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THE STATUS OF TACTICAL WHEELED VEHICLE ARMORING INITIATIVES, AND IMPROVISED EXPLOSIVE DEVICE (IED) JAMMER INITIATIVES IN OPERATION IRAQI FREEDOM

HEARING

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED NINTH CONGRESS
FIRST SESSION

HEARING HELD
MAY 5, 2005

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THE STATUS OF TACTICAL WHEELED VEHICLE ARMORING INITIATIVES, AND IMPROVISED EXPLOSIVE DEVICE (IED) JAMMER INITIATIVES IN OPERATION IRAQI FREEDOM

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, Thursday, May 5, 2005.

The committee met, pursuant to call, at 9:05 a.m., in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the committee) presiding.

OPENING STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, COMMITTEE ON ARMED SERVICES

The CHAIRMAN. The committee will come to order.

This morning the committee continues its review of the status of the armoring program for Army and Marine Corps tactical vehicles in Iraq, as well as the status of deployment of electronic jamming devices to counter the threat of improvised explosive devices, better known to all of us as IEDs.

Our leadoff witness is Dr. Steven J. Teresa of the Lawrence Livermore National Laboratory. And on our second panel, Brigadier General Joseph Votel, Director of the Joint IED Defeat Task Force, Office of the Secretary of Defense; Brigadier General Jeffrey Sorenson, Deputy for Acquisition and Systems Management, Office of the Assistant Secretary of the Army; and Brigadier General William Catto, Commanding General, Marine Corps Systems Command.

And on our third panel, Lieutenant General James N. Mattis, Former Commander, First Marine Division, and Commanding General, Marine Corps Combat Development Command; and Lieutenant Colonel Paul J. Kennedy, Former Battalion Commander, 2nd Battalion, 4th Marine Regiment, First Marine Division.

The jurisdiction of this committee is such that we cover a very wide range of issues, but the significance of other issues pales relative to the importance of providing the best protection possible to our men and women serving in Operation Enduring Freedom and Iraqi Freedom.

No other issue in the past two years has taken a higher priority for this committee. We have done a lot of work on this specific issue of armor, and I wanted to let my colleagues know where we stand with respect to committee action that has been taken and the task force that we have put together to work the armor issue, because there has been no element of this conflict that has been more deadly to our people than the IED blowing these things remotely,

sometimes hardwired, on our troops who are either in operation or in convoy. And we put together a task force headed up by Mr. Bob Simmons. I want to run down some of the things that we have done so we can take a look at the present state of affairs, and when we get our updates from the services and from Dr. DeTeresa, the committee can decide where we want to go from here.

We began oversight of the Army on these programs in 2003. The Army at that point approved $129 million for add-on armor kits; $300 million remains, however, at this time unfunded.

In January of 2004, we reviewed the Army production plan that was originally scheduled to complete 7,000 kits by December of 2004. We determined that the best production effort could actually finish those kits much earlier, in fact by April 2004; and we submitted a memo to the Army noting that we had enough in terms of arsenals, industry and steel mills, if they operated at max capacity, to move this production of armor to the left, that is, to move it up to April.

We visited the steel mills that churn this stuff out. We reached agreement with steel mill management and union officials to voluntarily set aside the commercial work they were doing and dedicate a hundred percent of their capacity to armor plate production.

The delivery schedule for steel was compressed at that point by four months; that is, we moved the production from December 2004 to April 2004. Now, at this point, we found something else, and that was that when we built Strykers, we utilized high hard steel;that is three-eighths-inch high-performance steel, and we had a lot of it left over from Stryker production. So we discovered that at the steel mills while we were making the visits, and we started to move that into the system.

We determined at that point that we needed additional manufacturing capacity, and the Army, working with Les Brownley, the Army committed nine depots and arsenals to armor kit production.

We also suggested to the Army that 11 sites be opened in Iraq to install Humvee armor, because by doing that we could put that armor on—when the Humvees arrived in country, we could marry it up with armor and move it out to its location in theater.

On March 2nd of 2004, the Secretary directed the compression of the schedule to what we recommended in terms of production rates, to the House recommended production rates. The Army notified us at that time of delinquent deliveries of steel from Canadian steel mills, and they requested our assistance. And we sent our team out to Canada to resolve the delivery issues. At that point, we started to look also at the tactical truck fleet because these 5-ton trucks with the Army, particularly 7-ton trucks with the Marines, with the capability that they have in terms of a load carrying capacity, lends itself to the heavy weight that is involved in armoring up.

We delivered, on June of 2004, Stryker steel gun boxes; these were gun boxes made out of excess Stryker steel that we had found that were delivered to Iraq. In November of 2004, aluminum mill shipments threatened to break production of armor kits for trucks. Our team met with the aluminum company executives and arranged for a shift in priorities back to the armor programs.

Our oversight team also discovered that the IED countermeasure supplier was running out of Army funding and laying off produc-

tion personnel, and at that point, we went into a negotiation with the Secretary of Defense, and we agreed on a very substantial reprogramming to put the IED countermeasure production at full speed.

In January of 2005, we shipped our first—the Army shipped its first 5-ton truck kit, three months later than the original commitment. And our HASC team at the same time was working on oversight of IED production, and we started to move into that area.

CENTCOM then reported this policy—that we are all familiar with now—that no unarmored vehicles, that is, vehicles without level one, two or three armor, would go out on operation after February 15 in theater in Iraq or Afghanistan.

Since then, we have been working the IED countermeasure problem, and what we have done is the committee passed last year—I think everybody's familiar with this provision that we passed that said that the Secretary of Defense, if he is taking casualties on the battlefield, can wave every existing American law with respect to acquisition and simply buy what the troops need as quickly as possible.

We have developed some new jamming capability, and we have a product that we think we can flood into the field very quickly. And a couple of days ago the Secretary of Defense (SECDEF) signed out the directive that is utilizing this new license that HASC developed and that we passed into law last year for the first time, and that is that with a goal of arriving at contract within 15 days after certification. The certification was signed just a couple of days ago. We hope to be able to get this new capability flooded into the field, not ramped up on a classic industrial schedule, but flooded into the field within the next 45 to 60 days.

So SECDEF is moving out that. He signed the certification that we provided for him, certifying that there was an urgent combat need for this system, and this will be will be the first system moved out under this new structure that we have. Now this is going to require lots of personal accountability because what we are doing is replacing miles of paperwork and lots of bureaucracy with individual accountability, but we think that this is an area that is so critical that we are going to have to move very quickly, like we have managed to move in the past, and so we are going to exercise this new instrument that we have put together.

Now, we have a big bureaucracy; we in Congress have helped to build up bureaucracy in lots of agencies and for good—in many cases, for good reasons, you need to have lots of checks and balances in a system where taxpayer monies are spent in large numbers. On the other hand, when you are in a combat situation, sometimes that bureaucracy gets in the way. We have moved out on our armor situation sometimes fitfully, sometimes in a robust manner. We have had a number of good news stories. We have gotten companies that have developed things, and we have gotten depots that have moved out quickly, and we have been able to move capability into the field. On the other hand, we have also been plagued with all the glitches and foul-ups and delays that attend large bureaucracies.

What we are here to do today is to take a picture of where we are, of our present status, what we have got in country, how well

it is protecting our troops, and where we need to go from here. And so we are not going to be—we are not here to congratulate ourselves on accomplishments. We are not here to continue to berate and criticize this system which we built, which moves products and capability rather slowly to our people in uniform. But we are here to speed it up, to see what else we can do to move this process along and to provide better protection for our folks in uniform.

And we have got some warfighters here today. And I am glad we have got them here because we also have some of our experts in developing systems. And I have already asked a couple of questions about some new things; perhaps we could put our Humvee and trucks in theaters. So I am glad we have our warfighters here, and they will be able to comment and perhaps have some interchange with some of our designers on some of the requirements that we could get into theater fairly quickly.

So gentlemen, thank you for being with us today.

And let me comment, also, that my good colleague, Mr. Weldon, who is the chairman of the Tactical Air and Land Forces Subcommittee and whose subcommittee has moved large amounts of money into the armor program and has been aggressively pursuing this program, he has also been very concerned. And he and I are partnering on this hearing.

And Curt, did you have anything you wanted to say.

[The prepared statement of Mr. Hunter can be found in the Appendix on page 77.]

STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA

Mr. WELDON. If the gentleman would yield.

Just briefly, Mr. Chairman, I want to thank you for your tireless work, along with the ranking member. Chairman Hunter has taken a personal interest in this issue to the extent that I have never seen in my 19 years in Congress, to the point of going out into the field, on his own and with key staffers assigning teams, to get the real story.

Now we should not have to do that. Now I want to tell you that as a strong supporter of the military, I am not too happy today. Now maybe this hearing will make me happy.

Now I am the Chairman of the Tactical Air and Land Forces Subcommittee that oversees the funding for these programs. Over the past year, while Chairman Hunter and staff have been out doing yeomen's efforts—it goes well beyond what a committee chairman should ever have to do—and basically looking over the shoulders of those men who are responsible for making sure that our soldiers are protected, we have been assured repeatedly that we have equipment in the field that in fact is meeting the needs. And I want to hear today that that is, in fact, the case.

I want to applaud both you, Chairman Hunter, and especially the staff that you have assigned, most particularly the incoming staff director who has done a fantastic job on this issue on your behalf. And I want to ask one question. I am a strong supporter of the Marines. I am going back to Iraq on Memorial Day with a delegation to see the troops again for a short trip. But I want to ask the Marines to answer me a question today, because this offends me, as

perhaps one of the most loyal supporters of the Marines. I want to ask if the commander of E company, Captain Kelly Royer—which was the company that suffered the most casualties and deaths during their six-month tour in Iraq, 185—who on May 31st of 2004's fitness report, and I quote, He has single handedly reshaped a company in sore need of a leader, succeeded in forming a cohesive fighting force that is battle-tested and worthy—but after he confronted the brass about the shortages threatening his men, it was changed, and the superiors found him to be quote, dictatorial, with no morale or motivation in his Marines.

I want the Marines to answer the question about Kelly Royer. Is that what we do to an officer who reports that there are problems within his unit? And what is the status of him today? Is, in fact, he being railroaded out of the Marine Corps?

So, Mr. Chairman, I would ask, when the Marines come to the table, that I expect answers on that question about this specific—if they want to go into a classified session when we talk about the personnel issues, then so be it, but I am quoting from Marine documents.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

And I want to thank my colleague, Mr. Skelton, who has been a great partner in this bipartisan effort to accelerate armor of our folks in theater.

And Mr. Skelton, thank you for everything you have done, and the gentleman is recognized.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MEMBER, COMMITTEE ON ARMED SERVICES

Mr. SKELTON. Mr. Chairman, thank you. And let me join you in welcoming our witnesses and our panels this morning.

Mr. Chairman, let me commend you for holding this hearing. This is good. This is very important. And I, too, would like to join my friend from Pennsylvania on seeking the answers regarding that company commander. That goes to the very heart of the credibility of the United States Marine Corps.

We are dealing with the process of writing our bill, Mr. Chairman, as you know, and our paramount responsibility is still the oversight of our forces here deployed in Iraq. Today's hearing is very, very helpful. Men and women in our armed forces have exceeded what we, as their leaders, have the right to expect. This is most especially true of the soldiers and the Marines involved in the daily fight, to be given the responsibility to lead, to equip these men and women is to be given a very, very important job, and I consider that responsibility to belong to the members of this committee, to the Congress of the United States and the Constitution and as well, of course, as the witnesses today.

The Army and the Marine Corps, with help from Congress, are making progress with armoring vehicles, and they have dramatically upgraded their force protection capabilities. Mr. Chairman, I believe if we had to grade our efforts to date we would have to give ourselves a C at best. As the recent article from the New York Times brought home again, we started our occupation in Iraq with-

out a plan, without the right equipment for the fight, and we were too slow to react when it became clear that post-combat operations were just as dangerous, if not more so, as the combat originally was. A heavy price has sadly been paid for mistakes.

Now, it is neither helpful or fair to even try to single out a person or an organization as being to blame. Instead, I believe we must make sure that at least something good comes out of this mistake and something good comes out of this hearing. I, again, Mr. Chairman, congratulate you for this hearing. I ask that the remainder of my statement be placed in the record.

The CHAIRMAN. Without objection. I thank the gentleman.

And our lead-off witness is Dr. Steve DeTeresa of Lawrence Livermore National Laboratory, a laboratory that heretofore has been engaged in the design of our strategic weapons systems that has lots of talented folks.

And Dr. DeTeresa, you folks have put a team together and have put together some pretty substantial armor that you have moved into theater. Tell us about this.

STATEMENT OF DR. STEVEN DETERESA, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. DETERESA. Mr. Chairman, and members of the committee, thank you for inviting me to report on one of several force protection efforts that we at the Lawrence Livermore National Lab have been conducting under the joint sponsorship of the Defense Advance Research Projects Agency, or DARPA, and the Lawrence Livermore Lab.

DARPA and Lawrence Livermore Lab have a history of responding quickly to urgent matters of national security, and we are privileged to have the recent opportunity to support our service men and women engaged in the Global War on Terror.

This morning, I will describe our work to develop and field armor kits to convert cargo trucks to gun trucks for convoy escort and other missions requiring a mobile weapons platform. We have been engaged in this work at the request of this committee since December of 2003. I am happy to report that our efforts have already helped to save lives.

This project has truly been a joint effort, and the work I am about to describe is that of many dedicated and hardworking Livermore Lab employees and consultants, DARPA program managers, Vietnam veterans, Army personnel and civilians, and U.S. Industrial partners.

The concept of the gun truck was developed over more than five years of wartime experience in Vietnam. We saw many parallels between the need for these mobile weapons platforms in that conflict and in the current conflicts. Our work to develop a modern version of the gun truck began where Vietnam left off. And we were fortunate that much of the knowledge gained in this former war is preserved in the Fort Eustis Transportation Museum and in the memories of the close brotherhood of Vietnam gun truck veterans.

Allow me to describe the details of this project using the presentation slides that you have before you.

In your first slide, and in the poster over to my left, you will see an example of a gun truck, and I will take the time to describe what that is. As I mentioned, it is a cargo truck that is converted with add-on armor into a mobile weapons platform. It involves armor for the cab and an armored box that is on the back of the cargo truck with multiple weapons. The reason we use a cargo truck is that it can handle the excess weight which is within the capacity of the truck, and the primary purpose is for convoy escort and other defensive missions.

On your second slide, you see a summary of where we are to date. Although small, we have made an impact. There are 31 5-ton gun trucks in Iraq, and they are saving lives. And we believe more are needed.

The CHAIRMAN. Now, Dr. DeTeresa, if you can put the picture of that gun truck back up there for one second. And we have got a picture of one of those trucks that was hit by an IED, is that your—that is, the Ironhorse effort took a heavy IED. And I saw the report from the driver who said that all seven personnel walked away with no injuries. That box is double hold, is it not?

Dr. DETERESA. That is correct.

The CHAIRMAN. So you have got two layers of three-eighths-inch-high hard steel, separated by about eight inches?

Dr. DETERESA. There are two layers of steel, and then there is also ballistic fiberglass.

The CHAIRMAN. And explain why you have the steel and the ballistic fiberglass on the inside of that box.

Dr. DETERESA. Well, it provides additional protection, both from IED threats and small-arm threats. And the inside fiberglass is a small shield, so it is a very effective combination of materials.

The CHAIRMAN. So you have got two layers of steel, approximately three-eighths-inch, eight inches apart, and then you have got an inch and a quarter of E glass inside that interior wall. Is that right?

Dr. DETERESA. Yes.

The CHAIRMAN. Now, explain the ballistic glass along the top. I think this is instructive, as we go into the future here, in putting these armored systems together.

Dr. DETERESA. Well, this is one of the things we have added to this design since the Vietnam era. We were most interested in providing protection for the gun crew from the IED threat, and so what we have added is the transparent armored windows that you see on the sides of the box, allows the gun crew to have watch and have high situational awareness and yet be protected.

The CHAIRMAN. Now, you will notice that my colleagues, most folks in this committee, have been to Bethesda and Walter Reed; we have looked at the casualty reports fairly extensively. A lot of the casualties are the gunners. In the case of the Humvee, it is usually the gunner who catches—who is in the blast plane and catches that fragmentation in the face, head and neck. And it is similarly, if you are in a truck, if you are standing up, even though you are actually a little below some of the blast planes, if that IED is close to the roadbed itself, the ballistic glass allows you to look out, to have the situational awareness without catching that fragment when that IED blows. And that is an area where I think you

folks can do some real—give some real help to the Marines and the Army with respect to their Humvees because the Humvee troop carrier has a 4-foot high or so steel high-hard or RHA steel sides to it, and if we had a slotted 12-inch high ballistic glass plane that we could slide over the rim, just like those ballistic glass panes on the rim of a gun truck, that would allow your folks that are riding in the troop carrier version of the Humvee to look out, to have what they call situational awareness and not catch the fragment from that initial IED blast.

So is that—and I want to—when General Mattis comes up, we have talked about that a little bit because he has been head of the first division in a hot area, and I want to talk to you a little bit about that, General Mattis, to see if there is not—you have at least initially expressed support for that type of a ballistic glass apparatus to put on the Humvees. In fact, I will tell you what, why don't you come up right now while Steve DeTeresa is here. Come on up, we are an informal bunch here.

General Mattis, you have been the commander of the First Marine Division during some very severe fighting and in a very severe IED environment in the Fallujah AO. What do you think about the—first, about the adequacy of the Humvee troop carrier, but also the prospects of having a glass rim, a ballistic glass windshield along the top of that troop carrier?

General MATTIS. Sir, the glass can only help. What we cannot do with these armor solutions is encase the Marines and soldiers so well that they cannot see what is going on outside. Much of their survival depends on identifying the threat before they ever get to it. At this time, we are finding anywhere from 40 to 60 percent of the IEDs before they are detonated. That has a significant impact on the reduction of casualties.

Glass like this can assist greatly because the armor, while it is best—if something goes off, you have armor between you and the blast—but, eventually, you get to the point where the lack of observation actually has the opposite effect behind the armor, actually increasing your vulnerability.

The CHAIRMAN. So anyway, Steve, if that is the case, General, if you had a rim, a 1-foot high glass rim around the troop-carrying Humvees in the back, that obviously would give you that ability to look out it, yet not catch the full—that blast in the initial IED explosion.

Mr. DeTeresa, is that something that you folks at Livermore could fabricate fairly quickly for testing at Aberdeen?

Dr. DETERESA. Yes. We have actually thought about that design, so we could work on that quickly.

The CHAIRMAN. Could you have a prototype in a week or so?

Dr. DETERESA. I would give it a little more time than that.

The CHAIRMAN. Okay. Well, please proceed, Mr. DeTeresa.

And General, hang tough right where you are at; you may want to comment on some of his testimony here, if you could.

General MATTIS. Yes, sir.

Dr. DETERESA. We will go back to the truck that we see on our left that we have in front of you, which was the 5-ton gun truck called the Ironhorse, which took a hard hit from an IED. As we heard, all the crew members survived with relatively minor injury.

And then the other feature of the truck—the truck was damaged beyond repair, but all the armor was recovered and has been moved to a new truck. And it is back out on the road. That is part of the design of the kit that we have.

The next poster we would like to show is an example of what we heard before, the troop-carrier version of the box made from the Stryker steel. It is a lighter version, so that you can take the weight with troops in the back of the cargo truck. This vehicle was also, at least in one case, subjected to an attack by a car bomb, a vehicle-borne IED. And we have another poster that shows the damage to the truck. And again, all crew members survived.

I think that this points out that with relatively simple armor kits, especially with these heavier 5-ton gun trucks, that we can save lives pretty simply.

Mr. SPRATT. Mr. Chairman, one question, were all of these adaptations made in the field?

Dr. DETERESA. The kits were sent to the field and were assembled in the field, but the kits were designed here and tested thoroughly at the Aberdeen Test Center.

The CHAIRMAN. What is the thickness of that Stryker steel that you have got in the back there, Mr. DeTeresa?

Dr. DETERESA. Actually, that is something I do not recall exactly. I believe it is a little bit over a quarter-inch thick, as I remember; but it has got additional armor with it.

The CHAIRMAN. Okay.

Dr. DETERESA. We have jumped around a bit, and if we are going to follow my package of——

The CHAIRMAN. Go right ahead, Mr. DeTeresa. Reassemble and continue to present.

Dr. DETERESA. Let me point out on slide number five, which you have in front of you, what we have is a comparison between an up-armored Humvee and the 5-ton gun trucks. And let me tell you up front that we have always believed—and we still believe—that the best convoy escort is provided by the combination of these vehicles, not one or the other. And that is based on the experience in Vietnam, and it is based on things that we are seeing today.

The up-armored Humvee obviously gives you the nimble vehicle that is able to move around as a commander vehicle and a scout vehicle. But the 5-ton gun truck, by virtue of the fact that it can handle the additional armor and have multiple weapons, provides a much more serious convoy protection platform. And there are many things we have compared here, but in the end, I will save some time and say that both will make the effective convoy escort as we have seen in Vietnam.

We have one last poster which is an example of 5-ton gun trucks that were being made—we call them homemade gun trucks—that were being made in the field. Pointing out that the troops recognized the benefit of using a 5-ton truck for armoring and providing escort to convoys.

This was one of our motivations. When we saw this, we said, we can do better; we can provide them with a very good kit that is easy to assemble and provide substantial armor protection, knowing what we know from the history of Vietnam. So that is where we got to in our efforts was to improve that situation, recognizing

that this was something that was needed and was actually being developed by the troops in the field.

The CHAIRMAN. Mr. DeTeresa, was that one of the ones assembled at the Mad Max shop—what they called the Mad Max truck in Balad?

Dr. DETERESA. Stunt Works is the other name. I am not sure where this one came from, but actually, I believe there are several kinds of those facilities around the country where people are doing this.

I would like to skip all the way to our various view graph, which is our timeline for the project. I just want to go over a few points.

I mentioned that we started this work at the request of this committee. That was back in December of 2003. In the first phase of this, in the matter of the time period from January—end of January to April 2004, we had designed, built and tested at Aberdeen Test Center the first prototype, so we were ready to go. Over the next few months, there were lots of discussions about requirements and features that were needed to send the kit into field, and the committee helped to expedite that.

And finally, in July, we were able to send the first prototype, which was well received by the unit, and soon after, we received an operational needs statement requesting 28 more kits. To meet that, we pursued funding, and again, the committee helped and introduced us to some of the DARPA efforts. And jointly with DARPA, we got the funding to build the 30 kits actually that we sent, and that was done over the time period from October to December; we built and fielded those 30 kits. They were built over a period of time from the end of December to January, and now, all 31 are on the road, including the ones you have seen in some of the posters here.

The CHAIRMAN. Mr. DeTeresa, what type of weaponry will the gun truck accommodate?

Dr. DETERESA. Typically, a gun truck handles crew served weapons, machine guns. And that is the purpose of this. As a mobile weapons platform, you want substantial firepower on the back of these trucks, meaning multiple weapons. And I actually have a slide, but I will just describe that now. The reason for multiple weapons—and for reference, it is number nine—besides the greater firepower, you have got redundancy in case of weapon malfunctions, which does happen, and you are able to repel simultaneous attacks in different directions. So to make a true gun truck, you really need multiple weapons. And actually, that has been a little bit of an issue with the folks who have our gun trucks over there. They have a hard time getting the multiple weapons.

The CHAIRMAN. But it takes 50's.

Dr. DETERESA. Fifty calibers are preferred, but smaller-gauge weapons are also useful.

The CHAIRMAN. Okay.

Dr. DETERESA. If we skip to ten, one of the things I wanted to highlight is the fact that we have tested this thoroughly at the Aberdeen Test Center. You will see examples of the prototype box, which was subjected to a live IED test. And you will see holes in the side of the armor. You will see damaged ballistics windows. The result of all that was nothing got through the box. This is sub-

stantial. And any of the typical IEDs that we see out there will not penetrate this armor. So it is a very simple design and a very effective one.

And in addition, they have also tested the armor against RPGs and minimized the impact of an RPG by stripping all the attending frags and minimizing any of the blastings effects. So, again, by virtue of the fact that this is a cargo truck that can handle a substantial weight, there is nothing magical about the armor system. It provides very substantial protection.

I would like to skip to number 12, in the interest of time, again, to again point out that there are 31 of these gun trucks in the field and to point out also that the feedback on these has been very positive. We have had comments from the gun crews that they feel much safer and they feel well protected and that these are clearly superior to anything they have used before.

One of the other satisfying things about this is that the crews and the troops that are engaged in this, providing feedback and suggestions for improvement, and we strive to continue to improve the design and make this a better weapons platform for the troops.

And 13, I think it is important to acknowledge many of the DOD organizations that have made this possible, provided a lot of critical support. First of all, the U.S. Army Developmental Test Command and their sub-organization Aberdeen Test Center was instrumental in all the ballistic and road testing and actually helped with some aspects of the design. And those folks were hardworking folks who did a lot of work to get our kits up to speed and sent out.

The Army Research Lab has always been our partners in looking at armor materials and performance, and they have provided a lot of valuable input. We have not talked about it, but the cab kit that we designed was actually based on an initial design by the U.S. Marine Corps. And this is at the Albany, Georgia, Logistics Base for the 923 truck. They shared that design with us. We improved it and provided that for the field.

And then the Tank and Automotive Command of the U.S. Army was helpful in expediting these kits to the field when we got to the point where we could ship.

So what I would like to do is summarize with 14 and say, we have produced a kit which is relatively inexpensive. I did not mention the number, but $40,000 will provide a full gun truck kit, which includes the cab armor. It is a highly effective and highly survivable mobile weapons platform. And we believe that the combinations of these gun trucks and up-armored Humvees are the right vehicles and the right combination for convoy escort. I will also mention that these trucks are also valuable for troop transport and perimeter and checkpoint security.

If I may, I would just like to make a closing statement. I would like to thank you for the opportunity to discuss this element of force protection and also to thank you for your continued support and concern for the safety of our men and women in the military. Thank you.

The CHAIRMAN. Thank you, Mr. DeTeresa. And thanks for laying that out. I thought that was a good context to bring up our next panel. And so we are going to move, without further ado, to—we

will bring our next panel up. And we will have—and we are going to get, for the committee, the state of armor in the theater, where we are at, what the production rate is, and how far away we are from completion.

And General Mattis, if you want to stick around right there, I think we have got enough chairs, or you can move back to an observation post, whichever you want. Why don't you hang around there as we bring up General Joe Votel, who is director of the IED Defeat Task Force; General Jeff Sorenson, United States Army Deputy for Acquisition and Systems management; and Brigadier General William D. Catto, United States Marine Corps Commanding General, Marine Corps Systems Command?

Come on up, gentlemen.

General Sorenson, you are going to lead off here.

STATEMENT OF BRIG. GEN. (PROMOTABLE) JEFFREY A. SORENSON, DEPUTY FOR ACQUISITION AND SYSTEMS MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY (ACQUISITION, LOGISTICS AND TECHNOLOGY)

General SORENSON. Yes, Chairman Hunter, Congressman Skelton, and distinguished members of the committee, thank you for this opportunity to provide you an update to the status of current force protection programs.

Since our journey began in August 2003, we have increased the number of armored vehicles deployed to theater by a factor of over a hundred fold in 18 months. This serves as testament to the tremendous support of our industrial partners, our government program management offices and their supporting engineer and logistics centers, and our test community.

We have also increased delivery of body armor, IED countermeasure systems and changes in tactics and training to provide a holistic approach to enhancing the force protection capability of our deployed forces.

Your support to provide resources to fund our efforts is greatly appreciated, and with your continued support, including quick passage of the FY 2005 supplemental, we will continue our efforts to satisfy theater force protection requirements in an expeditious manner.

Following my other colleagues' introductory remarks, I will discuss in detail our current armor status with the charts that have been provided to you and will be ready to answer any questions that you have. Thank you.

[The joint prepared statement of General Sorenson and General Votel can be found in the Appendix on page 82.]

The CHAIRMAN. Okay, thank you very much.

General Catto.

STATEMENT OF MAJ. GEN. (SEL) WILLIAM D. CATTO, COMMANDING GENERAL, MARINE CORPS SYSTEMS COMMAND, U.S. MARINE CORPS

General CATTO. Chairman Hunter, Congressman Skelton, honorable members of the committee, thank you for the opportunity to appear before you to discuss the state of vehicle armoring in the

Marine Corps today. I am accompanied this morning by my Deputy Commander, Mr. Barry Dillon.

As you may remember, the Marine Corps forces departed Iraq for the first time in October of 2003. At that time, none of our tactical wheeled vehicles were equipped with armor. A month later, in November, we received confirmation that as part of Operation Iraqi Freedom II, we would return to Al Anbar province, which includes Fallujah and Ramadi.

When one of our forces took responsibility for this province in March of 2004, 92 percent of their 3,049 vehicles had armor installed. Armor was available in Kuwait for the remainder of the vehicles, but operational timeline did not allow for installation prior to crossing the line of departure. As operation tempo allowed, the remaining vehicles were armored.

I am pleased to be able to report to you today that 100 percent of our wheeled vehicles involved in combat operations in Iraq, Afghanistan or the Horn of Africa are equipped at a minimum with zonal two, level two armor.

The current wartime environment is ever changing as we face a thinking, adaptive enemy. Therefore, we continue to address the immediate and anticipated needs of our warfighters in theater in multiple ways, ensuring that we design, fully test and manufacture armor solutions that perform well while at the same time ensuring that it does not severely degrade the operational capabilities of existing vehicles.

Each successive armor enhancement has been designed and vetted with the operational forces in the fight. Our vehicle armoring program has evolved over the last 17 months through now three generations of armor.

The first generation consisted of level three protection, comprised of commercial, off-the-shelf components or three-sixteenths-inch high hard-armored steel doors and flanks. At that time, they were the best available material solutions.

Our second generation, offering level two protection, consisted of three-eighths-inch rolled homogenous armored zonal kits. By August 2004, 100 percent of our vehicles had this type of armor.

Our current or third generation marine armor kit consists of integrated components offering enhanced level two protection as can be seen in your handouts and the display boards. By addressing the details of our armoring strategy in my written statement for the record, I would like to specifically highlight the most recent measures we are taking in theater.

Since mines are a growing threat, we are expediting the delivery of Marine armor kit underbodies for organizational or battalion level installation into 400 Humvee A2s. Production of these underbodies will be completed in the next 30 days. Within the next 60 days, we expect to complete production of underbodies to upgrade the armor of our 5-ton medium trucks and logistic support vehicles.

Additionally, with the assistance of the Chairman and his staff, the Defense Logistics Agency in Kuwait has made available up to 450 sheets of 6-by-6-foot rolled homogenous armor for use in theater. The Marine Corps Logistics Command, which is our depot, has completed its assessment of this material to determine the best and most expeditious and effective means for in-theater cutting and in-

stallation of this steel for use as rocker panels of our base Humvees and sustainment for 5-ton truck underbodies.

The operational tempo determines the rate at which we can pull our tactical vehicles out of service to install upgraded protective solutions, therefore, we are continuing looking to identify production and installation capabilities and opportunities to enhance the speed and production and installation without degrading operational force capabilities. A perfect example is our armor installation facility established at Camp Al Taqaddum in Iraq.

Finally, with your continued support, enabled by speedy passage of the fiscal year 2005 supplemental, we can continue our efforts to quickly meet emerging vehicle armor protection requirements to stay ahead of an adaptive enemy. I will be happy to answer any questions that committee members may have.

[The prepared statement of General Catto can be found in the Appendix on page 90.]

The CHAIRMAN. Thank you.

General Votel.

STATEMENT OF BRIG. GEN. JOSEPH L. VOTEL, DIRECTOR, JOINT IMPROVISED EXPLOSIVE DEVICE DEFEAT TASK FORCE, HEADQUARTERS, DEPARTMENT OF THE ARMY, OFFICE OF THE DEPUTY CHIEF OF STAFF, G3

General VOTEL. Yes. Mr. Chairman and Congressman Skelton, thank you very much for the invitation to be here today, and members of the committee. Sir, we would also like to express our thanks to Mr. Bob Simmons and Mr. Norm Morris on your committee who have been so instrumental in helping us breakdown obstacles in fielding these devices that we are going to discuss this morning. Thank you very much for that.

You are aware, from our previous classified discussions, the sensitivity of the area in which we are talking this morning. I am going to do my best to answer all of your inquiries as part of my presentation——

The CHAIRMAN. You can keep it as general as you want to, General.

General VOTEL. Thank you, sir.

We are continuing to make progress in a number of areas, but as you noted and as we agree, obviously, there still is much to be done. There are still many soldiers, Marines, airmen and sailors who are being injured by these devices, so we continue to focus in on this area.

I look forward to updating you and members of the committee here on this particular area of our holistic approach, electronic countermeasure devices, following my counterparts. Thank you, sir.

[The joint prepared statement of General Votel and General Sorenson can be found in the Appendix on page 82.]

The CHAIRMAN. Okay. Thanks. And we will move—and I apologize to other members for taking so long to move through our first two panels to get to questions, but I think it is important to set the stage and understand what we have.

General Catto, one question on this. The underbody steel that we are going to put on the Humvees operating in the western AO there where we are taking some triple stack mines, at this point,

they were going to—they had the armor, the RHA, available in Kuwait. Do the Marines have possession of that right now, that steel?

General CATTO. Chairman Hunter, I just talked with the folks at DLA. They have given us 450 pieces of the armor. We are looking now at how are we going to cut it and get it there. The plan is to do it as rapidly as we possibly can. In fact, I talked to General Payne this morning at our depot about how we are going to do that.

The CHAIRMAN. Are you going to cut it with the equipment that they have got in Kuwait? They have got that heavy machinery that is available to cut it in Kuwait. Are you going to move it up in already cut pieces?

General CATTO. We will cut it to size there, prepare it and then move it up so we can install it at the battalion level in western Iraq, so they do not have to do the work, other than installation.

The CHAIRMAN. How are you fixed for plasma cutters and the requisite attachment stuff, your bolts, your nuts, the accessories? Do you have plenty of those?

General CATTO. I think, at this time, we are fine; if we are not, I will let you know and ask for help.

The CHAIRMAN. Okay. Gentlemen, if you could just give us very quickly—and then I want to move to Mr. Skelton—the percentage of Humvees that are level one, and that is obviously, that is the 1114, that is the manufactured Humvee, the percentage of those that are in theater and the percentage that are level one, as opposed to level two and three. Have you got that basic info, General Sorenson?

General SORENSON. Yes, sir. If I can refer you to the spreadsheet charts that are in your packet there, the first one entitled, Armor Summary. If you go to the top line, identified as UAH, meaning up-armored Humvee, this is the 1114 series you speak of. And today, as of the 28th of April, the latest report out of the area of responsibility (AOR) is that they are at almost 80 percent full of level one requirements for the up-armor Humvee.

With respect to add-on armor kits for the Humvees——

The CHAIRMAN. Now when you say, "of the requirement," what does that mean in hard numbers?

General SORENSON. Sir, if you, again, go across here—if I can refer you to the spreadsheet that we passed out. You have the AOR requirement, which at this point in time is 10,079. Now that was an increase just identified here at the end of March. The previous requirement was 8,105, which was in August 2004, and to date, as we have predicted before, we were going to complete that requirement here in the May timeframe. However, because of the fact that the requirement has increased, we are now projecting July 2005 that all up-armor Humvees and 1114s——

The CHAIRMAN. So you will have how many in theater at that time?

General SORENSON. At that time, it will be over 10,000.

Mr. REYES. Mr. Chairman, I have a question. When you refer to the area of operations, you are referring to the areas of both Iraq and Afghanistan?

General SORENSON. That is correct.

The CHAIRMAN. General Catto, same question.

General CATTO. The up-armor Humvees?

The CHAIRMAN. Yes.

