TRANSCRIPT

Defense Writers Group

A Project of the Center for Media & Security
New York and Washington, D.C.

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Under Secretary of the Air Force
November 29, 2006

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Q: Welcome to Dr. Ronald Sega. He's the undersecretary of the Air Force, has been for about a year now. Before that, well, he's got probably the most impressive resume since Harold Brown came in here 25 years ago. He's the DOD executive agent for space, and he was for about four years the DDR&E before this job. He's an astronaut. How many times did you go up?

A: Twice.

Q: So, anyway, glad to have you. You've made that transition from DDR&E to undersecretary of the Air Force. I'm kind of interested in what you found when you got to the Air Force position that was surprising to you, disappointing to you, make you draw back in horror (laughter.) And what you've done to apply your experience from DDR&E to fixing the space programs that were in trouble.

A: OK. That's a fair question. (inaudible) research and engineering, DDR&E, that was from 2001 to 2005; we had three major areas of emphasis in technology and also an emphasis on workforce. And by in large, one way or the other, those of all have been and will continue to be important to the Air Force. One is the national aerospace initiative in which we developed a technology framework for areas in air and space. Some of them were in the areas of high-speed turbines and hypersonics. Another area was in space access. Another one was in space technology, and during that period, we saw a doubling of the science & technology across the Department of Defense in the area of space-related activities. And so that ends up helping form a base on which we can do other things, such as establishing more small satellite activity to operation response in space

and so forth in the Department of Defense overall and in the Air Force. (Inaudible) a space development and test wing at Kirtland Air Force Base, part of Space and Missile Systems Center, SMC, at the end of July of this year, that's located literally across the street from the Air Force Research Laboratory so that the idea and the S&T kinds of things can move quickly through technology development, systems development, system production, to capability more quickly. And so that was one area in terms of DDR&E, and we've clearly continued along that technical path toward being able to fly small systems. One small TACSAT, if you will, is scheduled to launch on the 11th of December on a Minotaur out of (inaudible), so things are kind of moving along in that area. Another was in the area of surveillance and knowledge, and most recently, Secretary Wynne announced the standup of Cyber Command, will be located at Shreveport, Louisiana, where General Elder is the commander there of 8th Air Force. So some of that was information assurance and in sensors and knowledge management and things that formed the basis of how he would work in the cyber domains. That's been helpful. A third area was in energy and power, and a little known fact there is we probably increased percentage-wise largest amount in S&T in the Department of Defense from 2001 to 5 in energy and power, albeit it started at a relatively low level. And coming over as the undersecretary of the Air Force came the designated SDA, kind of the energy executive for the Air Force, and we've established an energy strategy, and supply and demand. The supply part of it in terms of aviation; we use a lot of fuel, bought 2.5 billion gallons as a matter of fact each year. And so, looked at an alternative source of a jet fuel, and actually purchased synthetic fuel derived from natural gas, but the process can be done by starting with coal or oil (inaudible), and so we tested them in engines at Wright-Patterson, one engine that I was actually watching, the CFM56 Core, which is the engine we use in the KC-135R, and it's (inaudible) engine in the -737s. And it did pretty well, frankly, on the fuel--you could see the flame pattern at the aft side of the hot section go from the orange-yellow flames to clear. It was the synthetic fuel was turned on, so we predict the numbers are way down, then we looked at a blend of that kind of fuel to a TF33 engine, which is the one on the B-52, and I tested that at Tinker Air Force Base, and then took it to Edwards Air Force Base and I flew on the first test flight of that, where we had Engines 7 & 8 flying a blend of synthetic fuel--50/50 roughly, with JP8, and they continued to take the test points on those two engines run off a fuel supply off of Tank 4 on the 27th and 29th of September, and now that engine's coming back from test. So we've supply side on the fuel part as well as on the facilities and infrastructure. And kind of a little known fact, the Air Force is the No. 1 purchaser of renewable energy in the country (inaudible). In FY05, purchased a million megawatt hours in renewable energy; four of our bases are 100 percent on renewable--Dyess, Fairchild, Minot, and Columbus, so that's the kind of supply side. Demand side, we worked on this DDR&E, too, and it (inaudible) engine programs to get greater efficiency in the engines, as well as computation research in terms of the plan form of the airplane to increase efficiencies on the airframe itself, as well as planning tools for management of the fleet. For the takeoff of an Air Mobility Command plane about every 90 seconds (inaudible) around

