

Source List: Service Providers For Radiation Effects Testing Of Microelectronics

by David G. Morrison, Editor, How2Power.com

This document offers information on commercial service providers of radiation effects testing for microelectronics and related devices and systems. The focus here is on test services—both those conducted in-house and at external test facilities—for products to be used in space, nuclear or other environments. Though the focus here is on companies offering test services, some also offer related services such as simulation and design for radiation hardness. Such services, however, are beyond the scope of this document, so descriptions of those other services have largely been omitted except for brief mentions within overviews of company services.

These listings include the following types of information:

- Company name, contact information, and website
- Types of in-house tests performed
- Facilities, test set ups, and test equipment, particularly radiation sources
- Types of tests performed at outside facilities
- Test standards supported
- Test planning, reporting, analysis and related services
- Special experience or capabilities

Unless otherwise indicated, the descriptions of test services provided here are taken from vendor websites, with some edits to stay within the scope of this document and for editorial style. Information reflects data posted as of June 2026. If you have questions or comments about this list, contact the [editor](#). (update 07/30/2026)

Stay tuned for a separate listing of test facilities offering single event effects (SEEs), displacement damage dose (DDD) and other specialized tests.

Companies listed in this section include

- VPT Rad
- Radiation Test Solutions
- Zero G Radiation Assurance
- Northrup Grumman Radiation & Survivability Engineering Services
- Space R³
- Trusted Semiconductor Solutions
- The Rad Team
- Fifth Gate Technologies
- CoolCAD Electronics
- Nucleon

Other organizations listed here:

- Vanderbilt University Institute for Space and Defense Electronics

VPT Rad

Phone: 978-328-0620

Email or contact page: sales@vptrad.com

Web: <https://www.vptrad.com/>

Description

VPT Radiation Laboratory and Test Services (VPT Rad) provides specialized environments and test solutions for evaluating electronics used in aerospace and nuclear applications where ionizing radiation can degrade the service life of the electronic devices. Located just 20 miles north of Boston in Chelmsford, Massachusetts, our state-of-the-art testing facility has in-house cobalt-60 irradiators optimized for TID and a suite of test equipment for device screening and evaluation.

To complement our high dose rate ≥ 50 -rad(Si)/s (HDR) and low dose rate 10- to 100-mrad (Si)/s (LDR) TID sources, our in-house test capabilities include a TESEC 881 Spektra, an LTX-Credence D-10 test system capable of supporting both memory and mixed-signal analysis, a Bruker Biospin electron paramagnetic resonance (EPR) dosimetry system, as well as customized rack solutions.

Our low dose rate (LDR) TID facility complies with TM 1019 Condition D. This capability, in combination with our high dose rate (HDR) TID capability (TM 1019 Condition A), puts us in the unique position to be able to provide a complete enhanced low dose rate sensitivity (ELDRS) analysis for our customers.

The VPT Rad facility meets the requirements of MIL-STD-750 and MIL-STD-883 with DLA Lab Suitability status. The facility also services radiation test needs for customers and programs outside the U.S. using European Space Components Coordination (ESCC) 22900-compliant test methods.

In addition to our in-house irradiation and test resources, our DLA lab suitability covers support for off-site neutron irradiation testing facility for displacement damage dose (DDD) under Test Method 1017, as well as test support for heavy-ion single events effects (SEE) testing at TAMU, Berkeley and Brookhaven National Laboratories.

Radiation Test Solutions

Phone: 719-531-0800

Email on contact page: <https://radiationtestsolutions.com/contact-us/>

Web: <https://radiationtestsolutions.com/services/radiation-effects-testing/>

Description

Radiation Test Solutions (RTS) provides state-of-the-art environments for radiation effects testing of electronic devices for aerospace applications. Our clean-room laboratory meets classification, compliance and security measures required for radiation effects testing on electronic devices.

RTS' world-class team of experts provides testing for the full range of radiation effects. We have contributed to the success of hundreds of missions in both the traditional and the new space industries, including commercial and government initiatives. Working closely with electronic component manufacturers, we also provide valuable insights into RAD-hard design and qualification.

