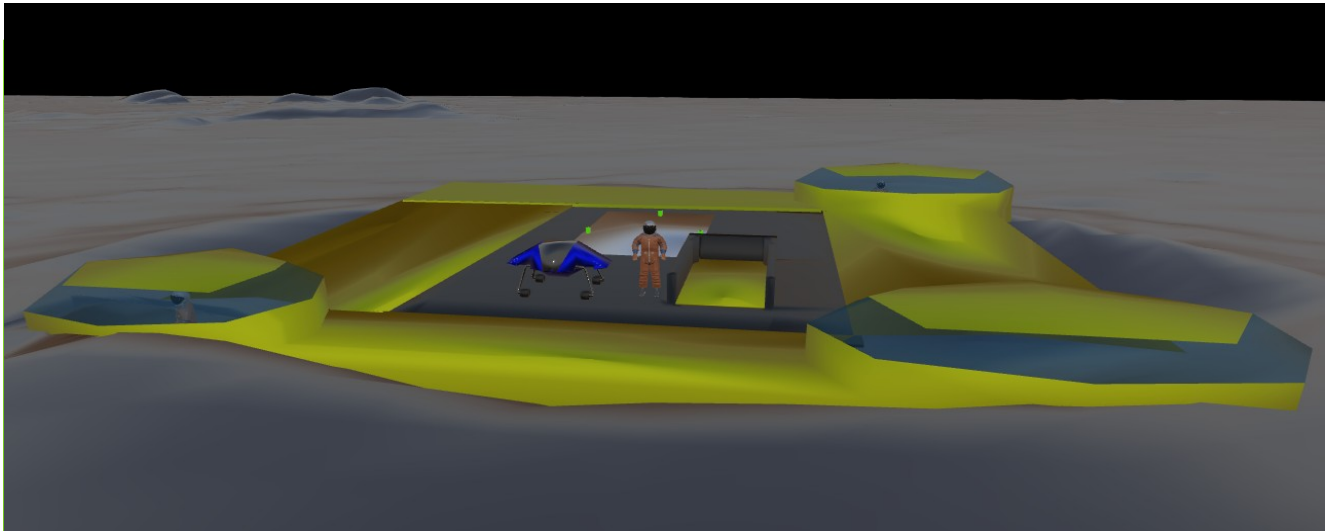


**Decadal Survey on Biological and Physical Sciences Research in Space 2023-2032**  
**Research Campaign: Artemis III**



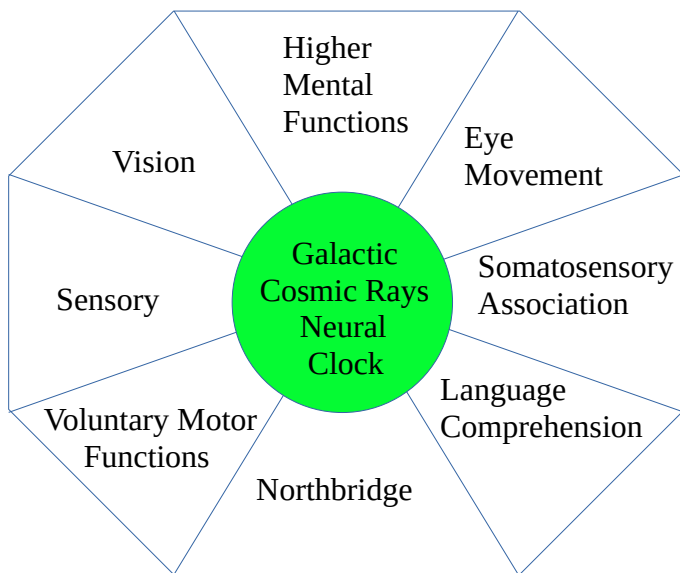
**Environment: Cis-Lunar Space Neutrino Subterranean Asset<sup>[1]</sup>**

The asset hosts a galactic propulsion system research facility on the Moon. Energy is being generated and transferred to small spacecraft, from fusion reactors located 3 meters below the lunar surface. The facility comprises a descent/recharge/ ascent platform for ESPA class spacecraft plus 3 pressurized habitats for human explorers.

