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HEARING
ON
NATIONAL DEFENSE AUTHORIZATION ACT
FOR FISCAL YEAR 2019
AND
OVERSIGHT OF PREVIOUSLY AUTHORIZED
PROGRAMS
BEFORE THE
COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED FIFTEENTH CONGRESS
SECOND SESSION
—
SUBCOMMITTEE ON TACTICAL AIR
AND LAND FORCES HEARING
ON
**GROUND FORCE MODERNIZATION
BUDGET REQUEST FOR FISCAL YEAR 2019**

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GROUND FORCE MODERNIZATION BUDGET REQUEST FOR FISCAL YEAR 2019

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Washington, DC, Wednesday, April 18, 2018.

The subcommittee met, pursuant to call, at 3:01 p.m., in Room 2118, Rayburn House Office Building, Hon. Michael R. Turner (chairman of the subcommittee) presiding.

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

Mr. TURNER. The committee will come to order. The subcommittee meets today to review the Army and Marine Corps ground force modernization program for the fiscal year [FY] 2019 budget request.

I would like to welcome our guests: General John Murray, Deputy Chief of Staff, G-8, principal military financial advisor for Army program development; Lieutenant General Paul Ostrowski, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology; Lieutenant General Robert Walsh, Deputy Commandant for the Marine Corps for Combat Integration; and Brigadier General Joseph Shrader, Commanding General, Marine Corps Systems Command—you all need longer titles.

[Laughter.]

Thank you for—each of you for your service to our Nation. Today the subcommittee will review a broad portfolio of ground force equipment modernization programs that are associated with acquisition strategies covering over \$40 billion in budget authority.

Our focus today is to conduct oversight on how the budget requests for these modernization programs and acquisition strategies are aligned with the new National Defense Strategy and how they will begin to restore full-spectrum operational readiness.

Last year, during a similar subcommittee hearing, General Murray testified that “the Army has nearly half of the funding for modernization [and] equipment that it had just 8 years ago.” And the Marine Corps said that between fiscal year 2012 through year 2016, “Marine Corps spending on ground procurement decreased by 48 percent in its base budget.”

Essentially, the Army was both “outranged, outgunned and outdated,” end quote. And the Marine Corps was out of balance and requiring accelerated modernization to maintain [overmatch capabilities]. The National Defense Authorization Act [NDAA] for Fiscal Year 2018 and the balanced budget agreement for fiscal year 2018

and 2019 sets the necessary conditions to start the long process of repairing the damage resulting from years of combat operations compounded with deferred modernization.

We all acknowledge this damage did not occur in a single year and it will take consistent levels of long-term increased investment to rebuild. The Army's modernization budget request for this year represents a 22 percent increase over last year's modernization budget request.

I am pleased to see the Army is requesting enough funding to modernize one and a half armored brigade combat teams [ABCTs] as opposed to last year's plan to modernize only half of the requirements for one complete ABCT.

The Marine Corps procurement request for ground equipment this year is \$2.9 billion which if enacted would be 80 percent increase over last year's budget request of \$1.6 billion.

So, it does appear that the Army and Marine Corps are taking the necessary steps to accelerate modernization and mitigate existing capacity shortfalls and capability gaps.

For example, the Army has identified six modernization priorities that include long-range precision fires, next-generation combat vehicles [NGCVs], future vertical lift, Army network, air and missile defense, and soldier lethality. To help streamline procurement of these capabilities, I understand the Army has also established eight cross-functional team pilot programs to expedite the requirements process and accelerate these priorities.

The subcommittee expects to hear how the fiscal year 2019 request is addressing these modernization priorities and better understand program schedules and fielding timelines that will enable acceleration of these capabilities to the soldier.

As a follow-up to the subcommittee's hearing from last September on Army tactical network modernization, we expect our witnesses to provide additional details and justifications underpinning this new strategy and ask how the fiscal year 2019 request enables it.

The National Defense Authorization Act for Fiscal Year 2018 also directed the Army to develop a long-term modernization strategy. Today is a good opportunity for the witnesses to provide us with an update on where the Army is with developing this strategy.

From a Marine Corps perspective, this year and next will represent critical milestones for the amphibious combat vehicle [ACV] program, the CH-53K heavy lift helicopter program, as well as accelerated ground-based air defense initiatives. We expect to receive updates on all of these issues today.

In summary, we cannot dig ourselves out of this readiness and modernization hole in just a couple of years or NDAA cycles. I want to again place emphasis on what I said at last week's committee hearing: we are experiencing a crisis in military readiness.

Over the last 3½ weeks, we have witnessed a series of aviation accidents where 16 service members have tragically lost their lives. Many of these tragic events are a result of lack of training hours due to constrained resources and/or the current state of aging equipment, all of which resulted from years of underfunding our military and clearly shows the magnitude of the problem we are all dealing with.

This increase in modernization funding is absolutely required to maintain our competitive advantage against strategic competitors and improve overall readiness. However, with the increased funding comes additional responsibility. If we are to sustain higher top-line defense budgets, we need to be assured that the military services and the industrial base can execute the funds that Congress has authorized and appropriated.

The bottom line is, we have to get this right and we have to do it now.

Before I begin, I would like to recognize my colleague and good friend from Massachusetts, Ms. Niki Tsongas, for any comments she would like to make.

[The prepared statement of Mr. Turner can be found in the Appendix on page 29.]

STATEMENT OF HON. NIKI TSONGAS, A REPRESENTATIVE FROM MASSACHUSETTS, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Ms. TSONGAS. Thank you, Mr. Chairman, and good afternoon.

I would like to thank our witnesses for being here today to discuss Army and Marine Corps modernization budgets for fiscal year 2019. Good to have you with us.

Based on an initial review of the budget request, both the Army and Marine Corps appear to have received significant funding increases in most areas. This has enabled in several cases both services to accelerate procurement of needed items, hopefully providing stability while also leading to lower costs through buying in bulk.

For example, the Army has increased its procurements of armored combat vehicles of several types to approximately one and a half brigades per year, a dramatic increase from the half a brigade per year or less of recent budgets.

The Marine Corps has been able to simultaneously buy more Joint Light Tactical Vehicles [JLTVs] while also pursuing healthy production rates of other vehicle upgrade programs.

As our witnesses will recall, this subcommittee had a hearing last year focused on the Army's new plans in the area of communications networks and associated programs. At the time, I was very concerned that the Army might be making hasty decisions regarding eliminating current programs in favor of chasing new and potentially unproven technology.

Now, after reviewing the Army's updated budget request in detail, I am cautiously optimistic that the Army is pursuing a more conservative plan that realigns some funding for current effort, but maintains or even expands funding for the majority of programs.

The Army also plans to do a significant amount of experiments and prototype efforts to explore new technologies. These efforts are intended to inform a new tactical network for the future. Furthermore, the Army intends to maintain competition in most of its radio programs, which is good to see.

Finally, there is one major question mark and that regards the path forward for providing better on-the-move communications capability to armored brigade combat teams. These units were going to receive WIN-T [Warfighter Information Network-Tactical] Increment [Inc] 2 for this purpose. But that aspect of the WIN-T pro-

gram has been terminated. It remains to be seen what the Army's plans are for providing this capability. I hope to hear more today about the way forward.

With that, Mr. Chairman, I yield back and I look forward to hearing from our witnesses.

Mr. TURNER. Thank you.

I understand General Murray will provide opening remarks for the Army followed by General Walsh who will provide opening remarks for the Marine Corps. Without objections, the witnesses' prepared statements will be included in the record.

General Murray, please begin.

STATEMENT OF LTG JOHN M. MURRAY, USA, DEPUTY CHIEF OF STAFF, G-8, OFFICE OF THE U.S. ARMY DEPUTY CHIEF OF STAFF; AND LTG PAUL OSTROWSKI, USA, MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY

General MURRAY. Thank you, sir. Chairman Turner—that is a nice short title, sir—Ranking Member Tsongas, distinguished members of the subcommittee, on behalf of our Army Secretary, the Honorable Mark Esper, and our Chief of Staff, General Mark Milley, General Ostrowski and I look forward to discussing Army modernization with you.

Last year, I told you that we were approaching an inflection point; this year I would tell you that based upon everything you have just talked about, we are at an inflection point. We can no longer afford to choose between near-term readiness and modernization, and, specific to modernization, we can no longer afford to choose between improving existing systems and developing new ones. We must be able to do both, and I think you will see some of that in the 2019 budget and then specifically when we bring the 2020 budget across in about a year, you will see that.

The Army's focus on the demands of ongoing campaigns combined with constrained resources and an industrial age organizational model have slowed, deferred, and in some cases halted the development of new capabilities. Meanwhile, our adversaries have, or are quickly attaining, a competitive advantage.

Building on the fiscal year 2018 President's budget, we believe the FY 2019 budget request aligns with the National Defense Strategy, continues to reverse the downward trend that has stifled Army modernization, and serves as an important step toward expanding and maintaining overmatch.

However, we must stress that a major increase in modernization this year will not in itself reverse the trend. We must have sustained, predictable, and adequate funding over the long term to allow us to develop an effective plan to reduce future risk while making the most effective use of the valuable resources we are entrusted with.

In fiscal year 2019, we plan to selectively upgrade the equipment that is critical to near-term readiness and focus our science and technology and our research, development, test, and evaluation [RDT&E] funding on the six Army modernization priorities, those areas crucial to combat which have eroded in the restricted budget environment.

This includes as you mentioned, Chairman, long-range precision fires, next-generation combat vehicle, future vertical lift, the network, air and missile defense, and soldier lethality. The American people expect their Army to win and meeting this expectation requires the Army to maintain overmatch against the near-peer threat.

We urge Congress to provide fiscal stability so we can maintain our current warfighting readiness while simultaneously building a more modern, more capable, and more lethal force for the future.

I would like to thank you and the entire committee for your unwavering support of the men and women of the United States Army, our Army civilians, and our Army families. Thank you and we look forward to your questions.

[The joint prepared statement of General Murray and General Ostrowski can be found in the Appendix on page 32.]

Mr. TURNER. Thank you.

General Walsh.

STATEMENT OF LTGEN ROBERT S. WALSH, USMC, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND, AND DEPUTY COMMANDANT, COMBAT DEVELOPMENT AND INTEGRATION, HEADQUARTERS, U.S. MARINE CORPS; AND BGEN JOSEPH SHRADER, USMC, COMMANDING GENERAL, MARINE CORPS SYSTEMS COMMAND

General WALSH. Thank you, Chairman Turner, Ranking Member Tsongas, distinguished members of the subcommittee, for the opportunity to testify before you today with my teammates, General Murray, General Ostrowski, and also my partner, General Shrader.

The Marine Corps ability to serve as our Nation's crisis response force is due largely in part to this subcommittee's continuing strong support and we appreciate that on behalf of all the Marines.

Additionally, the Bipartisan Budget Act is going to go a long way to give us the stability we really need to be able to continue to develop the capabilities we have. Across the Marine Corps Combat Development Command, we have got over 18,000 men and women sailors, Marines, civilians that are operating as the capability developers for the Marine Corps and integrating this across the Marine force.

Over the past year, the Marine Corps has been focused on deterring conflict by providing combined arms teams to theaters either already in crisis or at the risk of crisis to meet the Congress' mandate to be "ready to suppress or contain international disturbances short of large-scale war."

We operate—you talked about the National Defense Strategy—within three of the four areas described in the National Defense Strategy of the contact, blunt, and surge forces. Our forward-deployed Marines and sailors operate daily as part of that contact layer.

Today, they are vulnerable to—they are vulnerable to attacks in ways we haven't seen in decades. To operate within the contact and blunt layers, Marines foster—need to foster the lethal combat forces to be a credible deterrence force.

During the last several budget cycles, we have been focused heavily on improving readiness to improve the force and increase

our ability, but with the stability that you have given the budget, with a 7 percent increase in the total obligating authority with the Marine Corps, we have been able to push money into our modernization accounts at a rate of 32 percent. This increase in modernization spending is a signal, it is a sense of urgency that we will be prepared to address the threats in the National Defense Strategy.

Like the Army, in the Marine Corps 2019 budget we aligned ourselves with five priorities: information warfare, long-range precision fires, air defense, command and control in a degraded environment, and protective mobility and enhanced maneuver along with the Secretary of Defense direction to increase lethality, resilience, agility, and build a flexible, dynamic force.

Additionally, I would like to emphasize to this subcommittee our close coordination and in many cases full alignment with the United States Army and their programs. Our work with the Army provides more efficient use of taxpayer dollars and ensures the end product provides the best capability to our Marines, soldiers, and the operating forces.

Thank you for allowing General Shrader and I to testify before you today.

[The joint prepared statement of General Walsh and General Shrader can be found in the Appendix on page 43.]

Mr. TURNER. Thank you, gentlemen. I have a couple of questions before I pass it on to my ranking member. General Murray, thank you for accompanying me when we visited the Holston Army Ammunition Plant, that was very illuminating, got to get a firsthand view of both the state of the facilities, the demand issues, and production. Holston and Radford are both government-owned contractor-operated facilities and both are in the process of expanding their production capability of critical materials needed for ramping up production of high-demand munitions.

I would like for you to update us on the facilities, where they are at expanding production, any additional information you would like to give us. You gave us an effective understanding of the issues when we were there together at Holston. And in your opinion, are there ways to accelerate these projects? I would like to also know what near-term actions are being considered, the things that we need to be considering as we put the NDAA together and, I know, are you considering stockpiling TNT [explosive]?

General MURRAY. Yes, Mr. Chairman, thank you for that question. As you know at Holston, in 2018, it is really a multiyear effort, so it really goes even before fiscal year 2018. But in 2018, we put \$105 million and then \$100 million in 2019 to expand the capacity. That is about a 6 million pound increase in RDX [explosive] and about a 2 million pound increase in IMX [explosive].

And that work continues. It is probably not any different than the schedule we showed you when we were down there. We have looked for opportunities to accelerate and taken those opportunities where we could, but as you know it is—until it becomes an insensitive munition, it is in fact a sensitive munition.

So chances for acceleration are probably not great, but we remain on track and we have looked at the issue of storing TNT and we continue to explore that option. The demand for the insensitive mu-

nitions in theater right now is dropping slightly, so we have been able to catch up on some of the backlog, but we will continue to look for opportunities to expand the use of TNT, and then also add additional investments in those two critical facilities.

Mr. TURNER. General Walsh, we are aware that the Marine ground units are almost wholly without an effective organic air defense system. We are also aware on the subcommittee that the Marine Corps has plans to develop a family of systems that can develop—excuse me—that can defend against airborne threats.

Can you please update on the Marine Corps plans and how do these coordinate with other service branches?

General WALSH. Thank you, Chairman. We have got really what I would say is a two-phased approach to this. In near term, we had been looking at the counter-UAS [unmanned aerial system] capabilities, but now with the National Defense Strategy to increase that, we have kind of looked at longer range capabilities. So within the—the near term, we have been developing on—as a light capability on our MRZR which are our ATV [all-terrain vehicle] capability and also on the M-ATV [mine-resistant ambush protected ATV] that we have.

