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A SECOND LOOK

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P R O C E E D I N G S

MR. SINGER: Hello, I'm Peter Singer, director of the 21st Century Defense Initiative here at Brookings, and it's my pleasure to welcome you all today. The 21st Century Defense Initiative at Brookings wrestles with the changing forces that are acting upon the age-old phenomena of war. These forces range from changing technologies to new actors in war, to changing expectations or replacing on our warriors, to changing doctrines and new training schemes, even budget changes that a lot of people in this town are starting to wrestle with.

A little over a year ago, we were honored to be joined by this gentleman who set before us a vision of how he saw some of the key issues, policies and questions that surround an important new aspect in the discussion of what's changing in this realm of war, the introduction of unmanned systems.

He discussed the U.S. Navy's growing use of new technologies and its development and integration of unmanned systems into the current and future Navy force structure, especially on the information dominance side. He also addressed the major operational challenges and benefits from the new and rapidly evolving technologies, and he spoke to the doctrinal and legal and ethical questions that are starting to come out from all of this. It was a very fascinating discussion,

and what's interesting is that through the power of new technology, that discussion has, in a sense, become a living entity, spreading both geographically, but also chronologically. That is, a year and a half later we continued to get questions and contacted from folks about that talk, everything from Navy lieutenants on ships thousands of miles away to students at the Naval War College, to journalists here in D.C.

But one of the challenges of technology, and I would argue the wider policy world today, is the incredibly fast pace of change. So, for instance, in the short time since that discussion, we've seen technologies that were, for example, in what you could describe as the dream stage now start to take flight.

As an example, we've got several programs vying for the Navy's U Class Program for carrier deck unmanned systems. Or as another illustration, the Fire Scout: in the time since we had this discussion, the Navy's unmanned helicopter, went from doing sea trials on the tall combat ships to, just a couple weeks ago, deploying out to Afghanistan in support of coalition forces there. So, in essence, what we're seeing is new possibilities, but also new challenges that come out of not just the advance of this technology, but also by putting this technology in a wider set of hands for uses, and this will only continue.

As an illustration, last week I was involved in a war game

which was set in the year 2025, which is the year a lot of our planning scenarios and documents and strategy head towards. And one of the things I had to remind the team that was planning in terms of what the red and the blue teams might have at their disposal was the fact that in the year 2025, the 18-year-old sailor in that space will have been born in 2007, the very same year that the iPhone was born. So the 18-year-olds in 2025 will have a very different sense of technology, as well as a very different set of technologies at their hands than the 18-year-olds today, which already is tough enough for us to wrap our heads around.

And so it's lucky for all of us that we're able to do something that's all too rare in Washington, which is to pull back, to reassess, to reexamine where matters stand and where they're headed, in essence, to take a much needed second look at a rapidly changing issue. We're even more lucky today to have Admiral Gary Roughead, the 29th Chief of Naval Operations, rejoin us for that relook. Not only did he originally set us on this journey, but he brings to this discussion a wealth of operational and command experience in the nation's service, including being the only one of two officers ever to have commanded the fleets in both the Atlantic and the Pacific.

He has a well-deserved reputation as a thinking leader dedicated to mentoring the next generation of leaders, including having

served as commandant of the U.S. Naval Academy, from which he previously graduated.

And finally, he brings some unique experience to the challenges of dealing and integrating with new technologies into the realm of national security and war, including being the first officer to command both classes of EJA ships. Admiral, it's an honor for us to have you rejoin us here today.

ADMIRAL ROUGHEAD: Thank you very much. (Applause)

Well, I really do appreciate the opportunity to come back and visit and talk. I apologize for my tardiness. If I said I was in a budget meeting, I know everyone wouldn't believe me if I said that, but it's true.

It is good to be here. The last time we were in the middle of the QDR for 2010, we were putting together the budget for '11. And it seems as if only yesterday I was here, but if you think in the intervening time, not only did we wrap '11, we wrapped '12, and now we're into '13, so time does fly when you're having a good time.

And I think that the other thing that has changed, even though we could see it on the horizon and we could sense it, and we were beginning to get the first buffets, if you will, of what is sure to be a very interesting and, indeed, a challenging budget environment, that was the environment as we came together the last time and I talked, and all that

really is now starting to come to pass.

