HONEYBEE ROBOTICS
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Dust Tolerant Electrical Connectors for the Lunar Surface

LSIC Cross Cutting and Surface
Power Joint Meeting
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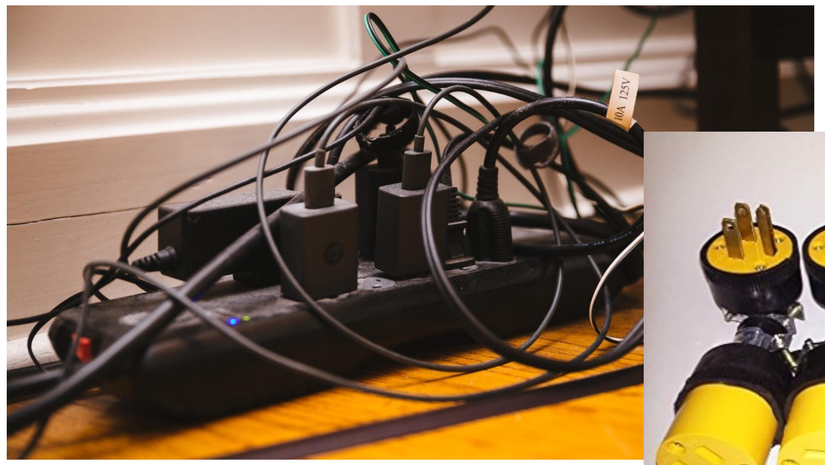
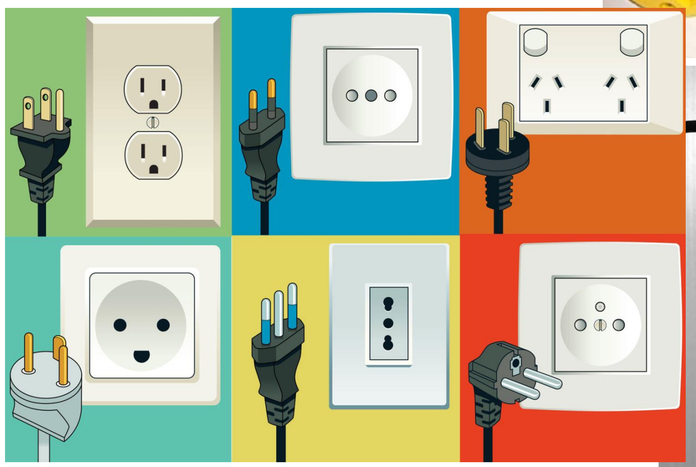
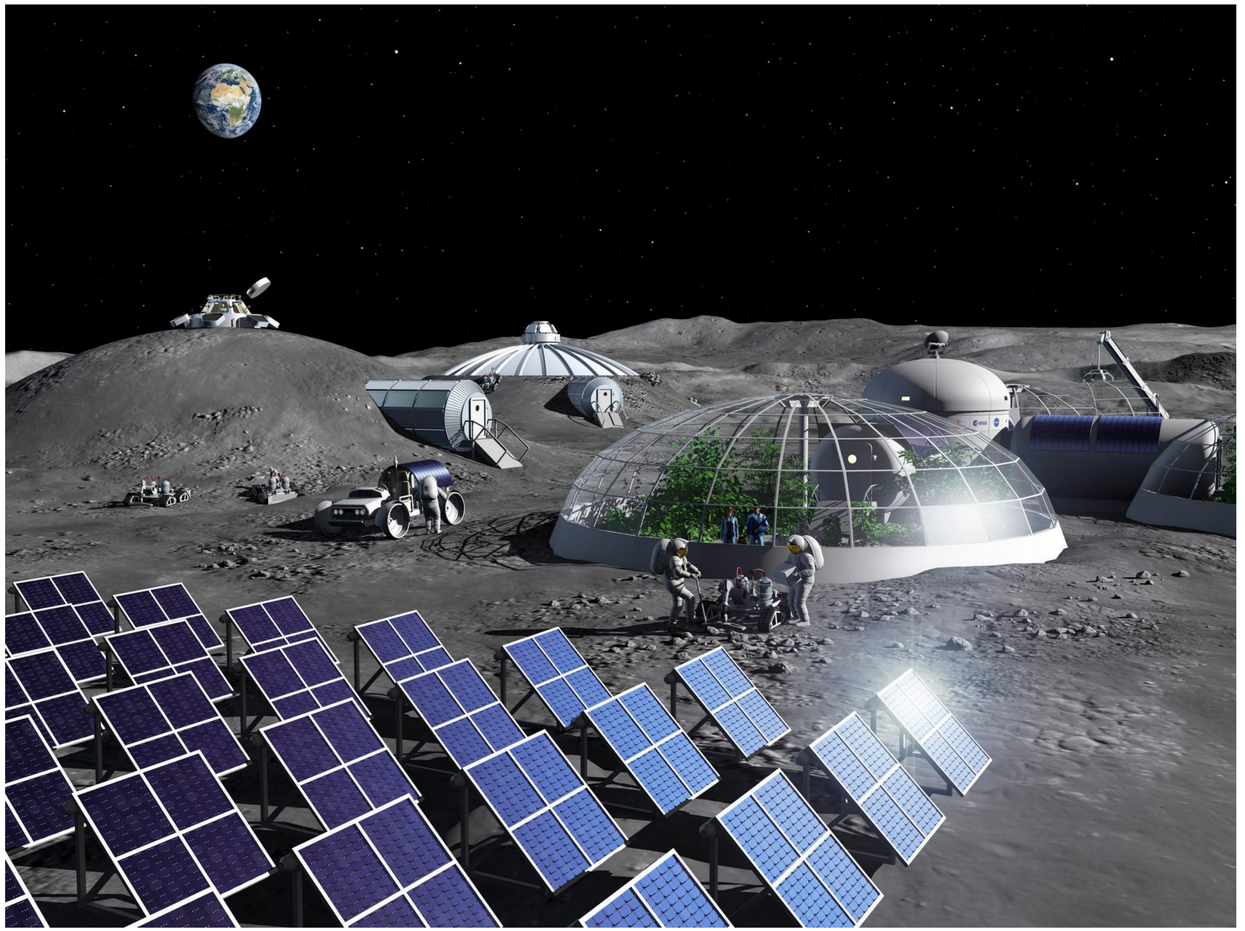
Reusable Electrical Connectors

