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

To be presented by J. Pellish at the 2020 NASA Electronic Parts and Packaging (NEPP) Program Electronics Technology Workshop (ETW), June 15-18, 2020.

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

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EEEE Parts & Radiation Engineering Capability Overview

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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

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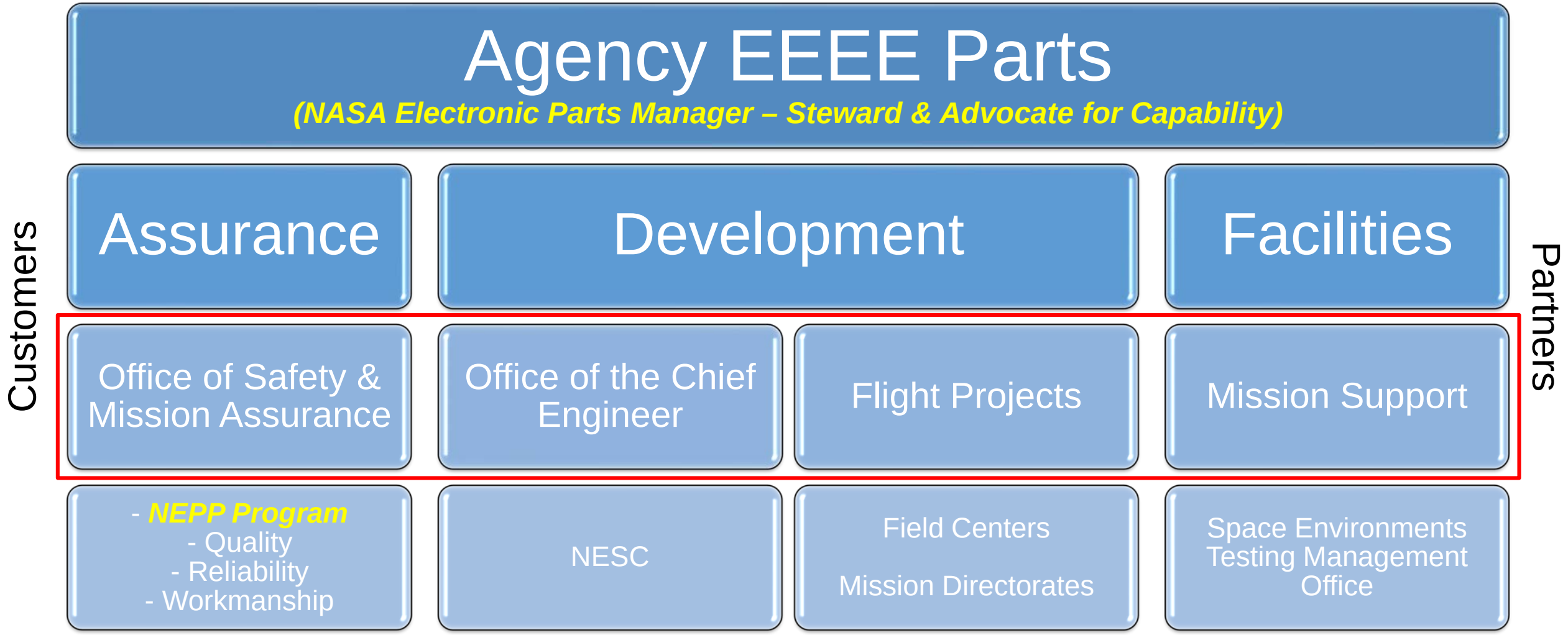
NASA EEEE Parts – Interfaces