At the time that I was here, we had just stepped off on really changing and recasting how the Navy was approaching what I called the world of information, the advancing of information as the focal point, where we wanted to bring our combat capability, our operational capability into focus in a different way than we had in the past. Because it was clear to me that we had moved beyond what I called the primacy of the platforms -- the airplane, the submarine, and the ship -- and how we focused our budgetary thinking, how we thought about our operations, and, indeed, how we even organized ourselves as we made fundamental and significant decisions for the Navy, we were at the beginning of that.

And I'm very pleased to say that we have stayed the course. Not only have we stayed the course, but I have seen exactly what I had hoped to see and the benefits that were to be derived from that change in direction.

Since that time, we changed our staff structure and moved into the director for information dominance by bringing together the director for intelligence and the director for command and control. That has worked out extraordinarily well for us.

We have now gone through two budget cycles, going into the third, with that construct. First was rather formative, '12, I could really

see the difference in how we thought about things, how we made decisions, and what those decisions produced. Not only has the clock gone by quickly, but the officer that I had been waiting to move into that position for a couple of years as I thought about where I wanted to go has now completed his tour. He has done it brilliantly, and Vice Admiral Jack Dorsett, who was the plank owner -- the term we use in the Navy -- as the first director of information dominance, is going to pass the baton to his successor this summer. But I cannot say enough about what Jack has done to really put that organization in place, and he'll be relieved by Kendall Card, who has been his trusty right hand and truly work horse throughout this entire effort. So I'm very pleased, and I'll touch a little bit more about some of the benefits on that.

At the same time, we also moved forward and we reactivated the U.S. 10th Fleet, a fleet that first came into being in World War II, to get after the threat of the U-boat in the Atlantic. It didn't have any forces, so to speak of. It was taking on a new form of warfare in the way that Germany was using the U-boat, and the 10th Fleet was able in a short period of time to overcome that threat.

Vice Admiral Barry McCullough has accelerated 10th Fleet faster than I had hoped in my wildest dreams. And, in fact, he and I just had another session this morning as he continues to refine that. We have

made some additional changes. He now is the only numbered fleet commander in the Navy that has budget authority. And we have also put in the rest of our network warfare structure in underneath him so that we can gain more efficiencies and greater effectiveness as we go forward.

And then, of course, I think one of the keys to it all is the creation of the Information Dominance Corps, when we brought all of the various specialties together and have begun to operate them as a corps, to lead them as a corps and manage them as a corps. It's 45,000 people in the Navy when you do that. And we're beginning to see that we've been running long enough to where we are now cross-detailing. So you may have a cryptologist commanding a unit that at one time would have been commanded by an intelligence officer or vice versa, and we're seeing that cross-pollenization and a better awareness of the total information dynamic taking place.

It's also in that N-26 organization that we put our unmanned systems and even some of our manned systems, again, to better manage that portfolio as an information domain as opposed to things that are done on ships, submarines, and airplanes, and that in the course of the normal routine, maybe you can integrate them together.

So there's no question that what we've been able to achieve and where we are now would not have been possible without better

structuring ourselves, approaching this information dominance concept comprehensively, and then integrating into that the approaches that we have with anti-access area denial capabilities.

At the time we started down this path, air/sea battle as a concept had not been really flushed out, but it really is in how we have organized ourselves that when we got together with the Air Force and the Marine Corps to do air/sea battle, it was a natural fit in how we had organized ourselves, how we were able to look at anti-access area denial. Because in the world we live in today, most of that is going to be in the information domain in one form or another, so, again, that has allowed us to move ahead.

It has not been without challenge. In fact, Peter may recall that I used a favorite Machiavelli quote of mine as I was talking about where we were going, that nothing is more difficult to take in hand, more perilous to conduct, or more uncertain of its success than to take the lead and the introduction of a new order of things. That's just the nature of the beast.

But I would also say that as I look at where we are today, we have been able to move through that. That's not to say that there's still not areas where we have to do some additional work to better synchronize activity, but I also believe that we're at a time, to quote Machiavelli again,

that tardiness often robs us of opportunity, because I do believe that we're in a period of budgetary time, where it's going to be important to move quickly, to solidify the gains that we have made, and to make good decisions about the paths that we want to be on in the future.

I think that innovation in the Navy is something that we are proud of. We have seen it transform naval warfare in the past. The fact that we're celebrating 100 years of naval aviation is one milestone of that innovation. But I also go back in time and think that it was kind of a mix back then, as well.