the world. So it's important that we do that well and try to be as efficient and as effective as possible in the aviation side. And on the facilities side and the infrastructure, when we build new buildings, energy is a consideration in design. We're also looking at lower-speed vehicles if that's appropriate; some of our bases have 25 mile an hour speed limits, so if you look at the vehicle in saying, this is where it's environment's going to be, it's going to be that speed, you can look at more efficient vehicles to do that job to get things from A to B. And I was at Hickam Air Force Base the last couple of weeks, and they have a hydrogen gas station, and there was three vehicles out there that they've retrofitted or modified or both from the design standpoint in running hydrogen, and one is a bus; we took a group when I was riding that bus, on the one that used hydrogen as a source as well as a van and they have another flight line vehicle. So the energy piece is one that kind of transitions, and the last one's workforce. And I've been pretty passionate about science, math, and engineering for a long time before DDR&E and dean of engineering so I think that's pretty important. And through the DDR&E time, now continuing, we had a program, we had a couple of names, SMART was one, and National Defense Education Program, that emphasized scholarships in math, science, engineering, and some language, similar attributes to the National Defense Education Act of 1958, this is the National Defense Education Program, in having a payback component to it. But that also allows more interaction, I think, in a very positive way with students that are getting a scholarship knowing that they are going to, for the first group, probably into DOD laboratories. So, trying to build a relationship between some of the more senior folks in a lab and the student. So, say for example in the summer, they would take an internship in a laboratory and gets some hands-on in terms of their work, so that when you go back to the classroom, they can connect what they're learning in the classroom to what they had hands on in the laboratory, say during the summer. And then as they move along in their curriculum, if it's anything like the college that I was dean at, dean of the capstone program, kind of pulled things together. And probably if you're very familiar with this area, your capstone was kind of related to that area and you'd build on on what you've learned and you also then (inaudible) do well in your school. You're going to hit the ground when you have your first job, and I think that's all real positive, so we're working hard on recruiting, retaining of our technical components in the Air Force, which is pretty important. So many of those things carry over from a technology standpoint, from the acquisition part of your question, approached in more of a back-to-basics. Back to my dean of engineering, you know, solid systems engineering, how would you go about doing these types of things, an experienced workforce that has built up over time their knowledge of and complexity of things they've worked on, so not only does the technology mature in time from science & technology tier level 1 and 2 to technology development 3 & 4, to systems development 5 & 6, to system production, but the people also end up getting more experiences. So when you're an acquisition program manager, that they have some technical instincts, as well as experience in program management and financials, so that's important that we don't take on too much in the acquisition process but do things more in a block approach is also there. We have specs

and standards and that's very important, you have the correct balance and work with industry and aerospace and our corporations so forth to establish forums in which the industrial base can come together with government and establish the right specs and standards in this process, and reduce the acquisition cycle time. And so you see that in some of our programs. TSAT is one of those that we submitted in FY07, we got funded in the Block 1 block approach; GPS IIIA, we'll begin the GPS III's satellite effort in a block approach. So those are the kinds of things that we brought forward and took the experiences in the technical area, and start to apply them towards acquisition to get more of our programs out the door in a relevant time, with the rate of change in the 21st century and focus on delivering on cost, on schedule.

Q: Well, you mentioned TSAT. I'd like to ask you a specific question about that. There's a lot of word around that that program is heading toward a delay of some kind. Is it?

