said, 30 satellites. If we start to lose satellites before we can launch replacements, we can adjust those orbits to ensure that we provide the best possible coverage for GPS. The fundamental requirement is 24 satellites. So we will continue to manage that constellation to make sure that we adjust orbits to improve and provide the best possible GPS capability we can.

In addition, we actually have—

Senator VITTER. I do not mean to interrupt. But the best capable. What is the possibility of falling short of what is our expectation and defining a gap as anything short of that?

General JAMES. Well, sir, again, the fundamental requirement is 24 satellites. We are at 30 now. Plus, we have three on-orbit spares that we can actually bring back into the mix. So again, just an opinion that the probability is relatively low that you would see major problems with a GPS signal worldwide. There could be areas where, for example, over the poles or northern latitudes that you have less accurate coverage, but still within requirements, et cetera. So again, it is a very dynamic position, as the satellites move around in the sky, in terms of the coverage you get and what you would see. But you would really have to drop from 33 today, 30 plus 3 on- orbit spares that we have, down to that 24, which is the very basic requirement that we are required to meet and provide from the United States.

[The prepared statement of General James follows:]

Senator VITTER. Gentlemen, any of you can respond. What are your general thoughts regarding this Institute for Defense Analysis report and the specific conclusion that we suffer from no one really being in charge in a global sense with regard to space? Do you think there is some fairness in that? What should be done about it? How can we bring more focus in terms of developing an overall space road map and investment plan?

Mr. PAYTON. I would say, Senator, when we say no one is in charge, that is a misnomer. I would say the warfighter is in charge. Those of us on the acquisition side turn to the warfighter to deter-

mine what capabilities we deliver, at what pace we deliver those capabilities, and at what price. Again, part of our back to basics is a very tight integration of warfighter conversations with the acquisition community so that we do satisfy those needs that they advertise.

Senator VITTER. Well, let me ask it a little differently. Warfighter is a lot of different people, and we salute them and we certainly want to service them. Who is in charge of integrating all of that input and those needs into a clear, unified road map?

Mr. PAYTON. Since place is global inherently, we turn to Strategic Command for that.

Senator VITTER. And you think they are effective in truly integrating that into an overall road map and investment plan?

Mr. PAYTON. Yes, sir.

Senator VITTER. Where is that sort of overall road map laid out and defined?

Mr. PAYTON. Through the normal Pentagon planning processes. Strategic Command quantifies their priorities, representing the theater combatant commanders. They quantify their priorities and the pace that they need those priorities filled, and whether it is Air Force or Navy or even the NRO, we marry our deliveries to those warfighter needs.

General KEHLER. Sir, if I could add a little bit to that as well. Again, on the Department of Defense side of this equation, Strategic Command, as a combatant command, sits in a very critical place in terms of space operational capabilities. That is where the requirements originate, and when the warfighting requirements for space-related things originate, there is a process that ultimately hands those requirements, once they're validated, in large part—not exclusively, but in large part—to the Air Force. When they come to the Air Force, then the Air Force Space Command, my command, is responsible for taking those requirements and turning them into actual capabilities.

On the operational side, a very similar thing happens. Strategic Command is responsible for the day-in-and-day-out operations of our space assets as well, our DOD space assets. General James is the commander day in and day out that exercises that operational responsibility, the operational control, if you will, over those assets.

So there are two chains here. In terms of the warfighters and warfighting requirements, we think this works pretty well. This is something we have arrived at after a great deal of effort to get us into this particular position where warfighting requirements follow the standard chain that other warfighting requirements follow, and space operations follow a standard set of activities that actually puts the capability in the hands of the people who are forward who need it.

So we are pretty comfortable that, as we sit here today, we understand how requirements turn into programs that turn into capabilities and who is responsible for that. We are also pretty comfortable today that the operational use of these platforms and how we make that available to the warfighters is also pretty well understood.