I look back with envy on the first stirrings of the idea, and then from that idea of flying an airplane off of a ship, that we had in three months actually procured the airplane. I wish our procurement process worked that good today to be able to do it.

But again, you hit this inertia, and 6 years later, there were only 38 aviators in the Navy and so, again, very slow climb out. But then when World War I came along, that's when you began to see things move. And so I think that's one case of naval innovation. The other, I would submit, is nuclear power that totally transformed where we can be as a Navy, where we can be persistent, and, indeed, where we can exercise the ultimate stealth.

And I think that the initiatives that we're talking about today

in information dominance and in unmanned systems will fall into that category when we look back on this period of time.

The process that we have gone through as we've looked at putting our budget together in '12, not only has it served to capitalize on what we are doing in information dominance, but the other driving factor that we in the Navy have focused on is getting our arms around total ownership costs, because I think in the types of systems that we're acquiring today, if we're not thinking about that total ownership cost -- that includes manpower, as well -- we could be delivering a force that is unaffordable.

So we have looked very, very hard at that as we've made our investment decisions, not just in the information dominance area, but across the board, as well. And I'm also pleased that in the '12 budget and what we have been setting up over the last couple of years is really to create some stability, some uniformity in how we're going forward. And if you look at the Navy's force structure, let's just remove the information dominance piece that I've talked about, I'm very pleased that in all of the platform areas which I said are now no longer, you know, the dominant drivers that perhaps they used to be, in the submarine community, for example, this year we moved to building two Virginia class submarines. And we are now into the design of the replacement for the ballistic missile

submarine, the Ohio class, that I consider to be the most survivable leg of the triad.

In our surface fleet, right before Christmas, getting the approval to go forward with a buy of 20 Littoral Combat Ships, that ship is going to be very well suited to the environments that I think we'll be operating in in the future: restarting the DDG-51 line, building the joint high-speed vessel. And some of you may have seen where we have now, in cooperation with the Army, we've now taken all of the joint high-speed vessels that had been in the Army, they're now all -- all will be in the Navy and operated by the Navy.

We continue to build the big deck amphibs, the LAJ, and the LPD-17 to address the needs of the Marine Corps, because I think that that amphibious capability, the ability to be offshore, is going to be increasingly important in the years ahead where sovereignty concerns are going to weigh so heavily on countries as they deal with different situations.

But I think in the aviation area is where we are essentially renewing ourselves: Joint Strike Fighter, in the case of the Navy, proceeding on with that. And the airplanes are not too far from here undergoing tests at Patuxent River.

We have continued to procure the Super Hornet, which is

going to be able to bridge us into the JSF quite nicely. We have in test the P-8 maritime patrol aircraft that is the replacement for the P-3. That testing is going very well.

We have in our squadron in Norfolk the advanced Hawkeye, the E-2D, which really enhances the battle space awareness, and when coupled with other systems that we have in the Navy, really gives us a reach and an awareness the likes of which we've never had before. I might also point out that the E-2D does not reside in the aviation portfolio, but rather resides in our information dominance portfolio.

Two new helicopter series that we have, the Romeo and the Sierra, one of the most advanced anti-surface and anti-submarine helicopters on the planet. But I'm also very pleased with what we've been able to do with unmanned, and, as Peter alluded to, in a very short period of time.

We had done a trial deployment of Fire Scout, the vertical takeoff UAV. There were some exciting moments on that deployment, to be sure. But as I tell everybody, the thing that I have come to find out about UAVs is that they do exactly as they are -- what they are told to do, unlike most Navy aviators. So all you have to do is make sure you have the code right and you know exactly what it's going to do. No offense to my good friends wearing wings.

But since that time, we have pressed VT UAV out again on another deployment on one of our frigates. It's in support of Special Operations forces in the Middle East, amassing hours and missions at a very steady rate, a very reliable rate. And as has also been mentioned, because of the capability of that aircraft, we have deployed some of the men to Afghanistan to support ground troops.

And as we put this unmanned enterprise together, the direction that I gave to my people is it has to be flexible, it has to be moveable, it has to be agile, and we are not going to be constrained by saying it's a naval capability, it will operate off naval ships. We want to be flexible. If someone says I need a VT UAV detachment, you pick it, we will provide that. And it may be on a ship, it may be ashore, or it may be on some platform off the coast of some country, which I think gives tremendous potential for maritime domain awareness.

