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# **Mine Resistant Ambush Protected Vehicle (MRAP)**

**Ground Combat Element (GCE) Advocate  
Science and Technology (S&T) Advisor Case Study**

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# Mine Resistant Ambush Protected (MRAP) Vehicle Case Study

## I. Executive Summary

### 1. Introduction

a. Purpose. The study uses a recent example of a Ground Combat Element (GCE)-requested capability that encountered combat development challenges in order to illuminate some of the systemic problems inherent and endemic to the Expeditionary Force Development System (EFDS) at Marine Corps Combat Development Command (MCCDC). The study begins with a chronology of events documenting USMC operator and advocate efforts to have the Mine Resistant Ambush Protected (MRAP) capability fielded in a Counterinsurgency (COIN) combined arms context. This case study will examine in detail how and why the EFDS elected not to fulfill the I Marine Expeditionary Force (MEF) Forward (Fwd) MRAP Urgent Universal Need Statement (UUNS) of 17 Feb 2005, thereby creating a significant adverse impact on the MEF (Fwd) GCE's ability to accomplish its mission. The perspectives shared here are those of the author who serves as the Science and Technology (S&T) advisor to the Deputy Commandant, Plans, Policies, Operations (DC, PP&O) and GCE Advocate. The author of this case study also served as the Science Advisor to the Commanding General (CG) Multi National Forces, West (MNF-W) during some of the events described herein.

b. Methodology. This case study is composed of two detailed discussions. The first constitutes a chronology of events documenting USMC-specific involvement with MRAP. The chronology begins with MRAP as a proposed solution to projected threats and ends with MRAP as an urgently needed tool to mitigate an Improvised Explosive Device (IED) emergency in Iraq. The second discussion focuses on the combined arms context into which MRAP fits. It is in this later analysis that the reasons for the appearance of the IED emergency will be discussed, as well as the degree to which USMC combat developers prepared for the COIN environment from which the MRAP needs emerged.

c. Constraints. In accordance with DC, PP&O guidance, this study did not include interviews or written queries of any employees or institutions coming under the command or oversight of the larger Marine Corps combat development community. These are understood to include MCCDC, the EFDC, Marine Corps Systems Command (MCSC), the Marine Corps Warfighting Laboratory (MCWL), the Joint Non-Lethal Weapons Directorate (JNLWD), and the USMC S&T Program at the Office of Naval Research (ONR).

**2. Background.** The MRAP Case Study was conducted in an effort to better understand the challenges USMC operating forces encountered when seeking combat developer support for a capability of interest to the GCE Advocate. The MRAP Case Study discussions, conclusions, and recommendations are drawn from the references and author's recollections, both in his capacity as the S&T Advisor to the GCE Advocate, as well as the Science Advisor to CG, MNF-W in 2006. The details contained within the case study represent a combination of verifiable documents, written communications, and the recollections of others who are knowledgeable of the MRAP topic.

### **3. Discussion**

a. Bottom Line Up Front (BLUF). The author has observed the MCCDC EFDS is currently incapable of verifiably delivering specific capabilities requested by operational commanders within responsive timelines. In the case of MRAP, this was evident even when a senior General Officer (GO) advocate shepherded requirements through the Byzantine system. The Marine Corps has advocated an MRAP capability as a Key Performance Parameter (KPP) since 1996 (References a.1. and p.7). In 2005 under belly blast IEDs were known by the USMC to threaten HMMWVs in Operation Iraqi Freedom (OIF) (References r.2., p.10., and c.1.). In order to mitigate the IED threat I MEF (Fwd) submitted a solution-specific need for a Commercial-Off-The-Shelf (COTS) 4<sup>th</sup> generation armor MRAP capability. The requested solution set included an urgent request for protection against Explosively Formed Penetrators (EFP) (References r.2.). In spite of the all-around superior protection of COTS MRAP (References p.1. and p.2.) combat developers did not fulfill the I MEF (Fwd) UUNS. Based upon the research provided in this case study the author suggests I MEF UUNS was not fulfilled because individuals throughout the EFDS perceived the MRAP as a threat, as it would compete for limited funding against other existing programs and combat vehicle initiatives. References p.8., p.3., and p.10. constitute supporting documentation for this observation. Additional research indicates MCCDC personnel did not forward the MRAP UUNS to MCWL for S&T investments in rapid MRAP and EFP developmental solutions (References e.2. and p.11.). In 2006 I MEF (Fwd) requested an MRAP capability again in response to the IED threat. (References r.4., r.5., and r.6.). During this second attempt, I MEF (Fwd) requested MRAPs, Intelligence, Surveillance, and Reconnaissance (ISR), and other COIN-enabling capabilities through Joint channels and self-help open purchases (References r.8., r.11., r.12., r.13., r.15., r.16., r.17., r.18., r.24., r.25., and r.28.). This approach better served the Marines, Soldiers, Sailors, and Airmen of MNF-W because it circumvented the EFDS. In 2007, when MRAP was combined with the I MEF (Fwd)'s other self-acquired capabilities and the favorable developments resulting from the "Anbar Awakening," the IED emergency was contained. However, delays and denials of capabilities led to a measurably higher casualty rates than were necessary (Reference p.18. and c.6.). The author concludes that in order to prevent unnecessary EFDS delays in the future, MCCDC must fundamentally change its capability development system. New legislation may be required to codify changes that guarantee an operationally-adaptable and fully accountable process. In conclusion the author suggests the DC, PP&O should be assigned as the USMC Advocate for wheeled combat vehicles.

#### **b. MRAP Chronology of Events**

Since 1996, a number of Marines have been advocating the need for Commercial-Off-The-Shelf (COTS) armored vehicles known as MRAPs, based on projected mine threats. The deliberate procurement of MRAPs would have enabled this unique COTS capability to be made a combined arms component of our Prepositioned War Reserve (PWR). There it could remain as a hedge against contingencies where its use might be immediately required. The MRAP advocates had studied the history of the South African and Rhodesian "Bush Wars," as well as Viet Nam and Somalia, and the immediate need for MRAPs seemed compelling (References a.1., p.7., and e.2.).



MRAP advocates presumed that combat developers at MCCDC and MCSC were cognizant of both the modern asymmetric threats to wheeled combat vehicles and the MRAP innovations of the 1970s. They believed that by articulating both the threat and presenting the opportunity to procure a mature solution that combat developers might prepare for contingencies. They published articles, submitted papers, and gave presentations that outlined the high likelihood of a mine warfare threat during ship-to-objective movement. In spite of the evidence of a growing mine threat, one confirmed by Marine Corps Intelligence Activity (MCIA) projections, COTS MRAPs were rejected by combat developers in favor of developmental vehicle concepts and programs. MCCDC and MCSC officials remained focused on expeditionary vehicle concepts that were suited to MV-22 internal and CH-53X external transport, in addition to Maritime Prepositioned Shipping (MPF) compatibility. COTS MRAPs, while combat proven, were large, heavy, and incompatible with MPF ships. In spite of the near-term need to have MRAPs included in the USMC combined arms tool kit, any vehicle concept that did not fit the future expeditionary vision was dismissed by MCCDC and MCSC (References a.2., a.3., and a.4.).

In 2004 and early 2005, during the conduct of Operation Iraqi Freedom (OIF) in Al Anbar Province, IEDs were having a significant, adverse impact on the ability of I MEF (Fwd) to accomplish its mission. I MEF (Fwd) was heavily dependent on High Mobility Multi-Purpose Vehicles (HMMWVs) for troop transport and other routine missions throughout Anbar Province, that defined the Multinational Force West (MNF-W) Area of Operations (AOR). This dependency included both urban operations and long-haul convoy tactical movement along the extensive paved Main Service Routes (MSR) that linked urban areas. Known threats included IEDs that attacked the HMMWVs from the side, as well as buried centerline IEDs, a.k.a. under-belly IEDs. The employment of Explosively Formed Projectiles (EFP) elsewhere in the Iraqi Theater of Operations (ITO) was known to I MEF (Fwd) and their appearance in MNF-W was predicted (References r.5., c.1., a.15., and a.16.).

Consequently, I MEF (Fwd) submitted an Urgent Universal Need Statement (UUNS) requesting a family of 1,169 COTS MRAP vehicles on 17 Feb 05. At the time this constituted approximately 1/3 to 1/4 of the HMMWV fleet in MNF-W. Several MRAP candidates were named in the UUNS, included the Casspir, Buffalo, and the Cougar. The UUNS sought to employ supplemental funding to immediately replace vulnerable 1<sup>st</sup> and 2<sup>nd</sup> generation HMMWVs. These vehicles were either equipped with “monster garage” bolt-on armor or constituted Marine Armor Kit (MAK) equipped up-armor HMMWVs (UAH). The UUNS request for 1,169 vehicles also sought to deliberately skip 3<sup>rd</sup> generation armor solutions such as the M1114 that are factory-built vehicles based upon the vulnerable HMMWV design (References a.1., p.7., r.5., p.2., and p.1.).

The UUNS did not seek a replacement of all HMMWVs in MNF-W, which at that time numbered about 4,000 vehicles. The UUNS did seek to rapidly purchase COTS 4<sup>th</sup> generation MRAP vehicles designed from the ground up to defeat a range of known threats including Small Arms Fire (SAF), IEDs, and Rocket Propelled Grenades (RPG). Specifically, MRAPs were urgently needed to mitigate under-belly IEDs that had already appeared in MNF-W as well as prepare for the appearance of EFPs. MRAPs were sought for the most hazardous missions, especially long-haul tactical movement along the MSRs throughout the AOR. The continued

MEF (Fwd) operation of a combined arms mix of MRAPs and M1114 HMMWVs was assumed, with the M1114 being better suited to urban and unimproved or off-road missions (References r.5., p.9., a.6., and c.1.).

At the March 2005 USMC Safety Conference, the Deputy Commandant for Combat Development and Integration (DC, CDI), Gen Mattis, concurred with the MRAP way-ahead, after it was briefed by the UUNS author. That way-ahead was described as a phased transition during which HMMWVs would continue to be armored, such as the M1114. At the same time, the Marine Corps would move quickly to field significant numbers of COTS MRAPs in support of OIF/OEF, as per the I MEF (Fwd) UUNS. This would permit the USMC to phase out HMMWVs for many hazardous missions over time, and allow MRAP to serve as a COTS bridge to the future Joint Light Tactical Vehicle (JLTV). Other senior USMC leaders present included LtGen Gregson, Gen Nyland, and BGen Hejlik (References p.1. and a.15.).

Meanwhile, the UUNS was received and analyzed at MCCDC. For lack of a wheeled vehicle advocate, the Combat Development Directorate (CDD) and EFDC assigned Installations and Logistics (I&L) to serve as the Lead Advocate for the MRAP UUNS, when it was in fact a GCE capability. The I&L analyst clearly lacked the GCE competencies, as evidenced in I&L's written Combat Development Tracking System (CTDS) entries. The GCE Advocate, who had been assigned to a Supporting Advocate role, formally recommended that an MRAP Program of Record (POR) be established, and the UUNS fulfilled (Reference p.8.).

Concurrently, the EFDC requested that MCSC survey the military wheeled vehicle industry. The study determined that 4 and 6 wheeled COTS Cougars, RG-31, RG-32, Mamba, Casspir, Dingo, Cobra, ASV, Eagle, and Lion COTS MRAP variants were all superior to the M1114 in fulfilling the baseline survivability requirements of the UUNS. The study also found and reported that most of the surveyed MRAP variants were more effective than the M1114 at protecting against side-blast IED detonations (Reference p.2.).

In the spring of 2005 the Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF) Working Group (DWG) (today known as the Combat Development Integration Board [CDIB]) met to decide the fulfillment fate of the MRAP UUNS. The primary concerns expressed by the CDIB related to funding and reprogramming implications, not the operational need. There is no evidence of analysis or discussion relating to the strategic, operational, or tactical risks of permitting the rate of casualties due to the evolving IED threat. Instead, the briefer proposed, and the voting members apparently concurred with shoe-horning the UUNS capabilities into existing vehicle efforts. These programs included the UAH, Light Armor Vehicle (LAV), and MAGTF Expeditionary Family of Fighting Vehicles (MEFFV) PORs. Most significantly, the MRAP UUNS was suggested for inclusion within the set of disparate HMMWV follow-on initiatives that would eventually become the developmental JLTV. In the end the CDIB did not approve the UUNS for fulfillment (References p.3. and p.10.).

Following the CDIB, the EFDC apparently did not follow its own protocols. The MRAP UUNS was not forwarded to MCWL so that a developmental solution to the MRAP need could be researched. This procedural deviation meant that MCWL and the USMC S&T Program at

ONR were not compelled to reprogram funding that might have helped mitigate the evolving IED threats to MNF-W vehicles with better protection. Most significantly, this process deviation prevented the initiation of the development of EFP predestination stand-off screens specifically requested in the UUNS. Instead, ONR and MCWL perpetuated Reconnaissance, Surveillance, and Targeting Vehicle (RST-V), Ultra Armored Patrol Vehicle, and other investments related to long-term HMMWV follow-on, even though none of those projects served the urgent protection needs of the MEF (References e.2., r.5., a.5., a.6., p.11., p.4., and a.13.).

MCCDC also apparently did not forward the UUNS to the Marine Requirements Oversight Council (MROC) for review and decision. This would have amounted to a second departure from the EFDS process. In researching MROC staff documents at the MROC Secretariat staff, the author could not locate any MROC Secretariat records of an MRAP UUNS presentation or any MROC Decision Memorandum (DM) pertaining to the 17 Feb 2005 MRAP UUNS. The author cannot determine from available documents if the MRAP UUNS was formally presented to a GO at MCCDC for an internal determination. The fact that the UUNS was not presented to the MROC would clearly be inconsistent with CG MCCDC's expressed desire to approve the MRAP course of action, briefed during the Executive Safety Board in March 2005 (References p.1. and a.15.).

In the spring of 2006 I MEF (Fwd) returned to MNF-W. The IED emergency had worsened considerably. The under-belly IED threat from deeply buried IEDs that had already been experienced by I MEF (Fwd) in 2005 was having a significant adverse effect on the ability of Soldiers, Sailors and Marines MNF-W to accomplish their mission. Strategically, the images and statistics were also having a negative impact on support for OIF, in keeping with Fourth Generation Warfare (References p.18., a.16., r.13., b.1., b.11., and b.7.).

In its capacity as Combined Joint Task Force HQ, MNF-W, I MEF (Fwd) resubmitted the MRAP request in the form of two Joint Urgent Operational Needs Statements (JUONS). This time, the urgent needs for MRAPs were approved by the Commanders of MNC-I, MNF-I, CENTCOM and the Director of the Joint Rapid Acquisition Cell (JRAC). In the absence of combat developer support for MRAPs, Service support was obtained directly from the Commandant of the Marine Corps based on a statistically verified casualty analysis at MARCENT. Congress and the new DoD leadership made fielding MRAP to the Marine Corps and the Army a top priority, leading to the MCSC-managed Joint MRAP program of today (References r.8., r.11., r.16., and r.17.).

### c. MRAP in the Context of COIN

Several critics of the MRAP surge have emerged in recent weeks and months. Some point out that for the effective execution of COIN the MRAP is counterproductive. Heavy, voluminous, and less agile than light trucks they restrict the access of Coalition Forces (CF) in urban areas and off-road. Also, the physical separation imposed by heavy armor would appear to alienate and intimidate locals, when in fact COIN doctrine emphasizes face to face interaction and shared hazards for communication and mutual confidence. Others have observed that MRAP is appearing too late, is untested, and will alter the unique expeditionary qualities of the Marine Corps especially. Publicly available evidence from OIF shows that these arguments are

either incorrect, or at least incorrectly applied to MRAP in isolation. When seen in the broader context of time, one must take into account that combat developers did not field COIN-enabling combined arms capabilities that might have prevented the IED challenges and the urgent need for MRAPs (References p.15, b.12., b.13., a.26., a.22., a.25., and p.29.).

COIN execution would appear to require the employment of a mix of capabilities, both technical and human, to overmatch an asymmetric opponent without sacrificing the intimate human connection between the populace and Coalition Forces (CF). The Marine Corps has a long history of COIN experience, as evidenced in the “Small Wars Manual,” the Vietnam Ink Blot tactics described in “First to Fight,” and the Combined Action Platoon(s) chronicled in “The Village.” It is therefore not surprising that Marines introduced COIN tactics into MNF-W well prior to the publication of FM 3-24. From a technology perspective, in OIF the Marines only needed tools that guaranteed superior SA, interpersonal communication, and violence mitigation in order to alleviate Iraqi suffering and prevent publicly unacceptable casualty rates. Ideally, if Marine AOR-wide situational awareness had been sufficient following the transition from conventional combat to COIN, the urgent need for MRAP levels of protection in MNF-W might never have developed (References b.10., b.13., b.14., b.15., and p.18.).

This would have required that USMC combat developers act assertively on the information that was known to them in 2003 with respect to setting the conditions for persistent SA, especially throughout the vast expanses of the Al Anbar Province in 04 and 05. In fact, GO-level direction had been provided in various documents to develop SA-enabling capabilities. Better SA might have prevented the IED from emerging as such a devastating weapon, preventing the IED emergency. This in turn would have permitted the more secure execution of offensive COIN thereby reducing the need for MRAP as casualty figures would have been greatly reduced from all causes. MEF (Fwd) and CF omniscience would have prevented insurgents and criminals from preparing and executing their varied destructive tactics. This would have been the case both within the built-up urban areas where COIN is predominantly executed as well as along the long lines of communication between them, where IED attacks have been the most lethal (References r.2., r.2a., r.6., and r.6a.).

Today, perhaps the most important contributions to any COIN-enabling combined arms tool kits are Intelligence, Surveillance, and Reconnaissance (ISR) technologies to fill gaps in SA. Tactical SA is a prerequisite to COIN success. The ideal ISR sensors remain the individual Marines and Soldiers themselves. Stand-alone technological solutions should only fill the gaps between those human sensors. Admittedly, a larger manned force is expensive on many fronts, and ISR is a relatively cheap technical alternative if fielded and integrated promptly. So in the absence of sufficient personnel to “saturate” Al Anbar Province, persistent ISR was urgently needed to fill the gaps in SA so as to optimize the COIN environment for the secure execution of friendly initiatives. If the MEF (Fwd) had benefited from relatively gapless tactical ISR in the first place it may never have felt compelled to urgently request MRAP (References a.26, r.2., and p.15.).

The MEF (Fwd)’s tactical gaps in SA were significant, as insufficient forces were committed for the given mission and terrain, and compensatory ISR had not been provided to make up the difference. This was especially so when the MEF later assumed the mission of

MNF-W. Regretably, MCCDC combat developers did not push such capabilities to the warfighters. Amplifying the dilemma for the MEF (Fwd) from 2004 through early 2007 was the fact that even following the submission of thoroughly-researched requests for material ISR, protection, and other COIN-enabling solutions, MCCDC did not fulfill the UUNS requests.

A lack of any reasonable ability to predict future consequences from current and past decisions is implied in the saying that “hindsight is always 20/20.” However, as per the many references, USMC combat developers had ample knowledge of threat projections, lead time, and had even received EFDC process-compliant and specific GO direction to prepare needed COIN-enabling capabilities for known threats and possible contingencies.

During preparations for OIF in 2003, HQMC planners anticipated that some form of post-invasion unrest, and even the need to transition to COIN were going to take place. Lacking sufficient forces, the vast expanses of the Iraqi Theater of Operations (ITO) dictated that SA would have to be augmented with persistent ISR in order to conduct COIN with any degree of AOR-wide security. Alternatively, in the absence of Situational Awareness (SA) effective armor protection would have to compensate to insure AOR-wide mobility.

Both operators and HQMC advocates, including 3 successive DC, PP&O GCE Advocates, foresaw the need to develop and field COIN-enabling capabilities. Before and during 2005 requests for persistent tactical ISR, advanced NLW, and practical language translation and communications tools to enhance the IO campaign were submitted as means to stimulate funding and set needed developments in motion. However, these efforts were largely unsuccessful apparently in light of the reprogramming implications for PORs favored by combat developers, per the author’s observations. The EFDS did not effectively allow for advocate or warfighter-initiated adjustments to long-term acquisition plans (Reference l.1., l.2., r.1., r.6., and r.26.).

Seen in this context, MRAP is only one of the more recent, though highly visible, examples capabilities denied by USMC combat developers. MRAP is a “last ditch” force protection measure in COIN. While critical for COIN tool set inclusion, its necessity only became evident in Al Anbar when the other prerequisites for the secure execution of COIN were absent, the most important of which was SA. As noted earlier, a handful of vocal USMC advocates knew from history that mines would become an ever-more attractive insurgent weapon, and that a nominal COTS MRAP capability should be procured to hedge against just such uncertainties. (References r.2., r.7., r.9., and r.12.).

During the period that Marines have been responsible for the Al Anbar Province AOR, the unfulfilled SA and other COIN-enabling capability gaps became evident in operational practice. Concurrently with MRAP requests, from 2004 through early 2007 advocate and operator requests were repeatedly submitted for mobile tactical persistent ISR capabilities, including high altitude airships, armed and unarmed Tier II Unmanned Aerial Vehicles (UAV), mobile tower-mounted cameras, and covert miniature sensor suites. In all cases, those ISR capabilities were either delayed or denied by combat developers at Quantico. Requests for specific material solutions were frequently rejected outright whenever the needs were not understood, or viewed as competition against PORs. The specificity of operator-requested material solutions resulted when warfighter-research revealed that the programmed solutions to

capability gaps were ineffective or unsuited to the emergent threats in-theater. Operational and technological differences between the programmed solutions and submitted UUNSSs were frequently misunderstood by technologically deficient combat developer analysts and therefore discounted (References r.8., r.11., r.12., r.13., r.15., r.16., r.17., r.18., r.24., r.25., and r.28.).

The forward deployed MEFs remained committed to executing offensive COIN in Al Anbar Province in spite of ISR and other gaps. Free from persistent ISR observation, insurgents prepared and executed IED, SAF, and Indirect Fire (IDF) attacks with relative impunity. Enemy tactics, techniques and procedures (TTP) evolved quickly and massive, deeply buried, flammable accelerant-enhanced IEDs became the norm rather than the exception. Marines and Soldiers paid a cost in casualties, especially from IEDs, but knew the success of COIN at the tactical level required perseverance in spite of those higher than necessary losses (Reference r.5. and p.18.).

Even in the presence of ISR/SA and other COIN IO-enabling gaps, the IED crisis was avoidable with MRAP. The rapid fielding of requested COTS MRAP would have neutralized one principle enemy advantage early on, as MRAP was the quickest means of making ineffectual the insurgent's IED casualty-production TTP. When SECDEF intervened in 2007 there was no end to the IED emergency in sight. In fact it had grown to one could no longer hope that newly arriving ISR capabilities and planned personnel surges would have any effect in the near-term. Massive IEDs employed against vulnerable tactical vehicles served as some of the most damaging IO weapons directed at U.S. public opinion. Televised images, along with the U.S.-verified casualty statistics, demoralized the public to the point that bipartisan Congressional concern and dropping presidential opinion polls began to threaten a premature withdrawal. Only one thing was certain, namely that MRAPs would dramatically reduce casualties from IEDs immediately when fielded (References r.2., r.7., l.3., r.9., r.23., and r.26.).

As a short aside, separately, concern with the deepening IED emergency and encouraged by the COTS MRAP opportunity, the Secretary of Defense in 2007 designated the Joint MRAP Program as the top procurement initiative in DoD. Congressional champions contributed supportive advocacy and oversight. Some critics have recently stated incorrectly that the Marine Corps and Army were thereby forced to accept equipment they did not want. Actually, SECDEF and Congress guaranteed that Marines and Soldiers in harm's way received equipment they had repeatedly requested, i.e. wanted. Similarly, if MRAP is perceived as coming late in OIF this is an indictment of Service combat developers, and also constitutes evidence of conscientious leadership by SECDEF and Congress. Finally, over the past year many explanations for the non-fulfillment of the 17 Feb 05 MRAP UUNSS have been given, with industry capacity to produce 1,169 MRAPs being a central justification. Those production concerns have since been refuted in practice (References a.6., a.7., a.9., a.11., a.15., a.16., a.19a., a.21., a.22., a.25., a.26., a.27., a.28., p.15., and c.3.).

Returning to the topic of the IED emergency of 2006, concurrently with its MRAP JUONSS requests, I MEF (Fwd) also circumvented USMC combat developers by open-purchased COTS ISR, NLW, IO, and other COIN-enabling capabilities that MCCDC had not programmed. As with MRAP, such self-help would avoid the predictable loss of time in renewed delays and rejections. All of these MEF (Fwd) initiatives have since proved to be critical combat power multipliers. Other forms of I MEF self-help included mine rollers that were conceived, designed,

prototyped in “Monster Garage-type” operations in-theater. Initiatives also included open purchases of powerful commercial ground penetrating radars to detect deeply buried IEDs. I MEF (Fwd) might have open-purchased large numbers of MRAPs; however, the law prevented the command from spending more than \$250k on a single system. At \$500k to \$1M per vehicle MRAPs would have broken the cap (References r.13. and p.1.).

In any future investigation of USMC combat development support of the GCE, at least two general questions can be posed based on a study of the MRAP example. First, why was there no MRAP contingency plan at MCCDC? In other words, why didn’t combat developers serve as the lead individuals and entities for conceiving, researching, and preparing for the short-notice provision of COIN-enabling capabilities like MRAP? Second, in the absence of developing the needed concepts and solutions, why didn’t those combat developers support the MRAP UUNS and other self-help solutions conceived in the field with the sense of urgency communicated in repeated requests?

As another short aside, it is useful to revisit the original operator request for MRAPs. I MEF’s objective in asking for the original 1,169 vehicles (constituting 1/3 to 1/4 of the HMMWV fleet in MNF-W) in 2005, was to bridge from the vulnerable HMMWV family of vehicles to a future follow-on like-capability, namely the JLTV. By employing this capability-bridge, the Marines could protect exposed forces with an “80%” operationally effective COTS solution in a COIN context. It would have set the conditions for an optional increase in the MRAP requirement, as eventually happened in 2007 for all ground forces in Iraq. At the same time, the JLTV could have been accelerated, and improved with additional MRAP-like requirements. This was and remains a rational approach to combined arms combat vehicle employment in the context of MNF-W COIN. MRAP as a prerequisite spiral to the JTLV was fully anticipated by MRAP advocates (References p.1. and p.7.).

In the end, SECDEF, Congress, and GO advocates in I MEF (Fwd) warfighter and MARCENT component billets were required to shepherd MRAP and other requirements by means of forcing functions. These included MEF (Fwd) open purchases, MARCENT work-arounds, MNF-W JUONS, repeated, solution-specific UUNSs to circumvent or compel combat developers to support operators’ urgent needs, and finally SECDEF’s “DX” priority coding of MRAP. Eventually, those forcing functions paid off. Persistent ISR initiated through MEF (Fwd) self-help and MRAP, in combination with political developments in Al Anbar, have all been added sources of combat power in the MNF-W AOR. Together, they have contributed to the reduction in IED attacks, the winning of Iraqi confidence in the AOR, and the accomplishment of the MEF mission (Reference a.28a.).

Unfortunately, no fundamental process changes have resulted at MCCDC, process changes that might help guarantee that the same sorts of GCE challenges with MRAP and other needed capabilities are not encountered in future conflicts. While MCCDC has been tasked with reinventing the UUNS process as a result of the Naval Audit Service report of 28 Sep 07, no substantive changes to POR-centricity, transparency, or accountability is expected by the author (Reference p.14.).

Additionally, and perhaps most alarmingly, the relearning of past lessons in combat development will become less tolerable, as sufficient time to correct will be a luxury that is no longer available. Our asymmetric foes understand the value of creativity, speed, and surprise, with technology being the primary enabler of each. Technology forecasters such as Ray Kurzweil and Clayton Christensen have accurately predicted for us the impact of both technology acceleration and disruptive innovations. Consequently, for Marine Corps warfighters in the future a loss of any time in the receipt of needed capabilities will incur ever-greater operational penalties. MRAP is just one current example of how a loss of time had direct and measurable consequences on a COIN battlefield (References b.1., b.2., b.3., b.6., b.7., b.8., b.9., b.10., b.11., b.12., and p.18.).

**4. Conclusions.** The MRAP cases study has demonstrated that Marine Corps combat development organizations are not optimized to provide responsive, flexible, and relevant solutions to commanders in the field. Also, several Marine Corps Orders may be relevant for any future analysis or investigation of USMC combat developer actions related to MRAP. Those orders are References o.1., o.2., o.3., o.4., o.5., and o.6. Other specific conclusions are listed at the end of the study body.

**5. Recommendations.** The MCCDC EFDC should reorganize and reform the EFDS in order to deliver relevant capabilities to field commanders in a timely manner. This reorganization should be fully transparent, include both operators and advocates, and be codified in legislation. Other specific recommendations are listed at the end of the study body.



# Mine Resistant Ambush Protected (MRAP) Vehicle Case Study

## II. Body

### 1. Introduction

a. Purpose. The study uses a recent example of a Ground Combat Element (GCE)-requested capability that encountered combat development challenges in order to illuminate some of the systemic problems inherent and endemic to the Expeditionary Force Development System (EFDS) at Marine Corps Combat Development Command (MCCDC). The methodology consists of a chronology of events documenting USMC development and fielding of the Mine Resistant Ambush Protected (MRAP) capability in a Counterinsurgency (COIN) combined arms context. This case study will examine in detail how and why the EFDS elected not to fulfill the I Marine Expeditionary Force (MEF) Forward (Fwd) MRAP Urgent Universal Need Statement (UUNS) of 17 Feb 2005, thereby creating a significant adverse impact on the MEF (Fwd) GCE's ability to accomplish its mission. The perspectives shared here are those of the author, the Science and Technology (S&T) advisor to the Deputy Commandant, Plans, Policies, Operations (DC, PP&O) and GCE Advocate. The author of this case study also served as the Science Advisor to the Commanding General (CG) Multi National Forces, West (MNF-W) during many of the events described herein.

b. Methodology. This case study is composed of two detailed discussions. The first constitutes a chronology of events documenting USMC-specific involvement with MRAP. The chronology begins with MRAP as a proposed solution to projected threats and ends with MRAP as an urgently needed tool to mitigate an Improvised Explosive Device (IED) emergency in Iraq. The second discussion focuses on the combined arms context into which MRAP fits. It is in this later analysis that the reasons for the appearance of the IED emergency will be discussed, as well as the degree to which USMC combat developers prepared for the COIN environment from which the MRAP needs emerged.

c. Constraints. In accordance with DC, PP&O guidance, this study did not include interviews or written queries of any employees or institutions coming under the command or oversight of the larger Marine Corps combat development community. These are understood to include MCCDC, the EFDC, Marine Corps Systems Command (MCSC), the Marine Corps Warfighting Laboratory (MCWL), the Joint Non-Lethal Weapons Directorate (JNLWD), and the USMC S&T Program at the Office of Naval Research (ONR).

**2. Background.** The MRAP Case Study was conducted in an effort to better understand the challenges USMC operating forces encountered when seeking combat developer support for a capability of interest to the GCE Advocate. The MRAP Case Study discussions, conclusions, and recommendations are drawn from the references and author's recollections, both in his capacity as the S&T Advisor to the GCE Advocate, as well as the Science Advisor to CG, MNF-W in 2006. The details contained within the case study represent a combination of verifiable documents, written communications, and the recollections of others who are knowledgeable of the MRAP topic.

### **3. Discussion - MRAP Chronology of Events**

#### **a. MRAP-related events and documents 1996 through 2004**

##### **(1) Capt Wayne Sinclair introduces the USMC to the MRAP**

LtCol Wayne Sinclair is a USMC Combat Engineer who has long advocated that personal protection should be one of the primary Key Performance Parameters (KPP) included in every tactical vehicle. In 1996 then Capt Sinclair, who had lived in South Africa, fully understood the havoc unrestricted, asymmetric mine warfare could have on both the military and civilian population. He witnessed first hand how properly designed equipment could overcome the effects of offensive landmine warfare when coupled with the right tactics, techniques, and procedures (TTPs). He knew that American way of war would often have main supply routes that the enemy has access to, whether in maneuver warfare, or COIN. Consequently, effective maneuver on the battlefield would be supported by the South African MRAP capability. This first hand experience made Capt Sinclair a strong advocate for improving the USMC ground tactical vehicle fleet (GTVF). Capt Sinclair reasoned that if a poor country like South Africa could essentially neutralize the effects of offensive landmine warfare in a few short years through dedicated research and development while in the midst of conflict the United States and the Marines should be able to do the same in peace time. In July 1996 the Marine Corps Gazette published Capt Sinclair's award-winning article titled "Answering the Landmine."

His 1996 MCG article (Reference a.1.) stated in-part: *"Although landmines have been a major weapon of war for more than a half century, the Corps continues to lag in adopting defensive measures...Perhaps the greatest advancements in the development of mine resistant vehicles came from the Rhodesian Bush War in south central Africa between 1962 and 1980... their most effective answer was found in landmine survival measures rather than detection methods or equipment. The remoteness of the many hundreds of miles of unpaved roads made the daily task of sweeping and clearing most roads with any degree of certainty impossible. Therefore... the Rhodesian Army developed tactical wheeled vehicles that would significantly protect their occupants from a mine's blast and allow for the vehicle to be repaired and returned to service."* Note: Sinclair's description of the difficulty of detecting and clearing expansive road networks, and the attractiveness of better protection could constitute a prediction of the value of MRAP capabilities in Iraq over the past four years. Here he also introduced the audience to mine resistant ambush protected vehicles that had already proven themselves in combat.

Sinclair's article continued with a physical description of the proven vehicles that was largely duplicated in detail for the purpose of constructing the I MEF (Fwd) MRAP UUNS in 2005: *"The most important design feature of these Rhodesian vehicles and the vastly improved models later developed by the neighboring South Africans was a V-shaped armored body or hull that served deflect the blast away from the passengers and crew aboard the vehicle. Since nearly all the vehicles in service had relatively flat, unarmored bottoms, the blast wave from a landmine was simply trapped and thus absorbed by the vehicle and its occupants. The raised, armored V-hull served a number of purposes besides blast deflection with remarkable results: It increased the stand-off distance from any buried mine*

*encountered; accommodated an internal potable water tank (though primarily for drinking, could also cool and ‘flatten’ an explosion if the outer armor was ruptured); provided crew members with excellent visibility... and provided all-around small arms protection to both passengers and crew. The V-hull was and still is a stunning success—these vehicles reduced mine related injuries by over 70 percent while virtually eliminating fatalities. To understand why this vehicle design feature is so successful in saving lives, knowledge of the killing mechanisms of landmines is helpful. In essence, when a vehicle detonates a landmine, the occupants face three direct threats: blast overpressure, fragmentation, and vertical acceleration. Overpressure injuries to the ears and other air-containing organs can be so severe as to resemble blunt trauma. They are the result of an extremely rapid pulse of air entering the vehicle—perhaps through a ruptured floor—and having no way to quickly escape. Short of causing a rupture, this blast wave may induce a severe deformation of the vehicle’s surface that is in contact with some part of the occupants’ bodies and thus induce death or injury. Secondly, fragmentation wounds can be produced by shrapnel from the mine itself; the ejecta (material that was covering the mine), and by pieces of the vehicle. Finally, vertical acceleration is caused by a sufficiently large explosive charge (e.g., a landmine) “tossing” a relatively light vehicle in the air upon detonation. The acceleration produced by such a launch has been measured in 5-ton trucks at well over 100 times the acceleration effects of gravity. This movement can easily cause spinal, neck, and head injuries as well as injuries from hitting the inside of a vehicle, being thrown from the bed of a truck, or being struck by loose items flying about. Furthermore, the loss of vehicle control and subsequent “crash” that can follow a mine hit; especially if driving over 35 miles per hour, can also result in casualties. Any vehicle that earns the title “mine resistant” must reduce the risk of injury from all sources to an acceptable level.”* Note: The vulnerabilities of HMMWVs and the types of consequent casualties suffered by Marines from IED strikes in Iraq over the past four years are identical to those described by Capt Sinclair in 1996. Those same specific material solutions to known vulnerabilities of 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> generation armored vehicles were listed in the I MEF (Fwd) MRAP UUNS that would be signed 17 Feb 05. Until 2006, one of the two most common commercial MRAPs in-theater was the South African designed RG-31 Nyala.

Capt Sinclair’s 1996 article continued: *“As noted earlier, the South Africans began investing heavily in countermine technologies in the mid-1970s. Their many years of highly mobile operations in low and mid-intensity bush warfare (where landmines figured prominently) are well regarded in worldwide military circles and make the South African Defense Force’s countermine methods and mobility equipment during this period particularly worth studying...Inside the armored V-hulls, crewmen and passengers sit in shock absorbing, molded rubber seats—restrained from the deadly forces of acceleration by four-point seat belts. Fixed containers with secure lids are provided to store any loose items during travel that might otherwise become projectiles from the blast wave or the acceleration effects of a landmine. Direct fire protection in the form of side armor and ballistic glass is also standard to defeat off-route fragmentation mines (e.g. ‘claymore’ type) and to defend against the ambush that can often accompany a mine detonation. Some vehicles designed specifically to carry troops are equipped with centerline seats and seatbelts. This arrangement allows troops to face ‘outboard’ to provide better situational awareness and more responsive all-around security. Firing ports are usually included to allow occupants to employ their individual weapons while behind protective armor. Lastly, these vehicles use modular, frangible (break-*

*away) components in the undercarriage beneath the V-hull to minimize the transfer of blast energy to the vehicle's body and allow rapid repair of damaged or missing items in the field."*

Note: Again, the specific material solutions listed in the 17 Feb 2005 I MEF (Fwd) MRAP UUNS reflect at the detail level those contained within the 1996 article.

The article continued: *"During [U.N.] operations in Somalia, as had been the case in previous wars and commitments, U.S. soldiers and Marines were forced to relearn lessons from the past and harden their vehicles in any way possible...Between December 1992 and March 1994, at least 8 vehicles and 16 Americans fell victim to landmines...Not surprisingly, the U.N. contingent from Zimbabwe (formerly Rhodesia) took no casualties from landmines. The Zimbabwean soldiers used "Puma" mine protected trucks developed in the 1970s during the bush war there."* Figure 1 below shows a Puma:



Figure 1. 1970s vintage Puma MRAP pictured in Capt Sinclair's article.

The article continued: *"One recent example of the effectiveness of these vehicles took place when a "Casspir" mine-protected infantry fighting vehicle, in service with Canadian forces in Bosnia, struck an estimated "triple stack" of anti-rank mines with no injury or loss of life. Amazingly, the Casspir was quickly returned to service after repairs were conducted in theater. The United Nations has recently purchased dozens of South African designed countermine vehicles, primarily for transporting prominent political figures around the former Yugoslavia and the Middle East. Clearly, when it comes to completing the mission while protecting lives, these vehicles leave very little to chance."* Note: It was in this section of his 1996 article that Capt Sinclair introduced the Marine Corps to the COTS South African Casspir 4<sup>th</sup> generation MRAP. It is again noteworthy that the Casspir, as well as the even newer COTS U.S. 4<sup>th</sup> generation Cougar and Buffalo MRAPs were specifically mentioned as material solution candidates in the I MEF (Fwd) MRAP UUNS that was signed by BGen Hejlik on 17

Feb 05. 1<sup>st</sup> generation (i.e. scrap field expedients), 2<sup>nd</sup> generation (i.e. MAK), and 3<sup>rd</sup> generation (i.e. M1114) armor HMMWVs were rejected as potential solutions for the MRAP UUNS. BGen Hejlik unambiguously emphasized skipping those generations in favor of procuring designed/built from the ground up COTS 4<sup>th</sup> generation MRAPs.

Throughout his 1996 article Capt Sinclair highlighted the urgency of procuring mine resistant ambush protected vehicles: *“The landmine problem will continue to haunt us...Mines are a cost-effective way for an unsophisticated enemy to produce casualties without becoming decisively engaged with superior forces...In stark contrast to the South Africans and a growing number of other armed forces, the United States has no standardized mine-resistant vehicles...An affordable answer to the landmine was developed over 20 years ago. Its time the Marines at the sharp end shared in the wealth of the discovery.”* Note: The mine resistant vehicles that he introduced the Marine Corps to in 1996 were already combat proven commercial products, as were an even greater variety of COTS MRAPs when BGen Hejlik submitted his need in early 2005.

Capt Sinclair continued to write and lecture about the combat-proven capabilities of the South African MRAPs for the next 10 years. In 2003 the Marine Corps Association published his compilation of landmine related works in a pocket guide entitled *“The Last Defense.”* The Last Defense was issued to Marines during combat operations in Iraq.

## **(2) Majors Roy McGriff and Joseph Allena advocate MRAP at Quantico**

In recent years LtCol Sinclair has not been alone in his quest for better protection. In 2003 one of his School of Advanced Warfighting (SAW) classmates and Logistics Officer, Maj Roy McGriff, wrote his ‘future war’ paper on MRAP. In fact it was during that academic year that Maj McGriff and Maj Joseph Allena, an Artillery Officer actually coined the acronym Mine Resistant Ambush Protected (MRAP) vehicle.

It is noteworthy that during the conduct of his 2002-2003 thesis research Maj McGriff continuously encountered push-back from operators at all levels, both enlisted and officer, when presented with the MRAP idea. As if conditioned with a sense of futility, his audiences shared a common first response that 1) the MRAP idea was unrealistic because the Marine Corps would not nor could not afford it and 2) the acquisition system would certainly reject MRAPs because it was something new that differed from/was outside of established Programs of Record (PORs). This same sense of procurement and process futility persisted even while their warfighter audiences agreed that the MRAP made operational common sense.

In spite of these frustrations, and motivated by their operational sense of urgency with a “longer war” looming, Majors Sinclair and McGriff were determined to impress upon the Quantico combat developer community the need for MRAP. These first introductions of MRAP to MCCDC and MCSC by Maj McGriff and Maj Sinclair occurred during the period of 2002 to 2003. Based on their prior conversations with operators, they suspected that approaching combat developers via the conventional-traditional procurement or “Big A” acquisition process was unlikely to meet with success.

So, they introduced MRAP at the concept level. Maj McGriff argued in his future war paper titled “*Mine Resistant Armor Protected Vehicles*” (Reference p.7) that MRAP-like KPPs were necessary to support Ship to Objective Maneuver (STOM). He based his thesis on the Marine Corps Intelligence Activity (MCIA) analysis that indicated the GTVF’s most likely threat in a STOM environment would come from mines, small arms fire (SAF), and rocket propelled grenades (RPG). Maj McGriff argued MRAP KPPs would enable the GTVF to not only survive but thrive against these threats. This included improving battlefield tactical mobility by allowing the force to safely use the MSR and get to their objective area, thereby reducing the risks associated with supporting and sustaining the decentralized operations STOM called for. His sense at the time was that Role-On Role-Off (RORO) shipping could be used for expeditionary forces, i.e. as if anticipating the use of RORO shipping that began in Dec 07 in support of the current surge of MRAP capability.

When Maj McGriff discussed the MRAP concept and its potential to support STOM with senior civilians and action officers within MCCDC it was poorly received. The MCCDC personnel repeatedly stated the primary defining GTVF capability should not be survivability but transportability. They defined the future GTVF must be air transportable by the CH-53X and the MV-22. In addition it must be compatible with the full range of Maritime Prepositioned Shipping (MPF) ships. Maj McGriff pointed out that neither the LVS or 5-ton truck replacements were envisioned to be air transportable. He argued that current, commercial off the shelf (COTs) MRAP technology might not be optimal but given the fact Marines were in the middle of a shooting war a COTS MRAP would provide the most immediate solution. In fact, he suggested that the Marine Corps could use the war as an opportunity to skip the initial design phases and choose a “best available” from the commercial market and then adapt or spiral develop the requirements based upon battle field requirements as determined by commanders in the field and vetted by MCCDC.

At that time the STOM vehicle technologies under consideration were best represented by the MV-22-compatible Reconnaissance, Surveillance and Targeting Vehicle (RST-V). The Office of Naval Research (ONR) and the Defense Advanced Research Projects Agency (DARPA) sponsored RST-V prototypes created by General Dynamics Land Systems (GDLS). RST-V was also of transitional interest to MCSC; a PM had been established and future funding programmed. The RST-V was seen as a potential replacement for the HMMWV. As per the ONR Corporate Communications Office on 24 Jan 03: “*The Reconnaissance, Surveillance and Targeting Vehicle (RST-V) program is designing, developing, and testing/demonstrating four advanced hybrid electric drive, lightweight, highly maneuverable technology demonstrator vehicles capable of V-22 internal transport. The vehicle incorporates technological advancements in the areas of integrated survivability techniques and advanced suspension. The vehicle also hosts integrated precision geo location, communication and Reconnaissance, Surveillance and Targeting sensor subsystems. The RST-V is a 4x4 hybrid electric drive vehicle which can be equipped in a range of mission variants, including a forward observer/forward air control vehicle, reconnaissance, a light strike vehicle, battlefield ambulance, air defense, logistics vehicle, personnel carrier, anti-armor, mortar weapons carrier, Command Post variant, and mobile 60 kW generator.*” The RST-V (see Figure 2 below) and other HMMWV-replacement technologies would later be wrapped into the Combat Tactical Vehicle (CTV) concept, and the Joint Light Vehicle (JLTV) requirement. These concept and

programming initiatives came to be championed by LtGen Mattis, who would serve as DC, CDI at MCCDC in 2004-2006:



Figure 2. RST-V testing, as reported by ONR Corporate Communications in 03.

Undeterred, Maj McGriff and Maj Sinclair then approached MCSC with the immediate need for the adoption of a mature MRAP-enabled protection capability. They emphasized that the USMC was at risk of repeating the historical pattern of armor protection by means of sequential generations, namely: 1) using local scrap metal to improve protection (i.e. OIF I field expedients); 2) the fielding of standardized kits of bolt-on armor (i.e. MAK); 3) the fielding of bastardized vehicles (i.e. M1114); and 4) the fielding of designed-from-the-ground-up MRAP vehicles (i.e. COTS MRAP). This pattern had been observed in Viet Nam, Rhodesia, Somalia, and other 20<sup>th</sup> Century conflicts. It was also projected to recur soon based on an assessment that had been provided to Maj McGriff by the MCIA in support of his SAW thesis research. Skipping the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> generations and going straight to MRAP was the most sensible alternative, given historical precedents. However, the briefing by the two combat engineers was again negatively received at MCSC. MCSC officials also invariably asked *“where is the requirement?”* In the end, Maj McGriff’s and Maj Sinclair’s efforts to convince Quantico officials of the immediate need for MRAPs in 2002-03 failed.

