Outline

• Overview of current capability structure
• Highlights of select capability efforts
• Changing radiation test facility landscape & radiation block buy
  – Required capacity and capabilities
  – Establish effective & efficient access for all
  – Much progress since last year’s workshop
• Interagency partnerships and whole-of-government efforts
  – Strategic Radiation-Hardened Electronics Council (SRHEC)
    • See presentation from Dr. Matthew Kay at last year’s NEPP Program ETW
  – Department of Defense Trusted & Assured Microelectronics Program
• Summary and forward work
EEE Parts & Radiation Engineering
Capability Overview
Management Functions

• Manage EEEE parts workforce at the Agency level
  – Radiation effects on EEEE parts are in-scope, as is management of the Agency radiation test facility block buy
  – GSFC is lead Center, with support from JPL

• Provide resources for Centers to acquire in-scope 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
NASA EEEE Parts – Interfaces

Agency EEEE Parts
(NASA Electronic Parts Manager – Steward & Advocate for Capability)

Assurance
Office of Safety & Mission Assurance
- NEPP Program
  - Quality
  - Reliability
  - Workmanship

Development
Office of the Chief Engineer
NESC

Facilities
Flight Projects
Field Centers
Mission Directorates
Mission Support
Space Environments Testing Management Office
Parts Management Team Members

Formal Connection

NEPP Program

NESC

NASA Electronic Parts Manager GSFC

Lead Center GSFC

Supporting Center JPL

Member Centers

AFRC ARC GRC JSC KSC LaRC MSFC

External Partners

National Aeronautics and Space Administration / EEEE Parts & Radiation Engineering

• 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.
Highlights of Ongoing EEEE Parts Management Efforts
Changing Radiation Test Facility Landscape & Radiation Block Buy

*Focus on heavy ion and high-energy proton single-event effects (SEE) testing*
Domestic Radiation Facilities – SEE Testing

• Distributed across the United States and globe
  – Located in more than 15 states across the U.S.
  – International facilities

• Split into several general categories
  – Heavy ion (four primary U.S. sites: BNL, LBNL, MSU, and TAMU)
  – High-energy protons, including medical therapy proton facilities (many)
  – Medium- and low-energy protons (e.g., CNL, LBNL, and TAMU)

• Require various procurement mechanisms and agreements

• For heavy ion SEE test facilities, 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
Recent NASA Radiation Test Facility Activities

- New award in FY20
- Project-funded
- PayGo

- Project-funded
- PayGo

- Agency-funded FY20+
  - Transitioned from project funding in FY18-FY19

- Two new awards in FY20
- Project-funded
- PayGo
- More agreements under consideration

Facility Access Assurance & Support

- CNL 5-year Agreement
- TAMU 5-year Agreement
- Medical Facility 3-year Agreements
- LBNL 5-year Agreement
- Cross-Agency Collaborations for Domestic Facility Stewardship and Support

National Aeronautics and Space Administration / EEEE Parts & Radiation Engineering

Interagency Partnerships and Whole-of-Government Efforts

Microelectronics Workforce Development & Technology Characterization
Radiation Effects and Radiation-Hardened Microelectronics
Summary & Forward Work

• Continuing NASA EEEE parts management evolution
  – Refining capability structure, cross-Center workflows, and knowledge / tool sharing
  – Building / augmenting 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!
## Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AFRC</td>
<td>Armstrong Flight Research Center</td>
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<tr>
<td>ARC</td>
<td>Ames Research Center</td>
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<tr>
<td>BNL</td>
<td>Brookhaven National Laboratory</td>
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<tr>
<td>CNL</td>
<td>Crocker Nuclear Laboratory</td>
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<tr>
<td>EEEE</td>
<td>Electrical, Electronic, Electromechanical, Electro-Optical</td>
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<td>ETW</td>
<td>Electronic Technologies Workshop</td>
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<td>FY</td>
<td>Fiscal Year</td>
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<td>GRC</td>
<td>Glenn Research Center</td>
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<td>GSFC</td>
<td>Goddard Space Flight Center</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>JPL</td>
<td>Jet Propulsion Laboratory</td>
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<td>JSC</td>
<td>Johnson Space Center</td>
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<td>KSC</td>
<td>Kennedy Space Center</td>
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<td>LaRC</td>
<td>Langley Research Center</td>
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<td>LBNL</td>
<td>Lawrence Berkeley National Laboratory</td>
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<tr>
<td>MSFC</td>
<td>Marshall Space Flight Center</td>
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<tr>
<td>MSU</td>
<td>Michigan State University</td>
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<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
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<tr>
<td>NEPP</td>
<td>NASA Electronic Parts &amp; Packaging (Program)</td>
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<td>NESC</td>
<td>NASA Engineering &amp; Safety Center</td>
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<tr>
<td>OCE</td>
<td>Office of the Chief Engineer</td>
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<td>OSMA</td>
<td>Office of Safety and Mission Assurance</td>
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<tr>
<td>SEE</td>
<td>Single-event effects</td>
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<td>SRHEC</td>
<td>Strategic Radiation-Hardened Electronics Council</td>
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<tr>
<td>TAMU</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>TRL</td>
<td>Technology Readiness Level</td>
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<tr>
<td>U.S.</td>
<td>United States (of America)</td>
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