



## Civil Engineering & Construction on the Moon and Mars

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By Melodie Yashar  
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Humans to Mars

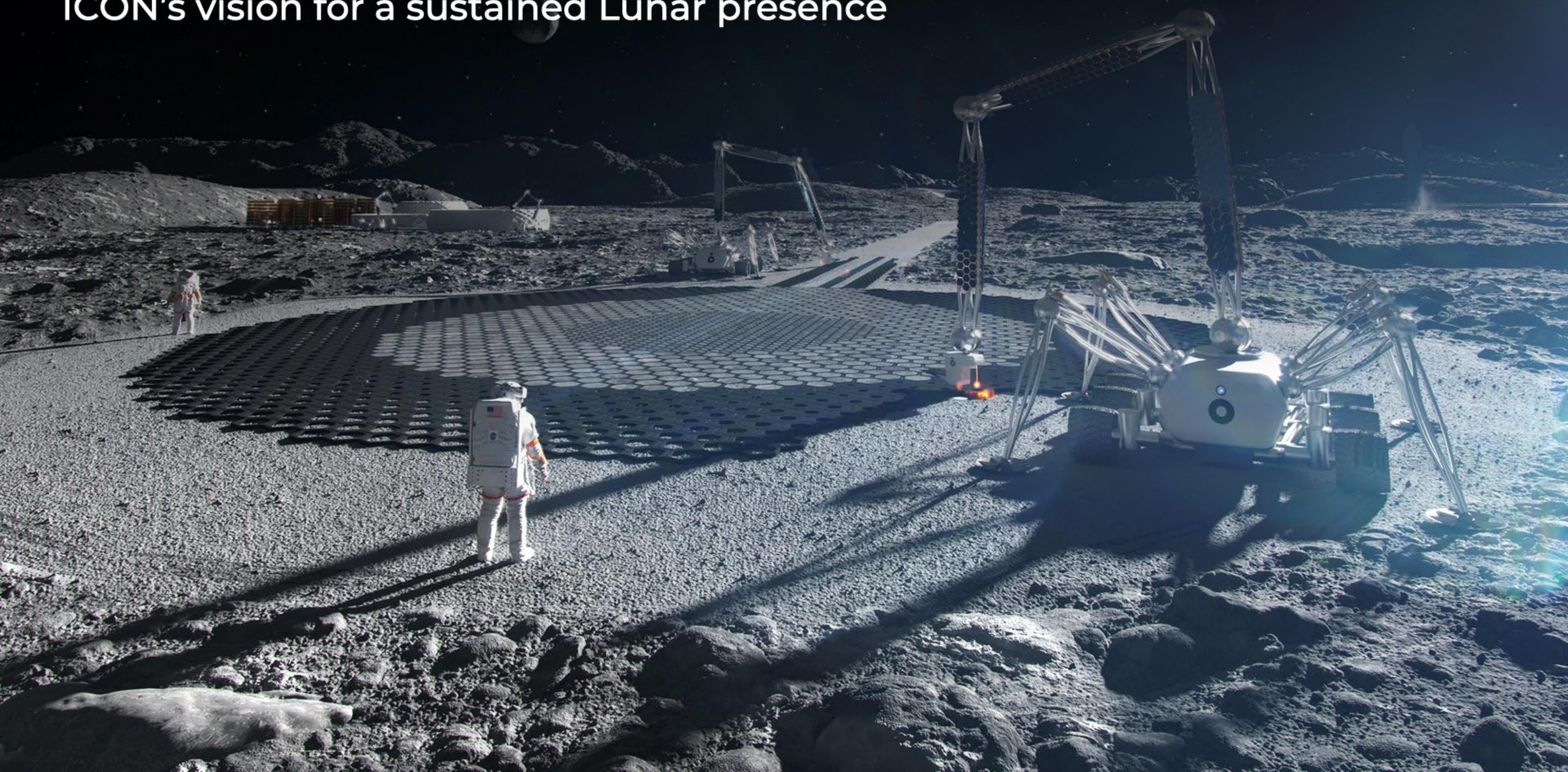


# ICON's vision for a sustained Lunar presence

ICON was awarded a Small Business Innovation Research Contract (SBIR) and Strategic Fund Increase (STRATFI) contract through the AFVentures (Air Force) to develop "Project Olympus" the highly automated off-planet version of the Vulcan Printing System.