We Need These:





To Connect Power to These:

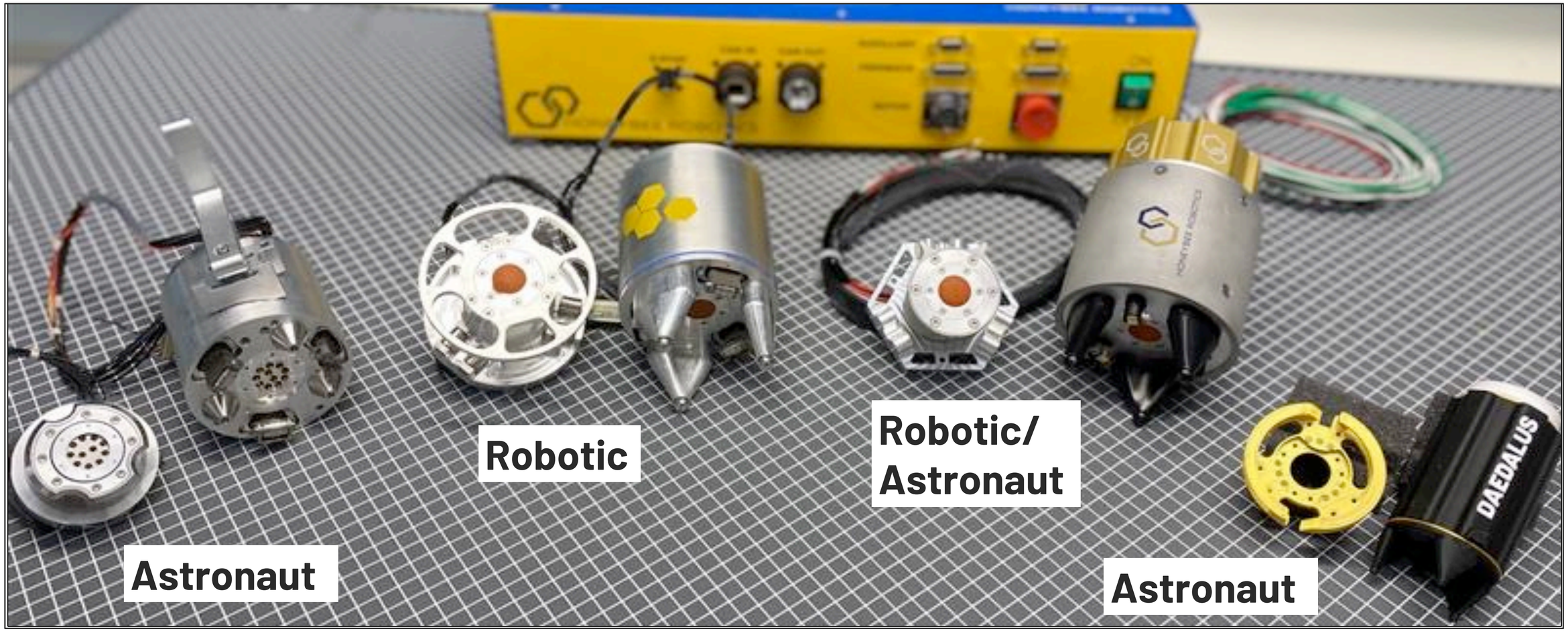


Lunar Surface Challenges

Lunar Environment

- Lunar regolith
  - Abrasion
  - Wear
  - Jamming
  - Coating
- Thermal
- Vacuum
- Electrostatics