General JAMES. Sir, if I could just expand quickly. Again, under the Joint Forces Component Commander, then we have responsi-

bility for Army, Navy, and Air Force space forces. We also reach out to the combatant commanders around the globe. We receive inputs in from them on a daily basis in terms of what are the requirements for current operations today, and we build all that into a tasking order and provide those capabilities on a regular basis. So we are, indeed, integrating those space capabilities across all the services, provide that combatant commander with what he needs on a regular basis.

General KEHLER. And I would add one final, sir, if I may. The IDA reports and other reports have really not just looked inside the Department of Defense, but they have looked across the interagency where they have raised some of their concerns. You have a defense activity. You have an intelligence activity. You have other activities. And the question that they have raised is how do those interact, and those are questions that, among other things, will be looked at in the space posture review.

Senator VITTER. The final question for now. I would love thoughts from any of you, including the GAO, about the suggestion by some that we do not have enough focus—it is not all or nothing, but enough focus on small satellites, things that are more focused, simpler, much cheaper, and we focus too much on mega, extremely complex systems, and that we could get some benefit in certain areas from focusing on smaller, simpler things, including spurring more entrants in the field and more competition because not everyone is going to get in the business of building the mega, most complicated satellites. Do you have reactions to that very broad suggestion?

Mr. PAYTON. It is a very timely topic, Senator. Last night we launched out of Wallops Island a spacecraft called TACSAT–3, a small satellite launched off of a Minotaur to low-earth orbit. It was a project run by Air Force Research Lab but with participation from Navy Research Lab, and it was part of our operational responsive space program. Again, a technology demonstration, but demonstrating that we can field and deploy a spacecraft for a particular theater combatant commander needs.

So that demonstration, again launched last night, will have about a year of on-orbit operation to demonstrate some new technologies, but mostly how to operate more efficiently with an on-orbit asset. So, again, that is one example of small satellites through the operational responsive space program, how small satellites can benefit military combatant commanders.

General KEHLER. Sir, we would agree. We see that there is great potential in smaller platforms that do single-purpose kinds of things that can be put up faster and at lower cost. The warfighters have said that there are requirements for platforms like that. The commander of Strategic Command has told us that he is interested in being able to augment or reconstitute pieces of the constellations that the warfighters depend on.

As Mr. Payton said, this is a next step that we just took last evening on this road. We are very encouraged by what we are seeing so far. We would like it to go faster, and we are trying to work on that in terms of investment, but we see the great potential in being able to put another strategic arrow in our quiver with smaller satellites. In some cases, we may be able to do a substantial

amount of some of these missions. In some cases, we are going to have to have larger platforms.

General JAMES. Sir, just from an operational perspective, we are preparing, once they are done with the experimental phase of these, to actually take them over operationally and build the concepts and the tactics and techniques and procedures to actually provide that data right into the theater and develop those procedures where we accept requests from the theater and use these operationally as well as experimentally. So we are all on board with moving forward in that arena.

STATEMENT OF VICE ADMIRAL HARRY B. HARRIS, JR., USN, DEPUTY CHIEF OF NAVAL OPERATIONS FOR COMMUNICATION NETWORKS

Admiral HARRIS. Sir, from the Navy's perspective, we are a strong believer in the ORS concept. Our Navy Research Lab, in conjunction with the Office of Naval Research and the Air Force's Research Laboratory and various applied physics labs across the country—we partner with them to participate in the ORS program. We think it is great for the country. It is great for industry, and it gives the warfighter the potential for on- call services down range. So we are committed to it and we happily participate in it.

Ms. CHAPLAIN. We have been generally supportive of the ORS program, not just because of the focus on small satellites, but it also provides the potential to standardize design techniques and to also lower the costs of launch, which is very important to reducing acquisition costs overall, and also of the potential of the program to bring in new players into the space business.

Also, just by virtue of working on smaller programs that go faster, you are providing a lot of learning opportunities for people that do not have those opportunities on these longer kinds of efforts. It encourages just more learning and risk-taking in general.

You have to be cautious in applying this concept across all of space because some of the requirements are very demanding and the solutions inherently have to be different at this point in time.

Senator VITTER. Thank you.

Thank you, Mr. Chairman.

Senator BILL NELSON. Senator Sessions?