General CATTO. We have 37 of the foreign variants that we bought very early when we went into Iraq back in March. We also have over 475 M–1114s that we have received through Multinational Corps Iraq that have come through the joint community for our use. Additionally, we have 498 that are on order today, and as the production capability ramps up, we will be receiving them.

I would like to stress one thing, also. As we work through the M–1114 shortages, the joint community and the Army have been very helpful with trading assets for us in terms of, the guys who need it the most got the assets.

The CHAIRMAN. So in theater, you have received up-armored Humvees from Army units and other parts of Iraq?

General CATTO. 475 that have come from Multinational Corps Iraq and the joint community that have been parceled out to us through the Army productions.

The CHAIRMAN. Okay. General Mattis, do you have any take on how many Humvees you have got in our AO in Iraq? How many were in the Fallujah AO?

General MATTIS. Mr. Chairman, you are aware that I departed Iraq about six months ago, but it is around 2,675 is our latest reporting, sir.

The CHAIRMAN. That is a total Humvee pool.

General MATTIS. Yes, sir.

The CHAIRMAN. And how many of those are fully up-armored? Maybe General Catto has got that.

General CATTO. Well, we have 100 percent of our A2s and baseline Humvees are armored at level two with the zonal kits, and they have been that way since August of 2004.

The CHAIRMAN. Okay. But how many of those are at level one, which is the up-armor?

General CATTO. 475 that we have had loaned to us through the Multinational Corps Iraq, and the 37 foreign that we bought very early in the campaign when we went back.

The CHAIRMAN. Okay. Thank you.

Gentleman from Missouri, Mr. Skelton.

Mr. SKELTON. I will ask just one question—any of you can answer this. I am privileged to represent Jefferson City, Cole County, Missouri. A National Guard unit was activated and given orders to go to Iraq. Through local funding and local steel, that was cut to specification and later approved by Aberdeen, their vehicles were later armored. What other examples have you—and I notice you have not mentioned any such situations—how many other examples of local self-help have you experienced in helping soldiers, Marines, National Guard, Reserves up-armor the vehicles for the young folks who are being deployed? Any of you.

General SORENSON. Sir, I will try to answer that question first.

I think there have been a number of examples where people have gone to the local communities and tried to acquire some steel to put on their vehicles. We have been aggressive in pointing out to them that if the right steel, right composition of steel, whether it is RHA, the rolled homogenous armor or the high hard steel is not

applied, then, in an IED incident, they may be causing more problems than solving.

We have, I think at this point in time, gotten ahead of the byway with respect to putting armor on vehicles. As you will note here in the data that was provided, in many cases, we are over requirements in terms of being able to satisfy what is necessary. In fact, we have at this point in time with respect to a total of armored vehicles, we have at this time 36,000 vehicles that basically have the armor. Now we are in the process of changing out the level three, which essentially was the headquarter's, Department of Army approved, steel provided to units, provided to theater to put on vehicles and replacing that with level two, which is a more hardened with ballistics glass capability for the units and for the vehicles.

Mr. SKELTON. I merely say I am proud of the citizens of Jefferson City that took it upon themselves when the military was not up-armoring the vehicles at that time.

The CHAIRMAN. I thank the gentleman.

The gentleman from Colorado, Mr. Hefley.

Mr. HEFLEY. Thank you very much, Mr. Chairman.

Well, you know, it seems obvious that the IEDs are the big threat, and that is what we are talking about armoring against. And we have made huge investments in defeating the radio frequency detonator IEDs with the use of jammers. So the enemy adjusts to our technology it appears and are now beginning to use more and more hardwired—or at least that is my information, you can correct me if I am wrong on that. And I would like to know what we are doing to defeat the high hardwired threats. And also, have we explored the use of spectral contrast or terrain analysis to find these hardwired devices before they can be employed?

General VOTEL. Sir, I think I can address that one for you.

Certainly, we can characterize the enemy by being very adaptive, very smart, very learning, very innovative in what he is doing. And it is very clear to us from watching him and studying him that he watches how we base our operations, attempts to learn from those and then attempts to exploit what he thinks are vulnerabilities. In theater, the radio control device, initiated device, does remain the primary threat that we are seeing. We have seen him do some other things and move to, as you have suggested, some of the hardwired capabilities.

In general, some of the things that we are trying to do, working with the services in helping us, is use some of our aerial platforms, be they from an aero stat or from a UAV or from some other type of fixed wing aircraft, to help us with change detection technology that will allow us to identify anomalies on the ground that will help us identify where these devices are in place.

We are also pursuing a strategy for persistent surveillance, things like NS microwave, the JLENS Raid Aero stats and towers that we are moving in theater that provide us long-term persistent surveillance over the high likelihood areas where IEDs are placed so we can provide the long-term persistent stare, if you will, that allows us to see what is happening there.

And then I will tell you that I think the third thing that we are doing is really helping focus on training for our soldiers and Marines. A key piece of this, of identifying any anomalies on the

ground, really exists in the eyes of our soldiers and Marines who are on patrol, be they from vehicles or on their feet. They clearly are our best sensor. So what we are attempting to do is make sure that we have provided the best information and provided the most relevant current training and situational awareness so they understand the environment that they are going into and, more importantly, they understand the enemy that they are fighting and how he operates.

Mr. HEFLEY. I see the light is still green, and let me ask one other quick question.

How did we get ourselves in this position? Did we have no idea going in there that we would need armored vehicles? Are we surprised that the IEDs became such a big deal?

General CATTO. If I may, Congressman Hefley, remember this has been an evolving theater. When the Marine Corps went back in Iraq in early March, the threats were 60-millimeter, 81-millimeter mortar kinds of rounds. That has evolved from the lower kinds of munitions, 122- to 155-millimeter artillery shells to 500-pound bombs, to double-stacked anti-tank mines, et cetera.

As we have added armor, they have added greater explosives, so as General Votel discussed, it is not just one solution, it is a combination of good tactics, training and procedure with our soldiers and Marines on the ground. It is using aerial assets such as UAVs, fixed-wing assets, EA6s for our electronic countermeasures in the air; and it is using IEDs and things like explosive-sniffing dogs.

It is a game of improvements, changes, counter improvements, changes. So there is no one solution.

General MATTIS. Sir, if I could take a stab at that, as well, if I were to sum up what I learned after 30 years in this business, all combat is one improvisation after another. That is all it is. The enemy has not made all of its adaptations because they wanted to; they have been forced into positions.

For example, when we found their hard wires, the initial way they set off IEDs, they went into direct attacks with small arms. That didn't work out well for them, so they had to adapt again. They went for the radio frequency. You are aware from closed sessions what we have done to check and checkmate those, and we forced them into other indirect fire modes.

But this is combat, and this is a thinking enemy up against us. We are out-thinking them and we will continue to out-think them.

I will tell you that something as small as a rifle scope that we are putting on every Marine's rifle, thanks to the money provided by the Congress, has turned out to be very helpful in spotting those little antennas and the red wires going off into the ditches and that sort of thing.

It is a very complex issue. We improvise better than the enemy improvises; but it is a bloody issue, and we have to keep improvising to stay ahead of it.

The CHAIRMAN. Thank you.

The gentleman from Massachusetts, Mr. Meehan.

Mr. MEEHAN. Thank you, Mr. Chairman. Thank you very much, Generals, for appearing.

General Sorenson, a recent GAO study found that the Army has been consistently unable to meet reoccurring spikes in demand for

up-armored Humvees and add-on kits, which obviously is a surprise to members of the committee who have worked hard on this, including the chairman.

The GAO faulted the Pentagon for the shortfall, because it didn't ramp up armor production to the maximum level. It also pointed out that the Pentagon didn't release funds in a timely and predictable manner, even though money had been appropriated and was available.

The GAO recommended several actions for the Army to take. They recommended that the Army update its war reserve requirements at least every year to account for change in operational tempo; and second, develop computer models that can estimate supply requirements to deploying units as part of prewar planning.

Can you comment on what the Army is doing to follow up on those GAO recommendations?

General SORENSON. Yes, Congressman. Let me give you some insight into what we are trying to do as we go forward here in planning for future contingency operations and future operations.

To date, what you have found in many cases as we tried to ramp up, as previous Congressmen asked the question, Did we not know what was going on, after the March to Baghdad, there was clearly a need and an interest in the theater commanders to move to a more motorized force. As the motorized force was becoming more apparent on the streets, the enemy began to take advantage of it and began to attack us with IEDs.

Subsequent to that, we began to try to do what we could do with the vehicles we had, such as the M–1114, such as putting armor on trucks, trucks that were never designed to carry armor in some cases, and so we had to go through a lengthy process to do that.

What we have learned from all this activity is that in the future, we are going to be fighting as an expeditionary Army, we are going to be fighting as a modular force, and we are going to be fighting an asymmetric enemy. In order to contest that, we have to be more flexible. So as a consequence of what we are doing right now with our trucks and vehicles is developing an armor strategy by which we will put armoring into the chassis—armoring into the ballistic glass, armoring into latches, armoring into the frame, increasing the engine capability such that a vehicle would be almost like a chameleon.

In an operation in terms of the move to Baghdad, where speed was more of the essence, maybe you don't need the armor, but as you go into stability operations, because that chassis, because the engine, because the latches, because the glass are there, we then hang the armor package on it; and it now becomes, as opposed to an unarmored vehicle that was needed to, if you will, proceed quickly, an armored vehicle that now conducts stability operations.

That is what you are going to see in terms of the future. And we are working at that right now with the consortium of vehicle contractors and working through at this point in time through fiscal year 2006, beginning to let contracts for these kits that can be added on to the vehicles in the future.

Mr. MEEHAN. General, how much of the fiscal 2005 supplemental does the Army intend to use to purchase these M–1114 Humvees?

And it was my understanding that the Army is planning a transition from the M–1114, the fully armored, to the M–1151 version. What is the Army's plan for purchasing fully armored 1151 Humvees with both the underbody and the perimeter and overhead kits? And how many and when?

General SORENSON. Sir, as we talked, as I was just mentioning, we are going to buy the 1114s. We are going to buy about a thousand 1114s through this next year. As we transition to what we call the 1151–1152 vehicle, we will be procuring those that will essentially have the frame, have the engine armored with an underbody protection capability such that we can add these packages on. And the intent is to move from the 1114, which is basically a standard armored vehicle that at this point can only conduct stability operations to the point where we can get a vehicle both to do combat operations and then stability operations.

Mr. MEEHAN. General Votel, I am concerned the Army has not fielded the best jammer technologies for the troops in Iraq. The Army has spent $140 million sole-source contract to procure the older Warlock jammer systems which have limited effectiveness. At the same time, you are investing $500 million in a competitive program for rapidly developing, proving and fielding the next generation of jammer technologies.

How do you balance the immediate needs of our troops with investing in what I think will be a more proven technology for the future?

General VOTEL. Thank you, Congressman.

That is a difficult balance, and it is one that we are constantly looking at. What is the overriding factor for us is trying to provide protection to our soldiers and Marines and forces deployed right now and trying to address the immediate requirement; and that is what is taking priority for us.

So we are at the same time developing a next-generation system, if you will, which is in testing as we speak here. We are also continuing to procure some of our legacy systems that are currently fielded. We are looking at ways to take systems that we have in the field and give them additional capability, and then we are doing things, as the chairman identified here, of putting out rapidly developed, low-cost systems that can address a portion of the threat.

Mr. MEEHAN. Mr. Chairman, I just want to compliment the General, you and the task force's use of the Backscatter x-ray imaging for force protection in Iraq. I am familiar with that; there is a company in Massachusetts that I have visited, and it is a source of pride to us, and I am just happy to see that Backscatter x-ray imaging.

General VOTEL. We have had two reports in the last two weeks where the Backscatter, the van model, has actually helped us identify vehicle borne IEDs (VBID), giving indication to a soldier and/or a Marine in each situation, and allowed us to deal with that in another manner.

The CHAIRMAN. I thank the gentleman.

The gentleman from Pennsylvania, Mr. Weldon.

Mr. WELDON. Thank you, Mr. Chairman. And I thank you for appearing here. I apologize for having had to go out and back, but

I had a number of other things going on, like our colleagues do. But this is an extremely important hearing to all of us, and to me personally as the chairman of the Tactical Air and Land Forces Subcommittee.

As you heard me say in my opening statement, I am not a happy camper right now. I am embarrassed and I feel let down. I feel let down because the responsibility of this committee is to oversee the safety and services of our military personnel when they enter harm's way, and they have done that. It was this committee that stepped out ahead of this Administration a year ago, saying we could not stand for the budget that was being requested which called for a cut in the Army's net funding for this year. And we requested a $25 billion supplemental when the White House didn't want it.

It was this committee who saw the need to provide additional support for our troops, and we fought that battle even though we knew that it would cause us problems personally in the case of the members on this side of the aisle with our Administration, but we did the right thing.

It was this committee back in 1996 when the Pentagon said they didn't want to arm the Predator. It was this committee that put language into the defense bill that called for the armoring of the Predator when the services did not request it, and we had the vision to see. And three, four years later everyone took credit for what this committee had done, even though the first year we did it in a bill that was blocked by the Pentagon.

And so I come to this hearing with a sense of outrage. I can't tell you the number of homes I have sat in with families whose soldiers have come home in body bags. I know you take the loss of any life seriously. I sat in the home of a young Marine in Bridgeport, Pennsylvania, who had just married before he went in; and I tried to console his wife and his parents.

Last week, I was at another event for a soldier that fell in January, and I was with his brother, who is still serving in Iraq, and his parents. And like our colleagues here, we have to live with this, and we take it very seriously.

When we think and have been told that a problem has been resolved, or is being resolved, then we believe that. This staff director should not have to go out to companies to double-check whether or not they are doing what they said they would do, but we did it.

And I would thank you, Mr. Chairman, for the documentation—and I would urge all of our colleagues to look at that to give you the complete assessment of what this committee has done on this issue of armoring and providing personal protection for the troops. We will take a back seat to no one in that support.

But what really offends me, and I have to say this to my Marine Corps friends—and you remember very well my first term in Congress; I fought the Administration and I fought the current Vice President and led the effort to restore the V–22 program, which took us 12 years. You know I was in the forefront of that, and it was tough; but we won the day because it was what the Marines deserved to have to provide the over-the-horizon medium lift capability they needed.

I am absolutely overwhelmingly offended when I read reports that a Marine captain, Kelly Royer, commander of E Company, a company that suffered the largest casualties of any company in the theater the six months they were there, is perhaps being railroaded out of the Corps because he simply spoke up about the troops that he was leading.

Now I am not going to perceive to know who Royer is. I have no idea who the guy is. I never met him; I never talked to him. But I do know he came out and publicly spoke out about his frustration with his company not being properly protected.

Instead of what I think should have been the proper response, which was to have everybody join in and fight the system and demand that the work be done to protect those troops, it appears as though—it appears as though he is being singled out now, even though past reports of his career, which I read into the record and I am going to read into the record again, were positive.

"On May 31, 2004," his fitness report and I quote, "he has singlehandedly reshaped the company in sore need of a leader, succeeded in forming a cohesive fighting force that is battle tested and worthy," unquote. Those are pretty strong words. And then I have other quotes that I assume came from his personnel file.

Now he is being found to be dictatorial with no morale or motivation in his Marines. Perhaps it is just coincidental that the one report was before he spoke out and the second was after he spoke out. But I am going to tell you, as one Member of Congress, I am not going to sit still until we find out. If it can't be done in open session, then we want a closed session.

Will you tell us why the reports about Captain Royer have been changed?

And so, General, I would ask you and the public to tell me, do you have any indication that there is any attempt to punish directly, or indirectly, Captain Royer for having spoken out about the problems of E Company?

General MATTIS. Congressman Weldon, I can assure you, I can unequivocally state that this has nothing to do with him speaking out. I used to speak to Captain Royer probably on a several-times-a-month basis. My headquarters was in Ramadi. I didn't focus on it any more than the other places.

But you know, sir, have you ever been disappointed when you found out something that you didn't know what was going on? When NCOs come forward, when sergeants come forward with a concern, I have always found it very well advised for an officer to dismiss the NCOs' concerns. The pressures, as some of you who have served, the pressures you understand on company and battalion commanders in the midst of a tough fight are beyond my ability to explain them.

Take one of our most articulate associate justices of the Supreme Court, Oliver Wendell Holmes, Jr., who was an infantry officer in the Civil War; and he said—speaking to his fellow veterans many years after the war, he said, "We have shared the uncommunicable experience of war."

So I am probably not going to articulate it well, sir, but I would tell you the last thing that any commander, any battalion commander, ever wanted to do—and the battalion commander joins us

here today—is to relieve one of his company commanders. The pressures on a company commander in combat, especially one in an intense fight, to hold the key terrain of Ramadi—and that was the key terrain; for all you have heard of Fallujah, Ramadi was the key terrain. That battalion was given more up-armored Humvees than any other, by a factor of two, because of the nature of the fight there.

The fight there, that was written about in that New York Times article, was over a year ago.

[The information referred to can be found in the Appendix on page 142.]

General MATTIS. We had 17 different forms of armor on the 1st Marine Division vehicles at that time. And to set the tactical context for when that article starts out, the supply lines out of Kuwait had virtually been cut in the northern Babil area. Army troops, already completing a 12-month tour, were being turned around in Kuwait to return to Iraq and relieve us, so it could bring more assault battalions into the fight in Fallujah that had been blown up at the same time.

Out on the Syrian border, Husaiba was under severe attack. We lost the company commander and four NCOs in the first hour of fighting. Ramadi was an open fight. The enemy got their back broken, and from that time until June, there was no fight left in the enemy in Ramadi.

They have recovered since that time. They are an adaptive enemy.

My point to you is that in the midst of what was going on, this company was standing strongly against the enemy. But when NCOs, months later, come in with concerns, the battalion commander took the last step he ever wanted to take; and I support him in what he decided to do. It had nothing to do with, since that time, his concerns. We addressed his concerns every day, as we did with every company commander, but that was war and the enemy surged against us.

And you are aware of what happened in Fallujah. We went in, we stopped, we came back out at this time; and we had to ship troops hundreds of miles while a robust enemy assassination campaign killed the people in many places that had been working with us. It was not a good time and we eventually restored the situation, but there are costs not just in lives lost and wounded, but also costs in terms of people's identities and the challenges to our character.

And I can explain more in private session.

Mr. WELDON. I would appreciate a private session. I am not trying to second-guess what our military officers do. That is not my job, and I never want that to be my job. I have total confidence in our leadership.

And maybe this report is wrong, that the leadership overseeing Captain Royer on May 31 of a year ago—which wasn't even a year ago, was about 11 months ago—made such very, very strong, positive comments about the leadership qualities of this Marine. I didn't write those comments. I don't know who did. You know who did. But somebody wrote—they weren't mediocre comments, but ex-

tremely strong comments about the work of this leader 11 months ago.

And I understand the New York Times article was about issues that happened months ago, but the point is, something changed. Maybe it was the officer himself that changed, which is what you are saying, but you can understand why perhaps we would be somewhat suspect if that officer had also come out and publicly spoken out about the concerns of the troops under him, especially when that unit was the most heavily hit unit in terms of suffering casualties in theater.

I look forward to a private session with you, and I would thank again the chairman and the deputy staff director for their outstanding work on this issue.

The CHAIRMAN. And let me suggest, Mr. Weldon, that we will accommodate a private session, General, if we could. Anything else would disserve the officer in the process. We will do that.

The gentleman from Arkansas, Dr. Snyder.

Dr. SNYDER. Thank you, Mr. Chairman.

Thank you, gentlemen for being here. I hope you all know how glad we are that you are here. I hope you also are feeling very, very uncomfortable about being here because there is a lot of dissatisfaction on this committee, the Congress and the American people. If it makes you feel any better, most of us are very uncomfortable with our position here.

I have a different take on this than Mr. Weldon. I think we have also dropped the ball, that we have thought that, well, if we just have a funding level when someone says they are short of money and we pump money into it, that is good enough.

That is not good enough. That is not the kind of oversight that Congress needs to be providing, the kind of attention. It should not take a young man standing up in Iraq at a town meeting that Secretary Rumsfeld is holding on December 8, making the comments that he does. That generates another focus on this kind of issue.

So I think this is a very painful day for all of us, but the goal is the same, I think, to get better. I assume this is the report that Mr. Meehan was referring to, the GAO report that came out in April of this year.

I ask unanimous consent that this could be inserted in the record in its entirety.

The CHAIRMAN. Without objection.

Dr. SNYDER. And the title of it is, Actions Needed to Improve the Availability of Critical Items During Current and Future Operations. In just one of—their very brief, one-page summary, they say, "While U.S. troops develop short-term solutions to manage item shortage during OIF, DOD and its services have begun to undertake systemic long-term changes to fix some supply problems identified. While GAO did not evaluate their potential for success, the majority of the changes are focused on distribution and not on the full gambit of systemic deficiencies that GAO identified."

[The information referred to is retained in the committee files and can be viewed upon request.]

Dr. SNYDER. I think you have some pretty knowledgeable people saying you are not there yet; you are going to have other problems down the line. It not just the distribution system. I look at it as

a pyramid. In Congress, I think we think the top of this pyramid is funding, that if we are giving you proper funding and have our laws stay out of your way for procurement, we are doing our job.

But that is not accurate. If the problem down below is distribution systems and proper planning, information, all those kinds of things, if the stones in the pyramid below are inadequate, the pyramid crumbles and it doesn't matter what is on top.

One of the problems that we have had on this committee on this issue—and in my view, a lot of issues—is getting information. We have been told multiple times, I don't know how many times, that the industrial capacity was at full capacity, maximum capacity, that everything was being done to produce armor that could be; and it turned out not to be accurate.

I was really struck in the last week when the information in one of the newspapers came out about the death of Pat Tillman, and they make very strong statements that information was withheld from the American public that this was a fratricide incident until after this brave man's funeral. I don't think that does his family or the American people any favors.

It is a problem that this Congress and the American people have had about getting information about these kinds of problems, and it is very, very frustrating. And we are now two years into this war and still having problems getting the information.

I commend you for being here today. I hope and I know you are working very, very hard to solve this, but we all are not doing the kind of job—we are not having the kind of success that we would like to have; and in my view, that includes this committee also.

One specific, detailed question, General Catto: You mentioned March. What March are you talking about?

General CATTO. March of 2004.

Dr. SNYDER. March of 2004, so a year ago. And would you repeat again what you said about the changing threat? Did I understand you to say at that time that IEDs were not considered the kind of threat you were dealing with?

General CATTO. That is correct. In a low level, we did not have a lot of incidents of IEDs at that time frame, and they have increasingly become a bigger threat with more incidents, greater explosives, et cetera.

Dr. SNYDER. Are you saying they had been a threat and dropped off, or they have continued to escalate since that time?

General CATTO. They have continued to escalate since the time the Marine Corps went back into Iraq until the present time.

Dr. SNYDER. Mr. Reyes has made a lot of trips to Iraq, and Mr. Weldon and the chairman and others. I have made several trips, and prior to March, I was in Iraq; and in my office I have a picture of me sitting in a mess hall, talking to some troops. And there is a poster right behind us—this is a mess hall photo that says, "Beware of IEDs." That was six months before. I am confused on this time frame.

General MATTIS. If I could take a stab at this, what we are getting here: The Marines came out of Iraq for a period. The first IEDs that hit us the summer before, we went through 5–1/2 months of stability operation. We didn't lose one sailor or Marine

killed. The IEDs were small, ineffective, and relatively easy to hunt down the people who were laying them.

They adapted. Basically they made bigger IEDs and went to RF stuff.

We came out of Iraq in October. The IED threat matured. We got the word we are going back in November. General Kelly, my assistant division commander, and I flew back into Iraq in November and December. General Catto joined us in December with modifications to armored kits, and we began the armoring.

In March, when we came in, we were hit by a limited number of IEDs, you are right, but the Marine Corps was out of the theater, and the 82nd Airborne was turned over to us in March. We have a little gap.

Just like politics, every war is local. They are all local. We didn't see the maturation. We picked up from 82nd Airborne's great turnover to us, what we were coming back for; that is what we were armoring our vehicles for.

Dr. SNYDER. My time is up, but one of the issues that has been talked about, we have this turnover. I guess you are saying there was not adequate communication between the units that you were replacing, that somehow our sharing of intelligence when we have that kind of transition on these rotations——

General MATTIS. Quite the opposite. The 82nd Airborne warned us about what we were going into.

We got the word in November we were going back in. The ships were still at sea bringing our gear home. They arrived in December. General Catto was at my headquarters with armored solutions that we began producing in January. We were going as fast as we could, and it was thanks to the 82nd Airborne's very keen attention and getting us that information, we knew what we were getting back into over there, sir.

Dr. SNYDER. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman. I would direct the gentlemen to look at the time line and the actions taken by the staff team that the committee has put into action. I don't know if he has taken a look at that, but they have worked steadily.

We have compressed schedules. We have driven reprogramming. We have met with union leadership and business leadership to reopen mills and to keep them operating at full capacity. So our team—I want our members to know that our team has been out there. And if they look at the key points where we compressed the schedules on the 7,000 kits in April of 2004, how we have driven the reprogramming on IEDs, I want our members to know that our staff team, that has been dedicated to this, has been active.

Look at the road map that we have provided there for you.

Dr. SNYDER. Mr. Chairman, may I respond?

The CHAIRMAN. I certainly would like to have the gentleman respond, but I heard the gentleman say that there is more to this than just simply funding money. And the committee has been doing more than providing money.

Dr. SNYDER. It is also a bigger issue than just this armor. The GAO report talks about problems with batteries, tires, vehicles, body armor, meals ready-to-eat, vehicle generators.

I appreciate what you all have done and what the committee staff has done on this specific issue and what members do in terms of bringing this to the attention of the American people, but there are problems out there that we will continue to have problems addressing; and it is going to bite us again. I mean, that is what GAO is predicting.

Well, thank you.

The CHAIRMAN. That is why we are having this hearing and that is why we had four classified hearings on the force protection situation, to see what we can do from this point, how we can move forward and how we can accelerate the programs we have initiated.

The gentleman from Nevada, Mr. Gibbons.

Mr. GIBBONS. Thank you very much, Mr. Chairman. I would like to ask General Votel about the training our soldiers receive in improvised explosive devices before they are deployed over there.

As I understand it today, our soldiers are not receiving a lot of training here in the United States, but more likely receive their training in IEDs when they deploy, immediately before they deploy to overseas.

In your opinion, General, how great is the need to establish a training center, an IED training center, for our soldiers to experience IED environments before they are deployed overseas?

General VOTEL. Thank you, sir. I think it is very important that we provide a high-quality experience for our soldiers and our Marines and everyone who is deploying, so they have the opportunity to practice and train in the environment in which they are going to fight.

My observation is, I think we are well on our way to doing that with the resources that we already have at the National Training Center out in California, at the Joint Readiness Training Center in Louisiana and, on the Army side, the Combined Arms Training Center in Hunfeld, Germany. All of those locations for Army forces are being used to train units to be there. And we talk directly with the commanders and the operations officers that run those training areas to ensure that they have the latest information and that we are replicating the environment as closely as we can.

Mr. GIBBONS. What kind of physical environment is best suited for an IED training center? What do you need? Is it an area where you can utilize technology for defeat of IEDs as well as the experience of detecting and disarming IEDs? What kind of environment do you need and do we have that environment in these centers that you are talking about?

General VOTEL. Yes, sir, I do. At the training center in California, it is an environment that is uniquely suited to what we are doing. I know that historically has been a place where we have trained a lot of our large, armored mobile forces on the Army side, but they have undergone a fairly remarkable transformation to build up villages and to replicate some of the urban environment that exists in Iraq. And so what we have tried to do is provide this combination of open terrain and urban terrain that we do see in Iraq.

One of the things we are seeing is, we have made very good use of Yuma Proving Ground, Yuma, of course, being an Army facility. Also it is home to the Joint Experimentation range complex that

has been put together with OSD money, and we made an additional investment to more closely replicate not just the physical environment—that is, roads, buildings—but also some of the background signatures, cell phone nets, other atmospherics that are necessary for us to go in and test the equipment, or the particular solutions we are looking at, and test it against an environment that we can closely replicate to what we see in Iraq.

There is a combination of training areas, like we have at the NTC, that are very suitable; and there are test facilities out in Yuma, Arizona, that are very suitable to what we are doing. And there are things going on in other places.

In Louisiana, at the Joint Readiness Training Center, the terrain is a little bit different than it might be Iraq or Afghanistan. Nonetheless, we are able to replicate many of the situations very successfully there.

Both of the training centers have made huge investments in trying to provide HUMINT roles who actually replicate the people on the ground. So we are doing a good job of trying to replicate that and close the gap between what units experience in training and what they are going to experience when they get into theater.

Mr. GIBBONS. Are there any restrictions that you are running into, or obstructions that you are running into, with regard to the utilization of electronic countermeasures for IEDs that influence the training in any of these areas?

General VOTEL. Yes, sir, there are some FCC regulations. We are working through the Spectrum Management office in the Pentagon to help us with that. We have been successful in working through some of those to get some access to frequencies that we can use to prove to soldiers. Of course, confidence in these systems is paramount in making sure that they are used properly and we have soldiers set up. So we have had some success in doing that and we are continuing to do that.

One of the other things we are doing is, we are working in conjunction with the rapid equipping force. We have gone out and purchased a number of training boxes, if you will, that replicate the current family of Warlock systems, and we have bought a fairly large number of those, about 500 of each of those. Those are in the process of being produced. We think we will have the first deliveries here in about three weeks, and we will be sending these out to the training sites so they will have, in numbers, these training devices that can be used and can replicate the capabilities in a training environment.

Mr. GIBBONS. Thank you, General. And I hope during the course of all this that you will let us know what we can do to assist you in providing the training needs that will help our soldiers, sailors and airmen deal with these IEDs in a very forward-looking, forward-leaning fashion.

The CHAIRMAN. I thank the gentleman.

The gentleman from New Jersey, Mr. Andrews.

Mr. ANDREWS. Thank you, Mr. Chairman. I would like to thank the witnesses for their testimony this morning and acknowledge the fact that no one has cared more or worked harder about protecting these young men and women than you have and the people you represent. We appreciate your efforts.

I also want to say that it is clear to me that the efforts of Chairman Hunter and Mr. Taylor and Mr. Skelton and Mr. Simmons, a lot of members of this committee, have made a difference, and I express my appreciation to them as well.

I am hearing really two stories or two parts of one story here. The first is the story as to what happened after about November of 2003, when we heard that it was going to become a top priority to get more armor into the field. And that story has had fits and starts and it has told us a lot about the labyrinth of the military bureaucracy in dealing with the private sector. There have been successes and failures, and I think the hearing properly focuses on how to make the successes greater.

I am interested in the first part of the story, which is how we got to a point, before November of 2003, where we were so poorly prepared. It is my understanding, General Sorenson, in your written testimony, that we deployed 235 up-armored Humvees during the initial phase of combat; and our present goal, if I am not mistaken, is 10,345.

That is a colossal difference, one for which you are not responsible. It is your job to fill the order. But I am heartsick about the inaccuracy and inadequacy of the orders that were placed with you.

You were quoted in an article in the Philadelphia Enquirer talking about the beginning of the insurgencies and saying that no one, no one, predicted in the insurgency a potential to use these IEDs so widely. When did you first get asked to ramp up production of the up-armored vehicles and by whom?

General SORENSON. Sir, thank you for the question.

I arrived at the Pentagon about October of 2003, shortly after the AUSA convention. And at that time, I was beginning to get briefings with respect to what was going on in theater and the fact that we were beginning to see incidents of IEDs and we were looking at what were potential ways to respond to that.

At the same point in time, we went back and began to look at what was in the laboratories, testing communities, at the time ARL was putting together some door kits that you could add on to a Humvee.

But going back to your other question about the 1114, this vehicle in terms of what the basis of issue was only for reconnaissance soldiers and MPs who were going to be conducting military operations: Subsequent to that, we have found, because of the IEDs and the stability operations and the fact that we had never anticipated, if you will, this type of a threat, we had to go back and go ahead to begin to armor.

I will go back and make one point. When we put together a kit in response to Bosnia, we built the kit for the Humvee that essentially had a lot of body armor underneath, but not so much to the side. As we began to look at the threat in terms of what we were encountering in Iraq, we found that the threat wasn't to the bottom, but was to the side because the IED explosives were coming from the side.

Mr. ANDREWS. At some point there is a sea change. We go from having 200 and some of these armored vehicles to rushing to get ourselves over 10,000. Frankly, the track record in the months at the end of calendar 2003 is not bad. You have ramped up 8,000-

and-something right now. But I am less interested in the industrial production than I am the paradigm shift in people's thinking. Who was it that came to you and said, you know, we need a lot more of these things in a hurry; and when did that happen?

General SORENSON. Sir, I would have to go back and create—we have some time lines and time charts, and I can respond to that for the record.

[The information referred to can be found in the Appendix beginning on page 158.]

Mr. ANDREWS. I would appreciate your doing that.

Let me ask you a related question. I know you cannot and should not disclose sensitive intelligence. I am not asking you to do that, but who is advising you how many of these things we are going to need a year from now and what is the basis of their advice?

General SORENSON. Sir, I think, again, if you look at the data we have provided here, we have begun to fund for in excess of the requirement. And right now, we are postured to do that with the kits we currently have in production as well as the up-armored Humvee.

At this point, Training and Doctrine Command (TRADOC) has been working this particular issue, looking at lessons learned, looking at what the future operations of the Army would be, looking at what the future armored requirements are going to be. In the June time frame, they are to report back to headquarters with respect to what they think the potential armored solutions.

Mr. ANDREWS. I know the committee would be interested in hearing what that recommendation is.

I just close with this point: One of the reasons that I think our military is so successful is that it is your training and your orientation to anticipate the worst and prepare for it, and then if anything short of that happens, we are home free. And I am just dismayed, dismayed, that planners above your pay grade did not follow that practice in this case and seemingly assumed the best, received the worst, and we are here in this predicament as a result of it today.

Thank you.

The CHAIRMAN. I thank the gentleman.

The gentleman from North Carolina, Mr. Hayes.

Mr. HAYES. Thank you, Mr. Chairman, I think this has been a very valuable hearing in a long series of hearings in this particular subject. Let me first start by making a comment.

General Mattis, I think you have an extremely clear and accurate view, so stated somewhere on the West Coast not long ago about our objective in this whole process, and that is to destroy the enemy. And I want to compliment you on your clear and concise view and also your willingness to articulate that.

Along the same line, you also made a comment—I think it is valuable for the committee to seize on the day you spoke about taking over for the 82nd. And I suspect that was General Swannack that you replaced. The sequence of events that occurred and the rate at which, or the nature by which, the battle reshaped itself with the passage of time, I think is very important.

There have been statements made that we all care about—Weldon, Andrews, acquisition of armor, installation, very important. But there are a lot of facts, and you really touched on some-

thing in there that I don't think we really grasped before, the evolution of what has happened here; and I think we need to think about that before going forward.

And my good friend, Dr. Snyder, I appreciate his participation, and he is a faithful member, but I take exception to his characterization, as the chairman did, about our awareness and the aggressive way that the committee and the military have pursued the issue of armor and IED jammers—the four classified hearings, very important, and we continue to do that.

I remember Mr. Simmons on my right and others have visited sites and encouraged numerous, various manufacturers and others to get on the ball and get this material. The Philadelphia Enquirer article, I was shocked and disappointed.

There is a long history here of what happened. We could have done a lot better job. We don't need to dwell on that. What we do need to dwell on is the acquisition process. We would love to measure responses with a stopwatch. Typically, when the Pentagon gets involved, it becomes a calendar. But an acquisition, you are talking about carbon dating to find out what is going on.

I think part of what we talk about coming out of here today is the acquisition process. This committee has very, very strongly supported our industrial defense base in this country. We have not received similar support from some folks in the Pentagon and some folks in the other body—I guess we can call them the Senate here.