And on that capability, we have got integrating Stinger missiles for rotary wing and fixed wing, a counter-UAS Coyote capability, an EW [electronic warfare] capability we call Modi, and also integrating a laser capability that we are working very closely with the Army on—with the counter-laser weapon system along with the sensors that go with that.

That is the near-term capability and it is kind of a spiral ability that we are going to integrate into the JLTV that goes—as it goes forward. And as that goes forward we are working very closely with the Army on a longer range capability.

In the interim we also have \$4.5 million that we have got in 2018 that we are working to develop and integrate a COTS [commercial off-the-shelf] system that we could demonstrate near term as we develop more money into the future that we have got for R&D [research and development] with the Army to integrate in with their IFPC [Indirect Fire Protection Capability] Block 2. And I will ask General Shrader if he would like to add anything from the acquisition side.

General SHRADER. Sir, I would just echo really the work that we have done on the lightweight system that—that General Walsh talked about, we call it the—the Lightweight Marine Air Defense System that we would put on the RZR. We have—we have to date fielded 14 of those within a 12-month period from identifying the requirement to fielding. So we are happy with that. We want to continue on that effort.

And that—on that vehicle, it is two vehicles where you have a command and control vehicle and then you have another vehicle that has the radar and the—the capability to compute the firing data and then engage with—we will just say EW Modi system. And we have done that in a 14-month period and we—we use that as the base and then spiral, what General Walsh said, spiral more capability into that. Not only that system, but also into the M-ATV and the JLTV as that comes onboard and also working with the laser, the 2-kilowatt laser. That is—that is all I would add, sir.

Mr. TURNER. Thank you. Ms. Tsongas.

Ms. TSONGAS. Thank you, Mr. Chairman. Since the start of the wars in Iraq and Afghanistan, DOD [Department of Defense] developed various systems for quickly addressing urgent needs for equipment. These efforts understandably started as urgent needs directly tied to ongoing combat operations.

Recently, however, the use of the term “urgent” has migrated to other more routine requirements often tied to need statements from Army or Marine Corps units that in many cases are not deploying into a combat zone in the near future. Of course, the entire Army and Marine Corps exist to be prepared for possible combat in the future, so expansion of the label of urgent—urgent need to include anything plausibly related to a future combat operation could obviously include almost anything.

While I support as many on this—we all in this committee do, support filling such urgent needs for units in combat or about to deploy to combat, I would like to explore what looks like an expanding definition of urgent need.

So with that, General Murray and General Walsh, can you talk about and explain how the Army and Marine Corps currently categorize urgent needs? And can you also explain in detail where such urgent need statements come from and how are they reviewed? So I will start with you, General Murray.

General MURRAY. Yes, ma’am, thank you. So it is—it is hard to know when you are going to deploy into combat, so we have had predictability over the last 16 years, I understand that with path charts and BCTs can prepare the year out. But it is hard to predict the world’s situation. So most of the urgent requirements that we are seeing are coming from division commanders, they are—they are funneled up through corps commanders, prioritized, and racked and stacked if you will. They go to the forces command commander if they are within FORSCOM [U.S. Army Forces Command]. If they are within the Pacific they go through the four-star in the Pacific. If they are in Europe, they go through the three-star Army commander in Europe.

And then they come back to the building. The G3 [operations staff] racks and stacks them from an Army-wide priority look. We have lawyers look at them to make sure that there is a compelling reason why it is an urgent requirement and normally either the vice or the chief are briefed on them that this is an emerging requirement, this is the way we would like to do.

Ms. TSONGAS. And what would the standard be for that, that the lawyer is—is employing to decide that?

General MURRAY. It is just probably no—there is probably no piece of law I can point to and say. Now, there are Army regulations and there are DODIs, DOD instructions, that talk about urgent and compelling, but they don’t—they don’t point to a specific, it has to be A, B, C, D, and E to be qualified as urgent.

So it is based up—it is really based upon the world situation. I mean what is going on in—in Korea at this particular point in time has—has led to most of the DRs, directed requirements, here recently, and then it is always for a limited quantity and it is not an acquisition strategy. It is just naming the requirements for the

piece of equipment that we are after if it doesn't currently already exist in our inventory.

Ms. TSONGAS. Is there any process in place to make sure that these decisions aren't inappropriately influenced by non-government actors such as industry representatives?

General MURRAY. For my perspective, yes, because the directed requirements that I have seen and I have personally signed do not—it is a requirements document, that this is the requirements for a capability that we would like—the acquisition community to either find, buy, or produce. And that is about the limit. Now, I do put into some of those, you know, the—the timeframes we are talking about because urgent implies fairly rapidly, but I have never seen or signed a directed requirement that specifies an acquisition strategy.

And from my personal experience, from my perspective, there has been no contractor influence on the solution.

Ms. TSONGAS. General Walsh.

General WALSH. Congresswoman Tsongas, so I am just going to—I think our process is parallel very much with what General Murray said. What I will say is our urgent requests come in from our operating forces the same way, they come into our capability development directorate down there at Quantico. We assess them pretty much the same way. We also have deliberate operational needs that come in from the operating force commanders. So the ones that are urgent are coming in generally from the operating forces that are in combat areas that have urgent needs, maybe loss of life or capability in that sense.

They come in, we rack and stack them, and then we send them up to our Marine Corps—Marine Requirements Oversight Council that is up with all the deputy commandants and the Assistant Commandant of the Marine Corps and eventually up to the Commandant. So that is the process we go through.

We have been doing this a lot as you well know throughout Iraq and Afghanistan, so we have gotten fairly good at this. I think where—where the questions start to lie I think with Congress is the desire to go fast is starting to maybe sometimes look like it is getting outside the operational needs process in, for example, where we developed our rapid capabilities office that we have developed and all the services have developed those.

And so now we are spinning technology out fairly quickly at the lower end, not major acquisition development programs, but smaller. And I think the key part with that is trying to work with Congress and I think in this last year we have been very successful to work with Congress to show the areas that we have been working in that we would be wanting to demonstrate capabilities and experiment with that, and then continue to come back and engage with Congress on what actual programs that we are using to experiment with to be able to try to rapidly prototype those capabilities.

So I think some of it looks like this rapid capability development is merging into the urgent operational needs process, but we keep these completely separate from a process standpoint.

Ms. TSONGAS. And are you comfortable that these decisions aren't being inappropriately influenced by, as I said, non-govern-

ment actors such as industry representatives? And what do you have in place to be assured of that?

General WALSH. Yes, Congresswoman, I think—to be honest with you, I don't see us getting involved with the industry at that point when those capabilities come in. They come in, we look at what the best capability would be out there. We do do some demonstration capabilities when we try to bring in vendors to kind of see what opportunities are out there, but we kind of look at it from more of a capability standpoint than looking at a specific vendor's capability.

And let me ask if General Shrader wants to—because he works very closely with me on this process.

General SHRADER. Ma'am, I would say that there is, on the acquisition side, the material development side, there is a process that we have in place where a vendor can introduce something and it is a non, unsolicited proposal type of process that we have. But as far as industry partners trying to come in and influence, try to generate an urgent need, no, ma'am, I don't—I am not aware of anything like that going on, ma'am.

Ms. TSONGAS. Thank you. Thank you, Mr. Chairman.

Mr. TURNER. Mr. Cook.

Mr. COOK. Thank you, Mr. Chairman. I want to thank our guests for being here today. And I am going to start with the Army and I want to talk about the Strykers. And I am big fan of the Strykers. I notice I guess the request is what, for three Stryker upgrades, is that correct right now?

General MURRAY. As it stands right now, yes, sir.

Mr. COOK. And we are pretty well straightened down on the—the V-hull even though it is heavy and everything else. The folks on the Strykers over in Europe, they—they seem to really like that a lot, at least that was what came back to me. Any—any problems with that other than the weight?

General MURRAY. No, sir. So the Europe unit, the 2d Stryker Cavalry Regiment is in fact flat-bottom Stryker. What I think you are referring to is the 30-millimeter cannon.

Mr. COOK. No, no, I am talking about the hull.

General MURRAY. Yes, sir, those—those are all—

Mr. COOK. No, no, the 30-millimeter I am happy with, no problem at all. But—so I am more worried about, you know, mines and things of that nature. The other thing I—when I was over there and we were at Grafenwoehr, a place where—you know where I am talking about, and we are talking—they had four or five different variants. We had a CODEL [congressional delegation] there and they had the different systems.

And I guess I didn't realize that—are they going to change that with the mortar or some of the variants in the future or have they pretty well standardized what is going to be available to that? And I don't have it all in front of me, but I was pretty impressed with the versatility of that weapon system.

General MURRAY. Yes, sir. I think the actual number is nine different variants and I may be wrong, but it is—it is more than five. But in terms of the—the numbers of variants on the Stryker chassis, I think we stabilized it. As a matter of fact, we are adding to

it, so that will be the platform for our mobile SHORAD [short-range air defense] solution.

Mr. COOK. And we are going forward with the reactive armor, the variations of the Trophy systems? I think it is my understanding both services are—are committed to that talking. We are not going to—we are OK on that because I am a big supporter of that, by the way.

General MURRAY. So, Trophy, yes. Between 2018 and 2019, it is about four brigades' worth that will go on the Abrams tank. We have finished the characterization of Iron Curtain which we were trying on the Stryker. There was a decision to come on that this summer and then we're in the process of characterizing Iron Fist on the Bradley right now down at Redstone Arsenal.

Mr. COOK. Yes. Did—did you happen to look at the system that the Dutch are using for their armored personnel carriers? It is very—the big thing about it is it is very lightweight supposedly. I haven't seen it. I did want to try and get over there and see what it looked like, but read a little bit on it, but not much.

General MURRAY. I am not familiar with what the Dutch are using. We have looked at the German system, I believe it is called ADS [Active Defence System]. So we have had some folks in Germany to look at it. It is a very similar concept, different—different design, but a very similar concept to an intercept very close to the vehicle as the Artis system called Iron Curtain.

Mr. COOK. Okay, I am going to get off script a little bit and I want to ask you about line charges. In fact, the last time I saw line charges about a year ago out at Fort Irwin and I got to tell you it is remarkably similar to the same line charge in terms of 51 years ago in 1967 in Vietnam where it shoots out again, when we did it, it was from an AMTRAC [assault amphibious vehicle]. And everybody holds their breath and of course it didn't work.

And it just—I have always been sketchy about that. I think everybody is sketchy about it because of the dangers involved with it, particularly to the ground troops, you know, when it ruptures. Is there anything to improve that, because this is the enemy that we are probably going to encounter with minefields or mines or something like that. And to be able to do something expeditiously to blow up whatever it is, it just seemed almost archaic and that was—I don't know, maybe anybody can answer that?

General MURRAY. Yes, sir. It is, probably is; there are only so many ways you can pack C4 [explosive] into a tube. But I—what I can tell you is I know of no requirements being worked in the Army system to replace the MICLIC [Mine Clearing Line Charge], the mine charge.

Mr. COOK. Yeah. I asked that question and he said no, and I was sarcastic and I said, we are going to use the same one that I used 51 years ago. And they said, yeah, pretty much so. Anyway, I yield back.

Mr. TURNER. Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman. I want to thank our witnesses for your testimony today, most especially thank you for your service to the country. So I understand that, and we have touched this with the chairman's question, but I understand that one of the Army's ongoing priorities is to develop systems in order

to counter short-range air defense threats such as drones and in so doing has been experimenting with high energy lasers. As a proponent of directed energy technologies I am encouraged to hear that the Army is pursuing these advanced technology solutions such as the mobile experimental high energy laser, or MEHEL, to supplement its current ground force capabilities.

And so can you discuss your—your progress on these efforts so far, as well as how you are training soldiers to actually operate the systems?

General OSTROWSKI. Sir, I will just tell you that in addition to the one that you mentioned, we are also very much engaged in 2018 with respect to a technology maturity initiative. This is taking a Stryker vehicle and putting a 50-kilowatt laser on that platform in order to get to a TR [technology readiness] level 7 by the first quarter of 2021. So it will be integral on both the—the IFPC program in terms of a Block 2 IFPC, as well as mobile SHORAD. So the intent is to bring that on as fast as we possibly can because as you know it is cheaper per round in terms of a shot in order to use that particular laser technology against both RAM [rocket, artillery, and mortar], as well as UAS threats.

Mr. LANGEVIN. And progress on the—the one I mentioned, the MEHEL laser, is that—that is different than the one that is on the Stryker, right?

General OSTROWSKI. Can you repeat the question, sir?

Mr. LANGEVIN. Yes. I just want to know the mobile experimental high energy laser or the MEHEL, is that—that is not the same one you are putting on the Stryker, is it?

General OSTROWSKI. Sir, I believe you are talking about the 100-Kw [kilowatt] one as opposed to the one that we are putting on the Stryker which is a 50-kilowatt. Again, we moved from 2 kilowatts to 5 kilowatts as we continue to improve the maturity of the technology. And so the next one for us right now in terms of the Stryker based is the 50-kilowatt laser.

Mr. LANGEVIN. Okay, thank you, gentlemen. So with further developments in artificial intelligence [AI], would you agree that using AI to help control swarms of drones during offensive operations or to provide logistics to forward units much like commercial companies that are experimenting within the United States has potential to be game changing? And how are you incorporating these ideas into your modernization strategy?

General WALSH. I would say yes to all, sir, and I would say that it is probably fundamentally the technology that has the—the chance to be most—to changing the character of war as we move forward. So yes, we are very interested in artificial intelligence incorporation into weapon systems. Of course there are policy issues that go along with that that we will have to deal with as that—as that technology develops.

We are very closely watching what is going on in industry and the other services. We are trying to capitalize off investments that OSD [Office of the Secretary of Defense] is making and the other services are making. We see this not necessarily as the—as the right place to invest a tremendous amount of money right now. We think this is a—this is a technology that industry will develop much faster than we will, and the opportunity to sprint will come

and we just need to be in a position to sprint to catch up with industry when it is mature.

Mr. LANGEVIN. Thank you. And—and how are both your services building cyber and electronic warfare resiliency into your modernization efforts to ensure our new platforms and systems will continue to function in a contested environment?

General OSTROWSKI. Sir, I will just tell you that for every one of our programs and during our testing we go up against cyber threats, as well as EW, and that is across the board. Not only the systems that we are currently in the process of developing, but also systems that we already have in the field such as the Abrams tank for instance, or Apache helicopters, not only from an outsider threat, but also from an insider threat.

We are spending a lot of money on a lot of initiatives. We have red teams that go at these particular systems whether they are out at NTC [National Training Center] or other places in order to ensure that whatever we are doing across the board, we are consistent with the EW threat and cyber threat on both—both our ground, as well as our air platforms, as well as our IT [information technology] efforts.

Mr. LANGEVIN. Thank you. General Walsh.

General WALSH. If I could, Congressman. When we wrote our Marine Corps Operating Concept, the—one of the priorities we saw was being able to operate in the information warfare area. And from that we did our Marine Corps Force 2025, it was about a year-and-a-half-long force structure review. And what came out of that was developing our MEF [Marine expeditionary force] information groups. Within those information groups they are focused on cyber, EW, signals intelligence, information operations.