Senator SESSIONS. Thank you. Thank you, Mr. Chairman. It is good back with you, and I am glad that my colleague, Senator Vitter, is your ranking member. I am sure you can get a lot more productive work out of him than you were able to get out of me. He is committed to our country's defense and has the brain power to understand the complexities that we deal with.

General Kehler, you point out in your testimony Air Force Command provides land-based strategic deterrence through the ICBM fleet. Could you outline for us, briefly, how you maintain the reliability of this force over time and what are the challenges in what you do?

General KEHLER. Sir, first of all, we are about to complete a very substantial investment in the Minuteman ICBM force that will take it to the year 2020. We are looking at what it might take in additional investment to take it to the year 2030.

Now, how do we do that? We do that through a variety of programs that sustain this force and analyze the force and where it may need investment and then take those investment steps. One of the key activities that we have is an aging and surveillance program. That aging and surveillance program looks very hard at the boosters themselves and the supporting equipment that goes with those to try to predict where failures might occur in the future.

For example, three times a year—and we are looking at going to a fourth, but for right now three times a year—we operationally test fly a full-up Minuteman round, if you will, from one of the operational bases where it is disassembled, taken to Vandenberg, reassembled, shot down the western range. We also fire static test assets at various locations around the country. We also dissect some of these missiles. We do analysis on the chemical content of the fuels, and we constantly look at the electronics. The system, as it sits there deployed operationally in the field every day, is constantly going through a set of self- checks and self-analysis to tell us what its health is.

Senator SESSIONS. I think you are to be commended for that. I think that has been an important part of the confidence we have in that system.

So you are doing as many as three flights a year?

General KEHLER. Yes, sir.

Senator SESSIONS. I remember we cut the ICBM force from 500 to 450. Part of the agreement to do that was that we needed those launches for testing. I believe that is right.

General KEHLER. Yes, sir.

Senator SESSIONS. So, Mr. Chairman, I do not know if we have lined up enough in our GMD program for testing. You have always felt we probably should have more rigorous testing, and then if we are going to keep this system in place for a while, we will need to make sure we have got enough when we look at that number on testing.

Senator BILL NELSON. We are going to bring General O'Reilly in here.

Senator SESSIONS. Okay, very good.

Operationally responsive space is something I know that the chairman has been interested in and supportive of. You announced, Secretary Payton, a launch yesterday?

Mr. PAYTON. Yes, sir. Last night.

Senator SESSIONS. So far, so good?

Mr. PAYTON. Yes, sir. It was a successful routine launch out of Wallops Island. The satellite separated from the last stage of the Minotaur launch vehicle. Solar rays unfurled, and they are going through on-orbit checkout right now.

Senator SESSIONS. Just briefly, how do you feel about how the progress is going on this? I think you said that earlier, but would you summarize that for me what your best judgment is? Are we on schedule?

Mr. PAYTON. Yes, sir. In addition to the TACSAT operational experiments, we have another program that is responding to an urgent need from Central Command, a project we call ORS satellite number 1, not very descriptive. It is intended to respond to an urgent need from Central Command. So we have selected an industry

team to go out and build the spacecraft with very mature technology, piece part technologies designs. Part of that is to even use the existing link from space to the ground, use the existing link that the U2 uses today, so that when this satellite flies over Central Command, they will be able to receive it as if it is a very high altitude U2. And it fits right into their analytical work stations for Central Command. So it is a very fast-paced program that the ORS program is managing.

Senator SESSIONS. Space News reported May 18th that the 2010 funding request is insufficient to launch the ORS 1 satellite mission planned for 2010. Is that a disappointment? How did we let that slip?

Mr. PAYTON. No, sir. We have a decision point in the program, again, part of our back to basics. If the program is still making good progress on its design evolution and its subcontracting and delivery of the piece parts for the spacecraft and the sensors, if that is going well in early July, we will make a conscious decision about how fast to continue that program. So the budget requests necessary to keep that program on a fast pace are in the process to come to the Congress for approval.