A: Well, the Congressional marks from last year are, from what we requested to what was received, is substantially better than the previous years; nearly a 400 million dollar mark and then in 07 about 130, so when you have a reduction in funding that results in a bit, a little delay normally. But we're in also the early part of the satellite part of the program, the space segment, and still due for (inaudible) select for next year. But we are under contract of the ground segment, TMOSS, as of January of this year, a 2.1 billion dollar effort to look at how the ground segments can have more (inaudible) back-to-basics kind of thing. Any rate into the network, network-centric approach, and then we're back to the cyber kind of piece to get that right, setting the protocols and standards in for the space segment. So the space segment interfaces the ground segment that's connected to the network, and so we went forward on a ground segment first, which to some people seemed unusual. But if your key is to develop a network that you're going to be depending on, the pieces need to be connected to the network. So having the ground segment in place that has that network conductivity and standards and protocols are established for an IP-based system, then I thought that was the right thing to do. And so, gone forward on that just to see how all this works, but TSAT remains a very important program. It advances us down the road in two fundamental areas; one is in placing a router processor in space for IP-based communications, and second is a higher bandwidth crosslinks with lasers. And so we're not going for the full-up end state right away. We have a Block 1 that has a reduced capacity from what our end state will be in both the capacity of the laser crosslinks, as well as the performance of the processor router, both being significant.

Q: I don't know exactly how to read that, does that--yes, there has been a delay in the sense that it's less of a system than you had anticipated having at this point, at the point you're talking about, or has there been no change?

A: Well, people work through the programmatics since I haven't seen exactly what its

schedule is in terms of the impact of reduction of funding. But basically on track at this point with the Block 1 approach, and we're still focused on that. Clearly we're in, the budgetary things are very important. We're also in the middle of, the end of the fall review, and so the budgetary question is work in progress. So we know what we're doing in '07; it's not quite as much as we were anticipating, but still it's significant, I mean there's a lot of money in TSAT. Seven-hundred-something million, so we know what's '07, but in '08 and beyond is a work in progress.

Q: Dr. Sega, I wanted to ask you about space radar. But in the context of how it may represent a trend (inaudible) may not, but what I wanted to ask you is how confident you are at the end of the day when all is said and done that the DOD and the intelligence community will have a common material solution for space radar. And I ask that because it'll get some programs, like the J-UCAS program, originally you had two services pursuing their own systems based on their own requirements. Then they came together, they were going to pursue a joint system, so they did a lot of technology development (inaudible) those technologies. But now they're going their own way again, so I'm wondering if you feel that service unique requirements or organizational unique requirements kind of will drive people toward unique material solutions, although there will be a lot of merit in trying to have as much joint technology development as possible.

A: Good question. I think that a common system makes sense, and as we move down that road we're increasing the converging to that. In the case of radar, technology is kind of moved forward in phased arrays. We've had phased arrays on all kinds of things; PAVE PAWS, antennas, AEGIS, radars, F-22 electronically steered array, AESAs, JSF AESAs, we're working on the technology pieces for radar that is building on that technology, and the performance of a multiple, multi-functional phased array can supply the needs, I think, for all interested communities. And it would be a very robust system because of the nature of technology. And General Tom Sheridan, who is the program executive officer, PEO, for space radar, has done a good job over this last year. Once again, there was a mark on space radar, but not nearly what it was the previous year. And it was more of a ramp, I think both the TSAT and space radar, of the path that we're going, this back-to-basics makes sense and we do the same sort of thing to radar. But General Sheridan is now the deputy, a deputy, at the NRO, and so he has the opportunity of having three bosses. One for day-to-day kinds of things is Dr. Don Kerr in his deputy role at NRO; he's the senior Air Force officer in looking at our space cadre and more individual management of people's careers, which I think is very important, back to this workforce issue. We're going to need a great knowledge, I think, as we go forward in the 21st century because it moves. (Inaudible) too much about it, but the rate of change of technology will be higher than the last century, so you have to kind of prepare for that. And the Air Force is a great technical organization, and so watching that workforce is very important, and so Sheridan in that role reports to General Chilton at Air Force Space Command that watches the space cadre. His third hat is that with

space radar, and that's PEO for space radar, he reports to me. And so that is a role that he has had and continues to have and I think that this would be in the sense co-located and working together has also been helpful. So I think we're on a good course, and in that particular case, an airplane may be over here doing something over here, and the satellites (inaudible) you know, round and round and round, and if it's very capable then I think we get the job done and it's right thing for the country.

Q: SMC officials are supposed to meet this month with Ken Krieg to review the status of the SIBERS program. I was wondering did that meeting happen? If not, when is it going to? What happened?