Just now this summer we are standing up defensive counter operations cyber companies that are down inside the MIG [MEF information group], so we are now pushing that capability all the way down in small detachments, all the way down to the company level. So we are pushing the capability down in structure first with the capabilities and material solutions, some of which we have in a lot of ways in the electronic warfare, we have had that in our radio battalions and also in our electronic warfare Prowler squadrons, our EA-6Bs, but pushing that capability down to the lowest level, the first thing was get the structure in place and then the material solutions will follow.

Mr. LANGEVIN. Thank you all. I would say this is important because as much as we are making progress on these technologies, our enemies and adversaries have invested heavily in being able to disrupt our activities in a contested environment, and what we can do to build resiliency, then the better off we are. So thank you, gentlemen, for your testimony and again, thank you for your service. And I yield back.

Mr. TURNER. Mr. Wittman.

Mr. WITTMAN. Thank you, Mr. Chairman. Gentlemen, thanks so much for joining us. Thanks again for your service.

General Ostrowski, I wanted to touch base on where the modern operational systems for the soldier are going. We know that a soldier can carry about a third of their body weight and as it gets higher, it affects their mobility.

We know sometimes they can carry as much as 100 pounds of gear which does impact their ability to carry out the mission. I do understand though that there is some new technology out there, the squad multipurpose equipment transport, better known as SMET, that is able to carry equipment, munitions, help in that, even carry a wounded soldier. So an addition to that element at the squad level for tactical flexibility and additional capacity.

We all know the benefits of that to me are pretty clear. The Chief of Staff of the Army placed some emphasis and said, listen, we are going to use more of these ground unmanned robotic systems to achieve mission.

Give me a perspective, are there any plans in place to expedite the acquisition of a system like the SMET? Are there things that maybe you could do in the technology demonstration timelines to compress those to get more quickly to acquisition? Give us your perspective on how that's coming together.

General OSTROWSKI. Yes, sir. I will tell you this is basically a modern acquisition success story in terms of the way we are doing business today. Number one, the ability to go out with an other transactional authority [OTA] announcement to an industry that normally would never participate in Department of Defense type initiatives.

So going out to an industry that typically has not had any kind of a contact with us and saying we need your help. The OTAs allow us to do this. That is what we did in July of last year. And we had numerous candidates bring in systems as well as proposals.

We downselected to four of those systems. We are currently at that point right now. We are waiting on the money to come in from the 2018 budget, so thank you very much for getting that through. And so now, as a new start, we can begin that work. So, the bottom line is going forward, we will have another—the intent is to buy 20 systems per vendor of the four vendors that we downselected to.

We will then put those in the field with soldiers to gain soldier feedback. And by first quarter 2019, so at the end of this calendar year, the intent is to downselect to one.

Mr. WITTMAN. Oh, good.

General OSTROWSKI. From there, we are going to buy approximately 60 systems. And we are going to put those out either at either Fort—I would say—hang on, just half a second—yes, bottom line is we are going to put that out at Fort Drumm or Fort Campbell.

Mr. WITTMAN. Yes, yes.

General OSTROWSKI. And the intent there is to have those in the field for approximately one year during which time soldiers will be able to get feedback on them. We will get feedback on them and then have the opportunity to then make a downselect decision to whether or not it is good enough as it is or whether we want to improve it with intention of award right after that.

So, again, the opportunity to go faster and get the capability that we know soldiers will want at the end of the day. And that is just the ground side. There is other opportunities as well through aerial vehicles and the rest that we are looking into because it is all about reducing soldier load.

Mr. WITTMAN. Okay.

General MURRAY. Sir, if I could add.

Mr. WITTMAN. Sure. Yes.

General MURRAY. Just really under—all right, just really quickly and I think the time—I agree with him, I think the timing is really part of the good-news story. So and this was in the case of—for developmental activity, this is was a directed requirement, because we knew what we wanted. We knew what was available industry-wise from technology standpoint.

So instead of going through a 5-year requirements process, we just wrote the requirement, got it out to industry, and 16 months later, 6 months of that being the CR [continuing resolution] that we couldn't get started.

Mr. WITTMAN. Yes.

General MURRAY. I mean we are ready to field capability to our soldiers right now.

Mr. WITTMAN. That is great. That is great.

Lieutenant General Walsh, I wanted to talk a little bit about the modernization efforts in the Marine Corps. About 29 percent of the resources for modernization are being utilized by the ground combat and tactical vehicle strategy. And the investment priority there is with the ACV.

And we know that you are at Milestone C now looking for a downselect to be able to get that vehicle operationalized. So it looks like ACV is on the near horizon. As you know in the whole tactical back and forth about forceful entry, speed and surprise are important elements of that as you are looking at that.

And we know that there are some technologies out there that allow for greater resolution in early detection of things that may be coming to shore. We know even groups, even non-state actors like Hezbollah now have pretty sophisticated radar-guided missiles out there. So that all creates a little more of a challenge in the contested environment there. There is always tradeoffs as you—the Marine Corps has been through in looking at speed and capability with those vehicles and mobility, obviously on land. So how do you have the right combination of both?

Are you concerned as you look at this right mixture of ACV range and speed within that highly contested environment, do you think you have the mix right? And how have the ACV prototypes performed so far in this particular environment? Are you satisfied where things are when you get to the downselect?

General WALSH. Thank you, Congressman. I will start with the last part of it is so far we have been very pleased with the two vendors in what we are getting out of those capabilities. The ACV 1.1 capability was supposed to be just a ship-to-shore capability from a threshold requirement. And we see the vendors, both vendors meeting the objective capabilities.

So, in many ways they are exceeding what we already have in our AAV [amphibious assault vehicle] capabilities. Now, with the tradeoffs of the capabilities you talked about as you are well familiar with is trying to go fast. We weren't willing to trade off a lot of those capabilities to be able to be protected, maneuver, and have lethal firepower when we get ashore.

So we have developed through a non-developmental program with the two vendors. We are looking forward to the Milestone C

decision in June. But the larger part of your earlier question is what we have really been working on in this contested environment is we are going to have to operate differently.

It is not all about AMTRACs on line coming ashore. It is much more into what you were just talking about, sensing the battle space, deception, jammers in that area. And we have been doing a lot of work in that area.

Last year, we had our advanced naval technology experiment that was focused completely on ship-to-shore maneuver. And in that ship-to-shore maneuver, the majority of the first parts of the landing operations were all unmanned systems, whether they were in the air, on the surface, and under the surface.

Many of the capabilities that we saw we learned from, as you are very familiar with the Naval Undersea Warfare Center up in Rhode Island. We got capabilities from them that now a lot of our reconnaissance forces that we have rapidly prototyped that we are now using for swarming hydrographic capabilities to be able to sense as we come ashore.

So I think this unmanned area is going to take us into many different areas to be able to do deception, but the key part is not conducting operations the way we have in the past.

Mr. WITTMAN. Thank you, Mr. Chairman. I yield back.

Mr. TURNER. Mr. Gallego.

Mr. GALLEGO. Thank you, Mr. Chair. The budget request is going to be an increase of over 82 percent for long-range precision fires capable of up to 400-kilometer shots. The development of such technology is critical as we build the next-generation conventional deterrence, especially when looking at Korea and Europe.

What is the expected timeline for R&D and fielding of this technology to the best of your ability?

General OSTROWSKI. Yes, sir. The bottom line is the precision strike missile which it is now being called as opposed to the long-range precision fires, is in OTA as well. So we have two competitors, both Lockheed Martin as well as Raytheon, that are competing for this.

The first time we will have an opportunity to see where we are at is the fourth quarter of 2019 when each of the vendors will provide four missiles to us of which we will fire three. Depending on the results of that, again, where the intent is to fire those at max range, so the 499.

Depending on the results of that we intend to expedite the delivery of the system much faster. Originally, it was 2025. We are thinking more like 2022. But it will all depend on the fourth quarter 2019, when we get the results of the test.

Mr. GALLEGO. Anything to add, gentlemen?

General WALSH. The only thing I would add on that, working very closely with the Army on how to increase longer range capabilities coming out of our HIMARS [High Mobility Artillery Rocket System] capability. But the other piece too is we have got about \$20 million of RDT&E in 2019 to be able to look at how we can integrate a much quicker capability, commercial off-the-shelf capability for an anti-ship missile capability that in the long term working very closely with the Army in 2020 and beyond in the long-

range fires capability for anti-ship that is also capable of on-land capabilities.

Mr. GALLEGO. Excellent. So to kind of latch on to that theme. I understand some of the testing for these systems will go on in Arizona, good choice, at the Yuma Proving Grounds. Is there adequate space to test the long-range shots both at Yuma and at White Sands Missile considering we are dealing with some rather long distances?

General MURRAY. Yes, sir. There is more than sufficient range at both those locations to test this.

Mr. GALLEGO. Okay. Let me move on into the tactical network modernization. The Army is requesting nearly \$500 million in new—again, tactical network technology modification line. What is the intent of this line? And in other words what does it buy? What is it bringing us?

General MURRAY. So you—thank you, sir. I believe you were briefed last fall on the network modernization. You were very familiar with the halt, the fix, and the pivot. So the network modernization modification line really does two things for us.

Number one is that it is primarily focused on fix. So we have halted three specific programs, which you are very aware of and then the fix piece is to fix the current baseline. Our current baseline is WIN-T Inc 1b in some of the force fielded with WIN-T Inc 2 on-the-move capability.

So it is to finish the fielding of the Inc 2 stuff that we have already purchased that will go on through 2018, so it is fielding the light gear to the light infantry units primarily. Cascade of heavier equipment to some Strykers and not all of them into the ABCTs is to accelerate the common platform we are going to use across all formations to include the ABCTs, the Joint Battle Command-P, the JBC-P.

And then it is also to do some experimentation with the CFT [cross-functional team] looking at what we are calling the integrated tactical network. And I think the thing that is exciting about this is when we developed networks in the past, we start at the top and make it fit, small units, companies, platoons, battalions.

And we are starting at the bottom and scaling up in this case. We are making sure it works at the platoon, company, battalion level. And right now, in 2018, if the money is made available, we intend to look at an IBCT [infantry brigade combat team] and ABCT and SBCT [Stryker brigade combat team] and do the scalability up.

And this is mostly—it is almost solely modified commercial off-the-shelf gear or SOCOM [Special Operations Command] gear that has already been purchased and proven.

Mr. GALLEGO. Let us go a little deeper. What are the plans in terms of when it comes to Stryker, are we talking—you said some Stryker, are we talking full brigades or what is the plan in terms of—

General MURRAY. There is not enough of the light gear to go to every SBCT and—a Stryker brigade, we are peer fleeted and some of them will have all have a lighter gear, a few of them and that

is one or two I believe, but I have to get back to you on that, will have the older, heavier gear just like the ABCTs do.

[The information referred to can be found in the Appendix on page 61.]

Mr. GALLEG0. Okay. I yield back.

Mr. TURNER. Thank you. Gentlemen, I am going to have to apologize, both my ranking member and I had conflicts to the end of this. I didn't want you to think that it was you. My ranking member had a memorial service for Member Slaughter. And I have a meeting with the chairman of the committee. So I am going to pass the gavel over to Mr. Banks and call on Mr. Brown. But I appreciate your testimony and your service.

Mr. Brown.

Mr. BROWN. Thank you, Mr. Chairman. I would like to ask the Army and probably General Ostrowski about the future of vertical lift. And future vertical lift, I know that it is I think number three on the priority list, the six priorities for Army modernization according to General Milley. Recently General Tate described the development in a way that the Army is going to spend more time kind of working through issues, identifying requirements during the prototype phase more so than in past fieldings and—or development, and so that this way when you get to the program of record, we are able to deliver an aircraft that is much more adaptable to the changing environment, future requirements, upgrades in technology, et cetera.

If I have mischaracterized, please correct me, but the question is can you give us an update and what is the plan for rapid prototype development? And are there ways to accelerate the ongoing analysis of the alternatives that you are currently considering?

General OSTROWSKI. Yes, sir. I would say that the tech demonstration I believe is what you are talking about right now. It's called the Joint Multi-Role. And, again, this is the way that we should be doing acquisition in terms of being able to inform our requirements.

And we are having industry buy-in. So industries bought in both with respect to Boeing, as well as Sikorsky, and then Bell is a different partner. Each of these particular companies have come forward with their platforms to the tune of about \$450 million worth of spend in terms of industry to the Army's \$90 million per vendor in order to get at a demonstration of these technologies, whether it would be tiltrotor or whether it would be compound coaxial which each of these vendors are providing.

The intent is to have those fly. We have had the Bell flying already. And it continues to fly with respect to its prototype or its experimental version. And then now, we are looking very forward to the summer as we get the Sikorsky-Boeing's compound coaxial up in the air.

From there, sir, the intent is to finish off our analysis of alternatives by the second quarter of 2019, which helps us further refine our requirements and determine what else is out there.

And that allows us to then move into a TMRR, a tech maturity risk reduction, phase of the program in 2021. Depending on what we get and what we see from these two demonstrators, it allows us to make better decisions, better choices with respect to how far

the technology really is. Are these experimental or are they more prototypes? We hope for the latter, but we are concerned that we might not get there in terms of that.

So, again, they might be just experimental as opposed to prototypes. In conjunction with that we have to work with the Marines. We want to work with the Marines in terms of getting our capabilities sets. We need their money as they need ours in order to pull this together. Again, that is going to be requirements tradeoffs between the two services. So exciting program, the way we should be doing business.

Mr. BROWN. [inaudible] that you're experiencing with regard to your rotor-wing fleet. I didn't have the mic [microphone] on. Did you hear me?

General WALSH. Yes, I did. On the rotary-wing side, I think the most challenging ones, we have actually been bringing in new programs with our Yankee Zulu on our H-1s. Obviously, we are still in the last of multiyear for our MV-22s.

Probably the big challenge that we have got, exciting challenge is bringing in our CH-53 Kilo which is the largest, most capability to lift the most of any helicopter that is made. So that right now is in the systems development stage, transitioning those helos up to Pax River for further testing.

But I think that is probably the most—the leading thing that we have got going, we continue to buy out the last 25 AH-1 Zulus this year and 2019. Continue with the MV-22 as the Navy takes on the carrier onboard delivery. We are shifting some of that procurement over to them and then really the CH-53 Kilo is our large aircraft, bringing that in and trying to make sure that that program moves forward.

Mr. BROWN. Thank you. We like more work at Pax River in Maryland. Back to the Army, you may not be able to answer this in the time I have remaining. Futures Command, and I understand that there is currently no budget item specifically requested or allocated for Futures Command, which expects to be stood up by this summer or at least the initial phase. Are you going to reprogram money from other accounts to fund this command?

General MURRAY. We are going to try, sir. And so it's the same thing with the CFTs, when you look at cross-functional teams, when you look at the funding for the CFTs and timing was very much against us on this. If you remember it was last October that the Army announced number one, Futures Command and number two, the eight cross-functional teams in support of the six Army modernization priorities.

And it was December before the cross-functional teams' charters were approved and what it was they were going to work on. So this was last December. We turned in our budget on the second week of January.

