National Aeronautics and Space Administration

NASA EEEE Parts Management Overview & Status

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Image Credit: NASA & JPL

Electrical, Electronic, Electromechanical, and Electro-Optical (EEEE) Parts & Radiation Engineering Capability

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Outline

- Welcome to **Susana Douglas (NASA GSFC)**, acting deputy, NASA Electronic Parts Management
- Overview of current capability structure
- Highlights of select capability efforts
- Radiation Test Facility Landscape & NASA's Radiation Block Buy
  - Establish effective & efficient access for all Centers
- Interagency partnerships and whole-of-government efforts
  - Defense Microelectronics Cross-Functional Team
  - Department of Defense Trusted & Assured Microelectronics Program
  - Missile Defense Agency
  - Strategic Radiation-Hardened Electronics Council (SRHEC) (presentation at 2019 NEPP ETW)
- Summary and forward work

EEEE Parts & Radiation Engineering Capability Overview

Management Functions

- Manage EEEE parts capability at the Agency level
  - Radiation effects on EEEE parts are in-scope
  - GSFC is lead Center, with support from JPL
- Provide resources for Centers to acquire workforce expertise and a forum to coordinate activities with stakeholders (e.g., OCE, OSMA, etc.) and customers
- Track the state of the Agency workforce, including Center expertise, demand, and capacity
- Support Agency policy and technical decision-making processes
- Engage external partners as needed to support Agency objectives
- Evolve management functions as needed

EEEE Parts & Radiation Management Strategies

- Define stakeholders, engagement options, and outreach opportunities that facilitate access and efficient use of limited resources
- **Goal:** to grow and maintain a diverse and inclusive workforce for the Nation's aerospace electronic parts and radiation effects engineering capability, serving our stakeholders and sought out by academic, government, industrial, and international partners
- **How:** by striving to recruit and retain diverse talent from across the Nation to include the best ideas and approaches to provide our customers and partners with exceptional electronic parts and radiation engineering services through enterprise-level integration

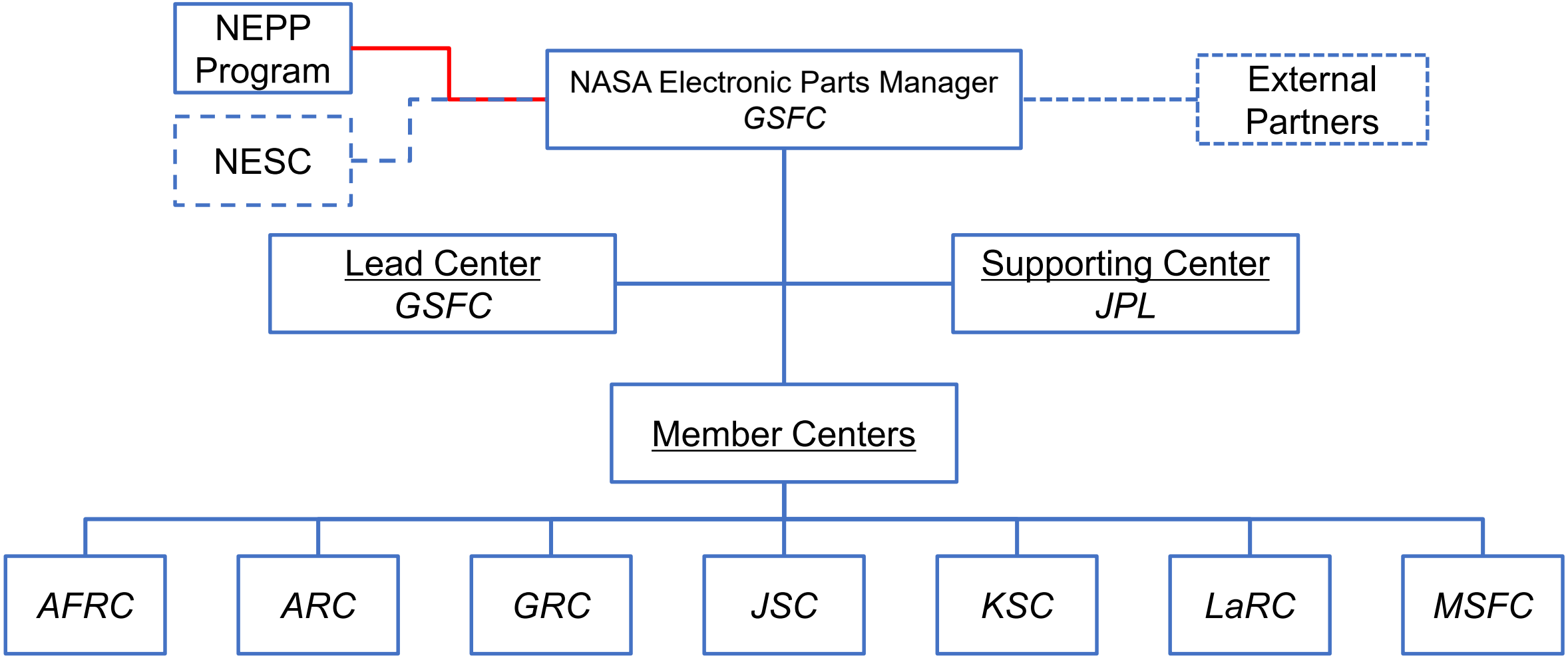
Play key roles in and across multiple domains

