



MERS: Remembering Human Factors

PM MERS is a critical cog in ensuring that Marine Corps squads operate as a system

“We fight as a team, so we manage the squad as a system not a Marine as a system. Each [Marine] brings a genuine capability to the squad so the squad can fight,” explained Mark Richter, Program Manager, Marine Expeditionary Rifle Squad (MERS).

PM MERS is tasked with the integration, modernisation and configuration management of everything worn, carried and consumed by the Marine and all the mobility platforms that the Marines have to operate in. The Program Office also manages the Marine Enhancement Program (MEP), which is similar to the Army Soldier Enhancement Program. Richter said, “[MEP] basically takes recommendations from Marines, industry and civilians and then every submission gets reviewed. If there is something in there that the team feels will add significant effectiveness, we fund it and buy it.” Examples of MEP initiative items that have been recently acquired include the new M16A4 grip, new flashlight and a forthcoming combat pack.

The Program Office acts as a co-equal with other PMs to ensure proper integration with new equipment large or small. The equipment can be quite complex with the Joint Light Tactical Vehicle (JLTV) programme being one such example. Richter said, “We are working very closely with the JLTV programme to make sure that we are fitting combat equipped Marines in those vehicles and those Marines can operate out of those vehicles when they are seated in them.”

Human Systems Integration

Timing is everything with Human Systems Integration (HSI) which covers the seven domains of: Manpower, Personnel, Training, Human Factors, Survivability Environmental, Safety and Occupational Health and Habitability. Richter said, “The greatest opportunity for integration is in the requirements development process,

once the requirement comes down to the acquisition community, when we are doing integration and we are doing systems engineering.”

The Marine Corps Load Effects Assessment Programme (MC-LEAP) is the Corp’s attempt put a metric to mobility and addresses HSI. Richter said, “We talk about mobility a lot but how do we put a metric to it. In a lot of human systems integration work it’s rather difficult to always express a metric to those seven different domains but, if you are creative I think we can do that.”

The Naval Research Advisory Committee in 2007 which addressed the need to unburden the Marine identified that there were inadequate models to correctly incorporate combat effectiveness parameters.

Richter said, “When we look at Marine burden it comes from weight stiffness and bulk. Those are the three things that as part of the load, take away from our mobility. What we wanted to do was to get a large dataset of information from Marines to develop a programme so we could go out and start to characterise these things and put metrics to them. We wanted to assess different combat loads and decisions that we were making and determine whether this was changing the combat effectiveness of a Marine when we started to add a piece of equipment to his kit. We wanted to take that information out and apply it on the battlefield and then look at the most promising areas that we would be putting Science and Technology money towards. If there are other areas, we can go out here within this programme and show that it is not an enhancement and cut it before we invest in it.”

At first appearance the MC-LEAP ‘tool’ constructed to do this may appear as just another obstacle course, albeit massive. It has actually been deliberately and meticulously created based on feedback and requirement from troops. Instead of regular assault course wall, these are replaced by for example the walls encountered in

Afghanistan with six foot walls that are often 18 inches thick and other features closely associated with Afghan battlefields, looking at balance, low crawling and entering confined spaces. Troops operating in it wear RFID tags for physiological status monitoring and each Marine is digitally timed as they go from one item to the next. Shooting parameters are also included, measuring their shooting skills during heavy exertion with the sensor pad recording everything real time.

The shape of MC-LEAP has been informed by comprehensive post deployment surveys. Richter said, “Two questions we have on every survey. What are the most physically demanding tasks you had to do during your tours, we also ask them what are the most common tasks you have to do during the tour. From that information and sitting down with these Marines we have developed physical representation of what they are actually doing in theatre and so in this case, moving through culverts and things like that we have replicated that to determine how the bulk, weight and stiffness is affecting them as they do that task.”

“You can see where weight is taking a toll, where stiffness is taking a toll and where bulk is taking its toll and from that we can look at large numbers of Marines through this and identify what would for that physical obstacle make better sense to do with our equipment.”

“We still have some refinements to do with [MC-LEAP] to make it 100 percent. I would say we are at about 85 percent, having run through it in August at Quantico, some of the items we have out there are too heavy. I need to lighten them up so we can have better mobility for our system.”

Burden sharing

There are currently significant levels of collaborative research in the area of burden which PM MERS supports. ▶

- ▶ Participants include the Naval Health Research Center which is undertaking a load study. The US Army Research Institute of Environmental medicine are working on a bio-mechanical variables related to lower extremity overuse injury which began in April.

Current MERS Integration projects include integration of JBCP platforms for the dismounted soldier and what the infantry community need for that. There also is a lot of work on alternative power systems and body armour and pack integration work such as on the new Enhanced Combat Helmet, with 1st Battalion, 3rd Marines beginning trials with a new plate carrier in February.

Hearing protection continues to be a problem. Richter said, "We do have Marines that electively don't wear hearing protection because they think it will disrupt their ability to detect somebody but we need a good hearing protection solution out there we have fielded the QuietPro from Nacre but getting Marines used to routinely wearing hearing protection is still a challenge. We should be doing

something new with our hearing protection programme this year."

The MERS programme is looking at replicating the weight associated with Counter-IED equipment being added to the individual gear that Marines train with from the start of their training.

The MERS team is also looking at providing new packs for mortar and anti-armour crews and machine gunners. Richter said, "They are not carrying the same load as a rifleman and so why should they have the same pack as the rifleman. [We are] trying to optimise it for the weapon system that they carry."

The Marine Corps's new anthropometry database was finalised in February after the completion of data capture in late September which covered 2500 Marines across the Corps.

Other areas of ongoing research investigation include squad level communications, hydration and a platform integration project that beginning this year which will

develop reconfigurable vehicle simulators. Richter said, "[This is] basically targeted at the JLTV programme to assess all the human systems integration work to tell them how much should a door actually weigh and is the Marine able to push that door open when he is at a 25 degree angle."

The MERS team recently trials an adjustable bitstock on the M16A4 with Marines in Hawaii that would address changes such as facial protection and body armour which the Marines involved liked very much. "This made a repeatable difference, so hopefully we can sit down with our requirement folks and come up with adjustability attributes based on the Marines we surveyed." ■

Mark Richter was speaking at WBR's Soldier Technology US 2011.



The MC-LEAP is helping the Marine Corps overcome issues related to weight, stiffness and bulk © DoD