# ICON's vision for a sustained Lunar presence



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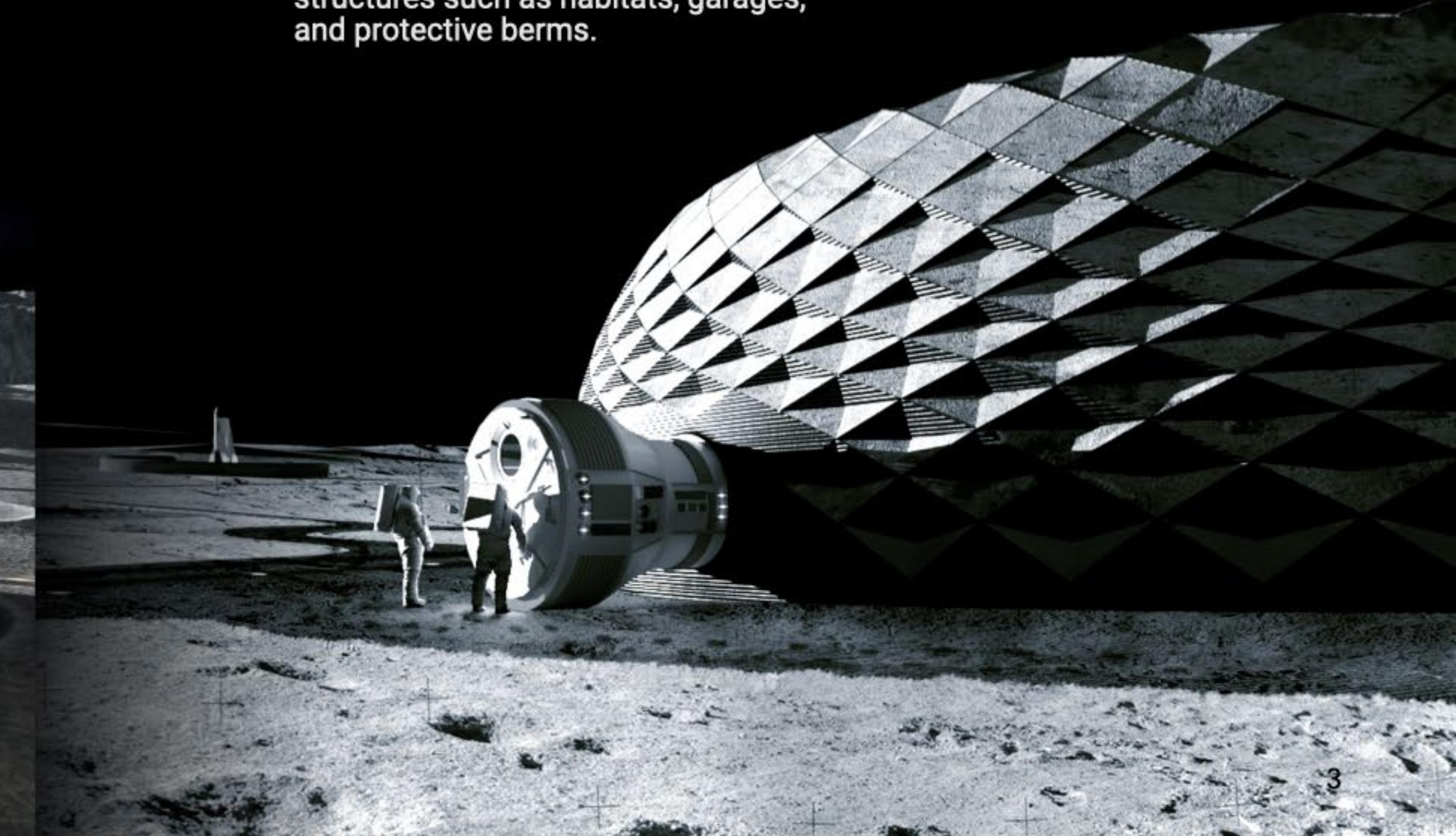
## Horizontal Construction

Horizontal Construction covers planar surfaces and structures such as rocket landing pads, foundations, and roads.