RTS Aerospace Radiation Effects Testing Capabilities

RTS offers the full range of engineering support. Our team

- Provides turnkey test solutions, from assistance with RFPs to delivery of final data analysis and reports
- Designs all fixtures, hardware and software necessary for radiation testing
- Performs testing in-house or remotely when necessary

Our in-house capabilities include

- Neutron, flash x-ray/prompt dose

- Total ionizing dose (TID) and device testing per MIL-STD-750, MIL-STD-883, Method 1019 and ASTM F1892
- Enhanced low dose radiation sensitivity (ELDRS) testing
- 14-MeV neutron irradiator. Testing per MIL-STD-750 and MIL-STD-883, Method 1017
- Radiation lot acceptance testing (RLAT)
- Focal plane array (FPA) radiation, characterization and testing
- Radiation engineering and component qualification planning
- Wafer-lot radiation screening, characterization, and qualification
- MIL-STD-750 and MIL-STD-883 screening and qualification of advanced COTS devices as well as design engineering for radiation hardened devices
- Dose-rate/prompt dose—flash x-ray—ion physics FX25
- MIL-STD-883; TM 1020, TM 1021, and TM 1023
- Dose-rate/prompt dose—flash x-ray—Pulserad 112

Our remote testing capabilities include

- Heavy-ion and proton single event effects (SEEs): single event latchup (SEL), single event upset (SEU), single event transient (SET), single event burnout (SEB) and single event gate rupture (SEGR) - EIA/JESD 57, ASTM F1192
- TAMU, LBNL, NSRL, high energy proton test facilities, and others
- (ASTM F1192 & EIA/JESD57)

We also provide sample preparation using

- Mechanical grind
- Thinning to 35 micron with verification

Radiation Effects Testing Standards and Protocols

Radiation testing standards exist to ensure that facilities and lab services meet certain requirements including common measurement standards, reliability, safety and logistical system alignment. RTS strictly adheres to DLA test methods, standards and guidelines for testing radiation effects on electronic devices. Our clients can be confident in the knowledge that their compliance and quality standards are being met. RTS has lab suitability for

- MIL-STD 750 and 883: TM 1017, 1019, 1020, 1021, 1023, 1080
- ASTM F 1192
- EIA/JESD57
- ESCC 22900
- ESCC 25100

In the remote environment of space, failure simply isn't an option. Don't trust your next aerospace project launch to just anyone. RTS leads the industry in aerospace radiation testing and is staffed by a team of world-class engineers and scientists who are fully invested in your success.

RTS' wide range of radiation effects testing services provides an affordable and convenient solution for both commercial and government industries looking to simulate the effects of ionizing radiation on electronic systems. Whether you're a satellite manufacturer needing to qualify your design or a semiconductor provider seeking independent third-party verification of your product, RTS has the solutions you need.

Zero G Radiation Assurance

Phone: (669) 250-2350

Email or contact form: <https://www.zeroadiation.com/radiation-testing>

Web: <https://www.zeroadiation.com/services>

Description

Radiation Effects Testing

Radiation sources and tests we support:

- SEE testing (heavy ion, proton, laser, etc.)
- TID testing (Co-60 gamma rays)
 - MIL-STD-883 TM 1019 Condition A, B, C, D
 - Low dose rate testing for ELDRS
- Displacement damage dose testing (proton, neutron)

Test solutions:

- Turnkey solutions—planning, design, execution, analysis
- Customized support—you provide the setup, we'll perform the irradiation or function as onsite consultant

Applications:

- Microelectronic devices and circuits: transistors, power devices, mixed-signal circuits, memories, processors, microcontrollers, ASICs, FPGAs, GPUs, etc.
- Custom modules, boards, systems
- SmallSat and CubeSat systems, subsystems, boards, boxes, COTS systems (camera, PC board, etc.)
- Space product development
- Materials: photonic devices, lens, battery cells, fiber optic cables, wires, shielding fabrics, etc.
- Medical sterilization (small volume)

Read more about our testing capabilities [see the website above] and get a test quote [see contact information above].

