

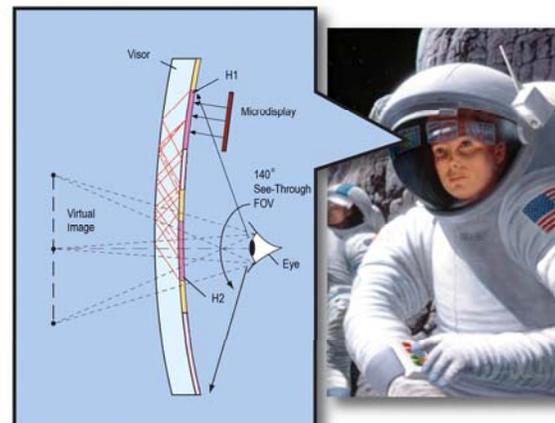
NASA SBIR/STTR Technologies



Holographic Waveguided See-through Display PI: Dmitry Voloschenko/Luminit – Torrance, CA Proposal No: 07-X4.03-9536

Identification and Significance of Innovation

To address the NASA's need for lightweight, space suit-mounted displays which will enable the astronauts to see important information during Moon exploration and missions to Mars, Luminit, LLC proposes to develop a novel Holographic Waveguided See-through Display (HoWSD) based on highly selective waveguiding Bragg holographic optical elements and unique LCD backlighting, which permits hands free, unobstructed viewing of information during astronauts' EVA. HoWSD offers a compact, high resolution low-profile display with high brightness and contrast, wide field-of-view, see-through display creating a clear convenient communication tool that will not interfere with the work envelope.



Technical Objectives

1. Identification of technologies for implementing HoWSD using computer modeling and numerical analysis.
2. Identification of technologies for implementing sub-systems.
3. Integration, testing, and evaluation of the HoWSD system.
4. Preliminary establishment of commercial potential.

Work Plan

1. Design HoWSD Visor Optics by Computer Modeling
2. Develop Method for Recording Visible Reflection Holograms
3. Fabricate a Waveguide Image Projection Element
4. Design the Optical Scheme
5. Fabricate Waveguide Holograms
6. Design HoWSD Backlight by Computer Modeling
7. Select and Procure HoWSD Components
8. Assemble Backlight for the Microdisplay
9. Integrate a HoWSD Visor Optics Demonstration Setup
10. Demonstrate Feasibility of HoWSD through Extensive Testing
11. Explore Commercial Potential and Product Viability
12. Prepare and Submit Reports

NASA Applications

The HoWSD system integrated into an EMU will enable astronauts to see important mission information, such as updates from the Primary Life Support System, warnings, and checklists during EVA without interfering in the work envelope.

Non-NASA Applications

HoWSD can be adapted for avionics, fire fighting, and in other areas where rugged helmet-mounted displays are needed to convey information quickly, legibly, and unobtrusively. HoWSD visor optics system will lead to cost-effective commercialization. In particular, the new HMD system will find numerous real-time 3D virtual reality applications. Medicine, avionics, education, CAD, portable computing and communication, law-enforcement, fire fighting, space exploration, and video games represent major markets for compact, low-cost lightweight HMDs in the private sector.

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