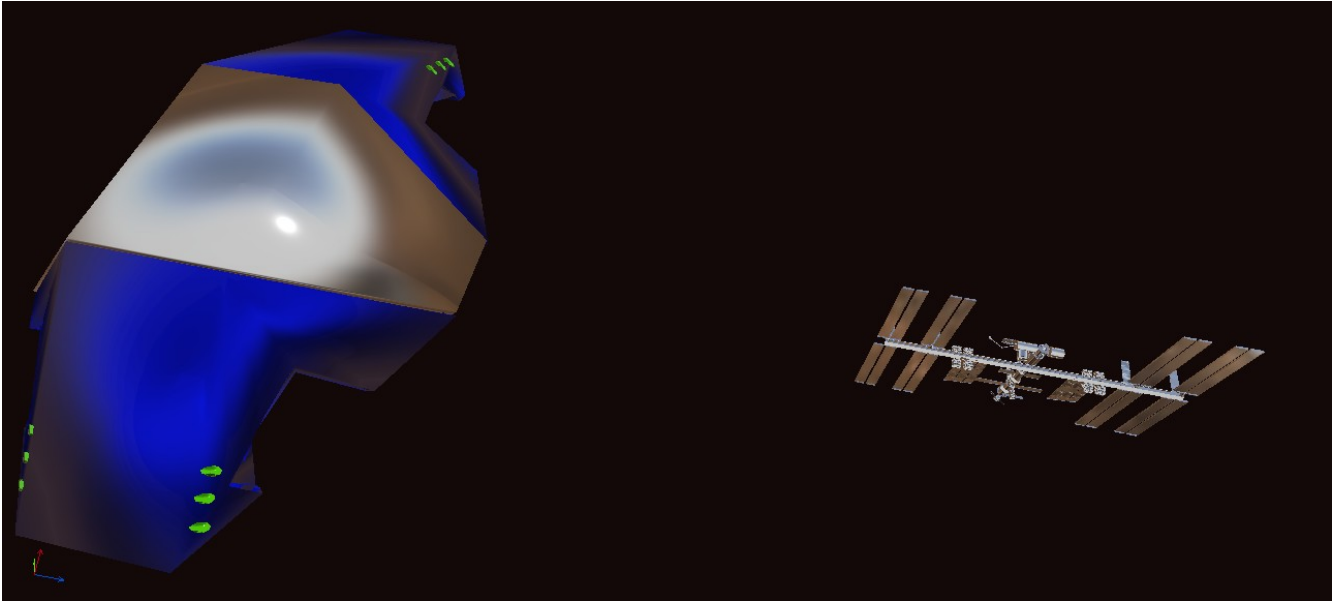
We've identified a knowledge gap in respect to dust mitigation as the following: "Could the magnitude of distinctiveness on the Lunar surface outweigh conditions found on Earth?".

**Acronyms**

- EELV:** Evolved Expendable Launch Vehicle
- ESIRA:** Extraterrestrial Scientific Investigations Robotic Arm
- ESPA:** EELV Secondary Payload Adapter
- GCR-NC:** Galactic Cosmic Rays Neural Clock
- LIBS:** Laser Induced Breakdown Spectroscopy
- LISA:** Laser Interferometer Space Antenna
- LTV:** Lunar Terrain Vehicle
- NASA:** National Aeronautics and Space Administration
- NFL:** Nuclear Fusion Lunar Landerover
- PRISM:** Payloads and Research Investigations on the Surface of the Moon
- sCMOS:** scientific Complementary Metal–Oxide–Semiconductor
- SMD:** Science Mission Directorate
- STMD:** Space Technology Mission Directorate

