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HEARING
ON
NATIONAL DEFENSE AUTHORIZATION ACT
FOR FISCAL YEAR 2014
AND
OVERSIGHT OF PREVIOUSLY AUTHORIZED
PROGRAMS
BEFORE THE
COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED THIRTEENTH CONGRESS
FIRST SESSION
—
SUBCOMMITTEE ON TACTICAL AIR
AND LAND FORCES HEARING
ON
**EQUIPPING THE INDIVIDUAL SOLDIER
AND MARINE: CURRENT AND FUTURE
YEAR ACQUISITION AND MODERNIZATION
STRATEGIES AND THE FISCAL YEAR
2014 BUDGET REQUEST**
—

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**EQUIPPING THE INDIVIDUAL SOLDIER AND MARINE:
CURRENT AND FUTURE YEAR ACQUISITION AND MOD-
ERNIZATION STRATEGIES AND THE FISCAL YEAR 2014
BUDGET REQUEST**

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Washington, DC, Thursday, April 11, 2013.

The subcommittee met, pursuant to call, at 3:30 p.m., in room 2118, Rayburn House Office Building, Hon. Michael R. Turner (chairman of the subcommittee) presiding.

**OPENING STATEMENT OF HON. MICHAEL R. TURNER, A REP-
RESENTATIVE FROM OHIO, CHAIRMAN, SUBCOMMITTEE ON
TACTICAL AIR AND LAND FORCES**

Mr. TURNER. I call to order the hearing of the Tactical Air and Land Forces Subcommittee. The Tactical Air and Land Forces Subcommittee meets today in open session to receive testimony on individual soldier and marine equipment programs in the fiscal year 2014 budget request. Today we will continue the subcommittee's oversight on the many challenges facing individual warfighter equipment, to include industrial-based sustainment, advances in weight reduction and equipment specifically tailored for the female warfighter.

This committee and this subcommittee in particular has always stressed the importance of individual warfighter equipment and has done so in a bipartisan manner through hearings and legislation. In bipartisan fashion we have worked with the Department and industry to eliminate critical equipment shortages post-9/11. We have drafted legislation reflecting the critical need for weight reduction for individual gear and have tried to improve the acquisition process in order to better incentivize industry.

I want to thank our former subcommittee chairman, ranking member, and other subcommittee members for their actions in this matter.

The past decade saw a significant increase in funding and prioritization for individual warfighter equipment, primarily through overseas contingency operations funding. Industrial bases were expanded and sustained at high capacities in order to meet evolving threats and high-priority demands from troops operating in Afghanistan and Iraq. This helped to incentivize innovation from industry and helped to mature technology for programs like body armor, protective clothing, and night vision equipment. Many lessons were learned regarding what worked and what did not.

I commend the improvements that have been made as well as the increased level in investment from prior years. However, considering the present fiscal realities, I remain concerned that the future priorities and levels of investment for individual equipment be sustained. We still have soldiers and marines carrying almost 150 pounds of gear on their back, depending upon the mission. Despite our better judgment, we are entering into a period of transition, the so-called peace dividend, and what happens to be a prolonged period of reduced defense budgets. What happens to individual warfighter equipment investment when the OCO [Overseas Contingency Operations] budgets go away and there is no longer a sense of urgency to address warfighter demand for lightweight gear?

We have a panel of witnesses here today who are prepared to address long-term modernization sustainment and integration strategies for individual equipment programs, current efforts to lighten the soldier and marine combat load, and ways to incentivize industry to continue to invest in innovation.

Before we begin, I would like to turn to my good friend and colleague from California, Ms. Loretta Sanchez, for any comments she may want to make.

STATEMENT OF HON. LORETTA SANCHEZ, A REPRESENTATIVE FROM CALIFORNIA, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Ms. SANCHEZ. Thank you, Mr. Chairman, and thank you all. I know I said hello to some of you, but I notice that you have brought a lot of people to answer our questions today, so I appreciate that. Thank you all for your service to our country.

We are really here today to try to figure out how we move forward now that we are out of Iraq and coming out of Afghanistan, and in particular with respect to the individual soldier or marine or seaman or airman, et cetera, and women, by the way, you know, what it is going to look like in the future. And we know the more technology we have, the more information we have, the more we want them to be so well equipped that sometimes they are carrying 150 pounds along with them.

So the answer is how can we use the new technologies, the new breakthroughs and ensure they are being used in the equipment that our men and women want and need and how do we do that in a time also of budget constraints. And as the chairman said, we threw a lot of money at this and we tried to fix the problem during the war, and then what typically happens is that you, especially in a tough time with no conventional-type or big war going on, you tend to downsize on equipment or not make the innovation that you need in equipment and try to concentrate on the larger systems or what have you.

So we want to make sure that we don't do that, in particular because the way some of this equipment or most of this equipment has been bought over this decade has been through no line item, but really in contingency accounts. So we are here to try to figure out and get some answers as to what we need to do.

I am going to have some questions for you with respect to the rifle competition and how that is going. I am interested in equipment for women now that we are going to be opening up more

MOSs [Military Occupational Specialties] for women in the military at large. And I am also interested in how we are going to keep innovation coming into the circle as we move forward and we don't really have the type of procurement or monies that we have had in the last decade.

So those are my concerns and I am sure that we will have a good discussion today. So I welcome you. And thank you, Mr. Chairman. And I also want to thank the members who have shown up for the subcommittee hearing. I appreciate it also. Thank you.

Mr. TURNER. Thank you, Congresswoman Sanchez.

We want to welcome then our witnesses. We have Brigadier General Paul A. Ostrowski, Program Executive Officer, Soldier; Mr. Peter B. Bechtel, Director, Capabilities Integration, Prioritization and Analysis; Brigadier General Frank L. Kelley, Commander, Marine Corps Systems Command; and Brigadier General Eric M. Smith, Director, Capabilities Development Directorate.

Gentlemen, thank you for your service and thank you for being with us here today. We are going to proceed with your testimony and then go into questions.

Without objection, we ask that all witnesses' prepared statements be included in the hearing record and we also ask unanimous consent that non-committee members, if any, do come to attendance, we have some that RSVPed that they will be here, the non-committee members be allowed to participate in today's hearing for all subcommittee members after they have had their opportunity to ask questions, and if there is no objection, the non-committee members will be recognized at the appropriate time for questions also.

With that, General Ostrowski.

STATEMENT OF BG PAUL A. OSTROWSKI, USA, PROGRAM EXECUTIVE OFFICER SOLDIER, U.S. ARMY; AND PETER B. BECHTEL, G-3/5/7, DIRECTOR, CAPABILITIES INTEGRATION, PRIORITIZATION AND ANALYSIS, U.S. DEPARTMENT OF THE ARMY

General OSTROWSKI. Chairman Turner, Representative Sanchez, distinguished members of the Subcommittee on Tactical Air and Land Forces, on behalf of myself and Mr. Pete Bechtel, we thank you for this opportunity to discuss the fiscal year 2014 budget request for equipping the individual soldier and marine. It is our privilege to represent senior Army leaders and America's soldiers. It is our privilege also to appear before this subcommittee with the fellow warfighters of the United States Marine Corps. We thank you, Mr. Chairman, and all subcommittee members, for your sound advice and strong support of the Army as we strive to ensure that our soldiers are well trained and well equipped to undertake any mission in any environment.

The lethality, safety, and security of soldiers remain the Army's highest priorities. We have without question the best-equipped, most technologically advanced fighting force in the world, but there are still challenges that we must meet. Today's all-volunteer, combat-seasoned soldier has steadily borne the brunt of increased equipment load, necessitating considerable attention to modernization efforts aimed at lightening that burden while maintaining a

decisive edge over any potential adversary. This is an important element of our modernization plan.

Our senior leaders continue an open dialogue with industry. Now, perhaps more than ever, it is clear that we must work together to identify appropriate courses of action to minimize negative impacts on our plans, programs and industry partners. We must continue to meet our contingency requirements while carefully balancing readiness and modernization.

We thank you again for your strong support of our soldiers and the Army. We are part of a joint force, constantly working to enhance the safety and security for our warfighters. Your wisdom and guidance is deeply appreciated as we work to ensure that our soldiers have the right equipment for the right operations at the right time to successfully accomplish their missions and return home safely.

We look forward to your questions.

[The joint prepared statement of General Ostrowski and Mr. Bechtel can be found in the Appendix on page 33.]

Mr. TURNER. Thank you.

General Smith.

STATEMENT OF BGEN ERIC M. SMITH, USMC, DIRECTOR, CAPABILITIES DEVELOPMENT DIRECTORATE, COMBAT DEVELOPMENT AND INTEGRATION, U.S. MARINE CORPS; AND BGEN FRANK L. KELLEY, USMC, COMMANDER, MARINE CORPS SYSTEMS COMMAND, U.S. MARINE CORPS

General SMITH. Chairman Turner, Ranking Member Sanchez, and distinguished members, thank you for the opportunity to appear before you today on behalf of your marines and their families. This committee is vitally important to the Marine Corps because it focuses on the individual rifleman, the heart and soul of the Marine Corps.

Brigadier General Kelley and I have prepared one written statement for the Marine Corps which has been delivered and I will offer a few brief opening statements for us both. I will keep these comments extremely short so that Brigadier General Kelley and I might use the maximum possible time to answer the important questions which you may ask. I would also thank very much our brothers in the Army for their support of all that we have done.

Having deployed twice to Iraq and once to Afghanistan, I can personally attest to the positive impact which you and your due diligence and hard work have had on the lives of the marines and sailors of our Corps and their families. Your willingness to provide support for us, to obtain the equipment we needed, meant that more warriors returned home to their families than otherwise might have been possible. I offer you this information not as a platitude but as an honest assessment from one marine back to his teammates who provided him with lifesaving support while in theater. I guarantee you that the marines who are forward-deployed at this very moment echo my sentiments.

We look forward to answering your questions, and, again, thank you for allowing us to appear here before you today.

[The joint prepared statement of General Smith and General Kelley can be found in the Appendix on page 49.]

Mr. TURNER. Thank you, gentlemen, for appearing before the committee and for the information provided.

This is one of those issues where sometimes it is a funding issue, sometimes it is a specific equipment issue, sometimes it is a process issue that affects our ability to get to the warfighter exactly what is needed for their performance. And I am going to ask you one of those process-procedure questions.

We are very concerned about the issue of body armor components and the fact of the extensive weight that our service members are experiencing both as we know it is having impacts on their bodies and on injuries, but also we know that it affects agility in the field. So in 2010 Congress mandated that the DOD [Department of Defense] establish a procurement line item for body armor components, again a process action, because Congress believed that there would be a better opportunity to get lighter equipment working in partnership with industry than the process that was currently going forward.

However, DOD has failed to comply with this requirement. DOD has indicated that body armor is considered to be an expendable item and that creating a procurement line for expendable items would add inefficiencies in managing procurement quantities due to varying procurement quantity requirements. Its duty is exclusively using operations and maintenance accounts almost entirely funded with overseas contingency funds to fund warfighter equipment. Industry is unable to see and forecast procurement levels across the Future Years Defense Plan. As a result, they cannot create business cases that support internal investment. Congress had stepped in trying to affect that process so that perhaps we could get both the same level of protection, but yet equipment that more meets the needs of the mobile warfighter.

DOD has stated that these inefficiencies would be created by establishing procurement line items for individual warfighters. I am concerned and want to know what your position is as to the opportunity to more effectively work with industry. We understand that DOD has said by using O&M [Operations and Maintenance] funding that they cite flexibility in acquisition, but we now have a situation where we have so substantially acquired what is almost a body protection system or systems for warfighters that perhaps it is time that we elevate it in the procurement process so that we can more technically affect the outcome.

I would love your thoughts, if anyone would like to comment.

General OSTROWSKI. Thank you, Mr. Chairman. I will start off. As you know, we are on record as a department that body armor would fall under the operations and maintenance accounts based on the flexibility that you cited. The letter from the Under Secretary of Defense to you and others clearly cited that. I think the key here, sir, is the flexibility piece that it offers and it has offered us some.

A case in point. Just recently we came upon a new threat in Afghanistan to our dismounted patrols, and those were dismounted IEDs, improvised explosive devices. When we had money in a line in the O&M account we were able to quickly move that money to create a counter to that called our protective overgarment and undergarment system which we have fielded up to 66,000 sets of and

are currently saving lives in Afghanistan. That flexibility was really highlighted with respect to that particular procurement.

With respect to the industry and not having visibility over our programs if it was hidden underneath an O&M line, we have a very open dialogue with industry, and going forward with the soldier protection system, which is the next generation of protection systems for all of our soldiers, we have maintained very tight contact with industry to include industry days, where we had over 100 vendors come in and we discussed our requirements and where we were going with respect to that.

We are currently funded well in DPEO [Deputy Program Executive Office] to create a capability of our soldier protection system and I know that there is a lot of push to move that line into the procurement side. I would just say that from our perspective, the flexibility is key, because with respect to personal protection, our ability to shift is adamantly important across the force.

Mr. TURNER. Thank you for giving that answer, because my followup question obviously, I understand the flexibility in the aspect of quantity and I understand the flexibility in the aspect of acquiring existing items or systems, but I think everyone is concerned about the development process, how do we get beyond just you being a purchaser but also then that partner with development. Because I think everyone shares, I know you share the same concern, that what you currently have is going to have to evolve to the next generation, the next level, so that we can ensure that, A, we don't have injuries, but also with the aspect of agility, it is less safe for the soldier in the field when they have a greater weight for them to be able to move.

General OSTROWSKI. Yes, sir. The one thing that the Department did do was ensure that we established a research and development line for our personal protection equipment, and that is the area that we invest, that is an investment account within the research and development line, and that is very open for visibility with respect to industry, our industry partners and so forth. That is where we go and chase—

Mr. TURNER. How did that line fare in this budget?

General OSTROWSKI. Sir, that line, I don't have the exact number on it. I will tell you, sir, that within my research and development lines that I have within Soldier and the budget is approximately \$185 million, which is above last year's request and last year's funding amount.

Mr. TURNER. Thank you. With that, I will turn to my ranking member.

Ms. SANCHEZ. Thank you, Mr. Chairman. I outlined the areas that I had a concern for you when I began, so let me just go through this first with Mr. Bechtel.

I feel that the Army is starting to say that individual equipment is good enough. I mean by that we had this problem before when we entered the war in Iraq and some people had better body armor than others and we lost lives. It cost us lives. So I am concerned that the Army is underestimating the performance costs and the long-term costs of the innovation with respect to weight.

I mean, I consider myself someone who goes out and exercises every day and I know what weight does, and I am concerned that

we are overloading soldiers. I am concerned that there is some skeletal information coming out that maybe they have too much on them. I know we had this, for example, on my police—when I look at our police, our law enforcement, local law enforcement, something like 40 percent of back injuries, and there is a lot of them throughout all the agencies, are due to too much weight on the belt, too much weight, et cetera, on the soldier, or in that particular case the policeman.

So my questions are, one, is there a DOD investment strategy for new materials that will provide improvements to warfighter equipment? How are we going to gauge that? How are we going to do that? And can you provide a couple of examples of the most recent new products that have significantly reduced the load on the soldier?

Mr. BECHTEL. Well, Congresswoman, you are exactly right. We certainly take care and have prioritized the mobility of our soldiers, both in terms of operational needs and in the long-term impacts from a manpower, personnel, and integration approach. It starts early on in the combat developer in labs. It proceeds forward all the way through tests, and ultimately during downrange forward operational assessments and so forth. So you are spot-on in terms of having impact on the soldier with predominately weight.

There is obviously the balance between protection, ballistic protection in most cases and otherwise, and the weight and the mobility aspect. We consider that very carefully, and General Ostrowski's comments on some of that with weight reduction for the body armor goes to that, working with industry and redefining the development document requirements to demand threshold 10-percent reduction in weight and moving on to an objective of 15-percent reduction.

Some recent examples of success stories goes to some of the network, and network, of course, is one of our five big priority areas for our soldiers' portfolio, and reducing the network and the battery weight as we go forward. So the various innovations of using commercial off-the-shelf and of capitalizing on what soldiers are more comfortable and familiar with, while also moving to conform battery and other soldier systems to reduce weight and the deployable net-zero type systems has been one important innovation that we have examined.

The other area is in the protective mobility realm using robotics specifically, soldier carried and transportable, as well as self-transportable systems that will help protect the cognitive and the physical stamina of the soldiers when they are operating as part of a squad as a system.

Ms. SANCHEZ. Generals, if you could also speak to what types of innovation or what you are doing about the size with respect for example if we are going to have women marines or soldiers in the combat area.

General OSTROWSKI. Yes, ma'am. First of all, I would like to just cite out a couple of other examples in addition to what Mr. Bechtel just answered. Our current improved outer tactical vest weighs 31 pounds. The soldier plate carrier, which we are now using in Afghanistan, dropped that weight to 24 pounds, so an incremental improvement right there in itself.

The female body armor, ma'am, is our latest invention that we were able to create with our industry partners and our Natick lab. What we were able to accomplish is a weight reduction from 31 pounds in the improved outer tactical vest down to 25 pounds for our female body armor. We currently have 19 sets of that female body armor in theater, we have it in eight sizes and we are going to field 600 sets in the months of August and September to the next forces deploying as part of the rapid fielding initiative.

Ms. SANCHEZ. 600 female sets?

General OSTROWSKI. 600 female sets. Yes, ma'am.

Ms. SANCHEZ. In eight different sizes.

General OSTROWSKI. Yes, ma'am. That is exactly correct. And going forward we will always field female body armor to our deploying forces from this point forward. August will be our first lot of those, and from now on every soldier, every female soldier deploying in the theater, will be given female body armor.

Ms. SANCHEZ. Thank you, General.

General SMITH. Ma'am, thanks for the opportunity to answer on this question. We are following closely what the Army is doing with regard to female body armor. Our position is that for us protection is paramount and that we wish to have both protection and comfort, but we won't sacrifice any protection for any marine, be it male or female, in order just to gain some comfort.

Our plate carrier, which is what we are currently using in Afghanistan, is in and of itself inherently scalable. It has got a shoulder strap system that is very lightweight that allows almost any torso size to fit that carrier to the body in the best possible means. That is what we are doing in order to lighten the load.

We absolutely echo and applaud your comments about injuries to shoulders, knees, backs, necks, ankles, hips. You name it, we are also experiencing and seeing that firsthand. So everything that we are doing when we work with industry is to let them know through industry days, through modern-day marine expos, that we need to lighten the weight. We need to reduce the weight of the material which carries the plate, the plate being the heart and soul of a protective system, because that is truly what is stopping the enemy threat, is the plate. We are doing that on a daily basis as we work back and forth with industry.

I would simply say before I pass it to General Kelley is that we do walk somewhat of a fine line in that if the requirement is for the protection and then we also establish a specific requirement for the weight, we could find a difficulty in having a system that protects, such as the plate, but then causes a problem when we say well, it is protected but it didn't meet the weight requirement. And we will be in an endless do loop of pursuing the perfect—the gold-plated standard.

Ms. SANCHEZ. General, do you have any comments on that?

General KELLEY. I can't really improve too much on what you have already heard, ma'am, but I would like to say one organization that we have at Marine Corps Systems Command, and even though it is at Marine Corps Systems Command we share this data with the Army and to be perfectly honest any of the other Services that would want to get their hands on it, and that is our Marine Expeditionary Rifle Squad. They have a program called MC-LEAP

[Marine Corps Load Effects Assessment Program], and the Marine Expeditionary Rifle Squad essentially focuses on the marine in our case, and we look at both male and female marines when we take a look at the MC-LEAP program, which takes a look at everything that this marine is going to wear and then puts them through a fairly grueling obstacle course and then evaluates what has happened to them during that evolution. And we look at everything, like how did they feel, how did they feel when they started, how did they feel when they ended, what was their heart rate, did they feel an impact on certain parts of their body.

Just to let you know that that was sort of tucked away in an individual weapons systems program, and we felt that it was so important that we actually elevated that policy to our systems engineer, our systems engineer of the Marine Corps, a guy by the name of Jim Smerchansky, and that Marine Expeditionary Rifle Squad approach is applied to everything that we do at Marine Corps Systems Command, based on the individual marine.

Ms. SANCHEZ. Lastly, I am the only one on this side, Mr. Chairman, so I hope you will indulge me with this, just a quick question. I mean, you guys are going to get a lot of time.

When I worked with the law enforcement I remember we did bulletproof vests and we had a program, we had a grant program from Homeland Department which I shepherded through because I also sit on Homeland, and one of the things that was interesting was at that time that my officers were using protection that was over 5 years old and after 5 years, because of sweat and sun and weather and using it and everything, it wasn't effective.

So my question to you, in the types of battle situations and everything where our people are wearing this, what kind of a shelf life does the equipment you are using have, and doesn't that sort of harken to this should be a line item where we are consistently understanding that we have got to be replacing this stuff and buying this stuff versus just loose out there?

General OSTROWSKI. Yes, ma'am, you are exactly correct. It must be properly surveilled and it must be properly bought so that we do not have a situation where the body armor becomes ineffective.

Ms. SANCHEZ. How long, if someone is using it out there, does it last?

General OSTROWSKI. Yes, ma'am. It depends on the individual soldier, quite honestly, because of the fact that an individual soldier will put the body armor through its paces.

Ms. SANCHEZ. Right.

