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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2014

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES HEARING

ON

POST IRAQ AND AFGHANISTAN: CURRENT AND FUTURE ROLES FOR UAS AND THE FISCAL YEAR 2014 BUDGET REQUEST

HEARING HELD
APRIL 23, 2013

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POST IRAQ AND AFGHANISTAN: CURRENT AND FUTURE ROLES FOR UAS AND THE FISCAL YEAR 2014 BUDGET REQUEST

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Dayton, OH, Tuesday, April 23, 2013.

The subcommittee met, pursuant to call, at 11:30 a.m., at Sinclair Community College, Dayton, Ohio, Hon. Michael Turner (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. MICHAEL TURNER, A REPRESENTATIVE FROM OHIO, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. TURNER. Good morning. We will call to order the hearing of the Tactical Air and Land Forces.

I am very pleased here as we look at the issue of the Department of Defense [DOD] unmanned aerial systems [UAS] programs for the fiscal year 2014. And before I begin, I would like to recognize the members of the Air and Land Subcommittee.

I am very pleased to have Chairman Frank LoBiondo with me, who represents the Second District of New Jersey. He is not only a member of our subcommittee and a member of the Armed Services Committee, he is also chairman of the Transportation and Infrastructure Committee Subcommittee on Aviation. In addition, he has jurisdiction over the FAA [Federal Aviation Administration], who is overseeing the test range selection process, and he has been a leader in this issue, including being the author of the language for the six test sites.

We worked very closely with him as the National Defense Authorization Act came forward and the language that they worked on in the Transportation Committee, trying to ensure that we had coordination between the Department of Defense, where a lot of the resident knowledge is on operations and development of UASs and UAVs [unmanned aerial vehicles], and the FAA. And then also including NASA [National Aeronautics and Space Administration], which has a significant amount of expertise. Ensuring that by pulling this collaborative process together, we might also then advance the work that is being done at Wright-Patterson Air Force Base through this process.

Also I would like to recognize Brad Wenstrup, who represents Ohio's Second Congressional District just south of us, eastern Cincinnati and Portsmouth. In addition to being a Member of Congress, he is a lieutenant colonel in the Army Reserve and served a year of active duty in Iraq, where he was chief of surgery with

the 344th Combat Support Hospital. He was awarded the Bronze Star and Combat Action Badge for his service in Iraq.

He is a fellow member of the Armed Services Committee, and obviously, being a Member of Congress from southwest Ohio, I am very pleased to have him both on the full committee of the Armed Services Committee, our subcommittee, and then here today.

Brad, thank you for being here.

Dr. WENSTRUP. Thank you.

Mr. TURNER. And then, next, we have Congressman Paul Cook, who represents the Eighth Congressional District of California. He has traveled a long way to be here. He is a retired Marine Corps infantry colonel who served in Vietnam. His career spanned 26 years and earned him a number of honors, including two Purple Hearts and the Bronze Star Medal with Valor device.

Mr. Cook, thank you for being here, and thank you for your contribution on the Armed Services Committee and for advancing the issues of UASs and UAVs.

I want to welcome our panel of witnesses here today. We have Mr. Dyke Weatherington, Director, Unmanned Warfare and Intelligence, Surveillance, and Reconnaissance. We have Mr. Steven Pennington, Director of Bases, Ranges, and Airspace and Acting Executive Director for the Department of Defense Policy Board on Federal Aviation; and we have Colonel Patrick Tierney, Director of Army Aviation.

Before we begin, I would like to thank Sinclair Community College for making this auditorium available to us, and especially Steve Johnson, the president of Sinclair. Steve, are you here? Steve, if you would stand, I want to recognize you. Thank you.

And also Adam Murka, the director of public information, for their efforts to make this hearing possible and all they are doing to try to advance UASs and UAVs in our community.

As most of you here are aware, the Wright Brothers were from Dayton, Ohio. They invented flight, and the region has excelled in advancing the industry of aerospace ever since. Ohio has a long tradition of unmanned systems innovation. The world's first unmanned aircraft system, the Kettering Bug, was developed here by the Dayton Wright Airplane Company in 1918.

The international UAS promotional organization, the Association for Unmanned Vehicle Systems International, AUVSI, was founded here in Dayton in 1972. And much of the research and technology that goes in today's UASs was developed right here at Wright-Patterson Air Force Base.

Today, the Dayton region and the State of Ohio strongly support the work we do with unmanned systems. Last year, the Ohio General Assembly passed a resolution noting that "collaborative relationships are well established in Ohio for research, development, testing, training, and manufacturing of unmanned aerial systems, including universities, manufacturers, researchers, workforce developers, the Ohio National Guard, the State of Ohio, and military, commercial, and private airspace users."

Ohio represents a unique and powerful leverage of research and development work in UAS integration, building on the Air Force Research Laboratory, AFRL, here at Wright-Patterson Air Force

Base and the NASA Glenn Research Center in Cleveland and the extensive Ohio aerospace contractor base.

Our national laboratories are doing critical work with the key enabling technologies to integrate unmanned systems into the national airspace, including sense and avoidance technology at Air Force Research Labs and secure command and control communication technology at NASA Glenn.

Our institutions of higher education—University of Dayton, Wright State University, and our host today, Sinclair Community College—are national leaders in research, education, and training for unmanned systems. Working together with our national laboratories and industry throughout the State and Nation, these educational institutions will ensure that Ohio's future in unmanned systems is every bit as robust as our rich history.

The unmanned aerial systems, or UAS, conference taking place here at Sinclair Community College is timely because unmanned aerial systems and their associated sensor technologies are moving to the civilian sector. The Federal Aviation Administration, or FAA, Modernization and Reform Act of 2012 directed the FAA to establish a program to integrate unmanned aerial systems into the National Airspace System at six test ranges. The designation and operation of test sites will be a tool for testing all aspects of UAS integration.

On February 14th of this year, the FAA issued a screening information request, SIR, for proposals to manage these sites. Last year, the subcommittee that I chair, the Subcommittee on Tactical Air and Land Forces in the House Armed Services Committee, introduced legislation that directed the Secretary of Defense to collaborate with the FAA and NASA on solutions to the challenges of UAS integration with the National Airspace System, or NAS, and provide an annual report on the progress being made in this area.

While there are multiple uses for unmanned aerial systems in the National Airspace System, the Association for Unmanned Vehicle Systems International has recently concluded that over 100,000 new jobs could be created by 2025 through UAS use, primarily in the commercial and civilian market areas of precision, agriculture, and public safety.

The migration of UAS aircraft and sensor technology to the civilian sector will provide for greater competition, innovations in technology for both civilian and military missions, and eventually decrease cost for both the Government and private sector. The U.S. military will continue to use unmanned aerial systems for intelligence, surveillance, and reconnaissance missions, as well as weapons delivery platforms.

Turning to our subject today, the fiscal year 2014 budget request for unmanned aerial systems, the Department of Defense plans to invest $2.3 billion for research, development, and procurement of unmanned aerial systems. The request for year 2014, unfortunately, is a decrease of $1.1 billion from the request for the fiscal year 2013.

The administration plans to produce some 234 fewer unmanned aerial systems than last year. I have concerns about whether this request will meet both the warfighter requirements and the emerging technologies and opportunities of UASs and UAVs. I hope our

witnesses will address this issue today, and we welcome their response.

Without objection, all of the witnesses' prepared statements will be included in the hearing record, and we will ask each witness to provide an opening remark. And then we will have questions from the four Members of Congress who are here.

We are going to begin with Mr. Weatherington. If you would please proceed with your opening statement.

STATEMENT OF DYKE D. WEATHERINGTON, DIRECTOR, UNMANNED WARFARE AND INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE, DEPARTMENT OF DEFENSE

Mr. WEATHERINGTON. Thank you, Mr. Chairman, members of the committee, for the opportunity to appear before you today to discuss the current Department of Defense unmanned aircraft acquisition programs and their role post Iraq and Afghanistan.

I am also pleased to address the related fiscal year 2014 President's budget request and the Department's activities related to the integration of DOD unmanned aircraft into the National Airspace System. I will be brief in order to move quickly to your questions.

I will begin by describing the scope of the Department's unmanned aircraft systems activity, both in terms of numbers and types of systems fielded and in terms of numbers of hours flown. I will then highlight the ongoing 2014 unmanned aircraft acquisition programs funded by the President's fiscal year 2014 budget request and then close with a short summary on the ongoing airspace integration efforts that will enable unmanned aircraft capabilities for operators and systems returning from Iraq and Afghanistan.

The Department has a number of and operates a wide range of unmanned aircraft varying in missions, capability, sizes, and performance. The systems also support a wide range of warfighter needs. DOD categorizes these aircraft systems into five groups based on various capabilities, such as maximum takeoff weight, operating altitudes, and speed.

Group 1 aircraft typically weigh less than 20 pounds and fly at altitudes less than 1,200 feet and at speeds less than 100 knots and typically in the vicinity of the operator. They number close to 9,500 aircraft out of the total DOD unmanned aircraft inventory of approximately 10,700 aircraft. The hand-launched Raven is an example of a Group 1 aircraft.

At the other extreme are Group 5 aircraft that weigh more than 1,300 pounds and typically operate at altitudes greater than 18,000 feet and typically are operated beyond line of sight. The jet-powered Global Hawk, comparable in size to a small commercial airliner, operates at altitudes greater than 55,000 feet. Another Group 5 aircraft is the Air Force Reaper, and DOD has about 130 Group 5 aircraft in its current inventory today.

In terms of flight hours, DOD unmanned aircraft have amassed over 4 million flight hours in the last 10 years, growing from approximately 16,000 hours in 2001 to nearly 700,000 operational hours in 2011. And these numbers do not include the Group 1 systems.

Flight hours declined to about 550,000 hours in 2012, as operations in Iraq completed and those in Afghanistan stabilized. His-

torically, about 80 to 90 percent of all the hours flown in DOD are combat-related hours.

With respect to the role of unmanned aircraft post Iraq and Afghanistan, the Department will continue to intelligently shape an affordable intelligence, surveillance, and reconnaissance, typically known as ISR, capability for our unmanned aircraft systems portfolio to meet DOD's requirements. Since we cannot predict the future strategic environment and how that will develop, we need to maintain a robust ISR enterprise capable of supporting the full spectrum of military operations anywhere around the world.

Having more home-based systems will provide a more normal training environment, enabling the training pipeline to recover from years of high-tempo operations. In all cases, the current budgetary climate dictates that we proceed smartly in terms of how we acquire and apportion ISR systems, including unmanned, to best deal with the evolving strategic environment.

In the future roles category, unmanned aircraft are likely to support many of the operations they do today, including ISR, also communications relay, logistics resupply, and providing our combat capability of limited strike. DOD's unmanned systems portfolio will continue to be based on combatant commanders' needs within the current physical environment.

In terms of the President's 2014 budget, it includes about $1.4 billion for unmanned aircraft systems research, development, test, and evaluation and about $1.2 billion for unmanned aircraft systems procurement. Compared to the fiscal year 2013 budget, as the chairman has indicated, this is a decrease of about $700 million, or about 34 percent, in research, development, test, and evaluation and a little over $600 million decrease in procurement.

The 2014 budget request funds these programs: the Air Force's Reaper and Global Hawk Block 40 programs; the Navy's Triton, sometimes known as BAMS [broad area maritime surveillance]; Fire Scout; the Marine Corps Small Tactical UAS program; and the new UCLASS [Unmanned Carrier Launched Airborne Surveillance and Strike] Navy program. It also funds the completion of the Army's Gray Eagle program and also funds the multi-service small hand-launched Group 1 systems of which there are several platforms.

The budget also funds the U.S. commitments to the NATO [North Atlantic Treaty Organization] Alliance Ground System, or AGS, and sustains and improves the fielded capability the Air Force has in Predator and the Army and Marine Corps Shadow systems.

From an airspace integration perspective, DOD has been working this challenge for a long period of time, and our long-term goal is to provide routine safe access to the National Airspace System for properly equipped DOD aircraft. The Department's Unmanned Aircraft Systems Integration Plan provides an overview of how the Department plans to accomplish this goal incrementally and is available online to the public.

The Department's Unmanned Aircraft Systems Task Force is the DOD advocate for shaping regulatory policy, procedures, and certification standards and technology development activities that are critical to the integration of DOD unmanned aircraft into the na-

tional airspace. Task force leadership and participation with the DOD Policy Board for Federal Aviation also serves as a congressionally directed multi-agency Unmanned Aircraft Systems Executive Committee, known as the ExCom. The ExCom's goal is to coordinate and align airspace integration efforts among FAA, DHS [Department of Homeland Security], DOD, and NASA.

In October 2010, the Executive Committee developed and provided to the congressional committees a National Airspace Access Plan for Federal Public Unmanned Aircraft Systems, which identified needs, challenges, and an incremental approach to meeting these challenges. The plan also provides specific recommendations in the areas of policy, regulation, and technology.

With that, I will conclude. I thank you for your support, and at this time, I will be happy to answer any questions.

[The prepared statement of Mr. Weatherington can be found in the Appendix on page 27.]

STATEMENT OF STEVEN PENNINGTON, DIRECTOR, BASES, RANGES, AND AIRSPACE, AND ACTING EXECUTIVE DIRECTOR, DEPARTMENT OF DEFENSE POLICY BOARD ON FEDERAL AVIATION, U.S. AIR FORCE

Mr. PENNINGTON. Thanks for having my written testimony put into the record. I would like to just highlight two things and get onto the questioning sooner.

