"Air Force Space Command"

General William Shelton

AFA Air & Space Conference
National Harbor, Maryland
18 September 2012

General Shelton: Thanks for the kind introduction, George.

I would like to register a complaint right up front to the program committee. Following General Mark Welsh in a speaking engagement is a pretty tough act to follow. He's just going to be a spectacular Chief for all of us.

George, to AFA, thanks for all you do and all that AFA does for our Air Force, and a special thanks for what George, you personally do to promote science, engineering, math and technical education. I'm a direct beneficiary of those efforts in Air Force Space Command, so I'm particularly grateful for what you do.

It's great to gather every year to take stock, to celebrate our collective successes and to evaluate our shortcomings across the Air Force. We also look back at this event to honor our past and the pioneers who made this Air Force the absolute best on the planet. Within Air Force Space Command, this is our 30th year anniversary. We just concluded that celebration last week. We've certainly come a long way in those 30 years and I couldn't be more proud of all our Airmen, past and present, who grew Air Force Space Command from a command with a very small set of assets and a budget of $11 million to a command with space and cyber operations as well as space acquisition, as George just noted, and a budget of over $12 billion.

So a lot's changed both internally and externally to the command over those 30 years, but unchanged has been the passion, the courage and the innovation of our Airmen. Now I could spend the entire time here regaling you with stories about the contributions of so many to the successes and growth of the command. But instead of focusing on our wonderful past, let me instead focus on the present and on our future.

I want to mention a few noteworthy successes since we gathered here a year ago. Then I'll cover what I believe will be some very hard choices for all of us over the next few years. Finally I want to describe for you a new vision for our command, which I believe could pay real dividends for the entire Department of Defense. I recognize that I have the highly coveted after lunch spot, so I know this can be very difficult on the insurance community, on their whiplash awards. But I just

ask one thing, no audible snoring please. I'll try to keep it short and we'll allow some time for questions and answers.

2012, although not without challenges, this last year has actually been very good to us. We had eight successful EELV launches in the past year, including four for the NRO, one for the Navy and the new Mobile User Objective System, the latest advanced EHF satellite, and the fourth wideband global satcom satellite in the constellation. The last NRO launch in June, NROL38, marked the 50th consecutive EELV launch. Allow me to foot stomp that a bit. Fifty successful launches in a row. Unprecedented in the history of space flight. And just last week we had another successful NRO launch out at Vandenberg.

Our folks have made space launch look easy, but please trust me when I say it's not. A lot of hard engineering, manufacturing operations and mission assurance work are required for each and every mission. After some horrific failures in the past, I believe we now know how to approach mission assurance to help ensure launch success, and in my mind we drift away from this formula at our own peril.

We're continuing what seems to be an endless on-orbit checkout of the first geosynchronous space-based IR, or SBIRS-GEO-1 satellite. By the way we actually reduced the checkout timeline, and we should be doing the final testing before certification of this great capability very shortly.

Now I harassed Lieutenant General Ellen Pawlikowski and her team about how long it takes to do on-orbit checkout of satellites. But many of you have heard me say the sensors are actually exceeding our expectations. I'm just anxious to add SBIRS GEO-1 to the overheard IR constellation supporting our missile warning, missile defense, battlespace awareness and technical intelligence missions. We're on track to launch the second SBIRS satellite in 2013. We've finally declared initial operational capability, or IOC, for the space-based space rail and satellite.

The satellite's first image was taken in October of 2010, and frankly, it's my fault that it took so long to get to IOC. We had just a couple of issues that I didn't think were adequately addressed for us to declare IOC earlier. But we've cleared those remaining hurdles, and on the 15th of August we formally certified SBSS as having reached IOC. This new satellite gives us much greater situational awareness of activities in geosynchronous orbit, which is arguably the most valuable real estate in Earth orbit.

I'm personally so impressed by the value of SBSS that I don't think we should ever be without SBSS flight capability in the future. Also in the space situational awareness and space C2 arena we've continued to make solid progress with the Joint Space Operations Center Missions System, or JMS. JMS will provide the central data integration and automation necessary to make the best use of the tremendous volume of data from our space surveillance sensors streaming in from SBSS and many other ground-based radar and optical sensors.