### **(3) Majors Roy McGriff and Gert DeWet advocate MRAP at MARFORPAC**

Following SAW graduation Maj McGriff was assigned to MARFORPAC. There he saw the opportunity to make his COTS/MRAP case to COMMARFORPAC and attempt to convince COMMARFORPAC to become the MRAP advocate. It was at MARFORPAC that Maj McGriff decided to change his strategy regarding MRAP. Instead of touting MRAP’s long

term benefits as an essential supporting element to STOM he decided to capitalize on MRAP's inherent safety aspects in an effort to highlight the immediate short-term gains the Marine Corps could realize if they decided to pursue a COTs MRAP program instead of a standard peacetime program of record (POR) development model. Together with Maj Gert DeWet, another Marine born and raised in South Africa and intimately familiar with what MRAP can accomplish on the battlefield, they began to highlight MRAPs inherent safety features. This became known as the MRAP Base Line Survivability Index (BLSI) and they based it upon the best safety program in the Marine Corps.

Majors McGriff and DeWet posited that managing risk is a cornerstone of the Aviation Community. The aviator's ability to incorporate risk management into their ethos and further working it into everyday tactics, techniques and procedures is one of the distinguishing features that set it apart from every other Marine Corps community. They decided that if they could translate that ORM mindset into the GTVF not only would it save lives getting to the battlefield, it would save lives and potentially increase operational mobility on the battlefield. Their concept went like this: MRAPs contain KPPs that include crashworthy seats, multi-point seat harnesses, integrated rollover protection, offensive and defensive weapon systems and they operate in complex three dimensional environments from which they can be attacked at any moment. All of these features are akin to an aircraft. If they could convince the Marine Corps leadership of these similarities then they might get General Officer advocates from each of the communities to come together to develop a single GTVF concept linking all of the communities.

This approach would mean creating a Tactical Vehicle Operator (TVO) that would be trained like an aviator to operate a multi-ton weapon platform in combat. The TVO would undergo extensive driving training and then deploy to the equivalent of a Ground Replacement Air Group (GRAG). At that GRAG the TVO would learn to operate the MRAP vehicle as a weapon system in combat. Once certified, the Marine would remain current as long as he or she logged the number of hours necessary to remain current. This concept copies the aviation model and treats Marine vehicle operators for what they really are, namely TVOs. By instilling a sense of professionalism similar to that of the Naval Aviator, which was missing from the fleet ground vehicle operators, the obsolete concept of the "Incidental Driver" would be permanently replaced with the Marine TVO.

Major McGriff and Maj DeWet presented this idea to then BGen Trautman, Deputy Commanding General MARFORPAC. He favored the idea. His resulting endorsements eventually led to Maj McGriff and DeWet briefing the Executive Safety Board (Reference p.1.) following their extensive collaboration with I MEF (Fwd) in the crafting of the 1<sup>st</sup> MRAP UUNS (discussed later). Once again, CG MARFORPAC and CG MCCDC both agreed and endorsed the MRAP concept, endorsing a plan to continue to produce MAK and MAS kits while moving ahead quickly with a COTS program to fund the I MEF UUNS.

In their on-going research of the benefits of MRAP, McGriff and DeWet discovered the extraordinary cost effectiveness of the mass procurement and fielding of such COTS vehicles in OIF. While fiscal cost was a distant second priority for these Marines, who regarded the moral imperative to protect their Marines and accomplish the mission as paramount, they knew that budgeters at the Pentagon would consider the fiscal impact carefully. So, they



translated the operational impact of the estimated \$500k-\$1M per system MRAPs with the \$150k-\$200k per system HMMWVs. The fiscal cost effectiveness of fielding MRAPs immediately was astounding. The larger national savings during OIF came through reduced long-term medical care, rehabilitation, and death benefit payments. Furthermore, the return to Service of damaged modularly constructed MRAPs and their frequent outright survival of IED strikes was an additional savings. They knew HMMWVs were wearing out on the battlefield in 2-3 years, while MRAPs would most likely last much longer. Added armor would shorten that life even more according to IGMC visits in 2005 and 2006. One MRAP could serve during a period of time that would require two or more HMMWVs. Coupled with a significant decrease in the current value of future medical cost of casualties, increase in morale, decrease in force replacement cost due to casualties, and improvement in operational effectiveness, the MRAP was significantly less costly than legacy vehicles.

Independently, Maj McGriff and Maj Sinclair had previously discovered an opportunity to work with the Army Rapid Equipping Force (REF) in order to field a number of the MRAP systems early. Marine Corps Colonel Brian Green served at the REF. He shared the Majors' views that lacking vehicle protection in Al Anbar Province was predictably and quickly leading to an emergency. Manufactured in South Africa, the Casspir is a modern COTS descendant of the Puma and Crocodile from Rhodesia that preceded it, and which Capt Sinclair discussed in his 1996 MCG article. The modern COTS Buffalo, Cougar, and RG-31 are likewise direct decedents of these African "Bush War" veteran vehicles.

The Majors had also discovered 53 Casspir MRAPs available for a purchase price of \$200k apiece. The REF had its own source of funding. The Majors appealed to Col Green at the REF to purchase and ship those systems to Multi National Force – West (MNF-W) (i.e. the MEF Area of responsibility [AOR] in Al Anbar Province) for use by the Marines, Soldiers and Sailors. It was an attractive opportunity to take advantage of a relative bargain. When Maj Sinclair deployed to I MEF (Fwd) shortly thereafter he was pleasantly surprised to see that Col Green and the REF indeed were able to provide eight of the requested systems on short notice. The Marines who received the 8 Casspirs in MNF-W were very grateful for the REF's efforts:



Figure 3. 4<sup>th</sup> generation Casspirs fielded to MNF-W via Col Green at the REF.

The larger Combat Engineer community was also energized by the MRAP arguments. Following the submission of a Combat Engineer Urgent UNS (UUNS) to MCCDC in 2004, the Marine Corps fielded a small number of MRAP vehicles to support the hazardous Explosive Ordnance Disposal (EOD) tasks in Al Anbar Province. The Army concurrently purchased and fielded a slightly larger number for its AOR. Buffalo and Cougar vehicles were purchased from Force Protection in South Carolina, and RG-31s were purchased from BAE Systems Land Systems. As predicted by Sinclair (by then with I MEF [Fwd]), McGriff, DeWet (both still at MARFORPAC), and Allena (by then at MARCENT) the vehicles repeatedly proved themselves to offer far superior protection to armored HMMWVs along various scales of performance. For MRAP-equipped forces, tactical mobility on the battlefield was substantially enhanced. Also, the confidence of operators increased because they could safely get to where their missions took them.

Following prebriefs to BGen Trautman and others at MARFORPAC, Maj McGriff and Maj DeWet finally briefed the Commander, LtGen Gregson, in 2004. He immediately became convinced of the need to move forward with the holistic approach to vehicle protection generally and the 4<sup>th</sup> generation MRAP specifically. LtGen Gregson assumed the critical role of operator advocate for the MRAP capability, but he retired too soon to implement his vision and thereby prevail over the programmatic resistance of combat developers at Quantico generally and MCCDC specifically.

#### **b. The I MEF (Fwd) MRAP UUNS submission and combat developer response**

In 2004 I MEF (Fwd) determined that superior vehicle protection was immediately needed in order to counter the enemy's strategy of harming our forces and hindering our mission. The harm was significant enough that U.S. political leaders might eventually become convinced to give up the fight in the MNF-W AOR. Vulnerable 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> generation armor HMMWVs were failing the Marines in Al Anbar in this respect, and IED casualties rose dramatically. 4<sup>th</sup> generation COTS MRAPs were urgently required to improve tactical mobility and combat power by increasing confidence and effectiveness of deployed forces in MNF-W. By leveraging South Africa's proven MRAPs, known U.S. technological improvements on those designs, and the perennial U.S. advantage in speed of manufacturing capability the MRAP could bridge the gap until the Joint Light Tactical Vehicle (JLTV) was ready to replace the HMMWVs in future years. Confidence was especially high due to the known speed of U.S. industry's proven "just-in-time" manufacturing techniques. The MRAP would serve as a preliminary spiral for the JLTV, and if combat developers could "square the circle" of both expeditionary requirements and the MRAP set of capabilities, perhaps it would lead to earlier delivery of the JLTV for OIF and OEF.

#### **(1) The MRAP UUNS formulation and submission**

Majors McGriff and DeWet were the SME authors of the I MEF (FWD) MRAP UUNS (Reference r.5.). While still at MARFORPAC, they were asked by the combat engineering community and Maj Sinclair in I MEF (Fwd) to execute the first draft of an MRAP UUNS. After all, if the urgent needs submitted by operational forces are to lead to effective and

realistic solutions they must be thoroughly researched by SME's familiar with both the operational challenges and material trade-space. McGriff and DeWet both helped to balance those prerequisites, as they had sufficient separation from the fight to deliberately analyze the strengths and weaknesses of all options in close coordination with the Marines in the fight. At the same time, the draft UUNS was extensively staffed throughout I MEF (Fwd) to insure that it was a collaborative effort and validated at all levels of technical and operational insight. This transcontinental team effort at UUNS and JUONS formulation has been standard practice in OIF and OEF to synthesize the most current technical knowledge with the most current operational experience in order to initiate the most useful material solutions for the fight:

UNIVERSAL NEED STATEMENT (UNS)						
Part 1a of 5 - Originator's Request						
Name (Last, First, Initial) MCGRIFF, ROY/ DEWET, GERT		Rank/Grade MAJ/04	Phone DSN 477-8334/ 8342		FAX DSN 477--8709	
Available for phone or personal follow-up?	YES	Interested in participation on Solution Course of Action IPT?	YES	Request UNS status updates by e-mail?	E-mail	RUC
<b>Type of Need</b> (select one that best describes the need)						
ADD a new capability that does not exist		X	IMPROVE or FIX an existing capability			REMOVE an existing capability

Figure 4. UUNS references Majors McGriff and DeWet as BGen Hejlik's SME POCs.

In his 17 Feb 05 urgent request for 1,169 MRAPs, BGen Hejlik made it clear in several sections of the document that the need for a material solution was urgent. In addition to the graph pictured below, he articulated that the urgency demanded a non-developmental COTS material solution that was known to exist due to thorough technical and operational SME research, both in the MNF-W AOR and at MARFORPAC:

When Needed						
Urgent	X	6 Months	1 Year	2 Years	5 Years	10 Year
						Other (d

Figure 5. Under "When Needed" BGen Hejlik stressed the need for MRAP was urgent.

*"The expanded use of IED/RPG and small arm fire (SAF) in the AO requires a more robust family of vehicles capable of surviving the IED/RPG/SAF threat as we operate throughout these areas.*

*The necessity to operate across known [Ground Lines of Communication] GLOC makes us susceptible to ambushes, IED/VBIED/SVBIED/RPG/SAF attacks at the discretion of the enemy.*

*Marines are expected to respond rapidly, and without a large security contingent, therefore we need a vehicle that enables us to survive the first blow and then counter attack. GCE, CSSE, ACE, CAG, MEG & MHG units are acutely exposed to the IED/RPG/SAF threat as they continue to prosecute offensive operations and stability and security operations simultaneously and often within sight of each other.*

*This need was identified through operational combat experience and critical analysis of casualty data from the Joint Theater Trauma Registry Report (JTTR) in order to determine if a technical solution is available to reduce the number of injured personnel who require Level III and IV medical treatment.*

*Operational experience dictates current and anticipated missions in theater are better supported by a family of MRAP vehicles...[that] should possess the following survivability baseline characteristics:*

*- Protect the crew from IED/mine threat through integrated V-shaped monocoque hull designed specifically to disperse explosive blast and fragmentary effects. Minimum protection should be 30 lbs TNT under any wheel and 15 lbs anywhere under the vehicle.*

*- Protect the crew against 7.62 x 54mm armor-piercing ammunition at 30 meters.*

*- Protect from overhead airburst and side protection against fragmentation from 155mm shells and blast protection against contact-detonated anti-personnel and anti-tank mines.*

*- Vehicles should have transparent armor with rifle firing ports on all four sides (similar to the Cougar or Casspir) that permit aimed fire from the standard service rifle with iron sights or optics.*

*- The vehicle should be easily recoverable and repairable in the field, with modular components that are designed to break away from the vehicle in the case of a blast, with replacement components that can be reattached to the vehicle on site.*

*- H-60-like, non-retracting four-point restraint system bolted to the floor for every single occupant of the vehicle – no one sits unharnessed. All harnesses have single point quick release feature.*

*- Crashworthy, shock absorbing seat cushion material similar to aircraft seats designed to mitigate accelerative effects of mine blasts. Seats should also be multi-positional with the emphasis on the ability to fight effectively (outward field of vision to facilitate rapid weapons employment) and removed completely as required.*

*- 360 degree rollover protection.*

*- Vehicles should be modular and scaleable. Beyond their baseline survivability, they must be capable of having additional armor/standoff screens attached to increase the protection to predestinate and defeat the primary kill mechanisms of explosively formed penetrators and shaped charges.*

*- The vehicle needs to have ample cargo pax and the secure stowage of their equipment in anchored "bussle boxes" to minimize secondary projectiles that acceleration forces produce during a bottom attack mine incident.*

*- The vehicle should have a fire suppression system in the cab and PAX compartment.*

*This would also relate to the capabilities sought in the Program of Record for the Engineer Squad Vehicle, CDTS (97051FF), approved as a MNS on 990326.*

*The OIF EDL will be reinforced with 4th generation (designed and built from the ground up to withstand IED/RPG/SAF) MRAP vehicles.*

*A logistics support package must be fielded with this UUNS, to include operator and maintenance training, tool sets (if required) and an appropriate amount of spares for consumables like tires, batteries, filters, etc.*

*The MEF cannot continue to lose Level III and IV serious and grave casualties to IED and MVA at current rates when a commercial-off-the-shelf capability exists to mitigate the technological causal factors regarding these particular threats.*

*Urgent Universal Need Statements (UUNS) must be submitted immediately in order to respond to HQMC I&L Code LPC request for operating forces to identify combat requirements through UUNS process for consideration in the supplemental funding available for FY05.*

*Operating forces and component commanders must come together to specify requirements for multi-role/multi-mission MRAP vehicles.*

*Operating forces, service components and supporting establishments have come together to modify and enhance vehicle protection from unprotected to 2nd generation factory produced armor add-on kits in response to the enemy threat.*

*Operating forces see fleeting opportunities to utilize supplemental funding to replace 1st/2nd generation vehicles by skipping a generation and procuring 4th generation MRAP vehicles.*

*This would provide the operating force with a modular and scaleable system capable of ... [providing] the operating forces a multi-role vehicle system capable of mitigating four of the greatest casualty-producing agents during OIF: IEDs, RPGs, SAF and MVA casualties.*

*The MRAP will mitigate or eliminate the three primary kill mechanisms of mines and IEDs – fragmentation, blast overpressure and acceleration.*

*It will also counter the secondary kill mechanisms of vehicle crashes following mine strikes and fire aboard vehicles.*

*The MRAP vehicle capability will help establish a baseline survivability index that will increase protection and reduce the number of casualties requiring Level III and IV*

*medical treatment in a given theater of operations against an increasing and changing IED/RPG/SAF threat and mitigate grave and serious injury risks inherent to combat support and combat service support units conducting line and long haul convoy operations.*

*MRAP capability will provide the operating forces a multi-role (truck or ambulance) and multi-mission (C2 or recon) family of vehicles capable of mitigating four of the greatest casualty-producing agents during OIF: IEDs, RPGs, SAF and MVA casualties.*

*MRAP vehicles are inherently robust with modern safety features that include NASCAR style multi-point seat harnesses, crashworthy seats, ballistic armor and monocoque hulls and heavy-duty parts that are designed to withstand and react to IEDs, SAF and RPGs in such a way that reduces traumatic injury to the occupants.*

*Together these systems will significantly mitigate the risks associated with non-battle injuries resulting from motor vehicle accidents as well as the current and projected enemy threats from IED/RPG/SA.”*

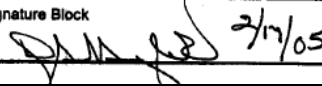
Approval Authority – MEF Level or as appropriate (Division, Wing, Service Support Group, etc.)		
Command I Marine Expeditionary Force	Name of Approval Authority (Last, First, Initial) Hejlik, D. J.	Rank/Grade BGen
Mailing Address I MEF P.O. Box 555300 Camp Pendleton, CA 92055-5300	Phone DSN 361-0445	FAX
	E-mail	
Date Received		Date Forwarded
Approval Authority Comments (optional) Due to anticipated funding constraints, I MEF recommends procurement of the troop transport and multi-mission MRAP requirements before funding the other variants. This will provide the most protection for the greatest amount of forces based on injury statistics.		
Signature Block  2/17/05		


Figure 6. BGen Hejlik’s signature on the I MEF (Fwd) MRAP UUNS dated 17 Feb 05.

**(2) The 2005 Safety Conference**

Upon returning to the US following I MEF (Fwd)’s Relief in Place and Transfer of Authority to II MEF (Fwd) (RIPTOA), Maj McGriff was directed by LtGen Gregson to brief the UUNS-articulated MRAP requirement before the March 2005 USMC Safety Conference. The 11<sup>th</sup> Annual (2005) Safety Conference was convened and presided over by the Assistant Commandant of the Marine Corps (ACMC), Gen William Nyland. The conference took place at the Miramar Naval Air Station on 29 and 30 Mar 05.


Maj McGriff’s briefing (Reference p.1.) emphasized that the 4<sup>th</sup> generation MRAP was intended as a COTS solution to a theater-specific challenge, but that it was an 80% intermediate solution that would serve as a bridge to a future capability. The briefing even included a picture of a COTS Cougar and an associated cost slide. Attendees of that conference can also confirm that the MRAP defined in the 2005 UUNS and discussed at the conference was precisely how we continue to define it in 2007. The Cougar is also one of the MRAP variants

that is being urgently procured in the largest quantities today. LtGen Mattis, then the CG of MCCDC, was present at the March 2005 conference, as were LtGen Amos and LtGen Gregson, the operational MARFOR advocate for the MRAP combat development way-ahead. MajGen Hejlik, who had signed the UUNS authored by Majors McGriff and Dewet in collaboration with his GCE staff, was also present at the conference. It is noteworthy that neither Gen Magnus (current ACMC) nor Gen Conway (who still served as the Joint Staff J3) were present in the audience. The key slide excerpt from McGriff's MRAP presentation was the Cost Slide:



PHASE II: ART OF THE POSSIBLE

- **PURPOSE:** INTRODUCE MRAP
- **METHOD:** AUGMENT GTVF EDL
  - FY05 SUPPLEMENTAL
  - EVALUATE, SPIRAL DEVELOP
- **ENDSTATE:** MROC DECISION
  - ENDURING SOLUTION



VEHICLE					
QTY	TYPE	EST COST RANGE		EST COST TOTAL	
414	4 Wheel Pax / Cargo	\$375,000	\$450,000	\$155,250,000	\$186,300,000
36	4 Wheel Ambulance	\$375,000	\$450,000	\$13,500,000	\$16,200,000
36	4 Wheel 5-ton Cargo	\$375,000	\$450,000	\$13,500,000	\$16,200,000
36	6 Wheel 7-ton Cargo	\$375,000	\$450,000	\$13,500,000	\$16,200,000
<b>522</b>				<b>\$195,750,000</b>	<b>\$234,900,000</b>

ESTIMATED COSTS INCLUDE WARRANTY, SETS/KITS, MAINTENANCE PKG, TRAINING

Figure 7. The cost slide associated the MRAP with a priced family of Cougar variants.

On 16 Jul 07 USA Today published an article in which McGriff, now a LtCol, was interviewed (Reference a.15.). In that interview McGriff stated that his proposed way ahead for the MRAP UUNS was: *"A phased transition. Continue to armor Humvees. At the same time, as quickly and as expeditiously as possible, purchase as many MRAPs as possible. Phase out Humvees."* (Ref ) Following Maj McGriff's proposed way-ahead, LtGen Mattis in his capacity as DC, CDI, stated to all from his seat in the audience that the USMC way-ahead would be the path proposed by McGriff. LtGen Mattis confirmed: *"That's exactly what we're going to do."* For the time being it appeared that MCCDC EFDS managers would receive their direction from DC, CDI and the Marine Corps leadership, and MRAPs would be rapidly purchased en mass using FY05 supplemental funding, as BGen Hejlik had intended when he signed the UUNS in theater.

### (3) The EFDC Vehicle Hardening Study

In response to the I MEF (Fwd) UUNS, the MCCDC EFDC requested that MCSC survey the military wheeled vehicle industry, and obtain MRAP and non-MRAP vehicle capabilities (Reference p.2.). That study determined that 4 and 6 wheeled COTS Cougar, RG-31, RG-32, Mamba, Casspir, Dingo, Cobra, ASV, Eagle, and Lion COTS MRAP variants were all superior to the M1114 in fulfilling the baseline survivability requirements of the I MEF (Fwd) MRAP UUNS. Most significantly, several of the MRAP variants were more effective than the M1114 at protecting against the side-blast (155mm blast) detonation IED threat, touted by USMC leaders as being the most prevalent IED employment tactic in 2005. In fact, the study determined that the M1114 was one of the least capable COTS-industry options for protecting Marines against this particular and long-known threat. This raises concerns today given that MCCDC and MCSC staff members continue to inform USMC General Officer leadership that the M1114 was the “gold standard” of protection in 2005. In light of the documented EFDC-MCSC Vehicle Hardening Study, this may be a question for the IGMC to explore.

The slide below is taken from the EFDC-MCSC study. It lists very specific design characteristics to be employed as metrics in analyzing COTS vehicle products. It is noteworthy that these metrics were also noted as requirements in the I MEF (Fwd) MRAP UUNS, Maj McGriff’s SAW thesis, and most importantly in Capt Sinclair’s 1996 MCG article:

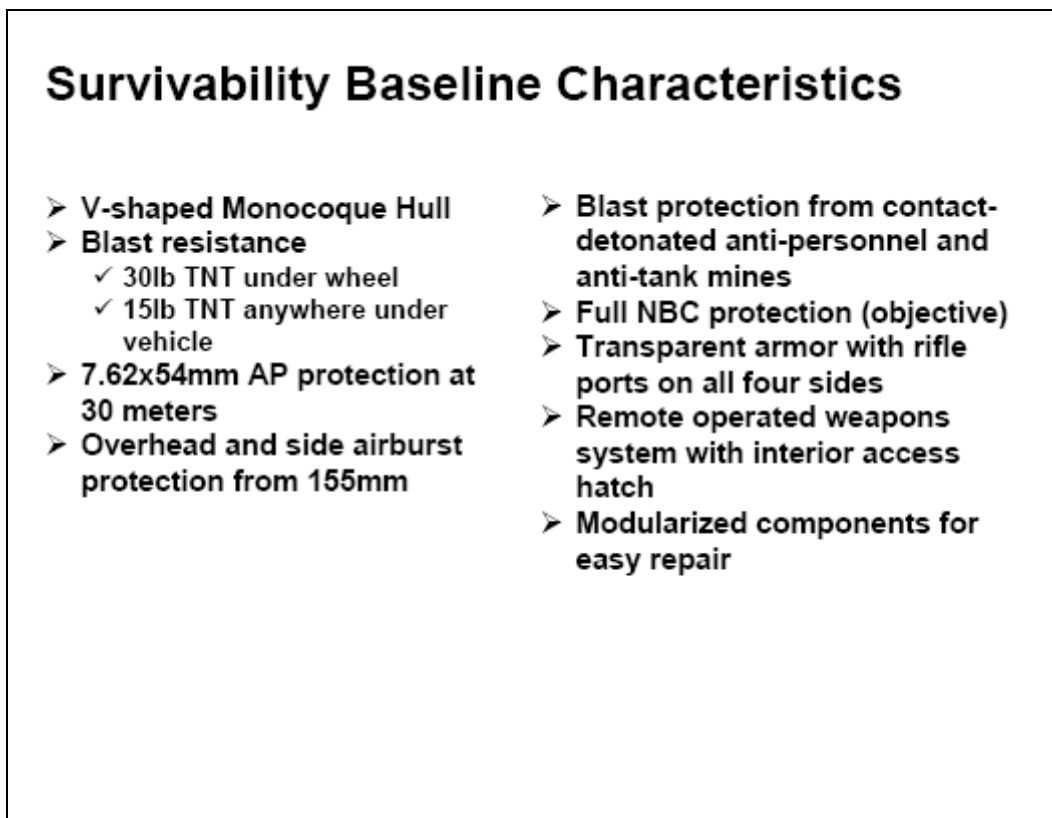


Figure 8. Survivability Baseline included V hull, 155mm protection, and modularity.

The two slides below were also taken directly from the EFDC-MCSC study presentation. Together, they comprise the actual COTS MRAP and M1114 technical comparisons. This comparative information was created specifically for the CDIB to consider as



it contemplated a material (or non-material) solution to the MRAP UUNS. This information was also briefed to the CDIB. Again, given this knowledge, it is incomprehensible that USMC senior leaders would have selected the M1114 and MAK UAHs as solutions to the urgent IED emergency in MNF-W, unless the MCCDC staff provided incomplete information:

### MRAP Survey

Model	7.62 x 38 AP	7.62 x 64 AP	166 mm Blast	16 lb Mine Center	30 lb Mine at Wheels	Fully NBC Protected	360° Rollover Protection	Ballistic Glass	Seating Capacity	C190 Capable	GVW (lb)	Max Payload (lb)
M1114	Yes	No Yes	No	No	No	No	No	Yes	4	Yes	12,100	2,300
Casspir	No	No	No	Yes	Yes	No	Yes	Yes	14	No	25,220	1,320
Mamba MK III	No	No	No	Yes	No	No	Yes	Yes	11	Yes	14,550	2,425
RG-31 M2	Yes	No	Yes	Yes	Yes	No	Yes	Yes	11	Yes	27,550	5,500
RG-31 Mk3	No	No	Yes	Yes	Yes	No	Yes	Yes		Yes	20,940	3,300
RG-32M	No	No	No	No	No	No	Yes	Yes	5	Yes	13,450	2,900

Survey Indicates UUNS met
 Yes or No Indicates confirmation

Figure 9. Casspir, Mamba, RG-31, and RG-32 were all superior to the M1114.

### MRAP Survey

Model	7.62 x 38 AP	7.62 x 64 AP	166 mm Blast	16 lb Mine Center	30 lb Mine at Wheels	Fully NBC Protected	360° Rollover Protection	Ballistic Glass	Seating Capacity	C190 Capable	GVW (lb)	Max Payload (lb)
Cougar 4x4	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	8 - 10	Yes	34,000	5,000
Cougar 6x6	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	10 - 16	Yes	51,000	8,000
Dingo 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8	Yes	27,000	6,600
Cobra	Yes	No	Yes	No	No	No	Yes	Yes	7 - 9	Yes	16,900	2,650
AML 60, 90						No			3		10,680 - 13,000	900
Saxon	No	No							12		23,500	
Eagle IV	No	No	Yes	No	No	No	Yes	No	4	Yes	16,755	5,300
VBL	No	No				Yes				Yes	8,400	2,204
XM1117 ASV	Yes	No Yes	Yes	No	No	Yes - Marked provided	Yes	Yes	4	Yes	29,560	3,360
Lion	Yes	No	Yes	Yes	No	No	Yes	Yes	6	Yes	20,660	5,000

Survey Indicates UUNS met
 Yes or No Indicates confirmation

Figure 10. Cougar, Dingo, Cobra, Eagle, ASV, and Lion were all superior to the M1114.

**(4) Lead and Supporting Advocate CDTS analyses of the MRAP UUNS**

The MCCDC Combat Development Tracking System (CDTS) is an on-line tool allowing MCCDC and HQMC advocates to provide written analyses of UUNS documents for further consideration by the MCCDC managers and leaders. EFDC recommendations are then forwarded for consideration by MCCDC leaders. Reference p.8. is the set of EFDC entries pertaining to the MRAP UUNS analysis that were entered in early Mar 05.

MCCDC's CDTS records reveal motivations for not fulfilling the GCE-focused MRAP UUNS that contradict some USMC public statements (References a.10., a.11., a.14., a.15., a.16., a.19a., and a.20.). CDTS entries point to mid level process managers questioning MRAP because it would compete against favored programs and futuristic expeditionary warfighting concepts for funding. A key observation is that Installations and Logistics (DC, I&L) was assigned as the "Lead Advocate" for the GCE-initiated MRAP UUNS. The Lead Advocate often leads to the solution way-ahead recommendations. The I&L recommendations reflect a lack of technical and operational insight in the reviewer, as well as a lack of curiosity to better understand the need through an urgent Request For Information (RFI):

<b>Universal need Statement (UNS)</b>		
<b>Part 2 of 5 - Advocate Endorsement</b>		
<b>OIF-III - Mine Resistant Ambush Protected</b>	<b>03/01/2005</b>	
<b>(MRAP) Vehicle - 05053UB</b>		
<b>Lead Advocate:</b>		
Lead Advocate Organization:	Installation & Logistics	
Advocate Decision to Continue UNS Processing:	Undecided	
<b>Comments</b>		
<p>It appears that this is more appropriate as an UNS than as an urgent UNS. Many issues are unclear. What is the capability gap we are trying to fill? How and where would we employ it, in Division as a support vehicle or in the FSSG as a convoy asset? Is it seen as a replacement or an additive vehicle? It seems to be a medium tactical wheeled vehicle-like capacity, would it be employed as a replacement for the MTRV? The skill sets required to operate this seem to be a hybrid of a 0313 and a 3531, neither of whom seem to totally fill the bill. We debated over whether the appropriate maintainer would be a 2100 or a 3521, would it be a combat vehicle or a tactical wheeled vehicle? In any case, structure will need to be identified and put in the appropriate units to operate and maintain this vehicle. What drives the 10 ton load? Would it require a 20 ft ISO compatible bed? What kind of mobility would be required, MTRV-like 30-70 or LVS-like 85-15? Would it have to be road legal to complete its mission? Embarkation requirements? Would it need to be self off loading or could it rely on MHE? If developed as a variant of the LAV, would the on-board power available be sufficient?</p> <p>Major issue that would keep us from fielding this as an urgent UNS would be the hybrid skillsets involved in operation. Neither the 3531s or 0313 could fall on this and operate it with familiarization training.</p>		
Lead Advocate Endorsement Complete	Date Advocate Endorsement Complete:	Tue 03/01/2005

CDTS Page 11. I&L assigned as lead advocate for a GCE-focused UUNS.

I&L wrote: *“It appears that this is more appropriate as an UNS than as an urgent UNS. Many issues are unclear. What is the capability gap we are trying to fill? How and where would we employ it, in Division as a support vehicle or in the FSSG as a convoy asset? Is it seen as a replacement or an additive vehicle? It seems to be a medium tactical wheeled vehicle-like capacity, would it be employed as a replacement for the MTRV? The skill sets required to operate this seem to be a hybrid of a 0313 and a 3531, neither of whom seem to totally fill the bill. We debated over whether the appropriate maintainer would be a 2100 or a 3521, would it be a combat vehicle or a tactical wheeled vehicle? In any case, structure will need to be identified and put in the appropriate units to operate and maintain this vehicle. What drives the 10 ton load? Would it require a 20 ft ISO compatible bed? What kind of mobility would be required, MTRV-like 30-70 or LVS-like 85-15? Would it have to be road legal to complete its mission? Embarkation requirements? Would it need to be self off loading or could it rely on MHE? If developed as a variant of the LAV, would the on-board power available be sufficient?”* The most harmful Lead Advocate observation was: *“It appears that this is more appropriate as an UNS than as an urgent UNS.”* Whatever its analytical basis, this comment dismissed the MEF perspective on the urgency of IED mitigation, and appeared to predestine the MRAP UUNS for non-fulfillment.

The I&L comments reflect a lack of GCE-related insight of the reviewer: The I&L Lead Advocate’s comments about skill sets and a set of questions that focused on logistical convenience for this urgent requirement to lower casualties were perplexing. In that analysis, the I&L reviewer demonstrated a clear lack of understanding of the I MEF (Fwd) request. As noted above, the lead advocate also did not issue RFIs back to I MEF (Fwd) via MARCENT in order to clarify those areas in which she lacked understanding. Furthermore, the reviewer made no mention of mine resistance or ambush protection. There was no comparative analysis of the design of armor vehicles and no evident awareness that the operators were asking for a combat-proven COTS truck that an average military truck driver could figure out how to operate with minimal instruction. At best one could say that the I&L representative, whose lead advocate analysis MCCDC eventually deferred to, was technologically and operationally deficient. As a result, a technologically and operationally less qualified civilian provided the dominant MRAP UUNS analysis input to the CDTS.

PP&O, the advocate for the GCE at HQMC, was placed in a supporting advocacy roll only, even though MRAP was being requested by forward deployed GCE warfighters for the battlefield. As will be seen immediately below, the GCE represented by PP&O at the Pentagon recommended approving the request, and developing and fielding MRAP through an MRAP POR in early 2005. This recommendation was not carried forward to the MROC, the body on which DC, PP&O (the GCE Advocate) sits as a voting member. The posted CDTS PP&O recommendations reflect competent GCE insight of the reviewer. The pertinent page out of the CDTS is included below. As was the case with the I&L comments above, the yellow highlighting was added by the author of this case study for emphasis:


<b>Supporting Advocate Comments</b>		
<b>Aviation Combat Element Comments</b>		
Aviation Supporting Endorsement Pending	Date Complete:	
<b>Command Element Comments</b>		
Command Element Supporting Endorsement Pending	Date Complete:	
<b>Plans, Policies &amp; Operations Comments</b>		
<p>Enhanced survivability and mobility of our Marines operating in a hazardous fire area against mines/IEDs/RPGs/SAFs threats is a viable requirement. As we are seeing in OIF and OEF, a need to improve the Marine Corps' current vehicles and platforms against current and emerging mine/IED/RPG/SAF threats exist. This capability is required in all elements of the MAGTF. The engineer community has been pursuing a more survivable engineer platform (Engineer Squad Vehicle) for years, but the initiative has never made the cut in the ARL ranking. The Marine Corps is currently spending a great deal of money and effort in hardening current vehicles/equipment and purchasing COTs/NDI capabilities to mitigate the threat. These efforts address an effort to fix/improve operating forces deployed in theater, but doesn't establish a POR and fix the Marine Corps' requirement in the long term. As written, this UUNS will require billions of dollars to fund. Recommend pursuing some of these requirements using joint money provided through the Joint IED Defeat Task Force. Along with filling the requirements of this UUNS, recommend the Marine Corps establish a MRAP POR to establish the logistic tail and incorporate this capability into the Marine Corps for the long-term.</p> <p>--Capt Lowe, Troy T - 03/01/2005 - (703) 784-6257 - </p>		
PP&O Supporting Endorsement Complete	Date Complete:	03/01/2005
<b>Supporting Agencies Comments</b>		
Support Agencies Supporting Endorsement Pending	Date Complete:	
Date Created:	03/01/2005	
Last Updated:	03/02/2005	
Updated By:	GS-13 Amberger, Sally A	

Figure 12. PP&O assigned as supporting advocate for a GCE-focused UUNS.

PP&O wrote: *“Enhanced survivability and mobility of our Marines operating in a hazardous fire area against mines/IEDs/RPGs/SAFs threats is a viable requirement. As we are seeing in OIF and OEF, a need to improve the Marine Corps' current vehicles and platforms against current and emerging mine/IED/RPG/SAF threats exist. This capability is required in all elements of the MAGTF. The engineer community has been pursuing a more survivable engineer platform (Engineer Squad Vehicle) for years, but the initiative has never made the cut in the ARL ranking. The Marine Corps is currently spending a great deal of money and effort in hardening current vehicles/equipment and purchasing COTs/NDI capabilities to mitigate the threat. These efforts address an effort to fix/improve operating forces deployed in theater, but doesn't establish a POR and fix the Marine Corps' requirement in the long term. As written, this UUNS will require billions of dollars to fund. Recommend pursuing some of these requirements using joint money provided through the Joint IED Defeat Task Force. Along with filling the requirements of this UUNS, recommend the Marine*

***Corps establish a MRAP POR to establish the logistic tail and incorporate this capability into the Marine Corps for the long-term.*** PP&O, i.e. the GCE Advocate, recognized that an MRAP POR was essential in order to fulfill the requirement. The PP&O recommendation represents quite accurately what has occurred with the MRAP program that is being executed by MCSC today, though almost two years later than necessary. Additionally, PP&O recognized that MRAP fulfillment would be expensive. Instead of rejecting fulfillment in favor of a lesser capability as the CDIB would do later, PP&O was solution-oriented and suggested seeking JIEDDO funds.

The Combat Development Division (CDD) at MCCDC is composed of senior active duty officers and senior retired Marine Officers in GS billets. As MAGTF Officers, together they have enough operational insight to the Ground Combat Element (GCE) operational relevancy of the UUNS. Consequently, assignment of the MRAP UUNS to I&L as the Lead Advocate underscores fundamental flaws in the EFDS during wartime. Senior retired Marines, as permanent personnel, often have disproportionate, budget-centric influence over the UUNS vetting process. When viewed from a bureaucratic perspective, the MRAP UUNS would have had unfavorable reprogramming implications for MCCDC's programmatic focus. All HMMWV, follow-on, Expeditionary Fighting Vehicle (EFV) Reconnaissance, Surveillance, Targeting Vehicle (RST-V) and other Joint Light Tactical Vehicle (JLTV) predecessors would be at risk of being decremented, delayed, or even cancelled if the billion-dollar COTS MRAP request were approved. This reflects a penny-wise/pound-foolish mindset best represented by a notional comment: ***"If the MCSC ground procurement budget in peacetime was \$2 Billion per year, how could we possibly afford \$4 Billion in MRAPs?"*** The larger picture reveals that the OIF burn rate was \$8B per month. So, from this non-operationally focused EFDC perspective a deliberate mis-assignment becomes a rational possibility.

Again, as senior retired Marines, the EFDS managers controlling the UUNS process at MCCDC could also not have missed the technical and operational authority of the signed UUNS, or the compelling urgency articulated within it. So, assigning a HQMC civilian logistician, having limited ground combat insight and committed to the health of stateside PORs, as the lead advocate in the analysis of a GCE UUNS assured the process outcome. This mis-assignment also relegated the strong GCE Advocate endorsement paragraph from PP&O to a supporting advocate input. In the end, PP&O's MRAP requirement fulfillment and POR establishment recommendations meant little, in fact as will be seen later the UUNS was never even forwarded to MCWL for technological investigation. The amplification of I&L's operationally irrelevant priorities and the minimization of PP&O's shared sense of urgency with I MEF (Fwd)'s request set the stage for the CDIB that followed.

#### **(6) March 2005 DOTMLPF Working Group/CDIB presentation**

In the spring of 2005 the I MEF (Fwd) MRAP UUNS, CDTS ID # 05053UB, was briefed before the Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF) Working Group (DWG) (Reference p.3.). Today the DWG is known as the Combat Development Integration Board (CDIB). The presumed author and presenter of this brief was Mr. Larry Platt, who worked for GS-15 (then Colonel) Len

Blasiol, in support of the EFDC. Mr. Platt, then a GS-14, had previously served as a LtCol within the EFDC.


Note: Like Mr. Blasiol who had served at MCCDC within the EFDC as a Col for several years before retiring and transitioning to the civil service, Mr. Platt had not served as active duty officer in the operating forces for many years prior to his retirement and transition. There are many similar cases at MCCDC. This is common practice throughout the DoD as 1990's force reductions lead to active duty officers assuming headquarters roles to free uniformed service members for operating positions. The challenge at MCCDC, however, is that prolonged program association skews objectivity. Also, lacking technical credentials in what amounts to a technology-centric environment compounds the biases that uninterrupted program association compels over time. Graduate school technical credentials and periodic tours with operating forces as a civilian can benefit currency and neutrality to a great extent. However, such qualifications and deployment expectations cannot be required of MCCDC civilians. Requiring such tours, as well as graduate school tech credentials for voting personnel on the CDIB, might be worthy of consideration in order to alter the priorities and insight of EFDC managers. During wartime, the best course of action may be to have operators make up more than 50 percent of the voting CDIB.

Returning to the chronology, the I MEF (Fwd) MRAP UUNS was briefed before the CDIB in the spring of 2005 (Reference p.3.). There is no written documentation available to the author that indicates a solution was voted upon at the DWG/CDIB, that a MCCDC GO was briefed on the outcome of the meeting(s), that the recommendation was forwarded to the MROC for consideration, or that the MROC formally approved or disapproved the MCCDC recommendation. The CDTS contains the only known documented reason for non-fulfillment of the MRAP UUNS remains budgetary and long-term doctrinal concerns. The documents also specify that the concerns that funding MRAP would decrement the budgets of PORs and futuristic concepts in which combat developers already had a vested interest. This documented evidence of budgetary concerns directly contradicts an Associated Press article of 24 May 07 (Reference a.11.) regarding the non-fulfillment of the MRAP UUNS. In that article a senior USMC official stated "***This was not a budgetary decision...You can take that to the bank.***" Key slides from the DWG presentation are included below, along with perspective on each.

Below is CDIB Slide 3 titled "***Needs, Timeframe, and Desired Endstate.***" The slide bullet titled "***is similar to the capabilities desired for up armoring***" reveals a significant error in MCCDC technical analysis. It is correct that 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> generation 'up-armoring' initiatives have as their aim a decrease in casualties. Yet, the capabilities actually afforded through up-armoring remain at many times more vulnerable to all forms of IED strikes. This vulnerability is amplified when combined with the fundamental flat bottom/low clearance design vulnerability of the HMMWV to center line, under belly strikes where IED gases are tamped. Up armored legacy vehicles are in no way similar to designed from the ground up 4<sup>th</sup> generation MRAPs. Technically aware Marines such as Majors Sinclair, McGriff and DeWet already knew from the South African experiences in the 1970's that COTS MRAP designs provided significantly better protection than up-armored vehicles. In fact we know today through our own Service tabulation of mounted Marines killed and wounded in action (KIA and WIA) from IEDs in OIF that MRAP protection is four to five times superior to that of up-armor.

While looking for unintentional duplications constitutes a valid component of a complete analysis, the DWG/CDIB at MCCDC was and remains technologically under-educated for the task of technical analysis. In 2005 they also exhibited strong preexisting biases that preordained recommendation outcomes and a lack of understanding of the time-sensitivity for urgent needs. The author has observed that the modus operandi of mid-level officer and civilian CDIB members is to find a POR delivering anything remotely connected to the operator's request. This technique, repeatedly demonstrated, permits the CDIB to recommend non-concurrence with any request for urgent material solutions outside of current concept or POR deliverables and without technical rigor. A layman's perception of similarity is merely required as voting members of the CDIB lack graduate-level technical credentials.

UUNS are then 'deferred for study' to/at MCWL, or in the case of the MRAP UUNS simply not fulfilled without even being forwarded to MCWL. The purpose, timing, manager and due date of the study is not communicated back to the UUNS submitter; sometimes no study is ever conducted. The CDIB 'technical' comparison of the MRAP to up armored HMMWVs was particularly questionable based on known enemy threats in 2005 and their own comparative vehicle survey, as were the MRAP's basic design advantages in countering them. Even the layman could not have missed those technical advantages, which raises the issue of CDIB priorities and sense of urgency being different from that of the MEFs engaging in combat in theater. In the end, the flawed conclusions, whatever their motivations had tragic operational consequences in the case of MRAP. Oddly, the flawed conclusions continue to be defended by some official USMC representatives today. The Needs, Timeframe, and Desired Endstate slide is immediately below:



## Needs, Timeframe and Desired Endstate (Cont.)


- **Does this UNS supersede or replace any other needs?**
  - **MRAP is independent but,**
    - is similar to the needs expressed in Engineer Squad Vehicle
    - is similar to the capabilities desired of up armoring
    - more specific with regard to desired capabilities
- **The desired end state is:**
  - Modular, scalable, baseline survivability in new vehicle platform that can be immediately fielded.
  - Should be: provide enhanced protection against IED/RPG/SAF/MVA in order to reduce Level III and IV grave and serious casualties.

3

Figure 13. Needs, Timeframe, and Desired Endstate slide.

Below is CDIB Slide 5 titled “*Doctrine Impacts.*” Quantico PORs and the Science and Technology (S&T) objectives that enable them are focused on the long-term doctrines of Expeditionary Maneuver Warfare (EMW) and Distributed operations (DO). In balancing near, mid, and far term equipment requirements it is clearly a part of MCCDC’s charter to look towards maturing the equipment that will enable the Corps to execute those doctrines. In 2005 the HMMWV follow-on (today known as JLTV), the Marine Expeditionary Family of Fighting Vehicles (MEFFV), Expeditionary Fighting Vehicle (EFV), and other futuristic vehicle concepts were USMC combat developer priorities. However, capabilities like the JLTV were known at that time to be unprepared to field any capability before 2013. While important for Quantico, EMW, DO and the immature material solutions that accompanied them were meaningless to the MEF (Fwd) which was in urgent need of heavily armored vehicles of significant mass that could counter the extreme forces of large buried mines.

So, the first bullet observed with concern that a heavier force might result, even though a heavier force is exactly the material solution that the MEF wanted delivered. Unfortunately, the MEFs and MARCENT did not have a vote on the MRAP or any other UUNS-requested capability during the conduct of the CDIB deliberations. The immediate needs of the MEF for MRAP were eclipsed by funded combat developer priorities because MRAP was an idea invented outside of Quantico and lacked any advocacy amongst influential voting combat developers. The author of this study was a witness to the extraordinary resistance that Mr. Blasiol and Col Oltman, a fellow senior member of the CDIB, exhibited to I MEF (Fwd)s request for direct, “conferenced-in” participation in later CDIB meetings. It appeared to operators that CDIB transparency was deliberately avoided, if transparency was not forced or directed from above. The Doctrine Impacts slide is below:



## Doctrine Impacts

- **Unknown**
  - Consider employment of a significantly heavier force. (28,000lbs)
  - Consider emerging concepts.
    - EMW
    - DO

5

Figure 14. Doctrine Impacts slide.



Below is CDIB Slide 8 titled “*Material Impacts.*” This slide is key to understanding why the 2005 MRAP UUNS was not fulfilled; namely 1,169 MRAPs would have taken resources from other fully funded PORs that MCCDC had an institutional interest in protecting. What was not excluded from the slide is more significant than what was included. The slide did not discuss operational impact, casualty rate data, cost of casualties, or the possible strategic, operational or tactical impact of a reduced casualty rate on the overall war effort in MNF-W, if the MRAP were immediately fielded. The slide also did not discuss casualty rates in terms of personnel losses, the cost of replacements, the likely favorable impact of decreased casualties on the length of the war, and the cost of replacing vehicles destroyed by IEDs. All material impacts related to Quantico’s localized programmatic vision for the future, and not to the urgent needs of the current conflict.