First, to the entire group of congressmen here, but particularly Congressmen Turner and LoBiondo, the 2012 NDAA and FAA reauthorization were very, very helpful to encouraging multiple defense—multiple agencies to work together to advance UAS integration in the NAS. And so, we are working closely, as you all know, with our partners in the FAA. They are the lead for the U.S. test sites. We are working closely to make sure they understand the defense equities.

AFRL [Air Force Research Laboratory] is in the room today. We are continuing collaboration between AFRL and the Tech Center and various other FAA centers to, in fact, move research and development from various centers, whether it is DOD or whether it is FAA, back and forth.

The final thing I would like to highlight is that DOD has a long history of building advanced capabilities and not just doing the R&D [research and development], which is certainly very important, but also building the training pipelines and then the ops procedures. So what we refer to that as is airworthiness certification for the aircraft. So DOD has an airworthiness certification capability that we do for all aircraft, including UAS, including small UAS.

Likewise, we have a pilot training standard. In the civil parlance, it would be referred to as licensing. So we train pilots and operators based upon the type of UASs they fly.

And then the final piece is we have developed operational procedures. So whether you are flying in the NAS or you are flying in Afghanistan or formerly in Iraq, we have developed operational procedures in the terminal area, arrivals and departures, and an en route system.

We believe this body of information, from the far end at research and development all the way to operational procedures, could be very, very helpful to our FAA partners in building civil standards for airworthiness, civil standards for pilot licensing, and then, of course, ops procedures for use in the NAS.

So, again, I look forward to your questions, and I will turn it over to Colonel Tierney.

[The prepared statement of Mr. Pennington can be found in the Appendix on page 43.]

STATEMENT OF COL PATRICK E. TIERNEY, USA, DIRECTOR, ARMY AVIATION, G–3/5/7, U.S. ARMY

Colonel TIERNEY. Thank you for the invitation to participate.

I have given written testimony for the record, and in order to save time, I will forego reading and presenting it and get right to your questions.

Thanks.

[The prepared statement of Colonel Tierney can be found in the Appendix on page 49.]

Mr. TURNER. Thank you.

In almost all of your comments, you touched on some of the areas that we are interested in and I know that participants in the conference are interested in.

Mr. Pennington, I am going to begin with you. Thank you for referencing the negotiations and the discussions between DOD and the FAA, and I am going to ask you a question about the status of the negotiations.

I also then, Mr. Weatherington, I am going to ask you about the issue of that cooperative relationship that the Armed Services Committee has tried to encourage—in other words, require——

[Laughter.]

Mr. TURNER [continuing]. Between the FAA, DOD, AFRL, and NASA Glenn.

So starting first with Mr. Pennington, you have been very active in this issue, and DOD and the FAA have been negotiating for years on UAS operations into the national airspace. Now that we have this provision that Mr. LoBiondo had worked so diligently on, of the six proposed test sites, what can you share with us on the status of those negotiations or any aspect of what we may currently know about the process?

Mr. PENNINGTON. So, sir, as you mentioned, the SIR [screening information request] is on the street, and the agreement we have with our FAA partners is that when they begin actually reviewing the proposals, they will involve DOD. And my office will work with Dyke's office and, in fact, all of the offices across DOD to make sure that we understand whatever equities are involved and then do the best that we can in this process to deliver something that is useful to the Nation.

The only caveat I will give to you, sir, is that, as you know, in sequestration, we have challenges. So in the near term, I don't know that DOD has any significant material assistance we can provide to the test sites. There will certainly be potentially in-kind.

But the material assistance, we simply probably don't have the capability to do it under the current sequestration.

The final piece is we all believe that these test sites potentially could be very useful to aiding the FAA in building these three pieces, pillars, to civil integration, which is airworthiness, pilot licensing, and then, finally, the operational procedures.

Mr. TURNER. Thank you.

And I appreciate you mentioning the effects of sequestration. In this committee, we are all very concerned also, the personal aspects of those at Wright-Patterson Air Force Base who may be facing furloughs.

As you may be aware, I voted against this mess because I was so concerned as to what the effects would be on our national security, and we are certainly seeing them in all aspects of what we are trying to advance. And I appreciate you acknowledging that even in this, there are effects and implications.

Mr. Weatherington, you had mentioned the Executive Committee aspect in your overall comments of AFRL, FAA, NASA, and DOD. Can you tell me how that cooperative relationship is going there? Any difficulties?

As we look to putting together the National Defense Authorization Act for this year, we are going to be looking again to encourage—require—this cooperation and some aspect of trying to advance UASs in the national airspace with an understanding that not only does DOD have a need for operating in our domestic airspace, but also has the incredible knowledge that could advance us on the civilian and commercial aspects.

So what insight could you give us about how that cooperative relationship is going?

Mr. WEATHERINGTON. Thank you, Chairman Turner, for the question.

At the macro level, I believe and my boss, who is the DOD representative at the principal level on the ExCom, would agree that we made significant progress in the UAS ExCom. We have been working it about 4 years now. Initially, we started out at basically the tactical level, working procedural activities that would improve DOD, DHS, and NASA access to the NAS. That is really improving the COA [certificate of authorization] process, as you indicated in your opening remarks.

Since that time, we have addressed a number of those issues and improved that process, and now we are moving on to more substantial activities that, from my perspective, both help DOD and the other Federal public users, but also, as Mr. Pennington alluded to, provide a framework then to move on to a wider consumer base for unmanned aircraft systems.

Specifically in that is addressing the see and avoid, sense and avoid capability that is articulated in 91–113. We are working that right now very heavily within the ExCom, developing short-, mid-, and long-term solution sets that support primarily again the Federal public user base, but also provide a long-term strategy for a broader user set.

Also, to amplify on Steve's answer to your previous question, in developing the plan for the test sites, FAA came to DOD and asked us for expertise first in the development of the contract that they

would use for that. And so, DOD provided contract expertise from actually the DARPA [Defense Advanced Research Projects Agency] organization for the type of contract they were going to use.

Since that time, FAA has identified specific skill sets that would be beneficial in the evaluation of those proposals. And so, DOD is working those particular skill sets at an individual level name that we can provide to help FAA more adequately address those proposals when they come in.

Mr. TURNER. Thank you, both.

I want to again thank the other three Members for both their leadership on this issue and their partnership, and for their being here today. I think it certainly shows the long-term interest that Members of Congress have and that our committee has on how this process is going to go.

And with that, I want to recognize Mr. LoBiondo.

Mr. LOBIONDO. Thank you, Mr. Chairman.

I am very pleased to have the opportunity to be here today. I want to thank our panel and my colleagues for joining us and you, Mike, for calling this hearing.

Also thank you for your expertise, your dedication and commitment to all things DOD, but especially in this particular area, where there is exciting new program that is getting ready to get off the ground.

I represent the Federal Aviation Administration Technical Center in Atlantic City, which is the premier facility in the Nation for safety and security research and development. So I have a pretty vested interest in all of this. They have been designated to do all the validation for the next generation of air traffic control, and this is kind of a natural fold-in to that.

So we also have at that campus complex the 177th Fighter Wing, and attached to that is the Warren Grove Range. Mr. Pennington, the Warren Grove Range offers a tremendous amount of land area and airspace that is being utilized by the FAA Tech Center for their ScanEagle flight demonstrations.

Do you know if there are any plans for the Air Force to expand the UAS flight operations into Warren Grove? And if not, is that something you and your team would consider looking at for an official position?

Mr. PENNINGTON. Sir, if the 177th and the FAA desire to do such, they will bring it back through Headquarters Air Force, and we will work it relatively quickly. As you know, there has been—this is a long-term presence of the fighter wing that has been there and then, secondly, of the range. And my organization, as you know, also oversees the range.

But yes, sir, we would quickly look into it.

Mr. LOBIONDO. Thank you.

Secondly, also Mr. Pennington, as you are aware, the upcoming FAA designations of the six UAS test sites are supposed to be coordinated with NextGen, among other requirements. Do you have any idea or can you tell us what the Air Force is currently undertaking to integrate NextGen into the UAS research and development and operations?

Mr. PENNINGTON. So, sir, yes. We have Jack Blackhurst here. We also have Paul Schaeffer. We are working very, very closely with

the FAA NextGen office and looking at the technologies, starting with ADSB, automatic dependent surveillance-broadcast, out. And there is a series of efforts inside of DOD looking at miniaturizing ADSB transceivers and seeing if we can fit them onto UASs, sir.

Mr. LOBIONDO. And can you say if there are any best practices that the FAA should be talking to DOD about when figuring out how these test sites should be accomplished and everything put together? I am assuming that those conversations are already happening. At least I hope they are.

Mr. PENNINGTON. Yes, sir. As Dyke mentioned, we have been having those conversations from the very beginning when we received the test site language in both agencies. We have been discussing a criterias-based approach and then letting the test sites be incubators for the three things that I talked about earlier—airworthiness, pilot licensing and training, and also ops procedures to facilitate the creation of a civil market.

And then we believe that it would also help DOD in providing a broader access to the NAS.

Mr. LOBIONDO. Thank you.

Mr. Weatherington, as chairing the Aviation Subcommittee under Transportation and Infrastructure, our subcommittee will be taking an in-depth look at UAS integration into the National Airspace System over the coming months. I think you can see that from today's hearing, there will be a lot of interest in moving forward from a lot of different areas.

I wanted to get your opinions on what you think the biggest obstacles our FAA partners should focus on to make this happen safely? And secondly, what do you think would be the greatest gains for the general public with this?

Mr. WEATHERINGTON. Sure, sir. So from a DOD perspective, I can tell you probably the biggest single challenge that we see in airspace integration is defining an alternate means of compliance for the see and avoid capability.

FAA recently indicated that their current position on see and avoid is that can only be accomplished by a human on the aircraft, in the aircraft, and so there is no other way to provide that capability, which forces DOD and, frankly, all the other users into the COA process.

Today, the COA process is working pretty good. As I indicated, we made some process changes within FAA, and that has helped a lot. But eventually, DOD's position is we have got to move beyond the COA process.

To do that, we have to reach agreement with FAA on how we meet a see and avoid capability. So that is that short-, medium-, and long-term process that I mentioned before.

Recently, DOD certified its first see and avoid capability in the ground-based method of operation at Cherry Point Marine Corps station. We are working with FAA for them to acknowledge that certification and allow us to use that under a COA process. The Air Force will probably follow that lead with their own ground-based system, probably at Cannon Air Force Base, and then the Army will follow them.

So this solution for see and avoid is really upon us right now. DOD and the other Federal public agencies have some flexibility

because we—as Mr. Pennington indicated, we have the ability to self-certify. But ultimately, it is FAA that will ultimately make the decision if that system is safe to operate in the NAS. And so, that is the challenge we have in the short term.

Mr. LOBIONDO. Okay. Thank you.

Thank you, Mr. Chairman.

Mr. TURNER. Thank you.

Mr. Cook.

Mr. COOK. Thank you, Mr. Chair.

In reading the background material, I was concerned about the number of mishaps. And if I understand it correctly, the trend on this is going down more and more and more. And so, I am trying to get some insight into this, and I don't want to say pilot error, but I guess it is a pilot because they got the joystick, or operator error.

I am very concerned about that, on how we can—you know, if we are going to budget all of these platforms in the future, and it is a very expensive, some of them are very expensive pieces of gear. If you could kind of address the issue of accidents, whether it is pilot error, operator error, or how vulnerable they are to enemy action, such as even machine gun fire?

You don't have to go into SAMs [Standard Army Maintenance]. I think everybody knows that, but if you can address that, I would appreciate it.

Mr. WEATHERINGTON. Yes, sir. So the good news is, much like almost any other aircraft system that DOD develops, the accident rate for the entire class of unmanned aircraft systems has been following a very predictable trend downward.

And as a follow-up to this, I can provide you data that indicates that, for example, today the aircraft Class A rate, which is a whole loss or an accident that results in fatality, for the Air Force unmanned aircraft system portfolio is about 5 per 100,000 flight hours. Five years ago, it was about 20 per 100,000 flight hours.

[The information referred to can be found in the Appendix on page 57.]

Mr. WEATHERINGTON. So the trend has been down. Last year, it was about 6.5. So the trend continues to fall. And if you lay that curve on top of other curves for other kinds of aircraft, the slope of the curve is almost identical.

Now the comparison for all Air Force aircraft, the loss rate is about—Class A rate is about 1 per 100,000. So unmanned aircraft are still higher than the total aircraft loss rate. But when you compare the types of aircraft that the Air Force is flying, they line up much better with the construction and the operation that you would find in general aviation aircraft.

If you look at the general aviation loss rate, that rate over the last 3 or 4 years runs between 5 and 7 or 8 per 100,000 aircraft. So from a DOD perspective, we believe that the loss rate is going to continue to reduce. We believe that we are on a good trend.

As to the specific reasons for those loss rates, it is spread about equally between equipment failures, like loss of an engine—in fact, the last Air Force loss they had was a Predator in theater that had an engine failure—and pilot error. And DOD is working both of

those activities through a number of research and development activities. Many of them have gained significant success.

Colonel Tierney likely will tell you that the Army on its Gray Eagle program about 3 years ago instituted an auto-land system on their Gray Eagle programs, automates the landing and takeoff of that system. And that significantly reduced the loss rate we saw in that class of systems, compared to what we were doing before.

Mr. COOK. Thank you.

I appreciate that. I just wanted to also ask about the expense cost of the Broad Area Maritime Surveillance units. They are twice as much as the ones that are going to be ordered for the Navy/Marine Corps than the Air Force. I think they are twice as much. Wasn't it $22 million as opposed to going up to $50 million something?

And I understand the bells and whistles and everything like that, but it just seems like that is a pretty steep change on something. If you could address that?