Our industrial defense base is vitally important. When we call on them, and if you look at the reports here today, you find training of people in Pennsylvania and Ohio, having them and the personnel ready to go 24 hours a day, 7 days a week.

I hope, General Votel and General Sorenson, that is a part of our lessons learned as we go forward today, because there are some vital lessons that we can carry forward that will put us in a position to respond in the future to the always- and ever-changing battlefield.

Now for a question, General Votel and General Sorenson. As we look at the whole issue of armoring, whether we begin with an armored vehicle or add on later, a part of our forward-looking consists of new materials that can be used that are lighter and even more effective. My understanding is that there are some ceramic and glass materials, laminating structures, that could improve and strengthen efficiency.

Are we using that as a part to respond to all the issues we have talked about with armor?

General SORENSON. Let me answer that question, and the answer is absolutely "yes." to date, even in our armoring strategy and armoring efforts to date, we have had about 60 vendors provide technical solutions for armoring, everything from steel to composites and more elaborate capabilities. Of those, we have tested over 300 solutions. As we go into the future, as I was describing before, the intent is to get to some composites, to some steel, basically a standard common application that we can put on many of our vehicles in order to reduce the logistics requirements, as well as provide a better surge capability.

If we can get the same ballistic glass, or the same latch or the same door to go on more of our vehicles, we could better respond

with respect to more vendors with improved solutions. And the intent at this point in time is to look at—in many cases, to look at our science and technology base.

Mr. HAYES. One more question, if I may. Are you looking at glass ceramics and glass laminates as future armor decisions? Are you familiar with those?

General SORENSON. I am familiar with those, and as I mentioned before, I think we are looking at those in our science and technology base at the present time, yes.

Mr. HAYES. Thank you, gentlemen, for your service.

Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman from Mississippi, Mr. Taylor.

Mr. TAYLOR. Let me begin by thanking you generals for being here. I believe each of you is a combat veteran from this war, and I thank you for your service in doing that.

I would like to echo the remarks that my friend from Arkansas said. I am not particularly pleased, and I am certainly displeased with what has happened. I don't think our Nation has anywhere near shown the commitment that our young men and women in the field deserve.

I think it started with sending troops off to war and saying only the front line troops need the best body armor. If you recall, the Guardsmen and Reservists did not have it and people needlessly died. And I would remind this committee that despite all of the money we have thrown at the problem—we have thrown a lot of money at the problem.

The day after that Tennessee Guardsman questioned Secretary Rumsfeld, I went to Rock Island and there were a dozen people in white coats telling me why they couldn't get the job done, while three blue collar workers were working on a Friday afternoon. Now, tell me that is the national commitment to solve the problem.

With the jammers, I mean, let us face it, the game that keeps getting played is, we are fulfilling the requirement. Requirement is artificially low; requirement isn't every vehicle. Everybody in this room knows the only reason that the number of jammers is classified is because they don't want the American people to know how few are protected.

I appreciate General Votel's efforts, and I appreciate what the guys are doing at Indian Head. People are working on it. But we, as a Nation, have been so incredibly inconsistent on this war.

George Bush says he is a wartime President. Well, doggone it, if he can find the time to go out and pitch Social Security, he can find the time to make these programs happen because kids are needlessly dying. And I suspect that half the kids in Iraq needlessly died because of lack of armor, body armor, and lack of jammers.

I think the next thing we need to address—and we do all get ready to serve on programs and—I know I do; we are not addressing the need to change the shape of the vehicles. Pressure detonated mines are now causing a lot of injuries over there.

Bottom line is, almost all the vehicles we have over there have flat bottoms. I am a boater. I understand boats probably better than a lot of folks. A flat-bottom boat hits a wave, it bounces up. A V-bottom boat hits the same wave, it slices through it. That ex-

plosion going off underneath the vehicle is a wave. And until we start changing the shape of our vehicles, we can have all the armor, but if that vehicle gets thrown 10, 20 yards, the people in it get severely injured.

I don't hear much talk about changing that. And, again, does that have to be the fourth mistake we make? Why don't we start addressing it today? And the last thing, why is it that a Nation that is at war can't turn to these factories and say, make it, because the truth of the matter is, this body is afraid to declare war on the insurgents in Iraq. If we had declared war as a body, then our Nation would be in a position to call the steel mills, to call the ballistic glass folks and call American manufacturing, what is left of it, and say, Make the things our troops need.

Gentlemen, I realize you have been the pinatas de jour. I appreciate your service, but before we start pointing the finger at them, every member of this committee ought to look in the mirror as to whether or not we are making the commitment as a Nation. We can find the time to cut taxes for Paris Hilton. We can find the time to pass a $1.5 trillion prescription drug benefit, but somehow we haven't found the time to take care of the troops.

Getting to the question of V-bottom vehicles, gentlemen, what kind of progress is being made toward that? And again do we have to wait until we field 20,000 flat-bottom Humvees with armor before we finally decide it is time to move on to something. Again, I don't care who makes it as long as it is made in this country, but do a better job of protecting the kids in the field.

General VOTEL. I will address a couple of things that we are doing with respect to the shape of vehicles.

One of the areas which we deal with on the IED task force is the functional capability for our engineering units and others to go out and perform route clearance. Clearly, keeping the lines of communication, the roads, the systems that we rely on for operations, for our logistics is vitally important.

What we have done is, we have gone out and brought into the theater vehicles like the Buffalo, which comes with a specific V-shaped hull design and provides the type of protection that is afforded by that design. So that is in service with our engineering units, who are primarily doing route clearance operations for us right now. And the response we are getting from them is overwhelmingly positive.

One of the things we have recently done, really taking a cue from the Marine Corps, is procuring a vehicle we call the Cougar. This is designed as a joint EOD, explosive ordinance disposal, force vehicle, and it does have a V-shaped hull. It is produced in South Carolina. The Marine Corps moved out on that, and we watched that closely and saw the advantage of that right away in making sure our forces—most of those who are responding to these types of situations with IEDs and have, in combination with Army supplemental money and money that we have taken out of the Iraqi Freedom Fund, fully funded the expedited production of those. We will see some coming into theater as early as August.

Mr. TAYLOR. What is your goal on that?

General VOTEL. We are working on 122—our focus is on EOD teams that are in the theater of operations, Iraq, Afghanistan, the

Horn of Africa, and that is how we have addressed it through the IED task force because that is what our focus is. We clearly recognize there are ramifications for the long-term force, and so we are working with the institutional part of the Army to make sure that we are programming for these in the long term.

General SORENSON. If I may add to that, right now I believe you are aware of the fact in the data that was provided here, we have 395 armored security vehicles which essentially have a V-shaped hull. In the supplemental, we have put a requirement in there to buy an additional 824, bringing it up to almost over 1,100.

To date, the amount we are trying to satisfy is about 872, and we will intend to do that by the fiscal year 2006 time frame.

Mr. TAYLOR. Gentlemen, what is the target date that you can assure this committee that before troops rotate to Iraq, they will have trained with jammers here in the States? And the reason I say this, right now I have got close to 4,000 Mississippians over there. They never saw a jammer until they arrived in Iraq, never trained with one in the States and were told they were trained with them in Kuwait. That never happened; the first time they saw it was in Iraq. And many of the jammers they received did not have the software in it.

That is water under the bridge. I regret that happened, but there will be other units rotating into theater. What is the game plan so that there are enough jammers that they can train in the United States, since we are losing half of our casualties to IEDs, and that they will be proficient at this before they get to the theater?

General VOTEL. Sir, I will address that. As we last talked here, three, four weeks, we have gone back to the rapid equipment force and we have made an immediate purchase here of 500 of each of the types of jammers, training devices, if you will, of each of the major Warlock systems that we have fielded in the theater. That is under contract and we think we will have the first systems here in about three, four weeks. We think production will be completed in about 16 weeks.

Our goal is to basically take those devices and equally break them between the major training sites where forces are undergoing training so that, as they go to the mobilization sites and as they go through their rehearsal exercises at the combat training centers, they will have systems in number to train with.

We are moving training sets down into Kuwait so that as they go through some of the training that takes place there, the refinement training, others will be able to reinforce that and do so with real devices.

Mr. TAYLOR. The troops that are rotating in now are trained with jammers prior to going into theater? The rotations in January and May?

General VOTEL. I can't speak necessarily for the Marine Corps rotation. For the Army rotation, for the most part, I think that is pretty much complete now. They have got in some amount of training back here and they get training from the Explosives Hazards Awareness team and from folks off of our task force. They come through Kuwait. That is what this rotation has got.

General MATTIS. For the Marines and sailors going in, part of them, whether they be aviation Marines or combat service sup-

porter infantry, all of them go through training at March Air Force Base where we train them in urban terrain. We are building a center at Twenty-nine Palms.

Right now we have to split the training between March Air Force Base and Twenty-nine Palms. Twenty-nine Palms is the only place we have the waiver in order to actually use the improved counter-IED equipment. And so they all get it and have been getting it for several months. I would have to check on when it started, but all of them in country now have training on the gear they use.

Mr. TAYLOR. Thank you, gentlemen, for your service to our country.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

And I want to remind the gentleman and the rest of the committee that we will vote momentarily on this supplemental, which has in it the dollars that we are going to use to proliferate some new technology into theater. And we are not going to proliferate it in the old way, that is, we are going to surge production, using lots of companies; it is not going to be a long, slow acquisition trail. And we are going to move it in very, very quickly; and it is being done under our new license that directs getting the contract under way within 15 days.

But we look forward to working with you, General Votel, on that program.

The gentleman from Minnesota, Mr. Kline.

Mr. KLINE. Thank you, Mr. Chairman.

Thank you, gentlemen, for being here. You can sense a certain frustration among the members of the committee.

My colleague, the gentleman from Mississippi, expressed his concern that we couldn't find the time and the money to defend our troops. I disagree with that. I think this committee has shown that it is willing to spend the time in briefings and hearings, in visits to bases and stations and plants around the country and, of course, to our troops in theater. And certainly we have shown a willingness to spend money, and we are going to spend some more today to protect our troops.

There has been some discussion today about what went wrong, what failed. Well, clearly when we do acquisition for the Pentagon, we have a system that is, as my colleague said, sometimes carbon dated in identifying requirements and planning and programming and budgeting to make sure that we are buying the best equipment, the right equipment for our troops, and getting it fielded on time; and I think we would have to agree that somehow that system let us down here. We didn't properly plan, program, budget, execute to get our troops the equipment that they needed in the form of armored vehicles, which were never designed to be armored in the first place. But we didn't foresee that need and we didn't get that equipment and appropriate devices to counter the IED threat. So that is where we are today.

We have been scrambling on this committee, and I know you have, to make up for what is clearly a failure in that system, to get the equipment that our Marines and soldiers need on the ground. And this committee, under this chairman, has taken extraordinary steps to give you the latitude, to give the Secretary the

latitude to get things done quickly, to bypass the carbon-dating process and get at least to a count of the process, if not the stopwatch, which we would like to see. And yet we continue to be frustrated.

And we are counting the numbers and the percentages, and is it the right requirement? And what we want to do is make sure that our soldiers and Marines have got what it takes to keep them as safe as we can keep soldiers and Marines engaged in combat.

So the question is, what more can we do to get either regulations out of the way, to get you money faster? What more can we do to kick this thing where it needs to be kicked and move us down the road faster?

Now, we are always going to be chasing—General Mattis very eloquently described the situation we have in combat. We are dealing with an adaptive enemy, so our requirements are changing right now in real time while we are sitting here. And that archaic, decades-long, established system of identifying those requirements and validating them and then programming them is not responsive enough.

I guess I will give up on my speech and just ask the question again. Would anybody like to step up to it? What more can we do to move this thing so that we can acquire things in the same responsive way that you insist that your solders and Marines do in the field?

General CATTO. Congressman Kline, one thing that would be very helpful to us: As we talk about looking at what can we do for the future, let's take a second and talk about survivability in vehicles. We are at about the 98 percent point in what we can do to make vehicles better. You can't put any more armor on these things. We are breaking the springs; the suspensions can't—the enemy continues to put bigger explosives, et cetera. We are just at the peak of what we can do.

We need to look at vehicle design from the tires up. It has to be for survivability where you have a combination of deployability in terms of—if you look at the Cougar, that thing weighs 36,000 pounds; it is tough to hurt, but let me tell you fellows, it is very hard to get it off the ship. So there is a trade there.

We have to look at things like ceramics, which you talked about. The problem with the ceramics is, if you hit a ceramic today, it will work for the first blast and then it shatters. Well, if you are in a daisy-chain IED, you are fine the first time; the second one kills you. Metal doesn't do that, but metal is heavy and—you understand the problem, it is physics.

We need help in the science and technology regime to get us materials that are light and very, very strong so when General Sorenson's guys and my guys put A-kits on vehicles, we don't weigh them down so they can't move. I mean, there is a balance between what can we do for the weight, what can we do for mobility, and how are we going to deploy them.

In this case, in my opinion, it is a science and technology issue to help us with the kinds of composites and blast-protective material that will allow us—to give us this kind of protection on vehicles and still be able to move. I mean, that goes all the way to things like our SAPI plates. You put a small arms protective insert

in an outer tactical vest that weighs 4.5 pounds, one in the front, one in the back, well, pretty soon our Marines and soldiers are wearing 60 pounds of gear between Kevlar helmets, their SAPI plates, et cetera. How do we make that helmet more protective? We can't make it any heavier.

We are really at the point now where it is a science and technology effort, where we have to get the materials that give us the same form and function, but that are lighter.

And so I think, to answer your question, you need to put moneys in the science and technology regime that are pointed exactly to those kinds of things, and they have to be funded long enough for us to make the research and get the breakthrough.

General SORENSON. Sir, if I may just add on, not to spend time talking about the science and technology, I agree with General Catto, those particular efforts would certainly help us to do what we need to do for force protection and survivability.

But to address your question about the process, just a couple thoughts: As an acquisition officer for a number of years here, this particular dilemma we have encountered, now we have, in the department, had to go back through and recalibrate the way we go through our process. Our vice chief's staff, as we began this particular conflict, began having weekly meetings which were basically what he called the Army Strategic Planning Board, where requirements would be vetted, we would look forward in terms of what was necessary for planning purposes, and begin to make changes immediately to what we were procuring or how we had to make changes so we could get that through the acquisition process.

The dilemma becomes, in many cases, just like what we talked about; and I think the chairman has spoken about what the committee has done.

I will go back to October 2003, where we began to identify a need to have armor packages, we had to go through a lengthy process in order to get the reprogrammings done, and you take money from one pot and you put it in another one. I will tell you, that process is very laborious; it takes an enormous amount of time in trying to work through all the records as we go through the Army staff to 0SD staff, to OMB, to Congress, and back down the chain.

If there could be some flexibility put in with respect to providing, if you will, an amount of money to do what was necessary—you know, By the way, you go do that, spend it on what you need and report back on what you spent—that would give an enormous amount of flexibility to the acquisition process, as opposed to what it is right now where we have our budgets and we have our lines, and any time we want to change things we have to go through this entire pyramid up here, and down the pyramid down the right-hand side.

So, again, providing some flexibility to accounts, line accounts, that basically say, You have $100 million, you have $200 million, you use this as you see necessary; and by the way, report back to us how that money is being spent. I think that would go a long way to improving our ability to react to necessary changes on an immediate basis.

Mr. KLINE. Thank you, General. That is precisely the direction I was looking at.

I hope, Mr. Chairman, we can follow up on that as a committee.

The CHAIRMAN. If the gentleman will yield——

Mr. KLINE. I yield back.

The CHAIRMAN. If the gentleman will yield on that.

General, I would ask you to look at the new law that this committee did just write for you, and it says that if you are taking casualties in combat, the Secretary can waive every law on the books of the United States of America up to $100 million, the figure you just suggested.

This first—this jammer is going to be the first model under this particular provision. Secretary Rumsfeld has signed that; he has certified it as an urgent need. We are going to knock that thing out, and we are going to surge it into production, and we are going to surge it into the field. We got back an 8-month profile from the Navy on the production. We said, That doesn't work, we want to do it really within 30 to 60 days.

So my recommendation is, if we can get that to you while you are here today, that is a license that you need to use. And you need to get one guy to sign off on that, and that is SECDEF. You go to SECDEF and tell him you have a combat requirement, and I don't think he is going to turn you down.

So I think you have got precisely the instrument that you need. So why don't you take a look at that and get back with us, let us know what you think about it.

General SORENSON. Will do, Mr. Chairman.

The CHAIRMAN. The gentlelady from San Diego, Ms. Davis.

Ms. DAVIS OF CALIFORNIA. Thank you, Mr. Chairman.

Thank you to all of you for your service and for being here.

I want to follow up for a second the comments just made about science and technology. As I recall, looking at budgets a while ago, we saw that those accounts actually have been cut; and I wonder, have you had a chance to look at those? Do you think that we are doing what is required and necessary in order to bring about the results that you just mentioned?

General CATTO. I was the Vice Chief of Naval Research at ONR in a former life, before I became an acquisition guy. And what I would tell you is the S&T budgets have declined to some extent. I think there is a reason for that, because the S&T community in many respects hasn't been responsive to what the guys need.

It is very hard to get DARPA and ONR to give you help on specific technologies and transition into the operational forces. And I think that is the frustration that I personally have, having worked as the Commanding General of the warfighting lab and the Vice Chief of Naval Research, and then moved into acquisition. To get the science and technology guys to work on the kinds of technologies that soldiers and Marines need so that we field them during our lifetimes is very difficult.

Ms. DAVIS OF CALIFORNIA. Well, Mr. Chairman, I would suggest that perhaps that is something that we need to push on. And I think that we have tried to change those numbers from time to time, at least in the relatively short time I have been on the committee, and I don't know that we have all had that support. So I would take that under advisement, and I think that is something that we need to take a look at.

I wanted to follow up with my colleague, Congressman Snyder, for a second on the GAO report. Have you all read that? Have you had a chance to review that?

General SORENSON. Ma'am, I have just gotten a copy of that. I have not completely reviewed it. I looked it over very briefly last night. I believe in some cases some of the information, obviously, just like any other report, is dated. However, there are some particular nuggets there which probably are worthwhile to go off and pursue, but I couldn't give you a complete answer at this point in time.

Ms. DAVIS OF CALIFORNIA. I wonder if you just want to comment on the systemic problems that were identified. And do you think that the problems are systemic? If you had had an opportunity to look at the issues, how—perhaps if you haven't read it, it would be difficult—but how would you have written that differently? What particularly would you have identified as the problems?

And we have had a chance to discuss them here, but I am just wondering if you could respond to the report itself.

General SORENSON. Again, I would have to come back to you with a better response because, like I said, I have just received a copy of the report and I have not gone through it in detail.

I guess if you are asking for a personal opinion on what we saw prior to this with respect to our efforts to armor our vehicles and things like that, clearly there were some systemic issues with respect to working with industry, defining exactly what the requirement was going to be, how we can begin to move it, accelerate it and so forth.

I think in many cases, too, as we begin to work on these kits, you will find that the kits were designed by a host of different manufacturers—we had Stewart and Stevenson, we had Radian, we had Armor Holdings—and in many cases they went off and did the system engineering work to build that kit.

But I will tell you in many cases what we would get back from industry, specifically the steel industry, is that the plates were cut. But in one case they were cut 1 foot—or excuse me, 3 feet; next one was 3.2 feet, next one was 3.3. So in many cases we were really not working well together to accommodate and put out packages that, quite frankly, could be used on all of the vehicles.

It goes back to what I said earlier. We are having all the consortiums get together, identify some common parts such that we can pursue an aggressive strategy to accelerate, as well as have a surge capability, to accommodate need for armoring different vehicles, but armoring and giving it force protection with common components, as opposed to everybody has got their unique little thing.

Ms. DAVIS OF CALIFORNIA. I appreciate that. I mean, it seems like common sense that you would be working to coordinate in that regard, and yet sometimes it is difficult to walk in one another's shoes and try and get that out there. I appreciate that.

I know, in having met with a number of Marines who have come back from the field, they certainty speak highly of the plates; they know that those definitely saved their lives. But they also responded that they were being asked to wear so much armor that they couldn't even move any longer. I think that that is a real

problem, and when you speak of the technology and the materials that we use, that is also one to address.

Mr. Chairman, I see that my time is up. I wanted to just ask one question, which is a really more sensitive question. I certainly wouldn't want it to be taken that any of the deaths are any different from one another; these are all men and women who have given their lives, who are very courageous. But I wonder whether the families are notified whether—in fact, how, the way in which they were killed—whether it was necessarily in combat in an up-armored vehicle, IEDs, and whether you think that the public as a whole should have more information.

Should the Congress have more information? Should we be told? Should we have some way of knowing the numbers and how those deaths correspond to the way in which individuals were killed? Would that spur on any more activity than we already have seen?

I know everyone is working at full capacity here, but I am just wondering, is that something that we should know more about?

General MATTIS. Ma'am, if I could address that. The family needs to know everything that we know; that is the bottom line. Now, in the chaos of the battlefield, there are sometimes legitimate reasons why we don't know the specific thing that happened at that moment, there is always going to be information gaps, especially to a family that is getting the worst possible news.

With that said, at the time we release information in Iraq, you will notice it is very cursory, and the reason is to keep from reporting back to the enemy, at least in the Al Anbar Province—I am speaking for the Marines here—what we call battle damage assessment. We don't want them to know that the mortar rounds that they fired into Ramadi last night killed a soldier, sailor or Marine. We will simply say we lost one of our lads in the Al Anbar Province.We don't want to give the enemy the feedback.

But once it comes down to the family, nothing is kept back. There are times when there is just legitimate friction and fog of war that causes problems, but no other restraints whatsoever, ma'am.

Ms. DAVIS OF CALIFORNIA. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentlelady and her—I think her point is an extremely good one with respect to the analysis of what is happening, for example, to platforms with the IED threat and with the other threats that affect them. Because right now we are in the stages of developing a new generation of systems, and there is nothing more instructive, probably, to that process than this real war that is going on right now.

So we have talked—intelligent lady, we have talked about that with the service leadership and operational leadership, and my understanding is that there is fulsome reporting or analysis going on with respect to the actual attacks and the damage resulting from that. That is something that we need to concentrate on.

And also, to the gentlelady, one thing we have done: I think there is probably nothing more meaningful to a family than to have the commander of the people—of a soldier, sailor, airman, Marine who is killed—talking to the parents. And we have managed to get that done in several places where they don't have much information, at least initially.

But I think General Mattis makes a good point about not announcing to the world what happened in these recent activities.

The gentleman from Pennsylvania, Mr. Shuster.

Mr. SHUSTER. Thank you, Mr. Chairman.

First, I want to thank all of you for your service to this Nation, especially in the times we are living in and what is going on in the world. And I also appreciate what General Mattis said to us early on, reminding us that combat is an ever-changing environment; and I think some of us, some of the people across this country and here in this committee forget that fact.

And it is not a new phenomenon, it is something that has been going on for thousands and thousands of years, as long as wars have been fought, the enemy figures out a way to overcome your defenses; and we have got to change, so what is likely today to defend our troops tomorrow may be ineffective.

Could you please, any one of you—I am not sure who to direct it to—clarify for me the problems with up-armor. Was it a bigger problem in supplying of steel; or was the problem the capacity to get the vehicles up-armored the workforce, the number of people we had out there?

And the second part of that question is, were there any problems with the weight of the steel on the vehicles, whether it is a Humvee or it is the Iron Horse? Could you comment on that?

General SORENSON. Yes, Congressman, thank you.

Initially we did have some issues, as was addressed earlier, at the beginning here, with respect to acquiring the amount of steel that was necessary. I believe most of those particular issues have now been overcome, and we are now to the point where at the beginning we had maybe one steel manufacturer that was essentially providing capability, we are now up to three. Where we had one, if you will, government organizations more or less working on armoring, we are now eight and nine depots with arsenals. And where we had but a handful of contractors, three or four, there are now clearly a dozen-and-a-half, essentially providing capability here to our forces.

When we first began to embark upon the add-on armor kits specifically for the Humvees, it was a very difficult issue because many of the vehicles that we have that were committed to the war are of the variety that we call the A0, the initial deliveries of, if you will, Humvees that were delivered to the Army and the Marine Corps years and years ago. And we are talking about the 1980's.

We had to go through a very deliberate process whereby we analyzed how much armor could we put on this vehicle, and what was the optimum amount in order to give force protection, but yet not basically load down the vehicle so that it couldn't move. And I will tell you, in some of the first instances when we put one of the kits on a vehicle and ran it up there at the Aberdeen Test Proving Grounds, the vehicle came to a basic stop and it shattered the front shaft.

So we had some difficult challenges we had to go through, the interim process trying to find out how much weight could we put on this vehicle, and essentially what will that armor package look at—and oh, by the way, where would we optimize that armor?

We went back to theater, the 8,400 that the chairman spoke of before, when that first requirement came in, and went through a detailed analysis of what does that 8,400 break down to in types of vehicle, so we could begin to identify what armor package could go on what particular vehicle.

Subsequent to that, as we have talked about now in terms of the 1151 that we are about to go produce, that will be able to accommodate the armor package that essentially is the same as an 1114.

So we have learned a lot by going through this, but initially, you are right, we had some significant issues with respect to how much armor can we put on some of those, if you will, Humvees, the older Humvees that we had in theater.

Mr. SHUSTER. In light of your answer, then, my next question is, because we had trouble getting the steel and the fact that we don't have a significant steelmaking capacity in this country anymore, and that the weight was a problem, why aren't we aggressively pursuing the use of composites?

And I know you mentioned earlier that we are looking at it, but from what I can find out and gather, we are not putting a whole lot of money into it. And it just seems to me that composites—again, from what I understand, you may have different information—composites work. I mean, Boeing is building a new airplane, jetliner, that is going to fly 35,000 feet up in the air and deliver a couple hundred passengers around the world. And from what I understand, it is in testing composites work.

Why aren't we aggressively—and when I say "aggressively," why aren't we spending money getting composites into the field and lightening the load on the truck? And not having to depend on foreign countries to get the composites, we can manufacture them here.

General SORENSON. Sir, we are actually working through that. In fact, there are several companies, several composite armor makers that are basically providing that capability. We have talked a lot with respect to the soldiers giving us feedback in terms of how the vehicles are being weighed down, the issues respective to the frame; and as a result of that, we have gone back and really pursued many of the composite makers.

Specifically, as I mentioned before, we have had about—over 300 solutions shot up at Aberdeen. A lot of those were composites, and in some cases, the composites didn't give enough protection, so we had to take the composite and essentially put in, if you will, a small piece of armor or aluminum or something else to give it the capability of force protection that we are looking for.

Mr. SHUSTER. Decreasing the load on the truck, though, by using a combination——

General SORENSON. Yes, but in some cases, there were tradeoffs. From our test results, our initial test results—again, I go back to early 2004, late 2003; the results at that point in time with respect to composites were not to the standard that we needed in terms of force protection.

I think subsequent to that they have increased substantially, and I believe the Marines have used some of the composites in their latter designs that have shown us that, as we go forward, even in our

1151 forecast, we are going to have some potential composite makers for armor protection.

Mr. SHUSTER. I haven't heard you talk much about it today, the composites. We are spending a lot of money on steel. So are we going to aggressively go after composites to be put on the ones that are successful?

General SORENSON. Yes.

Mr. SHUSTER. I would like to—I see my time is up. If you could give me some kind of report on what you are doing, because as I said, what I understand is that it is—the money is not being spent to go after the composites, and they have a great benefit us to.

And I don't know the cost, but I—can you just quickly comment on the cost?

General SORENSON. The costs in some cases have been a little bit more expensive than, obviously, the steel, but there are some tradeoffs there. And I can certainly give you some more feedback in terms of the composite companies that we have worked with, and what we are doing in that regard.

[The information referred to can be found in the Appendix beginning on page 158.]

Mr. SHUSTER. I would appreciate if you would give me that. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman for an excellent line of questioning.

The gentleman from South Carolina, Mr. Spratt.

Mr. SPRATT. Thank you, Mr. Chairman. And thank you all for your testimony and for your service to our country.

About a month before the war began, General Shinseki was in my office for a briefing on another subject. When we finished, I took the opportunity to ask him his assessment of the postwar planning, because I had great concerns about what could happen; and he gave me a surprising answer. He said, Sir, I haven't been briefed.

Now here is the Chief of Staff for the Army whose main responsibility is to take and hold real estate, who had a major—had a primary role in this invasion, this war; and also had experience—he did—running a multilateral force dealing with a partially Muslim population, trying to pacify and stabilize Bosnia and Kosovo. This is a week before he testified that several hundred thousand troops would be necessary.

He told me, I haven't been briefed yet, a month before the war was to begin.

Were there deficiencies, blind spots? I won't ask you to pass on General Shinseki's situation, but were there deficiencies and blind spots in our planning process that caused us not to foresee what could have been foreseen in this situation?

I will put that question to anyone.

General MATTIS. Sir, certainly with hindsight we can spot blind spots. We adapt quickly—probably the U.S. Military adapts more quickly than any other on earth. But we are certainly subject to a certain degree of criticism about the post—what you would call the decisive combat, defeating the enemy's main forces.

Mr. SPRATT. Would it be accurate to say we were unprepared, surprised, by what has developed with respect to this insurgency, in particular, the way that they have been able to deploy these improvised weapons?

General MATTIS. Sir, I wouldn't go that far. The U.S. Navy went triumphant. It crossed the Pacific coast in World War II and got to Okinawa, found vehicle-borne IEDs in the form of Kamikazes. I think we need to be—I need to be slow to characterize as failure an enemy adaptation.

Our Army, our Marines, our Navy, our Air Force are employable worldwide. There are numerous situations where these heavily armed vehicles would have bogged us down and we would not have made the speed we might have needed; or in certain areas, the enemy simply wouldn't have responded this way.

I think in hindsight you can always find areas you could have planned better because all planning is anticipatory decision-making. And thanks to our professional military education, which must remain strong, I think we have adapted well.

But there were certain aspects to this fight that were probably missed. I can tell you that, as a division commander, I have clear guidance from my MEF commander, then General Hagee, now our commandant, which anticipated the need to get the electricity turned on to work with Iraqi security forces; and as I was pulled out of Baghdad and Tikrit, I had a very clear plan from actually a year before that General Hagee had given to me—now General Conway commanding me—that I knew what to do.

Mr. SPRATT. Let me ask you this: I was there, I think it was October of 2003, and the units were beginning to experience the problems that we are having with IEDs, and also with a lack of the latest version of Kevlar vests, body armor, particularly for the units that had been rear echelon units that were now in places like Baghdad.

And one young MP from an MP—a National Guard MP company in the Carolinas, told me, Sir, I can account for at least three people who have been killed in my unit, my company, because they didn't have the latest version with the ceramic plates of the Kevlar vest.

I came back, and I knew some folks at DuPont, so I called them into my office to see what we could do to facilitate the production of these things; and I found out that they weren't the prime, that somebody else was the prime contractor for us, and that they then had to let out subcontracts to at least two or three subcontractors and vendors, and the process was all very onerous and time consuming. And there were through FIT rates that each one of them—each supplier in the chain was subject to.

I didn't get the sense then that there was any Herculean effort to override all of these onerous military procurement processes and get the deal done, get the Kevlar vests out in the field.

Looking back, would you think that we should have taken more extraordinary efforts to break through these bottlenecks and speed up the process to deliver these things that the troops clearly needed?

General MATTIS. Sir, I will defer to the acquisition folks on that, but let me make one point.

I personally did not wear one in OIF–1, and the reason I didn't wear it was the speed. They are very heavy, as you know, and anything you can do to lighten one of your Marines, they can move faster, more agile.

Going back to OIF–2, once I made certain that every sailor and Marine I had had one—or had two, one in front, one in back, then I took one, too. The situation had changed.

Mr. SPRATT. This applied before we got that level of supply, did it not?

General MATTIS. I think we were okay. When we actually decided we needed them, sir, I was able to give one to every sailor and Marine in my division.

I can only defer to the acquisition people as far as the time line. I don't know how they did it, but they did it.

General CATTO. Congressman Spratt, I think some of your criticisms are valid in terms of the process in some of the convoluted contracting, et cetera, that went on earlier in the conflict.

But the principal problem with SAPI plates in particular, though, is the raw material for them. There just hasn't been enough of the raw material available worldwide for that particular technology.

I have been to Brazil looking for raw material for those particular things. It is just an issue of there just wasn't enough around for the demand, and I think that my counterparts in the Army had the same problems.

General SORENSON. That is correct. We had the same issue with respect to—it was essentially the raw material. We had several producers that could take the raw material and produce the plates, but it was getting that flow, getting that pipeline to the point that we could actually develop enough plates to get to theater.

Mr. SPRATT. Thank you for your testimony. My time is up. I appreciate it.

The CHAIRMAN. I thank the gentleman.

The gentleman from Michigan, Mr. Schwarz.

Dr. SCHWARZ. Thank you, Mr. Chairman.

Am I correct in assuming that the Humvees that are being manufactured now by AM General are Level one, the ones that are coming off the line are Level one Humvees that have the armor protection, the integrated armor against small arms; is that correct?

General SORENSON. No, sir, not exactly.

What AM General——

Dr. SCHWARZ. Okay.

General SORENSON. Let me just clarify. AM General produces the frame. They send that frame to Armor Holdings. Armor Holdings then puts on, if you will, the armor package that we now call the 1114.

So it is a joint—what AM General does, though, is make sure that that frame can accommodate that armor package.

Dr. SCHWARZ. What I am getting at here is capacity. UAW Local 5 at AM General indicates that they are working 4 days a week a 10-hour shift, one day a week an 8-hour shift, one Saturday a month, 28 chassis a week, and they could double that production if asked to do so.

Is there some comment that you would like to make on that? Is there a reason why if the upgraded Humvees aren't out there—either the armor maybe doesn't have the capacity, so it wouldn't make any sense to have AM General make any more—or, in fact, could we go up, as UAW Local 5 says—good folks out in the Midwest, who would be very happy to work the extra hours and produce twice as many of these chassis a week.

Do any of you gentlemen have a comment on that?

General SORENSON. Sir, I will take that question. Thank you.

As we just talked about with respect to SAPI plates, the flow of material to make it an armor essentially comes out of AM General. At this point in time they are not the critical hurdle to get through. It is to get the armor package put on, which essentially is Armor Holdings.

Now, as we go into our 1151 production, the intent at some point in time is to take advantage of the surge capability that AM General has, that have more than one producer, if you will, of the B kit, the armor package that we can put on these vehicles such that we can surge the capability, use the additional excess assets that are there at AM General, and begin to, if you will, deliver systems much quicker than we are today.

Dr. SCHWARZ. So at the conclusion—I will go very rapidly, Mr. Chairman.

I can come to the conclusion that, if you could, you would use the extra capacity AM General quite candidly says they have, and the holdup is with the armorer?

General SORENSON. That is correct, yes, sir.

Dr. SCHWARZ. Thank you.

I yield back, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

The gentleman from Rhode Island, Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

And thank you, gentlemen, for your testimony today and for your service to the country.

I would like to follow up on two things: One, IEDs; and the second will focus on composite materials that one of my colleagues was actually talking about earlier.

But since we are talking so much about IEDs this morning, I wanted to also ask if you can give us an update on tracking down how the insurgents, our enemies, are being resupplied, whether this material is hidden in country and they are just obtaining it that way and building IEDs; or if they are being resupplied from outside the country.

Obviously, we didn't have much success finding weapons of mass destruction, so I am not exactly optimistic that we are going to also be able to track down the source of where the IEDs are coming from. But if you can give us an update on how robust that effort is and what the status is, I think that would be helpful.

The other thing that I would like to ask about this morning, with respect to composite material, clearly our focus has to be protecting the soldier. It is our concern, it is your primary concern; and I understand that, I hear that from you today.

