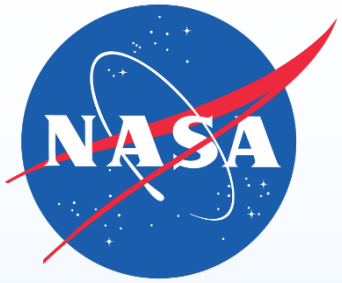

NASA Electronic Parts and Packaging (NEPP)

A NASA Office of Safety and Mission Assurance (OSMA) Program

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Acronyms

Acronym	Definition
3D	Three Dimensional
AF	Air Force
AF SMC	Air Force Space and Missile Systems Center
AI	Artificial Intelligence
BAE	BAE Systems
BOK	Body of Knowledge
BYU	Brigham Young University
CLTs	NASA CIO Leadership Teams
CMOS	Complementary Metal Oxide Semiconductor
COTS	Commercial Off The Shelf
DDR	Double Data Rate (DDR3 = Generation 3; DDR4 = Generation 4)
DiRAM	Dis-integrated Random Access Memory
DLA	Defense Logistics Agency
DoD	Department of Defense
DOE	Department of Energy
DRAM	Dynamic Random-Access Memory
EEE	Electrical, Electronic, and Electromechanical
ESA	European Space Agency
FinFETs	Fin Field Effect Transistors
FPGA	Field Programmable Gate Array
GaN	Gallium Nitride
GIDEP	Government-Industry Data Exchange Program
GPU	Graphics Processing Unit
IC	Integrated Circuit
IR	Infrared
JEDEC	Joint Electron Device Engineering Council (JEDEC)

Acronym	Definition
LANL	Los Alamos National Laboratories
MBMA	Model-Based Missions Assurance
Mil	Military
MOSFET	Metal–Oxide–Semiconductor Field-Effect Transistor
MPSOC	Multi-Processing System on Chip
NASA	National Aeronautics and Space Administration
Navy Crane	Naval Surface Warfare Center, Crane, Indiana
Navy Crane	Naval Surface Warfare Center, Crane Division
NEPAG	NASA EEE Parts Assurance Group
NEPP	NASA Electronic Parts and Packaging
NESC	NASA National Electric Safety Code
NRO	United States Navy National Reconnaissance Office
OCE	Office of the Chief Engineer
OSMA	NASA Office of Safety and Mission Assurance (OSMA) Program
R&M	Reliability and Maintainability
RH	Radiation Hardened
SAE	Society of Automotive Engineers (SAE)
SAPP	Space Asset Protection Program
SEB	Single Event Burnout
SEE	Single Event Effect
SiC	Silicon Carbide
SME	Small and Medium-sized Enterprises
SNL	Sandia National Laboratories
SOC	Systems on a Chip
STMD	NASA's Space Technology Mission Directorate
TOR	Technical Operating Report