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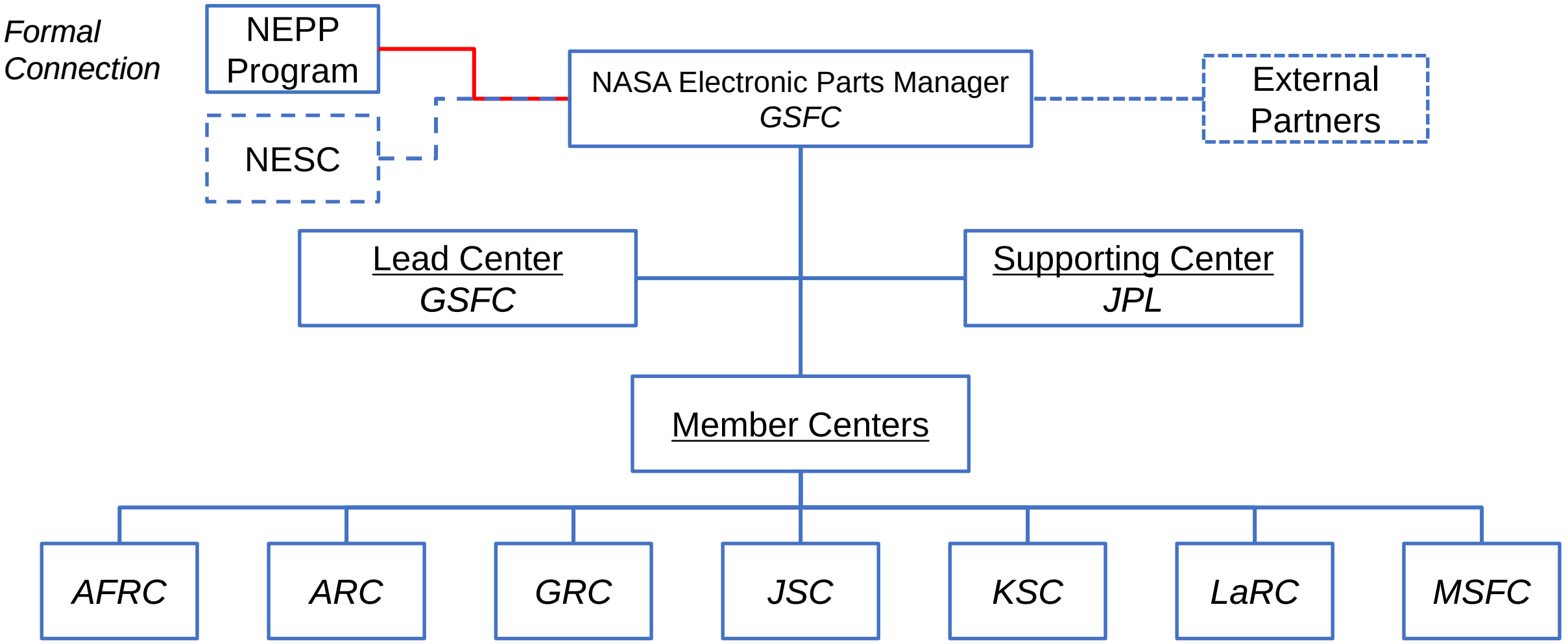
Parts Management Team Members



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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

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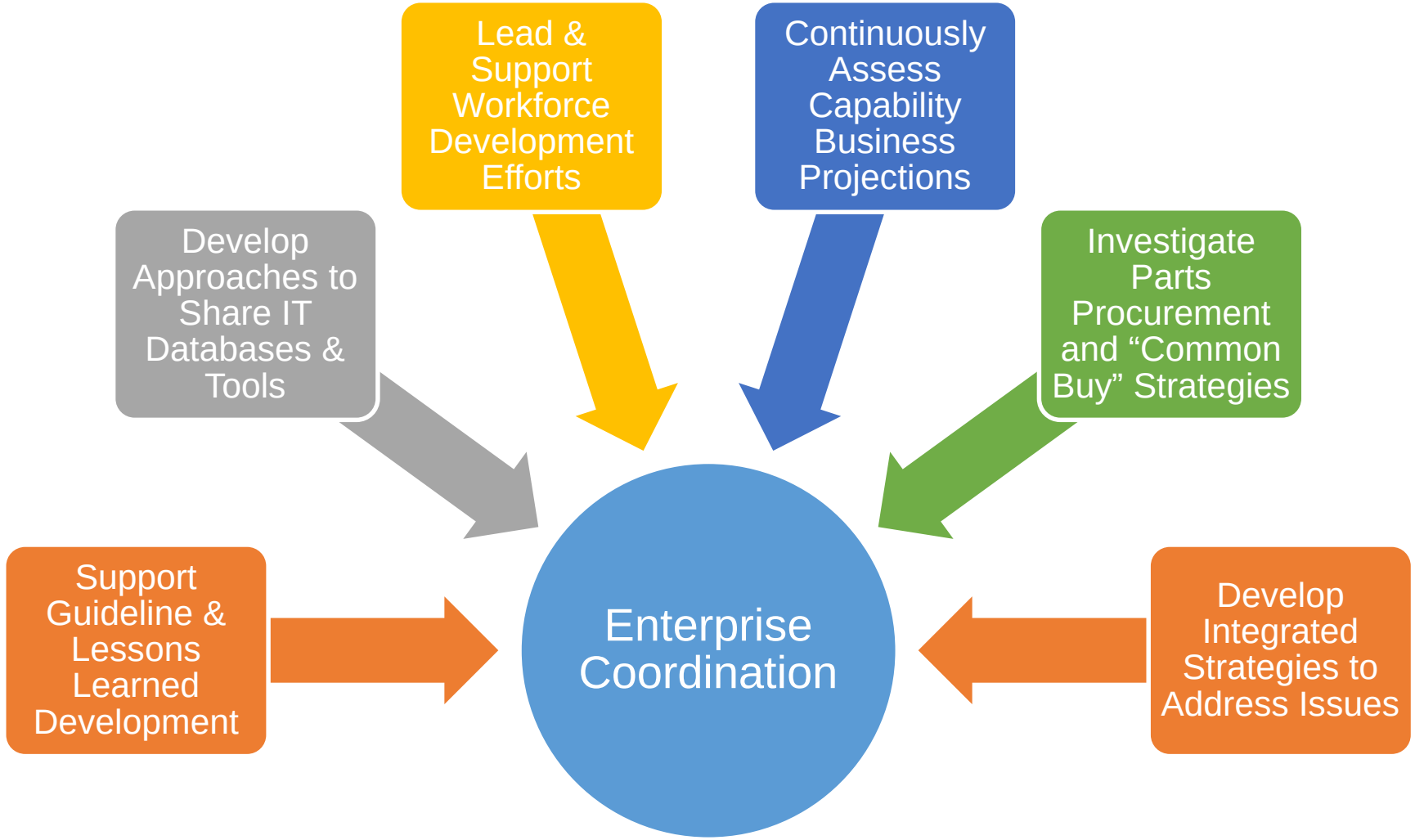
Highlights of Ongoing EEEE Parts Management Efforts