We continue to fly the BAMS demonstrator -- Broad Area Maritime Surveillance System -- in the Middle East. It is worth its weight in gold. We deployed the first demonstrator there a couple of years ago for a proof of concept. We're wondering where it is, because it's not come back, but I think that speaks of the value of it. And we are continuing that program in our budget, because I think that's going to give us the long dwell that we need.

I was extraordinarily pleased with the flights of the X-47B, the carrier version of our UAV. It's a flying wing. Some of you may have seen the clip. Flights went very well. The airplane performed very well. The landing was dead on, which, in carrier aviation, is critically important, because you don't have a lot of real estate to work with. And we remain committed to getting a squadron of U class aboard an aircraft carrier by 2018, and we're going to press to do that, so good focus there. The control system for the UCAS is in a King Air and in a Hornet surrogate so that we can continue to refine that process. And work for us is a bit more challenging unmanned environment than for most because of the extraordinarily dense electromagnetic environment around our ships at sea, and so that's a capability and that's a feature of our unmanned systems that we pay a great deal of attention to.

But I would also say that, you know, so naval aviation I think is a pretty exciting place. In fact, if you're a young sailor or officer coming into naval aviation today, you are looking at an entirely new fleet. And the point that I make about everything that I have just listed, at a time when budgets are going to be very, very challenging, you can touch everything I talked about. You can physically put your hand on it, which I am pleased that we have been able to do, because those things that exist in PowerPoint may have a problem crossing the Valley of Death, and I think

those of us who have been in the business can understand how challenging that can be, so pleased with that.

I'm also very pleased that we have been able to keep the press on in unmanned underwater systems. In the session that I had here a couple of years ago and in different venues where I have had the opportunity to speak about unmanned systems, I've challenged the technical community, the research community, the academic community to give us power in unmanned underwater systems. Safe, shipboard, long duration power is the coin of the realm. And I've been extraordinarily pleased with the response that we've received and some of the durations that we're now beginning to see in that technology.

I'm also pleased with some of the tests that we have run with network unmanned underwater systems that I think will have the potential, if we do it right, of changing the underwater domain. So the fact that when we talk unmanned, we tend to look up in the sky, I look underwater, because that is an area where you can truly change naval warfare.

I would just say that some of the challenges that I think we face, and I talked about, you know, tardiness and how that could rob us of opportunity, the need to compress the cycle, compress the timeline of being able to take concepts, to be able to take test vehicles and get them out there, that compression is going to become increasingly important.

I've worked over the last couple of years to make sure that we're not injecting more time in the process than we have to, particularly as you take it through what I think in many instances are lengthy developmental and operational test and evaluation processes. I think we have to be able to do that.

We have to have a very serious discussion, as we are in the Navy, about what the bandwidth requirements are, what are the network requirements. And as new systems come on, it's great that we're designing a new system that can do X, Y or Z, but if you're relying on existing networks to do that, existing data links, they're pretty well saturated, particularly when you're dealing with the maritime environment where our pipes going on and off ships are somewhat a bit more restricted than what you may find in terrestrial applications, so taking a good, hard look at that, taking a look at the architectures that we want to have in place.

Also examining in the Navy how we would be introducing these into our fleet. And we have not elected to develop separate organizations that will deal with our unmanned systems, particularly on the aviation side. The original plan, as these were first envisioned, was to be able to put separate squadrons together of a VT UAV or a U class or the BAMS, for example. I can't afford the overhead and I think

the overhead is excessive when we do that. And so you will see in the Navy VT UAVs becoming part of helicopter squadrons, BAMS becoming part of the P-8 squadrons, or we'll be operating them in an integrated way, and to think of the battle space not as an unmanned mission or a manned mission, but how do you bring the two together.

I think the other thing that will be important as we go forward, and this is sometimes more challenging than it may appear on the surface, is how can we sail well? How can we realize that we're riding something that's not paying off for us, divest of it, and get out of it cleanly, and move on to something else without penalty? And in the system in which we work, I think those who have worked in the system know that that can be one of the hardest things to do in Washington, to admit that something isn't working, that the money that was invested was invested with due diligence, but that the technical leap we were trying to make didn't deliver, and, therefore, we move forward. No harm, no foul, let's get on with it and do something else. And I think if we want to be truly innovative, we have to get beyond the impediment that keeps us from being able to do it.