So we got into the 2019 budget what we possibly could. And we are really focused on the 2020 budget for both Futures Command, which will go FOC [full operational capability] in that budget, just an IOC [initial operational] capability in 2019 and the cross-functional teams to get after it. And we were very much constrained by time with the 2019 budget.

Mr. BROWN. Thank you, Mr. Chairman. I yield back.

Mr. BANKS [presiding]. The gentleman's time has expired. I yield the next 5 minutes to myself.

General Ostrowski and General Murray, I wonder if you can give us a quick status update on the Army's plan to replace the transmissions in the Bradley family vehicles and armored multipurpose vehicle programs.

General OSTROWSKI. Yes, sir. The intent there with respect to your—you are talking about the Bradley A4.

Mr. BANKS. Yes.

General OSTROWSKI. And again, as we make continual upgrades to the Bradley fleet of vehicles, the A3 being the last, which is to currently field the capability, those were suspension upgrades.

And so, we are moving forward now. We have done the research and development and we are now in the process of negotiating the production contract for the upgraded A4 version of the Bradley.

A4 Bradley has an upgraded transmission as well as engine, as well as additional electric power in order to run the systems that we continue to load on to the Bradley in terms of the overall electrical power piece.

So, we are in the process of finishing off those negotiations with BAE [BAE Systems]. And the intent there is to award that contract in the very near future.

Mr. BANKS. Okay. Anything you would like to add?

General MURRAY. No, sir. But I think you said, I mean, there is some confusion about a replacement transmission. Right now, I mean there has been no decisions on anything other than General Ostrowski just mentioned. The upgraded transmission we are working under the A4 contract.

Mr. BANKS. Okay. My next question is for both of you as well. I noticed that in the fiscal year 2019 budget there is a request for Humvee ambulance modernization funding for the second year in a row.

However, there aren't any funds also requested for non-armored Humvee modernization. So I wonder if you can comment on both of those and in your professional military opinion if that is the best way forward.

General MURRAY. So, yes, sir. And thanks to Congress we have been very successful at upgrading this very specific version of our Humvee, the up-armored ambulance and thanks to the graciousness of Congress, the National Guard and the United States Army Reserve are complete with that modernization.

We began a program last year. Congress added some money to it, do the Active Component, the Regular Army ambulance fleet that we're about 10 percent through and then we have asked more money in 2019. About 6 months ago, we had the decision meeting on the upgrading the Humvee fleet.

In my mind, that is not a question of will we upgrade the Humvee fleet, it is just a question when because as you know the JLTV fleet only replaces about 50 percent of our light tactical vehicle needs. So Humvees will be with us for a long time into the future.

We talked about upgrading, starting with the unarmored Humvee fleet first because that is the oldest fleet, that is about 9 years

of fleet age. We like to keep it below about 12 years, so we are approaching that.

That decision will go to the chief sometime within the next 2 to 3 months and then we expect to quickly follow that on with what we want to do with the up-armored, the armored fleet Humvees. And then, again, in my opinion it is going to be just a question of when, not necessarily if.

General OSTROWSKI. Sir, I will just add that we are poised from an industrial base perspective, with our public/private partnership with AM General as well as Red River in Rock Island in order to press forward should the decision be made to get after the recap [recapitalization] of the Humvees.

Mr. BANKS. Okay. Thank you. My last question for all four of you, could you maybe address or talk for a moment about how you are addressing the systematic challenges of the redistribution of equipment overcoming the growing capability gap between the Active Component and Reserve Component?

You talked a moment ago about the Reserve Component in my previous question, but as the Reserve Component becomes—units become more of a pit stop for divestiture, what are we doing to address those types of issues if that make sense?

General MURRAY. Yes, I think there is really two pieces of that, sir, if I could. So equipment on hand is the amount of equipment, actually there are three. The equipment on hand is the equipment they have. We call it the UH rating.

We have made great strides during the course of the war to where the National Guard and United States Army Reserve are almost at parity with the Regular Army in terms of the equipment that they need on hand.

The piece as you refer it, and there is also the dual-use equipment. So in their State mission and their Federal mission, we are in very good shape on that. Where the U.S. Army Reserve and the Army National Guard are lagging somewhat, although we have started—we have closed this gap over the last 10 years—is in the most modern equipment available. And that is primarily because we have focused our most modern equipment on the next deploying units.

So regardless of component, whether it was a Reserve unit, a Guard unit or an Active Component unit, we put the equipment in the hands of that deploying unit, which often got left in theater for follow-on forces and become theater-provided equipment which has set us back a bit. But we are very focused on closing that gap to modernize equipment and there are three components.

Mr. BANKS. I have 7 seconds left. Would anybody from the Marines like to comment on that?

General WALSH. Very quick. Congressman, I would say we look at it from a total force perspective. We deploy our Reserve units all the time to fill for Active units, so we try to maintain the same capabilities across both the Active and Reserve force.

Mr. BANKS. Okay. My time has expired. I yield to Mr. Carbajal.

Mr. CARBAJAL. Thank you, Mr. Chair, and thank you all for being here today.

The budget request for fiscal year 2019 includes an Army request for \$47 million to procure 133 ground mobility vehicles [GMVs],

which are fairly small, unarmored Jeep-like trucks, for a unit cost of \$271,000 each. Twice what a typical Humvee costs. Fiscal year 2018 budget included a request for 100 vehicles of the same type for \$260,000 each. For these procurements the Army has proposed doing a sole source contract award to procure a modified version of the Special Operations Command vehicle.

The Army, based on an urgent needs statement, plans to procure 5 brigade sets totaling about 300 vehicles via the sole source contract with the plan for a competition in the future to buy more.

General Murray, do you think the cost per vehicle for more than \$270,000 each is warranted? I ask because there appear to be several commercially available vehicles on the market for much less.

And the Army already has large numbers of unarmed Humvees that meet most of the requirements for this vehicle. Simply put, are we going to spend more than we should?

General MURRAY. Sir, on the GMV and if you don't mind, I will start with the sole source contract. So, in our opinion that is not true. We bought off an existing SOCOM contract, so the SOCOM was buying this vehicle.

They had headspace in their contract. This contract was competed prior to us buying off this contract. So we leveraged the SOCOM specifications. We leveraged the SOCOM open competition that this vehicle went through before we bought off the headspace in their contract.

So in our opinion it is not a sole source contract, that we are buying off the SOCOM contract. The primary consideration for this vehicle when the decision was made to go with the SOCOM contract was speed for, as you stated, five airborne IBCTs.

The full and open competition which has funding in 2019 to complete is for 30 IBCTs. Is the 270 high? It is higher than some of the options on the market. But this was the fastest way to get this requirement to the field because the competition was done, the EMD [engineering & manufacturing development] phase was done. The downselect was done, so a lot of the things that takes up those years to get to a—what it is you are going to buy was done by SOCOM before we opted to buy off that contract.

Mr. CARBAJAL. Thank you very much.

General Ostrowski, is there detailed records about the decision-making process that led to what was articulated by General Murray?

General OSTROWSKI. Yes, sir. We certainly documented that. I do have the SOCOM contract. I do have the modifications to the SOCOM contract that we can certainly make available to you.

How it was competitively awarded. How we modified that contract in order to reduce the cost of vehicle because we didn't need all of the components that SOCOM had on that vehicle. All the bells and whistles we didn't need because again, what we needed was a capability to move in a period of darkness from a drop zone to a landing strip at the speed that is faster than the boot. And so hence, the five airborne brigades to start with.

The key thing here, sir, is that the competitive piece of this is going to be where industry is going to have the opportunity to really get after. Right now, we are going to have vehicles in the field in 2018 going off the SOCOM contract. Otherwise, we would not

have had vehicles in the field until 2020. The intent is with the award of the competitive contract, as General Murray alluded to, the intent is to bring that forward and have the ability for the other 30 brigades to have a capability, again, competitively awarded, but we hope at a much cheaper price.

Mr. CARBAJAL. Thank you very much. I look forward to getting that from you in writing if possible.

Mr. Chair, I yield back.

Mr. BANKS. The gentleman yields. And being in the chair has its privileges, so I am going to yield another 5 minutes to myself. And back to you, General Murray and General Ostrowski. I wonder if you could talk—there has been some confusion about the objective of the next-generation combat vehicle program.

And I wonder if you can talk about that for a moment. How the Army is balancing its investments in incremental upgrades for current vehicle systems versus next-generation capabilities.

So, General Murray.

General MURRAY. So that is the fundamental dilemma, sir. I mean you just hit it right on the head right there. And it is beyond next-generation combat vehicle. I mean that is the inflection point that I talked about or the decision point where the Army is.

It is not so much stress in 2019 because of the newness of the CFTs at that point, but in 2020 as we build it, it is how you balance that investment between current, the incremental upgrades for the near term and where you start investing heavily in future capability because the period in between when you can start fielding new and when you stop upgrading old is risk, that you are really saying that the current fleet is good for X numbers of years, whenever you can cut into that new system.

Next-generation combat vehicle has been described in a variety of ways and I go back to the original construct that I have heard briefed by General Les Brown to both the Chief and the Secretary and it is really along two paths.

And we really won't know where we are going until we do some of the experimentation, prototyping, the early evaluation by soldiers, which is one of the most important aspects of the CFTs is get equipment into the hands of soldiers early and often throughout the process, we can get their deliberate feedback before we write a requirements document. There is no requirements document written for next-generation combat vehicle.

But the path we are on right now basically is two fundamental paths. A manned variant of some size, shape that would carry probably a couple crewmen and up to five or six soldiers in the back, that it has to be manned or unmanned at the commander's call at the point of decision whether you send a vehicle forward unmanned for instance into a breach. You probably want to send an unmanned vehicle or you actually crew that vehicle. And then the second path is remote combat vehicles that could be tele-operated from the manned version.

And so, one manned vehicle, tele-operated to robotic combat vehicles. That is fundamentally the two paths that the NGCV cross-functional team is working down.

General OSTROWSKI. I will just add, sir, there is really three sprints as General Murray talked about with respect to the two dif-

ferent variants. The first sprint is going to take place between now and the fourth quarter 2019.

And the opportunity there is to gain knowledge from some of these experimental demonstrators that we have, then to conduct another sprint. Add in additional technologies between now and 2021, so the second quarter of 2021 will end the second sprint.

Again, with soldiers. Getting feedback. Making use of existing technologies as well as future technologies. And then a final sprint, which gets us to the fourth quarter of 2023. Again, incorporating lessons learned, incorporating the technologies that come to bear and the rest of it in order to get to a decision point in 2023 of where we go from there.

General MURRAY. And if I could just add real quick. So, I mean one of the key things of this is we won't get everything we want by whenever it is we field this. So building in the ability to add more capability as we go to upgrade the vehicle like we have done with the tank and the Bradley. So building in the size, the electrical capacity, the ability to add new technologies to it as we grow this vehicle.

Mr. BANKS. Can you elaborate on the cost?

General MURRAY. In NGCV, I have got it right here. So right now there is \$165 million in 2019 RDT&E.

Mr. BANKS. What about through 2023?

General MURRAY. That—I am sorry, sir. Pushed the wrong button. It is all pre-decisional. So that is what we are working right now on the POM [program objective memorandum] build.

Mr. BANKS. Okay. Thank you very much.

Thanks to each of you. This has been very informative just in the brief time that I have been here today as we near the NDAA period. So we appreciate your testimony and your participation.

The hearing has adjourned.

[Whereupon, at 4:09 p.m., the subcommittee was adjourned.]

A P P E N D I X

APRIL 18, 2018

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 18, 2018

Statement of the Honorable Michael Turner
Chairman, Subcommittee on Tactical Air and Land Forces
Hearing: Ground Force Modernization Budget Request for Fiscal Year 2019
April 18, 2018

The hearing will come to order.

The Subcommittee meets today to review the Army and Marine Corps ground force modernization programs and the fiscal year 2019 budget request.

I'd like to welcome our witnesses:

- Lieutenant General John Murray, Deputy Chief of Staff, G-8 and principal military financial advisor for Army program development and justification;
- Lieutenant General Paul Ostrowski, Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology;
- Lieutenant General Robert Walsh, Deputy Commandant of the Marine Corps for Combat Development and Integration; and
- Brigadier General Joseph Shrader, Commanding General, Marine Corps Systems Command.

Thank you each for your service to our Nation.

Today the subcommittee will review a broad portfolio of ground force equipment modernization programs and their associated acquisition strategies covering over \$40.0 billion in budget authority.

Our focus today is to conduct oversight on how the budget requests for these modernization programs and acquisition strategies are aligned with the new National Defense Strategy and how they will begin to restore full-spectrum operational readiness.

Last year during a similar subcommittee hearing, General Murray testified that “the Army has nearly half of the funding for modernization and equipment that it had just 8 years ago,” and the Marine Corps stated that “between fiscal year 2012 and fiscal year 2016, Marine Corps spending on ground procurement decreased by 48 percent in its base budget.”

Essentially the Army was “outranged, outgunned and outdated,” and the Marine Corps was out of balance and required accelerated modernization to maintain overmatch capabilities.

The National Defense Authorization Act for Fiscal Year 2018 and the bipartisan budget agreement for fiscal years 2018 and 2019 sets the necessary conditions to start the long process of repairing the damage resulting from years of combat operations compounded with deferred modernization.

We all acknowledge this damage did not occur in a single year and it will take consistent levels of long-term increased investment to rebuild.

The Army's modernization budget request for this year represents a 22 percent increase over last year's modernization budget request. I'm pleased to see

the Army is requesting enough funding to modernize one and a half armored brigade combat teams as opposed to last year's plan that modernized only half of the requirements for one complete ABCT.

The Marine Corps procurement request for ground equipment this year is \$2.9 billion, which if enacted, would be an 80 percent increase over last year's budget request of \$1.6 billion.

So it does appear that the Army and Marine Corps are taking the necessary steps to accelerate modernization and mitigate existing capacity shortfalls and capability gaps.

For example, the Army has identified six modernization priorities that include Long-Range Precision Fires, Next-Generation Combat Vehicles, Future Vertical Lift, Army Network, Air and Missile Defense, and Soldier Lethality.

To help streamline procurement of these capabilities, I understand the Army has also established eight cross-functional team pilot programs to expedite the requirements process and accelerate these priorities.

The subcommittee expects to hear how the fiscal year 2019 request is addressing these modernization priorities and better understand program schedules and fielding timelines that will enable acceleration of these capabilities to the soldier.

As a follow-up to the Subcommittee's hearing from last September on Army tactical network modernization, we expect our witnesses to provide additional details and justification underpinning this new strategy and how the fiscal year 2019 request enables it.

The National Defense Authorization Act for Fiscal Year 2018 also directed the Army to develop a long term modernization strategy. Today is a good opportunity for the witnesses to provide us with an update on where the Army is at with developing this strategy.

From a Marine Corps perspective, this year and next will represent critical milestones for the Amphibious Combat Vehicle program, the CH-53K heavy lift helicopter program, as well as accelerating ground based air-defense initiatives. We expect to receive updates on all three of these issues today.

In summary, we cannot dig ourselves out of this readiness and modernization hole in just a couple of fiscal years or NDAA cycles.

