Follow-On Report to the ISSA White Paper on Considerations on Defense Force Personnel Survivability in Vehicle Incidents Under Urban Warfare Conditions

US Defense Force Personnel Remain Vulnerable as New Vehicle Systems Enter Production Without Appropriate Survivability Systems

A Report by

ISSA

The International Strategic Studies Association

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Further to the ISSA White Paper of June 11 and June 21, 2007,[1] the US Army and US Marine Corps have responded rapidly to advice that the protection was inadequate for military personnel against improvised explosive devices (IEDs) and other incidents in the new Mine Resistant Ambush Protected (MRAP) family of vehicles and the proposed upgrades to existing HMMWV soft-skinned vehicles in the Iraq War theater. However, even as major orders for the new MRAP vehicles are being placed, the advice has not been transformed into contractual directives to ensure that the appropriate technology is used within the MRAP and other vehicles to address the threat.

As a result, not only has the situation not yet been resolved to guarantee the improved safety of US troops, a methodology has not yet been put in place to move toward fixing the present contract specifications for MRAP and other vehicles, or for ensuring that, in the future, military vehicle safety standards can be given adequate oversight and planning.

The major manufacturers of the current MRAP range of vehicles have reportedly all been given advice as to the requirement to protect personnel against the secondary effects of blast. This requires attention to (a) personnel seating, (b) restraint systems, and (c) seat/harness mounting systems and associated structural strengthening. USMC and US Army officials have become aware of, and have accepted, the fact that armor protection against

[1] *Considerations on Defense Force Personnel Survivability in Vehicle Incidents Under Urban Warfare Conditions*. See www.StrategicStudies.org. See: *ISSA Releases Findings of Study into US Military Vehicle Safety*.

the initial effects of blast are insufficient to protect the occupants of vehicles under combat conditions, and that, as noted in the original ISSA White Paper, "issues such as inertial compression of the body due to acceleration and, in particular, "slam down" — the effect of the vehicle being lifted by blast and then slammed down after it — cause the an unduly high proportion of spinal injuries, head trauma and other injuries, and poor restraint systems, including those still specified (unchanged from earlier vehicles) for the new MRAPS and upgraded M1114s, create death and injury among vehicle occupants".

The International Strategic Studies Association (ISSA) team monitoring the situation has decided to issue this, and further, updates to the original White Paper, given the rapid pace of contracting and proposed deployment of the MRAP and upgraded HMMWV vehicles into conflict situations.

What has become apparent is that, essentially, and despite the fact that the MRAP vehicles and HMMWVs are to operate in high-danger situations, few of the vehicles fully meet even the two basic civilian safety standards, for motor vehicle seats, namely the National Highway Traffic Safety Administrations Standard No. 207 and Standard No. 210.[2] Significantly, as well, no-one is certifying the operational safety and viability of the vehicles being delivered to the USMC and US Army, other than the vehicle manufacturers themselves; there is no independent audit standard.

As well, reinforcing the point made in the ISSA White Paper of June 11/21, 2007, that "US Army testing capabilities for the new vehicles have themselves been limited, with only sufficient test dummies to test the two front seats in the vehicles", it is clear that the and that the US Army Test and Evaluation Command at Aberdeen Proving Ground in Maryland does not have sufficient resources to adequately test vehicles against the anticipated range of true operational conditions which the vehicles are now encountering in Iraq. The Aberdeen facilities have only been able to undertake limited testing, under static conditions, against the front seats of the test vehicles, and have not been able to test the rear seats in a manner which would enable them to assess the threat of injury.

The International Strategic Studies Association concluded that the lack of a coherent framework of vehicle safety standards for the US Armed Forces –

[2] Officially, §571.207 and §571.210. Regulation 207 is the easiest and least important of the requirements with which manufacturers of vehicle seats and vehicles must comply. Regulation 210 is the more important and more difficult.

and the fact that adoption even of the National Highway Traffic Safety Administration's Federal Motor Vehicle Safety Standards (FMVSS) and minimal and outdated Regulations – constituted a major threat to the achievement of US Secretary of Defense Dr Robert Gates' stated goal of placing personnel safety ahead of platform survivability. As a result, it would be of substantial benefit to the US Armed Forces if the uncoordinated, but exceptionally dedicated, efforts of key US Defense Department officials were supported by a responsible Congressional oversight capability within the House and Senate committees responsible for defense procurement.

