Load Affects Assessment Program (LEAP): Creation, Evolution, and Lessons Learned

Alison E. Kelly[1], Mark Richter[2], David W.Tack[1], , Ken Ueno[3], Phil Terhaar[3], Eric Kramkowski[4], Dorothy Wojtarowicz[4], and Linda Bossi[3],

[1]HumanSystems Incorporated, Guelph, Ontario, Canada
[2]Marine Expeditionary Rifle Squad, Systems Command, United States Marine Corps, Quantico, Virginia
[3]Defence Research & Development Canada, Toronto Research Centre, Toronto, Canada
[4]Quality Training and Consulting, Markham, Ontario, Canada

The overburdened soldier will experience problems such as fatigue, heat stress, injury, and performance degradation; this is a fact few would dispute. The specific relationship between the magnitude of the soldier's burden and the degree of decrement on their battlefield performance was an area of research that had been given little attention to date. Knowing how the soldier's load would affect their performance is a key factor in effective combat mission planning, and in the acquisition of future soldier system ensembles. The development of a comprehensive, objective methodology to quantify the effects of different soldier loads upon operational task performance was needed in order to examine this load / performance relationship.

To address this need, The Marine Corps Load Effects Assessment Program (MC LEAP) was created in 2009 in conjunction with the Program Manager (PM) of the Marine Expeditionary Rifle Squad (MERS) of the United States Marine Corps (USMC). The development of the LEAP was a multi-staged iterative spiral design process that involved input from USMC experts in combat mobility requirements. Elicitation of information from subject matter experts (SMEs) via focus group sessions and design workshops resulted in a preliminary LEAP concept that identified general combat tasks and mobility requirements. Further reviews and input from SMEs resulted in a downselection to combat tasks that were deemed critical to Marines in the areas of mobility, lethality, and survivability. Different measurable attributes of human performance, such as speed, agility, and power were identified and related back to these specific combat tasks. Subsequent focus sessions resulted in the identification of a series of specific combat-related tests that could produce measurable performance attributes. These combat-related tests were then assembled into a detailed conceptual obstacle course design, which was reviewed, revised, finalized, and eventually physically constructed. Topics such as specific obstacle dimensions, order of obstacles/tasks, course duration, method of measurement, soldier safety, and transportability of the obstacle course were all addressed during this iterative spiral design process. Once physically constructed, the 10-obstacle and 3-accessory station LEAP underwent verification testing prior to being employed in subsequent Marine and soldier performance data collection efforts.

Over the past 4 years, five different experimentation campaigns have been successfully executed using the LEAP, with soldier feedback being collected from almost every study. The soldiers' subjective feedback concerning the obstacles and accessory stations indicated a high level of face validity, relevancy, and overall participant satisfaction with the LEAP.

The addition of a horizontal jump as well as a few minor protocol alterations have been made between successive LEAP data collection campaigns. An upgrade in the timing systems has also allowed for a more discrete level of analysis and understanding of soldier burden upon combat performance.

From the days of early paper based design right through to the prove-out testing and the completion of data collection efforts, many valuable lessons have been learned that have helped the LEAP evolve from both a technical and logistical standpoint.

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