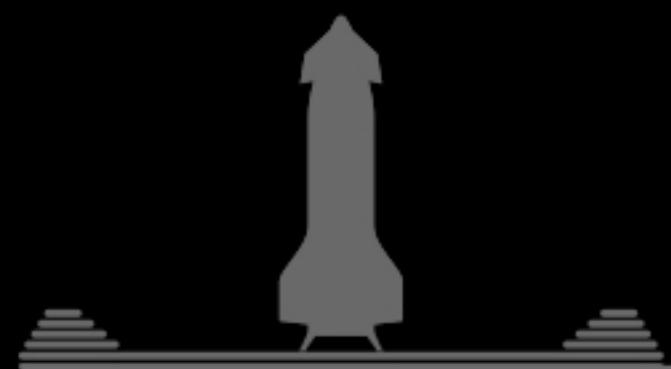


## Vertical Construction

Vertical Construction covers volumetric structures such as habitats, garages, and protective berms.



# Phased Construction and Master Planning



## Phase 1

Initial construction focus is on creating critical infrastructure such as landing pads, roadways, blast walls, etc.



## Phase 2

With established infrastructure in place, construction begins on the initial base habitats.



## Phase 3

The lunar base according to master plan is built out to support the determined population size for the first permanent settlement off of Earth. Current NASA thinking is more on the scale of an outpost, rather than a city.



