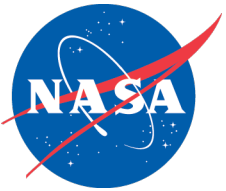


# **NASA EEEE Parts Management – Overview & Status**

Susana Douglas  
Acting NASA Electronic Parts Manager  
NASA Goddard Space Flight Center

NEPP ETW  
June 13, 2022

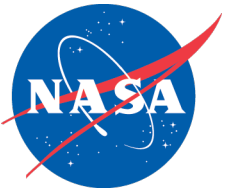
# Acronyms



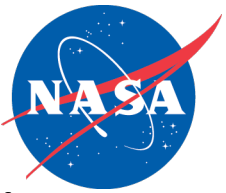
AFRC	Armstrong Flight Research Center
ARC	Ames Research Center
BNL	Brookhaven National Laboratory
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical
ETW	Electronics Technology Workshop
DoD	Department of Defense
FRIB	Facility for Rare Isotope Beams
GRC	Glenn Research Center
GSFC	Goddard Space Flight Center
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSC	Kennedy Space Center
LaRC	Langley Research Center
MDA	Missile Defense Agency
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
NSRL	NASA Space Radiation Laboratory
OCE	Office of Chief Engineer
OCIO	Office of Chief Information Officer
OSMA	Office of Safety and Mission Assurance
SAE	Society of Automotive Engineers
SCALE	Scalable Asymmetric Lifecycle Engagement
SCRM	Supply Chain Risk Management
SDA	Space Development Agency
SEE	Single Event Effects
SOTA	State of the Art
SRH	Strategic Radiation-Hardened
SRHEC	Strategic Radiation-Hardened Electronics Council
TAMU	Texas A&M University
U.S.	United States (of America)
UTC	University of Tennessee Chattanooga