Northrup Grumman Radiation & Survivability Engineering Services

Phone: 310-813-0000

Email or contact page: Radiation.Testing@ngc.com

Web: <https://www.northropgrumman.com/what-we-do/space/radiation-survivability-engineering-services>

Description

Radiation & Survivability Engineering Services

Northrup Grumman performs analysis and test to mitigate effects from natural and nuclear weapons radiation environments.

Located in Redondo Beach, California, our Radiation & Survivability Center of Excellence conducts research on the effects of natural and nuclear weapon environments on space systems, including

- Satellite and missile programs
- Airborne platforms

- A broad classified portfolio

Capabilities

Radiation Test Operations

Our dedicated team conducts electronic tests in ionizing/particle radiation environments to assess degradation caused by the impacts of natural space conditions or nuclear weapons in our state-of-the-art Radiation Test Operations (RTO) Laboratory. RTO, which has served customers with its own irradiators since 1968, provides turnkey service solutions and offers cradle-to-grave test development, execution, and logistics.

Natural space radiation & survivability test and analysis:

- Total ionizing dose, including enhanced low dose rate sensitivity (ELDRS), and displacement damage
- Single-event-effect criticality analyses and rate calculations: upsets, latchup, burnout, transients, functional interrupts, gate ruptures
- Material survivability effects: micrometeoroids & orbital debris, atomic oxygen, UV degradation, etc.

Nuclear hardness & survivability test and analysis:

Exo-and endo-atmospheric threats:

- Transient radiation effects in electronics (TREE) from prompt dose photocurrents, high dose rate total ionizing dose (HDR TID), and neutron displacement damage
- Neutron single event effects
- Electromagnetic pulse (EMP) effects, such as high-altitude (HEMP), cable system generated EMP (SGEMP), 'Box' internal EMP (IEMP)

Radiation simulation tool expertise:

- Space and hostile radiation and survivability environment calculations: AE9/AP9, OMERE, etc.
- Space radiation transport modeling and shielding calculations: FASTRAD, MCNP, NOVICE, etc.
- Hostile effect modeling: MCNP, THTk, SIRE, Redbook, etc.

Radiation Test Operations (RTO) laboratory:

Discover our comprehensive turnkey test solution, offering diverse capabilities to develop and execute testing tailored to your requirements. Between crafting a test plan to delivering a detailed test report, we cover it all.

- In-house test board design and fabrication
- Test bed development
- Automated test equipment
- In-house irradiators
- Tests in other radiation environments

Irradiators

Northrop Grumman offers various irradiators on-site which are accessible for turnkey test campaigns to minimize delays in test execution. Our Co-60 irradiators are available to elicit total dose effects from high dose rates and enhanced low-dose rate sensitivity (ELDRS) in electronics, and can service material samples as well. Our flash x-ray machine delivers prompt dose simulations essential for hostile survivability investigations.

Additionally, you are invited to rent time on these irradiator capabilities, where you may ship your equipment to us and visit our facility to set up your tests for irradiation, while our dedicated test engineering personnel safely operate the irradiators for you.

Irradiators:

Total dose:

High dose rate (50 to 300 Rad(Si)/s):

- Two Gammacell 220 chamber irradiators

Low dose rate (≤ 10 mRad(Si)/s):

- One Gammacell 220 chamber irradiator

- One J.L. Shepherd 142 chamber irradiator
- Two NILS beacon room irradiators
- One Hopewell DS20 room irradiator (expected 2025)

Dose rate (A.K.A prompt dose):

Upset (1E7-1E11+ Rad(Si)/s):

- One Febetron 705 Flash X-Ray Irradiator (expected Q4 2024)

Others:

- Gammacell 220 High Dose Rate Irradiator
- J.L. Shepherd 142 Low Dose Rate Irradiator
- NILS Beacon Low Dose Rate Room Irradiators
- Hopewell DS20 Low Dose Rate Room Irradiator (Avail. 2025, Tentative)

Tests In Other Radiation Environments

Our personnel continue to perform test development and execution activities in a variety of radiation environments. When the need arises, count on us to make the appropriate arrangements to meet your requirements and ensure the attainment of your testing objectives.

