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SOLDIER AND MARINE EQUIPMENT FOR DISMOUNTED OPERATIONS

HEARING

BEFORE THE

SUBCOMMITTEE ON TACTICAL
AIR AND LAND FORCES

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

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SOLDIER AND MARINE EQUIPMENT FOR DISMOUNTED OPERATIONS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON SEAPOWER AND PROJECTION FORCES,
Washington, DC, Thursday, March 17, 2011.

The subcommittee met, pursuant to call, at 10:34 a.m., in room 2118, Rayburn House Office Building, Hon. Roscoe G. Bartlett (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. ROSCOE G. BARTLETT, A REPRESENTATIVE FROM MARYLAND, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. BARTLETT. The Tactical Air and Land Forces Subcommittee meets today to receive testimony on Army and Marine Corps modernization programs for equipping the dismounted soldier and marine.

The hearing today will provide the subcommittee with a better understanding of the holistic approach the Army and Marine Corps are using to effectively develop, coordinate on, and procure equipment used by the individual soldier and marine.

As I mentioned in my opening statement during last week's hearing on Army modernization programs, I believe the number one modernization priority is always the individual soldier and marine, and those programs should always be adequately resourced.

I want to stress those same points today. There is no doubt that the equipment, body armor, and processes that our soldiers and marines have and use today are saving lives and has greatly improved during this past decade. I commend the witnesses before us today for the effort and hard work they have done in this area.

I have often wondered, though, if we would have taken just five percent of what was spent on the now-terminated Future Combat Systems program and applied it to lessening the weight of what our soldiers carry, where would we be today?

We can certainly appreciate the daunting task that our witnesses face in managing these programs. In the case of the Army, the PEO [Program Executive Office] Soldier manages approximately 477 products and programs that are considered individual soldier equipment. However, according to Department of Defense criteria, none of these programs or products are considered to be a major defense acquisition program.

This committee will always support continuing to enhance the individual soldier and marine's capability and protection. However, the price we often pay is even more weight, which could impact individual performance.

Individual riflemen commonly carry in excess of 100 pounds of gear on all dismounted missions; some much more than that. Excessive equipment weight is a consistent complaint that we hear about when we talk to our deployed soldiers and marines. They say, make it lighter. Not surprisingly, we are also seeing an alarming number of muscular-skeletal noncombat injuries in our military hospitals that are placing more and more soldiers and marines in nondeployable status.

It seems that for every good idea in weight reduction, there is a good idea for something new to hang on the soldiers, not to mention the problem of power, primarily batteries. In fact, some have used the analogy of a Christmas tree, where the soldier is the tree, and we keep hanging more and more gear on the soldier.

From fiscal year 2011 through 2016, the Army has programmed over $2 billion for its Nett Warrior program; an ensemble program that consists of several components that are integrated into the network and will provide improved situational awareness and better understanding of the battlefield to the dismounted soldier. The Army expects this to translate into soldiers being at the right place at the right time with the right equipment, making them more effective, more lethal, and more survivable. However, this system adds at least 12 pounds to the soldier's combat carrying load and requires at least two batteries per day. Does this added capability warrant the additional weight?

So the question we hope to answer today is: How do we lighten the soldier and marine combat load, while also continuing to maximize the combat effectiveness and capability?

We also expect to receive updates on the Army and Marine Corps body armor program, to include test and evaluation processes; current weight reduction initiatives; and the new joint Enhanced Combat Helmet, the ECH program.

I understand the ECH is expected to significantly improve the ballistic protection capability from the current fielded helmet. I want to emphasize that ballistic protection is only one aspect that needs to be addressed regarding helmet capabilities. The other aspect, and just as significant, is protection from blast and blunt trauma, the primary cause of traumatic brain injury, which continues to be the most prevalent injury from operations in Iraq and Afghanistan. So we look forward to hearing today how the ECH will provide better protection from TBI [traumatic brain injury].

This hearing will also provide the opportunity to receive updates on the Army and Marine Corps small arms acquisition strategies to include the M4 carbine. I understand the Army is preparing to conduct a full and open competition for a new individual carbine that could potentially replace the existing M4 carbine. Among other things, we expect to learn the details of this competition.

In the end, everything touches the individual soldier and marine and consequently impacts them. We must continue to provide them with the best possible equipment available.

[The prepared statement of Mr. Bartlett can be found in the Appendix on page 37.]

Mr. BARTLETT. Before we begin, I would like to turn to my good friend and colleague from Texas, Silvestre Reyes, for opening remarks he may wish to make.

Mr. REYES. Thank you, Mr. Chairman.

And thank you, gentlemen, for being here this morning.

Mr. Chairman, I was at our border conference, and so I asked my good friend Mr. McIntyre to do the opening statement. He did a lot of preparation, so I feel bad taking it at this time. So, without objection, can I recognize him to make our opening statement?

Mr. BARTLETT. Thank you for yielding your time to Mr. McIntyre for your opening statement.

STATEMENT OF HON. MIKE MCINTYRE, A REPRESENTATIVE FROM NORTH CAROLINA, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. MCINTYRE. Thank you, Mr. Reyes.

First, I would like to thank our witnesses today for your service to our country. All of you, I know, have been directly involved in making sure that our soldiers and marines have the very best equipment, and firsthand, of course, know the very serious responsibility that that carries.

Let me say, representing a congressional district that sits between Fort Bragg and Camp Lejeune, I also understand the great need to make sure that those men and women have everything that they need to serve our country.

Thank you, Chairman Bartlett, for having a hearing focused on this very important concept and the concern that we have on how best we equip our men and women in uniform.

The war in Afghanistan is often fought, we know, by small groups of soldiers and marines in very tough terrain, and they often fight outnumbered, so maximizing the capability for each one of them is essential. It is also the right thing to do, to make sure that none of our folks that are serving us, who have trained so well to defend and protect our country, should ever be without the proper equipment, but also be able to function with that equipment in a practical way that lets them be able to perform to the very best of their duty that they have sworn to do.

Just as we want our tanks and our other vehicles to have a clear overmatch capability, we also want our individual soldiers and marines to have a big advantage, not to see a fair fight, but to see an overwhelming opportunity to overcome anything that may come their way. How we do that without giving the troops more and more equipment that weighs them down, quite literally, we know is a difficult challenge.

The weapons, ammunition, the water, the food and the other items that a soldier and marine must carry in combat add up very quickly. Add to that the difficult terrain and weather conditions, especially in Afghanistan, and we know the task of figuring out the right balance becomes even tougher between what is necessary to carry into battle, yet what also can be lightened in some way or compacted in another way to make it more easily accessible and less strenuous when they are there to do their job.

Of the many issues the Army and Marines are trying to deal with, two seem to stand out: First, providing protective body armor without making the load on a soldier or marine too heavy to be effective; secondly, how can we lighten that load of our own weapons, ammunition, and other gear without lessening the ability for an

overwhelming amount of firepower, or being able to carry out whatever other duty of combat may be required. If we can solve these two key issues, we will go a long way toward making our troops more effective than they already are.

I look forward to learning more about the progress the Army and Marine Corps are making in this area. Thanks to you, and especially also thanks to those who are out serving even now. God bless you.

Thank you, Mr. Chairman and Mr. Reyes. I yield back.

[The prepared statement of Mr. McIntyre can be found in the Appendix on page 40.]

Mr. BARTLETT. Thank you very much.

We would like to welcome our witnesses. By the way, while listening to the testimony, you might look up on the screen. There you see the items that our soldiers carry. The lower left is the gunner, who carries 144 pounds. If you look down that list of things he carries, there is not one thing that I don't think he needs to have, which adds up to 144 pounds. Clearly not everybody is a Hulk Hogan. We can't all carry 144 pounds. We have got to do something to lessen that load.

Our witnesses today are: Dr. David M. Markowitz, Director, Capabilities Integration, Prioritization, and Analysis, U.S. Army;

Brigadier General Peter N. Fuller, Program Executive Officer, Soldier and Commanding General, Soldier Systems Center, U.S. Army.

General Fuller, I understand this is probably your last appearance before our subcommittee, that you will be going to Afghanistan. Sir, you leave some really big shoes to fill. Your successor is going to have a real challenge keeping up. Thank you so much for what you have done for the soldier.

Brigadier General Frank L. Kelley, Commander, Marine Corps Systems Command, U.S. Marine Corps;

Brigadier General Daniel J. O'Donohue, Director, Capabilities Development Directorate, Combat Development and Integration, U.S. Marine Corps.

We will proceed with the panel's testimony and then go into questions. Without objection, all witnesses' prepared statements will be included in the general record.

Gentlemen, thank you for your service, and thank you for being with us today.

Dr. Markowitz, would you please begin?

STATEMENT OF DAVID M. MARKOWITZ, DIRECTOR, CAPABILITIES INTEGRATION, PRIORITIZATION, AND ANALYSIS, U.S. ARMY

Mr. MARKOWITZ. Sir, thank you.

Chairman Bartlett, Ranking Member Reyes, and distinguished members of the subcommittee, thank you for the opportunity to appear before you to discuss soldier requirements. My name is David Markowitz, and I am the Director of Capabilities Integration within the Army G3. The directorate is responsible for the review, validation and approval of material capabilities.

Let me briefly overview trends in soldier requirements as theater has transitioned from urban mounted operations in Iraq to the

more dispersed, dismounted operations in Afghanistan. I will highlight five individual soldier capability areas.

One, lethality. Broadly, soldiers in theater have been requesting lighter weapons that can effectively engage the enemy at the longer ranges seen in Afghanistan. Solutions across weapons, ammo, optics and soldier training.

Two, protection. The Army continues to provide threat-based, customized ensembles of soldier body armor and protective equipment. Our initiative seeks to maintain the proper balance between enhancing protection while continuing to lighten the soldier's load.

Three, network. Dismounted and dispersed operations are placing increasing demand on getting the network down to the individual soldier. The network provides not only communications, but situational awareness, access to intelligence and support; everything our soldiers expect in the cellphone age.

Four, intelligence, surveillance, reconnaissance. In the counter-insurgency fight, it is imperative that forces are able to attain and use actionable intelligence at the lowest levels. We are fielding a wide range of capabilities from hand-held biometrics devices, signals intelligence, and unmanned vehicles such as Raven, a soldier-portable air vehicle.

Five, and finally, counter-IED [Improvised Explosive Device] electronic warfare. We are increasingly providing the soldier, individual soldier, counter-IED and electronic warfare devices, such as explosive analyzers and manned portable jamming equipment. These are capabilities we had not normally associated with the individual soldier.

Sir, as you said in your opening comments, our greatest challenge is balancing these new, promising capabilities and soldier load.

Thank you for your continued support to our soldiers. I look forward to further discussing these issues and answering your questions. Thank you.

[The joint prepared statement of Mr. Markowitz and General Fuller can be found in the Appendix on page 42.]

Mr. BARTLETT. Thank you very much.

General Fuller.

STATEMENT OF BG (P) PETER N. FULLER, USA, PROGRAM EXECUTIVE OFFICER, SOLDIER AND COMMANDING GENERAL, SOLDIER SYSTEMS CENTER, U.S. ARMY

General FULLER. Thank you. Chairman Bartlett, Ranking Member Reyes, distinguished members of the subcommittee, on behalf of the Army, I, too, want to thank you for giving me the opportunity to appear before you so I can discuss what we are doing to support our soldiers.

I also want to thank you for your continued support to the Army and to specifically PEO Soldier. You say I have big shoes to follow, or people are going to follow with big shoes, or however you said it, sir. But I didn't do this. It is the team that did it; the soldiers that did it. I just represent them, and I appreciate that.

Specifically with PEO Soldier, we have been striving to ensure that our soldiers are lethal, survivable and can operate in any envi-

ronment, as you said. The well-being of our soldiers is our number one priority, as I know it is your priority.

Less than two months ago, Staff Sergeant Giunta stood before you to receive the Congressional Medal of Honor for his selfless actions on October 25, 2007, while operating with his squad in Afghanistan. Prior to Sergeant Giunta's deployment, PEO Soldier team fielded Sergeant Giunta and his unit with equipment. I submit to you that Sergeant Giunta was able to stand before you on that day in January because of our combined efforts to do what he needed and to provide what he needed to fight in Afghanistan.

In November of 2006, Sergeant Giunta and his fellow soldiers received numerous pieces of equipment to ensure that they were lethal, survivable, and could operate in the environments of Afghanistan. Their gear include the M4 carbine, 40-millimeter grenade launchers, rifle optics to enhance their lethality, the Army Combat Helmet, the Outer Tactical Vest, which is our soft body armor, that had the Enhanced Small Arms Protective Inserts—there are hard plates inside—as well as ballistic eyewear. We provided this to them to enhance their survivability.

They also received the PVS–14 Night Vision Device. Our climbing gear, cold weather gear, and a lot of other items were provided to them to ensure they could operate in Afghanistan.

If Sergeant Giunta were to deploy today to Afghanistan, I believe that he would barely recognize some of the equipment we are now providing to our deploying soldiers.

At this time I would like to introduce Staff Sergeant Will Corp. If Sergeant Giunta were to deploy to Afghanistan, he would be outfitted in the same kit that Sergeant Corp has.

Just to let you know who Sergeant Corp is, he comes from Oklahoma. He enlisted in the Army in 1998 as a military police officer. Sergeant Corp is also a wounded warrior. While serving in Afghanistan—excuse me, in Iraq in 2006, in June of 2006, he was hit with an IED and had an amputation of his lower right leg. He then went to the Warrior Transition Unit, and then he came to support us at PEO Soldier. He allows us to have this feedback as to what do we need to do to ensure that our soldiers have feedback into the process to ensure we provide them the right kit.

Ranking Member Reyes, he came from the 978th MP Unit out of Fort Bliss, Texas. I just wanted you to also know that.

Let me just walk through what our soldiers are getting now when they go to Afghanistan. They still deploy with the M4, which Sergeant Corp has, but now they have our new 855A1 ammunition. It is an enhanced lethality round, optimized specifically to the M4.

We have lighter body armor in our Improved Outer Tactical Vest. We didn't make him wear all the equipment, but the vest is setting on the ground right next to him. It weighs 3 pounds less than what Sergeant Corp and also Sergeant Giunta would have deployed with. It has better fit, better load carrying, so the weight that the soldiers are wearing that you see on that slide is bettered distributed across their body. In addition——

Mr. BARTLETT. I would like to note, he is a very strong young man. He picked that up as if it were light. Please, after the hearing go down and pick it up if you are here. It is not light.

Thank you.

General FULLER. Sir, we also have deployed now a light body armor plate carrier. It is 15 pounds lighter, and Sergeant Corp is wearing that. It just gives them the hard ballistic protection without all that additional weight. This lighter system was developed based on input we received from soldiers such as Sergeant Giunta and such as Sergeant Corp. The plate carrier allows our field commanders to better tailor their package and their protection to their specific mission.

Soldiers going to Afghanistan now also deploy with a fire-resistant combat uniform and combat shirts, and they are pretreated with insect repellant. And they are also in a new camouflage pattern, which we call OCP, Operation Enduring Freedom camouflage pattern, which you see in this color.

They also deploy with two pairs of mountain boots, and these boots are lighter than our previous combat boots. Even our machine gun is now lighter. It is 9 pounds lighter. Just to name a few items.

Many of these items where improvements were made because of soldiers like Sergeant Giunta and also Sergeant Corp providing us feedback as to what needed to be improved so they can conduct their missions. Soldier feedback is essential, and one of the reasons that this PEO is the only PEO with a command sergeant major.

And Sergeant Corp, please, take a seat. We don't want you to stand the whole time here. Sorry.

The command sergeant major is very important inside our PEO because he allows us to maintain contact with soldiers in the field, listening to what works, what doesn't work, and what they really need to perform their mission.

An example via the NCO [non-commissioned officer] channels that we have just received is that our soldiers want better groin protection against IED effects while operating in the dismounted mode. We are working through the requirements process with Dr. Markowitz and others; but at the same time we are rapidly providing several potential solutions to a number of our soldiers in Afghanistan for their evaluation.

Although we believe we are providing soldiers with greatly improved kit, it does come with the added weight, as both you and Mr. McIntyre talked about. The weight in Afghanistan environment impacts both their physical and cognitive abilities. Regardless, we are continuing to strive to give our soldiers that decisive edge to ensure they are dominant on the battlefield.

To this end, we have deployed a new weapon in limited numbers. It is the XM25. It is a counter defilade target engagement system. The XM25 is a capability that breaks parity during direct-fire engagements, and our soldiers are calling it "The Punisher." With The Punisher, the enemy can no longer shoot at our soldiers and hide behind a wall or something to protect themselves from our counterfire. But again, it weighs 18 pounds.

We are also trying to find new technologies to provide our soldiers with the same protection at a reduced weight. We know that Sergeant Giunta's body armor worked as intended because it stopped enemy bullets twice, allowing him to continue his mission. But when you think about it, what we have done with our ballistic armor is we have taken something similar to your grandmother's

china, wrapped it in Kevlar. And if you want more protection, we give you more china and more Kevlar, resulting in increased protection, but at a greater weight.

To find a new lightweight technology, we now have two research and development lines dedicated in our fiscal year 2012 so we can focus specifically on soldier protection items. This will allow us that increased focus with these new lines.

We believe that our soldiers in the operating environment benefit from knowing where are they, where are their friends, and where is the enemy. We have this capability, and it was very clear that when Sergeant Giunta was operating in October 2007, he would have liked this capability. He was trying to find his best friend Sergeant Brennan during the battle, and he had to look several places before he was able to determine that the Taliban was trying to separate Private Brennan—excuse me, Sergeant Brennan from his unit and trying to capture him. If Sergeant Giunta had this capability on that day, he would have known immediately not only where Sergeant Brennan was, but also where was the enemy.

We have this capability today in limited quantities in Afghanistan. We call it Land Warrior. It provides unprecedented tactical awareness, as well as significant improvements in the soldiers' lethality, survivability and sustainability for our dismounted soldiers. They can see their location, the location of the enemy, and exchange critical data with other friendly ground forces and also our Air Force. It allows our soldiers to have that decisive advantage.

The next increment is called Nett Warrior, as you articulated. However, Land Warrior weighs 15 pounds; Nett Warrior weighs 12 pounds. We still have not reduced the load of our soldier by taking 12 pounds off them as we provided them this new capability. We are challenged to maintain this new high-tech capability when all soldiers want something like this on the battlefield, but we understand that Nett Warrior allows us to have that essential step along the path of getting our dismounted soldiers into the network. It is allowing us to facilitate the technology, the security and capability trades that will be necessary to get our dismounted soldiers at a lightweight capability. We are going to also look at the commercial industry and try to leverage their technologies.

I once heard someone mention that we had many "centers of excellence" within the Army and the Department of Defense. Within PEO Soldier, we are striving to better communicate and collaborate across these centers of excellence, something that is critically important, because when one realizes at the end everything, as you said, touches or involves our soldier.

The Army has made great strides, but we are not resting on our laurels, and I challenge this committee and I challenge our nation to stay focused on our soldiers and their equipment as future difficult fiscal decisions are debated and implemented.

The centerpiece of the Army is its soldiers. My basic branch in the Army was armor, and I always thought that the tank and its other combat vehicles was the primary purpose of the Army. I soon realized when I was riding around in those tanks with my crew that the purpose of the Army and the strength of the Army is the soldier, not the big-ticket platforms. So I ask you to remember the

soldier is not an accessory on these big-ticket platforms. The soldier is the purpose of those platforms.

Chairman Bartlett, Representative Reyes, distinguished members of the subcommittee, I want to take a moment to thank you on behalf of the men and women in uniform for all of your strong support to the Army, and also the strong support that you have provided to PEO Soldier. It has been an honor to serve with such professional soldiers, and it has been an honor for me to represent them in appearing before you.

And as you said, this could be my last time I appear before you in my position as PEO Soldier. I soon will be wearing the exact same equipment that Sergeant Corp has that we field to the soldiers. I have complete confidence in its ability to make sure that I am lethal, survivable, and can operate in the Afghanistan environment. As you said, I am deploying to Afghanistan in the summer to work on General Petraeus' staff.

It is with my sincere thanks that I commend you and your professional staff on your unwavering support to the soldier. I thank you again, and I look forward to your questions.

[The joint prepared statement of General Fuller and Mr. Markowitz can be found in the Appendix on page 42.]

Mr. BARTLETT. Thank you very much, sir.

General Kelley.

STATEMENT OF BRIG. GEN. FRANK L. KELLEY, USMC, COMMANDER, MARINE CORPS SYSTEMS COMMAND, U.S. MARINE CORPS; AND BRIG. GEN. DANIEL J. O'DONOHUE, USMC, DIRECTOR, CAPABILITIES DEVELOPMENT DIRECTORATE, COMBAT DEVELOPMENT & INTEGRATION, U.S. MARINE CORPS

General KELLEY. Chairman Bartlett, Ranking Member Reyes, and distinguished members of the subcommittee, thank you for this opportunity to discuss the capabilities we have developed and are pursing to ensure our marines are effective, survivable and expeditionary on the battlefield.

Our job is to develop capability, provide equipment, and integrate this throughout and beyond the MAGTF [Marine Air Ground Task Force]. We do that from the perspective that your Marine Corps is a strategically mobile, middleweight force, optimized for forward presence, and rapid-crisis response.

Our priorities are our Commandant's priorities. We will continue to provide the best trained and equipped marines in Afghanistan. We will rebalance our corps and posture it for the future. We will educate and train our marines to succeed in an increasingly complex environment, and we will keep faith with our marines, our sailors, and our families.

Our job is accomplished by orienting on the individual marine, the focal point of our corps. Our goal is to give that marine the equipment and confidence to accomplish his or her mission successfully. A marine's mission is not achieved as an individual, but as an integrated unit. The United States Marine Corps is America's expeditionary force in readiness, task-organized as a Marine Air-Ground Task Force. The expeditionary ethos drives the way we organize our forces, train, develop, and equip.

To be a middleweight expeditionary force, our equipment must be lightweight, scalable and integrated. Our effort in lightening the MAGTF is an intentional, deliberate, disciplined and measured response aimed at reducing the size, weight and energy required by the individual rifleman.

Our Commandant has recently stated that we have captured overhead efficiencies and savings by focusing on the following efforts: buying smarter through acquiring more intelligently; working closely and collaboratively with our Army counterparts; and streamlining our own operations.

A tremendous example in our quest to be more efficient and effective is captured in the way that we use and produce energy. Your Marine Corps is committed to finding ways to be more energy efficient. And since 2009, we have aggressively pursued efficient energy capabilities that will make marines self-sufficient, increase our combat effectiveness, and protect lives.

One program in particular that has contributed to lightening the load of the combat marine is the Solar-Powered Alternative Energy Solution, or SPAES. On the individual marine, over a dozen batteries in six different configurations are used at any given time. Centralizing power, standardizing that power, and reliably distributing that power has the potential to reduce the reliance upon multiple types of batteries that are currently used in systems and carried in significant quantities as spares, not to mention the environmental impacts in waste regarding disposal.

Solar panels have been fielded to squads as a reusable energy source for rechargeable batteries. 3rd Battalion, 5th Marines, under the command of Lieutenant Colonel Jason Morris, is currently deployed to Operation Enduring Freedom and is using SPAES. We have received feedback from theater that patrols are leaving the FOBs [Forward Operating Bases] and patrol bases for 2- to 3-week periods, currently 3–5, using SPAES with the benefit of carrying fewer batteries. Typically, a platoon leaving the FOB for that period of time would be required to carry a 2- to 3-week supply of batteries. Through the employment of SPAES, that requirement has been reduced to 2 to 3 days.

Lightening the load is a total Marine effort. It is on the mind of every marine and civilian in our corps, an imperative issued by our Commandant. We actively seek and listen and take input and advice from deployed marines in the field, from marines participating in exercises or attending our schoolhouses. We even take information and guidance from marines who are awaiting a haircut at the Quantico barbershop.

A few weeks ago I overheard two marines discussing helmets while they were waiting for their haircut. It was a professional and informed discussion. Later I received this from Sergeant Paul Downs, who now works at MCIA [Marine Corps Intelligence Activity] on our base at Quantico, and he summarized our conversation as follows, and he felt compelled to just send me the e-mail straight out.