MRAP was COTS with no combat developer advocate, only GCE and operator advocates outside of process control. Due to the substantial resources that would be required to fulfill the request a reprogramming threat to existing PORs was seen by the briefer and the CDIB voting members. Even if some Congressional relief were assured, MRAP threatened to trivialize S&T initiatives at ONR that were less capable of providing protection in the near-term. Major futuristic programs in 2005, such as EFV, MEFFV, HMMWV-follow-on concepts, which included RST-V, CTV, and eventually the JLTV, faced the prospect of being terminated if the cost of COTS MRAPs were too high. Even LAV, M1 and MTRV were seen as being placed at risk.

This thinking supposes that MCCDC staff knew best the mind of Congress in terms of the political viability of funding current urgent vehicle needs and long-term capability plans. It is clear today that MCCDC was unqualified to venture a guess on that thinking at the action level, even though the action level perspectives carried the day in a non-transparent process. Even a simple study of history would have encouraged further investigation. Congressional funding of the B17, the B24 and the B29 in WWII suggest there is a precedent for funding urgent needs during war as well as long-term projected needs for a future strategic bomber. As we are discovering today, both MRAP (now) and JLTV (future) are viable efforts.

In addition to concern about competition for resources, the procurement of a combat-proven COTS system that from the perspective of protection was superior to immature funded S&T initiatives also threatened embarrassment for developmental system advocates and managers. The concern with program self-preservation is apparent on Slide 8 below. Material impacts on the operating forces were not even a noted consideration:



## Materiel Impacts

- New system capabilities development time
- Joint impacts
- Impact on M1, AAV, EFV, LAV and MEFFV
- Impact on current modifications to HMMWV, MTRV and LVS
- Aviation programs

8

Figure 15. Materiel Impacts slide.


Below is CDIB Slide 11 titled “*Cross Advocacy Issues.*” Cross-advocacy issues were not relevant to the discussion of a requested COTS material solution when the MEF (Fwd) GCE was the main effort of the MAGTF in the conduct of operations in Al Anbar province. The introduction of “to be determined” issue regarding a need for further analysis guaranteed further delays. Based on the signed UUNS, MCCDC staff knew this even though earliest fulfillment would save lives in what had grown into an IED emergency in theater. The DWG/CDIB’s decision to scour MCWL, ONR, and DoD acquisition community for an alternative solution is rational from a bureaucratic perspective, if the intent is to complete the research quickly. ONR could tap into a larger bowl of ‘Blue’ S&T resources without endangering MCSC resources. Also, other Joint solutions might present the opportunities to employ “other people’s money” for a USMC solution.

This rational search could be forgiven as good staff work in peacetime, when lives in theater were not directly effected by delays, and “100% solutions” were feasible. However, this MCCDC-initiated “requirement” for further analysis on an UUNS that has already been thoroughly researched by the originator was, under the emergency circumstances of Spring 2005, appears to the author to have been an effort to protect USMC PORs through new delays. The positive reception to a major MRAP purchase at the March 2005 Safety Conference belies this perspective. More than a year later, the MRAP-related events in 2006 again revealed the inaccuracies of MCCDC’s analyses, as a new CMC decided to support a major MRAP purchase at the July 2006 EOS, after a seven-slide brief from COMUSMARCENT.

The appearance of these particular DOTMLPF issues, irrelevant for the requested vehicles, reveals the concern of the briefer that the real, battlefield challenges in OIF would upset

an established programmatic way ahead. One can conclude from this MRAP case that PORs cannot be forced to adjust to the exigencies of war in the EFDS without much stronger warfighter influence.

The 2005 MRAP analysis process was therefore questionable, as it is logically turned priorities on their head. In practice, the countering of an unknown threat that the JLTV might face when fielded in 2013, assuming the JLTV would have MRAP capabilities, seemed to have been identified as a higher priority than the daily killed and wounded being experienced by the MEF from known IED threats in 2005. So, the fact that the CDIB and MCCDC did not recommend fulfilling the specified need using reprogrammed funds was not unjustifiable. As another example, what did MPF implications have to do with a capability urgently needed in theater to save lives when that urgent capability would be flown into theater, as is now being done with MRAPs? CDIB analysts set the bar unnecessarily high for bureaucratic approval by stating below that *“it will require all advocates to be involved.”* The CDIB members knew that this would be difficult to achieve even in peacetime, and yet they elected to apply this time consuming standard to an urgent need received in a time of war. This suggests to the author that the CDIB may have intentionally introduced a bureaucratic roadblock not germane to an urgent need. The Cross Advocacy Issues slide is below:



## Cross Advocacy Issues

- **Is an advocate partnership necessary to achieve this capability/eliminate this deficiency?**
  - This is a MAGFT issue and impacts all of the advocates  
It will require all advocates to be involved.
- **Can another advocate’s initiative dramatically increase the benefits of pursuing the capability described in this UNS?**
  - TBD, what is the potential for other solutions from MCWL, ONR or the Joint community to provide solutions?
- **Are there any impacts on Maritime Pre-positioning Forces (MPF)?**
  - Only if they are added to MPF.

11

Figure 16. Cross Advocacy Issues slide.

Below is CDIB Slide 13 titled *“POM Issues.”* This slide is representative of a MCCDC pattern with regards to the treatment of UUNS and UNS documents. In the past one of the first questions from the DWG/CDIB has been the issue of whether or not the capability described in the UNS is on the respective Advocate Requirements List (ARL). Yet, the ARL

lists and prioritizes known capabilities that already have logged UNSs, Statements of Need (SON), and even requirements. Also, ARLs are periodic documents, and an advocate is unlikely to include an UNS-defined new capability on the ARL unless it has been thoroughly vetted and development has begun. This “chicken-egg” dilemma plagues the UUNS approval process whenever the UUNS asks for something new, however mature and urgent that capability may be (like the COTS MRAP), if that capability has not been considered or approved by the advocates or the combat developers before.


Another difficulty with this slide is that it continues to doubt that the MRAP UUNS was a GCE equity and helps justify the somewhat absurd notion, already decided by the UUNS process managers, that I&L should be the Lead Advocate. The sub-bullet asking “*What does it [i.e. MRAP] replace? What does it cut is a better question.*” is again a revelation of the real CDIB concerns with regards to fulfilling the MRAP UUNS. The fear that funds will be reprogrammed away from vehicle-related programs that are favored by combat developers dominates the entire presentation. In the end, neither the I MEF (Fwd) HQ, the II MEF (Fwd) HQ, nor any of the tactical commanders losing increasing numbers of Marines to IEDs in MNF-W had a vote on the MRAP UUNS. Lacking process transparency also caused a delay in general operator awareness of non-fulfillment.

Note: In a time of war (including extended COIN) it can be argued that the immediate perspective of the operators in contact should dominate the UUNS combat development process, i.e. a 51% (+) influence over MCCDC developer actions. DC, CDI’s commitment to the MEF (Fwd)s is firm, but DC, CDI depends on his staff. Therefore the 51% MEF (Fwd) dominance of UUNS decision making should logically begin at the SME and the middle management level, not in terms of mere advice, but in voting participation. Once this warfighter dominance of the UUNS process is established the vote should be the final outcome and determine the recommendations the MROC. Unfortunately, there was no warfighter vote on MRAP, and the combat developer concerns for POR reprogramming dominated the outcome.

Finally, the sub-bullet stating “*UUNS states ‘urgent’ and is targeted at 05 supplemental. Reality...POM 06...Concept of employment.*” This was the statement that demonstrated the influence of the I&L Lead Advocate’s lacking sense of urgency regarding the MRAP fulfillment. Instead, if the analyst had an operational understanding and shared the sense of urgency of the MEF (Fwd), the bullet might have read “*Consider ways to present to senior leadership, DOD leadership, and Congress for mid-year funding of an initial, significant capability.*” Since the middle manager, CDD overseers of the UUNS process assigned I&L as the Lead Advocate inappropriately, and accepted her analysis without conducting an RFI back to the MEF, the lack of urgency was shared by MCCDC generally. Later in 05, ACMC would testify before Congress on the subject of equipment. In that testimony he would thank Congress for supplemental assistance, and he would confirm that those funds were spent on up armored HMMWVs. The urgent need for MRAPs was not mentioned.

In the end, it was this POM Issues slide that sounded the EFDC rejection of the MRAP capability need and any sense of urgency associated with the operator request. The MRAP was neither invented nor advocated at MCCDC, and as with many relevant UNSs before (especially tactical ISR) and UUNSs that would follow, without a MEF (Fwd) vote on CDIB

processes new ideas were indefinitely assigned the status of ‘deferred for study.’ This POM slide is the first sign that MCCDC staff would intentionally slow-roll MRAP at the middle management level, and a handful of bureaucrats were able to allow an UUNS to go unfulfilled while maintaining the real tactical, operational and even strategic implications below the leadership radar. Other reasons for non-fulfillment were given later such as “no industry capacity.” But those issues were not documented in 2005 and the industry capacity to produce 1,169 MRAPs rapidly has been disproved in the current Joint program (References a.27., a.28., and a.30.) The actual reasons for the MRAP’s dismissal in 2005 are contained in this presentation. The POM Issues slide is below:



## POM Issues

- **Is this issue on your Advocates Requirement List (ARL)?**
  - **This is a new issue and would have to be added.**
    - Which advocate? I&L or PP&O?
    - What does it replace? What does it cut is a better question.
    - Potential \$1B program.
- **What year do you expect this issue to compete in the POM process?**
  - **UNS states “urgent” and is targeted at 05 supplemental.**
  - **Reality...POM 06...Concept of employment...**

13


Figure 17. POM Issues slide.

Below is CDIB Slide 14 titled “*Proposed Courses of Action.*” The MCCDC mid-level recommendation was to feed existing PORs even though they were HMMWV-based death traps, or wholly inadequate work-arounds when compared to COTS MRAP with respect to protection. MRAP was intended to respond to a growing IED emergency and the appearance of more lethal threats such as deeply buried center line devices and EFPs. The emergency appeared and continued to grow in MNF-W because MCCDC combat developers did not equip the MEFs for COIN contingencies, with tactical ISR being the most pressing gap, as will be discussed later. As for protection, MRAPs were an “80%” immediate emergency ‘bridge’ solution to allow the MEFs to continue to operate offensively while more expeditionary vehicle solutions (like JLTV) were accelerated (Reference p.1. and a.15.).

I MEF (Fwd)’s MRAP UUNS did not foresee replacing every HMMWV in MNF-W with MRAPs (Reference r.5.). It asked for a carefully researched number of 1,169 systems

broken down into a family of COTS variants. The utility of other HMMWVs was not dismissed, as the requested number represented perhaps only 1/4 - 1/3 of the total vehicles fielded in MNF-W. Lesser protected but lighter, more accessible and more maneuverable M1114 HMMWVs would continue to have useful characteristics for urban areas once those they were better secured, especially with improved ISR-enabled situational awareness. Their immediate utility, however, would come from superior protection along the extended paved lines of communication between urban areas in Al Anbar where the largest and deadliest IEDs were being encountered. As a niche, theater-specific capability heavy MRAPs could later be demobilized and placed in Propositioned War Reserve (PWR) or Depot storage as a hedge against future contingencies.

The proposed courses of action revealed again the priority of the CDIB to protect existing developmental paths. The first two bullets, increasing LAV provision, HMMWV up-armor and increased employment of ECM reflected a POR-centric approach, in spite of the content of the UUNS. Non-material solutions including TTP changes and increased use of air reflected the substantial lack of operational insight of the members of the CDIB. Additionally, the CDIB's proposed COAs omitted the single most effective innovation of the war, namely persistent surveillance to compensate for the lack of ground forces in MNF-W and elsewhere in the ITO. Had the MCCDC briefer proposed the fielding of long-range cameras to achieve an "unblinking eye" along MSR's the proposed courses of action would have appeared to reflect intelligent and thorough analysis. Even after requests from I MEF (Fwd) in 2006 and early 2007 for an order-of-magnitude increase in Scan Eagle UAVs and other cameras, MCCDC did not fulfill them. The Proposed Courses of Action slide is below:



## Proposed Courses of Action

- **With respect to the DOTMLPF impacts, please list recommended materiel solutions AND non-materiel solutions which may satisfy the need.**
  - Materiel solutions:**
    - Increase AAO, production, and fielding of LAV.**
    - Evaluate current up armoring solutions, adjust AAO.**
    - Increase employment of UAV.**
    - Increase use of electronic counter measures.**
  - Other service vehicles?**
  - Threat...future threat**
  - Non materiel**
    - TTP**
    - Increased use of aviation/ air delivery assets**

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Figure 18. Proposed Courses of Action slide.

The MRAP presentation to the CDIB reviewed DOTMPF issues only. There was no mention of the tactical cost, the impact of current or likely casualty trends, or the national cost of casualties for various scenarios. There was also no mention of the strategic cost of casualties inflicted by a savvy enemy who, by February 2005 was employing the 4<sup>th</sup> Generation “bloody nose” strategy. Nor was there any mention of the operational cost of HMMWVs getting destroyed or wearing out due to overweighting in very short timelines (both well-know at the time). Similarly, there was no comparison of incremental 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> generation vehicle improvement versus an order-of-magnitude superior 4<sup>th</sup> generation (and COTS) design changes, or any analysis of the personnel cost associated with replacing injured Marines. Finally, there was no mention of reviewing the MRAP requirement with the Army acquisition requirement counterparts, and no attempt by the Lead Advocate to get her questions answered.

At this point it is worthwhile to contrast MCCDC’s bureaucratic approach to armor to the operationally-focused WWII acquisition philosophy for aircraft. Speed of technological evolution was critical to overmatching our enemies. When the B-17 proved to be inadequate, we immediately developed and fielded the B-24. When the B24 proved to be inadequate for long lines of communication in the South Pacific, the U.S. rapidly fielded the B29. Great risks were taken in maintaining the tempo of strategic air capability advancement, and no program was held sacred by decision makers and staffs. All that mattered was operational relevancy and winning quickly. So, one missing aspect of MCCDC analysis is any reference to risk reduction in the current war, by “risking” over-buying systems needed in the short run, also known as a need for technological and material speed in modern warfare. Instead, the MCCDC orientation was to save money and accept risk in OIF not just with the MRAP but also many other COIN-enabling capabilities. In this sense, before MRAP no aspect of Quantico combat development was “at war,” and this it can be argued had as a direct effect the prolonging of the entire war.

As an example of lacking urgency, 2006 e-mail correspondence between I MEF (Fwd), MARCENT, and MCWL revealed that the CDIB did not forward the unfulfilled MRAP UUNS to MCWL for technological consideration (Reference e.2.). This had significant implications in 2007, as no USMC investment was initiated by MCWL, ONR, or SYSCOM to find a total defeat solution for the explosively formed penetrator (EFP) threat that BGen Hejlik had specifically highlighted in his 17 Feb 05 UUNS. USMC did not seriously begin to invest in an MRAP EFP solution until after USATODAY’s publication of MRAP’s vulnerability, even though insurgents were aware of this vulnerability (Reference p.11., a.13. and other references). As a direct consequence large numbers of MRAPs are being fielded to Iraq in 2007 without EFP protection because a material solution for that threat has not yet been sufficiently matured due to a new start delay of well over two years. Only a second bidding on MRAP contracts in the summer of 2007 is requiring such protection (Reference a.18.). As is evident in the DWG/CDIB presentation, EFP was not even discussed. Budgetary concerns dominated the outcome.

The urgency of the operational need for MRAPs in Feb 05 was clearly articulated; the enemy threats MRAPs were designed to mitigate had already been experienced, or were considered imminent by the MEF (Fwd) at the time of the UUNS submission. Similarly, the specified material solution which was thoroughly researched and determined by experts in-

theater and UUNS authors at MARFORPAC, was clearly a COTS MRAP. Legacy vehicle incremental 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> generation armoring solutions were specifically dismissed as options.

The enhancements to the safety of thousands of Marines in theater, and the consequent contribution to the accomplishment of the MEF (Fwd) mission, were not trivial. MCCDC SMEs and the MCCDC managers advised by those SMEs were fully cognizant of the imminent threat to HMMWVs, the capabilities of COTS MRAPS, and the authority of the I MEF (Fwd) CG signature. Wheeled vehicle planners should have known the history of military wheeled vehicles, especially a landmark vehicle innovation like the South African MRAP. They were even reminded of this history in Sinclair and McGriff papers. The chronic threat to any HMMWV-based platforms was confirmed in the EFDC's own Vehicle Hardening Study that had been executed as a part of the analysis.

The I&L comments formed the bureaucratic justification that CDIB needed to internally slow-roll the MRAP UUNS until such time as it was dismissed, as evidenced in the 10 Jun 05 EFDC Info Paper. Later e-mails and other documentation would state that the CDIB had "supportability concerns," even though the MRAPs requested were combat proven COTS products. Other arguments that MCCDC staff eventually provided to senior Marine Corps leadership related to lacking MRAP industrial production capacity, the lack of appearance of the centerline underbelly threat in Al Anbar, the superior protection afforded by M1114s to side blasts, and the irrelevance of EFP protection to Al Anbar Province. Interestingly, none of these points were discussed at the CDIB in 2005. More likely, this rationale was added afterward, when MCCDC staff were at risk of being embarrassed by the rejuvenation of the MRAP program in 2006 and 2007.

Late in 2007 Gen Mattis has added a new rationale to justify the 2005 MRAP decision, namely that MRAPs are too high off the ground in a complex fire fight. In his WETA PBS NewsHour, he stated that the prevalence of complex attacks in Feb 05 favored vehicles with a lower silhouette. This NewsHour utterance was the first time a silhouette argument has been employed in MRAP critique. Also, LtGen Mattis was referring to insurgent tactics and techniques that he last encountered as a Division Commander in 2003 and early 2004, not the challenges that I MEF (Fwd) was addressing in the I MEF (Fwd) MRAP UUNS of 2005 when he had departed theater. This effort of LtGen Mattis to second-guess the I MEF (Fwd) Commander's UUNS based on his outdated personal experience, without qualifying it as such, was confusing. It is critical to note again that none of the current arguments are documented in the LtGen Mattis' EFDC/CDIB/DWG MRAP UUNS process documents at MCCDC in early 2005. The only documented rationale for shelving the MRAP UUNS remains the protection of PORs related to STOM in which individuals in the combat development process had a vested interest.

As a direct consequence of competing priorities, the MRAP UUNS did not gain traction with MCCDC staff during LtGen Mattis' tour as DC, CDI. The Brookings Institution has since estimated that the delay until UUNS resubmission in the fall of 2006 unnecessarily cost the lives of as many as 742 Marines and Soldiers in Iraq, due to IED attacks on HMMWVs (Reference c.6.). In a letter to the CJCS earlier this year, CMC noted that over 150 servicemen



and women had been killed and over 1,500 seriously injured in vehicle IED incidents in the MNF-W AOR alone between 21 May 06 and 1 Mar 07.

The reason that the Marine Corps component of the MRAP program has grown in scope is because MCCDC ignored common sense COIN requirements, as well as the growing IED emergency in MNF-W. The COIN capabilities that might have prevented the emergence of a significant IED threat in the first place had not been provided by MCCDC combat developers. These included ISR, armed ISR, NLW, IO-supportive communications equipment, real-time language translation, and other tools. When the MEF recognized the growth of those COIN gaps, it researched and submitted specific requests for mature solutions. Even those theater-generated UUNS requests for COIN capabilities were dismissed at MCCDC. It took extraordinary efforts by I MEF (Fwd) to force the fielding of MNF-W-wide threat-mitigating ISR, but the IED emergency grew to the point that at least initially ISR alone would not be able to stem the casualties. The widely publicized and strategically demoralizing emergency compelled a concerned SECDEF and Congress to act as a conscientious board of directors and step in and actively insure that warfighter urgent requests for MRAPs were fulfilled. As will be seen later in this study, by then the magnitude of the threat dictated a significantly larger protection solution, i.e. the MRAP surge initiated in 2007.

#### **(7) May 2005 IGMC Equipment Readiness Assessment**

During the period April through May of 2005 the office of the Inspector General of the Marine Corps (IGMC) conducted a Readiness Assessment of Marine Corps ground equipment in Iraq (Reference p.9.). The Director of Readiness in the office of IGMC assembled and deployed a team of 11 Subject Matter Experts (SMEs) from HQMC to Al Anbar Province in Iraq. The report stated that the assessment team inspected over 1500 individual pieces of equipment covering 39 Table of Authorized Materiel Control Number items from across II MEF (Fwd). With its focus on equipment readiness, the IGMC employed an MOS 3510 CW04 from HQMC I&L (LPC) to look at combat vehicle issues in theater, in addition to other logisticians. The office of the IGMC has verified that there was no team member participant from the GCE Advocate in PP&O. Also, no team member was focused on the actual fulfillment of urgent operational needs, beyond maintenance and accountability of equipment once it arrived. In summary, the 2005 IGMC SME team was logistics heavy, with no PP&O/ GCE representation.

The two primary objectives of the 2005 IGMC Readiness Assessment were to determine: *“If the planned Marine Corps equipment density list for the theater of operations is adequate to meet the theater strategy and concept of operations”* and *“If the current state of equipment readiness is adequate to support long-term operational requirements.”* Once there, the team conducted the assessment using interviews and inspections leading to the May 2005 publication of the *“US Marine Corps 2005 Ground Equipment in Iraq Readiness Assessment.”* The IGMC Readiness Assessment was conducted after I MEF (Fwd)’s submission of the MRAP UUNS and after the March 2005 Safety Conference where the MRAP way ahead was verbally agreed to by DC, CDI. It was the report referred to by CMC as an apparent basis for deciding in favor of the M1114 and UAHs as the *“Gold Standard”* solutions to the MRAP UUNS (Reference I.4.).

The report did state that ***“Combat Operations require speed, agility, and the capability to close on an objective or target quickly with overwhelming combat power. The distances involved and the fleeting nature of insurgents demand highly responsive, highly maneuverable, and highly agile ground combat power. Much of this ground combat power must include vehicles with heavy gun turrets.”*** Even without a GCE participant, this comment compares favorably with the I MEF UUNS request for MRAPs, even in the absence of IGMC visibility of the I MEF MRAP UUNS during the readiness assessment.

Excerpts from the IGMC report that are relevant to CMC’s letter include: ***“Commanders have reacted to enemy tactics and techniques, such as the employment of Improvised Explosive Devices (IED), by adding armor protection to vehicles – thereby increasing weight to the vehicles and ultimately impacting on the wear and tear on frames, axles, and suspension systems,”*** and ***“Armoring efforts have dramatically reduced the available cargo weight and have caused excessive wear and tear of suspension and related components, brakes, transmission, power steering, and tires,”*** and ***“The majority of A2s assessed are anticipated to be operational for 18 to 20 months in theater. Application of the MAK, however, may decrease this duration by as much as six months.”*** It is worth noting that these operationally significant HMMWV armoring drawbacks would not have been evident with new COTS MRAPs having Level 1 armor and significant payload volume and weight capacity. So, it is peculiar that Marine Corps leadership apparently concluded that the M1114 was the ***“Gold Standard”*** solution to the vehicle armoring challenge posed by IEDs when the COTS MRAP alternative was available. The MRAP lifecycle in combat was estimated to be much longer than 18-20 months. By this calculation alone, it would take five \$200K HMMWVs to equal the lifespan of just one \$500K 4x4 Cougar. However, it can be better understood if the IGMC was not provided visibility of the I MEF (Fwd) MRAP UUNS or that the UUNS was under-represented to DC, CDI before the apparent CMC decision in June 2005.

An illustrative graph on page 30 of the IGMC report (below) titled ***“Combat Vehicle Equipment Readiness”*** was introduced with the words: ***“Given the current condition of the equipment plus support from LogCom and SysCom, the projected readiness for combat vehicle equipment is depicted:”*** Since the graph below takes into account the best case of LOGCOM and SYSCOM intervention, the MAK-equipped HMMWVs and M1114s were likely considered. A catastrophic decline in readiness was projected to begin in 2006:

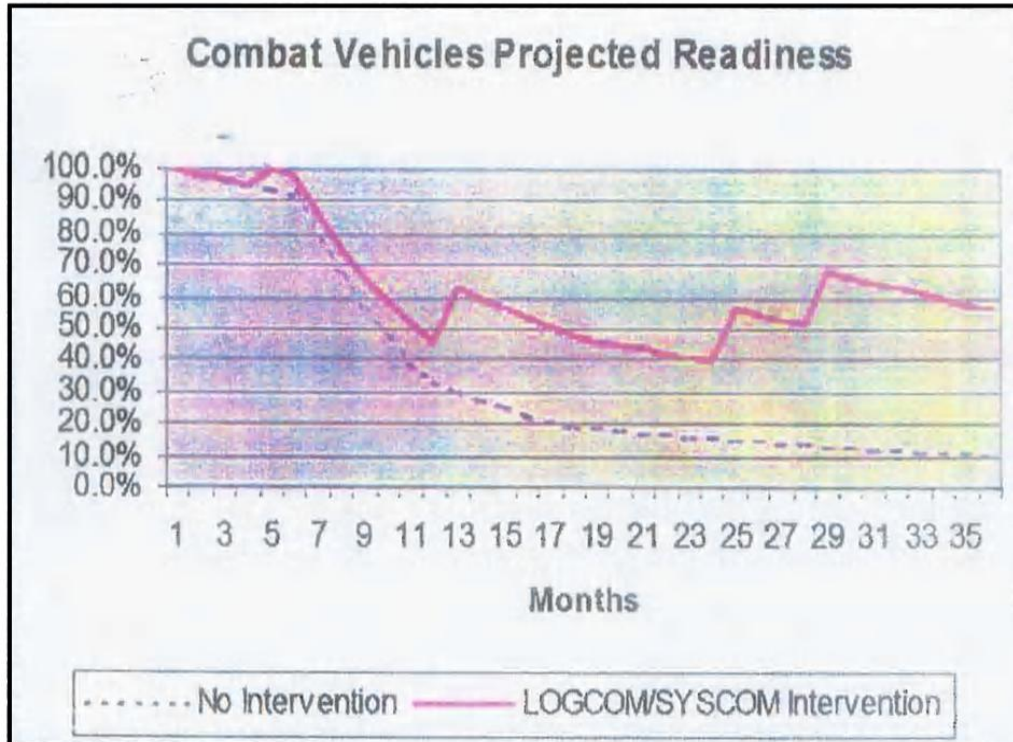


Figure 19. Table 2 of the 2005 IGMC report projecting degradation of UAH readiness.

Today it can be argued that the predicted decline would have been largely mitigated if the brand new and operationally suited COTS MRAPs had been made a USMC moral imperative in 2005, as it is today. The I MEF MRAP UUNS had foreseen the emergency from an operational viewpoint and intended to make it an imperative to get as many MRAPs fielded as quickly as possible by means of the UNS’ “urgent” designation. Because the UUNS was not acted upon when it was submitted, 19 to 24 months of MRAP procurement and the intervening consequences of not fielding them have been lost, with a cost in Marine deaths and injuries. CMC partially quantified these consequences in his 1 Mar 07 letter to the CJCS (Reference I.3), as did Congressional advocates in a later letter to SECDEF (Reference c.6.).

In a letter to Congress, CMC depended heavily on the 2005 IGMC Assessment for his explanation of the MRAP outcome (Reference I.4.). Again, the IGMC report states that the 2005 IGMC was exposed to over 100 different systems during its Readiness Assessment that were requested and fielded through the UUNS process. In spite of this reportedly close look at UUNs and the assessment’s overwhelming focus on vehicle protection, the body, findings, and recommendations of the assessment did not contained any reference to the MRAP UUNS submitted by I MEF (Fwd). The IGMC was apparently not provided visibility to that UUNS, the COTS MRAP protection alternative, or operator perspectives on such a potential material solution. Had a GCE Advocate SME been assigned to the team the IGMC would have been fully cognizant of the submitted need and the COTS opportunities. However, having been assigned as the Lead Advocate, I&L perspectives and insight dominated the report. Curiously, CMC’s letter indicates that this I&L dominated and logistics-focused report contributed heavily to the USMC leadership’s decision on a critical operational GCE requirement.

Earlier in his letter, CMC had stated that the IGMC recommended the Marine Corps continue with the MAK program, but plan to transition fully to the M1114 as soon as possible. There is no evidence in the report recommendations that the IGMC was ever exposed to the MRAP UUNS for comparative consideration. In essence the IGMC recommendation to continue with MAK and UAH was developed with incomplete information. Rather than defend the decision based on incomplete and I&L-biased information, an admission that the 2005 IGMC team was unbalanced might be more helpful for understanding the decisions on MRAP.

An additional factor with regards to receiving incomplete information is that the IGMC visited II MEF immediately following the MEF Command Element "Relief in Place Transfer of Authority (RIPTOA)" of the I MEF (Fwd). As is common knowledge within I MEF, II MEF, and MARCENT, there is a normal period of discontinuity following each RIPTOA hand-off. During that period it takes the incoming MEF several months to grasp and take ownership of all of the initiatives begun by the MEF headquarters that it replaced. In the end, the logistics-focused IGMC did not interview the recently returned I MEF staff having its fresh wealth of operational experience, and insight to previously submitted UUNS, so as to capture complete and credible information for the assessment. One month after RIPTOA, no MEF (FWD) is in a position to provide a comprehensive and historically integrated picture of operational needs in the MNF-W AOR as well as the MEF (Fwd) it relieved.

One of the key findings of the IGMC report was "***Finding # 4b: Action is needed to provide greater control and accountability in the fielding of urgent UNS equipment.***" This finding turned out to identify a larger trend that eventually was studied in detail by the Naval Audit Service in a report on the Marine Corps Urgent Universal Need Statement Process that was published on 28 Sep 07. In 2007 the Naval Audit Service reported that: "***...the effectiveness of the [UUNS] process could not be measured, the ability to accomplish the mission could be impacted, the potential exists for wasted resources, and delivery of required UUNS requirements to Marine Corps warfighters could be delayed.***" It is also interesting that the MRAP UUNS was handled outside of the normal MROC process, and was never presented to the MROC for a decision. This abnormal handling of an UUNS with resource and operational significance as great as the MRAP UUNS would be consistent with NRS concerns that were published in Sep 2007, i.e. that the "***...delivery of required UUNS requirements to Marine Corps warfighters could be delayed.***" The Naval Audit Service report came over two years too late to alert the IGMC and Marine Corps leadership in 2005 to significant gaps in UUNS insight, especially as it pertained to the I MEF (Fwd) MRAP UUNS.

The 2005 IGMC readiness Assessment body, findings, and recommendations contained no reference to the UAH or the M1114 being considered the "***Gold Standard***" of protection by operators or the IGMC SMEs. The concurrent stateside MCCDC EFDC Vehicle Hardening Study in fact determined that the M1114 was inferior to COTS MRAP alternatives. Yet, in recent months this Gold Standard characterization and terminology has been employed frequently by CMC and other Marine Corps leaders to justify the Corps' decision not to act on the I MEF UUNS or the MRAP-supportive outcome of the March 2005 Safety Conference. The Gold Standard characterization of the UAH and M1114 has no expert or documented basis.

#### **(8) 10 Jun 05 EFDC UUNS Update Information Paper**

On 10 Jun 05 the MCCDC EFDC published and widely disseminated an Information Paper, a document that still remains posted on the internet for general access at least until 1 Jan 08, and may still be there (Reference p.10.). The purpose of the paper was to provide the status of all active UUNS requests at that time. The paper listed 59 active UUNSs by category, namely: 1) UUNS awaiting DWG (a.k.a. CDIB) review or require solution resolution, 2) UUNS awaiting MROC approval, 3) MROC approved UUNS that were waiting for funding, and 4)UUNS that were funded and under execution by MCSC. On 10 Jun 05 twelve of those UUNS were listed as awaiting DWG review or require solution resolution. The MRAP UUNS was one of those 12:

With regards to the MRAP UUNS the info paper stated: ***“Mine Resistant Ambush Protected (MRAP) Vehicle – This UUNS requests an MRAP vehicle capability to increase survivability and mobility of Marines operating in a hazardous fire area against known threats...Status – EFDC is developing course of action for development of a future vehicle that provides the requested capability.”*** This MRAP UUNS update indicated that the COTS MRAP purchase that I MEF (Fwd) had researched and requested would not take place. Instead, the UUNS would supposedly be absorbed into a future developmental initiative, presumably the HMMWV follow-on, CTV and eventually the JLTV. At that time MARCORSSYSCOM and ONR were still planning a limited deployment of a few RST-V prototype vehicles, and this MV-22 transportable vehicle presumably had a major place in the STOM concept. RST-V could very well be included in the EFDC’s future vehicle development noted above.

With respect to the ongoing hardening of HMMWVs the info paper stated: ***“Tactical Vehicle Hardening: MAK - OIF deliveries: 190 M1043/5 kits delivered, 45 enroute; 304 2dr kits delivered, 456 enroute; 384 4dr kits delivered, 114 enroute...OCONUS installation underway. Achieved full install rate of 200 per month. 150 kits are installed on 26 MEU HMMWV’s, 8 kits installed on OEF/ANA ETT, 11 kits installed on CAFSM, 34 kits installed towards ITT requirements, 144 kits installed on 13 MEU; 561 (66 last week) kits installed in OIF A2s for theater MAK rotation, 94 enroute via Westward Venture, 144 enroute via Strong Resolve; about 150 out of Charleston ALD on 17 Jun 05; MAS - 56 kits have been delivered. A delivery rate of 16 kits per week...M1114 – Deliveries to begin in Jun and continue through Sep 05.”*** This was a top priority POR at Quantico – SYSCOM had apparently purchased huge quantities of steel for this effort and contracts had already been let – reprogramming in order to fund the COTS MRAPs requested in the UUNS would have gutted and perhaps cancelled this and other vehicle programs – the need for COTS MRAP of the operators located thousands of miles from Quantico had no chance of winning out against the survival instincts of the up-armor POR advocates on-site in Quantico.

Within the MAK hardening discussion was also a special report of note, namely: ***“LVS Kits - Per II MEF (Fwd) request, producing MAK style doors & underbody kits. Est. production timeline Aug; 5-Ton Underbody - Per II MEF (Fwd) request, MCSC is producing underbody kits. Estimate production timeline of Jul 05.”*** This statement would indicate that MCCDC and MCSC were responding to a request or requests from II MEF (Fwd) for a means of protecting tactical vehicles against underbody IED strikes. Though the CDTS UUNS library was

not available to the author for this Case Study, the II MEF (Fwd) requests would appear to have been submitted as an UUNS(s). If production was already to begin in July 05 the II MEF (Fwd) request would have had to have been submitted to MCCDC in May or April 05. This is further confirmation that the underbelly IED threat was known and negatively impacting operations in MNF-W, as I MEF (Fwd) had stated in its Feb 05 MRAP UUNS. In 2007 several senior leaders would publicly refute the significance of the underbelly threat in 2005 (References a.16., a.19a., and 1.4.). Yet, I MEF (Fwd), II MEF (Fwd), and even the combat developer's own 10 Jun 05 UUNS update contradict the Generals' assertions.

This 10 June 05 EFDC info paper above is the last known (i.e. known to this case study author) formal communication that the MRAP UUNS had been delayed or cancelled at MCCDC. This has also been confirmed by the MROC Secretariat. The MRAP UUNS was allegedly handled and decided upon outside of the standard process, in that it was never properly brought before the MROC for a formal decision for subsequent recording in an MROC Decision Memorandum.

Presumably, MCCDC is required to present UUNS to the MROC by SOP, even for the most mundane needs, and certainly for a mature capability of the magnitude of the I MEF (Fwd) MRAP request. Newsweek did report that USMC officials stated that at an Executive Session of the MROC it was decided that the M1114 HMMWVs constituted adequate protection (Reference a.14.). Yet, no documentation exists stating that it was brought before the MROC or an Executive Session of that body for a thoughtful deliberation, one that would have included DC, PP&O as the GCE Advocate. The normal MROC process was evidently not followed, and there was no oversight mechanism that would have caught the error in order to return to the CDIB in order to hold it accountable. The 10 Jun 05 MCCDC UUNS Status memo authored by LtCol Katchlein and discussed above indicated that a decision would appear to have been made somewhere not to execute the purchase of MRAPs, and roll the need into a future vehicle requirement. Still, it is not clear at what level that decision was made, a decision that ultimately impacted not only for the U.S. mission and safety of personnel in Al Anbar, but also had billions of dollars in cost implications. These included a prolonging of the war, future Veterans Administration Hospital expenses, personnel replacement and death benefits, and materiel losses, as well as future reprogramming when the IED threat became an emergency. APMC's 21 Jun 05 testimony below (Reference c.1.) did not clarify who deliberately decided not to fulfill the MRAP UUNS, and when.

Another open question remains, and that is whether or not a MCCDC General Officer saw the CDIB brief or even the CDIB recommendation, independent of whether any MROC-like process was followed. Yet, by June 2005, it is clear from the EFDC UUNS Status report that low-risk, effective, near-term protection would be mortgaged for a future higher-risk developmental program. It is of special concern from an accountability standpoint that it appears that determined efforts of MCCDC personnel managed to keep the I MEF UUNS out of the normal, formal MROC process. The perception is that advice was given (including the IGMC visit results) and decisions ultimately made "behind closed doors." There is no known MROC Decision Memorandum on this UUNS (we have checked with the MROC Secretariat), in spite of the fact that it had a near-term resource implication that equaled or even exceeded USMC's other

top tier programs such as EFV and even Osprey. In the end no historical trail other than a few presentations, process documents, and a MCCDC info paper are known to exist.

Due to this lack of MCCDC process transparency and the tangible in-theater consequences of this odd handling of the 1<sup>st</sup> MRAP UUNS, MCCDC SME and management inaction created a significant adverse impact on the Corps' ability to accomplish its mission. In summary, the author observes that MRAP was grossly mismanaged following the receipt of the 1<sup>st</sup> I MEF (Fwd) MRAP UUNS signed on 17 Feb 07.

#### **(9) 21 Jun 05 ACMC HASC testimony on USMC C-IED measures**

On 21 Jun 05 Gen William Nyland and MajGen William Catto briefed the House Armed Services Committee on the status of the USMC's efforts to protect Marine operating forces against IEDs in MNF-W (Reference c.1.). The written joint testimony submission of the two Generals read in part: *"...today, because we face this smart, adaptive and thinking enemy, we face [IED threat] munitions like single 122 to 155mm artillery shells, daisy-chained series of shells, triple stacked mines [author's insert: a.k.a. VO and under belly/centerline IEDs], shape charge-like weapons [author's insert: a.k.a. EFPs], and even suicide car bombs..."* This statement indicated that mines and EFPs had already appeared as threats in Al Anbar, serious enough to warrant specific mention in HASC testimony.

The ACMC-COMMARCORSYSCOM joint testimony continued: *"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...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..."* This statement confirmed that the FY05 Supplemental had indeed been received by the USMC, but that it was not employed for the purpose that the warfighters had expressly requested, namely the purchase of 4<sup>th</sup> generation COTS MRAPs. Instead, the funds were used to procure the ineffective MAK UAH and M1114. These USMC decisions were made even when I MEF (Fwd), the Safety Conference, and the EFDC Vehicle Hardening Study had all confirmed that the HMMWVs remained vulnerable to the underbelly IED threats that ACMC repeatedly reconfirmed had emerged in MNF-W throughout this testimony.

The joint testimony continued: *"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 Ordnance 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...*” Here the ACMC praises the Cougar MRAP as having *“dramatically improved the protection levels for Marines involved in highly dangerous activities...”* This contradicts 2007 assertions by Marine Corps leaders that MRAPs exhibited 1) reliability problems, since they were COTS, 2) were not tested, since they were in fact combat proven, and were not producible, since small Force Protection was already delivering hundreds of MRAPs even in the absence of industry partnering. Early Cougars did have some reliability problems that were quickly fixed by the manufacturer. Yet, none of those problems had to do with survivability. Consequently, it was not correct to suggest that reliability problems constituted a valid rationale for not buying a large number of MRAPs much earlier. If Force Protection’s MRAP is one of the top MRAPs on the market, then DOD can structure a contract that encourages reliability through a large purchase or through a licensing arrangement by large manufacturers for more reliably, as eventually happened in today’s Joint MRAP Program.

The joint testimony continued: *“We have determined that the M1114...Up-Armored HMMWV (UAH) is the best available, most survivable asset that meets our evolving vehicle underbody protection requirements...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...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...”* These statements related to the urgent efforts of the Marine Corps in Jun 05 to attempt to protect the underbodies of vehicles from centerline and VO mine threats. These comments acknowledged an evidently significant effort to provide underbelly protection to vulnerable vehicles. However, this contradicts 2007 assertions by Marine Corps leaders that the underbelly threat was not significant in 2005. The statement that the M1114 UAH *“...is the best available, most survivable asset that meets our evolving vehicle underbody protection requirements...”* was contradicted by the I MEF (Fwd) UUNS, the Safety Conference, and the EFDC Vehicle Hardening Study. It is also contradicted by the 05-06 casualty-based emergency procurement and fielding of MRAPs that has occurred since the MRAP requirements were resubmitted in 2006.

The joint testimony continued: *“The FY05 National Defense Authorization Report, Subtitle B, Amendment to the General Contracting Authorities, Procedures and Limitations, section 811 for Rapid Acquisition Authority ... 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...”* This statement shows that Congress had



already made rapid procurement and significant reprogramming possible on 15 May 05, and that would have permitted the mass procurement and fielding of I MEF (Fwd)'s requested MRAPs in 2005.

The joint testimony continued: *“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... 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... 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...”* This statement revealed that the USMC wanted survivability built into tactical vehicles *“from the ground up,”* i.e. the 4<sup>th</sup> generation designs that were already widely available with COTS MRAPs. Yet, the *“Next Generation Survivability Development Program Plan”* was as its name states a developmental program and likely the core of the HMMWV follow-on that would evolve to CTV and later JLTV. This statement more than any other in ACCMC’s testimony reveals that MCCDC had mortgaged the near-term protection of MRAP for the long-term promise of MRAP-like capabilities in an ideal vehicle.

The joint testimony concluded with: *“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...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.”* This statement was self-contradictory, as the most capable solution to the mine threat that had emerged in MNF-W was the COTS MRAP that had been requested by I MEF (Fwd).

### **c. Combat developer pursuit of non-urgent, non-MRAP developmental alternatives**

Based on the dated documents from within the MCCDC needs analysis and recommendation processes noted above, it is clear that there was a concurrent and determined pushback from MCCDC middle management and SMEs involved in the UUNS evaluation process. The way-ahead that LtGen Mattis had endorsed at the Safety Conference was bureaucratically resisted by combat developers from its inception. These SMEs and/or their supervisors constituted the providers of recommendations to LtGen Mattis in his 2005 capacity as DC, CDI as well as the USMC leadership.

As evidenced above, the non-operationally based recommendations of MCCDC were motivated by programmatic self-preservation. MRAP threatened to take resources from several other favored vehicle-related programs at MCCDC, ONR, and MCSC, most significantly the set of developmental initiatives that would eventually lead to the Joint Light Tactical Vehicle (JLTV). The prevalence of the bureaucratic arguments effectively undermined the warfighter-focused outcome of the March 2005 Safety Conference. A brief history of the competing

initiatives and the individuals involved in them is pertinent to this discussion:

**(1) 24 Jan 03 ONR Corporate Communications “1000 miles for the Marines”**

On 24 Jan 03 the Office of Naval Research posted an update on the developmental RST-V vehicle: *“The Office of Naval Research (ONR), the Defense Advanced Research Projects Agency (DARPA), and General Dynamics Land Systems (GDLS) announced today that during December, 2002 the RST-V Program completed a three day, 1000 mile demonstration of extended range operations with one of its V-22 transportable hybrid-electric demonstrator vehicles... Several of the RST-V vehicles are currently being outfitted and tested under off-road conditions in preparation for mission profile testing by March 2003. At the end of the technology demonstration program in 2003, the system will be ready to enter the SDD phase of acquisition...The RST-V...vehicles [are] capable of V-22 internal transport.”* RST-V was by this time already embedded in a POR at MCSC or was on the verge of being considered for such POR inclusion. Maj James Franks would in coming years come to serve as the Project Officer for RST-V at MCSC (Reference a.2.).

**(2) 27 May 05 Quantico Sentry “UUNS cuts wait for needed materiel”**

On 27 May 05 in a Quantico Sentry article, Maj James Franks, now the Project Officer for the RST-V had been interviewed on the role of MEF LNOs. In the interview he stated in-part: *The addition of the SYSCOM and MCWL, liaisons to the MEF staffs played a critical role in the UUNS process working efficiently, according to Maj. Jim Franks...who previously served as the MARCORSYSCOM liaison to I MEF. “They are clarifying the capability you are requesting and determining how much of it you really need...The MARCORSYSCOM liaisons help formulate the language of the UUNS so that it gets through the acquisition process more easily...The implementation and use of liaisons at the MEFs proved the ability of acquisitions to be responsive and flexible from the initial identification and development of an urgent need to the final delivery of a product that alleviates that need.” he said.* It is critical to note that as the MCSC LNO to I MEF (Fwd) during the period of 2004 to early 2005, Maj Franks, now returned as the RST-V Project Officer, would have been intimately familiar with the MRAP UUNS that was signed by BGen Hejlik on 17 Feb 05. These observations are relevant for later discussion of Maj Franks’ participation in the 2006 IGMC Readiness Assessment. Specifically, this relevance pertains to his possible role in influencing what visibility the IGMC would have or not have of the unfulfilled I MEF (Fwd) MRAP UUNS in early 2006 (Reference a.3).

**(3) Oct 05 Marine Corps Combat Lessons Learned on CTV**

The October 2005 publication of Marine Corps Combat Lessons Learned (MCCLL) stated: *“The Marine Corps intends to replace its fleet of more than 20,000 Humvee trucks with larger, sturdier vehicles that are better suited to the rigors of combat, officials said. Lt. Gen. James Mattis, head of the Marine Corps Combat Development Command, recently directed a group of officers at MCCDC to begin drafting technical and performance requirements for a "combat tactical vehicle"...The team, led by Col. Clarke Lethin, will present proposed concepts to the Marine Corps Requirements Oversight Council...The*

*Marine Corps expects to allocate funds for this new vehicle in fiscal year 2008, Lethin said in an interview...The Humvee has served the Marine Corps well, but recent conflicts have spotlighted its limitations, Lethin said. "The Humvee was designed as a utility truck for Cold War era, not as a vehicle for combat or direct combat...We want something that is much better than the Humvee in protection and capability." During the past three years, the Marine Corps and the Army have scrambled to upgrade their Humvees with armor protection, in response to the suicide bombers and buried roadside explosives that haunt U.S. troops in Iraq. The added armor, however, has degraded the Humvee's mobility and payload, Lethin said. "Even with an upgraded engine and suspension, we are not getting the payload and capacity we need." A replacement "combat tactical vehicle" will need to be large enough to seat six passengers and accommodate their gear, he said.*" Col Lethin, a recent graduate of the Industrial College of the Armed Forces (ICAF) in the fall of 2006, had years earlier served under LtGen Mattis in OEF. He was interviewed on JLTV after assuming duties as the Head of the Fires and Maneuver Integration Branch within the Combat Development Directorate at MCCDC. GS-15 Mr. Kevin McConnell would have served as his deputy during Lethin's tenure at MCCDC. Col Lethin later left MCCDC to assume duties as the I MEF CoS under LtGen Mattis at Camp Pendleton, CA. To the understanding of the author, Maj (now LtCol) Franks is acquainted with both Col Lethin and Mr. McConnell and may have coordinated with one or both on HMMWV follow-on, RST-V, CTV, JLTV, and/or MRAP. This would have occurred during Franks' MCSC PO assignment, his I MEF (Fwd) MCSC LNO tour, and/or his 2006 IGMC participation (Reference a.4.).

