

NOT FOR PUBLICATION UNTIL RELEASED BY
THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT

OF

GENERAL WILLIAM L. NYLAND
ASSISTANT COMMANDANT OF THE
MARINE CORPS

&

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

BEFORE THE

HOUSE ARMED SERVICES COMMITTEE

ON

MARINE CORPS VEHICLE ARMORING
AND IMPROVISED EXPLOSIVE DEVICE
COUNTERMEASURES

21 JUNE 2005

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE

Chairman Hunter, Congressman Skelton, and distinguished members of the committee: I am pleased to appear here today to update you on our Force Protection efforts, in particular, our evolving vehicle armoring and Improvised Explosive Device (IED) countermeasure initiatives. Let me begin by thanking you, Mr. Chairman, and the distinguished members of the committee for your unwavering support of your Corps during this challenging time. Your support of these magnificent young men and women is greatly appreciated by the individual Marine and the leadership of the Corps.

As the committee is well aware, we are at war with a smart, thinking, and adaptive enemy. As LtGen Mattis said when he testified on 5 May, he went 5 1/2 months at the end of OIF-I without losing a single Marine or sailor, yet during that period, the insurgency was growing. When the Marines returned to Iraq in March 2004, the threat had been evolving; in particular, the IED had become prevalent. The IED threat then was generally 60mm and 81mm mortar rounds – today, because we face this smart, adaptive and thinking enemy, we face munitions like single 122 to 155mm artillery shells, daisy-chained series of shells, triple stacked mines, shape charge-like weapons, and even 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 changes and we understand what works, and what does not, and why.

HISTORY OF VEHICLE ARMOR

From the start of Operation Iraqi Freedom - II (OIF-II) the Marine Corps has had a critical imperative to provide armor protection to all of our rolling stock. The goal was to provide the best level of protection possible to 100 percent of in-theater vehicles. To that end, the Marine Corps has evolved vehicle armor since we have been in combat in OIF II through three generations.

1st Generation (Level III)

Before I Marine Expeditionary Force (MEF) relieved the 82nd Airborne in Iraq on March 19, 2004, the Marine Corps provided 1st generation armor components for 100 percent of I

MEF's 3,049 vehicles within 10 weeks of the Corps receiving the order to execute. Level III armor protection or fabricated armor was affixed using a Commercial-Off-The-Shelf combination of appliqué panels, 3/16" "L" shaped doors, ballistic blankets, etc. The 3/16" 1st generation armor was the best materiel solution available at the time to fully meet operational requirements.

In April 2004, in response to an urgent need by the operational forces, 37 export model up-armored HMMWVs were purchased and fielded to I MEF. During this time, we made it clear that we would find more robust armoring solutions as better raw material steel became available. This spiral development, done in concert with the warfighter, has resulted in our 2nd and 3rd generations of armor.

2nd Generation (Level II)

As time and raw material availability allowed, we procured more improved armor component systems for HMMWVs and other tactical vehicles. We began fielding of "zonal" armor, which necessitated the identification and reprogramming of funds, to upgrade all armor kits to 2nd generation armor consisting of the Marine depot built 3/8" rolled homogeneous armor (RHA). RHA is defined as Level II because it is "kit" armor. In all, more than 4,100 vehicles were equipped in I MEF with upgraded Level II 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 94 up-armored HMMWV (M1114/M1116) from theater level assets.

As the threat continued to evolve and change, particularly with respect to IEDs, which became increasingly sophisticated and more powerful, it became clear that additional improvements to the "zonal" armor were necessary; thus, the evolution of the Marine Corps' 3rd generation of armor, as designed by the warfighter, Marine Corps Systems Command/Logistics Command, and US Army engineers.

3rd Generation (Level II+)

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 at the unit level. 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 II armor, however, it should be noted that it provides significantly greater protection than the 2nd generation “zonal” armor.



USMC Vehicle Armoring

Since August 2004 all Marine Corps vehicles operating outside the FOBs have been at Level II or better armor protection.

