

# Development of Extravehicular Visor Assembly (EVVA)

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HAT: 6.2.a-e

TA: 6.2.1 and 7.3.1

TRL: start 3 / current 4



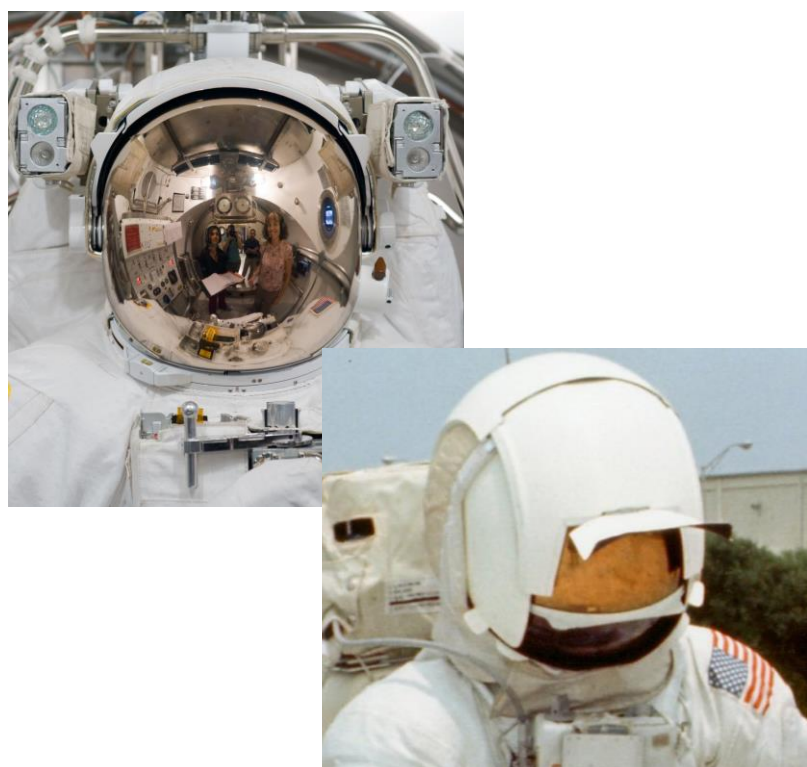
## ENGINEERING DESIGN PROCESS

For the next generation of NASA's space suits, being able to enable an architecture for microgravity and planetary capabilities is required. To support these future missions, we will need exemplary support hardware to be designed, such as a new extravehicular visor assembly (EVVA). This EVVA will carry out its heritage mission of protecting the astronauts' eyes from harmful radiation, giving needed shade, and providing thermal protection, while also incorporating new designs that maximize overhead visibility and incorporate new technology. It will be designed to adapt with xEMU lite, a next-generation suit architecture.