A: Meeting occurred, and I think he was doing this cordially; I ended up not being able to attend it because of meetings in the Pentagon. My deputy Gary Payton did attend and Ken Krieg was pleased with how the folks in the program office on the government side, the contractor and users have been working together going forward and there are specific milestones that need to be met and that progress has been good. I announced the 17th of November at the AFA Conference that SIBERS HEO was doing well on order, meeting or exceeding our expectations, and some of that technology is similar into the TEO satellite. So there's an on-orbit data conference as well as progress in terms of assembly, integration, and tests in the SIBERS program. An additional discipline that's been added to the program, again, the back-to-basics tenet, if you will, in terms of approaching the acquisition process itself. And obviously (inaudible) asked Ken Krieg the same question, I think you'd get the same answer that (inaudible).

Q: Sir, I'd like to ask you more of an operational question. To what extent is the Air Force in a position to contribute more troops on the ground in Iraq as opposed to aviation capability and are you expecting to be asked to contribute more in these months?

A: We have a rotation AEF construct, people rotating in and out, and we've been asked and provided folks that are doing that where we've actually added an additional component to our basic training in terms of battlefield airmen, so that our folks coming out of their initial training, have the exposure and have gotten to a certain skill level of handling weapons and providing a first step toward a background there. but we provided people to support those roles on the ground, and I'm not aware that we've been asked to do more than we are doing at this point, but we're pretty proud of our folks that have been doing that role.

Q: Are you capable of providing more at this point?

A: I'd have to go back and check because it's a question that they ask. I don't know if it's a question we've been asked, I mean, the numbers that we have asked to provide we've

provided (Question) I want to say it's in the range of 5 thousand, but I'd like to get back with you on that.

Q: General Keys was here a couple of weeks ago, and he actually took the opposite position. If I can paraphrase it right, he said too many airmen are doing these "in lieu of" kinds of tasks and that he needed some relief, the Air Force needed some relief, because he's having to spend scarce dollars to train people in core competencies that are not part of Air Force core competencies. Is that correct? (General assent of members).

A: I don't think we're exactly saying opposite things. We've been asked to do things here in this interim period and we're doing that. It's not saying it's easy to do that, I didn't say that either. And we're making this basic training, just for all of our folks coming through, extending it for another two-and-a-half weeks or so in the basic training portfolio. But our core missions in the Air Force is air, space, and cyberspace. And so as we provide this help in the near-term, longer term we'd love to focus on those. I think General Keys and I are pretty close on that. I appreciate that though, any of those kinds of things, it sounds like we're going to be saying different things, but the English language isn't perfect, we'll just work on talking until we have an understanding.

Q: Actually, I wanted to ask about space surveillance, surveillance of space, that is, the centerpiece program there of course is SBSS (inaudible) block approach, Block 10 and Block 20. And I understand the acquisition strategy has been a little bit of flux in terms of the number of spacecraft in Block 10 vs. Block 20 and vs. one Block 10, and that affect the number of spacecraft in Block 20. I remember there were decisions that need to be made pretty soon--I wonder if you could just tell us where that's (inaudible) right now.

A: Let me give you more of a general answer to your question as the details are embedded in the fall review and the budgetary processes, for example, how much money is spent on a specific program. Generally what we'd like to do in a block is to have more than a single satellite because you want to take advantage of the work that you've done and you build more than one in the block. It turns out that a capability of the sensor of SBSS (inaudible), and so its capability would be expected to do well but we haven't flown it. But, we haven't been all the way down the development process on it that we're moving rapidly in that direction. There was some adjustments that were made in terms of the management of the program, and again, getting a (inaudible) discipline program, part of it is more of our government folks at key places in plant where work is being done, but the idea of looking at that as a block and potentially more than one in a block makes sense, but we are in the middle of the budget process in terms of how much money and how fast the programs go.

Q: On a related note, I know that Northrop Grumman was in this position of what they call the (inaudible), and I think it still is in this position--sort of a systems integrator for

space surveillance requirement. That gave them a certain oversight authority or integration authority over SBSS, but the Air Force and the (inaudible) together agreed that they should step out of that role for SBSS to allow a little more direct interaction between the Air Force and the company's actually doing SBSS, which is Boeing-involved. And I was just wondering, has that helped the program as it was expected?