The other thing that we need to be focused on as a secondary concern is extending and protecting the service life of the equip-

ment, as well. And I am very disturbed about reports I have heard about how quickly you are running material into the ground and not doing enough to resupply. We need obviously to be concerned about the next battle, the next conflict that could arise anywhere in the world, whether it is the Middle East or other areas; and our equipment is being severely degraded far faster than what we had originally intended.

So I would like an update, first of all, on how our equipment is doing. And then, as a follow-up to that, I have been—I have been concerned about more rapidly developing composite material.

We have—I have two requests in right now, the defense authorization bill, for lightweight armor for vehicles, $5 million would go for the armored composite cab program, working with a company in Rhode Island called TPI. And as we know, composites can provide both alternative and standard armor for tactical vehicles while extending service life.

The other request is $5 million for lightweight materials for armored vehicles for Brown University, which has worked with the Army's Cardek program to research materials that could be the basis for the next-generation armor.

So my question is—and I do agree we touched on this this morning, so I want to give you an opportunity to expand on it, but what effect the add-on armor, either a Level two or Level three, is having on the service life of the vehicles? And can you expand upon the efforts that you are taking to decrease the weight of the armor, or the vehicles, to ensure sufficient protection without further degradation.

If you can expand on those, I know the committee would consider it helpful.

General VOTEL. Mr. Congressman, if I could, I will address your first question that dealt with the enemy and how we are working with that.

I think a full and complete answer really needs to be done outside the confines of this current setting here, and we would be more than happy to bring somebody off the IED task force to come to your office and share that information with you, if you would like to have them, and give you a full laydown.

In general, however, I think what we see is, IEDs are not a tactic that is limited to insurgents in Iraq or Afghanistan; they are clearly one of the preferred methods which worldwide insurgents use to make contact with the people whom they are trying to inflict.

And so we do see movement of techniques, of technology, of people and, certainly, materials that cross international borders. And we see some of that in Iraq and Afghanistan.

I would be more than happy to bring a team member across and talk with you in specific detail about that.

I am very happy to report, however, that one of the things that we have done is really starting to take efforts to get after bombmakers and those that would try to plant bombs against our forces or others. And we have a very robust system in place in theater now, that has been in place now for several months, and we are seeing some progress.

Again, I would offer to you that at the same time, we could come across and update you on that particular effort. We are very proud

of it, we think we are making some progress in that particular area.

Mr. LANGEVIN. I would welcome that update on both of those, that would be helpful.

General SORENSON. Sir, with respect to your other question about the impact on the vehicles, I can certainly assure you that we are doing everything we can to take care of the vehicles that have these armor packages. We, in some cases, modified the springs that we have deployed to theater and so forth.

But clearly the vehicles that we have put these armor packages on are the older vehicles, and we have had a number of problems; we have seen how they react to having that armor, how the soldiers are having to react to driving them, in some cases we have seen some pictures where they almost looks like a low rider, if you will, by the time you took the armor and put the package on.

But I can give you—if you will, take a question for the record and give you a more robust response with respect to our recap and reset efforts in terms of what we are doing to take these vehicles and put them back into a condition that they can be reused in the future.

[The information referred to can be found in the Appendix beginning on page 157.]

General CATTO. As a side statement, we are using our vehicles at seven to eight times the normal rate right now. It is going to be very helpful in the supplemental, with the support that we have gotten from this body, to replace those vehicles. So I think that you will find, in the upcoming years we are going to be okay, but it is not inexpensive. And we are grateful for the help that you have given us in terms of replacing the equipment that the Marine Corps has lost.

But if you go back to your composite question for a minute, it is going to be a great technology when it is mature. The problem we have is that it is just not ready for prime time. And that is why I say we need to have greater emphasis placed upon producing a composite that can take the place of armor, that is durable, that is lightweight, that is effective, and that becomes a very, very valuable commodity.

Mr. LANGEVIN. Well, gentlemen, thank you. And this committee, I know, looks forward to working with you to make sure that we are replacing equipment at the rate at which we need to; and at the same time, developing the next generation of composite materials to make the vehicles safer and the life of the vehicles last longer.

So thank you for your testimony.

And thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman.

I think we have just enough time for Mr. Simmons to slip in before we both have one minute left for this vote. We have got about six minutes right now, I think we may be able to make it.

So Rob, if you want to give it a shot.

Mr. SIMMONS. I thank you, Mr. Chairman, and I thank the gentlemen.

Almost 30 years ago in Vietnam I was called out to witness a scene in Fujian Province where I was stationed, which was a quar-

ter-ton Jeep that had gone over a mine placed in the highway. And the Jeep was totally destroyed, the four soldiers in it were all killed; and in fact, the largest piece of the Jeep that I could find was a piece of the engine block, which you could virtually lift with your hand.

And the message from that experience, to me at least, was that a determined enemy, if they want to blow you up, they are going to blow you up, and no amount of armor, sandbags, protective vests, bottom plates—whether flat or V-based—are going to save your life. You are just in the wrong place at the wrong time, you are going to die.

And I understand that. But what I don't understand is what has happened in this situation over the last several years. I went to Iraq in October of 2003. I returned back and submitted a four-page trip report to the Secretary of Defense. He gave it to the Secretary of the Army. And on 12 November of 2003 I received a four-page letter back from the Secretary of the Army saying that the movement of up-armor Humvees into the Central Command area of operations is a top priority, quote, ''a top priority.''

In January of 2004, I wrote him again after three of my constituents had been seriously injured, one nearly fatally, in an unarmored Humvee. And I said, What can I do as a member of the House Armed Services Committee to work with you to solve this problem of getting armor plate and up-armored Humvees into the theater ASAP, solve the problem ASAP, as soon as possible. I referred back to his reference that this was a top priority.

It was a full 13 months later that the Secretary of the Army established the Armor Task Force, and we still don't have coverage on all our vehicles.

As I read your armor summary, there are almost—there are over 5,000 that are not armored because they are not leaving the FOBs. Well, we hope they are not, but you know, in a battlefield situation, who knows? Whether you have to hop in that baby and hum out of there, you just don't know.

So there are 5,000 still in theater. We have heard it is a problem of the manufacturers, but when I went out to visit O'Gara-Hess, we discovered they had tremendous capacity. We hear it is a problem with, I don't know, the manufacturer and the UAW, but they have capacity.

And what I see in here, what I see is the statement that the priority of fielding UAHs to units in Iraq is determined by the commander of the U.S. Forces. And what I see in your testimony is installation of the kits shall commence should commanders request that these vehicles be equipped with this capability based on their own individual threat analysis.

So I think that the truth of the matter lies in the commander's setting of priorities, and the truth of the matter lies in what my colleague referred to as the glacial process of deploying equipment into the field. And that bothers me, and I suspect it bothers you.

It bothers me that this rolled homogenous alloy is produced, I believe, by only one company in America, Coleville, Pennsylvania. It bothers me that our industrial base is so thin that we can't produce this ourselves, we have to buy from the Canadians and the Swedes. And I wonder if this committee needs to legislate or have oversight

hearings on our industrial base when it comes to these issues, and maybe on our capacity to produce new materials that are lightweight.

The CHAIRMAN. Let me tell my good colleague, who has worked this issue with a lot of effort, that we are going to work on that issue, but right now you and I had better work on the issue of getting to the floor. We have got about a minute and a half left, and they may give us an extra minute or so. We will come back.

And gentlemen, we have got some sandwiches and the best Diet Coke you can buy available, if you want to grab a bite before we come back.

We will come back to finish the hearing. But, Rob, we had better take off right now and come on back; and you will get the rest of your question.

Mr. SIMMONS. Thank you, Mr. Chairman.

[Recess.]

The CHAIRMAN. Mr. Simmons gets to finish his questioning. But we will go to the gentleman from El Paso who has taken 11 trips now to Afghanistan and Iraq. Is it 11, Mr. Reyes?

Mr. REYES. Five to Iraq and ten to Afghanistan, but we are overdue and we need to go again.

The CHAIRMAN. He is very concerned about these issues and I thank the gentleman and thank him for being with us on our last tour in Fallujah. Gentleman from El Paso, Mr. Reyes.

Mr. REYES. Thank you, Mr. Chairman. And as always, thank you, gentlemen, for being here. I know this morning you have, I guess, endured some of the frustration by members of this committee; but you know, just to put it in context, when we were going—when we were in the build-up going into Iraq, we had hearing after hearing here, and a number of us would ask the questions that we were being asked for reassurance by the parents and spouses of our men and women in uniform. And we were always assured there won't be a single military person in theater that doesn't have all the equipment and hasn't been properly trained. And that is why you are hearing a lot of the frustration here, and we know that there are unexpected challenges that we face in combat. And we know, at least those of us who have had that kind of experience know, that you have got to improvise; and sometimes it is a situation that is so fluid that it evolves so fast that you are just not able to respond any other way except under emergency situations. And I think that has to be one of the lessons learned.

And before I ask you a question, I wanted to see, Mr. Chairman, is it—and on the way to vote, I asked you if we were possibly going to have a hearing on this GAO report that we have referenced here this morning that I don't think any of the witnesses have read completely yet. But the reason I think it is a good idea, Mr. Chairman, for instance, on page 53, it states: To improve visibility over the adequacy of the Army's war reserve, something we have been very concerned about, Congress may wish to consider requiring the Secretary of Defense to provide information that discloses the risks associated with not fully funding the Army war reserve. And there have been a number of concerns about that.

One bigger concern that I personally have is a statement in here by GAO that says while DOD agreed with the intent of three rec-

ommendations, it did not commit to any specific actions to address them. And therein lies the concerns that I have and I know a lot of my colleagues have about the things we have identified. So if we can have a hearing specifically relevant to the GAO report, I know I would be very appreciative.

The CHAIRMAN. We are going to have another hearing on force protection. And what I recommend is why don't we make the GAO report and the issues that it raises a part of that, and we will give that to our witnesses to prepare responses and we will make it a part of our next hearing. And if the gentleman wants to put it into the record, we will be happy to do that.

Mr. REYES. I appreciate that, Mr. Chairman, because I know you have been—in fact, I have seen firsthand, on the many trips that we have taken, the concern that you have for giving the troops anything and everything that they need; whether we here officially, or as one individual, who gave us a list of things that they needed that you championed right away. I think that is our legitimate role as members of this committee.

I was going to ask for whoever wants to take this, specifically in Afghanistan, all our vehicles are armored?

General SORENSON. To address the question with respect to Afghanistan, the answer is in fact no, that is not exactly the case. There again——

Mr. REYES. Can you tell me the percentage? And the reason I am asking you this, General—and I know the Chairman has been there as well—in a recent trip to San Antonio, some of the soldiers that were recovering there made mention that their armored vehicles are way less—and this is something they get frustrated about, that they are kind of the forgotten war or forgotten front in this issue, because they complained about having to go out on these missions with vehicles that are not armored.

And when I said well, from your viewpoint—and this may not be accurate, but I want to ask you this—but from your viewpoint—I am asking the soldiers—what is the percentage that you think is armored? And they were giving me guesses of 20 to 30 percent. Is that in the ball park that we have 60, 70 percent of the vehicles not armored in Afghanistan right now?

General SORENSON. I am not sure that is exactly the right number. And rather than give you a number that I am not confident of, I would rather give it—if I could take that for the record and respond back to you.

I will tell you that we have on a weekly basis, in fact every Saturday morning, we have discussions with theater, theater being both Iraq, Afghanistan. And we conduct a recount, if you will, of vehicles, exactly what is armored, what is not armored, any changes. We can provide that information to you, if you will.

[The information referred to can be found in the Appendix beginning on page 157.]

Mr. REYES. I would appreciate that, because I am concerned that those that are fighting in Afghanistan somehow feel like they have been neglected by—certainly by us and in terms of the supplies as well.

General SORENSON. I am not sure I would say that.

Mr. REYES. I am just telling what we are hearing, and that word was used.

General SORENSON. I think in many cases, there are different conditions and different environments. And as a result, the commander on the ground there has defined a different requirement than if you were the commander in Iraq.

Mr. REYES. I appreciate that. Well, my time is out, can you——

The CHAIRMAN. Mr. Reyes, you have been to theater over to 11 times, you have earned more questions. I don't believe there are any votes for awhile.

Mr. REYES. I thank you, Mr. Chairman.

One other concern that we have heard is that the predeployment training, before they deployed specifically to Iraq, the training that they get on Humvees that are designed to simulate what they would be driving in theater with all the armor and all, that is dramatically different. They are telling us they are much more sluggish, they react differently. They control way different than anything that they are training on here.

My question is, first of all, you have got to be aware of that, number one. And number two, what are we doing to address that? And one of my colleagues was talking about perhaps there may be some way to modify the training vehicles to respond that way, whether it is loading them up with the equivalent in weight—I don't know how you would do that—but that certainly is something that the soldiers are concerned about because, regrettably, sometimes when they get in country, they don't have this ramp-up of time to get familiarized with the vehicles. They jump in, go out on a mission, and they get hit. And they don't have that time to get familiar with them. So that is very critical in terms of what we are hearing on that.

General SORENSON. You are absolutely correct. I think to date, clearly the effort has been to try to move, as much as we can, the armored packages into theater. This has become an issue as late. It has been identified by a number of soldiers either returning, as well as soldiers deploying, and we are now identifying armored packages to be put on vehicles that can be used clearly here at home station. But even before they deploy, there is a training range there at a facility in Kuwait that they get some training on the vehicle to understand what the environment is, because the roads are different than what we have here, et cetera. So that actually is occurring.

But we are trying to get more of that training here back at CONUS so the soldiers will get more familiar with having this extra armor on and what does that mean with respect to responding to turns, curves, speed, et cetera. And we are working that right now.

General MATTIS. Congressman, that is also the same for the Marines. We have numerous troops on their second and third tour in Iraq now. For example, we have 300 men in 3rd Battalion on their third tour in Iraq, so we are not losing the skills either for all of our prioritizing the gear going to Iraq first rather than to the training establishment.

Mr. REYES. The only follow-up question I would ask is, it is my understanding, because of limitations in Kuwait, not everyone is able to do that; is that correct?

General SORENSON. I was going to say, sir, it is not to my understanding. That is correct.

The CHAIRMAN. I thank the gentleman and thank him for his attention to this issue.

And, Mr. Simmons, you were part-way through when we had to make that vote. Go right ahead.

Mr. SIMMONS. Thanks, Mr. Chairman. Before we broke for the vote, I expressed my frustration and concerns about the use of the words "top priority" by the Secretary of the Army in response to my concerns back in October of 2003 on this issue. Top priority seems to me to be just what it says, top priority; and yet the schedule of implementation puzzles me, because it has been so slow and the reasons given for it has been so diverse.

But let me go to my questions. First and foremost on the armor summary, it appears over 5,000 vehicles are currently unarmored. My question is when can we expect these vehicles to be up-armored; or, alternatively, are we being told that the commander in the field is saying that it is not important to up-armor these Humvees, these vehicles? That is point one.

Point two, the issue of IEDs. Have we talked to the Israelis about IEDs? I have been to Israel and have seen what they do in their border areas. I have seen some of the equipment they deploy and use on a regular basis. They have been dealing with IEDs for dozens of years. They have been dealing with the kind of threat that we are facing in Iraq for many years. How productive have we been in learning from others who might be willing to cooperate with us on developing and deploying and getting equipment into the field as soon as possible?

And then the final question is again, RHA, rolled homogenous alloy, one company I am aware of in this Continental United States that produces this in Coatesville, Pennsylvania. We have had to go to Canada and to Sweden. To what extent is the failure of our industrial base to provide material inhibiting our ability to protect our men and women in uniform in the field?

General CATTO. I would like to talk directly to your question about what we have done with the Israelis. We are exchanging technology with them. One of our key technology things is called OPAL. I won't address it anymore in an open forum, but it has been very successful in helping us identify suicide bombers or folks who are carrying concealed weapons.

We have also done a program with them for specialized search dogs that sniff out explosives off leash. And they are trained to go hundreds of meters forward and they will point out an IED or unattended munition and alert the handlers. We had two instances in theater with those dogs, and successes for us. And they were trained with the Israeli help and we have instituted that into our search dogs. We are talking to the Israelis constantly, and there is an exchange of information.

General VOTEL. Sir, I would just add with respect to the Israelis, through the offices of the IED Task Force, we have a well-established relationship with them and we have gone—they have been

very open and forthcoming with us. We have brought groups of officers and NCOs, Americans and Israelis to exchange information. We have gone as far as to ask them for some help in areas which we may now think we may have some capability gaps, and they have been forthcoming in identifying things to us and offering things for us to test and look at. And we are doing some of that in the next couple of weeks here.

General MATTIS. When we took the First Marine Division back into Iraq, an Israeli-trained detective on the Los Angeles department was on my staff. The LAPD was helpful to the Marine division going back in as we got ready. This Israeli-trained IED expert on the LAPD staff conducted training for all of my men going back in as they rotated through their predeployment training. And he was with us for the first 45 or 60 days we were in country.

General SORENSON. Just referring back to the armor summary, I draw your attention to the fact that right now in theater, we have close to 42,000 vehicles in theater. The requirement has been identified in terms of armoring vehicles somewhere in the neighborhood of 36,000. So in some cases, the basic difference there, the 5,000 are vehicles that the theater has identified to only occupy missions on a forward operating base. They are not to deploy outside the gate without an armored package. And in some cases, they are doing mail runs. But the determination has been not to put an armored package on these particular vehicles. So consequently, we probably won't.

You see here in terms of funding, we are funded right now to basically armor over 37,000 vehicles. So we are going to be well in advance of what we are planning for with respect to theater requirements.

Mr. SIMMONS. Thank you, Mr. Chairman.

And if I could make a quick comment. I am concerned that 5,000 vehicles have not been designated for some form of armor packaging, and my concern is very simple. It is all very fine for the commander in the field to say these vehicles will be operating within a base and a zone that does not create a current threat, but we do not know what tomorrow is going to bring. We do not know what tomorrow's requirements are going to be and 5,000 vehicles multiplied by three or four soldiers, any one of those could be an emergency situation out there in harm's way. And I would feel far more comfortable if I knew if they had some equipment on them.

But I guess this is the commander's decision. I am not sure it is a decision I would make, but I guess what you are testifying is this is the commander's decision to keep 5,000 vehicles in theater unarmored.

General SORENSON. I am coming back to the fact that we have received from CFLCC a requirement document to basically armor 36,000 vehicles. And we do know there are additional vehicles there, but at this point in time we do not have any plans to armor them, although we are adding additional armored packages that could be used, if required to armor some of those vehicles.

The CHAIRMAN. General Sorenson, let me ask you a question on this. We are trading out level one for level two. And level three is being, as I understand, virtually traded out in a lot of areas. So you have got these—a door on a Humvee is simply a steel that is three

feet by four feet and it can have a piano hinge where you pull the standard screws out of the hinges and put a piece of piano hinge on it in about 20 to 30 minutes, and put a three by four piece of high hard steel with 8-bolt holes cut in it, and you have got a new door. And in fact, retired Marine General Terry Paul did it in a record of about two hours, armored up a Humvee simply by lifting the hinges off the soft Humvee and putting the old ones on.

The point being that you are getting rid of—as I take it, when these kits come in, they have everything including the doors. And the two solid doors on a Humvee, they are each three feet by four feet. So that is the big package of protection across the side of the Humvee.

If you are taking the steel doors off—and I presume they are good steel, high hard steel—you could put those on, and those could be put on in theater on the soft Humvees, the 5,000 or so that Mr. Simmons referred to, could they not? It seemed like it would be a pretty fast changeover because you can change the doors out in a few minutes?

General SORENSON. Yes, Mr. Chairman. That probably could be done. There are only 3,000 of these Humvees that aren't armored. The Department is working with theater to try to bring some of these vehicles out of theater, the ones that are not armored, and bring them back to a reset, recap program so we can get the entire force reset with respect to what we are going to need in terms vehicles.

The CHAIRMAN. I understand all that. If you have a Humvee sitting there in a forward base—and even a base like Balad where they take a few rounds of mortar or were taking a few mortar rounds every couple of days, and now again taking some casualties there, right. And if they are close to a building, they herd everybody inside, and if you're not, I presume you get in your vehicle. If you have got these doors, which represent a large part of the armor profile in some numbers now, because we have taken them off and you simply lift those hinges up and pull them out pretty easily, wouldn't that be something that commanders could do at these forward bases if they were so inclined, without prejudice to any program or any time schedule or anything else?

General SORENSON. Mr. Chairman, you are absolutely right. And certainly we will convey that back as we work with theater, the possibility of doing that. But again, I think we are all working to get, like I said, some of these vehicles that are not armored out of Iraq, because in many cases the older vehicles have to come back to be reset. That is why we are trying to get back out of theater right now.

The CHAIRMAN. This wouldn't delay for one split second any retrievable vehicles. It would be a matter of using something that you had that is available when people need it. So why don't we scrub that with our operational people and talk to the chiefs about that and see what they think about it? Looks like to me you are going to have stuff laying around as these kits come in and you discharge some of the old stuff.

Let me see, the gentleman from Ohio, Mr. Ryan, has been waiting patiently.

Mr. RYAN OF OHIO. Thank you, Mr. Chairman.

I appreciate everything you gentlemen have done for our country. This is a difficult endeavor for all of us and I appreciate everything all you guys do. One of the issues that struck me throughout the hearing is the research and development. I think it was—General, you had mentioned that as being an issue. And some of the numbers I have, I think we are spending between 26 and $30 million on research on armor R&D. And to me it seems like a pretty low number, given the other side of what happens when we don't do the research and don't get the kind of products that we need. So I think it is important for, obviously, this panel to state the importance of that and communicate the importance of that to us.

I hope, Mr. Chairman, we can work in the future to try to get that budget up not only for the military research, but I think overall into the universities. And at Youngstown State where I represent, we have an advanced material science program that is just getting off the ground. One of the products they are developing is steel foam that maintains the same strength and character of steel, but made out of foam which is much lighter, which I think would achieve some of the goals that you would need in the military.

So I think it is important for us to be committed. And the military research, quite frankly, is in many ways more effective than research we do at NIH or somewhere else, because it has this practical application in the field. So I want to work with you and share with you some information that I have, but I would love to participate in trying to help you increase the budget for that purpose.

My main concern prior to the war, and which continues to be reaffirmed throughout these hearings, is that we weren't prepared for this kind of long-term struggle; and it is mind-boggling to me to think that is the case. Given our relationship with the Israeli Government and our cooperative ventures that we have between their military and our military, was anyone asked before? Because it seems like these IEDs have been common in what has been going on in the Middle East for a long time. Were we not using that as some kind of model to prepare ourselves, not necessarily to the extent it was used in the Middle East, but it would obviously be used more in Iraq. Was that used as a model for us to say hey, here is what is happening with IEDs in this particular region, in this particular struggle in the West Bank and the Gaza strip, and we know that will be used here and we need to prepare for it accordingly? And maybe if that was used as a model, wouldn't the response be we need the armor and we need to be prepared for these IEDs, and we are not going off in the war until we find ourselves ready?

General VOTEL. I am not sure I can answer your question as to whether we had studied that prior to the war. But what I can tell you is that since October of 2003 when I became involved with the Army IED task force, and now in my role with the joint IED task force, we have reached out to our international partners, the Israelis and others who have had experience in dealing with insurgencies where IEDs were either a major part of the enemy's tactic or one of the contributing techniques he has employed. I think we have done a good job of looking at what others are doing and how they have approached the problem from training, from an organization, from intelligence and from a technology standpoint in trying to bring some of those things forth.

General Catto gave you the example of the use of off-leash search dogs. That is not anything peculiar to the Israelis. Other countries use it as well. I think that is one small example of how we have reached out. To the point, quite honestly, within the IED task force, right now one of my deputies is a U.K. Officer, and he is there to help bring the experience of their army in dealing with insurgent-type operations into our consideration and make sure that we are cooperating and coordinating as closely as we can in this particular fight.

Mr. RYAN OF OHIO. I guess my question isn't whether or not you are working with the U.K. Or working with the Israelis, but it was prior to the war. It seems like we were surprised that they would sit back and fight a guerilla war and use the IEDs the way they have. I would just think that there would have to be some preparation in the war-gaming, that one of the scenarios is they sit back and wait and fight a guerilla war. And I remember we were talking about it here, using IEDs in an urban setting.

My time is up, but the point being is that I hope in future conflicts like this, we scrub this, as the Chairman would like to say, and make sure that we cover all the different angles here, because I think a lot of this could have been prevented. I don't think we necessarily needed to rush in as quickly as we did without covering all of our bases.

Thank you very much. And I look forward to helping with the research and development aspect of it and look forward to working with all of you. So thank you for your contribution in coming before us today. Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman from North Carolina, Mr. Jones.

Mr. JONES OF NORTH CAROLINA. Mr. Chairman, thank you very much. And first I would like to submit and ask unanimous consent to enter four written questions I submit and get written answers back, please.

The CHAIRMAN. Without objection, any written questions you submit for the record here will request an answer.

Mr. JONES OF NORTH CAROLINA. I am still waiting for those questions from Secretary Rumsfeld, sir, but I don't want to bring that up.

The CHAIRMAN. We will try to deliver these in the same batch.

Mr. JONES OF NORTH CAROLINA. Probably will get the same response, but I hope not.

The written questions are for the United States Army and it does deal with Army issues. But I want to say to my friends, the Marine Corps, that I am not going to ask you a question, but I might when I finish this. But for three months, I have been watching an outstanding Marine who was charged with murder. His name is Lieutenant Ilario Pantano. I have had the opportunity to go down and meet with him. I have met with his lovely wife and have seen his beautiful boys. And I never met a person in my life that loves the Marine Corps—let me rephrase that. This man loves the Corps. No matter what has happened to him, he loves the Corps.

Today I am pleased to report that a Marine corporal who was videotaped shooting and apparently injured an unarmed Iraqi in a Fallujah mosque last year will not face court martial, the Marine Corps announced. And if I mispronounce his name, I do apologize

to him, Major General Richard Natonski. And I want to read what he said:

"Consistent with the established rules of engagement and the law of armed conflict, he will not be charged and move forward to a court martial."

Last week there was article 32 hearings down in Camp Lejeune. This was a witness for the prosecution, those who are prosecuting Lieutenant Pantano who has been being charged with two counts of premeditated murder. This is Navy medical corpsman George Gobles. And he was a witness to the prosecution, and his comments about Pantano, "a damn good leader," he testified. "I felt the safest with, you know, this platoon, because more than anything, because of Lieutenant Pantano and his leadership."

Also Major Brian Neal, the operations officer for Pantano's battalion, testified that Lieutenant Pantano was one of the finest second lieutenants he had ever known during his 17 years in the Corps. To me, that is one heck of a compliment. He recalled—Major Neal recalled the day of the shooting and I quote him: "to me, it was a good day. We killed two obvious insurgents."

I don't know how in the world this thing has gotten where a man who loves the Corps, so talented, would probably—maybe not now—had made a career of the Marine Corps. A valuable person. The charges, Mr. Chairman and Ranking Member, came two-and-a-half months after the shooting, when this marine did his job. He thought he was doing his job as he was trained. Two-and-a-half months later, a sergeant that he had demoted from a leadership position to be the radio man, two-and-a-half months later, Mr. Chairman and Ranking Member, he decides this might have been a murder. So he tells a fellow marine, and then it works its way up.

I truthfully do not know, and I pray to God that the hearing officer will recommend to General Huck that this not move forward, just like this corporal who was doing his job in the battlefield. And I agree with many of my colleagues on both sides of the aisle. I regret that we are in Iraq. I regret what is happening to our men and women in uniform. But God bless them, they are doing a great job.

Many of you at that table, probably all of you have been in a battle. I haven't. But some of this stuff is common sense. You don't have to be in a battle to understand what is happening.

Let me tell you one other thing. I hope that the base commander or whomever is in charge, I don't know if the prosecutor for the Marine Corps was one man or two, but in the courtroom when this man's life is at stake for doing his job for this Nation, they were joking and laughing to the point that they were told to apologize to Lieutenant Pantano's mother. And I know you gentlemen at the table are not responsible for any of this. And my frustration and my preaching is not at you, I promise you, but I don't know how we can ask our men and women, Army, Navy, Air Force, and Marines, to go into this type of situation with an unconventional-type enemy and no eye-witness to what Pantano did.

Sergeant Coburn, the Corpsman, they said we didn't see it. This corporal, and I thank God he is not going to be court-martialed, they videotaped it. And I hope and pray, Mr. Chairman and Rank-

ing Member, that this Lieutenant Pantano is exonerated. And I have said it on the floor of the House, I pray to the good Lord that he and his family will be cleared.

And this might be my question, and I will close, that I hope if he is exonerated and he chooses to stay in the Corps, which he loves so much, that he would have a future, just like I hope this corporal, if he decides to stay in—I just don't think, Mr. Chairman, we should be second-guessing any of our men and women in uniform when they are in the battlefield. They have an enemy in front of them, whether armed or unarmed. I don't think any of us sitting behind a desk, unless we have been in their shoes, need to be making decisions of such.

I don't think it is fair for me to ask you, but I will ask if you have any comments, not so much about Pantano, but maybe tell me what does happen to a person like the corporal or like Lieutenant Pantano if they decide to stay in the Marine Corps? Do they have a future? Give me a yes or no. And I know I have taken Mr. Davis's time but I would like to know do they still have a future in the Corps?

General MATTIS. Congressman Jones, I respect everything you have said. The lieutenant, the corporal, they absolutely have a future. If they are found to be innocent, they are innocent and they will be treated as such. But what sets the U.S. military apart often from other militaries in the world is when we send them around the world, they represent what President Lincoln called the ''better angels of our country.'' we investigate every allegation against our troops. And as you can see from what you read this morning coming off the West Coast, what General Natonski has decided, there is no rush to judgment.

In the case on the other coast, in the 2nd Division area, we have a case that was reported up through the chain. Now I realize the NCO, there may be issues I can't address, I don't know the specifics. But we are always reluctant to ignore the comments of an NCO in the Marine Corps, of a petty officer in the Navy. By conducting an investigation and conducting a thorough one—and an article 32, as you know, is like a civilian grand jury. He is not in front of a court martial yet. I am not saying he is in an enviable position, and I respect again what you are saying, but we owe it in the Naval service where we hold people accountable who are leaders, whether they are lieutenants, corporal or generals, that we look at the circumstances surrounding something like that. Right now, that is what is going on, and I have to defer to the investigation itself, sir.

Mr. JONES OF NORTH CAROLINA. Chairman, if I could make one statement and then I will close. I appreciate your answer, and that I think is very encouraging, that if they are exonerated both with will have a future. That will not be held against them.

I would like to talk about Sergeant Coburn. He was demoted from his leadership position. Everything I have read from the Jacksonville paper, the Wilmington Star—the Wilmington News—and one thing that I do want to make clear for the record, Sergeant Coburn, being cross-examined by lawyer Gittins for Pantano and Marine Stackhouse, also attorney, he responded 50 times by saying ''I don't know or I can't remember.''

Again, I hope and pray that we give all the support that we talked about today as it relates to armor, and we remember that these men and women are human beings. And maybe if sometimes you don't have the luxury of a full second—you have been there, I haven't—it is a split-second decision. Let us give them the benefit of the doubt. Thank you, Mr. Chairman.

The CHAIRMAN. I thank the gentleman and I thank him for his attention to this very important area.

Gentleman from Kentucky, Mr. Davis.

Mr. DAVIS OF KENTUCKY. Thank you, Mr. Chairman. Returning back to the original focus of the hearing, I would like to make some comments and then ask a specific technical question. I think if one views military history—and I will speak as a student of military history—our current military, Army Marine Corps, Navy and Air Force, especially our forces on the ground in Iraq, are the best trained, best armored and best protected force in the military history of the world. That is very clear to anybody who I think would really open the books and get beyond politically motivated comments.

And I would like to take exception with a couple of my colleagues in the minority and some of the comments that they made earlier this morning from what I believe is a mischaracterization of the current situation by constantly resurrecting the events of past—of nearly two years ago, and now overcome by other events. And my suggestion would be all of us should be careful in our rhetoric, because the comments by some in this body, indeed though may seem well-intentioned to those members, do indeed have a contradictory effect in the culture to encourage and potentially embolden enemies who would not otherwise engage in destructive activities, and sends the wrong message, and thus potentially putting our service members in unnecessary danger and harm.

More correctly, I think what we need to focus on and where we are focusing is to assure that the material management life cycle is collapsed, very similar to the competitive models of competitive American manufacturing in the automotive industry and high-technology industry, which can field a brand-new vehicle in a year in an environment that contains continuous improvement and adaptation to a fluid and changing marketplace, not unlike the fluid situations you have so well adapted to.

And I make my comment from this perspective, as one who had delivered a technical paper at the Annual Mine Warfare Conference at the Naval Postgraduate School in 1996. I have to tell you, with nine years of perspective, I stand absolutely amazed at the great strides in adaptability of the Marine Corps and the Army on the ground.

I was in Israel with Chairman Saxton comparing tools and techniques, procedures, tactics that were being used both by Israeli defense forces in dealing with similar tools. They did some things that were interesting and adaptive based on their unique situations.

I have to say in the context of some of the remarks made by two minority members this morning, we in many areas are far in advance of where they are. And I think it is a commendation to the efforts of folks that have reacted well to this situation.

That being said, I would like to move into the future and think strategically as we are moving into a more network-centric and more adaptive expeditionary-type environment. General Sorenson, you made a comment that the future vision is to have vehicles that can be rapidly reconfigured for changing situations. For example, when we move from the conventional ground combat, the first phase of Operation Iraqi Freedom and then versus the second phase, where it became more unconventional, dealing with a counterinsurgency situation, we have taken immediate steps. But looking from a standpoint in the long term, does this vision include the ability to rapidly reconfigure—an area of personal interest to me—the heavy combat service support vehicles that tend to be the most vulnerable when they go into countries, the "Red Ball Express" they were called in World War II. If you comment what you are doing in that area, particularly looking down the road 5, 10, 15 years.

General SORENSON. Thank you for the question. And that is exactly what we are doing. Much similar to what we are doing with the Humvees, we are doing the same thing with the heavy trucks. As I mentioned, there is a consortium right now with all the heavy truck manufacturers, Freightliner, Oshkosh, International. They are getting together to assemble with respect to their particular vehicles where can we make some common applications of force protection capability, i.e., latches, doors, glass, et cetera, such that we can begin to find other vendors that can produce these and put these on different vehicles and make them all fit, so when we will have a surge capability, as opposed to every particular vehicle having their own unique solution, which is exactly what we have right now.

So the intent is just like what we have done with the Humvees in terms of getting the chassis and getting a B kit, if you will, that we can hang onto that vehicle to make it an armored capability. We are going to do the same thing with our medium vehicles and also heavy fleet to identify how we can do the same thing.

Mr. DAVIS OF KENTUCKY. Do you see this type of technology—I wouldn't call them add-ons correctly, but other parts of their deployment package? Would that be resident with the units or would that be kept at a logistical location and adapted based on contingencies?

General SORENSON. I would say both. TRADOC is working to define what the future armor strategy ought to be, what that composition of armor capability ought to be. As we produce these kits, some of them will be in a warehouse, but in other cases as they deploy forward, a number of these kits will go forward, such that as they go from combat operations to sustainment operations, they can make that adjustment rather rapidly and not require a bunch of mechanics and welders and so forth to begin to put these kits on. In many cases, the basic maintenance capability can be put on immediately.

Mr. DAVIS OF KENTUCKY. I yield back the balance of my time, Mr. Chairman.

The CHAIRMAN. Did the Ranking Member have a few comments?

Mr. SKELTON. I know the Chairman and other members of the committee heard me make reference to this before, but I—and I

would like to address a question to General Mattis, if I may. It appears that the insurgency guerilla warfare was not anticipated or not anticipated fully. General, I am not a clairvoyant nor am I a graduate of any of the war colleges, but my studying of things military over the years as a member of this committee caused me in September of 2002 to send a letter to the President with copies to the Pentagon. I have reason to believe they were widely distributed. The letter which, of course, is before the war, which began in March of 2003, anticipated potential and extensive conflict against American forces and/or among the Iraqi ethnic and religious groups; in other words, the potential for insurgency.