The new sensors are designed to produce far greater quantities of data, and that volume of data already today, overwhelms our legacy system. So, JMS will be a vast leap forward in computational power, plus it will be a modern, open, service-oriented architecture design to allow Lieutenant General Susan Helms to better conduct all space operations in her role as the Joint Functional Component Commander for Space.

This framework will allow us to develop standard specifications for application developers to build, test and provide our JMS operators with the next killer app if you will, much the same way the current iPhone and Android development community works. Certainly a novel approach for military C2 systems and a first for us in the space arena.

As many of you know, last year we completely revised the acquisitions strategy for JMS. Restructuring it to deliver the SOLA and multiple increments of capability, to leverage commercial and government software already developed, and to allow for an ongoing development environment. Our new acquisition strategy was recently approved, so we're off and running on this program officially. Just to reiterate what some of you have heard me say a few times now, the approach slashed the $1.2 billion program in half, and will deliver much needed capabilities several years earlier than the original program.

Now here's another historic achievement. On the 16th of June we completed the second Orbital Test Vehicle or OTV mission with the X37B. OTV2 spent 469 days on orbit. The mission was a spectacular success, and while we can't talk about the specifics here, X37B and the entire team of blue suit, civilian and contractor operators, engineers, testers have absolutely exceeded our expectations.

Another long-term effort and investment that came to fruition this past summer was the construction of the Space Education and Training Center located on Peterson Air Force Base. Last week in the midst of our 30th Anniversary celebration we dedicated the SETC in honor of former Air Force Vice Chief and former Air Force Space Command Commander General Tom Moorman.

For all who know General Moorman's contributions to national security, space and beyond, this was a fitting tribute to him and to his accomplishments.

The Moorman SETC houses the National Security Space Institute, a unit of AETC and the Advanced Space Operations School, which is a unit of Air Force Space Command. These units will administer the advanced training and education courses to space and cyber professionals from across DoD, the inter-agency and allied nations. We currently expect to graduate about 2,000 students this year, but ultimately we believe the SETC will graduate somewhere around 2,500 per year. George, we hope you and the Board of Aerospace Education at AFA will get to know this place.

Now in the cyber arena, we've continued to make progress on the Air Force-wide AFNET, the number one Air Force cyberspace initiative. Granted there have been challenges associated with the migration of all legacy systems and users from local and installation-administered networks to a centrally managed network. But this AFNET migration will be critically important to our future enterprise and to the defense of Air Force networks on a global scale. We expect to complete the AFNET within the next year. A single AFNET will provide more automation, ensure maintenance of standards, facilitate expansion and enable global situational awareness, which is of course a critical element of cyber defense.

And one last thing I'd like to mention in the area of cyberspace, and that is the formation of a rapid cyber acquisition office co-located with Major General Susan Vautrinot's 24th Air Force at Lackland. We're building a great partnership with the Life Cycle Management Center to ensure we can do cyber acquisitions on operationally relevant timelines. Major General Craig Olsen's team is really putting their shoulders to the wheel to make this a success.

Now, there's much more we could talk about regarding our last year, but those are the big highlights. So let me now talk about some really hard choices that I believe are facing us in the next few years. Space and cyberspace capabilities are more critical than ever. These two domains in particular have given us ubiquitous capabilities on which every operation, and every Soldier, Sailor, Airman, Marine, Coast Guardsman depends heavily.

I'd invite challenges to that statement, but I can't think of a single military operation, across the entire spectrum of conflict, and at every level -- strategic through tactical -- that doesn't somehow depend on space and cyber. Furthermore, you could argue that the entire world runs on GPS. It's the global

timing standard for almost everything and it supports the
precision required in management of billions of dollars of global
market trades daily and a global industry worth billions of
dollars annually.

Without question, space and cyber capabilities have become
foundational to military capabilities and operations. And to
paraphrase the old commercial, we don't leave home without it.