NASA EEEE Parts – Interfaces

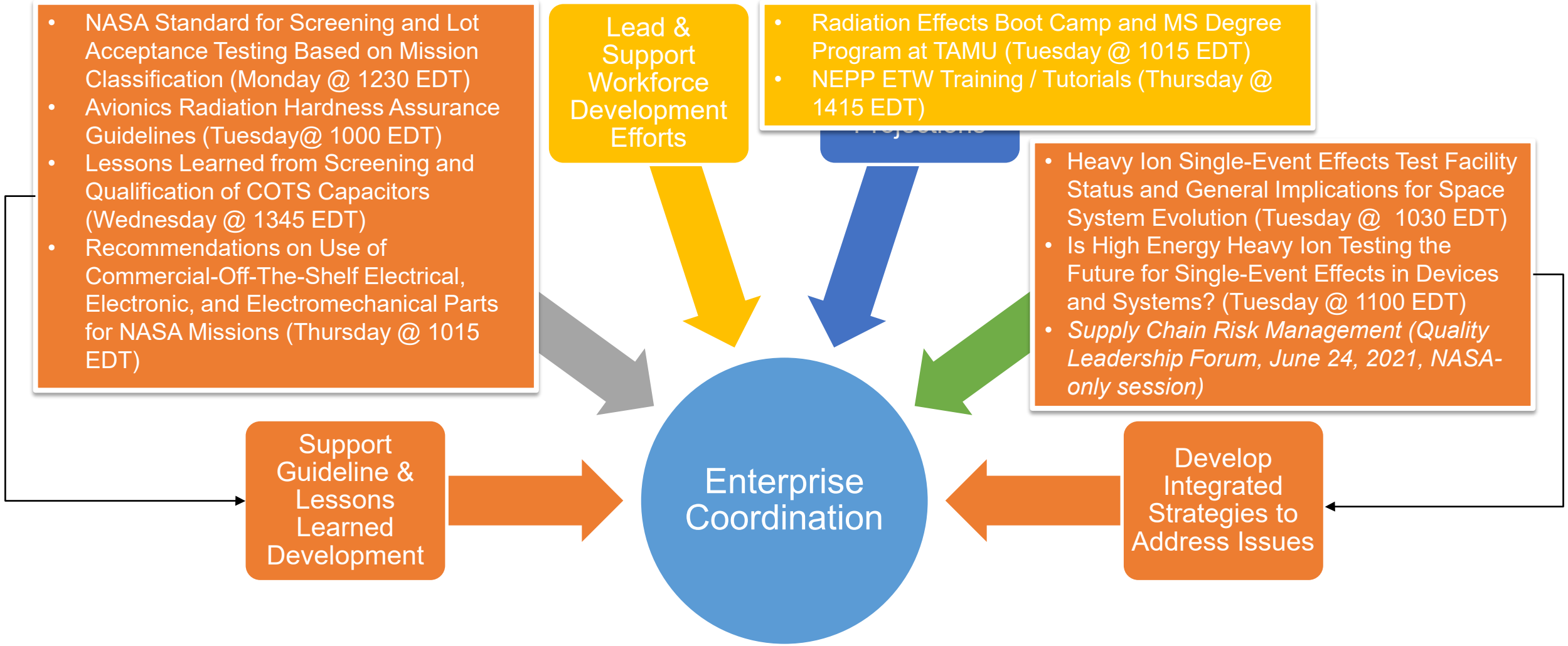
Agency EEEE Parts Capability

Assurance	Development		Facilities
Office of Safety & Mission Assurance	Office of the Chief Engineer	Flight Projects	Mission Support
- ***NEPP Program*** - Quality - Reliability - Workmanship	NESC	Field Centers Mission Directorates	Space Environments Testing Management Office

