

xEMU Environmental Protection Garment Internship

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Overview

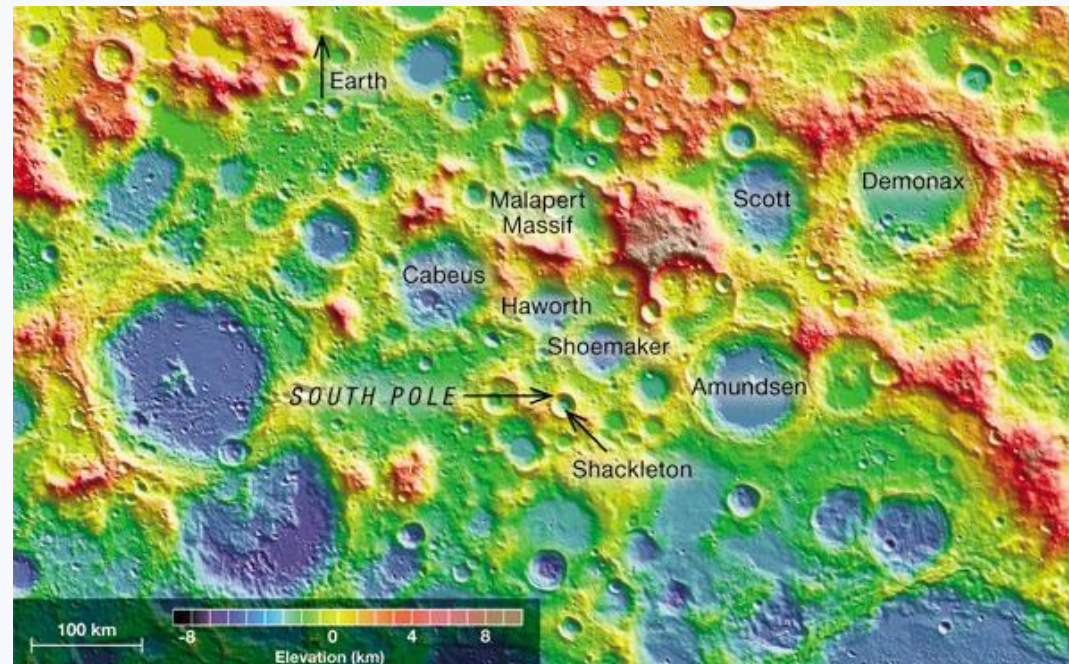
- The Artemis Program
- Shackleton Crater
- The Lunar Environment
- Designing a Lunar Spacesuit
- My Internship

The Artemis Program

- In 2017 the president of the United States directed NASA to return to the Moon.
- NASA's goal is to replicate and build upon the legacy of Apollo through an eventual sustained lunar presence.
- To accomplish this NASA and industry partners will need to use In-Situ Resources, like water.
- Experts believe this can be found in significant amounts in permanently shadowed regions on the poles of the moon.
- Next-gen spacesuits will have to deal with harsher environments, more frequently, and for a longer period of time.

Shackleton Crater

- Shackleton Crater is almost exactly on the south pole of the moon
- The unique lighting makes for an excellent location of a lunar base



The Lunar Environment

- Extreme temperatures in PSRs
 - -414 F (About 40 degrees above Absolute 0)
- Electrostatically charged lunar regolith
 - Very sharp
 - Very clingy
- Suit Durability
- About 1/6th Earths gravity



eXploration Extravehicular Mobility Unit

- NASA's Government Reference Design Spacesuit
- First real attempt at a planetary spacesuit system since Apollo
- Made for extended use on the lunar surface



The Environmental Protection Garment

- The protective outer layer of the spacesuit
- Deals with the intense environment of the lunar surface while allowing the astronaut to move as freely as possible
- Often left as an afterthought but is deeply integrated into every component of the spacesuit
 - Portable life support system
 - Pressure Garment Subsystem
 - Digital Control Unit
 - Extra-vehicular Visor Assembly
 - Communication Antenna
- Must be easy to put on/remove while being dust-tight

My Internship

- Fall Semester in Houston, working on site at JSC
- Worked on the EPG team (We got you covered!)
- Ran several projects while also covering random small tasks
- Got hands on experience with spacesuit requirements, design, and testing
- Designed spacesuit material experiments, and testing equipment along with world leading researchers
- Secured a second (and third) internship working on my PhD research!

Lessons learned

- The EPG is an integral part of the spacesuit NOT a secondary design product
- Spacesuit design requires lots of people with a wide range of experiences
- Communication is important with all the stakeholders on a project
- There is a need for spacesuit engineers!

Questions?

