Synopsys Solutions Support NASA's Artemis Program with Spacesuit Analysis and Communication System Development

Synopsys is working with EMA and Cesium, part of Bentley Systems, to test equipment functionality by virtually replicating components, systems, and the lunar environment

Key Highlights

- NASA's Johnson Space Center in Houston taps Synopsys and Electro Magnetic Applications, Inc. (EMA) to research Artemis spacesuit charging levels resulting from exposure to the lunar environment
- Cesium and Synopsys are collaborating with NASA SCaN's (Space Communications and Navigation) Lunar 3rd Generation Partnership Project (Lunar 3GPP) at the agency's Glenn Research Center in Cleveland to support cellular network rollout on the Moon
- Engineers at NASA Glenn are leveraging Synopsys' electromagnetic simulation solution to analyze the performance of antennas on spacesuits and rovers during simulated lunar missions

SUNNYVALE, Calif., April 14, 2026 /PRNewswire/ -- NASA selected Synopsys, Inc. (NASDAQ: SNPS) and EMA to verify spacesuit compatibility with the lunar environment. This work advances Synopsys' ongoing support of future Artemis missions, which also includes a collaborative effort with Cesium, part of Bentley Systems, and NASA's Glenn Research Center in Cleveland to validate cellular system performance on the lunar surface using digital twin technology.

The joint effort by EMA and Synopsys focuses on reducing risks to extravehicular activity (EVA) systems, specifically spacesuits, caused by both triboelectrification from lunar regolith interactions, and electrical charging and electrostatic discharge (ESD) from the space plasma environment. Analyzing charging levels that the complex, multi-layer Artemis spacesuits may experience on the moon is a key consideration for sustained lunar surface operations, because ESD events can damage mission-critical electronics needed for communications and life support.

Under the planned approach, EMA and Synopsys will apply and develop physics-based analysis workflows using Ansys Charge Plus™, a software simulation tool for electromagnetic charging and discharging, to evaluate spacesuit materials, layered stack-ups, and representative suit features across relevant lunar plasma conditions. Charge Plus is currently the only commercially available software capable of computing these types of space-charging problems in full 3D due to its ability to model the coupled physics governing plasma interaction, surface charging, charge transport, and ESD in complex, multi-material systems.

These simulation efforts are paired with test and validation activities conducted at EMA's Space Environment and Radiation Effects (SERE) Laboratory in Pittsfield, Mass., one of the few facilities capable of replicating key aspects of the space plasma environment on the ground. This integrated simulation-and-test workflow allows teams to identify charging drivers, evaluate design tradeoffs, and focus validation where it matters most for astronaut safety and mission success.

"We're honored to support NASA's Johnson Space Center as they advance EVA readiness for Artemis," said Justin McKennon, CTO of EMA. "By pairing test-informed data with simulation workflows, we can help identify worst-case charging conditions, evaluate material stack-ups, and target validation where it matters most."

In addition to spacesuit validation, Cesium integrated 3D spatial and true-to-reality Moon topography data into Synopsys digital mission engineering environment, where radio frequency (RF) signal propagation performance is analyzed using Ansys RF Channel Modeler™ software. Ansys HFSS™ simulation software is also included in the technology stack for high-fidelity antenna models installed on spacesuits and rovers, providing insight into end-to-end connectivity across the lunar surface.

"To build a lunar network, you must first build a digital moon," said Patrick Cozzi, chief platform officer, Bentley Systems. "Cesium's high-fidelity digital twin provides a virtual stage to test how communication signals perform against complex lunar topography, validating network reliability and ensuring mission-critical connectivity before hardware is deployed."

The Lunar 3GPP team at NASA's Glenn Research Center leverages this solution to visualize and validate RF coverage in the context of realistic operating scenarios. The insights can help inform radio placement that will enable connectivity outside of a future Moon Base. It will also support mission planning by identifying potential "shadow zones" caused by geographical elements on the Moon, like craters and rock formations that astronauts and rovers should avoid.

"The Artemis program is an ambitious, collective effort to return humans to the Moon and establish a sustained presence as a foundation for future exploration," said Jim Bridenstine, former NASA Administrator and current advisor for AGI, part of Synopsys. "As we move further into the unforgiving and promising environment of space, we need to innovate quickly, boldly,

and effectively. Embracing digital engineering technologies that enable teams to model, test, and refine designs virtually before hardware is built, is an important step to reducing risk and accelerating innovation."

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the leader in engineering solutions from silicon to systems, enabling customers to rapidly innovate AI-powered products. We deliver industry-leading silicon design, IP, simulation and analysis solutions, and design services. We partner closely with our customers across a wide range of industries to maximize their R&D capability and productivity, powering innovation today that ignites the ingenuity of tomorrow. Learn more at www.synopsys.com.

Contacts

Media

Pete Smith

pete.smith@synopsys.com
corp-pr@synopsys.com

SOURCE Synopsys, Inc.

Additional assets available online: