THE EFFECTS OF FATIGUE ON POSITION DETERMINATION AND COGNITIVE WORKLOAD USING A VISUAL AND 3-DIMENSIONAL AUDITORY DISPLAY

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This study compares the effects of a visual and a 3-dimensional auditory display on primary and secondary task performance, mood, and mental workload at incremental levels of sleep deprivation. It is based on a study conducted by the Army Research Laboratory, Cognitive Science Branch, Aberdeen, Maryland, from 12 Marines performing land navigational tasks in two helmet-mounted display (HMD) modes; visual and 3-dimensional auditory, for a 48 hour period. The results indicate that performance under sleep deprivation is significantly impacted in both modalities; however, performance in the primary task was more degraded in the 3-D auditory modality. Additionally, Marines were more likely to experience degraded performance in the secondary task with increased sleep deprivation. The recommendations address the need to design HMDs that will not overburden sensory channels and the concern for military leaders to understand the additional demands imposed on solders in a HMD environment.

KEYWORDS: Helmet Mounted Displays, Visual HMDs, Auditory HMDs, Sleep Deprivation, Cognitive Performance, Workload, Navigation

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