NEPP Mission Statement

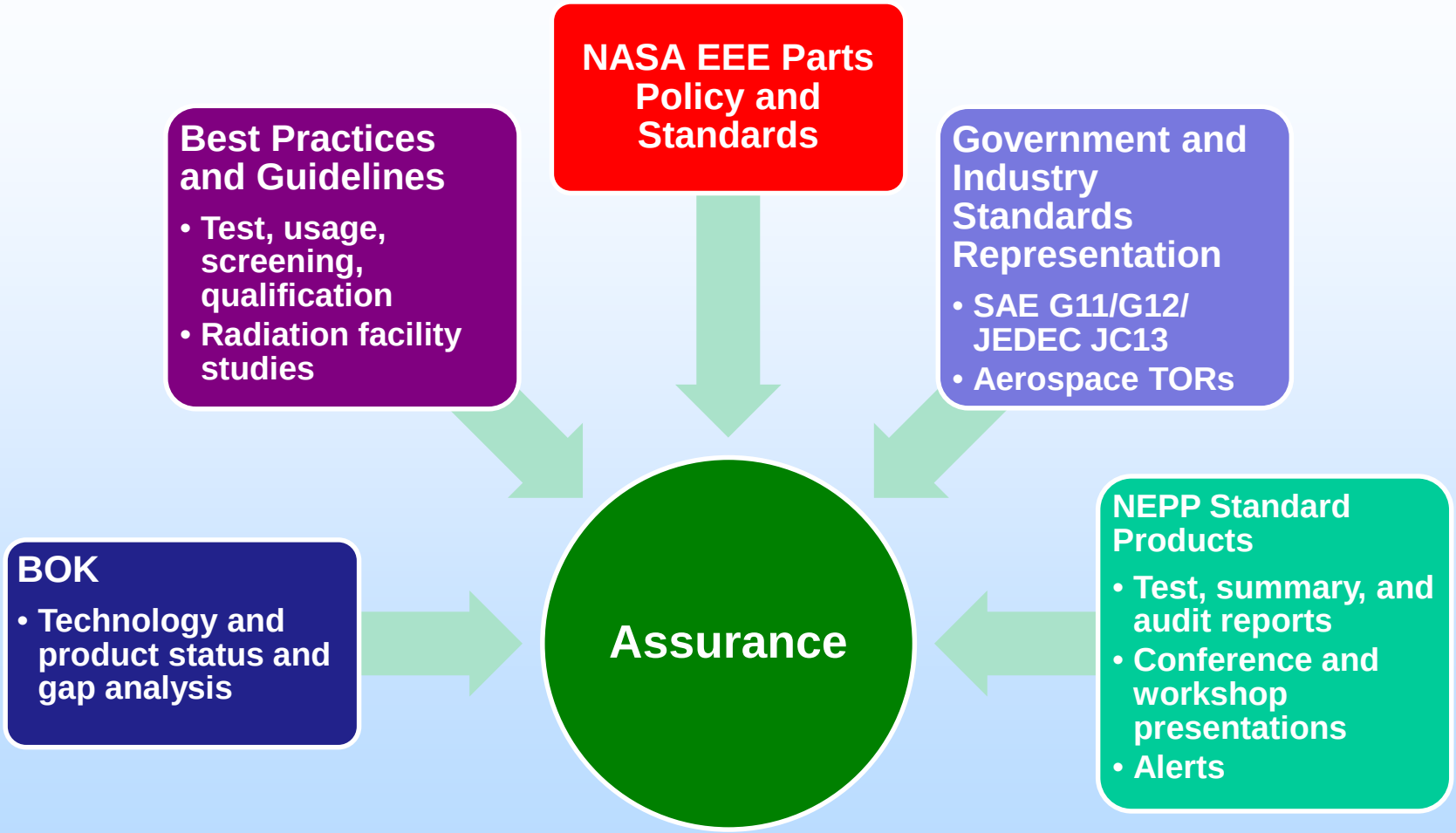
Provide NASA's leadership for developing and maintaining guidance for the screening, qualification, test, and reliable usage of electrical, electronic, and electromechanical (EEE) parts by NASA, in collaboration with other government Agencies and industry.

NEPP - Charter

Body of Knowledge (BOK) Documents

- **What goes into a BOK**
  - An overview of the technology
  - An overview of technology applicability to space/aeronautics
  - An overview of technology maturity, produceability and/or commercial availability
  - Reliability, qualification, and/or radiation knowledge-base
  - Technology direction or extent of the reliability issue for the future Identification of experts, technology sources, test houses, etc.
  - Facilities/capabilities
  - Recommendation for follow-on NEPP task (if applicable)

