HSI® HUMANSYSTEMS® INCORPORATED

LEAP Research on Predictors of Mobility

The international defence research community have collectively used LEAP to build an understanding of how equipment design characteristics impact mobility.

Testing with the Load Effects Assessment Program (LEAP) has reliably differentiated between equipment ensembles in meaningful ways.[1]

"Knowledge about performance degradation or costs of the cumulative or interdependent effects of these physical stressors on soldier performance is critical."

Bossi et al (2016)[1]

- Encumbrance from equipment is parameterized in terms of weight, bulk, and stiffness.
- Each added kilogram decreases performance by approximately 1.5%.[2]
- Encumbered anthropometry can be used to quantify the bulk of equipment.[3]
- Stiffness can be measured through functional range of motion assessments.
- Test rigs have been used to manipulate encumbrance dimensions independently for testing.
- The "P" of LEAP signifies the collaborative data sharing enabled by a common experimental paradigm and data standards.
- The LEAP is the research platform for studying the effect of equipment related encumbrance on mobility.

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[1] Bossi, L. L., Jones, M. L., Kelly, A., & Tack, D. W. (2016). A Preliminary investigation of the effect of protective clothing weight, bulk and stiffness on combat mobility course performance. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 60, No. 1, pp. 702-706). Sage CA: Los Angeles, CA: SAGE Publications.
[2] Gijsbertse, K., Linssen, L., Woering, A., & Catoire, M. (2021). The effects of mass, bulk and stiffness of personal protective equipment and clothing on physical performance when performing a military mobility obstacle course. Applied Ergonomics, 95, 103448.
[3] Mitchell, K. B., Brown, S. A., Villa, J., & Garlie, T. N. (2018). The Sensitivity and Role of Equipment Bulk on a Military Mission Oriented Obstacle Course. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 62, No. 1, pp. 1419-1423). Sage CA: Los Angeles, CA: SAGE Publications.

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