

# NASA SBIR/STTR Technologies

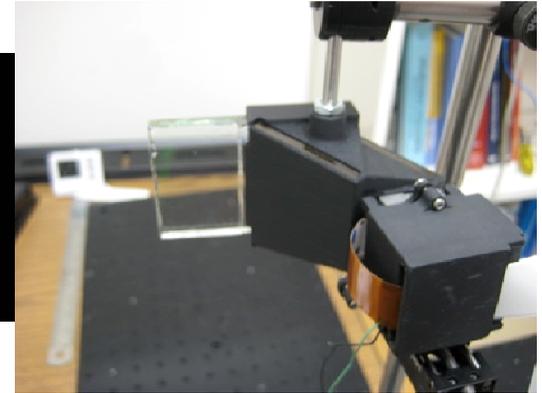
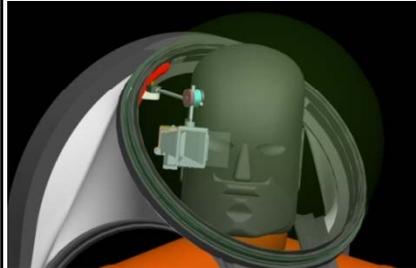
## Holographic Waveguided See-through Display

### Contract No.: NNX-09-C-A46C



#### Technology Description

- Luminit, LLC is developing a Holographic Wave-guided See-through Display (HoWSD) based on wave-guiding holographic optical elements, which permits hands free, unobstructed viewing of information during EVA.
- HoWSD offers a compact, low-profile display with high resolution, high adjustable brightness, high contrast, a wide field-of-view, and a convenient non-pupil forming tube-shaped eye-box, creating a communication tool that will not interfere with the work envelope.
- HoWSD provides a see-through holographic visor that conforms to the shape of the Mark III Helmet.
- HoWSD is safe: designed with a minimum number of elements placed into the helmet, there are no elements/objects between the astronaut's eyes and the helmet visor.



#### Status

- Fabricated and assembled prototype as per the design
- Improved image/backlighting uniformity
- Demonstrated for a flat visor:
  - Resolution: **1024 × 768 pixels**
  - Grayscale: **32 gray levels**
  - Image quality: **~ 12.5 lp/deg**
  - Adjustable brightness: **400 nit - 2000 nit with green display source**
  - Contrast (on/off): **~75:1**
  - Field of view: **~15.5° dia.**
  - Eye relief: **~70 mm**
  - Transparency to the eye: **at least, ~81%**

#### Transition / Impact

- Improved image quality and ergonomics will provide a display tool that enhances astronaut capabilities during EVAs.
- In addition to being unobtrusive, HoWSD will help to reduce the time the astronaut needs to make decisions/implement tasks.
- Commercial applications for HoWSD include helmet and head-mounted displays for Government, military, and commercial sectors.

#### Expected Product

Helmet mounted display instrument for hands-free information viewing during EVA.

#### Completion Targets (01/2011 – 10/2011)

- Optical design conformal to the Mark III helmet; green display source
- Mechanical design for packaging/placement of the microdisplay and electronics
- Fabrication and assembly of the prototype as per the design.

#### Target TRL

A target TRL of 4 is expected by the end of the Phase II effort.

#### Sponsorship

NASA Glenn Research Center

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**Open Contracts:** NNX-09-C-A46C

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