He wrote: Sir, in my experience with the MICH/ACH [Modular Integrated Communications Helmet/Advanced Combat Helmet] helmet, when compared with current PASGT [Personnel Armor System for Ground Troops], it excels in multiple areas. One of the big-

gest issues of the PASGT is how it integrates with current body armor. While in the prone position, during squat or buddy rushes, the PASGT, because of its bulky size, shoves forward over the eyes and takes away precious seconds of suppressive fire to fix. The MICH/ACH does not have this problem. Also, the MICH/ACH is lighter and uses a more comfortable suspension system.

In my experience of leading marines, the number one reason that they remove their helmets is discomfort. The MICH/ACH helmet solves these issues.

I believe Sergeant Downs would agree that we are on the right path, and we will continue to help marines travel lighter and move faster through a reduction in size and the amount of equipment and dependence on bulk supplies.

We rely on men like Sergeant Downs to thank and inform critically.

Your invitation asked us to help you better understand marine equipment for dismounted operations. To do that, I briefly mentioned some efforts and options on our equipment. And I have also refreshed your insight into how we are organized for mission success and the priorities of our Commandant.

I would like you to know before all else, though, before we see the marine as a system, before we look at the equipment, we see the marine. We never lose sight of the individual marine. I have often visited the fifth deck of the Naval Medical Facility out at Bethesda, most recently on March 4. I get a chance to talk to the marines while I am there, and we talk about where they are from, how they landed in the hospital bed. We talk about what is next, and we talk about the gear that saved their life. Mothers, fathers, wives and the marines themselves thank us.

Our work is enduring and far from over. And with your continued support, we will continue to protect our marines. Thank you.

[The joint prepared statement of General Kelley and General O'Donohue can be found in the Appendix on page 61.]

Mr. BARTLETT. Thank you very much.

General O'Donohue.

General O'DONOHUE. Mr. Chairman, we just have one statement for the Marines. I am prepared to answer questions as we go, sir.

Mr. BARTLETT. Thank you all very much for your service and for your statements. As is generally my policy, I will reserve my comments and questions until after all of the other members of the subcommittee have had an opportunity to make their comments and ask their questions.

I turn now to my friend and colleague, the ranking member, Mr. Reyes.

Mr. REYES. Thank you, Mr. Chairman.

Thank you, gentlemen, for being here.

And, Sergeant Corp, thank you for your service and sacrifice you have made and your family has made on our behalf. I hope you feel free to take that off, because I am a little warm, and I am just wearing a civilian coat here. So please don't hesitate to take that off.

I have one question which may be basic, and there is probably good reason for this, but in Afghanistan—I just came back about a month ago—in Afghanistan, the Army standard individual weap-

on is the M4 carbine. The Marines, in contrast, use the M16A4. And I was wondering why don't we standardize the weapons? Why can't both services use the same type of weapon? Are there individual requirements that favor one over the other based on the services? I will wait for your answer there.

General FULLER. Sir, the Army also has M16A4s in its inventory. It has basically 600,000 M16s in the inventory and about 500,000 M4s. The M4s were brought into the field because our soldiers, especially in a close-combat fight, saw that they needed a shorter weapon.

If you see what Sergeant Corp has, that is an M4. It gives you an adjustable butt stock. It has a five-inch shorter barrel than the M16. So it is more optimized for coming out of a vehicle or operating in a vehicle with a shorter weapon so you can better engage, and also while you are in dismounted operations.

We work very closely with the Marines, and I will let General Kelley talk about that piece of it. But we work very closely with the Marines. As we look at our new individual carbine competition, we are sharing all of that information with the Marine Corps and with General Kelley's team. So we both have the same kind of weapon, the same types of weapons, and we just have more of them from the perspective that we have more infantry, and that is where our primary M4s are going, into our infantry formations.

General O'DONOHUE. Sir, the primary weapon, service weapon, for the Marine Corps is the M16A4. We also have a combination of M4s to fit the mission profiles briefed by General Fuller.

We have a different mission profile than the Army, which results in a different combination of equipment and requirements for both the dismounted marine and also for vehicles. We put a premium on range, marksmanship, and dismounted operations. We also use and employ the M4 for close combat and for missions and for marines who have the confines of vehicles.

Again, our focus is on the infantryman, and we design the vehicles around the infantrymen, and that includes the M16A4 for the advantages of range and accuracy.

Mr. REYES. Thank you.

That brings me to the second part of my question, and that is that for fiscal year 2012, the Army is requesting $8.5 million to begin a competition for a new individual carbine. At the same time, the Army has requested $35 million to buy new M4 carbines and an additional $41.8 million to upgrade the M4s that you already have in inventory.

To me, it seems unusual in that—at least I have not heard—and in talking to the soldiers and marines, there don't appear to be any problems with the current weapons. Is this just a modernization effort by the Army, and perhaps the Marines as well, in putting out for competition—is it the next generation that will replace the M4, or can you explain that to us?

General FULLER. Yes, sir, I can. Currently we have, as I said, 500,000 M4s in our inventory. There is an ability to improve that capability, and we call it the M4A1. It gives you a heavier barrel. A heavier barrel to the field means you can increase your sustained rate of fire, and you won't have any type of issues associated with the barrel overheating.

When you receive an M4A1 carbine, you also receive the fully automatic mode. So now soldiers can engage not only with a short-round burst, but a fully automatic, so they can pull the trigger, as you are probably aware. We have not had that in our weapons.

So we are taking our fleet of 500,000 M4s, and we are going to upgrade 140,000 of them to this M4A1 configuration, which is where you see the funding associated. We want to continue to improve the M4, not necessarily associated with a complaint or a challenge that the field is having, but we want to continue to refresh that technology. Is there a better way to provide them the way the weapon operates? Can we provide them a different operating system so the barrel, the bolt, the firing mechanism, we give them ambidextrous, because we don't have ambidextrous controls right now. So that is what you see.

We have made 63 improvements to the M4 since it was first was fielded into the force in 1991, and this is just another iteration of improvements. While we improve those 500,000 M4s, we want to see through a full and open competition is there something better available for our soldiers? And that is what this competition will be doing for our individual carbine.

At the end of that competition, we are going to evaluate the products that are available against our M4 and make a business case decision within the Army, is there something better? And is it substantially better and worth the investment to make an investment into a new, modern, or a different carbine, which we call the individual carbine?

So I hope that explains it. We want to improve our current fleet while at the same time looking at is there something else also available.

Mr. REYES. General Kelley or General O'Donohue?

General KELLEY. I will just echo what General O'Donohue said, that the M16A4 remains our primary weapon. But we have also enjoyed a close working relationship with the Army. It has been very open in terms of what they are pursuing. And at this particular time, on the acquisition side of the house, sir, we are monitoring what the Army is doing with the M4.

General O'DONOHUE. Sir, just to follow up on that, on the requirement side, again, with the M16A4 as seen in the context of we build the Marine Corps on the rifle squad, so to look at a weapon, to compare the Army's M4 with the M16A4 and service rifle to service rifle would be a better comparison than what we are looking at, the M4.

Also in the context of the rifle squad, we have the Infantry Automatic Rifle that is just being fielded. It is a significant decrease in weight both in the weapon itself and the ammunition. It replaces accuracy for volume in terms of suppression.

So if you look at the balance within the squad and the mix between the Infantry Automatic Rifle, the M16A4 and the carbine, which we use for more specialized purposes, that is how we derive the mix. So, again, we are monitoring the M4, but we have a different mix of weapons which give a different context and calculus to how we view the carbine.

Mr. REYES. Thank you.

Thank you, Mr. Chairman.

Mr. BARTLETT. Thank you very much.

Mr. Wilson.

Mr. WILSON. Thank you, Mr. Chairman.

I want to thank all of you for being here today. I am particularly grateful. I represent Fort Jackson, Parris Island, so I am very grateful. Also, I have four sons in the military, and, Sergeant, my oldest two sons served in Iraq, and so we appreciate your service. And then I, too, served for 31 years in Army National Guard, and I appreciate your diagram of uniforms, because this is me. I was at the National Training Center in 2001, and so I recognize this equipment. Of course, many people would recognize it now in a museum.

But the point is that you all really are providing the best equipment for the people protecting our country and our freedoms. We want the best equipment, and I appreciate you expediting as new innovations come about. This is just so helpful.

Back on the carbine, which obviously is of interest to all of us, and I want to join with my longtime friend Congressman Reyes on this, and that is with the future of the M4, has there been an analysis of alternatives as you are initiating the competition, General Fuller?

General FULLER. Sir, actually there would be two parts. If Dr. Markowitz would answer the first part, then I will follow up.

Mr. MARKOWITZ. Sir, my office was responsible for considering the need for analysis of alternatives and actually wrote a waiver request to Dr. O'Neill, the acquisition executive within the Army. I did that really based upon two important considerations. One was the Army's Training and Doctrine Command had just completed a very comprehensive capabilities-based assessment looking at overall small arms. It provided much of the spadework you would normally associate with an analysis of alternatives, identifying what was the need of the actual carbine itself, its key performance parameters and key system attributes, as well as the desired need.

Additionally, working closely with our acquisition brethren, we looked at what is the additional information needed to complete this type of assessment. Most of the additional information we needed really had to come from industry and more detailed testing of what was available out there.

It was then my call to make a choice of did I want to have an analysis of alternatives without that industrial information, or waive this initial assessment, start the acquisition process, and do a more detailed assessment of what was out there and, with that more informed information, make the decision.

So my recommendation to the acquisition executive was to waive the formal AOA [analysis of alternatives] and really do in some ways a more comprehensive analysis based upon actual information from what is truly available from industry.

I will leave it to General Fuller to explain how the acquisition process will complement and get that type of information we need for an intelligent decision.

General FULLER. Representative Wilson, you are asking why didn't we do an AOA up front, and as Dr. Markowitz said, we are going to be doing this AOA, but we are going to be calling it a business case analysis. Let us take real products that are provided

through this full and open competition through an evaluation process. At the end we have real information, and we take that and we then do the business case analysis, which is really your analysis of alternatives to our M4A1 and M4 capability. The M4A1 will go through that exact same evaluation process so we ensure that we have sufficient data on exactly what is the capability that we have, and is this better, and why is it better.

So we are defining exactly what our criteria is for this business case analysis so we know what good is and what is better and how are we going to do this evaluation. This evaluation will be done at the end of the competition. It will provide you that AOA analysis. I think it is a prudent way to really provide our soldiers and our other stakeholders, like yourselves, as to why we made an informed decision as to did we buy another new weapon, or did we not, and here is why.

Mr. WILSON. This is encouraging, but I also want to verify that it is not going to be just based on the lowest bidder. It should be a combination of quality, cost with lifecycle included and manufacturing capability. Does that fit into what you are doing?

General FULLER. Yes, sir. Absolutely. As a matter of fact, when we go through the evaluation process of our individual carbine competition, it is a multiphased effort. It is production capacity. It is whether or not we receive our government purpose rights so we can then take that government purpose rights and allow other vendors to come forward and build that if we want to increase our rates of production. It is the evaluation of the life cycle costs, the sustainment costs, how well it maintains accuracy. There are a lot of different elements associated with that.

Mr. WILSON. And final question. Is this included in the fiscal year 2012 budget as to the proposal request? Does the continuing resolution have any effect, Dr. Markowitz or General Fuller?

General FULLER. Sir, the continuing resolution does not have an impact currently on our M4 or our individual carbine efforts because we had a funding line previously. So this is not a new start, which would have impacted it. But it could impact us in the future if we continue in this manner, but it currently does not.

Mr. WILSON. Would it be included in fiscal year 2012?

General FULLER. Yes, sir. It will be included in fiscal year 2012 and also fiscal year 2013. The competition will run through 2013, with a decision made in fiscal year 2013.

Mr. WILSON. Thank you very much.

Mr. BARTLETT. Thank you.

Mr. McIntyre.

Mr. MCINTYRE. Thank you, Mr. Chairman.

General Kelley, the Enhanced Combat Helmet, I know you state on page 8 of your testimony, and I quote, "is an example of the Marine Corps' efforts to provide greater protection at approximately the same or less weight as the currently fielded lightweight helmet." And then over on page nine you state that "the ECH is a collaborative effort between the Army, Navy and Marine Corps, with the Marine Corps acting as the program manager lead."

Could you tell me what is the schedule for the Enhanced Combat Helmet and when you expect to begin fielding this helmet specifically in Afghanistan?

General KELLEY. Sir, December 23 of 2010, sir, we gave the program manager for the ECH the Milestone C decision authority to go—to produce helmets for first article test. The first article test started in February. It will end in about 2 weeks, sir. Then we are anticipating fielding most probably in the first quarter of 2012, sir.

Mr. MCINTYRE. Is that pretty much following on schedule?

General KELLEY. What we have been noticing in first article tests most recently, sir, is some different performance than what we have noticed in DT [Developmental Testing]. We believe now that we have identified the root cause of the ECH helmet problem that we are seeing in the first article test right now. It occurs during the curing and paint process.

Normally when that helmet is developed, it will set on the shelf, and it will gas off. It will release air essentially and some water vapor, and then it will go through the curing process. That was as the process was originally intended from manufacturing.

In order to accelerate that process, bring the helmets, make them available more quickly, they increased the temperature at an earlier stage. So what we are noticing, that is changing the matrix, so to speak. We believe that we have identified what the problem is here.

What that might do for us, sir, is that we will evaluate the data in the next two weeks. We will probably need to do some additional testing. That might add about 45 to 60 days. That will probably start in the June timeframe. We are preparing to see what that will do as we cross the fiscal year. But we still believe that because our folks have been able to identify—and, by the way, we have been working with the Army on this. I think we all agree that we have identified the root cause and have a way ahead. So I would say the first quarter of fiscal year 2012 looks reasonable.

Mr. MCINTYRE. I would ask both of you to just to simply answer yes or no, and if the answer is no, why. Is the wearing of body armor ever optional in theater?

General FULLER. Sir, I believe it is no, but I will get that—I don't manage what happens downrange. We can get this officially for you on the record. I believe it is no. We give them options, and they can scale their body armor, but I don't believe they are not allowed to not wear body armor in the combat zone. We will get that for the record.

[The information referred to can be found in the Appendix on page 87.]

Mr. MCINTYRE. If you would in the next 10 business days.

General, in the Marine Corps, is it ever optional?

General O'DONOHUE. Sir, for commanders, lieutenant colonel and above, they have the option to modify the protective posture of the marines according to mission terrain, weather, and the like. It is not optional to the marine, but the commander will look at the mission profile. In fact, our aim throughout this is to give the most options to the commander so he can tailor his protection according to mission where mobility gives more survivability. That would be a case where he might want to scale down from the full modular tactical vest to a plate carrier, would be one example, sir.

Mr. MCINTYRE. The last part of my question: Are there adequate inventories of body armor available for training and combat oper-

ations in the Army and in the Marine Corps? If each of you would answer are there adequate inventories or not?

General FULLER. Within the Army, yes, sir. When we have our soldiers training prior to deployment, we provide them the body armor that they would be wearing in Iraq or Afghanistan, wherever their deployment is, and we also give them the hard ballistic plates. So they wear the full complement, get used to it, loaded the way that they are going to be wearing it when they deploy.

Because I talked about the grandmother's china wrapped in Kevlar, we ensure that that ballistic plate is still going to provide you the desired protection, and you haven't cracked it during your training. And we X-ray the plates prior to the soldier's deployment. We also X-ray them midtour during their operations. So we are constantly checking the inventory of our plates to ensure that the soldiers have high-quality body armor, and they have high confidence in it. But the objective is give them the capability—we have sufficient capability—before they deploy so they can train with it.

Mr. MCINTYRE. Thank you.

General.

General KELLEY. The answer is, yes, sir. I can't improve on anything that General Fuller set out, but I also want to say that we give the marines the gear that they need to exercise that option, the armor protective levels that Brigadier General O'Donohue discussed.

We also work with the Army in terms of monitoring each other's inventory just to make sure that in case if there is ever a shortage, that we would be able to support each other. But we go through the same process in terms of issuing and also checking the gear when a marine comes out of theater.

Mr. MCINTYRE. Thank you.

Thank you, Mr. Chairman.

General FULLER. And, sir, they are the exact same plates between the Army and the Marine Corps and the Air Force. So we all have the exact same plates.

Mr. BARTLETT. Thank you very much.

You heard the bells go off. We will recess for some votes when we have about 5 minutes remaining. There will be time for at least one more series of questions.

As required by the rules of our committee, those who were present at gavel fall will be recognized for questions in order of seniority, rotating between Democrat and Republican. For those who appeared in committee after gavel fall, they are recognized in the order of the time of their appearance at the committee, which means that Ms. Tsongas is our next questioner.

Ms. TSONGAS. Thank you. You know, I grew up in the Air Force, and one of the things I learned was to be on time. Occasionally it falls to our benefit.

I want to thank you all for being here today.

General Fuller, it is a great pleasure to see you. I am sad to learn that this will probably be your last testimony, but I know you will serve General Petraeus in Afghanistan very, very well. I look forward to seeing you there and hope for your safe return.

I would like to engage just in a little bit of pride of place. General Fuller, you and I took a tour of Natick, the Soldiers System

Center in Natick. It is not in my district, but not too far, and near the birthplace of our Nation's Army. I greatly enjoyed our visit there and learning about the research that has been conducted at this one-of-a-kind facility that treats the soldier as a system.

Massachusetts is also home to some of the most significant defense technology companies and as a cluster in the country. My district in particular has some remarkably innovative companies that do a lot of work around protecting the soldier, and much of it is making its way into all of the advances that we see here.

But the issue of body armor and its weight remains a great one. I was a new Member of Congress when I first came to this committee and heard testimony on the challenge of body armor weight. I asked a young soldier, who I believe, General Fuller, you had with you, if he was ever tempted to take off his body armor, and he replied, "Yes, indeed." So the commanders do have flexibility in the field, and I am sure that they are challenged often by those men and women they are overseeing to take it off.

But the issue of oversight has been a great one, and in the language in the fiscal year 2007 Defense Authorization Act, the President established a separate, dedicated budget line item for body armor, to improve research, development and procurement of it. And it was a great step in ensuring that the Defense Department focuses on this issue and allows us to provide better oversight.

I have two questions, and if we can't get to a full answer, maybe on return.

The Army is now approximately 14 percent female. How are your efforts, which I know you are working on with the Air Force, to research and develop more comfortable body armor for women progressing?

I will get to my second question if there is time.

General FULLER. Yes, ma'am. As you said, one size does not fit all within the Army. Fourteen percent of our force is women. We are, on the uniform side, actually developing a female-cut uniform. We are going through the evaluations of that right now.

On the body armor, what we have done when I talk about our new, Improved Outer Tactical Vest, we are in the second generation of it. It actually gives you more adjustments for our smaller-stature individuals in the military, such as women that might sometimes be of smaller stature. So we recognize that we need to do something, so that we have done it with the soft body armor having better adjustments for women, so when you adjust it, your side plates, for example, don't come all of the way around to the front by the time you have got the adjustment correct on your side.

In terms of the hard plates, we are looking at the technology, but there is still difficulties trying to get a more conformal hard-plate body armor available. The physics associated with trying to have the body armor work in a complex shape is just a bridge too far right now. We are working it, we are researching it. We are looking at is there a better way that we could interface. Can we provide some undergarment to our women that allows them to better interface the body armor to their body size and types? We are working through that also.

It is a challenge. One size can't fit all, we recognize that, but we don't have an answer at this time other than our soft body armor,

which now has better adjustments, and our female uniforms, which are in evaluation right now.

Ms. TSONGAS. Are you collecting any data around the impact of just sort of the current, sort of standard body armor and its capacity to protect women versus—and the need, sort of undergirding the need to move ahead on developing body armor that is adaptive to women, better suited to their body types?

General FULLER. Ma'am, we don't collect specifically data on women. We collect data on all of our soldiers to include the women. So I would say we don't have any specific data associated, but we can subcategorize that. I can provide for the record any data that we have concerning the collection of information.

But we recognize that it is a challenge. We are looking at it. As I said, we haven't figured out how to conform the hard-plate armor and provide that ballistic protection that the soldiers require, regardless of whether they are man or woman. But we are looking at that action.

Ms. TSONGAS. Well, I would suggest that you collect women-specific data just simply to drive the urgency of the need to focus on research and development in this area.

I don't know if I have a time for another question or if we need to go vote.

Mr. BARTLETT. We will do a second round of questions. Thank you very much for your questions.

Mr. Runyan, we have 6 minutes and 51 seconds remaining.

Mr. RUNYAN. Thank you, Mr. Chairman.

I thank everybody for coming out and answering some questions.

My background personally is very athletic, and I have some, as we all—we have concerns of weight and being mobile. My experience is, and I think in my past career in the NFL [National Football League], we have stripped all of the pads off. And I think a lot of soldiers would agree with that that it is easier to move without all of that on there.

Where is the threshold; do you know? When we weigh these soldiers down, when do these injuries set in, the arthritic knees, the backs? That is something I have experienced in my past life, and I am just curious if there is that data out there.

General FULLER. Sir, I understand what you are talking about, and as you just identified, there are a lot of different sizes of individuals. You or I might be able to carry more weight for a longer period of time, but it might have a more residual effect on us.

We are looking at this information. I would say we are really trying to do a better job of systems engineering at the individual soldier level. We recognize we do great jobs when we do systems engineering on platforms, and we have treated the soldier, as Representative Bartlett said, as a Christmas tree, and we just hang things on our soldiers. We recognize we can't do that. We have to do a better job of doing the system engineering, understanding what are the physiological challenges associated with adding more kit, regardless of its capability, and the impact it will have on our soldiers' ability.

As you recognize, once you start getting tired, your cognitive scale sometimes starts to become diminished at the same time, and that is not what you really want in a combat environment. So we

don't have specific information other than we are now thinking about this more holistically. What do we need to do to provide capability to the individual soldier, and what is that weight doing to that individual soldier, and understand the physiology associated with that.

At the same time, as we heard General O'Donohue talk about, we are looking at how do we start thinking of a unit instead of just an individual soldier. When I talk about Sergeant Giunta, Sergeant Giunta was not operating as an individual. He was in a squad inside a fire team inside a platoon. We are looking at small tactical units. Can we distribute some of this capability across a unit? What are the risks and the advantages so we don't weigh down everybody with the same exact capability, but distribute capability across the unit?

Mr. RUNYAN. Thank you, because also relating to that, and relating to wear and tear and also injuries leading to that, it becomes a fiscal problem in the end if you have to rehab soldiers, or they are being disabled or being taken out of service. It is really something I think we really do have to address. I appreciate your answer on the last question.

I yield back, Mr. Chairman.

Mr. BARTLETT. Thank you. We will recess now for the vote and be back as soon as we can. Thank you.

[Recess.]

Mr. BARTLETT. Our subcommittee will reconvene. Mr. Critz.

Mr. CRITZ. Thank you, Mr. Chairman. Thank you, gentlemen, for your testimony today.

I guess there is, I think, congratulations in order. When will it be official you will be Major General?

General FULLER. I hope it would be very soon, but it looks like June or July time period.

Mr. CRITZ. Well, congratulations.

My questions revolve around the sniper, counter sniper. Looking back through some information from years past, then Major General Petraeus was talking about sniper detection as a sufficient deficiency in 2003. Then Vice Chief of Staff of the Army Cody made counter sniper a priority in the spring of 2006.

So my question is, Dr. Markowitz, has the Army approved the requirement for soldier wearable sniper detection devices yet?

Mr. MARKOWITZ. Sir, that is a good question.

Mr. CRITZ. Sounds like a no.

Mr. MARKOWITZ. No, no. We are still exploring it is the short answer, and let me give some, if I can, a little bit of background.

Mr. CRITZ. It was brought up in 2003. It is now 2011.

Mr. MARKOWITZ. Sir, the counter sniper, when it was initially brought up, was very broad counter sniper concerns. We immediately started to do some TTP, or tactics, techniques, procedures changes and soldier training on our counter sniper, both avoidance and how to minimize the effects.

Very shortly after introduction of the TTP change, counter sniper casualties went dramatically down in Iraq. At the same time we started to field counter sniper technologies across the board, both providing vehicle-borne counter sniper gunshot detection systems that could identify where we put more remote mounted weapons

systems so soldiers wouldn't be exposed. We have expanded into areas like mannequins and decoys, various forms of deception devices, with several lessons learned across the piece. Those that have generally succeeded we have kept, including vehicle-mounted gunshot detection. We started to field a fixed site gunshot detection. That is very valuable. In fact, the Pentagon has just had that series of systems put around the boomerang projects. Individual gunshot detection has always been an area that has been the highest challenge, for a few reasons. One is it is weight for the soldier, which we have had some of the discussion today as one of our greatest challenge areas.