Senator SESSIONS. So you have got an urgent request. The original plan, as I understood it, was to do it by 2010, but our warfighter now is not going to have it.

Mr. PAYTON. No, sir. Again, we do not want to spend money to keep a program on a pace that technically it will not deliver. So the decision point this summer is what pace to deliver that spacecraft on.

Senator SESSIONS. It is not a question of money but a technological capability?

Mr. PAYTON. It is a question of can the industry prove that they can deliver on that 2010 pace.

Senator SESSIONS. And if they can, you will have the money to fund it?

Mr. PAYTON. Yes, sir. If not, our plan is to continue the program, but not on the rapid pace.

Senator SESSIONS. Thank you, Mr. Chairman.

Senator BILL NELSON. General Kehler, you were mentioning other agencies. Of course, the Department of Defense has an imminent interest in knowing what the weather is. We have had not too good experience with a polar-orbiting environmental sensing satellite, NPOES. General James, how important is it that these sensors get fielded?

General JAMES. Well, sir, as you know, from the warfighting perspective, weather it is absolutely essential and maintaining our awareness of the weather in theater and out is extremely critical to planning and conducting operations. So it is certainly critical.

Looking to the ground weather perspective, there are many weather satellites that we rely on, of course, the current DMSP constellation, which we will have three satellites to be launched. So that will carry us forward for some period of time. And then other NASA and civil weather satellites that we can utilize for weather forecasting. But it is absolutely critical to military operations and also space operations because there is space weather that our space satellites conduct and determine and monitor, solar wind, solar

flux, those sorts of things that are important for satellite operations that we also need to maintain the capabilities for from the warfighter and operational perspective.

Senator BILL NELSON. Well, the structure on NPOES between the Air Force and NOAA and NASA has not worked. There is a committee or a task force report that is coming out in a week or so headed by a very respected person in these matters, Tom Young. That report is going to say that basically, since it is underfunded, it needs to be funded, but that between the DOD and NOAA and NASA, they have got to get their act together. And the recommendation is going to be that basically NASA design and operate the satellite for NOAA with the cooperation of DOD. Do you have any problem with that?

General JAMES. Sir, I will just speak from the warfighter perspective. The warfighter has weather requirements. As long as the acquisition process meets those requirements, then no. But I would turn to the acquisition side to talk about the management of the program itself, but the requirements will still be the requirements and they need to be addressed in whatever form or program management structure exists.

Senator BILL NELSON. Okay. Mr. Secretary and General Kehler?

Mr. PAYTON. I would suggest that today NOAA operates not only the polar-orbiting satellite that they have sponsored, but also the DMSP military spacecraft. So from a shared operational perspective of constellation management and flying the spacecraft and tasking the spacecraft, NOAA does that for both the Air Force and the rest of the world right now. We rely on European sensors also from their program they have called MEDOP. So the operational relationship is already established.

The difficulty with NPOES has been a very complex and sophisticated suite of sensors that have been troublesome in their development, in their engineering, most notably a sensor called VIIRS, visible and infrared sensor. That is the shared difficulty that NASA and NOAA and the Air Force have right now, and the delivery and development of that sensor has been the cause of our frustrations with the NPOES program.

Senator BILL NELSON. Well, I would suggest to you that another problem is its management by committee, and you have got to have a lead. The Tom Young report is going to suggest that NASA be the lead.

Mr. PAYTON. If we do march down that path, we will have to have very strong confidence and guarantees from NASA Ordinal that they could satisfy the warfighters' requirements. We would have to work out mechanisms to ensure that.

Senator BILL NELSON. Where does Ash Carter play into this?

Mr. PAYTON. Senator, I honestly do not know. He would be a critical decision-maker if we moved down that path.

Senator BILL NELSON. Well, what I would like you to do is maybe we will get him and you back up here after you have looked at this Tom Young report. But this thing is going to take another billion-billion and a half to complete. I think the management structure has in large part been the problem, as well as the technical challenges. So we will visit on that one on another day.

Mr. PAYTON. Yes, sir.