Some of the other work that we are doing, particularly with a group that I have chartered up at our War College in Newport that works for me, the Strategic Studies Group, a group that reconstitutes every year about a dozen or so bright Navy captains, and have an Air Force colonel,

Marine colonel, and a Coast Guard captain on there, is to look at different things that are of interest to me. I personally write the tasking letter which consists of less than a page to them. It's their work that delivered on our unmanned focus, their work that delivered on the creation of N-26 and the 10th Fleet and the Information Dominance Corps.

Last year they did some work on direct and energy. This work -- this year they're working on a new computing environment for the Navy, because I was struck that when I pull my Droid out of my pocket, and then I look at the big computer I have sitting on my desk, I can extract more and do more with that little thing I hold in my hand. And so what I've chartered them to do is to talk to me about how we can rethink how we move information and how we're able to tap into information in a very secure way. I won't go into the busyness of the Navy today, because what I have been talking about is the future, but suffice it to say that we've been rather busy. And I think that what we have also done in the last couple of months is reaffirm the strategy that we issued with the Coast Guard and the Marine Corps about three and a half years ago.

I always get the question, you know, is the strategy going to be rewritten? Are you going to rewrite the strategy? If you recall, the strategy calls for six capabilities that we want to be able to field. We want to be global. We want to be a deterrent force, both with our nuclear

deterrent, but also with our conventional force structure, exercise sea control, project power, conduct maritime security, provide humanitarian assistance, disaster response.

Coincidentally, someone at a venue not unlike this asked me that question, when are you going to rewrite the strategy? That question happened to be asked when I knew what we were going to do in Libya, but it had not been out in the public yet. And so I thought about that question, and I said, let's see, deterrent forces on patrol, as it has been for decades, two aircraft carriers are sitting in the North Arabian Sea as we see changes sweeping across the Middle East. Not a bad conventional deterrent force that's down there, knew what we were going to be doing in Libya, projecting power, controlling the sea and the access to the ports there, sea control. Go a little farther to the east, we were conducting counter-piracy operations off the coast of Somalia with a strange group of countries to include China and Russia and India, and every once in a while Iran comes down and spends a little bit of time there. That's maritime security.

And then at the same time, we had the Ronald Reagan Strike Group that was en route to a combat deployment in SENTCOM that pulled off on one day's notice and provided humanitarian assistance in Japan.

And so if we question the relevance, the strategy, the capabilities that we continue to see employed around the world, that one snapshot in time kind of captured it all. The question for us now is, how do we advance the capabilities? How do we anticipate the future? How do we properly develop the human capital that will operate these new systems? And then how do we control the total ownership costs? And that's where I spent a lot of time thinking.

So with that, I will stop. I've spoken far too long, hopefully primed the pump a bit, and I look forward to your questions. (Applause)

MR. SINGER: Why don't you join me here, okay? And I'm going to abuse the moderator's role by asking the first question. So you quoted perhaps the greatest Italian philosopher, Machiavelli. I'm going to counter with the greatest American philosopher, Mark Twain, and he said --

ADMIRAL ROUGHEAD: By the way, I have him loaded on my Droid.

MR. SINGER: He said that history doesn't repeat itself, but it rhymes. And I particularly appreciated the way you reference certain parallels that you saw in terms of technologies that had previously transformed naval warfare, such as plane, such as nuclear power, and I wanted to maybe press you to dig a little bit deeper for us in terms of your

views on two questions.

One is, where in the history of, say, those parallel technologies and experiences do you think we might be today? And then the second is, what are the lessons that you draw from those experiences, both in terms of maybe positive choices they made back then or false pathways they went down into? What are the lessons that you draw out of this other than -- you know, perhaps I was thinking we need to find the great-great-grandson of that Navy contract officer back in 1911, who figured out how to get a new plane out there in three months. That's one lesson we can't draw, but what are the larger ones?

ADMIRAL ROUGHEAD: I think when you ask the question where do I think we are, if I could go to naval aviation, I would say that we're probably in 1938/1937. We have the concepts, we have the tools, if you will, but the leaders in 1938 probably didn't envision Midway, which was really the, in my mind, the real advent of carrier aviation, not just on the part of the United States Navy, but also on the part of the Japanese Imperial Navy.

And so I think that we have the things we need, but how it all comes together and how you use it in conflict really didn't come to pass until then. So I think we are moving down that path. I believe we're putting some structures in place, we're developing the skills. We're now

starting to begin to develop the numbers of people who are truly becoming quite expert in that.