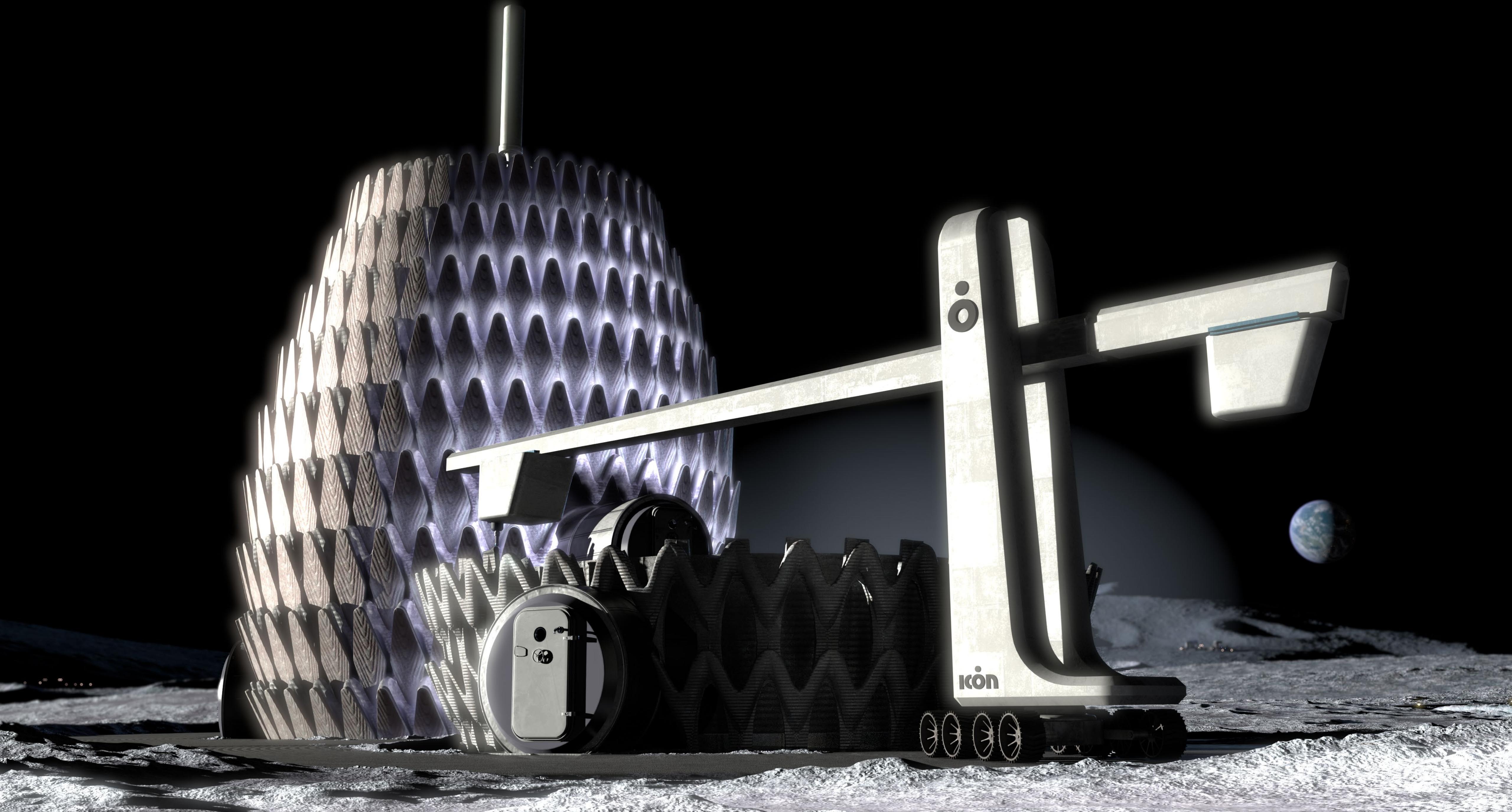
## Strategic Expansion

Building towards the complete master plan for the Lunar bases, additional structures are constructed as needed for a sustained presence on the Lunar surface.

