2015 Air and Space Conference

Harnessing The Coming Aerospace Revolution
General Ellen Pawlikowski
Air Force Materiel Command

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MR. BARRETT: Thank you, thank you, on behalf of the Air Force Association welcome to the 2015 Air and Space Conference. Our next speaker serves as Commander Air Force Materiel Command, Wright Patterson Air Force Base, Ohio. The command employs approximately 80,000 people and manages 60 billion dollars annually. Executing the critical mission of war fighting support through leading edge science and technology, cradle-to-grave life cycle weapon system management, world class developmental test and evaluation and world class depot maintenance and supply. She'll make a presentation. If time allows we'll open up this session for questions. I remind you the cards that are sitting on your chair where you can fill out and pass to the corners and we'll get those in front of her. Each of you should have a copy of her bio. We're very pleased to have her speak with

us again this year. Please welcome to the stage General Ellen Pawlikowski.

GENERAL PAWLIKOWSKI: Good morning everyone. Okay, so everybody is all spread out. You can come forward if you want. Because none of the big guys are going to come because there former secretaries are speaking in another room, but I've locked the doors so you can't escape now. Too late, you made your decision. First of all thank you for coming today. This is pretty special for me, I've been coming to this conference for many, many years and this is the first time I've had an opportunity to speak on the big stage at this and this is really my first formal presentation of any significance since I took over as the Commander of Air Force Materiel Command in June, so it's my first opportunity to kind of brag on the great things that Air Force Materiel Command is doing and to be able to share where we're going.

Now the topic that was given to me was harnessing the coming aerospace revolution. And this and the focus I think -- and the context of all the

things that we see going on particularly in the industry and around the world about how we in the Air Force are going to leverage these things, but you know as I was looking at this I decided -- if you know me I'm not much of a harnesser of things. I'd rather be a revolutionary. So what I'd like to do over the next few minutes is to share with you some of my fellow revolutionaries and what we are doing within Air Force Materiel Command to leverage those things that are going on and to create those revolutions in Aerospace World to continue to make the world's greatest Air Force effective as we go into the next decade and the decades after that.

And it's a pretty important time to think about that future. If you look at today, it's a very different environment in the world that the Air Force has to deal with arguably even then what it was five years ago. By that I mean five years ago we were focused on the global war on terrorism and the major focus was on Afghanistan and Iraq and that that type of environment -- we built up our MQ-9s. We had all

of our focus in that area and then this gentleman over on the bottom left hand -- right hand corner for you pulled a little surprise on us and walked into the Ukraine and there was a little bit of student body left as we looked at how do we deal with that environment. And then on top of that General Hyten in the space community learned a lot about what the Chinese were up to in those two areas on the top when we talk about cyberattacks and what's going on in the space environment.

And then of course our constant reminder of the importance of the Asia-Pacific particularly when you look at our friend in Korea. Well for the Air Force we've been there for each one of these. You've heard about our deployment of the F-22 and of course the great Airman, General Breedlove -- the first thing he turned to was his F-15s when we dealt with the Ukraine and now we've deployed the F-22 there. We've got our great cyber warriors down in San Antonio that you may have seen a lot about. They're there -- General Hyten and his campaign plan. When it comes to

the space world and of course our MQ-9s the rest of the services have left. We've never left the AOR when the MQ-9s continued to fly there and then of course our show of force with our bombers with respect to our North Koreans. All of these are areas that our Air Force is involved in. All five of our mission areas essentially 24 hours a day in for a long term basis.

But one of the things that was highlighted over what I just described is the importance of our ability to shift and to be agile. To use the word that the Secretary used yesterday when she talked about operational agility. Our ability to one minute be focused on ISIL and then the next minute at response to President Putin comment that he's deploying 40 additional ICBMs. This is not the environment that many of us grew up with where there were set pieces and you put together campaign plans and you had months to prepare and build up like we did for Desert Storm. This is a pull on our Air Force and our capabilities to be able to move rapidly and effectively and to be able to adapt and that is what

the Secretary talks about when she talks about strategic agility. And indeed as she mentioned yesterday about a year ago we put out a new Air Force strategy.