I want to again place emphasis on what I said during last week's subcommittee hearing. We are experiencing a crisis in military readiness.

Over the last three and a half weeks we have witnessed a series of aviation accidents where 16 service-members have tragically lost their lives.

Many of these tragic events are a result of lack of training hours due to constrained resources and/or the current state of aging equipment; all of which resulted from years of underfunding our military, and clearly shows the magnitude of the problem we are dealing with.

This increase in modernization funding is absolutely required to maintain our comparative advantage against strategic competitors and improve overall readiness. However, with this increased funding comes added responsibility. If we

are to sustain higher topline defense budgets we need to be assured that the military services and industrial base can execute the funds Congress authorizes and appropriates.

The bottom line is we have to get this right and we have to do it now.

I understand General Murray will provide opening remarks for the Army, followed by General Walsh who will provide opening remarks for the Marine Corps.

Without objection, each of the witnesses prepared statements will be included in the hearing record.

RECORD VERSION

STATEMENT BY

**LIEUTENANT GENERAL JOHN M. MURRAY
DEPUTY CHIEF OF STAFF OF THE ARMY, G-8**

AND

**LIEUTENANT GENERAL PAUL A. OSTROWSKI
MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY
FOR ACQUISITION, LOGISTICS AND TECHNOLOGY**

BEFORE THE

**SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES**

ON

ARMY MODERNIZATION

**SECOND SESSION, 115TH CONGRESS
APRIL 18, 2018**

**NOT FOR PUBLICATION UNTIL RELEASED BY THE
COMMITTEE ON ARMED SERVICES**

INTRODUCTION

Chairman Turner, Ranking Member Tsongas, distinguished Members of the House Armed Services Subcommittee on Air and Land Forces, thank you for your continued support and demonstrated commitment to our Soldiers, Army Civilians, Families, and Veterans. On behalf of our Army Secretary, the Honorable Mark Esper, and our Chief of Staff, General Mark Milley, we thank you for the opportunity to appear before you today. We look forward to discussing the Fiscal Year 2019 Army Modernization Budget Request with you.

Modernization is critical to the future of our Army. For the last several decades, the U.S. Army possessed overmatch based on its qualitative edge in capabilities. It enabled our Army to defeat enemy formations, underpinned credible deterrence, and served as a critical pillar of Joint Force capabilities in all domains – air, land, maritime, space, cyberspace, and the electromagnetic spectrum. Now, a combination of strategic, technological, institutional, and budgetary trends places at risk the Army's competitive edge over near-peer adversaries in the next fight.

The Army has reached an inflection point: we can no longer afford to choose between near term readiness and modernization and, specific to modernization, we can no longer afford to choose between improving our existing systems and developing new ones - we must be able to do both. The American people expect their Army to win, and meeting this expectation requires the Army to maintain overmatch against emerging threats and adversaries. While we continue to work hard to improve our readiness, we are now expanding our focus on a dedicated and robust modernization effort. As you know one of the most critical elements in achieving this objective is sufficient resources. We believe that the Fiscal Year (FY) 2019 Budget Request reflects the President's commitment to restoring the military, especially in the case of Army modernization.

Building on the FY18 President's Budget, we believe this budget will continue to reverse the downward trend that has stifled Army modernization and serve as an important step towards expanding and maintaining overmatch. We will seek to employ these funds in the most efficient and effective manner by turning ideas into actions through continuous

experimentation and prototyping, reforming our acquisition processes, leveraging technology, and improving training. Our purpose is simple: ensure that future generations of American Soldiers remain the most lethal fighting force in the world.

THE URGENCY OF MODERNIZATION

The Army's focus on the demands of ongoing campaigns combined with constrained resources and an industrial age organizational model has slowed, deferred, and in some cases, halted the development of new capabilities. Meanwhile, our adversaries have, or are quickly attaining, a competitive advantage. Moreover, the character of war has changed, and the Army must adapt and innovate faster. The Army is engaged in a protracted struggle to out-innovate future competitors, and right now, we are not postured for success. If the Army does not modernize its force to expand and maintain overmatch, we face the potential of being out-matched in high-end conventional combat.

MODERNIZING THE FORCE

The Army Modernization Strategy has one focus: make Soldiers and units more lethal so they can fight and win our Nation's war. It is established upon a vision for the Future Army and the challenges of balancing near-, mid-, and far-term investments. To provide a comprehensive plan for modernization, the Army establishes and aligns modernization objectives and organizations to orient on potential military peers for the current, next, and future fights that span across and beyond the Future Years Defense Program. All of this must be done within a 21st Century system that provides for unity of effort and unity of command in support of the modernization process and allied interoperability from the outset.

As our draft strategy lays out, first and foremost, we must return to mastering the fundamentals of shoot, move, communicate, protect, and sustain better than any potential adversary. In the near-term, the Army will invest in capabilities that address critical gaps and improve lethality to expand and maintain overmatch against China and Russia. In the mid-term, the Army will develop, procure, and field next generation capabilities to fight and win in Multi-Domain Battle. In the far-term, we will build an

Army for a fundamentally different conflict environment – one that will require us to exercise mission command across dispersed and decentralized formations, leverage disruptive technologies at the small unit level, and operate with and against autonomous and artificial intelligence systems, all at an accelerated speed of war.

To accomplish these objectives, this year we plan to selectively upgrade the equipment we have and focus our Science and Technology and Research, Development, Test and Evaluation funding on the six Army Modernization Priorities. The six prioritized capability areas naturally align with the Army fundamentals of shoot, move, communicate, protect, and sustain.

Our first modernization priority is to restore the Army's Long Range Precision Fires (LRPF) capabilities in order to regain our dominance in range, lethality, and target acquisition.

- Within the FY19 budget the Army will expedite development of a long range precision missile, which will have a range of up to 499 kilometers, through competitive prototyping and flight demonstrations which will allow for fielding of an urgent material release variant three years prior to full material release.

The Army will also:

- Increase capacity to produce improved Army Tactical Missile System (ATACMS) missiles to extend service life until the new LRPF missile can be developed and fielded.
- Develop an Extended Range Guided Multiple Launch Rocket System that extends range and improves guidance systems to increase the lethality for specific targets at increased ranges.
- Focus LRPF Science and Technology critical technology efforts on such areas as propulsion for extended range missiles; extended range cannon artillery; enhanced guidance/navigation for weapons; advanced energetics; and advanced warheads for area effects munitions.

Our second modernization priority is Next Generation Combat Vehicles (NGCV). A next generation vehicle is needed to enhance Soldier protection, increase mobility, and make our forces more lethal.

- Army Combat Vehicle Prototyping focuses on the development of the next generation combat vehicles. The FY19 funding supports concept development, prototyping and demonstration of combat vehicles (both manned and unmanned) to assess future concepts and designs.

Separate from the NGCV effort the Army is making significant investments to improve the platforms and increase the production of Ground Systems. We will:

- Significantly increase production of M1 Abrams and M2 Bradley Fighting Vehicles over the Future Years Defense Program, which will enable the procurement of five ABCTs' worth of combat vehicles in the next five years; previously, the Army planned to fund the modernization of one BCT every 2.5 years
- Incrementally upgrade the Abrams, Bradley and Stryker platforms resulting in more lethal, survivable and mobile combat vehicles; by upgrading our individual vehicle capabilities, the Army ensures that our brigade combat teams will be equipped with the technology necessary to maintain near-term overmatch.
- Prototype Mobile Protected Firepower to provide protected, long-range, direct fire capabilities to the Infantry BCT to ensure freedom of maneuver and action in close contact with the enemy.
- Increase quantities of next generation ground vehicle capabilities – Armored Multipurpose Vehicles and the Joint Light Tactical Wheeled Vehicles.

Our third modernization priority is Future Vertical Lift (FVL) platforms – reconnaissance, attack, assault – that are survivable on the modern and future battlefield.

- The Joint Multi-Role demonstrator, the initial FVL effort, is focused on restoring vertical lift dominance with next generation agility, reach, protection, lethality, and

mission flexibility. Future systems should also benefit from improved power generation, autonomy, artificial intelligence, and manned-unmanned teaming.

The Army will also:

- Continue development of the Improved Turbine Engine in order to increase payload, range, fuel efficiency in our existing AH-64 and UH-60 fleets.
- Develop and field lightweight precision munitions (LPM) for light targets requiring precision as an alternative to Hellfire missiles, as well as begin to field the Joint Air-Ground Missile (JAGM).
- Sustain production of AH-64 Apache and UH-60 Blackhawks through multi-year contract execution, while developing the next generation of CH-47 Chinook helicopters.
- Develop and field the Advanced Threat Detection/Common Infrared Counter Measure (ATDS/CIRCM) and modernized radar warning receiver (MRWR) to improve our 'detect and defeat' capability.

Our fourth modernization priority is to modernize the Army Network. We must have a communications system that is intuitive, mobile, expeditionary, reliable and can be used to fight cohesively in contested cyber and electromagnetic environments.

The Army will:

- Accelerate and procure fleet the Joint Battle Command-Post (JBC-P) capability.
- Realign WIN-T Incr 2 funding to support Army's "Halt, Fix and Pivot" network strategy.
- Procure Handheld Manpack Small Form Fit (HMS) Manpack, 2-Channel leader Radio and Nett Warrior capability for four BCTs.
- Procure and Field COTS like unique line of sight and beyond line of sight rapid deployable communications capability to 3 Security Forces Assistance Brigades (SFABs).
- Equip Cyber protection teams with deployable kits and deployable tools to defend the network and operate in Cyber space.

Our fifth priority is to modernize and restore our Air and Missile Defense (AMD) systems to ensure our future combat formations are protected from modern and advanced air and missile delivered fires – including drones.

- Within this category, the Army's number one priority is to procure four battalions of the Interim Maneuver-SHORAD (IM-SHORAD) capability by FY22. IM-SHORAD adds a mounted capability but we also need to improve the dismounted capability and will start doing so in FY21.

We will also:

- Field Block 1 Stinger missiles that deliver improved performance against unmanned aerial systems and fill the SHORAD capability gap until the IM-SHORAD is fielded.
- Produce Patriot Missile Enhancement Segment missiles with improved performance against advanced threats and continue to pursue a significant upgrade effort for the Lower Tier AMD Sensor.
- Focus AMD Science and Technology on critical technology to include opportunities for technology insertions. Areas of Science and Technology focus include smaller and cheaper missiles; high energy lasers; advanced seekers; and advanced energetics and propulsion.

Finally, we must aggressively enhance Soldier lethality, a holistic series of capabilities that span all fundamentals including shooting, moving, communicating, protecting, and sustaining. Two areas to highlight include:

- Accelerating the Squad Designated Marksman Rifle to increase squad lethality at ranges from 300-600 meters and serve as a bridge to the Next Generation Squad Weapon (NGSW).
- Procuring an initial quantity Enhanced Night Vision Goggles-Binocular to provide dismounted Soldiers the immediate capability to operate in 0 percent illumination, such as in underground facilities.

The Army will also:

- Develop the NGSW to improve probability of hit and incapacitation as well as reduce weapon and ammo weight.
- Demonstrate the Squad Multipurpose Equipment Transport (SMET), which will aid a nine-man squad by carrying up to 1,000 pounds of equipment and supplies and generating 1KW-3KW of power for a 72-hour mission.
- Focus Soldier Lethality Science and Technology concept development and exploration into areas such as Fused Integrated Mobility Device/Heads Up; Hostile Fire Locator System; Integrated Head-borne System; Advanced Fire Control Technologies; and human-system interfaces that increase small unit standoff distances, enhance situational awareness to deny and surprise adversaries.

To implement this strategy, the Army is currently undertaking a series of acquisition reform efforts designed to promote unity of effort, unity of command, efficiency, cost effectiveness, and leader accountability. Part of this effort is the work of a three-star-level task force responsible for mapping out options to consolidate the modernization process under one command. To develop and deliver better solutions faster, the early integration of concept and testing will allow the Army to fail early and cheaply as we experiment, prototype and test, thus increasing the probability of success by learning from early failures. Critical to this effort is the establishment of Cross-Functional Teams (CFTs) for each of the identified modernization priorities. Each CFT will incorporate elements from acquisition, testing, resourcing, and capability development communities and directly report to Army senior leaders.

THE DEFENSE INDUSTRIAL BASE

The past trends of constrained resources in the Army's modernization account have led to significant challenges for the Defense Industrial Base (DIB). When developing our equipment modernization strategy, we have carefully assessed risk across all portfolios to ensure balanced development of new capabilities, incremental upgrades to existing systems, and protection of critical capabilities in the commercial and organic elements of the DIB.

The Army remains concerned about the preservation of key skills and capabilities in the engineering and manufacturing bases for our original equipment manufacturers and their key supplier bases. To assist our industry partners to address manufacturing and producibility risks, the Army supports efforts such as the Army Manufacturing Technology Program, Foreign Military Sales, and Direct Commercial Sales.

The Army continually assesses risk in the Industrial Base across all Army portfolios to identify fragile and critical sectors within the DIB, and facilitate risk mitigation strategies. The Army also continually assesses the health of the organic industrial base (OIB), including our depots, arsenals, ammunition plants, munitions centers, and Government-owned Contractor-operated plants. The Army maintains critical skill sets in our OIB and continues to modernize our OIB infrastructure, as needed, to support readiness.

IN CONCLUSION

We sincerely appreciate the opportunity to address the challenges the Army faces in modernizing its force. Building on the FY18 President's Budget Request, the FY19 request continues to reverse the downward trend in modernization funding. However, we must stress that a major increase in modernization this year will not, by itself, reverse the trend. We must have timely, predictable, sustained, and adequate funding across the Future Years Defense Program and beyond.

The budget request provides us the opportunity to build our force through key modernization efforts. As importantly, Army's senior leaders are committed to being good stewards of our Nation's resources while meeting the equipping and modernization needs of our Soldiers.

Mr. Chairman and distinguished Members of this Subcommittee, we sincerely appreciate your steadfast and strong support of the outstanding men and women in uniform, our Army Civilians, and their Families.

Lieutenant General John M. Murray
Deputy Chief of Staff, G-8

Lieutenant General Murray was commissioned as an Infantry officer in the U.S. Army upon graduation from the Ohio State University in 1982. Throughout his career, Lieutenant General Murray has served in leadership positions and commanded from Company through Division, with various staff assignments at the highest levels of the Army.

Lieutenant General Murray has held numerous command positions. His command assignments include: Commanding General Joint Task Force-3; Deputy Commanding General–Support for U.S. Forces Afghanistan; Commander Bagram Airfield; Commanding General 3rd Infantry Division at Fort Stewart, Georgia; Commander, 3rd Brigade, 1st Cavalry Division, at Fort Hood, Texas while serving in Operation IRAQI FREEDOM; Commander, 1st Battalion, 18th Infantry, 1st Infantry Division, United States Army Europe and Seventh Army, Germany; Commander, C Company, 1-12th Infantry Battalion, 4th Infantry Division (Mechanized), Fort Carson, Colorado.

