Fourth Update Report to the ISSA White Paper Series on Considerations on Defense Force Personnel Survivability in Vehicle Incidents Under Urban Warfare Conditions[1]

New Survivability Systems Validated for US Armed Forces Vehicles, But Unsafe MRAPs, HMWWVs Still Being Deployed

The International Strategic Studies Association

ISSA

This Report Released: February 16, 2008

The US military has now confirmed the viability of low-cost, life-saving systems to protect troops in military vehicles facing insurgent attacks. This means that vehicles currently being shipped to combat forces in Iraq and Afghanistan without the vital upgrades may now face the urgent necessity for in-theater retrofitting of the technology, and the removal of systems which actually compound the dangers being faced by the troops.

Studies by the International Strategic Studies Association (ISSA) over the past year have urged consideration and incorporation of the new systems to protect troops against the effects of blast, and the new tests now confirm absolutely the accuracy of the ISSA analysis.

US Army and US Marine Corps (USMC) officials in late January and early February 2008 validated, through a mandated series of scientific tests, internal military vehicle systems which would help save ground force personnel from grievous injury and death, and substantially mitigate the level of injuries, from enemy attacks using improvised explosive devices (IEDs) and rocket-propelled grenades (RPGs) against vehicles.

One vehicle seating and harness system was shown to dramatically improve chances of survival and to avoid injury in vehicle accidents. However, the two separate tests also showed clearly that most existing systems being fitted in US military vehicles actually exacerbated the danger to troops and compounded the prospect of death or injury when their vehicles were subjected to blast or crash.

[1] Original Report Released: June 11, 2007. Expanded and Updated Report Released: June 21, 2007. Follow-on Report Released: July 3, 2007. Second Follow-on Report Released: October 8, 2007. Text of all reports available on www.StrategicStudies.org.

Despite this, many new armored vehicles, and particularly the mine-resistant, ambush-protected (MRAP) vehicles, and lighter HMMWV ("Hummer") vehicles, were still, as of mid-February 2008, being shipped to US forces in Iraq and Afghanistan without the now-validated safety system. The only system to pass the two sets of tests was the CCOPS *Cobra* system[2], which had been highlighted by independent analysis of the International Strategic Studies Association (ISSA) through 2007 and 2008.

Analysts at the ISSA contended in their findings that reductions in deaths and in the seriousness and pervasiveness of injuries received in Iraq and Afghanistan combat situations would have profoundly altered the strategic framework of the US-led "war on terror". ISSA President Gregory Copley noted that the possibility of perhaps halving US military deaths and catastrophic injury in the wars — which may have occurred had the life-saving technology been deployed from the beginning of combat operations in 2003 — would have had a profound impact on US political and public support for the wars and would have thus hastened its successful conclusion.

Mr Copley said that the scope of potential savings of lives and the prospect of massive reductions in both the occurrence and levels of injuries to troops was of "truly strategic proportions".

He noted: "There is little doubt that had such savings in lives and reductions in the frequency and levels of injuries occurred during the early stages of the Iraq deployment, in particular, then the US would have been politically empowered to have undertaken the type of decisive tactical and doctrinal approach to urban conflict subsequently taken during the 'surge' led by Gen. David Petraeus, commander of the Multi-National Force - Iraq (MNF-I), much earlier in the war. This would have led to a very different outcome for the US, the Coalition, and for Iraq."

The ISSA had been conducting an investigation into the lack of safety systems for US Army and USMC vehicles deployed in urban warfare systems since early 2007, and major omissions in survivability systems, highlighted in ISSA White Paper Reports of June 11, 2007, June 21, 2007, July 3, 2007, and October 8, 2007, had begun to be addressed by the US Army and USMC by October 2007. It took until February 2008, however, for scientific tests to be completed to validate the problems as outlined by the ISSA reports.

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[2] The CCOPS *Cobra* seating system was developed under contract with the US Army National Automotive Center at the Detroit Arsenal and is currently produced by Global Seating Systems LLC, of Exton, Pennsylvania. See earlier ISSA White Papers on Personnel Survivability for more complete details. Some additional details available at www.globalseating.com.

Tests on the seating and restraint systems for the MRAP were conducted at the highly-regarded Calspan Corporation test facility in Buffalo, New York, during the week of January 28, 2008, and at Penns Park, Pennsylvania, by the equally highly-regarded ARCCA Incorporated crash safety engineering test facility during the week of February 11, 2008. Testing for the HMMWV seats and restraint systems took place during the weeks of January 28 and February 4, 2008, at the NIAR Horizontal Accelerator test facility in Wichita, Kansas.

The crash portion of the testing on seats for the MRAP was undertaken by Calspan using a Hyge Horizontal Accelerator, and the blast and slam-down testing was performed at the ARCCA facility using a state-of-the-art drop tower. All tests were conducted using a 50th percentile Hybrid III anthromorphic test device (a test dummy).

The new series of tests absolutely validated earlier ISSA allegations that most of the seating and restraint systems used in the MRAP and HMMWV were lethally dangerous to vehicle occupants, often posing as great a threat to the life of troops in combat or training operations as occurs from enemy-initiated blast action. Moreover, the test results sent many of the MRAP vehicle manufacturers rushing to correct the problem, even though they had, in many instances, ignored the ISSA warnings that their failure to act was exacerbating the situation.

Copley noted: "These test results not only validate the ISSA finding that only one seat and restraint system being fielded was up to the task of minimizing battlefield losses of personnel to death and injury, but also validate the view that up-armoring vehicles is in itself an insufficient response to the fluidly-changing threat environment from insurgent-initiated blast."