Senator BILL NELSON. In the meantime, I think it would be well if you would get with Ash Carter and you all get Dr. Young's report and see what conclusions and reach out to NOAA and to NASA.

Mr. PAYTON. Yes, sir. His organization is already working with us to scrutinize Mr. Young's—to date, his suggestions and to look at alternative implementations.

Senator BILL NELSON. Let us talk about protected communications. It appears there may be a gap in 2018. What is the likely potential for this gap? General Kehler and Mr. Secretary?

General KEHLER. Sir, protected communications remains a critical warfighting requirement. That has not changed here recently, although some of the budget decisions with the '10 budget have adjusted the demand date for increased protected com. Some of it was tied to the Army's future combat system and some other service programs that have now been altered with other budget decisions.

Nevertheless, the requirement for protected communications for the forward forces remains an especially growing requirement for communications on the move that are protected. We have two programs underway right now. One is not protected. That is the WGS system. We have put two of those satellites on orbit. The first one was turned over to Pacific Command almost a year ago and is functioning very well. The second one is on orbit and going through its checkout phase, and all indications are that that one will be very successful. We have four more of those to launch in the coming several years to put much more unprotected capability on orbit, which is important for the warfighters as well.

Protected communications today is MILSTAR. That is the name of the satellite that does that. We are going to replace that with advanced EHF, or AEHF. We expect to launch the first of the AEHF satellites within the next year or so, perhaps a little bit longer, the fall probably of 2010, and that will be the first of four advanced EHF satellites. Now with the budget decisions on TSAT, which was to be the follow-on, we are looking very hard at an architecture that will continue to put upgraded, if you will, advanced EHFs into the system beyond number 4.

So sitting here today, I am not concerned about a gap, as we would think of, you know, no satellites on orbit. The question is how quickly can we bring additional capability into advanced EHF as the warfighter need goes up. I think we have a way forward to do that. I think it was Mr. Payton who used a great word a week or so ago in another appearance where he talked about ″harvesting″ the technology out of the TSAT program. We will need to go do that, find out how quickly we can infuse some of that technology, both in WGS and in AEHF, and continue to rely on commercial as well and approach this in the sense of an architecture.

So I am not overly concerned, sitting here today, about a gap, if you will, in '18 or '19. I think the challenge for us is to decide how do we go forward here with advanced EHF and what does that mean in terms of being able to pull new things into advanced EHF. Those decisions have to be made and brought back probably in the next budget, not this one.

Senator BILL NELSON. Ms. Chaplain, do you think there is a gap?

Ms. CHAPLAIN. We have not done a formal gap analysis on this issue and would like to, but we are concerned about the potential

gap in protected communications, as well as the ultra high frequency communications, as well as missile warning capabilities, and of course, the GPS and the weather satellites.

AEHF is still not out of the woods yet either in terms of technical problems. It is important to remember that. And while you can add evolutionary over-time capabilities to AEHF, you have to also be aware that at some point you might be adding so much you need, again, a larger satellite bus and more redesign that might take more time than you think to answer.

Senator BILL NELSON. I want to talk about TSAT. It was canceled, but after we spent 2 billion bucks on it. Mr. Secretary, what plans are in place to preserve the work that was done for TSAT?

Mr. PAYTON. Yes, sir. The TSAT program had matured what I call piece part technologies to a very high technical readiness level. These are irradiation hardened processors, laser com, a multitude of technologies that the GAO identified several years ago and the Air Force agreed with, and we spent over $2 billion maturing those technologies before we would set the configuration of the spacecraft itself and before we would select a single particular industry to go build the spacecraft.

Those are the technologies that I used the term ″harvest″ from the TSAT program so that we collect the intellectual property that the Government has rights to, we collect the equipment that the Government justly, rightfully owns, and we start laying in the plans and the designs on how to apply those harvested technologies to both AEHF and WGS.

So that is in front of us over the next months, and again, we will turn to the warfighter to prioritize which new capabilities we add when out of that harvested collection of intellectual property and piece part technologies from the TSAT program.

Senator BILL NELSON. Is AEHF next?