	Vehicle Systems in CENTCOM AOR	OIF O/H	OEF O/H	HOA O/H	Total	Level I	Level II	Level III	Total Unarmored Vehicles not Leaving FOBs
LTV	M1114	35	0	0	35	35			
	HMMWV	2500	85	18	2603	0	2438	165	225
MTV	5-ton	173	1	0	174	0	174	0	3
	MTVR	878	11	0	889	2	887	0	3
HTV	LVS	236	0	0	236	0	236	0	0

Note 1: MNC-I has provided 458 M1114s to II MEF (Fwd) and 36 for ITTs in OIF and 35 in OEF

Note 2: Two of the 37 export model M1114s procured lost to battle damage

Level I: A wheeled vehicle that is manufactured as an armored vehicle
 Level II: HQDA and Marine Corps approved Add-on-Armor (AoA) kits
 Level III: Hardening of vehicles through fabricated armor (HQDA) approved steel

For Official Use Only

As of 15 Jun 05

The MAK is the result of a cooperative engineering design effort between the warfighters, Marine Corps MCLC/MCSC and the U.S. Army, designed to take full advantage of the increased capabilities of the HMMWVA2. 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. With the recent receipt of the FY05 Supplemental, the Marine Corps has received funding for all 5,550 vehicles.

The most timely and efficient solution to achieve the desired levels of protection quickly was to develop and produce the MAK armor kits through our Maintenance Center at Marine Corps Logistics Base, Albany, GA, which initially began production of the MAK in November 2004. CONUS installation of these kits began in December 2004, to meet 26th Marine Expeditionary Unit (MEU) requirements, while we also created an installation center in theater at Camp Al Taqaddum, Iraq, and began installation of the kits at that site in March 2005. Installation at the Taqaddum center will continue at a rate of at least 200 systems per month as operational tempo, the threat, and combatant commanders allow (over 300 were completed in May). CONUS installation will advance at a rate of approximately 150 systems per month. Production of the entire requirement of 5,550 MAK systems will be completed by December 2005.

Similarly, for our MTRV 7-ton trucks, we have developed what is known as the MTRV Armor System, or MAS. This armor system is a permanent modification to our MTRVs, and is therefore classified as Level I armor. 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 MTRV.

The MROC's overarching goal for MAS- armored MTRVs is 1,850 vehicles, and our interim requirement is 1,018. The Marine Corps has received all funding required for production of the 1,850 MAS Systems.

Production of the MAS began in April 05 and is estimated to continue at a sustained rate of 22 systems per week. OCONUS installation of the MAS began in-theater last month at the same location as the MAK.

MECHANISMS

The 3rd generation vehicle armor currently being fielded was developed in an aggressive, integrated program. 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 particular for the development of the MAS. This input was critical to initiating integration of armor protection capabilities onto the MTRV.

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. 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 appliques. 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. 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. In testing the MAKs, ballistic and IED protection levels of the side armor has been demonstrated to be slightly better than that afforded by the M1114. In addition, while the underbody protection provided by MAKs is somewhat less than that of the M1114, we believe fielding of this MAK armor was a necessary interim solution in order to provide protection to a greater number of vehicles rapidly.

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.

In order to provide added protection to our explosive ordnance disposal teams and combat engineers, we also pursued the recent procurement of the Joint Explosive Ordinance Disposal Rapid Response Vehicle (JERRV), commonly referred to as the Cougar. The Cougar was the first Hardened Engineer Vehicle delivered to the Marine Expeditionary Forces and has dramatically improved the protection levels for Marines involved in highly dangerous activities such as detection and removal of IEDs used by insurgents. This vehicle is designed to withstand mine and IED blasts. The Marine Corps recently purchased 27 Cougars, of which 18 have already been fielded to the operating forces. The Cougar has been proven under the most extreme conditions and as a result, the Joint IED Defeat IPT identified the Cougar/HEV (Hardened Engineer Vehicle) to meet its requirement to produce and field 122 JERRVs. The Marine Corps will receive 38 of these 122 Cougars. This development will meet the needs of the operating forces of all Services in OIF and OEF by increasing their survivability against IEDs.