So let me build for you what I consider to be a true
conundrum. The Budget Control Act as you know has already
reduced the Defense budget by some $487 billion. As with all
services, we did our best to find ways to cover that large
reduction, yet the Air Force reductions thus far have not been
viewed favorably in the Congress. While the FY13 budget is far
from complete, it's very clear that the force structure changes
we counted on for our share of that $487 billion will not be
allowed, thus creating a need for continuing to resource that
force structure in FY14 and beyond. That will clearly, clearly
create additional pressure on the Air Force budget for FY14.

Now let's talk about the reality of sequestration. Even if
the outfielder makes a diving catch and sequestration is out,
there is a strong possibility of additional cuts to Defense as
part of the deficit reduction package. Where will those cuts
come from? How will we assess the priorities for those cuts?
And on a parochial note, how will that foundational space and
cyber capability fare in that priority scheme?

It's interesting that space and cyber capability don't
really scale with force structure. You either have a full
constellation of GPS satellites to provide global coverage, or
you don't have global coverage. You either have global missile
warning coverage, or you don't. You get the picture. And it's
the same with cyber. If we intend to remain a global power, and
I think we do, there are foundations of capability that must
exist regardless of force structure size.

So there's the conundrum. The budget pressures are real,
and they must be addressed. The foundations of military
capability are essential for global capability, and they aren't
free. It kind of reminds me of the Beatles song; remember the
Beatles song "When I'm 64." The line from that song says, "Will
you still need me, will you still feed me, when I'm 64?" Today
we become 65, and the answer to that question will you still need
me is absolutely yes. Will you still feed me, that's the
question.

These are very hard choices for our Air Force, for the
Department of Defense and for the nation. And just as I get paid

to advocate for space and cyber capability, others get paid to advocate for their capability as well. Tough times, hard choices and strategic challenges throughout the world. Complexities for us all. And we can make it harder than it needs to be. Frankly, I'm looking for teammates to come alongside us and provide us help with these challenges. Teammates in industry who recognize that working together is the only way to continue to field the capabilities we need for the joint warfighter. Teammates in Congress who understand the disruption caused by careless marks against a program resulting in additional expense and stretched-out capability for delivery. Teammates who work in a cooperative spirit to knock down the bureaucratic barriers in our acquisition system. Barriers that delay programs and drive cost into the program.

In my humble opinion, and perhaps in a mighty burst of naiveté, I believe we can save considerable resources with a teaming mentality. I know this is simply back to the future in the space business. In my 36 years in the business, I know how it used to be. I'm not longing for the past as much as I'm hoping and striving for a future which would look like the relationships of the past. It can, and it should be that way.

Now let me give you a peek under the tent of what I believe should be the future of Air Force Space Command. It shouldn't surprise anyone that we face a lot of change today relative to the space and cyberspace domains. Threats to space assets and capabilities are definitely on the rise. As I said before, the dependence in the Joint Force on Space and Cyber is something that can be, and likely will be, challenged by our adversaries.

The space domain, in a word, has become far less benign. The number of space-faring nations has doubled since the end of the Cold War. Orbital debris remains an ongoing problem, and it's still growing. I think we're all aware of the fact that in this environment, a single irresponsible act in orbit can jeopardize everyone's valuable space assets.

Cyberspace domain is a continuously landscape of threats, adversaries and technologies. And the cost of entry is still low. Attribution is difficult at best in that environment.

I can say much more about the challenges in the space and cyberspace domains, and in concert with the budget choices I mentioned earlier, in my opinion we can't merely stay the course. So we're laying out roadmaps for change within Air Force Space Command. We're going to redouble our efforts in energy toward innovation and capitalize on the synergy that's possible between space and cyber systems. We'll look for the cost trades in some innovative architectural concepts I'll speak to in a moment. Not

only because it makes sense to do so, but because we must. In short, to use the parlance of a younger generation, business as usual will amount to an epic fail.