NEPP – Product Delivery

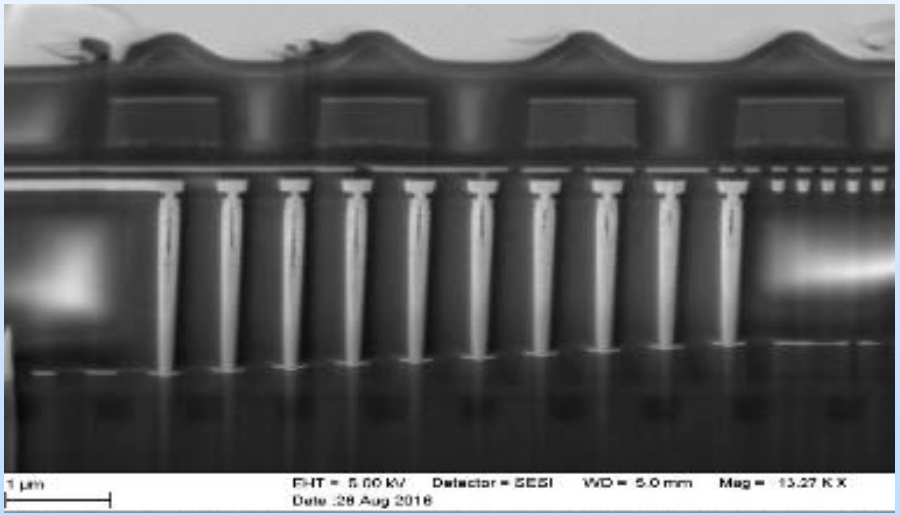


Related task areas:

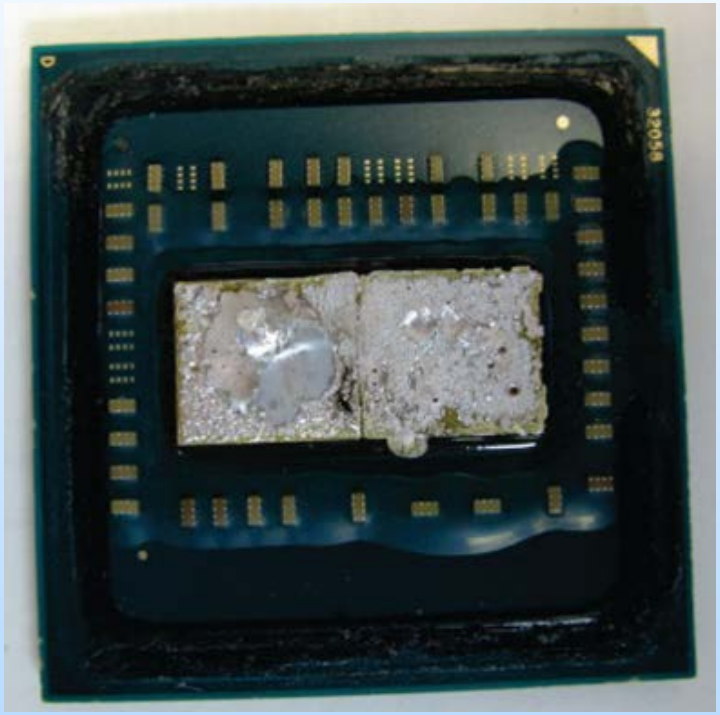
Technology/parts evaluations lead to new best practices, etc…

Advanced Technologies

- **Technology/device evaluations with a nod to developing test methods and user guidance**