Honeybee Dust Tolerant Connectors

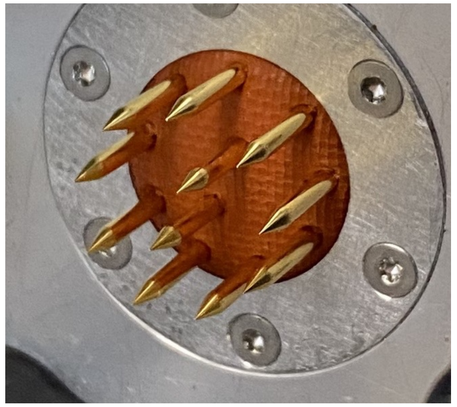


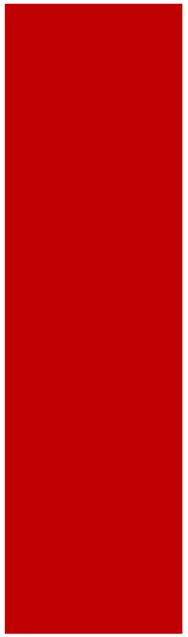
Dust Tolerant Technology

Stowed

Deployed

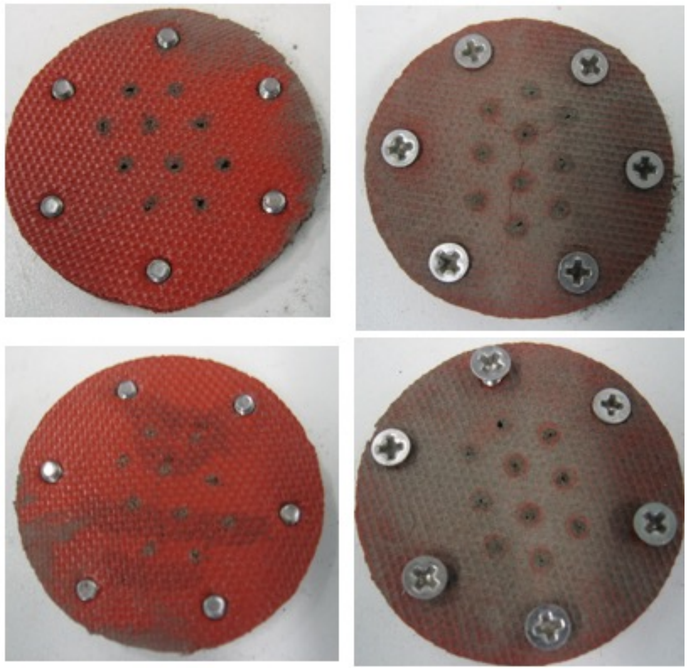
Pin Close Up