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.

Recent and ongoing events in Iraq require us to continue to shape and refine our requirements. We have determined that the M1114/M1116 Up-Armored HMMWV (UAH) is the best available, most survivable asset that meets our evolving vehicle underbody protection requirements. In order to meet the Marine Corps' immediate requirement and provide the range and depth to support force requirements, we are in the process of identifying the requirement for M1114/M1116 vehicles. This requirement is being refined today by the warfighter, MARCENT, and Headquarters Marine Corps.

Most recently, because of the growing threat of mines and IEDs, the Marines have increased delivery of MAK underbodies for installation at the unit level on 400 HMMWVs. Production of all 400 MAK underbodies is complete. As of 12 June, 140 have been delivered to our forces in Iraq, with the balance due to arrive via military air no later than 22 June.

We are also making very good progress on the production of underbodies to upgrade the armor on our 5-ton medium trucks and Logistics Support Vehicles (LVS) in Iraq. Production of (124) 5-ton truck underbodies will be completed by the end of July. The (243) LVS kits will be completed by the end of August. It is taking us a little longer because we are adding MAK- style doors and air conditioning to the LVSS. Both the 5-ton and LVS kits will be shipped in-theater via military air.

In addition to other Marine Corps armor initiatives, on 28 April 05 the Marine Corps Systems Command (MCSC) advised Marine Corps Logistics Command (MCLC) that there were 6'x6' 10 mm sheets of Rolled Homogeneous Armor (RHA) steel in the Defense Logistics Agency's (DLA) possession in Kuwait. The Marine Corps Logistics Command was tasked to determine how best to exploit this additional opportunity to increase armor protection within the MARCENT Area of Responsibility. MCLC, in conjunction with MCSC, developed a recommendation that making rocker panels for base model HMMWVs was the best and quickest option for use of this steel.

On 10 May, the Marine Corps purchased 450 sheets of steel from DLA's Defense Supply Center Philadelphia (DSCP), and the Army Material Command (AMC) in Kuwait agreed to cut the steel to prototype the rocker panel to "fit check" the design and determine the precision of cutting with hand-held plasma torches. This method was AMC's primary means of cutting steel, because AMC does not possess the facilities to execute large scale RHA steel cutting. AMC delivered the first cut panels to the Marine Corps on 18 May. These panels were in turn shipped via convoy to Camp Al Taqaddum (see below) for installation and arrived on 28 May.

The Marine Corps has subsequently worked with AMC in-theater contracting assets, adjusted the template from their AMC experience, and aggressively canvassed the in-theater industrial base to find RHA cutting capability to meet the dual parameters of speed and precision. Four options were locally available: continue manual plasma cutting, water jet, automated CNC plasma cutting and standard plasma cutting. MCLC and MCSC recommended we move forward with the automated CNC plasma bid due to the need to complete this effort quickly. Deliveries are expected to begin within three weeks with the job to be completed within eight weeks.

The Marine Armor Installation Site (MAIS) at Camp Al Taqaddum provides a forward location for units to come in and install armor without having to drive or ship their vehicles back

to Kuwait. The MAIS site is a culmination of a 13-month effort to bring the HMMWV armor program to its most mature capability – consisting of perimeter, overhead, and mine protection; with a suspension and air conditioning package to enhance performance. The MAIS is a forward deployed installation site that is responsible for armoring the HMMWVA2s and the MTRVs and LVSs with their armor. Because of its proximity to the warfighter, it alleviates some of distance and therefore exposure of forward deployed vehicles to dangerous convoys.