Mr. CRITZ. Right.

Mr. MARKOWITZ. Battery usage for its reliability throughout extended mission has been an issue we need to do. We fielded a system a year and a half ago. We had an ATEC assessment of it, Army Test and Evaluation Center, forward operating assessment. Overall, the feedback was negative of this initial version in that it had a lot of false positive rate for identification. When a fire occurred and soldiers went prone, they lost direction about where the shots had come from.

We initiated then a new operational needs statement, because we are interested in getting this technology developed and out in the field. That next generation has gone through the competition. Maybe General Fuller can talk about the status of the acquisition. In terms of the requirement, we are really looking forward to seeing how this next generation performs in Afghanistan. We want to make sure that we balance the weight and the capability systems well so that we don't ask for something that is too impossible to do or impose too much of a weight load on the soldier or battery load. So we will have to see how this next generation performs in Afghanistan. We are refining the requirement to our delivery systems so we can field it across the Army. Once we get that information, then we will start forward with a more deliberate requirement. But we are not stopping in terms of getting capability to our soldiers in the field.

Mr. CRITZ. The reason I bring it up, too, is that the Army put a request in the fiscal year 2009 emergency supplemental, and that was funded at—I am trying to think—13,500 detection devices were awarded a contract in 2010, but it was based on an fiscal year 2009 emergency supplemental of $50 million that was appropriated in June of 2009. So I guess the contract took 13–15 months to get awarded on a fiscal year 2009 emergency supplemental request? I am trying to get to where it took so long to get, one, from when a need was identified to where we are under contract as of October of 2010?

General FULLER. Yes, soldiers do want a dismountable or a gunshot detection system that they can wear when they are dismounted. We have that capability. When you talk about the fiscal year 2009 funding, we went through the rapid equipment force and bought a small number right off the shelf of this capability and got it immediately into the field. Then we wanted to do a full and open competition to allow other vendors to come forward. That did take longer than we wanted. We did get through full and open competition with that capability. The production will be available starting

in May of this year, and we will then start fielding it to our soldiers.

Did it take longer than we wanted? Yes. The process to go through full and open just took longer. But we did get initial capability, and that is what Dr. Markowitz said. The initial capability didn't work as well, so we then spiraled in these improvements into the full and open competition. So we believe what we were going to be fielding starting in May will provide the capability that the soldiers really want.

We are also trying to take that same capability and tie it into that Land Warrior-Nett Warrior capability so that not only do I know that someone is shooting at me, but I can push that information to others so maybe they can engage. But it has taken longer than we wanted, sir.

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

Mr. BARTLETT. Thank you very much. I now yield to Mrs. Roby.

Mrs. ROBY. Thank you very much. Thank you for being here today to answer our questions. I very much appreciate it.

We are currently fielding the plate carriers for soldiers and marines in Afghanistan which are considerably lighter than regular body armor. What is the long-term plan for fielding plate carriers, meaning do you plan to pair plate the Army and the Marine Corps?

General FULLER. Ma'am, the plate carrier, what we did was try to provide that commander with the capability tailored to their mission. So they have their full-up individual IOTV [Improved Outer Tactical Vest], individual outer tactical vest, that allows them to have full-up protection capability. They can then take off some of the components. We have protection up on the shoulders, for example, around the neck and in the groin area. They can take that off. It allows them to save about three- to-five pounds, depending on the size.

We gave them the plate carrier. The plate carrier just holds that hard ballistic armor plate front, back and sides. It gives that commander that flexibility. We are only providing it to our infantry units that are actually operating forward that need to operate outside of a forward operating base in or at altitude. So when you are starting to talk about reduction in the IED threat, because a plate carrier doesn't give you that soft armor protection you would need during and IED threat.

So we are not planning on fielding the plate carrier to all of the Army. We are fielding it to our infantry units, and infantry units specifically going into Afghanistan to give that commander that flexibility.

I have the ability to wear my full-up IOTV when I am in an environment that could be both rifle shot or IED, or I could wear my plate carrier so I could just have rifle shot protection, recognizing that my IED threat is low.

We are trying to give them that flexibility because of the weight.

General KELLEY. Currently we are fielding the modular tactical vest and the scalable plate carrier. The modular tactical vest, inventory objective there is about 108,000, ma'am, and about 64,000 for the scalable plate carrier.

In the Marine Corps, we plan on migrating to our improved modular tactical vest, which is the IMTV, and that will be paired with

just the plate carrier. Inventory objective for both of those is 108,000.

We had a chance to discuss a little bit earlier about options in the field for commanders, lieutenant colonels, and above in order to determine what protection level they determine for their particular force. So the IMTV, the improved modular tactical vest, paired with the plate carrier, gives our commanders out in the field that option.

I think it is kind of interesting that what happens, a lot of times we want to compare the modular tactical vest to the improved modular tactical vest. What we are really asking our guys to do out in the field is decide do I want my marines wearing the improved modular tactical vest or that plate carrier, and that is where you will see the delta in terms of weight.

We have done a lot of work also with our program manager for marine expeditionary rifle squad in terms of helping design the vests themselves in terms of proper fit, how much weight that they will carry, how it integrates with the weapons systems and radios that they will carry. So in the end for us, ma'am, it is the IMTV and the PC, the plate carrier.

Mrs. ROBY. Thank you so much.

General FULLER. Just as a point of reference, you heard me talk about a plate carrier and individual tactical vest and you are hearing General Kelley talk about IMTV and all these other acronyms. The same ballistic capability. Different names, just like we have different uniforms on, but the same capability, same ballistic protection regardless of what it is called between the two services.

Mrs. ROBY. Thank you for making that clear.

Mr. Chairman, I yield back. Thank you.

Mr. BARTLETT. Thank you. There should be time for a second round of questions. I just want to make a couple of comments now and then ask a question or two, and then we will have a second round of questions, and then I will have some final questions, if there is not interest in a third round, to close the hearing.

Several days ago another panel was before us, and we noted that the military does two things that we are frequently not involved in, that the Congress is not involved in. They decide to develop a new weapons program and they develop the requirements for that and the characteristics of that, and then they come to the Congress and say we would like you to fund that. And then for programs that don't go well, they come to us and tell us we think that this program needs to be aborted and we would like your consent to do that. Hardly ask our consent. We are just going to abort it and we are telling you we are doing that.

We asked that panel, could we be a part of the process? This should not be a semi-adversarial relationship between the Congress and the Pentagon, we would like to be involved in that process. What one of them told us, gee, this is an executive responsibility and you shouldn't really be involved in the process. So I took out my Constitution and I went to Section 1, which defines the responsibilities of the Congress, and Article I, Section 8 says: The Congress shall have power to raise and support armies, to provide and maintain a navy, to make rules for the government and regulation of the land and naval forces, to provide for organizing and arming.

I think arming refers to all of these platforms; doesn't it? The Constitution says that is our responsibility. And disciplining the military and the authority of training the military according to discipline prescribed by the Congress.

And then I went to Section 2 of the Constitution, which describes the powers of the executive, and I looked for all of those parts of Section 2 that relate to the military, and I found one. It says the President shall be the Commander in Chief of the Army and Navy of the United States and of the militia of the several states when called into the actual service of the United States.

So if we went strictly by the Constitution, the Congress ought to have responsibility for almost everything that the Pentagon now claims is the province of the executive and we have no responsibility for that.

The compromise, we would like to be in on the process. We have a very capable staff here. Some of our Members have a background. We have engineers. I am a scientist and an old farm boy. Because I was a farm boy and I was born in 1926 and lived through the Great Depression, we learned to make do. So when I got my doctorate in human physiology and I went to work for the Navy, I saw opportunities to make do with some of the skills that I developed in getting my doctorate and I ended up being awarded 20 patents, 19 of them military patents.

So I am pleading for an opportunity for us to work with you in developing these systems, and we would like to be in on the process. We hope that you will work with us.

Let me just ask a question or two, and then we will have a second round of questions. I will come back.

I hope that every time I recognize one of the members they will ask a question that I was going to ask so I don't need to ask any questions at the end. Several have been asked, but not all of them. I would like to ask a couple of questions about body armor.

How can we achieve better protection with less weight and how do you incentivize industry to do that? Ms. Tsongas has asked most of that first series of questions I had, but there is one part of it that hasn't been asked. How do we incentivize industry to be more creative and innovative in this area?

General FULLER. Sir, that is a good question. I think in part of your first discussion, I think there is always going to be dynamic tension between the executive, industry, and the Congress because we all have to operate together. When you are talking about trying to improve our body armor, we are trying to have our research and development arm look at new technologies, which we don't see anything that is game changing or within the near term that is going to change our ability to provide increased protection and lighter weight. So I think the next area we need to look at is what is our requirement and is it a validated requirement. What are we using as our means to validate that the product is what it needs to do.

We just went through a review of our body armor holistically, from head to toe, and we are going through that requirements generation process, and that potentially could allow us to provide a lighter plate to our soldiers.

We have technically overbuilt our plates right now. We overbuilt them because of our testing process. We said we wanted, the way

I say it is, we wanted to ensure that you can go in the ring with Mike Tyson. And if you could take two hits from Mike Tyson, then when Fuller climbed into the ring, you knew you would be able to survive those rounds.

That is the same thing we did with our body armor. We used a round that is not on any battlefield in the world, and we set that bar for a reason. Now we are trying to evaluate that bar because that bar causes us to have increased weight. Do you we want to adjust the bar? That is one way. If the technology can't get us there, can we adjust the bar and understand why we are adjusting it. So we are going through that review right now.

Having these research and development lines I think will assist us in keeping industry interested in pushing IR&D, their independent research and development, to try to find new technologies also. But we are looking at this. We are trying to find is there a new technology, is there another way to build the plate. We want to incentivize the contractors with our research and development line in fiscal year 2012 to have them come forward and say, We would like to have a 20-percent weight savings in the plate; can you achieve that and how would you do that.

Again, our end state is every soldier is protected regardless of where they are in the world, and we want to ensure that we don't ever reduce the capability of the plates from what it has to actually stop. But as I said, did we put the bar too high for the process that we used initially.

Mr. BARTLETT. Thank you. You mentioned a separate line. We are very pleased with that. We have been arguing for that for several years now. The armor used to be a part of clothing. It isn't clothing, but in order to get adequate focus on it we needed a separate line, and we are really pleased with that.

Two more really quick questions and then we will go to a second round. Please provide justification for using only government laboratory for all first article and lot acceptance tests for body armor components? Aren't there civilian labs out there that can do just as good a job?

General FULLER. Yes, sir. As you are aware, from the PEO Soldier perspective, we used to use predominantly commercial labs to do all our testing. PEO Soldier is about volume and velocity. Last year, we fielded 230,000 soldiers in the Army with that kit that Sergeant Corp is wearing, and that equaled to 17.8 million pieces of kit total. So it is about volume and velocity.

When we saw the threat change in Iraq specifically, we went from our SAPI [Small Arms Protective Insert] to our ESAPI [Enhanced Small Arms Protective Inserts] plates, our small arms protective inserts to our enhanced small arms protective insert plates. We needed immediately to buy two million of these plates, or two million sets of these plates. So what happened was we get the industry involved on building, and then we were going to commercial labs to do the testing.

We want to ensure that we maintain that high level of fidelity on our testing processes. Through your actions in the Hill, Department of Defense Test and Evaluation—excuse me—the Director of Operational Test and Evaluation, DOT&E, now has oversight of all of our testing operations.

The second thing we wanted to do was bring our testing in-house to ensure that we can maintain that pedigree from the time we produce that product, the time we test it to the time we field it through that nondestructive testing process we call the X-rays. So we wanted to bring it in-house. So we brought in our hard body armor testing, we brought in our soft body armor testing, and we are bringing in our ballistic eyewear, our helmet testing and also even fire-resistant capability.

But I am getting out of the testing business. I don't want to be working with the independent contractors that are doing this testing. I want to go to the Army Test and Evaluation Command and say, here is the capability, I need this tested, and then they can subcontract, which is what they will be doing to these private labs. They provide the oversight, they provide the support, they validate the product. I then am a customer to the testing lab.

So it is a fine balance when we are talking about that testing capability within the Army. If we have overcapacity, then we have an inefficiency from a financial perspective because people are waiting for someone to come. We don't want Maytag repairmen at our test organizations.

So we want to figure out what should be their overall capability and when we have these surges, if we needed new capability, we need to buy a lot of it and then have a lot of testing going on, they go out and subcontract and they certify the subcontract labs, which is what they have done. So they have done that on the hard plate side, they have done that on the soft armor side, and they have done it on the ballistic eyewear.

So we actually have a lot of testing ongoing at commercial labs even though it is now under the Army Test and Evaluation Command.

Mr. BARTLETT. Thank you, sir I am happy we still have competition. It makes everything better and cheaper. And thank you for sharing that. One other really quick question. We hear a lot of complaints regarding the current pad suspension system being too hard and that it lacks durability. Are you receiving similar complaints and what types of internal pad suspension systems will be used in the Enhanced Combat Helmet?

General FULLER. Sir, from our perspective, we have 1.1 million soldiers, and there is a lot of different head sizes. We are finding two things are going on. One, we actually are a high-tech Army. When we are talking about that body armor, I flippantly say it is your grandmother's china wrapped in Kevlar. It is high-tech. You need to care for it like it is high-tech. That is why we have the X-ray machines.

When we put a helmet on your head that gives you great ballistic and blast and blunt trauma protection. It is actually high-tech. You need to have it fitted to you. You just can't say, I think this is your head size, go ahead and wear it. When you wear it and you don't have it fitted to your head appropriately, or you don't wear all the pads that we provide to you, you end up saying well, the helmet doesn't fit me, and I think I need a new set of pads.

We are constantly getting feedback from the soldiers. We are trying to reinforce to them, understand how to wear the kit, understand the environment in which you think you want a softer pad

will also potentially create or exacerbate a blast effect which can potentially give you TBI or mild traumatic brain injury. We have to balance all this. We don't know if you are going to be operating in a warm environment one day and in high altitudes the next day. So the pads have to be able to respond to all those environments.

As we go through our Enhanced Combat Helmet with the Marine Corps, and our Army combat helmet, we are looking at a new pad solicitation. All vendors again, full and open competition, come forward, is there a better pad available than what we currently believe we have. Many people say we are buying a cheap pad. It is not a cheap pad. We don't go for the lowest bidder, we go for the best protection in that helmet to ensure that you give them that blast, blunt, and ballistic protection.

Mr. BARTLETT. Thank you very much.

Mr. Critz.

Mr. CRITZ. Thank you, Mr. Chairman.

Could someone provide the committee with some of the operational feedback you are receiving regarding the operation of the M4 in Iraq and Afghanistan?

General FULLER. Sir, we do post combat surveys on every brigade combat team that comes out of either Operation New Dawn or Operation Enduring Freedom, so Iraq and Afghanistan. We correlate all of that information. We ask them about all of the equipment they have, to include their M4s. High response on the M4s.

We, I believe, lost the system perspective when we talk about the M4 and its capability. When we fielded the M4, we used the exact same ammunition that had been developed for the M16. We forgot the system perspective, as Dr. Markowitz talked about in his opening comments. We are trying to provide that soldier the lethality package, it is a combination of the optics, the ammunition, the training, the weapon and the interface to the soldier. So you have to combine all of this together.

But we didn't think about the ammo when we gave them a carbine that actually has a shorter barrel. So some of the effects that we potentially saw, you saw a greater flash because the bullet, although it is not thinking, thought that it had an additional 5 inches to burn. So you have a flash at the end. General Petraeus actually did a byline, a personal request. He wanted flash suppressors for the forces in Afghanistan. I immediately responded and got flash suppressors. I contend we actually needed to give them better ammunition, which is now our new 855A1 ammunition. It is optimized to the M4, but it doesn't negate the fact that the marines are still using the M16A4. It doesn't have any impact, it is just optimized to the M4. So the burn in that bullet exiting the barrel is when the burn completes so you don't have a big flash coming out the end. When you don't have that flash, you have clean burn. When you recycle the weapon, we use that same gas to recycle the weapon. If the gas is dirty, you potentially could see an increase in dirty operating system inside your weapon which could potentially cause a jam. So you have to clean it more frequently.

Now we have the ability to give you a weapon, optimize the performance of that weapon with the ammunition, which gives you better performance in terms of the performance of the bullet, it gives you better performance in terms of performance of the weap-

on, and the soldiers are saying that they were concerned. We call it green ammunition. It gets the lead out of the ammunition. They thought it was going to be like fat-free and not work well. The soldiers are saying it works very well. It does exactly what they want it to do. We believe we will see any issues anybody ever had with cleaning their weapon or flash on their weapon will be mitigated from a systems engineering perspective.

Mr. CRITZ. Good. Just one quick question. Much of the debate and much of the testimony up to this point has been sort of the alarm that the military has, all branches and the Pentagon, with the CR [Continuing Resolution], what it does to what you are planning and industry. I was looking at your soldier modernization efforts, the Army's modernization efforts for 2011–2015, and I see the 50 cal, 50 percent lighter, helmet sensors, combat glove, mountain combat boot, water treatment. Now these are in your fiscal year 2011. What is the impact of the CR on these programs, not even looking at fiscal year 2012 out to 2015?

General FULLER. A great example, sir. When you talk about that lightweight 50 cal, we call it the XM806, 50 caliber machine gun designed to be able to take all of that heavy recoil. Our contractor has come up with a concept that is still in development that says we can give you half the weight of that 50 caliber machine gun, same capability, same ammunition but at half the weight. We have to delay that program for a year based on the continuing resolution.

A lot of our other items, when we look at the mountain combat boots, for example, Operation Enduring Freedom, camouflage pattern, is the cash flow is different when we are in a continuing resolution. So it might not have an impact on an actual program, but it has impact on how the cash is flowing. And the way that cash is flowing, we talk about small vendors building uniforms, for example, and so we have these ripple effects. So it is creating a challenge within PEO Soldier, the way the cash is flowing due to the continuing resolution.

Mr. CRITZ. We are just as frustrated as you are, and I want to let you know that all of us on this panel are working very hard to move this forward.

But thank you, and I yield back.

Mr. BARTLETT. Thank you very much. Mr. Runyan.

Mr. RUNYAN. Just one quick question, Mr. Chairman.

You talked about temperature relating to the equipment. Have you addressed body temperatures and fatigue relating to the soldier?

General FULLER. Yes, sir, we have. As a matter fact, Sergeant Corp is wearing today our Army combat shirt. Before you would have worn your Army combat uniform, which would have a blouse on top. Then you put your body armor on top, and when you put your body armor on top, you would find that it would retain all that heat in a hot environment. Or just because you are now carrying all of that weight, as we were talking about earlier, so you are generating a lot more heat yourself.

We have an Army combat shirt which has moisture wicking material here in the center underneath where you have your body armor, and we have both weights, winter weight and a summer

weight depending on where you are and what the environment is. At the same time, we still want to give them that protection and the protection we are talking about on the shirt is fire resistance. So it is a fire resistant shirt, doing system engineering interfacing to ensure that there is no exposure of material that could potentially allow you to be burned if you were in an event that had some flash fire. So that is how we are trying to mitigate some of that.

Another item he has on is the camel back or the water hydration system. Having the ability to carry water on you and be able to drink it very easily by just having a tube system keeps you hydrated. So we are again thinking of the soldier as a system, trying to think through what does a soldier actually need. They need to keep them cool sometimes and warm sometimes, and when they are getting hot from all of the weight they are potentially carrying, how do you mitigate that by wicking the moisture away.

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

Mr. BARTLETT. Thank you.

As a senior member of the Science Committee, I have now been twice to the South Pole. I sometimes use this as an example of how you kind of get in a rut and keep doing the same thing even though it may not make much sense. At the South Pole, the sun shines continuously for six months without a cloud in the sky. That is a real desert. They have two inches of precipitation a year, and the wind blows incessantly, sometimes 100 miles an hour. It is blowing 24–7 year around. Guess where we get our energy from at the South Pole? We fly diesel in on an airplane to run a diesel generator. It shows how you can get stuck in a rut. Obviously, what we need to be doing at the South Pole is solar in the summertime down there, and wind all of the time down there.

I think we kind of got stuck in that same rut with our soldier. If the soldier needs something, of course he carries it because is what soldiers have always done. So if he needs more, he simply carries more. I am very pleased to note that the 4th Brigade of the 101st Airborne is thinking outside the box. They now have employed six donkeys to serve as pack animals to help them carry this gear. Through the centuries, men have found other options than putting it on their back.

The American Indian, who hadn't invented the wheel, did find that if he cut down a sapling and put his teepee on the sapling, it was easier to get it to the next site than it was to carry it on his back. When we discovered the wheel, we found it was easier to put the load on a wheeled vehicle and then pull that rather than carry it on our back.

And I wondered if you had really been thinking outside the box—if you want a pack animal, I would suggest that a neutered male goat would do a really great job. They are really tough animals. If you bottle-feed them, they will follow you around like your pet dog all the rest of their life. If you are looking for something to carry things for you, you couldn't do better. By the way, there are a lot of goats over there, and they survive very easily in that environment.

I would also like to suggest, and again this is because I am a farm boy and see some opportunities to make do. I would like to at least look at why don't we provide the soldier with the means

of having that with him other than carrying it on his back. And I am not sure what that would be, but I would sure like to look at things to address that problem.

There was a comment made here about please walk through the Army and Marine Corps requirements board process? How often do you meet? What have been the major results of your meetings? What it is describing there are all the things that the Constitution says Congress ought to be doing. Now I know that the Congress through the years has perhaps unintentionally relinquished most of their constitutional authority to the executive and the courts, and we ought to be about trying to get some of that back. But at least at a minimum, couldn't we be involved in that process so that we understand when you come before us in a hearing how you got there, so we are a little more enlightened and can be more helpful to you; would that be okay?

Mr. MARKOWITZ. Sir, I am not an expert in the Constitution, but in terms of the requirements process, we have been looking to how to reform it. And particularly in light of the Weapons Systems Reforms Act, which has placed increased emphasis on analysis of alternatives and cost-benefit analysis and trade assessments. I know even for the ground combat vehicle, Congress has asked for all of the information that had been done for that analysis of alternatives submitted to Congress, and we are now in the process of doing that.

In some ways the request would be if you look at how we do that Weapon Systems Reform Act and how to integrate what has been asked of the Department of Defense and what we are now trying to comply to with your request so that we have kind of an efficiency for how we do these kind of cross-leveling or cross-assessments. People in my office will get a request from some Member of Congress for our analysis of alternatives and the background for why a certain requirement is the way it is. And we gladly try to share that information. But it is haphazard. It depends upon the system and the congressional interest at the time. I would ask that if we look at it, we just combine what is now done in terms of acquisition reform with this request. If it goes forward, how to streamline those two efforts, sir.

Mr. BARTLETT. I am sure that you have a very mature, meticulous, detailed process for making these very important decisions. You have outside consultants, technical consultants, that advise you. You look at the technologies and ascertain how far you can go with these technologies. You are making these decisions. You do board gaming, which really identifies deficiencies that you need to address. I am just appealing that we would like to be a part of that process. Traditionally Congress has not been a part of that process, but I think that we should have been. The Constitution says we should be a part of that process.

By the way, I am very pleased that you see your exercise in the M4 as determining whether or not there is something better, that you are not determined you are going to have a new weapon, you want to see if in fact this new weapon is enough better than improving what we have got. As the old farmer says: Will the juice be worth the squeezing? And there are lot of things in the military where you need to apply that old farm principle to it.

Well, I have a lot more questions I could ask, but your time is very valuable. So if it is okay with you—Mr. Runyan, do have an additional comment or question.

Mr. RUNYAN. No, Mr. Chairman.

Mr. BARTLETT. Okay. If it is okay with you, we will submit the remainder of my questions for the record where you can do a better job of answering rather than on the spur of the moment here. Thank you very much for your service.

General Fuller, thank you for your service. The shoes that have to be filled are both figurative and literally really big shoes. Your successor has a real challenge, sir. Thank you for your service. I thank all of you very much for your service to our country.

The subcommittee is adjourned.

[Whereupon, at 11:35 a.m., the subcommittee was adjourned.]