By the way, you might want to get rid of that acronym. That has been around a long while, and it wasn't very complimentary to some people. So always beware of acronyms. As somebody in the Marine Corps a long time, that is—I kind of hate them, if you haven't figured that out.

Mr. WEATHERINGTON. So the BAMS program is—now the Navy refers to that as the Triton program. It is a derivative of the Global Hawk platform that the Air Force currently flies.

The Navy had to make some changes in that platform from a sensor perspective because the Navy was operating primarily in a maritime environment. They also added some capabilities to improve safety.

So, for example, the BAMS aircraft incorporates lightning protection for lightning strike. It incorporates de-icing capability, and it improves the redundancy system through the triplex system that they have today.

The cost of the BAMS Triton system actually lines up pretty closely with what the Air Force previously paid for their Air Force Block 30 program. So we don't see a significant cost change between the previous system that DOD was buying in Global Hawk and the current BAMS capability.

Now there are a couple other Navy programs that are on the horizon. The UCLASS program, the carrier-based program, is very early in the acquisition phase, has not met Milestone A yet. And so, we haven't defined that program specifically yet.

And then the other program is the STUAS [Small Tactical Unmanned Aircraft System] program, which currently is for the Marine Corps today, which is a small system, a Group 3 system that operates off surface combatants.

Mr. COOK. I am going to show my ignorance here, if I haven't already done that. Years ago, in fact, it was the tail end of my career, we had the Pioneer, which—and that is completely gone now. The Shadow is the next. How effective is that in terms of the truck and the launch and everything?

It kind of seemed primitive when I saw it. Of course, that was a number of years ago, and being an infantry type, all this stuff,

and I certainly appreciate your indulgence in explaining this to me. But——

Mr. WEATHERINGTON. Yes, sir. So I could certainly answer your question, but I think Colonel Tierney would be much more appropriate to answer that question.

The Marine Corps and the Army operate identical Shadow systems in theater today.

Mr. COOK. Yes, that is what I started with.

Colonel TIERNEY. Well, I could add to that, sir, is in terms of the Shadow has been extremely effective for the BCTs, the brigade combat teams, that organic UAS capability that that brigade commander owns and can count on.

In reference to the launcher, the way that system works is it is basically just launched off a catapult. And what is really great about that is running a whole airfield that you have got helicopters coming in and Air Force aircraft, is it really only consumes the—it doesn't consume the runway.

You can launch it from being the runway. So while aircraft are still taking off and landing, that Shadow is continuing to take off and then just offset to a much shorter runway. So while it looks kind of primitive, it really gives you a great capability to launch them anywhere.

Combined with the system's ability for its automatic takeoff, automatic landing—for the Army systems across the board, there is no man in the loop on a stick and rudder. Everything is automated. If it loses link, it comes back and automatically lands, and the operator's input is moving where it is by basically a joystick around on a map.

But specifically, it has been a really effective platform. It is relative small, about 400 pounds. It largely just has the sensors. There are no weapons on it, but you don't find too many BCTs that are executing any combat operations without having that thing overhead, especially on objective.

Mr. COOK. Thank you very much.

That is all I have.

Dr. WENSTRUP. Yes, thank you, Mr. Chairman.

Thank you, gentlemen, for being here today.

Mr. Pennington, I have a question for you. On the domestic debate, the question of privacy, of course, comes up. And as I understand, the FAA will have responsibility over the commercial requirements for that, and I am curious who has the responsibility within the military, and what are some of the proposals for privacy protection for our citizens?

Mr. PENNINGTON. So there is—Congressman, a great question. In the military, there is a longstanding prohibition, as you know, for any gathering of intelligence on Americans in the U.S.

So we have various sensors on manned and unmanned aircraft that we use all the time in training. We have very clear prohibitions on the utilization of that data for anything other than military purposes, which is to train. And likewise, we have very clear standards on how you have to maintain the data and dispose of it.

And so, the FAA and then certainly Department of Justice and others have got to think through similar questions about how we do UAS, private or civil UAS. But I would tell you that we have

a fair body of law on how we handle airborne aircraft currently, whether they are rotary wing or fixed wing and whether they are first responders, public, or whether they happen to be private vehicles.

We have a fair body of law that explains what you can and cannot do with that data. So I think that might be a useful place to start.

Dr. WENSTRUP. Thank you very much.

Colonel Tierney, the Army is looking into the Gray Eagle as unmanned vehicle. How is that different from the Air Force's Predator?

Colonel TIERNEY. Similar when you look on them, look at them out on a ramp. It is really the task and purpose, and then there are some design changes. The task and purpose that the Army is using its Gray Eagle for is, well, the acronym, RSTA—reconnaissance, surveillance, and target acquisition. It is really the fix and finish capability that is organic to the division, the two-star commander formation that basically gives his eyes on the battlefield.

The reason it is different is our philosophy on how we are going to fly them and fight them. From a flying perspective, the Gray Eagle, again, there is no stick and rudder component of a trained pilot that is manning it. It is completely automated for takeoff and landing.

So our operators are all enlisted soldiers that know how to operate the ground control station, but we have not run anybody through flight training. So our ability to train is—how we train is significantly different.

Also the design is it is not a—while it is GPS [global positioning system] capable, we are principally operating on line of sight. So either from a satellite-denied environment, we simply don't have the signal, that is really not in effect. Line of sight is its principal way that it is going to operate. So that is two differences.

And then, lastly, it is the integration into the division. I mean, this really for the Army is such a game-changer. Really, since GPS navigation and night vision, is the biggest leap forward for us that have become so integral to how we fight. We could no more go in with a borrowed M–4 than we could with a borrowed aircraft.

So guys counting on that aircraft being overhead is really critical, and then the ability to train with that. And perhaps later, we can talk more about how we are training our own manned fleets, how they are going together.

But it is the design, the task purpose, how it will be used, that makes those differences. And while they all started from a joint design, and there is a lot of commonalities in terms of how they are working with the ground control station, frequency bands, et cetera, that task purpose that is uniquely for the Army and for those divisions is why it is different in some aspects from the Predator or Reaper.

Dr. WENSTRUP. So it is more adapted for ground missions?

Colonel TIERNEY. Absolutely.

Dr. WENSTRUP. Thank you, Colonel.

Mr. TURNER. We will go to our second round.

Colonel, one of the exciting applications that people discuss with UASs and UAVs is manned/unmanned teaming, which would ex-

pand the breadth of both the pilot's reach and those that are working with a deployed system. Could you talk about that for a moment and what some of the areas that you see that might be gained from that, and how that might evolve as we look to what this emerging area of UAVs and UASs?

Colonel TIERNEY. Yes, sir. That specific capability is probably the biggest game-changer, at least for the Army, how that integrates. And what we call that manned/unmanned teaming is that partnership between a manned aircraft, let us say an Apache attack helicopter, and the unmanned aircraft that is overhead. And there is a wide range of abilities that we have been able to incorporate.

From a technical aspect, we have called all the way to Level 4 control, but especially in our line-of-sight configuration, for example, the front-seater in an Apache can take control of the aircraft and move it to get that lag between a pilot at a remote station so that he can physically take flight control and get it positioned where he needs to.

The next level is that he can control the sensor so that if he sees something, he is trying to instead of relay that from person to person, he can control that. So you can see where it does exactly what you said, sir. It really extends that pilot's reach.

But what we are finding, the real game-changer that we didn't expect is that having—having that Gray Eagle up overhead and allow you to husband those more expensive, maintenance-intensive airplanes in terms of like an Apache. So when you actually need it to go do its job with a 22-hour orbit time of a Gray Eagle, it can be over monitoring and then, when you need to, bring those attack platforms forwards.

Recently, within the last 10 months at the national training center, the observer controllers' comments were when Gray Eagle is overhead, it is not a fair fight. That the guys have figured out how to work the system, for example, sitting on a ramp 60 kilometers away looking at the image of the—this is the Op 4 in a training environment. They are able to see where the tanks are located and had a really smart front-seat Apache co-pilot gunner, used to be an artilleryman. So we don't even need to launch.

Call the coordinates in—and in this training scenario, called the coordinates in and didn't even need to launch. Frustrated the observer controllers. They said, well, that is cheating. You guys have to launch to actually get—so they pulled up 8 kilometers or 6 kilometers within the range of the Hellfire missile. And again, never actually saw them with human eye but knew where the targets were at.

And those are the type of changes that are occurring. Instead of staying up for hours and hours and putting a man at risk either from fatigue, you know, you are flying guys 130, 140 hours a month, or risk to enemy fire, you can balance that and really allow yourself to have those aircraft available from the guy on the ground says, "I need you to get here now with weapons," that aircraft is always available.

So that is a couple ways. But from the Army's perspective, it is really going to be a game-changer to include reducing the number of aircraft that we have to keep up, manned aircraft, up and flying day in and day out.

Mr. TURNER. Excellent. Thank you.

And as we all know, we don't want it to be a fair fight.

Colonel TIERNEY. No.

Mr. TURNER. So thank you for that description.

Colonel TIERNEY. Yes, sir.

[Laughter.]

Mr. TURNER. Mr. Pennington, when we talk about trying to achieve this cooperation between the FAA and DOD, we do so because we know that DOD has been on the lead front of research and development, design, application of UAV technology, sensors, and technology maturation. They have also, obviously, from their utilization of UASs and UAVs been on the forefront of acquisition, working with industry to assure that they can achieve the end result.

And then in integration. I mean, when we talk about integrating them into our airspace, DOD has already been very active in both in foreign application, but also in war zones for the integration of multiple layers of both private military aircraft that are manned and UAVs and UASs.

And then, of course, there is the issue of deployment and ensuring that the operation, the skills that are necessary for operation, that they are developed and utilized. As we try to go toward this cooperation, obviously, Air Force Research Laboratories are a significant resource that we are trying to leverage in this.

Could you please speak for a moment as to how you can see this asset of the Air Force Research Laboratories being leveraged through this process of DOD and the integration with FAA?

Mr. PENNINGTON. Congressman, great question. I think there are two things, and Dyke touched on one of them. So I will spend a little less time on that.

Sense and avoid is the—there are two critical issues. One is sense and avoid. The second one is how you maintain a secure link between the aircraft and the ground site. So, in sense and avoid, AFRL has been leading the discussion, along with our friends in the AFMC [Air Force Materiel Command], LCMC [Life Cycle Management Command] in terms of a customer Global Hawk or another vehicle for how do we actually do it.

Do we use EO [electro-optical]? Do we use IR [infrared]? Do we use radar? You could use all of them. And then, secondly, building an algorithm which would accept these inputs and then provide info to the pilot. And then, eventually, as you move down the automation and autonomy lane, it also begins to be—it provides it directly into the aircraft and notifies the air traffic system that it needs to turn right or left or climb or descend to avoid a potential collision.

So sense and avoid is the first key piece. The second key piece is the fact that we have the aircraft displaced from the cockpit, which is on the ground, which is referred to as the ground control station. So we must make sure that we utilize what DOD, and particularly, it has been AFRL, along with Rome Labs, in looking at information integrity, assurance, and security.

And the same applies, as you know, or you have seen a couple articles in the last weeks about potential vulnerabilities of current aircraft avionic suites to what is referred to as hacking or cyber at-

tacks. Certainly, a GCS [ground control station] that is separated from the aircraft, like we do in the UASs, is something that we must pay attention to this issue of information integrity assurance and security.

Mr. TURNER. And then, for each of you, this is a budgetary hearing. How is it that we can look forward to 2014 and our budgetary priorities and the emerging opportunities of UASs and UAVs. So I am going to ask each of you, if you will, to provide us a commercial of what are we underfunding?

As you look to overall what is available, what the opportunities are, what are we missing? What is an area that perhaps we need to pay better attention to that might have incredible opportunities for us?

I will start with Mr. Weatherington.

Mr. WEATHERINGTON. Chairman Turner, you have heard this before, but I will say the number-one risk to the DOD unmanned aircraft portfolio and probably ISR in general is the budgetary uncertainty that DOD currently faces. We are facing that certainly in fiscal year 2013 with working the sequestration.

As you are well aware, the 2014 budget was delivered, but there is still a big question mark as to what that budget will actually end up being. And so, there is very much uncertainty in many program managers' minds as to what resources they are actually going to have in 2013 and 2014.

Unfortunately, that leads us to be conservative, and in the short term, DOD is forced to make some decisions that in the long term probably aren't in the best interests of the Department, but we have no other alternative.

So the major improvement we could make is stabilizing the budget, whatever that is. Then DOD could do a much better job of doing its long-term planning for whatever that budget will support.

The next step is the threat continues to evolve. You can pick up a newspaper almost any day and hear about some new activity somewhere around the world. It is very much different than when I was in a blue uniform, and we kind of knew who the bad guy was. And virtually all of our resources were dedicated against that threat, and we had a really good idea what the fight was going to be and where it was going to be and how we were going to fight it.

Today, we have a much more diverse threat, and that presents DOD some significant challenges, both in what the specific capabilities we are to address that threat and how much of each kind of capability we can afford. In the building today, we are going through a significant reevaluation of the Department's long-term strategy and how ISR supports those various mission capabilities that we have to execute.

In the short term, you see that reflected a little bit in the fiscal year 2014 budget, the President's budget request, because we are still trying to figure that out. So I am sorry I can't be more specific than that.

In terms of unmanned aircraft systems specifically, I would articulate that the systems we have designed are going to be around for a long time. We built in a lot of flexibility into these systems.

Someone mentioned earlier in the conference today that we are flying 30- and 40-year-old airplanes, and unfortunately, that is true.