And General Welsh summed up what I was just describing when he said that they are the same five missions that we've been doing since we were just young pups right after World War II, but we have to think about how we are going to do them differently. And then the Secretary highlighted the key element of this strategy is all about strategic agility. We need to be quicker. We need to be able to go around the world. We need to be able to respond and change rapidly. Well all of those things that I talked about in that previous chart and if you look at this, what I will put it to you is that the Air Force cannot be -- none of those things happen without Air Force Materiel Command.

Whether it's the discovery of new ideas in their development by the Air Force Research Lab or the full life cycle management of those weapons systems.

When the F-22 deploys you better believe General Fick knows what's going on and he's engaged from the Life Cycle Management Center. The test center in terms of their conscious force to make sure that what we're developing and what we're fielding actually works the way we advertised it because sometimes we're a little optimistic in terms of what we do and then of course the Air Force Sustainment Center that is the heart and soul of keeping all of our systems up and flying. Whether it's F-22s flying to Europe or it's MQ-9s flying over ISIL or frankly if it's even space systems that are operating out of installations, Air Force Materiel Command has got to be there doing our job.

And I put it to you that if we aren't agile then the Air Force can't be agile. If we can't turn quickly and we can't be responsive and we can't be quick in terms of our processes then the Air Force is not going to be agile. Either operationally agile as the Secretary talked about when it comes to day to day operations or strategically agile when it comes to looking at our future. So right after I took command

we had a relook at the Air Force Materiel Command Mission Statement and we revised it somewhat to highlight the importance of agility when it comes to the material management which is what Air Force Materiel Command does and truly our entire focus on agile combat support because we go everywhere now from the Air Force Research Lab with developing and discovering new ideas to the Air Force Installation and Mission Support Center lead by Major General T.C. Carter which is responsible for the installations across the world for our Airmen and the mission support associated with those. So our job is to deliver and support agile war winning capabilities in all three domains: air, space and cyber. We do it because our vision delivering the world's greatest Air Force.

The Air Force's vision is the world's greatest Air Force. For us we've got to deliver that world's greatest Air Force and we want to do it by being the most trusted and agile provider of innovative and cost effective war winning

capabilities. General Welsh told me that he considers AFMC the cost conscience of the Air Force. Combine that with our need to be agile and innovative. That's what it's all about. And so when we look at harnessing the coming aerospace revolution I tell you that we're looking at, how do we be more agile? How do we become more agile? In two ways. First if you look at the mission statement the more agile is in there. What that means is that the weapons systems that we discover at AFRL and we develop through LCMC and we test at the test center and we sustain have to be agile in how they operate. That means we need weapons systems that are easily adaptable. We need the value of numbers, not just quality when it comes to our weapons systems, which means that we need to have cost effective weapons systems, lower cost solutions that allow us to be able to distribute in a wider span of the globe and to be able to adapt those systems quickly. So our focus is on as we look at the early stages, we are looking 15 -- 10 to 15 to 20 years out how do we ensure that those

systems that we are fielding -- Joint Stars recap for example. LRSB, all of those have to have adaptability and speed I terms of how we are able to use those as agile war winning capabilities.

On the other token is the word agile in our vision statement which talks about us being an agile provider. That means that everywhere from the research lab has to be able to quickly deliver capabilities or sustain those capabilities or support those capabilities in an agile way meaning that we have to be able to be flexible, we have to have speed and most effectively we can't break the bank. We have to be cost effective so that the Air Force can afford to use the weapons systems that we have today.

So when we look at our mission and our vision our focus when it comes to agility and our focus in if you will creating that aerospace revolution is how do we deliver more agile weapons systems and how are we more agile in terms of how we provide the material management for those weapons systems. And so what I want to do with the rest of my

time here is share a couple stories of my fellow revolutionaries if you will within Air Force Materiel Command, the first of which is Lieutenant John Cagogas. Lieutenant John Cagogas is from Illinois and he is really in the spirit of Jimmy Doolittle because he is an engineer by training but he's also a pilot. He is a small UAS pilot. Unmanned Aerial System pilot.