General OSTROWSKI. What we do to ensure that the body armor, the plates are up to standard, is prior to ever soldier deploying, we have a non-destructive test, it is basically an X-ray, and we X-ray those plates. Halfway through the tour of the soldier in theater we X-ray those plates yet again. And then again when they return back to CONUS [Continental United States] we X-ray them yet again.

So what we do is we ensure that they go into theater with a body armor that is complete and is sound, and we continue to surveil that through the process of being in the fight. This process works very, very well and is well established. But however, we do need to continue to buy body armor because it does wear out over time

in terms of storage, and that was recently exposed with respect to the SOCOM [Special Operations Command] plates that had a separating of the materials over time.

Ms. SANCHEZ. Great. Thank you, Mr. Chairman. I have some other questions, but considering you have so many people on your side, I will let them ask for a while. How is that?

Mr. TURNER. Great. I appreciate that. What we have in order is Mr. Cook, Dr. Wenstrup, Mr. Runyan, Mr. Gibson, Mrs. Roby, Mrs. Walorski, and Mr. Castro.

We are beginning with Mr. Cook.

Mr. COOK. Thank you, Mr. Chair. Thank you, gentleman. I just want to ask a couple of questions about the testing of this. Part of my questions are, I don't know, maybe I should have read S.L.A. Marshall's—or reread those books one more time about the mobility of a soldier, or, if I could paraphrase, a marine, and how are you going to test this, whatever you come up with. Right away I am thinking of Fort Irwin or MCAGCC [Marine Corps Air Ground Combat Center Twentynine Palms] out there where it is 120 degrees. And whatever you come up with I want to make sure that those soldiers and marines can move around with that equipment. Twenty-five pounds is a lot. And then depending upon what kind of gear you are going to have, what is going to be on it, grenades and all this stuff, and I can go on and on and on, but it weighs that individual down.

There was a guy by the name of Al Gray at a conference 100 years ago, before you were probably born. Al Gray talked about, hey, it is very easy to make decisions. We were talking about cold weather gear, which at the time the Marine Corps had gear that was pre-World War II. And he said it is very easy to make decisions in Natick when it is 70 degrees in the laboratory, but if you don't really test this in the field environment under different combat situations, you are going to be in for a surprise. And my surprise was 13 May, 1967, with the M16 rifle, which was going to be the great, great savior. And I won't even describe the horror show of Bravo Company, 1st Battalion, 1st Marines. Why? Because it was not ready. And we went over there, and, oh, yeah, you got to keep the weapon clean. You get on a helicopter, the prop wash, and you get out. You land, you get in a firefight and, guess what? One round, you have a failure to extract, and it is back to the Revolutionary War where you have to take a cleaning rod and punch it out to get that weapon working. A lot of marines died, unfortunately, probably some soldiers died, because it wasn't tested for battlefield conditions.

So my question basically is I just want to make sure on whatever equipment we have, that we exhaust all the scenarios and everything, including what areas you are going to be fighting, how far they are going to be able to go, whether they can go on a 10-kilometer, 20-kilometer hump, because I tell you, it is going to affect you. And those weights you are talking about, you know, my back is—by the way, the flak jacket probably saved my life because I was stupid enough to trip a booby-trap and 2nd lieutenants should not be walking point, and that is another story in itself. But it actually worked. And all I am saying is that I hope we could do that. I really think that it is imperative that we have the best equip-

ment, offer the best protection for the scenario that they are going to be in. And this might have to change.

So the problem I had with the military, once you are committed, you know, that is going to be on the shelf for how many years? We have got to have that flexibility, because certain situations change and based upon the field data we might have to change the whole scenario. So if you could comment on that.

General SMITH. Sir, thanks for that question. We share a similar fear in General Gray and a similar situation of being out where we maybe should not be and being injured in the fight.

I can tell you, sir, that what we do, and General Kelley has some specifics on part of the testing that we do, but as an infantry battalion and regimental commander, I often had to provide my forces here in CONUS to test and evaluate the equipment that was being proposed in its early fielding before we went to full-rate production, so I would give a platoon or a squad or a company to test that. And as you know, sir, lance corporals are not very shy about telling you if something does or does not work before we start spending real money on that.

Mr. COOK. Thank God.

General SMITH. Yes, sir. So we do test this, and as we always say, in every climate and place. We will send it to Camp Lejeune, we will send it to the desert at Twentynine Palms, attempting to test and see how this thing does in everything from cold conditions to sandy conditions, and we let the users use it and provide us feedback as opposed to this is what you are getting, we are going to let you tweak it now. We ask them up front, does this work for you, can you fight with this?

I will tell you, sir, that because of the work, again, not a platitude, but of this particular committee, we are able to produce things and field them in combat that work, because my weapon worked every single time as did every single marine that I had, both at regiment and battalion. I had multiple marines shot in the SAPI [Small Arms Protective Insert] plate, get up and walk home. So there is a tremendous amount of confidence by the youngsters that are out there operating with this gear now because they or somebody they know got to run it through the wringer out at the mud at Camp Pendleton.

General KELLEY. Just to echo about General Gray, in his vast career a lot of people don't know that General Gray at one time was the commanding general of the Marine Corps Research and Development Command, MCRDC, which is the legacy command of where I am, and General Gray lets me know frequently how we are doing. So far I think we are doing okay, because I still have a job.

Sir, one point that you bring up about the M16, there is a great book out there, I don't know if you have had a chance to read it, *The Great Rifle Controversy* [*The Great Rifle Controversy: Search for the Ultimate Infantry Weapon from World War II Through Vietnam and Beyond*]. It talks about the first days of how we developed rifles. And I had a chance to read that book, and one thing that it taught me is that the rifle, the ammo, and the soldier or the marine behind it, it is a whole system and we need to approach it from a systems perspective. So that is why using soldiers or using marines of all shapes, sizes, and genders is absolutely critical.

I cut my teeth on my first non-fleet tour up in China Lake, sir, learning how to do operational tests out in VX-5 [Air Development Squadron FIVE], loved it, and it is one of those things that shapes your career. So like Eric and Paul and Pete, I share your concern about testing as well. I am sure we will get a chance today to probably talk about ECH [Enhanced Combat Helmet], and that is an area where testing has proven itself to be invaluable for that. I will save my comments on ECH later.

Mr. TURNER. Dr. Wenstrup.

Dr. WENSTRUP. Thank you, Mr. Chair. I served a year in Iraq '05-'06 as a surgeon in a combat support hospital so I base my questions and my comments on my experiences there, as you might imagine, and I will say that there were many, many lives saved by the individual body armor that soldiers and marines were wearing, and I was very pleased to say an 89-percent survivability rate is unheard of in war.

I wonder, do we keep track of lives saved by the armor that we implement, and at the same time look at times when maybe the armor fell below expectations and we had a loss?

General SMITH. Sir, I can't answer your question specifically that we do in fact track every single marine or soldier who was struck in a SAPI plate by enemy projectile and survived or did not survive. I can't answer that. I can tell you that the survival rate that you are talking about is very, very typical. In fights in and around Fallujah, a great witness one day is a guy named Captain Dana Covey, and the marines all knew that if you hit Captain Covey's table there at the Bravo surgical hospital you were going to survive. All you had to have was something better than an agonal pulse and you would survive. The marines actually talk about that. Young lance corporals know that if you make it there, you are good. They do have tremendous amount of confidence in the gear that they are carrying and they have been issued.

As goes back to earlier questions, the weight of it though is a concern, and we will continue to try to reduce that weight, because that does have longer term effects. Usually what we are dealing with is a youngster who is trying to get into the fight as opposed to get out of the fight. That is who we are, that is who we recruit, that is who comes to us.

So we also check to make sure those plates are uncracked, that they are in optimum shape. We have to be very, very careful on how we do that, because we all learn how to play with pain very early on and that is kind of who we are as a force, so we do have to kind of ensure that we are providing a true supervision to make sure that the marines that go into the fight not only have the perfect gear, but having to reissue that gear would not prevent him from going into the fight.

Dr. WENSTRUP. I have to say that I was impressed about 6 months into our tour that we received new armor, that we got new plates because there was a newer and better version. It made you feel that someone is looking out for you and constantly trying to improve things. So I applaud that.

One of the concerns that I had at the time, and I haven't seen it since that time, was when we had the mismatch of uniforms and where you were wearing an old BDU [Battle Dress Uniform] vest

with the ACU [Army Combat Uniform] or something like that. And we went through a period where there was a very good sniper in the area and my concern was it was such a definitive outline for a sniper to see the differentiation between where the armor ended and where flesh began. I haven't seen that since, and I hope that that is a standard that we will never see that again, because I do feel that was an unintended consequence, but it is certainly something that took place. Maybe you can verify my trust that that is the situation today.

General OSTROWSKI. Sir, I can certainly verify that, both in our current uniform and operational clothing, individual equipment, our body armor that we wear that now. And going forward in the Army should we decide to undertake a new uniform for the Army, the body armor, the organizational clothing, individual equipment will match the family of uniforms very closely.

Dr. WENSTRUP. Thank you. I yield back my time.

Mr. TURNER. Mr. Runyan.

Mr. RUNYAN. Thank you, Mr. Chairman. I don't want to make it a statement, but if there is a question in it, it is actually for Mr. Bechtel. Obviously with being a member of this subcommittee, I chair the Veterans' Affairs Subcommittee on Disability Assistance and Memorial Affairs, and as we go through this process I wanted to ask Mr. Bechtel, talking about priority and analysis from a holistic place where we sit dealing with the taxpayers' money from both aspects, not only from the HASC [House Armed Services Committee] aspect, also with dealing with these broken soldiers and marines at the end of the day. At the end of the day it is costing the taxpayer money if we don't have the lightest or we are not pushing the technology hard enough because we are afraid of spending the money there but we are spending it down the road.

Is there any of that analysis that goes into thinking about those future things? I know for myself I played 14 years in the NFL [National Football League]. I feel it every day. It is that beating you put on your body, and it doesn't catch up to you. And I am not even 40 yet and I feel it every day. But you are going to have a lot of those same things coming down the road. Is there any of that analysis that takes place?

Mr. BECHTEL. There is, Congressman. As we discussed before, that is a very important part of the requirements, the testing, the procurement, and then postfielding analysis as well. We have talked a lot about body armor and you clearly understand the tradeoff between protection, ballistic and otherwise, and the weight for mobility purposes, as well as near-term health and long-term health on the skeletal, the muscular, et cetera. The same for the helmet and other systems and so forth.

We are taking a hard look at ways to improve the mobility of the soldier and the squad as a system in terms of use of robotics, use of vehicle support, changing our doctrine and our concepts, not just the materiel aspect, in terms of how we will provide just-in-time logistics to the tactical edge and so forth.

I would highlight, sir, some other areas of innovation as well though. Vehicular suspension as well as protection goes to that point; the development now of the T-11 parachute for airborne troopers to help arrest the rate of descent and to accommodate the

heavier soldier now with an under-chute weight approaching 300 pounds, given the previous conversations about how much weight our troopers are carrying. So we are taking that innovative approach across a lot of systems to take care of our soldiers for the near-term operational mission need, but as important the long-term health and quality of life, sir.

Mr. RUNYAN. Do you see a change that would actually come from your medical reports of injuries, have you seen changes in that through the enhancement of the parachute suspension, lighter armor and all that? Do you have hard numbers that show that?

Mr. BECHTEL. May I yield to the Program Executive Officer?

Mr. RUNYAN. Yes.

General OSTROWSKI. Sir, I would be happy to answer that question. In fact we do. It has decreased the rate of injury by over half with respect to our Rangers currently that are using the T-11 parachute. The 82nd Airborne was just recently issued the parachute and we don't have any numbers from them yet, but over half of the injuries have been avoided within our Rangers.

Mr. RYAN. Thank you very much. Thank you, Mr. Chairman, and I yield back.

Mr. TURNER. Mr. Gibson.

Mr. GIBSON. Well, thanks, Mr. Chairman, and I thank the panelists for being here and also for your service, for the sacrifice of your families, and also to our senior enlisted who play such a critical role in this area and so many others, really everything.

My questions, at least the first couple, are going to probably press the envelope because today we are talking about acquisition and modernization. I am going to be asking about science and technology and some research and development. So if we just hit the limits of that, just say so.

But on the issue of soldier load, one of the things I learned when I got back home, we have the College of Nanoscale right there in Albany and just learning just the amazing possibilities there and with coatings and composites, the possibility of that impacting positively the soldier load and the efficacy of the protection. I am just interested to know from both the Army and the Marine Corps' perspective where you are in that research. Thanks.

General OSTROWSKI. Sir, I can point out one example that we have a nanotechnology facility at Picatinny in New Jersey. That facility has done a lot of work with superheating of nanotechnology, nanoparticles, if you will, within different composites. I recently visited their facility and what I was able to see at this current time with respect to the state of the art of the technology, they are able to create a 6-inch disc, plate if you will, again, not the size of a body armor plate but a 6-inch size, literally half to a third of the weight of what you would think it would be. When you pick that disc up it is that light. It is clearly leap-ahead technology with respect to both penetration capabilities, as a penetrator, and hopefully also as a defeater of rounds coming towards us. So that is one area that we are focusing on as a leap-ahead kind of capability.

In terms of the science and technology realm elsewhere, again, for the last 11 years at war we did exactly the right thing by providing what was available now and getting it out there quickly to our soldiers. We now have an opportunity to take a step back and

determine what really makes sense going forward to address all of these issues, to include soldier load. Do we create a scalable tailorable system; i.e. the soldier protection system, and the Marine Corps has got an opportunity just like it that we are coordinating with them on, that makes it such that a commander can determine exactly what level of protection that soldier will wear for any given engagement. Give him options. As a material developer, that is our job.

In addition we have to look at state-of-the-art science and technology efforts to get away from soldier load by new and innovative approaches. One was mentioned already, robotics. Quite honestly, the other one is guaranteed 24/7 aerial resupply. We have the ability to use our current precision-guided parachutes that we have, except that the guidance systems are very bulky. If we can cut the weight of those down or make them disposable we could allow soldiers to train with them constantly. And when they believe in their resupply they will carry less. We all know that a pound off a soldier incrementally that we take off of him is not a pound off. They will simply replace it with something else because they don't know if they will ever get resupplied. If we can guarantee them resupply and train with it to the point where they believe in it, we might absolutely fix this problem long-term.

General SMITH. I will be very brief so General Kelley can talk perhaps about the Office of Naval Research. But General Ostrowski and I actually talked about this just a couple of days ago, that his last comment is exactly correct. When you can provide—most of what a marine is out there carrying is chow, water, ammunition. When there is an absolute guaranteed concept that he is comfortable with that he is going to be resupplied, they are going to cut a lot of weight. A gallon of water, once you include the container, is seven pounds, no matter who is carrying it. So once we can that out of a marine's pack, that is going to be a tremendous benefit.

As was stated, it is Boyle's Law of the Grunt, the amount of stuff carried will expand to fill the pack provided. And you have to be careful of that, because when we live in a harsh, light, lethal, and austere environment, and that is kind of our bailiwick, you don't necessarily know when the next time you are going to have an opportunity for a certain class of supply. So fixing the logistics piece, I won't say fixing, enhancing the logistics piece does in fact go a long way toward lightening the load of the individual rifleman.

General KELLEY. So, sir, Eric is absolutely right in pointing to the Office of Naval Research as our essentially science and technology lead within the Department of the Navy, serving both the Navy and the Marine Corps. Also part of our acquisition system on the requirement side and thus the material developer as Paul alluded to, we have the Marine Corps Warfighting Lab that will go out and actually experiment not only with technology, discrete technological solutions, but also concepts of operations, to include every element of the MAGTF [Marine Air-Ground Task Force].

One of the things we are finding out is that the more mature logistics environment, the weight of what our marines are carrying actually goes down, and that was something that I don't that would have been intuitive right from the get-go. Keeping our eyes wide

open, looking for nontraditional sources of information to help us solve that problem is something that is really important.

Going to academia is also very important. And also, although I know it is tough for industry, I think we do need to invigorate industry's discretionary IR&D [Independent Research and Development] funds so that they can also come up with some solutions, things we may not be thinking about on the military side.

Mr. GIBSON. Thank you, Chairman. My time has expired.

Mr. TURNER. Next we have Mrs. Roby. Following Mrs. Roby it will be Mr. Castro, Mr. McIntyre, and Ms. Tsongas.

Mrs. ROBY. Thank you, Mr. Chairman, and I too want to thank each of you for your service to our country and the sacrifice that not only you make, but your families as well. So thank you from my family to yours.

General Ostrowski, as you may know, this committee included language in the Fiscal Year 2013 NDAA [National Defense Authorization Act] which directed the Army and the Marine Corps to determine the feasibility of developing a soldier wearable universal controller that could control multiple small unmanned aircraft systems, unmanned ground vehicles, et cetera, and I understand the Army and the Marine Corps have been working with various stakeholders, to include Fort Rucker, which is out in the Second District, is part of this development. So I just wanted to know if you could provide the status of the capability development document for the unmanned systems.

General OSTROWSKI. Yes, ma'am, we do have a capability development document that is going through the process of staffing in the Army. We believe that there is a lot of goodness with respect to having a universal controlling capability. It speaks to the same thing that we are doing with the Nett Warrior program on behalf of PEO Soldier where one device does multiple things. I will defer to Pete Bechtel with respect to the exact status of where that particular thing is.

But I will also tell you this, ma'am. We have a requirement to come back to this committee and give an update very shortly, and Pete will talk to that as well. Pete.

Mr. BECHTEL. Thank you, General.

Congresswoman, you are right. We are looking at that. We do have the requirement and we recognize the NDAA language to come back to this committee and others with a report on the progress. We have absorbed the universal controller requirement into the combat development document for the common robotic system individual, or CRSI system. Moreover, there was a limited test conducted in October of last year at Fort Benning, Georgia, with controls demonstrated for both an unmanned ground system and an unmanned aerial system, and we look forward coming back to this committee and discussing that with you.

Mrs. ROBY. We will look forward to that as well. Generals Kelley and Smith, and I will defer to either one of you who may best answer this, but in your written statement you mentioned that the Marine Corps established the Squad Integration Facility, also known as Gruntworks. And I understand the intent of Gruntworks is to emulate the Skunk Works® [Lockheed Martin Advanced Development Programs] projects, but I wanted to see if you could

elaborate about the organization and some of the projects that they may be working on.

General SMITH. I will be very brief and then pass to General Kelley. Gruntworks is a phenomenal facility that is relatively, not relatively, it is extremely low-cost, it is actually run by a guy that I went to the basics school with 26 years ago. Its intent is to be a forward thinker and to integrate every single thing that we are looking at.

What we are trying to prevent, it's a cost-avoidance mechanism in many ways. If I'm about to buy a new piece of body armor, for example, but if it does not properly position a marine in the seat of a HMMWV [High-Mobility Multipurpose Wheeled Vehicle], for example, or a JLTV [Joint Light Tactical Vehicle], then I have no business buying that. So before we start down that path, we are going to check to make sure that that system that we are about to put on a marine's back allows that marine to use everything else. Body armor which does not allow a marine to get a proper sight alignment and sight picture on a battle rifle has no place for us.

So that is the intent of Gruntworks, and I have to tell you that it is a phenomenal facility. It is right down the road here in Quantico. And it is open to all. We would have love to have you come down there, it is an open invitation. And I would pass over to General Kelley for a couple more details about how they are much like Skunk Works.

Mrs. ROBY. Thank you.

General KELLEY. Thank you, ma'am. I had a chance to describe the Marine Expeditionary Rifle Squad organization that exists at Marine Corps Systems Command. Gruntworks is part of that. The marine that Eric is talking about is probably one of our greatest thinkers, a guy by the name of Mark Richter. And he essentially has built that organization, MERS, Marine Expeditionary Rifle Squad, and the Gruntworks right from ground zero, and it is probably one of the greatest thinking elements of Marine Corps Systems Command. I wish I could take credit for all of the things they are doing.

I can't really improve on what Eric talked about in terms of all the things that MERS and Gruntworks is doing. One of the things we had a chance to describe was putting marines in their gear and then running an obstacle course and then evaluating the effects on their body and then being able to evaluate their potential for further performance. One of the other unintended benefits of MERS is the fact that it has also drawn attention not only from the other Services, but also from our coalition partners. Great Britain and Australia are very enthusiastic about what Gruntworks has done and they are setting up organizations very similar to that in their own countries. Again, all that information that comes out of things like Gruntworks and MERS are the types of things that we share across the two Services.

Mrs. ROBY. Thank you so much. My time has expired.

Mr. TURNER. Mr. Castro.

Mr. CASTRO. Thank you, Chairman, and thank you gentlemen, both for your service to the country and for your testimony here today.

My question has to do with the involvement of the soldiers in making adjustments to equipment and to gear. What is the feedback loop, the channel of communications between the everyday soldiers and the folks who are making decisions about what kind of equipment and gear they are going to be using?

General OSTROWSKI. Sir, we have numerous venues to allow those opportunities to occur. One of our most highly publicized is the Network Integration Evaluation at White Sands and Fort Bliss. It is there that we have the opportunity to have soldiers running through all of the operational venues that we have in our Army focusing on the network, but branching out well beyond that to include vehicles and other things.

In addition, as part of our normal acquisition process we do have operational testing events where our soldiers have the opportunity to use the equipment in an operational setting environment, and that testing is controlled in a manner such that we can get that feedback on a continual basis.

But even prior to that one of the things that we are doing now is ensuring that our soldiers within PEO Soldier, within my organization, that our soldiers are part of our source selection and evaluation boards and that we have soldier touch points as a particular item is being developed to ensure that the soldiers are giving input as to whether or not we are on the right track with that. That is a continual process that we are doing now and I think it is the right way to go.