The advantage we have in the unmanned aircraft systems portfolio is it is a relatively new and healthy and young portfolio, and we have built a lot of investment into it that allows us to integrate new capabilities into it very quickly. So I find that those systems are going to likely be the most adaptable we have.

The other advantage is they are relatively inexpensive to operate, compared to other legacy systems we have. Now have to be very careful when we start making comparisons between manned systems and unmanned systems because the unmanned systems were procured for a specific mission set that in most cases you cannot find an equivalent to in the manned world.

But I will use a simple example. Colonel Tierney mentioned Shadow. Previous to the Army having Shadow, the way we did that reconnaissance was with a manned rotary-wing asset, you know, Kiowa, Blackhawk, and Apache. Those systems, compared to a Shadow, are 10 times more expensive to operate than a Shadow.

Now Shadow doesn't do everything they do, but if what you need is risk-to-capability or ISR capability, that is exactly what you want to use because you keep those resource-intensive assets on the ground, and you save them for when you really need to use them.

Likewise, the Air Force in Predator and Reaper. Those systems are relatively inexpensive to operate. Operating costs in the $3,000 to $4,000 a flight hour compared to other manned systems. And again, not equivalent, but an F–16 is in the $25,000 to $30,000 an hour price range.

So, again, if you can use—if those systems of Predator, Reaper are what you need to accomplish a mission and you can leave your F–16 parked on the ground, then that is a good thing for the Department to do.

Mr. TURNER. Very well said. The issue of uncertainty, both through sequestration, the era of repeated continuing resolutions, brinksmanship legislative budgeting and spending, it certainly has had its significant effects on DOD and the industry. We hear it everywhere we go.

Certainly, Secretary Hagel made that point when he was just before our committee. So very well said.

Mr. Pennington.

Mr. PENNINGTON. Dyke has laid out very clearly what the challenges are. I would like to just focus on some potential opportunities, which if we can keep them in the budget I think will make both the military public users and the civil users better off in the future.

I talked about sense and avoid. Dyke talked about ground-based sense and avoid. Ground-based sense and avoid is the near-term opportunity certainly for Federal public users, but potentially for civil users, to dramatically expand access to the National Airspace System.

So if you have an ASR–11, if you have some other sensor that is relatively high resolution with a C–2 system and you go through the appropriate testing, in that body of airspace, you can begin to fly UASs much more frequently. And that certainly is a capability

that we in DOD think is very important, but also I think that it is going to be something that the test sites and other civil proponents in the future will think is important.

Longer term, airborne sense and avoid is the way to go certainly for larger aircraft, where you have the size, weight, and power available to be able to have that onboard. And a lot of that research is going on right here in the Dayton area. So that sort of not just research, but also application. Moving it into a vehicle is important.

Now why do I mention that, that it is not just a DOD, but it is a civil side? The way to open the civil market is to be able to answer what Dyke talked about in see and avoid. Well, part of see and avoid, we believe, is that if you can get the sense and avoid and you have an agreed-upon certified solution set, then civil proponents could work with the FAA and their local community and say that this is the radar we have, this is the testing we have done of the radar, and this is how it meets the standards.

And within the framework of that, we should begin to operate. And then, secondly, airborne sense and avoid, as civil proponents begin to put that on their aircraft, it should dramatically open up the places that you can use these.

Why this is incredibly important to DOD is that if that happens, there will be a much broader civil market than there will be the military market, and the military will be able to choose from this competitive civil market, just like we do for cars and airplanes today. And we believe that it will be an advantage to us. We will have a greater variety of choice.

Secondly, most likely, the prices will be lower. Thirdly, IR&D [independent research and development] will be being done by industry primarily, with a little bit of military help, where it is the opposite way around right now.

So if we can kind of keep those sort of things secured in the budget, I think we will be better off both on the military side and, as Congressman LoBiondo works on his side, on the civil side.

Mr. TURNER. Excellent reference to the dividend that this will pay.

Colonel Tierney.

Colonel TIERNEY. Sir, can I go down those questions?

I guess from a fiscal perspective, in the near term for our UAS, it is our O&M [operations and management], our operations dollars available to operate them. In the Gray Eagle's case, we have enough to acquire it, but not enough to fly it, which is problematic for an acquisition policy and law. If we can't afford to use, we are not allowed to buy it.

From a research and development perspective, we are kind of really at the dawn of this. You can kind of think of jet fighters when they first came around, how many iterations went by that there is still a lot to learn. And as that budget shrinks, it is just less opportunity we have to improve it, to really take advantage of what it is capable of.

From a threat perspective, when we talked about could they have been shot down or what are the threats against them is really from an enemy, a direct action against us, we are able to task organize how we fight to not afford that opportunity, either from greater

standoff distance of the sensors, by either closing with and throwing our smalls at them. So you are throwing a mosquito size or relative small UAS, and they are trying to swat it with a sledgehammer.

I think it is not that direct action. The threat we have to be concerned about is a network penetration from a cyber attack against a UAS system that is well integrated, but basically is vulnerable in that regard.

And the last point, I think that when you said where are those opportunities as we transition commercially? I think from the Army's perspective, you can see a lot of tactical to practical applications—be it civilian like Medevac or telemedicine or night vision—that are applied.

You can see that we are rapidly approaching the ability, once the airspace issues are worked out, everything from the surveillance missions we are doing on some type of screen line look very similar to an oil pipeline, any type of infrastructure, those type of techniques. And while you said we couldn't necessarily materially support some of the efforts, the lessons we have learned, there is already a great history of the Army transitioning those lessons back to civilian application.

Mr. TURNER. Thank you.

Turning to Mr. Cook.

Mr. COOK. Thank you, Mr. Chair.

Once again, I am going to show my ignorance on this, but maybe you can help me through this. And this is on the data link, and you kind of alluded to it earlier. I have these visions, and I am always looking at the enemy, how they are going to counteract this.

Of course, the old days, it would just be called "jamming." Now it is much more sophisticated. If you invest, if you change the battlefield, where you are going to rely upon these systems and not human individuals, but actually how reliable or what is the possibility of that being interfered with so that they cannot function and carry out their tactical missions?

Colonel TIERNEY. We are mandated to now everything is the TCDL [tactical common data link] or technical. It is communication data link is secure. There is no more unsecure that can be, in theory, jammed in there without some effort.

The lost link capability when the aircraft doesn't see what signal it is supposed to be, that it doesn't go do what somebody says it is to do, it comes home.

When we did—related to this were the analysis of alternatives for the Armed Aerial Scout, the Scout helicopter, the OH–58. When we looked at what is its successor, the analysis of alternatives showed that it was a combination, manned/unmanned teaming. So that we retain the ability to do both.

We can't always presume that we are going to win every battle so that the airfield that you lose and the UAVs don't have any place to land, that we have kind of thought through that. So, specifically, when you say how will we get when that battlefield changer occurs, when will be the counteraction to that, is we still see that there is that requirement for the manned system out there so that we can put the appropriate tool for the appropriate task when necessary.

Mr. COOK. Colonel Tierney, on that same vein, I guess, you briefly mentioned cyber threats, cyber attack. Could you discuss that a little bit, the risk of a cyber threat as it pertains to these systems?

Colonel TIERNEY. Well, just like any network system that is linked, just what is that penetration capability, penetration detection, the penetration defense of any network? And so, for example, the feeds, the products that we get back from there, like say, for example, full-motion video. But then that is fed and distributed out to all the users across the division, the brigade combat teams, down to the battalion.

So that travels along a network. So there is certainly a risk there that that could be either interfered with or stolen, like any other kind of data.

There is the other part against what you just said, sir, about that where you called it weakening or jamming, that what are we doing to protect that? So you can't spoof the aircraft and let it think it is the signal it is receiving and basically turn it back on it.

So, again, it is those abilities to encrypt it, to defend against it, and then just be aware across a larger spectrum with the Army is that how well protected are our networks. And as these outliers, these Scout aircraft are on the edge of this network, that they are not a vulnerability. We recognize that it has to be protected, and it is built that way from the ground up, not so much as an afterthought in particular with the technical communication data link that is secure to each one of those.

Mr. COOK. Thank you very much, Colonel.

Mr. Chairman, I yield.

Mr. TURNER. Well, I want to thank each of our panelists—Mr. Weatherington, Mr. Pennington, Colonel Tierney—not only for your being here, but also for your expertise.

I mean, clearly, this is a very important area for our national security and then also for a domestic economic opportunity. Your thoughtfulness, your expertise will help us make better decisions and ensure that we make the right ones as we go forward.

So also, then thank you for being here today and contributing your comments to this forum and for the interest that we have in the community.

I also want to thank then our Members of Congress for being here. Frank LoBiondo, Paul Cook, and Brad Wenstrup, thank you for being here.

I wanted to note that there are many initiatives that are congressional led versus bureaucracy led or agency led. This is one of those. This is one where Congress has stepped in and said we need to make a mark here. We need to integrate this opportunity. We need to make certain that the parties are working together.

If it had not been for Congress leaning forward on this issue, we would still be talking about the prospects of the day upon which we begin this process. Instead, by Congress leaning forward, we are beginning that process now.

I want to congratulate Frank LoBiondo for his leadership both on the Transportation Committee and the Armed Services Committee in bringing those issues together, and I appreciate his cooperation and being able to work with him on this important issue.

As we look at the potential for these six test sites, another aspect of this which is exciting is learning of all of the inherent expertise that we have across the country. People have been thinking about this and have been working on these issues for a significant period of time, and I think that inventiveness, that ingenuity that is going to be unleashed by this first step of these test sites will lead us to the day where we are not even just in test sites, but we actually look at how is this applied across our Nation in our domestic airspace and what it has accomplished. And part of that will have begun by the information that you provide us today. So I appreciate that.

I also want to thank everyone for participating, and certainly the members of our community for their diligence on the issue of how then can our region take advantage of the assets that we have at Wright-Patterson Air Force Base, the engineers and scientists that are here, and the inventive spirit of our community and apply it to both our national interests in UAS and UAVs, but also for a local economic development opportunity.

And with that, we will be adjourned.

[Whereupon, at 12:37 p.m., the subcommittee was adjourned.]

A P P E N D I X

APRIL 23, 2013

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 23, 2013

HOLD UNTIL RELEASED BY THE
HOUSE COMMITTEE
ON ARMED SERVICES

STATEMENT OF

MR DYKE D. WEATHERINGTON

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STRATEGIC AND TACTICAL SYSTEMS

OFFICE OF THE UNDER SECRETARY OF DEFENSE
(ACQUISITION, TECHNOLOGY, AND LOGISTICS)

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

April 23, 2013

HOLD UNTIL RELEASE BY THE
HOUSE COMMITTEE
ON ARMED SERVICES

Post Iraq and Afghanistan: Current and Future Roles for UAS and the Fiscal Year 2014 Budget Request

Mr. Dyke D. Weatherington
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(Acquisition, Technology, and Logistics)

Good morning Mr. Chairman, Congressman Sanchez, and Members of the Committee. Thank you for the opportunity to appear before you today to discuss current Department of Defense (DoD) unmanned aircraft system (UAS) acquisition programs and their role post Iraq and Afghanistan. I am also pleased to address the related Fiscal Year (FY) 2014 President's Budget (PB) request and the Department's activities related to the integration of DoD unmanned aircraft (UA) into the National Airspace System (NAS).

Unmanned Aircraft Systems (UAS) Overview

The Department operates a wide range of UAS with varying missions and capabilities. Table 1 depicts the broad diversity of the types of DoD UAS supporting a wide range of warfighter needs. Table 2 is a summary of fielded DoD UAS, and Table 3 is a summary of annual flight hours flown by DoD UA, excluding those of the Group 1 systems. Upon review, it is apparent that the majority of UAS are Group 1 systems; and that UA flight hours grew rapidly starting in 2001, but are now beginning to decline as operations in Iraq have completed and Afghanistan operations have stabilized. The Department's ongoing efforts to integrate UAS operations in the NAS will enhance the

ability for DoD to develop, train, and operate at home, as our forces return from Afghanistan.

UAS Category	Max. Gross Takeoff Weight (lbs)	Normal Operating Altitude (ft)	Speed (KIAS[1])
Group 1	0-20	< 1200 AGL[2]	100
Group 2	21-55	< 3,500 AGL	<250
Group 3	<1320	< 18,000 MSL[3]	Any
Group 4	>1320		
Group 5		> 18,000 MSL	

Table 1: Joint UAS CONOPS UAS Categories[4]

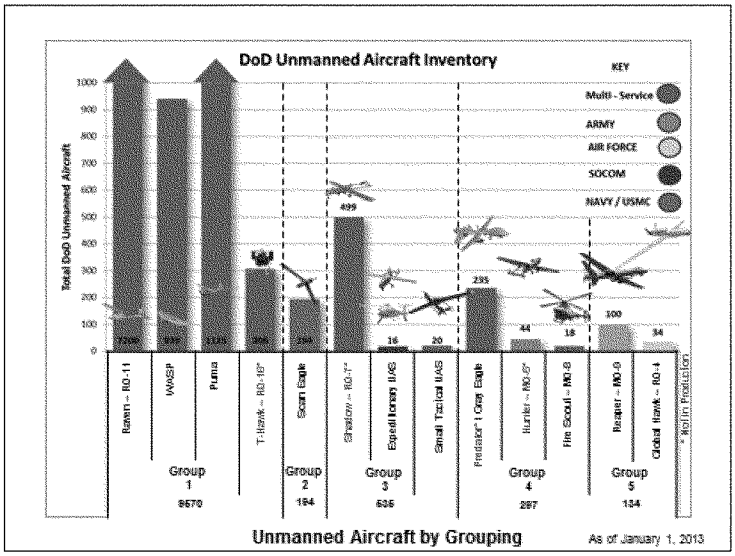

Table 2: UAS Inventory Summary

In addition to the UAS programs shown in Table 2, the Unmanned Carrier

[1] Knots (Nautical Miles per Hour) Indicated Airspeed
[2] Above Ground Level
[3] Mean Sea Level
[4] Lighter than air vehicles are classified by the highest of their operating attributes.