And what John has been focusing on is getting at that adaptability and low cost that I talked about for our agile weapons systems. And it's a cartoon there of the swarm of small UASs. It may look like a cartoon today but it is we believe -- can be a very much a game changing reality for our Air Force in the future. We have some pretty awesome munitions today, but they are very expensive and they rely and when we separate them -- the weapon from the aircraft we separate it from the human.

The whole focus here is to take these small unmanned aerial vehicles and dealing with the sophistication that autonomy can provide us but also

keeping the man in the loop for a longer period are able to essentially replace some of those more costly munitions with smaller munitions that actually are delivered by talking to each other under the control of a human. This is what's called collaborative and distributed operations. So imagine maybe if some of you have seen the Audi commercial with the little robots coming down. Well Lieutenant John Cagogas is working on that today, but with a real mission capability. And the whole purpose -- one of the focuses of his area is right now we are up to being able to command and control -- we're going to test this month five with just one person.

So you've heard General Welsh in the Air Force talk about our crisis when it comes to pilots for unmanned aerial vehicles. Well this is a part of our activity. If we're going to be able to do multiple swarming UASs then we have to be able to have -- we can't have swarm of Airmen because it won't be cost effective will it? We won't be able to do it. So the whole purpose of his activity is to demonstrate

that the technology is there to enable us to develop these swarming weapons if you will that will enable us to be agile and cost effective as we go forward in the future when we talk about delivering of munitions and putting effects on the battlefield.

So there's an example of what my revolutionaries are doing in terms of bringing that agile, award winning capability to the Air Force. But we all know in here that it's not always going to be just new systems. That our systems that we have today are going to be with us for a long time.

And if we are going to have agile war winning capabilities we also have to figure out how we make the systems that we have today more agile and adaptable as we go to the future and one of the things that we are working on is something called open missions systems. And I want to introduce you to my second revolutionary which is Lieutenant Colonel Ryan Knapp. Ryan is part of the B2 program office. He hails from Minnesota and that is a B-2. Purposefully blurry in terms of the details on there but I think

the message you see is -- that's a pretty complicated weapons system and it was not built in a time where we were focusing necessarily on adaptability. But it is an awesome weapons system and it's going to be in our portfolio for a long time. And the idea behind applying open mission systems like the B-2, like the F-16, like the F-15, is our ability to bring capability quickly into these systems by establishing an open mission systems approach, particularly with avionics and then other systems with on it. We are able to do if you will a plug and play approach to a new box. We develop a new radar for one system. By applying open mission systems we can take that same radar and put it on a different platform like the B-2 and we can quickly bring new capability onto our legacy platforms and therefore be adaptable and responsive and lower cost because I'm not developing seven different boxes for seven different aircraft if you think about it that way. And I don't have proprietary because I can pull a box off and put another box off from another vendor.

What Ryan did working closely with Northrup Grumman is in just eight weeks they implemented an open mission system architecture on the B-2 and actually flew a mission in which they communicated with a Gulf Stream with an off the shelf radio. If anybody knows anything about the B-2 -- whenever you try to do anything with the B-2 we used to affectionately say the B and it stood for billion. It would cost a billion dollars and it would take at least a couple years. Well what they did in eight weeks would have taken us months to do, but most importantly from my perspective they demonstrated that you could if you will teach an old dog new tricks because we took a system that we developed without open mission systems and we applied the open mission systems architecture.

And think about the potential of this in the future, providing that agile war fighting capability when we can bring new capability very quickly onto our existing legacy systems. It's part of an overall effort that has been lead by the rapid capability

office to be able to introduce open mission systems across the Air Force and you'll see it in acquisition like Joint Stars recap which is going to start from the beginning with open mission systems as LRSB is today. These are two examples of how we are applying war fighting or getting to those more agile war fighting capabilities. But let me shift to talk about what we're doing to make sure that AFMC and our material management is more agile, because I got some more revolutionaries to introduce you to.