I did the same a few days before the invasion in March, 2003. As a result of my first letter, Steven Hadley and Elliot Abrams came to my office to allay my concerns. Sadly, I was right. Now, if I can come up with a potential problem, why can't those of you who study and live the military anticipate this? I realize at that time you were just a two-star general and you may say, Congressman, it was above my pay grade. But you are the only one here to ask that question of. Why was it not anticipated that there would be an insurgency? And I am not talking about the type of insurgency, but just an insurgency. General.

General MATTIS. Congressman Skelton, it is not above my pay grade. It is a very valid question.

Mr. SKELTON. Not above the pay grade now, but as a two-star, it may have been.

General MATTIS. That is what we are paid to do. Much of the professional PME, professional military education that we offer to our military leaders today is thanks, in no small part, to your sustained tenacious drive toward this sort of preparation of our leadership.

I will tell you that General Hagee, when he was the commanding general of 1 MEF, I was flown out of Afghanistan, if I remember right, in March of 2002, back to 1 MEF as his deputy. And in April we went through a war game. He pulled out all of our best planners, earning the ire of some of our gray beards, and said the day we step across that border, we will be in phase four behind us, so start putting together the plan. I was not so brilliant. I went to him and said, can't we concentrate on winning the war first? He said no, this is important.

They put together a plan that was so good that when I was sent down to command First Marine Division for the attack in Iraq, I took the plan with me. In November of that year, former Commander in Chief of Central Command was the guest of honor at the First Marine Division birthday ball—and this is November. We deployed, as you know, in January and February. And he said, ''Young men,'' he said, ''you will destroy the enemy's army in six weeks or us old guys are going to disown you.'' but he said, ''Then the work begins.'' I had two generals and a former retired marine commander of Central Command who warned us that the hard work would start not when we were fighting the main force of the enemy.

We had a plan, we executed the plan. I am speaking now as tactical commander, as a division commander. Perhaps it was not on the national level thoroughly thought through. Certainly with hind-

sight, we can see things. Perhaps because of the clarity of your views and the reading that you have done—I have seen your reading list, as you recall—you were able to identify it. We went five and a half months, Congressman Skelton, five and a half months after we pulled out of Tikrit and Baghdad in the southern area, and I didn't lose one sailor or marine. We lost about 55 or 60 wounded, some grievously wounded. And the insurgency was growing during this period.

You know, sir, I can't give you a sufficient answer. I think if instead of 2005 it was 1805 in this room, we would not anticipate that in 10 years the British Navy would sail up the Chesapeake and they would burn this building. I think in 1905, we would not anticipate that in 12 years our Indian fighting armies spread across the western frontier and would be fighting with machine guns and barbed wire in the trenches in Europe.

Sir, life is one darn thing after another. It is not a good answer for you. We anticipated a lot. We had a plan. We knew how to get the lights turned back on, get the water treatment plants working so there would be no cholera, to make common cause with the Iraqis. And in many, many places, it has worked. And when you look at an election in Iraq where a purple finger could have gotten your family destroyed, killed, and they had a voter turnout that rivaled what we had in some of our elections, I think we have accomplished a lot.

And it is always easy in hindsight to see where perhaps we fell short, and I acknowledge and take responsibility for it. But we have done a lot of things right, sir and that was thanks to the PME in the anticipation and a lot of work that we have done to try and get it right. The victories we have had—and they have been significant—have not come by happenstance. And the challenges, yes, and the losses as heartbreaking as they are, well, it could have been a lot worse, sir.

Mr. SKELTON. General, I thank you.

The CHAIRMAN. I thank the gentlemen.

Gentlemen, thank you very much for your testimony, and we still have a panel to go. So this is a good marathon session, but I think it is worthwhile.

You know, one thing that I think is—one realization I think most folks have from looking at the operation in the warfighting theaters, the asymmetric threats that have been carried out fairly effectively by an enemy that is adaptive have reflected, I think, to all of us that the Humvee is basically a big Jeep. It was a successor to the Jeep. It was never intended to be a tank or even an armored vehicle, and yet it has gone—we have used them in tactical situations. We have used them in combat situations. And we have loaded them up and tried to load them up with enough armor to the point where it is a little bit like the cartoon where you have the little boy that is ready to go out and play in the snow, and his mommy is asking why he is not moving, and he says, you have got so much stuff on me, you have bundled me up so much against the cold that I can't move.

You can only do so much with a Humvee. Even if you have the beefed-up suspension and the increased engine power that we had—put into the 1114, you still have basically a big Jeep that has

to carry a lot of steel. Since—although we are talking about the armor situation and force protection in theater, what do you think, General Catto? Where do you think we are going to be going with the next vehicle? Do you think the Humvee has, in light of this asymmetric warfare, seen its day and is going to be relegated to garrison-type situations? Do you think we need to go with another vehicle that has more suspension, more horses, more protection?

General CATTO. Mr. Chairman, I think we have got a lot of Humvees for the near term that we are going to use until we die. Your question really means are we going to develop a vehicle from the ground up for survivability that we can put armor packages on or off of, depending upon the requirement. And I think the answer is that is where we have to go. And it is going to be an issue of what is the mission you want and what do you want the vehicle to do and how do we build that? My opinion is we are going to have to start with a new class vehicle and build it from the tires up.

The CHAIRMAN. General Sorenson, what do you think?

General SORENSON. I think in some cases you are correct. In fact, right now we have been conducting, if you will, with industry partners, tactical rodeos, just like we did with the Stryker competition. We are doing a utility vehicle and a medium utility vehicle, and we are having industry show up and kind of give some ideas in terms of what we can do; as well as we are trying to leverage other lessons learned from this environment to figure out how we can plan for improvements in what the soldiers are requiring for utility vehicles and medium utility vehicles in the future.

The CHAIRMAN. Well, gentlemen, thank you. And let me just leave you with this. We have a schedule to finish out the armor program. We want to look at this schedule with you and we would like you to take it back and take a look at it to see if there is any way we can accelerate the program, and let us know what the long poles and the tent are. And the committee will work with you to try to shorten those poles and try to compress the schedule.

We are going to vote in a little bit on this bill, the big supplemental that will have—incidentally, along with the other things and the jammer funding that is in this and armor funding, we also have money to try to handle for the first time these mortar rounds coming into theater. And we have had some tests out at Yuma and El Paso that have proven fruitful. And we are going to be moving systems into theater fairly quickly and we would like to have your feedback on that, and I think we have got some candidate locations for those first couple of systems. But we do need to scrub with you this schedule and see if we can't compress it, accelerate it, and do whatever it takes to get the program finished.

Thank you very much. We will move to our third panel. And General Mattis, you have the pleasure of being with us in your first panel for a long time, so stay where you are at. And you are going to be joined with Lieutenant Colonel Paul J. Kennedy United States Marine Corps, former battalion commander, 2nd Battalion, 4th Marine Regiment, First Marine Division, who is now with Headquarters Battalion, First Marine Division.

General Mattis, if you want to lead in and introduce. And also, General Kelly, come up to the table. You are welcome, too.

STATEMENT OF LT. GEN. JAMES N. MATTIS, FORMER COMMANDER, FIRST MARINE DIVISION, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND, U.S. MARINE CORPS

General MATTIS. Thank you Mr. Chairman, Lieutenant Paul Kennedy served as the lead First Marine Division planner for OIF 1. Going back into OIF 2, his name had come up on the command list and he took command of 2nd Battalion, 4th Marines. This battalion was given the task of holding Ramadi. Ramadi in Al-Anbar Province is the center of gravity. It is the administrative and legal center of Al-Anbar Province, which is the heart of the Sunni triangle and it was the critical key terrain that must be held. While Fallujah received a lot of attention, the place that we could not lose control of was this town.

Colonel Kennedy served under an Army brigade commander who served under my command. In other words, we have a Marine division with an Army brigade, and inside the Army brigade was the 2nd Battalion, 4th Marines. And that is the command structure he operated under.

I observed Colonel Kennedy on probably a daily basis in terms of his troops, because that is where my headquarters, was and I would depart every day through his lines. And I would go down and see him probably as often as I saw any other battalion commander, every week to ten days or so, maybe two weeks if I was caught elsewhere.

Colonel Kennedy proved to be one of our more effective combat leaders in one of our toughest fights that the Marine Corps has fought since Vietnam. I think that is a sufficient introduction, Mr. Chairman.

The CHAIRMAN. Thank you very much, General.

Colonel, the floor is yours, sir.

STATEMENT OF LT. COL. PAUL J. KENNEDY, FORMER BATTALION COMMANDER, 2ND BATTALION, 4TH MARINE REGIMENT, FIRST MARINE DIVISION, HEADQUARTERS BATTALION, FIRST MARINE DIVISION, U.S. MARINE CORPS

Colonel KENNEDY. Mr. Chairman, distinguished members of the committee——

The CHAIRMAN. Have you got that mike on there? And bring in pretty close if you can.

Colonel KENNEDY. Yes, sir.

Mr. Chairman, distinguished members of the committee, thank you for this opportunity to address the issues that surround the force protection of the marines and sailors of 2nd Battalion, 4th Marines.

It is my distinct privilege to represent the nearly 1,100 marines and sailors of 2–4 during these proceedings, for after only a short seven months home, they are forward-deployed as a force in readiness. For this opportunity I am exceptionally thankful.

Over the course of seven months within the City of Ar Ramadi, Iraq, 2–4 battled a relentless and adaptive enemy for control of this provincial capital, the heart of the Sunni Triangle. During this period we bore witness to an ever-increasing lethality of attacks that ranged from simple improvised explosive devices to suicide bombers

to full-blown urban combat. This wrought a terrible price for our service. This is war, and we are committed to winning.

In April, May, and July, we fought full-scale combat on the city streets of our assigned area, accounted for nearly 1,000 enemy dead combatants, while maintaining control over the population of 450,000 Iraqi citizens. This success did not come cheaply. In the almost daily fight that defined our lives, 34 young men gave their lives with the several times that number wounded.

In spite of the sacrifice, their spirit readied them for each successive challenge, eager to deny the enemy the chance of victory. They stood ready to defend the lives of the innocent, but, most importantly, they stood ready to defend the lives of their fellow countrymen, and in this they exceeded all expectations.

In response to Representative Weldon's earlier questions, I am also the officer responsible for writing the fitness report concerning Captain Royer. I would tell you that Kelly Royer is a good and decent man and initially a strong combat leader. In over 90 days of intense combat, my confidence in his ability to lead eroded to the point of necessitating his relief. This was my decision and my decision alone. And, sir, I will tell you that it was not an easy one to take.

The relief was not based upon any complaints that he had forwarded or suggestion of falling out of disfavor. It was strictly a matter of leadership shortfalls brought about by long-term exposure to combat. I have spoken to the captain in recent months in his current and demanding assignment as the operations officer for Headquarters Battalion of the 1st Marine Division.

Sir, beyond these comments and out of respect for Captain Royer's personal reputation and that of his family, I would await a closed hearing to further discuss this particular matter.

I thank the Members of Congress for their support in providing my marines the best equipment possible to continue this war on terrorism, and I am grateful for your inquiry as to the welfare and well-being of the Magnificent Bastards of 2–4. At this time I would be happy to answer your questions.

The CHAIRMAN. Colonel Kennedy, thank you for your very succinct statement, and, in light of your leadership position as the commanding officer of the battalion, that we should give a lot of credibility to what you have just said.

You know, one thing in reading the story about E Company, one thing that it refers to is the—to a lack of equipment, to a delay in armoring. And that is a thread that is woven throughout this story, along with the aspect of Captain Royer.

And there has been—it appeared to me, and I think this has probably been the case throughout the history of this country, that there is always a disconnect between those of us who are the shopkeepers back in the States, or in the system, whether it is wearing the uniform or the congressional system or in the civil service or in industry, that supplies your equipment and the warfighter who needs it.

And, in fact, I can remember when we were with you, General Mattis, I was there with Congressman Calvert and Congressman Reyes last time, and I asked you what you needed, and you said, I would like to get scopes for my guys and for all the marines,

ACOGs. That makes sense because even though it is a little magnification, it gives them added capability, and they are all—marines are good shots above all, and that leverages that capability.

And I came back and I met with the head of SOCOM, and I called him up and I said, do you have any ACOGs? And he said, I have a hundred that I can ship tomorrow. And he had a guy in there at 7 a.m. in the morning in my office, and he rolled out a blanket—I don't know how he got through security—and he had every device known to man that Special Operations had. And he said, I could send a hundred overnight.

I saw the e-mails after we sent those coming from the marines about the old Congressmen getting involved in the acquisition system, and all we were doing was sending you what you asked for, right? No strings attached. So my point is that it appears to me that there is, and always has been, and probably always will be to some degree, a disconnect between the guys that need stuff, the guys in the battlefield, and the system that supplies that stuff. And what we are trying to do is shorten up that connection and make that connection one that is more responsive.

So, Colonel Kennedy, if you look at the statements that are in this, have you read this article that is the subject of a lot of Members' understanding of the situation?

Colonel KENNEDY. Yes, sir, I have.

The CHAIRMAN. Okay. You have read where they talk about having unarmored Humvees and Humvees that were partly armored and some that were there that appeared to be almost totally soft. But as I recall when you folks went in, one pledge that the Marines gave me when you came over, left out of Kuwait, was that all the Humvees coming in—this is when you came back to Fallujah—came into Fallujah—that everything that was going to be in operations would have some kind of armor on it, either steel doors, or that plus something else; so maybe not 1114s and maybe not kitted, but would have some level of armor.

But from your estimation, your personal estimation, was there more that could have been done in terms of moving armor to the guys who were doing the fighting, which was largely this company and your battalion in particular?

Colonel KENNEDY. Sir, there was a progression of armor protection that started when we got to Kuwait. We had originally embarked about 80 Humvees from Camp Pendleton, none of which were armored per se. Before we departed in the two-week bloc of preparation, before we departed, 75 percent of the vehicles that went forward—I gained some vehicles in that process—75 percent of those vehicles were armored to some Level three protection.

None of the troops' carrier Humvees that went forward had anything less than the armored doors, and if they did not have armor in the back in the actual troop compartments, they went empty. Echo Company did not make that transit. They flew into Al Assad and met with us in Ramadi. Every vehicle that went forward either had the LOGCOM-provided Level three armor or armor that we procured in Camp Victory from Army units that were departing the theater.

The CHAIRMAN. So you had—the stuff that you brought in from Kuwait typically would have the two—have the doors armored, have steel doors?

Colonel KENNEDY. Yes, sir. The original doors, I believe, were called the Simula doors. They were half doors. We had not seen the L-shaped armor at that point. We received a number of side armor panels from the division logistics system and from the Army units that were depositing that same armor that they had locally fabricated in Kuwait.

The CHAIRMAN. Okay. The marines that were killed in that firefight, which I think you had one Humvee that took heavy fire, the one that is referred to in the article? I think you had, what, seven or eight marines killed in that particular vehicle? What did that have on it?

Colonel KENNEDY. Sir, I cannot attest 100 percent. As we—any armor that would have been on that vehicle was totally destroyed was pulled off soon thereafter. During that period on the 6th of April when it was ambushed, that fight continued for three days, and there was a varying state of breakage of the equipment.

I have pictures from—taken right after those marines were pulled from those vehicles. They were shot through the windshield by a 12.7-millimeter heavy machine gun. Armor really was not an issue in protecting or failing to protect those marines. Even if they had had the 4-inch-thick ballistic glass, from the 100 meters away, a heavier machine gun is going to defeat any armor.

Six marines died right out. One was manning his machine gun, so he was standing above the armor that would have afforded him any protection. And the last marine to have been killed in that ambush, in fact it was a sailor, a corpsman that was treating the marine on the ground. So he was outside of the vehicle. I do not believe that armor in that case would have made a difference, sir.

The CHAIRMAN. That machine gun is approximately what caliber? Is that the equivalent of a .50?

Colonel KENNEDY. It is exactly a .50-caliber.

The CHAIRMAN. .50 cal is going to tear up a Humvee fairly quickly.

What about the second vehicle that they speak about in the article that was following that particular Humvee? I think it states that it had armor. What degree of armor did that have, if you can recall?

Colonel KENNEDY. Yes, sir. On the 29th of May, Echo Company was tasked with investigating a parked station wagon that was on the side of the road. We had not seen vehicle-borne IEDs at that stage in our time in Iraq, but it seemed suspicious because the Iraqis do not just leave a vehicle unattended. It would be quickly stripped.

A convoy of four vehicles was passing that station wagon, passed within six feet of the vehicle, when it detonated on the last Humvee. That Humvee was transporting not only the Marines that were assigned to the Quick Reaction Force, but it was, in fact, carrying additional marines that had been picked up along the road that had been conducting a patrol. So it was a fairly full vehicle.

The armor had again, sir, LOGCOM-provided flank protection. It had the Foster Miller panels on the backside, and it had L-shaped doors and the ballistic glass for the windshield.

I was the on scene of that explosion within about five to ten minutes. We surveyed the entire vehicle. There were no perforations or failures of the armor systems themselves. It was where marines were exposed above the protection of the armor or through the void where the L-shaped door is that they were killed by the overpressure.

Ultimately, sir, it appeared to have been four to five .155-millimeter artillery projectiles, plastic explosives and ball bearings that killed those marines.

The CHAIRMAN. So in that incident, a fully up-armored 1114, with all of the—with the full suit of armor would not have prevented the deaths? Is that basically your opinion?

Colonel KENNEDY. Sir, we experienced just over 200 IEDs over the course of the time we were there. Sir, there were times where I had no rational explanation for why marines survived detonation of an IED right at their feet. Other times they were as much as 50 meters away and were injured grievously. I do not know if an up-armored Humvee would have or would not have survived that level of explosion. It was a big bomb, sir. The station wagon itself was completely disintegrated. There was a small portion of the engine block left.

The CHAIRMAN. Okay. And the first incident you described, the ambush where you had heavy machine gun fire coming through the front of the vehicle, that, in your opinion—is there any type of armor suit that we make for the Humvee today that would have survived that or would have prevented that or repelled that attack?

Colonel KENNEDY. I don't believe so, sir. I know that a .50-caliber machine gun at that range striking any armor, it is going to penetrate anything short of a Bradley fighting vehicle or a tank. It is going to kill it.

The CHAIRMAN. I don't think the ballistic glass, any of the species of the ballistic glass that we make is heavy duty enough to take a hit, much less multiple hits with a .50.

Mr. Skelton.

Mr. SKELTON. Colonel, thank you for your testimony. Regarding the marine in question of which you spoke, did you write the earlier OER on him?

Colonel KENNEDY. Yes, sir, I did.

Mr. SKELTON. And the subsequent comments that Congressman Weldon read, did you write those as well?

Colonel KENNEDY. Sir, actually those were—those were comments provided for this report. There was comments provided up the chain of command. There are procedures to safeguard that officer's career, reputation, checks and balances. So I believe that is where those comments were taken from, sir.

Mr. SKELTON. Thank you.

The CHAIRMAN. General Mattis, let me ask you while we have got you here—we are going to have a vote very quickly on this supplemental—what is your take on the western AOR right now, the Fallujah to Syria border? And in particular, if you look at the standup of the Iraqi forces and the mentoring that we are under-

taking now, the embedding of American advisers, if you will, the ongoing training, we have got a lot of Iraqi forces being stood up for almost every AOR except that AOR. They are a very small, dedicated Iraqi group. The implication is that is pretty heavy lifting.

I would like to have your personal opinion as to whether you think that the Iraqis are going to be able to hold that tough piece of territory and manage it not to an extremely high level, but to a basic level of stability?

General MATTIS. Sir, Mr. Chairman, I would like to caveat what I say, that I have been out of there for a while. With Fallujah no longer providing a sanctuary due to the victory that we had in November, last November, the border is, as you know, almost impossible to fully control. We have our own challenges on our own southwest border. This is a very remote and long border, and there is always going to be some people coming across which impacts on the security situation there.

The election, however, has changed this dynamic. I think it is why the enemy is trying to kill so many Iraqis now.

The Iraqi security forces that were out there were penetrated by the enemy, heavily penetrated by the enemy. Plus they had intense tribal loyalties. And the current situation that the leadership, Iraqi and American, has taken charge of shows they have got to bring in nationally recruited Iraqi security forces. Young guys from the hometown walking down the street in uniform are too vulnerable. They know where their families are. They have tribal loyalties. Troops that are a nationally recruited force living in barracks, operating more on military or paramilitary lines will give us a better opportunity to allow them to, with American support, American stiffening, American training, American reaction forces for quite some time yet—will permit them to do what perhaps the disappointing performance of the previous force could not provide.

The CHAIRMAN. But do you think they are going to be able to do it? And I agree with you totally that this is going to have to be a national force. Do you think they are going to be tough enough or the Iraq situation may evolve to where we can move out of some of the more lightly traveled areas and some of the less difficult areas in Iraq? But I can see in my mind's eye a continuing call from the Iraq Government for American forces to stabilize that western AOR, that piece of the triangle.

General MATTIS. Sir, since I am no longer over there, I always look a little askance at Washington, D.C., generals talking authoritatively about things a long ways away, or New York reporters writing about Ramadi when they have never been there. But it is trending in that way, sir.

The CHAIRMAN. I would be interested in your take on that. And thank you for your service. You have a great reputation as a warfighter, and you did a great job handling our people. And, Colonel, thank you for your description of this tough area, this difficult area. You know, it is—the Marines have a very disciplined process, which is quite a personal process. And I know when my son was going through TBS, I remember him, he was writing his reports one day, because they get all the young—all the new officers end up—are placed in leadership positions, and they have to rate some-

times their best friend; right? The rest of their peers. And their peers in turn rate them, and that means you have to sit down, look somebody in the eye, and tell them that they failed. And that is a difficult thing, but it is one that is necessary for the development of marines. And I don't think there is any substitute.

And so I think the committee has got to take your statement as one that is—one that is made with honor, with insight and obviously an understanding of the situation that we do not have.

So you certainly—I think you have served the committee well in giving us your take, straightforward, on this situation. And beyond that, I think it has been good, General Mattis, to have you here with us also listening to the armor discussion, because you are a consumer. And we are going to have to change this system. We are going to have to get a system developed. We are going to have to develop more response. This system is largely a product of Washington, D.C., to some degree, a product of Congress. It is a product of $600 hammers that nobody ever wanted to see again.

So we have a system that can say no 35 times before it says yes to anything. Even the new Jammer, this license that the Secretary signed out to use, a license we have given them to buy equipment for the combat theater, waiving all laws, there was enormous resistance, I can tell you, to utilizing that for something as basic as a Jammer. So hopefully we have trotted this one out, and we will use that as a model to follow.

So let's work together and try to get this—try to work out this disconnect that has always existed to some degree between the field and the suppliers and serve our people well. So thanks a lot to your endurance, all parties involved. And thank you, General Kelly, for your helping to escort this august body, and thanks for your service to the country as well.

This hearing is concluded. Let's get back together in three or four weeks, and let's sit down and see where we are.

[Whereupon, at 1:34 p.m., the committee was adjourned.]

A P P E N D I X

MAY 5, 2005

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MAY 5, 2005

OPENING REMARKS OF CHAIRMAN HUNTER

Army and Marine Corps Vehicle Armoring and Improvised Explosive Devices (IED) Electronic Countermeasures "Jammers" Programs in Iraq.

May 5, 2005

The Committee will come to order.

This morning we meet to receive a status update on Department of Defense force protection initiatives in Iraq with particular emphasis on improvised explosive devices (IED) jammer programs and the armoring of Army and Marine Corps tactical wheeled vehicles (TWVs) which include HMMWV (HUMVEES) and big ol TRUCKS.

I would like to welcome our distinguished panel representing the Army, the United States Marine Corps, and the Joint Defeat IED Task Force. Gentlemen, thank you for the service you do for our men and women in uniform.

We are so proud of our men and women currently serving in Iraq and Afghanistan. Whether members of Active Duty, Reserve, National Guard units, or civilians, these heroes embody the best ideals of our nation – serving so that others may be free -- and we thank them and their families for all for the sacrifices they continue to endure.

The trust given to the people in this room by the soldiers, marines and families is that we will provide them with the necessary systems and equipment so that they can be successful in accomplishing their mission at anytime, anywhere in the world. In keeping this trust, we must be honest in our assessment of whether we are doing everything in our power to not only provide the soldiers, sailors, airmen, and marines with what they need to accomplish their mission — but also when they need it.

Force protection is an essential part of this trust and has two components. The offensive component requires the equipment, systems and tactics to maintain the initiative, to defeat, disrupt, and deny the enemy the ability to attack. The defensive component provides the survivability required to carry out the offense. Improvised Explosive

Devices (IEDs) still continue to be the destructive weapon of choice employed by the extremists, murderers, and thugs who would continue to try and deny the Iraqi people democracy.

This committee has closely monitored and has been actively involved with vehicle armoring initiatives, improvised explosive device or IED electronic counter measures "JAMMERS", night vision equipment as well as many other key items necessary to allow our forces to carry out their important, necessary mission.

The vehicle armor situation in Iraq has improved to over 28,000 armored vehicles, and General Casey now has standing orders that after February 15th of this year, no vehicle without armor protection is allowed to operate outside secured forward operating bases.

However despite all this, Members of Congress continue to receive claims that entire units are operating without adequate vehicle armor. Just this past month alone, two major press articles have highlighted the

inadequacy of the Department to meet the force protection requirements of men and women serving overseas.

Emerging Vehicle Armor Requirements

- Last month, emerging requirements for more Add-On Armor kits for our tactical trucks.
- Poor requirement forecasting by the Army let these production lines go dark and now the raw materials have not been ordered causing an unnecessary constraint on the production.

This is unacceptable gentlemen. It is clear that we still need to do better and I hope that the testimony we receive today can help us understand the ground truth regarding vehicle armor.

Effective electronic jammers are also an essential tool in defeating the IED threat and yet at a HASC full committee hearing in March, General Casey testified that only 25% of his validated theater requirement for jammers has been met. I hope our panelists today can provide us a better update on the jammer situation.

From the Department of Defense, we welcome Brigadier General Joseph L. Votel, the Director, Joint IED Defeat Task Force,

From the Army, Brigadier General Jeffrey A. Sorenson, Deputy for Acquisition and Systems Management, Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

Representing the Marine Corps, Brigadier General William D. Catto, Commanding General, Marine Corps Systems Command.

Gentlemen, we look forward to your testimony today.

I now recognize the committee's ranking Member, my good friend Mr. Skelton, for any remarks he may wish to make.

[Following Mr. Skelton's remarks]

Without objection, the witnesses' prepared statements will be entered into the record.

RECORD VERSION

STATEMENT BY

BRIGADER GENERAL (PROMOTABLE) JEFFREY A. SORENSON
DEPUTY FOR ACQUISITION AND SYSTEMS MANAGEMENT
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
(ACQUISITION, LOGISTICS AND TECHNOLOGY)

AND

BRIGADIER GENERAL JOSEPH L. VOTEL
DIRECTOR, JOINT IMPROVISED EXPLOSIVE DEVICE DEFEAT TASK FORCE
HEADQUARTERS, DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF, G3

BEFORE THE

SUBCOMMITTEE ON DEFENSE

COMMITTEE ON APPROPRIATIONS

UNITED STATES HOUSE OF REPRESENTATIVES

ON JOINT SURVIVABILITY PROGRAMS

FIRST SESSION, 109TH CONGRESS

May 5, 2005

NOT FOR PUBLICATION
UNTIL RELEASED BY THE
COMMITTEE ON APPROPRIATIONS

Mr. Chairman and distinguished Members of the Committee, thank you for this opportunity to report to you on current Force Protection Programs. It is our privilege to represent the Army, and the Soldiers who rely upon us to provide them with world-class weapon systems and equipment so they can successfully accomplish any mission at anytime, anywhere in the world.

Mr. Chairman, we are working to enable the Army and our Sister Services to fight and win the Global War on Terror (GWOT), while transforming our forces to defeat future enemies of the United States. Nothing we do is more urgent or pressing than ensuring our Soldiers, Marines, Sailors, Airmen, and civilians have the best leaders, organizations, and equipment we can provide them today and tomorrow. Our task would be impossible without the tremendous support from you, the Members of the Committee, and your staff members. You have helped us make tremendous strides in enhancing the level of protection afforded to our Soldiers who are conducting operations in support of OEF/OIF.

For the Army, protecting the force, present and future, means protecting the Soldier. In the Spring of 2004 nearly every attack from an improvised explosive device (IED) resulted in a Coalition casualty. Today, through personal body armor, improved protection in vehicle up-armoring, electronic counter-measures, greater situational awareness, and better training and operational focus, we have drastically reduced this ratio to about one casualty for every four IED detonations, and we continue to drive down this ratio. We do this through a holistic approach to force protection – personal body armor, vehicle armor, and electronic shields. The Army has balanced materiel solutions with innovations in both the organization of our forces and in unit level tactics and training.

We are also bolstering the protection afforded to our Soldiers when they are mounted and traveling the dangerous roads of Iraq. This includes enhancing the protection levels of tactical wheeled vehicles in one of three possible ways. The first level (I), and the optimal solution, is to produce new vehicles with integrated armor, ballistic windows, and air conditioning. This protects the

Soldiers from small arms, many types of mines, and IEDs. At the second level (II), we provide Add-on-Armor kits consisting of armor plates, ballistic glass, and air conditioning. These kits also protect our Soldiers from many small arms, mines, and IEDs. The third level (III) provides Department of the Army–approved steel and kit patterns for fabricated kits. This is an interim solution that is installed at the theater or unit level. It does not include ballistic glass. The Army is taking care to ensure that all kits and Add-on-Armor provide an appropriate level of protection and do not pose a separate danger to Soldiers by overloading vehicles or causing secondary fragmentation on impact from an IED. The Army has extensively tested these kits against a variety of probable threats and will continue to test all applications submitted by industry.

The tactical wheeled vehicles that are receiving this additional protection include: the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), the Heavy Expanded Mobility Tactical Truck (HEMTT), the Palletized Load System (PLS), the Family of Medium Tactical Vehicles (FMTV), the Heavy Equipment Transport (HET), the 5-ton truck, and the line haul truck tractor. The Army has installed level II and level III armor kits, under this program, on over 28,000 wheeled vehicles in the theater of operations, in addition to fielding almost 8,000 Up-Armored HMMWVs. Our goal is to procure Level II Add-on-Armor kits for over 25,000 wheeled vehicles in theater. The Secretary of the Army stood up an Armor Task Force at the General Officer level to provide increased management to the armoring effort. Weekly meetings of this task force were initiated on December 1, 2004, with the short term goal of speeding up the armoring of tactical wheeled vehicles and the long term goal of determining a comprehensive armoring strategy for all Army vehicles. His task was to ensure that all vehicles driving across the berm from Kuwait into Iraq have armor protection. Per his guidance, that goal was achieved on February 15, 2005.

The Up-Armored HMMWV is one example of a type of vehicle with integrated armor protection. The Up-Armored HMMWV protects against bullet threats, IED fragments, and anti-tank/anti-personnel mines. Theater commanders deployed with 235 Up-Armored HMMWVs in May 2003. The

requirement has steadily increased and now stands at over 10,000 Up-Armored HMMWVs. Industry had been producing 450 Up-Armored HMMWVs per month since October 2004; production increased to 550 per month in March 2005. The United States Central Command currently has almost 8,000 Up-Armored HMMWVs in its area of responsibility. We anticipate meeting the current theater requirements with June 2005 production. The Up-Armored HMMWV program has funding for a total of 10,345 vehicles.

The threat of Radio-Controlled IEDs remains pervasive in both Iraq and Afghanistan. Working in conjunction with Congress, CENTCOM, Services, and industry, the Joint IED Defeat Task Force is making progress in meeting the requirements for forces in both Iraq and Afghanistan. Since our last update to this Committee in February, we have fielded an additional 900 countermeasure devices in the theater, bringing the total to over 4,200. We are also continuing to work diligently to develop a comprehensive system that will provide the full spectrum protection that our forces need for current and future threats—and which will ultimately replace the complex combination of devices currently deployed in theater.

We are a Joint military and we are constantly working together to enhance survivability for our deployed forces. Our brave men and women in uniform display unrelenting tenacity, steadfast purpose, quiet confidence, and selfless heroism. We appreciate your wisdom, guidance, and strong support as we work to ensure that they have what they need to successfully accomplish their missions and return home safely.