Launched Airborne Surveillance and Strike (UCLASS) system is in the Materiel Solution Analysis acquisition phase.

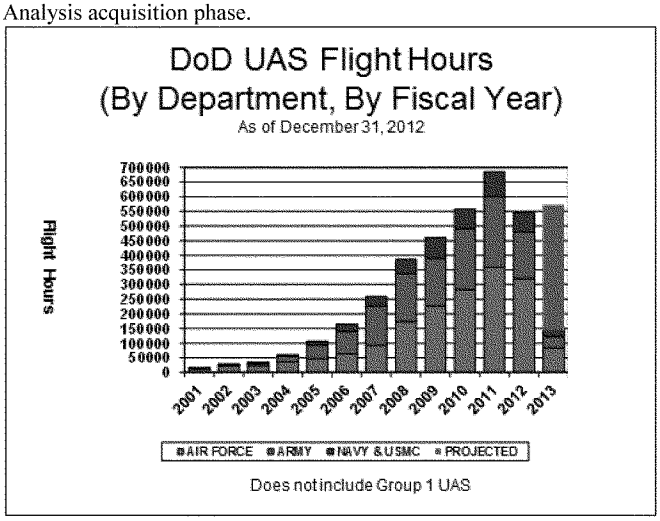

Table 3: UAS Flight Hour Summary

UAS Post Iraq and Afghanistan

As we draw down our forces in Afghanistan, the Department will intelligently shape an Intelligence, Surveillance, and Reconnaissance (ISR) and UAS portfolio that meets DoD requirements and is affordable. Given that we cannot predict how the future strategic environment will develop, we need to maintain an ISR enterprise capable of supporting full spectrum military operations anywhere in the world.

Systems returning home will provide for a more normalized training environment, enabling the training pipeline to recover from years of high operational usage. In all cases, the current budgetary climate dictates that we proceed smartly in terms of how we

acquire and apportion ISR systems, including UAS, to best deal with an evolving strategic environment.

The future roles of UAS are likely to be similar to those UAS perform today. In addition to ISR, UAS can also provide communications relay; logistics resupply and limited strike capabilities. UAS capabilities are based on the Combatant Commanders' prioritized needs, and the Department's UAS portfolio will continue to be based on those needs within the fiscal environment.

Fiscal Year 2014 President's Budget

The FY 2014 President's Budget (PB) includes $1,447 million for UAS Research, Development, Test and Evaluation (RDT&E) and $1,191 million for UAS Procurement. Compared to the FY 2013 PB, this is a decrease of $732.3 million (34%) for RDT&E and $624.6 million (34%) for Procurement. The FY 2014 budget request funds the Air Force's MQ-9 Reaper and RQ-4B Global Hawk Block 40; the Navy's MQ-4C Triton, MQ-8C Fire Scout Rapid Deployment Capability, RQ-21 Small Tactical UAS, and UCLASS; the Army's MQ-1C Gray Eagle; and the multi-Service small hand-launched UAS programs (Raven, Wasp, and Puma). Additionally, the budget funds the U.S. commitment to the NATO Alliance Ground Surveillance (AGS) system, and sustainment and improvements for the fielded Air Force MQ-1B Predator, and the Army and Marine Corps RQ-7 Shadow systems. Highlights of the President's FY 2014 budget request are summarized below.

RQ-4 Global Hawk / MQ-4C Triton / NATO AGS

The Air Force RQ-4, Navy MQ-4C, and NATO AGS UAS programs provide high-altitude, long-endurance ISR capabilities. The RQ-4 Block 20 includes a communications relay payload; the Block 30 includes a multi-intelligence suite for imagery and signals intelligence (SIGINT) collection; and the Block 40 includes multi-platform radar technology for synthetic-aperture radar (SAR) imaging and moving target (MT) detection and tracking. All Block 20 aircraft are operational, the Block 30 operational capability will be sustained through December 31, 2014, and the final two Block 40 AF RQ-4s will be delivered in FY 2014. The Navy MQ-4C Triton will provide the Navy a persistent maritime ISR capability. Mission systems include inverse-SAR/Maritime MT, electro-optical/infra-red full motion video (FMV), Electronic Support Measures (ESM), an Automatic Identification System (AIS), a basic communications relay capability, and Link-16. The five NATO AGS aircraft, similar to the Air Force Block 40s, are being procured and developed over the next several years and will complete deliveries by mid-FY 2017. All Global Hawk variants support both Line-of-Sight (LOS) and Beyond-Line-of-Sight (BLOS) capability.

Missions: The AF and NATO AGS RQ-4 systems perform high-altitude, long-range, near-real-time, high-resolution ISR collection, while the Navy MQ-4C provides tactical persistent maritime ISR. Both AF and Navy systems support Joint and Combatant Commander Requirements, while the Navy MQ-4C also supports the numbered Fleet commanders from five planned worldwide sites.

FY 2014 Budget Request: The budget funds the AF development efforts for the Block 40 and the Multi-Platform Radar Technology Insertion Program; the U.S. contribution to the NATO AGS; and the Navy MQ-4C Triton engineering and manufacturing development effort and advance procurement for three Low Rate Initial Production systems.

Prime Contractor: Northrop Grumman; Rancho Bernardo, CA & Bethpage, NY

MQ-9 Reaper

The MQ-9 Reaper UAS is comprised of an aircraft configured with an array of sensors to include multi-spectral targeting payloads (electro-optical (EO), infra-red (IR), laser designator, and IR illuminator) providing real-time day/night FMV, SIGINT, and SAR/MT payloads; and weapons. The ground control segments support both LOS and BLOS operations.

Mission: This single-engine, turbo-prop, unmanned armed reconnaissance aircraft is designed to operate over-the-horizon at medium altitude for long endurance. The primary mission is "hunter-killer" for reconnaissance and strike against time-critical targets.

FY 2014 Budget Request: The budget funds continued development, including improvements in endurance, production and fielding of Reaper aircraft and ground stations to support the Department's goal to field and sustain 65 Combat Air Patrols (CAP)/orbits. The FY 2014 request supports the procurement of 12 aircraft and 12 fixed ground control stations.

Prime Contractor: General Atomics–Aeronautical Systems Inc., San Diego, CA

MQ-1B Predator / MQ-1C Gray Eagle

The AF Predator and Army Gray Eagle systems are comprised of aircraft configured with multi-spectral targeting payloads (EO, IR, laser designator, and IR illuminator) providing real-time FMV, weapons, and ground control stations with communications equipment providing LOS and BLOS control.

Missions: Both systems include single-engine, propeller-driven unmanned aircraft that operate over-the-horizon at medium altitude for long endurance to provide real-time ISR, target acquisition, and strike capability to aggressively prosecute time-sensitive targets. The Army MQ-1C Gray Eagle also adds SAR/MT, a communications relay capability, a heavy fuel engine, de-icing, tactical common data link, and a greater weapons capability.

FY 2014 Budget Request: For Predator, the budget funds development and fielding of AF and U.S. Special Operations Command (SOCOM) critical modifications to the airframe and ground station elements. For Gray Eagle, the budget funds continued development and integration of the Universal Ground Control Station, a ground-based sense-and-avoid (SAA) system, and a SIGINT capability; and procurement of 15 aircraft and three modular platoon sets of equipment.

Prime Contractor: General Atomics–Aeronautical Systems Inc., San Diego, CA

RQ-7 Shadow / RQ-11 Raven / RQ-21 STUAS

The RQ-7, RQ-11, and RQ-21 systems provide organic day/night FMV reconnaissance, surveillance and target acquisition (RSTA) LOS capabilities embedded

in maneuver formations, and are capable of providing crucial information to the ground commander.

Missions: The Army/USMC RQ-7 Shadow and the USMC/Navy RQ-21 STUAS systems provide the tactical maneuver commander near real-time, 24 hour RSTA and force protection in benign and limited adverse weather conditions. The multi-sensor RQ-21 is runway-independent, requiring minimal space for take-off and recovery from unimproved expeditionary and urban environments, as well as from all air capable Navy ships. The multi-Service RQ-11 is an "over-the-hill" rucksack-portable, day/night, limited adverse weather, UAS that supports combat battalions (and below) as well as selected combat support units.

FY 2014 Budget Request: For RQ-7, the budget funds upgrades to system hardware and performance based logistics support. For RQ-11, the budget procures upgrades and provides training and contractor logistics support. For RQ-21, it procures 25 aircraft, conducts test and evaluation, and provides contractor logistics support.

Prime Contractors: Shadow - AAI Corporation, Hunt Valley, MD; Raven - AeroVironment, Monrovia, CA; RQ-21- INSITU, Inc, Bingen, WA

UAS Airspace Integration

The Department is addressing major issues to enable DoD UAS integration into the NAS through a joint, unified effort led by the DoD UAS Task Force. The UAS Task Force serves as the DoD advocate for shaping regulatory policies, procedures, certification standards, and technology development activities that are critical to the integration of DoD UAS into the NAS. Table 4 depicts the classes of airspace within the

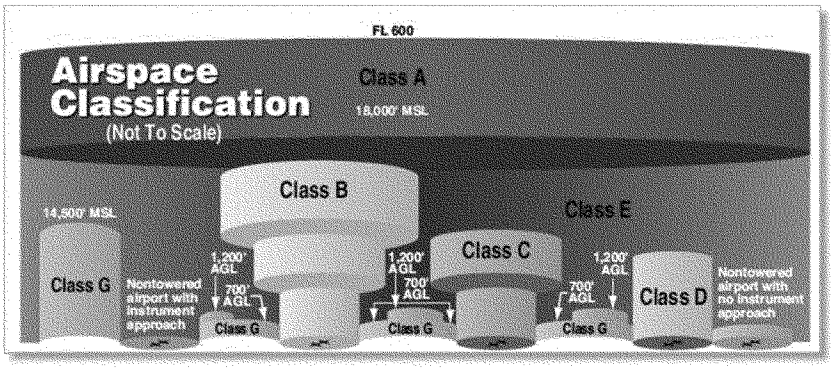

Table 4 National Airspace System Airspace Classes

NAS. The UAS Task Force leadership, in partnership with the DoD Policy Board on Federal Aviation, also serves and supports the congressionally directed, multi-agency UAS Executive Committee (ExCom). One of the UAS ExCom's key goals is to coordinate and align efforts among FAA, DoD, Department of Homeland Security (DHS), and the National Aeronautics and Space Administration (NASA) to ultimately achieve safe and routine access for Federal agencies to operate UAS in the NAS. In October 2010, the UAS ExCom developed and provided the congressional committees a "National Airspace System Access Plan for Federal Public Unmanned Aircraft Systems," which identified needs, challenges, and an incremental approach to the challenges. The plan also provided specific recommendations in the areas of policy, regulations, procedures, and technology for increasing public UAS access to the NAS.

Progress in Integrating UAS into the NAS

In 2011, the DoD UAS Task Force published the "Unmanned Aircraft System Airspace Integration Plan"[5] and "Joint Concept of Operations for Unmanned Aircraft Systems Airspace Integration," both of which focus DoD's incremental efforts and resources to safely increase UAS access to the NAS. These documents leverage policy, procedures, and technologies to improve access in the near term until appropriate SAA technologies can be developed to safely allow UAS routine access to the NAS. The UAS Task Force airspace integration effort, outlined in these documents, includes short-term and long-term activities. As part of the short-term activity, DoD worked with the FAA through the UAS ExCom to simplify the application and approval process for Certificates of Waiver or Authorization (COA), the current FAA process to gain access to the NAS outside of restricted and warning areas. This effort resulted in improved COA process transparency, established and expedited the timelines and priorities, clarified application language, and established a feedback system. DoD and FAA also completed an agreement on sharing UAS mishap data and to date DoD has passed 8 years of data to the FAA to support their analysis. DoD, FAA, DHS, and NASA also began working the more challenging issues identified in the ExCom-developed "NAS Access Plan" by establishing focused ExCom working groups.

In 2012, solid progress was made in incrementally improving DoD access to the NAS. DoD signed a memorandum of understanding with FAA, allowing transition of an

[5]DoD *Unmanned Aircraft System Airspace Integration Plan* and *Unmanned Systems Integrated Roadmap, 2011-2036*" are available at http://www.acq.osd.mil/sts/organization/uw.shtml

unmanned aircraft from a DoD Class D facility to adjoining restricted and warning areas without an additional COA. Also, FAA published new policy guidance extending COA expirations up to 24 months. A UAS ExCom working group completed an analysis of existing DoD risk mitigation procedures for multiple unmanned and manned aircraft operations in DoD controlled Class D airspace and their applicability to other locations. Another UAS ExCom working group completed the refinement and live demonstrations of risk mitigation procedures to increase access for small UAS in Class G airspace.

DoD was also actively involved in providing inputs to FAA on its consolidation of UAS operational approval guidance into a single FAA Notice (N8900.207) published in January 2013. The Notice provides clear guidance on the application process for COAs and UAS operations in the NAS, and acknowledges DoD and other public agencies' authorities regarding training and airworthiness standards. DoD and FAA are also in final coordination of an update to the "DOD-FAA Memorandum of Agreement (MOA) Concerning Operation of DoD UAS in the NAS" that allows increased access for small UAS and operations in DoD controlled Class D airspace. Many of the issues that DoD has been discussing with the FAA for the last few years will see significant improvement with the new policy and guidance.