#### **(4) 9 Feb 06 InsideDefense.com "Marines Delay Fielding of Scout Vehicles"**

On 9 Feb 06 InsideDefense.com reported that: *"The Marine Corps' plan to field two developmental [RST-V] vehicles in Iraq early this year has been delayed until this summer due to reliability problems discovered during testing last fall, according to an official at Marine Corps Systems Command...Instead of going to Iraq this month, the RST-Vs are now expected to go in June or July, said Maj. Jim Franks, RST-V project officer at MARCORSYSCOM... The compressed time line General Dynamics is working under prevented the company from anticipating problems and fixing them in advance, he said...Last March, General Dynamics received a \$5.9 million contract to upgrade two RST-Vs for a potential deployment to Iraq. The upgrades included the armor package, reliability improvements, air conditioning, a government-furnished command and control payload, and a 30 kilowatt export power capability. A spokesman for MARCORSYSCOM said the additional software and hardware work on the RST-V would cost \$1.2 million...Testing on the RST-V began last October at Aberdeen Proving Ground in Maryland and stopped short in December when the Marine Corps determined that further testing would be meaningless until the reliability problems were solved first, Franks said."* Maj Franks' role as the RST-V Officer at MCSC would prove to be relevant for the MRAP case study. In May 06 the IGMC again conducted a Readiness Assessment of ground equipment in Iraq. This time the IGMC attempted to be more inclusive by balancing the team with SMEs from Quantico for the purpose of evaluating the current material status of systems already in Iraq or being requested. The office of the IGMC has confirmed that Maj Franks was a participant in the 2006 IGMC team that went to Iraq. The issue can be summarized: Maj Franks was a strong advocate for a program against whose resources the MRAP would conceivably compete. Still, he was made a member of an allegedly independent team, even when he had a vested interest in the outcome of the IGMC

Assessment. This will be discussed in greater detail under the 2006 IGMC Assessment (Reference a.5.).

**(5) 7 Apr 07 Nat Def Mag: “Next-gen humvee faces delays, budget crunch”**

On 7 Apr 07 an article titled “*Next-generation humvee faces delays, budget crunch*” authored by Sandra Erwin was published on nationaldefensemagazine.org. It stated in part: “*The Army and Marine Corps are expected to delay an industry competition to design and build a new family of light trucks to replace aging humvees [i.e. the JLTV]... the program has encountered obstacles — the biggest one being the Defense Department’s decision to buy 6,800 mine-resistant armored vehicles as “interim” replacements to armored humvees... comments by senior officials and industry experts in recent months suggest that the services will be in no rush to commit to a new vehicle design after having spent billions of dollars on the interim armored vehicles... The Marine Corps already built a JLTV prototype at the Nevada Automotive Test Center to experiment with various technologies...As the services continue to sort out desired vehicle features and technical details, they also are acknowledging that the JLTV effort could be slowed down or ultimately derailed...A major issue is whether the billions of dollars the services will be spending on interim trucks the...MRAP will eat up procurement funds that would have been directed to the JLTV program...The Army and the Marine Corps had to react last year to urgent [MRAP] requisitions from commanders in Iraq...“MRAP may not match any future strategy. But it’s a lot of money,” Conant said...Once the conflict ends, funds for new trucks may dwindle to pre-war levels...Army and Marine officials persistently have warned that MRAP is not a replacement program for JLTV. But it is obvious that the services at this point don’t have a cogent long-term plan beyond MRAP...Marines, for their part...intend to acquire a new armored personnel carrier. The so-called Marine personnel carrier, or MPC, is not part of JLTV but rather a stopgap for the troubled Expeditionary Fighting Vehicle...But the [EFV] program may not survive the latest round of cost overruns and performance failures. Marine officials asked to redirect some of its EFV funds to a new personnel carrier...The MPC would give Marines a “cheap solution” while the EFV sorts out its troubles. At the same time, it would give the Corps a much needed fast combat vehicle before JLTV arrives, said Conant...the humvee by far is the vehicle that most soldiers [and Marines] ride in Iraq, not only did it need to be armored, but commanders also asked for dozens of equipment add-ons, including weapons, sensors and power units...Some vehicles can’t carry jacks to fix flat tires because of the excess weight. The M1114 armored humvee was designed at 12,500 pounds but the ones in Iraq end up weighing 15,600 pounds. “Over a ton and a half over where we planned to be”...For the foreseeable future, the services will focus on MRAP, especially if JLTV drags out ...” Today, the JLTV requirement appears to be evolving. The author understands that MRAP levels of basic protection, and EFP total defeat as a Preplanned Product Improvement (P<sup>3</sup>I) add-ons are being considered for incorporation into JLTV requirements. There are also questions if JLTV can “square the circle” to achieve both MRAP capability thresholds and expeditionary weight and off-road requirements (Reference a.8.).*

A significant dilemma in this is that one of the MRAP’s integral design strengths happens to be its total mass. Mass is a primary protection against the IED and traditional mine acceleration forces that cause blunt force trauma and traumatic brain injuries to vehicle

occupants. At the same time increased mass and corresponding vehicle size runs directly counter the projected expeditionary nature of future Marine Corps force employment, in support of EMW and DO. In the Jan 08 issue of National Defense Magazine Sandra I. Erwin & Grace V. Jean wrote an article titled: ***“Marines: MRAP Impedes Operations.”*** The article stated in part: ***‘The Marine Corps and the Army have decided to curtail their orders for mine-resistant ambush-protected vehicles, ostensibly because they foresee fewer roadside bomb attacks in Iraq. But there are other reasons, such as the impracticality of operating these vehicles off-road and in urban areas. A Marine Corps official says the 60,000 to 80,000-pound vehicles create significant logistics impediments that would make them hard to deploy, not just to Iraq, but to almost any other war zone. Seventy-two percent of the world’s bridges cannot hold the MRAP,’ says Brig. Gen. Ronald Johnson, assistant deputy commander for plans, policies and operations. Transporting the vehicles to combat zones also is tough for Marines because the trucks cannot fit aboard the amphibious ships that carry Marine equipment and supplies. ‘You can’t put an MRAP on a maritime pre-positioning force ship,’ Johnson says.’*** Over the spectrum of potential conflict scenarios MRAP capability will likely be needed on MSRs, given operational employment doctrine has combat troops bypassing enemy positions in both 3<sup>rd</sup> Generation Warfare scenarios and 4<sup>th</sup> Generation warfare scenarios. It is a capability that will arguably be needed in many future contingencies.

At the same time one must recall the USMC 2005 Safety Conference recognized this when LtGen Mattis endorsed the MARFORPAC/I MEF (Fwd) MRAP way-ahead. MRAP was intended as a COTS bridge to the JLTV that would permit the HMMWV to be phased out over time. MRAP was not intended to entirely replace the HMMWV. It was intended to become a part of the Marine Corps’ combined arms tool kit to hedge against various contingencies where MRAPs unique superior protection capabilities will remain critical, even in the future. MRAP-like capabilities are inferred in the JLTV. However, the MRAP quickly became the top procurement priority for the incoming SECDEF for clear reasons. The KIA and WIA rates wrought by IEDs since his arrival in 2006 had no reasonable end in sight, even in the summer of 2007. Some now say that highly publicized casualty rates were politicized; however that perspective is inaccurate. By 2006, the destruction of HMMWVs by IEDs was causing the entire political establishment to consider pulling its support for OIF, including some of OIF’s staunchest past supporters. Average observers in our democracy had no reason to retain confidence that the trends would be reversed.

The benefits of the troop surge led by GEN Petraeus were not yet entirely evident in the summer of 2007. With the exception of Iraqi re-alliances and the remarkable tactical IED emplacement turn-around resulting from self-initiated I MEF (Fwd) and II MEF (Fwd) ISR, NLW, and IO initiatives in Al Anbar Province, there was no reliable sign that the need for MRAPs would diminish. This was even truer of Army forces operating in and around Baghdad. In any case, when the SECDEF made his decision to push MRAP to the ITO with Congressional support, neither the up armored HMMWV, nor the M1114, nor the only partially defined future JLTV ill-defined were capable of stemming the IED casualty rate, i.e. the key to rescuing both broader political support and thereby U.S. national objectives in Iraq.



Figure 20. MRAP competed against CTV, and now JLTV and MPC resources.

The issue of the MEF-initiated/forced provision of these true tools of counterinsurgency (COIN) will be discussed later in this cases study. What will be seen is that the dire need for MRAPs, however non-optimal they may be for all future operations, was the result of an emergency created by combat developers in that they had likewise refused operator requests for the tools of COIN. The need for an immediate “80%” non-optimal MRAP need became urgent when echelon combat developers continued with their own programmatic priorities and did not respond to the growing emergency.

**d. The I MEF Fwd MRAP JUONS and UUNS resubmissions of 2006**

Following RIPTOA in early 2006 the new CG, I MEF (Fwd), MajGen Richard Zilmer and his DCG, BGen Robert Neller became immediately aware of the continuing urgent need for MRAP protection to counter the IED emergency. During the intervening year all action on responding to I MEF (Fwd)’s original UUNS for MRAP had come to an apparent standstill at MCCDC. Realizing the need for higher level advocacy, MARCENT quickly became the I MEF (Fwd)’s operational champion and took the cause of MRAP again. Much of the history of the Feb 05 MRAP UUNS was unknown at that time, as the UUNS had apparently not been presented to the MROC by MCCDC and DC, CDI for a formal decision. Furthermore, CDTS documentation on the UUNS was not well known, and some combat developer staff members appeared unaware that an UUNS for MRAP had been submitted in 2005. Independent of the reasons for the shelving of the UUNS, MRAP was still urgently needed, and MARCENT encouraged I MEF (Fwd) to resubmit an urgent need.

MARCENT capability war planners studied MCCDC's 2005 handling of the MRAP UUNS and realized that MRAP would most likely not be favorably received at MCCDC if it were again submitted as a USMC UUNS. Coordination between war planners and MCSC was also minimized, given known institutional opposition to a large urgent MRAP purchase. Consequently, MARCENT war planners supported the I MEF (Fwd) decision to submit the full MRAP capability through the Joint chain in the form of an MNF-W-generated Joint Urgent Operational Needs Statement (JUONS).

Effectively circumventing MCCDC staff, CMC was directly given a compelling briefing in July 2006 that analyzed casualty rates by-vehicle. An update of that brief was widely circulated in DOD in Jan 2007. CMC immediately authorized a large procurement of MRAPs. Thus empowered, I MEF (Fwd) immediately submitted a 2<sup>nd</sup> MRAP JUONS request for the entire warfighter need at that time for all forces operating under MNF-W command—Soldiers, Sailors, and Marines. The total requirement at that time was 1,185 vehicles, remarkably similar to the 1,169 vehicle count from 2005 (References r.8. and r.11.).

Casualties continued to increase throughout 2006 with no certain end in sight. So, late in 2006, that the MNF-W MRAP requirement was increased to roughly 3,700 MRAPs for all troops in Anbar. The Marine Corps had finally decided to risk budget and risk “over-buying” MRAPs that might not be needed by the time they were fielded. That over-buy risk was later mitigated effectively with indefinite quantity contracts. The same time these contracts led to a much more rapid production and faster fielding rate, precisely the outcome that the MRAP war planners at MARCENT had anticipated.

### **(1) May 2006 IGMC Equipment Readiness Assessment**

During the period April through May of 2006 the office of the Inspector General of the Marine Corps (IGMC) conducted another readiness assessment of Marine Corps ground equipment in Iraq (Reference p.12.). This time, the Director of Readiness assembled a larger team of SMEs, including a Major 0302 from SYSCOM who was to serve as the operationally-oriented combat vehicle expert for the team. He was Maj James Franks, who was apparently still serving as the RST-V PO at MCSC. As noted earlier, Franks apparently had also served a tour as the MCSC LNO to I MEF (Fwd) during the general timeframe that I MEF (Fwd) submitted the 1<sup>st</sup> MRAP UUNS to MCCDC. Since its primary focus was again on equipment readiness, the IGMC team also included MOS 3510 personnel from HQMC I&L (LPC) who had looked at motor transport maintenance and accountability issues in Iraq the year before. The “*U.S. Marine Corps 2006 Ground Equipment in Iraq Readiness Assessment*” was published in May 06.

The precise inputs and notes that were provided by SMEs like Maj Franks back to the IGMC team leadership are not available to the author. All of the author's assumptions on this particular report are informed speculation. However, certain coincidences and circumstances are compelling for the purpose of this case study.

First, the 2006 report again proposed that the HMMWV was right choice for protection in MNF-W, and there was no mention that the MRAP was wanted by operators to

replace the more vulnerable HMMWVs. This is curious since the I MEF (Fwd) MRAP UUNS was still unfulfilled. Secondly, the IGMC team apparently relied heavily on Maj Franks for the purpose of assessing the value of IED protection alternatives for tactical vehicles. Several individuals familiar with these events have stated that Maj Franks was a vociferous opponent of MRAP, even before he was assigned to the IGMC. As unequivocally opposed as he was to MRAP, he was said to have been an equally outspoken advocate for RST-V and JLTV. Thirdly, the IGMC report states that the 2006 IGMC was exposed to over 100 different systems during its Readiness Assessment that were requested and fielded through the UUNS process. In spite of this close look at UUNS and the assessment's overwhelming focus on vehicle protection, the body, findings, and recommendations of the assessment do not contain any reference to the MRAP UUNS submitted by I MEF (FWD) in either 2005 or 2006.

As with the 2005 Assessment, the IGMC leadership was apparently not provided visibility to that UUNS, the COTS MRAP protection alternative to the M1114 and UAH, or operator perspectives on such a potential material solution. The issue was not merely JERRV's for engineers, but rather MRAPs for all members of the MEF (Fwd) engaged in long-haul tactical movement. While Maj Franks was a part of the team and well-aware of the MRAP UUNS and I MEF (Fwd)'s continued determination to receive a 1100(+) family of MRAPs, this was not evident in the IGMC Assessment.

As noted earlier, Maj Franks purportedly served as the SYSCOM Liaison Officer (LNO) to I MEF (FWD) for a period during that headquarters' 2004-2005 Iraq deployment, i.e. during the time that the MRAP UUNS was submitted. He was also assigned as the MOS 0302 SYSCOM representative on the IGMC team, which is relevant for this MRAP case study. In May 06 the IGMC again conducted a Readiness Assessment of ground equipment in Iraq.

The issue of concern relating to Maj Franks participation can be summarized as follows. As the PO for RST-V, Maj Franks was a strong advocate for his funded and STOM-compatible POR that the MRAP would conceivably compete against for resources. It can be established that Maj Franks was well acquainted with the MRAP UUNS and MRAP technologies generally in his role as a PO at MCSC. It can also be argued that he provided significant input to the IGMC assessment from an alleged GCE perspective since in the absence of MCCDC requirements officials and PP&O representation on the IGMC team he was relied upon for his ground perspective in all areas. It can also be established that Maj Franks was made aware that I MEF (Fwd) was drafting a renewed request for MRAPs while he was in theater, and that he expressed strong opposition to the pending operator request. It is noteworthy in this regard that the lack of fulfillment of the very significant 17 Feb 05 I MEF (Fwd) MRAP UUNS was not mentioned in the 2006 IGMC Assessment, nor was the pending renewed request.

The question for any future investigation of this issue would be whether the omission of the MRAP UUNS and any discussion of the I MEF (Fwd)'s known continued determination to acquire the capability in 06 was unintended or deliberate. In light of the case study constraints, the author's insight is limited. However, the circumstantial evidence that 2006 IGMC omissions may have been deliberate or at least based on IGMC team member biases are compelling, and possibly worthy of IGMC review.



## (2) The 21 May 06 MNF-W (i.e. I MEF [Fwd]) JERRV JUONS

On 21 May 06 the DCG, I MEF (Fwd) signed a JUONS requesting 185 “*Medium Mine Protected Vehicles (MMPV)*” (Reference r.8.) The JUONS contained specific technical and commercial contact information for the Force Protection Company of South Carolina. The product sought by MNF-W (i.e. I MEF [Fwd]) was the “*Joint Explosive Ordnance Disposal Rapid Response Vehicle (JERRV)*.” The JERRV was in fact Force Protection’s Cougar Category II MRAP product. As a JUONS this MRAP need was submitted from MNF-W via and approved by General Officers at the following joint commands: 1) Multi National Corps – Iraq (MNC-I), 2) Multi National Force - Iraq (MNF-I), 3) U.S. Central Command (CENTCOM), and 4) Joint Staff (J8), and then finally to the Joint Rapid Acquisition Cell (JRAC) for funding consideration. The JERRV JUONS was rapidly staffed, considered, and funded by the JRAC. The I MEF (Fwd) decision to request the JERRV (Cougar) MRAPs by means of JUONS was deliberate. I MEF (Fwd) was aware of the fact that MCCDC had disapproved the MRAP UUNS that it had submitted early in 2005. Instead of battling with the bureaucracy at Quantico, I MEF (Fwd) decided to try the Joint resourcing route. They were not disappointed.

It is also noteworthy that the MEF asked for only 185 vehicles as opposed to the 1,169 it had asked for in 2005. This was a direct reflection of the psychological effect of repeated combat developer refusals to provide requested equipment. The MEF assumed that if the JERRV request was modest (even though they needed many more MRAPs) that it would be received more favorably. This “gaming” of the system proved to be necessary when dealing with USMC combat developers where the mantra of capability programmers appeared to be “do not ask for anything that will require the breaking of PORs through reprogramming.” The JRAC was and is completely dedicated to the expressed and validated needs of the warfighter. But I MEF (Fwd) remained conditioned by budgetary rationale for UUNS disapproval, and at least for the JERRV request a reluctance to ask for too much was evident.

## (2) MARCENT MRAP JUONS intervention and advocacy

It quickly came to the attention of MARCENT war planners that there was a significant discrepancy between what I MEF (Fwd) was requesting in 2006 (185 each of a specific MRAP variant) and what had been requested in 2005 (a family of 1,169 MRAPs) (Reference e.2.). On 16 Jun 06 Col Thomas Cariker wrote: “*Gents, I will send you a brief on Sivr that call for CIED vehicles and some requested help from us by Marcent. The are asking for us to see if we can find an old UUNS signed by Gen Hejlik some time ago referencing Mine Resistant Ambush Protection Vehicle (MRAP). Chiefs/Staff, They are also asking if we can assign a CIED ground wheeled vehicle advocate for current threat vehicle advocacy (not next generation Hummer replacement).*”

On 16 Jun 06 the MCSC LNO to II MEF, LtCol Stephen Eckberg, wrote to I MEF (Fwd) regarding the original OIF-III - Mine Resistant Ambush Protected (MRAP) Vehicle - 05053UB UUNS noted in Col Cariker’s e-mail: “*I just talked to Sally Amberger (the Advocate) at HQMC I&L, and she said that the subject UUNS (attached below) has not been to the MROC yet, because there is no solution. She thought that it was passed to MCWL for a*

***solution---can you shed any light on the MROC status? I believe this effort is tied in with the talks we had yesterday about all the Purple money available for CIED.”***

On 16 Jun 06 Mr. Brad Stillabower of MCWL wrote to the MCWL CoS, Col Jeff Tomczak. Col Tomczak, who was just then discovering the existence of an urgent MEF need for MRAPs at MCCDC. Mr. Stillabower explained that the MCWL had not worked on the MRAP and was just then being familiarized with the existence of the original MRAP UUNS (OIF-III-MRAP-05053UB). ***“...we haven't worked this in Tech Div, as far as I know. According to CDTS, this MRAP UUNS was entered into CDTS in Feb 05, was briefed to DWG (now called CDIB), but the record shows no recommendation coming out of the DWG. It was not passed to MCWL, as far as I can tell from the CDTS record...MRAP sounds a lot like MMPV, a JUONS which MGen Catto included in his HASC testimony this week on USMC FP efforts: MGen Catto's testimony: ‘In the interim, we're moving forward with approvals for the Medium Mine Protected Vehicle (MMPV), which has been requested as a Joint Urgent Operational Need. Various types of IEDs, rocket propelled grenades, and small arms fire in-theater make it necessary for the Marine Corps to field a vehicle capable of surviving these types of attacks, and be able to counter attack. The MMPV provides that increased survivability and mobility. The Marine Corps plans to procure and field 185 MMPVs, which will provide our forces with a modular and scalable system capable of increasing the level of protection in accordance with the type of weapons available to the enemy.’”*** This e-mail provided more evidence that the I MEF (Fwd) MRAP UUNS of 17 Feb 2005 was intentionally kept from the attention of the MROC by MCCDC.

It is noteworthy that the Commander, MCSC (MajGen Catto) was already working on procuring the 185 JERRVs for I MEF (Fwd) using JRAC (i.e. Joint/CIED) funding as a result of JRAC JERRV JUONS approval. MCCDC was hardly aware, if at all aware of MCSC actions which turned out to be beneficial for MARCENT and the MEF (Fwd). The work-around to avoid MCCDC involvement in fielding MRAP by employing the more responsive JUONS-JRAC connection had been successful.

Later on 19 Jun 06, Maj John Moore of MCWL joined the discussion and clarified the relationship of the I MEF (Fwd) UUNS from 05 to the JERRV UUNS. He added: ***“This is an older UUNS that was never funded due to supportability. There's currently an UUNS for 185 JERRVs but MEF is writing a supplement to this that will expand that number significantly. Once validated, the request will be taken to JIEDDO for funding consideration.”***

I MEF (Fwd) remained a carbon copy recipient of these MCWL e-mails, to include MCWL's impression that the JERRV JUONS would soon be supplemented with a much larger I MEF (Fwd) JUONS request for 1,000 additional MRAPs. However, on 20 Jun 06 I MEF (Fwd) staff wrote to MARCENT staff to correct that impression, in spite of MARCENT's concerns for the smaller I MEF (Fwd) JERRV requirement: ***“...Col Milburn [I MEF (Fwd) CoS]...will take this subject up on Friday with Col Supnick [MARCENT CoS] when he arrives here at Camp Fallujah. We are sticking with the requirement for 185 JEERV vehicles...”*** Realizing that I MEF (Fwd) was concerned that a large requirement like the 1,169 that had been requested in 2005 would doom the MRAP need to a 2<sup>nd</sup> rejection by MCCDC, the CoS of I MEF (Fwd) had understandably become “gun-shy” at asking for too much. This precisely reflected

the operator sense of futility in asking for capabilities from combat developers that Majors McGriff, Allena, and Sinclair had observed in 2002-2003. The operating units feel obligated to politically “game” the USMC combat developers and their priorities if they are to expect anything today, as the operators understand they are at the mercy of a process they do not control.

On 20 Jun 06 Maj Joseph Allena wrote to fellow MARCENT MRAP champions: ***“...The 185 [JERRV] is down range. The 1000+ is a re-energized previous UUNS...Two distinct efforts. I think we all agree 185 is a lock for us to request. It is down range and being worked...The 1000+ is the delta. I doubt we will get 1000+. I doubt we will get the money for 1000+...BUT... if it yielded 500 or even 1 more it is a victory. We need to get more of these in theater so the Marines can see them and use them. That unto itself will generate momentum as these vehicles earn the respect of the troops. They will demand more. A forcing function unto itself. The MEF FWD does not see the money picture and I am not sure they know what you have discovered about JIEDO money. They have got to help us help them...The continuity is provided by MARCENT. This could be the biggest opportunity for MARCENT to demonstrate its utility (if any) as a service component HQ.”***

On 22 Jun 06 Maj Allena followed up with: ***“I [think] the COS is versed in this enough to be able to discuss with the MEF on his visit. He seemed to really embrace this in the brief last week. Also, Col Kanewske, our G-3, is back and was briefed by me on this, and said he was going to mention it with Col Marletto (MEF FWD G-3). Also, I talked with Col Butter on this as well. He seemed to think that the MEF- generated UUNS was not a big obstacle. Not going to speak for him, but I got the impression he was willing to "write it for them.”***

A MARCENT staffer later wrote: ***“...[we] felt like we had to "fight" I MEF (FWD) to get a bigger requirement. So we ended up going to the 3-star (LtGen Sattler), and going to CMC to give the I MEF (FWD) "top cover" from CMC, so that you [I MEF (Fwd)] would approve the larger MRAP requirement...Our feeling was: MARCENT is an operational command. Our job is to support the warfighter...You tell us what you need, and "demand" that we support you with what you need, not with what you think we can do for you given your knowledge of political realities in Washington...”*** Again, it took MARCENT advocacy efforts to convince the I MEF (Fwd) CoS and staff that the MEF no longer should feel constrained to ask for less than what it truly operationally needed, whether it be the MRAP vehicles or any other capability. By taking Service-specific MCCDC requirements officials out of the funding approval chain, the MRAP fielding effort moved quickly, and continues to so today.

### **(3) The 10 Jul 06 MNF-W (i.e. I MEF [Fwd]) MRAP Vehicle JUONS**

Energized by rapid Joint Staff processing of the JERRV JUONS, and the support that MARCENT was offering the MEF through direct interaction and access to CMC, I MEF (Fwd) submitted a much larger MRAP JUONS on the heels of the 1<sup>st</sup> MRAP JUONS (Reference r.11.). This 2<sup>nd</sup> MRAP JUONS requested a family of 1,000 MRAP vehicles on 10 Jul 06. Together with the JERRVs, the combined total now approached the 1,169 MRAPs requested in the original 2005 UUNS, intended for Soldiers, Sailors and Marines serving under MNF-W command. Like the JERRV JUONS that preceded it, this 2<sup>nd</sup> MRAP JUONS was quickly processed by the JRAC and fully funded.

#### **(4) The 28 Sep 06 2<sup>nd</sup> I MEF (Fwd) MRAP Vehicle UUNS**

During the month of September 2006 the JRAC looked for the appropriate Service SYSCOM to transfer the funding necessary to fulfill the two MRAP JUONSs. When MCSC was identified as the appropriate organization to execute a Joint MRAP program, SYSCOM indicated to MARCENT that it required an MRAP UUNS to spend the Joint funding it was being provided. The two JUONS had served as the validated needs. However for SYSCOM to execute the OSD-reprogrammed funding an UUNS was required for administrative completeness-correctness. MARCENT then approached I MEF (Fwd) and assisted with the preparation of the document. The 1,000 MRAP JUONS was employed as the content template. MCCDC and MCSC wanted to fund only the USMC portion of the MNF-W requirement, so a total of 805 MRAPs were included in a USMC request for appropriation for MRAPs on the FY07 supplemental. The Navy quickly funded MRAPs for Sailors in Anbar. Army support for the MNF-W Commander's requirement and the MRAP program for all soldiers in Iraq came several months later.

MCCDC staffers were directed by DC, CDI to expedite the processing of the USMC UUNS for 805 MRAPs so that MCSC could rapidly put out a Request for Information (RFI) to industry. It was at approximately this time that major defense contractors began to partner, as they knew the RFI meant that the needs had been approved and contracts were pending. The JUONS and UUNS approvals laid the groundwork for the rapid ramp up of industry capacity to meet the urgent demands of warfighters in MNF-W. This teaming and preparation is exactly the same industry behavior that could have occurred if the 17 Feb 05 MRAP UUNS had been approved. Unfortunately, the apparent decision to not to seek MROC approval of the UUNS delayed the ramp-up initiation by approximately 19 months, with measurable consequences in MNF-W.

#### **e. MRAP press and political fallout since 2006 MRAP needs resubmissions**

##### **(1) 1 Mar 07 CMC letter to CJCS**

On 1 Mar 07 CMC wrote a letter to the CJCS urging his support for urgent MRAP procurement (Reference 1.3.). The letter stated in part: ***“The MRAP vehicle has a dramatically better record of preventing fatal and serious injuries from attacks by Improvised Explosive devices (IEDs). Multi-National Force – West (MNF-W) estimates that the use of the MRAP could reduce casualties by as much as 80%. Since 21 May 2006, when MNF-W issued its first urgent request for MRAP, over 150 servicemen and women have been killed and over 1,500 seriously injured in vehicle IED incidents.”***

CMC continued: ***“Based on the recognition of significantly reduced lethal and severe injuries in MRAP vs. the HMMWV, on 2 January 2007, Commander MARCENT requested support for a policy change that would provide MRAP level protection for all Marines operating outside the wire in MNF-W. Under this policy, limited use of the Up Armored HMMWV's will be authorized in specific tactical situations where the operational characteristics of HMMWV are required.”***

CMC continued: ***“BGen Mike Brogan, CG MARCORSYSCOM...[has]... developed an acquisition strategy based on maximizing the number of vendors and, upon completion of appropriate testing, ramping up production to as many as 750 vehicles per month by Sep and 1200 vehicles per month by December. Given that resources are not a constraining factor, my acquisition community believes that the entire 6738 requirement could be produced by March 2008.”*** This statement is CMC’s own confirmation that production capacity of MRAPs was always a matter of government will to commit the necessary resources, not the physical capacity of industry to respond.

This was reconfirmed when on 17 Sep 07 a program titled ***“Procurement Process Slows Deployment of Improved Vehicles”*** aired on the Jim Lehrer News Hour. In an interview of MRAP manufacturers narrator Paul Solmon stated: ***“...Force Protection, the U.S. company now making many of the vehicles, told us a large contract would have prompted them to partner with other firms, make lots more MRAPs, quickly. Archie Massicotte, who works for a rival company [International Truck and Engine], says it took his firm only two months to get into production...[ Massicotte stated] ‘Two months from the time that we got the initial order until the time we actually had to deliver test vehicles to Aberdeen. So we can take these through a production environment, almost in assembly line effort, and produce these at a high rate’...[when asked by the reporter] ‘If DOD had come to you in 2003 and said, we need something like this, would you have been able to have the same turnaround time? [Archie Massicotte stated] ‘Sure. Sure.’”***




CMC’s letter to the CJCS continued: ***“The Marine Corps views the MRAP as a theater specific requirement that meets an immediate need for force protection...It is... the best available vehicle for force protection... We see the JLTV as requiring considerable time and investment in research and development in order to accomplish these goals and therefore do not expect to see it in significant quantities for 4 to 5 years. We do not see a direct link between MRAP and JLTV.”*** CMC’s comment that MRAP and JLTV are not linked represented a decisive departure from the perspective of MCCDC in the spring of 2005. The CDIB briefing of the MRAP UUNS showed a direct link between the two in that MCCDC staffers were concerned that developmental programs like JLTV might have to help pay for COTS MRAPs. In fact the arguments against reprogramming were victorious and led to the non-fulfillment of the UUNS, including its not being forwarded to MCWL for consideration. In the 10 Jun 05 EFDC UUNS status info paper the MRAP Vehicle UUNS stated: ***“Status – EFDC is developing course of action for development of a future vehicle that provides the requested capability.”*** As noted earlier, the future vehicle referenced here was the CTV, which evolved into the JLTV program championed by then DC, CDI LtGen Mattis and Col Clarke Lethin.

CMC continued: ***“Getting the MRAP into Al Anbar Province is my number one unfulfilled warfighting requirement at this time. I request your support in fielding this force protection capability.”*** If the mass procurement and fielding of MRAPs had begun in 2005 in response to the known and acknowledged threats at that time, as the USMC is doing today, hundreds of deaths and injuries could have been prevented. The urgency of the request to CJCS was unmistakable. That sense of urgency contrasts sharply with more recent concerns expressed by CMC and other senior USMC leaders that MRAP is needed in lesser numbers and that it is not suited to USMC’s expeditionary character. The radical departure from the spirit of the 1 Mar

07 letter is driven by a sharp drop in violence, including decreased IED strikes that has transpired in Anbar. This is due to a combination of inner provincial Iraqi re-alliances and the dramatic benefits of persistent tactical ISR, and later, cemented with MRAPs and additional troops. Had ISR and other tools of CIN been fielded promptly in past years by combat developers the IED emergency and urgent need for MRAPs may never have materialized. In other words, the combat development challenges extend well beyond the MRAP case, and several will be discussed later in this study as they relate to IED threat mitigation.

**(2) Draft 13 Mar 07 DC, PP&O S&T Advisor brief to ODDR&E**

On 13 Mar 07 the S&T Advisor to DC, PP&O had, at the invitation of the office of Director Defense Research and Engineering (DDR&E), prepared a presentation for DDR&E regarding urgent operator needs and process challenges associated with fulfilling them (Reference p.6.). On 13 Mar 07 the scheduled presentation was abruptly cancelled by supervisors within the DC, PP&O S&T Advisor’s chain. This decision to order cancellation followed allegedly adverse reactions of the impacted organizations, including MCCDC, and their leaders to the contents of the draft. The draft presentation implied that by cancelling and delaying valid urgent needs or delivering solutions different from those requested, Marine Corps decision makers perpetuated operational and occupational hazards, causing harm to personnel and wasting government resources. The presentation slides pertaining to MRAP and MRAP EFP protection are included below:

	<ul style="list-style-type: none"> <li>• <b>Description:</b> <ul style="list-style-type: none"> <li>- Mine Resistant Ambush Protected (MRAP) Vehicle</li> <li>- IEDs employed against vehicles the greatest cause of MNF-W casualties</li> <li>- MRAP Objective: replace vulnerable M1114 HMMWVs in the MNF-W AOR</li> <li>- Buffalo – CAT III</li> <li>- Cougar – CAT II</li> <li>- Cheetah – CAT I</li> </ul> </li> </ul>
<p><b>Status:</b></p> <ul style="list-style-type: none"> <li>- I MEF UUNS signed 17 Feb 05 (1169)</li> <li>- MCCDC denies UUNS 05 – sites expense, M1114, and ONR initiative</li> <li>- I MEF JUONS signed 21 May 06 (185)</li> <li>- I MEF JUONS signed 10 Jul 05 (1000)</li> <li>- I MEF UUNS signed 28 Sep 06 (805)</li> <li>- Time lapse Feb 05 – Sep 06: 19 months</li> </ul>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;">  <div style="background-color: #90EE90; padding: 5px; margin-left: 10px; text-align: center;">Survivable MRAP</div> </div> <div style="display: flex; align-items: center;"> <div style="background-color: #FFB6C1; padding: 5px; margin-right: 10px; text-align: center;">Vulnerable HMMWV</div>  </div> </div>

21. MRAP JUONS and UUNS slide from the draft DDR&E presentation.

Layered MRAP Protection for Total EFP Defeat

EFP Kinetic Energy

Internal Spall Suppression    Organic MRAP Armor    Layers of Ballistic Fabric and Liquid Armor    Nanoarmor Outer Layer

- **Description:**
  - MRAP Explosively Formed Penetrator Total Defeat Capability
  - Acceleration of nanotube-armor R&D and production capability
  - Acceleration of sheer-thickening liquid armor R&D
  - Acceleration of spall-suppressing internal MRAP layer-curtain
  - Development of individual folding passenger protection within MRAP

- **Status:**
  - JUONS signed 7 January 2007
  - UUNS signed 13 January 2007
  - JUONS and UUNS at CENTCOM and MCCDC, respectively

MRAP Vehicle

External Appliqué Up-Armor for MRAPs to Achieve Total Defeat of EFPs

Velcro Attachment Mechanism for Ease of Installation by Marine and Soldier Operators in the Multi National Force - West Area of Operations

22. MRAP EFP Total Defeat UUNS slide from the draft DDR&E presentation.

**(3) 23 May 07 USA Today: “Corps refused 2005 plea for MRAP vehicle”**

On 23 May 07 an article titled *“Corps refused 2005 plea for MRAP vehicle”* authored by Tom Vanden Brook appeared in USA Today (Reference a.15.). It stated in part: *“More than two years before the Marine commandant declared getting new armored vehicles his top priority, the Corps did not fulfill an urgent request to buy 1,200 of the vehicles for troops in Anbar province, according to Marine officials and documents. Commanders in Anbar, the heart of the Sunni insurgency in Iraq, wanted the Mine Resistant Ambush Protected (MRAP) vehicles to protect troops attacked by insurgents using improvised explosive devices (IEDs), according to a Feb. 17, 2005, request filed by then-brigadier general Dennis Hejlik. The Marines, the request said, “cannot continue to lose ... serious and grave casualties to IED ... at current rates when a commercial off the shelf capability exists to mitigate” ... Since 2005, Pentagon leaders have shifted course on the MRAP. The Marines have requested 3,700 of the vehicles, and the Army is now seeking up to 17,700 ... officials said the Marines determined in 2005 they could protect troops better with armored Humvees than MRAPs. Even if the Marines acted on Hejlik's February 2005 request, there weren't enough vehicles to fill it, said Tom Miller, then head of the Marines' MRAP program. That argument doesn't make sense, said Sen. Joseph Biden, D-Del. “How is it possible that a request that is literally life or death got lost?” asked Biden, a major supporter of the MRAP. Hejlik, now a major general, said Wednesday that the primary threat to Marines in Iraq in early 2005 was from bombs that tore into the sides of vehicles... The Marines determined in June 2005 that Humvees with reinforced armored doors provided more protection for Marines, Hejlik said. It “was the gold standard that would provide the necessary protection.”*

**(4) 31 May 07 USA Today: “MRAPs can't stop newest weapon”**

On 31 May 07 an article titled “*MRAPs can't stop newest weapon*” authored by Tom Vanden Brook appeared in USA Today (Presentation a.13.). It stated in part: “*New military vehicles that are supposed to better protect troops from roadside explosions in Iraq aren't strong enough to withstand the latest type of bombs used by insurgents, according to Pentagon documents and military officials. As a result, the vehicles need more armor added to them, according to a January Marine Corps ... the armor on those vehicles cannot stop the newest bomb to emerge, known as an explosively formed penetrator (EFP). The Pentagon plans to replace virtually all Humvees with MRAPs to provide better protection against roadside bombs, responsible for most casualties in Iraq...Since MRAPs are so much safer against traditional roadside bombs, the document says, Iraqi insurgents' use of EFPs ' can be expected to increase significantly.' As a result, the Marine commanders in Iraq who wrote the statement asked for more armor to be added to the new vehicles...Brig. Gen. Michael Brogan, who confirmed the document's authenticity...leads Marine Corps Systems Command [stated]'How rapidly we can engineer that onto these vehicles is yet to be seen...*”

**(5) 28 Jun 07 Senator Biden and Senator Bond letter sent to SECDEF**

On 28 Jun 07 Senator Biden and Senator Bond sent SECDEF a jointly signed letter expressing their concerns with slow procurement in response to urgent operational needs. CMC and CoS Army were copied on the letter (Reference c.6.). The letter stated in part: “*We are concerned that the Department is failing to respond to Urgent warfighter requirements because of unconscionable bureaucratic delays in Washington...For example, a commanding general in Iraq submitted an Urgent Universal Needs Statement (UUNS) for 1,169 Mine Resistant Ambush Protected vehicles (MRAPs) in February 2005; no action was taken until another urgent request was made in May 2006. It has taken another full year to get the MRAPs tested and on contract. This delay forced American marines and soldiers to continue to rely upon humvees that are vulnerable to Improvised Explosive Devices (IEDs). Had this request been handled on a priority basis, hundreds of MRAPS could have been deployed as early as July 2005. From July 2005 through May 2007, Brookings Institution data indicate that 927 Americans lost their lives in Iraq as a result of IEDs. If MRAPs can prevent sixty-seven to eighty percent of those fatalities, the 621 to 742 Americans would still be alive today and many times that number would have avoided serious injuries... We believe an intensive review of urgent needs statements and the timing of action on them will show delays and refusals based on a combination of bureaucratic inertia and vested interests in established programs... While we have some ideas for fixing these processes, we believe that an internal review and the recommendations that flow from it will ensure remedial action. We stand ready to assist with any measures that may require legislative action, but we are hopeful that most the necessary changes can be he made internally -- and quickly.*”

**(6) 17 Jul 07 USA Today: “Pentagon balked at pleas for safer vehicles”**

On 16 Jul 07 an article titled “*Pentagon balked at pleas from officers in field for safer vehicles*” authored by Peter Eisler, Blake Morrison and Tom Vanden Brook appeared in USA Today (Reference a.15.). It stated in part: “*...In February 2005...an urgent-need request for the same type of vehicle came from embattled Marines in Anbar province. The request,*



*signed by then-brigadier general Dennis Hejlik, said the Marines "cannot continue to lose ... serious and grave casualties to IEDs ... at current rates when a commercial off-the-shelf capability exists to mitigate" them. Officials at Marine headquarters in Quantico, Va., shelved the request for 1,169 vehicles. Fifteen months passed before a second request reached the Joint Chiefs and was approved. Those vehicles finally began trickling into Anbar in February, two years after the original request. Because of the delay, the Marines are investigating how its urgent-need requests are handled. The long delay infuriates some members of Congress. "Every day, our troops are being maimed or killed needlessly because we haven't fielded this soon enough," says Rep. Gene Taylor, D-Miss...When the Pentagon added armor to the sides of Humvees to guard against bombs planted along roadsides, the insurgents responded by burying bombs in the roads. The bombs could blast through the vulnerable underbelly of the Humvees. ... "Are you telling me no one could see that (need) coming, no one could recognize that the bottom of the Humvee" didn't protect troops, and "that's why the kids inside are losing their legs and their lives?" [Rep.] Taylor asked...Six officers interviewed by USA TODAY say the threat to the Humvees surfaced sooner. Lt. Col. Dallas Eubanks, chief of operations for the Army's 4th Infantry Division in 2003-04, says IEDs became more menacing before he left Iraq. "We were certainly seeing underground IEDs by early 2004," he says. In mid-2005, two top Marines — Gen. William Nyland, assistant Marine commandant, and Maj. Gen. William Catto, head of Marine Corps Systems Command — testified before Congress that they were seeing an "evolving" threat from underbelly blasts. They said at the time that armored Humvees remained their best defense...By February 2005, the Marines were formally asking for more. Field commanders sent their first large-scale request for MRAPs, seeking 1,169 vehicles with specifications that closely mirrored those of the Cougar....[the Marine Corps leadership] convened March 29-30, 2005, at the Marine Corps Air Station in Miramar, Calif...In attendance: five three-star generals, four two-stars, seven one-stars and [Maj] McGriff. McGriff knew the MRAP's history and the Pentagon's reluctance to invest in the vehicle. He had learned about the vehicle from a fellow Marine, Wayne Sinclair. Sinclair, then a captain, wrote in the July 1996 issue of the Marine Corps Gazette that "an affordable answer to the land mine was developed over 20 years ago. It's time that Marines at the sharp end shared in. .. this discovery." Addressing the generals, McGriff recommended analyzing every incident involving Marine vehicles the same way investigators probe aircraft crashes. Look at the vehicle for flaws, McGriff recalls telling the officers, and examine the tactics used to defeat it. Lt. Gen. Wallace Gregson, commander of Marine Corps Forces in the Pacific, and Lt. Gen. James Mattis, leader of the Marine Combat Development Command, listened and then conferred for a moment. The room grew quiet. "Then they said, 'OK, what do you want to do?' " McGriff remembers. He recited the very plan that the Pentagon, under a new Defense secretary, would embrace in 2007: "A phased transition. Continue to armor Humvees. At the same time, as quickly and as expeditiously as possible, purchase as many MRAPs as possible. Phase out Humvees." According to McGriff, the room again grew silent. Then, Mattis finally spoke: "That's exactly what we're going to do." Mattis' words failed to translate into action. The urgent-need request McGriff drafted went unfulfilled at Marine headquarters in Quantico. A June 10, 2005, status report on the request indicated the Marine Corps was holding out for a "future vehicle," presumably the Joint Light Tactical Vehicle — more mobile than the MRAP, more protective than the Humvee, and due in 2012. In practical terms, that meant no MRAPs immediately. McGriff foresaw some of the turmoil over vehicles in a prophetic 2003 paper for the School for Advanced Warfighting in Quantico. "Currently, our*

*underprotected vehicles result in casualties that are politically untenable and militarily unnecessary," his paper read. "Failure to build a MRAP vehicle fleet produces a deteriorating cascade of effects that will substantially increase" risks for the military while "rendering it tactically immobile." Mines and IEDs will force U.S. troops off the roads, he wrote, and keep them from aggressively attacking insurgents...Rhodesia, a nation with nothing near the resources of the U.S. military, had built MRAPs more than a quarter century earlier that remained "more survivable than any comparable vehicle produced by the U.S. today," McGriff wrote...After McGriff addressed the generals in March 2005, another 15 months passed. Then the Marines in Iraq reiterated the request for MRAPs. This time, they sent the request directly to the Joint Chiefs. This time they were successful. In December 2006, after insurgent bombs had killed almost 1,200 U.S. troops in Iraq, the Joint Chiefs validated requests from Iraq for 4,060 MRAPs, and the formal MRAP program was launched. By March 2007, Marine Corps Commandant James Conway called the vehicle his "No. 1 unfilled warfighting requirement." In part, that's because he saw it save lives in Anbar province. Brig. Gen. John Allen, deputy commander of coalition forces there, says the Marines tracked attacks on MRAPs since January 2006. The finding: Marines in armored Humvees are twice as likely to be badly wounded in an IED attack as those in MRAPs. Perhaps more convincing: No Marines have been killed in more than 300 attacks on MRAPs there... After substantial testing, the military...has concluded that MRAPs are vulnerable to explosively formed projectiles, the newest and most devastating variation of the IED. More armor has been developed for the MRAPs the Pentagon ordered this spring...Jim Hampton, now a retired colonel, questions why the Pentagon and Congress didn't do more to keep the troops safe. "I have colleagues who say people need to go to jail over this, and in my mind they do..." This well-researched USA TODAY article revealed a history of wider DoD awareness of and push-back on MRAP that was occurring concurrently with the Marine Corps' own MRAP experience.*

The Army in particular had a much larger need for MRAPs, yet found no institutional resolve to support MRAPs until well after both USMC, SECDEF, and Congressional leadership emerged in 2007. The author of this case study is aware that the larger Army need had been quantified, and that this information was known to USMC MRAP Advocates at MARCENT. In fact MARCENT war planners sought to galvanize support at several levels within CENTCOM for a Joint requirement so that the Army as a Service could support an MRAP capability for all soldiers in Iraq, not just those in Anbar, and sought a cooperative way ahead, in a fashion that we recognize as the present MRAP Joint Program. Instead, it took Congressional and SECDEF oversight to force the issue in 2007. It is interesting that Army followed USMC's lead on all aspects of MRAP, from early push-back to later participation in the MCSC-led Joint Program. It can therefore be reasonably projected that a similar or virtually identical Joint program would have resulted if MCCDC and the MROC had approved the MRAP need submitted by I MEF (Fwd) on 17 Feb 07.

