

NASA Awards United Semiconductors Contract to Accelerate Semiconductor Production on the International Space Station

THE SEMICONDUCTOR RACE JUST LEFT EARTH. The next great American manufacturing revolution may not begin in a factory on Earth. It may begin 250 miles above it.

LOS ALAMITOS, CA, UNITED STATES, August 7, 2026 /EINPresswire.com/ -- United Semiconductors LLC (USLLC) announced that NASA, through its In-Space Production Applications (InSPA) program, has awarded the company a multi-year Phase 2 contract to scale semiconductor crystal production aboard the International Space Station—a decisive leap from breakthrough experiment to commercial manufacturing ambition.

Phase 2 is designed to attack one of the hardest bottlenecks in advanced electronics: growing high-quality semiconductor materials whose microstructures are disrupted by gravity-driven effects on Earth. USLLC will pursue larger semiconductor crystals; shorten on-orbit processing time; and develop the Outer Space Commercial Autonomous Reactor (OSCAR) as the engine of a new production architecture.

"This is a quantum leap—from half-inch crystals today to an eight-inch production goal, for materials that face fundamental manufacturing limits on Earth. We are not simply improving a process; we are opening an entirely new manufacturing frontier for American technological and economic leadership."

- Dr. Partha S. Dutta, Principal Investigator and Chief Technologist, USLLC

Mission 1 already delivered the proof point: four ingots produced on station, sharply improved homogeneity and microstructure, container-free growth, approximately two times device performance, and about 10 times device yield compared with Earth-based counterparts. Phase 2 now aims to turn that evidence into repeatability, throughput, device-ready wafers, and a launchpad for future production on commercial low-Earth-orbit platforms.

8-INCH	2X	10X
PHASE 2 CRYSTAL-DIAMETER GOAL	DEMONSTRATED DEVICE PERFORMANCE	DEMONSTRATED DEVICE YIELD
FROM 12 MILLIMETERS TO 8 INCHES. FROM GRAMS TO KILOGRAMS. FROM A PIONEERING ISS DEMONSTRATION TO THE BLUEPRINT FOR AN ORBITAL SEMICONDUCTOR INDUSTRY. Performance and yield figures reflect NIST testing and validation of data from earlier flight crystals.		

The crystals at the center of this program sit beneath the systems defining the 21st century—artificial intelligence, quantum computing, secure communications, autonomous navigation, infrared surveillance, high-power lasers, advanced sensors, radiation-hardened spacecraft, and low-power, high-speed electronics. USLLC's pioneering vision is to utilize microgravity as an industrial advantage that terrestrial crystal growers cannot simply reproduce.

THE SPACE-TO-EARTH SEMICONDUCTOR REVOLUTION

AI AND DATA CENTERS - III-V materials combine high carrier mobility with direct-bandgap optoelectronic capability. USLLC sees a path toward faster switching, lower-voltage operation, light-enabled signal processing, advanced memory, chipllets, and neuromorphic systems - technologies that could help attack AI's exploding energy and bandwidth demands at the materials level.

DEFENSE, SPACE AND INFRARED DOMINANCE - The same substrate platform can address radiation-hardened electronics, large-area infrared optics, electromagnetic sensing, high-power laser systems, and secure communications. These are not convenience markets; they are strategic capabilities tied to deterrence, surveillance, resilient space architecture, and national readiness.

SUPPLY-CHAIN INDEPENDENCE - USLLC is positioning unique III-V platforms as potential alternatives or complements where Germanium and other critical inputs face geopolitical and sourcing pressure. The strategic prize is control: trusted U.S. know-how, trusted production, and trusted access to materials that enable defense and commercial systems.

"AI, quantum computing, and next-generation memory are colliding with the limits of conventional materials. Our space-manufactured III-V platform is designed to break through that wall—opening a path to faster switching, optical-speed data movement, radically lower power, and quantum-ready architectures. This is not an incremental upgrade; it is the materials foundation for the post-silicon era."

- Dr. Robinson Pino, Senior Engineering Director, USLLC

THE COMMERCIAL FLYWHEEL

USLLC plans to transform space-grown crystals into high-performance devices, shifting value from its current substrate to finished product sales. The company's business case projects the potential for profit economics from space-grown crystals over terrestrial material sales, subject to technical execution, launch costs, market adoption, and scale.

BUILDING THE ORBITAL INDUSTRIAL STACK

The mission calls for USLLC-designed hardware operating through ISS resources, followed by transition pathways to commercial stations and free-flying platforms. USLLC's implementation network includes CSS Inc., Redwire Space, and Space Tango—a commercialization chain spanning payload development, station integration, transportation, operations, and future commercial destinations.

"NASA has given this team the opportunity to convert a landmark scientific success into an American industrial capability. Our mission is bigger than a crystal, a furnace, or a flight: it is to build the foundation for high-value manufacturing in space and bring its benefits back to Earth."

- Dr. Geeta Rajagopalan, President and CEO, USLLC

ABOUT UNITED SEMICONDUCTORS LLC (USLLC) is a U.S. small business with an advanced semiconductor substrate production facility in Los Alamitos, California. Since 2005, it has supplied critical substrates to the U.S. defense sector and national laboratories. The company says it is the only domestic producer with large-area III-V binary-substrate capability up to 150 mm and the only global producer with large-area III-V ternary-substrate capability.

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