DoD's long-term goal is to reduce and ultimately eliminate the need for an FAA issued COA for the vast majority of DoD UAS operations. DoD has a number of activities underway to achieve that goal, including development of sense and avoid (SAA) capabilities. Over the past 3 years, DoD has made significant investments in

ground-based and airborne SAA technologies to enable broader access to the NAS for DoD UAS.

DoD has been actively engaged in developing a clear path to accelerate UAS access to the NAS to support the growing need for training and operational missions. While progress has been slower than DoD would prefer, short-term policy and procedural changes have improved UAS access, and continued improvements are in progress. The DoD UAS Task Force will continue to lead the efforts outlined in the "DoD UAS Airspace Integration Plan" to accelerate UAS airspace access through short-term and long-term activities. DoD will also continue to work through the UAS ExCom, establishing priorities and identifying paths forward for incremental improvements and eventually the long-term goal of routine UAS access to the NAS.

Conclusion

UAS in the future will continue to provide the critical enabling capabilities that they do today, to include ISR, communications relay, and strike. The future presents opportunities to expand the role played by UAS in support of the Combatant Commanders. The FY 2014 budget request funds the current Combatant Commanders' needs.

Integration of DoD UAS into the NAS will enhance the ability for DoD UAS pilots and operators to train at home, as more systems return from overseas. The ability to maintain combat readiness, support ongoing operations and provide disaster relief, if called on, requires improved NAS access for UAS. The Department's airspace

integration activities are critical to this improved access and are resourced in the FY 2014 budget request.

Biography

Dyke D. Weatherington

Director - Unmanned Warfare & Intelligence, Surveillance, and Reconnaissance

Mr. Dyke Weatherington is the Director, Unmanned Warfare & Intelligence, Surveillance, and Reconnaissance (ISR), Strategic and Tactical Systems in the Office of the Under Secretary of Defense (OUSD) for Acquisition, Technology and Logistics (AT&L) and the Office of the Assistant Secretary of Defense for Acquisition. He is responsible for acquisition oversight of Department of Defense Unmanned Aircraft Systems (UAS) and manned ISR aircraft systems. UAS programs include the Navy Unmanned Combat Air System (Demonstrator), Global Hawk, Triton, Predator, Gray Eagle, Reaper, Shadow, Fire Scout, many small UAS, and the NATO Alliance Ground Surveillance system. For ISR, Mr. Weatherington's portfolio includes the Joint Surveillance Target Attack Radar System, Rivet Joint, U-2, Liberty, and Guard Rail Common Sensor. Mr. Weatherington is also the functional lead for the Deputy Secretary of Defense directed UAS Task Force that serves as a forum for the Military Departments to collaborate on UAS initiatives and resolve issues. He also serves as Chairman of the multi-agency (DoD, FAA, DHS, and NASA) UAS Executive Committee Senior Steering Group that addresses UAS access to the National Airspace System for its members.

Prior to coming to the Office of the Secretary of Defense, then Lieutenant Colonel (USAF) Weatherington was the Program Element Monitor for U-2 and Global Hawk sensors, data-links, and imagery standards within the Air Staff (SAF/AQI), serving in this position from 1997 to 2001. During this assignment, he also served as the U.S. Head of Delegation to NATO Air Group IV in the ISR mission area.

Previous experience includes a position as the Chief of the Precision Targeting Branch at the Reconnaissance System Program Office at Wright-Patterson AFB (WPAFB). Earlier Air Force management and engineering positions included activities at Ballistic Missile Office (BMO) at Norton AFB and intelligence analysis efforts at Foreign Technology Division (now National Air Intelligence Center (NAIC)), also at WPAFB.

Mr. Weatherington was born and raised on his family's farm near Burnside, Illinois. He holds a Bachelor of Science Degree in Engineering Mechanics from the United States Air Force Academy (1981) and a Master of Arts in National Securities Studies from California State University (1993). He is also a graduate of the Air Force Air Command and Staff College and the Defense Systems Management College. He has been awarded numerous Air Force Decorations including the Airman's Medal.

United States Air Force

Testimony Before the House Armed Services Committee, Subcommittee on Tactical Air and Land Forces (Field Hearing)

Post Iraq and Afghanistan: Current and Future Roles for Unmanned Aircraft Systems and the Fiscal Year 2014 Budget Request

Witness Statement of:
Mr. Steven Pennington
Director, Bases, Ranges & Airspace
Acting Executive Director, DoD
Policy Board on Federal Aviation

April 23, 2013

BIOGRAPHY

UNITED STATES AIR FORCE

MR. STEVEN PENNINGTON

Mr. Steven Pennington is the Director of Bases, Ranges, and Airspace, and Executive Director for the Department of Defense Policy Board on Federal Aviation, Headquarters Air Force, Washington, DC. He leads 221 Airmen and civilians in the Aviation Integration Division, Air Force Range and Airspace Division, Department of Defense Notice to Airman Office, the Air Traffic Control Services Cell, and the Air Force Flights Standards Agency. His broad portfolio includes integrating remotely piloted aircraft into the national airspace system and internationally, leading the Department of Defense Next Generation Air Transportation System office, facilitating global civil/military aviation integration, liaising with the Federal Aviation Administration, and leading the Air Force energy operations and encroachment initiatives.

Mr. Pennington was born in Honolulu, HI and entered active duty in 1977 through the Reserve Officer Training Corps program at the University of North Carolina. Prior to his current assignment, Mr. Pennington held a number of leadership positions to include Director of Staff, Air Force Directorate of Operations, and Commander, Air Force Operations Group, the Pentagon, Washington, DC.

Mr. Pennington is married to Lorraine S. Gravley of Billings, MT, with seven children.

EDUCATION:

1977 Bachelor of Arts, University of North Carolina, Chapel Hill, NC
1981 Squadron Officer School, Air University, Maxwell Air Force Base, AL
1981 NATO Tactical Leadership School, Jever Air Base, Germany
1982 Electronic Warfare Officer School, Mather Air Force Base, CA
1985 Air Command and Staff College by correspondence, Air University, Maxwell Air Force Base, AL
1998 Air War College by correspondence, Air University, Maxwell Air Force Base, AL

ASSIGNMENTS:

1. August 1977 – November 1985, Flying Training and Operations, Numerous Locations
2. November 1985 – February 1989, Commander, Electronic Combat Flight, Tyndall AFB, FL
3. February 1989 – August 1990, Electronic Warfare Officer, Lindsey Air Station, GE
4. August 1990 – February 1993, Commander, 7100 Transportation Squadron, Lindsey Air Station, GE

5. February 1993 – August 1995, Director of Operations, 563d Flying Training Squadron, Randolph AFB, TX
6. August 1995 – July 1996, Commander, 607th Air Support Squadron, Camp Red Cloud, Korea
7. July 1996 – July 1998, Commander, Combat Operations Squadron, Osan AB, Korea
8. July 1998 – Mar 2002, Chief, Experimentation & Wargaming Division, HQ Air Force, Washington, DC
9. Mar 2002 – Mar 2004, Joint Operations & Exercises, HQ Air Combat Command, Langley AFB, VA
10. Nov 2002 – July 2003, Chief, Current Operations, Tampa, FL & Camp As Saliyah, Qatar, Iraq
11. September 2004 – May 2007, Commander, Air Force Operations Group, HQ Air Force, Washington, DC
12. August 2007 – January 2010, Director of Staff, Directorate of Operations, HQ Air Force, Washington, DC
13. February 2010 – Present, Director of Bases, Ranges, and Airspace, HQ Air Force, Washington, DC

Chairman Turner, Ranking Member Sanchez, and distinguished members of the subcommittee, I appreciate the opportunity to appear before you today to discuss Current and Future Roles for Unmanned Aircraft Systems and the Fiscal Year 2014 Budget Request.

As you are aware, the United States Air Force has employed Unmanned Aircraft systems (UAS) in support of operations in Iraq and Afghanistan, as well as other theaters around the world in increasing numbers. Unmanned Aircraft Systems provide a critical component to the necessary intelligence, surveillance, and reconnaissance required to maintain continuing advantage over potential adversaries. As some of those operations draw down, UAS will return to home station. This increase in U.S. based aircraft will drive the need for integration into the National Airspace System (NAS) to enable initial qualification and sustain combat readiness training.

The United States military has been the vanguard for numerous aviation advancements, from the introduction of jet engines to the use of Global Positioning Systems. Unmanned aircraft are now part of this legacy. In order to fully exploit new system capabilities, preserve our airmen's training edge and fully capitalize on the commercial potential, it is imperative we achieve commercial, civil and public UAS integration into the NAS and not merely selective access to small segments of it.

The Department of Defense (DoD) engages with the Federal Aviation Administration (FAA) and other federal agencies in a variety of separate but interconnected bodies to collaboratively advance public UAS access to the NAS in a safe and efficient manner. The primary coordinating organization is the UAS Executive Committee (ExCom), mandated in the Fiscal Year 2009 National Defense Authorization Act (NDAA). While the 2009 NDAA called for the DoD and FAA to standup the ExCom, it was agreed to expand membership to include National Aeronautics and Space Administration (NASA) and the Department of Homeland Security (DHS). Those two organizations, along with DoD represent the preponderance of public UAS operators. The ExCom was formally chartered in 2010 and is comprised of senior members from DoD, NASA, DHS and FAA. Advances in public UAS access to the NAS are the building blocks that will form the policies, procedures and regulations that will provide access for all sectors of the aviation community.

In addition to the ExCom, the DoD works with the FAA and other UAS stakeholders

through the Next Generation Air Transportation System Joint Planning and Development Office, DoD's Policy Board on Federal Aviation, and RTCA special committees. These organizations have collaborated on a variety of issues and have made slow but steady progress toward NAS integration.

Current unmanned aircraft lack the technology to fully comply with 14 CFR Part 91 General Operating Rules, Part 91.113 "see and avoid" which limits unrestricted UAS operations to Restricted and Warning areas. Any operations outside that airspace requires FAA approval and typically requires the use of ground observers or chase aircraft to satisfy the see and avoid requirement. We are developing technology that fulfills this "see and avoid" requirement and will provide the foundation for UAS integration into the NAS. Ground Based Sense and Avoid (GBSAA) is a mid-term solution that eliminates ground observer and chase aircraft requirements and expands our ability for night operations.

The Services are working a variety of GBSAA solutions to safely increase UAS NAS access. The DoD has worked closely with the FAA during the development process. While progress in the early years was limited, recent meetings with the FAA have shown great promise. We look forward to working with the FAA on a GBSAA implementation plan. GBSAA is a vital component in increasing NAS integration and will have immediate impact at several Air Force locations.

The USAF GBSAA solution is looking to leverage existing radars and fusion-tracker hardware components currently certified to provide Air Traffic Control (ATC) services for the FAA and some DoD operating locations. A very promising Proof-of-Concept aimed at providing accurate separation and altitude estimation was accomplished at Gray Butte Field. We are leveraging that work to field an Air Force certified GBSAA system supporting Air Force Special Operations Command unmanned aircraft operating out of Cannon Air Force Base, New Mexico. Contingent on successful deployment, the Air Force will build upon this prototype to implement similar GBSAA capability at other Air Force installations. GBSAA provides the avenue for safe integration into the NAS with manned aircraft and will serve as a complimentary component with Airborne Sense and Avoid (ABSAA)

Airborne Sense and Avoid is a far-term NAS access solution for larger unmanned aircraft. It promises to provide autonomous, pilot-on-the-loop conflict and collision

avoidance for all classes of airspace and is critical to achieve unrestricted access to the NAS and ensure military capability and effectiveness. The Air Force is the primary operator of the larger unmanned aircraft that require access to multiple classes of airspace, including Class A airspace. Air Force employment of unmanned systems drives a requirement for Sense and Avoid.

While much work remains to be done, significant advances and the pace of progress toward NAS integration has accelerated in recent months. Of note, the recent efforts of Mr. James Williams and Mr. Douglas Gould of the FAA's Unmanned Aircraft Integration Office have been particularly noteworthy and forward looking.

In closing, I would like to add that given the revolutionary nature of this challenge, a constrained fiscal environment, but most importantly, the promise of this technology, it is imperative that all stakeholders in unmanned aviation – government, industry and academic institutions – collaborate as much as possible. This is needed to maximize resources and develop the necessary rules, procedures and technologies to quickly and safely enable the full integration of unmanned aircraft systems into the NAS.

Thank you for your time and your unwavering support of the men and women of the United States Air Force. That concludes my statement, and I welcome your questions.

RECORD VERSION

STATEMENT BY

COLONEL PATRICK E. TIERNEY
DIRECTOR, ARMY AVIATION, G-3/5/7
UNITED STATES ARMY

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE TACTICAL AIR AND LAND FORCES

FIRST SESSION, 113TH CONGRESS

ON POST IRAQ AND AFGHANISTAN: CURRENT AND FUTURE ROLES FOR UNMANNED AERIAL SYSTEMS AND THE FISCAL YEAR 2014 BUDGET REQUEST

23 APRIL 2013

NOT FOR PUBLICATION
UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE

Chairman Turner, I am pleased to be here today to discuss the role Unmanned Aircraft Systems (UAS) play in today's Army. I welcome the opportunity to testify before you and I appreciate the tremendous and ongoing support this committee has provided to our Army and our soldiers stationed around the world.