Parts Management Team Members



Agency & Cross-Center Activity Highlights



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Radiation Test Facility Landscape & NASA's Radiation Block Buy

Focus on heavy ion single-event effects (SEE) testing

U.S. Domestic Radiation Facilities – SEE Testing

- Distributed across the United States and globe
  - Located in more than 15 states across the U.S. (international facilities too)
- Split into several general categories
  - High- (>100 MeV/amu) and low-energy (<50 MeV/amu) heavy ion
  - High-energy protons, including medical therapy proton facilities
  - Medium- and low-energy protons
- Require various procurement mechanisms and agreements
- For heavy ion SEE test facilities in particular, persistent concerns about available capacity and capabilities required to meet growing demands from academia, government, and industry
  - Cross-agency collaborations are examining the trade space and investment options
  - More information in tomorrow's briefings

Understanding and Improving Supply Based on Needs

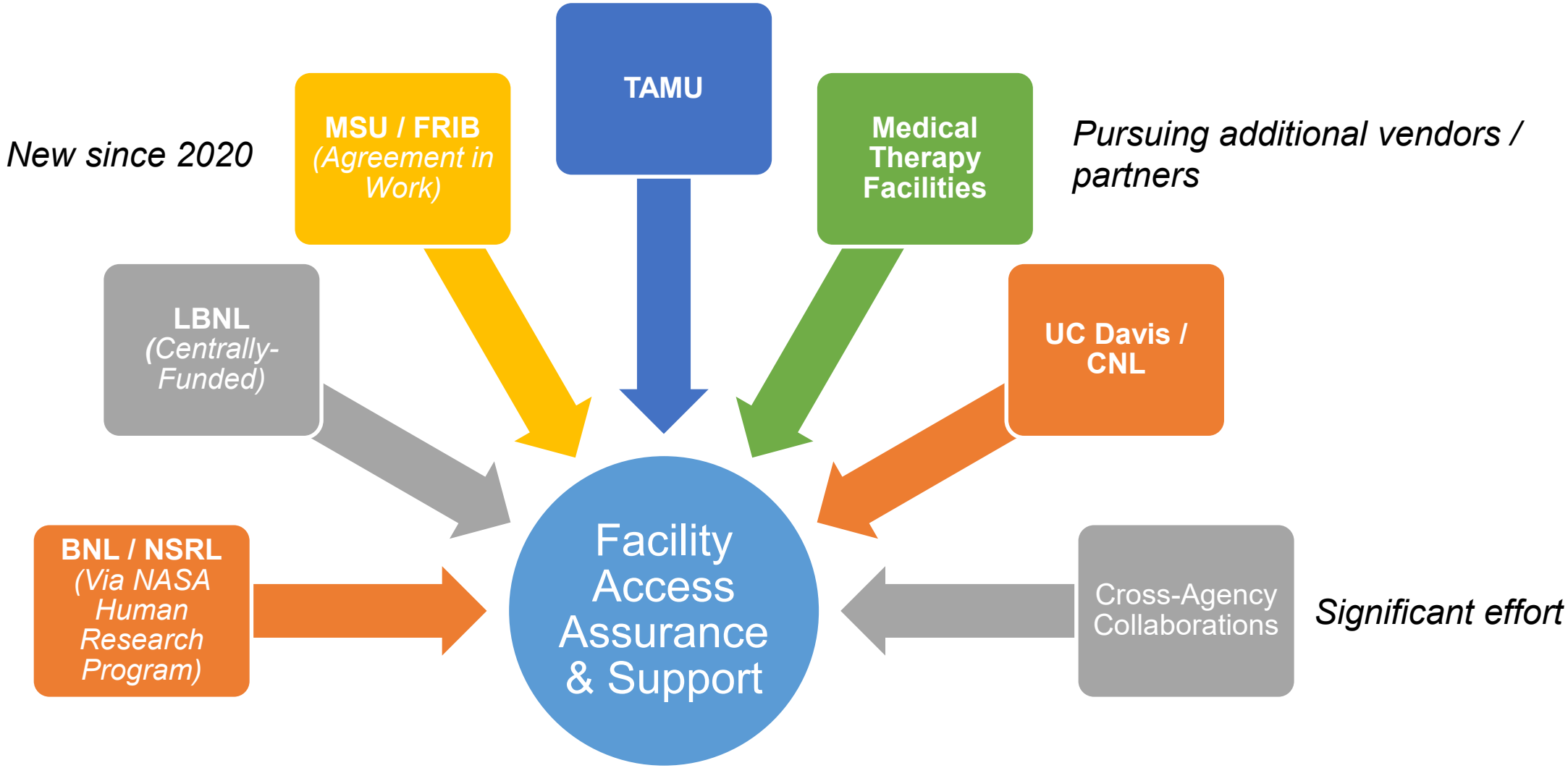
Testing at the Speed of Light (nap.edu)