A P P E N D I X

March 17, 2011

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 17, 2011

Statement of Chairman Roscoe G. Bartlett (R–Maryland)

House Subcommittee on Tactical Air and Land Forces

Hearing on

Soldier and Marine Equipment for Dismounted Operations

March 17, 2011

The Tactical Air and Land Forces Subcommittee meets today to receive testimony on Army and Marine Corps modernization programs for equipping the dismounted soldier and marine.

The hearing today will provide the Subcommittee with a better understanding of the holistic approach the Army and Marine Corps is using to effectively develop, coordinate on, and procure equipment used by the individual soldier and marine.

As I mentioned in my opening statement during last week's hearing on Army modernization programs, I believe the number one modernization priority is always the individual soldier and marine and those programs should always be adequately resourced.

I want to stress those same points today. There is no doubt that the equipment, body armor, and processes that our soldiers and marines have and use today is saving lives and has greatly improved during this past decade. I commend the witnesses before us today for the effort and hard work they have done in this area.

I've often wondered though if we would have taken just five percent of what was spent on the now-terminated Future Combat Systems program and applied it to lessening the weight of what our soldiers carry, where would we be today?

We can certainly appreciate the daunting task that our witnesses face in managing these programs. In the case of the Army, PEO (Program Executive Office) Soldier manages approximately 477 products and programs that are considered individual soldier equipment, however according to Department of Defense criteria, none of these products or programs are considered to be a "major defense acquisition program."

This committee will always support continuing to enhance the individual soldier and marine's capability and protection, however the price we often pay is in even more weight which may or may not result in sacrifices to individual performance.

Individual riflemen commonly carry in excess of 100 pounds of gear on all dismounted missions; some much more than that. Excessive equipment weight is a consistent complaint that we hear about when we talk to our deployed soldiers and marines: They say "make it lighter." Not surprisingly, we are also seeing an alarming number of muscular-skeletal non-combat injuries in our military hospitals that are placing more and more soldiers and marines in non-deployable status.

It seems that for every good idea in weight reduction there is a good idea for something new to "hang" on the soldier, not to mention the problem of power, primarily batteries. In fact, some have used the analogy of a Christmas tree where the soldier is the tree and we keep hanging more gear on the soldier.

The Army has programmed from Fiscal Year 2012 thru Fiscal Year 2016 over $2.0 billion for their Nett Warrior program, a program that consists of several components that are integrated into the "network" and will provide improved situational awareness and better understanding of the battlefield to the dismounted soldier. The Army expects this to translate into soldiers being at the right place, at the right time, with the right equipment making them more effective, more lethal, and more survivable. However, this system adds at least 12 pounds to the soldier's combat carrying load and requires at least 2 batteries per day. Does this added capability warrant the additional weight?

So the question we hope to answer today is: How do we lighten the soldier and marine combat load while also continuing to maximize their combat effectiveness and capability?

We also expect to receive updates on the Army and Marine Corps body armor program, to include test and evaluation processes, current weight reduction initiatives, and the new "joint" Enhanced Combat Helmet—the ECH—program.

I understand the ECH is expected to significantly improve the ballistic protection capability from the current fielded helmet. I

want to emphasize that ballistic protection is only one aspect that needs to be addressed regarding helmet capabilities. The other aspect, and just as significant, is protection from blasts and blunt trauma—the primary cause of traumatic brain injury which continues to be the most prevalent injury from operations in Iraq and Afghanistan. So we look forward to hearing today how the ECH will provide better protection from TI.

This hearing will also provide the opportunity to receive updates on the Army and Marine Corps small arms acquisition strategies to include the M–4 carbine. I understand the Army is preparing to conduct a full and open competition for a new, individual carbine that could potentially replace the existing M–4 carbine. Among other things, we expect to learn the details of this competition.

In the end, everything touches the individual soldier and marine and consequently impacts them. We must continue to provide them with the best possible equipment available.

Opening Remarks for Congressman Mike McIntyre
Tactical Air-Land Forces Subcommittee Hearing
March 17th

First, I'd like to thank our witnesses today for their service to the nation. All of you are directly involved in making sure our Soldiers and Marines have the very best equipment, which is a very serious responsibility to carry.

I'd also like commend Chairman Bartlett on having a hearing focused on how we equip the individual Soldier and Marine.

This is a critical issue facing today's military in light of the kind of combat our troops face every day.

The war in Afghanistan is often fought by small groups of Soldiers or Marines in very tough terrain.

And, our troops often fight outnumbered, so maximizing the capability of each one of them is essential.

It is also the right thing to do because it gives each one the very best chance to come home safely.

While much progress has been made since 2001, much more work remains to be done.

Just like we want our tanks and other vehicles to have a clear "overmatch" capability against enemy tanks, we want our individual soldiers to have a big advantage against enemy infantry.

In short, we don't want to see a "fair" fight. We want even our individual troops and small units to be able to handle anything they come across.

How to do that without giving troops more equipment than they can carry is a difficult challenge.

Weapons, ammunition, water, food, and the many other things a Soldier or Marine must carry in combat adds up quickly.

Add to that weight the difficult terrain and weather conditions they face in Afghanistan and the task of figuring out the right balance gets even more difficult.

Of the many issues the Army and Marines are trying to deal with, two seem to stand out:

First, how do we provide protective body armor without making a Soldier or Marine's load too heavy to be effective?

Second, how can we lighten the load of our own weapons, ammunition, and other gear?

If we can solve those two key issues, we would be a long way toward making out troops even more effective than they already are today.

I look forward to learning more today about the progress the Army and Marine Corps are making in this area.

With that, Mr. Chairman, I yield back.

RECORD VERSION

STATEMENT BY

BRIGADIER GENERAL (P) PETER N. FULLER
PROGRAM EXECUTIVE OFFICER SOLDIER

BEFORE THE

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

ON SOLDIER AND MARINE EQUIPMENT FOR DISMOUNTED OPERATIONS

FIRST SESSION, 112TH CONGRESS

MARCH 17th, 2011

NOT FOR PUBLICATION
UNTIL RELEASED
BY THE COMMITTEE
ON ARMED SERVICES

Chairman Bartlett, Congressman Reyes and distinguished members of the Subcommittee: On behalf of the Army, I want to thank you for giving me the opportunity to appear before you today so that I can discuss what we are doing to support our Soldiers. I also want to thank you for your continued support as the Army and specifically PEO Soldier strive to ensure that all of our Soldiers are lethal, survivable and can operate in any environment. The well being of our Soldiers is our Army's number one priority, as I know it is your number one priority.

SSG Giunta

Less than two months ago, Staff Sergeant (SSG) Salvatore Giunta stood before you to receive the Congressional Medal of Honor. As you are aware, SSG Giunta was awarded the Medal of Honor for his selfless actions on October 25, 2007 while operating with his squad, an element of the 173rd Airborne Brigade, in the Korengal Valley of Afghanistan. Prior to SSG Giunta's deployment, the PEO Soldier team fielded SSG Giunta and his unit with equipment. I submit to you that SSG Giunta was able to stand before you on that day because of our combined efforts to ensure he was prepared to fight in Afghanistan.

In November of 2006, SSG Giunta and his fellow Soldiers received numerous pieces of designated equipment to ensure that they were lethal, survivable and able to operate in the environments of Afghanistan. Their lethality gear included the M4 carbine, 40mm grenade launchers, and rifle optics, to name a few. Their survivability gear included the Army Combat Uniform, the Army Combat Helmet, Outer Tactical Vest (OTV) soft body

armor with Enhanced Small Arms Protective Inserts (ESAPI) hard plates, and ballistic eye protection. We know that SSG Giunta's body armor worked as intended, since his body armor stopped enemy bullets twice, allowing him to continue his mission. His unit also had equipment that included the AN/PVS-14 Night Vision Device, a rucksack, climbing gear, cold weather gear and a variety of other items to assist them in accomplishing the mission in the Afghanistan operating environment.

If SSG Giunta were to deploy to Afghanistan today, he would barely recognize some of the equipment we are providing. Currently, a Soldier going into Afghanistan will still deploy with the M4, but now he takes ammo designed for better performance and less visual signature, the M855A1. We have also deployed lighter body armor in the Improved OTV (IOTV) which is not only weighs less but provides a better fit through side adjustments.; in addition, we designed and deployed a hard body armor plate carrier that weighs about 15 pounds less than what SSG Giunta wore during his deployment. This lighter weight system provides field commanders with the ability to select the level of body armor needed to support the specific mission. Soldiers going to Afghanistan are now deployed with fire resistant combat uniforms and combat shirts, pre-treated with insect repellant, and in an appropriate camouflage pattern for Afghanistan; two pairs of mountain combat boots; and a machine gun that is 9 pounds lighter, just to name a few items. Many of these improvements were made because of Soldiers like SSG Giunta providing us feedback on what needed to be improved to be able to conduct their mission -- to ensure that they are lethal, survivable and can operate in any environment.

When I talk about the equipment we have provided to SSG Giunta and the many improvements we have made since then, I am talking about some pretty high tech capabilities. Some do not believe that the Army is high tech – they look at the Air Force fighters or the Navy's nuclear submarines and they think that the Army just does not measure up. But I am here to tell you that our Army IS high tech. Take our body armor for example, some think it is just your grandmother's china wrapped in Kevlar, but it isn't. Body armor is developed to provide the best protection for the least weight. It is specifically designed with the optimum set of ballistic materials and layering structures to ensure our Soldiers are survivable from threats on today's and future battlefields. Our night vision and precision targeting devices are providing unparalleled capability for our Soldiers to see in low-light and no-light conditions with accuracy and at greater ranges. The Army has now integrated and fused the functions of the Thermal Weapon Sight and an Image Intensifier to provide increased capabilities in a small profile system called the Enhanced Night Vision Goggles. We continue to improve the Soldier's situational awareness to help ensure his dominance on the battlefield. To this end, we have developed a gunfire detection system that uses acoustic sensors to help locate the enemy -- we start fielding these devices in Afghanistan this month. We are developing a Sense Through The Wall (STTW) system that uses Doppler radar to sense people inside of structures before Soldiers enter, a potential game changer for units clearing buildings. We are also working to replace the magnetic compass on our laser designator rangefinder with a much more accurate device that will allow our dismounted Soldiers to utilize our Nation's most accurate laser guided muntions like Excalibur and the Joint Direct Attack Munition (JDAM).

But high tech doesn't stop there – it extends into the Soldier's weapons as we provide our Soldiers with solutions that enable affordable precision lethality. Sometimes our first steps are not as affordable as we would like, but the capability warrants the extra initial cost. The XM25 is a definite example of where the cost is worth the capability. We have deployed a number of XM25, Counter Defilade Target Engagement Systems to Afghanistan. This is a system that breaks parity in the direct fire engagement and clearly provides us with overmatch. Warfighter feedback illustrates the game changing nature of these systems and their ability to significantly dominate during engagement. The Soldiers are calling it "The Punisher" and they absolutely praise its effectiveness. It defeats the enemy while providing better protection for our Soldiers. This system is a direct-fire, semi-automatic, shoulder-fired, man-portable system that provides a 25mm air bursting capability and enables small units and individual Soldiers to engage targets in defilade. With "The Punisher," the enemy can no longer hide behind a wall, shoot at our Soldiers and be protected against our counter fire. The Army is committed to continuous improvement in all of its weapon systems. To this end, we are modifying the M4 Carbine through the M4 Carbine Product Improvement Program (PIP) which will pursue a multi-path strategy to enhance the current carbines durability, reliability, maintainability, accessory integration, sustained rate of fire and overall ergonomics. We are also pursuing an Individual Carbine competition to ensure that the M4, a world-class weapon that has been battle-proven in thousands of firefights in the past ten years, is still the best capability that can be provided to our Soldiers. This competition will result in the selection of a weapon that

will be assessed for performance and value against the existing carbine capability – ensuring the best value for the Army.

At PEO Soldier we work hard each day to ensure that every Soldier is provided the best capability possible. We strive to give our Soldiers a decisive edge and to ensure they are dominant on the battlefield. I believe that the combination of our equipment improvements as well as our increased collaboration with our Sister Services, our industry partners and academia will ensure that our Soldiers are dominant on the battlefield. However, I believe that there is one area that needs more focus. GEN Casey spoke of it in his testimony of March 2nd to this committee and I quote: "*...No matter where our Soldiers are operating, they need to know where they are, they need to know where their buddies are, they need to know where the enemy is and when they shoot at the enemy, they need to strike them with precision.*"

We are working hard to provide our Soldiers with this capability while at the same time not burdening them with its added weight - weight that in the Afghanistan environment impacts their physical and cognitive abilities. The need to have this capability is made clear by looking at SSG Giunta's situation in October 2007. When SSG Giunta was on his mission, he wanted to know where he was, where his friends were, and where the enemy was. Reviewing that operation as recounted by SSG Giunta, we see that SSG Giunta tried to find his best friend Sergeant (SGT) Brennan during the battle and had to look several different places before he was able to determine that the Taliban was trying to separate SGT Brennan from the unit and

capture him. If SSG Giunta had this capability on that day, he would have known immediately where both SGT Brennan and the enemy were located.

We have this capability today in limited quantities in Afghanistan – we call it Land Warrior. It provides unprecedented tactical awareness as well as significant improvements in lethality, survivability, and sustainability of these dismounted Soldiers. Land Warrior equipped Soldiers are able to see their location, the location of friendly forces in real time, and exchange critical tactical information with both ground forces and close air support aircraft. This allows our Soldiers to have a decisive advantage over enemy forces. Knowing where your friends and enemies are helps us to dominate the battlefield. However, this capability comes with a weight penalty to the Soldier.

Our next increment of the Land Warrior capability is called Nett Warrior (named after COL Robert Nett, who received the Medal of Honor as a Lieutenant in World War II). Although the Nett Warrior weight is only 12 pounds (three pounds less than that of Land Warrior), we have not removed 12 pounds worth of other equipment when we provide this capability to our dismounted Soldiers. It is fair to say that we are currently challenged to claim that a Nett Warrior equipped Soldier is "high tech" when compared to the capability and weight of commercially available smart devices, but it is the Army's first essential step along the path to getting the Soldier into the network. Nett Warrior is setting the stage for the Army to facilitate the technology, security and capability trades that are essential to getting us to that lightweight network capability. The next versions of Nett Warrior will adopt the advances made by commercial industry in creating smart

devices, so we will see a significant reduction in size and weight while capabilities continue to increase.

Systems Engineering – Soldier as a System

I often remind my team that we do not build anything within PEO Soldier, but instead we rely on the hard work and efforts of our industry partners - many of them located in your districts. Last fiscal year alone, we fielded over 230,000 Active, Army National Guard and Army Reserve Soldiers with over 17.8 million pieces of kit. This equipment included everything from socks to thermal sights. When we fielded these 17.8 million pieces of Soldier kit, we tried to do the systems engineering to ensure that we saw the Soldier as a System. We don't want to continue to treat a Soldier like a Christmas tree -- where we just hang more things on them. Instead, we have been making a deliberate effort to integrate these technologies together to provide a capability that we put onto the Soldier. With a systems approach, PEO Soldier is doing a better job of looking at the Soldiers' operating environment and trying to ensure they have the right equipment to be decisive. For example, we are focusing many efforts on the weight that our Soldiers carry. We understand that there is a need to lighten their load and we continue to partner with government, academia and industry to work initiatives that could potentially help reduce the weight burden of our equipment – much of which is due to Soldier protective equipment. To that end, in the next fiscal year, we will have two new Research and Development lines to fund Soldier protective equipment research. These funding lines will support efforts such as research into new lighter weight materials for

our hard ballistic plates, which, on average, weigh 25 pounds per Soldier, new fire resistant materials and more effective ballistic eyewear.

We are also thinking of the Soldier as an integral part of a Tactical Small Unit (TSU). We have learned over these past ten years of sustained combat operations that we fight not as individual Soldiers, but as members of a team, a squad – or Tactical Small Unit, with SSG Giunta's testimony just one great example. This realization has provided a new way to look at how to outfit our Soldiers and opens up possibilities to lighten the weight of the individual by looking at its distribution among the members of these TSUs. Our doctrinal fighting load consists of 48 pounds; however it can range up to 120 pounds depending on the mission of the Soldier. The average load for our Soldiers operating in Afghanistan is 63 pounds, with many Soldiers carrying up to 130 pounds. The ability to distribute the individual Soldier's load across the TSU may be key to reducing their burden and ensuring overall physical and cognitive dominance.

Process Improvement

We continue to make great strides in our processes to ensure a Soldier portfolio second to none. In February 2009, we made several changes within the PEO, to include standing up a Task Force focused on Soldier Protection, as well as creating a permanent internal audit team. The combination of the Task Force and the audit team greatly strengthened the oversight of our of body armor testing. Furthermore, we have taken to heart the input from the various audit agencies like the Government Accountability Office, the DoD Inspector General, as well as many others who made

recommendations for improvements to our processes. A total of 61 recommendations have been made by the various audit organizations and all but four recommendations have been addressed and implemented, with the remaining four recommendations expected to be closed this summer. Because of this assistance, our body armor testing methodology has transitioned from good to great, our tests are rigorous, our standards of quality are high and our management controls are second to none. As SSG Giunta can attest, the quality of our products should never be questioned, but I freely admit that there were some challenges in our old processes.

Another process improvement which serves to underscore our commitment to the Soldier is the development and fielding of a number of Nondestructive Test Equipment units that x-ray hard body armor plates when Soldiers are out on rest and relaxation (R&R) leave. The NDTE looks for cracks and/or any sign of damage to the plates. As a result, Soldiers are issued freshly tested armor plates upon their return from R&R. We confirm this commitment through our extremely rigorous surveillance of our body armor – doing routine inspections on a regular basis from the unit level up to ensure that the Soldier has the best protection available.

All Together

I once heard someone mention that we had many "Cylinders of Excellence" within the Army and the Department of Defense (DoD). This has been true in the past but we are beginning to see a change in this behavior. PEO Soldier is striving to better communicate and collaborate across these "Cylinders of Excellence" – something that

is critically important when one realizes that in the end, everything touches and/or impacts the Soldier.

One of the benefits we have seen over these past six years since PEO Soldier was stood up, is the value of our increased emphasis on how we field the kit to our Soldiers. Within the PEO, we established and maintain integrated fielding schedule so that at the unit level we minimize impacts to Soldiers' schedule and training, while at the same time maximizing their available dwell time. We are also working with other Program Executive Offices to synchronize our efforts and to provide a truly integrated product. Additionally, we have been working with our sister Services as well as the Special Operations Command to create efficiencies in the Soldier as a System concept, in lightening our Soldiers' load and in looking for revolutionary advances in equipment solutions that would meet our Soldiers' challenges. We do this through hosting meetings to specifically address capability development, thus potentially increasing our efficiencies as well as reducing redundancies across DoD. It was through this type of communication and collaboration with the Special Operations Command that we discovered and then fielded our Soldiers with a machine gun that is nine pounds lighter than the current Army system.

An example of this emerging spirit of collaboration would be a recent conference that PEO Soldier sponsored on Head Protection. This conference was open to members of the DoD, the Veteran's Administration, academia, and professional sports participants. Our goal in sponsoring this event was to ensure that all of these "Cylinders of Excellence" were aware of each other's efforts in an area of great importance to the

Warfighter. This collaborative approach focused on the causes, effects and potential mitigation of head injury in the areas of blast, ballistic and blunt impact to our Soldiers.

Another example of collaboration is our on-going efforts with the U.S. Marine Corps with regard to the development and procurement of an Enhanced Combat Helmet (ECH). The ECH will have the same form, fit, and function as the current Advanced Combat Helmet (ACH) design, but with increased ballistic protection over that provided by the ACH – potentially at either equal or lighter weight. Testing continues, but the results look extremely promising and are exceeding our expectations. The results of this effort are being closely monitored by other Services and organizations.

It was through our collaboration with our sister Services that we realized the benefit of a female combat uniform. Recognizing that the Army is comprised of 14% women, we are currently evaluating a Women's Army Combat Uniform to better meet their needs. The female combat uniform is designed to better fit a woman's body. A Human Factors study conducted on our new female uniform last year at Fort Polk, Louisiana found that issues of restriction and discomfort were few in number and the uniform has been well received by its participants.

Whenever possible, we conduct our development, testing or procurement efforts in collaboration with the other military Services and organizations to increase efficiencies across DoD. Whether we are discussing the camouflage uniform, helmet improvements, night vision devices or even our weapons systems, we are collaborating across the DoD. For example, we are providing members of the U.S. Air Force with our

new camouflage uniform specific for Afghanistan - Operation Enduring Freedom (OEF) Camouflage Pattern (OCP) - as they deploy to Afghanistan. This was based on the decision by the U.S. Air Force leadership to leverage the Army's research into effective camouflage specific to the OEF environment, as well as utilizing our uniform production contracts to outfit their personnel - a great example of DoD efficiencies. We manage the development and production of night vision goggles for the USMC and thermal weapons sights for all Services. In addition, we have shared a very effective capability, the Common Remotely Operated Weapon Station (CROWS), with the Air Force and SOCOM to increase MRAP survivability and lethality. These are just a few examples of collaboration.

In our October 2009 report to Congress concerning our camouflage uniform efforts, we highlighted that we had a multi-phased strategy to ensure our Soldiers have the appropriate uniform camouflage regardless of their location. Our lessons learned in developing OCP is supporting the last phase of our efforts. We have an initiative underway to develop a potential family of uniform patterns that could be used by an expeditionary Army in multiple environments worldwide. Perhaps more importantly, we are seeking a pattern that would work in concert with the family of uniform patterns and be applicable to our Organizational Clothing & Individual Equipment (OCIE) (the largest expense for which we would have to maintain multiple patterns). We are working with our sister Services on this initiative which has the potential for their application and could be another efficiency if implemented across DoD. Across the DoD, we continue to

look for ways to save resources while we give our Soldiers the best capabilities possible.

Summary

Just because the Army has made great strides in improving our equipment from what we issued to SSG Giunta in 2006, we are not sitting back and resting on our laurels – more still needs to be done. I challenge this Committee and this Nation to not lose focus on our Soldier equipment as future difficult fiscal decisions are debated and implemented. The centerpiece of the Army is its Soldiers. My basic branch in the Army was Armor and I thought the tank and other combat equipment was the main purpose of the Army. I soon realized that our Soldiers are the strength of our Army, not the big ticket platforms. I learned that the purpose for those big ticket programs and platforms was for the Soldier – the Soldier is not an accessory of a platform, but the purpose for that platform. The tanks I operated in did not operate without me or my crew – we were the purpose for the tank.

The Soldier represents the heart of our Army. We need to care for them and their families. They are indeed our greatest source of strength and pave the way for the freedom our Nation enjoys.

Chairman Bartlett, Congressman Reyes and distinguished members of the subcommittee, I want to take a moment to thank you for your strong support of our Army. I want to express that appreciation sincerely on behalf of the men and women in uniform. It is an honor to serve with such professional Soldiers and it has been an

honor for me to have been able to represent them in appearing before you. As my tenure as PEO Soldier comes to a close, this will likely be the last time I testify in front of the Subcommittee in my current capacity. I will soon be wearing the equipment that we field to Soldiers and have complete confidence it its ability to keep me protected, lethal and able to operate in the OEF environment. I am deploying to Afghanistan to serve on GEN Petreaus's staff this June. It is with my sincerest thanks that I commend you on your unwavering support for our Soldiers. I would also like to commend your professional staff for their constant support, guidance and professionalism to me and my organization over the past two and a half years."