**(7) 26 Jul 07 USA Today: "Marine leaders defend '05 decision on MRAPs"**

On 26 Jul 07 an article titled "*Marine leaders defend '05 decision on MRAPs*" authored by Tom Vanden Brook appeared in USA Today (Reference a.16.). It stated in part: "*In February 2005, then-brigadier general Dennis Hejlik signed an urgent request asking for 1,169 Mine Resistant Ambush Protected vehicles to "increase survivability and mobility of Marines operating in a hazardous fire area" in Iraq's Anbar province. Now, as they defend*

*their decision to send armored Humvees instead of Mine Resistant Ambush Protected vehicles, top U.S. Marine commanders are saying Hejlik did not specifically mean MRAPs...On Friday, Marine Corps Commandant James Conway said at the National Press Club that "what Denny Hejlik was asking for in that urgent need statement was that kind of a capability, not that family of vehicles. He wanted a vehicle that gave him an ambush- and mine-protected kind of capability."... Hejlik, who leads the Corps' special operations command, issued a memo last week ... "I must stress that we were not seeking a specific vehicle design," Hejlik wrote. "Rather we wanted to significantly enhance the force protection capability of our vehicles. Frankly, the term Mine Resistant Ambush Protected (MRAP) vehicle meant nothing to me at the time, other than additional force protection for our forces." However, the 2005 request Hejlik signed cited the term MRAP and some of the vehicle's unique characteristics, such as its Vshaped hull "designed specifically to disperse explosive blast and fragmentary effects." The request also said the vehicles should have special "firing ports," which are standard features on the MRAPs the Pentagon is ordering now..."Terrorists also employed mines, but to a much lesser degree and with much less destructive power than we are experiencing today," Hejlik said in his memo. "The terrorists primarily targeted the sides of our vehicles and, to a much lesser extend, the undercarriage" of Marine vehicles. Conway said Friday that underbelly blasts from homemade bombs, also called improvised explosive devices (IEDs), were not a significant threat in early 2005. The February 2005 request said MRAPs were needed for more than just underbelly blasts. It said the "expanded use" of IEDs, rocket-propelled grenades and small-arm fire "requires a more robust family of vehicles." Friday, Conway provided statistics on underbelly blasts for the first time. From January to September 2005, there were about 10 such attacks. After September, there were 10 per month for the rest of the year. There were 16 attacks in January 2006, and 120 for all of 2006. Such attacks increased, Conway said, because there were more armored Humvees in Anbar." This USA TODAY article publicly captured some of the primary MRAP-related contradictions between authoritative documents in the public domain and the statements of senior Marine Corps leaders. In addition to the contradictions, the reasons being employed to publicly justify the USMC shelving of the 05 MRAP UUNS lacked documented authenticity.*

The documented justifications employed by the DWG/CDIB in 2005 in no way reflected the publicly stated justifications of 2007. There has been an inclination to narrow the discussion to just underbelly attacks today, to suggest that the MRAP is a "one-trick" armor capability. However, MRAPs provided superior occupant protection against all attacks, not just underbelly attacks. This all round MRAP superiority has been known to the Marine Corps since the conduct of the Vehicle Hardening Study in 2005, yet it is not mentioned in public. Instead there appears to be a sole focus on justifying past decisions.

In recent months, many officials have also stated that the M1114 up-armored HMMMWV was the "**Gold Standard**" for combat vehicle protection against the side blast IED threat in 2005. Given that MRAPs have actually been the real global Gold Standard for almost 40 years, USMC references to the M1114 might be better understood as retroactively buttressing deficient or non-existent staff analysis within the MCCDC EFDC almost three years ago. The Sinclair article in 1996 (Reference a.1.), the MRAP UUNS of 2005 (Reference r.5.), and the MCCDC EFDC Vehicle Hardening Study (Reference p.2.) all authoritatively contradict the recent M1114 "Gold Standard" assertions.

## **(5) 30 Jul 07 CMC response to Sen. Biden (and Sen. Bond)**

On 30 July 2007 the Commandant of the Marine Corps (CMC) sent separate letters to Senator Joe Biden and Senator Kit Bond (Reference 1.4.). CMC's letter responded to concerns for USMC delays in equipping Marines that the Senators had raised in their jointly signed letter sent to the Secretary of Defense (SECDEF) on 28 June 2007. In his 30 July letter CMC sought to justify MCCDC, MCSC, and Joint Non-Lethal Weapons Program (JNLWP) actions on several urgent needs, requirements, and programs. CMC's letter included a discussion on the USMC's alleged delay in responding to the 2005 operator request for MRAPs. Therefore, an analysis of the CMC's letter to Congress is the optimal framework for this case study of MRAP, since it constitutes the Marine Corps position on the topic.

It is necessary to point out that CMC's letter is divided into two distinct parts. The first is his signed letter. The second is an extension of the letter that follows his signature. CMC introduces this section with: *"Enclosed is additional information relevant to your specific concerns."* This delineation between CMC's personal signed letter and the extension is critical. It was obvious in researching the MRAP case study that CMC did not author that additional section. It was certainly prepared by the subject matter experts (SMEs) and civilian and uniformed middle management of MCCDC, MCSC, and other subordinate offices for the CMC. It contains SME-level project and program detail that CMC would have to trust as being factual.

This is all the more true since at the time of the USMC decisions to not fulfill the MRAP UUNS and continue with armored HMMWV solutions Gen Michael Hagee was CMC. Then a LtGen, Gen Conway was on the Joint Staff serving as the J3. This observation is pointed out up front because there are many inconsistencies and contradictions within the letter extension, which CMC conceivably might not have recognized. He must trust the details that are presented to him for signature as an executive generalist, as do all General Officers. The 30 Jul 07 CMC letter and additional information stated:

### **(a) Cover letter and cover letter analysis**

CMC's letter to the Senators began: *"Thank you for your letter regarding the Marine Corps' accelerated acquisition process. The Secretary of Defense asked me to provide you information on how the Marine Corps is leaning forward to provide Mine Resistant Ambush Protected vehicles and enhance our persistent surveillance capabilities in support of Marines in Iraq and Afghanistan."*

*The Marine Corps' responsiveness to requests from Marines in Afghanistan and Iraq for new or improved equipment to meet emerging threats continues to be a matter of utmost concern. The key is to balance the rapid fielding of new capabilities with a host of other variables - among them the maturity of the technology, the ability of the industrial base to develop the capabilities in sufficient numbers and on an accelerated schedule, and finally, the logistics system to adequately support the capability once fielded."*

1 A question worth asking is: who ‘balances’ these issues? Is it accomplished by operationally and technologically-savvy (i.e. bilingual), programmatically neutral government personnel with relevant physics, engineering, or computer science insight? Is it accomplished by neutral government personnel who have a true insight into the state of the commercial art and industry capacity? Or is it overwhelmingly accomplished by acquisition and process specialists within the support establishment who have tangible programmatic interests in the outcome of decisions. These specialists who manage USMC combat development include non-promotable twilight tour officers, retired Marines working as civil servants at MCCDC, MCWL, MCSC, and ONR, and familiar contractors who also have a large stake in the outcomes of decisions.

2 The balance has been wrong, and short of fundamental, verifiable institutional change it will remain wrong. Instead, the balance is clearly in favor of USMC support establishment staff vision of programmatic exigency and MCCDC-driven priorities, as opposed to warfighter-driven priorities.

CMC’s letter to the Senators continued: ***“The Marine Corps recognizes that the current requirements and acquisition processes have not been perfect in meeting all the needs of our combat forces and we are taking steps to improve our methods. Continued involvement of senior leadership, revisions to our urgent needs review process, and increased engagement with other Service efforts and industry will allow the Marines Corps to increase the responsiveness and effectiveness of delivering critical capabilities to the warfighter. The timeliness and importance of this effort is well understood, as Marines who work rapid acquisition issues on a daily basis are themselves warfighters, many only recently returned from combat action in Iraq and Afghanistan.”***

1 What are those improvements, revisions, and increased engagement mechanisms specifically? Also, the civilians in the CDIB, SYSCOM, MCWL, and JNLWD who are depended upon for continuity and subject matter expertise, are not operationally current or technologically proficient. Similarly, many if not most of the CDIB, SYSCOM, MCWL, and JNLWD active duty officers have been on extended ‘homesteading’ twilight tours at Quantico and cannot be considered warfighters.

2 Generals are “generalists” by design and effectively less pivotal in the needs fulfillment equation. And the weaker the background of the generals with regards to technology and opportunities the more they become the tools of the SMEs. These tenured USMC middle management and junior SME individuals, having repeatedly exhibited value sets, incentivization, and concepts of “urgency” divorced from the best interests of both warfighters and the future of the Corps, have a record of providing bad advice to Marine Corps General Officer leadership. This bad advice has done real, measurable damage to both the Corps’ and the country’s national security objectives. As the USMC “experts” they knew better, even though the negative operational outcomes were reasonably predictable.

3 In the end, just having warfighter generals assigned to MCCDC leadership means little. Much deeper and lasting institutional change is needed to correct the

staff advisory bodies beneath the generals in order to prepare the USMC for the future. Warfighter-led systems decision making is worthy of consideration:

CMC's letter to the Senators concluded: ***“Enclosed is additional information relevant to your specific concerns. A similar letter has been sent to Senator Bond. I want to personally thank you for your interest in supporting our deployed forces and for your continued support of the Marine Corps.”***

**(b) Additional information and analysis**

CMC's “additional information” began with the subtitle: ***“MINE RESISTANT AMBUSH PROTECTED VEHICLES, LASER WARNING DEVICES, AND PERSISTENT SURVEILLANCE CAPABILITIES”***

1 The middle managers at Quantico and their junior SMEs obviously drafted this section for the CMC. As a GO generalist CMC relied on those individuals for truthfulness and accuracy as he signed the letter. Unfortunately, CMC and the intervening GOs were let down by those individuals in this document. By continuing with unqualified assertions such as “inadequate industry capacity,” a meaningless phrase in the post-industrial age in the United States, one could come to the conclusion that USMC needs outside assistance in managing combat development, perhaps through legislation that enforces permanent change.

2 Generals are “generalists” by design and effectively less pivotal in the needs fulfillment equation. And the weaker the background of the generals with regards to technology and opportunities the more they become susceptible to inadequate technological analysis from MCCDC SMEs. These tenured USMC middle management and junior SME individuals, having repeatedly exhibited value sets and concepts of “urgency” divorced from the best interests of both warfighters and the future of the Corps.

CMC's “additional information” introduction to the MRAP issue stated: ***“MINE RESISTANT AMBUSH PROTECTED VEHICLES (MRAP). The Marine Corps has pursued an integrated and comprehensive solution to vehicle and personnel survivability against the evolving Improvised Explosive Device (IED) threat. Materiel approaches actively pursued since 2003 include multiple generations of vehicle armor, improved body armor, fragmentation resistant goggles, flame resistant over garments, high-powered jammers, and the development of purpose-built vehicles, Non-materiel approaches include new convoy operational tactics and improved training designed to provide the highest degree of protection to our Marines consistent with mission requirements.***

***Subsequent to the fall of Baghdad, IEDs emerged as the number one force protection issue for Marines in Iraq. Central to the development of an integrated solution to the IED threat were decisions regarding the armoring of existing vehicles to meet the side-blast IED threat. The Marine Corps' initial response was to up-armor our vehicles, providing immediate first generation armor protection, and revise our convoy training and tactics. Complementing our immediate actions we continued searching for improved armor protection and developed the Marine Armor Kit (MAK). In October 2004, the Marine Corps***

*decided to procure 498 M1114s (armored High-Mobility Multi-Wheeled Vehicles (HMMWVs) and began procurement of the MAK for all other HMMWVs.*

*In early 2005, Marine Commanders in Iraq submitted an Urgent Universal Need Statement (UUNS) to, "increase the survivability and mobility of Marines operating in a hazardous fire area against known threats." The UUNS requested 1,169 vehicles that would increase survivability and protect our Marines in different mission profiles."*

1 The Feb 05 MRAP UUNS did indeed request 1,169 vehicles that would *"increase the survivability and mobility of Marines operating in a hazardous fire area against known threats."* However, an analysis of this assertion reveals that the phrase was a wholly unrepresentative and incomplete capability abstracted from a detailed and specific context of a COTS MRAP technical requirement. Its non-contextual simplicity is misleading.

2 Known threats in February 2005 included EFPs which were specifically discussed in the UUNS, i.e. MRAP vehicles: *"... must be capable of having armor/stand-off screens attached to increase the protection to predestinate and defeat the primary kill mechanisms of explosively formed penetrators..."* Also, in February 2005 the underbelly blast threat was known and specifically discussed in the UUNS, i.e. MRAP vehicles must include an *"...integrated V-shaped monocoque hull designed specifically to disperse explosive blast and fragmentary effects"* and *"minimize secondary projectiles that acceleration forces produce during a bottom attack mine incident."* Furthermore, by CMC's own recent admission before the National Press Club underbelly blasts had been experienced in Al Anbar operations as early as January 2005: *"From January to September 2005, there were about 10 such attacks."* (USATODAY, 23 July 2007).

3 In fact the MRAP UUNS specifically asked for design features that entirely excluded the M1114s and HMMWV (UAH) MAK kits. The February 2005 UUNS stated specifically: *"Operating forces see fleeting opportunity to utilize supplemental funding to replace 1<sup>st</sup>/2<sup>nd</sup> generation vehicles, by skipping a generation and procure 4<sup>th</sup> generation MRAP vehicles"* and: *"The OIF EDL [equipment list] will be reinforced with 4<sup>th</sup> generation (designed and built from the ground up to withstand IED/RPG/SAF) MRAP vehicles."* The material specificity of the MRAP UUNS emerged from I MEF Fwd operational experience and the known threats in February 2005, and the first-hand knowledge that both the M1114 and MAK hardened HMMWVs were extraordinarily vulnerable to underbelly and side-blast attacks, and COTS MRAP designs would mitigate those threats. Therefore, the MRAP UUNS requested specific capability design features that excluded the M1114s and UAH based on the known threats at the time of UUNS signature.

4 The UUNS requested COTS MRAPs, not an abstract, purely spec-based increase in vehicle protection capabilities that Quantico might have preferred. The UUNS specifically called for an *"MRAP family of vehicles,"* a known and commercially available quantity that possesses survivability baseline characteristics that included:

a “...*integrated V-shaped monocoque hull designed specifically to disperse explosive blast and fragmentary effects...*” (this automatically excluded M1114 and MAK Program options and pointed straight at the COTS MRAPs as the solution for underbelly blasts, a known threat in February 2005)

b “...*protect from overhead airburst and side protection against fragmentation from 155mm shells...*” (MCCDC’s own analysis of early 2005 determined that 4 and 6 wheeled Cougar MRAPs, as well as RG-31 MRAP variants were more effective than the M1114 at protecting against the side-blast threat)

c “...*capable of having additional armor stand-off screens attached to increase the protection to predestinate and defeat the primary kill mechanisms of explosively formed penetrators...*”(EFPs, a known threat in February 2005)

d “...*have transparent armor with rifle firing-ports on all four sides... that permit aimed fire from the standard service rifle with iron sights or optics...*” (Cougar and Casspir were specifically called out as examples in the UUNS – M1114 could not have filled this requirement)

e “...*minimize secondary projectiles that acceleration forces produce during a bottom attack mine incident...*” (Again, operational experience highlighted the known underbelly threat at that time in early 2005, as well as the extreme vulnerability of HMMWVs to such attacks)

f The UUNS requested 759 Multi-mission combat MRAPs, 229 troop transport MRAPs (16 PAX min capacity, clearly not an up-armored HMMWV), 58 7-ton cargo flat bed truck equivalent MRAPs, 58 ambulance variant MRAPs, and 65 EOD engineer variant MRAPs with 50 ft investigating arms (i.e. Buffalo, Cougar, RG-31, Nyala, or Casspir [all mentioned by name in the UUNS], not an up-armored HMMWV) for a total of 1169 MRAPs. The UUNS was seeking those specific vehicles or other commercially available and operationally equivalent COTS MRAP products, not up-armored HMMWVs or M1114s.

5 The MRAP UUNS called for a specific COTS vehicle with a design and MRAP name-association that was well known to Marine Corps leadership in early 2005. The Buffalo, Cougar, and RG-31 already fielded in Iraq by the Marines for engineers at that time were unambiguously known as MRAPs and were the specific material solution sought in the UUNS, as verified by LtCol Roy McGriff, the author of the document interviewed in USATODAY 16 July 2007. McGriff also briefed the UUNS and MRAP requirement at the March 05 USMC Safety Conference, a briefing that included a picture and cost slide of the Cougar. MajGen Hejlik and LtGen Mattis (the MEF (Fwd) requesting official, and the responsible-accountable developer, respectively) were both present. In fact the MRAP design and name were widely known since the publication of Capt Sinclair’s award-winning Marine Corps Gazette article of 1996. The statement above is misleading at best based upon a cursory reading of the UUNS.



CMC's "additional information" on MRAP continued: ***"Following a trip to Iraq in early 2005, the Inspector General of the Marine Corps (IGMC) recommended that the Marine Corps continue with the MAK program, but plan to transition fully to the M1114 as soon as possible."***

1 With respect to the CMC's emphasis on the IGMC trip to Iraq in early 2005, there is no MRAP vs M1114 vs MAK-equipped HMMWV logistics-focused comparative analysis in the published report. In fact, it would appear that MRAP and the I MEF MRAP UUNS were never seen by the IGMC, much less evaluated. Here again, it is worth noting that the author has heard from independent sources that the infantry SME assigned to investigate, interview, etc. for the IG was Maj Franks from MCSC. He is said to have been a vociferous opponent of MRAP even before he was assigned the task of seeking operator perspectives on the UUNS. He was said to have been an equally outspoken advocate for the RST-V and JLTV, programs for which he had expressed a protective predisposition. Additional research might resolve these suppositions.

2 The recommendations of the IGMC in 2005 to: ***"...continue with the MAK program and transition fully to the M1114"*** (Ref ) stand in stark contradiction with the specific family of MRAP vehicles requested in the UUNS, and the proposed way-ahead briefed by the I MEF operators and endorsed for execution by DC, CDI at the Safety Conference, namely: ***"Continue to armor Humvees. At the same time, as quickly and as expeditiously as possible, purchase as many MRAPs as possible. Phase out Humvees."***

3 The lack of any MRAP discussion in the IGMC Readiness Assessment would indicate that the IGMC had no visibility of the I MEF MRAP UUNS in-theater or interview the experienced I MEF (FWD) staff originators who had just returned from Iraq. It also indicates that the IGMC *was not made aware of the COTS MRAP opportunity*, or the UUNS that were both assuredly known to the HQMC I&L SMEs who dominated the IGMC's team.

CMC's "additional information" on MRAP continued: ***"The M1114 was the best answer for the side-blast IED threat faced in Iraq at that time."***

1 This statement is contradicted by the Marine Corps' own armor protection analysis of early 2005. In support of the MRAP UUNS, in early 2005 the EFDC-MCSC Vehicle Hardening Study was conducted. It determined that 4 and 6 wheeled Cougar MRAPs, as well as RG-31 and several other COTS MRAP variants were more effective than the M1114 at protecting against the side-blast threat. In fact, the M1114 was determined to be one of the least capable options for protecting against this and other known threats. This statement is incorrect, and was known to the Marine Corps to be incorrect in early 2005.

CMC's "additional information" on MRAP continued: ***"Marine Corps leadership, including operational Marine Corps commanders in Iraq, met soon thereafter to take up the issue of our ground tactical vehicle fleet and the increase in casualties as a result in shifting threat in IED tactics used by the enemy."***

1 It is difficult to tell from his letter whether the CMC was referring to the USMC Safety Conference of Mar 05, or an MROC Executive Session that had been referred to in a Newsweek article. If he was referring to the Safety Conference a clear breakdown in communication has occurred between the drafters of this CMC letter and the real record of what happened at the conference. As Maj McGriff stated in his 16 July 2007 USATODAY article interview the way ahead agreed to was: "***A phased transition. Continue to armor Humvees. At the same time, as quickly and as expeditiously as possible, purchase as many MRAPs as possible. Phase out Humvees.***" At that March 05 Safety Conference LtGen Mattis stated in front of most USMC leadership that the way-ahead would be the proposal briefed by McGriff (and endorsed by Hejlik who signed the UUNS). According to Maj McGriff, Mattis' exact words in his crucial capacity as DC, CDI were: "***That's exactly what we're going to do.***"

2 If on the other hand CMC was referring to an MROC Executive Session, it is of special concern from an accountability standpoint that the MCCDC personnel managed to keep the I MEF (Fwd) UUNS out of the normal, formal MROC process. With a total lack of transparency advice would have been given and decisions ultimately made "behind closed doors." There is no known MROC Decision Memorandum on this UUNS, in spite of the fact that it had a near-term resource implication that equaled or even exceeded USMC's other top tier programs such as EFV and even Osprey. In the end no historical fingerprints other than a few presentations, process docs, and an info paper that the author has been able to locate to date.

CMC's "additional information" on MRAP continued: "***The UUNS submitted in January 2005 was considered along with material solutions that included MAK armor kits for HMMWVs.***"

1 As noted above, ever-more destructive side blasts, underbelly blasts, and even the emergent EFP threat were all discussed in the February 2005 MRAP UUNS. MRAP was the only conceivable "immediately available" solution to those known threats, given a USMC leadership commitment. The MAK armor kits and the M1114 were known at that time at the MCCDC GS-15/0-6 middle management SME level to be wholly inadequate. The MAK armor kits and the M1114 should never have been considered as potential material solutions. Their inclusion was, at the least very serious negligence on the part of MCCDC staff, possibly criminal in the sense of false representation.

2 It is clear that MRAPs were considered by executive leadership at the March 2005 Safety conference. According to the MRAP briefer at that conference (also the author of the Feb 2005 MRAP UUNS), then-Maj MacGriff, stated that CG MCCDC decided to pursue a large MRAP purchase immediately. We know MCCDC typically prepares MROC briefings and briefs the MROC, and records minutes of MROC decisions. What is not clear in this analysis is why typical MROC procedures were not followed, or what actually happened in this meeting of Marine Corps Leadership, as stated in the second section of CMC's letter to the Senators. We know CMC was, at the time, in a Joint billet, so it is unclear whether he has personal knowledge of this meeting. This comment might be suggesting that operational commanders in Iraq shifted their position, away from MRAPs, shortly after many Generals at the

March 2005 Safety Conference concurred that MRAPs were the way ahead. Consequently, this comment raises many questions.

3 In the spring of 2005 MAK armor kits and the M1114 were both known by MCCDC subject matter experts and MCCDC middle management to be inadequate at materially solving the I MEF (FWD) MRAP need. This was confirmed through both IGMC findings that UAHs suffered a reduction in functional life and a severe reduction in payload, as well as Vehicle Hardening Study confirmation that the Level 2 MAK and Level 1 M1114 (functionally equivalent in protection) could not fulfill the baseline protection capability of withstanding the 155mm side blast IED. Therefore, neither the MAK armor kits nor the M1114 should have been considered as potential material solutions, for the Feb 2005 MRAP UUNS, by MCCDC or the Marine Corps leadership. With respect to the MAK UAHs this comment is especially incomprehensible in light of the fact that the 2005 IGMC assessment reported: "...all Marines interviewed desire Level I armor."

4 The ever-more destructive side blasts, underbelly blasts, and even the emergent EFP threat were all discussed and solutions requested in the February 2005 MRAP UUNS. COTS MRAPs with their specific 4<sup>th</sup> generation designs that integrated a monocoque hull into a family of vehicles were in actually the only conceivable "immediately available" solutions to those known threats. There is compelling evidence that other programmatic wills were at work within MCCDC and SYSCOM that blocked this internal USMC realization. In the end, the decision not to go forward with fulfilling the UUNS with MRAP, as urgently requested, was a conscious USMC leadership choice that did not consider the operational and commercial facts. In practice the decision short-circuited the UUNS process, preventing MRAP from proceeding to the MROC as MRAP requirements approval, funds reprogramming, and the initiation of Congressional interactions for new funds would have jeopardized the threatened program interests.

5 The comment that the *"...UUNS submitted in January 2005 was considered along with material solutions that included MAK armor kits for HMMWVs"* reveals that the two were indeed distinctive material alternatives. It demonstrates USMC leadership foreknowledge that the I MEF UUNS was requesting a specific MRAP material solution that was known to be different and exclusive from the MAK armor kit material solution. This stands in contrast with previous letter assertions that the UUNS merely sought a general capability, i.e. "increase the survivability and mobility of Marines operating in a hazardous fire area against known threats." (Ref a) As will be seen in the paragraph that follows, it also stands in contradiction of the assertion in the addendum of a USMC leadership association between the general capability and a specific MRAP material solution did not exist in 05 (see below).

6 The letter assertion also contradicts statements the Marine Corps has been making to members of the Senate Armed Services Committee staff. In a 26 Jun 07 letter to Senator Biden concerning the Feb 05 MRAP UUNS, Senator Levin wrote: *"The...Marine Corps indicated the request from theater called for more effective armor materiel, which came in the form of fragmentation kit upgrades, rather than a specialized vehicle like the MRAP."* This assertion made to staffers by a USMC officer is refutable simply by reading the UUNS and considering the results of the EFDC Vehicle Hardening Study. Again,

CMC confirms in his letter that MRAP was indeed a known material solution that competed against other distinctive material solutions. Accordingly, it would be best to confirm this point, and in necessary, to clarify the record with the Chairman of the Senator Armed Services Committee.

CMC's "additional information" on MRAP continued: "*At that time, the industrial capability to provide a purpose-built MRAP-like vehicle (as we now define it in 2007) in the numbers required did not exist.*"

1 The letter comment regarding MRAP "*as we now define it in 2007*" is consistent with recent comments of other senior Marine Corps leaders that the USMC did not know what an MRAP was in 2005. Yet, it is inconsistent with the statement that immediately precedes it: "*...UUNS submitted in January 2005 was considered along with material solutions that included MAK armor kits for HMMWVs.*" Multiple credible documents show that USMC knew exactly what a COTS MRAP was in 2005 and that it had the same definition as a specific material solution then as it does now in 2007.

2 For example, the MRAP design and operational reasoning have been widely known throughout the Marine Corps since the Marine Corps Gazette's July 1996 publication of Capt Wayne A. Sinclair's award-winning article titled "*Answering the Landmine.*" In that 1996 article, Capt Sinclair detailed the physics advantages of the unique V shaped monocoque hull, and the inherent risk of a flat bottom vehicle, such as that integral to the HMMWV family of vehicles. This family includes the MAK-equipped A2 HMMWV and the M1114.

3 Furthermore, the monocoque hull-equipped COTS Buffalo, Cougar, and RG-31 vehicles were already fielded in Iraq by the Marines for engineers in 2005. This fact was well known to Marine Corps leaders. The monocoque hull of MRAPs was specified in the I MEF MRAP UUNS, as they were indeed the COTS products sought.

CMC's "additional information" on MRAP continued: "*Though MRAP-like vehicles had been procured in very small numbers to support Explosive Ordnance Disposal (EOD) and engineer specific missions in the summer of 2005...*"

1 This loose association of the Cougar, Buffalo, Casspir, and RG-31 with the term MRAP is misleading. All of those vehicles are and were specifically known as MRAPs. Based on all "MRAP" literature, from Capt Sinclair's award winning article, to Maj McGriff's SAW thesis, , the 1<sup>st</sup> MRAP UUNS, the 2005 Safety Conference briefing, the JERRV JUONS, the MRAP JUONS, and the 2<sup>nd</sup> MRAP UUNS, all combat developers and leaders knew and know that the allegedly "*MRAP-like*" vehicles purchased for EOD were MRAPs in fact.

2 Casspirls, Buffalos, and Cougars were mentioned by name in the 1<sup>st</sup> MRAP UUNS. In the 2<sup>nd</sup> MRAP UUNS RG-31s and Cougars were pictured as members of the family of MRAP solutions. This was also the case for the MRAP JUONS. The JERRV JUONS pictured the Cougar. In Maj McGriff's presentation to USMC leaders in 05 a cost slide pictured the 4-wheeled Cougar variant (see Figure 7 earlier). The confusion of these words

above introduces the reader to a misleadingly vague definition of MRAP, in spite of the abundant and compelling documentation that meticulously and unambiguously defined an MRAP. As noted earlier, CMC cannot be held accountable for these words as their objective was transparently disingenuous. Again, it is clear that CMC did not have the background to confirm or dismiss this document, one that he was asked to sign and submit to Congress.

CMC's "additional information" on MRAP continued: "...*these vehicles were not considered a practical armored vehicle option as they were not adequately tested, exhibited reliability problems, and industry could not build them fast enough.*"

1 This comment is inexplicable considering that the UUNS process seeks to fill "urgent" needs with mature capabilities that can be fielded immediately, or soonest. It was well known that Force Protection Cougars had early transmission problems. However, the RG-31s did not exhibit any such reliability problems. Additionally, all of Force Protection's alleged "*reliability problems*" were known to MCSC, since they had been purchasing them. They knew those reliability problems had nothing to do with survivability characteristics, that they were narrowed to basic vehicle functionality. It stands to reason that a forward thinking solution might have been to correct those reliability concerns and then field the best MRAP vehicles in the world, instead of accepting the fatal operational weaknesses of the HMMWV.

2 Since a HMMWV is known to wear out within a very short period of time when up armored and is subject to total destruction and non-functionality when attached with IEDs, its reliability characteristics can be said to be severe. It is perhaps misleading to continue advancing initial manufacturing problems of just one manufacturer that were quickly overcome. A rush order of fully operationally tested and highly reliable Supply System capabilities would of course be ideal. When those capabilities don't exist within the USMC or other military Supply Systems the next choice is COTS, such as MRAP. With respect to the word "urgent," it is common knowledge within the Joint Rapid Acquisition Cell (JRAC), the Army Rapid Equipping Force (REF), the Joint IED Defeat Organization (JIEDDO), and other rapid fielding offices that some risk is acceptable as a tradeoff for speed of delivery. The operational commander (CG, I MEF [FWD]) verified the "*practicality*" of COTS MRAP by signing the MRAP UUNS. COTS products such as MRAP, having user community and other customer reputations, produce sufficient operator confidence to forego "*adequate testing*" and reliability guarantees in the name of speed.

3 Principles of industry motivation and behavior do not support the letter's "*industry could not build them fast enough*" comment. Where there is a proven product with a proven production method the only thing needed to ramp up capacity is money. Consequently, only an approved MRAP requirement would have been needed to guarantee compensation for industry's investment in ramping up capacity. It is noteworthy that the NewsHour has questioned industry on this USMC MRAP allegation in conjunction with their investigation. The answer uniformly has been that given the military commitment (i.e. approved requirement and resources) it would have taken six months for the larger manufacturers to partner and ramp-up, as they have today. Historically, it is not accurate to state that the U.S. cannot create manufacturing capability at will. Ubiquitous "just-in-time" manufacturing

techniques are one of this country's asymmetric material advantages. The ramping up of MRAP production in 2007, once requirements and acquisition staff opposition were removed is evidence.

4 USMC did not execute either of those resourcing prerequisites. As a consequence, the ramp up of industry capacity was delayed by almost two years, until MRAP became the dire emergency that it is today. Again, USMC's own internal records reveal a different set of motivations for delaying (better said shelving) the UUNS that were not shared by CMC in his letter. Those documents point to mid-level process managers and their SMEs not wanting MRAP because it would compete against JLTV, HMMWV, and other favored vehicle programs for funding. These SMEs and their supervisors would have constituted the providers of information to DC, CDI, LtGen Mattis, the key Deputy Commandant with regards to combat development as.

5 Unfortunately, that one-sided advice was spread to then-CMC (Gen Hagee) under the less qualified guises noted in General Conway's letter above. This effectively undermined the operationally focused outcome of the Safety Conference where LtGen Mattis had indicated his intent to pursue MRAP. Combined with the 2006 IGMC with its objectivity apparently undermined by a particular team member having an interest in the outcome, i.e. with the IGMC team intentionally stacking the deck against MRAP, Gen Hagee's decision to forego MRAP in favor of the status quo was preordained.

CMC's "additional information" on MRAP continued: ***"The decision to pursue the M1114 was made by the Marine Corps leadership because of its proven capability to protect, its tactical utility, the demand by the Marines in theater, and its availability."***

1 On all four counts this M1114 justification is questionable:

a The M1114 was known to be incapable of protecting the Marines in Al Anbar against known threats, as evidenced in the UUNS, the MCCDC Vehicle Hardening Study, and other credible sources at that time.

b The lacking tactical utility of the M1114 was stated in the UUNS, in that current non-4<sup>th</sup> generation vehicles (i.e. armored HMMWV) neither survived the first engagement blows allowing for immediate counterattack, nor did they mitigate the casualty rates at that time, in both cases jeopardizing mission success.

c The requirement by the Marines in theater was specifically for a design-specific family of COTS MRAP vehicles to replace the vulnerable HMMWVs, as unambiguously stated in the UUNS. That document was signed by the Commanding General and is the only authoritative position on all this for the purpose of a study, especially today when memories from 2005 fade.

d The lacking or abundant availability of MRAP was a Marine Corps decision. No more than six months would have been needed for to ramp up following UUNS signature, if the DC, CDI had so-advised CMC. Industry follows legally

binding contracts and money. Today's "Liberty Ship-like" MRAP effort is evidence that it could have been done then. But, USMC made a conscious decision to provide neither a commitment nor money in 05 in order to protect programs. Availability is a questionable assertion.

2 The comment regarding "***proven capability to protect***" is contradicted by the historical record and needed vehicle characteristics documented in the MRAP UUNS. Specifically, the M1114 was known to be incapable of protecting the Marines in Al Anbar against the known threat of the under-belly/center-line IED detonation. The M1114 was known to suffer from the same design flaws as other HMMWVs, namely a flat bottom and low ground clearance which together served to amplify-tamp the forces of under-belly/center-line IED detonations. Further, the Vehicle Hardening Study determined that 4 and 6 wheeled Cougars, RG-31, RG-32, Mamba, Casspir, Dingo, Cobra, ASV, Eagle, and Lion COTS MRAPs were all superior to the M1114 in fulfilling the baseline survivability requirements of the I MEF (FWD) MRAP UUNS. Most significantly, several of the MRAP variants in the Vehicle Hardening Study were more effective than the M1114 at protecting against the side-blast (155mm blast) detonation IED threat. It was this side-blast threat that has been touted by USMC leaders as being the most prevalent IED employment tactic in 2005. In fact, the study determined that the M1114 was one of the least capable options for protecting against this particular IED threat.

3 The comment regarding "***tactical utility***" of the M1114 or any other HMMWV is contradicted by the historical record and needed vehicle characteristics documented in the I MEF MRAP UUNS. The UUNS stated that "***Marines are expected to respond rapidly, and without a large security contingent, therefore we need a vehicle that enables us to survive the first blow and then counterattack.***" Further, according to the UUNS-documented operator metric of tactical utility "***MRAP vehicles will protect Marines, reduce casualties, increase mobility and enhance mission success.***" The abilities to survive the first blow and counterattack were critical, and neither the M1114 nor the MAK-equipped UAVs were noted as being in the solution space by the MEF. Only the specifically defined MRAP was. The 2005 IGMC assessment reinforced this with the observation that "***Combat operations require...the capability to close on an objective or target quickly with overwhelming combat power.***" As noted in the I MEF (FWD) MRAP UUNS, the COTS MRAP was able to do this.

4 The CMC's comment regarding the M1114 responding to "***the demand by the Marines in theater***" is contradicted by the I MEF (Fwd) UUNS itself which represented the actual requirement of the Marines in theater. This was to continue to armor HMMWVs in theater but concurrently procure MRAPs to phase out HMMWVs (including the M1114) entirely because of their inherent limitations and vulnerabilities. It was further articulated by LtCol McGriff at the March 2005 Safety Conference where, representing MajGen Hejlik who had signed the UUNS, he stated the intended way ahead was to: "***Continue to armor Humvees. At the same time, as quickly and as expeditiously as possible, purchase as many MRAPs as possible. Phase out Humvees.***" The last thing operators wanted in response to their demand—to "***increase the survivability and mobility of Marines operating in a hazardous fire area against known threats***"—was more HMMWV's with flat bottoms, low ground clearance, and vulnerability to side blast IEDs. They wanted MRAPs because they were the best available capability at that time (and today) for the type of combat environment they were confronting.

5 The letter comments regarding “*the demand by the Marines in theater*” and “*availability*” are also contradicted by common knowledge of industry behavior. Given a proven product and a proven production process, all that is required to ramp up capacity and speed fielding is funding. Still, funding must be guaranteed to industry through legally binding contractual commitments from the DoD, or at least an equivalent certainty that funding is available to fulfill those obligations. To claim industry was not supporting the war effort flies in the face of a fundamental approach to this war—volunteerism. Just as we have an all-volunteer military, so we have an all-volunteer industrial establishment. No MRAP capacity was offered by industry because requirements and acquisition officials in the Army and Marine Corps did not ask for them in large volumes. 2007 has proven this: had they asked for all of them quickly, they would have gotten a lot of them quickly.

6 The M1114 specifically, and HMMWV generally had strong USMC program advocates stateside, as requirement approval, funding, and contracts were achieved and comfortable relationships established. MRAP did not benefit from such program advocacy, i.e. a lack of programmer support that CMC’s letter confuses with physical or commercial impossibility. In the case of MRAP an approval of the requirement would also have been a necessary first step, as would a similar aggressive achievement of funding and contracts, such as benefited the M1114. However, this would have necessitated either 1) an additional monetary outlay for MRAPs, perhaps might put at risk the (due in 2013) JLTV program, or 2) the reprogramming of funds from other funded programs of record (PORs). In the end, the record shows that the Marine Corps, driven by programmer considerations, did not provide industry those prerequisites necessary for ramping up MRAP production capacity in the same way. In other words, the “*availability*” comment is an indictment of USMC programmatic preferences at that time, not lacking industry capacity to build and deliver COTS MRAP. This phenomenon was described by the former director of Force Transformation, retired VADM Art Cebrowski, as “The tyranny of the POR.”

CMC’s “additional information” on MRAP continued: “*Supported by the IGMC report of May 2005 and the perspective of our combat commanders, Marine Corps leadership concluded that the M1114 was the most viable solution to the vehicle armoring challenge posed by IEDs.*”

1 In the end, it appears that the USMC leadership decision not to commit resources to MRAP earlier was based on support establishment budgetary priorities, not industry, technical, or operational realities. Being composed of uniformed generalists, the leadership was beholden to the parochial interests of SMEs resident at Quantico, and likely MCWL and ONR as well as any organization having a big stake in the success of the JLTV. The advice originated with fully informed officers and civilian SMEs at Quantico who were presumably aware of the consequences of their advice.

2 Yet many, if not most of those mid level officers and civilians are still working in influential positions today, making parochially-based decisions that have similar negative impacts on current and future combat capabilities. They survive every transient uniformed leader, retaining their disproportionate influence in the realm of pace and information.



CMC's "additional information" on MRAP concluded with: "*A program was initiated to replace existing HMMWVs with M1114s as an 'immediately available means' to meet operational requirements. The UUNS became one of the inputs for the Marine Corps Joint Light Tactical Vehicle (JLTV) initiative.*"

1 As noted above, what can be made "*immediately available*" in the world of COTS is entirely a Marine Corps commitment decision. Also, although it appears late in the letter, at least CMC did mention this key JLTV program by name, arguably the main seed of all MRAP delays and the UUNS' eventual rejection. It is a nightmare come true for government labs and combat developers when a new entrant, non-developmental solution might appear commercially thereby negating the continued justification for in-house government-sponsored development of comparable, or even inferior initiatives. If common sense embraces a COTS solution that answers the pressing operational need, government infrastructure, reputations, advancement, and actual jobs are threatened.

2 JLTV was just such a threatened initiative, with COTS MRAP making immediate common sense, even though it is a theater-specific need to answer an emergency. I have heard from various OSD officials that JLTV will now be expected to reach for the protection capabilities integral to MRAP. Others have also stated that the overall cost of MRAP will indeed delay JLTV. Achieving MRAP capabilities while seeking mass reductions will be physically and fiscally challenging for JLTV as well. Delays are certain; program continuation of JLTV may even be called into question. The "disruptive" MRAP, while needed for warfighters today, is definitely bad for combat developer business.

3 The notion in the CMC letter that the MRAP UUNS became "*one of the inputs*" to JLTV is overstated. The UUNS was dismissed in favor of continuing armor HMMWV and JLTV. As one piece of clear evidence, no USMC EFP protection initiatives were begun in the USMC S&T Program or at MCWL as a result of the UUNS. In fact the UUNS was never even forwarded to MCWL for consideration in 2005, and this was not discovered until 2006. The UUNS might have died invisibly in MCCDC and outside of normal MROC scrutiny as the SMEs had intended, were it not for tenacious efforts at MARCENT to resurrect MRAP consideration in the summer of 2006, as the IED emergency worsened in theater. The originally intended demise of the MRAP UUNS is clearly evident in the EFDC information paper of 10 Jun 05; the CMC letter confirms as much.

### **(c) Summary observations on CMC's letter and additional info**

It is clear that the MCCDC staff was successful at keeping the real reasons for shelving the MRAP urgent need concealed from the view of Gen Hagee in 05, and now General Conway in 07 and 08. As evidence, CMC's letter relies on justifications that don't make sense in light of contradictory documentation, and don't correspond with MCCDC DWG/CDIB analysis of MRAP in 2005. Two related issues are also worthy of discussion:

1 MCCDC ignores I MEF (Fwd)'s request for EFP protection:

a It is clear that MCCDC staff did not grant any weight to I MEF (Fwd)'s request for COTS MRAP vehicles in early 2005. It is equally significant that, independent of the basic vehicle armor solution issue, there is no evidence that any concurrent analysis or S&T new start initiatives were commissioned by MCCDC to address the EFP threat. EFP protection was specifically requested in the MRAP UUNS as it was a known threat at the time. Considering the agile enemy the threat would certainly evolve rapidly in response to any new armor. In a USA TODAY article CMC himself stated that insurgent first shifted their IED attack strategies from side attacks to center line, underbelly attacks in response to the appearance of armored HMMWVs in Al Anbar Province. LtGen Mattis also spoke of the evolving nature of IED attacks when he was interviewed by the NewsHour on MRAP. LtGen Mattis served as DC, CDI in 2005. The question one can now pose is: since DC, CDI was aware of the evolving threat why was there no immediate investment in the defeat of EFPs as requested in the MRAP UUNS? The EFP threat was known, and as armor improved EFP employment would reasonably be expected to increase based on known insurgent patterns. The CMC letter recited the 10 Jun 05 Info Paper claim that the MRAP requirement was absorbed into the JLTV requirement. This turns out today to be untrue.

b With respect to fielding the MRAPs as they are produced without the benefit of the "*EFP predestination screens*" requested by I MEF the OSD, Army and MCSC-executed MRAP program are making the correct decisions. With respect to urgently needed capabilities an "80% solution" now is better than a "95% solution later." MRAPs, though arriving years late, are saving lives today due to SECDEF and Congressional insistence on speed. EFP protection can be spiraled in when mature, as per the current MRAP Program plan. But the Marine Corps combat developers need to answer for this EFP protection development shortfall, as well as the MRAP UUNS shelving. EFP protection should be 3 years more mature than it is today, based on MRAP UUNS development initiation. EFP protection would benefit all vehicles, whether MRAP, MTRV, LAV, AAV, LVS, MAK-UAH, or M1114, and for all Services in the ITO. Unfortunately, as with MRAP vehicles, EFP analysis and development by USMC has become another emergency, and one effectively out of synch with the fielding of MRAP.

c If the IGMC were to review this MRAP case study, more discovery concerning MCCDC's analysis and handling of the EFP threat would probably yield useful information regarding combat development challenges as a whole..

## 2 MCCDC ignores requirement for developmental lead time:

a When threats begin to emerge on the battlefield, it is incumbent upon a new UUNS process that MCCDC not focus single-mindedly on future wheeled vehicle requirements with a long-term, multi-year time horizon. JLTV and like capabilities are attractive visions for the future, however their preservation for their own sake does little to serve Marines who are in harm's way today. In both 3<sup>rd</sup> and 4<sup>th</sup> Generation warfare, speed matters to the Joint Commander. Since MCCDC's mission is to address immediate, near-future in addition to long-term requirements, all should be planned in a fast and comprehensive way. If this requires much greater Marine Corps Service-level discretionary control over the 6.1,

6.2, and 6.3 S&T resources currently under the control of ONR (i.e. the USMC S&T Program at ONR), then this must be accomplished by SECNAV, or through legislation as necessary.

b The Naval Audit Services' critique of MCCDC's UUNS processes stressed that MCCDC needs to communicate with the operating forces on how it is addressing needs (Reference p.14.). Given the lead time that can be associated with countering battlefield threats, it might have been useful to spin up the S&T years earlier, in anticipation of enemy counter-moves. Whatever the case, it is clear that USMC lost the initiative in the IED fight for some time as we were reacting to enemy moves with incremental changes. As history had shown in previous conflicts carefully researched by Capt Sinclair and Maj McGriff, this mine move/counter-move TTP exchange is ineffective and costly. It is not revisionist thinking to suggest speed on this issue would have been useful at MCCDC in 2005.

6 In an 11 Jan 2007 USA Today article, Army LtCol James Crider, Commander of 1<sup>st</sup> Squadron, 4<sup>th</sup> Cav, 4<sup>th</sup> Infantry Brigade, stated of the MRAP: ***"it would have been great to have them a year ago..."*** This underscores the need for the Marine Corps to systemically introduce a mix of inputs into MCCDC-internal requirements definition programs, so that urgent needs receive effective and timely hearing. This does not mean urgent needs will always dominate in a competition for limited resources, as circumstances may be such that a future threat is so compelling that the operational forces might reconsider the degree of urgency in-stride. In other words, during war, MCCDC staff should enthusiastically welcome an empowered warfighter's participation as a full voting member of the CDIB, and follow his or her lead when pressing needs require near-term tradeoffs.

7 In the case of urgent needs, the will of the warfighter must prevail in any case where there is a split in the voting outcome. This default outcome would also appear to meet the spirit, intent, and operational commitment of DC, CDI. As evidence, on the topic of the fulfillment of a separate need, in an e-mail to CG, I MEF (Fwd) on 13 Sep 06 LtGen Amos wrote: ***"...I will never...repeat NEVER deny our forces forward what they need to fight this fight if I can in any way provide it for them."*** Today's DC, CDI defaulted to the urgent needs of the CG of the MEF (Fwd) and his need for speed. MCCDC's focus and priorities were evidently different in 2005. The current DC, CDI's deference to the warfighter on urgent needs must be built into the institution by means of new process rules in the upcoming rewritten MCO. If today's DC, CDI sense of urgency was codified and represented in process rules in 2005, then the MRAP UUNS would have been fulfilled as requested, and as a function of process, not combat developer intervention. In summary, the warfighter must be an empowered voting participant on the CDIB and have a total value of 51(+)% of voting influence over urgent needs.