Additional radiation effects testing we perform includes

Neutrons

- Displacement damage (1 MeV, 2.5 MeV, 14 MeV)

Gamma dose rate (a.k.a. prompt dose)

- Upset + Survival (1E7-1E12+ Rad(Si)/s)

Single event effects

- Heavy ions
- Protons
- Neutrons (fission or fusion)
- Laser (single or dual photon absorption)

To get started, contact a specialist to request information on testing and engineering services or request a quotation if you already know what you need [see contact information above]. Also see the [FAQs](#) for more information.

Space R³

Phone: 443-904-6510

Email or contact page: <https://www.spacercubed.com/contact>

Web: <https://www.spacercubed.com/radiation-test-and-analysis>

Description

Melanie Berg, founder and CEO (per <https://www.spacercubed.com/about>):

Space R3 is a woman-owned small business (EDWOSB) focusing on the challenges of creating reliable complex microelectronic systems. The company was founded by Melanie Berg. She is deemed an FPGA design and verification subject matter expert (SME); and is world renowned for her contributions to engineering and science.

Per <https://www.spacercubed.com/radiation-test-and-analysis>:

Radiation Test and Analysis: Heavy Ion, Proton, Neutron, TID, and Prompt Dose

We provide a variety of services geared to evaluate device/system susceptibilities to ionizing radiation.

Development of customizable test vehicles and test plans:

- Test vehicles are created to enhance radiation data abstraction and reliability.
- Test vehicles are of superior quality due to their ability to mimic full system operation for the target device under test (DUT).
- Test vehicles are designed using strict design rules regarding: synchronous behavior, clock domain crossings, metastability, DUT signal monitoring, DUT signal capture, signal integrity, and complex data reporting.
- Radiation test facility nuances are taken into account for test vehicle and test plan development.
- Test vehicles can be created to evaluate a variety of DUTs for their susceptibility to ionization. The following are examples of DUTs:
 - Field programmable gate arrays (FPGAs—SRAM, flash, and anti-fuse)
 - Memories (SRAM, SDRAM, DRAM, DDRn, MRAM, reRAM, etc.)
 - Analog-to-digital converters (ADCs—serial or parallel)
 - Sensors
 - Microprocessors
 - ASICs
 - Oscillators

Creation of DUT hardware:

- Custom daughter boards are populated with the DUT. They strategically interface to the customized test vehicle (mother board).
- Board interfaces use top-grade, reliable connectors that are capable of high-frequency data transmission (serial and parallel).
- DUT boards are robustly designed to withstand a variety of radiation particle exposures (neutron, proton, heavy ion, strategic dose, and total ionizing dose) with minimal complication or damage from alternate populated components.

Development of FPGA DUT designs:

- We have the ability to implement designs specific to customer DUT application.
- DUT designs can range from common/simple shift registers to complex system on a chip (SoC) implementations. SoCs can contain elements such as microprocessors, analog components, and other complex intellectual property (IP).

Management and evaluation of radiation test data:

- Data are organized and analyzed to fit our customers' needs.
- Evaluation includes: error rate prediction, system reliable and survivability prediction, and potential error signatures.

We are able to provide superior data analysis because of our robust test vehicles and their detailed reporting of DUT ionization responses.

Trusted Semiconductor Solutions

Phone: 763-417-9900

Email or contact page: <https://trustedsemi.com/contact-us/>

Web: <https://trustedsemi.com/capabilities/>

Description

Radiation Hardening

Trusted Semiconductor Solutions has expertise in radiation effects analysis, radiation mitigation through circuit design and layout, and radiation testing of microelectronics. TCAD simulation services are performed on semiconductor devices to assess radiation impact. Radiation hardening by design is implemented on digital, analog, or mixed-signal IP and integrated circuit designs. Total dose, dose rate, single event effects, neutron, and proton radiation testing services are offered to characterize performance of microelectronics.

Testing And Screening

Test and screening includes electrical, environmental, functional, mechanical, radiation, and reliability testing. Trusted Semiconductor Solutions specializes in testing of high-reliability microelectronics and space electronics. Our team also conducts failure analysis testing and device qualification testing. We routinely test to the MIL-STD and ESCC standards with expertise in device characterization, lot qualification, and comprehensive radiation effects testing.