MDA and NASA Hosted

2021 Domestic High-Energy Single-Event Effects (SEE) Testing Users Meeting (nasa.gov)

SAE CE-12 Surveys

Recent NASA Radiation Test Facility Activities



Interagency Partnerships and Whole-of-Government Efforts

Microelectronics Workforce Development Highlights and Future Thoughts

General Interagency Collaboration Categories

Radiation Effects and Radiation-Hardened Microelectronics

- Partnerships (Domestic & International)
- Program / Project Needs
- Science & Technology
- Technology & Development
- Test & Evaluation
- Workforce Development

Recent Legislation Emphasizing Microelectronics

- H.R.6395 (Public Law 116-283): William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021
  - TITLE XCIX—Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America (Sections 9901 – 9908)
  - https://www.congress.gov/bill/116th-congress/house-bill/6395

- S.1260: United States Innovation and Competition Act of 2021 [was "Endless Frontier Act"]
  - Also includes TITLE VI—SPACE MATTERS / Subtitle B / "National Aeronautics and Space Administration Authorization Act of 2021"
  - https://www.congress.gov/bill/117th-congress/senate-bill/1260

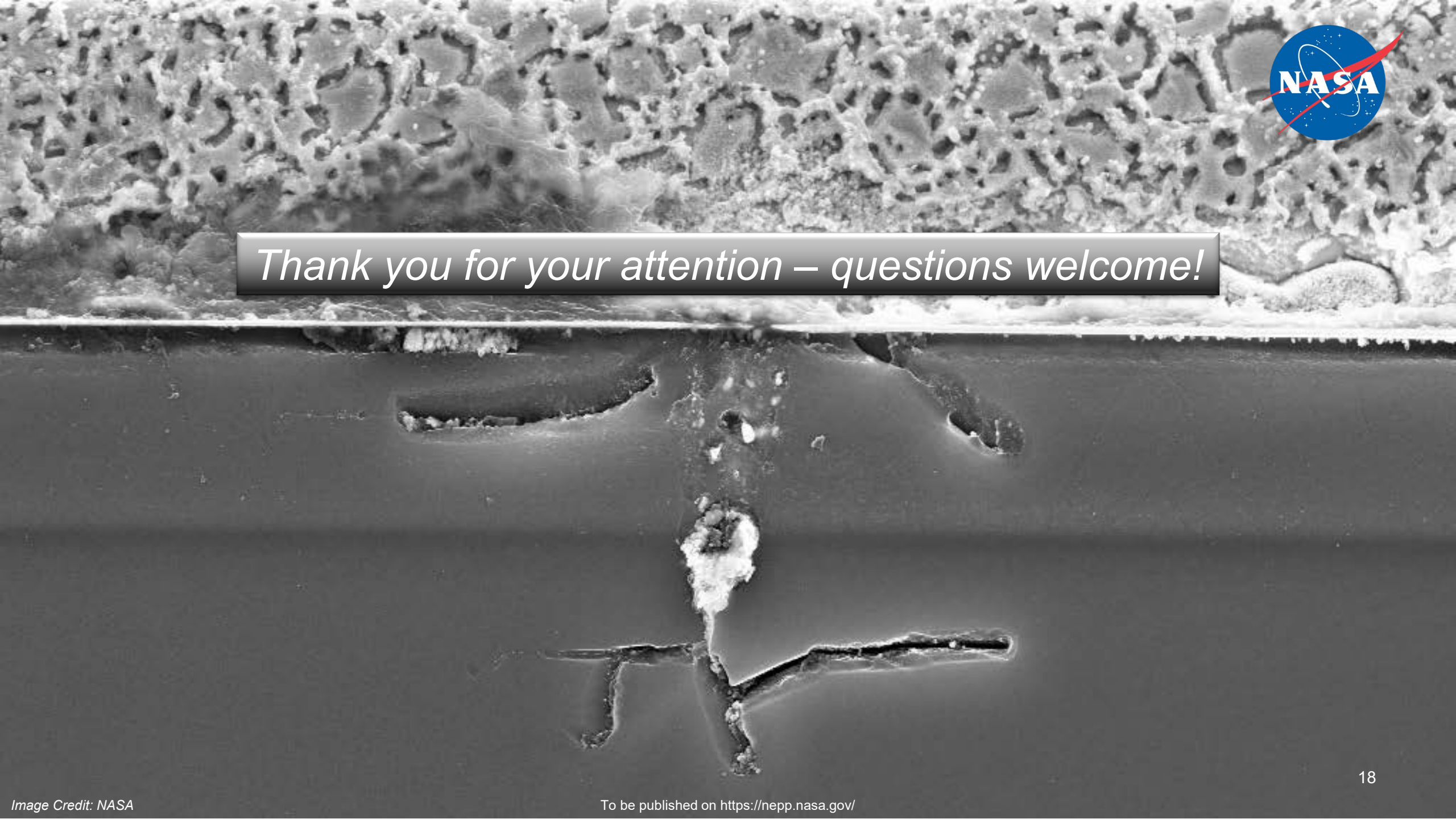
Recent and Ongoing Workforce Development Support