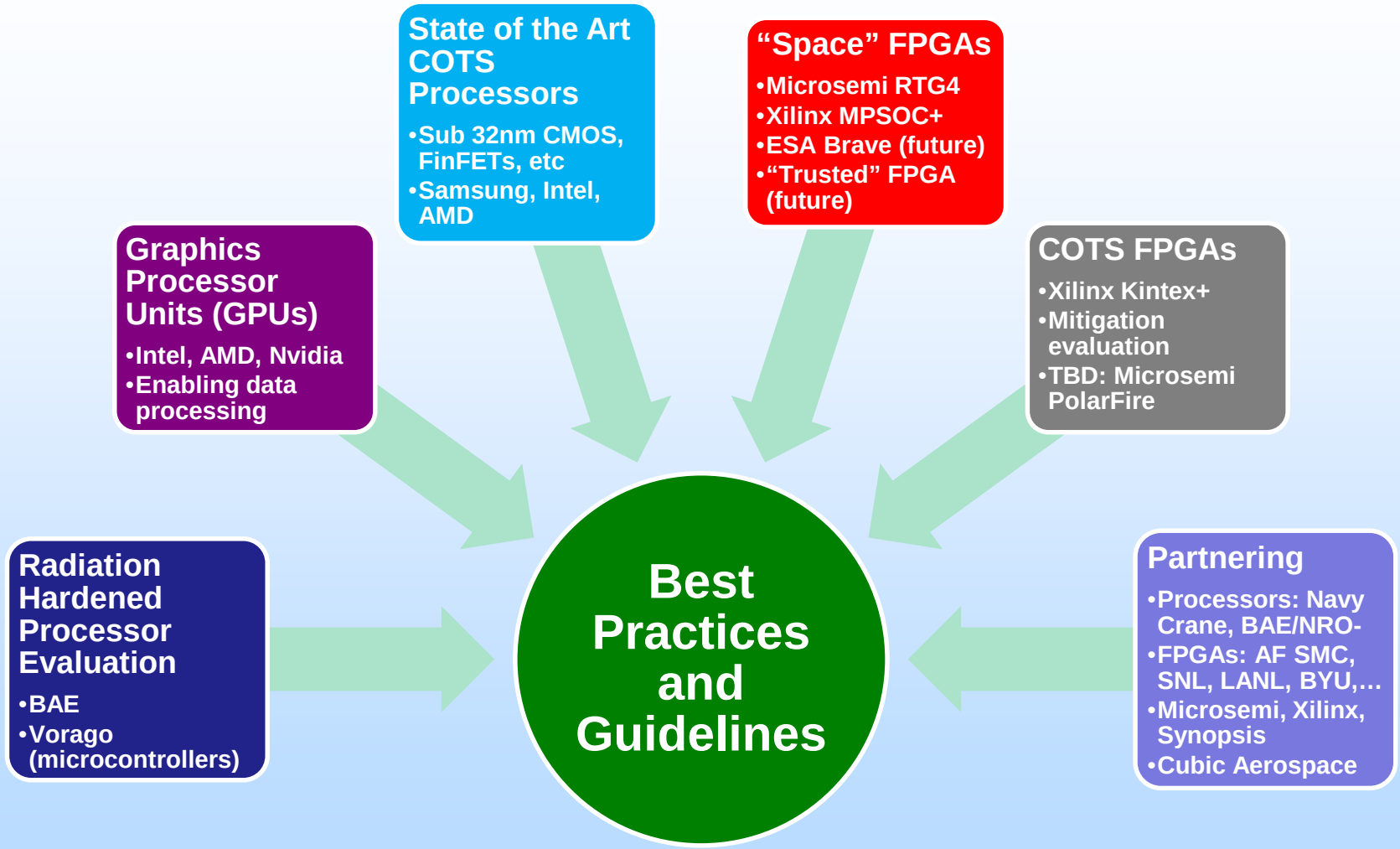


Hynix 3D Flash Memory



AMD Ryzen Processor

NEPP – Processors, Systems on a Chip (SOC), and Field Programmable Gate Arrays (FPGAs)



Potential future task areas:

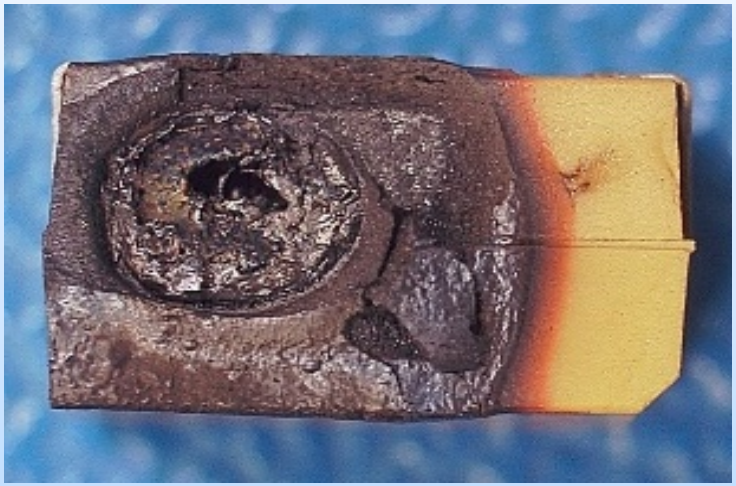
artificial intelligence (AI) hardware, Intel Stratix 10