8 In conclusion, in contrast with the CMC's letter, the 17 Feb 05 UUNS stated: "Operating forces see fleeting opportunity to utilize supplemental funding to replace 1st/2nd generation vehicles, by skipping a generation and procure 4th generation MRAP vehicles" and ***"The OIF EDL [equipment list] will be reinforced with 4th generation (designed and built from the ground up to withstand IED/RPG/SAF) MRAP vehicles."*** It is clear that MCCDC staff prepared CMC's ***"additional information"*** in the 2<sup>nd</sup> section of CMC's letter to the Senators. Given the additional clarity this study provides, it would be best for the IGMC to

review and, if confirmed, suggest that MCCDC correct the record with CMC, so that he in turn can correct the record with the Senators.

**(6) 17 Sep 07 Jim Lehrer NewsHour segment on MRAP delays**

On 17 Sep 07 a program titled "*Procurement Process Slows Deployment of Improved Vehicles*" narrated by correspondent Paul Solmon aired on the Jim Lehrer News Hour (Reference a.19a.). It stated in part: "*[Paul Solmon introduced Franz Gayl who stated]... 'This culture has been criminally negligent in a way that has led directly to the unnecessary loss of hundreds of American and innocent Iraqi lives and countless serious injuries'...the corporate Marine Corps was reluctant to candidly discuss these issues, however difficult they are to solve, outside of its own family environment... now it has become a moral imperative for the MRAP to be developed...[while in Iraq] ...I realized that the people around me had a completely different sense of urgency than the people that I was dealing with back here. I was able to see that the warfighter was being hurt directly by decisions being made within the bureaucracy back in the rear'...[Paul Solomon stated] General James Mattis assured us things have since changed dramatically...[when he stated] 'I believe we're fielding the most well-equipped Marines in the history of the Marine Corps.'*...[Paul Solmon introduced] Todd Bowers... *' I remember in 2004 seeing an MRAP pull into my camp...I actually got to look at the vehicle and see how safe it was, it was incredible'... Patrick Campbell [stated] 'You really think they're going to get rid of the Humvees?' [Paul Solmon stated] Meaning Humvees have the contracts, the connections, are the product of least resistance to the bureaucracy... [General Mattis countered that] A current item like the Humvee was widely available; the MRAP was not...[Mattis stated] 'We had a very low industrial base that could produce these.'*...[Solmon stated] others [say] this is 40-year-old South African technology. And Force Protection, the U.S. company now making many of the vehicles, told us a large contract would have prompted them to partner with other firms, make lots more MRAPs, quickly. Archie Massicotte, who works for a rival company, says it took his firm only two months to get into production.... [Reporter] 'If DOD had come to you in 2003 and said, We need something like this, would you have been able to have the same turnaround time?' [Massicotte] 'Sure. Sure.' [General Mattis countered that] industrial capacity wasn't the only problem. IED land mines, for which the MRAP is designed, weren't much of an issue at the start when he was leading troops into Iraq... [Mattis stated] 'Complex firefights were the norm. We were in a heck of a battle for Ramadi, for Fallujah...Nobody in the infantry wants to be high off the ground when you're in a fight. These vehicles are designed to be high off the ground, because with their v-shaped hull, they have to clear the objects on the ground and still be high enough to permit the full use of this v-hull that deflects the underbody blast of an IED mine. Today, we do not face the same number of complex firefights, so you can have Marines higher off the ground without creating vulnerability to other weapons systems'...[Franz Gayl counters] 'Speed is security. We regain the initiative just through our speed'[Solman stated] yet the military procurement system seems mired in bureaucracy... resembling a giant corporation, with more and more to lose from change...[Gayl added] 'because it causes great instability in large process-oriented systems that seek stability and are risk-averse. What threatens the programs back here sometimes is exactly what is needed to counter the threat over there, if it's urgently deployed. And so you come up with -- you appear to have a Marine Corps here and a Marine Corps over there.' [General Mattis countered] 'There's not two Marine Corps; there's one

*Marine Corps.'...[Solman stated] Mattis says, he's convinced his troops have what they need..."*

**(6) 18 Oct 07 ITP article on ineffective USMC UUNS handling process**

On 18 Oct 07 an article titled *“Process for Handling Marines' Urgent Needs Deemed Ineffective”* authored by Christopher J. Castelli appeared in Inside the Pentagon (Reference a.20.). It stated in part: *“The Marines' process for meeting urgent warfighting needs in Iraq, Afghanistan and the Horn of Africa has been ineffective due to insufficient oversight from Marine Corps Combat Development Command in Quantico, VA, according to an internal audit obtained by Inside the Pentagon. The Sept. 28 report, prepared by the Naval Audit Service for Navy and Marine leaders, criticizes the handling of troops' most pressing requests for equipment intended to fill key capability gaps. The report slams Marine Corps Combat Development Command (MCCDC) for poor management practices identified between April 2006 and August 2007...The review found MCCDC "had not established adequate oversight for the UUNS requirements process to ensure solutions were effectively and efficiently delivered to the warfighter." The UUNS process, at the time of the audit, was "not effective,"...MCCDC "owns the UUNS requirements process," and is therefore responsible for establishing the guidance, direction, and oversight needed to ensure the process operates efficiently and effectively, the report says. But the guidance that Marines have been using -- an administrative message issued last year -- does not define desired effects for the process, ... MCCDC had limited visibility throughout the process...feedback was absent for fielded solutions and there were no established metrics. "As a result, the effectiveness of the process could not be measured, the ability to accomplish the mission could be impacted, the potential exists for wasted resources, and delivery of required UUNS requirements to Marine Corps warfighters could be delayed..."* It was this Naval Audit Service report that independently confirmed I MEF (Fwd)'s expressed concerns for a dysfunctional USMC combat development process. The audit also validated many of the observations contained in the draft presentation that had been prepared by the GCE Advocate S&T Advisor at the request of the Office of DDR&E. As noted earlier, the author was directed to cancel that presentation and to contact all recipients of the draft to have them delete those files.

**4. Discussion - MRAP in the Context of COIN**

**a. The arguments that question MRAP**

**(1) 27 Dec 07 Los Angeles Times “Military Thinks Twice On Fortified Trucks”**

On 27 Dec 07 an article titled *“Military Thinks Twice On Fortified Trucks”* authored by Julian Barnes and Peter Spiegel was published in the Los Angeles Times (Reference a.26.). It stated in part: *“It was just what American soldiers had been longing for -- a patrol vehicle designed to withstand the powerful roadside bombs that have killed more service members than any other insurgent weapon in the Iraq war. But...the feeling in the Pentagon is far from elation. Instead, an intense debate has broken out over whether the vehicle that is saving lives also could undermine one of the most important lessons of the whole war: how to counter an insurgency...Though offering needed armor, the MRAP lacks the agility vital to*

*urban warfare. "It's very heavy; it's relatively large; it's not as maneuverable as you'd like it to be," ...But [it] is likely to influence how the Army fights future wars...Geoff Morrell, the Pentagon press secretary, said..."The key is to find a combination of things that address the problems. "...Support for MRAPs within the Pentagon has weakened recently, in part because of the decline in military casualties in Iraq...the MRAP has reignited a debate that has bedeviled strategists since the war began: Is the best way to save soldiers' lives to give them tools to survive attacks, or to prevent the attacks...MRAPs are a moral imperative, needed to protect vulnerable soldiers from death and dismemberment. But...the hulking vehicles are antithetical to fighting a guerrilla war...frustrated with the department's inability to move quickly, Gates [SECDEF] ordered MRAPs flown to Iraq in scarce cargo planes in an unprecedented logistical effort...Earlier this month, Marine Corps officials announced they were cutting the number of MRAPs they intended to buy, to 2,300 from 3,600, citing the reduced violence in Iraq and the questionable utility of the vehicles in other missions... "Congress latched onto this to show how pro-soldier and how pro-defense they were," said Winslow T. Wheeler..."It is another example of people thinking the way to address these conflicts is through technology. But that kind of thinking guarantees defeat in this kind of conflict."... Congressional MRAP advocates have argued that the short-term need to protect soldiers from roadside bombs far outweighs any long-term concerns..."We might be stuck with a lot of these things that don't have a clear application in the next field of battle," said a Biden aide, who spoke on condition of anonymity, as is customary for congressional staffers. "But it doesn't matter. We're fighting the war we're in now, not the war we're going to fight in five or six years."..."The MRAP program was driven by an urgent desire to protect U.S. forces from the No. 1 killer in Iraq -- IEDs," Morrell said...But the vehicles are not a good choice for combat infantry companies, the consultant said. They are too heavy to drive in soft sand and are difficult to turn on narrow streets..."You have a pretty good anti-mine vehicle that has zero fighting ability, terrible off-road mobility, and can't turn around in a city," said the consultant, who was not authorized to discuss the findings and spoke on condition of anonymity. "The bottom line is that this MRAP is a fundamental error."..."We went in the wrong direction," said retired Army Gen. Barry McCaffrey, who has advised the Bush administration on Iraq policy. "It is the wrong vehicle, too late, to fit a threat we were actually managing." It is true that Joint Forces do indeed appear to be better managing the threat. Also, the MRAP is not the optimal solution for all aspects of COIN, especially in urban areas where a mix of lighter and heavier armor would be ideal. However, several regimental commanders in combat in 2007 and well into COIN operations have expressed unequivocal support for MRAPs. General Officers in theater are still asking for them. Retired stateside officials have not provided compelling evidence that were effectively managing the threat when the decision to buy MRAPs was made. At that time, casualty rates remained high in MND-N and MND-B.*

As an aside, an additional reason that the IED emergency is subsiding is the concurrent employment of complimentary capabilities as coordinated combined arms. At the same time that OSD, the Joint Staff, and Congress came to the assistance of the Marines in 2006 to rapidly field MRAPs, the MEF (Fwd) was executing self-help forcing functions on other fronts. The complementary capability that I MEF (Fwd) forced combat developers to deliver was tactical persistent Intelligence, Surveillance, and Reconnaissance (ISR) capabilities that, in combination with political developments in Al Anbar Province, led to the lessening of the MRAP need. This will be discussed later.

## (2) 27 Nov 07 Wired Magazine “How Technology Almost Lost the War”

On 27 Nov 07 an article titled “*How Technology Almost Lost the War: In Iraq, the Critical Networks Are Social — Not Electronic*” authored by Noah Shachtman was published in Wired Magazine (Reference a.22.). LTC John Nagl, who authored the Army and Marine Corps Field manual on COIN (FM 3-34), was also interviewed by Shachtman. “*Some of the best weapons for counterinsurgency do not shoot, “Nagl's counterinsurgency manual says... "the decisive battle is for the people's minds." ...The people best equipped to win the battle for people's minds — US troops on the ground, local policemen, Iraqi Army officers, tribal leaders. The Pentagon's sluggish structure for buying new gear means it can take up to a decade to get soldiers equipped... Meanwhile, insurgent forces cherry-pick the best US tech: disposable email addresses, anonymous Internet accounts, the latest radios. They do everything online: recruiting, fundraising, trading bomb-building tips, spreading propaganda, even selling T-shirts... Every new Internet café is a center for insurgent operations. Every new cell tower means a hundred new nodes on the insurgent network...The insurgent groups are also exploiting something that US network-centric gurus seem to have missed: All of us are already connected to a global media grid. Satellite television, radio, and the Internet mean that many of the most spectacular attacks in Iraq are deliberately staged for the cameras, uploaded to YouTube, picked up by CNN, and broadcast around the world...*” It is true that the images projected onto the U.S. public’s computer and TV screens by insurgents and criminals in Iraq represent very effective employment of IO weapons against us. Our superempowered asymmetric foes benefit from decentralized and flat organizations, and until 2006 and 2007 they had enjoy the ability to maintain a superior technology exploitation tempo to our own in many cases.

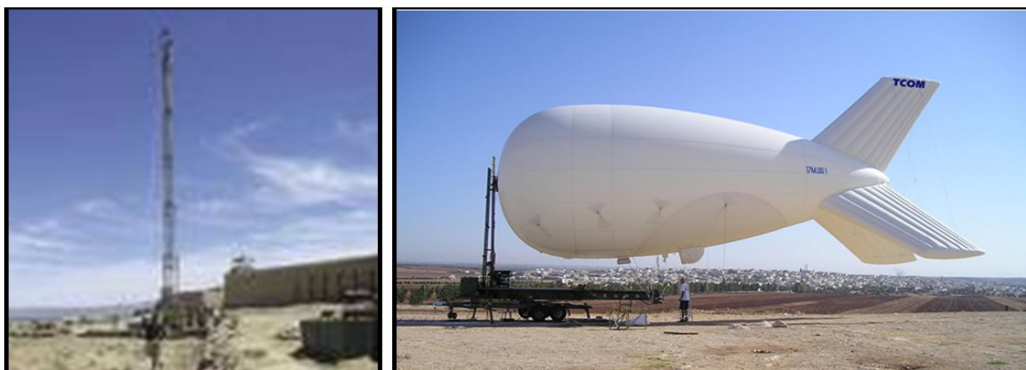
Massive IEDs employed against vulnerable tactical vehicles in Iraq have arguably served as the most harmful IO weapons employed against us in this respect. Those images, along with the U.S.-verified casualty statistics that accompany them, have demoralized the public to the point that bipartisan Congressional concern and dropping presidential opinion polls almost caused the U.S. mission in Iraq to fail through an early withdrawal. This strategic crisis was unnecessary, as the rapid fielding of COTS MRAP would have neutralized that enemy advantage years ago. MRAP was the quickest means of making ineffectual their IED TTPs.

However, MRAPs provided physical protection against weapons effects experienced at close range. These represented defense against a threat that had been permitted to grow unchecked in MNF-W, a less than ideal way to wage COIN then and now. The ability of insurgents to deliberately prepare such massive and highly coordinated events unchecked exposed our lack of Joint Force persistent tactical Intelligence, Surveillance and Reconnaissance (ISR). The persistent ISR was the primary threat enabler.

Experts in COIN and SASO agree that the ideal ISR sensor remains the individual Marines and Soldiers themselves. Stand-alone technological solutions should only fill the gaps. However, in the absence of having sufficient forces in Iraq those ideal ISR sensor systems were not available to saturate the AO in order to gain and maintain the higher tempo of situational awareness. To make up the difference tactical capabilities were needed as a prerequisite to

secure AO-wide tactical vehicle movement. As will soon be seen MCCDC combat developers neither pushed such capabilities to the warfighters en mass, nor fulfilled requests from the MEFs.

On the other hand, the Joint IED Defeat Organization (JIEDDO), spent significant resources to respond to Army tactical ISR needs in theater. The Rapid Aerostat Initial Deployment (RAID) aerostat and elevated camera tower platform combinations were deployed to provide ISR in support of FOB defense and local force protection. However, RAID towers and aerostats were entirely focused on FOB defense and force protection. The Marines and Soldiers of MNF-W were focused on conducting offensive COIN. They did so in spite of the ISR gap in Al Anbar Province and paid a heavy cost in casualties, especially from IEDs.



Figures 23 and 24. RAID tower and TCOM's a smaller 17 meter aerostat JLENS platform.

From 2004 to 2006 the MEF (Fwd) submitted repeated requests for mobile tactical ISR including armed and unarmed Tier II UAVs, mobile tower-mounted cameras, and covert miniature sensor suites. The Army's FOB-defense-oriented RAID and JLENS capabilities were not capable of fulfilling the MEF (Fwd)'s specific needs. Even if they had been, MNF-W was a lower priority for receipt of any MNF-I ISR systems. Those ISR capabilities were either delayed or denied by combat developers at Quantico because of an apparent POR business case to allow Army to fulfill the larger MEF ISR needs with Joint funding, rather than reprogramming USMC resources at MCCDC and MCSC.

In frustration, I MEF (Fwd) open purchased its own ISR systems, and in early 07 this I MEF (Fwd) ISR self-help began to set the IED-planting insurgents back on the defensive, as they now could be seen and killed during their attack preparations. Eventually, JIEDDO provided additional resources for the I MEF (Fwd) self-help ISR initiative known as the "Ground-Based Observation and Surveillance System (G-BOSS). The G-BOSS will be discussed later in this paper.

Discussing the Marines' effective later employment of ISR in support of COIN, Shachtman's article continued: "*All the while, Americans watched the action through high-powered surveillance cameras. Consequently the [Marines] knew who to question, and who to capture or kill...The extremists responded by blowing up the local cell tower... 'Now we've got them making really stupid decisions,' [Colabuno] says... 'They communicate by cell phone, too.'*" The surveillance video Shachtman referred to was likely a ground or UAV component of G-BOSS. These comments reveal that insurgents have become equally dependent on technology



for their activities as U.S. forces are. They also suggest that it may only be necessary for the U.S. to overmatch the enemy's technology exploitation, without giving up the face-to-face principles of COIN.

Shachtman also had the opportunity to interview GEN Petraeus, a cosignatory of the FM 3-34 COIN Manual. The article continued: "***General David Petraeus... oversaw the writing of the new counterinsurgency manual that John Nagl worked on. The book counsels officers ... 'If military forces remain in their compounds, they lose touch with the people, appear to be running scared, and cede the initiative to the insurgents.'***" With regards to technology GEN Petraeus surprised his interviewer when he appeared to differ with aspects of his own FMFM 3-34 COIN manual: "***...I was a skeptic of network-centric warfare for years, [Petraeus] confesses. But thanks to years of wartime funding, he says, the military now has the ability 'to transmit data, full-motion video, still photos, images, information. So you can more effectively determine who the enemy is, find them and kill or capture, and have a sense of what's going on in the area as you do it — where the friendlies are, and which platform you want to bring to bear.'***" Shachtman's article continues: "***[Nagl says] '...The slow-moving Defense Department bureaucracy hasn't worked quickly enough to roll out wired gear for the troops. Insurgents seized on commercial technology quicker than anticipated... suggests that... 'You have to think differently about people,' [Garstka] says. 'You have your social networks and technological networks. You need to have both.'***"

It is clear that 1) our dependence and the dependence of our adversaries on "high technologies" will continue to increase across the entire spectrum of conflict, including COIN; 2) even the U.S. military's COIN experts and staunchest critics of technology over-reliance in COIN admit to its growing critical role, including NCW; and 3) that human warfighters and technologies must be employed as combined arms. As an example the lack of both sufficient human ISR and compensatory technical ISR led directly to the IED emergency that required MRAPs.

### **(3) CSBA paper titled "*Of IEDs and MRAPs: FP in Complex Irregular Ops*"**

In late 2007 a paper titled "***Of IEDs and MRAPs: Force Protection in Complex Irregular Operations***" authored by Andrew F. Krepinevich and Dakota L. Wood was published by the Center for Strategic and Budgetary Assessments (CSBA) (Reference p.15.). The CSBA is an independent non-partisan policy research institute directed by Dr. Krepinevich. His MRAP paper was also referenced in the Los Angeles Times article discussed above, and now serves as an intellectual foundation for the current criticism of the DoD's crash MRAP procurement and fielding program.

In the paper the MRAP crash program of 2007 is declared almost certainly wrong without qualification, and then goes on to say that no definitive conclusions are offered. This beginning probably adds to the confusion. CSBA is known for high quality strategic analysis, but this paper seems to be written without insight into the thinking of the OIF War Planners who championed MRAP and the multiple warfighter requirements for MRAP.

If this study were to help provide innovative thinking, it might frame the issue around some of the following questions: how many MRAPs should we have? If the current crash program is wrong, then is any amount of MRAP capability good, even if only maintained in the PWR? Why didn't Army or Marine Corps combat developer planners initiate the MRAP buy? From a DoD innovation standpoint, why didn't South African Technology get introduced into U.S. capabilities until 25 years after it was proven on the battlefield? Does CSBA recommend MRAP technology at all, and if not why not?

They describe the call for MRAPs as having originated with *“some members of congress and at least one senior U.S. Commander.”* Yet, several U.S. Commanders have approved them. This case study has shown that Commanders of MNF-W, MNC-I, MNF-I, MARCENT, ARCENT, NAVCENT, and CENTCOM have all approved large MRAP requirements. What lacked was the support of Service combat developers to fulfill those valid requirements. As a conscientious board of directors, SECDEF and Congress came to the assistance of underserved warfighters. Leading with *“some members of congress”* in his paper suggested that Congress is initiating the MRAP requirement, when in fact Congress is merely advocating existing urgent warfighter needs for MRAP.

Oddly, the CSBA MRAP paper claims that this MRAPs crash program actually increase casualties through a resupply argument, despite statistically verified 'by-vehicle' casualty data to the contrary that has been circulated in Washington. Regimental Commanders executing COIN tactics report positive results with MRAPs, yet CSBA suggests without reference that MRAPs scare the local populace, and might turn them away from coalition forces. It would be interesting to understand better where this MRAPs are scary argument comes from. The author has noted a recent interview by Mr. Goldfarb of Col Gibbs in Baghdad suggests the contrary (Reference a.25.). Given the positive battlefield results in 2007, it is more reasonable to assume that the larger, more capable vehicles reassure the populace in our commitment to their security.

The paper provides cost-benefit anecdotes without rigorous, pro-forma cost-benefit analysis. So-called hidden costs of MRAPs, like increased fuel usage, and list-price comparisons are provided as evidence that the MRAPs are too expensive, without regard to hidden costs of HMMWVs at the Strategic, Operational, and Tactical levels of war. This can also include the present value of future cash flows from KIA and the high costs of seriously wounded troops in the form of VA hospital costs. The HMMWV lifecycle in combat is less than two years and M114s and UAHs is estimated to be less from greater mass. This contrasts with an MRAP lifecycle costs that are estimated to be 10 years. This reveals that the simple list price comparison is inadequate.

Shorter term considerations like political pressures to decrease troop presence in Iraq are not balanced with characterizations of “The Long War” or other analysis by Dr. Krepinevich, where he predicts we will be in Iraq for the next 20 years, or more. The actual “squaring of the circle” does not involve retroactively requiring the urgently procured MRAPs to conform to all future expeditionary or off-road requirements, but to ask how the JLTV will both protect occupants and be qualify as expeditionary. This was never the intent with the urgent

MRAP procurement for OIF. It will also be interesting to see what the trade-offs will be between weight and protective characteristics in the JLTV.

Finally, the issue is not an unwillingness of commanders to place their Marines and Soldiers in harms way. U.S. forces have and always will be prepared to expose themselves to substantial risks and hardships. The determination of the MEF (Fwd)s to conduct offensive COIN in Al Anbar Province in spite of an IED menace and a lack of adequate protection is evidence. The U.S. public should not need to be desensitized to a greater numbers of casualties (as the paper suggests) when the COTS MRAP capability exists and is available to mitigate many of those casualties, without sacrificing the mission. Rather, Dr Krepenovich should address the Service combat developers and how they can be more responsive to forces in the field.

#### **(4) Author's perspectives on the MRAP need in the context of OIF**

Other critics have suggested that MRAP is an example of the over-reliance of U.S. Forces on technology in their attempted conduct of COIN, especially in Iraq. They are correct in that the use of technology cannot be an end in itself, such as simple convenience to avoid all danger, or mere comfort and convenience. Gaining and maintaining contact with the population is first and foremost a function of direct face-to-face interaction. In COIN indigenous incentives and loyalties are often fluid, and this morning's innocent can easily be this afternoon's combatant if the sensed sincerity and expressed objectives of the local and the Marine do not align.

COIN analysts correctly emphasize that face-to-face contact without the barriers of armor and glass is in principle the most reliable means of maximizing situational awareness and achieving clear communications under such circumstances. This unmitigated personal contact is also key to identifying and gaining and maintaining contact with the enemy as well. The shared, unshielded vulnerability of the local and the Marine are also key to the credibility of the Marine. Dismounted operations and intimate proximity are ideal conditions for the conduct of COIN. The Marine Corps has known this since its successful employment of Combined Action Platoons in Viet Nam, vividly described in Francis J. "Bing" West's book "The Village." On the surface COIN doctrine today could even be perceived as rejecting high technology solutions.

However, today high technology should not be under-valued in our COIN solution set. Our insurgent opponents are also entirely dependent on technologies of varying maturity in order to conduct their simplest acts of asymmetric mischief. Enemy use of the internet to access Wikipedia to understand the construction of a field expedient EFP, to the use of basic commercial wireless products like cell phones and walkie talkies, and even momentary switch technologies, scopes and binoculars all represent technology dependencies. Insurgents also require a gas or electric circle saw or another tool to neatly cut pavement to deeply burry and conceal a center line IED, as just another of many examples. At the most basic level our enemy depends on reliable military explosives having long shelf lives. Even the accelerants employed to augment the blast are often commercial products. Even in Viet Nam and certainly every insurgency that preceded it, the success of neither insurgents nor occupiers can be

completely divorced from technology-enablement. Guns eventually defeated lesser-armed Native Americans and Zulus, even though it is commonly agreed that man-for-man they were probably better warriors. All other measures be equal technology remains crucial to achieving victory. In MNF-W sophisticated biometric tools and networked ISR are examples of successful overmatching in this regard, even though the solutions are coming very late indeed.

The key to COIN would then appear to be the employment of technology as necessary to *overmatch* the asymmetric opponent without sacrificing the intimate human connection between the populace and the Marines in Iraq. Most students of warfare would probably agree that even in COIN one cannot discard the mobility provided by vehicle technologies over the long hauls between urban areas. They might also agree that even in the cities themselves vehicles will remain critical as they overmatch our often foot-mobile opponents with capacity and speed. Overmatching could be better achieved with technology/capability balance, perhaps not the replacement of the entire HMMWV workhorse fleet with cumbersome MRAPs. The HMMWV still offers a degree of ease of access and inner-city mobility that the MRAP cannot, and social connectivity is not degraded. The Marines of the MEF know how to conduct COIN, and want nothing more than to do so, environmental conditions and situational awareness permitting. Ideally, if combat developers had properly equipped the MEFs for a rapid transition from conventional combat to COIN in Iraq the threat of IEDs would be virtually non-existent. The urgent need for MRAP would never have developed.

Retired Army Gen. Barry McCaffrey is partially correct in observing that: "*We went in the wrong direction*" with the MRAP surge. However, the question from the Marine Corps standpoint is when that 'wrong direction' actually began. Some have argued that the physical size and mass of the MRAP, and the disruptive urgent program itself, are cumbersome bandages on a wound that could have been treated differently. The author of this case study suggests that in the case of the USMC the wound was largely self-inflicted as operating forces were denied an adequate mix of ISR (both troops and cameras) by combat developers that might have helped prevent the IED emergency altogether. In short, the MRAP was needed to compensate for a lack of material preparation for COIN in Iraq. Technical tools needed to overmatch the insurgent's degree of wide area situational awareness were non-existent. Listening posts and ambushes were employed against the MEF, when COIN dictates that U.S. forces should prevail in this regard (Reference p.15.).

USMC combat developers also did not respond to the immediate IED emergency after it appeared in 2004, 2005, 2006, and through the beginning of 2007. With full knowledge of the casualty rates, they waited for forces to submit requests for mature capabilities (often repeatedly) in a reactive mode. The unmitigated IED onslaught was evidence that we had lost the technological advantage against our asymmetric foe. UUNs were employed as forcing functions to coerce basic support out of MCCDC, and still the resistance to reprogramming from local POR priorities increased rather than subsided. The emergency grew to such an extent that Congressional and SECDEF oversight was needed to compel USMC from the outside to field an "80% operationally effective and suitable" MRAP solution en masse, in support of multiple validated needs for MRAP. GEN McCafferty is correct in observing that MRAP is coming late, but this is no fault of the MRAP operators and advocates. It is an indictment of USMC combat developers who were evidently unable to project threats and hedge against OIF uncertainties.

Any urgent equipment provision decision should be made soonest so as to accommodate the need for delivery lead time. The IED-vulnerable M1114 and even the 2<sup>nd</sup> generation HMMWV MAK kits required lead time. This is all the more so for the COTS MRAP which wasn't even contracted until years after the original operator requests. Considering the obvious dilemma being faced by Marines on a daily basis, even in the open press, one would reason that MCCDC introspection and immediate course corrections would be spontaneous. Instead, as Maj McGriff had encountered on the subject of MRAP, there was a firm MCCDC adherence to a STOM-based investment vision. Capabilities invented or asked for from without that deviated from STOM were diverted for study, or dismissed. OIF would be short and distractions from OIF could be "waited out." This was especially true during the period of late 2004 through summer 2006, the period of greatest ISR, NLW and MRAP investment need.

Professional forgiveness is implied in the saying that 'hindsight is always 20/20.' This saying is fair for many of the tactical and operational surprises that USMC forces have encountered in OIF. The massive surplus and wide distribution of munitions stocks for use in IED construction, and the inability of U.S. forces to immediately secure ammunition depots during OIF I was one. The possible deliberate pre-staging of weapons and explosives in preparation for armed resistance by old regime loyalists, are others that can be attributed to a thinking enemy as well. Also, the length of the U.S. and Marine presence in Iraq was unknowable, as was the difficulty of establishing the political preconditions of a fledgling democracy. Finally, the technological creativity, rapid adaptability, and courage of insurgent forces facing Marines can out of fairness be said to a great degree to have been unpredictable. In the cases above, MMCCDC and SYSCOM can be forgiven for any lack of specific conceptual or material preparedness on those issues.

However, in the case of OIF USMC combat developers had ample warning and lead time to prepare and/or react appropriately on many other fronts. Some form of effective post-invasion unrest could have been predicted in 2003 due to the commitment of a smaller than optimal force for a very large task. The author was a HQMC witness to PP&O serving as a vocal representative of USMC concerns that the total U.S. force being committed to the OIF coalition was insufficient for the task at hand. MCCDC was also aware of this HQMC concern. While the IED emergency could perhaps not specifically be predicted in 2003, vast gaps in our tactical persistent surveillance, non-lethal weapons capabilities, and our deficient communications capacities in an Arabic and Kurdish speaking nation were.

Another important element that could have been predicted was Congressional support by means of supplemental funding following the passing of the "Joint Resolution to authorize the use of United States Armed Forces against Iraq" in 2002. In spite of differing member perspectives on the conduct divisions over the course, both parties have supported the forces in OIF in practice. In fact they have consistently supported exceptional funding measures in this regard with MRAP being only one example of many. USMC combat developers have known throughout the conflict that the USMC can freely approach Congress for such exceptional support without hesitation.

As noted earlier for MRAP, a handful of USMC advocates knew from history that mines would become an ever-more attractive insurgent weapon. Unfortunately, their repeated arguments begun in 1996 did not sway USMC developers, to consider even a limited purchase of MRAPs for Prepositioned War Reserve (PWR) or depot storage to hedge against uncertainties. Similarly, other operator advocates saw the urgent need for advanced non-lethal capabilities as far back as the early 1990s, with advanced being understood as non-kinetic such as optical, RF, acoustic, and directed energy weapons. NLWs represented a technology-enabled opportunity to accomplish the mission without undermining the IO campaign through kinetic force protection against people who might otherwise side with us. NLW advocates also did not manage to sway USMC developers. Finally, the vast expanses of Iraq and a limited MEF footprint meant that SA would have to be augmented with persistent ISR. MCCDC did not initiate action to prepare for this obvious gap and delayed its development even after the MEFs felt compelled to ask for it.

#### **b. USMC challenges regarding equipping MEFs appropriately causes IED emergency**

As will be seen below USMC combat developers set the conditions for an operational emergency that compelled the late surge of MRAPs. Since the optimal capabilities needed for effective COIN were being routinely denied to the MEFs, operating force vulnerabilities to IEDs and other threats grew, along with CF casualties. While MRAP has benefited from public name recognition in recent months, USMC operators and Congress have also pressured combat developers on this full range of other COIN-enabling and urgently needed capabilities. These technology-enabled capabilities fit GEN Patraeus, LTG Odierno, and Dr. Krepinevich's concepts of using some of the U.S.'s own asymmetric advantages to regaining the initiative by setting the battlespace conditions that are prerequisite for COIN to take place.

It is worth repeating a paragraph from earlier in the case study. Again, the reason that the MRAP program has grown in scope is because MCCDC ignored common sense COIN requirements, as well as the growing IED emergency in MNF-W. The COIN capabilities that might have prevented the emergence of a significant IED threat in the first place had not been provided by MCCDC combat developers. These included ISR, armed ISR, NLW, IO-supportive communications equipment, real-time language translation, and other tools. When the MEF recognized the growth of those COIN gaps, it researched and submitted specific requests for mature solutions. Even those theater-generated UUNS requests for COIN capabilities were dismissed at MCCDC. It took extraordinary efforts by I MEF (Fwd) to force the fielding of MNF-W-wide threat-mitigating ISR, but the IED emergency grew to the point that at least initially ISR alone would not be able to stem the casualties. The widely publicized and strategically demoralizing emergency compelled a concerned SECDEF and Congress to act as a conscientious board of directors and step in. As will be seen later in this study, by then the magnitude of the threat dictated a significantly larger solution, i.e. the MRAP surge in 2007.

The major areas in which conflicting and non-operationally focused combat developer priorities frustrated MEF (Fwd) initiatives include:

#### **(1) Persistent Intelligence, Surveillance, and Reconnaissance (ISR)**

It can be convincingly argued that if USMC combat developers had acted assertively on the information that was known to them in 2003 with respect to ISR needs and looming OIF challenges, different conditions would have existed in Al Anbar Province. The proper execution of COIN would have been permitted earlier with a reduced need for MRAP levels of armor as Marines and Soldiers would have possessed some omniscience throughout MNF-W and the insurgents would not have been able to execute their IED tactics. This would have been the case both within the built-up urban areas where COIN is executed as well as along the long lines of communication between them.

Instead of predicting, planning, and pushing creative ISR solutions to the MEFs, combat developers allowed gaps in ISR to grow prompting the costly in-theater emergency that led to the MRAP surge. In response the operators felt compelled to submit UUNSSs. There was at first an optimistic expectation that rapid combat developer actions to provide the COTS capabilities that had been well researched would follow. Yet, even then MCCDC in most cases rejected the operator requests, defaulting instead to preexisting business cases that did nothing to solve the urgent ISR needs. The delays that resulted were costly in theater. Examples of inadequate combat developer efforts to provide persistent ISR to the MEF (Fwd) include:

**(a) Tactical Concealed Video System (TCVS)**

TCVS is a plug-in component subsystem a broader Ground-Based Observation and Surveillance System (G-BOSS). Basically, TCVS constitutes a network of miniature cameras and other optional sensors for remote viewing and recording. From concealed 'hide' positions these networked ISR sensors capture the nuanced micro terrain, and the human-social activities within urban and other built-up areas of interest where UAVs and tower-mounted cameras lack field of view (FOV) access and/or magnified granularity. In 2004 I MEF (Fwd) recognized that in COIN operations in Al Anbar Province TCVS would help gain and maintain contact with the population and the enemy. It would also help Marines in developing a better understanding of enemy tactics, techniques, and procedures (TTPs) involving their employment of IEDs. It is in this context that TCVS has proved to be an absolutely complimentary capability to the larger G-BOSS Video – Common Operating Picture (V-COP). Once insurgents came to realize they are being persistently observed in open areas in the MNF-W AOR by tower mounted cameras and UAVs, they took greater pains to focus on urban micro terrain choke-points and areas that benefit from overhead obstructions to plant IEDs and emplace deliberate SAF ambushes (References 7.7., r.14, and r.26.).

In these compartmentalized locations TCVS will provide unique ISR inputs with any networked user being able to access any TCVS camera as well, to complete the G-BOSS macro view. Furthermore, the local high-resolution granularity that TCVS imagery will provide networked users will be invaluable for developing a detailed intelligence picture to provide COIN situational awareness. This intelligence will not only be built from insurgency related information, but also from criminal, and other observable societal data that is key to monitoring the progress of CF SASO and reconstruction efforts in the AOR. It is noteworthy that TCVS also has plug-in acoustic microphone and seismic sensors:

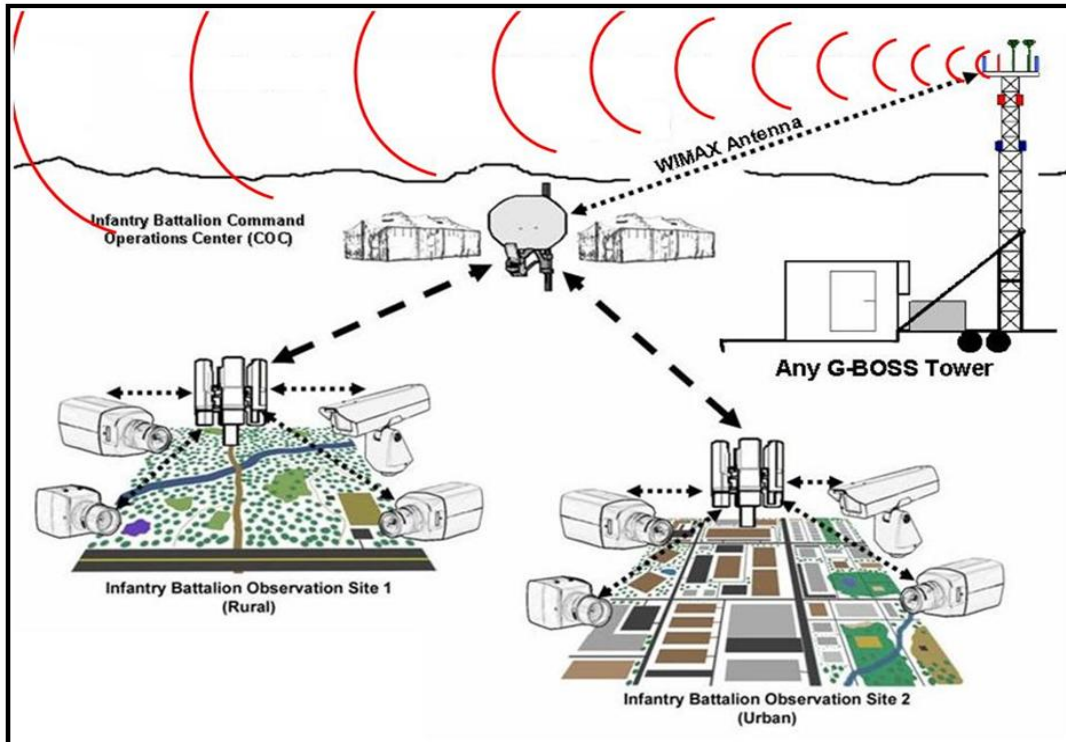


Figure 25. TCVS-G-BOSS integrated Concept of Employment illustration.

As for the history of TCVS, in 2004, I MEF (Fwd) concluded that the MEF's lack of an integrated, automated, day/night, all weather multi-sensor covert persistent surveillance capability to cover micro terrain was having a significant adverse impact on I MEF Forward's ability to accomplish the Marine Corps' mission in Al Anbar Province. The immediate threats that micro terrain surveillance would mitigate at that time were recurring insurgent ground infiltration and indirect enemy fire positioning at Forward Operating Bases (FOBs). The other was insurgent IED emplacement that drove I MEF (Fwd) to submit the 1<sup>st</sup> MRAP UUNS in Feb 05 prior to RIPTOA. Following up on the 2004 request from within theater, I MEF submitted a TCVS UUNS on 20 May 05. That document specifically defined TCVS as the material solution due to extensive prior MEF SME technical research and first-hand operational experience. In spite of a I MEF UUNS approval at MCCDC, MCSC over the next 12(+) months did not manage to field more than a handful of TCVS systems, and these came without TCVS life-extending power units critically needed for operational utility. The TCVS solution delivered to the MEF was incomplete and uncoordinated with the sole source vendor.

In 2006, following the next RIPTOA Quantico, and specifically MCSC inaction with respect to TCVS became ever-more evident even while I MEF (Fwd)'s needs for persistent ISR grew along with the menacing IED threat. Consequently, in an effort to accelerate the fielding of the capability, I MEF (Fwd) revalidated its original 2005 UUNS for TCVS, and added clarifying details. The 2<sup>nd</sup> TCVS UUNS was signed by DCG, I MEF (Fwd) on 12 Dec 06. It included an expansion of the urgent requirement to the immediate provision of a total of 40 fully accessorized legacy (version 1.0) Sentrus TCVS systems. This act of I MEF (Fwd) revalidation and clarification of TCVS followed the same pattern as the MRAP discussed earlier and other UUNS requested capabilities, again in the hope of combat developer action.



Even following revalidation in 2006, MCSC fulfillment of the TCVS need has been marginal, as systems were fielded without fuel cells, extended life battery packs, sufficient spare parts, or a long-term plan for in-theater FSR support. The 2<sup>nd</sup> TCVS UUNS not only requested an increased number of legacy systems, it also requested an immediate-concurrent research and development initiative (R&D) to develop an improved TCVS capability. The urgency of the 2<sup>nd</sup> TCVS UUNS was further amplified by a needs continuation letter signed by CG, I MEF (Fwd) on 27 Dec 06, and in a JUONS for G-BOSS signed in early 07. Finally, II MEF (Fwd) has reconfirmed the urgent need for a total of 40 legacy systems and a TCVS R&D investment as recently as Sep 07.

It is almost three years since the first TCVS UUNS was signed, and the initial capability has yet to be fully fielded and properly supported by MCSC. It has also been 12 months since the second UUNS requested a total of 40 legacy systems. As of the submission of this MRAP Case Study the additional COTS, legacy systems have yet to be contracted. Also, the R&D investment dedicated to an advanced TCVS capability has only been obligated within the last few months, in spite of a Jan 07 Congressional earmark given to MCSC for that purpose.

#### **(b) Ground-Based Observation and Surveillance System (G-BOSS)**

From 2004-2006 the absence of a persistent surveillance capability was having a significant adverse impact on I MEF Forward's ability to accomplish the Marine Corps' mission in Al Anbar Province. Marines and Soldiers in MNF-W were being killed and injured due to MNF-W's inability to persistently observe and mitigate insurgent IED, SAF-Sniper, and IDF attack preparations.

What G-BOSS adds to a fixed camera surveillance system is networking, video warehousing, and high bandwidth ISR asset integration with a theater-wide focus and an offensive orientation. G-BOSS expands ISR far beyond the single mast-mounted camera configuration. First, it adds a second camera to each tower to achieve a continuous 360 degree video panorama. Second, it assimilates-into the V-COP video streams from Tier II unmanned aerial vehicle (UAV) platforms such as the Scan Eagle and Small Unmanned Combat Air Vehicle (SUCAV), as well as those of Task Force (TF) Odin, Angel Fire, and Wasp Micro UAV (MUAV) ISR platforms. Third, G-BOSS assimilates into the COP micro terrain video ISR inputs from such ground sources as the stationary Tactical Concealed Video System (TCVS) and the mobile Cognition-Based Electromagnetic Pattern Analysis System (C-BEMPAS). Finally, G-BOSS employs the computational capabilities of the Angel Fire Backend to time tag and georectify all incoming imagery for video warehousing and instant retrieval. This will enable both historical backtracking to forensically deconstruct events after the fact, as well as forecast upcoming events based on analysis and recognition of pattern. Furthermore, Google Earth renditions of terrain and events will be possible as well as conventional map-corresponding nadir overhead video viewing. Finally, by enabling a true video COP, all authorized CF users in theater will have access to every individual G-BOSS camera view as well as every conceivable collection of camera views. In summary, G-BOSS will frustrate the ability of AIF to emplace IEDs or launch their own attacks due to the likelihood of compromise and CF retribution. G-BOSS will also better enable MNF-W to execute offensive COIN operations and spoiling attacks (References r.9 and r.26.).

The G-BOSS, as an AOR-wide capability was focused on the vast expanses of macro terrain that contain the Main Service Routes (MSRs) along which insurgents planted IEDs and emplaced SAF ambushes. These were the long-haul tactical movement routes for which the MRAP was primarily intended. G-BOSS was in this respect absolutely complimentary of TCVS micro-terrain coverage and would permit offensive COIN operations to be conducted more effectively throughout the MNF-W AOR. Unique aspects of an integrated and networked G-BOSS V-COP would also have significant potential to contribute to the Joint Counter-Improvised Explosive Device (C-IED) fight throughout the ITO. Furthermore, G-BOSS would assist with the challenge of tracking the cross-border activities of foreign Anti Iraqi Forces (AIF). Finally, G-BOSS offered CF the possibility of tracking the inter-theater movement and activities of AIF groups.



Figures 26. The first COTS 106 foot G-BOSS tower in Al Anbar.

On 4 Jun 06 I MEF (Fwd) requested G-BOSS to provide a Video - Common Operating Picture (V-COP), including a deep and instantaneously accessible memory for event back-tracking and predictive pattern recognition. At the direction of the CMC in 06 the G-BOSS requirement was originally submitted as a Service-specific USMC UUNS signed by DCG, I MEF (Fwd) on 4 Jun 06. CMC directed that it be submitted as such based on the recognition that that Army and Joint ISR solutions in the Iraqi Theater of Operations (ITO) did not fulfill MNF-W's need in terms of both the material solution and the time-critical urgency of the need fulfillment. Specifically, the Counter Rocket, Artillery, and Mortar (C-RAM) capability did not satisfy the G-BOSS requirement. G-BOSS is an offensive, theater-wide, operationally-oriented tool, while C-RAM was a tactical defensive tool for Forward Operating Bases (FOBs). Similarly, the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor/Rapid Aerostat Initial Deployment (JLENS/RAID) capabilities did not satisfy the G-BOSS requirement. Instead, the Video System Wide Area Network (VSWAN) was seen as the foundation of a G-BOSS capability that could be networked and expanded, and this led to the articulation of the concept in the UUNS date 4 June 2006.

Specifically, the G-BOSS UUNS sought the immediate Marine Corps procurement of dozens of COTS mobile towers capable of 360 degree dual-camera macro terrain coverage, as well as high bandwidth data transfer capacity. The G-BOSS UUNS also called for the immediate provision of a Master Station for remote tower data receipt, fusion, centralized storage, and V-COP dissemination.

MCCDC was responsible for receiving, analyzing, and approving a requirement to solve the G-BOSS UUNS. Unfortunately, MCCDC middle managers did not concede to the urgency of the operators, the authority of the signed UUNS, or the non-debatable nature of the requested material solution, one that remained amongst the top three priorities of I MEF, II MEF, and MARCENT. Instead, MCCDC pursued a long-term business case for USMC increasing its stake in the C-RAM Program that would not fill the G-BOSS need. Many months of MCCDC middle management inaction followed. MCCDC civilian middle managers were fully cognizant of the chronic vulnerability suffered by operating forces due to lacking AOR-wide persistent surveillance yet chose to obstruct G-BOSS and its plug-in complimentary ISR components. The MNF-W cost of forces killed and injured, especially due to unobserved IED emplacement, due to MCCDC inaction was not trivial.