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# Phased Construction and Master Planning





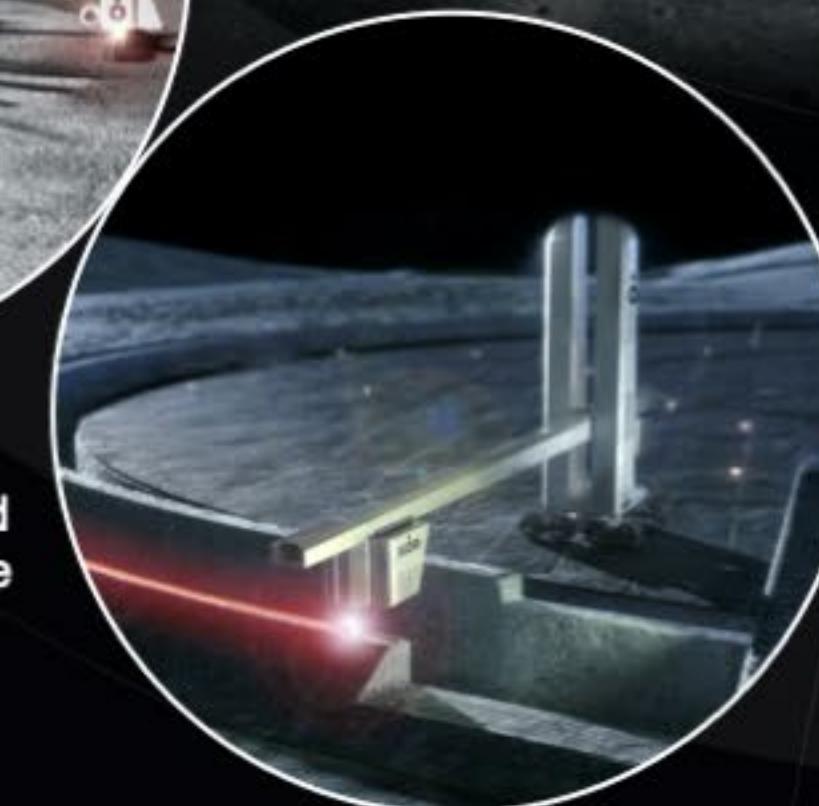
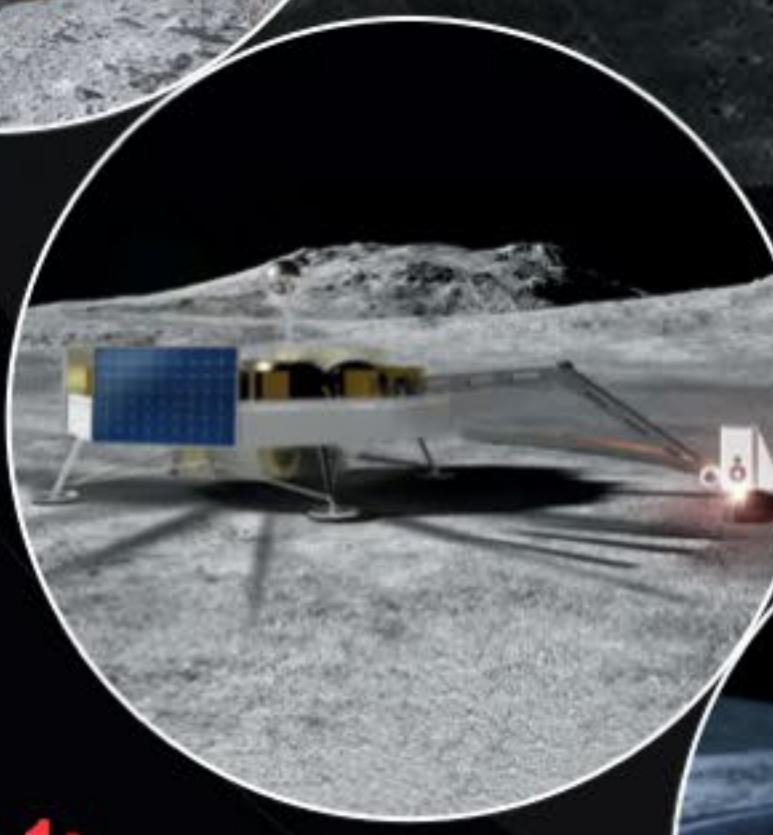