NEPP – Memories

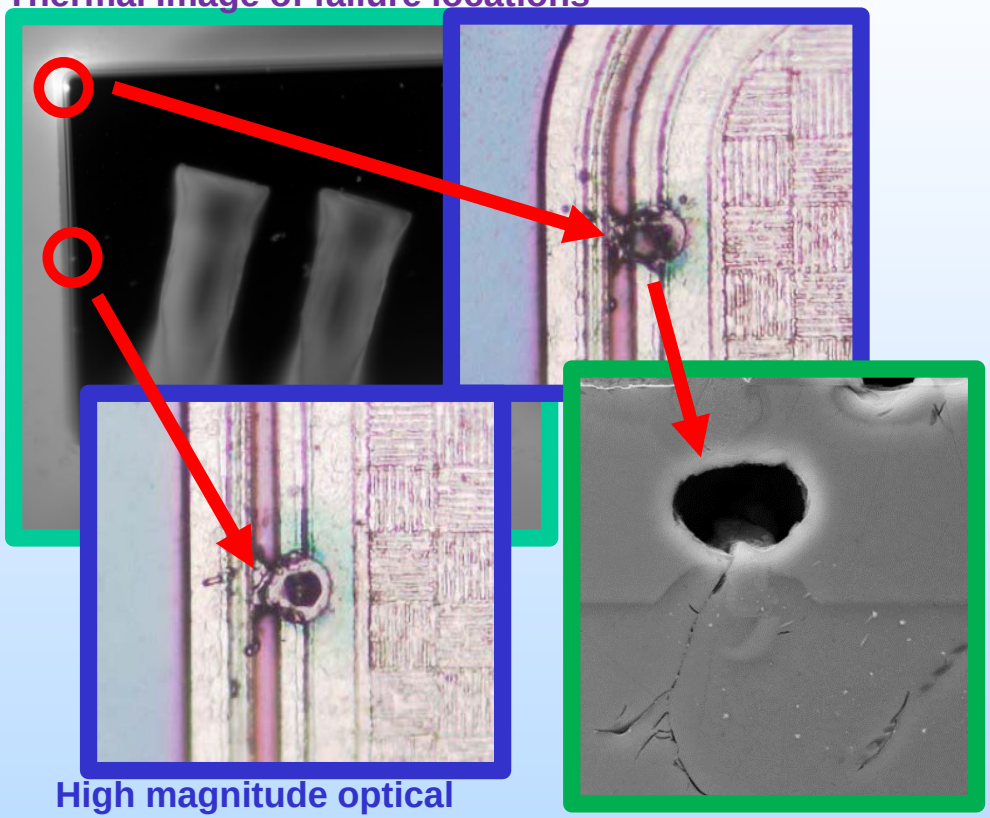
Related task areas:

Deprocessing for single event testing (also w/processors, FPGAs,…)