Previously, he was the Director, Force Management, the Pentagon; Assistant Deputy Director for Joint Training, J-7, Joint Staff, Suffolk, Virginia; Director, Joint Center for Operational Analysis, United States Joint Forces Command, Suffolk, Virginia; Deputy Commanding General (Maneuver), 1st Cavalry Division, Fort Hood, Texas; Deputy Commanding General (Maneuver), Multi-National Division-Baghdad OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), III Corps, Fort Hood, Texas; Chief of Staff, III Corps and Fort Hood, Fort Hood, Texas; C-3, Multi-National Corps-Iraq, OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), 1st Infantry Division, United States Army Europe and Seventh Army, Germany; Chief, Space Control Protection Section, J-33, United States Space Command, Peterson Air Force Base, Colorado; S-3 (Operations), later Executive Officer, 1st Battalion, 5th Cavalry, 1st Cavalry Division, Fort Hood, Texas; Chief, Plans, G-1, III Corps and Fort Hood, Fort Hood, Texas.

Lieutenant General Murray's awards and decorations include: the Distinguished Service Medal w/ Oak Leaf Cluster, the Defense Superior Service Medal with Oak Leaf Cluster, the Legion of Merit with two Oak Leaf Clusters, the Bronze Star Medal with three Oak Leaf Clusters, the Defense Meritorious Service Medal, the Meritorious Service Medal with two Oak Leaf Clusters, the Army Commendation Medal with Oak Leaf Cluster, the Joint Service Achievement Medal, the Army Achievement Medal with Oak Leaf Cluster, the Ranger Tab, the Combat Infantryman Badge, the Expert Infantryman Badge, the Parachutist Badge, the Air Assault Badge, the Joint Chiefs of Staff Identification Badge and the Army Staff Identification Badge.

Lieutenant General Murray hails from Kenton, Ohio. He and his wife, Jane, have three lovely daughters and seven grandchildren.

Lieutenant General Paul A. Ostrowski
Principal Military Deputy to the Assistant Secretary of the Army
(Acquisition, Logistics and Technology) and Director of the Army Acquisition Corps

Lieutenant General Paul A. Ostrowski graduated from the United States Military Academy in 1985. He earned a Master of Science degree in National Resource Strategy from the National Defense University's Industrial College of the Armed Forces in 2006. He graduated from Joint and Combined Warfighting School at the Joint Forces Staff College in 2000. Additionally, he earned a Master of Science degree in Systems Acquisition Management at the Naval Postgraduate School in 1996.

Lieutenant General Ostrowski has more than twenty-five years of experience in acquisition, operational, and Joint assignments. He currently serves as the Principal Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA (ALT)) and Director of the Army Acquisition Corps. Prior to this assignment, Lieutenant General Ostrowski served as the Deputy Commanding General for Support, Combined Security Transition Command-Afghanistan. He also served as the Deputy for Acquisition and Systems Management, Office of the ASA (ALT) in Washington, D.C., from September 2014 to March 2016. Lieutenant General Ostrowski was assigned as the Program Executive Officer, Program Executive Office (PEO) Soldier at Fort Belvoir, Virginia, from April 2012 to September 2014.

Previous assignments include the Assistant Deputy for Acquisition and Systems Management, Office of the ASA (ALT); Executive Officer to the Commander, United States Special Operations Command (USSOCOM), MacDill Air Force Base, Florida; Director, Operational Test and Evaluation, as well as PEO for Special Programs, USSOCOM; and Program Manager for Counterproliferation, USSOCOM. He served as a Legislative Fellow, as well as Project Leader for the Rapid Equipping Force in both Washington, D.C., and in Iraq during Operation Iraqi Freedom from June 2001 to July 2003. He also served as a Company Grade Officer in several command and staff positions in Joint Special Operations, Special Forces, and Infantry assignments.

Lieutenant General Ostrowski's awards and decorations include the Defense Superior Service Medal (with Oak Leaf Cluster), Legion of Merit, Bronze Star Medal, Defense Meritorious Service Medal (with Oak Leaf Cluster), Meritorious Service Medal (with Oak Leaf Cluster), Army Commendation Medal (with two Oak Leaf Clusters), Joint Service Achievement Medal (with Oak Leaf Cluster), Army Achievement Medal, Afghanistan Campaign Medal with Campaign Star, and NATO Medal. Additionally, he earned the Expert Infantryman Badge, Pathfinder Badge, Parachutist Badge, Air Assault Badge, Scuba Diver Badge, Ranger Tab, Special Forces Tab, and Army Staff Identification Badge.

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COMMITTEE SUBCOMMITTEE ON
SEAPOWER

STATEMENT
OF
LIEUTENANT GENERAL ROBERT S. WALSH
DEPUTY COMMANDANT
COMBAT DEVELOPMENT AND INTEGRATION &
COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND
AND
BRIGADIER GENERAL JOSEPH SHRADER
COMMANDER, MARINE CORPS SYSTEMS COMMAND
UNITED STATES MARINE CORPS
BEFORE THE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
OF THE
HOUSE ARMED SERVICES COMMITTEE
ON
FISCAL YEAR 2019 GROUND FORCES MODERNIZATION PROGRAMS
APRIL 18, 2018

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SUBCOMMITTEE ON SEAPOWER

Marines – Contribution to National Defense

Introduction

As set forth by the 82nd Congress and reaffirmed by the 114th, the purpose of our Corps is to provide maritime expeditionary combined arms air-ground task forces that are “most ready, when the Nation is least ready.” We are a naval force whose mission requires us to be ready – a fight-tonight, forward deployed, Next Generation force – able to respond immediately to emergent crises around the globe either from the sea, forward bases, or home station. The new *National Defense Strategy* (NDS) has further prioritized major power competition, in particular reversing the erosion of the U.S. military advantage in relation to China and Russia. Amphibious forces, in competition against the full range of potential adversaries, have significant roles in three of the four layers of the global operating model (contact, blunt and surge layers). While our organization, training, and equipment must continually adapt to meet changes in the operational environment, our fundamental purpose remains unchanged.

Globally Engaged, Force in Readiness

Combatant Commander (CCDR) demand for Marines and tailored Marine Air-Ground Task Forces (MAGTFs) continues to drive an aggressive operational tempo. We consistently maintain about 35,000 Marines, or one-third, of our operating forces forward deployed across the globe. Our current posture encompasses several global tasks: Marines supporting multiple CCDRs with offensive air support and strikes from our Amphibious Ready Groups / Marine Expeditionary Units (ARG/MEU) afloat; building partner capacity in both Iraqi and Afghan Armies confronting Islamic State and Taliban fighters; providing critical fixed-wing and artillery fire support to coalition-enabled Syrian Democratic Forces as they fought to clear the Islamic State from Raqqa, Syria; providing tailored military combat-skills training and advisor support to foreign forces as part of Marine Corps Forces Special Operation Command (MARSOC); deterring provocations in the East and South China Seas through the forward posturing of 5th Generation aircraft within the Pacific; providing immediate disaster response from our ARG/MEU and Special Purpose Marine Air-Ground Task Force (SPMAGTF) to Americans in the wake of four hurricanes; supporting continued efforts to ensure freedom of navigation through the Bab al-Mandab strait; and enabling full spectrum cyberspace operations while

supporting Joint and Coalition Forces as part of Marine Forces Cyber Command (MARFORCYBER). Marines are continuing to evolve as an inside force by fostering and strengthening relationships with our allies and partners, demonstrated by executing 62 joint, bilateral, and multinational exercises last year.

A Strategy Driven Budget

The National Defense Strategy (NDS) prioritizes major power competition, and in particular, reversing the erosion of the U.S. military advantage in relation to China and Russia. The Marine Corps' FY 2019 budget aligns budget priorities with strategy and guidance enabling the Corps to compete, deter, and win in the future operating environment. The request fulfills DoD and DON objectives by addressing Secretary of Defense direction to increase lethality; resilience; agility; and the building of a flexible and dynamic force. Guided by the NSS and NDS, the Marine Corps made specific decisions about the FY 2019 budget that support a more capable, ready, and efficient force.

The surest way to prevent war is to be prepared to win one under the most difficult of circumstances. Doing so requires new operational concepts, an aggressive approach to force development and a consistent, multiyear investment to restore warfighting readiness. The goal is to field a more lethal, resilient, and agile force. We have focused on preventing and deterring conflict by providing combined-arms task forces to theaters either already in crisis or at the risk of crisis to meet the Congress' mandate to be "...ready to suppress or contain international disturbances short of large-scale war."

As stated, your Marine Corps already provides key elements within three of the four layers of the global operating model described in the NDS – contact, blunt, and surge. Our forward deployed forces are part of the Nation's contact and blunt Layers – that competitive space where the military element of national power preserves the alignment of shared interests with our partners and allies—while the balance of Marine Corps forces are prepared to rapidly deploy as part of the Surge Layer, as one would expect given our role as an expeditionary-force-in-readiness. Our competitors, however, are continuously seeking to challenge us in new ways within the littorals, advancing their ability to locate, track, and attack the naval fleet and associated amphibious forces. Thus, future amphibious contact, blunt and surge layer operations will require many capabilities to allow us to be effective within the most likely future operating

environment. Our wargames and experiments indicate that the current gap in requirements between today's force and the future force is a critical vulnerability.

This statement aims to do two things: 1) Broadly describe how your Marine Corps is adapting to increase its competitive advantage and reduce the vulnerability against pacing threats ; 2) Explain how our ground programs budget priorities for the President's Budget Fiscal Year 2019 (PB19) submission will result in a more lethal force that is better postured to deter conflict, while remaining ready to prevail if one ensues.

Adapting to Increase our Competitive Advantage

Unlike experiences following past major U.S. military campaigns, where the world was generally stable enough that our Corps' overseas commitments decreased in quantity, today's Marines are employed more frequently, more widely, in more complex missions, and in smaller units than ever before. In recent years ARG/MEUs have been forced to operate in an increasingly disaggregated fashion, often times spread out over thousands of nautical miles in order to prosecute varied missions in littoral regions. This disaggregation strains the traditional capabilities of these units as currently organized and forces us to consider a wide variety of future ship mix and type options. Additionally, the proliferation of advanced weapons technologies, mass urbanization and migration, regional conflict and the challenges of the information age all combine to further drive the need for a properly manned, trained and equipped next generation Marine Corps.

Your Marines continue to innovate and build this next generation Marine Corps – a lethal, adaptive, and resilient Corps that implements combined arms and conducts maneuver warfare across all domains,. This transformation began in 2016 with the implementation of the Marine Corps Operating Concept (MOC). The MOC represents our institutional vision for how the Marine Corps will operate, fight, and win despite the challenges described above. While the Corps' fundamental purpose does not change, our concepts – and the organization, training, and equipment changes they drive – must adapt to effectively accomplish it. The MOC provides the foundation and context for subordinate operating and functional concepts – like Littoral Operations in a Contested Environment (LOCE) and Expeditionary Advanced Base Operations (EABO) – and it guides our analysis, wargaming, and experimentation. Further, the MOC drives the evolution of our Service doctrine, organization, training, materiel, leadership and education,

personnel, and facilities (DOTMLPF) through a detailed and thorough Concepts Based Requirements System.

The development and acquisition of long-range precision weapons by our Nation's chief rivals – China, Russia, North Korea, Iran, and Violent Extremist Organizations (VEO) – have placed many of our forward deployed forces within the effective range of their weapons systems, or “threat rings.” Forward deployed and stationed Marines are now vulnerable to attacks in ways we have not considered for decades. Forward positioned forces require a resilient, dispersed basing posture with sufficient forward stockpiles of logistics and a reliable command and control (C2) networks. Conversely, most of our forward bases and stations lack sufficient resilience against long-range kinetic and non-kinetic attacks; thus, jeopardizing our ability to prepare, project, and sustain combat power. Efficiencies in the construction and configuration of these bases, made possible by a previously existing security environment have now created risks to forward deployed forces. The PB19 begins to remedy these problems. Remediation efforts include increased dispersion of our forward elements, additional hardening of our existing facilities, to include aircraft hangars and command posts, the capability to rapidly repair damage to our air stations, effective counters to precision guided munitions and advanced integrated mobile air-defense capabilities. Many of these remedies will also prove effective to sea-based forces and to forces positions on expeditionary advanced bases.

Increasing the Lethality of Our Corps

In addition to increasing the survivability and resilience of our forward forces, we must also strive to make all forces more lethal. Building a more lethal force is not defined solely by hardware; it requires change in the ways the Marine Corps readies, postures, employs, and develops the force. The rapid changes in the character of warfare and the problems presented by current and future pacing competitors create fundamental challenges to ground programs, the associated concepts of employment, and the personnel that will operate the systems. We have discovered that key enablers such as unmanned systems, Manned/Unmanned Teaming, networked sensors/weapons and C2, and AI-enabled systems will all shape the next generation force's lethality. Some or all of these elements will appear in all future ground systems. We must prioritize modernization of ground programs to support our new operating concepts, regain lost

competitive space and fully leverage capabilities that other elements of the MAGTF and the Joint Force are fielding.

Ground Programs Budget Priorities

Modernizing – The Foundation of Our Future Readiness

What we desire to achieve is a Corps capable of exploiting, penetrating, and destroying advanced adversary defenses in all domains in support of naval or Joint Force operations. To do that, we must be afforded the flexibility to experiment with new technologies available on the market, determining what will work best in the future operating environment, and then delivering those capabilities to the force quickly to mitigate the rapid rate of technological change. Our newly chartered Marine Corps Rapid Capabilities Office (MCRCO) accomplishes that end, seeking emergent and disruptive technologies to increase our lethality and resiliency. The MCRCO leverages FY16 and FY17 NDAA provisions and partnerships to accelerate the acquisition process – with the consistent and steadfast support of Congress – we will continue to fund this office. Accelerated modernization is the most effective remedy to our long-term readiness problems and we must abstain from burying our modernization efforts under cumbersome acquisition processes – we have to get this right.

The PB19 investment approach is synched with the implementation of Marine Corps Force 2025, specifically investing in ground systems that enhance our capabilities in areas such as: Information Warfare (IW), Long Range/Precision Fires, Air Defense, Command and Control in a Degraded Environment, and Protected Mobility/Enhanced Maneuver. These capability areas support building a Next Generation Marine Corps across the Active and Reserve components of the force. Additionally we have foundational efforts which are critical to modernization efforts (such as infrastructure, training sustainment, and manpower) that enable that enable our warfighting capabilities. This approach includes changes to the structure of our into equipment sets that balance affordability with the need for a networked, mobile, and expeditionary force.

Information Warfare (IW)

We continue to prioritize the integration of information capabilities throughout the MAGTF. Within the Command Element, investments in the Marine Intelligence Program

allowed the formation of the MEF Information Group (MIG). The MIG establishes IW coordination centers for MAGTF Commanders, filling the IW gap at the operational level. Additionally, we have increased funding to MARFORCYBER to man, train, and equip cyber forces and conduct full-spectrum cyberspace operations. The coordination, integration, and employment of information and cyber capabilities will enable the MAGTF Commander to facilitate friendly force maneuver and deny the enemy freedom of action in the information environment.