The official test results have not yet been published by the US Army and US Marine Corps, but sources close to the tests said that, for example, the tests on the seats used in the Force Protection, Inc. MRAP vehicles — seats made by Seats Inc. — produced "the worst results ever seen" in such tests, and resulted in three simultaneous hardware failures. As well, the seats made by MasterCraft used on the Armor Holdings MRAP vehicles saw the failure of a key component during the tests.[3] Significantly, the Seats Inc. and MasterCraft seats and restraint systems used

[3] The seat made by MasterCraft (which also provides seats for many military vehicles throughout the world) suffered significant failure in the front vertical and rear tests. This seat was, for the tests and in its use on MRAPs, installed on a commonly used blast box which failed during the frontal and rear tests, bringing into question the use of a blast box and whether or not the many blast boxes in existence today are suited or properly tested for their environment. During the frontal test, the blast box and the seat tracks failed and the test dummy slid underneath the seat belts, which were improperly anchored. Had this been a human in the seat, the injuries would have been catastrophic. During the rear test, the blast box also failed, causing the dummy to slide up the seat back and strike its head. Had this crash occurred in a moving vehicle, the driver would have been forcibly shifted away from the driving position and unable to control the vehicle.

by some MRAP manufacturers were not built for military vehicles or a combat environment, and appear to have been chosen by MRAP manufacturers merely on cost grounds alone.

Tests were conducted for frontal (30 mph), lateral, and rear (just under 20 mph), and drop situations, as well as for blast. The Seats Inc. and MasterCraft seats both failed catastrophically in the tests,[4] with the exception that the MasterCraft seat passed the lateral test. Only the CCOPS *Cobra* seating, made by GSS specifically to address the two-stage effects of blast, as well as crashes and rollovers commonly occurring in military vehicles, passed all of the tests, and did so unequivocally. A new seat from each vendor was provided for each of the three tests.

The ISSA White Paper of October 8, 2007, urged that:

1. US Congressional oversight functions begin to enquire more closely into manufacturer compliance with the intent and letter of MRAP specifications for seating and restraint systems which demand attention to blast attenuation and crash survivability, and to consider the legal liability of manufacturers whose systems place vehicle occupants at unnecessary risk;
2. The US Department of Defense elevate the priority of retrofitting of in-theater M1114 HMMWV vehicles to the same level as the provision of new MRAP vehicles; and
3. The Department of Defense and the MRAP program office insist on full testing of all seats — driver, commander, and personnel seating — to be installed in MRAP and other military vehicles, to ensure that the seating meets the anticipated threat levels, not only with regard to direct effects of blast, but also addressing two-stage blast attenuation, frontal collision, and roll-over.

These recommendations led to ongoing pressure for testing to validate the internal systems of US military vehicles.

Significantly, the MRAP vehicles made by BAE Systems[5], and currently being deployed in Iraq, all carry the CCOPS *Cobra* system in the front seat positions, although the company is now being urged to consider the seating for all positions in the vehicles to afford the same safety levels for all occupants.

[4] The seat made by Seats Inc. (which provides seats for many military vehicles throughout the world) failed the frontal test (at only 30mph) so emphatically that officials at the test facility ranked it as the ugliest test that they had ever seen. It was reported that the dummy was completely ejected from the seat in the frontal test, and that there were a large number of parts that just simply broke. During the rear test, the seat structure collapsed backwards causing partial ejection of the dummy. The side test could not be run on this seat due to fear of damaging the test facility.

[5] BAE Systems in 2007 acquired Armor Holdings, and now produces MRAP and other vehicles under both the BAE and Armor Holdings brands.

ISSA Pres. Copley noted: "There is now absolutely no excuse for continued shipment of MRAPs or HMMWVs into combat or training operations unless they have the CCOPS *Cobra* system fitted. It is clear that some vehicle manufacturers persisted in the fitting of unsafe seats merely to improve profit margins, even though the MRAP specifications clearly stated that the seats and restraint systems had to be blast resistant. Some of the seats would not have even passed normal, civilian FMVSS (US Federal Motor Vehicle Safety Standards) requirements, and even those standards are totally inadequate to address the threat posed to life and limb by blast and crash situations."

He said that the long delays in getting the US and other defense forces to consider the vital role of appropriate seating and restraint systems in addressing the two-stage impact of blast, and in saving lives and the health of occupants during combat accidents and incidents, was reminiscent of the reluctance of navies in the Age of Sail to accept proven remedies for scurvy.

Delays, for reasons of bureaucratic obstinacy or for money-saving, in accepting life-saving approaches to dealing with scurvy, literally transformed the global strategic environment in the 18th Century, causing massive and unnecessary loss of life and dramatically slashing operational effectiveness. The failure to address scurvy in a timely and logical manner shaped modern history.

Today, we have seen the loss of life and the levels of injuries in the Iraq conflict – and elsewhere – mount to the point where the strategic picture has been impacted, quite apart from the massive human and financial cost entailed by failing to adopt new and proven approaches to dealing with the effects of combat blast on troops in military vehicles. With the latest evidence highlighted in the recent tests, there is now no valid excuse for deploying military vehicles which incorporate components which actually increase the risks to personnel in combat and training operations.

The ISSA calls for Congress to consider the legal liability of manufacturers who have knowingly installed untested and unsafe seats in MRAP, HMMWV, and other military vehicles, despite being warned of the dangers posed to troops.

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