IMPROVING HUMAN TASK PERFORMANCE WITH LUMINANCE IMAGES AND DYNAMIC OVERLAYS

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The goal of this project was to investigate and measure the effects of computer aided training, enhanced with static lighting, dynamic lighting and dynamic overlays, on crew performance of Space Station tasks.

Previous research ("Human Task Performance Evaluation With Luminance Images" - NRA 95-OLMSA-01) has shown that the use of static lighting in computer aided training simulations improved performance by humans when executing the tasks for which they were trained. This project extended this line of research to include dynamic lighting effects, which are common with a forty-five minute orbital day. In addition, the project also examined the use of augmented reality techniques, such as dynamic overlays, to enhance training and task execution during poorly or ambiguously illuminated situations.

Twenty-four male and twenty-four female participants were trained with a computer simulation of an alignment task using a Space Station docking target pattern. Training with normal simulation and training with simulation augmented with overlay information, three conditions were considered, no lighting (traditional computer modeling), static lighting and dynamic lighting conditions. After the training each participant was tested with two viewing conditions, normal video and video augmented with overlay information.

Results from the project showed that under some conditions, error was reduced with the use of overlays. Consistent gender effects were noted in both training and testing performance. Use of overlays resulted in increased confidence in participants. Additional analysis of results is underway.

Keywords
Space Station, dynamic overlays, computer-aided training, augment reality, luminance