United States Army

Brigadier General Peter N. Fuller

Program Executive Officer, Soldier
5901 Putnam Road, Building 328
Fort Belvoir,Virginia22060
Since: Dec 2008

SOURCE OF COMMISSIONED SERVICE ROTC

EDUCATIONAL DEGREES
University of Vermont – BS – History and Political Science
Shippensburg University – MS – Public Administration
United States Army Command and General Staff College – MA – Advanced Military Studies
National Defense University – MS – National Resource Strategy

MILITARY SCHOOLS ATTENDED
Armor Officer Basic and Advanced Courses
Industrial College of the Armed Forces
United States Army Command and General Staff College

FOREIGN LANGUAGES None recorded

PROMOTIONS	DATE OF APPOINTMENT
2LT	8 Sep 80
1LT	8 Mar 82
CPT	1 May 84
MAJ	1 Jul 92
LTC	1 Jun 97
COL	1 Mar 03
BG	2 Jul 08

FROM	TO	ASSIGNMENT
Mar 81	Mar 84	Tank Platoon Leader, B Company, later Scout Platoon Leader, Combat Support Company, later Executive Officer, Headquarters and Headquarters Company, 1st Battalion, 37th Armor, 1st Armored Division, United States Army Europe and Seventh Army, Germany
Apr 84	Oct 84	Student, Armor Officer Advanced Course, United States Army Armor School, Fort Knox, Kentucky
Oct 84	Mar 85	Motor Officer, 1st Battalion, 40th Armor, 5th Infantry Division (Mechanized), Fort Polk, Louisiana
Mar 85	Mar 87	Commander, D Company, 1st Battalion, 40th Armor, 5th Infantry Division (Mechanized), Fort Polk, Louisiana
May 87	Dec 89	Assistant Professor of Military Science, 1st Reserve Officer Training Corps Region, Shippensburg University, Shippensburg, Pennsylvania
Mar 90	Jul 92	Logistics Research and Development Coordinator, United States Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Maryland and Kuwait
Jul 92	Jun 93	Student, United States Army Command and General Staff College, Fort Leavenworth, Kansas
Jul 93	Jun 94	Training with Industry, Loral Vought Systems Corporation, Grand Prairie, Texas
Jun 94	Jun 97	Program Integrator, later, Assistant Director, PATRIOT Missile Defense System, Ballistic Missile Defense Organization, Washington, DC
Jun 97	Jun 98	Liaison, Close Combat Anti-Armor Weapons Systems, Program Executive Office, Tactical Missiles, Arlington, Virginia
Jun 98	Jun 01	Product Manager, Single Channel Ground and Airborne Radio System (SINCGARS), Fort Monmouth, New Jersey
Aug 01	Jun 02	Student, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, DC

BG (Promotable) Peter N. Fuller

Jun 02	Jun 04	Military Faculty/Instructor, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, DC to include duty as OPERATION ENDURING FREEDOM Special Task Force Team Leader, Office of the Chief Information Officer/G-6, United States Army, Washington, DC
Jun 04	Aug 07	Program Manager, Brigade Combat Team, Stryker, Program Executive Officer, Ground Combat Systems, Warren, Michigan
Aug 07	Nov 08	Deputy Commanding General for Systems Integration, United States Army Research, Development and Engineering Command, Fort Belvoir, Virginia
Dec 08	Present	Program Executive Officer, Soldier, Fort Belvoir, Virginia

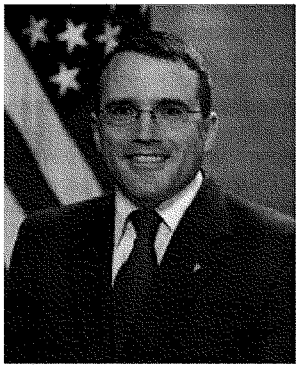
SUMMARY OF JOINT ASSIGNMENTS	DATE	GRADE
Program Integrator, later, Assistant Director, PATRIOT Missile Defense system, Ballistic Missile Defense Organization, Arlington, Virginia	Jun 94-May 97	Major
Military Faculty/Instructor, Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, DC to include duty as OPERATION ENDURING FREEDOM Special Task Force Team Leader, Office of the Chief Information Officer/G-6, United States Army, Washington, DC	Jun 02-Jun 04	Lieutenant Colonel/Colonel

SUMMARY OF OPERATIONS ASSIGNMENTS	DATE	GRADE

US DECORATIONS AND BADGES
Legion of Merit (with 2 Oak Leaf Clusters)
Defense Meritorious Service Medal
Meritorious Service Medal (with 2 Oak Leaf Clusters)
Army Commendation Medal (with Oak Leaf Cluster)
Army Achievement Medal (with 2 Oak Leaf Clusters)
Parachutist Badge
Office of the Secretary of Defense Identification Badge
Army Staff Identification Badge

Biography

Department of the Army



Dr. David M. Markowitz

Technical Advisor to the Deputy Chief of Staff, G-3
Office of the Deputy Chief of Staff, G-3
Headquarters, Department of the Army
Washington, D.C.

Dr. Markowitz was selected to the Senior Executive Service in February 2005. Since September 2007, he serves as the Technical Advisor to the Deputy Chief of Staff, G-3 and is the Director of Capabilities Integration, Prioritization, and Analysis, G-3/5/7. He oversees materiel requirements development for the current and future force, G-3/5/7 analysis, experimentation, and testing priorities, and budgeting and resource prioritization recommendations to the G-3/5/7.

From his appointment to the Senior Executive Service until his current position, Dr. Markowitz served as the Technical Director of the Center for Army Analysis. There, he oversaw all Center for Army Analysis support to Headquarters, Department of the Army associated with the Quadrennial Defense Review, the analytic agenda, and the analysis of Irregular, Disruptive, and Catastrophic challenges. He also was responsible for ensuring the quality of analysis performed by the Center's reach-back support to Operation Iraqi Freedom and Operation Enduring Freedom.

CAREER CHRONOLOGY:

- 1998 – 2005: Director of the Simulation and Analysis Center, Office of the Director, Program Analysis and Evaluation, Office of the Secretary of Defense
- 1998 – 1998: Department of Engineering Management and Systems Engineering, George Washington University, Washington, DC
- 1996 – 1998: Logistics Management Institute, VA
- 1991 – 1991: Office of Weapons Proliferation, Political-Military Bureau, US Department of State, Washington, DC
- 1989 – 1994: U.S. Army Research, Development and Engineering Center, Natick MA

COLLEGE:

- PhD, Operations Research, Massachusetts Institute of Technology, 1996
- AM (Magna Cum Laude), Mathematics, Harvard University, 1992
- AB (Magna Cum Laude), Mathematics, Harvard University, 1992

AWARDS AND HONORS:

- Department of the Army Decoration for Exceptional Civilian Service, 2007
- Office of the Secretary of Defense for Exceptional Civilian Service, 2005
- Chairman of Joint Chiefs of Staff Joint Meritorious Civilian Service Award, 2001
- Dana Reed Prize for Undergraduate Journalism, 1990

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS:

- Institute of Operations Research and Management Science
- Military Operations Research Society

MAJOR PUBLICATIONS:

- "Conventional Arms Negotiations for Today's Europe," *Harvard International Review*, vol.12, no.3, Spring 1990, p.49-52.
- "Fulcrums at Farnborough: Russia's New Fighter For Sale," *Harvard International Review*, vol.12, no.4, Summer 1989, p.71-75.
- "Future Needs of High-Tech Weaponry After the Cold War Thaws," *Harvard International Review*, vol.12, no.4, Summer 1990, p.54-62.
- "Heavy Traffic Analysis of Dynamic Cyclic Policies: A Unified Approach to Single Machine Scheduling," (co-authored with Reiman, M. and Wein, L.) *Operations Research*, vol 49, no. 2, p. 246-270
- Markowitz, D. and O'Keefe J., Menu Version of the Computer Man Program for MS/DOS Personal Computers, Technical Report Natick/TR-91/034L, US Army Natick Research, Development and Engineering Center, MA 01760-5015, June 1991.
- "Strategic Weapons in the Third World," *Harvard InternationalReview*, vol.12, no.1, Fall 1989, p.56-59. (Received Dana Reed Prize for Undergraduate Journalism).
- "The Stochastic Economic Lot Scheduling Problem: Heavy Traffic Analysis of Dynamic Cyclic Policies," (co-authored with Reiman, M. and Wein, L.) *Operations Research*, vol 48, no. 1. p, 136-154
- "Will We Be Ready: The Future of America's Surge Capacity," *Harvard International Review*, vol.13, no.1, Fall 1990, p.48-51. (500 reprints requested by the Naval War College, 1991).

NOT FOR PUBLIC UNTIL RELEASED BY
HOUSE ARMED SERVICES COMMITTEE

STATEMENT

OF

BRIGADIER GENERAL FRANK L. KELLEY
COMMANDER
MARINE CORPS SYSTEMS COMMAND

&

BRIGADIER GENERAL DANIEL J. O'DONOHUE
DIRECTOR, CAPABILITIES DEVELOPMENT DIRECTORATE
COMBAT DEVELOPMENT & INTEGRATION

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

SOLDIER/MARINE AS A SYSTEM

17 MARCH 2011

NOT FOR PUBLIC UNTIL RELEASED BY
HOUSE ARMED SERVICES COMMITTEE

Chairman Bartlett, Ranking Member Reyes, and distinguished members of the Subcommittee, on behalf of our Marines, our families and our civilian employees, thank you for your continued and generous support for our Marines in OPERATION ENDURING FREEDOM, OPERATION NEW DAWN and other contingencies. It is an honor to appear before you today and for this opportunity to discuss the capabilities we have developed and are pursing to ensure our Marines are effective, survivable and expeditionary on the battlefield.

INTRODUCTION

Our Marines continue to be the backbone of our Corps. Our goal is to give Marines the capabilities required to accomplish their mission. We accomplish this goal by considering the Marine and his gear as a total system, a system that is influenced by tactics, techniques, and procedures, equipped with extremely effective and capable weapons and personal protection equipment, and trained in the classroom, the crucible and live and simulated training facilities.

The United States Marine Corps is America's expeditionary force in readiness, tasked as a Marine Air-Ground Task Force (MAGTF). Whether it is the Marines in support of a humanitarian response to the crisis in Libya, or a portion of the 16,000 Marines conducting a campaign in the Sangin Valley in Afghanistan, we bring everything we need for the mission. Our equipment must be lightweight, reliable, effective, trainable, and expeditionary. For an individual Marine, his training, communications, weapon, uniform, personal protection equipment and everything he might carry must be viewed as a component of a bigger system, the "Marine." As such, applying systems engineering to the Marine is critical so that each piece of equipment meets or exceeds its performance requirements, and as

an element of the system, contributes to and complements the overall warfighting effectiveness of the Marine, the squad, and ultimately the MAGTF.

To do this, we constantly seek the balance between effectiveness and weight of the equipment and the speed, endurance and survivability of the warfighter. Each individual Marine is specifically equipped to perform his military occupational specialty. Our commanders in the field have the flexibility and the ability to tailor equipment sets to match the threat, the operating environment, and demands of the mission.

We have been engaged in OPERATION ENDURING FREEDOM, OPERATION NEW DAWN (formerly OPERATION IRAQI FREEDOM) and other contingencies for nearly a decade. During this time, we have adapted to our adversaries' ever-changing tactics on the battlefield. We have applied lessons learned in our efforts to develop new systems and enhance the effectiveness of existing systems to equip and safeguard our Marines.

The Marine Corps is mindful of the need to leverage programs, technologies, technical skills and competencies of other Services to ensure we deliver the most effective and affordable combat capability to our Marines. We work closely and collaboratively with our Army counterparts in Program Executive Officer (PEO) Soldier, PEO Combat Support & Combat Service Support, and the Natick Soldier Research Development and Engineering Center, as well as our partners at the Office of Naval Research, and other science and technology (S&T) organizations. We also seek to capitalize on our industrial base to identify and pursue innovative and ground-breaking solutions to meeting the warfighter's needs and to reduce acquisition and sustainment costs of our systems.

Additionally, we have partnered with our international and coalition partners in order to share the information we have learned and to harvest and implement the good ideas they may have. For example, the British have given us various ideas such as the protective undergarment. We are committed to using every resource available to maximize the overall combat effectiveness and survivability of our Marines while ensuring we are addressing the affordability needs of our Corps.

With your support, we will continue to make progress.

OPERATIONAL ENVIRONMENT

To protect against complex threats, requires increased protection and capability while providing agility. The fully equipped dismounted combat Marine carries a variety of gear at any given time while in theater. Aside from wearing his personal protection equipment, a Marine carries batteries, ammunition, food, water, weapons, and communications gear that contribute to the combat load. The Marine Corps recognizes that the load of a Marine coupled with an austere operational environment is challenging. That is why we continue to make advancements to not only improve the protection level of our body armor, but also to work towards reducing the weight of our equipment.

The weight on the combat-equipped Marine continues to drop for multiple reasons: a more mature theater of operation; multiple forward operating bases (FOBs) within an Infantry Company's Area of Responsibility making resupply easier; good decisions by small unit leaders; and to a lesser degree, weight reductions to equipment. For example, the transition to Scalable Plate Carriers vice Modular Tactical Vests was the largest contributor to weight reduction.

Consequently, in March 2010, the average assault load for Foxtrot Company, 2nd Battalion, 2nd Marines, from 30 randomly

selected Marines, showed an average weight of 58 pounds or 34% of their body weight. As compared, in April 2008, to the average assault load for 2nd Battalion, 7th Marines, from 30 randomly selected Marines, showed an average weight of 112 pounds per Marine or 63% of their body weight.

As one of two Marine Battalions that entered Afghanistan in 2007, 2nd Battalion, 7th Marines encountered a logistically immature theater of operations, limited logistics capability and very limited FOBs. In simple terms, when they left the patrol base, they needed to carry more with them because they may not be resupplied.

Lessons Learned

Added weight and thermal loading make Marines less effective in combat. Mobility and agility are two components that affect survivability. There is a correlation with reference to personal protection equipment effectiveness and mass. Harsh environmental conditions such as extreme heat have required research in thermal effects mitigation and adoption of tactics, techniques, and procedures by Marines to operate in adverse conditions. The balance of capabilities is achieved by modularity of components, ergonomic considerations, and integration as a system in order to optimize human performance. Understanding our Marines and the operational employment of capabilities are critical considerations in the optimization of material solutions.

EVOLUTION OF BODY ARMOR

There are significant advances in body armor in terms of where we were, where we are today, and where we are headed in the future. For example, in the late 1960s and early 1970s, the flak vest was introduced to U.S. troops during combat operations

in Southeast Asia. Flak vests provided greater protection to Marines against shrapnel from indirect fires, but very little, if any, protection against small arms ammunition.

Advancements in material solutions in the 1990s resulted in improved flak vests and improved helmets - both of which are used in our current overseas operations. We continue to make improvements in providing greater protection and lighter equipment for the dismounted Marine.

The asymmetrical threats faced by Marines have caused an increase in the need for more sophisticated personal protective equipment. Thanks to advances in technology, today's Marine is more protected than ever before. As a result, however, the Marine ended up with greater equipment weight. The Marine Corps now strives for that delicate balance between effectiveness and weight of the equipment and the speed, endurance and survivability of the warfighter.

EQUIPPING TODAY'S COMBAT MARINE

As a middleweight force, we are a strategically mobile force optimized for forward-presence and rapid crisis response, we are light enough to get there quickly, but heavy enough to carry the day upon arrival, and capable of operating independent of local infrastructure. The Marine Corps is an expeditionary force. To Marines, expeditionary is a state of mind that drives the way we organize our forces, train, develop, and equip.

The squad is designed as a complex and adaptive system with the physical and intellectual agility for employment throughout the spectrum of expeditionary operations. Each Marine within the squad has a mission and is equipped accordingly. Capabilities and equipment are developed and provided to each Marine to execute his function. The combat load weight differs among other squad members.

Personal Protection Equipment

Mission, enemy threat, maneuverability, weight, protection level and lethality are factors considered when equipping the warfighter. The wartime environment in OPERATION ENDURING FREEDOM is constantly evolving. We provide equipment that can be configured to meet varying levels of threat. No one is better suited to determine the most effective combination of personal protective equipment than the individual Marine.

The Marine Corps has published an Armor Protection Levels (APL) policy. The policy authorizes Combatant Commanders, down to the Lieutenant Colonel/Battalion Commander level, the authority and flexibility to tailor protection levels their Marines must wear based on the current mission, enemy threat and terrain while solving for the Marine's necessity to maintain mobility for individual survivability and lethality.

For example, the Scalable Plate Carrier (SPC) was fielded to provide a small arms body armor solution with greater mobility and reduced thermal stress in high elevations as well as thick vegetation and tropical environments. The trade-off is reduced fragmentation protection. The SPC is not intended to replace the Modular Tactical Vest (MTV) as the primary ballistic vest. Instead, it provides an option for a lighter weight ballistic vest that protects against a more specific enemy threat and allows Marines to remain combat effective when operating in extreme environments. We field the SPC to issue facilities where commanders prioritize and determine what PPE is subsequently issued based on their mission analysis.

The Marine Corps continues to focus on increased protection and weight reduction programs while maximizing our force protection. A portfolio of efforts is described below.

Improved Modular Tactical Vest (IMTV)

The IMTV is a replacement for the MTV and is a response to an Urgent Statement of Need. The IMTV provides improved load carriage, shoulder comfort, and cummerbund stability compared to the MTV. On a medium size chest, the IMTV reduces the weight of the MTV by 2.53 pounds. This is a seven percent weight reduction. The acquisition objective is 108,000 IMTVs and fielding is expected to begin 3QFY11.

Weight Comparisons

Item	MTV	IMTV
Weight (pounds)	33.83	31.30
Weight Reduction	2.53 (7%)	

Plate Carrier (PC)

The PC will replace the SPC that is currently fielded to Marines in Afghanistan. The PC provides reduced weight, reduced thermal loading, and improved mobility by reducing the soft armor area of coverage when compared to the MTV and IMTV. Improvements made to the PC include incorporation of a quick release mechanism, integrated shoulder padding and a cummerbund that is interchangeable with the IMTV. For a medium size vest, the PC reduces the weight of SPC by .28 pounds. This is a one percent weight reduction from the SPC to the PC. The acquisition objective is 108,000 PCs and fielding is expected to begin in 1QFY12.

Weight Comparisons

Item	SPC	PC
Weight (pounds)	24.53	24.25
Weight Reduction (pounds)	.28 (1%)	

Lightweight Helmet (LWH)

The acquisition objective for the LWH is 215,786. Fielding of the LWH was initiated in 3QFY03 and was completed in 3QFY09. In March 2006, a sustainment package was submitted to Defense Logistics Agency Troop Support (DLA TS) and was finalized in Nov 2007.

Suspension Pad System

The suspension pad system is a component of the LWH, and the acquisition objective is the same as the LWH. In November 2006, MCSC changed from the sling suspension system to a pad suspension system per Marine Administrative Message 480/06.

The suspension pad system is not a joint program. However, both the Marine Corps and the Army requisition the same National Stock Number suspension pad system currently sustained by DLA TS.

Enhanced Combat Helmet (ECH)

The Enhanced Combat Helmet (ECH) is an example of the Marine Corps' efforts to provide greater protection at approximately the same or less weight as the currently fielded Lightweight Helmet (LWH) and resists penetration by a selected small arms round. The ECH program uses the latest lightweight material technology, ultra-high molecular weight polyethylene materials to provide increased small arms protection above what is currently provided by the LWH. It is a remarkable achievement in materials manufacturing and production.

During developmental testing, in addition to small arms resistance to penetration, the ECH results showed 40-50 percent better fragmentation protection, better blunt impact performance, and better resistance to Ballistic Transient Deformation (BTD). Further, by adopting the Modular Integrated

Communications Helmet (MICH) design, the ECH provides a greater field of view, comfort and stability for the Marine.

The ECH is a collaborative effort between the Army, Navy and Marine Corps with the Marine Corps acting as the program manager lead. If First Article Testing is successful, the Enhanced Combat Helmet will be a Service common helmet with the Marine Corps fielding 38,500, the Army fielding 200,000 and the Navy fielding 6,750. The Marine Corps expects to field the ECH in 4QFY11.

Further efficiencies in production and cost reduction may be realized in future orders should all the Services adopt the ECH as their helmet of record program.

Weight Comparisons

Item	LWH	ECH
Weight (pounds)	3.21	3.06
Weight Reduction (pounds)	.15*	

* The LWH has 8% more head coverage when compared to the ECH thus if the ECH is compared with the MICH (a helmet that has the same coverage as the ECH) the weight is the same.

Flame Resistant Organization Gear (FROG)

Flame Resistant Organization Gear (FROG) provides Marines with increased burn protection from flash fires which are unexpected, sudden intense fire caused by the ignition of flammable, liquids, vapors, gases, or dust. This system consists of an ensemble of clothing (gloves, balaclava, long sleeved flame retardant shirt, combat shirt, and combat trouser) to provide commanders with options that are modular and scalable. FROG is issued to all Marines deploying to Afghanistan. We continue to make improvements to FROG with optimal blends of

flame resistant materials that balance durability and comfort while seeking to increase burn protection.

FROG is worn outside the wire to avoid severe burns caused in IED blasts. Generally, FROG is supposed to be worn in vehicles. However, because vehicles are generally at least a portion of the mission, FROG is generally worn all the time. Further, FROG has a knit torso that dissipates heat faster and wicks moisture better than the Marine Corps Combat Utility Uniform (MCCUU) so the Marines prefer it under their body armor because it makes them cooler. Presently in OEF, Marines are wearing FROG if they leave the Forward Operating Base. MCCUU is generally not worn, but if the commander believes that the flash flame threat is low he can authorize it.

Combat Utility Uniforms

Every Service member deserves the opportunity to wear an effective camouflage uniform commensurate with their assigned mission. The Marine Corps supports camouflage uniforms that reduce visual detection and enhance performance. There are no barriers to sharing the technology aspects of the Marine Corps' Combat Utility Uniform. All of the Services, including DLA, work closely with U.S. Army Natick Soldier Research, Development and Engineering Command (NSRDEC) and mutually benefits from the incremental advancements and technology leaps impacting the development of individual combat clothing and PPE.

The Marine Corps shares its uniform technology through multiple formal and informal venues. Formal collaborative venues include the Joint Clothing and Textile Governance Board (JC&TGB), the Cross-Service Warfighter Equipment Board (CS-WEB), and the Army-Marine Corps Board (AMCB). Informal collaborative venues include Commander-to-Commander and program office interaction between US Army's PEO Soldier and Marine Corps

Systems Command as well as the Marine Corps participating in technology sharing through its reliance upon the RDT&E capabilities of NSRDEC.

Batteries

On the individual Marine, over a dozen batteries, in six different configurations, are used at any given time. Centralizing power and reliably distributing power on a Marine will potentially reduce the reliance upon the multiple types of batteries that are currently used in systems and carried in significant quantities as spares. An S&T effort is currently under way with the Office of Naval Research to produce a prototype of just such a system. Solar panels have been fielded to the squads as a renewable energy source for rechargeable batteries. These systems are useful for Marines during long duration patrols or while manning observation positions. Power continues to be a challenging component of the weight reduction effort.

Weight Comparisons

Item	BA-5590 (one-time use battery)	Solar Power Adaptor for charging BB-2590 battery
Weight (pounds)	70 (Assumption: one battery used per day)	10
Weight Reduction (pounds)	In 30 days worth of missions, there will be a savings of 60 pounds per system	

Ammunition

We continue to work very closely with the U.S. Army under their role as the Department of Defense Single Manager for Conventional Ammunition. During each budget submission, the

Marine Corps and Army collaborate to ensure we align our procurements to gain cost efficiencies. In doing so, we balance our buys in the best interest of the Munitions Industrial Base, when feasible. Further, in those areas of munitions commonality, the Marine Corps consistently leverages the U.S. Army munitions Research, Development, Test and Evaluation (RDT&E) efforts to modernize our conventional ammunition stockpile and to prevent duplicative munitions RDT&E investment within the Department.

Small Arms

M-27 Infantry Automatic Rifle

A significant firepower enhancement is currently being fielded to four infantry battalions and a Light Armored Reconnaissance Battalion. The M-27 Infantry Automatic Rifle (IAR) is an accurate and reliable replacement for the M-249 Squad Automatic Weapon (SAW). The introduction of the IAR reduced the load of the three heaviest-burdened Marines in the rifle squad, the Automatic Rifleman. There is an eight-pound difference in unloaded weapons and a 14-pound difference in loaded weapons. This weapon significantly enhances the mobility of the Marines with the greatest quantity of automatic firepower in the squad and provides interoperability of ammunition throughout all the squad members by eliminating linked ammunition required by the M-249. As these infantry battalions continue to conduct pre-deployment training, the M-27 will debut on the OEF battlefield in the late May 2011 timeframe. The acquisition objection is 4,463.

Weight Comparisons		
Item	M-249 SAW w/bipod	M-27 IAR w/grip pod
Weight (pounds) Unloaded	16.98	8.8
Weight (pounds) Loaded	23.92 (200 round drum)	9.9 (30 round mag)
Weight Reduction (pounds)	Unloaded 8.18 (48.2%) Loaded 14.02 (58.6%)	

Communications

Currently, we are working to replace the radios being carried by dismounted users that require digital data transmission. The fielded AN/PRC-117F weighs 29.4 pounds with batteries. The replacement radio, AN/PRC-117G, is 20 percent lighter than the AN/PRC-117F. It adds the data networking capability equipping the end user with system that provides higher efficiency, greater information throughput, and expanded frequency range. These capabilities enable the Marine to communicate via Voice over Internet Protocol (VOIP), Command and Control Personal Computer (C2PC), Microsoft Internet Relay Chat (mIRC), and deliver streaming imagery simultaneously. No other dismounted Marine Corps tactical radio maintains the ability to concurrently transmit voice and data. Most of the radio replacements are taking place in theater and will transition into CONUS as long as funding is available to support the effort.