General SMITH. Sir, when we build a requirement for any piece of equipment, the first thing that happens is, we call him a CIO, a capabilities integration officer, those that work for me, go out to the operating forces, 1st Marine Division, 2nd Marine Division, 3rd Marine Division, 1st Marine Aircraft Wing, what have you, and we sit down with the operating forces, those who are going to use that equipment, and we say what it is that you need this thing to do? How much can it possibly weigh? And they get input from the ground up before we actually set the requirement, what is the most you can weigh?

Then, as General Ostrowski said, we also do operational test and evaluation, which we spoke about a little bit earlier, that those same individuals who gave us the initial requirement are the ones who get to test that, whenever possible. But lance corporals are basically interchangeable; East Coast or West Coast, they will speak their piece and speak their mind to you. So we get that input from the ground up and then we let those same individuals go out and test that equipment. And that ensures they are getting what they need.

I will say that sometimes they don't get what they want, and that is a very distinct difference, but we are in the business of providing marines what they need, not necessarily what they want, in that this is the piece of equipment that is going to best perform, best protect you, and we attempt to have a standard across the service so that we don't have to go inspect 14 different types of body armor, what have you.

Mr. CASTRO. And then—go ahead, General.

General KELLEY. Sir, I was just going to say feedback loop is absolutely the right term. And I don't care who you are, if you are

a general officer or a PFC [private first class], you had better be prepared for the answer because it may not be what you want to hear, just like what Eric said.

I think one of the things that is important, trade shows are very important venues for our young marines to get a chance to interact with industry. And it is remarkable. As a general officer I get a chance to follow them around and hear their interaction. There are some phenomenal ideas out there.

We have things within the Marine Corps called OAGs, I am sure that Paul has the same thing. They are operational advisory groups. That is absolutely direct feedback from folks that just came from theater. Even on the base where General Smith and I live there is a base newspaper called *The Century*. There is typically an advertisement in there on a Web site where folks from the fleet can send in their feedback direct to Eric and his boss, General Mills. All it takes is participation.

Mr. CASTRO. Sure. Then I have less than a minute left on my time, but perhaps for the record you all might submit an answer to this. But the Nation has just spent more or less 10 years at war with two wars, with significant boots on the ground, and my question is essentially with respect to equipment and gear and the issues that we have discussed today what the most valuable lessons have been that we have gleaned from our experience in Afghanistan and Iraq?

[The information referred to can be found in the Appendix on page 63.]

Mr. BECHTEL. Congressman, may I attempt a quick answer at that?

Mr. CASTRO. Sure.

Mr. BECHTEL. We have relied, to your previous point, on soldier innovation, commander needs on the ground to use rapid fueling initiatives, most notably through our rapid equipping force to rapidly get and meet the operational needs. Moreover, we have had our Army Test and Evaluation Command conduct some 22 forward operational assessments where soldiers are quite an important part of that. That helps inform not only program record, moving non-standard equipment into sustainment to keep for the long haul, but it also helps inform our soldier enhancement program, an important legislative innovation that keeps us moving forward, keeps a soldier the centerpiece for modernization.

Mr. CASTRO. Thank you.

Mr. TURNER. Mr. McIntyre.

Mr. MCINTYRE. Thank you very much. Thank you, gentleman, for your service and your patience late in this afternoon. I have two or three quick questions I will try to ask and see if you can give straightforward answers on.

One is a recent GAO [Government Accountability Office] study highlights the challenges that we faced with respect to combat uniforms and camouflage. This study made many recommendations that the Services largely concurred with. Can you provide us an update on the camouflage program and associated combat uniform programs? And in that if you can tell us is there a requirement to continue to improve the combat clothing worn by our warfighters, both the base uniform and the flame-resistant variant.

General OSTROWSKI. Yes, sir. We have got to the point of the end of testing with respect to the phase 4 camouflage program within the Army and what we have learned is that a family of uniforms, and by "family" I mean a uniform that is specific to the desert, one that is specific to a woodland environment, and one that can be used in the transitional between the two, outperform a single pattern universal camouflage pattern if you will each and every time. We have learned that.

Today at 1530 we will bring in the test results of over 120,000 data points gathered in a uniform test that is unequaled with respect to Department of Defense, and we are bringing those results to the Chief of Staff of the Army for his guidance going forward.

I will tell you, sir, that we also for every soldier deployed forward, we provide them with fire-retardant uniforms. Every single soldier. The cost of a fire-retardant uniform is over twice that of a regular uniform that we wear back here from the CONUS perspective, but each and every soldier moving forward, going forward, wears a fire-retardant uniform.

Mr. MCINTYRE. Thank you. I understand the Army will announce a new camouflage program. When you talked about the three variants, this is the actual program you are talking about and how the results are. How are these uniform programs dealt with in the budget? Do you have what you need in the budget?

General OSTROWSKI. Yes, sir. We have base funding, operations and maintenance funding for the camouflage program within our current budgets going forward to include fiscal year 2014.

Mr. MCINTYRE. Okay. And would you like to inject anything from the Marine Corps, General?

General SMITH. Sir, just that the camouflage utility uniform, we have a desert and a woodland pattern as well. We are very, very comfortable with it. With regard to the ability to adjust, I believe you asked to certain environments, a good example of both our ability and our need to remain flexible, our Commandant was recently out in the Pacific speaking to marines up in the northern training area on Okinawa. They had been out there for about 3 weeks, a very, very wet tropical climate, and they said, sir, these uniforms are not drying out. It has not been a problem for the past 10 years, having to worry about them being dried out. And the Commandant said we got to fix that. So he has asked General Kelley and some of his crew to come up with a uniform that finds the right balance between flame retardancy, durability, but the ability to dry quickly, so that as we rebalance in the Pacific we don't have marines who are suffering through wet utilities that may stay wet for days on end.

Mr. MCINTYRE. And what is the sustainment requirement for these uniforms with regard to the future and how long do you think the typical uniform worn back here as opposed to the flame retardant for those forward deployed will last?

General OSTROWSKI. Sir, typically we see a uniform in the theater go about 120 days before it needs to be replaced. Obviously, depending on what the soldier is doing in CONUS, back here in the United States, it depends on how long the durability, the lifespan of that particular uniform is. But forward, about 120 days is what we are getting on average.

Mr. MCINTYRE. How about in the marines?

General SMITH. Sir, we send the marines currently into Afghanistan with FROG [Flame Resistant Organizational Gear] gear, flame resistant outer garment. We will send them in, and a combination of about four sets will last that marine for 7 months. One or two of those sets may come back in a usable manner. But 7 months deployment, he is going to go through a good three sets while he is in theater. And they are very operational, but because of the flame retardancy they do not have the same durability. But that was a wise trade I think for us in those environments.

Mr. MCINTYRE. Okay. Thank you. Thank you, Mr. Chairman.

Mr. TURNER. Next we go to Ms. Tsongas, and then after that for a round two. We will have a limited round 2, which will be Ms. Sanchez and Mrs. Roby.

Ms. TSONGAS. Thank you, Mr. Chairman Turner. Although I am no longer on this subcommittee, it was my on honor to serve on it for several years. So thank you, Mr. Chairman and Ranking Member Sanchez, for allowing me to participate today. It was a hearing when I was on this committee I looked forward to because of all the tremendous work you do just to make sure we are equipping our soldiers in the best possible way given the many challenges they confront.

Last year the House included language in the National Defense Authorization Act encouraging the continued development of body armor systems designed for women, and as noted in your testimony, General Ostrowski, the Army has led the way on this effort. I have been briefed on the new improved outer tactical vest several times. I have actually had an opportunity to try it on and I think the improvements are tremendous. I have to say at the most recent briefing among the many changes to make it easier to wear, the thing that impressed me, well, that I took the greatest concern from was that prior to the adjustments it was very difficult for a woman who was wearing the standard issue vest to raise her arm properly in order to properly fire a rifle. So beyond the comfort issues and just being able to better distribute the weight and all of that, it is critically important as women, who now comprise 15 percent of the military and with the combat exclusion now moving forward, that women are adequately protected to do the task at hand. So I commend you for your work.

I would also like to commend PEO Soldier and Natick Soldier System Center for their work on developing this system. Natick is based in my native Massachusetts and has been described by some as the crown jewel of the Army, a sentiment which I share. It certainly has led the way on body armor and other crucial lifesaving equipment for our service members, such as fireproof uniforms designed to protect our soldiers from IED blasts in Afghanistan.

I think the other issue that we worry about is the weight of body armor, and I am glad to learn from your testimony that efforts are ongoing to reduce the weight by 10 percent by the fourth quarter of fiscal year 2014. I have heard from both the RAND Corporation and representatives from Natick that this is about all that is possible in the short term, and I would like to thank you all for your effort. But we know we have a lot more work to do. The tremendous weight that our soldiers bear, the muscular-skeletal injuries

that it causes, the impact on deployability are things we have to continue to wrestle with. These are costs we are going to bear for decades to come if we don't get a better handle on it.

Several new materials are on the horizon for body armor such as carbon nanotubes which you alluded to which could eventually lead to significant weight reductions of hard armor systems. But the RAND Arroyo Center found in their study last year on lightening body armor that it would take years of sustained research and development funding to achieve the breakthroughs that we need.

My question is, do you have a strategy to achieve breakthroughs with new materials for body armor? Can you commit to us here that robust funding for these vital systems will continue even as we draw down from Afghanistan?

General OSTROWSKI. Yes, ma'am. Earlier when the chairman asked what my funding line was with respect to body armor and personnel protective equipment, I told him that my overall line was \$185 million across the board of the portfolio of PEO Soldier.

Specifically though with respect to personal protection equipment on the research and development line, we have \$23.75 million in the fiscal year 2014 budget request going before the Congress. This is in addition to the science and technology funding that I don't have the visibility over that is going into labs such as Natick for their efforts with leap-ahead technology in terms of personal protection equipment.

Ms. TSONGAS. I don't really have enough time, but for the record I would be curious as to your thoughts on whether or not we should establish an executive agent for body armor, for the record. Thank you.

[The information referred to can be found in the Appendix on page 63.]

General OSTROWSKI. I think that there is a lot of goodness with respect to the ability for the different Services to have the flexibility within their mission sets. For instance, the United States Special Operations Command has very specific requirements based on their mission sets for body armor and personal protection equipment. The Marine Corps operates very much on the land but also at sea and they have very specific requirements with respect to their body armor, although we share plates and other capabilities, helmets included. So I think that the flexibility that the Services have is one that we would want to try to continue as we go forward.

Ms. TSONGAS. I have run out of time. Thank you.

Mr. TURNER. Very good. We will turn to our second round beginning with Ms. Sanchez.

Ms. SANCHEZ. Thank you, Mr. Chairman. A quick question. Well, actually this one is not so quick. This is for the Army. This is the rifle competition. So you are dual-tracking it now. I want to know where you are with looking for the second part, the second track, looking for a new carbine. And the reason is, I have been looking at this for a while.

In 1995 we started the Objective Individual Combat Weapon program. After 10 years and \$50 million we canceled that in 2005. Then we were stop again, start again, stop again, start again. This M4 replacement issue has been going on and on. In 2009 we had

the study from the Center for Naval Analyses where they surveyed our troops coming back from Iraq and 20 percent of them said they had a complete and total jam of their rifle.

The reason I bring this up is because over time when I talk to troops, and we identified the armor early on, we identified the MRAP [Mine Resistant Ambush Protected] vehicle issue going on. And this is another one of those issues that when I talk to our military who have gone to Iraq or Afghanistan, the number one issue they talk about is the jamming of their rifle.

In 2010 the Army did a study at Aberdeen ATC. They tested four rifles, the M4, the SCAR [Special Operations Forces Combat Assault Rifle], the HK416, and the XM8. It tested in particular with respect to the dust chamber reliability; i.e., how does our weapon jam, and the M4 was 800 percent less reliable than the HK416, and nobody disputed those facts.

So my question is, what are we doing about this? What are we doing to take a look at a more reliable weapon for our soldier?

General OSTROWSKI. Yes, ma'am. The M4 was first introduced as early as 1990 within our Army and since then we have made over 92 separate adjustments and modifications to that weapon system to improve accuracy, reliability, and so forth. Each one of these changes has brought about a much better weapons system than we ever had before.

The original requirement for the M4 was a mean rounds between stoppages of 600 rounds. Our recent testing—and that is basically three basic loads. So 7 magazines times 3 of those, 3 of those loads, 210 rounds, so basically 600 rounds would be 3 basic loads of ammunition before you got a single failure. Our recent testing in 2010 with the same weapon and the same ammunition, the M855 ammunition, revealed 3,592 rounds between stoppages. That is a 6 times increase over the original requirement of 600 rounds between stoppages. So the weapons that we carried back in 2001, 2003, and 2004 are not the same M4s that we are carrying today in terms of reliability because of all the improvements that we made on that weapons system.

We also went out to industry and we asked industry through a source selection called the Individual Carbine program to determine whether or not industry could provide us with a weapons system that was as accurate, as reliable, and was compatible with our current optics and also had a life-cycle cost that was within a boundary that we have established now for the M4. And that competition is ongoing. It has completed phase 2 testing with respect to the Individual Carbine program and the source selection authority has been given all of the testing material with respect to deciding whether or not any of the weapons goes forward into phase 3 of the competition.

Ms. SANCHEZ. So does that mean you are going to have a competition? You are having a competition? Where exactly is that competition? I ask because you mentioned that, and I understand that we had this rifle even in the 1980s. I get that. And I understand that you make changes to it. And I have no problem with Colt, by the way. I don't have a dog in this fight.

My fight is to make sure that to the extent possible we have something that really, really works well on all fronts for our sol-

diers. And when they are telling me, when you have a study that says 20 percent of them said their weapons completely and totally jammed on them, and you have your own study out of the Army that says that there is a more reliable weapon out there, maybe, then I think we need to make sure that we are really checking this and having this competition move forward. And the fact that this has been going on since 1995 tells me that there is a lot of politics in this. I don't have a gun manufacturer in my district. I just want the right thing. So are you or are you not truly competing this?

General OSTROWSKI. Yes, ma'am, we are absolutely competing it. The competition began with phase 1 in October of 2011 and we have been testing the weapons system through a phase 1 process, which was to look at whether or not the weapons that were offered by vendors were compatible with our optics and so forth, whether they were within the length and the weight standards that we established for the competition. And then we moved on to a phase 2, and phase 2 was to test the accuracy of the weapon, the dispersion, if you will, of the rounds as they go downrange, and also to test the reliability of the weapons through some environmental tests as well as just temperate. And that data has been the data that we have now compiled and is before the source selection authority to determine whether or not go into a phase 3. The source selection authority can take as many as three weapons forward into phase 3, as long as they passed all of the requirements necessary in phase 2.

Ms. SANCHEZ. And what is the timeline on that, just so I can keep my eye on it, because this isn't going to go away.

General OSTROWSKI. No, ma'am. If the source selection authority decides to move forward with a phase 3 it will run from the time now as the decision is imminent until the fourth quarter of this year, this fiscal year.

Ms. SANCHEZ. The fourth quarter?

General OSTROWSKI. Yes, ma'am. At that point, if there is a winner of the competition, then that will go before the Secretary of the Army in a cost-benefit analysis and a side-by-side comparison with the M4. The accuracy will be compared side-by-side, the reliability will be compared side-by-side, the cost, life-cycle cost side-by-side, as well as the compatibility side-by-side.

Ms. SANCHEZ. Great. Thank you for that answer. Thank you for your indulgence, Mr. Chairman.

Mr. TURNER. We have Mrs. Roby and then Mr. Cook and that will end our round two. Mrs. Roby.

Mrs. ROBY. Thank you, and I will be very brief. I have one question for Generals Kelley and Smith, and as I begin I am going to defer to each of you to determine who is best to answer. But last year General Amos identified expeditionary energy as one of the six pillars of modernization in the Marine Corps and I understand that there have been numerous advances since that time.

Would you update us on that program? Where has it been implemented and whether the Marine Corps is achieving any discernible efficiencies in power consumption?

General SMITH. Ma'am, thanks for the opportunity to answer that. There is sometimes confusion when we say expeditionary energy in what we are talking about. What we are talking about as

infantrymen is the ability for a young lance corporal to carry less gear, less weight.

So when I was forward-deployed in Afghanistan in places like Sangin we had spaces and greens, a couple of systems that are solar based, to bring in power so we didn't have to fly in or drive in or carry extra batteries. So we used that. Less fuel for a generator because it is now solar-powered.

Expeditionary energy is all about taking a load off of the young 19-year-old lance corporal who is out there carrying a rifle and a full pack. So we are going to continue to do that. We have used it to great effect in Afghanistan and we really have no intention of turning back the clock here. We are going to proceed forward and push as much as we can toward expeditionary energy so we can further reduce the weight.

Every battery you save or every gallon of fuel, it is not about the gallon of fuel, it is about the combat logistics patrol that would have otherwise had to drive out to that base to provide that fuel. Many of our casualties come from our logistics marines who are taking fuel and water and ammunition, et cetera, out to those forward warfighters.

So that is what we are doing. We have used it to great effect in Afghanistan and intend to continue. I will yield over to General Kelley.

General KELLEY. So, ma'am, last year we had a chance to talk to you about the weight of batteries that were saved say on a 3-week patrol, and that was on the order of about 700 pounds. That was probably the best metric that we had at that point. That is pretty significant.

I also think that General Smith brought up a really good point about the confidence that young marines get in these systems to help save power and not have to rely on resupply. One of the biggest things that we have done since last year, having testified here as well, and that has really changed the culture of what it means to be expeditionary and energy-conscious.

So we have the things like spaces and greens that are now part of the kit as folks deploy. But we have also looked to other drains on energy, shelter liners, LED [Light-emitting Diode] lights versus the conventional lights that we have had in the past. General Smith brought up a good point about water. We are now getting ready to deploy individual water purification tools for our marines to go and take care of their own water needs. So we are looking at everything right now, ma'am.

Mrs. ROBY. Thank you very much.

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

Mr. TURNER. Thank you. Mr. Cook will have the last question.

Mr. COOK. Thank you very much, and thank you. I know it has been a long afternoon and I should have thought of this question earlier. By the way, that means no more Halazone tablets, I guess, for the infantry. My age is showing.

I was on the Foreign Affairs Committee and we were talking about terrorism. We were talking about Syria and the subject came up about sarin and VX [nerve agent]. And then as I was listening about equipment and clothing, and right away I thought MOPP 4 [Mission Oriented Protective Posture Level 4: all chemical protec-

tion worn]. Where are we in terms of MOPP 4 conditions, God forbid, if we have to go in that environment? Because as you know, anybody who has been in that it doesn't take long before you are ready to pass out. So if anyone could address that, and that is the only question.

Once again, I want to thank you all for your great service and for your patience this afternoon. I know it has been a great hearing.

Mr. BECHTEL. Congressman, thank you. I will take a first attempt, if I may. I am glad you brought that up because the Army is looking hard at the mission of combating weapons of mass destruction very broadly both in terms of our CONOPS [concept of operations] and our operations for sensitive site exploitation, for active and passive defense, decontamination abroad, but even more important here in the homeland.

The personal protective equipment as part of that goes right to the center of that. And we are working through challenges of compatibility, for instance, with the M53 migration to the M50 joint protective mask with SCBA [self-contained breathing apparatus] gear and other sort of commercial and commercial-off-the-shelf equipment to help us aid in defense of civil authorities here at home, first responders and so forth. That will be the same condition, sir, as if we have to go into contested hot zones or warm zones overseas.

So our Maneuver Support Center of Excellence at Fort Leonard Wood and the CBRN [Chemical, Biological, Radiological, and Nuclear] School in particular are looking through those as part of the joint community to ensure we have both compatibility, but the most modern systems, negative plus positive over pressure conditions and so forth. So we are looking hard at that.

General SMITH. Sir, we are very fortunate in that we have got a unit called CBIRF, the Chemical, Biological Incident Response Force located very close to here, and that unit, that is what they do. So they are constantly using the gear that is provided, the suits, the masks, et cetera.

I will say, sir, as you know, anyone who references Halazone tablets is okay with me, and we can probably speak very candidly that there is no easy way to operate in a contaminated environment. We can mitigate as much as we can, but the real issue is why not to have it in the first place, or, two, to remove the forces as quickly as possible or rotate them with others. There is no easy way to operate in that environment, especially carrying the loads that we are still going to have to carry because it is still a combat environment.

We do have a pretty high confidence level in the gear that we have. It is jointly held gear. It is very effective. And, again, our good fortune to have CBIRF within the Marine Corps is that we get a near daily assessment of the gear that is currently out there and fielded and so we have a pretty good feel for when it may fall below the standards, and right now we are pretty comfortable with where we are, sir.

Mr. TURNER. Mr. Cook, thank you.

Gentlemen, I want to thank you for your participation. You had a wide range of questions today and we appreciate both your expertise and dedication. This is an issue that I think goes to the heart

of what everyone wants to make certain we are doing right thing. General Kelley, I appreciated your further elaboration on the issue of how do we have to look at these in part as systems so that we can try to have some greater advance. And General Ostrowski, I appreciate your acknowledging the research and development fund that in fact Congress was very active in establishing that hopefully can be a bridge to where we are going to find a balance to get both the effectiveness that you have obtained in protecting our men and women in uniform, but also with some increased performance.

So, gentlemen, thank you for your participation today.