Working Industry/Agency-Wide Concerns

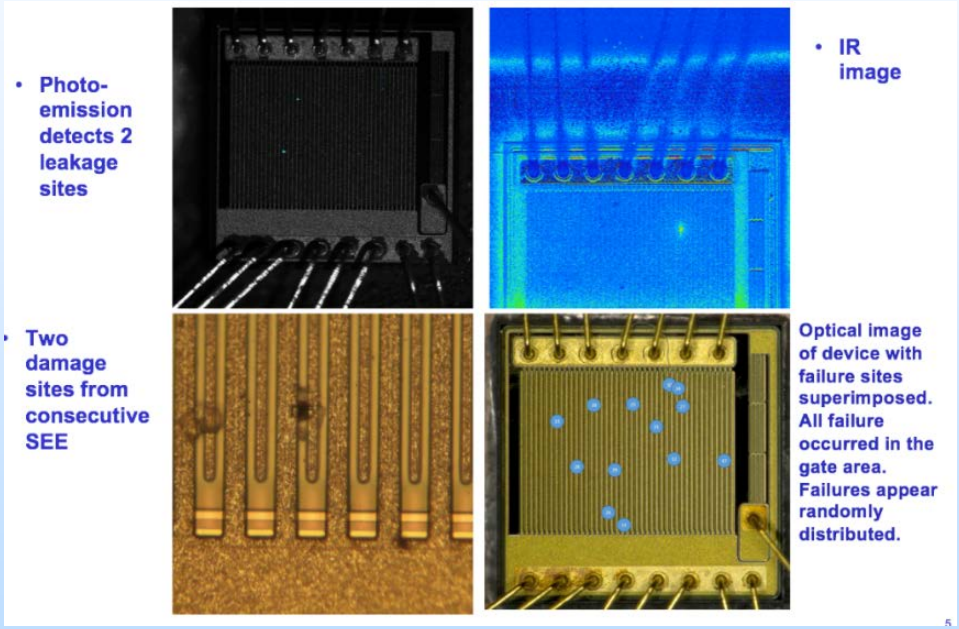


Tantalum capacitor failure

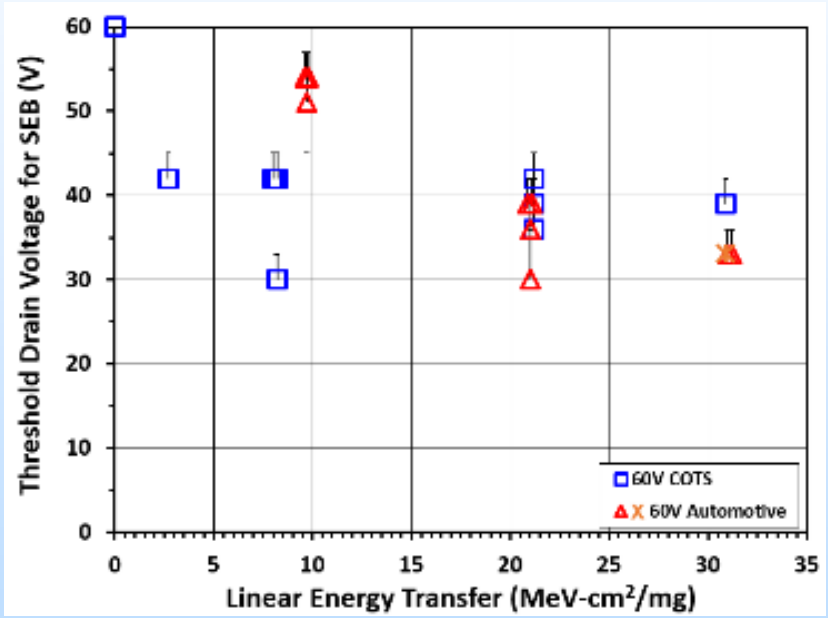


Failure analysis of Schottky diode radiation damage