Mr. PAYTON. Yes, sir. The first launch is a little bit more than a year from now. The fiscal year 2010 budget request includes money for the fourth AEHF, and again, our intention is to look at continuing that constellation with the properly phased upgrades to satisfy the warfighter needs.

Senator BILL NELSON. General Kehler, what are the lessons learned from the cancellation of TSAT?

General KEHLER. Sir, that is a really good question. We had begun the TSAT program, I think, doing a lot of things right. We were insisting on technology readiness that was high. We were dedicated to locking down requirements, et cetera. We thought that if TSAT had continued, that we had started the program correctly and that we had addressed many of the concerns that GAO and others have raised about programs like this.

I think the lesson learned is this is, in part, an issue, I believe, about synchronizing capability with need over the longer term. We were producing TSAT on a schedule that was going to have it ready to provide increased support for warfighting systems that are now perhaps taking a little bit different direction. So I think it is about synchronizing need.

At some point, I think Ms. Chaplain is also correct here in that you can only add to advanced EHF to a certain point, and from there on, we will have to look at a follow- on system to advanced

EHF. So we will see where this will have to go in the future, but certainly for the near term, continuing with advanced EHF through number 4 or perhaps beyond that, as we look at the next budgets, will be the right thing to do.

Senator BILL NELSON. Admiral, do you have heartburn as a result of TSAT being canceled?

Admiral HARRIS. No, sir, we do not have heartburn that TSAT was canceled as long as AEHF proceeds on the course that Secretary Payton and General Kehler have outlined. Protected communications, obviously, is important to the Navy, as it is to all the services, and we are confident, sir, that the Air Force will manage AEHF through to fruition.

Senator BILL NELSON. Well, do you have heartburn that MUOS is 11 months late?

Admiral HARRIS. Yes, sir, we do have heartburn with MUOS. The Air Force does not have a monopoly on delayed satellite systems. MUOS is suffering an 11-month delay right now. I believe that we will get through it. There are some technical challenges that the builder is experiencing with the critical path through the antenna downplexer. After it goes through that, the next phase of MUOS testing will involve the thermal vac where a lot of problems, as you know, could come up, but right now, the problem is in the antenna piece. It is mating the legacy UHF payload to the new antenna bus, and that is a very significant problem.

The Air Force has offered to help us in that, and we are grateful for that offer of assistance. The assistant Secretary of the Navy for Research, Development, and Acquisition has determined that he needs to put together a team of national experts to help industry to go through this problem that we are having with MUOS. We recognize the importance of the satellite to the warfighter for the UHF communications, and we are grateful for the assistance that the Air Force has offered in that regard.

Senator BILL NELSON. Is the Air Force going to pay for it for you?

Admiral HARRIS. No, sir. That is our program.

Senator BILL NELSON. How much extra is it going to cost?

Admiral HARRIS. Sir, I do not have that information now, but as soon as I get it, I will get that back to you as soon as we know what it is.

Senator BILL NELSON. Okay. We need to know that.

Admiral HARRIS. Yes, sir.

Senator BILL NELSON. The legacy UHF satellite is not lasting as long as it was supposed to. So now there appears to be the possibility of a UHF gap. Tell us about that.

Admiral HARRIS. Yes, sir. Sir, if MUOS suffers this 11-month delay, the first on-over capability will be in February of 2011. The projected 70 percent line from which we would call a gap will happen in mid–2010.

There is a bit of good news here and that is that we are using the legacy satellites, the LEASESAT and FLEETSAT, our fleet satellites. And every day that those satellites do not fall out of the sky or fail, that extends that gap point further to the right. I think it is a tribute to good satellite design and acquisition practices that

those satellites, as old as they are, continue to remain in orbit and are continuing to produce for us.

The Navy has also put in place several mitigation procedures, including using the digital part of LEASESAT in order to increase channel accesses. So that is good news.

And we are optimistic that we will be able to manage through this, and if there is a gap, below 70 percent, that that will be minimized, sir.

Senator BILL NELSON. Have you thought about putting a UHF transponder on a commercial satellite?