UAS have fundamentally changed the way the Army fights. These game-changing aircraft have profoundly increased our soldiers' situational awareness by providing a shared collective picture of the battlefield. This technology has resulted in a shorter period of time from target identification to destruction, increased lethality, greater ability to prevent fratricide, and has enhanced the survivability of our soldiers in combat. They do this cost effectively and at no risk to the lives of our aircrews.

Far from being a unique class of weapon, after 11 years of war they have proven so valuable that they have been woven into the very fabric of both Army Aviation and Maneuver Units. Today, UAS are as common as radios embedded in maneuver formations from platoon to division. The Army's UAS strategy of embedding organic assets within the maneuver formations ensures support to our ground commanders.

In this time of tightening budgets and fiscal uncertainty, UAS continually prove to be an invaluable, yet cost-effective asset to the ground soldier. Lower personnel and maintenance costs associated with operating UAS combined with increased endurance allows the Army to accomplish certain missions that would require far more rotary wing assets and personnel if executed with a manned platform. While the need remains for manned aircraft and will for the foreseeable future, unmanned aircraft allow the Army to achieve its goals while lightening the load on manned systems.

The primary focus of Army UAS continues to be reconnaissance, surveillance, and target acquisition (RSTA). Additionally, the Army recognizes the importance of assured communications of our ground forces, so all Army UAS the size of Shadow or larger are equipped with Communication Relay Payloads. As the Army continues to mature our battlefield network capabilities, Army UAS will continue to incorporate these capabilities on our platforms, enhancing network conductivities through an aerial component.

While there is no shortage of good ideas on how to leverage the many strengths of UAS, in the near to midterm, the focus remains squarely on RSTA. That said, the

Army continues to monitor how our sister Services are leveraging the potential of UAS, such as the Marine Corps' Vertical Takeoff and Land Cargo Resupply. The Army recognizes that limited Proof of Concept in Operation Enduring Freedom (OEF) offers unique insight into missions outside of RSTA. As such, the Army is studying these concepts and working to build the business case.

While the Army has embedded UAS in every echelon of maneuver formation, we are still exploring the boundaries of Manned-Unmanned Teaming (MUM-T). Examples of this can be found in our linked acquisition of Gray Eagle and the new AH-64E Longbow where the two aircraft are designed to complement each other during missions by sharing video and data seamlessly between them. Another example of pushing the boundaries of MUM-T is the integration of Shadow into the Full Spectrum Armed Reconnaissance Squadron. Traditionally a man-only aviation formation, the Army is for the first time adjusting Aviation formations by replacing some of the manned platforms with unmanned to gain added synergy. The Army is incorporating lessons learned from a deployment last year of this new MUM-T unit structure to inform future acquisition and force structure decisions.

The Army has three UAS programs of record: our 4 lb Raven, 400 lb Shadow, and 3600 lb Gray Eagle. Currently the Raven and Shadow Systems are undergoing modernization programs that maintain their relevance. Both of these platforms can be found in our Brigade and Special Forces Group formations. Gray Eagle, as our newest program of record, is still in the acquisition phase with the first 2 of 15 companies already fielded in support of OEF. This very capable platform is being fielded to the Division, Special Operations, and Military Intelligence Aviation Formations.

All Army UAS Programs of Record are either joint programs or they started as a joint program. Far from duplicative, Army UAS programs and missions are complementary, addressing capability gaps that could not otherwise be effectively closed by a single platform or mission. Just as one helicopter is not appropriate for all missions, neither is a single UAS. What is critical to understand is that all of the Services adhere to established common communication standards and protocols so that collected information can be shared across the breadth of the battlefield. The Army

adheres to these interoperability standards, allowing for the rapid integration of these systems with both ground forces and manned aviation.

Thank you for the opportunity to testify on behalf of Army Aviation. We are extremely proud of our soldiers and their accomplishments. While we recognize that the Army does not routinely engage in self-promotion of the contributions of its UAS, this quiet professionalism should not be the measure of their effectiveness. Around the world and with every unit in harm's way, Army UAS are operating effectively in the defense of our Nation.

Thank you, and I look forward to answering your questions.

COLONEL PATRICK E. TIERNEY, USA

COL Patrick Tierney Currently serves as the Headquarters Department of the Army, Director of Aviation. He has served in a wide variety of command and staff positions in conventional and Special Operations forces from Platoon to Brigade Command. He holds a Masters of Aeronautical Science and is rated in over 25 military and civilian fixed and rotary wing aircraft. He is a veteran of multiple combat and operational tours including Panama, Haiti, Colombia, Iraq and Afghanistan.

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

APRIL 23, 2013

RESPONSE TO QUESTION SUBMITTED BY MR. COOK

Mr. WEATHERINGTON. There are a variety of causes for Unmanned Aircraft Systems (UAS) mishaps to include pilot error, equipment problems and weather, to name a few of the causes. Essentially, these causes are not fundamentally different than those we observe with manned aircraft. Consequently, the overall mishap rates between manned and unmanned systems are comparable both in terms of the actual numbers and the trends.

According to the Air Force, mishaps that result in damage greater than $2M, a destroyed aircraft, or a fatality are referred to as Class A mishaps and the Air Force tracks the rate of these mishaps per 100,000 flight hours. Over the last 10 years, the average annual Class A mishaps rate is about 6 unmanned aircraft systems per 100,000 flight hours. At this point last year, the Air Force has had 10 Class A mishaps, for a rate of about 5.5. To date this year, the Air Force had 6 Class A mishaps and a corresponding rate drop to 3 mishaps per 100,000 flight hours.

Unmanned aircraft system mishap rates continue to trend down. This curve mirrors the historical mishap rate for manned aircraft; the slope is almost identical. [See page 11.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

APRIL 23, 2013

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Are combatant commands other than CENTCOM asking for Wide Area Motion Imagery capabilities to support their missions?

Mr. WEATHERINGTON. In general, many combatant commanders other than CENTCOM have recognized the tremendous value in wide-area surveillance capabilities in providing persistent visual coverage of large areas of interest and improving overall situational awareness of the battlefield. Therefore, the Department has seen growing interest in obtaining wide-area surveillance capabilities, to include Wide Area Motion Imagery.

Mr. TURNER. How would the elimination of funding for the Gorgon Stare program affect CENTCOM's ability to conduct operations in FY14 and beyond, as well as other combatant commands you just identified beginning in FY15?

Mr. WEATHERINGTON. The Air Force has provided CENTCOM with required Wide Area Motion Imagery (WAMI) capabilities to answer the Wide Area Surveillance Joint Urgent Operational Needs (JUON) Statement, which was subsequently closed on March 12, 2013. Gorgon Stare Increment 1 successfully delivered one orbit of WAMI capability (4 sensor pod sets, modified MQ–9 aircraft, and ground exploitation component), which deployed in 3QFY11 in support of CENTCOM requirements. Gorgon Stare Increment 2 completes developmental and operational testing in 4QFY13 and will be available for immediate fielding. Increment 2 will ultimately deliver two additional orbits of WAMI (6 sensor pods sets, new modified MQ–9 aircraft, and a new ground exploitation component), with significant improvements in sensor resolution and overall field of regard. Eliminating Gorgon Stare RDT&E and Procurement funding would not impact the Air Force's ability to meet CENTCOM's documented requirements or the fully funded Increment 2 enhancements. However, eliminating the procurement funding reduces available spares for current operations and planned capability enhancements beyond currently documented requirements.

Mr. TURNER. A large fraction of the DOD UAS inventory is Group 1 systems. What are the capabilities these systems provide and why has DOD procured such a large number?

Mr. WEATHERINGTON. The Joint UAS CONOPS describes Group 1 UAS as weighing less than 20 pounds, normally operated at altitudes below 1200 feet above-ground-level and at speeds less than 100 nautical miles per hour. Group 1 UAS are hand-launched, small aircraft with electro-optical and infra-red sensors for close-in reconnaissance and situational awareness, are man-portable (can be carried in a ruck sack) or man-packable (put into the back of a vehicle), and can provide an organic (tactical level) lethal strike capability. The systems are affordable, have a small footprint, provide the warfighter a critical tactical level of ISR capability, require no dedicated manpower, and ultimately save lives. All the Military Departments and SOCOM operate Group 1 systems, and they are procured off common contracts where appropriate.

Mr. TURNER. GAO recently released a report on Reducing Fragmentation, Overlap, and Duplication within Government. What is the Department doing within the UAS portfolio to gain efficiencies and reduce duplication?

Mr. WEATHERINGTON. The Department's goal is to provide the needed joint warfighting capabilities in a cost effective and efficient manner. Commonality, interoperability, and affordability are key attributes considered in the development, procurement, and sustainment of affordable and effective UAS capabilities. The Military Departments are required to analyze requirements utilizing the Joint Capabilities Integration and Development System (JCIDS) process. The JCIDS process supports the acquisition process by identifying and assessing capability needs and associated performance criteria to be used as the basis for acquiring the right capabilities. If these capabilities can be achieved through commonality, the Department will choose the common approach.

Mr. TURNER. What do unmanned aircraft bring to the table that manned aircraft cannot contribute?

Mr. WEATHERINGTON. The capabilities of unmanned systems are not unique compared to manned systems. Weapon systems produce effects in nearly all domains, independent of being manned or unmanned. It is important to highlight there are

no requirements for unmanned systems within the Joint force, but there are requirements that are better fulfilled by unmanned systems. Unmanned systems provide persistence, versatility, survivability, and reduced risk to human life, and in many cases are the preferred alternatives especially for missions that are characterized as dull, dirty, or dangerous. With that mindset, unmanned systems are being optimized for these dull, dirty, or dangerous missions:

- Dull missions are ideal for unmanned systems because they involve long-duration undertakings with mundane tasks that are ill-suited for manned systems. Good examples are surveillance missions that involve prolonged observation. Unmanned systems currently fulfill a wide variety of "dull" mission sets, and the number will increase in all domains as unmanned systems capabilities improve. Unmanned systems routinely operate for up to 28 hours on a single mission.
- Dirty missions have the potential to unnecessarily expose personnel to hazardous conditions. A primary example is chemical, biological, and nuclear detection missions. Unmanned systems can perform these dirty missions with no risk of exposure to the operators.
- Dangerous missions involve high risk. With advances in capabilities in performance and automation, unmanned systems will reduce the exposure risk to personnel by increasingly fulfilling capabilities that are inherently dangerous.

Mr. TURNER. How does the cost of UAS and manned aircraft compare in: a. Manning b. Total O&M (not just per flight hour)?

Mr. WEATHERINGTON. The Department has conducted a number of comparisons of cost between UAS and manned aircraft. While the results have been somewhat mixed, there are several findings that have persisted in our studies.

First, capability drives complexity and cost. This theme applies to development, procurement, and operating (O&M) costs. In general, more capable systems are more complex, take longer to develop, and cost more to procure and operate regardless of whether they are manned or unmanned. It can be difficult to compare common manned and unmanned attributes across platforms, but capabilities-based decisions can still be made.

Second, in most cases, a direct cost comparison between UAS and manned aircraft is difficult because the operating environments and capabilities are fundamentally different. Using the Global Hawk and U–2 as an example again, the Global Hawk flies a mission that is three times the length of a U–2 mission. Supporting that mission requires three full-workday shifts of manpower—significantly more on a per-sortie basis, but on par from an "hours on station" basis.

That said, manning requirements for UAS are roughly comparable to manned aircraft with similar missions and capabilities. Likewise, O&M costs for comparable systems are similar with the exception that in some cases UAS may require less in flight training hours. We have made some initial looks at O&M cost per "hour on station", but have found those metrics to be inconclusive as they are highly dependent on assumptions intended to level the differences between the missions of the unmanned and manned systems. For comparison purposes, the operational cost per flight hour is $3,725 for MQ–1 Predator and $4,196 for MQ–9 Reaper, a more capable system.

Mr. TURNER. How does sortie generation of manned and unmanned aircraft compare? In figuring total cost to the government, are the lower costs of acquiring UAS offset by a higher sortie rate?

Mr. WEATHERINGTON. According to the Air Force, the monthly sortie generation rate (sorties per month per unit possessed aircraft) for the manned aircraft is 14.3 and for unmanned aircraft is 8.3. However, there is no clear comparison of sortie generation rates between manned and unmanned aircraft due to the significantly different capabilities and missions. Unmanned aircraft focus on long duration, intelligence gathering missions supported by professionals who launch, recover, and maintain the aircraft and exploit and disseminate the data collected. In contrast, most manned aircraft mission sets are rarely set up to be purely intelligence gathering missions and provide an entirely different capability set including shorter-endurance missions such as suppression of enemy air defenses, close air support, interdiction and air superiority. Acknowledging the mission differences, in order to provide the same duration presence for a given mission, manned aircraft would have to generate more sorties than unmanned aircraft. This does not necessarily make an unmanned aircraft inherently less expensive than manned aircraft, although requiring fewer sorties to accomplish a mission can influence cost (scenario- and platform-dependent).

Mr. TURNER. Understanding that UAV missions are often longer duration, can you compare operational availability rates?

Mr. WEATHERINGTON. According the Air Force, for Fiscal Year 2013, Aircraft Availability (AA) rate for manned aircraft is 66 percent, while the AA rate for unmanned aircraft is 78 percent. Specifically, the MQ–1 AA rate is 79.8 percent, MQ–9 rate is 80.1 percent, and RQ–4 rate is 61.4 percent.

Mr. TURNER. Air Force officials have stated that it takes around 140 personnel to mount an "unmanned" Predator mission. How does that compare to, say, a comparable F–16 mission?