And as I go around and I visit our young operators in the information dominance area, they're pretty good. But how does it all synchronize? So I think that we're, you know, kind of on the edge of jumping into that.

I would then like to go to the nuclear power analogy, and I think that's one of the greatest stories of perseverance and bringing new technology -- quite frankly, very disruptive technology -- into an organization that ultimately transformed naval warfare. What I would like to be able to take away from that is the discipline with which we did then and continue to operate that capability, because I do believe that even though we want in the world of information to allow the innovation to flow because of the security issues, that same type of discipline and process, and as we train very high-end operators, you know, what are the expectations, what are the standards, what are the steps that we take those people through?

So I kind of blended the answer there a little bit, but I think those are some of the things that we really need to think about. Because kind of touching back on the security piece, you know, we've looked long and hard, for example, at how do you use information, some of the new

mediums and applications? And you immediately are drawn into the security dimension. And so how do you balance the benefit and the security? What are the protocols you use? And I think that being somewhat risk- adverse, we tend to default very hard onto the security side, and I think that can stifle the usage. We in the Navy have gone through that debate. We have become quite avid advocates for the use of social media in how we move things around. And so I think, you know, that scenario where we've got to get the protocols, the security, the standards right, but not lose sight of it.

Because just as a current example, when I got up -- the last few days I've been getting up in the morning and I get great reports from people in the field about, you know, we did this, this is the status, and I've been watching the water coming down the Mississippi. Why do I watch that? We have a base last year that does all of our personnel activity that flooded out, shut the Navy personnel system down. I get great reports from the commanders, but I go on Millington's Facebook page and I can find out exactly what's going on in real time and what people are doing about it and how they feel about it and the level of anxiety that exists, and I can't pull that from a normal report. So how do we want to use that sort of, you know, idea or technology? So it's pretty exciting actually.

MR. SINGER: All right, thank you. So we have lots of

questions. What I'd like to ask is, wait for the mic, please introduce yourself, and here all questions end with a question mark. (Laughter) So why don't we, right up front here.

MR. FULGHUM: Dave Fulghum, *Aviation Week*. There was a lot of concern about whether the technology you're investing in was very important during the Libyan operation, and I think their electronic attack and cyber operations. Were there enough cyber and electronic attacks used there to validate your need for that against what many considered a really third-rate power?

ADMIRAL ROUGHEAD: Yeah, the -- let me just touch on the electronic attack first, if I could, and I'm going to fog with the cyber business a little bit because of not wanting to get into areas that I shouldn't. But electronic attack, I would submit that a story of the value of electronic attack, but also the agility of it.

My view is when you talk about a third-rate power, I don't consider our aviators flying into an air defense system of a third-rate power any less critical than going into an air defense system of a high-end power. I think it has to be taken very seriously because of the proliferation of systems that we see around the world. So my sense is that you are always going to have to go in and affect that system electronically before you do anything kinetically to it. As you know, we, in the last couple of

years, have been directed, and we are very -- we very much wanted the mission to take up the broader electronic attack mission, and that led to the additional procurement of the growlers that the Navy had.

The Growler squadron, first Growler squadron deployment into Iraq, they recovered from a combat mission in Iraq. Forty-seven hours later they launched a combat mission into Libya from an air base in Italy. That's pretty extraordinary as far as agility and the capability to do that.

It would have been better to not have to move that squadron, but that's why we're investing in Growler. So I think electronic attack is going to become increasingly important, It figures prominently into our information dominance portfolios, not just an electronic attack that's carried onboard our airplanes, but also the electronic sweeps that we're continuing to advance on our surface ships and our submarines.

In the cyber side, I do believe that whether it's a submarine or a ship or an airplane, but particularly a submarine, I think can be an extraordinary system in which to participate in cyber operations, particularly the way that we tend to rely more and more on mobile capability. So I think that, you know, those are areas that we have focused on, that we're putting significant investment into, and it's a major part of what we're doing.

MR. FULGHUM: So is the answer then that, yes, we did use both capabilities in Libya, and, yes, they did prove themselves valuable?

ADMIRAL ROUGHEAD: Yes.

MR. SINGER: Okay, right there.

MR. McVADON: Eric McVadon, retired Navy officer and consultant on Chinese security affairs. Admiral, you're going to probably regret you mentioned Machiavelli so often you'll be associated with him, but you said that tardiness robs us of opportunity, yet you seem to be satisfied with 2018 for the UCAS carriers.