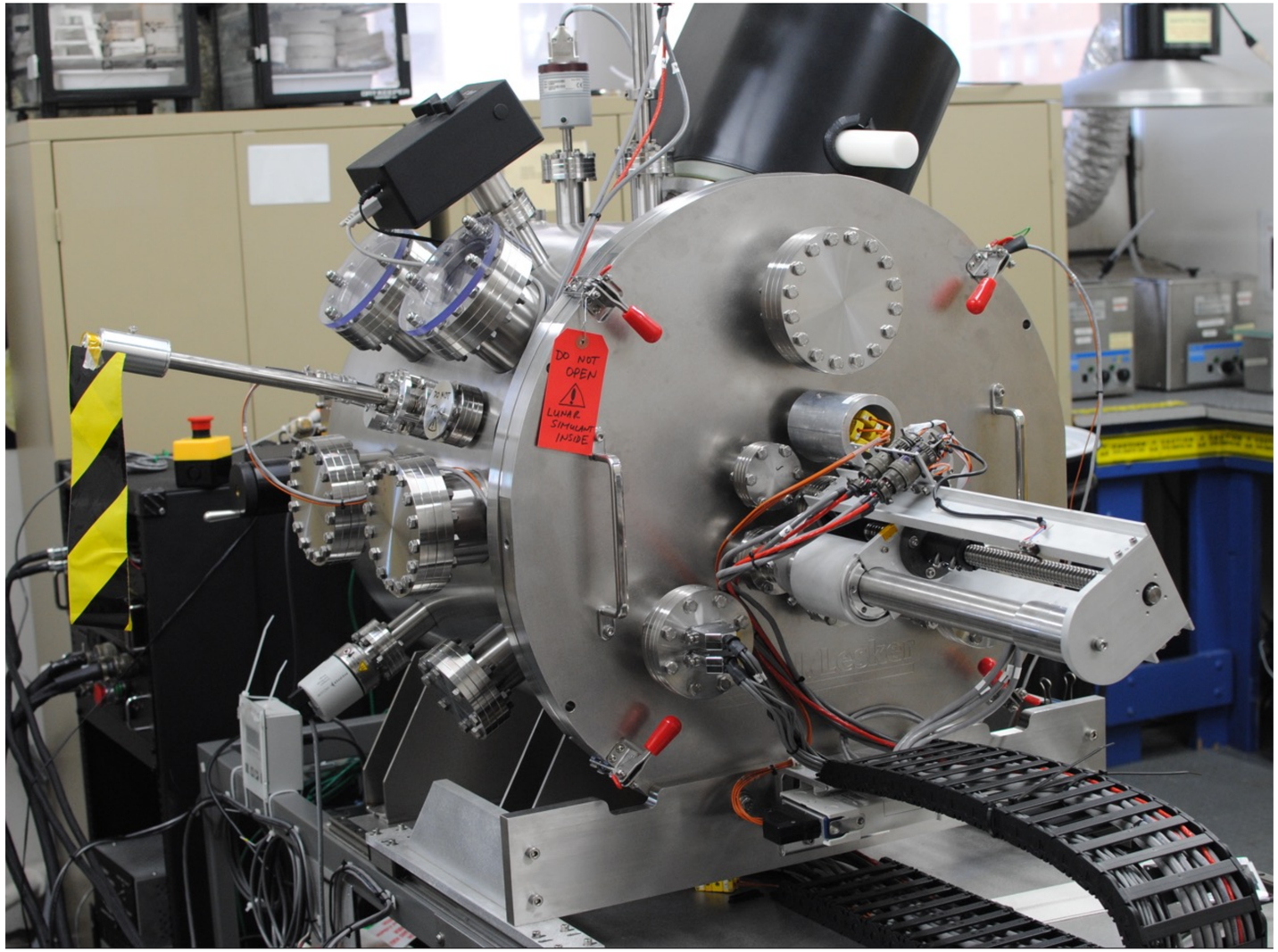
Debris Intrusion Animation

Self Healing Surfaces



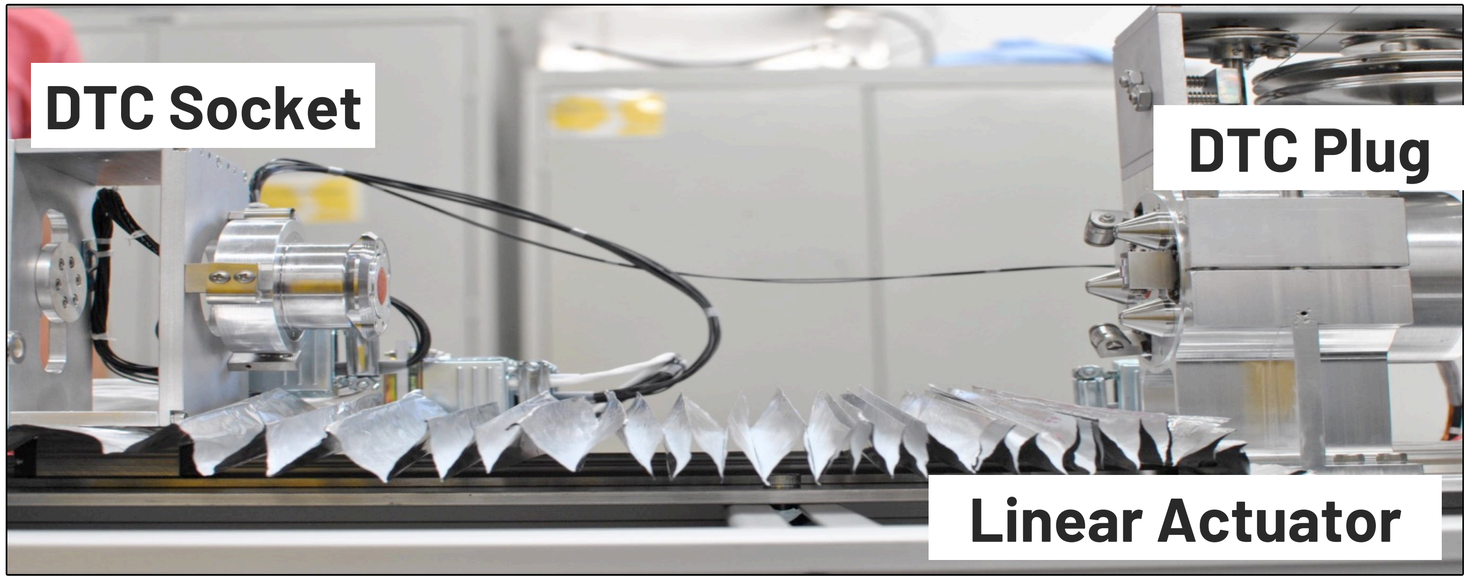
Chamber Test Setup

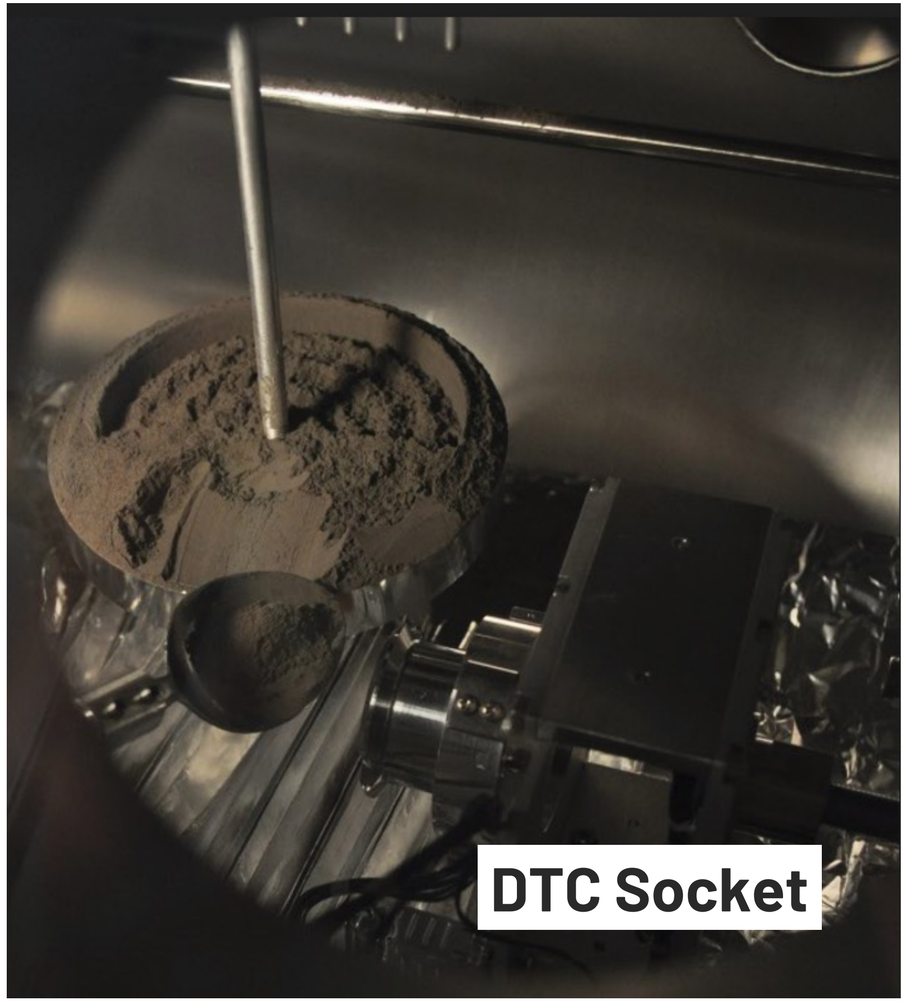
- 10^-6 Torr vacuum pressure
- Plasma source on simulant
- Residual Gas Analyzer (RGA)
- Wobble stick
- Linear stage for connector
- Thermal shroud
- View ports
- Data acquisition system
- Regolith simulant
- Microgravity?