Weight Comparisons

Item	AN/PRC-117F	AN/PRC-117G
Weight (pounds with batteries)	29.4	23.5
Weight Reduction (pounds)	5.9 (20%)	

OPTIMIZING THE INTEGRATED WARFIGHTER

Gruntworks

The Marine Corps has an established Marine Expeditionary Rifle Squad (MERS) integration facility called Gruntworks. Gruntworks characterizes how components of a Marine's equipment influence combat performance in terms of weight, bulk and flexibility and effectiveness. This effort provides a metric for mobility in various equipment configurations to evaluate future systems.

The MERS organization designs and refines the system—in this case, it is the Marine. MERS does not procure equipment; it works with all the Program Managers within Marine Corps Systems Command to ensure individual items are integrated into an effective combat fighting capability to deliver a balanced squad.

For example, the M16A4 service rifle continues to be the primary weapon in the rifle squad and for Marines throughout the Corps. The focus of improvements for the M16A4 this year is integration with equipment and ergonomic solutions to assist the diverse anthropometry found in the Marine Corps. Our small arms weapon systems within the rifle squad have been optimized with magnified day optics, image-intensified and thermal sensors, and multifunctional illuminators. These systems are provided to members of the squad depending on their billet and mission.

In the future, we will pursue a fully integrated infantry system of equipment that will be driven by an overarching requirement. This will drive integration of capabilities more effectively at the requirements level instead of trying to engineer it during materiel development. This requirement will define parameters for size, weight, power, interfaces, and integration as well as set goals for weight reduction from current capabilities. The first increment of this capability

will seek to better integrate the capabilities being fielded now or in the near future; the second increment will leverage emerging technologies to define attributes for the baseline load bearing, protection, and power systems and will require that all additional capabilities be fully integrated with those baseline systems. This will reduce or eliminate the need for additional equipment to have their own power, cabling, and carrying pouches, thereby reducing the bulk and weight of the requisite combat load. The Army is taking a similar approach, and the requirements and acquisition communities in both Services are sharing their ideas to collaborate where their interests coincide.

FUTURE INITIATIVES FOR LIGHTENING THE LOAD

An expeditionary force in an austere environment tends to carry more weight. For example, innovative logistics and resupply coupled with equipment weight reductions can reduce the burden of Marines. The Marine Corps Warfighting Laboratory (MCWL), which is part of the Combat, Development and Integration command (CD&I), has experimented in sea-based logistics along with robotics and autonomous aerial delivery for logistic resupply. In July 2010, MCWL concluded an experiment with a Company Landing Team (CLT). The CLT was ashore and was resupplied by amphibious shipping which was 40 nautical miles offshore. These experiments coupled with the S&T initiatives underway, by the Office of Naval Research (ONR), will provide a multi-pronged approach towards reducing the weight carried by a rifle squad in the Marine Corps.

CLOSING

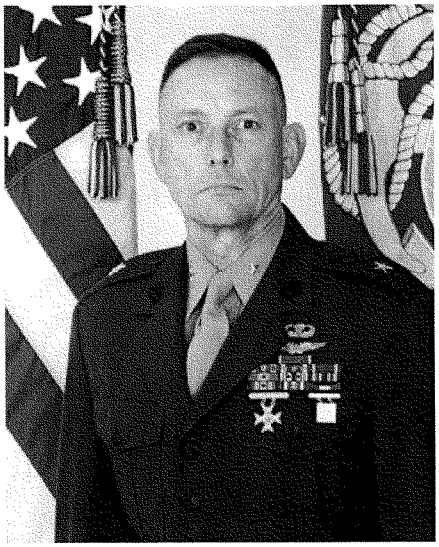
We have been engaged in sustained overseas contingency operations for close to 10 years. During this time, we have made

many advancements to provide the best personal protection equipment for our warfighters. Through lessons learned, we have reduced weight, integrated equipment, transferred the load and enhanced human performance to lighten the load of your dismounted, combat-equipped Marines.

We continue to address the current threats of our enemy while looking towards future threats and solutions. This is accomplished by developing and fielding more capable systems faster and more efficiently.

We work hard to ensure the safety of our Marines by providing them with the best and most effective equipment. We cannot put a price on the lives of our Marines, Soldiers, Airmen and Sailors. Protecting them with better and more capable equipment has been, and will always be, the highest priority of the Marine Corps. Your support will position the Marine Corps to ensure our warfighters' safety. Again, thank you for your continued support.

Brigadier General Frank L. Kelley
Commander, Marine Corps Systems Command



Brigadier General Kelley, a native of Philadelphia, Pa., graduated from the University of Notre Dame in 1983 with a degree in Aerospace Engineering and was the recipient of the Naval ROTC Donald R. Bertling Award. Upon completion of Officer Candidate School (OCS), he was commissioned a Second Lieutenant in the United States Marine Corps.

In February 1984 he completed The Basic School and received orders to Pensacola, Fla., for flight training. He then proceeded to the 453rd Flight Training Squadron (FTS) at Mather Air Force Base, Calif., for electronic warfare training where he was a distinguished graduate and the recipient of the Colonel Mike Gilroy Award for leadership and training excellence.

After completing EA-6B Prowler training at Whidbey Island, Wash., Brigadier General Kelley reported to Marine Tactical Electronic Warfare Squadron 2 (VMAQ-2), where he participated in the Unit Deployment Program, in addition to Operations Desert Shield and Desert Storm as the Contingency Plans and Tactics Officer.

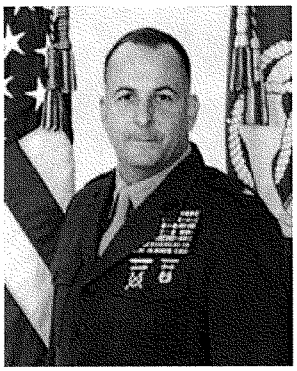
He received orders to Air Test and Evaluation Squadron (AIRTEVRON) FIVE (VX-5), where he was the Electronic Warfare Branch Head. He then reported to Naval Air Systems Command (NAVAIRSYSCOM) as the Avionics Systems Project Officer (ASPO) for the EA-6B.

He returned to the fleet as the Operations Officer for VMAQ-1 and then as the Assistant Operations Officer for Marine Aircraft Group 49 (MAG-49). He reported to the Pentagon as an action officer to the Deputy Assistant Secretary of the Navy(DASN) for Expeditionary Forces Program.

He attended the Marine Corps War College and taught at the Command and Staff College. He transferred to Marine Corps Systems Command (MCSC), Quantico, Va., where he was the Program Manager for Unmanned Systems. Brigadier General Kelley's next assignment was Military Assistant to Dr. Delores Etter, the Assistant Secretary of the Navy (ASN) for Research, Development and Acquisition (RDA).

In August 2007 Brigadier General Kelley was assigned to the position of MCSC's Program Manager for Training Systems (PM TRASYS) in Orlando, Fla. In August 2009 Brigadier General Kelley was reassigned as MCSC's Chief of Staff and took the helm as its Commander in July 2010.

Brigadier General Daniel J. O'Donohue
Director, Capabilities Development Directorate



Brigadier General O'Donohue's command assignments include: Commanding Officer, Charlie Company, 1st Battalion, 2nd Marines (1993-1995), Commanding Officer, 2nd Battalion 5th Marines (2002-2004), Commanding Officer, 1st Marine Regiment (2009-2010).

Brigadier General O'Donohue's staff assignments include: Ground Structure Planner, Headquarters Marine Corps (1988-1992); 8th Marines Operations Officer (1995); Operations Officer for Joint Task Force and Special Purpose Marine Air-Ground Task Force Liberia (1996); Tactics Instructor and Expeditionary Operations Program Director at the Amphibious Warfare School (1997-2000); Operations Officer, 1st Marine Division (2001-2002); Assistant Chief of Staff G-7 / Division Combat Assessment Officer (2004); Deputy Branch Head for the Secretary of the Defense's Office of Force Transformation (2005-2007); Branch Head, Ground Combat Element Branch, Plans, Policies and Operations, Headquarters Marine Corps (2007-2008); Assistant Chief of Staff G-3 for 1st Marine Division (2008-2009); Director, Capabilities Development Directorate (2010-).

He and his wife, Rani, have been married 27 years. They have 7 children: Erin, Sara, Danny, Michael, John, Mark, and Peter.

DOCUMENTS SUBMITTED FOR THE RECORD

MARCH 17, 2011

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON, DC 20310-0103

SAAL-SMS

DEC 10 20

MEMORANDUM FOR PROGRAM EXECUTIVE OFFICER, SOLDIER

SUBJECT: Acquisition Category (ACAT) II Designation for the Individual Carbine Capability (IC) and Designation of Milestone Decision Authority (MDA)

1. I have reviewed and approve your request to designate the IC program as ACAT II as outlined in Chapter 3 of Army Regulation 70-1 and I will retain the MDA as the Army Acquisition Executive. You are approved to initiate the IC program at pre-Milestone (MS) B.

2. Once I have approved the Acquisition Strategy, I authorize you to expend the appropriate funding to execute the strategy and release the final request for proposals to initiate and conduct the IC competition under Full and Open competition procedures.

3. In view of the recent approval of the Capability Development Document and the request from the Army G-3/5/7 to waive the regulatory requirement for an Analysis of Alternatives, I approve that waiver and direct that you return within 60 days with all the required documentation to obtain a positive MS B decision and enter the Engineering and Manufacturing Development phase.

4. The point of contact is Mr. Shelby Stevens, (703) 545-1781, or e-mail: shelby.stevens@us.army.mil.

Malcolm R. O'Neill
Army Acquisition Executive

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

MARCH 17, 2011

RESPONSE TO QUESTION SUBMITTED BY MR. MCINTYRE

General FULLER. There is no Department of the Army policy mandating the wear of body armor. Decisions regarding body armor are left to Commanders at the appropriate level based on sound tactical and operational requirements. When making decisions regarding body armor, the overriding concern of Commanders is the welfare of Soldiers. [See page 16.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 17, 2011

QUESTIONS SUBMITTED BY MR. BARTLETT

Mr. BARTLETT. Does the Army and Marine Corps currently have a validated requirement for lighter-weight body armor systems? What are your current requirements for body armor?

Mr. MARKOWITZ. The Army does not currently have a validated requirement for a lighter-weight body armor system. The Army's currently validated requirement for body armor systems is the Modular Body Armor Operational Requirement Document validated in 1999. The overall body armor system has been updated via directed requirements several times in the last ten years based on operational needs, technology improvements, and materiel improvements to various components of the body armor system. Each of these modifications sought increases in Soldier protection level. Only the directed requirement for the Soldier Plate Carrier System was focused on lightening the weight. The body armor requirement was last reviewed by the US Army Training and Doctrine Command (TRADOC) as part of a holistic body armor requirement review directed by Headquarters Department of the Army (HQDA) G–3/5/7 in June 2010. TRADOC completed its review in December 2010 and is currently updating the body armor requirement to include weight reduction while retaining the same ballistic properties. TRADOC will submit the requirement to HQDA for staffing by the end of 4th Quarter, Fiscal Year 2011. The Army's current requirements for body armor are all found in Department of the Army directed requirements, to include the following: 966,000 Improved Outer Tactical Vests (IOTV); 966,000 sets of Enhanced Small Arms Protective Inserts (ESAPI); 160,000 sets of X–Small Arms Ballistic Inserts (XSAPI) and 160,000 sets of X–Side Ballistic Inserts (XSBI); and 85,000 Soldier Plate Carrier Systems (SPCS).

I will defer to the United States Marine Corps regarding the status of any United States Marine Corp validated requirement for lighter-weight body armor systems.

Mr. BARTLETT. Does the Army and Marine Corps currently have a validated requirement for a new handgun system? Are you currently reviewing such a requirement?

Mr. MARKOWITZ. No, the Army does not have a validated requirement for a new handgun system.

Yes, the Army reviewed the Air Force Modular Hand Gun Capability Production Document (CPD) and placed it in a deferred status. The US Army Training and Doctrine Command (TRADOC) must provide analytical documentation to substantiate any proposed requirement for a new hand gun, before the Army will consider adopting or making changes to the CPD.

Mr. BARTLETT. Please walk us through the Army and Marine Corps Requirements Board process? How often do you meet? What have been the major results of your meetings? Are joint requirements generated during these meetings?

Mr. MARKOWITZ and General FULLER. The Army Marine Corps board (AMCB) meets approximately 8–10 times per year to discuss ongoing issues and efforts in order to improve interoperability among the two land component Services. As directed by the AMCB charter, the AMCB process begins with issue identification. AMCB stakeholders will develop a limited set of high level focused issues emerging from the previous Program Objective Memorandum (POM) cycle, OSD Program Review, Army Marine Corps Warfighter Staff Talks or as a result of new internal/external initiatives. Once the issue is ready for presentation, the AMCB follows a three-step review process: 1) First, a Council of Colonels reviews and refines the issue for senior leader presentation; 2) a 1–2 Star AMCB convenes to ensure the issue is sufficiently developed and merits 3–Star consideration; and 3) the 3–Star AMCB convenes to consider issues, analyze courses of action, and recommendations. 3–Star AMCB endorsed recommendations may be forwarded to the Chief of Staff of the Army and Commandant of the Marine Corps for consideration and potential implementation and may impact key programming or operational decisions.

Over the last twelve months the AMCB has reviewed several topics to improve interoperability between the two land components. Examples of these topics include: 1) small arms requirements, 2) agreement on service small arms ammunition requirements, 3) continued discussion on body armor and helmet requirements and 4) refining the Joint Light Tactical Vehicle requirements. While Joint requirements

are not generated at the Army Marine Corps Board, it provides a forum for collaboration and discussion on Service and or Joint requirements.

Mr. BARTLETT. What impact is the continuing resolution (CR) having on equipping and modernization strategies for dismounted soldiers and marines?

Mr. MARKOWITZ and General FULLER. The Continuing Resolution's (CR's) greatest impact to programs is the inability to execute according to plan. The Army has consolidated a priority list of anomalies for waiver in anticipation of a 12 month CR.

a. Lack of Fiscal Year 2011 (FY11) funding will cripple the M26 12–Gauge Modular Accessory Shotgun System program momentum and cause dedicated teams to disband due to lack of support funding and potentially eliminate the Government source of supply.

b. The Nett Warrior program will not meet Milestone C scheduled in March 2011 and capability fielding will slip for one year (FY13 to FY14).

c. The Counter Defilade Target Engagement FY11 program is unable to award contracts with funding limited to the FY10 funding levels. This will cause the program schedule to slip to the right by a year, will increase contract costs, and jeopardize production funding in the future.

d. The Mounted Soldier System production contracts cannot be awarded in FY11 and capability fielding will slip from FY13 to FY14. Delay in reprogramming will result in inability to fund:

(1) Engineering support to support program Milestones (on-going Government design efforts, hardware build to support Government testing, support contract award, etc.,).

(2) Award contract for hardware delivery for testing.

(3) Conduct of Developmental Test/Limited User Test.

Creates a $270K Support Unfunded Requirements (UFR) for the Lightweight .50 Caliber Machine Gun (XM806) in 1st Quarter of FY12 and creates an overall Production Cost increase (UFR) of approximately $6.3M to achieve the Army Acquisition Objective (27,273).

Mr. BARTLETT. In your opinion do we need to shift the program investment focus from the platform to the person? How can we help you to accelerate the innovation process for individual equipment?

Mr. MARKOWITZ and General FULLER. Although I cannot speak for the Army overall, I believe we have balanced our investments between platforms and individual items to provide today's Soldier with the needed capabilities.

Mr. BARTLETT. How are you effectively managing the power consumption problem for the individual soldier and marine?

Mr. MARKOWITZ and General FULLER. The Army continually strives to optimize size, weight, and power for Soldier worn/carried systems down to the lowest levels allowed by current technology, while still meeting military requirements.

In an effort to manage the variety of power consumers worn/carried by the Soldier, we are investigating a Soldier worn integrated power solution that will reduce the quantity and different types of batteries required by the Soldier. Instead of the Soldier carrying a 72 hour supply of multiple battery types, he will be able to power his equipment from centralized power sources integrated onto the body armor, weapon, and helmet.

Mr. BARTLETT. Do you consider body armor to be a consumable and in the same category as articles of clothing? If yes, then why? Please elaborate on your response.

Mr. MARKOWITZ and General FULLER. Body Armor is classified as a Type II Clothing and Textile expendable, but recoverable. As such, the funding to procure Body Armor, clothing and other protective gear is typically included in the Operations and Maintenance (O&M) appropriations along with other expendables and is treated as a purchase expense. Currently, the O&M appropriation provides flexibility to make adjustments to quantities to support the number of Soldiers deploying to theater.

Although the Project Manager is moving towards more rigorous life cycle management of the fleet of Soldier protective equipment, the current Body Armor requirement is nearly met, therefore, funding with O&M is appropriate for sustainment. However, Congressional language is in place directing the establishment of a dedicated procurement and Research, Development, Test and Evaluation line for Body Armor.

Mr. BARTLETT. Raising the level of protection. I view this as critical because of the relatively modest R&D investment DOD makes in body armor and other protective equipment. Because the contracts require the destruction of an entire lot when there is a lot failure and prohibits rework industry has an enormous incentive to ensure each lot passes therefore I understand they are adding redundancy and weight to their designs. Can you tell me do you have a requirement for lighterweight body armor plates and when and by whom was the composite body armor

requirement last reviewed and validated? Also, is it true that the contracting strategy employed by DOD has selects winners based on the lowest cost for a qualified product with no incentive for lighter weight or higher levels of protection and if so is this the best method for purchasing the best body armor at the lowest weight?

General FULLER. No, the Army does not currently have a requirement for lighter-weight Body Armor plates. The current requirement for Body Armor, the Modular Body Armor Operational Requirement Document, was validated in 1999, however, the overall Body Armor System has been updated via directed requirements several times in the last ten years based on operational needs, technology improvements, and materiel improvements to various components of the Body Armor System. The Body Armor requirement was last reviewed by the U.S. Army Training and Doctrine Command (TRADOC) as part of a holistic Body Armor requirement review directed by the Headquarters, Department of the Army (HQDA) G–3/5/7 in June 2010. TRADOC completed its review in December 2010 and indicated it will complete an update to the current Body Armor requirement and provide it to HQDA for staffing by the end of 4th Quarter of Fiscal Year 2011.

Regarding the contract strategy, the Army awards new contracts based on the Best Value to the Government considering technical, schedule, past performance, and price. During the solicitation phase, vendors have the opportunity to present lighter-weight Body Armor solutions, but must meet the Army's Body Armor specifications. Once the contracts are awarded, the Contracting Officer can consider all of the same or even additional factors in the award of follow-on delivery orders to qualified contractors.

Mr. BARTLETT. In terms of body armor acquisition, how can we achieve better protection with less weight and how do you incentivize industry?

General FULLER. The Body Armor industrial base has hit a technical "wall" to achieve a lighter more flexible Body Armor solution. No new advances in lighter ballistic materials are expected for the next five years given the current levels of Government and industry Research and Development investments. The only option to provide Soldiers with relief from the weight of Body Armor at this time is to make tradeoffs between two aspects: Removing components of ballistic protection and the area of coverage (i.e., Side Plates). Commanders must balance the level of Soldier protection with the increased mobility gained from lighter Body Armor. Reducing area of coverage presents increased risk of injury to unprotected areas of the Soldier, however, it provides the Soldier greater mobility, which may result in greater survivability in some terrains or combat situations.

The Army will continue to work with both Government and industry partners to quickly assess and if possible adopt new technologies. The Army is aggressively using the Small Business Innovation Research Program to promote the role of small business in support of new Body Armor initiatives. A new requirement is in process for the next generation of Soldier protection, and it is expected to be approved at the end of Fiscal Year 2012. The focus of the new requirement will be to develop a personal protective system that is lighter weight and tailorable to mission requirements.

Mr. BARTLETT. The Army and Marine Corps have formal and informal Tactics, Techniques and Procedures for doing about everything. Often the best, most effective way of doing something in the Army and Marine Corps is figured out by the soldiers and marines in the field and later is adopted by the military and taught in the school house. What lessons have been learned thus far from operations in Afghanistan about dismounted, backpack operations in rugged and high altitude terrain? What if anything been done to improve the physical fitness of soldiers and marines to enable them to endure the weight of the pack?

General FULLER. Lessons learned regarding dismounted, backpack operations in Afghanistan fall into three categories. The primary and most critical lesson learned is the need for lighter equipment. The Army continues to assess options in this arena and is constantly evaluating operational needs to support the warfighter. Second, is the role leadership plays in correctly determining load requirements based on the mission, weather and terrain. Many of these lessons learned and best practices have been codified into a Small Unit Operations in Afghanistan Handbook published to assist Soldiers and small-unit leaders in preparing for the difficulties and challenges they will face when deployed in unique geographic areas including rugged and high altitude terrain. It is incumbent upon leaders to correctly evaluate mission requirements and tailor as needed, special equipment to meet the task. Third, is the need to train to the conditions of the anticipated environment. Training conducted on a similar terrain for up to 45 days prior to deployment will substantially reduce the time requirement for acclimation to the operational theater. The unit mission and mission-essential task list (METL) drive the specificity of physical readiness training. Unit commanders who identify foot marching under fighting or

approach march load, as a METL requirement, incorporate progressive foot marching and total body muscular strength training, along with environmental considerations; such as altitude/temperature, as they prepare for full spectrum operations.

Physical fitness is not the key determinant to Soldier performance in rugged high altitude terrains, however, it plays such a critical role in training for and executing all areas of theater operations that the Army implemented a new physical readiness training doctrine in August 2010. This new system of training was adapted to address new and emerging physical fitness requirements based on feedback from Soldiers operating in theater. Recently updated, the physical readiness training doctrine links concepts found in Field Manual 3–0, Full Spectrum Operations, and applies the principles of training specified in Field Manual 7–0, Training for Full Spectrum Operations. The key outcome of this linkage is the integration of physical readiness training to ARFORGEN and Warrior Tasks and Battle Drills. The new physical training doctrine provides for a balanced training program that better prepares Soldiers for task performance and provides injury control by recommending exercise intensity, exercise volume, and training and recovery within progressive training schedules. Conducting operations in rugged and high altitude and urban environments underscores the importance of trunk stability, total body muscular strength training, progressive load carriage, and the overall importance of posture and body mechanics on foot marching and load carriage. This new doctrine is a tool for Commanders to use to create a high performance physical training program, because ultimately it is the Commander who carries the responsibility for preparing their Soldiers for the physical challenges of the operational environment.

Mr. BARTLETT. Traumatic Brain Injury (TBI) continues to be the most prevalent injury from Iraq and Afghanistan. How are PEO Soldier and Marine Corps Systems Command helping to mitigate these injuries?

General FULLER. Program Executive Office Soldier's effort to mitigate or protect Soldiers from the effects of blast, ballistic and blunt impact events on the brain is focused in two areas; accurately measuring the blast, blunt impact and overpressure caused by Improvised Explosive Devices so that a correlation can be made to the actual brain injury and the development of an improved helmet pad suspension system.

The U.S. Army is developing and testing a second generation Helmet Sensor. The small lightweight helmet-mounted sensor will record and store linear and rotational accelerations and over-pressures that occur when Soldiers are exposed to high energy induced blast impulses and impacts. The data collected from the sensor will be used to support Medical Research and Materiel Command development of an objective exposure monitor/head injury screening tool.

Additionally, the Army is executing an effort to improve the Army Combat Helmet (ACH) pad suspension system by increasing blunt impact protection, stability and Soldier comfort. The current suspension system provides blunt impact protection of a maximum 150 g's at 10 feet per second (fps). The objective, currently in testing under a Small Business Innovation Research contract, is to improve blunt impact protection to a maximum of 150 g's at 14.1 fps. This translates to a 100 percent increase over the current capability. The new suspension system will be compatible with the ACH and Enhanced Combat Helmet. The Army intends to issue a Helmet Pad Request for Proposal for the improved impact protection standard in 4th Quarter of Fiscal Year 2011 (4QFY11) and plans for production and fielding by 2QFY12.