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Armor Summary

	VEHICLE SYSTEM		CFLCC AOR O/H REPORT 28 APR 05	VALIDATED ARMOR REQ 14 AUG 04	VALIDATED ARMOR REQ 30 MAR 05	FUNDED	PROD COMPL FOR LEVEL I & II REQUIREMENTS VALIDATED ON: 14 AUG 04	PROD COMPL FOR LEVEL I & II REQUIREMENTS VALIDATED ON: 30 MAR 05	CFLCC ARFOR REPORT AS OF 28 APR 05 LEVEL I[1]	LEVEL II	LEVEL III	% OF TOTAL VALIDATED REQUIREMENT LEVEL I - III	% OF TOTAL VALIDATED REQUIREMENT LEVEL I & II	UN-ARMORED VEHICLES NOT LEAVING FOBs
LTV	UAH	ADD-ON ARMOR	7,991	8,105	10,079	10,345	COMPL	JUL 05[2]	7,991			79%	79%	
LTV	HMMWV	ADD-ON ARMOR	19,158	13,872	13,872	14,220	COMPL	COMPL		12,712	3,437	116%	92%	3,009
MTV	FMTV	ADD-ON ARMOR	4,994	2,805	3,335	3,598	JUL 05	AUG 05		1,392	2,797	126%	42%	805
MTV	M939+(5 TON)	ADD-ON ARMOR	3,349	3,073	2,688	3,818	JUL 05	JUL 05		399	2,055	91%	15%	895
HTV	HEMTT	ADD-ON ARMOR	2,835	1,595	2,430	1,595	COMPL	SEP 05[3]		1,507	1,054	105%	62%	274
HTV	PLS	ADD-ON ARMOR	940	871	914	1,275	COMPL	COMPL		786	71	94%	86%	83
HTV	HET	ADD-ON ARMOR	625	665	758	665	COMPL	AUG 05[3]		559	65	82%	74%	1
HTV	M915	ADD-ON ARMOR	1,691	1,302	1,877	2,025	JUL 05	SEP 05		323	1,233	83%	17%	135
	SUBTOTAL		41,583	32,288	35,953	37,541			7,991	17,678	10,712	101%	71%	5,202
	ASV		94	872	872	394	DEC 06	DEC 06	94			11%	11%	
	FUEL TNKRS	AoA	1,375	372	1,375	542	APR 05	TBD		144		10%	10%	N/A
	M113 FOV	AoA	734	734	734	325	NOV 05	NOV 05				0%	0%	
	TOTAL		43,786	34,266	38,934	38,802			8,085	17,822	10,712	94%	67%	5,202

AS OF 28 APR 05

[1] DOES NOT INCLUDE 230 CODE H UAHs & 7 BATTLE LOSS ASVs; 106 ASVs SHIPPED

[2] ASSUMES SUSTAINED PRODUCTION RATE OF 550 / MONTH

[3] BASED ON TENTATIVE PRODUCTION SCHEDULES

LEVEL I – HQDA APPROVED INTEGRATED ARMOR
•PROTECTION AGAINST SMALL ARMS, IEDS, & MINES
LEVEL II – HQDA APPROVED ADD-ON ARMOR (AOA) KIT
•HEAVY AND MEDIUM AOA KITS –PROTECTION AGAINST SMALL ARMS, IEDS, & MINES
LEVEL III – LOCALLY FABRICATED ARMOR KIT
•HQDA APPROVED STEEL
•PROVIDES COMPARABLE PROTECTION TO LEVEL II WITHOUT BALLISTIC GLASS

CONUS & USAREUR INSTALLS				
	USAREUR		CONUS	
	O/H	INSTALLED	O/H	INSTALLED
HMMWV	0	475	587	594
FMTV	7	0	0	155
M939	64	5	17	93
HEMTT	1	25	0	60
PLS	4	15	0	38
HET	0	0	0	6
TOTAL	76	520	604	947

95-100%
85-94%
75-84%
< 74%

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AoA Future Schedules

	VEHICLE SYSTEM		CFLCC AOR O/H REPORT 28 APR 05	VALIDATED ARMOR REQ	LEVEL I, II & III KITTED VEHICLES AS OF 28 APR 05	PRODUCTION SCHEDULE					LEVEL II KITS READY FOR INSTALL[1]	QUANTITY IN TRANSIT[1]	LEVEL II KITS TO BE INSTALLED BY 31 MAY 05	TOTAL VEHICLES KITTED BY 31 MAY 05[2]	% OF VALIDATED REQ WITH LEVEL I-III BY 31 MAY 05
						MAY 05	JUN 05	JUL 05	AUG 05	SEP 05					
LTV	UAH	ADD-ON ARMOR	7,991	10,079	7,991	550	550	120	130	71		608		7,991	79%
	HMMWV		19,158	13,872	16,149						903	300	320	16,469	119%
MTV	FMTV		4,994	3,335	4,189	480	520	473	230	222	39	139	160	4,349	130%
	M939+(5 TON)		3,349	2,688	2,454	704	704	453			285	269	100	2,554	95%
HTV	HEMTT		2,835	2,430	2,561		200	260	280	280	58	33	120	2,681	110%
	PLS		940	914	857						347	69	160	1,017	111%
	HET		625	757	624		10	80	41		66	40	140	764	101%
	M915		1,691	1,877	1,556	397	336	250	250	250		95	20	1,576	84%
SUBTOTAL			41,583	35,952	36,381	2,131	2,320	1,636	931	823	1,698	1,553	1,020	37,401	104%
	ASV	AoA	94	872	94	12	16	19	22	24				94	11%
	FUEL TNKRS		1,375	1,375	144	246	150	122			227		40	184	13%
	M113 FOV		734	734		65	120	140							0%
TOTAL			43,786	38,933	36,619	2,454	2,606	1,917	953	847	1,925	1,553	1,060	37,679	97%

AS OF 28 APR 05

[1] AS OF 28 APR 05

[2] TOTAL VEHICLES KITTED BY 31 MAY 05 = LEVEL I, II, & III + LEVEL II KITS TO BE INSTALLED BY 31 MAY 05

95-100%
85-94%
75-84%
< 74%

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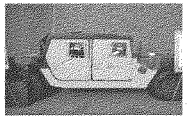
AoA Kits and Vendors

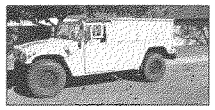
OGH HMMWV Kit

Produced By:
Armor Holdings Inc.
(OGHE)



ARL HMMWV Kit

Produced By:
GSIE/ARL

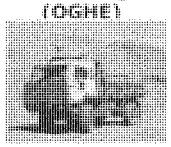


Troop Carrier Kit

Produced By:
ArmorWorks

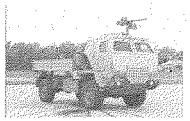
M1114 UAH
Gunners Protection Kit

Produced By:
Armor Holdings Inc.
(OGHE)



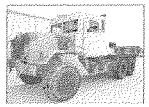
FMTV RACK Kit

Produced By:
ESSI Inc.
(Radian/SEI)



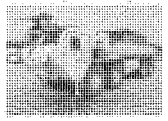
FMTV LSAC Kit

Produced By:
Stewart & Stevenson



M939 Kit

Produced By:
GSIE



HEMTT Kit

Produced By:
Armor Holdings Inc.
(Simula)

PLS Kit

Produced By:
Armor Holdings, Inc.
(Simula)

HET Kit

Produced By:
Armor Holdings Inc.
(Simula)

M915A2/3/4 Kit

Produced By:
Armor Holdings Inc.
(Simula)

M969 FTSS

Produced By:
VSE Corp

ASV
Produced By:
Textron

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Level III Armor Initiatives

NOT FOR PUBLICATION UNTIL RELEASED BY
THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT

OF

MAJOR GENERAL (SEL) WILLIAM D. CATTO
COMMANDING GENERAL
MARINE CORPS SYSTEMS COMMAND

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

ON

MARINE CORPS VEHICLE ARMORING

5 MAY 2005

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE

Chairman Hunter, Congressman Skelton, distinguished members of the Committee, it is my honor to report to you on the state of vehicle armor in the Marine Corps today. First, on behalf of all Marines and their families, I want to thank you for your continued support of our warfighters during this very challenging time.

HISTORY OF VEHICLE ARMOR

Providing armor protection to our rolling stock has been a critical, iterative, and Joint-Service process. The Marine Corps' over-arching strategy since the start of Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) has been to provide immediate armor support to all High Mobility Multipurpose Wheeled Vehicle (HMMWV) variants and all of our other vehicles, such as the 7-ton Medium Tactical Vehicle Replacement (MTVR). Our aim was to ensure that some level of protection be available to 100 percent of our vehicles. Therefore, we embarked upon an evolutionary, or phased, approach. By incorporating direct warfighter input and lessons learned in-theater, we have been able to get to what we believe is a very effective solution given the current warfighting environment – a solution that has clearly already saved lives.

Over the last 17 months, since the Marine Corps has been in combat in OIF II, we have evolved our vehicle armor through three generations.

1st Generation

In anticipation of, and in time for, I Marine Expeditionary Force (MEF) relieving the 82nd Airborne in-theater on March 19, 2004, 1st generation armor components were provided for 100 percent of I MEF's 3,049 vehicles within 10 weeks of receiving the execution order. This armor protection, defined as Level 3, or fabricated armor, was provided via a Commercial-Off-The-Shelf combination of appliqué panels, 3/16" "L" shaped doors, ballistic blankets, etc. The reason for fielding 3/16" armor in the 1st generation is that, at the time, it was the best available materiel solution that would fully meet the operational requirement for all 3,049 vehicles to have some level of armoring before going to Iraq.

Additionally, in response to an urgent need in April 2004, we fielded 37 export model up-armored HMMWVs to I MEF.

We always made clear the fact that we would pursue a more robust armoring solution as better raw material steel became available. The result of which is our 2nd and 3rd generations of armor.

2nd Generation

As the security situation further deteriorated, the Marine Corps pursued the procurement of more-improved armor components for HMMWVs and other tactical vehicles. Thus, the fielding of "zonal" armor. This included the identification and reprogramming of funds in order to upgrade all vehicle armor kits to a 2nd generation of armor, consisting of the Marine depot-built 3/8'' rolled homogeneous armor (RHA), defined as Level 2 armor because it is "kit" armor. Eventually, more than 4,100 vehicles were fielded to I MEF in support of the Global War on Terrorism with upgraded Level 2 3/8" armored "L" shaped doors, flanks, underbody, tailgates, rear cab plates, ballistic glass, and gunner shields. In addition, to support our 2nd generation armored vehicles, in a joint effort with the Army, the Marine Corps received a Multi-National Corps-Iraq distribution of 200 Add-on Armor kits and more than 400 up-armored HMMWV (M1114/M1116) theater level assets.

Second generation underbody protection kits have been designed since May 2004 for base model HMMWVs. Installation of these kits shall commence should commanders request that these HMMWVs be equipped with this capability based on their own individual threat analysis and vehicle payload considerations.

Due to extreme usage levels, environmental conditions, and increasingly sophisticated and more powerful enemy Improvised Explosive Devices (IEDs), it became clear that additional improvements to the "zonal" armor were necessary; thus, the evolution of the Marine Corps' 3rd generation of armor.

3rd Generation

For non-M1114 variant HMMWVs, this 3rd generation armor consists of integrated kits, known as Marine Armor Kits, or MAK. The MAK system is a modular, bolt-on system that can be installed by Marines of any Military Occupational Specialty. MAK systems offer significantly improved protection against the most prevalent threats, including small arms fire, IEDs, and up to 4 pound mine blasts. Because the MAK is kit armor, it is classified as Level 2 armor, even though it provides greater protection than the 2nd generation "zonal" armor.

The MAK is the result of a cooperative engineering design effort between U.S. Army and Marine Corps operators and engineers, designed to take full advantage of the increased capabilities of the HMMWVA2, and based upon U.S. Army Research Lab Add-on Armor kits. It is important to note that the design of the MAK incorporates lessons learned from testing and in-theater operations.

With a Marine Requirement Oversight Council (MROC) overarching goal of 5,550 HMMWV installations, the MROC interim requirement for MAK systems is for 3,100 vehicles. To date, the Marine Corps has received funding for 2,750 vehicles, with the remaining required funds included in the FY05 Supplemental request.

As we worked toward developing the MAK, we looked at everything that was available and determined that the most timely and cost effective solution to achieve the desired levels of protection was to develop and produce armor kits through our Maintenance Center at Marine Corps Logistics Base, Albany, GA, which began production of the MAK in November 2004. Production with current available funding will continue through July 2005. CONUS installation began in December 2004, to meet 26th Marine Expeditionary Unit (MEU) requirements, and OCONUS installation at Camp Al Taqaddum, Iraq, began in March 2005. OCONUS installation will continue at a rate of 200 systems per month as operational situations and combatant commanders allow, and CONUS installation will advance at a rate of approximately 150 systems per month. Timely receipt of Supplemental FY05 funds will allow for production of the entire MROC requirement of 5,550 MAK systems by December 2005.

Similarly, for our MTVR 7-ton trucks, we have developed what is known as the MTVR Armor System, or MAS. This armor system is a permanent modification to our MTVRs, and is therefore classified as Level 1 armor, and is designed for the life of the vehicle (21 years). The MAS is capable of withstanding small arms fire, IEDs, and mine blasts up to 12 pounds. It consists of metal/composite panel armor, with separate cab and troop compartment kits, dependent upon cargo or personnel variants of the MTVR.

The MROC interim requirement for MAS armored MTVRs is 1,850 vehicles. The Marine Corps has received enough funding for 920 of the required kits. Funds for the remaining systems are included in the FY05 Supplemental request.

Production of the MAS began last month and will continue through February 2006, at a sustained rate of 22 systems per week. OCONUS installation of the MAS will begin in-theater

this month at the same location as the MAK. CONUS installation is anticipated to begin in July 2005. Timely receipt of Supplemental FY05 funds will allow for production of the entire MROC requirement of 1,850 MAS systems by October 2006.

The following chart depicts the current state of our 3rd generation vehicle armoring efforts with MAK, MAS, and M1114 Urgent Universal Needs Statement deliveries as of 1 May 2005.

Approved UUNS Delivery Update As of 1 May 2005

UUNS	Reqt	O/H	Delta	Status	REMARKS	
M1114	498	0	498	0%	Fully funded; Under contract; Deliveries begin in Jun through Sep	⇧
MAK (percentage is # of installed kits vice # of kits delivered)	5550	479	5071	12%	Fully funded w/ receipt of FY05 Supplemental; OIF deliveries: 197 M1043/5 kits delivered, 0 enroute; 180 2dr kits delivered, 43 enroute; 326 4dr kits delivered, 157 enroute OCONUS installation underway; gearing up to full install rate of 200 per month; 150 kits installed on 26 MEU HMMWVs; 8 kits installed on OEF/ANA ETT; 11 kits installed on CAFSM; 4 kits installed on SPTT; 30 kits installed on BTT; 276 (58 last week) kits installed in OIF	⇧
MAS	1850	0	1850	0%	Fully funded w/ receipt of FY05 Supplemental; Production deliveries begin early May 05; OCONUS installation begins May 05 at a rate of 40 per month	⇧

● = 100% -85%, ◌ = 84% - 50%, ◍ 49% - 25%, ● 24% ⇧ = Funded & On Schedule ⇦⇨ = Schedule or Funding Uncertainty

ANA ETT: Afghani National Army Equipment Training Team
CAFSM: Compressed Air Foam System, Mobile
SPTT: Special Police Training Team
BTT: Border Training Team

To date, the Marine Corps Systems Command has received $487.4M for vehicle armoring purposes. We have provided "zonal" armor and ballistic windshields for all of our HMMWVs, MTVRs, Logistics Vehicle Systems, and 5-tons deployed in support of OEF, OIF, and Horn of Africa (HOA), including the 11th, 15th, 22nd, 24th, 26th, and 31st MEUs. In all, more than 5,000 vehicles have been hardened.

Additionally, in support of critical Explosive Ordnance Disposal (EOD) operations, production of 27 hardened engineer vehicles (Cougars) is underway, with the first 13 already fielded to OIF II. Furthermore, on 21 April 2005, via the Joint Rapid Acquisition Cell, the Deputy Secretary of Defense designated the Marine Corps Systems Command as the joint agent for the procurement of 122 Cougars for all joint EOD forces in theater.

It is clear from our actions over the last year-and-a-half that the Marine Corps is committed to aggressively matching our equipment to changing threats. Our ability to rapidly modify our vehicle armoring systems is a testament to this commitment.

The first chart following depicts the funding status of Marine Corps vehicle hardening actions as of 24 April 2005. The second chart depicts the level of armor protection for our vehicles in support of OEF, OIF, and HOA as of 1 May 2005.

USMC Vehicle Hardening Status As of 24 Apr 05

	TOTAL	FUNDED				rcd 9/04	rcd 1/18/05	rcd 1/31/05	As of: 4/12/05				UNFUNDED	
	FY03/04 FY05 REQT	FY03 POR	FY03 BTR/ ATR	FY04 POR	FY04 BTR/ ATR	FY05 Bridge Supp	FY05 Bridge ATR	FY05 IFF	TOTAL FUNDED	TOTAL OBLIG	TOTAL UNOB	COMMENTS	FY05 Supp 1 delta (after ATR/IFF)	FY05 Total Supp 2
1st Generation														
Ceramic Panels/ HMMWV doors/ Ball Blankets/Windshields	27 9	-	15 1	-	12 8	-	-	-	27 9	27.9	-		-	-
OGE Hardkits (110)	3 7	3.7	-	-	-	-	-	-	3 7	3 7	-		-	-
Air Conditioners	1 0	-	-	-	1 0	-	-	-	1 0	0.7	0 3	Oblig in process	-	-
LOGCOM 3/16" Armor	3 4	-	3 4	-	-	-	-	-	3 4	3.4	-		-	-
Total 1st Generation	**36.0**	**3.7**	**18.5**	-	**13.8**	-	-	-	**36.0**	**35.7**	**0.3**		-	-
2nd Generation														
LOGCOM Armor/Windshields	52 4	-	-	-	52 4	-	-	-	52 4	50 5	1 9	Oblig in process	-	-
Export M1114s (37)	6 6	-	-	-	6 6	-	-	-	6 6	6 6	-		-	-
OGE Hard Kits (48)	4 8	-	-	4 8	-	-	-	-	4 8	4 8	-		-	-
ERC (Explosive Resistant Coating)	3 0	-	-	-	3 0	-	-	-	3 0	3.0	-		-	-
Total 2d Generation	**66.8**	-	-	**4.8**	**62.0**	-	-	-	**66.8**	**64.9**	**1.9**		-	-
3rd Generation					(qty 2000/796/0)		(p/o qty 3100/1018/498)						(p/o qty 3100/1018/498)	(qty 5550/1850/498)
HMMWV Marine Armor Kits (MAK)	196 3	-	-	-	21 8	50 0	2 5	26 3	100 6	97 2	3 4	Oblig in process	10 0	85.7
MTVR Armor System (MAS)	393 5	-	-	-	45.0	100 0	26 2	28 9	200 1	193 7	6 4	Oblig in process	26.6	166 8
M1114s (498)	83 9	-	-	-	-	-	49 0	34 9	83 9	83 9	-		-	-
Total 3rd Generation	**673.7**	-	-	-	**66.8**	**150.0**	**77.7**	**90.1**	**384.6**	**374.8**	**9.8**		**36.6**	**252.5**
Armor Total	**776.5**	**3.7**	**18.5**	**4.8**	**142.6**	**150.0**	**77.7**	**90.1**	**487.4**	**475.4**	**12.0**		**36.6**	**252.5**

USMC Vehicle Armoring ISO OIF/OEF/HOA

Have provisioned level 2 armor protection for 100% of the requirement deployed ISO OIF/OEF/HOA

	OIF	OEF	HOA
HMMWV	2675	85	18
MTVR	875	10	0
5 Ton	170	1	0
LVS	235	0	0
Total	3955	96	18

Note 1: Numbers as of 1 May 05

Note 2: OIF includes I MEF and ANGLICO

Note 3: MNC-I has provided over 475 M1114s and 150 ARL HMMWV AoA kits

Note 4: The 100 M1114s "loaned" as advance on our procurement of 498 from MNC-I are subject to reassignment upon receipt of ours.

MECHANISMS

The 3rd generation vehicle armor currently being fielded was not developed in a vacuum. Specific to armor, in designing, developing, and testing the MAK and MAS, the Marine Corps reached out to industry, and our sister services, for assistance and expertise. Not only has it been a Joint-Service process, but the Marine Corps has also leveraged off of many different communities for development support.

Input from industry was used in the development of the MAS. This input was critical to initiating integration of armor protection capabilities onto the MTVR.

The U.S. Army's testing expertise, along with independent civilian testing facilities, has constantly been engaged with testing and performance validation of our proposed armor solutions. Each successive generation of armor protection has undergone durability and ballistics testing through the U.S. Army's Aberdeen Proving Ground or through independent civilian testing facilities. But, our input from the test community didn't stop here. As our proposed systems were tested under simulated operational environments, we constantly asked the testers to tell us what they found worked well, as well as identify areas they felt performance and level of protection provided could be improved, with their own expert recommendations for making these improvements without degrading another critical performance capability. For example, direct input from Aberdeen's test experts led to the use of the mild steel appliqués. They recommended taking advantage of the increased payload capacity of the HMMWVA2 by adding additional protection in the most likely hit areas – doors and rocker panels. They also found through their tests that extra steel did not necessarily need to be armor-grade steel to provide increased protection. In fact, an additional layer of mild steel, which is cheaper and more readily available, provides the same level of protection as RHA steel when laid over the top of the base RHA armor component.

We also query our intelligence personnel as to the most prevalent devices and weapons our enemy is employing so that we focus our efforts on developing protective measures against the highest priority threats. However, this is not to say that we focus simply on reactive improvements. Rather, we try to be proactive relative to the enemy's evolving capabilities. We continually draw on our intelligence resources and the expertise of our workforce and warfighters who have returned home to anticipate the needs of the warfighter in theater, which includes considering mixes of individual solutions to counter enemy capabilities.

Most importantly, as everything we do must ultimately support the warfighters' mission, we continuously ask warfighters what they want their systems to be capable of doing and under what conditions. It is critical to their mission success that we understand the environment in which these systems will operate. We cannot, and will not, do this without input or feedback from the warfighter.

Feedback from combat forces has been a critically important part of development of all of our armoring efforts. It was the warfighters who identified a requirement for installation of "L" shaped armored doors on our HMMWVs. This "L" shape provides additional protection to the rider by shielding his neck and head from exposure over that of a traditional window, while still providing some open area through which to return fire or simply to monitor activities outside the confines of the vehicle. A more recent evolution of our MAK system offers these same "L" shaped armored doors with additional protection via ballistic glass windows that can be opened, thus retaining the warfighter's capability for visibility and return fire.

We have even received input from the populace outside of the Department of Defense and industry communities. For example, the Marine Corps can thank you, Chairman Hunter, for the armored wheel wells of our MTVR and 5-ton truck underbodies. By simply thinking out loud during a visit to The Basic School at Quantico, you identified a critical deficiency in our vehicle undercarriage protection. Based upon your thoughts, we were able to design and fit armored wheel well protection to our MTVRs and 5-ton trucks, saving Marines' lives by protecting them from projectiles that would have otherwise likely penetrated the floor of a vehicle rolling over a mine.

These are but a few examples of how we work outside of our immediate community to evaluate and address critical issues to the warfighter. Assessing feedback and incorporating input from lessons learned from returning OEF and OIF forces is critical to our ability to initiate innovative and rapid modifications to our equipment to meet evolving threats as well as future challenges.

THE THREAT AND HOW ADAPTIVE THE ENEMY IS

We are at war with a thinking, adaptive enemy. Our ability to meet the changing capability needs of the warfighter due to an adaptive enemy hinges on our understanding the

reasons behind our successes, and failures, in the day-to-day fight. Operational decisions are based upon known, anticipated, and perceived threats.

We have seen the threat posed by enemy IEDs grow progressively – from 60 and 81 mm mortar rounds, to single 122s and 152s, to daisy-chaining large numbers of shells, and finally, to suicide car bombs. While there is no one absolute armor, technology, tactic, technique, or procedure that can counter these growing threats 100 percent of the time, we too are adapting, and are providing our warfighters' more and more effective solutions as the threat becomes larger and more severe.

A significant element to any solution we propose or develop has been, and will always be, what the warfighter wants. A solution that is effective in one scenario may simply not be applicable in another. The wartime environment constantly changes and there is no one better suited to determine what would be effective in any given situation than the warfighter. That is why we provide solutions to the warfighter that can be combined for different effects against varying levels of threats – so he can determine when and where which combinations of solutions should and will be employed.

WHERE WE ARE GOING IN THE FUTURE

Recognizing that our enemy is constantly evolving and changing his tactics, we are looking toward the future of vehicle armoring not just to combat his current capabilities, but also to prepare ourselves for future adaptations in the enemy's tactics.

First and foremost, we will continue to execute the armoring of our current MROC requirement of 5,550 HMMWVs with the MAK, and the 1,850 MTVRs with the MAS. The availability of the FY05 Supplemental will go a long way toward helping us complete this transformation of our rolling stock. Your passage of this supplemental bill will allow us to meet our goal of completing production of our MAK and MAS systems by December 2005 and October 2006, respectively.

We will also begin replacing 875 base model HMMWVs with HMMWVA2s fitted with our MAK systems later this month.

Furthermore, the Marine Corps Systems Command has a budget line item that enables us to continue developing advanced armoring solutions for our rolling stock.

At the same time, the Marine Corps is conducting an expeditionary armored force capability needs assessment. We are also developing a ground mobility integration plan to ensure the future Marine Air/Ground Task Force is able to perform mounted armored combat operations across the spectrum of military operations. These studies and plans, along with our current vehicle armoring efforts, should position us well for any fight in the future.

Marine Corps Systems Command is poised to execute any new requirements or capability needs that are identified by the warfighter. One example is the potential for a Mine Resistant Ambush Protected (MRAP) vehicle. Should this be formalized through the Urgent Universal Needs Statement process, and be appropriately funded, we will look to s Commercial-Off-The-Shelf or Non-Developmental Item solution procurement.

However, we recognize that these steps are not enough. We are reaching a plateau with regard to the capabilities of our vehicle armoring systems. The time is fast approaching that we will need to look to design and build our vehicles with survivability in mind, from the ground up, as opposed to "plugging in" solutions as more of a postscript. I am confident that this effort will be conducted in concert with the U.S. Army, as we work together whenever possible.

We make every effort to consider all available options as we work to find solutions to new threats, regardless of whether they can be found CONUS or OCONUS. This includes opportunities to provide capability enhancements, opportunities for shortening delivery schedules, or even in theater system fabrication or installation.

THE BOTTOM LINE

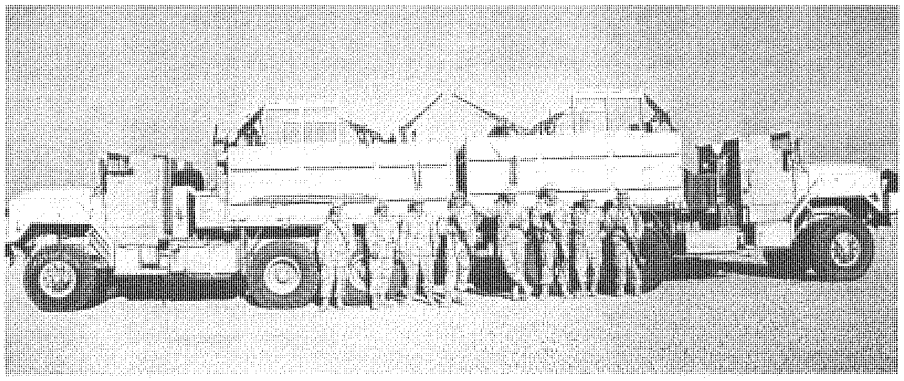
We are doing everything that can be done to ensure the safety of our Marines with the best and most effective armor that can be provided. The lives of all of our Marines and sailors are our most precious assets and their preservation through better and more capable equipment has been, and will always be, a top priority for the Marine Corps. We make every effort to maximize, for all of our Operating Forces, whatever assets are in theater.

We cannot afford to lose sight of the lessons we've learned about our enemy, and about our own capabilities, through the loss of American lives. These difficult lessons were purchased with our young warriors' lifeblood. They are too precious to forget and we will remember them as we move forward. With your continued support, we can ensure our Marines are ready for any future fights. Thank you.

DOCUMENTS SUBMITTED FOR THE RECORD

MAY 5, 2005

Gun Trucks and Transparent Armor for Force Protection



Presented to the House Committee on Armed Services
May 5, 2005

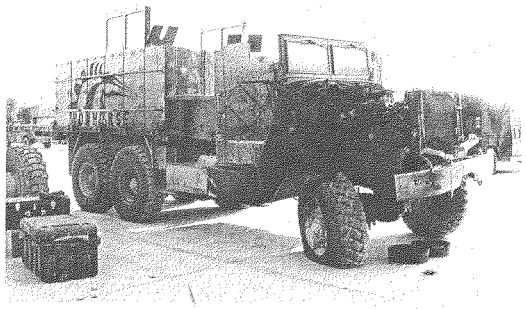
Dr. Steven DeTeresa
Lawrence Livermore National Laboratory

DARPA

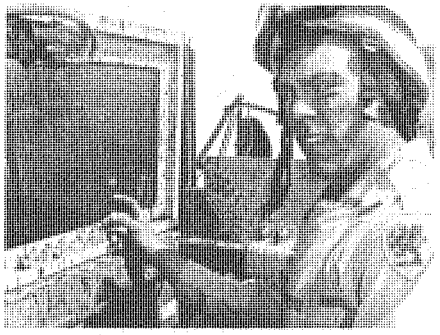
Executive Summary

- 27 five ton Gun Trucks are in Iraq and saving lives
  - More are needed
- Immediately address HMMWV gunner and troop carrier vulnerabilities with transparent armor

A Gun Truck crew from the 1073rd Maintenance Co. survived a recent IED attack



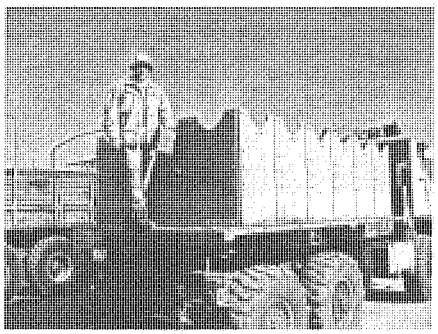
- News report claims that IED was two 152 mm artillery shells
- Armor has been removed and mounted on a new truck that's back on road



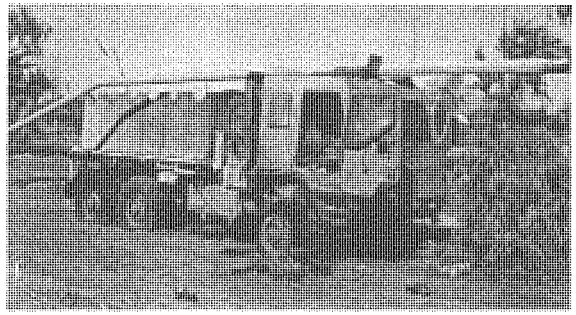
"Sir,
I was the driver of the 5 Ton that was struck by the IED. I had six other soldiers in that vehicle at the time of the incident. All seven are breathing today ....."

DARPA

A lighter weight troop carrier version of the armored box has also protected soldiers' lives



At the request of the HASC, the troop carrier boxes were produced by the Army using a modified LLNL design and Stryker steel



"Here is one of the pictures from the VBIED 30 Nov 04. There were 14 soldiers in the back and all walked away to include the folks in the cab, the car was a 4 door sedan packed and it pulled along side the truck."

DARPA

Comparison of 5-Ton Gun Trucks & M1114 Up-Armored HMMWV for Convoy Escort

Advantage

Characteristic	*5-ton Gun Truck*	*M1114*
Top Speed		
Acceleration		
Maneuverability		
Armor Protection		
Armament		
Cost (up-armor conversion)		
Interior Protected Space		
Crew/Troop Carrier		
Situational Awareness		
Repairability		
Flexibility		

The most effective convoy escort is with both types of vehicles

DARPA

SJD 05/05/05–5

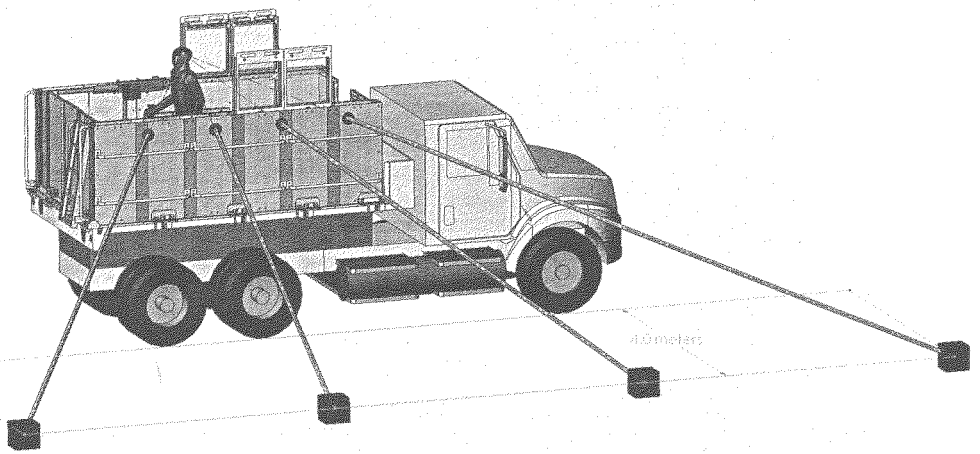
Comparison of 5-Ton Gun Trucks & M1114 Up-Armored HMMWV for Convoy Escort

Characteristic	*5-ton Gun Truck*	*M1114*
Top Speed	65 mph	65 mph
Acceleration	0-50 mph in 50 sec	0-50 mph in 26 sec
Maneuverability		√
Armor Protection	≥30 psf (except cab)	15 psf
Armament	3-4 weapons	1 weapon
Cost (up-armor conversion)	$40K kit + $32K guns	$150K upgrade + $8K gun
Interior Protected Space	300 cubic ft	100 cubic ft
Troop Carrier Capacity	14	3
Situational Awareness	20 sqft transparent armor + 9 ft height	<10 sqft transparent armor
Repairability	Bolted armor panels	
Flexibility	Several box configurations Multiple trucks	

DARPA

SJD 05/05/05–6

5-ton Gun Truck Protection Against IEDs



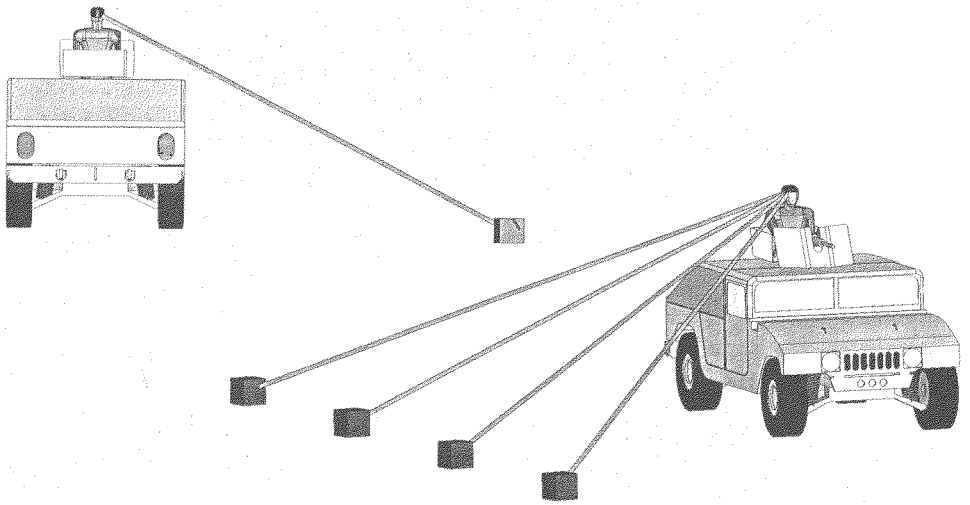
Frags from IEDs at 4 meters do not reach center gunner

DARPA

SJD 05/05/05–7

M1114 With Armored Gunner's Turret

Gunner in the HMMWV Turret is At Risk

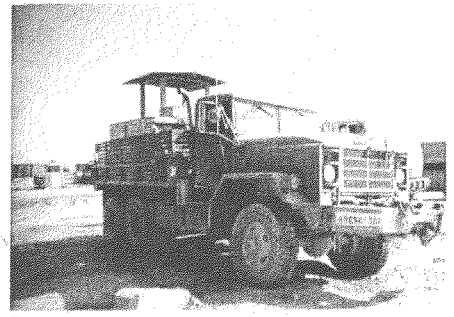


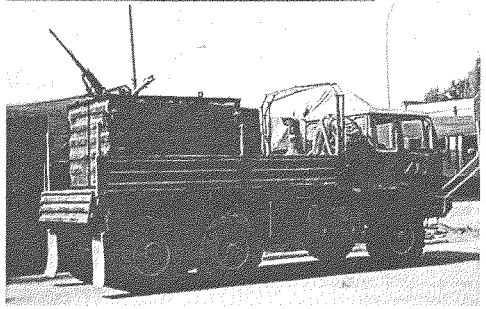
Gunner in turret has greater than 50% chance of a severe injury to upper torso or head from standard IED at 4 meters!