# NASA Parts Management News

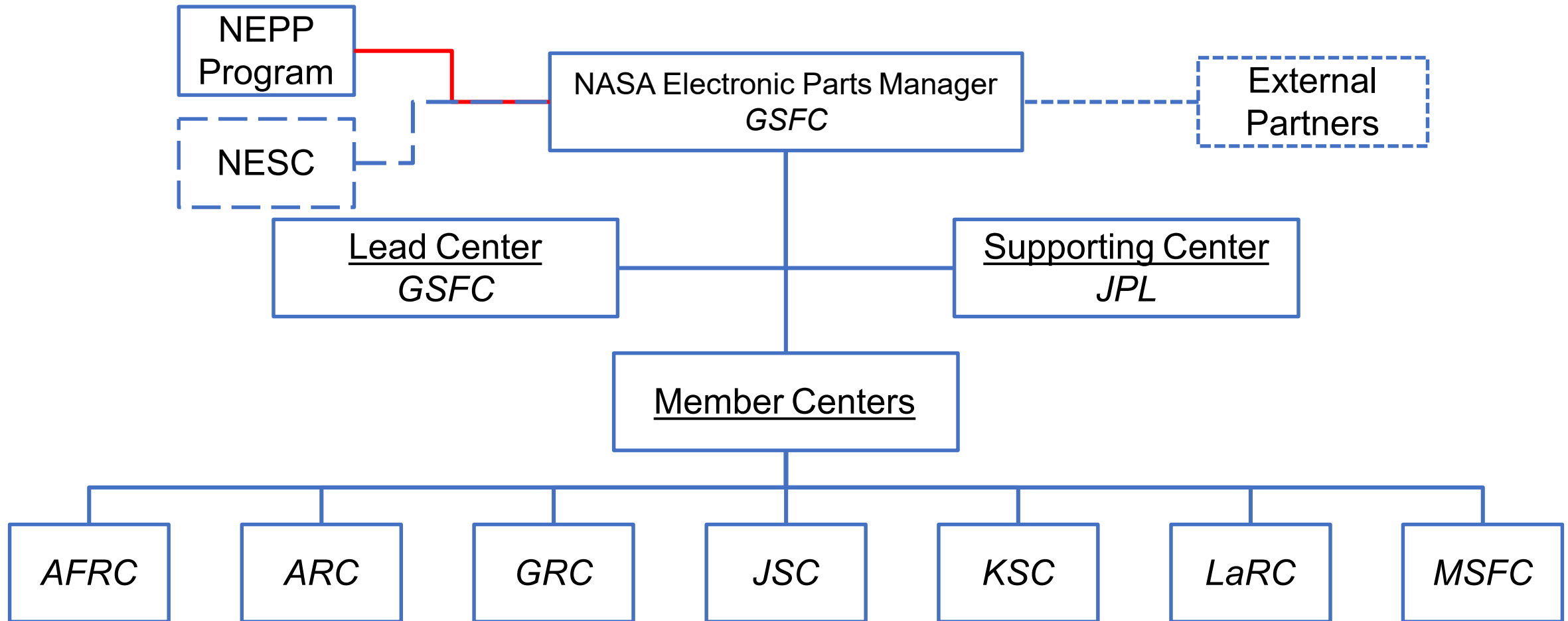


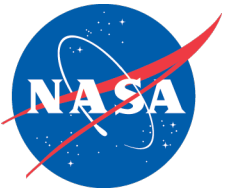
- Congratulations to NASA Electronic Parts Manager, Jonny Pellish, on his Congressional Fellowship with the Brookings Institution!
  - Serving on the U.S. Senate Committee on Commerce, Science, & Transportation
- Susana Douglas serving as Acting NASA Electronic Parts Manager through the 2022 calendar year



# Parts Management Role

- Manage and coordinate EEEE parts and radiation engineering capability and needs for the Agency

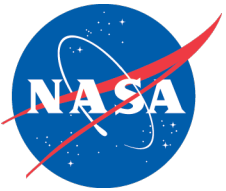




# NASA Documents in Development

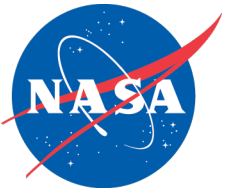
- NASA-STD-8739.11 EEEE Parts Selection, Testing, and Derating Standard in final stages for release this summer
- NESC Recommendations on Use of COTS Electrical, Electronic, and Electromechanical (EEE) Parts for NASA Missions Phase II report also in final stages for release this summer
- NASA Radiation Hardness Assurance Technical Standard beginning development stage complete
  - ❑ Increased scope and activity planned in Q3/Q4, update at ETW
- GSFC Center Handbook for Radiation Risk Assessment in beginning stages of development

# Highlights of Interagency Collaborations



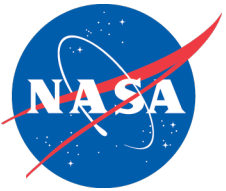
- Implementations for increased access to heavy ion test facilities
- Strategic Radiation-Hardened Electronics Council (SRHEC) Parts Library database functional as of 2021 Q4
  - ❑ Provides DoD common parts database with controlled access to other government agencies
- SRHEC reports for program and technology needs released in 2022 Q2
  - ❑ Provides continued access to SRH and SOTA microelectronics to DoD/U.S. government through identification of technology gaps
- Minimization of EEEE parts lead time impacts to vital MDA and SDA programs through NASA parts transfers via interagency agreements
- DLA reports for supply chain delays provided at JEDEC meetings through information gathered from coordinated data calls

# Radiation Test Facility Efforts



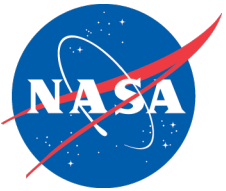
- Continued work both within NASA and through our DoD partners to increase heavy ion SEE test facility capacity and capabilities to address gaps in availability of these facilities
  - ❑ Multi-agency test needs gathered via SHREC working group
  - ❑ Test facility upgrades complete and/or in progress
    - Upcoming heavy ion test facility status by MDA at ETW
  - ❑ Interagency trial test at the MSU FRIB to help develop the facility for future testing needs
  - ❑ Tool development for test facility scheduling and coordination of block buy program
  - ❑ Medical proton facility and laser test usage as “pre-screen” tools
  - ❑ NASA/JPL working to develop SEE test guidelines documents for standardization of test methods and approaches