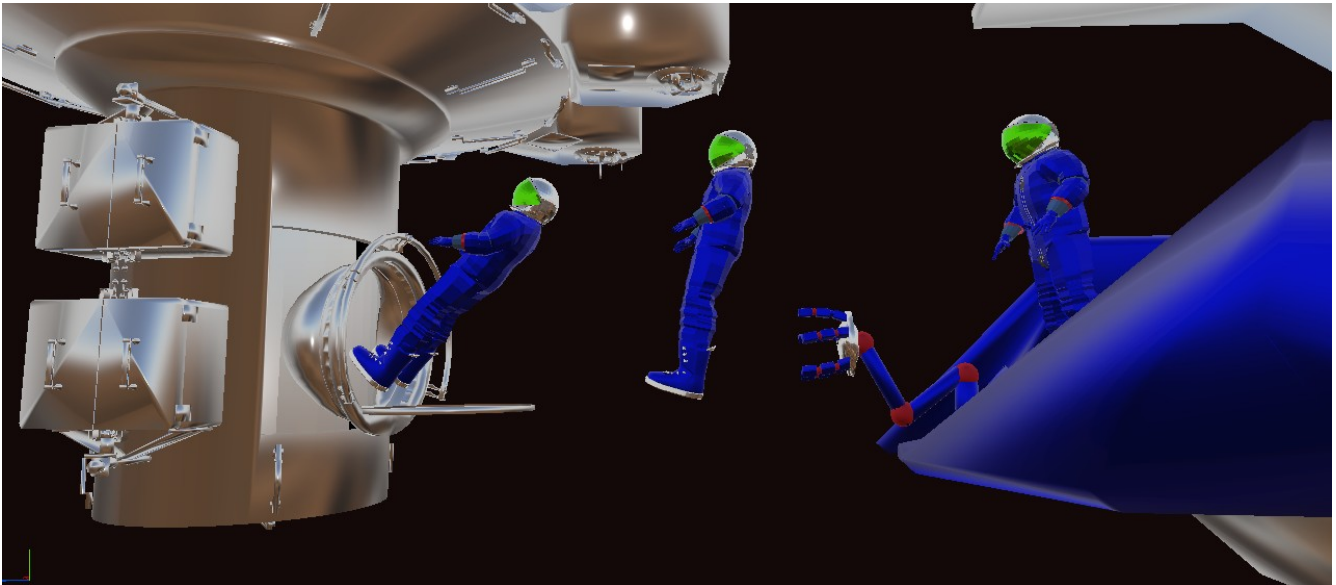


**Galactic Cosmic Rays Neural Clock Architecture**



CLuS'N approaching the ISS

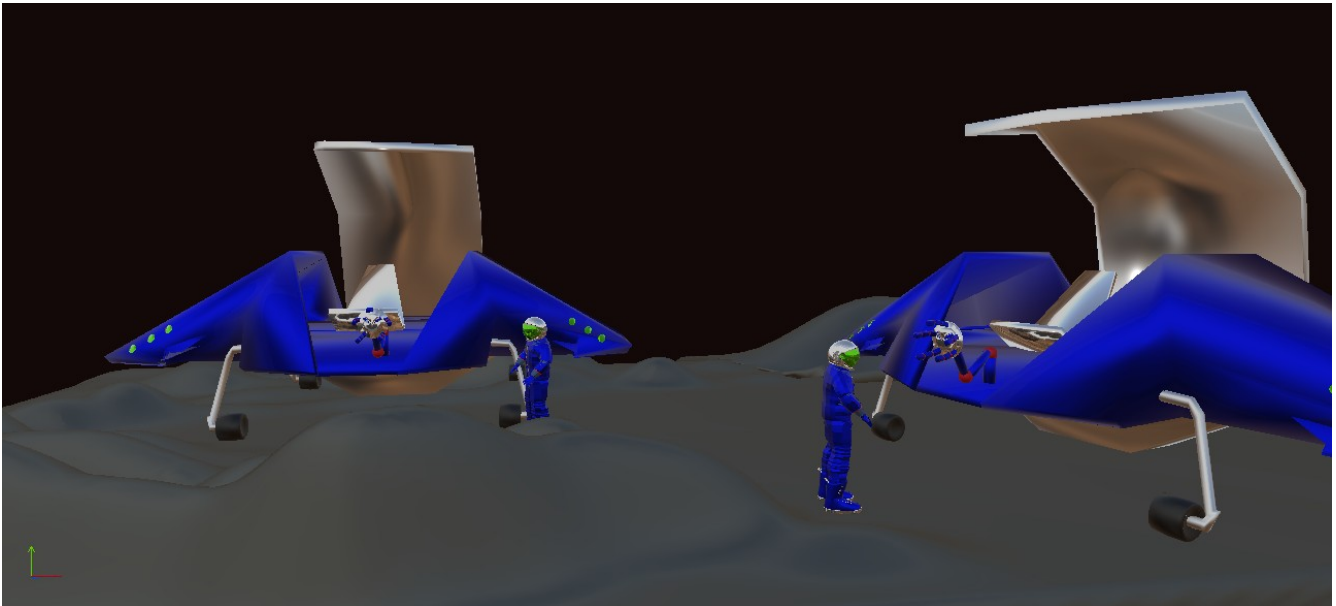
The Cis-Lunar Space Neutrino (CLuS'N) Laboratory is a next-generation spacecraft built to engage Astrophysical phenomena, from orbit around the Moon in support of the Artemis mission.



A United States Government Astronaut being transferred to the Quest airlock by the spacecraft (1 astronaut, 3 epochs). No docking involved.

The CLuS'N lab remains in orbit around the Moon for the duration of the mission to execute on-orbit rescue services. The Nuclear Fusion Lunar Lander (NFL) is the primary return-to-Earth vehicle and cargo resupply. Both spacecraft CLuS'N & NFL are launched on the same rocket every first time. The rocket is currently undergoing design, while the Spacecraft software is in production at [eee.orbitzone.space](http://eee.orbitzone.space).