The next one is Mr. Chris Igoner who works for the Seek Eagle office. Now I don't know how many of you know what the Seek Eagle office is, but when we develop a weapon and we want to put it on an aircraft we take it down to Eglin and we do some -- first some analysis and then we fly flight tests to verify that that weapon and that aircraft can fly together and we can do the release safely. Flight tests are expensive and one of the things that we have tried to do over the years is to develop a digital way to analyze our weapons systems. Collecting the intellectual property

rights from our industry partners can be an expensive proposition to build these digital threads.

So what Chris had done is using a laser scanner -- we have actually used the laser scanner to build 3-D models of our aircraft as well as the base. For example, recently in the F-35 -- and I see General Richardson here -- were going to do the scan of the KC-46 real soon and what that allows us to do is to dramatically reduce the time it takes to integrate weapons onto aircraft and the cost associated with it. So again this enables Air Force Materiel Command to more rapidly field things at a much lower cost and in a more adaptable way. By building these 3-D models we can actually share those with the designers and enable us to right from the beginning make sure that we are minimizing any scrap and rework and we're all in favor of testing but this way we can focus that test, minimize that test and just to give you an example. Instead of months to develop the models -- the configuration models -- it's taking us weeks.

In the case of weapons we are going from

weeks to days. And in our business time is money and it's agility and ability. So Chris is working on that. While Chris is doing that, over in the Air Force Sustainment Center and people talk about sustainment. You're not doing any -- where is that innovative and creative in sustainment. Well let me tell you our Air Force Sustainment Center is leading the way in looking at creative and innovative ways. And this is Mr. Ryan Perry. Mr. Ryan Perry has responsibility for getting the parts if you will for some of our legacy systems, like the B-52. Now the B-52's been flying for as long as I've been alive. And there's parts on that thing that are not available anymore. In particular one of them is there is a blower on it. Little piece, right, but can ground the airplane if it's not working. Has 100 different parts in this little piece, because it was designed a couple of decades ago.

Well what Ryan did is he applied 3-D printing out at manufacturing and reduced that 100 parts to one part. So we are now developing these

impellers for this blower using additive manufacturing, 3-D printing, and we can now deliver a part in three days instead of months and having to reverse engineer and hire somebody to build to a print. Think about what that does in terms of our agility, our ability to quickly turn a B-52 when it comes into the depot -- about the cost associated with the supply line. Now think to the future -- about what this could do -- is that I wouldn't even buy any parts. I could actually just have the digital design for those parts and when I need a part we turn the additive manufacturing. So Ryan is another one of my revolutionaries and he hails from Mesa, Arizona -- living in Oklahoma City right now. And then after Ryan we have Lieutenant Hailey Holcomb. Now this is another example of how you can teach a real old dog new tricks.

Hailey is the chief test engineer for what we call the nuclear red team. Now the red teams are not a new thing. We've been doing red teams in the Air Force largely through the rapid capability office

for years, but we've never applied them to our nuclear enterprise. And what the red team does is use modeling and analysis and testing to look at how our weapon systems will respond to new threats as we go forward. Now you can see how important this is, because it enables us for things like ground based strategic deterrent -- our next ICBM to be able to actualize and understand what are the key requirements for that in terms of the threat, but it also helps Global Strike Command when they are trying to figure out how to deal with today's threats. By using the read team and Hailey is standing next to an ALCOM. And what we have done is we've been able to expose the ALCOM and I can't go into the details to some of the threats that it would face in the next couple of years and been able to work with Global Strike Command to actually do changes to their CONOPS and their TTPs. Think of the power this has for us as we bring that -- what that nuclear enterprise forward and an ability for us to work very quickly and effectively with Global Strike Command to ensure that the requirements

are right and that we take into full account all things including CONOPS to new development as we go forward with these. Again not a new technique, but a technique that we have never used in a nuclear enterprise and it is already showing huge benefits in our ability to adapt that enterprise and to be agile in terms of our understanding of what the requirements are.