Admiral HARRIS. Yes, sir, we have. What we have determined is that the cost of doing that and the availability of a satellite to do that in terms of time—the earliest we could put one up would be in the 2012 time frame, which is after the first MUOS should be on orbit.

Senator BILL NELSON. Are there other contractors involved besides Boeing?

Admiral HARRIS. Well, for MUOS, the prime is Lockheed Martin. What we are trying to do with MUOS, sir, is put the legacy UFO payload onto the MUOS satellite, on the antenna bus. So the industry is trying to mate a Boeing legacy payload to a Lockheed Martin antenna bus, and that is where the first challenge, the critical path challenge, that we are facing is.

Senator BILL NELSON. We are going to go in just a minute over to the secure room.

General James, we had an Iridium satellite collide with a Russian satellite. Joint Space Operations Center has the job to track and to warn of collisions. DOD submitted to us a legislative proposal that would enlarge and expand the program to assist commercial entities with additional support. Will this expanded program result in additional information being provided to the Joint Space Operations Center?

General JAMES. Sir, the commercial and foreign entity program is that to which you refer, and that is a program for us to provide data to various users who sign agreements, and that data would be the location of your satellite, the possible conjunction of your satellite with another object, and then anomaly supports if you have a problem with your spacecraft.

The potential for data coming into the Joint Space Operations Center would be that, as a part of those agreements, we would look to possibly share data from the commercial providers of the world such as INTELSAT, INMARSAT, SES AMERICOM, where they have very accurate knowledge of their satellite location and they could then provide that into the Joint Space Operations Center freeing up our sensors to go look at other satellites from which we do not have very accurate information. So from an information-sharing perspective, we are looking at some agreements that we would like to foster with the commercial entities to gather some of that location information on their satellites.

Senator BILL NELSON. Would the Air Force get reimbursed for the services you provide to nongovernmental entities in that Joint Space Operations Center?

General JAMES. Sir, the law allows that. At this point, the Department has not elected to charge for those services. I believe that

will be a policy decision that needs to be made at OSD and above on how we implement that.

Senator BILL NELSON. In that operation center, do you not need upgrades?

General JAMES. Yes, sir. As we look at expanding our conjunction assessment capability, we are looking at additional processing capability requirements, as well as additional analyst capability requirements in order to meet some of those needs.

Senator BILL NELSON. In order to avoid these collisions, do you think anything else needs to be done?

General JAMES. Well, sir, where we are today is that we are bring on that additional processing capacity here in the near term. We are adding, through funding provided by Air Force Space Command, additional analyst capability, and we are planning to be able to do this conjunction assessment for roughly 800 satellites, those that can maneuver, by this fall. So that is our current plan that we are marching down.

But in the broader sense, we certainly need to increase our capability for space situational awareness, increased sensor capability, increased radar capability, increased on-orbit sensor capability, because we do have shortfalls today in terms of how often we can track objects, how small of an object we can track, and how accurately we can track those objects. So broadly speaking, we need increased space situational awareness capacity.

General KEHLER. Mr. Chairman, may I add just a quick remark to this? Space is more crowded than ever. We catalog over 19,000 objects that are on orbit today. There are most likely thousands more that we do not catalog because of their size, nuts, bolts, washers, that sort of debris, if you will, that is up there, fragments from things that have gone wrong, for example. We know that all of them are traveling at extreme speed, 17,000 miles an hour roughly, and this problem is growing for us.

We have now an investment road map for how we improve our space situational awareness. You will see some of that investment request in this budget that comes to you this year. That includes not only some improvements in sensors, but there is a piece of this investment that will go to General James so he can fuse the data that is out there better. To get better, faster, it is not about putting more sensors out, although we will do some of that. It is about using the sensors we have more effectively. We have plans in place to do that that will be included in this investment plan that you see from us this year.

Senator BILL NELSON. Thank you all for your public service. We are grateful. This is highly technical stuff that we are getting into. We are going to get several layers deeper now. So the committee will stand in recess and we will reconvene over in the Senate security area. Thank you.

[Whereupon, at 3:07 p.m., the subcommittee adjourned.]