In the space launch mission area we're pursuing a strategy to develop a more competitive marketplace. We're pursuing block buys of boosters to realize cost savings for the Air Force and stabilize funding for service providers and their suppliers. We're also working certification plans to allow new entrants to compete for National Security payload flights. In our satellite constellations we're essentially going back and looking at every architecture to examine ways to fulfill military requirements in a more cost-efficient and resilient manner. We're going to look more carefully at commercial solutions and best practices.

Configurations of lower cost space craft, multiple-node space craft, launch configurations and greater use of automation are all employed. We're also going to look heavily at hosted payloads as a possibility. Our commercially hosted IR payload, or CHIRP, launched last September on board the SES2 commercial telecommunications satellite, and it's been a valuable experience for us and for the industry. Beyond the necessity of finding efficiencies and cost savings, however, we may very well find that disaggregated or dispersed constellations of satellites may yield greater survivability. Along with that survivability, robustness and resilience in the face of threats.

Another goal of these studies is not only to look at affordability, but also economies of scale and responsiveness in acquisition. It may be time to step away from exquisite and move toward sufficient. I mentioned earlier that it had taken a long time to get SBIRS GEO-1 on orbit and into its next phase of trial operations. Likewise, with cyber acquisitions, we absolutely must be agile enough to respond to needed capability, and as I said earlier on an operationally relevant timeline. Moore's law is certainly alive and well, and along with the threat defines the need for quicker cyber acquisition.

I'm encouraged by initiatives like the one Major General Neil McCasland's Air Force research lab is pursuing called Agile Cyber Technology, which retains a group a professional firms and generates tasks for new capabilities on a more as-needed basis.

Speaking of cyber defense, we took some additional steps this year to normalize the cyber defense mission. We're taking the approach of defense first, so we made some proposals to formally designate three capabilities as weapon systems. Air Force Cyber Defense, Cyberspace Defense Analysis and Cyberspace Vulnerability Assessment/Hunter. These designations as weapons

systems will ensure cyber requirements receive equitable consideration along with program-associated funding.

We'll continue to make improvements to what we build in space and cyber and to how we build them. But ultimately, I believe the future of this Command's focus will gravitate away from simply the platforms and operations for space and cyber. We'll shift from the gadgets to a focus on information. Actual decision quality information. We move across networks, comprising platforms, equipment and personnel operating in multiple domains.

The information and knowledge we move must become platform and domain agnostic. Seamless networks terrestrial, air, space will provide the warfighter access to game-changing information when and where he or she needs it. Air Force Space Command will evolve along this vector, taking a far greater emphasis on the information we move, vice the platforms used. We will in the future build systems intrinsically designed with data and information-sharing mechanisms vice the stovepipes we've grown up with.

We need to look at satellites and sensors on orbit as merely parts of the bigger organism, generating and transmitting data relentlessly for use by anyone with the appropriate permissions.

That's the big picture. It's much bigger than flying satellites in space or pushing data through cyberspace or defending in cyberspace. The synergy that's possible with cyber and space being the responsibility of a single command is truly mind-boggling, and we intend to take advantage.

In closing, Air Force Space Command is celebrating 30 years of excellence. In over 20 years of continuous combat operations. I think the next 30 years will deliver even more. We're seeing a lot of change and a lot of challenges, but I'm genuinely excited about what the future will bring when tomorrow arrives.

I thank you for your attention this afternoon, and I look forward to your questions.

Moderator: Well thank you for that great presentation. In reality some of the early questions you've already handled with your later comments.

Space Command, your role as a commander of Space Command, you have some core functions that you are responsible for within the overall Air Force domain. Do you feel that you have adequate authority required to execute those, and do you have adequate

influence over the acquisition, development and fielding priorities to execute those?

General Shelton: Well the core function and lead integrator responsibilities, for those of you who don't know, I have the responsibility for space superiority and cyberspace superiority. I certainly have all the authorities I need to do the planning part of this. Developing what's called a core function master plan in each one of those areas. What remains to be seen is how we will adjust those core function integrator responsibilities into the programming realm. Developing the actual Air Force program for those two core functions.