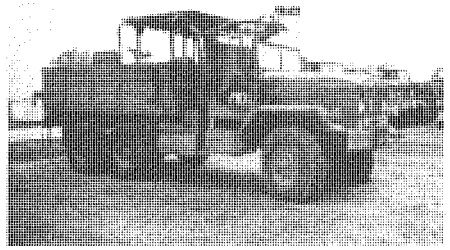
DARPA

SJD 05/05/05–9

5-ton gun trucks are being produced in the field from armor plate and scrap metal





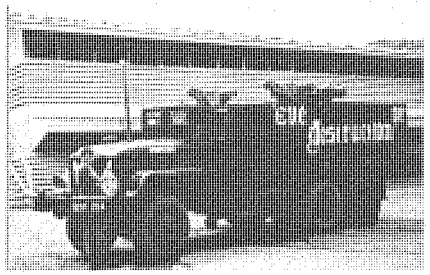


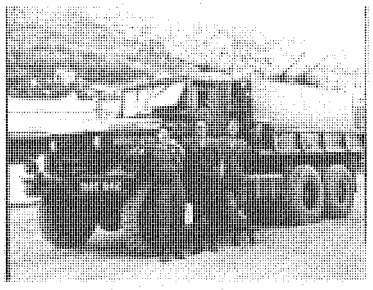
DARPA

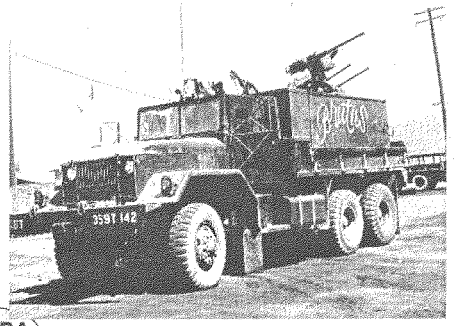
Gun Truck Design Approach

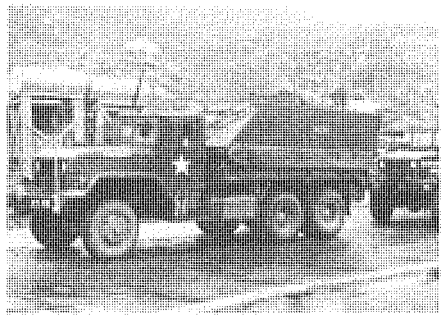
- Start with the 5+ years of experience in Viet Nam
- Use modern, low-cost armor to survive IED attack
- Multiple guns to respond with overwhelming firepower
- Design kit for easy field assembly and repair
- Design armored box to be reconfigured as needed by user
  - Flexibility to respond to changing threats and needs
- Design armored box to fit any cargo truck with 5-ton or greater capacity
  - Smaller versions of box can be used on lighter vehicles
- Get prototypes in field ASAP and collect feedback from users

We began our gun truck effort where Viet Nam left off 35 Years Ago









DARPA

SJD 05/05/05–2

Fortunately the "The Eve of Destruction" is preserved at Fort Eustis Transportation Museum

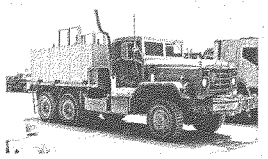
We utilized the Eve of Destruction exhibit, the knowledge of the Army Transportation Corps Historian (Mr. Richard Killblane) and the experience of Viet Nam gun truck veterans to start our efforts to develop a modern 5-ton gun truck.

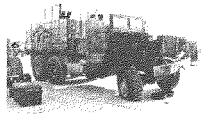
Lessons Learned from 8th Transportation Group in Viet Nam

- Convoy supply lines are vulnerable and easy targets
- Ambush can occur from multiple directions
- Armored jeeps alone could not repel or hold off attacks
- Escort needed to protect convoy until air support or other help arrived
- Convoy escort vehicles must match speed of other vehicles
  - Tracked vehicles fell behind
- Escort vehicle must have substantial armor and multiple weapons
  - Spaced armor was superior to solid wall
- Larger 5-ton gun trucks were intimidating

After 5+ years of war experience, it was shown that the most effective escort was provided by a combination of 5-ton gun trucks and jeeps

Gun Truck Project Timeline





HASC Call for support

Field prototype. ONS for 28 kits.

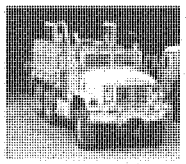
IED attack

Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
2003							2004						2005		

Design, build, & test prototype

Build, & field 30 kits

Requests for more kits



Total actual labor time = 6 months

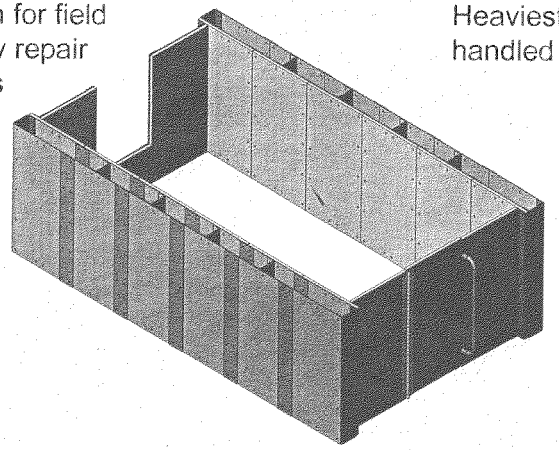
DARPA

SJD 05/05/05–5

Armored Box Construction

Bolted construction for field assembly and easy repair of damaged panels

Heaviest panel can be handled by two people

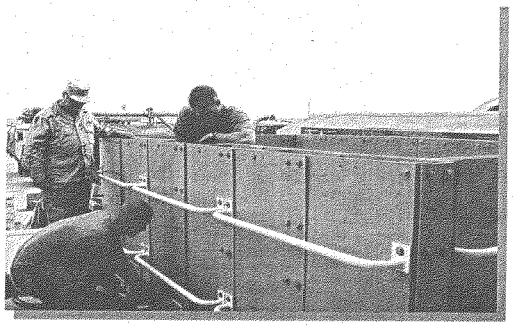


Spaced, double-wall armor steel box with ballistic fiberglass interior spall liner and fiberglass floor

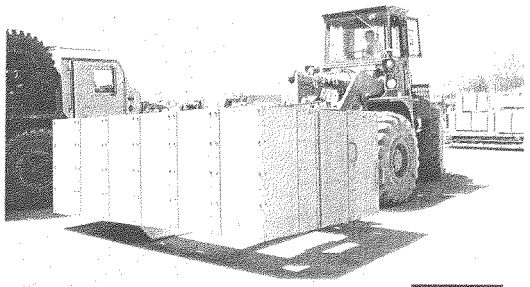
DARPA

SJD 05/05/05–6

The Gun Truck kit is easily assembled with standard hand tools



The armored box can be assembled on truck or on ground then lifted using forklift or crane onto cargo bed



The entire conversion takes a 4-man crew just 5 hours

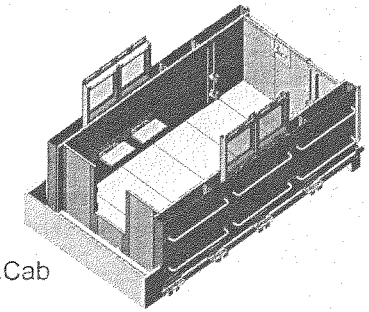
Modular, bolted construction– no welding, no drilling

Air wrench can be driven from truck's pressure supply

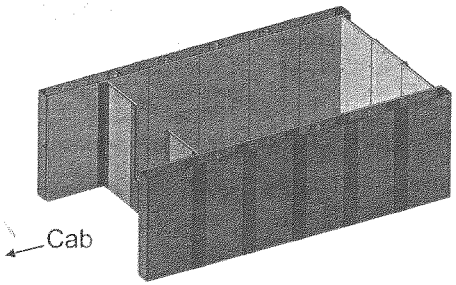
DARPA

SJD 05/05/05–7

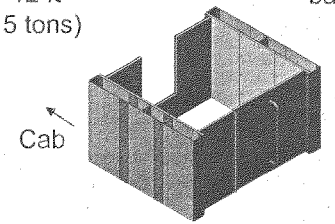
Modular construction and flexible design of armored box allows for different configurations depending upon need



Full-size box with 6 ft by 12 ft interior space (weight = 5 tons)



Full-size box with front wall moved back to provide storage space for gear

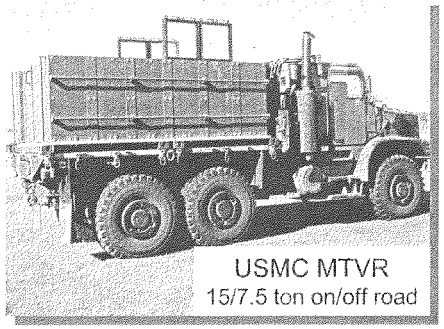


Half-size box with full armor protection for use on 2.5 ton trucks

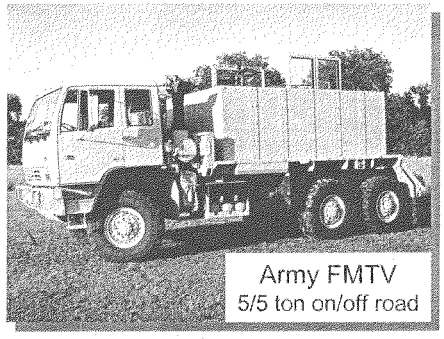
DARPA

SJD 05/05/05--8

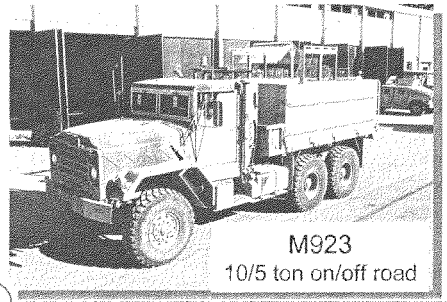
The full-size armored box will fit onto any truck with 5-ton or greater cargo capacity



USMC MTVR
15/7.5 ton on/off road



Army FMTV
5/5 ton on/off road



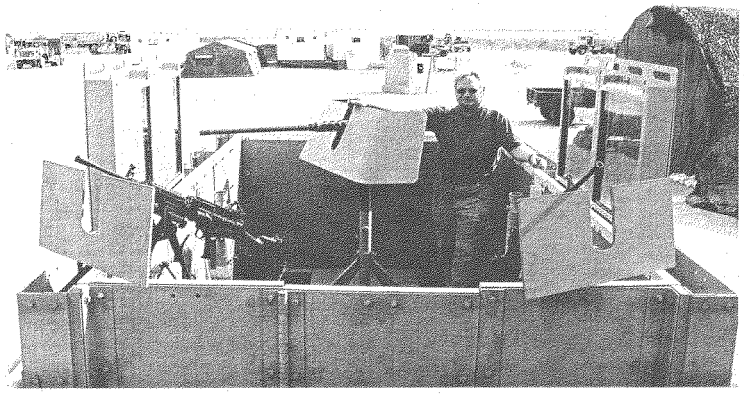
M923
10/5 ton on/off road

- The armored box is the same for each truck type — only the hardware required to mount the box to the cargo bed is unique.
- The armored box was successfully road-tested at the Aberdeen Test Center on all 3 trucks.

DARPA

SJD 05/05/05--9

A Gun Truck needs several crew-served weapons

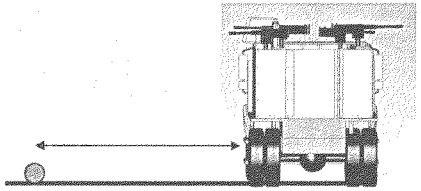


- Reasons for multiple guns (Viet Nam lessons learned)
  - Greater firepower
  - Redundancy when weapons malfunction
  - Repel simultaneous attacks from multiple directions
- Gun Truck companies have had difficulty obtaining multiple crew-served weapons

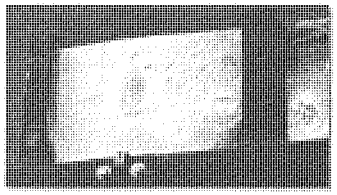
DARPA

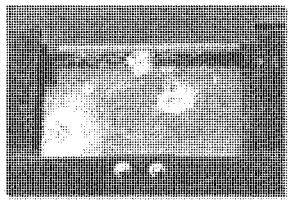
SJD 05/05/05–10

The armored box and ballistic windows stop all frags from typical IED

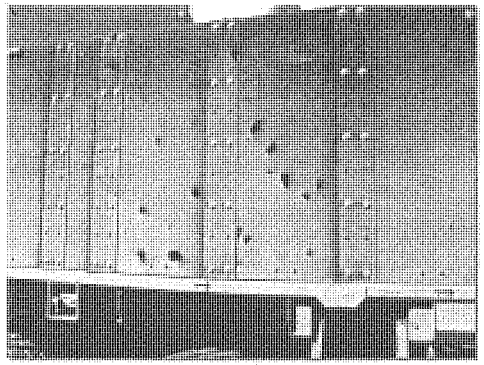


IED





The box armor also protects against all attending frags and blast from an RPG

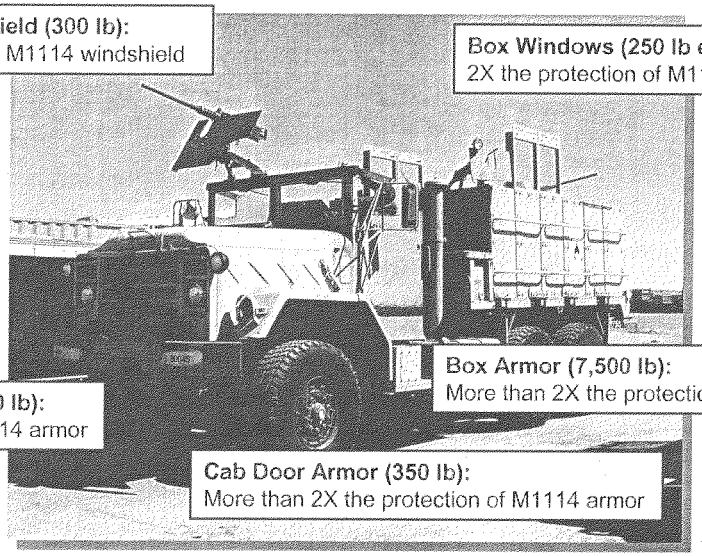


Testing performed at Aberdeen Test Center, Army Developmental Test Command

DARPA

SJD 05/05/05–1

Gun Truck Kit Ballistic Protection Levels



Cab Windshield (300 lb):
Equivalent to M1114 windshield

Box Windows (250 lb each):
2X the protection of M1114 windows

Box Armor (7,500 lb):
More than 2X the protection of M1114 armor

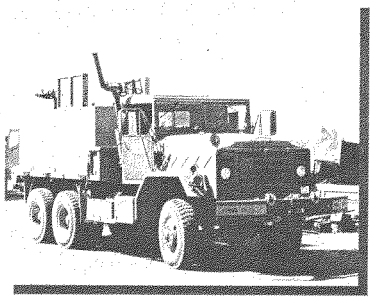
Cab Armor (2,100 lb):
Equivalent to M1114 armor

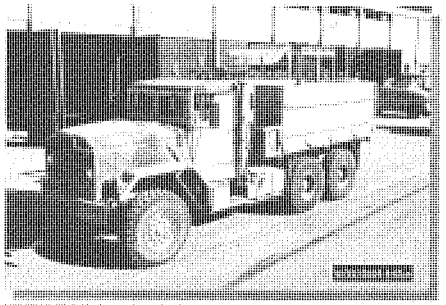
Cab Door Armor (350 lb):
More than 2X the protection of M1114 armor

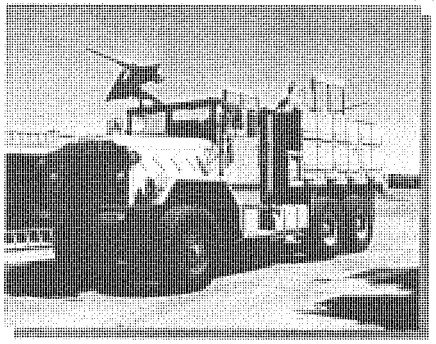
DARPA

SJD 05/05/05–2

There are 27 LLNL/DARPA Gun Trucks performing missions in Iraq





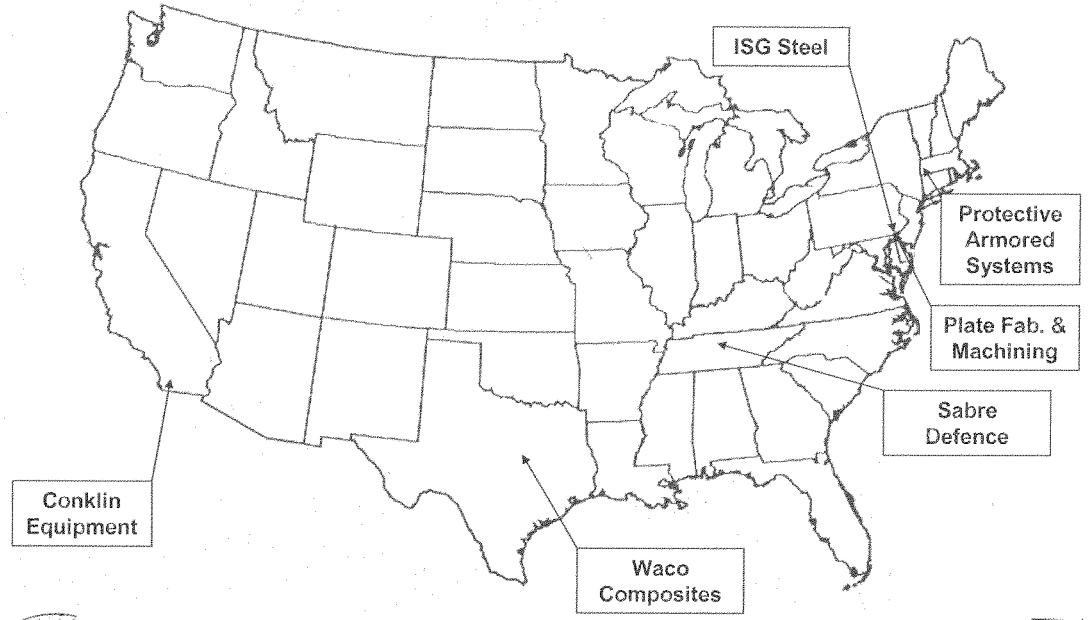


- First prototype went into service in July '04. Thirty more kits were delivered in Dec. '04
- Nearly all kits were built using the M923 truck
- Feedback from field has been very positive.
- **Every convoy leaving LSA Anaconda is escorted by 2 Gun Trucks and 2 M1114s**

DARPA

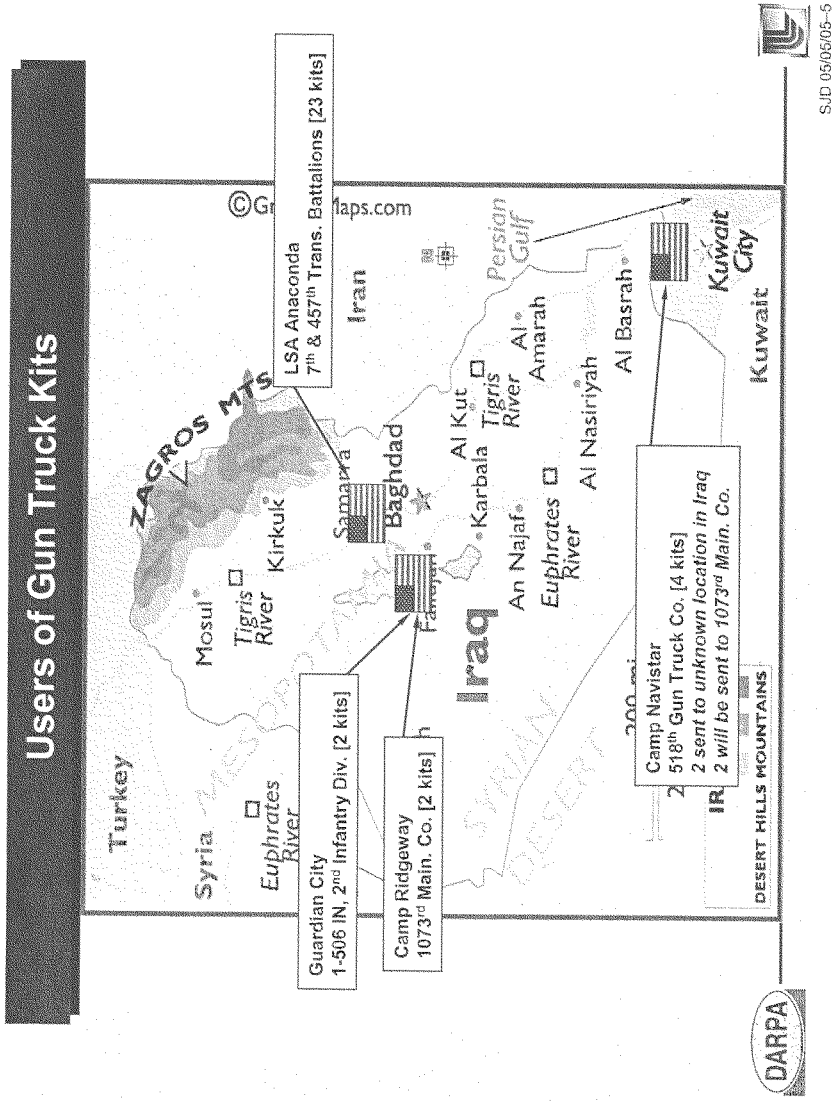
SJD 05/05/05–3

Vendors for Gun Truck Kits



DARPA

SJD 05/05/05–4


Users of Gun Truck Kits
Turkey
Syria
Euphrates River
Mosul
Tigris River
Kirkuk
ZAGROS MTS
Samarra
Baghdad
Fallujah
Karbala
An Najaf
Euphrates River
Iraq
Al Kut
Tigris River
Al Amarah
Al Nasiriyah
Al Basrah
Iran
Persian Gulf
Kuwait City
Kuwait
SYRIAN DESERT
DESERT HILLS MOUNTAINS
LSA Anaconda
7th & 457th Trans. Battalions [23 kits]
Guardian City
1-506 IN, 2nd Infantry Div. [2 kits]
Camp Ridgeway
1073rd Main. Co. [2 kits]
Camp Navistar
518th Gun Truck Co. [4 kits]
2 sent to unknown location in Iraq
2 will be sent to 1073rd Main. Co.
DARPA
SJD 05/05/05-5

Many DoD organizations provided critical support to the 5-ton gun truck kit development and fielding

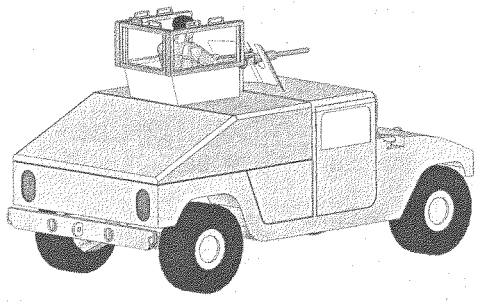
- U.S. Army Developmental Test Command
  - Test oversight, Safety Confirmation Release, Pentagon demo for CSA
  - Aberdeen Test Center
    - Ballistic testing
    - Road testing
    - Gun mount design
    - Armored box mounts and other upgrades to Stryker steel troop carrier box
- Army Research Lab
  - Armor materials and performance
  - RPG defeat
  - Lessons learned from ASK
- USMC
  - Albany GA Logistics Base (initial M923 cab armor design)
  - PM MTVR (ATC road testing on MTVR and Camp Pendleton demo)
- Tank & Automotive Command
  - Shipment of kits to field

DARPA

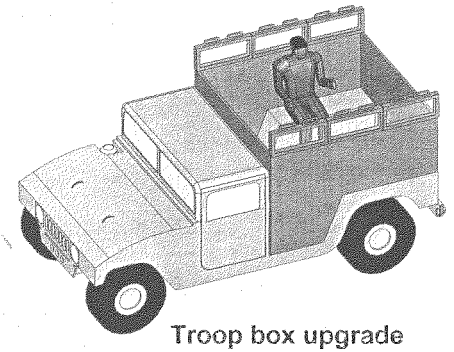
Summary: $40K Per Gun Truck Kit
Just Add Troops and Guns

- Gunners and crew have excellent IED survivability.
- Provides convoy security, troop transport, and perimeter and checkpoint security.
- Gun Crew has extreme Situational Awareness while protected.
- Easy in-field installation and repair.
- Total kit weight does not exceed vehicle capacity.
- Easy to produce kits in quantity.
- Survivability and firepower far exceed M1114.

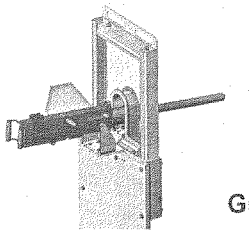
Recommendation: Add transparent armor to protect gunners and troops in HMMWVs ASAP



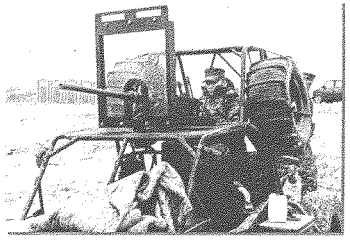
Concept for Gunner's Turret



Troop box upgrade



Gun Shield



DARPA

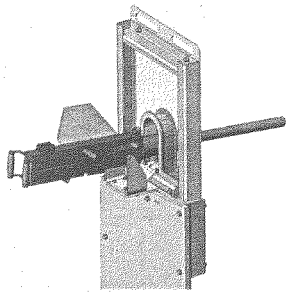
SJD 05/05/05–8

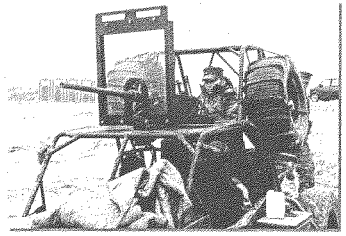
What's Next

- Fulfill requests received for more gun truck kits
- Attempt to obtain Army acquisition for additional gun truck kits
- Upgrade M1114 turret and crew box

A transparent gun shield has been designed and tested

- Stops all known IED frag and small arms threats.
- Will accept all crew-served weapons
- Mounts on gun truck box, HMMWV turrets, ring mounts, etc.
- Shield is balanced and reduces recoil loads on gunner and frame





Tested (road and firing) at Camp Pendleton on Feb. 11, 2005.

DARPA

SJD 05/05/05–1

In response to the NY Times Article and the issue of armor available to the battalion from its arrival in Kuwait through the redeployment to OIF:

- 2/4 embarked approximately 80 HMMWV's from Camp Pendleton prior to leaving the United States. Upon arrival in Kuwait, we received the ARMOX kits that were arriving to outfit the Division units. Approximately 75% of the vehicles were outfitted with this first generation armor.

- 2/4 received the highest percentage of ARMOX kits of any battalion heading to Iraq due to the perceived challenge of the area of responsibility (AOR).

- 1-124 Inf (FNG) dropped off their armor kits at Camp Victory, Kuwait as they prepared to deploy to CONUS. We took much of what was serviceable. This armor was a mix of pre fabricated kits (Army add-on kits) and locally produced steel. This included splatter shields and under-carriage plates. I cannot give a number to the increased percentage this afforded us but it was as good or better than just the ARMOX alone.

- Some vehicles departed Kuwait without some armor but this was a very small percentage of the whole.

- Upon our arrival in Ar Ramadi, the 1/1 BCT provided additional vehicles to the battalion. These included some with military procured armor; others with a mix of the ARMOX and welded-on steel. The BCT XO provided 2/4 with a plasma cutter and the use of his engineers/materiel to continue to improve the armoring process.

- In early July, the battalion received the first of the Up-armored HMMWVs (UAH). We initially received 16 but this would dramatically increase to 60 UAH. Each rifle company received approximately 4-5 UAH during the remainder of July. The rifle companies maintained approximately 10 HMMWVs and 3 MTVRs (the 7-tons all had ARMOX reinforced with plate steel and sandbags.

- 2/4 received the highest percentage of UAHs of any battalion in Al Anbar by over 50%.

The issue of Echo company's casualties as a result of available armor:

- Echo possessed the same number of armored vehicles as the other rifle companies, even though after June their activities were largely confined to manning static observation posts, whereas the other companies actively patrolled their AORs.

- Echo company's casualties do not indicate any link between the amount of vehicle armor and the total number of killed and wounded.

- IEDs/VBIED/SVBIED did not account for the majority of casualties.

Echo company casualty breakdown can be summarized:

- 21 KIA (includes attachments)

- Of the KIA- 6 died by IED; 14 died of GSW
- 2 of those killed by IED were dismounted. Armor was not an issue.
- 4 of those killed by IED were struck by shrapnel through exposure around the armoring (standing upright behind a MG or head/neck extending over the armor). Armor was not perforated.
- 6 of those killed by GSW were killed in a single event, shot through the windshield by a 12.7mm HMG (.50 caliber) Armor was not an issue.
- None of the other KIAs were in vehicles.

➢ 59 WIA (includes attachments):
- Of the WIA- 21 were injured by IED, VBIED, SVBIED
- 7 of the IED-wounded were dismounted patrolling.
- 7 of the IED-wounded were riding in armored 7-tons; all were RTD.
- 7 of the IED-wounded were riding in ARMOX equipped HMMWVs
- 42 of 59 were returned to duty.

The single largest issue of IED vs vehicle armor came on 29 May along MSR Michigan. Echo company QRF was returning from picking up a dismounted patrol (thus overloading a 10-man truck). They passed an abandoned station wagon that detonated (4-5 arty rounds) striking the last vehicle. 2 Marines were killed; 2 DOW; six were WIA (three RTD). The armor on this vehicle was not perforated nor were the SAPI panels attached to the rear. All injuries and deaths were the result of partial exposure above the armor or through the unarmored windows.

Sir, my conclusion is that in the one instance of catastrophic attack, the Marines and sailors became casualties because the vehicle was overcrowded not under-armored.

---Response by LtCol Paul J. Kennedy, former Commanding Officer of 2d Battalion, 4th Marines. LtCol Kennedy was Captain Royer's CO during the time period when Captain Royer was a Company Commander in Iraq

House Armed Services Committee
Armor & Countermeasure Timeline Key Points

April-October 2003	IED attacks grow steadily. Reach more than 100 per month.
September 2003	In response to operational needs statement for the year, requirements set at 8,400 kits.
October 2003	Army Research Laboratory designs and produces 40 kits of Humvee add-on armor.
December 2003	House Armed Services Committee (HASC) begins oversight of Army armor programs.
	Army approves $129 million for add-on armor kits. $300 million remains unfunded.
	HASC oversight team visits Aberdeen proving grounds to review testing of potential armor solutions.
	HASC engages Lawrence Livermore National Lab to find and develop armor solutions.
January 2004	Additional unvalidated requirement for 3,670 kits is submitted via operational needs statement.
	HASC reviews Army production plan originally scheduled to complete 7,000 kits by December 2004. HASC determines best production effort could finish 7,000 kits no later than April 30, 2004. HASC submits memo to the Army noting that arsenals, industry, and steel mills are not operating at maximum capacity.
February 2004	HASC oversight team and Army team visit steel mills. Reach agreement with steel mill management and union officials to voluntarily set aside commercial work and dedicate 100% capacity to armor plate production. Delivery schedule for steel is compressed by four months. HASC finds Stryker steel armor plate at mill.
	Feb 4, 2004 HASC Member classified force protection status briefing.
	HASC determines that additional manufacturing capacity is required. Army commits nine depots and arsenals to armor kit production.
	Original Army installation plan requires the cycling of vehicles from Iraq into Kuwait for armor kit installation. HASC determines that U.S. production will outpace installation capability in Kuwait.
March 2004	HASC issues memo to TACOM suggesting that 11 sites be opened in Iraq to install Humvee (HMMWV) armor.
	Mar. 2, 2004 HASC Member classified force protection status briefing.

	Sec. Army directs compression of schedule to HASC recommended production rates.
	CENTCOM issues operational need statement for additional 4,760 add-on armor kits.
	Army notifies HASC of delinquent deliveries of steel from Canadian steel mill and requests HASC assistance to resolve issues. HASC team site visit to Canada resolves delivery issues.
April 2004	HASC expands focus to the tactical truck fleet.
	Apr. 1, 2004 HASC Air Land Subcommittee hearing, panel dedicated to force protection and armor requirements.
	Apr. 21, 2004 HASC Hearing on Tactical Wheeled Vehicle Armoring and acquisition system responsiveness.
	Stryker steel arrives at Letterkenny Army Arsenal.
	CENTCOM reports 100% filled on body armor for entire theater of operations to include DOD civilians.
May 2004	Army completes 6,670 HMMWV armor kits one week late to the HASC schedule but six months ahead of original Army schedule.
	May 20, 2004 HASC marked version of the National Defense Authorization Act for Fiscal Year 2005 passes the House. Bill authorizes emergency bridge supplemental that contains over $1 billion for vehicle armoring initiatives.
June 2004	Stryker steel gun boxes delivered to Iraq
	Jun. 10, 2004 HASC Member classified force protection status briefing.
	CODEL Hunter to Iraq
July 2004	Army releases first funding for five ton truck armor kits.
August 2004	Army finally validates CENTCOM operational need statement (ONS) for additional 4,760 HMMWV add-on armor kits four months after HASC received the ONS from theater and highlighted the need at hearing in April 2004.
	CENTCOM requirement jumps to 13,876 add-on armor kits for HMMWVs.
	Marine Corps indicates all Marine tactical wheeled vehicles now have at the minimum, "level 2" zonal kitted armor.
October 2004	HASC team oversight trip to oversee force protection systems production.

November 2004	Aluminum mill shipments threaten to break production of armor kits for tactical trucks. HASC team meets with aluminum company executives and arranges for shift in priorities back to military armor programs.
December 2004	HASC team oversight trip discovers that Improvised Explosive Devices (IED) countermeasure supplier running out of Army funding and laying off critical production personnel.
	HASC Chairman holds Army $2 billion reprogramming action pending full funding of IED countermeasure production.
	Army announces new armoring strategy denoting levels of armor protection: level three, level two, and level one. Level three being the minimal standard of armor protection.
January 2005	Army ships first five ton truck kit, three months later than the original commitment.
	HASC oversight team reports on low cost jammer oversight studies.
	CENTCOM reports official policy of no unarmored vehicles outside of secured forward operating bases after Feb. 15, 2005.
	HASC Chairman receives senior level update on body armor.
February 2005	Army reports deliveries of IED countermeasures will not be complete until November 2005.
	Feb. 2, 2005 HASC Member classified force protection status briefing.
	HASC team oversight trip to IED countermeasure manufacturer.
	HASC team oversight trip to IED 2nd countermeasure 2nd tier manufacturer.
	HASC team oversight trips to tactical truck armor kit manufacturers and Army depot facilities to assess progress on armor kit production.
March 2005	HASC team oversight trip walks 3rd tier IED countermeasure production lines to eliminate production delays.
	HASC Air Land Subcommittee hearing, force protection panel.
April 2005	Low cost jammer tested at Yuma.
	HASC Chairman meets with General William Nyland, Assistant Commandant of the Marine Corps, to discuss solutions that address underbody armor protection requirements for Marine Corps HMMWVs.

HASC Chairman suggests using readily available excess armor panels located at Army Materiel Command depot in Kuwait to address HMMWV underbody protection kit requirement.

General Nyland agrees and commits to HASC Chairman to expedite contract order for HMMWV underbody protection kits.

May 2005

HASC Chairman requests DepSecDef use Rapid Acquisition Authority to mass produce low cost jammer.

SecDef issues determination and the first use of Rapid Acquisition Authority.

May 5, 2005 HASC Hearing on Army and Marine Corps Tactical Wheeled Vehicle Armoring and IED Countermeasure initiatives in Iraq.