[Whereupon, at 4:50 p.m., the subcommittee was adjourned.]

A P P E N D I X

APRIL 11, 2013

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 11, 2013

RECORD VERSION

STATEMENT BY

BRIGADIER GENERAL PAUL A. OSTROWSKI
PROGRAM EXECUTIVE OFFICER SOLDIER

and

MR. PETER B. BECHTEL, G-3/5/7
DIRECTOR, CAPABILITIES INTEGRATION,
PRIORITIZATION AND ANALYSIS

BEFORE THE

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

ON EQUIPPING THE INDIVIDUAL SOLDIER AND MARINE: CURRENT AND
FUTURE YEAR ACQUISITION AND MODERNIZATION STRATEGIES AND THE
FISCAL YEAR 2014 BUDGET REQUEST

FIRST SESSION, 113TH CONGRESS

APRIL 11, 2013

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UNTIL RELEASED
BY THE COMMITTEE
ON ARMED SERVICES

Chairman Turner, Representative Sanchez, and distinguished Members of the Subcommittee on Tactical Air and Land Forces, we thank you for this opportunity to discuss the Fiscal Year 2014 (FY14) budget request for equipping the individual Soldier and Marine. It is our privilege to represent senior Army leaders and America's Soldiers. It is also our privilege to appear before this Subcommittee with our fellow Warfighters from the U.S. Marine Corps. We thank you, Mr. Chairman, and all Subcommittee Members for your sound advice and strong support of the Army as we strive to ensure that all Soldiers are well-trained and well-equipped to undertake any mission in any environment.

Current and Future Individual Warfighter Equipment Modernization Plans and Strategies

History has shown repeatedly our nation cannot successfully accomplish its mission without the commitment of ground troops. This is why Individual Warfighter Equipment modernization is so important. A highly trained and properly equipped Soldier is the crucial and integral component of the successful employment of all Army systems. Program Executive Office (PEO) Soldier is the first organization in Army history to modernize the "Soldier as a System," thereby ensuring that everything the Soldier wears, carries and employs on the battlefield works in an integrated manner. Nearly 12 years at war have demonstrated conclusively that this integrated, comprehensive modernization strategy has saved lives, increased lethality and combat effectiveness, and improved the quality of life for Soldiers during and after their deployments.

In Fiscal Year 2012, PEO Soldier fielded more than 1.4 million items to more than 193,000 Soldiers, including individual weapons, protective equipment, body armor and flame-resistant clothing, fused night vision goggles, weapon-mounted sensors, laser rangefinder and designation systems, and more. We have, without question, the best-equipped, most technologically advanced fighting force in the world, but there are still challenges that we are working to meet. For example, today's All-Volunteer, combat-seasoned Soldier has steadily borne the brunt of increased equipment load necessitating considerable attention to modernization efforts aimed at lightening that burden while maintaining a decisive advantage over any potential adversary. This is an important element of our modernization plan.

The Army's equipment modernization strategy ensures our Soldiers have the right equipment, for the right missions, at the right time by procuring versatile and tailorable equipment that is effective, sustainable, and affordable. We must equip the Army for many missions, under many conditions and evolving threats. The Army's guiding principles include the following:

- **Enhance Soldiers for broad Joint Mission Sets**: Provide improvements by fielding technologies that empower, protect, and unburden Soldiers and formations, thus providing equipment at the earliest time to better accomplish the mission;
- **Remain Prepared for Decisive Action**: Facilitate fleet capabilities to increase lethality and mobility while optimizing survivability and

sustainability. Manage the full suite of capabilities enabling the most stressing Joint war fights.

These principles are prioritized into five Army priorities for the Soldier Portfolio: Network, Lethality, Training and Leader Development, Mobility, and Force Protection.

- **Network**: Army forces require communication systems and devices that allow connectivity for situational awareness across the force and over distances that span the joint operational area.
- **Lethality**: The Army requires the capability to incapacitate or destroy enemy personnel, materiel, and infrastructure across the full spectrum of joint operations.
- **Training and Leader Development**: Training is the critical base of all Army units and proper training is the foundation on which all other enabling technologies are applied. The Soldier must be trained to operate in complex environments, among various cultures, in coordination with host nations and allied partners.
- **Mobility**: Army forces require mobile protected firepower that can maneuver over long distances while maintaining power requirements in austere environments. Reducing the load weight of the Soldier will enhance his/her mobility and further reduce fatigue.
- **Force Protection**: Soldiers require protection to close with and defeat the enemy, conduct effective reconnaissance and security operations, develop the situation through action, and adapt continuously to changing situations. Soldier protection must have tailorable and scalable protection from small arms, IEDs, blast and fragmentation,

the ability to measure and mitigate blast effects in order to reduce incapacitation on the individual Soldier.

To accomplish these principles and priorities we must synchronize our requirements, acquisition, sustainment and resourcing processes to ensure that leadership can make informed decisions in a timely manner to meet the needs of our Soldiers.

The Army's strategic modernization planning combines a detailed analysis of investments in science and technology, and materiel development linked to emerging threats and capability gaps across a long-term, 30-year period. This will produce a detailed road map of our future capabilities across the acquisition lifecycle, and link our S&T investments with our Programs of Record, which we linked to our long-term sustainment strategy.

PEO Soldier hosted a detailed process review with key leaders from the Army requirements generation community, various Science and Technology (S&T) organizations and representatives from our user community. The review was the culmination of several months of effort focused on synchronizing schedules and aligning capability gaps to requirements, technology efforts and programs of record to obtain senior leader concurrence for a collaborative process that will support the materiel development, S&T and requirements communities and will result in a strategic Soldier modernization plan.

Other Key Improvement and Integration Efforts

We fielded new body armor that is better fitting and thus more comfortable for female Soldiers. TIME magazine named it one of the "Best inventions of the Year 2012." A collaborative effort between the Natick Soldier Research, Development and Engineering Center and PEO Soldier resulted in an Improved Outer Tactical Vest (IOTV) designed specifically for women, allowing them to perform their missions more effectively. The 101st Airborne Division's 1st Brigade is the first unit equipped with the new female body armor in Afghanistan.

It was through our collaboration with our sister Services that we realized the benefit of a tailored combat uniform. Recognizing that the Army is comprised of 14 percent women, we recently completed the evaluation of the Army Combat Uniform-Alternate (ACU-A) to meet their needs. The ACU-A fits the female body better and provides a better fit for some small-statured male Soldiers. A Human Factors study conducted on our new female uniform last year at Fort Polk, LA, found that issues of restriction and discomfort were few in number and feedback on this new uniform is positive. The ACU-A will be introduced as an alternative item into the clothing bag for all Soldiers in May 2013.

We have an initiative underway to develop a potential family of uniform patterns that could provide better concealment by an expeditionary Army in multiple environments worldwide. Perhaps more importantly, we are seeking a single pattern for our Organizational Clothing & Individual Equipment that would work in concert with the

family of uniform patterns. We are working with our sister Services on this initiative for possible DoD-wide use.

In other areas, the Pelvic Protection System (PPS) reflects our commitment to protect the Soldier. In this effort, we worked closely with our British counterparts at the inception of the effort and then extremely close with both the USMC and USSOCOM. The Army has procured more than Pelvic Protection Systems in response to a Warfighter request for increased protection from blast events impacting the pelvis, femoral arteries, and lower abdominal organs. To date, we have fielded more than 60,881 complete sets to units in Afghanistan. The PPS is saving lives.

The Army has developed the Generation II Helmet Sensor as an operational predictive tool to capture data for injury subsequent to a blast event. Some day the medical community can use those data to diagnose, and develop treatments for Mild Traumatic Brain Injuries more effectively. To date, we have fielded 19,000 helmet sensors to deploying Soldiers.

PEO Soldier is a key player to the Army's Operational Energy Initiative. Soldier Power encompasses expeditionary power solutions intended for the most austere operating environment. These solutions include Soldier power generation systems, power scavenging, renewable energy, power distribution, power management, and power storage solutions that are lightweight and Soldier portable or wearable. Soldier Power is a key enabler for dismounted combat operations. Providing energy alternatives to the most disadvantaged Warfighter will allow a small unit to sustain itself throughout

extended missions while reducing battery load and reliance on logistics convoys. These efforts will ultimately allow us to work towards our goal of energy self sufficiency.

As we drawdown from more than a decade of conflict, it is imperative that we incorporate lessons learned from combat, emerging threats, and an assessment of where commercial technologies and capabilities are headed. We must firmly ground our efforts to pursue priority capabilities that will enable the Soldier to have decisive overmatch on the battlefield. These include both "game changers" and other areas where public investment can have the most valuable effect.

Joint Army and Marine Corps Coordination

The Army and the Marine Corps collaborate closely in providing our Warfighters with the best equipment in the world. The Army, Marine Corps and Special Operations Command conducted a detailed review of our portfolios and determined common programs and requirements that could facilitate closer collaboration in the future. These programs include protective equipment, small arms and expeditionary power to name a few. One of the major outcomes of this session revealed how closely we have been working together over the past decade and that we will work even more closely in the future.

Whenever possible, we conduct our development, testing or procurement efforts in collaboration with the other military Services and organizations to increase efficiencies across the Department of Defense (DoD). With the camouflage uniform,

helmet improvements, night vision devices and our weapons systems, we collaborate across the Department.

Perhaps the greatest area of collaboration exists in finding ways to advance weight reduction for our Warfighters. While an individual equipment load is mission-dependent, a rifleman in a squad can carry a typical load of 110lbs. The largest increase in Soldier load is because of the Outer Tactical Vests and ballistic inserts. This Soldier load weight increase is greater in the mountains of Afghanistan.

The Army, in cooperation with the Marine Corps, has sought ways to reduce weight and the support equipment burden from nearly every angle. Examples of successful modernization include lighter body armor. The Outer Tactical Vest (OTV), which, with plates, weighed 33.5 pounds for a size medium, was replaced by the Improved Outer Tactical Vest, which not only weighs approximately four pounds less than the OTV it replaced, but provides a better fit through side adjustments. The Soldier Plate Carrier System further reduces weight by approximately eight pounds depending on size and configuration achieved by reducing soft armor coverage. This lighter weight system provides field commanders with the ability to select the level of body armor needed to support the specific mission. Soldiers in Afghanistan now have flame-resistant combat uniforms and combat shirts pre-treated with insect repellent and in an appropriate camouflage pattern for the terrain. They also have two pairs of mountain combat boots and a machine gun that is nine pounds lighter.

In Soldier Power, we are developing ways to provide lightweight power solutions. Soldiers now carry equipment that requires increasing amounts of power. The

Conformal Battery is an ergonomic Soldier-worn battery. It provides a central source of power for a variety of capabilities. The ergonomic engineering of the Conformal Battery provides Soldiers with a lightweight power that shares space with existing equipment on the Soldier's combat uniform.

We developed body armor to provide the best protection for the least weight. We designed it with the optimum set of ballistic materials and layering structures to ensure our Soldiers are survivable from current and future threats. Our next generation personal protective equipment, the Soldier Protection System (SPS), will challenge industry to reduce weight while maintaining or improving ballistic protection for our Soldiers. Our night vision and precision targeting devices are providing unparalleled capability for our Soldiers to see in low- and no-light conditions with accuracy and at greater ranges. The Army has now integrated and fused the functions of the thermal sensors and Image Intensification to provide increased capabilities in a small profile system called the Enhanced Night Vision Goggle. We continue to improve the Soldier's situational awareness to help ensure his dominance on the battlefield.

The Nett Warrior program is another example of how we have adapted to meet this weight challenge. Based on valuable Soldier feedback, we revised the Nett Warrior program to achieve substantial cost-savings and additional weight reduction that now provides superior situational awareness and understanding to ground combat leaders and small unit operations for faster and more accurate decisions in the tactical fight. Due to these adaptations and improvements, the Marine Corps is now expressing renewed interest in the Nett Warrior program.

At PEO Soldier, we strive to give our Warfighters a decisive edge to ensure they are dominant on the battlefield. With the combination of our equipment improvements as well as our increased collaboration with the Marine Corps and across the Department of Defense, our industry partners, and academia, we will ensure that our Warfighters maintain dominance on the battlefield. While certain materiel solutions may be different among the services due to slightly different mission requirements, we maintain close collaboration via joint S&T efforts, shared test events and data, and participation in each other's source selection evaluations.

Industry Partners

We are reminded daily of the hard work and dedicated efforts of our industry partners. As mentioned earlier, in Fiscal Year 2012, PEO Soldier fielded more than 1.4 million separate equipment items to deploying Soldiers. This includes fielding to Air Force and Navy Warfighters who deploy with Army units. This equipment included everything from socks to thermal sights. Our equipment modernization strategy relies on commercial technologies available now and the ability to work with industry to integrate mature incremental improvements while investing in new technologies in the future. A couple of examples include:

- Thermal Weapon Sight – We used Army acquisition procedures to reduce significantly the cost of new 17-micon sights and field them faster. Compared to the 25-micron sights, the 17 micron TWS will provide an average 15 percent

reduction in weight, 41 percent average increase in range performance across all variants, and an average battery-life improvement of 7 percent.

- ACH – The Advanced Combat Helmet (ACH) is a protective helmet consisting of a ballistic protective shell, pad suspension system, and four-point chinstrap/nape strap retention system. We test the ACH to ensure it provides ballistic and fragmentation protection for the Soldier. We use new testing protocols alongside legacy testing protocols to ensure the ACH provides Soldiers dependable head protection. Many ACH helmets include the Generation II Helmet Sensor, which records blast overpressure and forces that affect the Soldier's head during vehicle accidents, explosions or other violent incidents. The Lightweight ACH (LtWt ACH) will provide the same level of protection as the ACH but with 8 percent less weight. The ACH weighs 3.06 points while the LtWt ACH 2.81 lbs. We plan production contract awards for the Lightweight ACH in June 2013 with first deliveries expected in June 2014. We will field the LtWt ACH through attrition of older ACH helmets.
- ENVG – We reduced costs by increasing competition. We are also looking at some innovative approaches that may result in significant reductions in the cost of fused technology goggles.
- PEO Soldier is working with our industry partners to ensure we have the right equipment at the right place at the right time, and we recognize that our industry partners stand shoulder to shoulder with us as we meet the individual equipment needs of our Soldiers.

The Better Buying Power (BBP) initiative started by now Deputy Secretary of Defense Ashton Carter and Under Secretary of Defense (Acquisition, Technology and Logistics) Frank Kendall embraces a “cost-conscious culture” across the Department. This drive for efficiency enables the Army to implement management approaches that protect our ability to deliver needed Soldier capabilities—now and into the future.

For example, we are amending the acquisition strategies for the Thermal Weapon's Sights (TWS), the M4, and the Enhanced Night Vision Goggle (ENVG) to increase competition, thereby reducing the unit cost for each item. Additionally, we revised the test plan for the ENVG to make better use of existing data and reduce overall test costs.

Contracting is one area, in particular, where we have made significant strides over the last couple of years. We have taken significant steps to incentivize productivity and efficiency, including dedicated efforts to secure multiple awards that lower unit costs. The Army has embraced BBP's call for renewed emphasis on sensible contracting strategies that support best value to the Soldier.

The long-term nature of the reduction in the discretionary caps presents challenges to the Army's investment priorities. We must continue to meet our contingency requirements, along with our efforts to carefully balance readiness and modernization.

Our senior acquisition leaders continue an open dialogue with industry. Now, perhaps more than ever, it is clear that we must work together to identify appropriate courses of action to minimize negative impacts on our plans, programs, and partners.

Summary

Chairman Turner, Representative Sanchez, and distinguished Members of the Subcommittee, we wish to thank you again for your strong support of our Soldiers and the Army. We are part of a Joint force, constantly working to enhance the safety and security for our Warfighters. Our brave men and women in uniform display unrelenting tenacity, steadfast purpose, quiet confidence, and selfless heroism. We cannot let them down. Your wisdom and guidance is deeply appreciated as we work to ensure that our Soldiers have the right equipment, for the right missions, at the right time to successfully accomplish their missions and return home safely.



Brigadier General Paul A. Ostrowski
Program Executive Officer
Program Executive Office Soldier

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

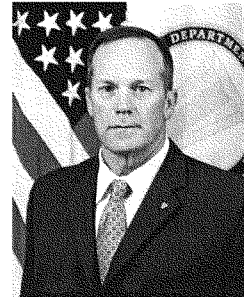
BG Ostrowski has more than twenty-five years experience in acquisition, operational and Joint assignments. He served as Assistant Deputy for Acquisition and Systems Management, Office of the Secretary of the Army (Acquisition, Logistics and Technology) in Washington, DC from September 2011-April 2012. He was the Executive Officer to the Commander, United States Special Operations Command, MacDill Air Force Base, Florida from May 2010-September 2011. He served as the Director, Operational Test and Evaluation, as well as Program Executive Officer for Special Programs, at United States Special Operations Command, MacDill Air Force Base, Florida from June 2006-May 2010. He was the Program Manager for Counterproliferation at United States Special Operations Command, MacDill Air Force Base, Florida from July 2003-July 2005. He served as Legislative Fellow, as well as Project Leader, for the Rapid Equipping Force in both Washington, DC and during Operation Iraqi Freedom in Iraq from June 2001 to July 2003. He was the Systems Acquisition Manager for United States Special Operations Command, MacDill Air Force Base, Florida from July 1998-May 2001. He served as Chief, Fort Bragg Field Operations in the Special Products Office at Fort Bragg, North Carolina from July 1996-June 1998. He also served as a Company Grade Officer in several command and staff positions in Joint Special Operations, Special Forces and Infantry assignments.

Brigadier General Paul A. Ostrowski's awards and decorations include the Defense Superior Service Medal, Bronze Star Medal, Defense Meritorious Service Medal (with Oak Leaf Cluster), Meritorious Service Medal (with Oak Leaf Cluster), Army Commendation Medal (with 2 Oak Leaf Clusters), Joint Service Achievement Medal (with Oak Leaf Cluster), and Army Achievement Medal. Additionally, he earned the Expert Infantryman Badge, Pathfinder Badge, Parachutist Badge, Air Assault Badge, Scuba Diver Badge, Ranger Tab, Special Forces Tab and Army Staff Identification Badge.

Headquarters, Department of the Army



Peter B. Bechtel
*Director, Capabilities Integration,
 Prioritization and Analysis*



Mr. Bechtel is responsible for the development, prioritization, assessment, and validation of Army current and future requirements; the review and prioritization of the Army budget and program; and, the oversight of capability portfolio management for the Army senior leadership. He develops the strategic plans and exercises management authority for key Army programs to include the Army Requirements Oversight Council and the Army Requirements and Resourcing Board, the development of the Army Planning Priorities Guidance for each PPBE cycle, and the development of Army Analysis of Alternatives guidance and Army JCIDS requirements inputs. Mr. Bechtel also chairs the Army Space Council.

Mr. Bechtel most recently served as the Deputy Director for Army Plans and Policy (DA G-35) and Director of the Army Nuclear and C-WMD Agency (USANCA) where he oversaw the formulation and integration of strategies and plans for key global strategic enabling capabilities and for regionally available multi-purpose forces. Mr. Bechtel led the Army's transformation implementation planning efforts for oversees Global Posture adjustments, the contemporary Army Force Generation (ARFORGEN) process, and future Missile Defense planning. Previously, he chaired the Army Capability Mix Panel for QDR 2006 to improve the mix of capabilities to meet the ground-domain demands of the Defense Strategy, led the Army QDR 2010 efforts for High End Asymmetric Threats, and led the Army contributions to the DoD Ballistic Missile Defense, the Nuclear Posture, and the Space Posture Reviews.

As a Combat Infantryman, Mr. Bechtel had operational deployments to Latin America and to the Persian Gulf, and additional peacekeeping and partner building deployments. He has also served as the Deputy Chief of Army War Plans Division, as an Assistant Professor of Political Science at the United States Military Academy, and as both a Strategist and the Special Assistant to the Director of the White House Office of National Drug Control Policy.

Mr. Bechtel graduated from the United States Military Academy and holds a Master of Public Administration degree from Cornell University. He is a career member of the Senior Executive Service and is a Department of Defense designated National Security Professional.

Not for public until released by
House Armed Services Committee

STATEMENT
OF
BRIGADIER GENERAL ERIC M. SMITH
DIRECTOR, CAPABILITIES DEVELOPMENT DIRECTORATE
COMBAT DEVELOPMENT & INTEGRATION
AND
BRIGADIER GENERAL FRANK L. KELLEY
COMMANDER
MARINE CORPS SYSTEMS COMMAND
BEFORE THE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
OF THE
HOUSE ARMED SERVICES COMMITTEE
ON
EQUIPPING THE INDIVIDUAL SOLDIER AND MARINE:
CURRENT AND FUTURE YEAR ACQUISITION AND MODERNIZATION STRATEGIES
AND THE FISCAL YEAR 2014 BUDGET REQUEST

11 APRIL 2013

Not for public until released by
House Armed Services Committee

Chairman Turner, Ranking Member Sanchez, 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 engaged in OPERATION ENDURING FREEDOM and operations around the world. It is an honor to appear before you today to discuss the capabilities we have developed and are pursuing to ensure our Marines are light, lethal and austere on the battlefield.

INTRODUCTION

As the Nation's Expeditionary Force in Readiness, the United States Marines Corps must equip each individual Marine with the right balance of lightweight and durable protection and lethality. The warfighting equipment we develop and field must allow adaptability to the harsh desert environments of the Middle East, the tropical jungle climes of the Pacific, and the urban centers of future Humanitarian Assistance/Disaster Relief missions. The Commandant has charged us with being ready to respond to today's crisis – with today's force – today.

The Marine Corps has benefited greatly from the lessons learned during almost 12 years of operations in the Middle East across the range of military operations. As we return from Afghanistan and refocus on our naval expeditionary roots, Marines will continue to answer the call "to be most ready, when the Nation is least ready." We will integrate the lessons learned about the enemies' weapon systems and their tactics, techniques, and procedures as we develop equipment for the future. The Enhanced Combat Helmet, the Improved Modular Tactical Vest and the versatile Plate Carrier are among those vital pieces of equipment. Our female Marines are serving across the battlefield in ever expanding roles, and accordingly, we are examining our equipment to determine whether adjustments are required to ensure every Marine receives the best possible protection while remaining highly mobile.

To Marines, expeditionary is a state of mind that drives the way we organize, train, and equip our forces. The squad is designed as a complex and adaptive system with the physical and intellectual agility for employment throughout the range of military operations. Each Marine within the squad has a specific mission and is equipped accordingly. The Marine Corps develops capabilities and equipment to ensure Marines are able to execute their individual tasks better than

any enemy could possibly execute his tasks. Of note, the combat load weight differs among squad members.

While working to equip the warfighter, the Marine Corps is mindful of the current fiscal environment. We continue to assess the impact of FY 13 sequestration and the associated cap reductions in FY 14 through FY21. The Marine Corps is a frugal force by nature and we continue to hold ourselves to a high standard when it comes to being good stewards of the American people's money. We will also do everything we can to equip America's sons and daughters with the equipment they need to have the best chance of returning home when we ask them to go into harm's way. Considering the present fiscal realities, one way we strive to be good stewards is through close collaboration 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 work closely with industry to develop innovative solutions to identified requirements while keeping cost-effectiveness and sustainability in mind as we enter what could be a prolonged period of fiscal austerity. 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 researching 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 of Enhanced Small Arms Protective Insert performance at reduced weights.

Marine Corps Efforts to Equip Female Marines

For the past three years, the Marine Corps has monitored and actively supported the U.S. Army's effort to develop female specific body armor. The U.S. Army developed new prototype body armor for female soldiers based on the Improved Outer Tactical Vest (IOTV), which is being evaluated for fit and sizing. The U.S. Army has designated the IOTV as their replacement

for the Outer Tactical Vest (OTV). The OTV was previously issued and shared with the Marine Corps. We have since replaced the OTV with the Plate Carrier (PC). We will address the interim and long term solution to enhance the fit, form, and comfort of the Marine Corps Family of Body Armor to best provide ballistic protection capability across the range of Marine stature profiles. The Marine Corps is nearing completion of a comprehensive survey on the fit of torso, pelvic, and helmet ballistic protection systems. The survey will provide us a better understanding of issues specific to both smaller stature and female Marines; and comprehensive data on fit, sizing, and comfort which will be incorporated into the design of the next generation, fully integrated, Modular Scalable Protective System (MSPS). We will continue to monitor U.S. Army efforts to develop solutions to address notable issues related to size and comfort of body armor for female soldiers.

Lessons Learned

As we focus on repositioning to the Pacific, the lessons learned over the past 12 years are being leveraged. In an expeditionary environment where the theater of operations is logistically supported from the sea, Marines will tailor their equipment for the mission assigned. Expeditionary logistical resupply is a key component to reducing the burden on the Marines in the rifle squad. However, the development of modular equipment has provided an opportunity for Marines to tailor their mission equipment needs - from light loads for executing recovery of a downed pilot, to heavier loads for missions requiring direct engagement.

Lightening the Load

Lightening the Load of the individual Marine continues to be a primary focus of your Expeditionary Force in Readiness. This focus must be considered in the context of the assigned mission, the enemy threat, required maneuverability and protection levels. Modular, scalable equipment allows the Commander on the ground and in some cases the individual Marine to determine the most effective configuration of equipment for the mission.

Marine Corps policy authorizes commanders down to the lieutenant colonel/battalion commander level the authority and flexibility to tailor protection levels that their Marines must

wear based on the current mission, enemy threat and terrain - while balancing protection with mobility.

One example of tailoring the equipment to the mission is the Marine Corps Plate Carrier which was fielded to provide dismounted Marines with body armor which also provides greater mobility and reduced thermal stress. The trade-off is a reduced area of fragmentation protection. The Plate Carrier has replaced the Outer Tactical Vest as the primary ballistic vest, reflecting the emphasis of improved lethality through greater mobility. It provides a lighter weight ballistic vest that still provides sufficient protection and allows Marines to remain combat effective when operating in extreme environments. The Improved Modular Tactical Vest is fielded as a supplemental system to provide commanders with the option for an increased area of coverage as dictated by mission requirements.

The Enhanced Combat Helmet 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 resists penetration by certain small arms rounds. The Enhanced Combat Helmet 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 Lightweight Helmet. It is a game changing achievement in materials manufacturing and production.

During developmental testing, in addition to improvements in small arms resistance to penetration, the Enhanced Combat Helmet results demonstrated 50 percent better protection against fragmentation, better blunt impact performance, and better resistance to Ballistic Transient Deformation. Further, by adopting the Modular Integrated Communications Helmet design, the Enhanced Combat Helmet provides a greater field of view, comfort and stability for the Marine. The Enhanced Combat Helmet is a collaborative effort between the Marine Corps, Navy and Army with the Marine Corps serving as the program manager lead.

The Marine Corps is committed to providing Marines with camouflage uniforms that reduce visual detection and enhance performance. The Marine Corps shares its uniform technology through multiple formal and informal venues. Formal collaborative venues include the Joint Clothing and Textile Governance Board, the Cross-Service Warfighter Equipment Board, and the Army-Marine Corps Board. Informal collaborative venues include: a Flame Resistance Technical Working Group; Commander-to-Commander and program office

interaction between US Army's PEO Soldier and Marine Corps Systems Command's Product Manager, Infantry Combat Equipment; as well as participation in technology sharing through its reliance upon the Research, Development, Test and Evaluation (RDT&E) capabilities of NSRDEC.

The Marine Corps continues to develop and improve the current uniform capability to reduce costs and mitigate current and future threats to our Marines. To reduce costs and improve the capability of the current Marine Corps Combat Utility Uniform (MCCUU), the Marine Corps is working to incorporate the flame resistant capability of the Flame Resistant Organization Gear (FROG), which will allow the enhanced combat uniform to replace the FROG. Additionally the Marine Corps is also looking at incorporating improved spectral mitigation, ballistic protection, and an improved permethrin treatment into the MCCUU as well. These improvements will be in line with proposed future Joint Combat Uniform requirements from the Joint Clothing and Textile Governance Board. The Marine Corps is also developing a tropical combat uniform and boot to support the strategic shift to the Pacific region. Marines conducting operations in hot, humid, and wet tropical environments have stated the need for improved performance over the current MCCUU and Rugged All Terrain (RAT) boot, which are designed to support operations over a broad range of operating environments but are not optimized for tropical climates. The Marine Corps tropical uniform and boot will be specifically designed and tested for tropical environments utilizing the latest textile technology to significantly reduce dry times for the uniform and boot and reduce the overall thermal strain on the Warfighter. As always, the Marine Corps will continue to develop, procure, and field uniforms that support Marines between the 5th and 95th percentile, both male and female, while ensuring the requirements of the Warfighter are met at an appropriate cost.

We are aggressively improving the energy effectiveness of our Marine's equipment as an additional aspect of lightening the load. On the individual Marine, over a dozen batteries in six different configurations are used at any given time. Centralizing and reliably distributing power on a Marine will potentially reduce the reliance upon multiple types of batteries that are currently used in systems and carried in significant quantities as spares. An effort is currently under way with the Office of Naval Research to produce a prototype of just such a system. The Marine Corps is working closely with the Army on system requirements and materiel solution development. Solar panels have been fielded to the squads as a renewable energy source for

rechargeable batteries. These systems are useful for Marines during long patrols or while manning observation positions. Power continues to be a challenging component of the Marine Corps effort to lighten the MAGTF.

We continue to work 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 procurements to achieve cost efficiencies. In doing so, we attempt to balance our purchase with the best interest of the munitions industrial base when feasible. Further, in those areas of munitions commonality, the Marine Corps consistently leverages U.S. Army munitions RDT&E efforts to modernize our conventional ammunition stockpile and to prevent duplicative munitions investment within the Department.

The Marine Corps, is closely monitoring the efforts of the Office of Naval Research (ONR), the Joint Service Small Arms Program (JSSAP) Office and U.S. Army Research and Development Command (RDECOM), in their pursuit of Lightweight Small Arms Technology (LSAT) in the form of case-less and case-telescoped 5.56mm ammunition with the potential to provide 40 percent to 50 percent 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 though engineering challenges associated with firing the case-less ammunition and the firing mechanism are currently in pre-prototype development.

With respect to future efforts on small arms, the Marine Corps, in partnership with ONR and the U.S. Army RDECOM, is investing in the development of high performance small arms barrel technology. This type of technology offers the potential to make lighter weight barrels with improved performance and barrel life and may eliminate the need to employ a second barrel with our light, medium and heavy machine guns. The barrel technology we are investigating uses high performance materials coupled with improved thermal management properties to allow engineers to make barrels smaller, thinner, and lighter while improving thermal efficiency and retaining performance at high rates of fire that may make carrying the second barrel unnecessary.

The Joint Services are working together through the Joint Service Small Arms Requirements Integration (JSSARI) working group and the Joint Service Small Arms Synchronization Team (JSSAST) to align science and technology investments with required capabilities in an effort to maximize limited resources across all Services.

Currently, we are working to replace the radios being carried by dismounted Marines 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 a system that provides higher efficiency, greater information throughput, and expanded frequency range. These capabilities enable the Marine to communicate via Voice over Internet Protocol, Command and Control Personal Computer, Microsoft Internet Relay Chat, 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.

OPTIMIZING THE INTEGRATED WARFIGHTER

Similar to the idea of skunkworks projects used in the private sector to encourage innovation, the Marine Corps established Gruntworks, also known as the Squad Integration Facility. Unique within the Department of Defense, Gruntworks analyzes how components of a Marine's equipment influence combat performance in terms of weight, bulk, flexibility and effectiveness. It evaluates planned or fielded capabilities in terms of integration on the Marine and within the squad, enables rapid prototyping of improved designs for those capabilities, and then supports re-evaluation of the improved designs using on site facilities at Gruntworks and combat experienced Marines. An indication of the unique capability and relevance of Gruntworks is the adoption of the concept by the Australians in their creation of "Diggerworks" and the continued interest from international partners such as Canada and the United Kingdom.

Gruntworks designs and refines the Marine Rifle Squad as a system. Gruntworks does not procure equipment; rather, it works with all of 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.

One of the major efforts Gruntworks has undertaken in the last several years is to envision, develop, and implement the Marine Corps Load Effects Assessment Program (MC-LEAP). The MC-LEAP consists of a combination of various obstacles traced to physically demanding infantry tasks that Marines have been encountered in Operation Iraqi Freedom and Operation Enduring Freedom. It provides an assessment and metric for base lining mobility as equipment is added or changed on the Marine in order to determine system level effects on Marines. The mobility baseline can then be used as a point of comparison for improving mobility in new requirements and systems. The Modular Scalable Protection System will be the first requirement to use this new metric. An initial evaluation of 100 Marines was completed at Camp Lejeune, NC with promising results. A follow-on effort is planned at Camp Pendleton, CA in fiscal year 2014. The Load Effects Assessment Program was adopted and is in use by Canada (CAN-LEAP) and Australia. The United Kingdom also has plans to build a system at its infantry school in Warminster. Initial runs by the Canadian Armed Forces produced data that correlates well with ours. The Army has expressed interest in the MC-LEAP, and we will continue to share data and derived requirements with the other services.

We began work in the last year to pursue a fully integrated infantry system of equipment. The effort began with the creation of the Modular Scalable Protective System (MSPS) Integrated Product Team (IPT), placing the Marine at the center of our capability development. This IPT is an initial step toward taking a system of systems approach which focuses on integration of capabilities for the Marine. The work of the IPT will result in a requirement for the MSPS and concept demonstrators for the Improved Modular Scalable Vest mentioned earlier. The MSPS requirement will drive integration of capabilities more effectively at the requirements level instead of trying to engineer them in during materiel development. This requirement will define parameters for protection, weight reduction, mobility and integration both within the system and with other capabilities. Requirements for an individual load bearing system and an individual wearable power/data management and distribution system that integrate with the MSPS will follow. This approach 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 and improving load carriage through improved ergonomic design. The end result will be the return of mobility to the individual Marine and, by extension, the Marine Rifle Squad after years of steady degradation. The Army is taking a similar approach, and the requirements

and acquisition communities in both Services are sharing their ideas and continue to seek to collaborate where requirements and execution profiles coincide.

CLOSING

Almost twelve years of sustained combat operations have provided the Marine Corps with countless lessons learned, industrial base provided technological advancements and battle-tested equipment improvements. As we meet today there are still Marines serving on the battlefield in Afghanistan, training with our allies in Africa, and forward deployed in the Pacific. The Marine Corps will continue to strike that delicate balance between effectiveness and weight of individual equipment with the speed, endurance and survivability of the individual Marine. We owe it to our Marines to continue to improve, to continue to innovate and to continue to lighten the load of the individual Marine's equipment. Our work and your support translate to success on the battlefield and the saving of lives.



Brigadier General Eric M. Smith
Director, Capabilities Development Directorate

Brigadier General Smith is from Plano, Texas and entered the Marine Corps in 1987 through the NROTC program at Texas A&M University. After completing The Basic School and Infantry Officer's Course, he was assigned to 2nd Battalion, 3rd Marines; participating in Operations Desert Shield / Desert Storm. Following a tour as an Officer Selection Officer, he attended the Amphibious Warfare School and then reported to 2nd Battalion, 2nd Marines for duty as Commanding Officer of Weapons and E Companies. During this tour he participated in Operation Assured Response in Monrovia, Liberia. After a tour as a Marine Officer Instructor at Texas A&M University, he attended the United States Army Command and General Staff Course. The following assignment was as the Naval Section Chief at the U.S. Military Group in Caracas, Venezuela from 2001-2003.



From 2003 until 2006, he served in the First Marine Division as the Division Operations Officer; Executive Officer of Regimental Combat Team 1; Commanding Officer of 1st Battalion, 5th Marines; and Assistant Chief of Staff G3. During this time he completed two deployments to Iraq in support of Operation Iraqi Freedom. Subsequent assignments were as a student at the Marine Corps War College, Senior Aide to the Commandant of the Marine Corps, and Director of the Fires and Maneuver Integration Division at the Marine Corps Combat Development Command. From 2009 until 2012 service included tours in the 2nd Marine Division as the Assistant Chief of Staff G3 and Commanding Officer of 8th Marine Regiment; completing a one year deployment to Afghanistan in support of Operation Enduring Freedom. In June of 2012 he assumed his current duties as the Director for Capability Development.



Brigadier General Francis L. Kelley, Jr. 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 became Commander in July 2010.

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

APRIL 11, 2013

RESPONSES TO QUESTION SUBMITTED BY MR. CASTRO

General OSTROWSKI and Mr. BECHTEL. We have relied, to your previous point, on soldier innovation, commander needs on the ground to use rapid fueling initiatives, most notably through our rapid equipping force to rapidly get and meet the operational needs. Moreover, we have had our Army Test and Evaluation Command conduct some forward operational assessments where soldiers are quite an important part of that. That helps inform not only program record, moving nonstandard equipment into sustainment to keep for the long haul, but it also helps inform our soldier enhancement program, an important legislative innovation that keeps us moving forward, keeps a soldier the centerpiece for modernization. [See page 19.]

General SMITH and General KELLEY. Since combat operations began in Afghanistan and Iraq, the Marine Corps has managed more than seven hundred requests for mission-critical capabilities through our "Urgent Needs Process". Each of these requests represents a case in which our combat experience has proven the need for an essential warfighting capability that our deliberate process did not fully anticipate. Through the Urgent Needs Process, we've been able to learn valuable lessons for the future and begin adapting our forces while in combat, without waiting for the next budget's planning cycle to begin.

Looking back across all of our Urgent Needs, a few trends become clear. First, all elements of our future force must be capable of maneuvering across the entire battlespace in an environment threatened by what we now call Improvised Explosive Devices (IEDs). This includes our combat service and combat service support units, as well as our ground combat units, and requires a wide variety of capabilities to both detect and defeat these devices. Second, and closely related, we've learned that we need expanded capabilities for Persistent Intelligence, Surveillance, and Reconnaissance (P-ISR)—the ability to see what's happening in the battlespace across extended periods of time, and then to share that information with every element of the force, down to the very lowest tactical level. These capabilities will continue to require advancements in both our sensor technologies and in the availability of the electronic "pipes" that allow us to share data. Finally, we've learned that future combat is likely to demand more widespread use of precision weapons, launched from both surface and air, which allow us to target only our adversaries, reducing collateral damage and therefore accelerating the speed at which our rules of engagement allow us to strike the enemy.

Taken together, these lessons show us that the nature of warfare hasn't really changed: we still need to be able to see, shoot, move, and communicate. The tools with which we accomplish those tasks are changing rapidly, however, and the Marine Corps will continue to aggressively learn from our combat experiences to ensure that tomorrow's Marines are equipped to fight and win, wherever our Nation sends us. [See page 19.]

RESPONSES TO QUESTION SUBMITTED BY MS. TSONGAS

General OSTROWSKI and Mr. BECHTEL. I think that there are a lot of positives with respect to the ability for the different services to have the flexibility within their mission sets. For instance, the United States Special Operations Command has very specific requirements based on their mission sets for body armor and personal protection equipment. The Marine Corps operates very much on land, but also at sea and they have very specific requirements with respect to their body armor, although we share plates and other capabilities, helmets included. So, I think that the flexibility that the services have is one that we would want to try to maintain as we go forward. [See page 22.]

General SMITH and General KELLEY. When it comes to requirements, the Marine Corps and the Army collaborate wherever their mission profiles converge. The Marine Corps is a light infantry force that primarily operates dismounted and its units are not tied to any specific mobility platform. This drove such features as the quick release and the differences in cut of the Improved Modular Tactical Vest (IMTV)

and Plate Carrier (PC) as compared to the Army's Improved Outer Tactical Vest (IOTV) and plate carrier. The Army and Marine Corps need the flexibility to develop body armor systems that meet specific requirements associated with their distinct mission profiles.

The Marine Corps and the Army share the same ballistic specification. The fit and form reflect the different service needs and desires from body armor systems. The Army and Marine Corps Body Armor Program Offices [PM SPE (Special Purpose Equipment) and PdM (Product Manager) ICE (Individual Combat Equipment)] work closely to coordinate their efforts on research, body armor specifications, design improvements and weight reductions. Our combined efforts seek to reduce duplication of research and invest in the most promising technologies. All our advances in body armor and efforts are shared during our regular Cross Service Warfighter Equipment Board meeting.

An example of a mission success of sharing and coordination is the Enhanced Combat Helmet (ECH) helmet. This effort started with an Army R&D effort which the Marine Corps used as the foundation for initiation of the ECH program. The close coordination and involvement of the Army in the program with funding and engineering expertise has been critical to the ECH's progress to date. Additionally, both the Army and Marine Corps are pursuing improved ballistic protection systems. The Army's Soldier Protection System Capabilities Development Document (CDD) will be the overarching document for ballistic protection requirements that will be reflected in individual Capability Production Documents (CPDs). The Army intends to start fielding the Scalable Protection System (SPS) in FY15, and is primarily focused on weight reduction. The Marine Corps will take a longer approach that will allow technology to mature to the level necessary to achieve our goals in protection, integration, and mobility, which we view as being equal in importance in a true next generation system. Additional Key Performance Parameters (KPPs) will be emphasized by defining mobility parameters using the Marine Corps Load Effects Assessment Program (MCLEAP), and integration parameters by the Integrated Product Team (IPT) within the Modular Scalable Protection System (MSPS) IPT (which is chartered). [See page 22.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

APRIL 11, 2013

QUESTIONS SUBMITTED BY MR. JONES

Mr. JONES. The Soldier Protection System (SPS) is a clear step forward in terms of integrating the systems worn and carried by our warfighters and balancing capabilities like protection and mobility while reducing weight. I commend this effort, but I am concerned that it may not go far enough. We're told that uncertainties regarding procurement volumes, intellectual property ownership, and R&D timelines have caused would-be industry competitors not to participate in this program. While many programs have collapsed because they have unrealistic requirements and schedules and some like JSF are constructed to be "too big to fail," I am concerned SPS may have the opposite problem ... meaning it could be too small to succeed. We need this program to succeed and bring as much weight reduction and capability to the warfighter as possible. The threshold weight reduction for SPS is 10%? Could greater reductions be achieved? What percentage of the total force do you plan to field this system to? How was the percentage determined? How was the long-term viability of the industrial base considered when constructing the program? What is your view of current participation and competition emerging from the industrial base for this program? What can be done to ensure it succeeds?

General OSTROWSKI and Mr. BECHTEL. [The information was not available at the time of printing.]

Mr. JONES. The MSPS is the USMC's version of SPS. We understand this takes a slightly different approach focusing on mobility and not weight reduction. Since the USMC is a smaller force, obviously this program may have an even harder time attracting industry investment than SPS? Would a joint program yield more industry participation and competition? How different are USMC requirements from the Army's? What percentage of the total Corps will get this system? How was that percentage determined? At this stage of the program, do you have a view of potential participation and competition that will emerge? Can you describe how you are collaborating with the other Services and with Industry to get the desired innovation and production results?

General OSTROWSKI and Mr. BECHTEL. This question is best answered by the Marine Corps.

Mr. JONES. The Soldier Protection System (SPS) is a clear step forward in terms of integrating the systems worn and carried by our warfighters and balancing capabilities like protection and mobility while reducing weight. I commend this effort, but I am concerned that it may not go far enough. We're told that uncertainties regarding procurement volumes, intellectual property ownership, and R&D timelines have caused would-be industry competitors not to participate in this program. While many programs have collapsed because they have unrealistic requirements and schedules and some like JSF are constructed to be "too big to fail," I am concerned SPS may have the opposite problem ... meaning it could be too small to succeed. We need this program to succeed and bring as much weight reduction and capability to the warfighter as possible. The threshold weight reduction for SPS is 10%? Could greater reductions be achieved? What percentage of the total force do you plan to field this system to? How was the percentage determined? How was the long-term viability of the industrial base considered when constructing the program? What is your view of current participation and competition emerging from the industrial base for this program? What can be done to ensure it succeeds?

General SMITH and General KELLEY. [The information was not available at the time of printing.]

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General SMITH and General KELLEY. The Modular Scalable Protection System (MSPS) is the Marine Corps initial effort to develop a fully integrated system of ballistic protective equipment for the individual Marine. The MSPS includes protection for the head, eyes, hearing, torso, pelvic region, and extremities and will be developed with a balanced emphasis on protection, integration, and mobility. We want to develop protection systems that are equal to or greater than our current capability but at reduced weight. Moreover, with the MSPS we seek to improve the ergonomics of the elements within the MSPS to improve load carriage, flexibility, and bulk over current systems. We are also looking at novel approaches to integrate load bearing capabilities (packs and pouches) and power/data management for the individual Marine.

The focus on returning mobility to the individual Marine will incorporate the Marine Corps Load Effects Assessment Program (MCLEAP) as a means to baseline our current systems, provide a mobility metric for the MSPS requirement, and measure improvements in mobility provided by prototypes for the MSPS.

The Modular Scalable Vest (MSV) is the torso armor component of the MSPS and is currently under development. The focus of the MSV program is to provide increased protection levels with no weight costs while enhancing Marine mobility and combat effectiveness through smart load management and integration capabilities. The MSV will provide the capability to scale protection levels in a single system, a load distribution and carriage capability, and inherent integration capabilities with the USMC Pack System. The MSV will utilize both a lighter weight soft armor, which offers 10–15% weight reductions over current soft armor, and the Enhanced Capability Small Arms Protective Inserts (EC SAPIs), which provide increased ballistic protection at current Enhanced Small Arms Protective Inserts (ESAPIs) weight. Both of these improvements were developed in coordination with the Army and will be resident within their future systems as well. We plan to begin fielding the EC SAPIs in Fiscal Year (FY) 2014 and the MSC in FY2016.

Would a joint program yield more industry participation and competition?

There is significant collaboration between the Army and the Marine Corps now and also significant participation and competition across the segment of industry interested in these capabilities with no conclusive evidence that a Joint program would influence greater competition or yield increased support to the warfighters in each of the Services. The response to the Marine Corps' effort to develop concept demonstrators for the MSV has been enthusiastic and promising. Recently, there has been increased interest on the part of the Army in the Marine Corps approach to the MSPS as a whole and the MSV specifically and plans are being made to test Army and Marine Corps concepts side-by-side. Additional interest on the part of industry is sure to result.

How different are USMC requirements from the Army's?

The Army and Marine Corps use the same ESAPI plates for hard armor protection and the same soft armor materials for torso and pelvic protection. The main difference between the Army and Marine Corps pursuit of next-gen personal protection systems is in the design and cut of our soft armor.

The Army's Soldier Protection System Capabilities Development Document (CDD) emphasizes weight reduction as the primary means to return mobility to the individual soldier. However, the Army's CDD does not include mobility as a desired attribute and while improved integration is an Army goal, it falls subordinate to protection and weight reduction. In addition, the Army intends to begin fielding their Soldier Protection System (SPS) in FY 2015.

The Marine Corps intends to take a longer approach to permit technology and design to mature to the level we believe necessary to achieve our combined goals in protection, integration, and mobility, which we consider of equal importance in our pursuit of a next generation system. The balance between protection and weight reduction are being emphasized by defining mobility parameters and requirements using the MCLEAP.

What percentage of the total Corps will get this system? How was that percentage determined?

Our initial acquisition objectives are intended to support forward deployed forces and forces preparing to deploy, approximately 38% of the total force, with the MSV and other components of MSPS as they are developed. This strategy is driven by the desire to equip our warfighters with the most up to date and capable protection systems while conscientiously shepherding our limited resources. Limiting fielding to deployers optimizes development and design of these new systems by directly incorporating user feedback into follow on configurations. This approach prevents costly and multiple fieldings of incrementally improved protection systems across the force until a final, optimized configuration is achieved. For the majority of the Corps, currently issued protection systems will be sustained and improved periodi-

cally through insertions of lighter soft and hard armor as technology and resources allow.

At this stage of the program, do you have a view of potential participation and competition that will emerge?

Using a government intermediary, industry is now actively participating in the first round of designs for the Modular Scalable Vest (MSV1). Based on the high interest and participation of industry, multiple industry partners are interested and capable of participating in and competing for the MSPS program.

Can you describe how you are collaborating with the other Services and with Industry to get the desired innovation and production results?

The Marine Corps intends to use the same plate armor protection and the same soft armor materials for torso and pelvic protection as the other Services. We also intend to maintain our relationship and cooperation with the Naval and Army Research Labs and as the MSPS program progresses, we anticipate additional industry partners will participate—especially as other MSPS components are developed and incorporated into the Marine Corps system-of-systems approach to individual ballistic protection.

The Marine Corps and Army will continue to collaborate in the development of requirements and materiel solutions for modular, scalable ballistic protection systems to include a head borne system, torso protection, pelvic protection, and extremity protection. Utilizing Small Business Innovation Research grants, Office of Naval Research, and Natick Soldier Research Development and Engineering Center, these efforts include the pursuit of improved soft and hard armor solutions that provide increased protection at equal or lighter weight. The Army and Marine Corps Body Armor Program Offices (PM Soldier Protection Equipment and PdM Infantry Combat Equipment) work closely to coordinate their efforts on research, body armor specifications, design improvements and weight reductions. Our combined efforts seek to reduce duplication of research and invest in the most promising technologies. All of our advances in body armor and efforts are shared during our regular Cross Service Warfighter Equipment Board meeting. An example of a mission success of the sharing and coordination is the Enhanced Combat Helmet (ECH). This effort started with an Army research and development effort, which the Marine Corps then used to start the ECH program. The close coordination and involvement of the Army in the program with funding and engineering expertise has been critical to the ECH's progress to date.

QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. What programs and/or policies have the military departments and/or DLA put in place to sustain and stabilize the domestic industrial base for warfighter equipment? How are these programs and/or policies being communicated to industry and to what effect? Are there any preliminary findings from the ongoing studies on the body armor, clothing, and textiles industrial base?

General OSTROWSKI and Mr. BECHTEL. The Army works closely with the Defense Logistics Agency (DLA) with regard to forecasting yearly sustainment requirements. The Army forecasts its sustainment requirements through the Tank Automotive Command Logistic Support Office, which is co-located with DLA Troop Support in Philadelphia. The Army defers to DLA for specifics regarding any preliminary findings from the ongoing body armor, clothing, and textile industrial base studies.

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General SMITH and General KELLEY. The Marine Corps acquires equipment in response to a funded and validated requirement. A way that the Marine Corps contributes to sustaining the domestic industrial base for warfighter equipment is complying with the Berry Amendment. All equipment we procure that contains materials covered by the Berry Amendment, mostly textiles, are from domestic sources. The Marine Corps, specifically Combat Development and Integration (CD&I), develops warfighter equipment requirements based on roles and missions laid out in Title 10. These requirements are validated by Marine Corps and DOD leadership, and are communicated to industry via Marine Corps Systems Command (MCSC) through Requests for Proposals and Requests for Information.

The Marine Corps also actively engages and communicates our programmatic and technical priorities, needs and future plans in a number of forums. We participate in events ranging from broad to small platforms. Broad platforms include events

like the annual Modern Day Marine Exposition and the biennial Advanced Planning Briefing to Industry during which the acquisition and funding plans are provided to industry. The more finite efforts include venues such as "Industry Days," where many individual Marine Corps ground programs offices meet with industry throughout the year, giving them an opportunity to meet with our acquisition professionals on potential solutions. In addition, the Marine Corps recognizes the potential capabilities, innovations, and technology solutions that small businesses can offer. MCSC Office of Small Business Programs (OSBP) is involved in small business and industry outreach events on a weekly basis. MCSC's OSBP participates in local and national small business outreach events, performing business matchmaking at many of those events, to match the capabilities of small businesses with MCSC and Program Manager Officer Land Systems requirements. Such events provide great venues for industry to stay abreast of opportunities with the Marine Corps acquisition community and for the Marine Corps to learn from industry about potential solutions. At present, we are not aware of any studies sponsored by the Marine Corps related to the industrial base regarding body armor, clothing and textiles.

QUESTIONS SUBMITTED BY MR. ENYART

Mr. ENYART. General, how do you incentivize industry to produce better equipment if the award decisions are made on price alone?

General OSTROWSKI. The Army typically awards contracts where the basis for award is Best Value to the Government and not necessarily lowest price. Many different criteria are taken into account during the source selection process in addition to cost/price. These include criteria such as delivery schedule, past contractor performance, and technical performance.

Mr. ENYART. Is there a DOD investment strategy for new materials that will provide step change improvements to warfighter equipment?

General OSTROWSKI and Mr. BECHTEL. Advances in materials science have the potential to impact all Army platforms. As such, the Fiscal Year 2014 (FY14) basic research investment in materials science is \$182 million, or 43 percent of the Army's total FY14 basic research funding. The Army invests in biotechnology, nanotechnology, and Army specific domains of materials science including high deformation rates in structural and protection materials, energetic materials, electronics, and power and energy. Examples include investments in Textile Composite Armor, which provides a framework for successful design of lightweight textile armor of the future. This research is unparalleled outside of the Army and its payoffs include transparent armor lenses that can be integrated into eye protection systems. Investments are also being made into insensitive munitions and energetic materials for next generation small arms weapons that give unprecedented firepower to the Soldier (e.g., a 40mm with energetic power greater than a 155mm) and environmentally benign materials. Additionally, the Army is investing in the capability to design, optimize, and fabricate lightweight protection material systems that exhibit revolutionary performance by manipulating matter all the way back to the atomic scale. This is a "grand challenge" that pushes the existing high-performance material envelope. Payoffs from this research include protection materials with 33 percent savings in weight of current systems and batteries with triple the energy density that can provide 30 percent longer life-times at a reduced cost (20–30 percent).

Mr. ENYART. Can you provide a couple of examples of the most recent new products that have significantly reduced the soldier's load? On average how often will weight-saving technology refreshes occur across the portfolio of items the soldier wears and carries? What are the risks to achieving these improvements? Are they being developed with overseas contingency operations funds?

General OSTROWSKI and Mr. BECHTEL. The Army is incorporating weight-saving technology that can meet current protection requirements into current personal protective equipment (PPE) and other Soldier equipment as rapidly as possible. The Army has leveraged new material construction and design approaches to reduce the weight of the Improved Outer Tactical Vest (IOTV) and Soldier Plate Carrier System (SPCS). The current Generation III IOTV, which weighs 31 pounds (lbs) (with plates) for a size medium, is four percent lighter than the previous IOTV variant. These same approaches are being applied to the SPCS, which weighs 23 lbs (with plates) for size medium, in order to reduce the weight by three percent. The latest specification for the Advanced Combat Helmet (ACH), which currently weighs 3.06 lbs for a medium, being procured by Defense Logistics Agency Troop Support for sustainment, requires a weight reduction of eight percent. The Lightweight ACH, which will also be procured by the Defense Logistics Agency Troop Support weighs 2.8 lbs for a size medium. By leveraging technology, we were able to achieve weight

savings of 6.5 lbs in the Nett Warrior program as compared to its predecessor, the Land Warrior. As new technology is available, we will continuously strive to reduce weight even further to lessen the burden on our Soldiers. Because of our rigorous test protocols for all PPE, the risks to achieving these improvements are significantly reduced. Our base budget includes Research, Development, Test and Evaluation funding for PPE.

Mr. ENYART. Mr. Bechtel, when you meet with industry, and I assume that you do since you were selected as the Army's witness for this hearing, how do you answer their concerns about insight into future requirements both in performance and quantity? Is this an area in which the Army can improve?

Mr. BECHTEL. This is an area where the Army continues to improve as we refine our requirements and acquisition processes. We balance the requirement for competition against the value of providing Industrial Partners better planning information. The Army holds discussions with industry focusing on operational requirements, potential future capability gaps, and resulting needs in many forums, such as Industry Days to exchange information regarding current and upcoming initiatives. The Army must ensure a competitive environment; therefore the release of information to industry is governed by statute and regulation. Materiel quantity discussions actually take place during the acquisition phase when the Army provides Requests for Proposals. An example of information sharing is the development of the Deployer Equipment Bundle (DEB) concept. It is currently being reviewed by Army Staff and would provide for modernized equipment and uniforms to support approximately 70,000 Soldiers' (or about 15 Brigade Combat Teams with enablers) contingency deployment related needs. The DEB concept is based on the two most prevalent scenarios currently addressed in planning and will provide useful start points for discussions about quantity.

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Regarding the Army's Soldier Protection System (SPS): What percentage of the total force do you plan to field SPS to? What is your view of current participation and competition emerging from the industrial base for this program? What can be done to ensure SPS succeeds?

General OSTROWSKI. [The information was not available at the time of printing.]

Mr. TURNER. What is the status of the phase 4 camouflage uniform evaluation?

General OSTROWSKI. The Army recently completed a very comprehensive Phase IV Camouflage study, which was the most extensive uniform camouflage study ever undertaken—underpinned by science with extensive Soldier involvement. The Army designed a scientifically rigorous evaluation program, studying the performance of camouflage in a wide variety of terrains, vegetation and times of day. Initial decisions and recommendations have been provided to senior Army leaders, and the Army is now waiting on a final decision announcement and guidance from our Army leadership regarding the scope and timelines of potential changes.

Mr. TURNER. In an effort to modernize an item in sustainment, the Army put forward a new purchase description for the Army Combat Helmet in late 2011 that takes advantage of new material technology to significantly reduce the weight of this most critical piece of protective equipment. The Defense Logistics Agency was directed to acquire the lighter weight ACH variant. Eighteen months since contracting action began on this lightweight ACH, still no helmets have been procured and fielded.

Why does there appear to be so much trouble completing a relatively minor technology refresh of the ACH that reduces weight from the warfighters head to prevent neck and spine injuries and increase mobility and combat effectiveness? Is this program representative of what can be expected if new technology becomes available for items that are in sustainment? What should be done to reform this process to make it more flexible and agile?

General OSTROWSKI. The Army is able to leverage improvements in technology by updating requirements in the product performance of these specifications. The Army updated the Army Combat Helmet (ACH) performance specification to realize an eight percent weight reduction. This performance specification was incorporated into the Defense Logistics Agency Troop Support's contracting action for the current ACH Solicitation. This contracting action experienced delays due to a mandated update to ballistic testing requirements by the Director of Operational Test and Evaluation, which resulted in a protest by one of the vendors as well as an audit of the new ACH test protocol undertaken by the Department of Defense Inspector General. These delays were unforeseen and are not representative of new contracting actions in regards to advancements in technology.

Mr. TURNER. Does the Army plan to pursue a new handgun and does a validated requirement exist for a new handgun?

General OSTROWSKI. The currently fielded M9 has been used successfully across the full array of mission areas and battlefield conditions. No formal complaints or requests for replacements have been submitted via the Operational Needs process. Going forward, the Army has examined potential improvements to handgun or side-arm capability. The Army's intent is to address past assessments that the current M9 pistol's operational effectiveness does not fully meet Soldiers expectations. Lessons learned from the last 10–11 years of combat operations identified areas to begin to improve, to include stopping power; reliability; lack of integrated rails to allow for mounting of lights, lasers and other handgun enablers; lack of suppressors to mitigate muzzle flash and noise; and lack of low light sights to facilitate target engagement. The Army will balance these needs versus the wear out of its existing handgun systems, and thoroughly assess a full cost-benefit analysis before making its final decision.

Mr. TURNER. I understand the procurement of the Army Lightweight Advanced Combat Helmet, which was originally bid out as a "lowest price, technically acceptable" (LPTA) solicitation was sent to a reverse auction. What benefits are achieved from using reverse auctions for critical safety items and personal protection equipment? What are your concerns regarding the use of LPTA and reverse auctions for critical safety items and personal protection equipment?

General OSTROWSKI. Reverse Auction is a pricing tool and takes the place of a "Final Proposal Revision" request. The utilization of this pricing tool allows for the purchase of critical safety items and personal protective equipment at the lowest price available. While a contract may be awarded to the lowest priced offeror whose proposal has been reviewed and considered to be acceptable, the selected manufacturer(s) will always be required to meet all performance requirements listed in the performance specification and contract. PEO Soldier is comfortable with a mixture of Best Value and Lowest Price, Technically Acceptable contract strategies based on the preliminary developmental efforts that occur prior to every production contract award, ensuring that all protective items consistently meet a high standard of performance.

Mr. TURNER. I am concerned about the requirements for issuance uniforms. I understand that the Department of Defense does not have a universal standard for when a soldier, sailor, airman, or marine must be issued fire-retardant clothing. For example, Army mounted combat crewmen are issued multiple layers of fire-retardant uniforms including base layers, combat uniforms, and cold weather outer layers.

Please explain how the Army determines who is issued what versions and components of flame-resistant uniforms and the process by which this decision is made to include the decisionmaker? What is the sustainment requirement for these uniforms and how is it budgeted?

General OSTROWSKI. Fire-resistant (FR) Army combat uniforms (FRACU) are provided to deployed Soldiers based on 2008 Army Requirements and Resourcing Board (AR2B) guidance. FR uniforms such as the Army Aircrew Combat Uniform (A2CU), Improved Combat Vehicle Crewman Coverall (iCVC), and Fuel Handler Coveralls are provided to Soldiers in select corresponding MOSs through either deployment related equipping efforts like Rapid Fielding Initiative (RFI) events or Army Clothing Bag or Central Issue Facility (CIF) issue for Military Occupational Specialty (MOS) related non-deployment garrison and training use. Soldiers performing in an MOS authorized position requiring FR clothing (e.g., aviators, combat vehicle crewmembers, fuel handlers, etc.) receive sustainment through the Operations and Maintenance (O&M) Base funded CIF for non-deployment activities. Deployment sustainment is provided through the Overseas Contingency Operations funded Army Direct Ordering program or theater CIF's. There are no FRACUs in the sustainment base (for all other non-deployed Soldiers).

Mr. TURNER. A recent GAO study highlights the difficulties the military services have experienced with respect to combat uniforms and camouflage with multiple variants across the Services, different and ineffective patterns, different FR materials, a lack of coordination within and across the Services, etc. This study made many recommendations that the Services largely concurred with.

Please provide an update on the camouflage program and associated combat uniform programs. Is there a requirement for continuing to improve the combat clothing worn by our warfighters, both the base uniform and the flame-resistant variant?

General OSTROWSKI. The Army recently completed a very comprehensive Phase IV Camouflage study which was the most extensive uniform camouflage study ever undertaken—underpinned by science with extensive Soldier involvement. The Army designed a scientifically rigorous evaluation program, studying the performance of camouflage in a wide variety of terrains, vegetation and times of day. Initial deci-

sions and recommendations have been provided to senior Army leaders, and the Army is now waiting on a final decision announcement and guidance from our Army leadership regarding the scope and timelines of potential changes. As far as inter-service uniform coordination or issues, those decisions fall within the Office of the Secretary of Defense's purview. The Army continuously seeks improvements to the combat clothing worn by our warfighters. Our combat and materiel developers routinely assess capabilities desired, using periodic survey and lessons learned feedback from Soldiers and unit leaders, and evolving technological improvements to ensure the uniforms worn by our Soldiers in combat and in garrison are meeting the Army's needs.

Mr. TURNER. Are you aware that the average age of the top 5 most often employed U.S. small arms are on average around 30 years old? How are you modernizing the family of small arms?

General OSTROWSKI. For the past two decades, the Army has continuously modernized our fleet of small arms, with improvements based both on technological opportunities and Soldier feedback. Since its adoption in the early 1990s, the M4 carbine has been one of the premier small arms weapons in the world. Based on feedback from the field, the Army has undertaken a multi-phased product improvement program to upgrade the Army's M4s to the M4A1 Special Forces' version carbine. The M4A1 provides a full auto capability, a consistent trigger pull, and has a greater capacity to maintain accuracy and zero while withstanding the heat produced by high volumes of fire.

The M320 Grenade Launcher, fielded to the Army in 2009, is the replacement to the M203 series grenade launchers, introduced in the early 1970s. As a modular system, the M320 attaches under the barrel of the M16 rifle or M4 carbine and can also convert to a stand-alone weapon. Additionally, the M320 improves on the M203 with an available integral day/night sighting system and improved safety features.

The Army also identified a need to upgrade its sniper weapons to extend range and address accuracy shortcomings of the M24, M110 Semi Automatic Sniper System, and M107 Long Range Sniper Rifle. This led to the XM2010 Enhanced Sniper Rifle which utilizes .300 Winchester Magnum ammunition to engage targets accurately out to 1,200 meters.

Several other examples of modernization efforts include: the MK19 40mm Grenade Machine Gun, adopted by the Army in 1986, upgraded with an adjustable sight bracket to allow compatibility with various optical sights, and a Modification Kit for increased weapon reliability; the M2 .50 Caliber Heavy Barrel Machine Gun, which is being converted to the M2A1 configuration to allow for rapid barrel change at the Operator level without the need for setting the headspace and timing, which significantly increases Soldier safety; and, the M240 7.62mm machine gun family, which has received 16 major improvements since 1998, to include the M240L, which provides the same capability at a weight savings of over seven pounds; and, last, the M249 5.56mm Squad Automatic Weapon has received 25 major improvements since 1987.

Mr. TURNER. To the extent possible what programs and/or policies has the Army put in place to sustain and stabilize the domestic industrial base for individual warfighter equipment? How have these programs and/or policies been communicated to industry and to what effect?

General OSTROWSKI. The Army works closely with the Defense Logistics Agency (DLA) with regard to forecasting yearly sustainment requirements. The Army forecasts its sustainment requirements through the Tank Automotive Command Logistic Support Office, which is co-located with DLA Troop Support in Philadelphia. The Army defers to DLA for specifics regarding any preliminary findings from the ongoing body armor, clothing, and textile industrial base studies.

Mr. TURNER. One of the great successes of equipment in the last decade has been developing rapid fielding initiatives that leverage commercial-off-the-shelf products such as ballistic eyewear—items that have saved the sight and reduced the number of eye injuries to our deployed forces. I understand items like this are purchased using overseas contingency funds feeding operations and maintenance accounts. As this funding goes away, how is the military going to ensure that soldiers, sailors, airmen, and marines are equipped with critical, relatively low-cost items, such as ballistic eyewear? What process is being used to determine what soldiers get "deployer bundles" or rapid fielding items going forward?

General OSTROWSKI. The Army's intent is to not lose sight of the significant progress we've made over the last 10–11 years in rapidly fielding and equipping our Soldiers and unit leaders. We have learned to value Soldier's innovative ideas and have developed processes to address operational commanders' needs on the ground through Rapid Fielding Initiatives (RFI) and most notably through our Rapid Equipping Force (REF). Each has been extremely successful over the last ten years of con-

flict; RFI using Overseas Contingency Operations (OCO) funding to provide critical individual Soldier and unit equipment—like ballistic eyewear—to deploying forces, and REF providing timely solutions—like RAVEN and PUMA Unmanned Aerial Systems—to warfighters and anticipating future requirements in collaboration with operational commanders and acquisition materiel developers. The Army's Soldier Enhancement Program (SEP), required by Congress since 1989, is the Army's existing, baseline funded program designed to rapidly assess innovative equipment designated for Soldiers. SEP items showing great promise to the Army at large are then used to inform further combat and materiel development. In the future the Army will maintain rapid equipping capabilities in some form and, though the structure and size of such organizations are still to be determined, this type of innovative approach to Soldier problem solving will still be a priority. Additionally, the Army staff is considering several options to define the long term requirements to support our Soldiers with the right equipment needed to accomplish the mission assigned in support of a Combatant Commander, including equipping concepts designed to ensure the latest operational uniforms, clothing and individual equipment are bundled and immediately available for fielding to Soldiers in synch with deployments to contingency operations.

Mr. TURNER. It has been almost 4 years (July 28, 2009) since the Government Accountability Office issued a report on Army and Marine Corps Ground Combat Helmet Pads. In the report, the GAO states that the "Army and Marine Corps are aware of the use of unapproved (helmet) pads and have taken steps to rectify this practice."

With Traumatic Brain Injury as perhaps the signature injury of the wars in Iraq and Afghanistan, can you tell me if soldiers and marines are still using unapproved helmet pads? If so, what steps are you now taking to rectify this practice?

General OSTROWSKI and Mr. BECHTEL. Helmets issued to Soldiers, whether they are new or previously used helmets, are issued with new and approved pad systems. The Army has taken multiple steps to ensure the use and wear of authorized helmet pads only. These steps have included the publishing of an Army-wide, All Army Activities Message in April 2009 on the Unauthorized Procurement of Ballistic Protection, Body Armor, and other safety items. The message specifically included a reference to the purchase of helmet pads from unauthorized sources. The Army also published a Ground Precautionary Action Message in February 2012, cautioning Soldiers against unauthorized liner systems in their helmets. Recently, Tank Automotive Command Life Cycle Management Command Safety of Use Message 13-013 was published, which contained a reference to the use or purchase of helmet pads from unauthorized sources. Also, the Advanced Combat Helmet Operator's Manual directs Soldiers to use only authorized pads and provides instructions to Soldiers to inspect for helmet pad serviceability.

Mr. TURNER. As evidenced by some of the recent and well-publicized training accidents in our military, it is clear that our service members need the best protective equipment during training as well as in theater. Specific to head protection for reducing Traumatic Brain Injury, what checks are in place within the Army and Marine Corps to make sure that our warfighters are receiving standard issue headgear, to include authorized pad systems, both in training and in theater?

General OSTROWSKI and Mr. BECHTEL. Helmets issued to Soldiers, whether they are new or used helmets, are issued with new and approved pad systems. The Army has, and continues to provide, guidance to Soldier leadership through Army wide, All Army Activity (ALARACT) Messages, Ground Precautionary Action (GPA) Messages, and Safety of Use Messages (SOU) to ensure identification and removal of unauthorized personal protective equipment (PPE) from the Army inventory. An ALARACT Message, issued in April 2009 on the Unauthorized Procurement of Ballistic Protection, Body Armor, and other Safety Items, was issued specifically including a reference to the prohibition of purchasing helmet pads from unauthorized sources. The Army published a GPA Message in February of 2012 cautioning Soldiers against unauthorized liner systems in their helmets. Recently, the Tank Automotive Command Life Cycle Management Command published a Safety Of Use Message that directed Soldiers not to use or purchase helmet pads from unauthorized sources. Also, the Advanced Combat Helmet Operator's Manual directs Soldiers to use only authorized pads and provides instructions to Soldiers to inspect helmet pads for serviceability.

Mr. TURNER. What are the Army and Marine Corps plans for female-specific equipment (to include clothing, individual equipment, and body armor) development? To what degree do these plans depend on sustainment funding and/or new program funding?

General OSTROWSKI and Mr. BECHTEL. The Army developed eight additional sizes to the Generation III Improved Outer Tactical Vest (IOTV) to accommodate female specific physiological measurements. These new IOTV sizes are designated Female IOTVs (FIOTV). There are currently 17 FIOTVs being worn by Soldiers assigned to Female Engagement Teams throughout Afghanistan. The FIOTV is on schedule to begin full rate production in the summer of 2013 and PEO Soldier is anticipating fielding 600 FIOTVs for one Brigade Combat Team in late August 2013. The FIOTV will be available to the female Soldier population deploying to Afghanistan in late Fourth Quarter, Fiscal Year 2013 (FY13). The FIOTV will require sustainment with Army G4 sustainment dollars starting in FY14. The Soldier Protection System—Torso Protection (TP) subsystem will seek to replace the current Concealable Body Armor, Soldier Plate Carrier System, and IOTV with one modular system. The TP will adopt the female specific sizing that contributed to the FIOTV. Successful development is dependent on Research and Development funding.

In addition, the Universal Camouflage Pattern Army Combat Uniform Alternate (ACU-A) with Permethrin provides females and smaller statured male Soldiers with a better fitting Army Combat Uniform (ACU). The ACU-A is also produced in smaller and shorter length sizes than the current ACU. The ACU-A will soon be available for Soldiers to purchase at Army Military Clothing Store (AMCS), online from AMCS, and online from Kentucky Logistics Operation Center. The ACU-A is funded through the Military Personnel Account for the Clothing Bag. Fielding to Soldiers began May 2013.

Finally, the Physical Fitness Uniform (PFU), currently pending approval by the Chief of Staff of Army, is also being sized to better fit female Soldiers. Female PFU uniforms are being tested in a Soldier user evaluation. This alternate style should better accommodate female Soldiers. Fielding to Soldiers is expected to begin in the first quarter, FY15. The PFU is funded through the Military Personnel Account for the Clothing Bag.

Mr. TURNER. What are the Army and Marine Corps plans to enhance communications with industry in the coming fiscal year?

General OSTROWSKI and Mr. BECHTEL. PEO Soldier maintains a continuous dialogue with our industry partners and meets on an ongoing basis with vendors to discuss both broad and specific issues with regard to our programs. In addition, we routinely hold Industry Days to exchange information with the industrial base on current and upcoming initiatives. We use tools such as the Federal Business Opportunities website to post Requests for Information and draft Requests for Proposals on pending requirements to gain industry feedback.

For the remainder of this fiscal year and in Fiscal Year 2014 (FY14), we have several Industry Days planned. On June 27, 2013, Project Manager Soldier Weapons will hold a Small Arms Fire Control Industry Day at Picatinny Arsenal, New Jersey. The focus will be to provide our industry partners with current information for materiel solutions to address current capability gaps. This forum will also allow industry representatives to keep the Government apprised of technology developments. The Cross Service Warfighter Equipment Board, on which PEO Soldier is represented, is working with our sister services and the Defense Logistics Agency Troop Support to conduct a multi-day Advanced Planning Briefing to Industry in Philadelphia, Pennsylvania in the Fourth Quarter FY13 to review new requirements for the upcoming fiscal year. From October 15 -17, 2013, Project Manager Soldier Sensors and Lasers will conduct Precision Fires Industry Days at Fort Belvoir, Virginia to enhance communications with our industry partners in that market sector. And finally, Project Manager Soldier Sensors and Lasers will also conduct two Industry Days for the Family of Weapon Sights—Crew Served (FWS-CS); one during the Second Quarter FY14 and one during the Fourth Quarter FY14. These Industry Days will focus on programmatic updates, draft technical documentation, and one-on-one sessions with potential vendors.

Mr. TURNER. Is there a DOD investment strategy for new materials that will provide step change improvements to warfighter equipment?

General OSTROWSKI and Mr. BECHTEL. Advances in materials science have the potential to impact all Army platforms. As such, the Fiscal Year 2014 (FY14) basic research investment in materials science is \$182 million, or 43 percent of the Army's total FY14 basic research funding. The Army invests in biotechnology, nanotechnology, and Army specific domains of materials science including high deformation rates in structural and protection materials, energetic materials, electronics, and power and energy. Examples include investments in Textile Composite Armor which provides a framework for successful design of lightweight textile armor of the future. This research is unparalleled outside of the Army and its payoffs include transparent armor lenses that can be integrated into eye protection systems. Investments are also being made into insensitive munitions and energetic materials for

next generation small arms weapons that give unprecedented firepower to the Soldier (e.g. a 40mm with energetic power greater than a 155mm) and environmentally benign materials. Additionally, the Army is investing in the capability to design, optimize, and fabricate light weight protection material systems that exhibit revolutionary performance by manipulating matter all the way back to the atomic scale. This is a “grand challenge” that pushes the existing high-performance material envelope. Payoffs from this research include protection materials with 33 percent savings in weight of current systems and batteries with triple the energy density that can provide 30 percent longer life-times at a reduced cost (20–30 percent).

Mr. TURNER. Please provide a couple of examples of the most recent new products that have significantly reduced the soldier's load? On average how often will weight-saving technology refreshes occur across the portfolio of items the soldier wears and carries. What are the risks to achieving these improvements? Are they being developed with overseas contingency operations funds?

General OSTROWSKI and Mr. BECHTEL. The Army is incorporating weight saving technology that can meet current protection requirements into current personal protective equipment (PPE) and other Soldier equipment as rapidly as possible. The Army has leveraged new material construction and design approaches to reduce the weight of the Improved Outer Tactical Vest (IOTV) and Soldier Plate Carrier System (SPCS). The current Generation III IOTV, which weighs 31 pounds (lbs) (with plates) for a size medium, is four percent lighter than the previous IOTV variant. These same approaches are being applied to the SPCS, which weighs 23 lbs (with plates) for size medium, in order to reduce the weight by three percent. The latest specification for the Advanced Combat Helmet (ACH), which currently weighs 3.06 lbs for a medium, being procured by Defense Logistics Agency Troop Support for sustainment, requires a weight reduction of eight percent. The Lightweight ACH, which will also be procured by the Defense Logistics Agency Troop Support weighs 2.8 lbs for a size medium. By leveraging technology, we were able to achieve weight savings of 6.5 lbs in the Nett Warrior program as compared to its predecessor, the Land Warrior. As new technology is available, we will continuously strive to reduce weight even further to lessen the burden on our Soldiers. Because of our rigorous test protocols for all PPE, the risks to achieving these improvements are significantly reduced. Our base budget includes Research, Development, Test and Evaluation funding for PPE.

Mr. TURNER. I understand that the Army has undertaken a detailed sizing study to update the sizing tariff for clothing and equipment—basically determining the size of men and women in the Army with the objective of ensuring that equipment fits everyone.

Mr. Bechtel, can you tell me the process that the Army went through to ensure that individual equipment, especially for dismounted soldiers, is available in sizes that fit men and women? Have you changed any requirements in order to field women in the infantry equipment that fits?

Mr. BECHTEL. The Army's Assistant Secretary of the Army for Acquisition, Logistics, and Technology materiel developers pursue individual Soldier uniform and equipment form, fit, and function optimization as part of their routine product improvement efforts. Very good examples of recent improvements include sizing and fit updates to the Army's Improved Outer Tactical Vest (IOTV) and Army Combat Uniform (ACU), resulting in additional female specific IOTV sizes and an ACU-Alternate (ACU-A) uniform which fits the female body better and provides a better fit for some small-statured male Soldiers. The Headquarters, Department of the Army Deputy Chief of Staff, Logistics G-4 led Army Uniform Board (AUB) also routinely reviews specific male/female uniform related issues for dress and non-combat uniforms. The Army continuously evaluates Soldier equipment requirements. Based on those evaluations, no changes to any specific Soldier protection requirement is necessary in order to address the expanding role of women in combat. The Army does not differentiate the critical protection needs of our Soldiers whether they are male or female. As a result, the Key Performance Parameters and Key System Attributes that identify the critical requirements for materiel solutions are no different for body armor, uniforms, and individual Soldier equipment with regard to men and women.

Mr. TURNER. Does the Army currently have a validated requirement for lighter-weight body armor systems?

Mr. BECHTEL. Yes, based on validated Operational Need Statements the Army developed and approved a Soldier Plate Carrier System (SPCS) directed requirement in 2009, and a Concealable Body Armor (CBA) directed requirement in 2012. These interim solutions provide a lighter weight alternative body armor capability specifically to for Soldiers conducting dismounted operations and training and mentoring

of Afghan National Security Forces, respectively, in Operation Enduring Freedom (OEF). The Army continues to strive for lighter weight capabilities, including body armor systems. However, the key performance parameters addressing Soldier protection will always be pre-eminent. The current Army requirement for an improved lighter weight body armor system is defined in the Soldier Protection System (SPS) Capability Development Document (CDD), approved in February 2013. This requirement will be used to develop the next generation of body armor, as well as other areas of personal protective equipment to include head protection. The SPS CDD specifically calls out the need for lighter weight armor, with objective weight reductions of 5–15% for soft armor, hard armor, and helmets. The SPS CDD also identifies a modular and tailorable capability, which facilitates reducing weight further through the ability to tailor body armor based on mission and threat. The Army recognizes the tradeoff between weight and Soldier protection, and continues to strive for lighter weight materiel solutions without sacrificing our protection standards.

Mr. TURNER. Does the Army G3 and requirement community take into account the long-term consequences and costs to the entire Government when developing requirements? Are you satisfied that the Army requirements community knows what is the art of the possible?

Mr. BECHTEL. Yes, we do assess the long term health consequences and potential retirement related costs to the government as a very important part of the requirements development process. For instance, proponents and combat developers recognize the amount of equipment in and weight of a Soldier's load can significantly impact the Soldier's long term health. A specific example to help assess, capture, and address this is the Army's use of the concept of manpower and personnel integration, what we call MANPRINT. The Army also pursues experimentation, testing, analysis, and surveys to assist in the collection of data necessary to substantiate performance and effectiveness in the requirements development process. In the area of body armor and other protection element, we fully recognize the tradeoffs between protection, ballistics, and weight, and the impact they have on the Soldier, not only from a mobility aspect, but also on the near-term and long-term health skeletal and muscular systems.

Regarding the art of the possible, yes the Army continues to take hard looks at ways to improve our operational forces. For instance, in the areas of Soldier mobility and the squad as a system, the requirements community habitually examines changing our doctrine and concepts, the use of robotics, and vehicle support (i.e., improved suspension systems) to push the envelope and provide a tactical edge. An example of an improved technological capability being pursued is can be found in work being done with nanotechnology and the superheating of different composites. State of the art nanotechnology is able to create a small armor plate, not the size of the current body armor plate, but a six-inch plate that is very light with the capability to potentially prevent against small arms munitions penetration. So we're pursuing innovative approaches across a lot of systems to take care of our Soldiers—not only for the near-term operational mission need, but just as important, the long-term health and quality of life for our Soldiers.

Mr. TURNER. Does the Marine Corps currently have a validated requirement for lighter-weight body armor systems?

General SMITH. The primary requirement for body armor systems is based on levels of protection required. There are validated and specific weight requirements for these systems. The Army's Soldier Protection System Capabilities Development Document (CDD) will be the overarching document for ballistic protection requirements that will be reflected in individual Capability Production Documents (CPDs). The Army intends to start fielding the Scalable Protection System (SPS) in FY15, and is primarily focused on weight reduction. The Marine Corps will take a longer approach that will allow technology to mature to the level necessary to achieve our goals in protection, integration, and mobility, which we view as being equal in importance in a true next generation system. Additional Key Performance Parameters (KPPs) will be emphasized by defining mobility parameters using the Marine Corps Load Effects Assessment Program (MCLEAP), and integration parameters by the IPT within the Modular Scalable Protection System (MSPS) IPT (which is chartered). The Marine Corps is continually evaluating the potential for weight reduction with the stipulation that new developments maintain the same levels of protection of current personal protective equipment.

The Marine Corps has consistently challenged industry during our various industry meetings and conferences to provide the same protection level at 20% decrease in weight. 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 in-

crease capability at the same or lighter weight. Presently, we are engaged in several Small Business Innovation Research (SBIR) projects through Marine Corps Systems Command and have funded white papers submitted in response to the Natick Soldier Research and Development and Engineering Center Broad Agency Announcement. 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 drive the development of lighter weight body armor technologies and designs.

Examples of efforts include research into new vest designs and materials, Lightweight ESAPI and objective weight ECSAPI, flexible armor, eyewear, helmets (Helmet Electronics and Display System—Upgradeable Protection Army Technology Objective (HEaDS-UP ATO)) and protective undergarments. In addition, the MSPS aims to integrate the attributes of current armor protective levels with a lighter weight, load distribution system that will also enable greater range of motion and less stress on Marines.

Mr. TURNER. It has been almost 4 years (July 28, 2009) since the Government Accountability Office issued a report on Army and Marine Corps Ground Combat Helmet Pads. In the report, the GAO states that the “Army and Marine Corps are aware of the use of unapproved (helmet) pads and have taken steps to rectify this practice.”

With Traumatic Brain Injury as perhaps the signature injury of the wars in Iraq and Afghanistan, can you tell me if soldiers and marines are still using unapproved helmet pads? If so, what steps are you now taking to rectify this practice?

General SMITH and General KELLEY. Team Wendy pads are used in the present Lightweight Helmet and will be used in the Enhanced Combat Helmet. The Team Wendy pads were proven to be superior in a 2006 Blunt trauma study when compared to all the leading pad systems.

The Army is leading an effort to find alternative pad systems. The Marine Corps is following this program and is committed to adopting the same system if it proves to be more effective than the current Team Wendy pad system. This effort has been coordinated through the Cross Service Warfighter Equipment Board (CSWEB).

Mr. TURNER. As evidenced by some of the recent and well-publicized training accidents in our military, it is clear that our service members need the best protective equipment during training as well as in theater. Specific to head protection for reducing Traumatic Brain Injury, what checks are in place within the Army and Marine Corps to make sure that our warfighters are receiving standard issue headgear, to include authorized pad systems, both in training and in theater?

General SMITH and General KELLEY. Team Wendy pads are used in the present Lightweight Helmet and will be used in the Enhanced Combat Helmet. The Team Wendy pads were proven to be superior in a 2006 Blunt trauma study when compared to all the leading pad systems.

A Marine Administration Message released in April 2007 establishes that it is Marine Corps policy, for Marines and Sailors assigned to both USMC and Joint command, to be issued Marine Corps approved PPE, which includes the Lightweight Helmet. It further clarifies that Marines and Sailors may not use commercial PPE in lieu of government tested, approved and issued PPE. The language is clear that enforcement of this policy is a Commander responsibility.

Mr. TURNER. What are the Army and Marine Corps plans to enhance communications with industry in the coming fiscal year?