# Lunar Excavation, Construction, & Outfitting Capability Development



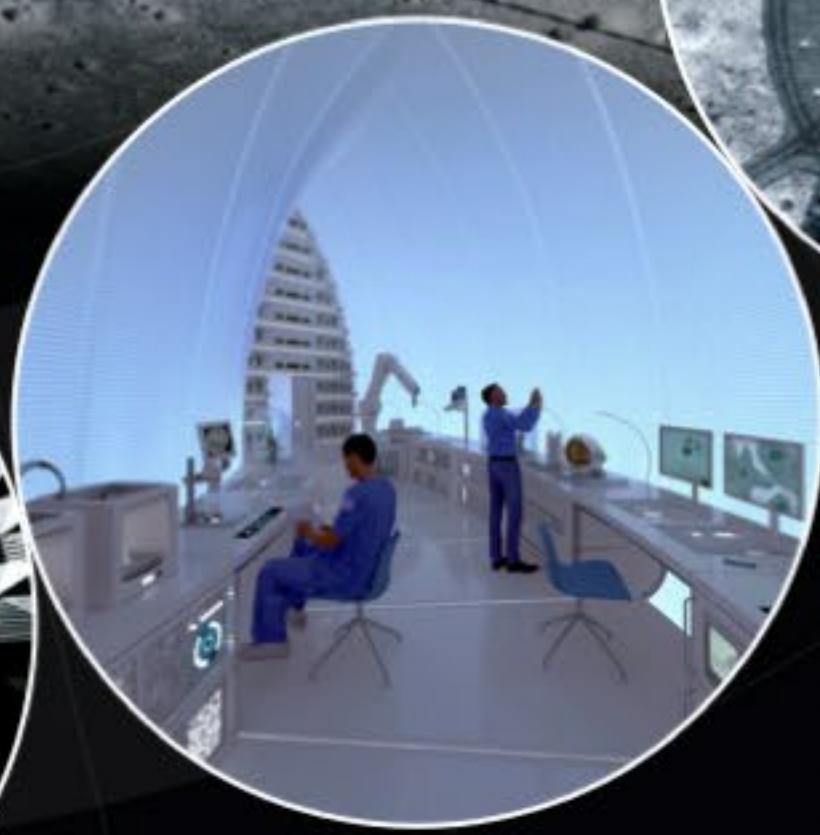
## Phase 1:

Develop & demonstrate excavation & construction capabilities for on-demand fabrication of critical lunar infrastructure such as landing pads, structures, habitats, roadways, blast walls, etc.