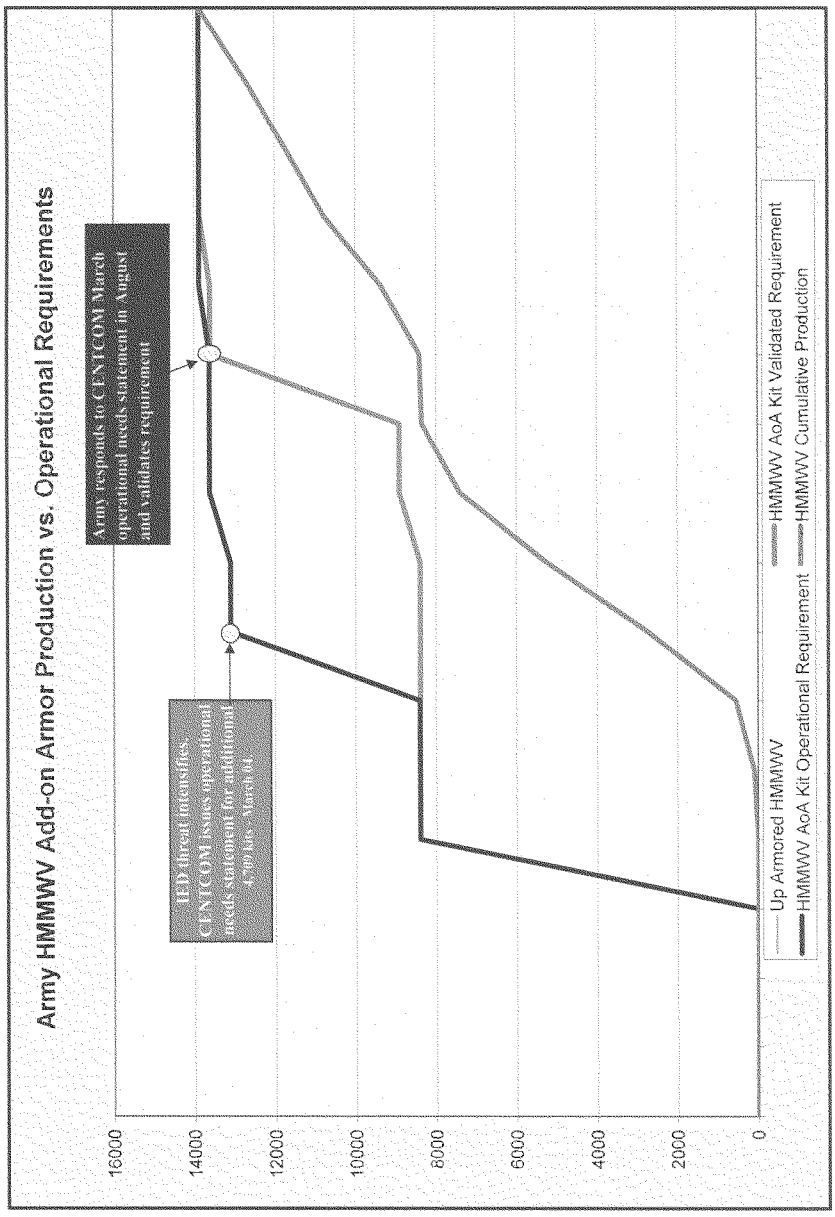
HASC oversight team receives briefing on the status of Marine Corps body armor outer tactical vest recall.

HASC Chairman meets with Lieutenant General (Lt Gen) Duncan McNabb, Director for Logistics (DJ-4), Joint Staff to receive personal protection update to include vehicle armor, gun trucks, marine corps underbody protection kits, and cross leveling of equipment

HASC Chairman learns Marine Corps underbody armor kit contract has yet to be awarded.

June 2005

June 21, 2005 HASC Hearing on Marine Corps Underbody Kit Armor Kits


Army HMMWV Add-on Armor Production vs. Operational Requirements
16000
14000
12000
10000
8000
6000
4000
2000
0
Army responds to CENTCOM March operational needs statement in August and validates requirement
IED threat intensifies. CENTCOM issues operational needs statement for additional 4,700 kits - March 04
Up Armored HMMWV
HMMWV AoA Kit Operational Requirement
HMMWV AoA Kit Validated Requirement
HMMWV Cumulative Production

New York Times
April 25, 2005
Pg. 1

Marines From Iraq Sound Off About Want Of Armor And Men

By Michael Moss

On May 29, 2004, a station wagon that Iraqi insurgents had packed with C-4 explosives blew up on a highway in Ramadi, killing four American marines who died for lack of a few inches of steel.

The four were returning to camp in an unarmored Humvee that their unit had rigged with scrap metal, but the makeshift shields rose only as high as their shoulders, photographs of the Humvee show, and the shrapnel from the bomb shot over the top.

"The steel was not high enough," said Staff Sgt. Jose S. Valerio, their motor transport chief, who along with the unit's commanding officers said the men would have lived had their vehicle been properly armored. "Most of the shrapnel wounds were to their heads."

Among those killed were Rafael Reynosa, a 28-year-old lance corporal from Santa Ana, Calif., whose wife was expecting twins, and Cody S. Calavan, a 19-year-old private first class from Lake Stevens, Wash., who had the Marine Corps motto, Semper Fidelis, tattooed across his back.

They were not the only losses for Company E during its six-month stint last year in Ramadi. In all, more than one-third of the unit's 185 troops were killed or wounded, the highest casualty rate of any company in the war, Marine Corps officials say.

In returning home, the leaders and Marine infantrymen have chosen to break an institutional code of silence and tell their story, one they say was punctuated not only by a lack of armor, but also by a shortage of men and planning that further hampered their efforts in battle, destroyed morale and ruined the careers of some of their fiercest warriors.

The saga of Company E, part of a lionized battalion nicknamed the Magnificent Bastards, is also one of fortitude and ingenuity. The marines, based at Camp Pendleton in southern California, had been asked to rid the provincial capital of one of the most persistent insurgencies, and in enduring 26 firefights, 90 mortar attacks and more than 90 homemade bombs, they shipped their dead home and powered on. Their tour has become legendary among other Marine units now serving in Iraq and facing some of the same problems.

"As marines, we are always taught that we do more with less," said Sgt. James S. King, a platoon sergeant who lost his left leg when he was blown out of the Humvee that Saturday afternoon last May. "And get the job done no matter what it takes."

The experiences of Company E's marines, pieced together through interviews at Camp Pendleton and by phone, company records and dozens of photographs taken by the marines, show they often did just that. The unit had less than half the troops who are now doing its job in Ramadi, and resorted to making dummy marines from cardboard cutouts and camouflage shirts to place in observation posts on the highway when it ran out of men. During one of its deadliest firefights, it came up short on both vehicles and troops. Marines who were stranded at their camp tried in vain to hot-wire a dump truck to help rescue their falling brothers. That day, 10 men in the unit died.

Sergeant Valerio and others had to scrounge for metal scraps to strengthen the Humvees they inherited from the National Guard, which occupied Ramadi before the marines arrived. Among other problems, the armor the marines slapped together included heavier doors that could not be latched, so they "chicken winged it" by holding them shut with their arms as they traveled.

"We were sitting out in the open, an easy target for everybody," Cpl. Toby G. Winn of Centerville, Tex., said of the shortages. "We complained about it every day, to anybody we could. They told us they were listening, but we didn't see it."

The company leaders say it is impossible to know how many lives may have been saved through better protection, since the insurgents became adept at overcoming improved defenses with more powerful weapons. Likewise, Pentagon officials say they do not know how many of the more than 1,500 American troops who have died in the war had insufficient protective gear.

But while most of Company E's work in fighting insurgents was on foot, the biggest danger the men faced came in traveling to and from camp: 13 of the 21 men who were killed had been riding in Humvees that failed to deflect bullets or bombs.

Toward the end of their tour when half of their fleet had become factory-armored, the armor's worth became starkly clear. A car bomb that the unit's commander, Capt. Kelly D. Royer, said was at least as powerful as the one on May 29 showered a fully armored Humvee with shrapnel, photographs show. The marines inside were left nearly unscathed.

Captain Royer, from Orangevale, Calif., would not accompany his troops home. He was removed from his post six days before they began leaving Ramadi, accused by his superiors of being dictatorial, records show. His defenders counter that his commanding style was a necessary response to the extreme circumstances of his unit's deployment.

Company E's experiences still resonate today both in Iraq, where two more marines were killed last week in Ramadi by the continuing insurgency, and in Washington, where Congress is still struggling to solve the Humvee problem. Just on Thursday, the Senate voted to spend an extra $213 million to buy more fully armored Humvees. The Army's procurement system, which also supplies the Marines, has come under fierce criticism for underperforming in the war, and to this day it has only one small contractor in Ohio armoring new Humvees.

Marine Corps officials disclosed last month in Congressional hearings that they were now going their own way and had undertaken a crash program to equip all of their more than 2,800 Humvees in Iraq with stronger armor. The effort went into production in November and is to be completed at the end of this year.

Defense Department officials acknowledged that Company E lacked enough equipment and men, but said that those were problems experienced by many troops when the insurgency intensified last year, and that vigorous efforts had been made to improve their circumstances.

Lt. Gen. James N. Mattis of Richland, Wash., who commanded the First Marine Division to which Company E belongs, said he had taken every possible step to support Company E. He added that they had received more factory-armored Humvees than any other unit in Iraq.

"We could not encase men in sufficiently strong armor to deny any enemy success," General Mattis said. "The tragic loss of our men does not necessarily indicate failure - it is war."

Trouble From the Start

Company E's troubles began at Camp Pendleton when, just seven days before the unit left for Iraq, it lost its first commander. The captain who led them through training was relieved for reasons his supervisor declined to discuss.

"That was like losing your quarterback on game day," said First Sgt. Curtis E. Winfree.

In Kuwait, where the unit stopped over, an 18-year-old private committed suicide in a chapel. Then en route to Ramadi, they lost the few armored plates they had earmarked for their vehicles when the steel was borrowed by another unit that failed to return it. Company E tracked the steel down and took it back.

Even at that, the armor was mostly just scrap and thin, and they needed more for the unarmored Humvees they inherited from the Florida National Guard.

"It was pitiful," said Capt. Chae J. Han, a member of a Pentagon team that surveyed the Marine camps in Iraq last year to document their condition. "Everything was just slapped on armor, just homemade, not armor that was given to us through the normal logistical system."

The report they produced was classified, but Captain Royer, who took over command of the unit, and other Company E marines say they had to build barriers at the camp - a former junkyard - to block suicide drivers, improve the fencing and move the toilets under a thick roof to avoid the insurgent shelling.

Even some maps they were given to plan raids were several years old, showing farmland where in fact there were homes, said a company intelligence expert, Cpl. Charles V. Lauersdorf, who later went to work for the Defense Intelligence Agency. There, he discovered up-to-date imagery that had not found its way to the front lines.

Ramadi had been quiet under the National Guard, but the Marines had orders to root out an insurgency that was using the provincial capital as a way station to Falluja and Baghdad, said Lt. Col. Paul J. Kennedy, who oversaw Company E as the commander of its Second Battalion, Fourth Marine Regiment.

Before the company's first month was up, Lance Cpl. William J. Wiscowiche of Victorville, Calif., lay dead on the main highway as its first casualty. The Marine Corps issued a statement saying only that he had died in action. But for Company E, it was the first reality check on the constraints that would mark their tour.

Sweeping for Bombs

A British officer had taught them to sweep the roads for bombs by boxing off sections and fanning out troops into adjoining neighborhoods in hopes of scaring away insurgents poised to set off the bombs. "We didn't have the time to do that," said Sgt. Charles R. Sheldon of Solana Beach, Calif. "We had to clear this long section of highway, and it usually took us all day."

Now and then a Humvee would speed through equipped with an electronic device intended to block detonation of makeshift bombs. The battalion, which had five companies in its fold, had only a handful of the devices, Colonel Kennedy said.

Company E had none, even though sweeping roads for bombs was one of its main duties. So many of the marines, like Corporal Wiscowiche, had to rely on their eyes. On duty on March 30, 2004, the 20-year-old lance corporal did not spot the telltale three-inch wires sticking out of the dust until he was a few feet away, the company's leaders say. He died when the bomb was set off.

"We had just left the base," Corporal Winn said. "He was walking in the middle of the road, and all I remember is hearing a big explosion and seeing a big cloud of smoke."

The endless task of walking the highways for newly hidden I.E.D.'s, or improvised explosive devices, "was nerve wracking," Corporal Winn said, and the company began using binoculars and the scopes on their rifles to spot the bombs after Corporal Wiscowiche was killed.

"Halfway through the deployment marines began getting good at spotting little things," Sergeant Sheldon added. "We had marines riding down the road at 60 miles an hour, and they would spot a copper filament sticking out of a block of cement."

General Mattis said troops in the area now have hundreds of the electronic devices to foil the I.E.D.'s.

In parceling out Ramadi, the Marine Corps leadership gave Company E more than 10 square miles to control, far more than the battalion's other companies. Captain Royer said he had informally asked for an extra platoon, or 44 marines, and had been told the battalion was seeking an extra company. The battalion's operations officer, Maj. John D. Harrill, said the battalion had received sporadic assistance from the Army and had given Company E extra help. General Mattis says he could not pull marines from another part of Iraq because "there were tough fights going on everywhere."

Colonel Kennedy said Company E's area was less dense, but the pressure it put on the marines came to a boil on April 6, 2004, when the company had to empty its camp - leaving the cooks to guard the gates - to deal with three firefights.

Ten of its troops were killed that day, including eight who died when the Humvee they were riding in was ambushed en route to assist other marines under fire. That Humvee lacked even the improvised steel on the back where most of the marines sat, Company E leaders say.

"All I saw was sandbags, blood and dead bodies," Sergeant Valerio said. "There was no protection in the back."

Captain Royer said more armor would not have even helped. The insurgents had a .50-caliber machine gun that punched huge holes through its windshield. Only a heavier combat vehicle could have withstood the barrage, he said, but the unit had none. Defense Department officials have said they favored Humvees over tanks in Iraq because they were less imposing to civilians.

The Humvee that trailed behind that day, which did have improvised armor, was hit with less powerful munitions, and the marines riding in it survived by hunkering down. "The rounds were pinging," Sergeant Sheldon said. "Then in a lull they returned fire and got out."

Captain Royer said that he photographed the Humvees in which his men died to show to any official who asked about the condition of their armor, but that no one ever did.

Sergeant Valerio redoubled his effort to fortify the Humvees by begging other branches of the military for scraps. "How am I going to leave those kids out there in those Humvees," he recalled asking himself.

The company of 185 marines had only two Humvees and three trucks when it arrived, so just getting them into his shop was a logistical chore, Sergeant Valerio said. He also worried that the steel could come loose in a blast and become deadly shrapnel.

For the gunners who rode atop, Sergeant Valerio stitched together bulletproof shoulder pads into chaps to protect their legs.

"That guy was amazing," First Sgt. Bernard Coleman said. "He was under a vehicle when a mortar landed, and he caught some in the leg. When the mortar fire stopped, he went right back to work."

A Captain's Fate

Lt. Sean J. Schickel remembers Captain Royer asking a high-ranking Marine Corps visitor whether the company would be getting more factory-armored Humvees. The official said they had not been requested and that there were production constraints, Lieutenant Schickel said.

Recalls Captain Royer: "I'm thinking we have our most precious resource engaged in combat, and certainly the wealth of our nation can provide young, selfless men with what they need to accomplish their mission. That's an erudite way of putting it. I have a much more guttural response that I won't give you."

Captain Royer was later relieved of command. General Mattis and Colonel Kennedy declined to discuss the matter. His first fitness report, issued on May 31, 2004, after the company's deadliest firefights, concluded, "He has single-handedly reshaped a company in sore need of a leader; succeeded in forming a cohesive fighting force that is battle-tested and worthy."

The second, on Sept. 1, 2004, gave him opposite marks for leadership. "He has been described on numerous occasions as 'dictatorial,' " it said. "There is no morale or motivation in his marines." His defenders say he drove his troops as hard as he drove himself, but was wrongly blamed for problems like armor. "Captain Royer was a decent man that was used for a dirty job and thrown away by his chain of command," Sergeant Sheldon said.

Today, Captain Royer is at Camp Pendleton contesting his fitness report, which could force him to retire. Company E is awaiting deployment to Okinawa, Japan. Some members have moved to other units, or are leaving the Marines altogether.

"I'm checking out," Corporal Winn said. "When I started, I wanted to make it my career. I've had enough."

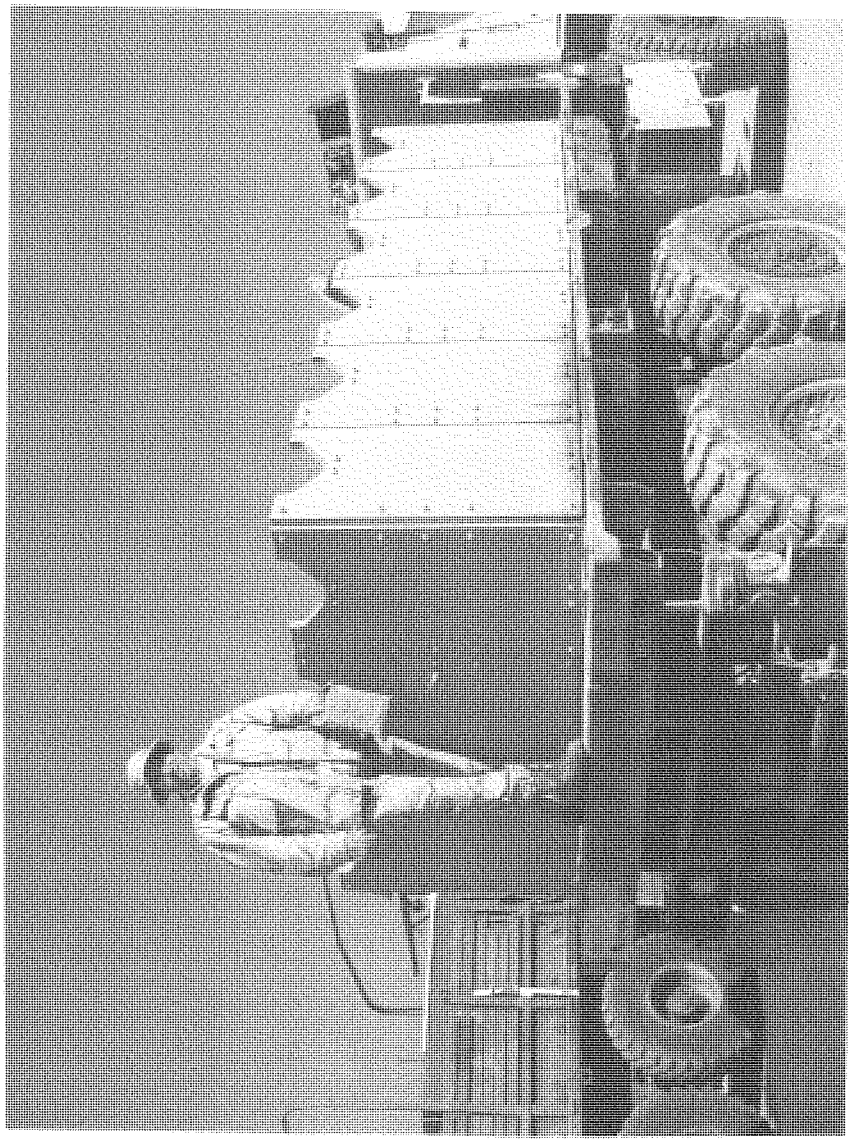
SECTION 801 – Rapid Acquisition Authority to Respond to Combat Emergencies

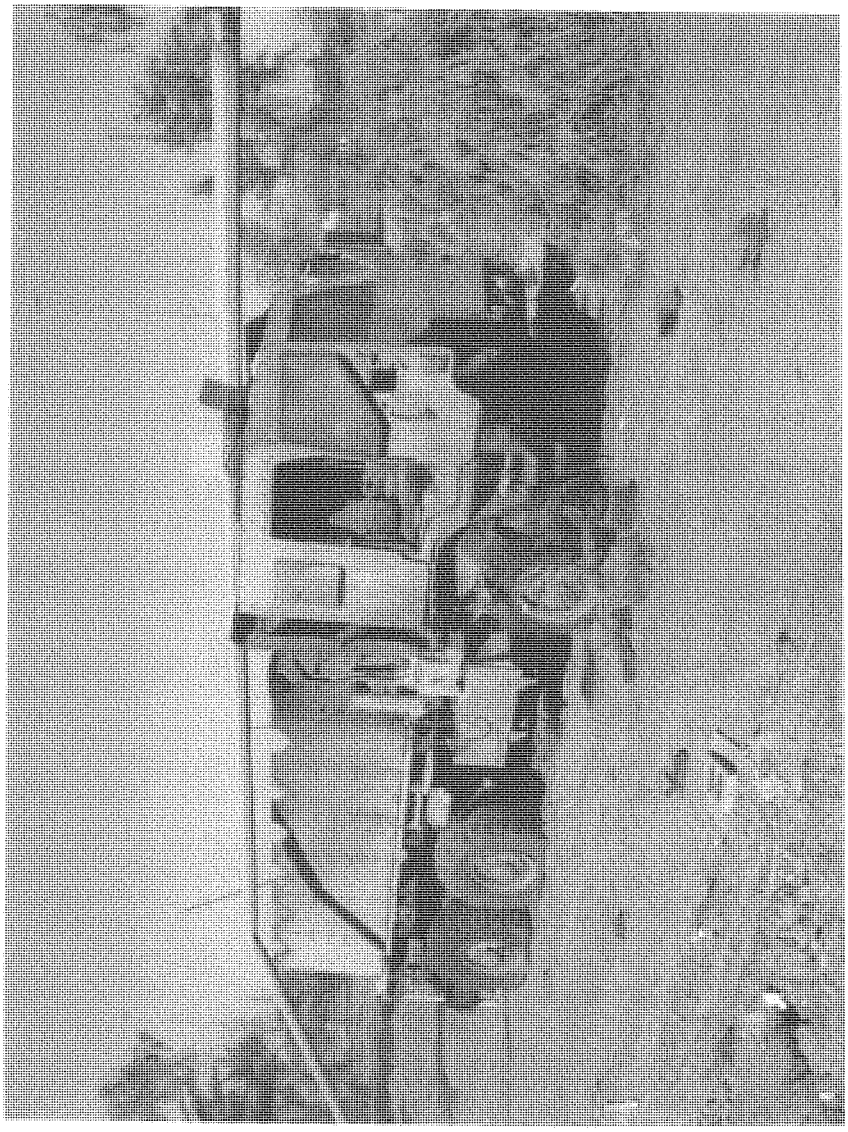
This section would authorize the Secretary of Defense to establish a streamlined acquisition process for use when combat fatalities have occurred, the combatant commander has an urgent need of equipment, and delay would cause a continuation of combat fatalities. This process is to be used as a "quick start" bridge to the normal acquisition process.

The committee finds that the Department of Defense acquisition system cannot respond in a timely manner to the combatant commander's urgent need of combat equipment. A rapid response to emergency combat situations would minimize combat fatalities when reacting to changes in the opponent's battlefield tactics.

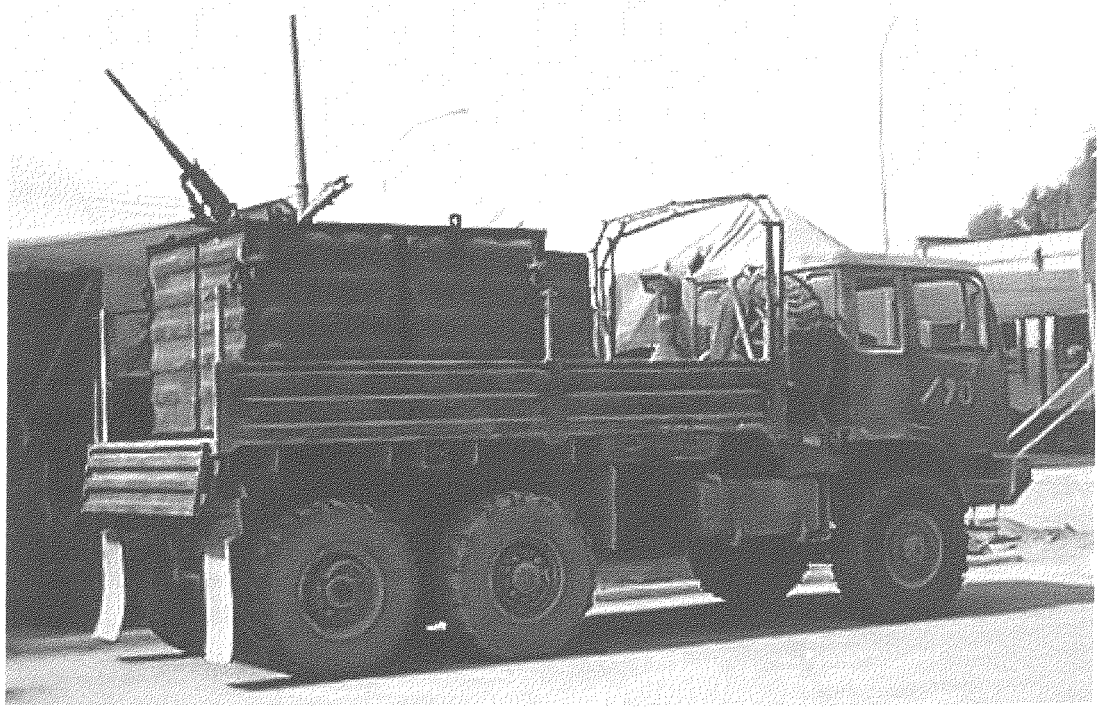
HOUSE REPORT 108-491

The "Iron Horse" in El Taqaddum, Iraq





HOMEMADE GUN TRUCK IN IRAQ



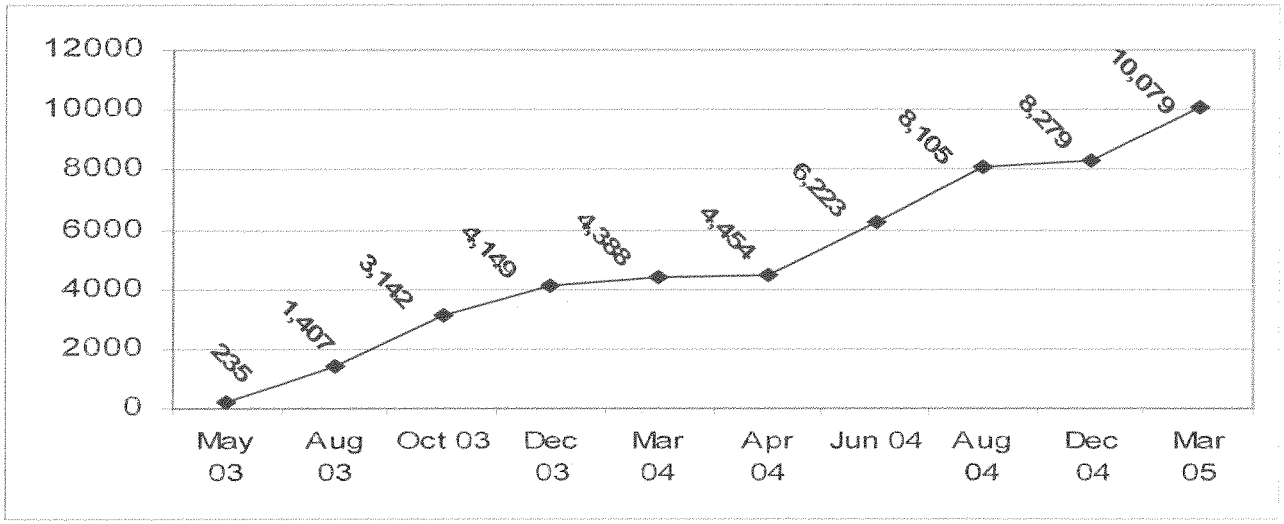
OEF AoA Requirements

	22-Apr-05	R'qmt	Completed	APR	MAY	JUN	JUL	AUG	SEP
Bagram Afghanistan	MTV	252	7	5	50	60	64	66	0
	M939 - GSIE	186		5	30	40	45	66	
	FMTV - LSAC	66	7		20	20	19		
	HTV	69	0	0	3	20	36	5	5
	HEMTT	56				20	36		
	PLS	3			3				
	M915A2	10						5	5

UAH

- 958 UAH required for OEF
  - Included as part of 10,079 Total Requirement
- 669 UAH on-hand in OEF
- CFLCC establishes UAH prioritization
- UAH Production reaches 10,079 in JUL 05

UAH Requirements



QUESTIONS AND ANSWERS SUBMITTED FOR THE RECORD

MAY 5, 2005

QUESTIONS SUBMITTED BY MR. REYES

Mr. REYES. What is the percentage that you think is armored? Is that in the ball park that we have 60, 70 percent of the vehicles not armored in Afghanistan right now?

General SORENSON. [The information referred to can be found in the Appendix on page 153.]

QUESTIONS SUBMITTED BY MR. LANGEVIN

Mr. LANGEVIN. I would like an update, first of all, on how our equipment is doing. And then, as a follow-up to that, I have been concerned about more rapidly developing composite material.

What effect the add-on armor, either a Level two or Level three, is having on the service life of the vehicles? And can you expand upon the efforts that you are taking to decrease the weight of the armor, or the vehicles, to ensure sufficient protection without further degradation.

If you can expand on those, I know the committee would consider it helpful.

General SORENSON.

PURPOSE: To provide Congress with an update of the HMMWV Recapitalization Program.

FACTS:

a. Recapitalization is an important on-going element of the TWV strategy that has proven effective. It is adding new capabilities such as engines, chassis, and transmissions, which enhances a program where existing equipment is aging.

b. The Light Tactical Vehicle Fleet (HMMWVs) represents 50% of the total tactical truck fleet, approximately 115,000 systems. The major portion approximately 86,000 vehicles are AO models. The fleet average age is 13.9 years against a EUL of 15-years. The HMMWV program is a Tri-service program, supporting Army, Marine Corps and Air Force requirements. Approximately 12,600 HMMWVs (12% of Fleet) are supporting OIF and are experiencing a 6:1 OPTEMPO [putting 6,000 miles in a war time one year period vs. 1,000 miles under a normal peace time OPTEMPO]. The M998 HMMWV variants are unable to accept add-on armor to achieve a 360-degree protection. These operational gaps necessitated the procurement of additional Up-Armored HMMWVs (UAHs) and 13,000 Add-on Armor kits to provide force protection for soldiers. Production lines have now been changed and we are currently producing only M1114's (UAHs), M1151 and M1152 platforms to accommodate the force protection requirements.

c. The VCSA approved and revised the HMMWV Recapitalization Program, which is essential to the aging fleet. A selected number of the M998A0 vehicles from the HMMWV fleet will be modified to meet the M1097R1 vehicle standard. The M1097R1 vehicle is more capable, reliable, and maintainable and can accept Add-on Armor for force protection. The result of this Recapitalization effort is a vehicle with an extended service life that is "like new" in appearance, 1900lbs increase payload, improved suspension components, increased electrical capacity, and is force protection compliant.

d. To meet Army demands, a third Recap production source, Maine Military Authority, has been added to the program to augment Red River Army Depot (RRAD) and Letterkenny Army Depot (LEAD) production capacity. The Army budget currently has programmed 697 vehicles in FY06 and 800 vehicles in FY07. However, the TWV Strategy and OSD Stress Study support quantities of 4000 in each of the program years. Funding strategy is to fund through supplementals. Additionally, a Re-power Program is underway to increase the horsepower and introduce an EPA compliant power train for both the HMMWV Recap and new production lines.

QUESTIONS SUBMITTED BY MR. ANDREWS

Mr. ANDREWS. At some point there is a sea change. We go from having 200 and some of these armored vehicles to rushing to get ourselves over 10,000. Frankly, the track record in the months at the end of calendar 2003 is not bad. You have ramped up 8,000-and-something right now. But I am less interested in the industrial production than I am the paradigm shift in people's thinking. Who was it that came to you and said, you know, we need a lot more of these things in a hurry; and when did that happen?

General SORENSON.

THE ARMY POSITION:

- The Army is meeting the CENTCOM Combatant Commander's increased requirements for Up-Armored HMMWVs with increased production, diverting current production, and redirecting assets in support of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF).
- The current requirement for Up-Armored HMMWVs is 10,079.
- There are approximately 7,991 Up-Armored vehicles currently available to, or directed to, the theater Area of Responsibility (AOR). This number includes approximately 2,725 Up-Armored vehicles obtained from units deployed and those diverted from production or redistributed from other units not currently identified for deployment.
- All Up-Armored HMMWVs deployed to theater will remain in theater, whether organic to units or in fulfillment to CENTCOM requirement to protect Soldiers' lives and to ensure we have enough armored vehicles required to perform the military mission.

TALKING POINTS

- The initial theater request for Up-Armored vehicle requirement was received in May 2003 for 235 vehicles. This requirement was fulfilled with vehicles coming directly from the production line (originally scheduled for other units) and a redistribution of vehicles assigned to Forces Command and U.S. Army Europe.
- In Aug. 2003, CFLCC requested an increase in Up-Armored vehicles from 235 to 1,233.
- By Aug. 2003, CFLCC further refined the requirement to 1,407 vehicles.
- On 3 Oct. 2003, the request increased to 2,957 to include Military Police requirements for OIF.
- Additional requirements for OEF were approved in Oct. 2003, bringing the total to 3,142.
- From Dec. 2003 to Jan. 2004 Up-Armored vehicle requirements increased by more than 1,000 vehicles bringing the total to 4,149.
- On 15 Mar. 2004, the Vice Chief of Staff, Army, approved additional increases bringing the requirement to 4,388.
- By Apr. 2004 additional Up-Armored vehicle requirements for OIF/OEF were approved by the VCSA increasing the requirement to 4,454.
- On 29 June 2004, the VCSA approved further requirements, bringing the total requirement to 6,223.
- On 14 Aug. 2004, the VCSA approved additional requirements to bring the total required to 8,105.
- On 23 Dec. 04, the VCSA approved additional Up-Armored vehicles requirement for OEF increasing the requirement to 8,275.
- On 11 Mar. 05, the VCSA approved additional Up-Armored vehicles requirement for OEF increasing the requirement to 10,079.

[A chart of the UAH Requirements can be found in the Appendix on page 154.]

QUESTIONS SUBMITTED BY MR. SHUSTER

Mr. SHUSTER. If you could give me some kind of report on what you are doing, because as I said, what I understand is that it is—the money is not being spent to go after the composites, and they have a great benefit to us.

General SORENSON.

PURPOSE: To provide information on S&T efforts for composite armor
FACTS:

a. The Army's S&T program continues to focus on developing lighter weight, improved protective armor technology for both vehicles and personnel to include advanced composite concepts/designs, active protection systems, and enhanced predictive models.

b. U.S. Army Research and Development and Engineering Command (RDECOM) has developed key advances in fibers and materials that have contributed to the success of the Interceptor Body Armor. Additional efforts have focused on systems for increased extremity protection, such as the Deltoid Axillary Protection system.

c. RDECOM is researching high-strength fibers such as M5 and Zylon, along with post-processing treatments, which could improve the fragmentation protection of soft armor systems. In addition, new methods of production and innovative architectures for protective materials (e.g., non-woven, unidirectional layers; backing materials; flexible resin impregnated fabrics) are being assessed.

d. RDECOM has been working toward lighter and more affordable solutions for the entire spectrum of Army vehicles. Combat System and Tactical Wheeled Vehicle armors have had considerable success in using ballistic-grade composites such as the family of Kevlar and "S2-glass" composite materials. The fiber reinforced composite materials are often combined with various metals or ceramics to form "hybrid" composite armors.

e. Hybrid armors come in three basic variants.

a. Metal-composite designs are approximately 30% lighter than monolithic steel. In general, the purpose of composites in these various hybrid constructions is to provide backing stiffness to the structure that is critical to the function of the armor design.

i. Metal-Composite armor: Used in the Low Signature Armor Cab, the M1114, and other vehicles in development

b. Hybrid ceramic-composite laminate designs are approximately 66% lighter than monolithic steel. In these designs the composite materials support the ceramic tiles and catch residual projectile debris resulting from an impact. These designs have a higher cost and maintenance burden, but they are significantly lighter than metal-composite armor systems.

i. Ceramic-Composite Monocoque armor: Demonstrated in a mobile platform, the Composite Armored Vehicle technology demonstration, including maintenance and repair technologies.

ii. Advanced Ceramic-Composite Structural armor: Higher efficiency armor technologies evolved for the Future Combat Systems Program.

c. Composite hybrid armor panels can be constructed from a variety of composite materials and metals. The relationship governing the performance of composite hybrid armors is governed by interactions between the layers of material used. As there are multiple layers of materials, changing constituent materials will affect total system performance. Numerical models have been coupled to ballistic experiments to provide an assessment process and a limited predictive capability to understand the influence of armor recipe changes.

i. Ceramic-Metal-Composite appliqué armors: Used in the M1117 Armored Security Vehicle, the STRYKER, and can be applied to the fleet of tactical wheeled vehicles.

	FY05	FY06	FY07	FY08	FY09	Total
Soldier Ballistic Protection	3.0	2.5	1.5	2.6	2.7	12.3
Adv Lighteweight Armor for Vehicles	4.5	10.3	10.9	13.5	13.9	53.1

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