

Aerospace Corp. Is Building Digital Twin For Lunar Collaboration

Garrett Reim May 29, 2026



The Aerospace Corp. sees the LUNaverse as a place where lunar pioneers can meet up digitally and test interoperability.

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Testing your hardware in space is hard. Testing it on the Moon is even more difficult—especially when, for example, you are trying to see how much dust your lunar lander might kick up as it touches down and whether that gritty regolith damages the solar panels on a nearby Moon base.

Enter the LUNaverse, the Aerospace Corp.'s attempt to simulate the Moon and cislunar environment digitally so that space agencies and companies can test their technologies virtually before launching to the lunar surface.

The Aerospace Corp., a federally funded research and development center (FFRDC), is developing the first version of the program, a sort of minimal viable product, after taking over the project from DARPA's 10-Year Lunar Architecture (LunA-10) Capability Study.

- DARPA study found cooperation vital for Moon economy
- The program could become a digital marketplace for future lunar services

“Once you see the visualization and you start to go through the operation, you realize, ‘Oh, I hadn’t thought of that,’ or ‘Gee, that doesn’t work,’” Dennis Paul, senior project leader at the Aerospace Corp.’s Space Enterprise Evolution Directorate, said at the American Institute of Aeronautics and Astro-nautics Ascend space conference in Washington. “It gives you the ability to basically run your operation or your use case without putting hardware at risk, spending lots of money to go there and then find out it doesn’t work.”

The LunA-10 study used digital models of in situ resource utilization plants, lunar landers, power systems, railroads, rockets and rovers, among other lunar infrastructure, to study what the first decade of a lunar economy might look like.

As part of the LunA-10 study, DARPA produced a “digital cislunar environment” that included engineering physics models for astrodynamics, gravity, lighting, line of sight and illumination on the Moon and in cis-lunar space.

But while LunA-10's digital environment ran on a single laptop, the Aerospace Corp. is rebuilding it as the LUNaverse, a multiuser, cloud-based environment in which many participants can interact at once. The FFRDC wants to create an open “digital commons” that connects the digital engineering environments of various organizations, enabling them to share data and models without abandoning their own tools or putting

their intellectual property at risk, Paul said.

“There can be another digital sandbox stood up” farther down the road, Paul said. “They can do a multiparty [nondisclosure agreement], and they could go over there and expose their [intellectual property] to each other.”

The Aerospace Corp. sees the LUNAverse as a place where lunar pioneers can meet up digitally and test inter-operability and collaboration. Eventually, the space might become a digital marketplace where organizations can perform a “digital test drive” of technologies, Paul said.

The Aerospace Corp. is guiding development of the LUNAverse and forming a consortium around the software with government, commercial, academic and research participants. Paul declined to name participants but said multiple companies from LunA-10 are collaborating. The original performers in the DARPA study were Blue Origin, CisLunar Industries, Crescent Space Services, Fibertek, Firefly Aerospace, Gitai, Helios, Honeybee Robotics, Icon, Nokia of America, Northrop Grumman, Redwire, Sierra Space and [SpaceX](#).

The Aerospace Corp. sees a future role for itself updating the model with the latest data gathered about the Moon—for example, its topography or radiation information. The FFRDC also expects it will probably play a role in validating the digital twins of technology developers, Paul said.

As the global space industry eyes Moon colonization, a complex multiparty settlement that is based in physics unfamiliar to earthlings, the LUNAverse is intended to help different parties learn to play together, Paul said.

This digital twin software is the logical conclusion of DARPA’s LunA-10 study: The Moon will not become economically productive if every mission must bring its own power, communications, thermal control, logistics, robotics and survival systems. Instead, the study encouraged shared utilities and commercial services that could lower barriers to entry for future users.

For example, a lunar power network might allow a Moon mining venture to focus on extracting and refining resources, eliminating the need to transport and install a large generation system, such as a surface fission power reactor.

The LUNAverse software is intended to help future lunar developers understand what is needed to connect to that network, theoretically allowing a company to plug and play with the rest of the lunar colony.

U.S. DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA)

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