TAU Systems Joins DARPA-Funded Program to Develop New Radiation Testing Capabilities for Space-Bound Electronics

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AUSTIN, TX, UNITED STATES, February 4, 2025 /EINPresswire.com/ -- • TAU Systems has joined DARPA's ASSERT program, aimed at improving radiation testing for space-bound electronics using their advanced compact laser-plasma accelerator technology

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>
> *Bjorn Manuel Hegelich, CEO and Founder of TAU Systems*

• This new technology will address the growing demand for radiation testing, increasing available beam time and improving testing accuracy for space electronics at a fraction of the size and cost of traditional accelerators

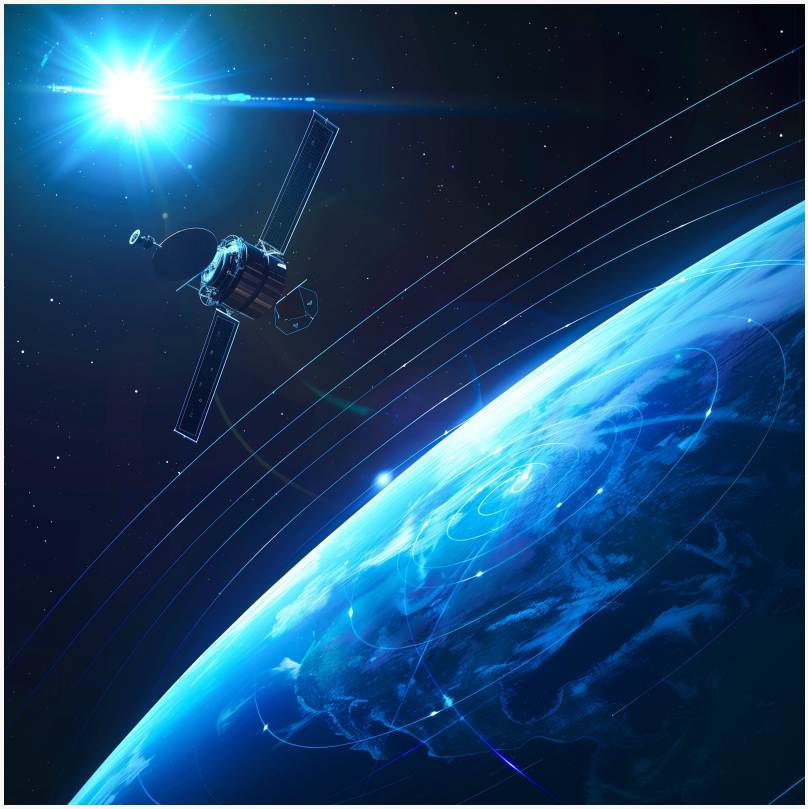
• In collaboration with NASA's Jet Propulsion Laboratory, Aerospace Corporation, and other key industry partners, TAU Systems' expertise and technologies will contribute to enhancing the resilience of microelectronics used in defense satellites, spacecraft, and communication systems

• TAU's compact accelerator offers applications beyond space electronics, including imaging semiconductor structures, developing cancer therapies, and conducting advanced medical imaging techniques

TAU Systems, the producer of ultrafast, compact laser-plasma accelerators, is proud to announce its participation in a DARPA-funded initiative to develop new radiation testing capabilities for space-bound electronics. This program, a part of DARPA's Advanced Sources for Single Event Effect Radiation Testing (ASSERT) initiative, seeks to enhance the resilience of electronics deployed in space environments where exposure to cosmic radiation poses significant risks to performance and longevity.

The harsh conditions of space present a critical challenge for electronic systems used in

satellites, spacecraft, and other space-based technologies. Single Event Effects (SEE) caused by high-energy cosmic radiation can disrupt or damage these systems, leading to catastrophic mission failures. Through DARPA's ASSERT program, TAU Systems will contribute its expertise in producing the high-energy particle beams necessary for testing and evaluating radiation-hardened components, ensuring that the next generation of space electronics can withstand these extreme conditions.



TAU Systems Radiation Testing Space Bound Electronics

DARPA's goal is to develop additional reliable sources for SEE radiation testing that can emulate the cosmic radiation encountered in space. TAU Systems, known for its cutting-edge particle accelerator technology, will support this initiative by developing a new, compact, cost-effective system that can simulate real-space conditions, allowing manufacturers and defense agencies to validate and harden their electronic systems against radiation-induced anomalies.

TAU Systems' involvement in the ASSERT program represents a crucial step toward enhancing the overall robustness of space-bound electronics. The company will collaborate with NASA's Jet Propulsion Laboratory, the Aerospace Corporation, UCLA, and RadiaBeam to develop and apply advanced radiation-hardened SEE testing methodologies. This effort will focus on developing and validating the eSEE (electron-based Single Event Effect) Testing concept.

"TAU Systems is honored to contribute to DARPA's ASSERT program, which will enable the U.S. space industry to build more resilient systems for space exploration and defense," said Bjorn Manuel Hegelich, CEO and Founder of TAU Systems.
He continued: "As chips become more powerful and transistors become smaller, they also become more susceptible to cosmic radiation. To be able to use advanced computing and automation methods like machine learning (ML) and artificial intelligence (AI) in space, rigorous testing using advanced particle accelerators is essential to enabling new technology, protecting critical assets and ensuring mission success."

Bridging the Gap in Beam-Time Demand
Currently, the U.S. has only four facilities capable of performing premium SEE radiation testing,

summing to a total of about 5,000 hours of beam time per year – far below the estimated 30,000 hours demanded by academia and industry. TAU Systems' compact design will generate between 2,000 and 4,000 hours of beam time annually per unit, greatly expanding access to critical testing.

SEE are disruptions in electronic components caused by high-energy particles, such as protons and heavy ions, which are prevalent in space. These particles can generate currents or voltage spikes that lead to temporary malfunctions or permanent damage. In critical defense and commercial satellites, SEE can interrupt communication, navigation, and data collection – vital functions that must remain operational in extreme environments.

Traditional radiation-hardened electronics undergo SEE testing using high-energy beams from large conventional ion accelerators to simulate the effects of space radiation. However, there is growing recognition that new, more advanced testing platforms are necessary to perform the requisite testing on advanced electronic systems. DARPA's ASSERT initiative, along with TAU Systems' advanced accelerator and beam delivery system capabilities, is designed to close this gap.

TAU Systems is a pioneer in compact particle acceleration technologies. Through its state-of-the-art particle acceleration technology, the company aims to provide critical SEE testing services to space electronics manufacturers, defense contractors, and other organizations focused on creating robust, radiation-tolerant systems. The data gathered from these testing campaigns will allow engineers to design stronger, more reliable systems that can operate safely and efficiently in space for extended periods.

"Understanding the effects of radiation in space is one of the most important steps in the design and development of resilient spacecraft," said Stephen Milton, Vice-President, Accelerator Science at TAU Systems. "DARPA's ASSERT program leverages two key new technologies to emulate the effect of heavy ions on electronics, pulsed electron beams for single-event effects testing* and TAU's ground-breaking Laser Wakefield Accelerator (LWFA) system that can precisely deliver a high-energy pulsed electron bunch to the device under test. Our system is significantly smaller and more cost-effective than conventional heavy ion test facilities; as such it can dramatically enhance the efficiency and accessibility of SEE testing. TAU is working with other key industry and university partners and together we believe such a new paradigm in SEE testing has the potential to revolutionize electronics testing capabilities and transform how space systems are prepared for the harsh radiation environments they encounter. With our expertise and DARPA's support, we are positioned to help industry overcome the challenges posed by cosmic radiation, ensuring that space missions can proceed without the risk of electronics failure."

How TAU System's Compact Accelerator Works

Particle accelerators hold great potential for semiconductor applications, medical imaging and therapy, and research in materials, energy and medicine. But conventional high-energy particle accelerators require plenty of space – some upwards of kilometers – making them expensive and

limiting their presence to a handful of national labs and universities.

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