The basic ISSA White Paper, Considerations on Defense Force Personnel Survivability in Vehicle Incidents Under Urban Warfare Conditions, focused heavily on the seating and restraint systems aboard MRAP and HMMWV systems, but, in reality, the whole approach to the inside structures of the vehicles neglected the requirements for personnel safety, particularly in blast situations. The basic flooring on a number of MRAP and other military vehicles has been seen to be inadequate to take the strain of blast and other combat situations, and so, too, are some of the wall-mounted cantilever brackets supposed to support seat capable of handling two-stage energy attenuation (EA) following blast.

Most vehicle manufacturers in the MRAP program seemed focused on (a) the cost of seating and associated systems and mounts, and (b) the cost of the systems. Significantly, although the vehicles had been developed with new technologies to meet a new generation of threat, the internal seating systems being adopted were, in fact, legacy technologies and off-the-shelf products which had never been adequately tested and which, clearly, would not withstand real conflict situations.

ISSA studies said, however, that the main MRAP vehicle manufacturers could not be faulted entirely, since adequate specifications for internal fit-out had not been given by the Defense Department and the Services, and contract pricing was based around the official specifications. Nonetheless, competent independent testing services had demonstrated that many of the seats being fitted into the vehicles would actually worsen the effects of blast, and would thereby jeopardize personnel survivability in conflict situations. Moreover, given the urgency of the vehicle programs, the vehicle manufacturers were reluctant to stop production ramp-up at this time because of the prospect of legal action against them by the Defense Department should they not deliver vehicles to the military on time.

It was understood that some attempt was now being made to authorize more complex testing of MRAP and HMMWV seats, but initial contracting of test services – apart from the Aberdeen Proving Ground tests and tests at a US Navy facility – was being done to facilities which had only the capacity to undertake static tests, which would be inadequate to the challenge.

The reality is that inadequate seats, and inadequate mountings and restraint systems, could negate much of the enormous cost and benefit of fielding new combat vehicles to the US forces. Put more bluntly: the wrong seats and systems will add substantially to the casualty levels of the Iraq and other wars. Moreover, had the appropriate seating systems been available earlier, the casualty levels of the Iraq War would have been, for the US, considerably lower, with all the attendant political and strategic ramifications which a lower casualty (death and injury) rate would have implied.

Statistics during the current Iraq conflict show that IEDs cause 73 percent of tactical vehicle KIA (killed in action), and roughly 50 percent of the WIA (wounded in action) are injured so severely that they cannot return to duty. Moreover, the rate if IED incidents was climbing rapidly during the course of the Iraq conflict, and the rate of IED discover/clearance was rising, but not commensurately with the rate of incidents. Significantly, although the incident rate was climbing, the level of KIA/WIA was remaining fairly flat, indicating that doctrinal changes by US forces were working. On the other hand, there was a clear strategy by insurgents in Iraq, and their principal, ultimate support, the Iranian Government, to keep the US media and public focused on casualty rates. Again, this begged the question as to whether, had the US introduced adequate seating and restraint systems earlier into combat vehicles, the casualty rate would have been lowered, and the political climate surrounding US force deployment altered.

The ISSA study, in looking at some six competing seats being used in the MRAP vehicles, only one could be said to effectively be a comprehensive "system", capable of meeting the threat. This was the CCOPS (Cobra Soldier survivability system), which, because of its significantly higher price, was fitted to only a few front-seat installations in some of the new MRAP vehicles. Moreover, the CCOPS maker, GSS, of Pennsylvania, was the only producer of total seating/restraint/mounting solutions which appeared to have designed and developed its approach around a realistic and broadly-tested approach to the threat.

It is important to note that the Arizona firm, Armorworks, which is known for its ballistic armor protection capability, had produced seats for some of the MRAP platforms (including some of the seats in the rear of BAE Systems vehicles). The ArmorWorks seats, however, have four-point restraint harnesses, and no provision to cope with the phenonenon known as "submarining", and are based on helicopter seats which provide for (and require) only single-phase EA, whereas ground combat vehicles require the two-stage EA to meet the secondary effects of blast, particularly in slam-down. The ArmorWorks seats, in the view of ISSA analysts, do not meet the threat specifications and neither do they mitigate dynamic amplification. It was known that these seats were being discussed for the US Marine Corps Expeditionary Fighting Vehicle (EFV) program as well as MRAP.

It is clear that the USMC and USA are heavily involved in interim solutions to the IED threat which are reactive, at best; ie: the proposed underbelly solution called the "Frag 4 kit" plus extra heavy armor for Explosively Formed Projectile (EFP) protection. The real solution needs to get away from monolithic armor enhancements and move towards a system for personnel survivability.

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