## Phase 2:

Establish lunar infrastructure construction capability with the initial base habitat design structures.



## Phase 3:

Build & Outfit the lunar base according to master plan to support the planned population size of the first permanent settlement (lunar outpost).

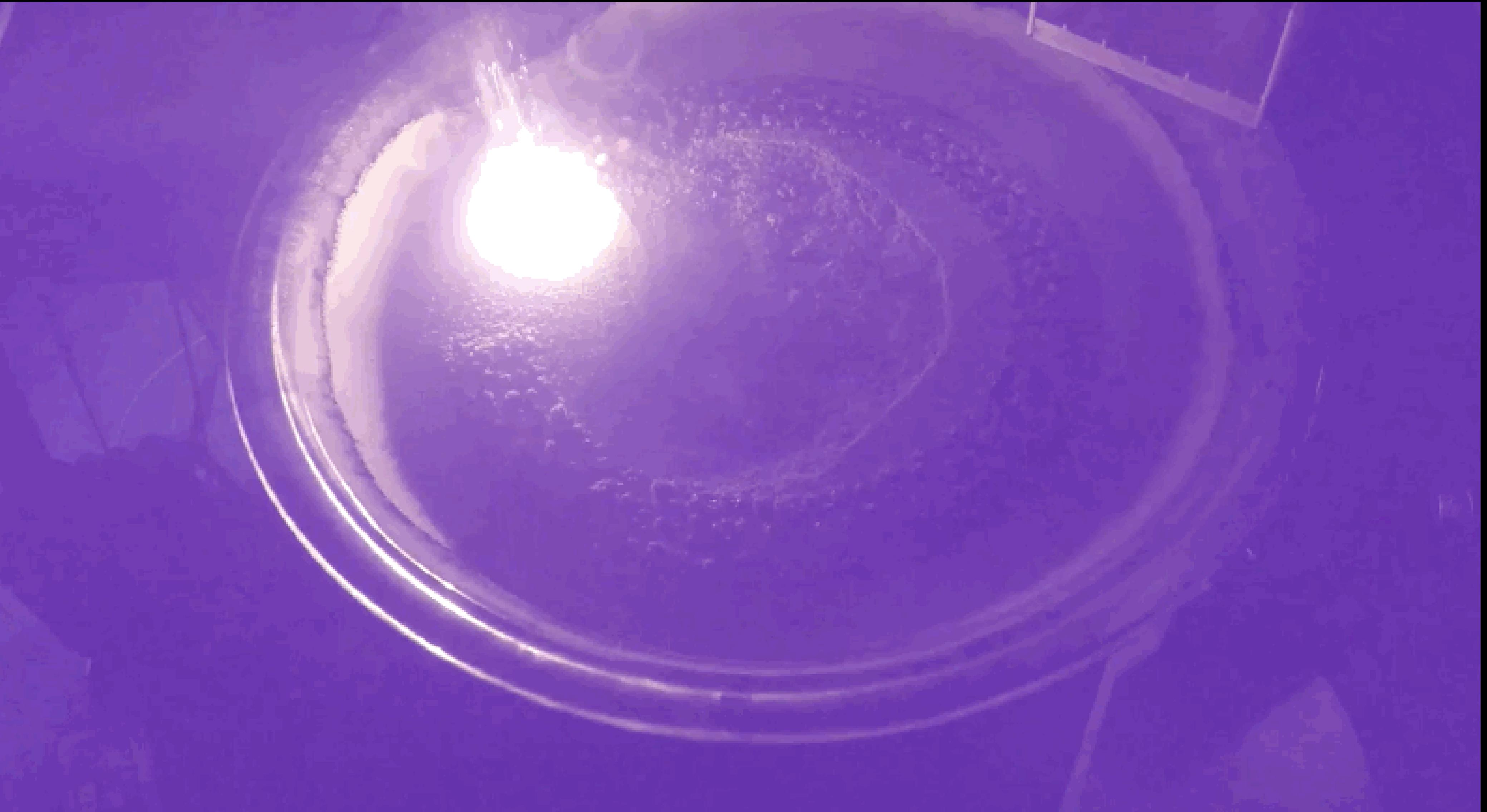


## Phase 4:

Complete build-out of the lunar base per the master plan and add additional structures as strategic expansion needs change over time.