The Rad Team

Phone: 678-723-8326

Email or contact page: <https://radiationteam.com/contact/>

Web: <https://radiationteam.com/testing/>

Description

Testing & Analysis Services

Testing services:

Explore the various testing services our team executes efficiently using our proprietary methodology and approach.

Heavy ion testing:

Heavy ion testing characterizes potential susceptibility to single event effects by exposing hardware to high energy ions representative of the space environment. This defines thresholds, cross sections, and failure modes needed to assess risk and guide mitigation.

Proton testing:

Proton testing captures the combined effects of SEE, displacement damage, and total ionizing dose under representative proton environments. This provides a realistic view of performance degradation and failure behavior to inform risk, design margins, and mitigation strategies.

Neutron testing:

Neutron testing evaluates susceptibility to SEE induced by atmospheric and terrestrial neutron environments, particularly for ground and avionics applications. This characterizes upset rates and failure behavior to support realistic risk assessment and mitigation strategies.

Facilities & Source Types

Our vast network of facility partnerships allows us to secure beam time quickly and frequently. We use U.S. and non-U.S.-based sources including heavy ion, proton, electron, neutron, CO-60 (gamma), x-ray, flash x-ray, and short pulse gamma.

Test Analysis Services

We provide comprehensive testing services that evaluate radiation impacts on various systems, ensuring safety, and functionality.

Test plan management:

The Rad Team manages radiation test plans from definition through execution, ensuring objectives, conditions, and success criteria are clearly defined and aligned with mission requirements. This approach improves test efficiency, data quality, and confidence in results.

On-orbit rate prediction:

We predict on-orbit event rates based on mission-specific radiation environments and device response data, quantifying expected SEE frequencies and cumulative effects over time. This provides a clear, mission aligned understanding of operational risk and system reliability.

Qualification services:

We support qualification of electronics for radiation environments through tailored test programs, requirements traceability, and data driven verification. This ensures hardware meets mission specific requirements with defensible compliance and reduced technical risk.

Fifth Gate Technologies

Phone: (719) 463-0640

Email or contact page: <https://5thgait.com/contact-us/>

Web: <https://5thgait.com/testing-services/radiation-effects-testing/>

Description

Test Services (per <https://5thgait.com/testing-services/>)

From design to acceptance:

At Fifth Gait, our team comprises a diverse and highly skilled group of testers, well-versed in evaluating both component and system performance. We specialize in designing and executing intricate tests on a wide array of complex devices and materials, leveraging experience at trusted test facilities all across the nation. Our unwavering commitment is to deliver comprehensive, turnkey solutions that yield nothing short of the highest quality results. When you choose Fifth Gait, you're choosing precision, expertise, and excellence in every aspect of testing.

- Radiation
- Electromagnetic
- Characterization

Radiation

Testing:

Radiation, whether in geosynchronous orbit or during terrestrial missions, can be a formidable environment. Fifth Gait thrives on this challenge, evaluating your system's mettle against various forms of radiation. Our team has experience with everything from microelectronics and materials to sensors to circuit cards to system-level testing.

Radiation Effects Testing (per <https://5thgait.com/testing-services/radiation-effects-testing/>):

Microelectronics:

Radiation poses a serious threat to microelectronic components, particularly in space and nuclear environments. Issues like single-event upsets and latch-ups, induced by radiation, can lead to data corruption and system failures. Thorough testing is crucial to identify and address these vulnerabilities and ensure mission success. Fifth Gait Technologies specializes in testing microelectronics for radiation-induced effects, employing advanced capabilities to confirm component reliability. As industry pioneers, we offer organizations flexible solutions and purpose-built testing services to effectively tackle radiation-related challenges, ensuring the secure and efficient operation of crucial technology in radiation environments.