HISTORY OF IED COUNTERMEASURES

IEDs/VBIEDs (Vehicle-borne Improvised Explosive Devices) continue to be a significant threat. These threats are not decreasing and have a major physical and psychological effect on troops. We are attacking this threat along several axes. First, we are full members on the Joint Improvised Explosive Device Defeat (JIEDD) Integrated Process Team (IPT), which reviews and seeks solutions to this vulnerability. We are also rapidly fielding technologies designed to detect and trigger these IEDs prior to contact with the troops. These technologies are primarily designed to trigger and/or obstruct electronic triggering devices. For this purpose, the Marine Corps selected IED Countermeasures Equipment (ICE) because it proved successful in terms of performance against the threats, and could be procured and fielded most expeditiously. The OIF requirement for 1,066 ICE systems is fully funded: 1,053 systems have been delivered in theater, 10 systems are being used for CONUS based training and three systems are being used as test systems. Although 1,066 systems was the initial requirement, we are procuring an additional 2,000 ICE systems with the \$30M received in FY-05 Supplemental funding in an attempt to better support OIF II.

The initial threat from Remote Control (RC) initiated IEDs came from low-frequency, low-power devices such as cheaply made, mass produced garage door openers, key fobs, and doorbells. ICE and similar systems use relatively low-power RF energy to jam the signals of RC initiators and prevent them from functioning at a distance, thereby enabling adequate protection. These jammers are intentionally low power to preclude interference between an RF emitter (the jammer) and our own communications systems such as Single Channel Ground and Airborne Radio Systems (SINCGARS) radios and Blue Force communications. Secondly, high power jammers cause greater interference and require more power to operate. Increasing the power

amplifier on the jammer also draws more power from vehicle generators, detracting from other vehicle systems. We are striving to balance the best jammers with the least impact on friendly communications while not degrading vehicle performance.

When the enemy began using low frequency, high-power RC initiators, a developmental effort began to address the threats by enhancing the ICE. The Hard-to-Kill (H2K) upgrade provides a countermeasure suite that combats the high-power threats that are prevalent in-theater without procuring a new system. The H2K device components will be integrated into an enclosure assembly and mounted to the current unit. H2K tests are ongoing that should enable production by the end of September 2005. All 3,066 systems will need the H2K upgrade to address the range of threats currently being encountered in Iraq. The FY05 supplemental for the H2K cards (\$12.6M) procures 434 of that total. In an effort to provide an interim upgrade to fielded units, the U.S. Army spearheaded an initiative that would provide operating forces with the capability to combat the Family of Radio Systems (FRS) threat. The interim upgrade, known as (m) ICE, has been tested and has been approved for procurement by PM CREW. The Joint IED Defeat Task Force has agreed to fund this initiative for all fielded units, to include the 3,066 USMC systems. Total amount funded by the JIEDD TF is \$15.3M.

Cellular, Satellite, Long Range Cordless Telephone and FRS Radio Jammer have become the worldwide number one initiator of IEDs. To date there has been very little high frequency communications threat in Operation IRAQI FREEDOM. We believe that threat will increase with the expansion of the cell phone infrastructure within Iraq. Cell phones have been identified as the emerging threat as RC initiators of IEDs in the world. \$2.1M to test current domestic and foreign jamming technology has been funded by the Assistant Secretary of the Navy for Research, Development, and Acquisition. \$3M of USMC funds has been advanced to purchase the initial allotment of the winning system. \$30M was received in the FY 05 Supplemental to support the I MEF "1,000 system" req. Testing was conducted 28 February 2005 – 1 April 2005. The Final Test Report was received on 31 May 2005. Final consideration of test results and recommendation for future acquisition activities will be provided by 30 June 2005.

ACQUISITION MEASURES

The FY05 National Defense Authorization Report, Subtitle B, Amendment to the General Contracting Authorities, Procedures and Limitations, section 811 for Rapid Acquisition

Authority to Respond to Combat Emergencies has been useful to the Marine Corps with the recent procurement of the JERRV, described above. The authority, once signed by the Deputy Secretary of Defense on 21 April, permitted a contract to be executed on 15 May 2005, two days after receipt of funds. Once the Joint IED Defeat IPT identified that the JERRV met the joint requirement, the Marine Corps Systems Command awarded the contract on behalf of OSD. This is a clear example of accelerated acquisition. Key to its success was a clear combat emergency/requirement, a viable contractor able to produce the vehicle, the availability of funds in OSD to resource the program, and regulation relief that enabled the acquisition program to react quickly.