# Workforce Development



- Mix of aging workforce concerns with increase in entry-level engineers entering the field requires focus on workforce development activities
- Continued success with radiation effects training programs
  - ❑ SEE testing hands-on training for government/industry/university
    - TAMU Bootcamp, NASA/JPL led
    - NSRL Radiation Test Workshop, MDA led
  - ❑ Focus on undergraduate opportunities with the [Scalable Asymmetric Lifecycle Engagement \(SCALE\) program](#) (prior NASA contributions with program development via SRHEC)
- NEPP Parts Engineering School effort kickoff in 2022
  - ❑ Developing groundwork for parts engineering course development
- Training / tutorials scheduled at the end of the last day at NEPP ETW

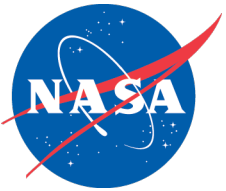




# Supply Chain Delays

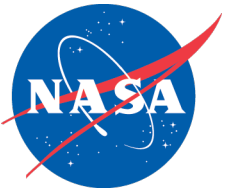
- Significant EEEE parts lead time delays reported in 2021 Q3 and continue to increase for select parts (resistors, microcircuits)
  - ❑ Minor impacts to NASA missions so far (schedule and/or **cost**)
  - ❑ Lead times expected to recover for **some** EEEE parts
    - Highly dependent on manufacturer raw material sourcing and stocking practices/forward planning
    - Specific part types more prone based on package types
- Coronavirus shutdowns and impacts to workforce highlighted weakness in the supply chain
  - ❑ Shipment delays often a significant impact
- Issues also with tooling and indirect materials needed for manufacturing (solvents, chemicals, gases)

# Supply Chain Issues / Lessons Learned



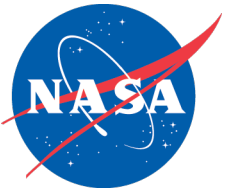
- Dependency on single or limited sources of supply which are primarily offshore are primary cause of current supply chain issues
- Strained sources of supply will incur higher cost to programs
- NASA commercial partners with large inventory programs are least impacted
- Early communication to NASA programs to procure parts early in the program and practice generous sparing philosophy may be helping to minimize impacts to missions
- Communication with manufacturers is key to understanding supply chain risks associated with their product
- Use our relationships with suppliers (manufacturers and distributors) to develop strategies beneficial to all parties in the long term

# U.S. Legislation Driving Forces in EEEE Parts



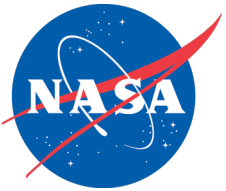
- U.S. government providing incentives to develop on-shore semiconductor manufacturing and research, and supply chain security
  - ❑ [William M. \(Mac\) Thornberry National Defense Authorization Act for Fiscal Year 2021 \(Public Law 116-283\)](#)
    - TITLE XCIX—Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America (Sections 9901 – 9908)
  - ❑ [United States Innovation and Competition Act of 2021](#)
- Additional supply chain security drivers for U.S. government systems:
  - ❑ [National Defense Authorization Act for Fiscal Year 2020 \(Public Law 116-92\)](#)
  - ❑ [Executive Order 14017: America's Supply Chain](#)
  - ❑ [Executive Order 14028: Improving the Nation's Cybersecurity](#)

# NASA Supply Chain Security Efforts



- Established NASA Supply Chain Security Working Group (SCSWG) under the Enterprise Protection Program, kickoff last month
  - ❑ Members from cross agency offices and mission directorates
  - ❑ Focus on promoting security of NASA supply chain processes
- NASA HQ hosted a Supply Chain Integrity Month event in April
  - ❑ NASA OCIO and EEEE Parts held a panel discussion on the NASA SCRM Proactive Supplier Engagement Process (PSEP)
    - Analog Devices 1st supplier to complete full process for risk assessment of parts catalog
- NASA Supply Chain Insight Central (SCIC) platform for tracking and managing supply chain issues
  - ❑ New module for management of Critical At-Risk Industrial Technology List (CARITL)

# Summary



- Continue to establish processes and infrastructure to address the needs of the space parts and radiation engineering community through cooperative work both among NASA internal stakeholders and our external partners
  - ❑ Interagency collaborations and sharing of knowledge and tools for sustainment and growth in the areas of
    - supply chain risk management and risk reduction efforts
    - new technology development and qualification activities
    - radiation test facility increased access
    - workforce development
  - ❑ Consolidate efforts when feasible and appropriate