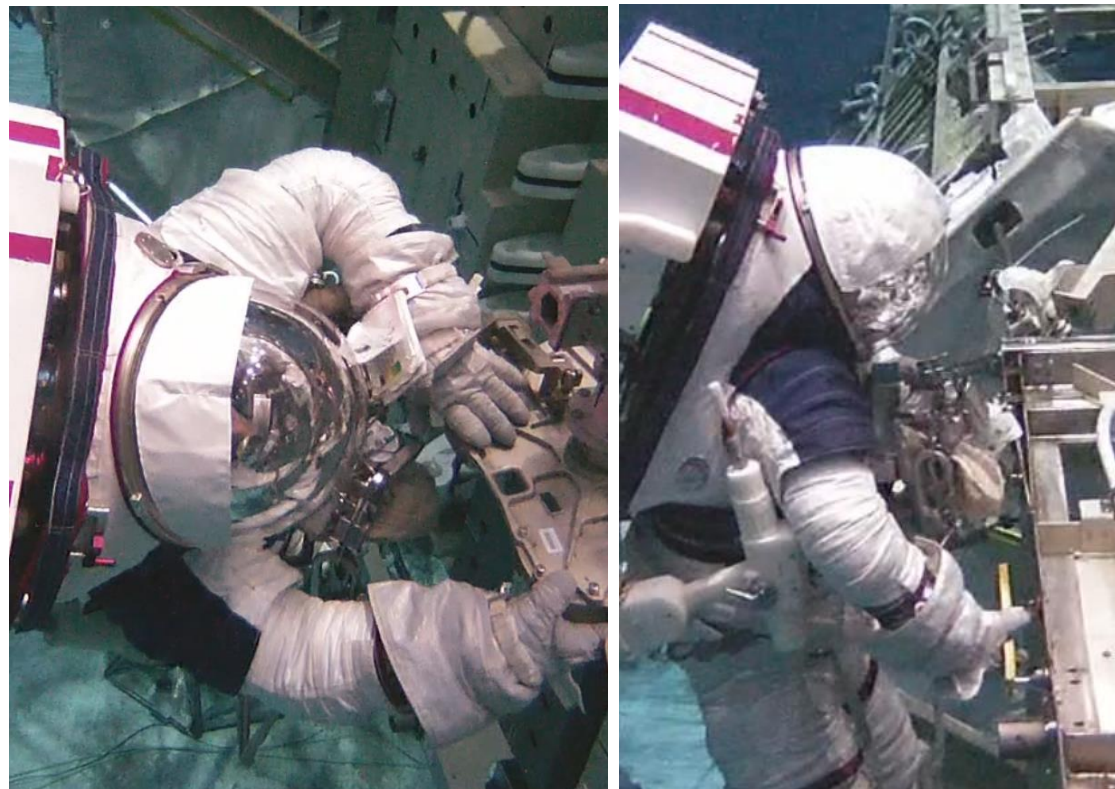
### Segmented Visor

#### Research

Reviewed Previous Designs

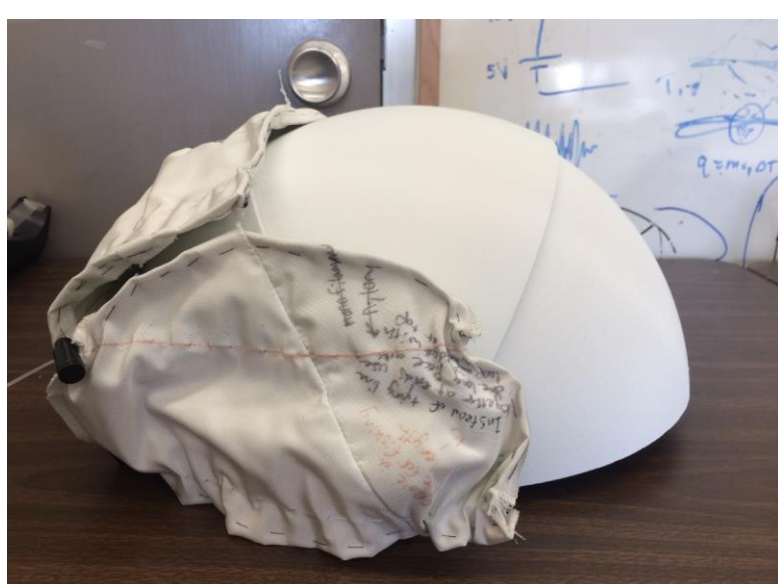
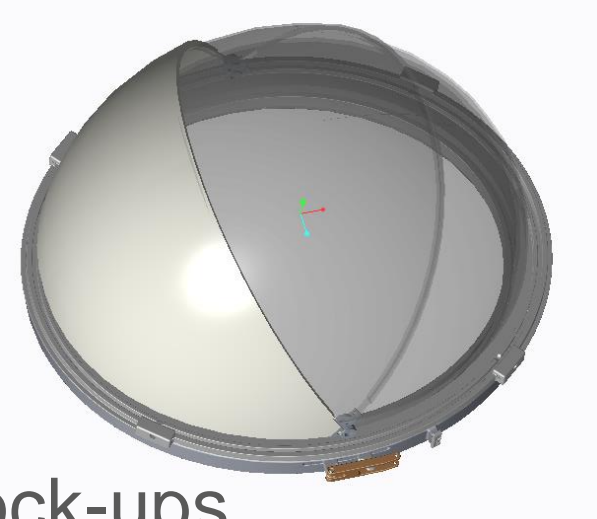


Reviewed Z-2 NBL Visor Testing



#### Design & Develop

- Created 3-D CAD Model
  - 2 movable visors
  - Top fixed shade
  - Rotates about a pivot
- Manufactured 3-D Printed Mock-ups



#### Test & Improve

- Continue to develop and manufacture a mechanical design for a new microgravity EVA space suit

2017 JSC Technology Showcase

### Active Coatings

#### Research

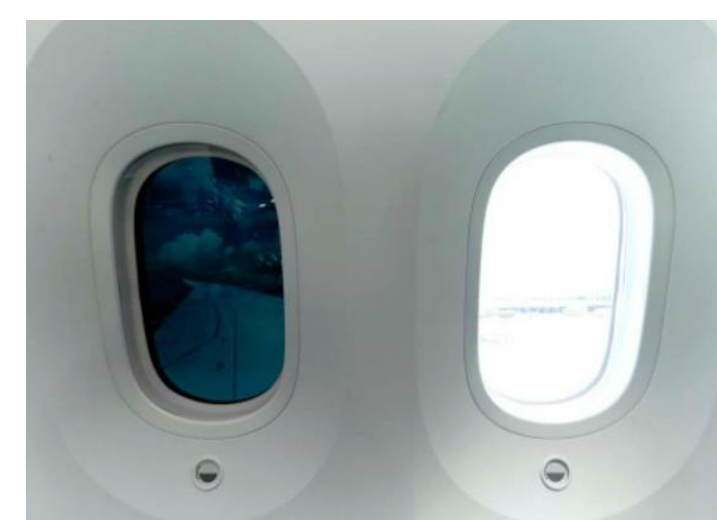
- Completed market research and literature reviews
- Set up a NASA@Work challenge "Incorporating Active Tintable Electronic Coatings into Next Generation Space Suit Visor."
  - Gathered innovative ideas and points of contact for industry partners working on electrochromic technology.

NASA@WORK

#### Design & Develop

- Contacted Boeing and AlphaMicron to understand COTS solutions on the market and how they could be applied to the space suit design.
  - Found that there are many advantages to an active coating because of reduced mechanisms, an inherent dust tolerant design, and auto-sense capabilities. However, the COTS designs are not currently compatible with the xEMU lite form factor, the space environment, and the xEMU lite power requirement. COTS designs can also fail in the off/transparent state.
- Pursuing low TRL funding sources for future development for exploration EVA space suit

Boeing 787  
Electrochromic Windows



AlphaMicron Electrochromic  
Motorcycle Visors