We believe a key element of any successful acquisition is clarity of requirements, coupled with adequate funding and clear lines of accountability to manage the program. Delegation of rapid acquisition authority to a level below the Secretary of Defense should be reviewed as a possible alternative. Additionally, the flexibility to reprogram funds using below threshold reprogramming authority in time of war and for combat emergencies, in excess of the current financial levels and percentages, should be reviewed. If the responsible acquisition professionals could make financial adjustments to their programs of record with greater flexibility this would accelerate emergency acquisition. Similarly, above threshold reprogramming thresholds and staffing requirements should also be reviewed.

The Marine Corps Urgent Universal Need Statement (UUNS) process has worked well for us in responding to the emergent needs of the warfighters because we were able to rapidly make decisions on validating a program's requirements and deciding on funding offsets. We often made requirement, funding and program decisions within days of getting a validated UUNS from the Fleet. We also enjoy a close and effective working relationship between our Combat Development Center for requirements development, the Systems Command for acquisition and the funding authority provided by the Deputy Commandant for Programs and Resources. These three organizations all fall under the purview of the MROC and we can commit to any acquisition decision required of the Marine Corps. UUNS have been very successful in providing quick reaction (contract in days and weeks in many cases) to meet the wartime needs of our operating forces.

THE ROAD AHEAD

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. We have also begun replacing 875 base model HMMWVs with HMMWVA2s fitted with our MAK systems later this month.

As we continue to counter an adaptive enemy, we are in the process of identifying the requirement for more M1114 vehicles. Additional vehicles may be needed in response to the recent Operating Force/MROC deliberations.

Furthermore, the Marine Corps 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.

With our Next Generation Survivability Development Program Plan, we are looking at designing and building the next generation of tactical vehicles with survivability in mind from the ground up, as opposed to "plugging in" protection solutions on the existing generation of vehicles. Should this plan be formalized with requirements, and appropriately funded, we will be able to initiate a development effort for procurement. I am confident that this effort will be conducted in concert with the U.S. Army, as we work together wherever feasible.

CONCLUSION

Our Marines and Sailors are our most precious assets, and the preservation of their lives through better and more capable equipment has been, and will always be, a top priority for the

Marine Corps. We will continue to make every effort to maximize whatever assets are in theater for all of our Operating Forces.

Since February, we have established the Marine Armor Installation Site (MAIS) at Camp Al Taqqadum. To date, we have installed 645 MAKs in-theater. We are over a third of the way done and at this rate will easily meet our 1695 goal by December 2005. We have 238 new HMMWVA2s with MAK in transit to the CENTCOM area of responsibility by surface vessel, and another 150 are at Charleston, South Carolina awaiting shipment later this month. This is almost half of our requirement to replace 850 base model HMMWVs.

The first MAS installation was completed on 31 May. We have completed another one since then and have ample kits on the ground in order to sustain the desired installation goal of 40 kits per month. With the installation of the MAS, the armor level protection of our MTRVs will be upgraded from Level II to Level I.

Because of the increased mine threat, we are expediting the shipment of 400 MAK underbodies, 124 5-ton underbodies, and 243 new LVS kits (underbody and MAK style doors). II MEF (Fwd) will install these three enhancements at the unit level.

In addition, we have fielded armor kits to the 13th MEU in preparation of their pending deployment, and will be fielding kits to the 22nd MEU in July.

In closing, I would like to thank you again, Mr. Chairman, and the distinguished, dedicated members of this committee, for all you have done in support of our Marines and service members deployed in harm's way. With your continued support, we will ensure our Marines are ready and well equipped for any fight. We will supply our warfighters with whatever it takes to win. Thank you.