The Marine Corps is making rapid progress in the use Small Unmanned Aerial Systems (SUAS). We are currently fielding to every infantry battalion in the Marine Corps SUAS platforms for conducting Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISR), enhancing the reach of current communications equipment, and for use in training for countering enemy UAS platforms. The Marine Corps is using some commercial off-the-shelf systems as well as systems produced through the use of additive manufacturing. Simultaneously, the Marine Corps is advancing the digital interoperability between these systems and digital communications systems in order to synchronize as well as control SUAS platforms.

Long Range/Precision Fires

The Marine Corps must advance its long range and precision fires capabilities. In support of this requirement, we have prioritized the reactivating 5th Battalion, 10th Marines as a High Mobility Artillery Rocket System (HIMARS) unit. Due to reach IOC in FY21, this battalion will expand long range fires capability to II Marine Expeditionary Force based in Camp Lejeune, North Carolina. In addition, we are exploring with the Army the ability to modify Guided MLRS rockets from aboard ships and modifications to the rockets to enable engagement of moving targets.

Technological advancements have also made it possible to operate precision guided munitions at lower echelon units. In this area, the Marine Corps has fielded Loitering Miniature Aerial Munitions (LMAM) as part of an urgent requirement to operating forces for use on the battlefield. Also, in conjunction with ONR is working on the Advanced Capability Extended Range Mortar (ACERM) Future Naval Capabilities (FNC) program. This partnership looks to utilize the existing 81mm mortar tubes to increase range of the system through the development of a precision guided gliding munition. Considering the changes in the complexity of the battle

space and increased congestion due to the increase prevalence of SUAS and LMAMS, the Warfighting Laboratory is experimenting with various air space planning tools and procedures to assist operators in planning and executing of fire missions. They are also exploring the use of SUAS and Radio Frequency geolocation to cue and target threats at increased ranges.

Air Defense

To modernize our air defense systems and capitalize on our current investments in the Ground Air Task Oriented Radar (G/ATOR) and Common Aviation Command and Control System (CAC2S), the Marine Corps is pursuing a Ground Based Air Defense (GBAD) kinetic means to defeat the latest threat. The rapid rise in threat air platforms requires the Marine Corps to rapidly modernize its GBAD capabilities in both Short Range Air Defense (SHORAD) and Beyond Visual Range (BVR). These modernization efforts began in 2017, and will protect our forces from an array of emerging air threats including: unmanned aerial systems (UAS); aircraft; and cruise missiles.

The first of these initiatives is the Marine Air Defense Integrated System (MADIS). MADIS is a maneuverable JLTV mounted short range air defense capability that is being designed to detect, track, identify and defeat emerging threat UAS, as well as Fixed Wing (FW)/Rotary Wing (RW) capabilities. The MADIS program is directly leveraging the Army's Program Director Counter Rockets, Artillery, Mortar (PD CRAM) developmental efforts. MADIS is designed to protect both ground maneuver forces and fixed sites. Future modernization efforts will include integration with G/ATOR and CAC2S as well as beyond visual range systems.

Command and Control (C2) in a Degraded Environment

PB19 invests in our C2 capabilities needed to build the Next Generation Marine Corps that will dominate the information domain.

Critical to the success of the MAGTF ashore is our ability to coordinate and synchronize our distributed C2 sensors and systems. Our modernization priorities in this area are the Ground/Air Task Oriented Radar (G/ATOR) and the Common Aviation Command and Control System (CAC2S). These systems will provide modern, interoperable technologies to support real-time surveillance, detection and targeting and common C2 suite to enable the effective

employment of that and other sensors and C2 suites across the MAGTF.

G/ATOR ensures no other service is more capable than the Marine Corps for controlling MAGTF airspace. It serves as the foundation for Commander, Joint Force Air Component delegation of airspace control to the future MAGTF, and provides MAGTF commanders the freedom of action to employ organic surface and air fires.

CAC2S provides the tactical situational display, information management, sensor and data link interface, and operational facilities for planning and execution of Marine Aviation missions within the MAGTF. CAC2S will eliminate the current stove-piped, dissimilar legacy systems and will add capability for aviation combat direction and air defense functions by providing a single networked system. CAC2S will be the primary C2 system that integrates MAGTF aviation operations with Joint, combined, and coalition aviation C2 agencies.

The MAGTF of 2025 must also improve the networking capability of ground systems. Networking on the Move (NOTM) is being procured to enhance networking among both ground vehicles and aviation platforms. NOTM provides the MAGTF with robust beyond-line-of-sight command, control and communication capabilities while on the move or stationary. Using existing commercial or military broadband SATCOM, this system extends the digital network to Marines at the furthest reaches of the battlefield. This system will enable the distributed Marine forces of 2025.

Protected Mobility/Enhanced Maneuver

Our Ground Combat and Tactical Vehicle Strategy (GCTVS) provides a framework for portfolio management and enterprise decision support. The Marine Corps is investing approximately 29 percent of its modernization resources into GCTV systems within the FYDP. The overarching combat and tactical vehicle investment priority is the modernization of Assault Amphibian capability through the Amphibious Combat Vehicle (ACV) program as the means to incrementally replace the legacy AAV.

The first phase and increment of the ACV program (ACV 1.1) is on schedule for Milestone C decision and down-select to a single contractor in June of 2018. It is successfully performing at or above the required performance parameters with both vendors demonstrating the capacity to meet objective requirements for ship-to-shore water mobility. Both manufacturers have delivered their required number of vehicles and are currently undergoing

rigorous developmental testing including water mobility and under-vehicle blast protection tests as well as operational testing with the user community. ACV 1.1 is on track to meet an FY20 initial operation capability target and has set the conditions for a seamless transition in the production of second increment (ACV 1.2) personnel carriers and supporting mission role variants for command & control and maintenance & recovery. Finally, ACV 1.2 is resourced to also deliver an initial active protection system capability and a lethality upgrade to improve support by fire to the infantry.

The second highest priority for combat and tactical vehicle investment remains the replacement of the legacy high mobility, multi-purpose, wheeled vehicle (HMMWV) fleet beginning with that portion which is most at risk; those trucks that perform a combat function and are typically exposed to enemy fires. In partnership with the Army, the Marine Corps has sequenced the Joint Light Tactical Vehicle (JLTV) program to ensure affordability in conjunction with the execution of the ACV program. This approach enables an affordable, incremental, and simultaneous modernization of the two most stressing gaps within the GCTV portfolio.

In this budget year, we are also beginning to look at a replacement for our legacy Light Armored Vehicles (LAV), the Marine Corps' current light armored reconnaissance platform. The Office of Naval Research (ONR) is leading the effort develop revolutionary technologies that will inform requirements development for what we are calling the Armored Reconnaissance Vehicle (ARV). This effort will identify the "realm of the possible" for the LAV replacement and will help accelerate movement to the acquisition phase within the next four to five years. The research will explore advanced technologies within size, weight, time and price point limitations, as well as generation-after-next-technologies using size and weight constraints only.

A subset inherent to our Protected Mobility/Enhanced Maneuver efforts is the requirement to increase Close Combat Lethality. We have made great strides in several areas such as; enhancing small arms and ammunition; virtual training tactical decision kits; sensing Unmanned Air Systems (UAS) and Unmanned Ground Systems (UGS); small situational awareness devices for Distributed Operations and decentralized decision making; loitering munitions; lightening the individual Marine's load and addressing power needs; Electronic Spectrum and Signature Management; and Active Protection Systems.

The Marine Corps rifle squad currently possesses a tactical advantage with its small arms overmatch capabilities for ranges up to 500 meters. To maintain relevance against recent small arms capability advancements made by potential adversaries, significant modernization efforts are planned within the next decade.

The Marine Corps is pursuing capability improvements to small arms with the goals of increased lethality and improved mobility. For lethality, the Marine Rifle Squad requires the ability to accurately engage and neutralize threats out to 600 meters. For mobility, Marines require the ability to move efficiently and effectively while carrying a standard combat load and weapon in order to accomplish combat related tasks.

The Marine Corps has also been supporting DARPA's Squad X program by providing personnel for testing. Squad X is maturing key technologies, developing system prototypes, and refining the prototypes to maximize the squad's performance against emerging threats. Squad X looks to develop a multi-domain combined arms squad through the integration of shared situational understanding, optimized resource management, synchronized action and increased lethality.

Further, the Marine Corps is working with the Army in regards to ground robotics with the future CRS-I program. It is also expects to participate more significantly in the Army's Leader Follower, Robotic wingman and Squad Multi-purpose Equipment Transport efforts to develop CONOPS, interface standards, open software architectures, and better define capability requirements. We are looking at its applicability with our EOD and engineer functions.

Modernization Foundational Effort - Training

As our capabilities continue to expand and the threat continues to adapt, our ability to train the MAGTF is challenged. As we implement the Marine Corps Operating Concept, we must modernize our synthetic training environment, making it more integrated and adaptable. Our units must be able to conduct collective training and mission rehearsals wherever they are; not only in training areas and simulation centers, but in barracks, in headquarters, at service-level training centers and while forward deployed on ships or in country. Our Live, Virtual and Constructive Training Environment Program will improve our ability to exercise multiple elements of the MAGTF from disparate locations as if they were collocated on the same battlefield. Neither live training nor synthetic training alone is sufficient. The strategy that will

offset our readiness beyond that of our opponents involves multiple synthetic repetitions leading to highly effective live training exercises and evaluations, followed by continual live, virtual, and constructive sustainment events.

Weapons proficiency, weapons employment, and the integration of combined arms and maneuver through live-fire training remain core components of our combat readiness. To meet these demands, our operating forces must rely on access to safe, modernized, and well maintained training ranges. The Marine Corps' range modernization efforts are designed to provide realistic training environments that simulate contemporary and future operating environments. Ongoing modernization efforts include a new generation of interactive targets that move autonomously, expanded military operations in urban terrain capabilities, improved instrumentation technologies, realistic threat representations, and scoring systems.

The Marine Corps' current and future immersive training environments are designed to enhance our Marines' abilities to make sound tactical and ethical decisions in chaotic, stressful and complex environments. These venues are equipped with contracted role players, the Tactical Video Capture System, battlefield effects simulators, special effects, and range instrumentation equipment that facilitates detailed after-action reviews. These training capabilities enable unit commanders to assess tactics, techniques and procedures in real time and to provide learning points for follow-on training. The expanded procurement and utilization of advanced force-on-force training will further allow Marines to improve their decision making abilities through engagement against a thinking, adaptive enemy.

Summary/Conclusion

The Marine Corps' Ground programs Modernization strategy will ensure the individual Marine enjoys a qualitative military edge over any adversary. Our goal is not to man the gear, but to adequately equip the Marine to ensure we can provide combat formations capable of closing with and destroying the enemy. In the near-term, our first priority is to increase capability and competency within the information environment, while concurrently actualizing structure design, leader development and training with corresponding updates to doctrine and policy. Equipment enhancement in the near-term will consist of balanced investment in existing capabilities while exploiting technological advances. In the mid-term, Marine Corps modernization targets increasing naval integration, expeditionary power projection, lethality, and

protection; the results of which will address restoration of multi-domain combined arms overmatch against peer and near-peer adversaries. In the long-term, the Marine Corps seeks new capability development and investment to enhance the next generation MAGTF, exploiting Science and Technology and applied research to attain significant improvements in capabilities, addressing identified warfighting challenges, capability gaps, and requirements to achieve asymmetrical advantages.

In future competition for international stability and security, the Marine Corps will provide a globally responsive expeditionary force that includes forward deployed, rapid response, and surge force elements. This expeditionary force is designed to maintain contact, blunt emergent aggression, and surge to prosecute a major campaign, thereby providing a wide range of options to command authorities to message, deter, combat, or defeat those that would attack the global order or threaten the global commons. As Marines have always done, when our Nation calls upon us, we will fight and win regardless of the dimension or domain.

Lieutenant General Robert S. Walsh
Commanding General, Marine Corps Combat Development Command, and Deputy
Commandant, Combat Development and Integration

Lieutenant General Walsh was commissioned a Second Lieutenant from the United States Naval Academy in May 1979. After completing The Basic School he was assigned as an infantry platoon commander in 1st Battalion, 7th Marines. He reported to Pensacola, FL for flight training and was designated a Naval Aviator in October 1981. Upon completion of an assignment to VT-26 as a Selectively Retained Graduate and the F-4 training syllabus he was ordered to VMFA-115 at Marine Corps Air Station Beaufort, SC in November 1983.

While in VMFA-115 he transitioned to the F/A-18 Hornet, attended the U.S. Navy Fighter Weapons School, and made two deployments before assuming duties as a flight instructor at TOPGUN in 1987. He returned to MCAS Beaufort in January 1990 and was assigned to VMFA-251, making two WESTPAC deployments, and was selected as the 1st Marine Aircraft Wing Aviator of the Year.

In July 1993, he reported to the 9th Marine Regiment as the Air Officer. He attended the Air Command and Staff College at Maxwell AFB before reporting to Headquarters, U.S. European Command, Stuttgart, Germany in 1995 where he served in the Plans and Policy Directorate.

In 1998, he returned to MCAS Beaufort for a third tour in Marine Aircraft Group 31 where he served as the Commanding Officer of VMFA-115 and deployed to both the European and Western Pacific Theaters.

He graduated from the National War College in Washington D.C. in June 2002 with a Masters of Science in National Security Strategy. From there he reported to Headquarters, U.S. Marine Corps, where he served in the Aviation Department. After his Branch head tour, Lieutenant General Walsh returned to MCAS Beaufort as the Commanding Officer of Marine Aircraft Group 31 from June 2004 to May 2006.

Following command, he returned to Headquarters, U.S. Marine Corps, as the Assistant Deputy Commandant for Aviation. In May 2008, Lieutenant General Walsh became the Commanding General of the 2d Marine Aircraft Wing and deployed to Operation Iraqi Freedom 09 as the Commanding General of the 2d Marine Aircraft Wing (Forward). In August 2010 he assumed the duties as the Director of Operations, United States Northern Command. In June 2012 he became the Deputy Commanding General, Marine Corps Combat Development Command. In July 2013, Lieutenant General Walsh assumed duties as Director, Expeditionary Warfare Division for the Chief of Naval Operations. In August 2015, Lieutenant General Walsh became the Commanding General, Marine Corps Combat Development Command; Commander, Marine Corps Forces Strategic Command, and the Deputy Commandant for Combat Development and Integration.

Brigadier General Joseph Shrader
 Commander, Marine Corps Systems Command

Brigadier General Joseph Shrader, a native of Princeton, West Virginia, enlisted in the Marine Corps in January 1981. He served for three years with 3rd Battalion, 5th Marines as an infantryman and was promoted to corporal. After his enlistment, he returned to West Virginia where he earned an associate degree in Mechanical Engineering Technology and a Bachelor of Science degree in Electrical Engineering Technology from Bluefield State College. He was commissioned a second lieutenant through the Platoon Leaders Course commissioning program in 1989.

Upon graduation from The Basic School, Brigadier General Shrader attended the Artillery Officer Basic Course in Fort Sill, Oklahoma, and then reported to 5th Battalion, 10th Marines (5/10). While assigned to 5/10, Brigadier General Shrader served as a Guns Platoon Commander, Battery Executive Officer and Battery Commander, and deployed to Southwest Asia during operations Desert Shield, Desert Storm and Provide Comfort.