DTC Test Setup

- Plasma source (top of chamber)
- Very scientific soup spoon on wobble stick
- JSC-1A regolith simulant
- Simulant rake

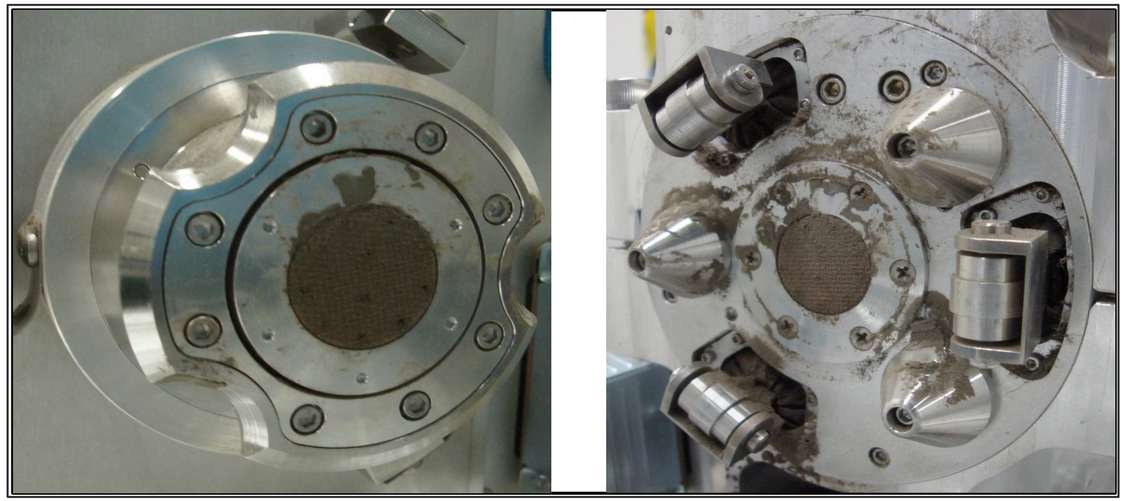




DTC Test Results

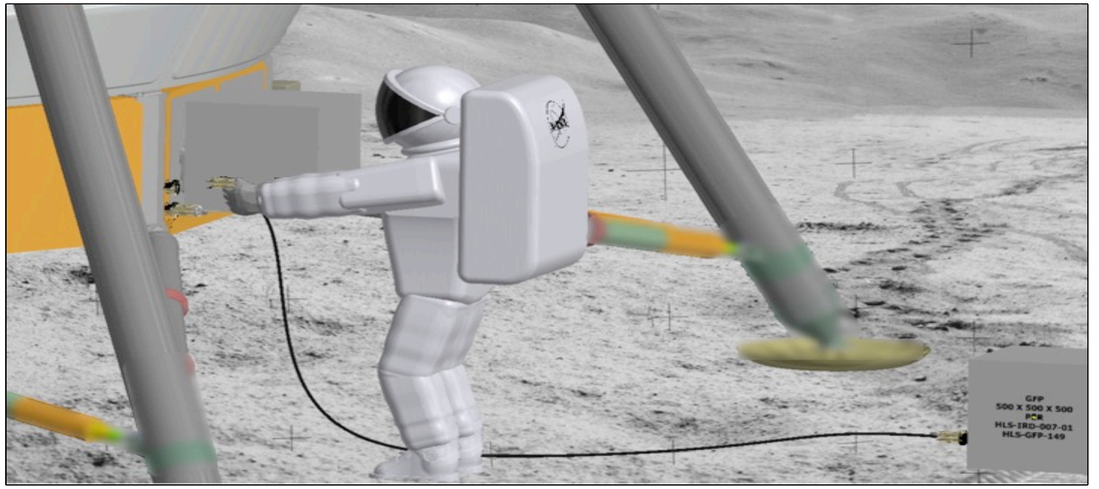
- Over 500 mate-demate cycles without degradation of electrical or mechanical performance
- Some simulant intrusion beyond self healing membrane
- SBIR program success, leading to phase 3
- Patent US8011941B2
- Publications