A: Yes. There was a layer of activity that SMC looked at and said that there's greater efficiencies in the realignment, and focused to where the work is being done and having additional government participation in these kinds of things is important. We're increasing that, and increasing not only the government role in these areas but making sure our folks have the experience to do well in that work.

Q: And just lastly, are you still I believe working a December '08 first launch for SBSS--is that schedule true?

A: At this time, that's where it's at. It's a first flight of that satellite, but I believe that's SMC has identified their target.

Q: Has OEF and OIF revealed any space limitations that you've taken steps to address, and could you specify?

A: Space has done well in support of OIF and OEF. The prospects of more persistence has been one of those attributes of ISR has increased in importance. And so how you would go about integrating air and space, and I think about integration in a couple of different dimensions. One is a cross-base in how systems would be mutually supportive, but also how something like ISR and persistence for an OIF, OEF, would look at it in an integrative way from space, air, and ground, and so the greater integration of those, and some of that would be benefited by design from the beginning and how you could rapidly transfer information and do mutual cueing in a function across the (inaudible), and so that is probably one of those areas that we'll continue to work harder on; more persistent awareness in space would be part of that.

Q: What part of it, what's missing in that? I mean, I think that many people, myself included, have this idea that there's always these satellites watching--how much more persistent can you get?

A: In terms of say, a radar, we looked at the radar. Some parts are just the physics; if we have a radar going overhead there's a power and aperture, part of the design of radar, and the radar beam goes through the earth and then back. And so the power that is received back in the radar goes, is one over r to the fourth. So fourth power of the distance, and so at that point, you're in the lower orbit, and so as you're passing overhead, you know, shuttle orbit is 90 minutes. And so then Earth turns below you and

you offset the next time, so if you're looking at a revisit then not too long after that you have to have another satellite in low earth orbit. Whereas a communications satellite, you can have your dish antenna offside your home and focus there. That light would be the antenna, you're in good shape, because a geosynchronous orbit, small signals are appropriate to make it down and you get your TV reception. And so from a communications standpoint, a geosynchronous orbit is good for some of this ISR, the low earth orbit position is the correct one at that point, and more persistence is important, so we're also looking at the smaller satellites that could potentially provide increased persistence, if you will, and so we have different experiments. There should be the word experiments after these TACSAT activities, because they're not built from the get-go for an operational satellite. It may be that during our experimentation it turns out that they have some residual value, similar to ACTDs and it can be used for a bit. But they're tactical satellite experiments, and some of those will be in the area of ISR, as we fly them.

Q: Do you have a goal as to how many more satellites you think you need in order to provide continuous coverage in low earth orbit satellites?

A: That's an optimization in terms of the space and air, and you do that not only in terms of the tactical performance, but also budgetary considerations of how you would try to optimize performance based on what value a space, air, and ground asset would provide. The network ends up enhancing that tremendously. So some effort as I mentioned before TMOSS, a significant effort there, is to get the networks of these things connect better and work together better. So that the systems engineering, back to the fundamentals again, are benefited if we look at the larger system as a way of going forward, and then you look at the constraint in terms of resources and try to optimize the solution.

Q: Don't you see that General Hamel has said that recently (inaudible), has said that he's (inaudible) UAV airs program, the alternate sensors program, as not just a contrary to SIBERS, it might just be that some of the (inaudible) technologies can be put into the SIBERS program potentially I would assume supplanting the Northrop Grumman sensor or (inaudible) sensor that's not being developed (inaudible). Can you talk a little bit about what the plan is--is there a new approach now to the air solution, is it not a (inaudible) anymore?