Brigadier General Shrader reported in June 1993 to Marine Corps Recruit Depot, Parris Island, South Carolina, where he served as a recruit training company Series Commander, Company Executive Officer and Company Commander. He then attended the Field Artillery Advanced Officer Course in Fort Sill, and in August 1996, reported to the III Marine Expeditionary Force (III MEF), Okinawa, Japan. While there, he was promoted to Major and served as Assistant Operations Officer, 4th Marine Regiment, and Battalion Operations Officer and Battalion Executive Officer with 3rd Battalion, 12th Marines.

He then attended the Marine Corps Command and Staff College on Marine Corps Base Quantico, Virginia, where he earned a Master of Military Studies degree. In June 2001, he was transferred to Marine Corps Systems Command where he served as the Armor and Fire Support Targeting Team Lead. Upon promotion to Lieutenant Colonel, he was reassigned to serve as the Deputy Program Manager for the Expeditionary Fire Support System.

In July 2004, Brigadier General Shrader returned to III MEF where he served as 12th Marines Operations Officer and later that same year deployed to Sumatra, Indonesia, in support of Operation Unified Assistance. In May 2005, Brigadier General Shrader received orders to stand up 5th ANGLICO, III MEF. In early 2007, he deployed in support of Operation Iraqi Freedom. In October 2007, he relinquished command of 5th ANGLICO and was reassigned as the III MEF Force Fires Coordinator.

In August 2009, he was promoted to Colonel after graduating from the Industrial College of the Armed Forces at National Defense University in Washington, D.C. He was then designated primary military occupational specialty (8061) Acquisition Professional Officer and assigned to Marine Corps Systems Command. Over the next four years he served as Product Group Director for Combat Equipment and Support Systems, and Product Group Director and Program Manager for Armor and Fire Support Systems.

In May 2013, he transferred to the Office of the Deputy Assistant Secretary of the Navy for Expeditionary Programs and Logistics Management to serve as Chief of Staff. In July 2014, Brigadier General Shrader took the helm as Commander of Marine Corps Systems Command. In August 2014, he was frocked to Brigadier General.

**WITNESS RESPONSES TO QUESTIONS ASKED DURING
THE HEARING**

APRIL 18, 2018

RESPONSE TO QUESTION SUBMITTED BY MR. GALLEG0

General MURRAY. During the Army's holistic network strategy review, it was clear that Warfighter Information Network-Terrestrial (WIN-T) Increment (INC) 2 was not adequate to meet the total Army's long-term network requirements. As such, the Army as part of its Halt, Fix, Pivot network modernization strategy, made the decision to:

a. Baseline the Active Component Armored Brigade Combat Teams (ABCT), Fires, Combat Aviation Brigades and all Army National Guard units, which includes SBCTs, on WIN-T INC 1B (Joint Network Node (JNN), Satellite Tactical Terminal (STT), Command Post Node (CPN))

b. Complete fielding and modernization of WIN-T INC 2 in the Active Component Infantry BCTs (IBCT) and Light Divisions:

(1) Replace Family of Medium Tactical Vehicles based Tactical Communication Node (TCN)/Network Operations Security Center (NOSC) heavy with the High Mobility Multipurpose Wheeled Vehicle-based Transportation Control Number (TCN)/Network Operations and Security Center (NOSC) Lite

(2) Maintain Point of Presence (PoP) and Soldier Network Extension

c. Complete fielding of WIN-T INC 2 to Active Component Stryker Brigade Combat Teams (SBCT):

(1) Three of seven SBCTS will be fielded as of Fiscal Year 2019 (FY19) (TCN/NOSC Heavy, Point of Presence (PoP), Soldier Network Extensions (SNEs))

(2) The remaining four Active Component SBCTs will be fielded with PoPs, SNES and displaced TCN/NOSC Heavy systems from the Active component IBCTs no later than FY21.

d. Close out the WIN-T INC 2 effort in FY21 Leveraging the Army's network modernization strategy in this manner allows us to synchronize capability within the formations across the force, and maintain interoperability, while providing the time and ability to identify and implement more appropriate solutions for the future. [See page 18.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

APRIL 18, 2018

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. As we work to modernize both small arms and all our key assets in the battle space one of the key elements is increasing connectivity—while improving both efficiency and lethality. I understand that you are in the process of developing the next generation of squad weapons and that in the near future we will see technological advances that dramatically upgrade both energy efficiency and secure communications through inductive rail technology. Could you please provide me with a status report re: acquisition of these new “smart” small arms platforms?

General MURRAY. The smart rail capability that you have identified is included as a requirement in the approved Next Generation Squad Weapon (NGSW) Initial Capabilities Development Documents (ICD). The requirement specifies the need for a Data Transfer Rail (power and data). This rail will be capable of transferring both data and power and will integrate with various fire control components and other enablers mounted on the weapon system. The Army will begin soliciting industry to provide prototype weapon systems that incorporate smart rail technologies. The test and evaluation effort for this capability is scheduled to begin in early FY 2020.

Mr. TURNER. I'd like to know your opinion on the Small Business Innovation Research (SBIR) program. Do you think that the program is useful for ensuring the innovation and diversification of our industrial base? In what ways can we develop the program to be more advantages for both the DOD and industry. The health of our industrial base is essential for our future national defense, I look forward to continuing to encourage innovation through these programs with you.

General MURRAY and General OSTROWSKI. The Small Business Innovative Research (SBIR) Program is useful in ensuring the innovation and diversification of our industrial base. Some ways that we can develop the program are to reinstate 3% administrative funds; waiving the requirement for Phase II awardees to have a DCAA-approved cost accounting system; permit consecutive Phase II awards; and fund/provide additional transition assistance. Administrative funds help provide additional outreach, especially to underrepresented states in DOD's SBIR investment, and it provides funds to establish dedicated contracting personnel who are experienced, knowledgeable and efficient in awarding SBIR contracts. Dedicated contracting personnel can shorten the time between the Phase I and Phase II awards, which is often a time of cash flow challenge for small businesses. The time from completion of the Phase II work—development of the working prototype—to commercialization is called “the valley of death” because it can take up to 10–12 years for a small business to realize commercialization of their innovative technology. Funding and providing additional transition assistance may be able to shorten that time to realize commercialization. Army will continue to expand opportunities for these small businesses to engage with Army labs to foster transition from Phase I to Phase II.

Mr. TURNER. In what ways has NATO standardization proven advantageous for your service? Do you believe that we should continue to seek NATO standardization in our procurement/research/development programs?

General MURRAY and General OSTROWSKI. NATO standardization has been extraordinarily beneficial. It is the foundation of interoperability in materiel, doctrine, and operations. We need to continue to improve our investments in procurement/research/development and continue to promote the sales of U.S. interoperable capabilities to our NATO partners.

The Army is optimizing for interoperability with our allies and partners to strengthen alliances and deliver more effective coalition operations.

Standardization, testing, and compatibility certification of ammunition to NATO standard Soldier weapons provides a wide range of small arms ammunition choices that can be confidently used. Collaborative agreements, such as the Ground-Based Air Defense (GBAD) Memorandum of Understanding (MOU) facilitate information sharing, exercises, and coordination of these essential command, control, and deterrent capabilities in peace time. This agreement allows the warfighter to access information which enables networking of surface-based air defense capabilities. Another example of how NATO standardization has supported interoperability is through Artillery Systems Cooperative Activities (ASCA). ASCA developed a software interface

that allows nations to digitally link and translate between different field artillery and fire support systems in a faster, more effective way. This digital link improves the effectiveness and interoperability of allied artillery systems. The Land Battle Decisive Munitions Precision Guided Munition MOU provides for common sharing, storage, and ammunition surveillance for signatory nations. Standardization is an interoperability force multiplier, which enables U.S. and allied forces to operate side by side or in support of each other.

Mr. TURNER. As we work to modernize both small arms and all our key assets in the battle space one of the key elements is increasing connectivity—while improving both efficiency and lethality. I understand that you are in the process of developing the next generation of squad weapons and that in the near future we will see technological advances that dramatically upgrade both energy efficiency and secure communications through inductive rail technology. Could you please provide me with a status report re: acquisition of these new “smart” small arms platforms?

General OSTROWSKI. The smart rail capability that you have identified is included as a requirement in the draft Next Generation Squad Weapon (NGSW) Capabilities Development Documents (CDD). The requirement specifies the need for a Data Transfer Rail (power and data). This rail will be capable of transferring both data and power and will integrate with various fire control components and other enablers mounted on the weapon system. The draft NGSW CDDs are currently in staffing at the Headquarters, Department of the Army, and are expected to be validated by the Army Requirements Oversight Council this Fiscal Year (FY) 2018. Once the requirements have been validated, the Army will begin soliciting industry to provide prototype weapon systems that incorporate smart rail technologies. The test and evaluation effort for this capability is scheduled to begin in early FY 2020.

QUESTIONS SUBMITTED BY MR. COOK

Mr. COOK. The Army and Marine Corps have a varied history of working together on developing and fielding platforms. While both are essentially ground forces with their own vehicle and aircraft fleets, they have sometimes pursued modernization in a truly joint nature (like the JLTV) or in a common nature (like the Abrams tank). On other occasions they have chosen to go down completely different roads while pursuing similar capabilities (like the USMC's Huey and Cobra vs the Army's Black Hawk and Apache). One of the next big opportunities for collaboration is on the evolving Future Vertical Lift program that is structured to replace Hueys and Black Hawks. Do you see this playing out more like the JLTV where both Services make concessions to achieve commonality or do you see it being more like the Huey and Black Hawk where service-unique needs outweigh the benefits of jointness?

General MURRAY and General OSTROWSKI. The Future Vertical Lift Long Range Assault Aircraft (FLRAA or Capability Set 3) is an Army led multi-service initiative with joint participation from the USMC. A Joint Analysis of Alternatives (AoA) is currently being conducted to assess both the service unique requirements and opportunities for commonality. A critical component of the AoA is the Joint Trades Analysis to be conducted after the service unique requirements have been identified. The Joint Trades Analysis is a three pronged effort focusing efforts to determine if benefits of service concessions can lead to an identical aircraft, a common dynamics system, or if benefits are not realized then components (seats, cockpits, special tools, etc) with high probability of commonality between the Army and USMC aircraft.

Mr. COOK. I saw that the FY19 request was only for three Stryker upgrades at a price of \$21 million. Is that enough to keep the upgrade production line open? What is the Army's plan to upgrade Strykers to the most modern A1 configuration?

General OSTROWSKI. The minimum efficient production rate is approximately one third of a Stryker brigade per year (120 vehicles) which has been met through a combination of vehicles going through an upgrade process and vehicles going through a modification process utilizing different funding lines.

In March 2018, the Army approved replacing the flat bottom Stryker brigades with Stryker Double V-Hull (DVHA1s). The Army submitted an FY18 Above Threshold Reprogramming request and a request to shift FY19 funding within Stryker funding lines that when combined with the current FY19 budget request will procure approximately one-half of a Stryker brigade (168 vehicles). The Army would like to continue the DVHA1 production rate at approximately one-half Stryker brigade per year until all flat bottom Strykers have been replaced with DVHA1s.

QUESTIONS SUBMITTED BY MR. CARBAJAL

Mr. CARBAJAL. General Ostrowski and General Murray, we understand the urgent need for Counter Unmanned Aerial Systems (C-UAS) and Maneuver Short Range Air Defense (M-SHORAD) capabilities, and we appreciate the Army working quickly to provide soldiers this necessary equipment. Do you believe there are synergies between the two missions that the Army can leverage and field a common capability that meets both missions requirements? Would you consider this approach if it was proven to reduce costs and accelerate fielding?

General MURRAY and General OSTROWSKI. Yes, we have identified some synergies already, including fire control and command and control. Those synergies led us to use a common turret and common command and control system, which reduced cost and accelerated fielding. We will continue to assess the opportunity to integrate the two systems into a common capability.

Yes, we will continue to assess the opportunity to field common capability in the future, especially if it reduces costs and accelerates fielding.

Mr. CARBAJAL. General Walsh and General Shrader, we understand that the Marine Corps may be looking to utilize common requirements for developing the weapon system that will be integrated onto ground vehicles against unmanned aerial systems and for mobile short-range air defense. Can you please tell the committee today what the benefits are with taking on this approach? For example, would you plan to see considerable cost savings and quicker fielding of systems if you had one weapon system to meet both missions?

General WALSH and General SHRADER. The Marine Corps is applying lessons learned from Joint Urgent Operational Need (JUON) CC-0558 and Joint Emergent Operational Need (JEON) ST-008 Counter UAS (CUAS) efforts into the Ground Based Air Defense (GBAD) Program of Record, Marine Air Defense Integrated System (MADIS). MADIS is the integration of enhanced anti-air warfare capabilities onto JLTVs to provide our Low Altitude Air Defense Battalions contemporary proficiency against current & future air threats from near-peer to non-state actors. The MADIS enhancements incorporate state-of-the-art radar, optics and C2 with kinetic/non-kinetic surface to air weapons which will provide the MAGTF a truly mobile & adaptable short range air defense capability to detect, track, ID and defeat threat UASs as well as fixed wing/rotary wing threats. There are significant benefits to this approach including:

- Rapid fielding Expeditionary MADIS (E-MADIS) & Light MADIS (L-MADIS) activities began in 3QFY17 with fielding of systems starting in 2QFY18 in response to JUON-0558. These initial efforts are now informing the MADIS Program of Record, which meets its Initial Operating Capability in FY21.
- Cost and time savings through integrating new capabilities, as well as repurposing existing capabilities onto the JLTV. The MADIS is being designed with the idea that future air defense upgrades and advancements will occur, and this system can be rapidly upgraded with little to no modification to the JLTV. This will be accomplished with the use of slide-on & slide-off air defense components to MADIS' "Picatinny Rail" configured turret.
- UNITY OF EFFORT. Employing many of the same short range air-defense (SHORAD) capabilities the Army intends to employ on their Maneuver SHORAD Stryker.
- ECONOMY OF FORCE.
 - In short order, MADIS can be mission configured based on the threat (UAS, FW, RW or all of the above).
 - Multiple mission capability provides not only force protection for the forward deployed MAGTF, but can also be easily employed at critical fixed sites including both OCONUS & CONUS bases & stations.
 - All R&D efforts are in close coordination/cooperation with the Army's PEO Missile & Space—the two services testing & selecting "best of breed" M-SHORAD capabilities for both the USMC's JLTV (MADIS) & the Army's Stryker.
- SIMPLICITY. Standardized M-SHORAD operation, maintenance & training for both the Marine Corps & Army.

QUESTIONS SUBMITTED BY MR. BISHOP

Mr. BISHOP. We understand the urgent need for Counter Unmanned Aerial Systems (C-UAS) and Maneuver Short Range Air Defense (M-SHORAD) capabilities, and we appreciate the Army working quickly to provide soldiers this necessary equipment. Do you believe there are synergies between the two missions that the Army can leverage and field a common capability that meets both missions require-

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