I kind of associate, maybe incorrectly, some urgency with UCAS, with the Chinese ASBM -- anti-ship ballistic missile. Is that the best we can do and is that what we should stick with, and do you make that association?

ADMIRAL ROUGHEAD: Okay. I think if you -- if I have any of my staff in here, when there's an IOC beyond 2013, they know I've become pretty irate over that, but -- no, but I think that, you know, what we're doing is, particularly moving onto UCAS, U class, I think that if we can deploy a squadron of U class on board an aircraft carrier in the next seven years, given where we are today, given the environment in which we'll -- as I said, the electromagnetic environment of the carrier, the nature of everything else that's still going on on the aircraft carrier, where we are

with UCAS, where we want to get to U class, the fact that we're stipulating that we want a squadron on board, that's pretty rapid.

I'm not saying I'm satisfied with it, but that type of technology and the application of that technology is -- that's at a pretty good clip. At the same time, continuing to invest in the types of capabilities that we are with the JSF, the additional Super Hornets, and keeping all of those investments balanced, I'm satisfied with that.

But if someone were to come in and say, hey, I'll give it to you in 2016 at the same price, I'll take them up on it.

MR. SINGER: Let's get some folks a little bit further in the back.

MR. FINKELSTEIN: Bob Finkelstein, Robotic Technology. A couple of decades ago there was a concept of the arsenal ship, a combat vessel that would be unmanned and heavily weaponed. Since then, the technology has advanced considerably. So is there any interest in revisiting the concept to take another look at it?

ADMIRAL ROUGHEAD: I would say that what you saw employed in Libya is not a bad arsenal ship; it was the SSGN. We happened to be in the Mediterranean at the time and was able to, you know, send quite a few missiles in toward Libya. But to the point of a surface ship that would be an arsenal ship, no. Again, I think you have to

look at all of the capabilities that we have in place and the nature of the development costs that we're dealing with.

The fact that we can now integrate our systems and such, that I think the future is going to be -- it's going to be very realistic for one ship to be shooting off of somebody else's information, and so I think we'll see the type of concept arsenal ship was envisioned to have. But at the present time, taking a blank sheet of paper, designing an arsenal ship, not in my plan right now.

MR. SINGER: I want to push a little bit further, not on the arsenal ship side, but on the ideas, you know, that we're getting to the ability to shoot off of someone else's knowledge. One of the keys within air/sea battle doctrine is not just that kind of exchange of information in terms of targeting, it is also the inverse in terms of vulnerability, depending on someone else to guard your systems, particularly such as in air defense or the like.

To go back to the prior question against ballistic missiles, are you satisfied right now with where we're at in the exchange of information, not just within the maritime environment, but perhaps cross-services within that air/sea battle doctrine sort of vision?

ADMIRAL ROUGHEAD: Yeah, I think, you know, the air/sea battle process and integration was really quite remarkable. The openness

that the services had, I mean the Navy and Marine Corps pretty open because we're all working off the same, you know, the same budget, but in the case of the Air Force and the Navy, our teams were integrated.

We opened programs to one another that had never been opened to one another before, and so the ability to go forward together and look at where is there a gap, where is there redundancy, where do you want redundancy, where do you think you have to have increased capacity, all of that has been very, very openly vetted. And I believe we've been able to make some, you know, far better decisions than we would have if we had stayed on the old path, so I was pleased with that.

MR. SINGER: Right there.

MR. HARPER: Jon Harper with *The Asahi Shimbun*. Have you seen the evidence that the Chinese are working on UAVs and are you concerned about the potential of that happening?

ADMIRAL ROUGHEAD: There's no question in my mind that China, as well as many other countries, are working on UAVs. I think that they've kind of captured the imagination, and, you know, not only are the countries that have the more technologically advanced militaries working on them, but you can go and buy them from somebody else if you want to. So I think UAVs are here to stay and to be advanced.

I would also submit that, and I touched on it earlier, the key

will not only be to get the good vehicle, but how do you move the information? How do you sense the information? And then how does that information find its way into the operational decision-making or into the kinetic result that you're seeking?

So having -- you know, the thing that I look at is the fact that somebody has the UAV is interesting. How is it being used? How is it being networked? And then what are the, you know, what are the capabilities? But it's one thing to have it, it's another thing to use it effectively. So, you know, that's where my interest goes.