Mr. BARTLETT. What is the prevalence of injuries that can be attributed to the weight of the load that soldiers and marines must carry?

General FULLER. I am not aware of any current studies that demonstrate a direct cause and effect relationship between load carry weight and musculoskeletal injury. Additionally no studies exist that quantify an actual number of injuries directly related to the weight of a load that a Soldier must carry during deployment. Most injuries are overuse/chronic in nature and are, thus, difficult to link to specific activities such as load carry. The U.S. Army Research Institute of Environmental Medicine is conducting survey studies to determine the potential association of load carriage and injuries during deployment. Additionally, the U.S. Army Public Health Command (Provisional) is working to include medical coding for cause of injury as a mandatory input into the electronic health record. This would require providers to code a cause of injury when one can be determined.

Mr. BARTLETT. Are the type of injuries that are caused by heavy loads generally the sort that heal fairly quickly or are we facing large numbers of long term rehabilitation and permanent disability?

General FULLER. It is difficult to draw any scientifically valid conclusions about long-term effects and rehabilitation requirements as a result from load carry. We do not currently have long-term data linking heavy load carriages to chronic musculoskeletal complaints amongst Soldiers nor to disability. The U.S. Army Research

Institute of Environmental Medicine (USAREIM) and U.S. Army Public Health Command (Provisional) published an article in Military Medicine in 2004 on the topic of Soldier Load Carriage. In that article, the authors listed the most common injuries associated with load carry marches for a 20 km max effort march and a 5-day 161 km march. Acute musculoskeletal injuries associated with these marches included back pain, foot pain, sprains/strains, knee pain, and stress fractures. USAREIM is currently studying the re-occurrence rate of low back pain in deployments.

Mr. BARTLETT. How many marines, and how many soldiers are currently in a non-deployable status due to injuries that can be linked to the weight of the individuals basic load.

General FULLER. There are no current data that directly link a Soldier's deployability status to basic load weight. Although musculoskeletal injuries are the leading reason for a unit to place a Soldier in a non-deployable status, the cause of these injuries is not presently captured.

Mr. BARTLETT. Does the Army and Marine Corps plan to procure a new handgun? Is a new handgun a high priority for the Army and Marine Corps?

General FULLER. The Army has not decided to procure a new handgun, nor has it adopted or validated any requirements documentation to support buying a new handgun. Because of funding lead time, the Army is executing planning activities for funding in case the Army leadership determines there is a need to pursue a new hand gun.

Because the Army has not decided to procure a new handgun, the question on priority cannot be addressed. A cost benefit analysis and usage analysis is required to inform the decision to buy more M9s, and/or replace it with a new hand gun.

Mr. BARTLETT. Please provide the committee with some of the operational feedback you are receiving regarding the performance of the M4 in Iraq and Afghanistan?

General FULLER. The Army continuously and actively solicits Soldier feedback on systems and equipment utilized in their deployments. Recently, 358 Soldiers from an Infantry Brigade Combat Team returning from Afghanistan participated in a feedback session and overall, relayed that they are satisfied with the combat effectiveness of their weapons. Of the 358 surveyed, 322 Soldiers engaged enemy targets with a weapon system. Of those 322 Soldiers who engaged enemy targets, 276 Soldiers reported having experience with the M4 or the M4 with rail adaptor system (known as the M4 Modular Weapon System) and found it to be effective in combat.

Mr. BARTLETT. We are hearing of complaints regarding the current pad suspension system being too hard and that it has a propensity to fall apart. What types of internal pad suspension systems will be used in the enhanced combat helmet? Are you hearing similar complaints regarding the performance of these pad suspension systems?

General FULLER. Based on three separate feedback sessions conducted in March 2009, March 2010 and January 2011 with returning units who served in Operation Enduring Freedom and Operation New Dawn feedback shows that the Army Combat Helmet (ACH) pad was rated very effective. There were comments from Soldiers on the pad suspension system, but the trend does not indicate a major problem with the issued helmet pad suspension system. Regarding the Enhanced Combat Helmet (ECH), the Army intends to use the helmet pad suspension system that is currently being issued for the ACH.

At the same time, however, the Army is executing an effort to improve the ACH pad suspension system by increasing blunt impact protection, stability and Soldier comfort. The current suspension system provides blunt impact protection of a maximum 150 g's at 10 feet per second (fps). The objective, currently in testing under a Small Business Innovation Research contract, is to improve blunt impact protection to a maximum of 150 g's at 14.1 fps. This translates to a 100 percent increase over the current capability. The new suspension system will be compatible with the ACH and ECH. The Army intends to issue a Helmet Pad Request for Proposal for the improved impact protection standard in 4th Quarter of Fiscal Year 2011 (4QFY11) and plans for production and fielding by 2QFY12.

Mr. BARTLETT. I understand the Army is going to initiate a best value, full and open competition for a new carbine this year to potentially replace its current inventory of 500,000 M4 carbines. If I understand this program correctly, a new carbine will be procured if a candidate weapon can outperform the Army's current carbine, the M4. This committee has always strongly supported full and open competition.

a) Given the magnitude and scope of this program why did you choose not to conduct a comprehensive analysis of alternatives before initiating the program?

b) Is the Individual Carbine envisioned to be a non-developmental weapon or a weapon that will be tested and developed?

c) Will the Individual Carbine be a jointly developed program with the Marine Corps?

General FULLER. a) The Army waived the regulatory requirement for an Analysis of Alternatives (AoA) on 10 December 2010. It was determined that an AoA would not produce relevant information in support of the program since the Key Performance Parameters and Key Systems Attributes were baselined on the current M4 Carbine capability as directed by the Army Requirements Oversight Council. Before a Full Rate Production decision is made within the Individual Carbine (IC) program, the Army will conduct an analysis to determine whether the IC or the existing M4A1 Carbine provides the best value for the Army. This analysis will use actual data collected during Test and Evaluation of the IC candidates.

b) The Individual Carbine will be a non-developmental weapon.

c) Although the United States Marine Corps actively participated in the development of the Individual Carbine Capability Development Document, there are no plans for the Individual Carbine to be a jointly developed program with the Marine Corps at this time.

Mr. BARTLETT. I understand that the Army had an estimated 267,000 night vision goggles (NVGs) in inventory in 2003, and now has approximately 681,000 NVGs in its inventory in 2011. The large increase in procured systems occurred in response to evolving requirements associated with Operation Enduring Freedom and then Operation Iraqi Freedom. As you know, industrial base capacity had to be expanded to meet these increased requirements, since there exists only a limited number of companies capable of producing this technology. Given the constrained budget environment what concerns do you have about the ability to maintain NVG production capacity and technological capability? What planning, review, and assessment are you undertaking to better understand these challenges in order to sustain this critical industrial base? What are your respective services' research & development and procurement budgets for NVGs in the FY 12 budget request, as well as within the future years defense program?

General FULLER. Night vision systems afford our Warfighters unmatched situational awareness, yielding improved survivability and lethality in all operational environments. Based on the volume of systems already procured, the Army does foresee a significant reduction in production quantities for most current night vision technologies. Army production deliveries are on schedule to complete in 4th Quarter of Fiscal Year 2012 (4QFY12). Current estimates indicate that FY13–FY17 Image Intensifier Tube sustainment quantities are less than 50 percent of peak production and less than pre-facilitization quantities beyond FY17. Other night vision technologies are also experiencing completion of the Department of Defense (DOD) requirements and reduction in demand. These changes in demand level raise the following concerns:

a. Potential cost increase due to lower sustainment volume.

b. Potential workforce reductions and industrial base consolidation due to reduced need–thus impacting competition.

c. Potential shift of industrial focus to lower performance Night Vision Goggle Systems designed for Commercial and Foreign Military Sales, increasing industrial viability and market share. This shift of focus may result in reduced capability and/or willingness to meet DOD's higher performance requirements.

d. Decreased ability for industry to respond to DOD urgent requirements based on loss of expertise and hi-performance production capability.

In FY12 there is a $9.8 million dollar request in Research, Development, Test and Evaluation for Soldier night vision devices. This development effort will support completion of product qualification testing on the current Enhanced Night Vision Goggle (ENVG). It will also support integration, testing, and evaluation of technologies to further enhance night vision and provide interoperability with other systems such as the Thermal Weapons Sight and Nett Warrior. In addition, the FY12 budget request includes $117.4M in procurement for ENVG. This will be used for the continued procurement of ENVG.

Mr. BARTLETT. How much weight do the Land Warrior and Nett Warrior components add to the load the individual soldier must carry? In your opinon, is this additional weight offset by the additional capability provided? What is the objective weight for this technology?

General FULLER. Deployed LW systems weigh between 11.6 pounds (lbs) and 9.6 lbs for a 12 hour mission, with improvements stemming from refining the essential configuration over time. The three Nett Warrior pre-production prototypes as tested in the Limited User Test from September to November 2010 weigh ~12.5 lbs for a 24 hour mission, all less than the threshold weight of 14 lbs. The current objective weight is 10 lbs.

The wearable LW/NW system key advantage is fightability. The increase in situational awareness allowing for faster and more accurate decisions in the tactical fight clearly offsets the system weight, as demonstrated in the following vignette. *A squad led by Staff Sgt. Sam Lee scrambled out in pursuit of a high-value target in a nearby building. But the last-minute change meant the house didn't sit in the direction they expected. "At that point," Lee said, "I'd normally have to stop, literally take out a compass, and orient myself," perhaps leaving the target precious seconds to escape, or worse, giving enemy crosshairs time to settle on his troops. Instead, without stopping, he flipped down an eyepiece and viewed a computer screen with an overhead GPS image of the area. With the target location plotted in advance, the team moved rapidly through the darkness.*

"We moved in and took the building with no delay at all," Lee said.

Staff Sgt Lee was able to lead his squad to the right place, at the right time, with the right equipment making them more effective, more lethal and more survivable in the execution of their combat mission.

Mr. BARTLETT. Who determined the Nett Warrior requirement? Were operators involved in the development?

General FULLER. The Ground Soldier System Increment I—Nett Warrior system requirement evolved directly from earlier developmental testing and in-theater operational use of the precursor Land Warrior (LW) system. The Army's combat developers within US Army Training and Doctrine Command (TRADOC) at the U.S. Army Maneuver Center of Excellence (MCoE), Fort Benning, Georgia, utilized all preceding developmental and operational lessons learned to develop and document the current Nett Warrior requirement in the Ground Soldier System Increment I—Nett Warrior Capability Development Document which was Army and Joint Staff approved in October 2010.

Yes, operational elements were specifically involved in the development of the Nett Warrior requirement. Dismounted Soldiers within small units (from squad to company and battalion level) have deployed to both Operation Iraqi Freedom and Operation Enduring Freedom with the precursor Land Warrior (LW) System, and their lessons learned and operational insights were applied to the requirements definition within the existing Ground Soldier System Increment I—Nett Warrior system.

Mr. BARTLETT. Are there ways to accelerate the XM25 program? What are the constraints to increasing production?

General FULLER. The current profile reflects Army prioritization. However, the XM25 program can be accelerated with additional funding for the current Engineering and Manufacturing Design Phase and the facilitation of production lines in Fiscal Year 2012 (FY12) and FY13. The primary constraint to increasing production is the lack of existing production lines/facilities.

Mr. BARTLETT. What is the current status of X–SAPI and XSBI and what is the long term acquisition plan for these programs?

General FULLER. The Army's Procurement Objective is 160,000 sets of X Small Arms Protective Inserts (XSAPI) including procurement of 160,000 sets of X Side Ballistic Inserts (XSBI) to support Operation New Dawn and potential future requirements. The Army has accepted 119,934 sets of XSAPI plates to date and delivered 97,500 sets to theater. Initial XSAPI fielding to Iraq is complete. A total of five contracts were awarded for the production of 160,000 sets of XSBIs in September 2010—one contractor was terminated after failing the First Article Test. Initial production deliveries were received in March 2011 and deliveries should be completed in the 1st Quarter of Fiscal Year 2012. Once the Army Procurement Objective is met, the Defense Logistics Agency will provide sustainment for the XSAPI and the XSBI.

Mr. BARTLETT. The Committee understands that the Army and Marine Corps have funded efforts to develop Lightweight Small Arms Technologies to include a machine gun, rifle, and both case-less and cased telescoped ammunition. The Committee also understands that development efforts have proven successful, with estimated weight reduction of 40% on the lightweight machine gun from the current M249 and more than 40% on the cased telescoped ammunition from the current ammunition. What plans does the Army and Marine Corps have for transitioning this promising technology from research and development into production so that the dismounted soldier can benefit from the weight reduction without losing any lethality?

General KELLEY. The Marine Corps, in partnership with the Office of Naval Research (ONR), the Joint Service Small Arms Program (JSSAP) Office and U.S. Army Research and Development Command (RDECOM), is pursuing Lightweight Small Arms Technology (LSAT) in the form of case-less and case-telescoped 5.56mm ammunition with the potential to provide 40% to 50% weight savings over current

brass cased 5.56mm ammunition. If successful, this technology may be applied to other calibers of ammunition. The new lightweight ammunition is not compatible with existing weapons and will require a significant investment for the development and fielding of new small arms that are compatible with case-less or case-telescoped ammunition. Prototype weapons have been built to demonstrate the case-telescoped capability, but there are engineering challenges associated with firing the case-less ammunition and the firing mechanism is currently in pre-prototype development. Additionally, the Marine Corps is engaged with the Joint Service development of the Joint Small Arms Modernization Initial Capabilities Document (ICD) that will be the foundation requirement for enhanced small arms weapons, optics, enablers and ammunition in the 2015–2025 timeframe.

Mr. BARTLETT. In terms of body armor acquisition, how can we achieve better protection with less weight and how do you incentivize industry?

General KELLEY. The Marine Corps has partnered with industry, government and academia through the Office of Naval Research and the Naval Research Lab to develop new technologies and materials that will reduce the weight of body armor or increase capability at the same or lighter weight.

The Marine Corps also coordinates its efforts closely with the Army to prevent duplication of effort and increase joint exploration of promising technologies. These combined efforts target the development of lighter-weight body armor technologies and designs.

The Marine Corps recognizes the potential innovations that small-size companies can offer and is actively engaged with these businesses through Small Business Innovation Research (SBIR) projects. For example, the Next Generation Helmet System is a Marine Corps SBIR effort, with Army support, which is looking at novel helmet system designs, shell shapes, and suspension and retention systems that will provide an optimized solution to protect against a myriad of operational threats (blast, ballistic, and blunt impact) while improving user comfort. Additionally, we are supporting an Alternative Lightweight Solution SBIR effort to determine the feasibility for Enhanced Small Arms Protective Insert performance at reduced weights.

We communicate with industry in a number of forums. Every two years we hold an Advanced Planning Brief to Industry, where all of those who do business with the United States Marine Corps, including academia and government labs attend. At this event, we brief the Marine Corps' acquisition and funding plans. In addition, we co-host the Modern Day Marine Exposition. At this event, we highlight the needs and way ahead of the Marine Corps to industry.

Mr. BARTLETT. The Army and Marine Corps have formal and informal Tactics, Techniques and Procedures for doing about everything. Often the best, most effective way of doing something in the Army and Marine Corps is figured out by the soldiers and marines in the field and later is adopted by the military and taught in the school house. What lessons have been learned thus far from operations in Afghanistan about dismounted, backpack operations in rugged and high altitude terrain? What if anything been done to improve the physical fitness of soldiers and marines to enable them to endure the weight of the pack?

General KELLEY. Survey data collected from Marines returning from theater reflect that Marines are not using their large backpacks as often during combat operations. Presently, squads carry their large backpacks when conducting observation post missions because these missions require a longer duration away from logistical support. Due to the logistical support structure maturing in Afghanistan, the use of the large backpack to sustain forces for daily operations has dropped significantly. Most dismounted Marines only carry a smaller assault pack when on routine missions and have access to regular resupply.

Feedback from Marines in Afghanistan indicates that our current large backpack is complex and does not integrate well with issued body armor. The feedback also indicates that the daypack was too small to carry the additional ammunition and supplies Marines need to conduct routine missions. Consequently, we have developed and plan to field a new large backpack that is less complex and has a larger day pack. This new pack, the USMC Pack, is a modified design based on the Army developed Airborne Pack. The USMC Pack features load lifting shoulder straps, an external composite frame that integrates better with body armor and provides for more versatility when getting in and out of vehicles.

As America's expeditionary force in readiness, an essential part of the Marine Corps culture is to train and condition our Marines for combat. Recent combat operations have reaffirmed that our best investment as a service is in our people. Some of the environmental challenges of combat operations reinforce the need to ensure that our Marines are as well prepared physically as we can possibly make them. In November 2006 we published our *Functional Fitness Concept* which describes a

new approach to physical training that resulted in a major changes in the way Marines view exercise and how units build training programs to prepare their people for combat. This approach focuses on preparing Marines for the physical challenges of combat operations and preventing injury.

Our fitness program is integrated into a multi-tiered approach ranging from our physical fitness standards to pre-deployment training. One way we measure a Marine's readiness in a combat operational environment is through the Combat Fitness Test (CFT). The CFT is designed to keep Marines ready for the physical rigors of the contemporary combat environment. The CFT was implemented on October 1, 2009.

In addition, Marine units scheduled to deploy to mountainous areas complete individual and unit training at the Marine Corps Mountain Warfare Training Center located in the Sierra Nevada Mountains. We are mindful that Marine units get specific missions, and as a result they are provided conditioning based on their mission profile.

Mr. BARTLETT. Traumatic Brain Injury (TBI) continues to be the most prevalent injury from Iraq and Afghanistan. How are PEO Soldier and Marine Corps Systems Command helping to mitigate these injuries?

General KELLEY. We are trying to mitigate the effects of Traumatic Brain Injury through our Suspension Material and Retention Technology-Test and Evaluation (SMART–TE) efforts. SMART–TE is developing improved testing methods to evaluate blunt trauma as well as other factors such as comfort and retention. As part of this effort, the Marine Corps, in collaboration with the Army, is testing the latest in suspension systems in order to evaluate the various commercial pads and retention systems with the goal of ultimately providing greater protection from blunt trauma for our Marines and Soldiers.

Additionally, the Next Generation Helmet System is a Marine Corps Small Business Innovation Research effort, with Army support, that is reviewing novel helmet system designs, shell shapes, and suspension and retention systems that will provide an upgraded solution to protect against a myriad of operational threats (blast, ballistic, and blunt impact) while improving user comfort.

Mr. BARTLETT. What is the prevalence of injuries that can be attributed to the weight of the load that soldiers and marines must carry?

General KELLEY. Available data indicates that a large percentage of non-battle injuries are due to musculoskeletal injuries (approximately 30%). Weight load may well play a role in some of these injuries, but its exact contribution is not certain as data elements to perform an appropriate analysis have not been systemically collected. Going forward, the Marine Corps, in collaboration with the Naval Health Research Center, is currently evaluating what data elements are essential to better answer this question. The Marine Corps recognizes that musculoskeletal conditions and injuries are significant risks to the combat effectiveness of the force and is addressing the possible contributing factors, to include lightening the load efforts, through a strong resiliency program that addresses medical as well as non-medical interventions to improve the health and well-being of Marines.

Mr. BARTLETT. Are the type of injuries that are caused by heavy loads generally the sort that heal fairly quickly or are we facing large numbers of long term rehabilitation and permanent disability?

General KELLEY. Most musculoskeletal injuries are of a temporary nature and heal allowing service members to return to full duty. Acute sprains, strains, and stress fractures are injuries that heal fairly quickly and theoretically could be linked to heavy loads. Only 20% of outpatient musculoskeletal and injury visits result in duty limitations. The Marine Corps has not noted a significant change in referral patterns to the Physical Evaluation Board that would imply that large numbers of combat load injuries are causing permanent disability. Current research and expert panels are looking into risk factors, causes, prevention strategies, and rehabilitation practices for musculoskeletal conditions to determine the most effective way to minimize the occurrence and effect of these conditions on the health and well-being of Marines.

Mr. BARTLETT. How many marines, and how many soldiers are currently in a non-deployable status due to injuries that can be linked to the weight of the individuals basic load.

General KELLEY. At this time, available data does not establish a clear link between non-deployable status and injuries that can be attributed to the weight of the individual's basic load. Marine Corps Systems Command has conducted post deployment surveys with select infantry battalions specifically asking about weight-related injuries that has not found any specific combat load weight issues. Specific studies are underway at the Naval Health Research Center to better understand the effect

of the combat load on Marines as well as further delineation of the causes of musculoskeletal conditions and injuries.

Mr. BARTLETT. Does the Army and Marine Corps plan to procure a new handgun? Is a new handgun a high priority for the Army and Marine Corps?

General KELLEY. The Marine Corps has no immediate plans to procure a new handgun for general use. We participated with the other Services in the development and validation of an Air Force-led Modular Handgun System requirement. We are conducting a capability assessment that will inform future investment decisions for a new handgun capability.

Mr. BARTLETT. Please provide the committee with some of the operational feedback you are receiving regarding the performance of the M4 in Iraq and Afghanistan?

General KELLEY. The Modular Weapon System M4 carbine variant is selectively fielded to Marines requiring shorter weapons to include officers up to the rank of lieutenant colonel and staff non-commissioned officers. The weapon system has received good reviews from Marines deployed to both Iraq and Afghanistan.

Most of the Marines in the Light Armored Reconnaissance Battalion in Afghanistan reported that they were satisfied with the M4 rifle and associated optics. For longer range engagements, one scout leader wanted some of his scouts to carry M–16s vice the M4 and at least one of the squad automatic weapons in each section to be the long-barreled version.

Marines from 2d Battalion, 24th Marines reported on their first 100 days of Operation Iraqi Freedom in June 2008 that the M4 is much better suited for the kinetic fight. It is also of great use for a mostly mobile company due to constantly getting in and out of vehicles. Additionally, it reduces the weight each Marine has to carry, even though it is just by a little. These Marines asked the Marine Corps to issue the M4 Rifle to all infantrymen.

Additional comments from battalion level operations in Afghanistan between 2004–2007: The M–4 carbine is a reliable weapon, and its size, weight, easy cleaning, and maintenance are all advantages for foot mobile infantry under harsh conditions. In military operations in urban terrain (MOUT) environments, and with a force that is largely vehicle-borne, this weapon has proved its worth. It is a great weapon for close quarter battle, with its retractable stock and shorter barrel, and makes convoys much more responsive to ambushes, improvised explosive devices (IEDs), or other threats, while not sacrificing much in the way of range or accuracy. The M–4 should be issued to all drivers, radio operators, staff members, staff non-commissioned officers, officers, and combat service support Marines.

The following is taken from 1st Battalion, 6th Marines OIF from September 2006–May 2007. In survey responses, 52% of the respondents stated that they carried an M–16 (A2/4) as their primary weapon and 17% stated they carried an M4. Of those that carried an M16 (A2/4), 19% stated they would prefer to be armed with the M–16 and 71% preferred to be armed with an M4. Of those armed with the M4, 98% stated they preferred to be armed with the M4 and none preferred to be armed with the M–16. Comments on the M–4 in interviews included the following:

"The M–4 was awesome. The way we operate out of vehicles, with as much gear as we carry, we are much more effective with a shorter, lighter weapon that is more maneuverable. The long range shooting is being picked up by having designated marksmen."

"The M–4 is a very, very good weapon in close quarter combat. I understand the Marine Corps is moving to get M–4s to the leaders, but I think the Marines who are actually going into the small rooms will benefit from them also."

In a survey of over 1300 Marines on individual and unit equipment conducted in November and December 2006:

- 96% preferred the M4 carbine over the M9/9A1 service pistol as their primary weapon.
- Given a choice between the two weapons, 82% preferred the M4 carbine over the M16A4 service rifle as their primary weapon.

Mr. BARTLETT. We are hearing of complaints regarding the current pad suspension system being too hard and that it has a propensity to fall apart. What types of internal pad suspension systems will be used in the enhanced combat helmet? Are you hearing similar complaints regarding the performance of these pad suspension systems?