Whether or not that becomes much more of a core function of lead integrator responsibility or that remains the purview of the Air Force corporate structure. That's a question yet to be answered. We have struggled with this for over a year now, and I think we'll continue to struggle a little bit with it to define what the roles and responsibilities will be. But we develop I think what are important and very visionary documents in these core function master plans that get integrated at the end of the day into a larger strategic Air Force plan, and those documents I think continue to get better and better every year.

Moderator: Thank you. This is kind of a world hunger question. One is how are you going to stop the hackers that are penetrating Air Force networks?

General Shelton: That's an excellent question. I tell you, we are in the United States and in the Air Force, bringing it closer to home here, we are very good in the cyber domain. Very good. But this domain is very different. You don't get to see what everyone else is producing. You don't get to see through visual imagery, a piece of hardware that you can then put your best engineering talent on and say this is what this particular piece of hardware can do. In this virtual domain, it's almost impossible to see all that's going on. It's impossible to really determine just how good the adversary might be. If you assume that you're that much better than everyone else, you've probably got the wrong mindset.

So keeping your routine hacker out is not a problem. Keeping a determined adversary out is yet another issue altogether. So what our challenge is going to be, and I think Dr. Mayberry sitting here has done a great study in this regard, what our challenge will be is to continue cyber capability. Continue network access and data throughput in the face of challenges. If you make the assumption that the adversary is already on your network and living there, and you come up with strategies and capabilities that will allow you to assure the

mission in spite of those challenges, I think that's the right mindset. So that's how we're approaching the problem. It is a monumental challenge for sure, because as I said in my prepared remarks, the cost of access is low and attribution is very difficult.

Moderator: Thank you. A follow-up in the cyber area, Susanne and 24th Air Force are obviously just one of multiple components to U.S. Cyber Command. Has the partitioning of roles and responsibilities been adequately completed there?

General Shelton: There is a partitioning of roles and responsibilities among the service components to Cyber Command. They've been assigned various geographic combatant command responsibilities. Time will tell whether or not that's the appropriate model. As you look at the way things have been divvied up, some things are obvious. They just make sense because the proponency of forces in that particular service, in that particular COCOM. But as you look at some other assignments in those regards, in the interest of equity across all service components, some of them make you scratch your head just a little bit. So there may be some adjustment in the future in how that's done. I'm sure General Alexander will be evaluating that as he goes here, but it's really kind of an interesting lash-up the way they've decided to do that and the way they decided to manage their interactions with the various COCOMs.

Moderator: Thank you.

In the past, DARPA had a program that looked at servicing and refueling of satellites. They are about to start another program very similar to that for those satellites out in the geosynchronous orbit. Do you see Space Command coming on board with any of those activities?

General Shelton: Interesting questions, and I'll probably get myself in a little hot water here, but I have never been able to make this concept work in my head. I certainly can have my thinking improved. But as you consider -- let me just take you through a timeline here. From initial start-up of program to launch is at a minimum seven years. So start at the back of that seven year development cycle, the space qualified hardware before you even get into the cycle is probably on the order of five years old or so. So now you're up to twelve years. The satellite life on orbit, if it lasts as long as we'd like, we'd like it to be somewhere around fifteen years as a minimum for a geosynchronous satellite. So 10-15 years, let me be generous and say ten years.

You're already at 22 year old technology by the end of life of that satellite. Now they want to go up there and refuel it to extend its life when we know solar rays degrade over time and produce less power. We know that we've got a 22 year old computer on board that satellite. Surely in 22 years there've been some improvements in computing technology. We know that there are probably some antennas, sensors, whatever on that particular satellite that need tech refresh. I understand the appeal here, but when you peel back the onion a couple of layers, it makes a lot less sense than it does on the surface, to me.

Moderator: One of the programs that suffered through the required budget cuts was Operationally Responsive Space, and a question here as to how you would value that and what you see as a path forward for that technology approach.