General SMITH and General KELLEY. The Marine Corps works closely with the industrial base to field innovative solutions to identified requirements keeping cost-effectiveness and sustainability in mind during this prolonged period of fiscal austerity. We do this by actively engaging and communicating our programmatic and technical priorities, needs and future plans with industry in a number of forums.

At the ground level, Marine Corps Systems Command (MCSC) established the Industry Interface Council (IIC). The IIC is comprised of Command representatives and industry who meet on a regular basis that provides an effective feedback between MCSC and industry on ways to continue to better serve and communicate with each other. A result from the IIC was the launch of the Marine Corps Advanced Planning Briefing to Industry (APBI).

Additionally, the Marine Corps participates in many events, large and small, in an effort to communicate with industry. The larger events include the annual Modern Day Marine Exposition that includes the Marine Corps Report to Industry and the biennial Advanced Planning Briefing to Industry. During these events, Marine Corps General Officers highlight the needs and way ahead of the Corps by providing industry with our acquisition and funding plans. Smaller events include “Industry Days” where many individual Marine Corps ground programs offices meet with in-

dustry throughout the year, giving businesses an opportunity to inform our acquisition professionals with potential solutions that could better equip our warfighters. As we continue to recognize the potential capabilities, innovations, and technology solutions that small businesses can offer, MCSC's Office of Small Business Programs (OSBP) is involved in small business and industry outreach events on a weekly basis. MCSC's OSBP participates in local and national small business outreach events, where the MCSC OSBP matches the capabilities of small businesses with MCSC and Program Manager Officer Land Systems requirements.

Such events provide great venues for industry to stay abreast of opportunities with the Marine Corps acquisition community and for the Marine Corps to learn about potential solutions.

Mr. TURNER. I am concerned about the requirements for issuance uniforms. I understand that the Department of Defense does not have a universal standard for when a soldier, sailor, airman, or marine must be issued fire-retardant clothing.

Please explain how the Marine Corps determines who is issued what versions and components of flame-resistant uniforms and the process by which this decision is made to include the decisionmaker? What is the sustainment requirement for these uniforms and how is it budgeted?

General SMITH and General KELLEY. The Marine Corps currently uses the same textile solution for its flame resistant uniforms as the other services—the “Defender M” produced by Tencate. All four Services continue to work closely and share in research and development and information on advancements in textiles that may result in better flame resistant protection coupled with lighter weight and improved durability.

The Marine Corps provides all of its forward deployed Marines with Flame Resistant Organizational Gear (FROG) which consists of outer and under garments, gloves, and head, face, and neck protection.

The decision to wear FROG is retained by the Combatant Commander but is often delegated down to the Battalion Command level. A commander's decision for his Marines to wear or to not wear FROG is commonly based on a careful consideration of the threat, environment, mission and other operational factors/conditions.

The sustainment requirement for FROG is the ability to support Marines forward deployed to Operation Enduring Freedom (OEF) and with the Marine Expeditionary Units (MEU). Sustainment is currently supported through a combination of Overseas Contingency Operations and programmed Operations and Maintenance Marine Corps (OMMC) funds.

Mr. TURNER. A recent GAO study highlights the difficulties the military services have experienced with respect to combat uniforms and camouflage with multiple variants across the Services, different and ineffective patterns, different FR materials, a lack of coordination within and across the Services, etc. This study made many recommendations that the Services largely concurred with.

Please provide an update on the camouflage program and associated combat uniform programs? Is there a requirement for continuing to improve the combat clothing worn by our warfighters, both the base uniform and the flame-resistant variant?

General SMITH and General KELLEY. The Marine Corps believes that every Service member deserves the opportunity to wear an effective camouflage uniform commensurate with their assigned mission and normal operating area. The Marine Corps supports camouflage uniforms that reduce visual detection and enhance performance.

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.

When it comes to requirements, the Marine Corps and the Army collaborate wherever their mission profiles converge. In the case of the uniform, the Marine Corps has looked at the places we think we would be most likely employed, and we've created a uniform for that.

We are not aware of any effort to develop a singular uniform. While we collaborate in many areas, in regard to the combat uniform, the Army and the Marine Corps selected different solutions. A distinct mission profile is the distinguishing factor that precludes development of a singular uniform.

Mr. TURNER. What are the Army and Marine Corps plans for female-specific equipment (to include clothing, individual equipment, and body armor) development? To what degree do these plans depend on sustainment funding and/or new program funding?

General SMITH and General KELLEY. The Marine Corps realizes that the differences in female anatomy are not necessarily compatible with current armor designs. We also have found that challenges remain in retaining ballistic performance

with curved plate geometries. Tests have shown conformal ceramic armor doesn't meet ballistic performance standards.

For the past three years, the Marine Corps has monitored and actively supported the U.S. Army's effort to develop female specific body armor. The U.S. Army developed new prototype body armor for female soldiers based on the Improved Outer Tactical Vest (IOTV), which is being evaluated for fit and sizing. The U.S. Army has designated the IOTV as their replacement for the Outer Tactical Vest (OTV). The OTV was previously issued and shared with the Marine Corps. We have since replaced the OTV with the Plate Carrier (PC). We will address the interim and long term solution to enhance the fit, form, and comfort of the Marine Corps Family of Body Armor (FBA) to best provide ballistic protection capability across the range of Marine stature and gender spectrum. The Marine Corps will conduct a comprehensive survey fit of torso, pelvic, and helmet ballistic protection systems during FY13. The survey seeks to obtain a better understanding of issues specific to smaller stature and female demographic, and comprehensive data on fit, sizing, and comfort which will be incorporated into the design of the next generation fully integrated, Modular Scalable Protective System (MSPS). We will continue to monitor the U.S. Army in their efforts to develop solutions to address notable issues with sizing and comfort levels of body armor for female soldiers.

We do not have a funding line for female body armor as all of our armor is incorporated into the Family of Ballistic Protective Systems. We are working with the Army as noted above on improvements to our current systems. We additionally have different sizing than the Army which improves the fit of the current systems with smaller stature Marines.

Mr. TURNER. Please provide a couple of examples of the most recent new products that have significantly reduced the soldier's load? On average how often will weight-saving technology refreshes occur across the portfolio of items the soldier wears and carries. What are the risks to achieving these improvements? Are they being developed with overseas contingency operations funds?

General SMITH and General KELLEY. Our goal is to give Marines the equipment and confidence to accomplish his or her mission successfully. To do this, we constantly seek the balance between effectiveness and weight of the equipment and the speed, endurance and survivability of the warfighter. The Marine Corps' continues to look at ways to make advancements in reducing the Marine's combat load.

For example, the introduction of the Infantry Automatic Rifle reduced the load of the three heaviest-burdened Marines in the rifle squad, the Automatic Riflemen. There is an eight-pound difference in unloaded weapons and a 14-pound difference in loaded weapons when compared to the M249 (Squad Automatic Weapon). This weapon significantly enhances the mobility of the Marines with the greatest quantity of automatic firepower in the squad and provides interoperability of ammunition sources throughout all the squad members by eliminating linked ammunition required by the M249. These systems were developed and procured with base budget not OCO funding.

Additionally, we are aggressively improving the energy effectiveness of our Marine's equipment as another aspect of lightening the load. On the individual Marine, over a dozen batteries in six different configurations are used at any given time. The Marine Corps is fielding, in OEF, the next generation of solar-powered alternative energy solution, SPACE and GREENS, to recharge batteries and power laptops, radios, and other Platoon through Battalion level equipment in order to reduce the need for generators and fuel resupply convoys. Centralizing, standardizing, and reliably distributing power has the potential to reduce the reliance upon the multiple types of batteries that are currently used in systems and carried in significant quantity as spares. Initial SPACES and GREENS efforts received some OCO funding.

Mr. TURNER. The MSPS is the USMC's version of the Army's Soldier Protection System (SPS). I understand the MSPS takes a slightly different approach focusing on mobility and not weight reduction.

Would a joint program yield more industry participation and competition? How different are USMC requirements from the Army's? What percentage of the total Corps will get this system? How was that percentage determined?

General KELLEY. The Modular Scalable Protection System (MSPS) is the Marine Corps initial effort to develop a fully integrated system of ballistic protective equipment for the individual Marine. The MSPS includes protection for the head, eyes, hearing, torso, pelvic region, and extremities and will be developed with a balanced emphasis on protection, integration, and mobility. We want to develop protections systems that our equal to or greater than our current capability but at reduced weight. Moreover, with the MSPS we seek to improve the ergonomics of the ele-

ments within the MSPS to improve load carriage, flexibility, and bulk over current systems. We are also looking at novel approaches to integrate load bearing capabilities (packs and pouches) and power/data management for the individual Marine.

The focus on returning mobility to the individual Marine will incorporate the Marine Corps Load Effects Assessment Program (MCLEAP) as a means to baseline our current systems, provide a mobility metric for the MSPS requirement, and measure improvements in mobility provided by prototypes for the MSPS.

The Modular Scalable Vest (MSV) is the torso armor component of the MSPS and is currently under development. The focus of the MSV program is to provide increased protection levels with no weight costs while enhancing Marine mobility and combat effectiveness through smart load management and integration capabilities. The MSV will provide the capability to scale protection levels in a single system, a load distribution and carriage capability, and inherent integration capabilities with the USMC Pack System. The MSV will utilize both a lighter weight soft armor, which offers 10–15% weight reductions over current soft armor, and the Enhanced Capability Small Arms Protective Inserts (EC SAPIs), which provide increased ballistic protection at current Enhanced Small Arms Protective Inserts (ESAPIs) weight. Both of these improvements were developed in coordination with the Army and will be resident within their future systems as well. We plan to begin fielding the EC SAPIs in Fiscal Year (FY) 2014 and the MSC in FY2016.

Would a joint program yield more industry participation and competition?

There is significant collaboration between the Army and the Marine Corps now and also significant participation and competition across the segment of industry interested in these capabilities with no conclusive evidence that a Joint program would influence greater competition or yield increased support to the Warfighters in each of the Services. The response to the Marine Corps' effort to develop concept demonstrators for the MSV has been enthusiastic and promising. Recently, there has been increased interest on the part of the Army in the Marine Corps approach to the MSPS as a whole and the MSV specifically and plans are being made to test Army and Marine Corps concepts side-by-side. Additional interest on the part of industry is sure to result.

How different are USMC requirements from the Army's?

The Army and Marine Corps use the same ESAPI plates for hard armor protection and the same soft armor materials for torso and pelvic protection. The main difference between the Army and Marine Corps pursuit of next-gen personal protection systems is in the design and cut of our soft armor.

The Army's Soldier Protection System Capabilities Development Document (CDD) emphasizes weight reduction as the primary means to return mobility to the individual soldier. However, the Army's CDD does not include mobility as a desired attribute and while improved integration is an Army goal, it falls subordinate to protection and weight reduction. In addition, the Army intends to begin fielding their Soldier Protection System (SPS) in FY 2015.

The Marine Corps intends to take a longer approach to permit technology and design to mature to the level we believe necessary to achieve our combined goals in protection, integration, and mobility, which we consider of equal importance in our pursuit of a next generation system. The balance between protection and weight reduction are being emphasized by defining mobility parameters and requirements using the MCLEAP.

What percentage of the total Corps will get this system? How was that percentage determined?

Our initial acquisition objectives are intended to support forward deployed forces and forces preparing to deploy, approximately 38% of the total force, with the MSV and other components of MSPS as they are developed. This strategy is driven by the desire to equip our warfighters with the most up to date and capable protection systems while conscientiously shepherding our limited resources. Limiting fielding to deployers optimizes development and design of these new systems by directly incorporating user feedback into follow on configurations. This approach prevents costly and multiple fielding of incrementally improved protection systems across the force until a final, optimized configuration is achieved. For the majority of the Corps, currently issued protection systems will be sustained and improved periodically through insertions of lighter soft and hard armor as technology and resources allow.

Mr. TURNER. What is the current status of the enhanced combat helmet? Why is it taking so long to procure this helmet?

General KELLEY. To date, the Enhanced Combat Helmet (ECH) successfully completed the First Article Test III, and it is undergoing full up system level testing which is anticipated to be completed in May 2013. Upon successful completion of

final testing requirements, the program office anticipates to award a delivery order during fourth quarter fiscal year 2013.

The delay in procuring the ECH is a result of qualitative test failures with the vendor's second and third production lines due to an Engineering Change Proposal. Through root cause analysis, the contractor identified the issue and applied course correction.

Mr. TURNER. In 2010, Congress mandated DOD to establish a procurement line item for body armor components. DOD has failed to comply with this requirement. DOD has indicated that body armor is considered to be an "expendable item" and that creating a procurement line for expendable items would add inefficiencies in managing procurement quantities due to varying procurement quantity requirements.

In your opinion, how would you categorize body armor? Do you consider body armor to be an "expendable" article, similar to a T-shirt? DOD notes that inefficiencies would be created by establishing a procurement line item. Do you agree with this statement? If yes, then please provide more details into what types of inefficiencies would be created. Recognizing that one of the benefits of using O&M funding is flexibility, and that flexibility was required during the rampup for OIF/OEF, should DOD reassess whether a procurement line item would be appropriate for future buys now that current conflicts are drawing down?

General KELLEY. 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 which is funded with OMMC. Further, body armor is not generally repairable. If it is damaged, body armor is disposed and a replacement is provided.

Body armor is a consumable item with a unit cost less than the expense/investment threshold, therefore appropriately funded with O&M. We believe this is the most responsive way to not only replace damaged gear but to also respond to changing requirements.

Mr. TURNER. Are you aware that the average age of the top 5 most often employed U.S. small arms are on average around 30 years old? How are you modernizing the family of small arms?

General KELLEY. Although the original versions of some of our small arms entered the inventory nearly 50 years ago, current versions are significantly modified or newly produced to provide enhanced target detection, identification, accuracy, dependability, and lethality. The examples below highlight the life cycle product improvements and modernization across much of our inventory.

5.56mm M16A4 Service Rifle—The first version, M16A1, entered the service in 1964. The current version was fielded in 2003 and features a heavier barrel, 3 round burst vice full auto setting, and MIL-STD-1913 accessory rails to mount target acquisition and designator devices to include the Rifle Combat Optic, a 4 power magnification optic issued with every weapon. These improvements, coupled with significant improvements in ammunition, have increased target detection, weapons accuracy, range, penetration, and dependability.

5.56mm M4 Carbine—The M4 was fielded in 2003 with similar features to the M16A4 (3 round burst vice full auto setting, and MIL-STD-1913 accessory rails to mount target acquisition and designator devices to include the Rifle Combat Optic, a 4-power magnification optic issued with every weapon). The M4 is the designated weapon for all Officers and Staff Non-Commissioned Officers up to the rank of lieutenant colonel.

5.56mm M27 Infantry Automatic Rifle—Fielding of the M27 Infantry Automatic Rifle (IAR) concluded in April, 2013. The IAR replaced the M249 Squad Automatic Weapon (SAW) within the Marine Rifle Squad. The M27 features a full auto firing setting, free floating barrel, and 4.5-power magnification optic, and is half the weight of the M249. The reduced weight of the IAR increases the automatic rifleman's maneuverability and displacement speed, allowing him to keep pace with the rest of the fire team, while the increased accuracy coupled with the full auto capability maintains the lethal capabilities of the Marine rifle squad.

7.62mm M40A5 Sniper Rifle—The M40 Sniper Rifle was initially fielded in 1966, with successors fielded in 1970 (M40A1); 2001 (M40A3); and 2009 (M40A5). Improvements within M40A5 include a fiberglass stock, 3x to 15x power variable scope, forward accessory rail to facilitate mounting the in-line night vision as well as other devices (target designators, range finders), and a weapons signature suppressor.

M240B Medium Machinegun—In 2006, the M240B replaced the M240G medium machine which had been in our inventory since 1997. The main improvements to the M240B include the MIL-STD-1913 accessory rails to mount target acquisition and designator devices to include the Machine Gun Day Optic (a 6-power magnification optic issued with every weapon), a hydraulic buffer w/in the butt stock to re-

duce recoil, and enhancements to the gas regulator. Combined, the improvements in the M240B enhance target acquisition, weapons accuracy, and weapon service life.

M2 .50cal Heavy Machinegun—The M2 Heavy Barrel Machine Gun has been in the inventory since 1933 and remains largely unchanged. However, in conjunction with the Army, the Marine Corps is in the process of upgrading the M2 to the M2A1. Improvements within the M2A1 .50 cal enhance safety and survivability and include a quick change barrel, fixed headspace and timing, and a new flash suppressor that reduces night weapon's signature by 95%.

MK19 40mm Grenade Launching Machinegun—The MK19 entered the Marine Corps inventory in the mid-1980s and remains unchanged. There are currently no plans to replace or modify this weapon system.

M9 9mm Pistol—The M9 pistol was initially fielded in 1985 and remains in service with no replacement planned. However, the Marine Corps is monitoring the Joint Modular Handgun System effort under the lead of the Army, and will determine its future participation based on operational needs.

In addition to the Corps' ongoing efforts to modernize its small arms and small caliber ammunition inventories, we also actively participate in the Joint Services Small Arms Synchronization Team (JSSAST). The JSSAST is a Joint body organized to openly exchange information, generate small arms requirements and pursue the technologies necessary to produce the next generation of small arms in the 2025 and beyond timeframe.

Mr. TURNER. To the extent possible what programs and/or policies has the Marine Corps put in place to sustain and stabilize the domestic industrial base for individual warfighter equipment? How have these programs and/or policies been communicated to industry and to what effect?

General KELLEY. The Marine Corps procures equipment in response to a funded and validated requirement, not in any specific effort to sustain the industrial base in any industry. A way that the Marine Corps contributes to sustaining the domestic industrial base for warfighter equipment is complying with the Berry Amendment. All equipment we procure that contains materials covered by the Berry Amendment, mostly textiles, are from domestic sources. The Marine Corps, specifically Combat Development and Integration (CD&I), develops warfighter equipment requirements based on roles and missions laid out in Title 10. These requirements are validated by Marine Corps and DOD leadership, and are communicated to industry via Marine Corps Systems Command (MCSC) through Requests for Proposals and Requests for Information.

The Marine Corps also actively engages and communicates our programmatic and technical priorities, needs and future plans in a number of forums. We participate in events ranging from broad to small platforms. Broad platforms include events like the annual Modern Day Marine Exposition and the biennial Advanced Planning Briefing to Industry during which the acquisition and funding plans are provided to industry. The more finite efforts include venues such as "Industry Days" where many individual Marine Corps ground programs offices meet with industry throughout the year, giving them an opportunity to meet with our acquisition professionals on potential solutions. In addition, the Marine Corps recognizes the potential capabilities, innovations, and technology solutions that small businesses can offer. MCSC Office of Small Business Programs (OSBP) is involved in small business and industry outreach events on a weekly basis. MCSC's OSBP participates in local and national small business outreach events, performing business matchmaking at many of those events, to match the capabilities of small businesses with MCSC and Program Manager Officer Land Systems requirements.

Such events provide great venues for industry to stay abreast of opportunities with the Marine Corps acquisition community and for the Marine Corps to learn from industry about potential solutions.

QUESTIONS SUBMITTED BY MS. DUCKWORTH

Ms. DUCKWORTH. Hearing damage and hearing loss are two of the leading injuries among warfighters and veterans. In 2011, the VA spent over \$1 billion on disability payments to veterans suffering from hearing loss. As hearing loss has grown to be the most common service-connected disability resulting from OEF and OIF, that number is expected to exceed \$2 billion in 2014. A recent GAO report even stated that "well before retirement, such [hearing] damage can reduce servicemembers' ability to communicate and affect the quality of their professional and personal lives. Moreover, it can create additional costs to the government and taxpayers by decreasing troop readiness and increasing the need for medical services and dis-

ability compensation.” The same report said, “while [servicemembers] were generally aware that they were required to wear double protection, each was wearing single protection and many cited comfort as a reason for their non-compliance. At other locations we visited, servicemembers cited the impact of hearing protection on communication.” Last year the defense authorization contained language recognizing the measures take by the U.S. Army Special Operations Command to provide communications equipment with simultaneous, inner-aural hearing protection. What has the U.S. Naval Special Warfare Command done to provide the same preventative equipment? Do other components have plans to take the same measures to provide enhanced hearing protection and communications for deployed service members?

General OSTROWSKI and Mr. BECHTEL. This question is best answered by the Navy.

Ms. DUCKWORTH. Hearing damage and hearing loss are two of the leading injuries among warfighters and veterans. In 2011, the VA spent over \$1 billion on disability payments to veterans suffering from hearing loss. As hearing loss has grown to be the most common service-connected disability resulting from OEF and OIF, that number is expected to exceed \$2 billion in 2014. A recent GAO report even stated that “well before retirement, such [hearing] damage can reduce servicemembers’ ability to communicate and affect the quality of their professional and personal lives. Moreover, it can create additional costs to the government and taxpayers by decreasing troop readiness and increasing the need for medical services and disability compensation.” The same report said, “while [servicemembers] were generally aware that they were required to wear double protection, each was wearing single protection and many cited comfort as a reason for their non-compliance. At other locations we visited, servicemembers cited the impact of hearing protection on communication.” Last year the defense authorization contained language recognizing the measures take by the U.S. Army Special Operations Command to provide communications equipment with simultaneous, inner-aural hearing protection. What has the U.S. Naval Special Warfare Command done to provide the same preventative equipment? Do other components have plans to take the same measures to provide enhanced hearing protection and communications for deployed service members?

General SMITH and General KELLEY. [The information was not available at the time of printing.]