Sensors:

Sensors are vital in collecting data and controlling systems in space. However, radiation-induced sensor failure can lead to incorrect analysis, with disastrous results. Fifth Gait Technologies has specialized testing services for sensors that ensure accuracy and reliability in the harshest of radiation environments. From active radiation testing with our purpose-built setup to simulations using our Nuclear Clutter Infrared Simulator (NICS) chamber, we deliver the expertise needed whatever your mission.

Materials:

Materials used in critical industries must withstand radiation without losing their strength. Semiconductor materials, for instance, face high effects of radiation impacts. Testing how materials react to radiation is essential in various fields. The state-of-the-art tools and knowledge of Fifth Gait Technologies ensure that materials keep their properties and functions in places where radiation is expected.

It is prudent to implement radiation tolerance evaluation and testing integration during the production process. Fundamentally, mission-critical components and systems in today's markets demand that quality assurance and objective testing be part and parcel of the production process. Contact us if you have any questions about how Fifth Gait Technologies might assist your company in radiation resilience testing services and enhancing the dependability of your most critical technologies [see contact page above].

Systems:

Verifying your components is only one part of ensuring your system performance in a high-radiation environment. At Fifth Gait Technologies, our team knows how to evaluate a system holistically as well as at the granular level, providing mission assurance and dependability. We are a trusted partner in the commercial space, defense, and energy industries because of our expertise, cutting-edge testing capabilities, and commitment to ensuring that every element of your system has been checked and is robust.

CoolCAD Electronics

Phone: (443) 524-4601

Email or contact page: <https://coolcadelectronics.com/contact-us/>

Web: <https://coolcadelectronics.com/services-info/>

Description

Per vendor website, <https://coolcadelectronics.com/services-info/>:

Radiation Testing

CoolCAD specializes in radiation testing of power devices such as SiC FETs, diodes and IGBTs and can also test discrete and passive devices and sensors.

- Terrestrial neutron testing is performed at the Los Alamos Neutron Science Center with the world's best atmospheric neutron simulator.
- Heavy-ion radiation testing can be performed at various temperatures with different ions and energies to simulate worst case conditions.
- Ionizing dose radiation testing uses a dry Co-60 source, x-rays, e-beams, protons or other gamma rays to determine long-term performance degradation due radiation.

Per vendor website, https://coolcadelectronics.com/about_us/:

CoolCAD is located in the Washington, D.C. metropolitan area, and has strong relationships with government, industry and academic institutions in the area. We have direct access to various government laboratories and agencies allowing us collaborate with key decision makers interested in SiC technology. We also have close connections with the University of Maryland (UMD) in College Park, and leverage talent and resources present at this flagship research institute.

Our CoolCAD Team possess a unique combination of expertise in electronics, excelling in semiconductor physics, fabrication, design, and integrated and board-level circuit development and manufacturing. Together we have published over 100 research papers in professional scientific and engineering journals and have multiple patents on our key discoveries in the area of wide-bandgap SiC electronics.

CoolCAD is a leader in the development and fabrication of SiC-based power devices and high-temperature electronics for many industries including aerospace, automotive, defense, geothermal development, green energy generation, industrial furnace control, water purification and oil and gas extraction.

Founded in 2008 by University of Maryland ECE Professor Neil Goldsman and ECE graduate Akin Akturk, CoolCAD Electronics started as a spinoff of UMD's Electronics Modeling & Mixed Signal Group. The company began as a computer aided design (CAD) house supporting the development of electronic circuits for use at cryogenic temperatures in outer space and in the new field of quantum computing.

Nucleon

Phone: (256) 870-7156

Email or contact page: info@nucleonspace.com or <https://nucleonspace.com/#homepage-contact-us-section>

Web: <https://nucleonspace.com/>

Description

Radiation-ready electronics for the full mission.

Nucleon unifies curated data, modern-part testing, and expert analysis into one workflow—so you can qualify faster, predict performance in flight or field, and de-risk every critical design.

- Nucleon database: radiation-effects intelligence at your fingertips.
- Testing services: TID, heavy-ion, proton, and neutron campaigns—results in ~30 days.
- Bill of materials reviews: quantified risk scoring, mitigation strategies, and component recommendations.
- Mission assurance: end-to-end qualification plans and radiation-hardness assurance.