Vendor Validation Tests

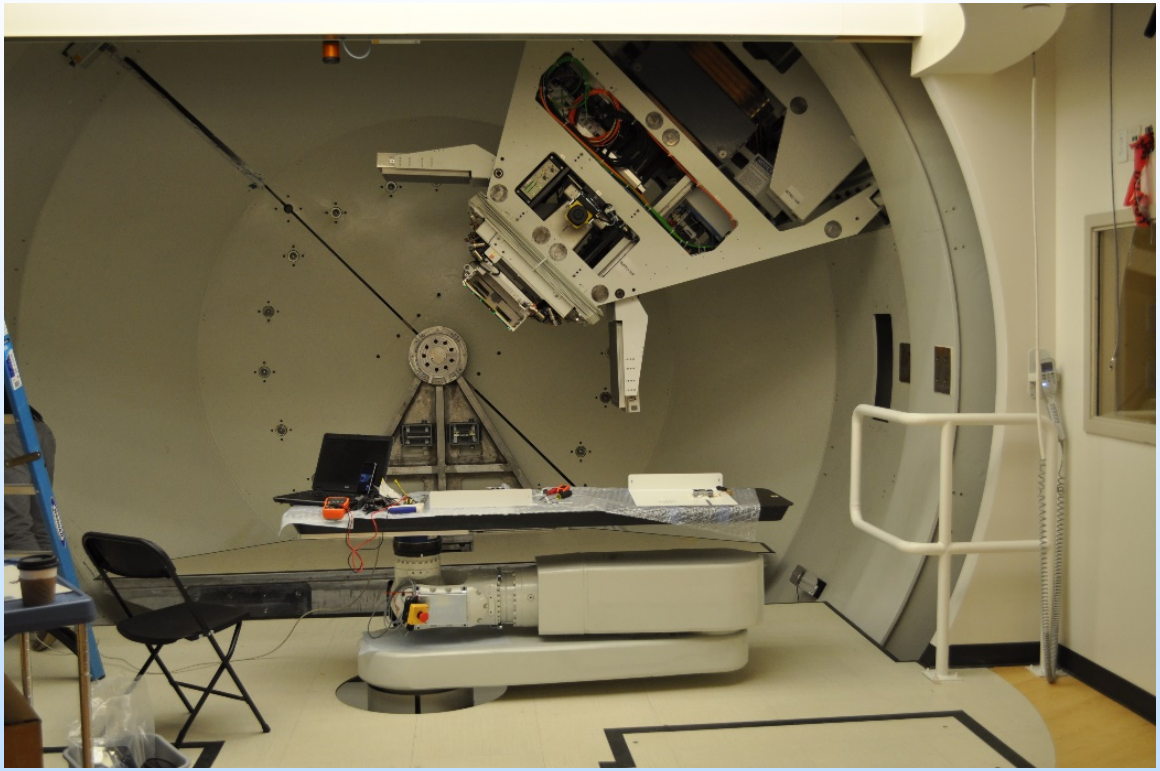


GaN IC – radiation test analysis



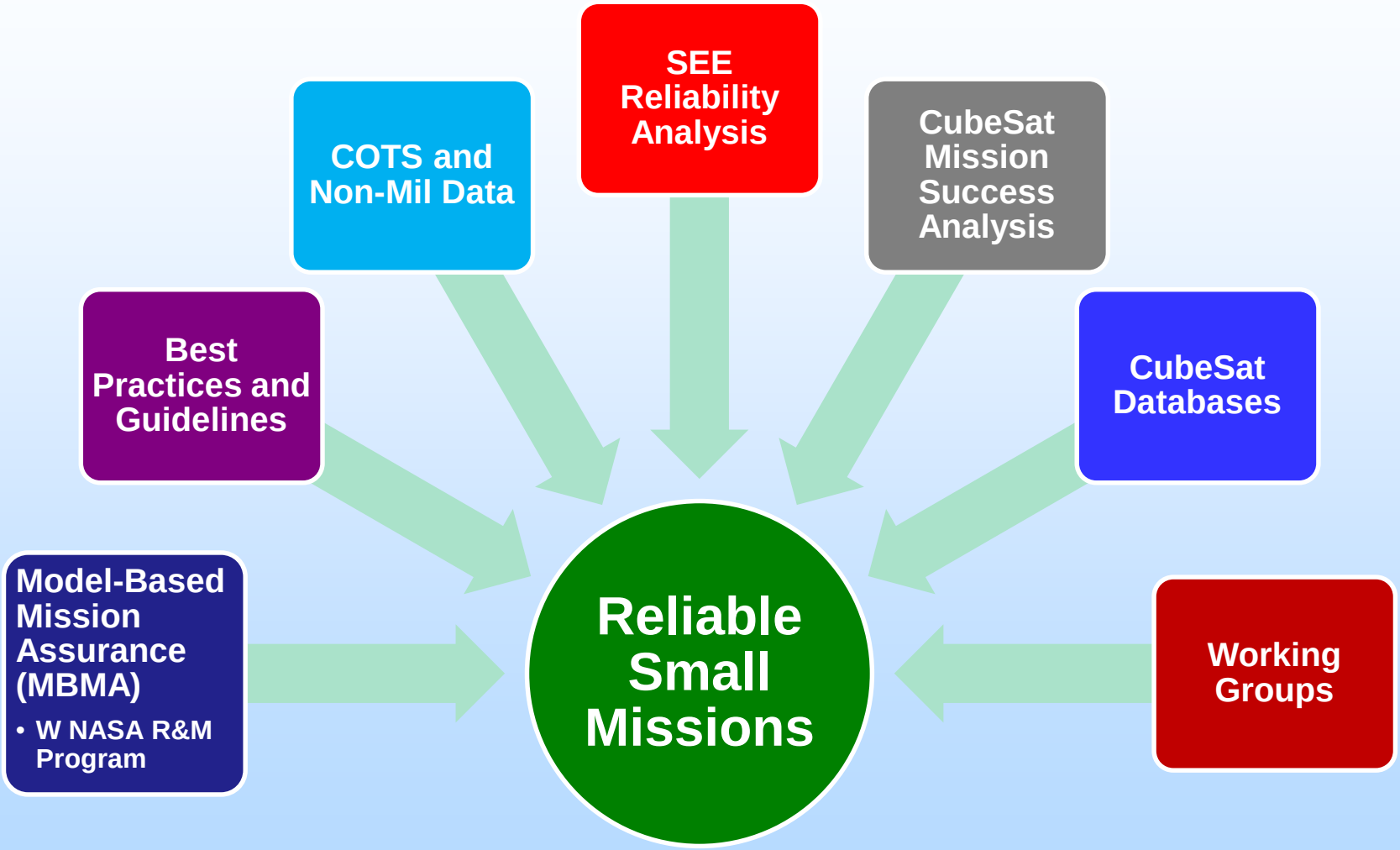
Comparison of n-type 60V trench MOSFET SEB thresholds