In frustration and determined to mitigate the severe CF and innocent Iraqi casualties that were jeopardizing the I MEF (Fwd) mission, CG, I MEF (Fwd) decided to procure COTS G-BOSS directly from vendors himself. He authorized the immediate MEF Fwd expenditure of \$20M - \$25M in Operations and Maintenance (O&M) funding to open purchase the COTS G-BOSS capability that Quantico had thus far denied. I MEF Fwd purchased COTS towers, cameras, and communications equipment directly from vendors for shipment to Iraq, and subsequent integration in the field by the MEF's Communications Battalion. This responsible act of leadership, while unorthodox, circumvented support establishment management inaction in order to save lives.

Concurrently, MNF-W drafted a JUONS for G-BOSS that incorporated the TCVS for covert micro terrain inclusion in the V-COP. This document, which included a

request for 240 Scan Eagle Tier II UAVs (see discussion of UAVs below), was presented to the Director of JIEDDO during his visit to Al Anbar Province the Resubmission of the G-BOSS as a JUONS out of frustration with MCCDC inaction on an UUNS again follows the familiar pattern that had been observed with MRAP, TCVS and other capabilities to be described below. In an effort to reinforce the initial capability, CG, I MEF (Fwd) submitted a JUONS in order to gain access to more substantial JIEDDO funding since G-BOSS helped the C-IED fight in the ITO.

Due to CG, I MEF (Fwd)'s personal circumvention of Quantico combat developers, the initial G-BOSS tower, camera, and networked communications capabilities began arriving in MNF-W in Dec 06. CG, I MEF (Fwd)'s employment of JUONS to avoid USMC combat developers mirrored his approach to MRAP. His use of COTS purchases would be successful repeated with other denied COIN-enabling systems as well. The persistent surveillance offered by the initial handful of open-purchased G-BOSS towers and cameras immediately began to set the insurgents back in MNF-W in Jan-Feb 07 by compromising their IED preparations and setting the conditions for CF spoiling attacks. With regards to the element of surprise, G-BOSS turned the tables on the enemy, and helped allow locals to regain initiative as well, now being armed with a superior and actionable situational awareness of criminal and insurgent activities. The reduction in IED attacks were a direct reflection of G-BOSS' success. It was this CG, I MEF (Fwd)-led technological initiative, combined with local cooperation and new alliances in Al Anbar, that began to turn the tide in MNF-W.

### **(c) Tier II Scan Eagle UAV/UAS**

The introduction of a few Tier II Scan Eagle UAVs into Al Anbar in 2004 greatly improved the SA of the MEF forces who benefited from its ISR support. The ability to disseminate Scan Eagle's real time video stream provided an unprecedented ability to gain and maintain contact with criminal and insurgent forces. The Scan Eagles can be queued via a computer network to conduct battlefield damage assessments, confirm intelligence reports, detect targets, and provide real-time streams of tactical ISR video.

The enemy's efforts to avoid constant observation from overhead wear him out by denying him the ability to sustain his tempo, hereby break his cycle of operations. This was repeatedly demonstrated in 2004 during the Al Fajr campaign. Through direct observation of individual insurgents and their activities within Fallujah, Coalition Forces were able to disrupt enemy operations and thwart new initiatives.



Figure 27. A Tier II Scan Eagle in flight and viewed from below.

The COTS Scan Eagle had only been deployed to MNF-W in limited numbers, and constituted a scarce critical asset. As an immediate means of increasing the tactical ISR in MNF-W was an efficient solution. By themselves Scan Eagle (SE) platforms could not be considered sources of persistent overhead ISR. Their fields of regard (FOR) were limited by horizons at typical operating altitudes of a few hundred feet. Additionally, slant ranges to objects and areas of interest within the SE's FOR drove resolution down towards the horizon. In the end, the highly capable SE platforms provided localized benefits only, and on a priority basis due to their scarcity, far from the AOR-wide persistence that was needed.

As the IED threat worsened in the summer of 2006, I MEF (Fwd) determined that the individual combat proven, COTS SE platforms lent themselves to networking and transparent inclusion in a Video Common Operating Picture (V-COP) that the MEF was developing in support of offensive COIN. The G-BOSS concept already incorporated the sensor inputs from networked tower-mounted cameras and the micro terrain inputs of TCVS in the V-COP. Now, I MEF (Fwd) desired to include the overhead imagery of the SE, however on a larger and AOR-wide scale, thereby complementing G-BOSS throughout MNF-W. This would require many times the number of SEs and ground terminals than had been committed to OIF to that date. More SEs operating simultaneously would permit smaller overlapping SE orbits fields of view that have as an outcome higher resolution, redundancies and persistence.

On 27 Jul 06 I MEF (Fwd) submitted a JUONS requesting 60 additional COTS SEs in addition to that declining handful that were still being employed by the MEF. A JUONS was employed because I MEF (Fwd) had already encountered strong informal resistance to the prospect of a SE UUNS submission. Instead of losing time in the IED fight with a futile

MCCDC request, I MEF (Fwd) approached the JRAC through MNC-I, MNF-I, and CENTCOM. I MEF (Fwd) had already experienced superior support from the JRAC with the JERRV JUONS, in light of MCCDC's shelving of the MRAP UUNS in 05. As with the JERRV JUONS, the Tier II UAV JUONS was promptly approved by the JRAC for funding (Reference r.12.).

When the JRAC approves the funding for a validated JUONS a Service must be willing to execute that funding in order to make the system work. Marine Corps combat developer cooperation was essential. Unfortunately, MCCDC, MCWL, and MCSC (who owned the SE contract) had different plans for the future of Tier II UAVs in the Corps. The urgent needs of I MEF (Fwd) to mitigate the IED emergency in MNF-W was less compelling for Quantico than to pursue a preagreed business case and program path for a renewed and time consuming competition of Tier II UAV capabilities. This process would take many months if not more than a years. It followed the standard "Big A" sequential acquisition model, including down-selection, testing, and evaluation.

In spite of letters to Congressmen from Service members under fire in MNF-W and a consequent CONGRINT, and repeated requests from I MEF (Fwd) and MARCENT to provide more SEs, Quantico officials refused to cooperate. In addition to not accepting and executing the JRAC-approved funding for immediate SE platform purchases, combat developers also were permitting the existing SE service contract to run out. No assertive effort was made by any middle management officials at Quantico to intervene on I MEF (Fwd)'s behalf to seek exceptions at HQMC or Congress to fill the warfighter need, even though both of those oversight entities would have been receptive. SE did not fit the programmatic way ahead for UAVs at MCCDC, MCWL, or MCSC with a goal of delivering POR developed capabilities in 2010.

In fact MCWL was already planning to experiment with the MTC "SpyHawk" Unmanned Arial System (UAS) when I MEF (Fwd) asked for more SEs. MCWL intended for the SpyHawk platform to serve as a test bed for developing concepts of operation, TTPs, new technologies, and advanced payloads. MCWL favored the developmental SpyHawk over the COTS SE, and it is noteworthy that the MTC vendor would be considered a competitor of the Boeing/Institu Group-produced SE:



Figure 28. The developmental SpyHawk from MTC currently pursued by MCWL.

When the JRAC offer to fund a USMC-executed expansion of the SE capability defined in the JUONS, combat developers pushed back, in spite of the warfighter urgent need.

As discussed earlier, the G-BOSS UUNS did not fare well before the CDIB at MCCDC, and like MRAP UUNS from 17 Feb 05 was effectively derailed without operationally supportive action in the summer of 2006. I MEF (Fwd) had gone the successful JUONS route in both cases as a means of working around USMC combat developer resistance. In the G-BOSS JUONS, which was also approved by the JRAC resulted in the provision of approximately \$100M in C-IED funding through JIEDDO. Contained within the G-BOSS JUONS was a request for 240 SE systems as a complementary UAS capability to the extensive network of tower and hide concealed cameras on the ground. The author has been told that in 2007 OSD, Congressional, and press pressure finally began to yield the delivery of a number of additional COTS SE systems to MNF-W to assist in the G-BOSS-centric C-IED fight (Reference r.26.).

#### **(d) Small Unmanned Combat Air Vehicle (SUCAV)**

The SUCAV is also a COTS Tier II UAV. SUCAV complemented G-BOSS generally and SE specifically. It had as its primary objective the physical deterrence of insurgent activities intended to harm CF and innocents with IEDs, SAF, IDF, and other enemy weapons. Armed with a suite of kinetic and non-kinetic weapons, SUCAV was designed to threaten insurgents during their attack preparations thereby preventing many of those acts of violence from occurring. Also, by taking the fight back to the enemy with an agile armed robotic platform at those locations where the enemy previously benefited from sanctuary on the ground, an element of insecurity would be added to enemy preparatory actions.

When combined with G-BOSS, whatever the adversary did would have been observable to CF from the practically invisible and silent combination of air and ground persistent sensors that contribute to the V-COP, and then be interrupted by SUCAV spoiling attacks. Furthermore, physical interruption would involve a terrifyingly precise, relentless chain of scalable CF responses that correspond to the insurgent's observed choices on the ground, in real time. As an attached or direct support capability, SUCAVs could escort the movement of tactical vehicles and help provide for the defense of FOBs. An UUNS was submitted for SUCAV on 1 Dec 06 (Reference r.19.).

Conversely, and perhaps more significantly, enabled by the substantial extension of line of sight (LOS) by the presence of G-BOSS towers, SUCAVs in general support could conduct longer range route reconnaissance based on persistent ISR cues. Similarly, they could move to contact against targets of opportunity based on ROEs and the achievement of Positive Identification (PID). In summary, G-BOSS would enable the SUCAV robotic air-to-ground capability to provide MNF-W forces a flexible variety of engagement options. The Figure 28 and Figure 29 drawings below are taken from the SUCAV UUNS:



Figures 28 and 29. Armed SUCAV using inputs from and providing inputs to the V-COP.

SUCAV’s integration of commercial ISR, acoustic communications, NLW, and lethal weapons aboard a commercially available Tier II platform permitted the I MEF (Fwd) operator-conceived and researched opportunity to be fielded quickly. SUCAV was a joint invention of the DCG, I MEF (Fwd) and the A/CS, G9 that would have contributed to G-BOSS’ AOR-wide V-COP while disrupting his IED attacks with a virtually instantaneous sensor-to-shooter decision loop. Following its receipt at MCCDC the SUCAV UUNS was effectively dismissed without any know experimentation investment with the Swift Engineering sole-source vendor. Even today, and in spite of senior Joint leadership calls for such armed ISR platform capabilities, USMC combat developers have not taken any action to rapidly experiment with, develop CONOPS for, procure, and field SUCAV to MNF-W.

MCCDC resistance to SUCAV likely has similar origins to SE resistance. SUCAV employed the COTS Tier II “KillerBee (KB)” monolithic wing Tier II UAV produced by Swift Engineering. Part of the resistance to SUCAV was driven by a lack of verifiable MCCDC technological competencies to understand that the capability was actually mature. Furthermore, as a proven platform offering superior survivability by design, the KB appeared to again contradict the MCCDC way-ahead for Tier II UAS generally, and the favored vendors of MCWL specifically.

Also, the SUCAV concept having been invented by operators in-theater was not conceived within the USMC combat development community, and garnered no advocacy at the CDIB or MCWL. This was a parochial pattern that I MEF (Fwd) had seen before. In spite of combat developer resistance, Swift Engineering has independently gone forward with SUCAV integration and demonstration employing Internal Research and Development (IRAD) funds.

In summary, SUCAV would have greatly contributed to the mitigation of the IED emergency in 2006 if it had been fielded for operational experimentation, even in small numbers. Unfortunately, it too was shelved at MCCDC, and consequences in the MNF-W include unmitigated U.S. casualty rates from IEDs in 06 and early 07.

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Figure . COTS Swift Engineering Tier II KB SUCAV platform in flight.

#### **(e) Multi-Mission Expeditionary Persistent Overhead Platform (MEPOP)**

On 22 Nov 04, then DC, PP&O LtGen Jan Huly as the GCE Advocate signed an UNS requesting immediate investment or partnering by the Marine Corps in promising untethered tactical high altitude airships initiatives at DARPA, DDR&E, and the Missile Defense Agency (MDA). The airship initiative came to be known as the Multi-Mission Expeditionary Persistent Overhead Platform (MEPOP). High altitude airships appeared to PP&O to be exceptional near-term platforms for ISR, weapons, and other specialized functions in Iraq specifically, and GWOT generally. The UNS was also stimulated by frequent CMC comments in the 2004 timeframe that persistent surveillance of the battlefield was one of USMC's top priorities for fulfillment in the counter IED fight. MEPOP was also included in the PP&O/GCE Advocate S&T Addendum to the ARL in 2004 (Reference r.2.).

The MEPOP UNS stated in part: *“The increasing tempo of events, and the ‘events density’ in compartmented urban warfare necessitates an unbroken operational picture. The subtleties of the movements of individuals must be highly resolved and continuous from a vertical aspect angle. Lack of continuity, as associated with the interruptions to persistence in current capabilities, amounts to the commander being forced to ‘blink,’ and thereby often losing situational awareness, as a previously perceived causal chain returns to perceived chaos and background noise. Unbroken continuity of awareness and understanding across the length and breadth of the terrestrial battlefield is critical in obtaining detailed event histories for prediction and attribution and the preemptive interdiction of increasing lethal “super-empowered” individual combatants in the Global War*

*on Terrorism. Urban density adds further difficulty in distinguishing combatants from non-combatants, as well as the challenges of compartmentalization, precision, and targeted retribution in that particular terrain. Therefore, there is an increasing need for flexible, tailorable, multi-capability platforms that maintain persistent and unencumbered line of sight with ground forces...*" The UNS went on to define the limitations of space-based capabilities, unmanned aerial vehicles, and manned aircraft with respect to the specific capabilities requested in the UNS.

The MEPOP UNS continued: *"MEPOP is a ... need intended to exploit and leverage existing and future concepts and technology thrusts related to autonomous, untethered, high altitude airship research and development. Marine Operating Forces need a capability to persistently and passively observe the battlefield from above...Overhead platform capabilities are critical...Specifically, there is a capability gap; an unfulfilled need for the maintenance of continuous, unobstructed line of sight between operators in compartmented, urban, and otherwise denied terrain and the overhead systems that are fielded to support those operators.... MEPOP benefits from an unmatched continuous loitering capability.... The MEPOP needs to be capable of maintaining an altitude of 15,000 feet directly over an area of interest for 30 days, enabling a typical reach of approximately 300 miles, having a 150 nm Line of Sight (LOS) radius from 15,000 feet. Persistence means that there are negligible requirements for intermittent refueling, maintenance, payload recovery, or electrical power refurbishment of the MEPOP bus. The MEPOP needs to be capable of remote piloting by a ground station operator and alternatively be capable of autonomously following preprogrammed instructions and/or execution options without frequent operator intervention. The MEPOP needs to be capable of being launched and recovered outside of the immediate theater with a cross-country transit capability..."* Options for higher altitude platforms were also discussed in the UNS, with the actual anti-air threat in a particular theater determining the loiter altitude and possible the design. As noted below, DARPA and MDA options extended designs and loiter altitudes to 70,000 and 100,000 feet.

The UNS described for combat developers at MCCDC the specific operational payloads and capabilities that such an airship should possess: *[MEPOP-enabled capabilities need to include 1)] Communications On The Move...[2)] Battlespace Awareness: Marines have limited ability to understand the environment in which they operate and the threats they face in denied areas during distributed operations. Commanders require info from across the battlespace, and must be able to transmit this through secure links to forward-deployed Command Posts (CPs), mobile ground stations and centers of military analysis far from the point of conflict. This will require a suite of fused sensors located high above the battlefield providing persistent coverage of adversary targets... [3)] Blue Force Tracking ...[4)] Detection of Mines, Fixed IEDs and Vehicle-Borne IEDs...Our forces require the ability to detect mines and IEDs, and understand their origins, across the battlespace...This capability must be on demand and must have the ability to detect the employment of mines and IEDs in all environments...to include improved surface roads in an urban environment. Further, the system must be able to collect this information in denied areas not immediately accessible to conventional forces. The system must report this information in near real time (on the order of minutes) to the operating forces on the ground. It must also record the history of relevant events so as to allow the Commander to see what events preceded IED detonations after the*

*fact and from where those events originated. Finally, the system must be able to accept tasking from operational units forward deployed....[5] Collection and Reporting of Ordnance Event Data...A MEPOP sensor suite that detects, collects, classifies, and processes ordnance event data is therefore also needed...Objective MEPOP Capabilities...the objective MEPOP spiral needs to be capable of ... of maintaining an altitude of between 70,000 and 100,000 feet directly over an area of interest ...”* Given such ISR equipped platforms high above major urban areas in Al Anbar Province, such as Ramadi and Fallujah, patterns would have emerged and spoiling attacks enabled in a way that would have precluded the need for specialized armor like MRAP. MEPOP was and remains an ideal ISR platform for COIN.

Understanding that a multi-mission high altitude airship platform would have Joint interest, DC, PP&O sought to employ the UNS as a forcing function to compel the USMC S&T Program, MCWL, and MCCDC to partner with on-going DoD initiatives. DARPA’s “ISIS” program was the most attractive as USMC buy-in through a Memorandum of Agreement (MOA) would guarantee that DARPA’s significant resources would pay for the development so long as USMC guaranteed transition or at least operational employment. Also MDA already had in-progress a HAA ACTD which the USMC could influence to its own advantage given a comparatively modest investment. Finally, DDR&E was considering a Tactical Unmanned Airship Capability (TUAC) ACTD, so long as it could find Service interest. The UNS elaborated on the USMC opportunities: ***“The Defense Advanced Research Projects Agency (DARPA) intends to find a Service Partner to embark on a demonstration of the capability described under the Threshold Spiral 1 MEPOP capability above. This untethered capability will also directly leverage the lessons learned from the Missile Defense Agency – sponsored High Altitude Airship Advanced Concept Technology Demonstration (ACTD)...”*** The notional TUAC ACTD residual platform is pictured below:

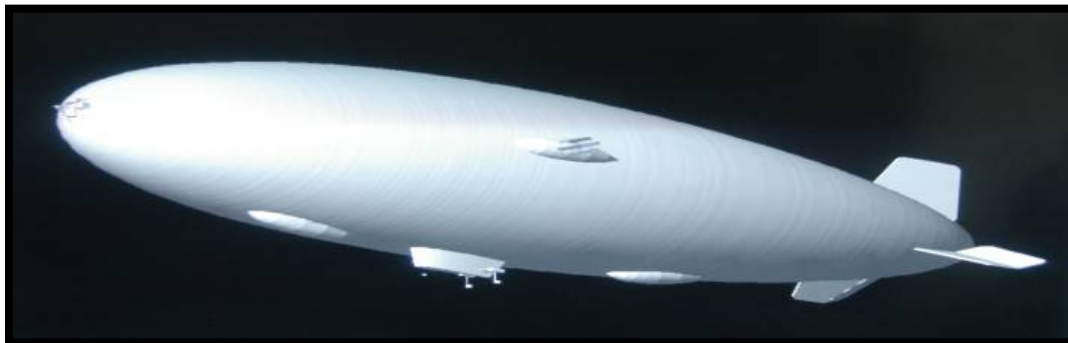


Figure 30. Unmanned airship concept previously planned for the TUAC ACTD.

MEPOP was also conceived as a kinetic weapons platform that could loiter many miles directly over a COIN battlefield, and under the control of the supported commander. The UNS included the following discussion: ***“Kinetic Weapons Launch and Gravity Well Drop. Distributed Operations, particularly in deep vertical urban canyons, will frequently require extremely precise kinetic engagement capabilities against fleeting targets from inorganic supporting arms...In a less permissive air environment kinetic precision, inorganic fires may be constrained to terminally guided indirect fires from mortars, artillery, and perhaps NGF. Terrain trajectory masking and lack of seeker LOS to actively designated targets until a munition's terminal phase will impose severe restrictions on such weapons***

*employment under those circumstances...A MEPOP provides the technology-enabled opportunity for a kinetic fires support platform to maintain continuous, LOS contact between small isolated units and potential targets in such circumstances, and from outside the anti-air threat weapons envelope of all but the most sophisticated adversaries. MEPOP could also deploy and possibly recover unused long-loiter munitions from over the battlefield.”* Such a gravity launched precision munitions platform would have made a significant contribution to COIN in Al Anbar Province, especially today.

MEPOP was also conceived as a persistent broad spectrum precision illumination platform. The UNS included the following discussion: ***“Precision Battlefield Illumination. Deliberate battlefield illumination in non-permissive airspace today is limited to the air and surface lofting of projectiles-flares that illuminate the ground using pyrotechnically-based visible and infrared light. These techniques are limited by the finite burn duration of the projectiles, the pre-illumination loss of surprise by firing unit revelation, the limitations of wind induced uncertainties, an omni-directional illumination that can be as disadvantageous to the attacker as it is to the defender, and a lack of real-time overhead control by the supported unit. Similarly, while permissive airspace allows spotlight-equipped aircraft to provide surgical illumination in support of some operations, pre-execution surprise is negated by the presence of such aircraft, as is real persistence. A persistent overhead platform provides the technology-enabled opportunity to provide continuous, precision illumination under the direct control of the supported unit. As a high power, directional overhead light with, real-time user variability over visible and Infrared (IR), duration, spot size, spot shape, and intensity. The commander would have the ability to 'turn the lights on and off' at will under a variety of meteorological conditions. Various command and control options could be employed, including but not limited to laser designation of spot location or sophisticated radio controlled preplanning.”*** Again, such a persistent, precision overhead IR and visible illumination source would make a significant contribution to COIN in Al Anbar Province.

Unfortunately, combat developers at MCCDC, MCWL, and within the USMC S&T Program at ONR did nothing with the MEPOP UNS. As a consequence ISIS was delayed and today the remnants of the DARPA program will not be tailored to the USMC needs. TUAC failed to make the cut for ACTD funding largely because of a lack of USMC combat developer interest. The outcome of the MDA-led HAA ACTD is unknown to the author at this time, but whatever its fate the USMC had no ACTD “skin in the game” and therefore the residual will not be used to help Marine in their COIN fight in Al Anbar Province. It can be argued that if combat developers had commenced to develop the untethered 15,000(+) foot ISR-equipped MEPOP capability in cooperation with others when the UNS was submitted in 2004 the IED emergency would not have been permitted to develop to the extent that it has. Blimp technologies are mature, even COTS. Untethered, propeller driven platforms under tactical radio control would have been a low risk improvement, capable of resource-driven programmatic acceleration.

Instead, when the persistent ISR gap that arguably brought about the IED emergency in MNF-W was presented to MCCDC in 2006 the USMC was forced to look for different solutions. A single exceptional ISR SME and ISR manager at MCCDC embodied the

same sense of urgency as I MEF (Fwd) in a search for a near-term solution to the persistent ISR gap that MCCDC had permitted to grow over the preceding years. MEPOP was immediately considered as a potential solution, but the immaturity of a radio controlled high altitude platform attributable to MCCDC neglect was soon clear. In a search for alternatives the Air Force Angel Fire manned platform was embraced. Compared to even a nominal MEPOP solution Angel Fire lacked platform on station persistence (hours versus a month) and lacked ‘unblinking’ sensor stinging capabilities (target orbit [periodic revisitation] versus geostationary [true persistent stare]). Most significantly Angel Fire is a manned aircraft operating at risk, even in COIN as MANPADS capabilities improve. MEPOP was unmanned. Another USMC-internal ‘political’ challenge with lighter than air technologies. CG I MEF was disenchanted with such platforms. USMC had been offered a small tethered capability by DARPA known as the Marine Airborne Radio Transmission System (MARTS). This field-launched tethered blimp communications capability failed during experimentation with I MEF (CA). Neither MCWL nor MCCDC recognized the difference between MARTS and MEPOP, and apparently neither did CG, I MEF. This became evident when CG, I MEF refused to consider the employment of JLENS tethered blimps for ISR over FOBs and COPs, even though Army was employing JLENS successfully. Angel Fire became the only default near-term solution to ISR since COTS Scan Eagle requests from in-theater continued to be refused by MCCDC.

It is noteworthy that CG, I MEF had also previously served as the DC, CDI at MCCDC. He would have overseen the CDD and its CDIP process during the period that the MEPOP UNS was deferred to MCWL for study, as was the fate of so many other needs submitted from in theater and from Advocates during the period 2004-2006. MEPOP ended up being just another example of the inability of the GCE Advocate to influence combat developers on developmental initiatives that were thought up outside of MCCDC and MCWL, and the consequences of that GCE impotence.

#### **(e) Cognition-Based EM Pattern Analysis System (C-BEMPAS)**

The C-BEMPS is a technological opportunity to employ mature cognition-based neural networks review digital video streams in order to identify and exploit the unconscious patterns of the adversary’s IED employment. C-BEMPAS sought to operationalize the state-of-art in cognitive computer science tools to detect and characterize IEDs during tactical movement. This neural network capability would also analyze video collected from other G-BOSS sensors on the ground and in the air. Machine-based sensing, analysis and alerting were the keys. Advanced artificial neural networks are capable of conducting deep analyses in real time in a way that both creates a rich library of relevant patterns, and allows the machine to learn from experience. In short, machines can develop intuitive skills that keep pace with insurgent TTP changes in ways that the human operators cannot.

Excerpts from the C-BEMPAS UUNS (Reference r.20.) include: ***“MNF-W has a Time Critical Joint urgent operational need for a Cognition-Based Electromagnetic Pattern Analysis System (C-BEMPAS) to aide in the Counter-Improvised Explosive Devices (C-IED) fight. The C-BEMPAS needs to be capable of electromagnetically scanning the terrain immediately to the front of and adjacent to a moving tactical vehicle and automatically interpreting the received data in real time and then alerting operators to patterns of interest.***

*The objective of C-BEMPAS is to enhance MNF-W C-IED operator detection and geo-location of IEDs while he is still outside of the Effective Casualty Radius (ECR) of those devices. C-BEMPAS will...possesses a machine realm capability to learn from experience. Specifically, the neural network will automatically learn from sensory input, and key the human operator to visible and infrared (IR) optical patterns of interest... sensory inputs to the initial spiral of the C-BEMPAS capability will be limited to optical inputs, to include both the visible and Near Infrared (IR) spectra. This particular bounding of the machine's sensory inputs mirrors the known and demonstrated criticality of human eyesight to detecting IEDs, as discussed earlier. Operator interaction will be the key to C-BEMPAS' utility. As C-BEMPAS is intended to function as an active assistant to human operators and observers, a series of interfaces, alerts and tools will be made available to the human to better understand the machine outputs..."* The C-BEMPAS described in the UUNS was intended to be employed as the processor-assistant aboard MRAP vehicles involved in tactical movement, especially in the capacity of convoy security. The MRAP family of vehicles was intended as the platform for mounting and employing the C-BEMPAS during tactical movement, especially during long-haul convoy movement between urban areas on paved MSRs where deeply buried mines were more common.

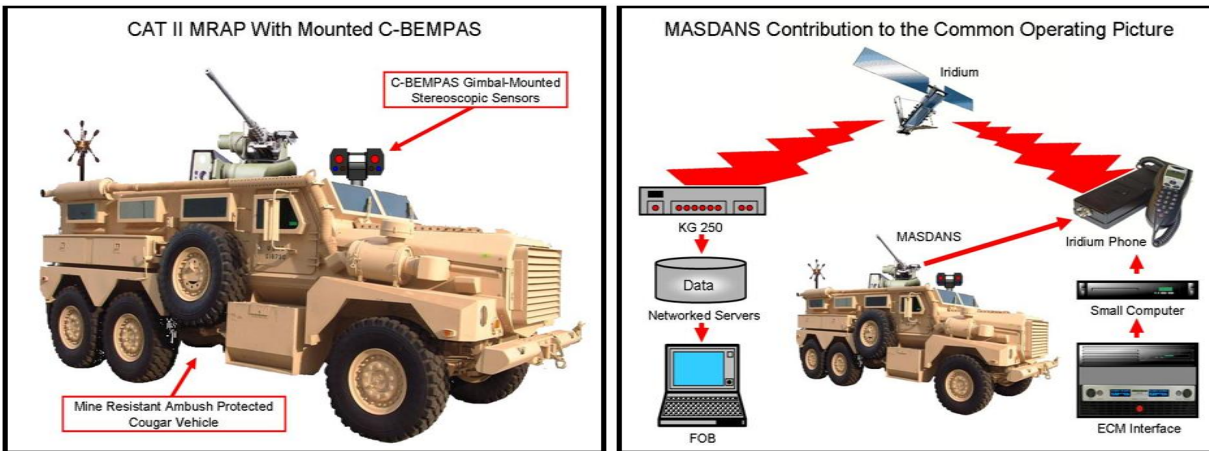
The specific objective of C-BEMPAS was to provide ISR operators technologically mature machine assistants to help recognize patterns of interest within the tens of thousands of digital video streams collected throughout the G-BOSS ISR network. Even though the ISR provided by these cameras and platforms compensates for the lack of sufficient personnel in MNF-W, the down-side is the necessity for operators and analysts to view that video and pick out relevant information. It is estimated that of all the video streams that are collected in-theater, less than 20% are actually reviewed by an operator or analyst. Furthermore, in-theater analysis by operators, the most valued analysis, takes critical personnel away from other missions. It is also tiring.

In COIN, C-BEMPAS would compensate for the desensitization and fatigue of human operators and analysts in IED pattern recognition through employment of an automated machine assistant. This recommended machine-based analysis solution was to serve as a tireless assistant to MNF-W C-IED operators. As processor nodes on the G-BOSS network C-BEMPAS could also continuously review video archives as tasked to identify and alert operators to V-COP patterns of interest that might reveal themselves in subsequent machine analyses capabilities.

A separate UUNS had been submitted for the armament, sensor suite, and MRAP vehicle platform intended to mount C-BEMPAS. It was titled the Mobile Acoustic Shooter Detection and Neutralization System (MASDANS), and was intended to serve as the counter sniper capability in MNF-W. The HMMWV-based Counter Sniper Vehicle (CSV) developed by MCWL without input from the MEF was determined to be non-survivable, and I MEF (Fwd) requested that MCWL not deploy the CSV (Reference r.16. and r.24.).

In the end the C-BEMPAS and MASDANS both were submitted as UUNSS and JUONSSs, and neither was delivered or developed. On the other hand, the IED-vulnerable and under-armed MCWL CSV was delivered, yet it had no operational need basis in

an UUNS, JUONS or UNS. This was again typical of the attitude of combat developers to the origin of ideas, and what the warfighter should accept, and it had costly consequences in theater through casualties perpetuated directly by fielding delays and out-right UUNS rejections.



Figures 31 and 32. C-BEMPAS and MASDANS would contribute to and exploit the V-COP.

## (2) Non-Lethal Weapons (NLW)

It can be argued that if USMC combat developers had acted assertively on NLW needs that were known to them in 2003 Marines in OIF would have had available to them humane, non-kinetic options to control violence without causing permanent harm to innocents. The Joint Non-Lethal Weapons Program (JNLWP) had been chartered and funded to develop advanced NLW capabilities for many years, with directed energy weapons (DEW) having the greatest potential for violence mitigation in COIN. Hopeful that the NLW work sponsored through the JNLWP would lead to early capabilities, Marine Corps warfighters and advocates submitted multiple formal need statements for NLW since 2001 in order to stimulate USMC-specific investments in acoustic, radio frequency, and optical DEW NLW.

Instead of establishing the necessary partnerships, contributing funding, and translating the operational NLW needs into programs for earliest NLW DEW transition, MCCDC pursued its own kinetic NLW priorities and did not respond to operator needs. USMC combat developer opportunities to procure and deploy humane and effective non-kinetic NLWs in support of Marine Corps operations in Afghanistan and elsewhere were missed. Furthermore, the excessively conservative JNLWP would not accelerate the development of its most hopeful capabilities for earliest fielding. Concerns for NLW EA and program management legal liabilities, while placing a premium on the bureaucratic and programmatic interests of developer labs caused the JNLWP to repeatedly hesitate and delay transitions.

The consequences of U.S. Joint Forces lacking state of the art NLW tools in Fallujah (Army-2003), Haditha (USMC-2005), Afghanistan (MARSOC-2006), Baghdad (Blackwater-2007), and other similar instances where innocents were apparently killed needlessly. Independent of the circumstances of each of those engagements and many other cases of escalation of force (EOF) at Al Anbar entry control points (ECP), kinetic weapons were the only tools at the disposal of U.S. forces. Effective NLW options were non-existent. The

many instances of death and injury of innocents at the hands of a U.S. military which is known globally to possess precision, humane, and scalable effects NLW capabilities has harmed the U.S. IO campaign. The highly publicized cases of what is widely perceived to be the excessive and indiscriminate use of force may even have delayed the development of U.S.-Iraqi trust that is critical for COIN to succeed. The delay in the development of trust would have been directly reflected in the delay in the mitigation of the IED emergency in MNF-W.

With respect to the development and transition of advanced non-lethal weapons the USMC has a special responsibility to all Joint Forces and the U.S. Government (USG). As the DoD Executive Agent for NLW development, the CMC is expected to lead the development aggressively to mitigate the escalations of misunderstandings and mob mentality that are common in COIN. Unfortunately, a fear of unknown personal and organizational legal consequences and a debilitating risk aversion within CMC's JNLWP has solidified an incentive to "do no organizational harm" that today takes a higher priority than saving innocents from harm and bettering the credibility of U.S. IO. Two of the NLW programs that have been less than optimally managed include the following:

**(a) Active Denial Technology/System (ADS/ADT)**

Before and since the declaration of the War on Terrorism in 2001, the U.S. has faced an asymmetrically advantaged enemy who gains disproportionate propaganda advantages from media images of the U.S.' excessive use of lethal kinetic force. Such images have harmed USMC IO and Public Affairs (PA) campaigns with a significant adverse impact on the ability of Marine Corps operating forces to accomplish their missions in Al Anbar Province, Iraq. The operationalization of non-kinetic NLW technologies is critical to mitigating this non-trivial impact.

Since 2001 the most promising NLW technology has been and remains active denial technology (ADT)-based DEW capabilities and systems. ADT is also the most mature NL DEW poster child of the JNLWP. The operational benefits of ADT's demonstrated NLW effects are not debatable. As evidence, since 2001 multiple expressions of need from operators have been submitted in an effort to accelerate the fielding of an initial ADT capability, as well as influence further technology development towards expeditionary weapons suitability. Since 2001 two ADT UUNS have been received from II MEF, and one ADT UUNS and one ADT JUONS have originated with I MEF. Several additional ADT needs have originated with HQMC Advocates, the U.S. Army, CENTCOM, and the 1<sup>st</sup> Mar Div. The most pertinent current need originated with I MEF (Fwd) for a Long Range NLW (LRNLW) that specifically requests the only operationally effective and suitable ADT configurations that can be mass produced, namely the COTS Silent Guardian (SG) and Active Denial System 2 (ADS #2) (Reference r.21.).





Figure 33 and 34. SG requested by I MEF (Fwd) for LRNLW, and notional SG ADT platforms.

The CMC DoD EA for NLW development has under his charge the JNLWD, the USMC S&T Program, and the Requirements Division of MCCDC. It is the collective charter of these CMC NLW EA organizations to transition ADT in support of requesting USMC operating forces. In spite of numerous expressed USMC needs for ADT since 2001, no MCCDC or USMC S&T funding has been programmed to develop or field ADT in the vehicle-integrated configurations of operator interest, or in the miniaturization of enabling technologies such as solid state ADT. Also, in spite of the non-trivial criticality and non-debatable SG ADT solution to the LRNLW UUNS, MCCDC management removed \$25M from the 2008 GWOT Supplemental request for ADT even after Congress was prepared to authorize it. This active, negative management intervention was more detrimental to earliest deployment of the SG than the management inaction that preceded it. Fortunately, outside intervention caused the leadership to reinclude it in the request before it was too late.

The chronic urgency of the ADT need expressed in the 1 Dec 06 LRNLW UUNS was and is not debatable, as the unintended casualties that ADT-enable NLWs are designed to mitigate had already been observed in Iraq, in the form of the death and injury of many innocent civilians. Similarly, the specified ADT spiral material solution path within the LRNLW UUNS was thoroughly researched by SMEs in-theater, and was not debatable. Also, the enhancements to the accomplishment of the Marine Corps IO and PA missions in Iraq by means of avoiding unnecessary innocent civilian casualties were not trivial.

MCCDC, JNLWP, and USMC S&T Program management, all under the authority of the CMC DoD EA for NLW, are fully cognizant of the significant adverse impact on Marine Corps operating forces mission accomplishment of their collective ADT management inaction. This includes conscious dismissal of operational CG signatories who intended to influence ADT investment to support expressed needs. This dismissal of ADT investment and acceleration highlights the blatancy of the NLW management inaction related to non-fulfillment of the urgent LRNLW UUNS specifically, and non-fulfillment of multiple past ADT-related urgent needs generally. In summary, USMC combat developer inaction on multiple operator requests for ADT NLW has created a significant adverse impact on the Marine Corps' ability to accomplish its mission in MNF-W.

### **(b) Compact High Power Dazzler (CHPLD)**

In 2005 Marines in Al Anbar province increasingly found themselves compelled to employ kinetic force to stop suspect vehicles at check points (CP) and ECPs. These EOF incidents sometimes resulted in the death and injury of innocent Iraqi civilians who had merely failed to heed visual warnings. As civilian harm continued, it had a significant adverse impact on II MEF (Fwd)'s ability to accomplish the IO and PA missions in MNF-W.

On 9 Jun 05 II MEF Fwd submitted an UUNS requesting 400 COTS Laser Dazzlers from LE Systems, Inc. II MEF SME research had determined that the Compact High Power Laser Dazzler (CHPLD) in particular was the highest power COTS laser dissuasion device on the U.S. market. It also had the largest target spot size of any such commercial device (Reference r.4.).

MCCDC was responsible for receiving, analyzing, and defining a requirement to fulfill the Jun 05 Dazzler UUNS. The Joint Non-Lethal Weapons Directorate (JNLWD) provided MCCDC SME support. In the summer of 05 the JNLWP sponsored a neutral side-by-side test of several green laser dissuasion devices including the CHP at the Air Force Research Lab (AFRL). One of the candidates was the BE Meyers GBD III, an entrant the MCCDC and JNLWP SMEs had insisted on including. The AFRL test determined that the CHPLD was both safer (closer-in NOHD) and more effective (longer range daytime glare).

Inexplicably, MCCDC endorsed the GBD III in contradiction of both the operators and the AFRL report. Subsequent tests at Dahlgren were technically flawed, and the endorsement of their CHP use prohibition recommendations by the Laser Safety Review Board (LSRB) was suspect. Still, the inexplicable commitment to the GBD III survived the protests of operators in theater and even a second MEF UUNS asking for the CHPLD. MCCDC insistence on GBD III also extended the MEF delivery delay to over 18 months.



Figure 35. The COTS LE Systems Compact High Power laser Dazzler (CHPLD).

As with G-BOSS and other delayed capabilities, I MEF Fwd frustration with MCCDC middle management inaction on delivery of CHPLD led to the CG's authorization to open purchase of 28 CHPLD s using O&M funds. The CHPLD s were delivered to Iraq on cost and ahead of schedule, and long before the arrival of even the first GBD III. Instead of supporting I MEF Fwd's initiative, MCCDC and JNLWD insured that the MEFs were prohibited from employing CHPLD s, an effective middle management inaction that directly caused further harm to Iraqis during EOF incidents.

The urgency of the operational need for Dazzlers was not debatable as the tragedies it was designed to mitigate had already been experienced (perhaps hundreds of innocent Iraqi deaths and injuries by the time I MEF Fwd submitted a second UUNS in Dec 06). Similarly, the specified sole source material solution within both Dazzler UUNSS was not debatable. The CHPLD's operational advantages were unique. Finally, enhancements to the critical MEF IO and PA missions were not trivial. MCCDC and JNLWD middle managers were fully cognizant of the superiority of the COTS CHPLD since the AFRL test report of 2005. Instead they waited 18 months to deliver the less safe GBD III to operators. This common foreknowledge eliminates simple negligence as a possibility, and highlights the blatancy of the inaction and misinformation of MCCDC and JNLWD regarding MEF needs (Reference r.22.).

Today, middle managers and SMEs at MCCDC and JNLWD are the subject of a private investigation by Oracle International Inc, in addition to being investigated by several journalists. On a separate front, independent testing of the CHPLD by Laser Compliance Inc. has determined the CHPLD's NOHD (minimum safe range) to be less than half that reported by Dahlgren, and is comparable to the original AFRL report. The CHPLD is 2X-3X safer than

the GBD-IIIC that has been deployed to MNF-W. This independent testing invalidates flawed Dahlgren tests which the LSRB endorsed. The CHPLD was also the subject of a GCE Advocate case study that was submitted to DC, PP&O previously.

### **(3) COIN communications and translation systems**

#### **(a) Automated Language Translation System (ALTS)**

Marines and Soldiers of MNF-W have been co-located and embedded with Iraqi Military forces in order to train them to become operationally and tactically self-sufficient. Additionally, MNF-W Combined Action Group (CAG) personnel frequently interacted with host nation personnel and civilians on a day-to-day basis. Accurate, near real time, and broadly-available Arabic-to-English and English-to-Arabic voice translation was and remains critical for the optimization of IO in MNF-W. As it pertains to mitigating the need for MRAP in COIN, a sound IO campaign established earlier might have mitigated the need for heavy armor in MNF-W as the IED emergency might not have appeared.

The Divisions and MEFs had over previous years sought high fidelity automatic voice translation capabilities as human translators were expensive and scarce. Early in the Global War on Terror (GWOT) the Defense Advanced research Projects Agency (DARPA) had developed the hand-held “Praselator” for wide issuance to operators in Afghanistan and later Iraq. These remarkable 1<sup>st</sup> generation hand-held devices assisted with the most basic communications, especially those interactions relating to EOF and FP. Marines had requested combat developers to provide these systems and directional acoustic comms in various past UUNs. These included CG, 1st MarDiv and CG, II MEF letters (Sheriff), FSEBW UUNs (II MEF), LRAD UUNs (I MEF [Fwd]), and the 3/6 LRNLW UUNs. All expressions of need to MCCDC combat developers went unfulfilled (References r.1., r.2a., r.3., r.6., r.6a., and r.10.).

Since the advent of DARPA’s Phraselator, COTS handheld voice translation systems have advanced significantly. For example, the “The Voice Response Translator (VRT)” is an electronic interpreting box, smaller than most handheld gaming devices, that is programmed by the operator to say different phrases in other languages. The VRT has the capability to say over 350 phrases in Arabic. The VRT uses voice recognition technologies developed in the former Soviet Union. A prototype device has been developed by Integrated Wave Technologies, Inc, (IWT) and Eagan, McAllister Associates (EMA). These prototypes are already being employed experimentally in Afghanistan and Iraq by Army forces.

In spite of the increasing utility of portable COTS products best represented by the like the VRT of today, in 2006 I MEF (Fwd) needed the state of the art in commercialized voice translation. A few hundred phrases were completely insufficient, even then. An entire Arabic dictionary as well as the accurate translations of nuanced concepts, attitudes, emotions, and dialect, were necessary for the MEF (Fwd) to optimize face-to-face COIN interactions at the level of the individual Marine and Soldier.

Over time the technologies enabling real time and near real time voice translation were slowly becoming more sophisticated at DARPA. The agency was engaged in the longer term development of hand-held and laptop based automatic voice translation capabilities that were better than Phraselator, but they were not yet mature. MCWL decided to hitch its hopes for automatic translation capabilities to DARPA's approach.

However, I MEF (Fwd)'s need was immediate, and developmental solutions were inadequate. The other challenge of the DARPA approach was their philosophy for any tactical system the entire translation capability had to reside on the machine in the hands of the operator, and a laptop at most. This severely restricted the memory and processing power of any solution. The parallel processing speed, sophistication, fluency, and language nuance interpretation needed for MEF (Fwd) COIN would need to be based on massive remote data bases and digital libraries, with hand-held cell phone access from within theater. Every Marine with a cell phone could thereby be functionally fluent in Arabic "in practice."

In 2006 Verbmobil was a mature commercial capability developed by the German Research Center for Artificial Intelligence. Verbmobil is a computer that translates between various selected language pairs. The computer works in 'almost real time' and was developed as a business application for conference calls. Verbmobil came to the attention of I MEF (Fwd) through two successful demonstrations sponsored by its American business partner, Raytheon. The key features of Verbmobil that were demonstrated involved the 'near real time' translation between the German and Japanese languages. This pairing could have been immediately adapted to English and Arabic:

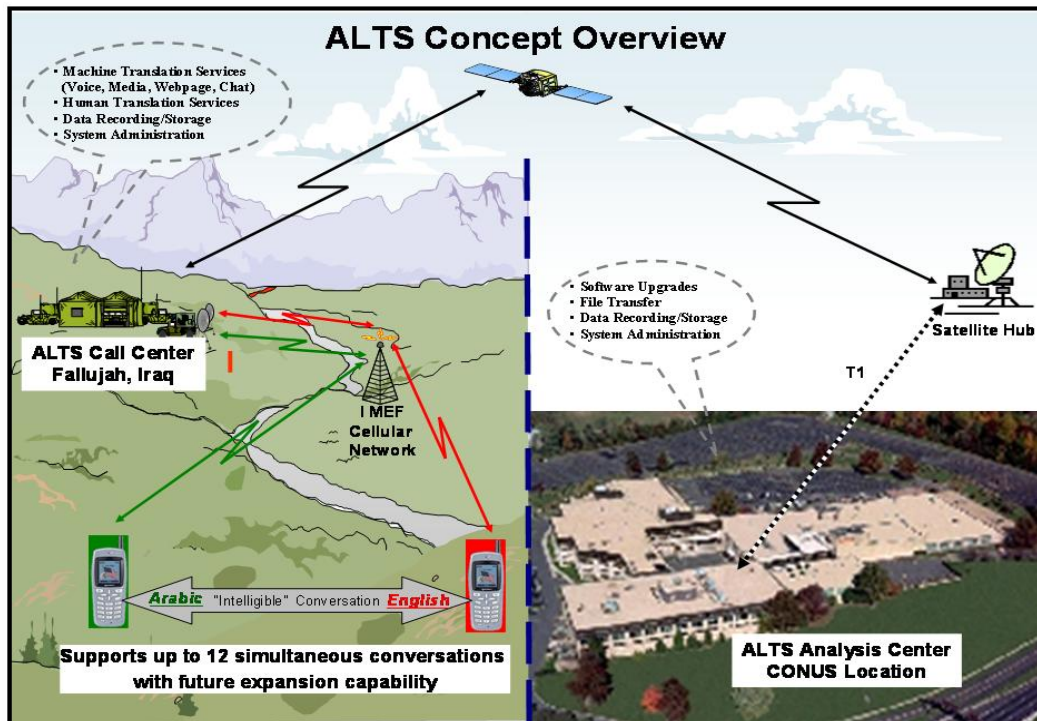


Figure 36. COTS Verbmobil-ALTS Concept of Employment illustration for MNF-W.