And then certainly last but not least, is the Air Force Installation and Mission Support Center where we are applying what I affectionately call something very valued in the space business called situational awareness to -- something which most people think is pretty mundane and that's management of civil engineering projects and capability. General Robinson who is one of my most important customers -- for her building partnerships is a very important part of her PACAF mission. And the Air Force Installation and Mission Support Center is a critical part of that because we have the Air Force Center for -- Civil Engineering Center.

So that gentleman right there is Senior Master Sergeant Vernon Jackson. He hails from my part of the country. He's from Newark, New Jersey and he's responsible for managing over 300 million dollars of O&M across three different NAFs and seven different wings. Includes 80 some engineers and what General Robinson requires is daily situational awareness of what's going on with these civil engineering projects.

This is not just throw it over the fence and when the CEs are done they'll let you know. Because an integral part of this to her building partnerships -- it is a daily requirement. What Vernon has done is he's applied some of the great information technology tools we have. He's built a collaborative environment. He's used chat rooms to connect all 80 of those engineers around the Pacific. The tyranny of distance is not a problem for Senior Master Sergeant Jackson. And as a result of this they've been able to dramatically reduce the amount of time they are spending preparing status briefings. And they have near real time status on these capabilities and know

where those systems are and they can more effectively manage those dollars, they can leverage their expertise regardless of where that distance is in a very effective way of being more adaptable, being more agile and more cost effective as we deliver what people might think is a mundane thing that doesn't require a whole lot of opportunities to innovate. Even in those things that are -- traditionally we haven't focused on applying new technology and new capabilities -- that's a major focus for us because for Air Force Materiel Command it is all about being agile in terms of delivering the capability -- whether it's the new technologies or it's the fundamental thing about making sure the General Robinson knows what the status is of those civil engineering projects.

So this was a quick scan of what's going on in terms of harnessing or I argue creating that aerospace revolution by Air Force Materiel Command. Because for us this is what it's all about. Delivering the world's greatest Air Force and we need

to make sure we're doing that today and that we are doing that in the future. Strategic agility is going to be critically important as you heard from the Secretary yesterday. And the Air Force cannot be strategically agile if Air Force Materiel Command isn't agile every day. And that's our focus -- those of you in the -- are part of Air Force Materiel Command, are getting tired of hearing me use the word agile but I can tell you I've been across many parts of the command and we get it. We understand the importance it is for us to be there and to be -- because we are essentially that backstop for the Air Force and we're proud of it and we're proud to be the leaders of this revolution. And with that I'll pause and if we have time for some questions.

QUESTIONER: Yes, ma'am, thank you very much for your presentation. We do have a couple questions for you. The Secretary has talked about the impact to the Air Force if there is a long term continuing resolution or a budget that's passed that exceeds the Budget Control Act and therefore sequestration kicks

in. Could you talk about what that might impact to either maintenance or some of the other things that you're involved with and is that word getting out?

GENERAL PAWLIKOWSKI: Um, okay the first question is particularly a year-long continuing resolution is very, very challenging for us and is in the context. A lot of people don't realize this that even under sequestration the funding level is higher than our FY15 budget. And so if we're in a continuing resolution, continuing resolution typically says you're going to be funded at the level you were funded last year so keep on doing the things that you were doing. Just to give you an example from my level, how problematic that is. Let's just take the Air Force Sustainment Center, which operates in working capital fund which means that we are looking -- we have to plan ahead so that we have the right work force, we have the right supplies, we have the right parts for our job for the year ahead. If we now get less funding than we anticipated from the life cycle management program managers because they don't have

the budget to bring planes in for their depot maintenance and do those other -- and all those things that we need to sustain it, I've got a problem. First, I have to balance that work force. Secondly, it's going to back up those weapons systems. They are not going to get through the depot when they were supposed to and that's just going to make '17 that much harder because now I'm going to be impacting readiness because I have too many planes that aren't ready to fly because they haven't had their regular maintenance that we know is critically important. For the life cycle management center you heard the Secretary say there's 50 some new starts. We have been gearing up to be able to hit the ground running on these and trying to put the requests for a proposal together and all of those things that enable us to start a program, we will have to stand that activity down. It will delay things and we will have to slip critical engineering changes to different weapons systems. We will -- and any time in the life cycle management business that you slow things down it's