General Shelton: ORS has done a great job. No question about it. They've been involved in I guess three or four satellites now. We've really learned a lot from the approaches, both successes and failures, of how we've gone about trying to produce satellites in a rapid fashion, in trying to provide a satellite that supports a single COCOM, and trying to build kind of plug and play sorts of satellites. But we've learned those lessons, and I'm not saying we've learned everything, but we learned quite a bit.

To our way of thinking it was time to kind of normalize that process and assign that kind of capability to SMC and make that a part of our satellite programs across the board. Rather than having kind of a one-off program office that does ORS, instead take the ORS conceptual processes and plug them into the mainstream. That was why we decided to take the ORS office down. That's what we were trying to do through SMC, and you've seen the Congressional marks on that. We'll see whether or not we're allowed to do that.

Moderator: There's been some recent dialogue as a result of the deployment of the NATO anti-ballistic missile systems from the Russians seeking maybe increased participation in both not only missile defense systems, but also in defense against asteroids. Do you see that proposal growing any time in the near future, and do we really understand what they're offering, if anything?

General Shelton: I'd tell you we haven't been involved in that at all. I've seen the press on it, but I have had no engagement, nor has anybody reached out to me from the Department of Defense, so I really couldn't comment on how seriously anyone at the DoD level is taking it.

Moderator: You talked earlier about expanding the
competitive arena in launch, and bringing in new players. Are
you satisfied with the rate of that closure and the closure on
the required certification requirements for SpaceX or one of the
other emerging companies being able to offer government launches?

General Shelton: Well first and foremost, let me say that
it kind of starts to sound like we're bashing the United Launch
Alliance, and I've got to tell you they're tremendous partners
with us -- 100 percent success record on national security space
launches. A wonderful, wonderful track record and we're
appreciative of their capability and their painstaking care they
put into every launch.

Now having said that, we pay a lot of money for it. We pay
a lot of money for it. We believe that introducing some
competition here is a good thing across the board. We believe
that if there are some new ways of looking at the problem that
some of these new entrants bring and we'll take advantage of
their though processes and give them the opportunity, assuming
they can be certified, give them the opportunity to compete for
national security space launches.

The certification process is rather rigorous. Some would
say onerous. But when you light the fuse on one of these
rockets, if your satellite is a billion and half and your launch
vehicle is somewhere around $250 million, and then you put the
associated costs around that, if it's a $2 billion enterprise
that you're trying to kick off into space, you want to be kind of
careful. And we are very careful. So conservatism rules here.
Rightly so. I don't think the taxpayers would expect any less
from us. Having said that, we are going to take a very hard look
at all these new entrants as they show interest in national
security space launch.

Moderator: Thank you. One last question here. There's a
lot of discussion about the pivot to the Pacific and the increase
in anti-access and contested environments and so on. How does
that affect Space Command? And now that space is a contested
environment, what do you see changing in your roles?

General Shelton: That's a great question. I think when
people talk about anti-access area denial, for the most part
they're talking about physical access. They're talking about
missile defenses, or rather missiles that provide defense, anti-
ship missiles, anti-aircraft missiles. They're talking about
integrated air defense systems, those sorts of things.

I tell you, if we end up doing conflict with a near peer,
there's going to be an anti-access problem in space and cyber as

well. As we see the threats increase in space, as you've read about the threats in cyber and the continuing evolution of those threats in cyber, we have to come up with concepts, architectures, operational plans that will allow us to continue to take advantage of the space and cyber domains despite the challenges. Despite those anti-access things. Our mantra here is providing the capability to operate through. Operate through those threats, operate through those challenges in both space and cyberspace.

I wish I could tell you that the threat vector in space was going down. It is not. It is going just the opposite direction, so we don't have great concepts for defense there. What we will probably need to do is increase our resiliency by having perhaps these disaggregated architectures, which at least complicate the adversary's targeting problem and provide us the capability to operate through those threats. So anti-access area denial, just as relevant in space and cyber as it is in the physical domains.

Moderator: General Shelton thank you very much on behalf of everybody here, and certainly the Air Force Association.

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