For I MEF (Fwd) applications, the COTS ALTS would have been capable of the point-to-point automatic translation of cellular telephone traffic. Any Marine or Soldier equipped with a cell phone in MNF-W would have been able to employ ALTS as face-to-face engagements occurred, with the two parties sharing and alternately speaking into the same handset. The initial ALTS capability was designed to produce a scalable, prototype system composed of a limited number of cell phone nodes, specifically 12 simultaneous cell phone pair conversations. Reach-back to a CONUS Call Center would have allowed troubleshooting.

It was in ALTS' need for uninterrupted line-of-sight cell phone connectivity that the network of G-BOSS towers would have been critical. G-BOSS would have formed the AOR wide area network (WAN) wireless backbone over which the Verbmobile-enabled ALTS would have operated throughout Al Anbar Province. Furthermore, all communications transmitted during the face-to-face interactions for which the translation services are required would have been monitored by voice recognizing software installed aboard G-BOSS. Large volumes of geolocated and time-tagged voice data would have been accumulated automatically for the purpose of voice data warehousing. This data will add a voice comms dimension to the COP and be instantaneously retrievable by operators and analysts.

I MEF (Fwd) asked MCWL to support the urgent MNF-W need for a proven COTS voice-to-voice Verbmobil ALTS. In fact, I MEF (Fwd) was even able to secure \$2M from OSD to accelerate the effort. This funding was provided to MCWL for that stated purpose. Unfortunately, the I MEF (Fwd) urgent need for an immediate and effective COTS solution did not match the MCWL programmatic way-ahead, which was DARPA's longer term and less effective solution. To the knowledge of the author, the OSD funding that had been provided to MCWL in I MEF (Fwd)'s name was allowed to expire through a lack of expenditure.

#### **(b) Long and Mid-Range Acoustic Devices (LRAD/MRAD)**

For certain FP and the most basic IO functions, the simplistic vocabulary and limited phrases provided by the Phraselator were extremely useful in 2006. In the realm of force protection simple warnings and instructions would have to be given acoustically from a longer distance, and with sufficient directionality so that individuals and small groups knew that they were the intended message recipients. These one-way messages would either achieve a cooperative target reaction when intentions were innocent, or alternatively they would confirm hostile intent and thereby contribute to PID so as to justify the application of lethal kinetic force. For this purpose, compact, lightweight, and highly directional acoustic communications devices were needed that could be integrated with the Phraselator. The Long Range Acoustic Device (LRAD) (LRAD 1000) and later the Mid Range Acoustic Device (MRAD) (LRAD 500), both COTS products of the American Technologies Corporation (ATC) were sole-source capabilities in this regard.

In April 2003 in an e-mail to CG, MCCDC, CG, 3<sup>rd</sup> MAW from within theater recommended acoustic non-kinetic capabilities to thwart specific threats non-lethally. Later, in an Aug 03 letter to DC, CD calling for USMC collaboration with OFT on Project Sheriff, CG, 1<sup>st</sup> Mar Div asked for a combined arms suite that included the LRAD component.

This was followed by a letter from CG, II MEF to CG, MMCDC endorsing the 1<sup>st</sup> Mar Div letter. In his endorsement CG, II MEF specifically called out the need for the LRAD. Those early expressions of need for LRAD and directional acoustics did not lead to MCCDC requirements development or USMC S&T Program investment in LRAD or LRAD-follow-on capabilities.

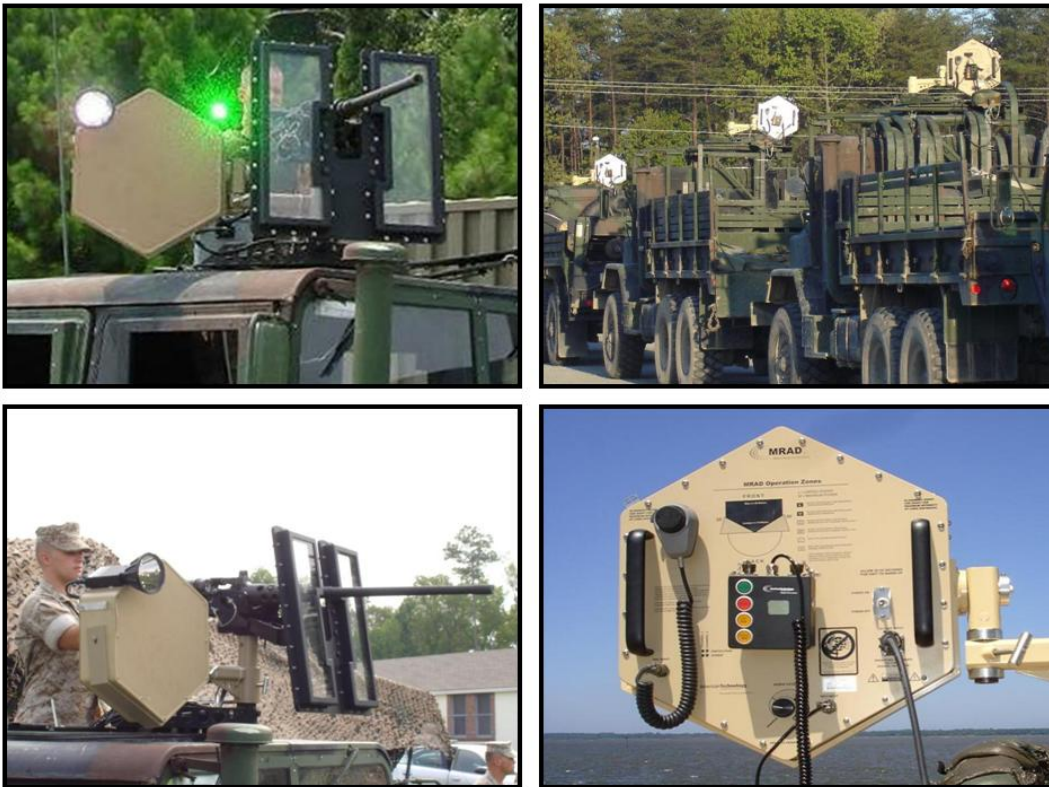


Figures 37 and 38. LRAD 1000 in CA, and LRAD 500 at the I MEF (Fwd) HQ in Al Anbar.

On 14 Oct 04 CG, II MEF signed an UUNS that called for the rapid development and fielding of a Full Spectrum Effects Battle Weapon (FSEBW) in support of OIF-3. The FSEBW integrated a full spectrum of lethal kinetic, non-lethal and acoustic COIN communications tools aboard a Light Armor Vehicle (LAV). The individual components of the integrated system included both mature COTS capabilities and developmental items of lower Technical Readiness Levels (TRLs) that could be accelerated from the lab and into the field, given additional USMC resources. With respect to LRAD the FSEBW stated “...***needs to include the Long-Range Acoustic Device (LRAD) hailer fully integrated with the DARPA-developed 1-Way Phraselator real-time translation capabilities for long-range verbal commands in local languages...***” The LRAD COTS product and the DARPA Phraselator were mature and being employed by Joint forces in OEF and many Army units in OIF. MCCDC combat developers passed on the FSEBW UUNS fulfillment. Furthermore, MCCDC did not make any technology investments that would have led to the integrated capability later, or fund any of the COTS COIN-enabling components such as LRAD and language translation systems that could have been deployed as stand-alone capabilities (References r.1., r.2a., r.3., r.5., r.6a., r.15., and r.19.).

On 28 Jul 05 the Commanding Officer of 3/6, signed an UUNS requesting a Long Range, Non-Kinetic, Non-Lethal Weapon (LRNLW) (Reference r.6). 3/6 was due to deploy to the II MEF (Fwd) AOR within the coming week. Personnel from the battalion were well aware of the success that other II MEF (Fwd) and Joint units were experiencing with non-kinetic optical and acoustic systems, including the LRAD and Dazzlers. The purpose of the

UUNS was to ensure that when the CHPLDs and any future LRADs were procured by USMC and shipped to theater that the Battalion would both help with defining the integrated combined arms design and also guarantee delivery of some systems to 3/6. The description of the 3/6 need stated in part: ***“3/6 has an urgent operational need for a man-portable Long-Range, Non-Kinetic, Non-Lethal Weapon (LRNLW)...Recommendation. Provide 6 COTS integrated LRNLWs possessing L/MRAD, Phraselator, HPWL, and Green Laser Dazzler, and provide funding for the time critical material release, fielding and sustainment.”*** As with the II MEF (Fwd) UUNS that preceded it, the 3/6 UUNS was not acted upon by MCCDC. As with the FSEBW UUNS that preceded it, the LRAD COTS product and the DARPA Phraselator were mature and being employed by Joint forces in OEF and many Army units in OIF. MCCDC combat developers passed on the fulfillment of the COIN-enabling LRNLW as well.



Figures 39 - 42. MRAD (i.e. LRAD 500) integrated within full spectrum weapons suites.

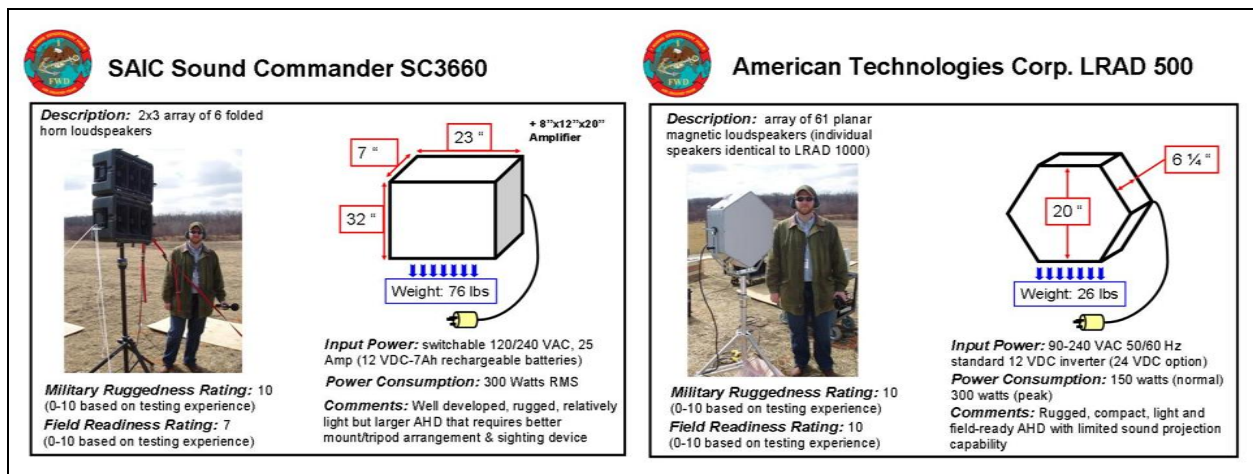
On 26 Jun 06 CG, I MEF (Fwd) signed an UUNS requesting 28 Long Range Acoustic Devices (LRAD). In detail they requested a mix of LRAD 1000s and LRAD 500s, with the LRAD 1000 constituting a longer range system and the MRAD being a smaller, lighter, and operationally more robust. The 28 LRADs were specifically requested due to their relatively compact planer configuration permitting flexible mounting aboard multiple platforms, their extremely directional sound propagation characteristics, and their array simplicity allowing for multi-channel complex mixing permitting the creation of a non-lethal dissuasive mode. Like the dazzler issue, I MEF was aware of LRAD and its uniqueness through market research and hands on familiarization. Like dazzlers, LRAD had also been a component in the II MEF UUNS for F-SEWS submitted 14 Oct 04. Since I MEF (Fwd) was familiar with the obstacles that F-



SEBW had faced in seeking validation, the material solution desired was precisely defined in the UUNS for unambiguous clarity, this time asking for the LRAD-enabled directional acoustic capability. The LRAD and its compact sister system the Medium Range Acoustic Device (MRAD) (a.k.a. LRAD 500) were known to I MEF (Fwd) to be COTS products that could be produced in the requested quantities within the UUNS delivery timeline of 90 days (Reference r.10.).

I MEF (Fwd) was aware that Joint Forces were successfully employing LRADS and MRADS in operations. The Army’s Rapid Equipping Force (REF) has successfully fielded some to Army forces in Iraq and elsewhere. It has been widely acknowledged that the LRAD and MRAD readily lend themselves to integration with other non-kinetic NLW such as collimated white lights and dazzlers, more so than other acoustic systems. Unfortunately, instead of executing the I MEF Fwd request as it was submitted for speed of fulfillment, it the MCCDC Force Protection Division sought a different outcome.

The Force Protection Division also had an institutional and programmatic interest in promoting the Sound Commander SC3660. Personnel there had previously made an independent determination, prior to the generation of OIF UUNSs related to acoustic hailing devices and NLW, that the Sound Commander SC3660 was what the operating forces needed. So, second-guessing the I MEF (Fwd) need as it had done with the II MEF FSEBW UUNS and the 3/6 LRNLW UUNS that preceded it, instead of fielding COTS LRAD, the MCCDC NLW program asked for a side-by-side test. In a Limited User’s Military Assessment (LMUA) the LRAD and MRAD were compared to a number of other sound systems, including the MCCDC’s Sound Commander. Penn State University ARL was contracted through the JNLWD to conduct the evaluation:



Figures 43 and 44. I MEF (Fwd) report extracts showing superior characteristics’ of LRAD 1000.

The result of the evaluation was that the MRAD (a.k.a., LRAD 500) was rated as the number one choice for check point and vehicle mounted applications in the Final Report, i.e. the missions that I MEF Fwd was considering for that system even before the evaluation. The Executive Summary of the ARL report states that the LRAD 500 (a.k.a. MRAD) was rated as the number one, and the Figure 43 matrix is copied from the actual report (highlights by the author):

AHD Ranking	Large Ship and Area Applications	Small Boat, Vehicle and Check-point Applications
1	SC3660	LRAD 500
2	PSAIR42	PSAIR42
3	MAD LTPMS 54	SC3660
4	-----	MAD LTPMS 6

Figures 45. Extract from the PSU ARL “Acoustic Hailing Device (HD)” evaluation report.

In and of itself, this superfluous comparative test caused a significant delay in any provision of any material solution to the I MEF (Fwd) UUNS. Because the requesting unit was actively engaged in combat one would expect the NLW program developer to immediately provide the requested systems. Instead, as evidenced in a MCCDC UUNS status message of 24 Aug 06, the MCCDC NLW Program chose to mis-represent the evaluation report results to I MEF Fwd in formal message correspondence.

On 17 Aug 06 the MCCDC CDD forwarded a message to the I MEF (Fwd) G-9. It stated that the PSU ARL side by side evaluation of the Sound Commander 3660, LRADs, and other devices revealed that the Sound Commander was the superior device. Specifically the forwarded MCCDC message stated: ***“Conclusion: The Sound Commander SC3660 greatly out performed the LRAD and PSAIR42 in head to head COMPARISONS. Additionally the Sound Commander SC3660 provides more sound projection capability for less cost.”*** In that message, no mention was made of the actual “number one” ranking of LRAD 500 for the missions and applications of interest to the MEF (Fwd). This misrepresentation was accompanied by an implied threat of additional delays in fielding if I MEF (Fwd) insisted on the LRAD path. The message continued: ***“If the LRAD is the only solution to the MNF-W UUNS, fielding will require in excess of \$1M, which is currently unavailable for rapid procurement...Realignment of the additional funding would entail a significant delay in fielding IOT seek MROC approval and identify additional funding sources”*** This statement is again evidence that the actual operational need is less important than the discomfort that combat developers experience with bureaucratic adjustments to their PORs. Finally, the message requested I MEF (Fwd) feedback on the MCCDC decision: ***“Request I MEF provide concurrence or non-concurrence (with supporting rationale) as appropriate...Concur/non-concur requested NLT 20060901 for re-brief to CDIB.”*** (Reference e.5.).

On Aug 29, after having had a chance to view the actual PSU ARL evaluation report, the A/CS G9 for I MEF (Fwd) fulfilled the MCCDC requirement for a response. In that e-mail the G9 stated: ***“In short, the I-MEF (FWD) does not concur with the proposal made in the STATUS OF THE OIF-III MNF-W LONG RANGE ACOUSTIC DEVICE (LRAD) URGENT UNIVERSAL N message dated R 241320Z AUG 06. The supporting rationale is contained in the power point brief attached to this email.”*** (Reference e.5. and p.5.). It is noteworthy that neither the MRAD nor the SC3660 were provided to I MEF (Fwd) by MCSC or MCCDC prior to RIPTOA in Feb 07. Instead, I MEF (Fwd) ended up open-purchasing 28 MRADs with O&M funding to fulfill its own requirement.

Similar to the dazzler case, MCCDC Force Protection Division had made an independent determination, evidently prior to the generation of OIF UUNSS, related to acoustic hailing devices (AHD) and acoustic NLW applications. MCCDC had predetermined that the Sound Commander SC3660 was what the operating forces needed. When confronted with the I MEF Fwd UUNS that refuted MCCDC presumptions and decisions to which they had already committed resources, MCCDC managers conceived a means to guide the user back to the Sound Commander, instead of fulfilling the need. This was done by means of the PSU ARL side-by-side evaluation that had been hoped to independently confirm MCCDC's previous unilateral programmatic decisions, made in an operational vacuum.

However, to the dismay of MCCDC Sound Commander champions, the PSU ARL evaluation did not confirm the MCCDC NLW Program's presumptions and sided with the I MEF (Fwd) user perspective, as the LRAD 500 was ranked as "number one" for vehicle mounted and check point applications. Unwilling to yield to the urgent needs of the MEF (Fwd) blatantly misrepresented the test results to reflect the MCCDC view. In the end neither the LRAD 1000 nor the LRAD 500 were delivered to the MEF (Fwd) by MCCDC or MCSC. Furthermore, no individual in the combat development process was held accountable for the deliberate official misrepresentation of the test results.

#### **(4) 25 May 07 Associated Press: "Marines Fail to Get Gear to Troops"**

On 25 May an article titled "*Marines Fail to Get Gear to Troops*" authored by Richard Lardner appeared on the Associated Press wire. It captures well the scope and concern of the unfulfilled urgent needs documented above, including MRAP. This article came on the heels of press revelations that the I MEF (Fwd) MRAP UUNS of 17 Feb 05 had not been fulfilled (Reference a.12.). The article stated in part: "*The system for delivering badly needed gear to Marines in Iraq has failed to meet many urgent requests for equipment from troops in the field, according to an internal document obtained by The Associated Press. Of more than 100 requests from deployed Marine units between February 2006 and February 2007, less than 10 percent have been fulfilled...It blamed the bureaucracy and a 'risk-averse' approach by acquisition officials. Among the items held up were a mine resistant vehicle and a hand-held laser system. 'Process worship cripples operating forces,' according to the document. 'Civilian middle management lacks technical and operational currency.'...The document's claims run counter to the public description of a process intended to cut through the layers of red tape that frequently slow the military's procurement process...*" This draft brief accurately reflected the lack of faith, and often trust, that the operating forces felt with regards to USMC combat developers.

Still, at the corporate level of combat development the USMC refuted any suggestions that there was any serious problem, or disenchantment. The article continued: "*In a briefing Wednesday, Marine Corps officials hailed their 'Urgent Universal Need Statement' system as a way to give Marines in combat a greater say in weapons-buying decisions. 'What we all liked about (the urgent requests) is they came from the operators out on the ground...said Maj. Gen. Dennis Hejlik, who was a commander in Iraq ...After receiving a February 2005 urgent request approved by Hejlik for nearly 1,200 of the vehicles, the Marine Corps instead purchased improved versions of the ubiquitous Humvee. The industrial*

*capacity did not exist to quickly build the new mine resistant vehicles and the more heavily armored Humvees were viewed as a suitable solution, Marine Corps officials said. That proved not to be the case as insurgent elements in Iraq developed more powerful bombs that could penetrate the Humvees....”* The known threats in 05 have been documented earlier in this case study. They included both the under belly, center line threat from buried IEDs as well as the existence of an probable proliferation of EFPs throughout the ITO.

The USMC Public Affairs made a somewhat startling statement regarding the influence of funding issues on decisions relating to the MRAP UUNS in 2005. The decision-making processes and UUNS analyses as discussed and documented throughout this case study indicate that the choice of HMMWVs over MRAP was solely a budgetary decision. However the article quoted USMC representatives as saying: ***“Brig. Gen. Robert Milstead, chief of Marine Corps public affairs, said cost was not a factor in choosing the Humvee. ‘This was not a budgetary decision...You can take that to the bank.’ The internal document, however, states that the cost of building new vehicles was a primary reason the request was denied by [MCCDC]... Needs of the deployed troops are ‘competed against funded programs... Resistance costs time...Unnecessary delays cause U.S. friendly and innocent Iraqi deaths and injuries’.... Separate documents indicate the deployed Marines became so frustrated at the delays they bypassed normal acquisition procedures and used money from their own budget to buy [systems]...”*** The analysis that constitutes this second half of the MRAP case study was already well-represented by the draft DDR&E presentation. As noted earlier, the Naval Audit Service indicted the USMC UUNS process in a report that was published in the fall of 2007. That report came after this article, and it would refute the comments of general officers and middle managers who praised the UUNS process in this article.

The senior civilian with the MCCDC CDD who actually manages the USMC urgent needs process was also interviewed by Lardner. He stated: ***“Len Blasiol, a civilian official with the Combat Development Command, said the speed with which requests can be met is largely dependent on how much research and development work needs to be done... ‘The first question is, ‘Is this something we can go out right now today and buy? Is it sitting on a shelf somewhere waiting for us to buy?’ And if it is, then we figure out how to buy it,’ Blasiol said.”*** It is clear that senior MCCDC combat development officials like Mr. Blasiol do not possess a basic understanding of industry principles.

High-end “COTS” items like MRAPs, camera suites, etc. do not literally sit on a shelf as toothpaste might in a convenience store. Instead they are built to order when government contacts provide legally defensible confidence to vendors that payment is guaranteed. Otherwise industry might build up expensive, on-hand surpluses that had no assured customers. Unsold inventory on that scale represents losses, and would bankrupt any companies who attempted to practice them. However, industry is rational and does not function that way. They first need a guarantee of payment before they produce anything beyond demonstrators. Apparently, Mr. Blasiol became confused because COTS states commercial “off the shelf,” and a toothpaste-convenience store image was generated in his mind. Unfortunately, he shared that mistaken understanding in a press interview.

It is noteworthy that a local support contractor from the Quantico, Virginia area was hired to support MCCDC and MCSC so as to participate in an Integrated Process team (IPT) relating to NLWs. That IPT traveled to the West Coast to analyze industry's capacity to produce a particular NLW capability that had been requested by I MEF (Fwd) in 2006. The support contractor participated as an industry capacity subject matter expert. He had also previously served as the Program Manager for Ground Weapons prior to retiring out of MCSC. To the amazement of company executives who hosted the IPT as the producers of the COTS NLW in question, he expressed concern that the corporation did not have multiple articles of the \$5M (+) NLW system sitting in a warehouse waiting for potential buyers. The support contractor and the NLW requirements official from MCCDC who led the IPT both stated that the lack of such an evident inventory was a firm indication that the NLW product was "not COTS," as advertised. This lacking insight of industry, acquisition, and technology processes and incentives permeates both government personnel at MCCDC as well as many of the local contractors who are hired by them to assist in analysis. Regrettably, lacking insight extended to MRAP decision making in 05.

The presentation referred to by Richard Lardner above confirmed that there are indeed challenges within the MCCDC combat developer process, and perhaps even amongst its personnel (Reference p.6.). Slides from that draft presentation included those posted immediately below this paragraph. The points and concerns raised in the bullets of those slides are self explanatory, and they remain fairly current and unresolved today, over nine months after their original drafting. Therefore, they stand by themselves, without elaborating additional text:

- **Over 130 I MEF Fwd JUONS-UUNS submissions:**
  - Low combined fill rate – JUONS and UUNS both <10%
  - Before Nov 06 JUONSs frequently languished at MNC-I
  - UUNSs cancelled, delayed, or solutions not what was asked for
  - Tandem JUONS and UUNS submissions routine to increase odds
- **CoS CENTCOM intervened to speed JUONS:**
  - JUONS urgency at MNC-I and MNF-I restored
  - II MEF now benefiting from CoS CENTCOM's action on JUONS process
- **Joint Staff actions always rapid and supportive**
- **JRAC actions always rapid and supportive**
- **UUNS process remains challenging:**
  - Process worship cripples operating forces
  - Civilian middle management lacks technical and operational currency
  - Risk-averse civilian middle management defaults to process controls
  - Mine Resistant Ambush Protected Vehicles (MRAP) delayed
  - Unmanned Arial Vehicles (UAVs) delayed
  - Ground Based Observation and Surveillance System (G-BOSS) delayed
  - Many other urgently needed capabilities delayed

Figure 46. While the JUONS process is sound, the UUNS process is broken.

- **JUONS fulfillment and S&T investment:**
  - JRAC understandably not chartered to initiate longer term S&T
  - JUONS designed for rapid procurement of mature capabilities
  - Still, later JUONS spirals often have S&T implications
  - Lead time is required for rapid and timely S&T maturation
  - OSD lacks a JRAC-like mechanism to enforce Service S&T follow-up
- **S&T insight of Service HQs deficient:**
  - Acquisition expertise and process-oriented, risk-averse mentality valued
  - Ever-less organic-independent physics and engineering insight
  - Losing independent uniformed insight into high payoff opportunities
  - Dependence on interested outsiders for S&T recommendations
  - HQ decision maker staffs appear to default to lab priorities
  - Services' in-house lab interests define the Service HQ S&T horizons
  - Industry IRAD and Joint efforts frequently dismissed by Service labs
- **S&T-related recommendations:**
  - Provide JRAC a mechanism to insure JUONS-supportive Service S&T
  - Legislation needed to educate and retain a substantial uniformed S&T cadre
  - Legislation needed for CENTCOM RDT&E in the spirit of SOCOM's MFP

Figure 47. Technological judgment is out-sourced to programmatically invested outsiders.

- **I MEF Fwd Operators Defined Solutions:**
  - Need for speed to get ahead of AIF
  - Operators know the requirements
  - CG expected staff to do tech research and define solutions
  - Broad G9 technology field of regard (Labs, Academia, Industry, DARPA)
- **MNF-W needs competed against funded programs:**
  - Angel Fire vs Constant Hawk
  - MASDANS vs Counter Sniper Vehicle
  - G-BOSS vs CRAM/RAID
  - ScanEagle vs Spyhawk
  - SUCAV vs Warrior UAV from TF Odin
  - Penetradar IRIS vs GSSI Road Scan
  - MRAP vs up-armor programs and ONR initiative
  - Terramax vs Forerunner
- **Developers resist divergent operator needs:**
  - Resistance costs time
  - Unnecessary delays cause U.S. friendly and innocent Iraqi deaths and injuries

Figure 48. Competition for resources at home, not warfighting needs determine the outcomes.

**5. Conclusions.** The information relied on for formulating the conclusions below was limited to what could be reliably documented and was made available to the author for the chronology of events discussed above. There may be more documented information that either reinforces or

contradicts the author's conclusions below. Capturing and including such additional information can only be achieved if the scope of the total GCE study is expanded, the MRAP Case Study is turned over to the IGMC, or a combination of both actions. In general, it can be concluded that a combination of flawed actions and inactions by combat developers pertaining to MRAP generally and the MEF (Fwd) urgent needs for MRAPs created a significant adverse impact on the GCE's ability to accomplish its mission. A detailed list of specific conclusions follows:

**a. MRAP Chronology Conclusions**

(1) The underbelly IED technique had appeared in the MNF-W AOR as a known threat to HMMWVs in February of 2005.

(2) CG, I MEF (Fwd) was aware that the M1114 and MAK up-armored HMMWVs remained vulnerable to the known underbelly IED threat, as well as to EFPs.

(3) CG, I MEF (Fwd) was aware in 2005 that MRAP could protect troops better than M1114 and MAK up-armored HMMWVs.

(4) CG, I MEF (Fwd) knowingly signed the UUNS that stated in parts: *“The MEF cannot continue to lose Level III and IV serious and grave casualties to IED and MVA at current rates when a commercial-off-the-shelf [COTS] capability exists to mitigate...these particular threats...”*

(5) CG, I MEF (Fwd) knowingly signed an UUNS that stated: *“Operating forces see fleeting opportunities to utilize supplemental funding to replace 1st/2nd generation vehicles by skipping a generation and procuring 4th generation MRAP vehicles...4th generation (designed and built from the ground up to withstand IED/RPG/SAF) MRAP vehicles...represent a significant increase in their survivability baseline over existing motor vehicle equipment... UUNS must be submitted immediately...for consideration in the supplemental funding available for FY05.”*

(6) CG, I MEF (Fwd) knowingly signed an UUNS that stated: *“Operational experience dictates current and anticipated missions in theater are better supported by a family of MRAP vehicles...MRAP vehicles are inherently robust with modern safety features that include NASCAR style multi-point seat harnesses, crashworthy seats, ballistic armor and monocoque hulls and heavy-duty parts that are designed to withstand and react to IEDs, SAF and RPGs in such a way that reduces traumatic injury to the occupants...a vehicle that enables us to survive the first blow and then counter attack... MRAP-designed vehicles [must include] multi-mission...troop carrying... cargo..., ambulance and EOD/Eng mission platform with Buffalo-like 50ft investigating arm... transparent armor with rifle firing ports on all four sides...similar to the Cougar or Casspir...integrated V-shaped monocoque hull designed specifically to disperse explosive blast and fragmentary effects...blast protection against contact-detonated anti-personnel and anti-tank mines...360 degree rollover protection... capable of having additional armor/standoff screens attached to increase the protection to predestinate and defeat the primary kill mechanisms of EFPs...”*

(7) CG, I MEF (Fwd) was aware that the candidate COTS material solutions sought in the UUNS were specifically U.S. MRAP products from Force Protection, from other known foreign COTS MRAP manufacturers, and from potential industry partnerships.

(8) CG, I MEF (Fwd) was aware in 2005 that an UUNS was the prerequisite to gaining 05 supplemental funding required to increase production and accelerated fielding of MRAPs from any and all manufacturing sources.

(9) Serving as the DC, CDI in 2005, LtGen Mattis was aware that the candidate COTS material solutions sought in the UUNS were specifically U.S. MRAP products from Force Protection, from other known foreign COTS MRAP manufacturers, and from potential industry partnerships.

(10) At the Mar 05 Safety Conference LtGen Mattis as DC, CDI expressed his concurrence with the MRAP way-ahead presented by Maj Roy McGriff, which included the immediate purchase of as many COTS MRAPs as possible.

(11) The IGMC Readiness Assessment of 2005 probably did not consider the I MEF (Fwd) MRAP UUNS during the conduct of its assessment, as I MEF (Fwd) was not in theater during the IGMC visit and there is no mention of MRAP in the report.

(12) MCCDC and MCSC combat developers were aware that MRAP provided better protect than the M1114 and MAK up-armored HMMWVs as a result of the EFDC Vehicle Survivability Study.

(13) Between Mar and Jun 05, MCCDC and MCSC combat developers pushed back on the I MEF (Fwd) MRAP UUNS to avoid reprogramming resources from favored STOM, MV-22/CH-53 transportable, and legacy HMMWV/MAK vehicle programs.

(14) Between Mar and Jun 05, MCCDC and MCSC combat developers effectively undermined DC, CDI's MRAP-procurement intent by raising MRAP concerns that were transmitted via DC, CDI to CMC.

(15) MCCDC and SYSCOM officials did not initiate Commercial-Off-The-Shelf MRAP combat vehicle development when the UUNS was received in 2005.

(16) MCCDC and MCWL officials did to initiate research and development of EFP protection for MRAPs when the MRAP UUNS was received in 2005.

(17) MCCDC officials did not fulfill DC, CDI's intent that he stated before the Safety Conference, namely to continue to field the M1114 while buying as many MRAPs as possible as a bridge to JLTV, and then phase out the HMMWVs.

(18) MCCDC officials falsely informed the CMC that the I MEF (Fwd) MRAP JUONS from May 2006 was the 1<sup>st</sup> USMC operator request for MRAPs, as CMC prepared to sign a letter to the CJCS.



(19) MCCDC officials kept the I MEF (Fwd) MRAP UUNS out of the proper MROC UUNS vetting process resulting in the MRAP UUNS not being considered by the MROC.

(20) USMC officials provided incorrect and incomplete information to Senate Armed Services Committee staffers with regards to the content of the I MEF (Fwd) MRAP UUNS.

(21) MCCDC officials provided incomplete and inaccurate information to CMC as he prepared to sign letters to Sen. Biden and Sen. Bond providing the USMC position on MRAP.

(22) MCCDC maintains that its decision not to fulfill the I MEF (Fwd) MRAP UUNS in 2005 was justified, even in the face of contravening information in an apparent effort to defend programmatic decisions and minimize concerns regarding delays and consequences.

(23) MCCDC and MCSC officials disregarded MCWP 5-1, Marine Corps Planning Process, PCN 143 000068 00, the replacement MCWP 5-1.

(24) While the possibility of individual corruption remains undetermined, the existence of corrupted MRAP processes is likely, and worthy of IGMC investigation.

(25) The issue might come down to long-term planning v. short term urgency, and whether the MCCDC staff has the ability, as currently structured, to grant an *effective* hearing to wartime urgent issues, or analyzing an urgent need when a long-term plan has been initiated. The Cold War orientation of spreading out systems acquisitions, over multiple years, seemed to hold sway as the primary option of serious discourse for the MCCDC staff.

(26) If the 17 Feb 05 UUNS signed by CG, I MEF (Fwd) had been approved by the CDIB, DC, CDI, and the MROC in early 2005 it would have quickly evolved into a program like today's with a significant prevention of IED-related casualties.

(27) The delay in the delivery of the urgently requested MRAP capability has had measurable operational consequences, and has created a significant adverse impact on the ability of the MEF (Fwd) GCEs to accomplish their missions. See following notes:

Note: Casualties: "iCasualties.org" is an independent website created in May 2003 to track casualties in the U.S.-led wars in Iraq. The website compiles information on casualties incurred by the Multi-National Force (MNF) in Iraq and the International Security Assistance Force in Afghanistan using news reports and press releases from the U.S. Department of Defense, CENTCOM, the MNF, and the British Ministry of Defense. The website is considered an "authoritative" record of MNF casualties in Iraq and has been cited by, among others, the BBC, Voice of America, The New York Times, and The Washington Post. The graph immediately below was taken directly from the website in Dec 07:

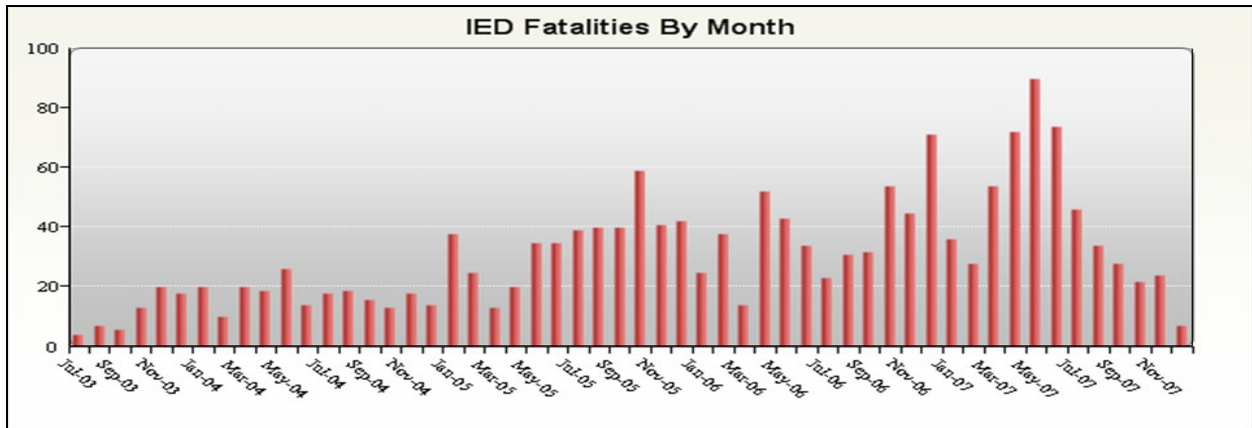


Figure 23. Actual IED fatalities in OIF as of Dec 07.

Note: The following graph is an artificial manipulation of the “iCasualties.org” graph above. Its purpose is to graphically display the notional lowering of IED fatality counts that could be projected if the 17 Feb 05 I MEF (Fwd) UUNS had been acted upon with the urgency of the existing program. Specifically, if today’s MRAP production and fielding surge was in full swing by September 2005 based upon its timely initiation by the 17 Feb 05 I MEF (Fwd) MRAP UUNS. The notional graph below is conservative. It assumes a mere 50% reduction in IED-related fatalities due to the replacement of a large portion of the Joint HMMWV assets in the ITO by MRAPs. A 50% reduction in fatalities is assumed even though the overwhelming majority of IED strikes occurred against vehicles, and the MRAP provides significantly greater reductions in IED fatalities. Furthermore, it assumes that major fatality reductions only would have begun in Sep 05. In fact it is known that 6-7 months would not have been needed for mkass deliveries of MRAPs into theater. By CMC’s and ACMC’s own periodic testimonies USMC has the ability to get COTS systems on contract within less than 90 days, even a few weeks, in response to an UUNS. Also, industry has demonstrated with the present Joint program that teaming and capacity are only a function of resource provision, with massive MRAP deliveries having occurred in 2007 within three months and less of contract signatures.

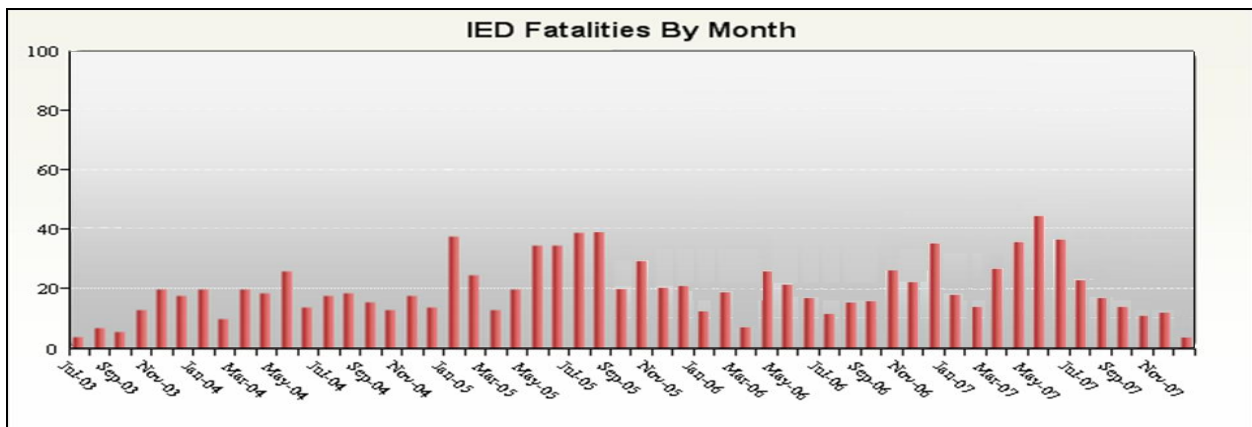


Figure 24. Notional fatalities if MRAP program deliveries had been underway in Sep 05.

(28) Gross mismanagement of the MRAP may have created a significant adverse impact on the GCE's ability to accomplish its mission, with measurable operational consequences, and several Marine Corps Orders (MCOs) may be applicable.

(29) MCCDC and MCSC officials may have acted in violation of MCO 3500.27B, Operational Risk Management (ORM). This MCO states in part: ***“ORM is an integral part of the decision making process for both Marine Corps military and civilian personnel in all operational and non-operational activities,”*** and ***“The primary objective of ORM is to avoid unnecessary risk. Successful implementation of the ORM process will increase mission effectiveness while minimizing unnecessary loss of assets, both personnel and materiel.”***

(30) MCCDC and MCSC officials may have acted in violation of MCO 5100.8, Marine Corps Occupational Safety and Health (OSH) Policy. This MCO states in part: ***“Commanders/commanding officers shall implement this Order...This Order promulgates Marine Corps Occupational Safety and Health (OSH) policy to eliminate or minimize the probability of mishaps occurring in training, industrial, U.S. Government and tactical vehicle, other operational, and off-duty environments...”***

(31) MCCDC and MCSC officials may have acted in violation of MCO 5100.29A, Marine Corps Safety Program. This MCO states in part: ***“Commanders at all levels are responsible for ensuring that the Marine Corps Total Force is maintained at the highest level of readiness possible by incorporating operational risk management (ORM) in all operations assuring controls are in place for any hazard that cannot be eliminated and providing appropriate safe and healthful facilities for all their personnel,”*** and ***“This order is applicable to all Marine Corps personnel, to include...military personnel and civilian Marines,”*** and ***“This order applies to all Marine Corps facilities, equipment, training facilities, and materiel; and is in effect ashore, on or off Marine Corps installations, or while embarked in aircraft of vessels.”***

(32) MCCDC and MCSC officials may have acted in violation of MCO 7510.5A, Marine Corps Fraud, Waste, and Abuse (FWA) Oversight, Awareness, Prevention and Remedies. This MCO states in part: ***“The Marine Corps is committed to an aggressive program of oversight, awareness, prevention, and remedies of FWA. Our goal is to preclude even the slightest impression of impropriety in the handling of our manpower, material, and money,”*** and Commanding Generals are responsible for ***“Requiring economy within their commands and strict compliance with regulations governing the receipt, accounting and expenditure of manpower, money and materials.”***

(33) MCCDC and MCSC officials may have acted in violation of MCO 5800.13A Investigations of Allegations Against Senior Officials. The fact that these acts occurred at least in part due to priorities connected to programmatic agendas and rigid process conformance for its own sake, and the fact that General Officer decision makers were impacted, may also make MCO 5800.13A applicable here.

## **5. Recommendations**

**a. Immediate USMC change recommendations**

(1) That DC, PP&O provide this case study to the Inspector General of the Marine Corps (IGMC) for consideration so that appropriate lessons learned can be gathered.

(2) That CMC correct the record with the U.S. Senators who received the CMC letter as well as public statements, should IGMC conclude that relevant specifics of this study are correct.

(3) That DC, PP&O approve the expansion of the scope of the GCE study to include several more recent case studies and the formulation of comprehensive combat development recommendations.

(4) That DC, PP&O approve the hiring of a qualified Contractor to assist with the execution of an expanded GCE Advocate study and to participate in the writing of the new UUNS MCO under the lead of MCCDC.

(5) That USMC model a “Ground Tactical Vehicle Fleet (GTVF)” on the USMC Aviation community and its professional standards.

(6) That USMC institutionalize the tactical vehicle Base Line Survivability Index (BLSI) based on the Aviation community safety program.

(7) That USMC introduce deliberate risk management to the GTVF.

(8) That CMC assign DC, PP&O as the Marine Corps GTVF Advocate.

(9) That USMC instill the same sense of occupational professionalism into GTVF operators as exists in the naval Aviation community today.

(10) That DC, PP&O, as the GTVF Advocate model GTVF safety manuals and procedures on the Aviation NATOPS.

(11) That USMC enforce rapid acquisition practices for urgent needs signed in-theater by requiring that an operationally current BGen to preside over every meeting of the CDIB, and that this critical meeting presence cannot be delegated.

(12) Insure that all urgent needs are logged at the JRAC and the Service HQ for visibility while still undergoing analysis below.

(13) Enforce deadlines on MCCDC analysis processes - measured in days, not weeks and months, and hold individuals accountable.

(14) Enforce rigorous reporting on the status of submitted needs – hold individuals accountable.

(15) That DC, CDI insure that the perspective of the operational command forward should dominate the CDIB voting influence over urgent needs, with 51(+) % of influence in the outcome of any CDIB decision on any need submitted from in-theater.

(16) Extend 51(+) % warfighter voting influence to all urgent needs submitted by predecessor MEF (Fwd)s.

(17) Extend 51(+) % warfighter voting influence to authorize the cutting off of all further analysis, testing, etc. if such activities slow fulfillment, and the warfighter is prepared to accept the risk.

(18) Require a mix of graduate-level physics, engineering, and CS MS qualified civilians as voting CDIB members – USMC experience is desired, but not required.

(19) Require a mix of Naval Postgraduate School MS qualified physics, engineering, and CS MS qualified in physics, engineering and CS uniformed CDIB members.

(20) Pay government civilians competitively compared to industry counterparts to attract competent physics, CS, and engineering credentials on the CDIB and at MCWL.

(21) Change civilian job descriptions to attract deployable technologists who value the warfighter sense of urgency.

(22) Require key civilians to regularly deploy with operational units for a minimum of six month tours, consistent with deployment rhythm.

(23) Terminate transient MCCDC LNOs in the MEFs; rather require full-length tour assignments of MCCDC personnel with MEF HQ rotations

(24) Reduce the civilian headcount at MCCDC to minimize management by committee, such as within the CDD.

(25) That DC, PP&O approve the hiring of a qualified Contractor to assist with the execution of an expanded GCE Advocate study and to participate in the writing of the new UUNS MCO under the lead of MCCDC.

**b. Concurrent DoD change recommendations**

(1) Eliminate all Service-specific needs statements, i.e. UNS, UUNS, ONS, etc.

(2) Create a Joint needs submission form using the JUONs as the template.

(3) Expand functions of the JRAC to receive all Service and COCOM needs, including S&T-related initiatives, to rapidly analyze and assign to appropriate USG developers

or SYSCOMs as executors, and develop a funding strategy to speed solutions and eliminate unintended duplication of effort.

**c. Proposed supporting legislation**

(1) Empower warfighting generals to make some larger COTS purchases on their own authority for speed.

(2) Permit commanders to balance enemy threats against system maturity, testing, cost, etc., instead of CONUS officials.

Raise funding cap on warfighter procurement from \$250k per system (currently) to \$1M or more per system.

(3) In conjunction with an increase in discretionary warfighter spending authority, authorize corresponding rapid prototyping and operational experimentation in-theater.

Note: The technical expertise within the MEF (Fwd) CE, Seabee, Communications, and Engineer units is consistently high. Given this in-house expertise the MEF (Fwd)s have created ‘Monster Garage’ concepts that provide in-theater developmental capabilities for the limited scale production of some urgently needed capabilities. There have been many documented material successes, including but not limited to mine rollers, G-BOSS ISR IOC, and TCVS power-life extension improvements. This should be institutionalized and provided significant resources under control of the warfighter, including S&T.

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