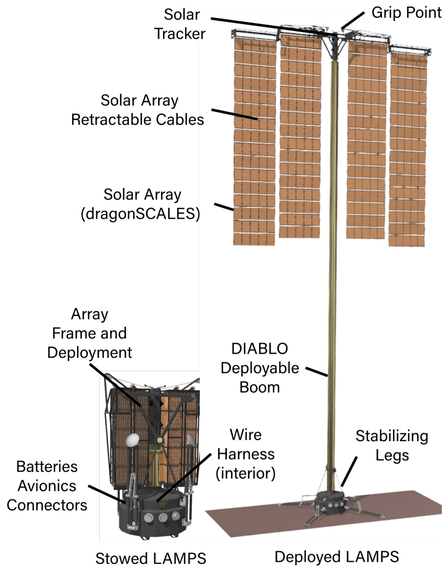
DTC Plug **DTC Socket**

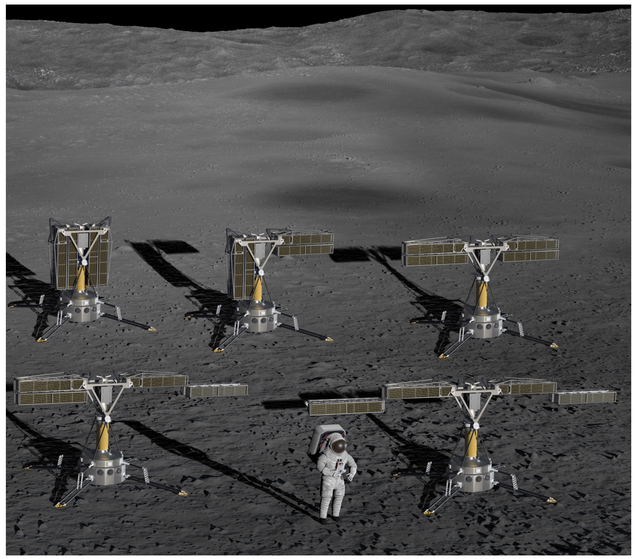


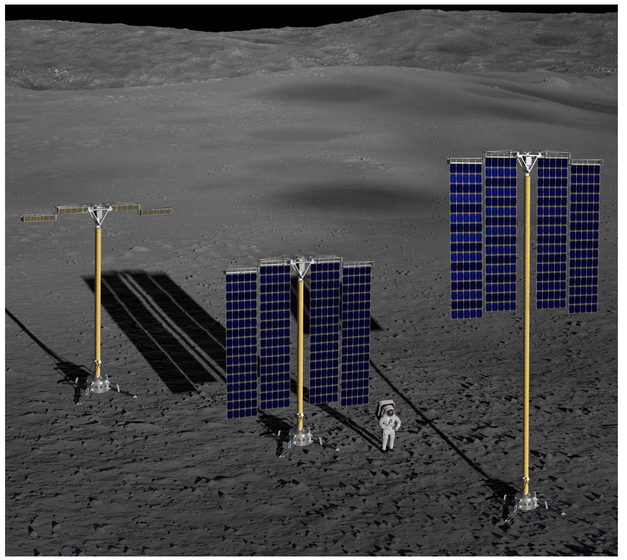
Next Steps in DTC Development

- Designing mechanism for Artemis astronauts
- Evaluating architecture for long duration missions >5 years
- Understanding range of power requirements
- Standardization of power requirements









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Thank You!

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