General KELLEY. The Team Wendy pads, presently used in the Lightweight Helmet, will be used in the Enhanced Combat Helmet. The Team Wendy pad is proven to be superior in blunt trauma performance testing and is in compliance with the Javits-Wagner-O'Day Act (41 U.S.C.46–48c) as a National Institute for the Blind/National Institute for the Severely Handicapped procurement list item. While the Marine Corps System Command has received no official Product Quality Deficiency

Reports, as of this time, the Marine Corps is participating with the Army to evaluate new suspension systems (pad systems) and retention systems (chin straps) to ensure that we optimize these systems to address both blunt trauma protection and user comfort.

Mr. BARTLETT. Do the Marine Corps plan to participate in the Army's new individual carbine program? If not, then why not? Will the Individual Carbine be a jointly developed program with the Marine Corps?

General KELLEY. Yes. Marine Corps combat developers actively participated in the Joint Integrated Product Team that developed Individual Carbine (IC) requirements and will closely monitor IC progress. Marine Corps Systems Command will also participate in the source selection team for the Individual Carbine. In parallel with the IC effort, we are developing requirements and acquisition plans to improve our current M16A4 rifle and M4 carbine with significant product improvements. Future decisions to procure the IC will be based on its achieved relative capability increase over our current weapons.

We are also closely aligned with U.S. Army planned improvements to the M4, which include ambidextrous selector switch, heavy barrel, improved trigger assembly, improved bolt/bolt carrier assembly, and a free floating rail system. These improvements are designed to enhance performance, reliability, and sustainability of the M4. The initial development of these upgrades is accounted for in our current budget.

Mr. BARTLETT. Do the Marine Corps plan to participate in the Army's XM25 program? Will the Marine Corps procure limited systems to operationally test and evaluate?

General KELLEY. Marine Corps combat developers are engaged with their U.S. Army counterparts and closely monitor Counter Defilade Target Engagement (CDTE) XM–25 development. The CDTE capability demonstrated substantial promise during the U.S. Army's recent Forward Operational Assessment (FOA) in Eastern and Southern Afghanistan, and we remain very interested in the capability. As the CDTE progresses beyond Milestone B, we will assess system capabilities and examine affordability options. The results of future U.S. Army operational assessments at the battalion level will certainly inform our decisions regarding this capability.

Mr. BARTLETT. The Army's Nett Warrior program is not a joint program. Are the Marines pursuing a similar program? If so, can you please provide details on that program. What is the Marine Corps's opinion of Nett Warrior and were Marines involved in any of the limited field user testing of the legacy Land Warrior system as well as the current Nett Warrior, Increment 1 configuration?

General KELLEY. The Marine Corps has been involved with both the Land Warrior and Nett Warrior Increment 1 programs from the beginning, participating as a member on the Source Selection Evaluation Boards for each. Involvement with Land Warrior included membership in Integrated Product Teams, participation in design reviews, observing trials, and utilizing Land Warrior in a Marine user evaluation at Camp Lejeune, NC.

We have had similar involvement with Nett Warrior Increment 1 to include the procurement of 15 Nett Warrior systems on the Army contract in order to allow the Marine Corps to conduct user evaluations and capability analysis independently.

The Marine Corps is currently a participant in the Joint Battle Command Platform (JBC–P) program which provides a similar capability to Nett Warrior Increment 1, but in a handheld form factor. Based on the Marine preference to pursue a handheld device, we are working with the US Army to develop the JBC–P handheld as the program of record to provide for a small unit situational awareness capability. The Army Program Manager for Nett Warrior is also the hardware Program Manager for JBC–P, and their intent is to use JBC–P as part of the technology insertions for Nett Warrior in the future.

Future decisions to procure the full Nett Warrior will be dependent on the outcome of evaluations and assessments against Marine Corps mission requirements.

Mr. BARTLETT. a) Please walk us through the Army and Marine Corps Requirements Board process?

b) How often do you meet?

c) What have been the major results of your meetings?

d) Are joint requirements generated during these meetings?

General KELLEY and General O'DONOHUE. a) Congressman, what I believe you are referring to as the Army and Marine Corps Requirements Board is really just called the Army Marine Corps Board or AMCB for short.

There are 4 steps to topics coming before the AMCB. They are:

1. Issue Identification: Topics are high level Army/USMC focused issues (e.g., concepts, capabilities/requirements, programs). These issues come from the previous

POM cycle, OSD Program Review, or as a result of new internal/external initiatives. This list is ever changing as emergent topics arise.

2. Issue Development: The AMCB will assign issues to responsible Subject Matter Expert (SME) teams and provide guidance concerning scope, timing and desired output. These teams will then develop assessments incorporating capabilities, service approved requirements and cost.

3. Issue Review. AMCB issue briefings will use a two-step review process. A Council of Colonels review will convene at least three weeks prior to convening the AMCB to refine the issue briefing, then a Flag review (one/two star level) will convene two weeks prior to ensure the issue is sufficiently developed and merits three-star consideration.

4. Issue Resolution: SME team leaders will brief developed issues, analyzed Courses of Actions, and recommendations to the AMCB. The AMCB often will give guidance to the SME's as to recommended Courses of Action. Unresolved issues may be presented to the CSA and CMC for further adjudication and final resolution.

Although in recent years topics have been coming into the AMCB to note where divergence exists between the two services. These briefs were to make leadership aware of why divergence between the services existed and to explain its cause and necessity.

b) Approximately 8–10 times a year

c) I would say some of the major results of AMCB's have been:

In the past 4 years:

1. Agreement on Mine Resistant Ambush Protected (MRAP) vehicle requirements and subsequently the MATV requirements.
2. Agreement on the Joint High Speed Vessel (JHSV) requirements.
3. Continued collaboration on body armor and helmet requirements.
4. Continued collaboration on small arm requirements.
5. Convergence on Service ammunition requirements.

Currently:

1. Defining of the Joint Light Tactical Vehicle (JLTV) requirements.
2. Continuation of refining Command and Control/Situational Awareness (C2/SA) requirements and solutions.

d) No, joint requirements are not generated by the board. While Joint requirements are not generated at the Army Marine Corps Board, the forum serves as a tool for collaborating and discussing Service and or Joint requirements that impact both land components.

Mr. BARTLETT. What impact is the continuing resolution (CR) having on equipping and modernization strategies for dismounted soldiers and marines?

General KELLEY and General O'DONOHUE. Now that the FY11 appropriations bill has passed, we do not anticipate any difficulty with our equipping or modernization strategies for the remainder of the fiscal year.

Mr. BARTLETT. In your opinion do we need to shift the program investment focus from the platform to the person? How can we help you to accelerate the innovation process for individual equipment?

General KELLEY and General O'DONOHUE. The Marine Corps' focus is to equip Marines to perform the missions and tasks required of them. Investing in equipment without consideration of the impact on a Marine's ability to accomplish required tasks can lead to overburdened Marines and reduced mission-effectiveness.

To help make mission-informed equipping investment decision, we have established a Marine Expeditionary Rifle Squad (MERS) integration facility called Gruntworks. Gruntworks characterizes how components of a Marine's equipment influence combat performance in terms of weight, bulk and flexibility and seeks to better integrate fielded equipment and soon to be fielded equipment on the individual Marine in a more ergonomic way. This effort also provides a metric for mobility in various equipment configurations for the evaluation of future systems.

The MERS Program Manager does not procure equipment, but works instead with all of the Program Managers within Marine Corps Systems Command to ensure individual items are integrated into an effective combat fighting capability with a balanced redundancy within the squad. MERS is unique in that its performance metrics are not cost, schedule and performance, but rather the effectiveness of the Marine squad, user acceptance of the equipment provided and the increase in mobility of Marines in combat.

In the future, the Marine Corps plans to pursue a fully integrated infantry system of equipment that will be driven by an overarching requirement. Such a requirement will drive integration of capabilities more effectively at the requirements level instead of trying to engineer it during material development. The Marine Expeditionary Rifle Squad Capabilities Development Document will define a requirements "box" in which all capabilities necessary for the Marine Rifle Squad and individual

infantryman must fit. This requirement will define parameters for size, weight, power, interfaces, and integration as well as set goals for weight reduction from current capabilities. The first increment of this capability will seek to better integrate the capabilities being fielded now or in the near future; the second increment will leverage emerging technologies to define attributes for the baseline load bearing, protection, and power systems and will require that all additional capabilities be fully integrated with those baseline systems. This will reduce or eliminate the need for additional capabilities to have their own power, cabling, and carrying pouches, thereby reducing the bulk and weight of the requisite combat load. The Army is taking a similar approach, and the requirements and acquisition communities in both services are sharing their ideas to collaborate where their interests coincide.

Congress can best support the innovation process for individual equipment through continued funding of science and technology research and development efforts that pursue innovative materials that provide equal or greater capability at reduced weight and support a shift in emphasis to a systems approach vice the development of separate, stand alone capabilities.

Mr. BARTLETT. How are you effectively managing the power consumption problem for the individual soldier and marine?

General KELLEY and General O'DONOHUE. There are multiple efforts taking place to address effective management of power consumption at the individual Marine level. One such effort is the Solar Power Adaptors for Communications Equipment (SPACES). Solar power adaptors not only solve power consumption issues by offering rechargeable power to the Marine on the move, but also contribute to lightening the load of the warfighter by reducing the amount of batteries carried by the Marine. This innovative equipment has been fielded to squads as a reusable energy source for rechargeable batteries. As we work towards centralizing power, standardizing power and reliably distributing power, the potential to reduce the reliance upon the multiple types of batteries that are currently used in systems and carried in large quantity as spares is significant.

On 13 August 2009, the Commandant of the Marine Corps (CMC) declared energy a top priority for the USMC. On 1 October 2009, the CMC created the USMC Expeditionary Energy Office (E2O) with the mission to "analyze, develop, and direct the Marine Corps' energy strategy in order to optimize expeditionary capabilities across all warfighting functions."

Additionally, the Marine Corps is the transition sponsor for a Squad Electric Power program, a Science and Technology initiative currently underway with the Office of Naval Research. This initiative began in 2011. It will address a future integrated power approach that notionally utilizes a central power source for all Marine-worn power consumers (tactical radios, intercom, global positioning system, optics), with the goal of weight reduction and energy reduction.

The Marine Corps will continue to work with all other Services, and Department of Defense agencies in standardization of power sources, with the goal of reducing unique batteries and other power sources that are logistically difficult to support.

Mr. BARTLETT. Do you consider body armor to be a consumable and in the same category as articles of clothing? If yes, then why? Please elaborate on your response.

General KELLEY and General O'DONOHUE. Yes, we consider body armor to be a consumable item because of its short life cycle.

In comparison, the way that body armor is used and replenished is similar to that of unit issued clothing. Further, body armor is not generally repairable. If it is damaged, body armor is disposed and a replacement is provided. Additionally, treating body armor as a consumable allows the Marine Corps to procure new technologies to meet changing enemy threats.

Mr. BARTLETT. Does the Army and Marine Corps currently have a validated requirement for lighter-weight body armor systems? What are your current requirements for body armor?

General O'DONOHUE. Yes. The overarching requirement for body armor in the Marine Corps is the Family of Body Armor Operational Requirements Document (FBA ORD). This requirement resulted in the fielding of the Outer Tactical Vest (OTV) and contains the protection requirements for all subsequent body armor systems, as well as the Enhanced Small Arms Protection Inserts (ESAPI) and side plates.

The Urgent Statement of Need for the Outer Tactical Vest Enhancement resulted in fielding of the Modular Tactical Vest (MTV), which provided improved features and fit over the OTV. The Improved Modular Tactical Vest (IMTV) will replace the MTV in the next fiscal year. The IMTV provides a seven percent reduction in weight and improves fit and ease of use.

The Urgent Statement of Need for an ESAPI Carrier resulted in fielding of the Scalable Plate Carrier (SPC), which provides somewhat reduced protection against shrapnel while maintaining protection against direct fire in exchange for weight

savings and increased mobility. The Statement of Need for the Plate Carrier provides for the replacement of the SPC with improvements such as more commonality with the IMTV and better fit while maintaining the savings in weight and mobility. We plan to field this capable later this year.

Even with the advancements made in the fielding of subsequent body armor systems, the objective protection and mobility goals for the Family of Body Armor ORD have yet to be achieved. We are currently involved in the Army's effort to develop a requirement to replace the current multiple body armor systems with a single, modular solution that incorporates the latest materials for soft and plate armor protection to bring us closer to achieving the protection and mobility both Services desire. We intend to rapidly procure new body armor systems as technology matures to meet both protection and overall mission requirements.

Mr. BARTLETT. Does the Army and Marine Corps currently have a validated requirement for a new handgun system? Are you currently reviewing such a requirement?

General O'DONOHUE. Yes. We participated with the other Services in the development and validation of an Air Force-led Modular Handgun System requirement. We are conducting a capability assessment that will inform future investment decisions for a new handgun capability.

QUESTIONS SUBMITTED BY MRS. ROBY

Mrs. ROBY. At what stage in the acquisition process is improved groin protection against a dismounted IED threat and what methods are being considered to further protect our Servicemembers?

Mr. MARKOWITZ. Current efforts being conducted for improved groin protection are not part of a formal acquisition process. They are being done in response to a 10 Liner request from a brigade in OEF that requested that the Army Rapid Equipping Force field multiple pelvic protection solutions to a battalion-sized unit for a 90 day evaluation. The Army currently provides Soldiers with a groin protector that connects vertically to the bottom front of the Improved Outer Tactical Vest and is interchangeable with the Soldier Plate Carrier System.

PEO Soldier is working with the Rapid Equipping Force to field a number of improved groin protection designs for the evaluation described above. These include the United Kingdom (UK) Army's Tier 1 silk boxer shorts that will go to a U.S. Army unit in June 2011. These shorts are designed to prevent debris from blast events to become embedded into soft tissue thus mitigating infection. PEO Soldier worked with several DOD agencies to quickly assess a number of commercial off-the-shelf protection products which could mitigate injuries from dirt and small fragments that are blown into the pelvic area during an IED event. The ballistic performance of these products was assessed at Army and Navy test facilities.

Concurrently, PEO Soldier conducted a Soldier evaluation of a variety of those same protection products at the Maneuver Battle Laboratory, Fort Benning, GA, in order to obtain feedback on wearability and comfort. Both male and female Soldiers participated in the evaluation. The results of the Battle Lab evaluation, and the Safety Confirmation Testing, will be used to down select to multiple configurations which will be fielded to OEF in July 2011

In addition to the efforts described above to support the 10 Liner, the Natick Soldier Research Development & Engineering Center began evaluating multiple ways to provide a meaningful level of protection for both males and females. Efforts focus on how this area of the body can be armored (i.e., protective undergarments, external overgarments, etc.). In addition, researchers will look at the effect that these garments have on Soldier mobility, comfort, thermal load, hygiene, etc.

Mrs. ROBY. I understand that the Army had an estimated 267,000 night vision goggles (NVGs) in the inventory in 2003, and now has approximately 681,000 NVGs in its inventory in 2011. The large increase in procured systems occurred in response to evolving requirements associated with Operation Enduring Freedom and the Operation Iraqi Freedom. As you know, industrial base capacity had to be expanded to meet these increased requirements, since only a limited number of companies exist capable of producing this technology. Given the constrained budget environment, what concerns do you have about the ability to maintain NVG production capacity and technological capability? What are your respective services' research & development and procurement budgets for NVGs in the FY 12 budget request, as well as within the future years defense program?

General FULLER. Night vision systems afford our Warfighters unmatched situational awareness, yielding improved survivability and lethality in all operational environments. Based on the volume of systems already procured, the Army does fore-

see a significant reduction in production quantities for most current night vision technologies. Army production deliveries are on schedule to complete in 4th Quarter of Fiscal Year 2012 (4QFY12). Current estimates indicate that FY13–FY17 Image Intensifier Tube sustainment quantities are less than 50 percent of peak production and less than pre-facilitization quantities beyond FY17. Other night vision technologies are also experiencing completion of the Department of Defense (DOD) requirements and reduction in demand. These changes in demand level raise the following concerns:

a. Potential cost increase due to lower sustainment volume.

b. Potential workforce reductions and industrial base consolidation due to reduced need–thus impacting competition.

c. Potential shift of industrial focus to lower performance Night Vision Goggle Systems designed for Commercial and Foreign Military Sales, increasing industrial viability and market share. This shift of focus may result in reduced capability and/or willingness to meet DOD's higher performance requirements.

d. Decreased ability for industry to respond to DOD urgent requirements based on loss of expertise and hi-performance production capability.

In FY12 there is a $9.8 million dollar request in Research, Development, Test and Evaluation for Soldier night vision devices. This development effort will support completion of product qualification testing on the current Enhanced Night Vision Goggle (ENVG). It will also support integration, testing, and evaluation of technologies to further enhance night vision and provide interoperability with other systems such as the Thermal Weapons Sight and Nett Warrior. In addition, the FY12 budget request includes $117.4M in procurement for ENVG. This will be used for the continued procurement of ENVG.

Mrs. ROBY. What improvements are being made in the area of power supply for the dismounted Servicemembers' individual equipment worn on the battlefield?

General FULLER. The Army is investigating a variety of expeditionary power alternatives that provide the squad with man-portable power that will allow the Soldier to power his equipment or charge his batteries in the most austere operating environments. These potential solutions include, but are not limited to, Soldier portable fuel cells (methanol, propane), renewable energy systems (solar, wind, hydro, and energy harvesters), multi-fuel generators, and universal battery chargers. Innovation in battery chargers has made it possible for the Squad to carry fewer chargers for the variety of batteries being carried by the Warfighter.

With funding, these expeditionary power solutions will allow for extended mission duration while reducing the unit logistics requirement.

Mrs. ROBY. What is the path forward to making the NettWarrior a joint program?

General O'DONOHUE. The Marine Corps has been involved with both the Land Warrior and Nett Warrior Increment 1 programs from the beginning, participating as a member on the Source Selection Evaluation Boards for each. Involvement with Land Warrior included membership in Integrated Product Teams, participation in design reviews, observing trials, and utilizing Land Warrior in a Marine user evaluation at Camp Lejeune, NC.

We have had similar involvement with Nett Warrior Increment 1 to include the procurement of 15 Nett Warrior systems on the Army contract in order to allow the Marine Corps to conduct user evaluations and capability analysis independently. The Marine Corps concept has been to leverage capabilities from the Nett Warrior system that will provide a relevant capability to the Marine Corps. This collaboration in testing and evaluation provides the knowledge for informed decisions on which capabilities to leverage without the complexity of a joint acquisition program.

The Marine Corps is currently a participant in the Joint Battle Command Platform (JBC–P) program which provides a similar capability to Nett Warrior Increment 1, but in a handheld form factor. Based on the Marine preference to pursue a handheld device, we are working with the US Army to develop the JBC–P handheld as the program of record to provide for a small unit situational awareness capability. The Army Program Manager for Nett Warrior is also the hardware Program Manager for JBC–P, and their intent is to use JBC–P as part of the technology insertions for Nett Warrior in the future.

Future decisions to procure the full Nett Warrior will be dependent on the outcome of evaluations and assessments against Marine Corps mission requirements.

QUESTION SUBMITTED BY MR. WILSON

Mr. WILSON. In the hearing on March 17, you alluded to the fact an Analysis of Alternatives should have been performed prior to the announcement of an individual carbine competition. However, you chose to request a waiver, which was ap-

proved by the Secretary of the Army. In the interest of seeing how these conclusions were drawn, will you please provide me and the Committee with the waiver justification, as well as any other information you submitted that the Secretary's decision was based upon?

General FULLER. The Army waived an Analysis of Alternatives (AoA). It was determined that an AoA would not produce relevant information in support of the program, since the Key Performance Parameters and Key Systems Attributes were baselined on the current M4 Carbine, as directed by the Army Requirements Oversight Council. In addition, an extensive Capabilities-Based Assessment on small arms requirements and gaps had just been completed in 2008. In 2009, the Under Secretary of Defense (Acquisition, Technology and Logistics) completed a Joint Assessment Team for small arms. All the Services participated in the assessment. This team concluded that with a multitude of potential materiel solutions available, product improvement programs and performance-based competitions are appropriate to address the alternatives. In order to determine the most prudent path forward, the Army will conduct a Business Case Analysis using actual data collected during the Test and Evaluation of the Individual Carbine candidate at the conclusion of the Commercial-off-the-Shelf competition. Attached is the request and approval for the waiver of the AoA for the Individual Carbine. [The attachment can be found on page 83.]

QUESTIONS SUBMITTED BY MR. CRITZ

Mr. CRITZ. Has the Army approved the requirement for the Soldier Wearable Acoustic Targeting System (SWATS)? If not why not?

Mr. MARKOWITZ. The Army has approved a directed requirement for 14,900 SWATS for use in Operation Enduring Freedom to evaluate the system's performance. The Individual Gunshot Detection (IGD) Capability Production Document (CPD) has not been approved at this time due the pending assessment of production line representative systems. The IGD CPD, currently in staffing is on deferred status. As agreed at the last 1–2 star AROC on Soldier Systems, IGD CPD would be deferred until the next generation of the system is evaluated in theater to inform CPD development. Poor performance of the earlier system raised questions on CPD key performance parameters and system attributes. A deliberate hold on staffing will remain in effect until the completion and HQDA review of an ATEC assessment of the next generation of Soldier Wearable Acoustic Targeting Systems (SWATS) currently headed to theater under the directed requirement.

Mr. CRITZ. Why has it taken so long to approve the requirement for SWATS considering the fact the VCSA made counter sniper a priority in early 2006?

Mr. MARKOWITZ. Development of the capability was initially slow due to assessed low Technology Readiness Levels (TRL) during a Proof of Concept in 2004 and poor performance of the first systems fielded. The Army signed a directed requirement in September 2009 which has enabled the procurement and fielding of 14,900 Soldier Wearable Acoustic Targeting System (SWATS) to meet field requirements. Fielding of these systems began in March 2011 and New Equipment Training (NET) is currently taking place. A capability production document (CPD) is in deferred status until such time as an assessment of production quality representative systems can be completed by the Army Test and Evaluation Command (ATEC).

Mr. CRITZ. What is the Acquisition Objective and Basis of Issue Plan for the Soldier Wearable Acoustic Targeting System (SWATS)?

Mr. MARKOWITZ. SWATS is the name of a particular individual gunshot detection solution. The actual program name is the Individual Gunshot Detection (IGD). Based on the draft IGD Capability Production Document, the projected Army Acquisition Objective for the IGD is 15,736.

Below is the BOIP for the IGD.

Brigade Combat Team (BCT) Type	Sensors per BCT	Army Force Generation Fiscal Year 2013–2015	TOTAL
Infantry BCT/Ranger	600	11	6,600
Stryker BCT	600	4	2,400
Heavy BCT	400	6	2,400
CAB/SF	542	8	4,336
	Total	29	15,736

Mr. CRITZ. Why did it take the Army until October, 2010 to award the contract for the majority of Soldier Wearable Acoustic Targeting System (SWATS) considering the funds were appropriated at the Army's request in the emergency supplemental in June, 2009?

General FULLER. Soldier Wearable Acoustic Targeting System (SWATS) is the name of a particular individual gunshot detection solution. The actual program name is the Individual Gunshot Detection (IGD). The Army G–3 approved a directed requirement in lieu of the IGD Capability Production Document (still in draft) after the Infantry Army Requirements Oversight Council met on 24 September 2009. This directed requirement gave the Army the authority to enter into contracts for the IGD capability. On 20 January 2010, the U.S. Army Research, Development and Engineering Command Contracting Center, Aberdeen Proving Grounds, Maryland, issued the IGD solicitation (W91CRB10T0027). This solicitation sought offerors with mature technology that would satisfy the IGD threshold technical criteria and the ability to provide production quantities. Project Manager Soldier Sensors and Laser's IGD contract acquisition strategy consisted of a Full and Open Competition, to include an operational evaluation, with an award based on the best value analysis of all offerors' systems. From March to July 2010, the Army Test and Evaluation Command conducted an Operational Evaluation of three IGD systems, which met the threshold criteria. After contracting activities and source selection, a production contract award was made on 29 October 2010 for 10,000 to 13,000 IGD systems. Initial fielding in Operation Enduring Freedom began on 29 March 2011.

Mr. CRITZ. Based on your experiences as PEO Soldier, do you have any recommendations on how this committee can provide additional flexibilities to make the acquisition process more responsive to our soldiers in combat?

General FULLER. At this time we believe we have the flexibilities within the existing process to accomplish our mission in a responsive manner. However, the Secretary of the Army has chartered a broad review of the acquisition process and those recommendations will help inform prudent reforms to the system.

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