A: The Nunn-McCurdy process that looked at what are we ahead on SIBERS had two paths going forward for an infrared sensing system after GO 1 and 2. The work is proceeding on GO 1 and 2, and it's been going on for a while. And so then the decision in terms of risk communication that looks at the progress of 1 and 2 was part of it. The other is moving toward new technology. What we've had on programs in the past, when they're quite long in time, then when you fly them the technology that you're using is,

they're old by that time. So if you end up shortening the acquisition cycle time in designing for modularity, then you look at ability to insert (inaudible). And so in the case of the technology of the IR detectors are getting better and better at infrared detectors. Not only for SIBERS, but also for astronomy and all kinds of things, you know, it's just getting better, and going from linear rays to square focal planes and more elements in them (inaudible). Big, big telescopes are built in the optical region and silicon-based kinds of things; others (inaudible). And so looking forward to increasingly capable focal plane; arrays is kind of important, and the question is, how do you take advantage of that, and insert them in so actually the system designs are being more straightforward is that more elegant solution is available. So the question is how does that then insert into a follow-on to the GO satellites and the new satellite design. Does it incorporate in a different way, and that's a little bit early right now--we've had our DAA out on those technologies through the Air Force Research Lab, and that's the other advantage of, as mentioned before, of having a wing now instead of a detachment, a larger effort in Albuquerque right next to the laboratory that kind of the cross-fertilization of ideas and people and those kinds of things are good, they go to the same crop shop and the gym, and so all those kinds of things matter actually. And so the laboratory that's gone out and the two winners were Raytheon and SAIC. And so that's worth to go, and so you need to be informed by how that goes, and then determine in another contract SMC lab (inaudible), in terms of how you then insert a newer technology into a satellite that perform that missile warning, missile defense, battle space characterization and (inaudible) function.

Q: (Inaudible) Was the sensor operating and able to observe any of the activities during the Iranian missile exercises or the Korean missile exercises that occurred earlier this year?

A: I won't go into any specifics, but it's done what we've expected it to do in terms of detecting launches.

Q: Dr. Sega, you mention Donald Kerr. He's on record in September as saying that China had recently painted or illuminated a US satellite and subsequently General Cartwright raised some questions about, said it was unclear whether China had tried to disrupt the satellite. What's your understanding now of what happened?

A: The policy is in terms of identifying specific capabilities that we have in these areas is not to talk about it.

Q: I'm not asking you to identify any capabilities in these areas, I'm asking you about an incident that Mr. Kerr described and that's the subject of some doubt as to what happened for a readout on what you understand happened there.

A: That's an area that I'm not going to address.

Q: For reasons of classification?

A: Classification policy in terms of the idea of capability that others may have....

Q: But again, it's not a question of any capability, it's what happened there as far as you're concerned. Can you say anything? Can you describe anything about that incident?

A: I actually, personally, I told you the policy on the personal side, I don't know.

Q: Well in that case, can I take a shot at something else? The business of a space based missile defense test bed is going to be coming up based on what we expect in the President's budget. What the Missile Defense Agency has said in the past it would seek, has the matter of what form that space based missile defense test bed reached your desk and what do you foresee in the early years?

A: The missile defense piece is out of MDA. Our interface with the MDA activities is those satellites that end up supporting (inaudible) such as SIBERS, as I've mentioned before. So SIBERS kinds of satellites and also the conductivity in terms of communications to bring that data to bear but I have not been involved in that. It's an MDA question.

Q: Sir, as you know, Secretary Rumsfeld (inaudible)--changes since Gates chosen to replace Rumsfeld and Democrats took Congress. How do you see all those things affecting space policy? Are there certain trends that we should expect to see more of and certain things which might fade back as we have this shift in (Inaudible)?

A: First, the part that I'm aware of on that transition that you talked about was that there's a hearing scheduled as I understand on the fifth of December at 9:30, so we have to let the process go through first. In terms of the space activities, I think Congressman Reyes was asked by one of you probably in this room what he thought about our approach to space and back-to-basics and those types of things, and he said he thought it was the right direction and the right way to go. And through my year plus a couple of months here I have (inaudible) a bipartisan support for the direction that we were going. And so at the standup, in fact, of that wing in Albuquerque, that would be the same day that Congressman Ebbert and Reyes were together at Kirtland Air Force Base, and so that only had them to understand what this new organization looked like, and then toured through the facilities together. And so from a space perspective and the committees that I have testified in front of and the staffers that I have interacted with, from my perspective has not been a partisan nature to the discussions. We're trying to do the right thing, and working with them, and I think we've pretty much been on the

same page.