Mr. WEATHERINGTON. When comparing the required manpower between remotely piloted aircraft and F–16s, the differences in mission profiles between the systems should be noted. Both the MQ–1/9 and the F–16 provide extremely critical and valuable capabilities to our warfighters. Unmanned aircraft, such as the Predator, focus on long duration, intelligence gathering missions supported by professionals who launch, recover, and maintain the aircraft and exploit and disseminate the data collected. In contrast, a manned F–16 mission set is rarely set up to be purely an intelligence gathering mission and provides an entirely different capability set including missions such as suppression of enemy air defenses, close air support, interdiction and air superiority. In Operation Enduring Freedom for example, the F–16 flies an approximate 6 hour sortie and is typically tasked to directly support ground forces with immediate close air support. The Predator is typically tasked with a long duration sortie of nearly 22 hours, during which an intelligence team continuously exploits mission data real-time.

According to the Air Force, a Predator mission involves approximately 140 to 206 personnel, including aircrews, maintenance support, and intelligence personnel, to provide a near-continuous combat air patrol for a year. Nearly 40 percent of this number of personnel is used to process, exploit, and disseminate intelligence data. Comparatively, an F–16 squadron deployment (typically 18 aircraft) includes approximately 400 operations and maintenance personnel to support daily operations for a typical deployment of 90–120 days. However, due to the vastly different missions between the F–16 and the Predator, there is no accurate methodology to directly compare manning requirements.

Mr. TURNER. What types of performance metrics should we be looking at to evaluate the cost effectiveness of the different air assets?

Mr. WEATHERINGTON. In general, the metrics the Department uses to analyze and evaluate weapons systems fall into three major categories: effectiveness metrics, cost metrics, and support/sustainability metrics. The specific metrics used, especially when it comes to effectiveness, are highly dependent upon the warfighting capability the weapon system is intended to satisfy. For example, we would choose to look at endurance for an ISR aircraft whereas we may choose to look at range and capacity for a cargo or mobility aircraft. There are no specific established performance metrics that can be used to directly evaluate UAS against manned aircraft for effectiveness or cost effectiveness. However, there are consistent themes that show up in our analyses that can indicate where UAS are attractive or unattractive for a given mission or capability. In general, UAS are attractive alternatives in the following cases:

- Complexity is low
- Performance would be limited by physiology (such as long endurance, high "g", or the presence of chemical, biological or nuclear agents)
- Risk/acceptable risk may be high

In contrast, a manned aircraft solution would be the most attractive alternative where:

- Mission is significantly complex (involving inflight retasking and/or autonomous decision making)
- The aircraft is intended to carry strategic weapons or passengers

Mr. TURNER. Not too long ago, UAS had a much higher accident rate than manned aircraft. What is the current safety record of UAS, and how does it compare to manned aircraft and aerostats?

Mr. WEATHERINGTON. Mishaps that result in damage greater than $2M, a destroyed aircraft, or a fatality are referred to as Class A mishaps and we track the rate of these mishaps per 100,000 flight hours. With respect to the Air Force, over the last 10 years, the average annual Class A mishaps rate is about 6 unmanned aircraft systems per 100,000 flight hours. At this point last year, we'd had 10 Class A mishaps, for a rate of about 5.5. To date this year, we've had 6 Class A mishaps and a corresponding rate drop to 3 mishaps per 100,000 flight hours.

Unmanned aircraft system mishap rates continue to trend down. This curve mirrors the historical mishap rate for manned aircraft; the slope is almost identical.

Mr. TURNER. Annual procurement of UAS has gone from 1,211 in fiscal 2012 to 288 last year to just 54 in the proposed FY14 budget. What are the procurement

plans for future UASs? Does an increase in quantities depend for a new generation of capabilities?

Mr. WEATHERINGTON. The Department's FY2014 budget supports a broad spectrum of ISR capabilities and largely sustains those systems and capabilities acquired over the past 10 years. We have acquired a tremendous amount of ISR capability over the past 10 years—the large majority of those assets are supporting our current operations in Afghanistan. As we draw down, some of those assets will likely be reallocated to other needs across the globe, but many of them will continue to support the current and evolving counter-terrorism mission.

For future UAS, the Department already has plans to leverage UAS to provide enhanced maritime surveillance capability and to enhance aircraft carrier versatility. The MQ–4C Triton will enter operational service in 2017 to work as a maritime surveillance asset alongside the P–8A Poseidon. Shortly afterwards the Department plans to field the initial carrier-based UAS capability with the Unmanned Carrier Launched Surveillance and Strike System (UCLASS).

Future procurement quantities of UAS are always driven by strategy and associated requirements for capability and capacity. With that in mind, for UAS to remain a valuable tool in the Department's arsenal, we need to continue to make progress solving today's tough technical challenges: ability to operate in unsegregated airspace, communications, and increasing levels of automation and/or autonomy.

Mr. TURNER. Does the procurement goal for UAVs still include a 65-orbit requirement? With the withdrawal from Afghanistan, on what is that requirement based?

Mr. WEATHERINGTON. The Department's Fiscal Year 2014 budget request continues to support the achievement of 65 combined MQ–1 and MQ–9 orbits, otherwise referred to as Combat Air Patrols (CAPS), and based on our continuing need to support counterterrorism operations and other global requirements for Intelligence, Surveillance, and Reconnaissance (ISR). Currently, the vast majority of our CAPS today are in Afghanistan, and therefore, there are numerous unfulfilled requirements across the globe, awaiting available assets. The Department is continuing to assess its ISR requirements post-Afghanistan in light of the new defense strategy to determine the required force structure and capability for this class of unmanned systems.

Mr. TURNER. How would the elimination of funding for the Gorgon Stare program affect CENTCOM's ability to conduct operations in FY14 and beyond, as well as other combatant commands you just identified beginning in FY15?

Mr. PENNINGTON. The Air Force has already provided CENTCOM with required Wide-Area Motion Imagery (WAMI) capabilities to answer the Wide Area Surveillance Joint Urgent Operational Needs (JUON) Statement, which was consequently closed on 12 March 2013. Gorgon Stare Increment 1 successfully delivered one orbit of Wide-Area Motion Imagery (WAMI) capability (4x sensor pod sets, modified MQ–9 aircraft, and ground exploitation component), which deployed in 3QFY11 in support of CENTCOM JUON requirements. Gorgon Stare Increment 2 completes developmental and operational testing in 4QFY13 and will be available for immediate fielding. FY14 President's Budget request freezes the Gorgon Stare program at Increment 2 configuration and terminates future RDT&E and Procurement funding. The FY14 President's Budget request procures Gorgon Stare Increment 2 spares and sustains operation and maintenance funding for six Increment 2 pod sets (purchased with FY11 and FY12 funds) and two ground stations to ensure the capability remains available to Combatant Commands and global force management allocation. Increment 2 will ultimately deliver two additional orbits of WAMI (6x sensor pods sets, new modified MQ–9 aircraft, and a new ground exploitation component), with significant improvements in sensor resolution and overall field of regard.

Mr. TURNER. DOD and the FAA have been negotiating access for UAS into the national airspace system for many years now. Where do negotiations stand on that and on the airspace rules for the six proposed test sites?

Mr. PENNINGTON. Through the Department of Defense (DOD) Policy Board on Federal Aviation (PBFA) and the Office of the Secretary of Defense (OSD) Unmanned Aircraft System (UAS) Task Force, the DOD has worked with the Federal Aviation Administration (FAA) to update the 2007 memorandum of agreement (MOA) between the DOD and FAA on UAS operations in the National Airspace System (NAS). The new MOA is expected to have final signature approval by the end of June, 2013. The MOA simplifies the certificate of authorization process for some operations. The DOD and FAA continue to work together through UAS Executive Committee working groups to explore other options to increase NAS access (e.g. Class D Joint Use working group). The PBFA is also engaged with FAA through the Joint Planning and Development Office to establish a plan to meet the congressionally mandated 2015 UAS integration date.

While supportive of the test site concept, the DOD is not involved in the development of airspace rules in support of the potential test sites. The FAA is responsible for the development of test site requirements, rules and selection criteria. Questions on the test site process should be directed to the FAA.

Mr. TURNER. In evaluating potential test sites and the flight rules under which they will operate, are there differences for where and how armed UAVs will be operated compared to unarmed systems?

Mr. PENNINGTON. Department of Defense (DOD) has not been involved in the development of evaluation criteria or airspace rules for the potential test sites. Questions on the test site process should be directed to the Federal Aviation Administration (FAA).

Regarding operation of armed and unarmed UAVs, DOD and FAA previously established procedures for UAS carrying weapons through the NAS to conduct weapons training. These flights are from DOD bases to ranges authorized for weapons release. The DOD has shared weapons carriage safety data and procedures with the FAA. There is no distinction within DOD on carriage of weapons between manned and unmanned aircraft; the same rigor, discipline, compliance and safety precautions are applied.

Mr. TURNER. Are the evaluations of the test sites based on the requirements of current UAS technology? How do the requirements next-generation systems like UCLASS affect the site selection process?

Mr. PENNINGTON. The Air Force and Department of Defense (DOD) uses restricted airspace to support DOD specific UAS technology development and testing. DOD has no plans to utilize the Federal Aviation Administration's (FAA) test sites for DOD UAS development, testing and evaluation requirements at this time.

The DOD is not involved in the development of evaluation criteria for the potential test sites. The FAA is responsible for the development of test site requirements. Questions on the test site process should be directed to the FAA.

A DOD representative will serve as an advisor to the Site Selection Evaluation Board (SSEB). Our representative will provide technical support and to assess proposals for potential impact to military installations and test and training operations to include next-gen systems to our ranges and Special Use Airspace. DOD fully anticipates the FAA will carefully consider negative impacts to military operations as well as impacts to private and commercial aviation during the selection process. The SSEB makes final decisions on test site selection.

Mr. TURNER. Much of the domestic debate over UAV operations centers on questions of privacy. The FAA has been charged with considering the privacy aspects of commercial UAV operations. Who is responsible for developing privacy protections for military UAV operations inside the United States?

Mr. PENNINGTON. For the United States Air Force, oversight of privacy protections associated with Unmanned Aircraft System (UAS)/Remotely Piloted Aircraft (RPA) operations in domestic airspace is provided by the Deputy Chief of Staff, Intelligence, Surveillance and Reconnaissance; the office of the Air Force Inspector General; and the office of the Air Force General Counsel.

For Department of Defense (DOD) and Air Force ISR missions, privacy protections are enumerated by DOD Regulation 5240.1–R and Air Force Instruction (AFI) 14–104, which also includes specific guidance for UASs:

"AFI 14–104, 9.6.2. Air Force Unmanned Aircraft System (UAS) operations, exercise and training missions will not conduct nonconsensual surveillance on specifically identified US persons, unless expressly approved by the Secretary of Defense, consistent with US law and regulations. Civil law enforcement agencies, such as the US Customs and Border Patrol (CBP), Federal Bureau of Investigation (FBI), US Immigration and Customs Enforcement (ICE), and the US Coast Guard, will control any such data collected."

Mr. TURNER. We understand that Gray Eagle recently concluded its Initial Operational Test and Evaluation (IOT&E). Can you describe the results?

Colonel TIERNEY. The Gray Eagle Unmanned Aircraft received an effective and suitable finding from Directorate of Operational Test and Evaluation. The Gray Eagle-equipped unit was rated effective at operating the MQ–1C system and has the potential to provide effective support to combat units. During the evaluation the aircraft successfully employed Hellfire missiles and demonstrated Level 4 interoperability with the AH–64E Apache helicopter which were shared requirements for both systems IOT&E. The unit also demonstrated its ability to meet its operational tempo—three continuous missions while maintaining an 81% operational readiness rating, satisfying the Sustainment Key Performance Parameter (KPP) requirement of 80 percent. The results confirm what we have witnessed in many years of combat that the system is appropriate for the Army's needs.

Mr. TURNER. We understand that DOD is investing in Manned Unmanned Teaming. What does the Army expect to gain from Manned Unmanned Teaming?

Colonel TIERNEY. The Army views Manned Unmanned Teaming (MUM–T) as more than just a situational awareness tool but as a method of maximizing the unique strengths of both our manned and unmanned aircraft fleets. Currently, the Army seamlessly moves full motion video/data between our Scout/Attack manned aircraft and unmanned aircraft. UAS traditionally operate at higher altitudes, with greater endurance, multiple mission sensors and often unobserved by the enemy. They also can assume more risk in mission execution as no personnel are placed in harm's way. In turn our manned Scout/Attack aircraft are dynamic, provide the needed lower viewing angle, afford a greater lethal presence and have the ability to conduct more detailed reconnaissance. The result is an improved overall situational awareness, increased survivability for our manned aircraft, greater lethality and by reducing the complexity of target acquisition; we are able to dramatically reduce the time from acquisition through engagement.

Mr. TURNER. The Army is continuing to acquire Grey Eagle UAS, which are similar to the Predator. Help us understand why the Army requires a different UAS, and why UAS of similar characteristics can't be operated as joint assets.

Colonel TIERNEY. To support the Ground Commander the Army requires a self contained, mobile, armed Unmanned Aircraft System capable of operating from austere locations, while not solely reliant on satellites for Command and Control. The competitively selected Gray Eagle, originally a joint effort between the Army and Air Force, incorporates lessons learned from 11 years of combat and leverages technology from both the Predator and Reaper programs. Far from duplicative, its missions are complementary, addressing capability gaps that could not otherwise be effectively closed by a single platform or mission. Just like one helicopter is not appropriate for all missions, neither is a single UAS. The robustness of the Gray Eagle UAS allows it to satisfy requirements for the General Purpose, Military Intelligence and Special Operation Forces. While all Aircraft are capable, of these three formations both the Military Intelligence and Special Operation Gray Eagle will be Joint Allocable through the ISR Global Force Management Process.