Agency & Cross-Center Activity Highlights



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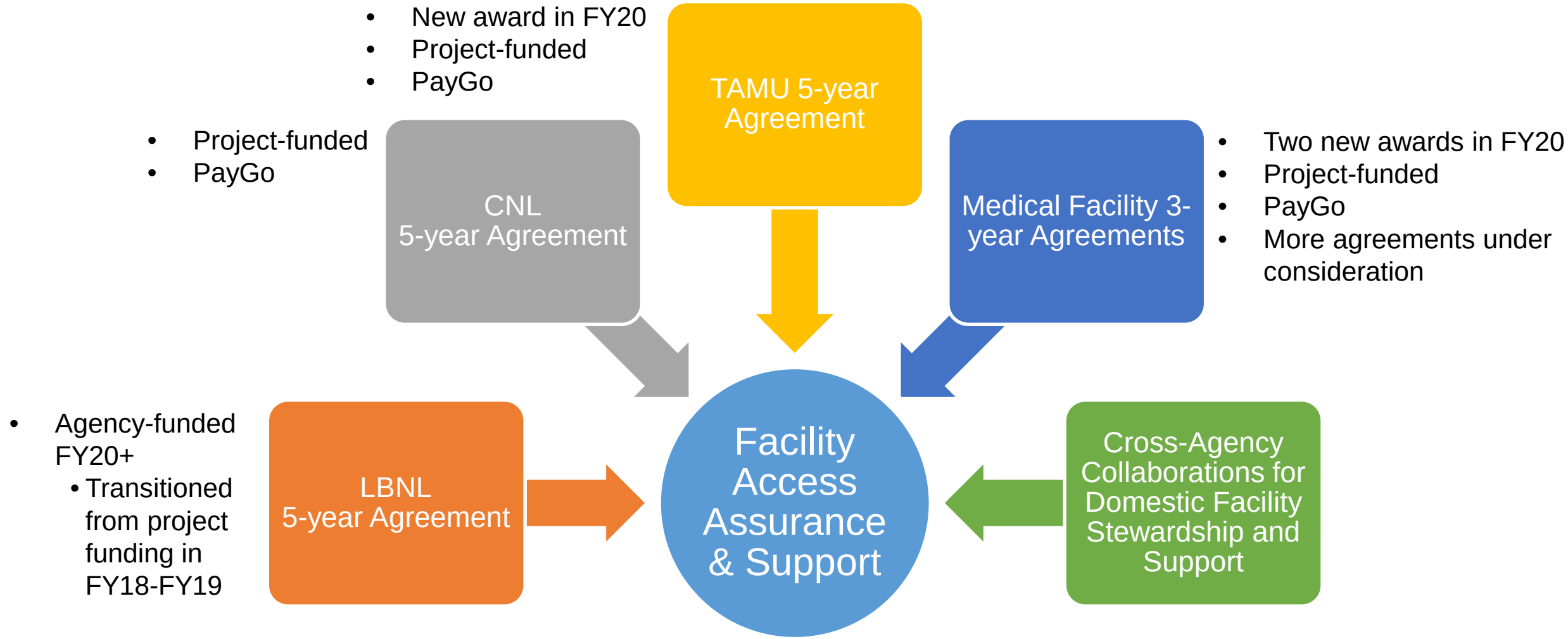
Changing Radiation Test Facility Landscape & Radiation Block Buy

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



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Interagency Partnerships and Whole-of-Government Efforts

Microelectronics Workforce Development & Technology Characterization

General Interagency Collaboration Categories

Radiation Effects and Radiation-Hardened Microelectronics

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

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

Image Credit: NASA

Acronyms

Abbreviation	Definition
AFRC	Armstrong Flight Research Center
ARC	Ames Research Center
BNL	Brookhaven National Laboratory
CNL	Crocker Nuclear Laboratory
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical
ETW	Electronic Technologies Workshop
FY	Fiscal Year
GRC	Glenn Research Center
GSFC	Goddard Space Flight Center
IT	Information Technology
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
LBNL	Lawrence Berkeley National Laboratory
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
OCE	Office of the Chief Engineer
OSMA	Office of Safety and Mission Assurance
SEE	Single-event effects
SRHEC	Strategic Radiation-Hardened Electronics Council
TAMU	Texas A&M University
TRL	Technology Readiness Level
U.S.	United States (of America)

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