Q: Have you had any special briefings since the elections?

A: No.

Q: I wanted to ask about the management of these programs, that there continues to be questions of the Air Force ability to manage these programs--if you have the talent, if you have the skills. One of the space cadres, one of the responses to that, what's your assessment right now of the ability of the space cadre to do the job, and what specific skills do you see maybe lacking?

A: Well, I think we can do the job as we are right now. But I also expect us to do things faster as we go forward in time and to have more products, if you will, coming out. If you look at the potential of smaller satellites and their capability of doing things, and again the rate of change of technology is twofold. One, you want to take advantage of that because it adds additional capability, but you also have to have the design talent and the integration capability to make sure that all fits, and this speed at which you can deliver additional capabilities and be at a pace consistent with the 21st century is important. With that as a context, OK now to do these programs, but the expectation is going to be increased in the future and therefore the focus on making sure that talent pool has the experiences and so again, one of the outcomes of having AFRL SE area down in the Albuquerque next to the Space Development and Test Wing, and we have 120-day study undergoing for the joint office in ORS that's also ingoing that includes then the other services--Navy, Army, DARPA, MDA in terms of some of the sensors and so forth, that would be technically consistent with that; NASA, NRO, involved in some of these more leading edge concepts on the smaller satellite side, that having more of our folks and particularly in the engineering, math, science areas, get more hands on experience will serve them well as the rate of change increases. And so OK now, but prepare the future, we've got to do some work on that workforce piece in my view.

Q: The small satellite is one that (inaudible).

A: Well, no, I think it's an opportunity but you also, you're also pushing the leading edge technology in a sense and potentially in more fronts than you had in the past when you were doing a few larger satellites going down the road. Now you can look at more of those. One of our TACSATS, for example, is going to be hyperspectral imaging, so the question is: How do you take advantage of new technology and back to focal planes and gradings and all kinds of things that could be possible when you look at new technologies?

Q: GAO has just done a report on (inaudible) links and space in a six-case study. And

some of it seems like human nature, we always love (inaudible), but that's human nature. But there are two pieces they say, problems they say, as a matter of national policy we shifted a lot of managerial responsibility with programs to industry (inaudible). And concurrently, the Air Force particularly shed an awful lot of in-house expertise, systems engineering and (inaudible), and the allegation from GAO is the Air Force gave up the ability to be a smart customer at the same time as (inaudible). You've got more experience in engineering than anybody I've seen come to (inaudible) this group; a lot of people just talk about the necessity, how do you decide how much in-house expertise you need to be able to reap the presumed benefits of (inaudible) industry's experts?

Q: Great question. One of the GAO reports, and one of the GAO folks that was at a hearing with me said that the steps we have taken are in the correct direction and that included increasing our cost estimation capability in-house both at SMC as well as an overall support in this case of the Air Force, and we work together with the (inaudible) and OSD, so that's important. Also, what you cost estimate to; in our case it's moving toward an eighty percent confidence interval for cost estimation. Now, if the spread between a 50 percent cost estimation and an 80 percent cost estimation is large, that's an indicator that the risk at the system production level potentially is too high. So, as we look at this construct in terms of this back-to-basics, we're reducing the risk in the system production stage; we're increasing the risk in the science and technology stage, pushing the frontiers harder. Some stuff that we're going to fly, don't be surprised if it doesn't work, some things on the satellites because we're going to be pushing quite hard, a percentage of those at the science & technology level. And so it's a redistribution of risk from the purchase of operational satellites and you look at the development of the next generation that you're going to count on. For example on the GO example of SIBERS, (inaudible) system development underneath, and the next generation is technology development, and the generation behind that is science and technology. So if you're looking at a capability you want to maintain, communications or something, then in my view that having investment in the next three generations seems to make sense. If you're really truly three generations out in science & technology, some of those are going to fall by the wayside. You need to push pretty hard down there, and not all are going to be successful, and that's good. Now in terms of the government workforce, as they march through here, they all have increased experience and they all have looking at the education experience giving you the technical instincts. Now as they become in the (inaudible), a program manager's up here, they have gained some management experience. They've gained some technical instincts as well as understanding the financial pieces which are important, and so now you have a cadre of people, not only in the cost estimation side, but on the program management side, that have additional technical experience and that is a good thing. And so what was observed of a trend that was in the 90s, basically, we are moving toward more rigor, more expectation on the side of the government side, more involvement in plant. Most of these programs that

you saw that we are getting on tracks, SIBERS High being one of those, GPS IIF being another program, NPOESS, more participation of key people working together. But the government expectations of those people and what they're doing is going up.