Together with the NEPP Program in many instances

- SCALE (Scalable Asymmetric Lifecycle Engagement) via SRHEC
  - "Nationally-coordinated, regionally-executed"
  - https://www.purdue.edu/discoverypark/scale/index.php
  - A. Smith, 2020 NEPP ETW presentation
- NSIN H4D (National Security Innovation Network Hacking for Defense)
  - https://www.nsin.us/, https://www.h4d.us/
- Single-Event Effects (SEE) Testing Bootcamp at the Texas A&M University (TAMU) Cyclotron Institute
- NEPP ETW training / tutorials and support for training in other community venues
- Examining opportunities for enhanced parts assurance / engineering training
- Considering other low-key training / knowledge-transfer activities that can benefit NASA workforce and partners

Summary & Forward Work

- Continuing NASA EEEE parts management evolution
  - Refining capability structure, cross-Center workflows, and knowledge / tool sharing
  - Building / maintaining relationships with both internal and external stakeholders to advance technology characterization, qualification, and deployment of EEEE parts and components
- Supporting high operational tempo for external radiation test facility activities, including NASA's own acquisition activities combined with significant interagency focus
- Implementing robust strategies for microelectronics workforce development to meet current and future mission needs



Thank you for your attention – questions welcome!

Image Credit: NASA

Acronyms

Abbreviation	Definition
AFRC	Armstrong Flight Research Center
AoA	Analysis of Alternatives
ARC	Ames Research Center
BNL	Brookhaven National Laboratory
CNL	Crocker Nuclear Laboratory
EDT	Eastern Daylight Time
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical
ETW	Electronic Technologies Workshop
FRIB	Facility for Rare Isotope Beams
FY	Fiscal Year
GRC	Glenn Research Center
GSFC	Goddard Space Flight Center
H4D	Hacking for Defense
IT	Information Technology
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
LBNL	Lawrence Berkeley National Laboratory

Abbreviation	Definition
MS	Master of Science
MSFC	Marshall Space Flight Center
MSU	Michigan State University
NASA	National Aeronautics and Space Administration
NEPP	NASA Electronic Parts & Packaging (Program)
NESC	NASA Engineering & Safety Center
NSIN	National Security Innovation Network
NSRL	NASA Space Radiation Laboratory
OCE	Office of the Chief Engineer
OSMA	Office of Safety and Mission Assurance
SAE	SAE International, previously known as the Society of Automotive Engineers
SCALE	Scalable Asymmetric Lifecycle Engagement
SEE	Single-event effects
SRH	Strategic Radiation-Hardened
SRHEC	Strategic Radiation-Hardened Electronics Council
TAMU	Texas A&M University
TRL	Technology Readiness Level
U.S.	United States (of America)
UC (Davis)	University of California