never cheaper. It's never cheaper. I've never seen anything that was cheaper when it took longer. So it's going to slow down the life cycle management. The test center we are not going to be able to get -- gear up for the test. We will not have the resources to conduct the test to support all of the weapons systems and we are going to have to make the hard choices. And then remember I've got Air Force Installation and Mission Support Center as well and there are a number of key civil engineering projects associated with the F-35 and the KC-46 that will not be able to start and with that means they will impact our ability to meet those key targets.

We talk a lot about our industry partners when we talk about the F-35, when we talk about the KC-46, but there is a piece to the Air Force that has to deliver the capabilities that we have -- in particular the military construction projects that if they don't happen we are going to be behind the power curve regardless if Duke is successful in getting those airplanes -- Duke and Boeing are successful in

getting those airplanes. So now as far as how well it's being communicated in engagements that I've had with members on the Hill I think they understand this. And there are a number of really key members over there that do understand the importance to us. But there is just -- as you know there are so many other elements that go in to the debate and when it comes to the Department of Defense Budget and the Budget at large but I do not believe that it's for a lack of understanding it, it's just a matter of how does that -- those implications weigh against some of the other things that are important to our legislative branch as they go forward with this decision.

QUESTIONER: Thank you. What are you doing to harness the capability of our reserve component to accomplish the command's mission?

GENERAL PAWLIKOWSKI: You know, we have a pretty active reserve and guard participation at Air Force Materiel Command, more than I had actually realized before I took over as Commander. And they play a critical element across the board. One of the

big areas that they play in the command is in our individual mobilization augmentees. And every single one of the centers has IMAs, as we call them -- brief, short for individual mobilization augmentees that support us in every single one of our centers. In addition to that we have some full time folks. For example, we recently added three colonel positions to the Life Cycle Management Center to support the National Guard and Reserve investments that are going on. They will be three full time Reservists managing programs at the Life Cycle Management Center. I recently -- when I made my tour of the Air Force Sustainment Center Air Logistics Complexes took with me Brigadier General Gary Keefe who is my National Guard augmentee and we have at each one of our Air Force sustainment centers Guard representation once again because we don't -- the Guard does not have separate ALCs. Their aircraft come into our air logistics complexes the same as the active duty ones. So if you go down to Atlanta -- you go down to Robbins you will see F-15's there that come from the Guard and

the Reserve and from the Air Force.

So we have them integrated across. We do have a couple of associate units as well and, in fact, General Keefe and I have talked about strengthening the relationship between their TESTCOM Center -- they have a small test center and the Air Force test center to see if we can better leverage them in that capacity as well. So they are a very integral part of what we do and I -- my personal experience by the way over the years has found that the Reservists are very invaluable in the material management in this IMA function because they can bring and share what they are learning in industry and so we get an opportunity to get a bird's eye view and somebody who is an expert when we talk about why can't we do this the way industry does it?

Well talk to Jim because that's what he does in his day job and he's here for his Reserve duty and so they work very, very well at helping us to stay in touch with what's going on in that revolution that's out there in the rest of the aerospace industry.

QUESTIONER: Thank you. Yesterday the Secretary of the Air Force introduced this idea of Should Schedule, could you elaborate just a little bit on that concept?

GENERAL PAWLIKOWSKI: Yeah, I think what she and Dr. LaPlante have been working on is this concept that when we start a program in all the Department of Defense services we do an independent cost estimate and as part of that independent cost estimate they also lay out what you might call an independent schedule. And the independent cost estimate in this independent schedule is based on history and since particularly in that era when we had all those Nunn-McCurdy's and the Department of Defense was getting criticized for failing to meet our commitments for cost and schedule the whole view of this independent estimate was that you wanted somebody who could take a step back and look at the program without having any investment on their own. So what we have done across the Department of Defense is when we lay in a program in the budget we lay it in for the schedule and the

cost that was done by this independent cost estimator. But starting with Secretary Carter when he was the Undersecretary for Acquisition and Technology, the acquisition community has challenged our program managers and our program teams to try to drive below that cost estimate, that independent cost estimate. And that's where you've heard the term called should cost where that was for example Duke got money for engineering change proposals that was laid in in the service cost position and the independent estimate because history says we put in engineering change proposals even when we have a fixed price contract.