Radiation Testing At Mission Speed

Plan and execute TID, SEE, proton, and neutron campaigns with trusted partner labs and Nucleon expertise—so you can qualify modern parts quickly and confidently.

- Turnkey campaigns: we scope, schedule, run, and interpret tests end-to-end across multiple facilities
- Fast timelines: join monthly runs or request accelerated slots for urgent programs
- Data you can use: results delivered in a normalized, traceable format—ready for qualification and design decisions
- Modern-part support: COTS and leading-edge nodes tested as soon as access and data allow

Request a Test Campaign [see contact page above].

Other organizations providing radiation effects test services:

Vanderbilt University Institute for Space and Defense Electronics (ISDE)

Phone: 615-322-7311

Email or contact page: <https://www.vanderbilt.edu/isde/connect-with-us/>

Web: <https://www.vanderbilt.edu/isde/>

Description

Engineering & Test Services

ISDE provides engineering and test services to evaluate and enhance the radiation hardness of microelectronics. Our facilities support radiation exposure testing, device characterization, and failure analysis using state-of-the-art equipment and simulation tools. We work with government, academia, industry, and small businesses to develop radiation hardened microelectronics for space, defense, and high-reliability applications, offering expertise in test planning, data analysis, and design strategies.

Engineering And Test Services

ISDE offers a comprehensive suite of engineering and test services to support radiation effects research and characterization. We assist with test planning, device characterization, and radiation exposure experiments, leveraging our specialized facilities and expertise. Our team utilizes advanced simulation tools to model radiation interactions and predict device behavior under various conditions. Additionally, we provide access to our test facilities for external users, enabling industry and government partners to conduct

independent experiments. Services can be arranged under a core agreement, ensuring streamlined collaboration and support for mission-critical projects.

The Institute for Space and Defense Electronics (ISDE) maintains a comprehensive suite of laboratory equipment and software tools to support research in radiation effects, reliability, and microelectronics. Our facilities enable experimental testing, device characterization, and advanced simulations to analyze and mitigate radiation-induced failures. From state-of-the-art irradiation sources and environmental chambers to industry-standard modeling and Monte Carlo simulation tools, ISDE provides the resources necessary for cutting-edge research and engineering solutions. This page details our capabilities, highlighting the tools and technologies that support our mission.

Our ARACOR 4100 X-ray Irradiator provides 10-keV X-ray exposure for total ionizing dose (TID) testing. This system enables controlled irradiation of electronic devices to evaluate long-term degradation effects in semiconductor materials and circuits.

ISDE operates two ^{137}Cs isotopic irradiators, which deliver gamma radiation for TID studies. These irradiators are used to assess the radiation tolerance of microelectronics by simulating space and nuclear environments.

The National Electrostatics Corp. (NEC) 6SDH Pelletron is a versatile ion accelerator capable of delivering proton beams from 250 keV to 4 MeV and alpha particles from 500 keV to 6 MeV, along with select light ions. The system includes a custom vacuum chamber measuring 20 inches in height and 24 inches in diameter. Inside the chamber, a 1-inch diameter beam can be precisely positioned using a motorized stage with approximately 2 inches of vertical travel. The stage features a mounting platform with 6-32 tapped holes on a 1-inch by 1-inch grid, allowing for secure and repeatable sample placement during irradiation experiments.

ISDE maintains a collection of radioactive button sources for controlled radiation testing and calibration. These sources provide low-dose exposure to alphas enabling precise characterization of radiation effects in microelectronics. They are used for device response studies and sensor calibration in a controlled laboratory environment. These sources complement ISDE's broader irradiation capabilities, allowing for flexible and targeted experimentation.

Additionally, our staff has off-site experience at facilities including

- Lawrence Berkeley Laboratory 88-in. Cyclotron
- Texas A&M Cyclotron
- Michigan State University National Superconducting Cyclotron
- Tri-University Meson Factory (TRIUMF)
- Brookhaven National Laboratory Tandem Van de Graaff
- NASA Space Radiation Laboratory (NSRL)
- Crane Linear Accelerator Facility
- Sandia National Laboratories Microbeam Facility