Q: This is a fairly long term process of growing this in-house by bringing them up through the--we're talking about a fairly shallow curve of improvement here over many years.

A: I kind of did that in a previous experience. I was a program manager and (inaudible) investigator satellite at one point called a (inaudible). And I ended up having a distribution of people that worked on the satellite and it was schedule for a thirty-month development, and the shuttle manifest was such that it split out a bit further but the total cost of 8,000 pounds of hardware is 15-and-a-half million dollars, and that kind of integration into the shuttle, of the satellite. And we ended up having a distribution there which kind (inaudible). We had some senior folks there and we had some folks kind of out of college with little experience, and in that case the interaction and the mentoring piece was very very important. And we didn't in that program have a nice smooth distribution, which you'd like, for the long haul, but you work with the situation and you optimize it, and then you have a plan forward for a good staple plan in terms of the talent, especially if you're working on these, you have people getting quite a bit of experience quickly.

Q: GPS III, can you give me a sense of the acquisition strengths (inaudible) for both the satellite and the ground station (inaudible)

A: On the GPS III it went through a requirements process in the JROC and joint staff, that the clarity in terms of what is expected is important to make this acquisition strategy work. GPS-IIIA will carry on the same frequencies from IIF, plus one additional frequency L1C, that's the frequency that's compatible with Galileo. It'll have increased power, of roughly 10DB, which is 10 times. And it'll have a growth path for GPS IIIB. The space segment and the ground segment we use these names, it's not helpful for use sometimes, (inaudible) access the ground segment. We'll work a little harder on having names that are more intuitive in the future. But space and ground segment will be well-coordinated but separate RFPs, and on these charts where I kind of keep track of the bigger pieces moving and the space segment and ground segment user equipment are kind of on the same page. As you look forward, you want to make sure that you're time sequenced with the three major parts of GPS and there's others that are augmentations and so forth, they're important too. But space segment, ground segment, and user equipment as we go forward so that the ground segment is providing the capability of working with the frequencies. It's capable of doing the command and control of the satellite; it's backward compatible with those that are on orbit as we look at the IIRs, IIRMs, IIFs, and then GPS III, A being on orbit. And so as we go forward, look at the

down select on the ground segment, from three to two and then out a bit in terms of looking at building the key parts that are working then and so you have real knowledge on the bench of how these parts (inaudible) are working. And then an issuing of the RFP (inaudible) space segment, both of which are looking at incentivizing for an earlier delivery. So once again, the philosophy of reducing acquisition cycle time is consistent with this approach and so we're working hard on making sure the RFP and the contract are consistent with that plan, and we're going to involve a variety of people to make sure that what we want to do is in fact reflected in the (inaudible).

Q: Inaudible.

A: I don't have that at this point. I'd have to defer that over to the SMC folks, but we are not taking a big step at this point, and so it is truly the block approach and the joint staff and the combatant commanders and the acquisition and technology folks are really, I think, doing a very good job in terms of communicating, and (inaudible). And we ask what do you need. They're now asking what do you have, so that we have a plan then that is well informed by the state of technology and the risk associated with delivery at a certain time versus another time, and what the decision in terms of what the needs are. And we agree to that and go and then we do it. And focus on it and get it done and then learn from them and then do the next block.

Q: So the sequence, you compete for ground segments (inaudible) and then (inaudible) would follow at some point after?

A: Well right now we have, there's kind of a two-part. One is three-to-two on the ground, then satellite contractor is selected, and then after that ground segment is selected. That's roughly the sequence we're looking at at this point.

END TEXT