As soon as I get a sense that somebody has a UAV, I try to dig in deeper and see, you know, how is it being used, and, quite frankly, what are the potential vulnerabilities of it, because that's, you know, that's part of the game, as well.

I think we tend to take a lot of weapons developments and think in terms of, you know, it exists, therefore, I'm at a disadvantage as opposed to it exists, therefore, how do I see an advantage? And so I think that's part of how we have to look at naval warfare, indeed all warfare, particularly in the information world. There are a lot of benefits to be gained, but there are also vulnerabilities almost at every turn.

MR. SINGER: As a writer, I can't resist, there's 44 other nations besides the United States that are building, buying, and using

military robotics. And so to that historic parallel that you laid out for us of naval aviation, in many ways another part of that parallel is the wrestling that everyone is going through to figure out what's the best doctrine for utilizing them.

I think we've got time for one more question, right there. Actually a little bit -- we need to give an Air Force guy a chance.

COLONEL FARINCOOK: Colonel Farincook with the Office of Naval -- Net Assessment. Admiral, you walked us through a couple of transformations that the Navy has gone through as far as aviation through nuclear power. One of the significant ones that the Navy went through was the battleship, and I was wondering if you would comment on what may happen with the carriers when we look into the future, particularly as it's challenged by these range capabilities, and a similar kind of challenge that went against the battleship. So where do you see particularly the super carrier as we move into the future?

ADMIRAL ROUGHEAD: Yeah, I think, one, it's how do you look at the carrier, how do you look at -- at how the carrier is employed, and the totality of the systems, defensive systems and offensive systems that it has. I know that there's a great deal of interest in the carrier vis-à-vis, you know, the DF-21. I mean that's the big question, and how that carrier now becomes vulnerable.

The carrier is moveable, the carrier is maskable, and then there's a whole set of defensive systems that are able to be employed. I would submit, and you'd expect it from somebody wearing this uniform, put me on that as opposed to a fixed land base where I can tell you exactly where the coordinates are and they're not going to change. And so I think it's interesting that we have the debate about the carrier or the questions about the carrier when the fixed land sites, which are extraordinarily vulnerable, are not part of that question. So it's not a question of an either/or. It's how do you maximize both of them?

With regard to the carrier, and I'll kind of step back and put a little different spin on it, I think of carriers as moveable sovereign airfields that we don't have to have permission to move. We don't have to have basing rights. We don't always have to have overflight rights, particularly if we're coming from the sea and the area that we're interested in is a coastal area. And so the question, to me, becomes where does the nation want to have the ability to have these flexible airfields that we can put wherever we want them and can move them rather quickly?

You can move from the Arabian Gulf and into the Adriatic, because I've done it before, in seven days. And to be able to move that amount of power, that power projection that quickly, without any negotiations having to take place, I would submit is an aspect of the

military that the nation may find helpful, even in the -- as you look into the future and the challenges that may be posed against it. You know, we have been dealing with capabilities and systems that are a raid against an aircraft carrier really since the beginning of aircraft carrier aviation.

They have moved from other ships, other aircraft carriers, submarines, air defense systems, cruise missiles, and that's all part of how warfare develops. A development occurs, you develop counters to it, and so I think we'll be working our way through it. But the fundamental question for me is, do you want to have the ability as a nation when sovereignty concerns will become more acute, in my opinion, in the future, do you want to have those sovereign airfields that you can put where you need them to be, where you can use them to deter or assure? And that's how I view the aircraft carrier.

MR. SINGER: We're getting to our closing time. There's two thoughts that I have here. One is that when we talk about the determinants of success, the first -- in navigating these types of revolutions and new technologies and challenges, the first is the ability to keep our eyes on the horizons, that is, to be aware of what's coming at us, but also to be able to mind the lessons of the past, and I think we've seen evidence of that here today.

The second is that one of the major determinants of success is

something that doesn't change, and that's good leadership. And I'm thinking of the historic parallel of Admiral Moffett and the story of naval aviation, that often its leaders that may not come from that particular background, but have a combination of vision and drive to get things done that often determines whether we really do achieve success.

And I think with those two things in mind, it's very lucky for us that we have you serving in our nation's service, but also that you've joined us here today to discuss these challenging issues with us. So please join me in a round of applause. (Applause)

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CERTIFICATE OF NOTARY PUBLIC

I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

/s/Carleton J. Anderson, III

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