Infrastructure Challenges



Using Proton Cancer Therapy Centers for electronics testing

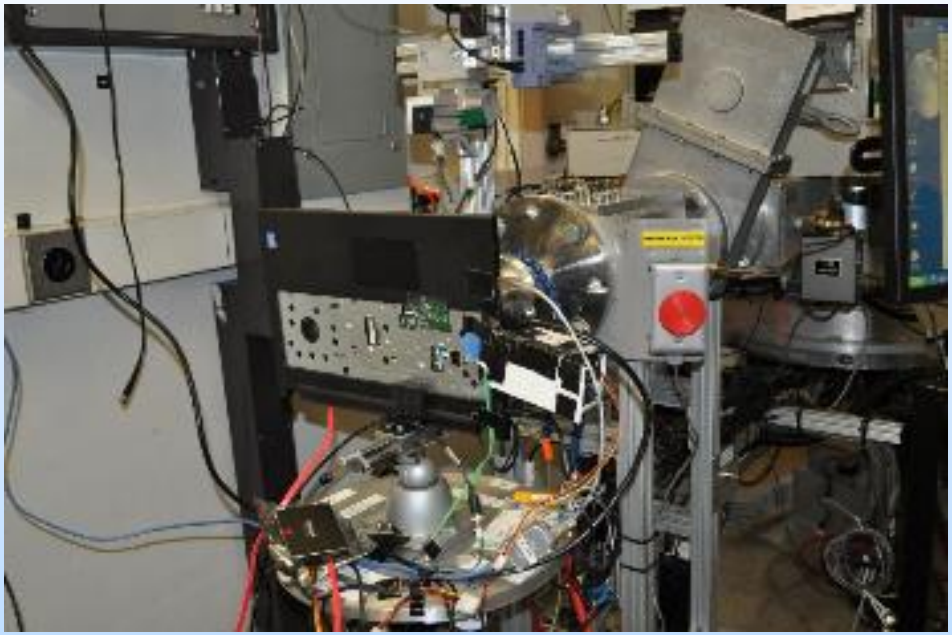
NEPP - Small Mission Efforts



Potential future task areas: automotive and avionics resilience

Partnering is key

- **Within**
  - **NASA**
- **With**
  - **Other government agencies**
  - **Industry**
  - **University**
  - **International**



http://nepp.nasa.gov