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# TRANSFORMING A LUNAR LAVA TUBE INTO A HABITAT: WHAT'S REQUIRED

**Abstract**

This project investigates what approaches, assets, and architectural modifications would be required in order to transform a lunar lava tube into a safe and livable environment by studying a terrestrial lava tube system. Taking advantage of the natural shielding properties of lava tubes may mitigate several of the design challenges anticipated for establishing a future lunar habitat. Other benefits include prolonging the lifespan of infrastructure by reducing material fatigue from thermal cycling and having access to a pristine scientific environment. However, constructing a habitat within a subsurface cave or void on the Moon will create new risks to astronaut safety and have its own unique design challenges. Before a prospective lunar lava tube can be accessed by humans, it will be necessary to assess its suitability for habitation and structural resilience to both natural and anthropogenic disturbances. A hypothetical approach to a human lunar exploratory mission and initial habitat requirements are outlined. Comparative planetology techniques are then used to evaluate the feasibility of such an approach, taking into consideration: potential equipment and operational limitations, architectural and accessibility requirements, and other possible obstacles arising from lunar environmental conditions.