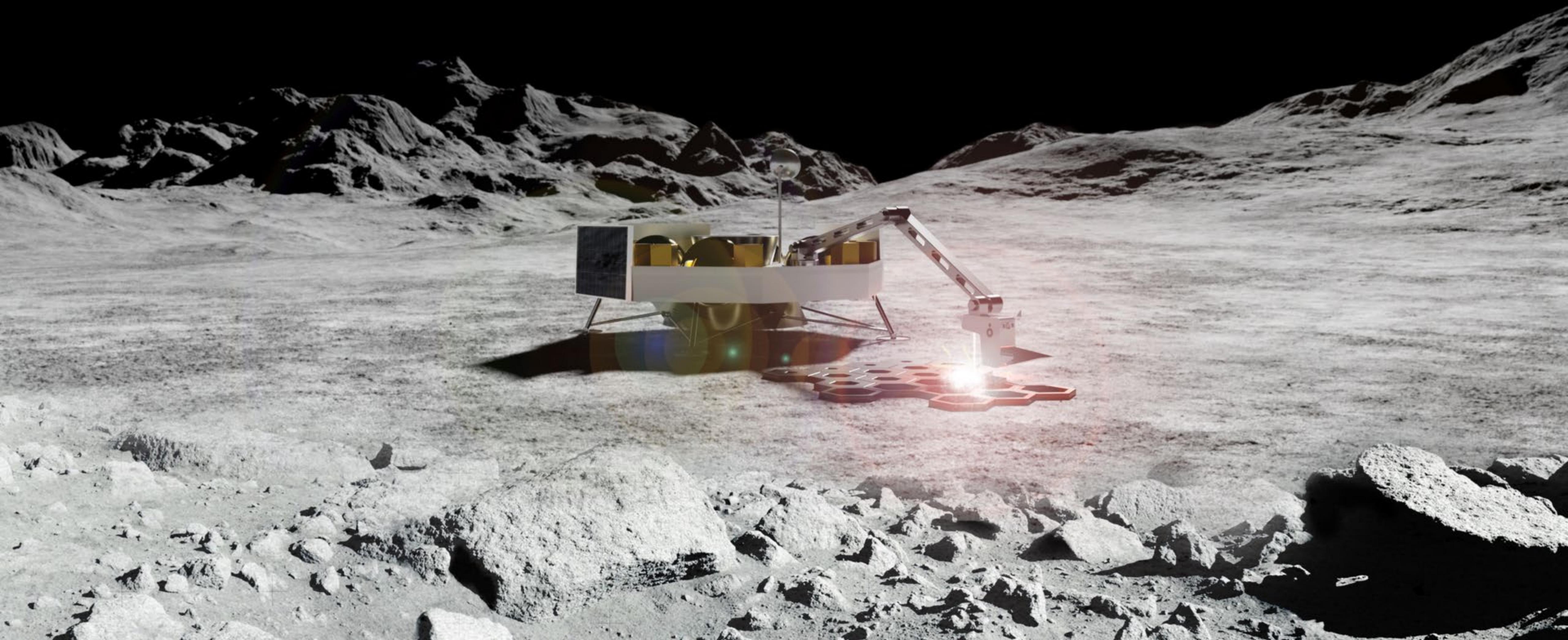
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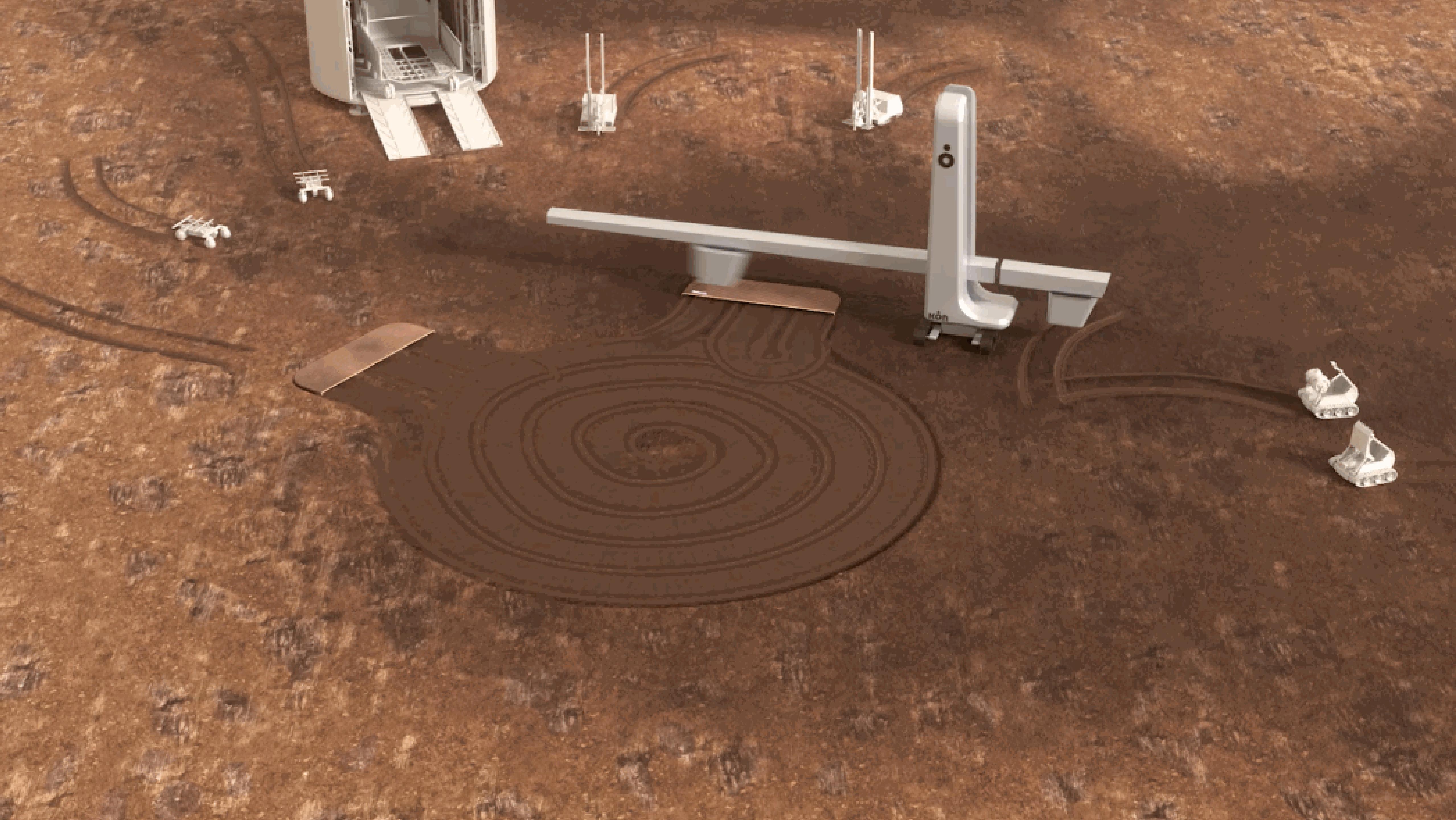
# Additive Construction System for the Moon & Mars



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# Initial Construction Technology Demonstration Mission





# Mars Dune Alpha / Crew Health and Performance Exploration Analog (CHAPEA)







ICONBUILD.COM

[melodie@iconbuild.com](mailto:melodie@iconbuild.com)