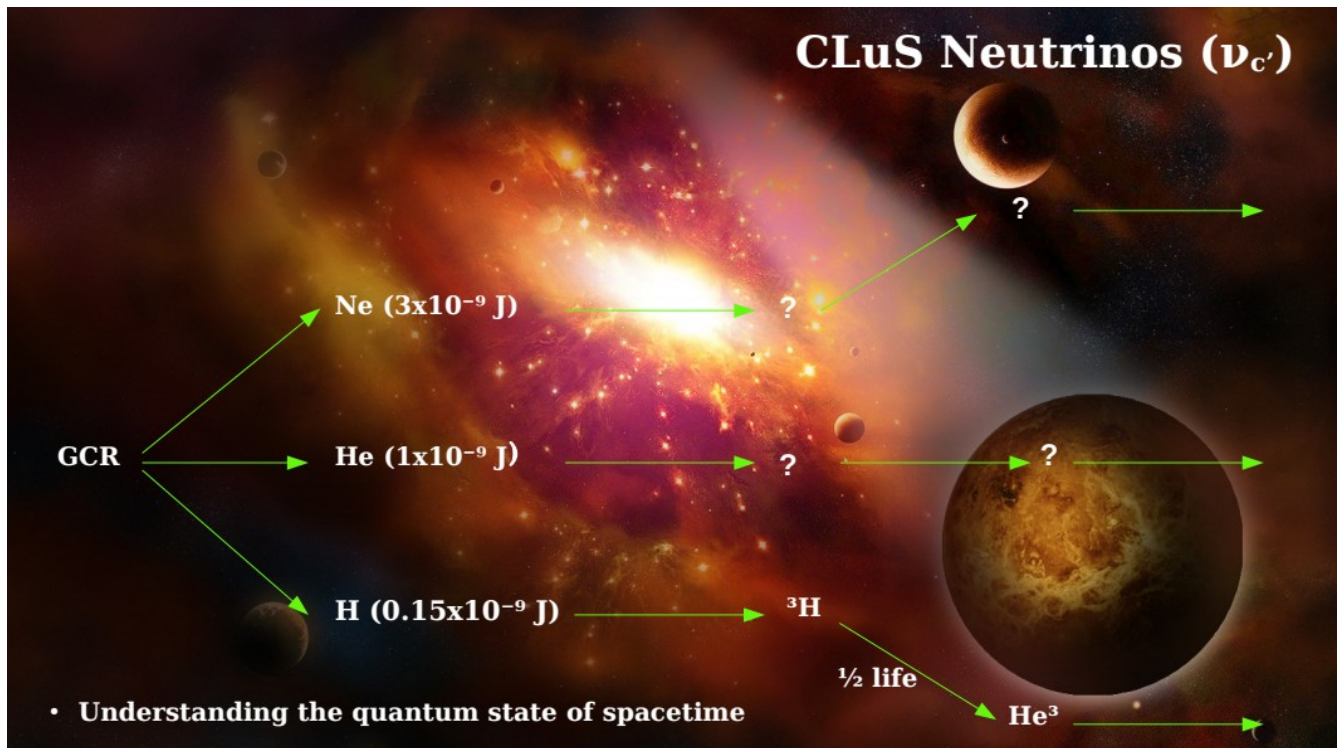
## Lunar Terrain Vehicles (LTVs)



**ORBIT proposes two single-seat robotic LTVs**

### 1. Extended Lunar Night Survival:

- $\nu_c$  technology may power the LTVs for a minimum period of 8760 hours without operational/mass constraints



## 2. 10 years of Operational Duration:

- The LTVs are capable of inspecting one another and apply some level of maintenance
- The Vc' reactors are anticipated to be replaced every 24 Lunar days (2 Earth years)
- Nucleosynthesis may allow operation past 10 years without the need to replace the reactors

## 3. Lunar Lander for LTV:

Strength: -enables standardization and multiple payloads delivery at lower cost  
-allows NASA to focus on other priorities such as the unforeseen

Weakness: limits innovation on LTVs design and parameters

- Due to the complexity of the proposed LTVs, communication with CLPS lander vendor should begin Now.
- The LTVs do not depend on CLPS. They may be launched to GTO. They are equipped with a propulsion system inherited from CLuS'N that allows them to coast in formation to the Lunar orbit and land on the surface.

## 4. Commercial Services:

- Service-based is an excellent approach as the commercial landscape is growing. Significant number of businesses are emerging with needs of mobility services, seen on community based organizations marketing research assessments. Helium3 is in high demand as well as raw metallic materials.

ORBIT corporate/commercial contribution: CLuS'N Subterranean Asset (ESPA-class spacecraft descent/ascent platform, energy supply, 3 pressurized habitats, Communications and Navigation)

### **Reference:**

[1] Traore, D. (2021). Cis-Lunar Space Neutrino Subterranean Asset. Bulletin of the AAS, 53(4). <https://doi.org/10.3847/25c2cfef.a5c91881>