Duke was very disciplined along with AMC and as part of their should ost they didn't do any engineering change proposals, right Duke? So that's should cost savings. So the should cost was what the program manager thinks it really should cost them versus what the independent cost estimator said and we have been very, very successful over the last three to five years at driving down those costs. And because in reality now the cost estimators are updating their

cost estimator relationships, so it's getting tighter and tighter in terms of should cost savings. But one of the things that recently we looked at is we said we've done this with the cost, but we haven't done this with the schedule. And there are a couple of cases where we thought that there were some pretty innovative ways to maybe drive the schedule down. For example, Joint Stars recap. When we looked at the, hey, if we were to use an existing airframe and apply open missions systems and use essentially off the shelf -- and I always use that term loosely -- radars maybe we don't need a six, seven year EMD program. Maybe we can pull that one. Well guess what happens though as we're setting up that program the independent cost estimators come in, they look at what we did in the past and lay out a schedule that's a more traditional program.

What Dr. LaPlante and the Secretary are talking about is just as we did the should cost we're going to challenge our program and industry teams to say what's the should schedule. What are we going to

do that's innovative that will allow us to drive down to a schedule that's less than that independent schedule was just as we've done it with the cost. And again one of the things that we had to be careful about when we talked about should cost and we need to be careful about that when we talk about should schedule is it has to be really based on data that says we can actually deliver the schedule. We're not looking for industry bids that says we're just going to take a six month challenge, right? And trust us we can do this for six month shorter or a year shorter. Because we've been down that path before where we signed up for a schedule that was too tight and wasn't realistically based so we're going to do with should schedule what we did with should cost. We're going to no kidding look at it, I think largely collaboratively although the Secretary talked about the incentive being -- and we're going to integrate it into the RFP, but it's going to be a realistic look at really can we pull the schedules in?

So that's what a should schedule is. Very

analogous to the should cost and my objective in this by the way is that out of this we can then -- our independent estimates will get better and better and then the real benefit of this is that we don't have money in the budget that doesn't need to be there for one program and we can apply it to another program. Because when we have an independent cost estimate with an independent schedule estimate that's too long and has more money in there those resources are not available to apply somewhere else, because we are driven to fund to the independent estimate. It's all part of the initiative, really honing our acquisition skills to be able to predict the schedule and land just the right amount of resources so that we cannot waste dollars by having them sitting where they don't really need to be, okay?

QUESTIONER: Thank you, ma'am what are your top three R&D priorities?

GENERAL PAWLIKOWSKI: My top three research and development priorities, well I'm looking at General Masiello here and I think for me those game

changers in technology -- one of which I talked about, autonomy, directed energy and hypersonics, because I believe that all three of those can get us to that strategic agility, so those three are critically important. You think about it. It's speed, it's the ability to reduce the manpower tail and lasers are just awesome. And then of course R&D investment for me, so that's -- I have to add a fourth one in and that is I am going to be a demanding customer as the agile combat support core function leader to the laboratory and elsewhere to bring R&D to improving the way Air Force Materiel Command does its job just like you saw there. I mean I want to really understand 3-D printing, additive manufacturing, because I think it could be a game changer for sustainment so if you were to ask me what's the fourth game changer, in my mind it's additive manufacturing because it can truly change the calculus of how we sustain our systems.

MR. BARRETT: Thank you. Well, that ends our time ma'am. We thank you so much for your presentation and your time today. Please accept this

small gift as a token of our appreciation.

GENERAL PAWLIKOWSKI: All right, thank you very much. Thank you.

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