



# NASA Electronic Parts and Packaging (NEPP) Program 2022 Electronics Technology Workshop (ETW)

## Government Working Group (GWG) Update

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# Acronyms

ARP	Aerospace Recommended Practice	NEPP	NASA Electronics Parts and Packaging
AS	Aerospace Standard	NRO	National Reconnaissance Office
ATM	Advanced Technology Microcircuits	NSWC	Naval Surface Warfare Center
CE-11	SAE Component Parts Committee	Pb	Lead
CE-12	SAE Solid State Devices Committee	PCN	Product Change Notice
CMP	Chemical Mechanical Planarization	PDA	Percent Defective Allowable
COTS	Commercial Off The Shelf	PEMs	Plastic Encapsulated Microcircuits
DLA	Defense Logistics Agency	PIDTP	Package Integrity Demonstration Test Plan
DPA	Destructive Physical Analysis	PMWG	Parts Management Working Group
DSPO	Defense Standardization Program Office	QML	Qualified Manufacturer List
EP	Engineering Practice	QPL	Qualified Products List
ESA	European Space Agency	Rev.	Revision
ETW	Electronics Technology Workshop	SAE	Society of Automotive Engineers
FOD	Foreign Object Debris	SMC	Space and Missile Center
GWG	Government Working Group	SME	Subject Matter Expert
HWG	Hybrid Working Group	TM	Test Method
JEDEC	Joint Electronics Device Council		
JPL	Jet Propulsion Laboratory		
MCM	Multi-Chip Module		
MDA	Missile Defense Agency		
MELF	Metal Electrode Leadless Face		
MIL-PRF	Military Performance Specification		
MIL-STD	Military Standard		
MSFC	Marshall Space Flight Center		
NASA	National Aeronautics and Space Administration		
NEPAG	NASA Electronic Parts Assurance Group		



# GWG was established in January 2017

## Purpose

- Discuss in detail topics that flow down from NEPAG which require technical solutions.
- Support parts assurance and reliability focused NEPP, NEPAG, & HWG initiatives.

## Objective

- Establish a one government stance to both terrestrial and space programs as applicable.

## Community

- Chaired by Kathy Laird/NASA-MSFC and Christian Schuler/NSWC Crane.
- Attendees represent 7 government agencies: Air Force (SMC & Wright Patterson), Army, DLA, MDA, NASA Centers, Navy, and NRO/Aerospace Corporation.

*GWG has held 121 meetings since inception.*

# 2021-22 GWG Activity Summary

## Technical Support

- Radiography Requirements Continuous Improvement
- HWG Support
- Thinning metallization DPA requirements (for CMP processes)
- Supply chain shortage awareness and discussion.
- Remote Audit & Inspection Support Options

## JEDEC/SAE Support

JEDEC/SAE CE-11/12 Virtual Meeting Preparation, action item review and prioritization.

Radiography continuous improvement: CE-12 Space Subcommittee presentation

- SAE NAVAIR QPL Qualifying Activity SAE Specs
- Relifing
- WCCA Questionnaire and Gov agency input
- Mil PRF-38534/38535 Definitions

## Guidelines & Specification Support

- Guidelines, Specifications, & EP Study Draft Release Reviews

***GWG has provided dedicated support for more than 30 topics since last ETW meeting.***

# Technical Support Details

- **Radiography Requirements Continuous Improvement**

- ✓ Supporting a continuous improvement effort to incorporate best practices language into the MIL-STDs to aid in the identification of rejectable anomalies such as FOD and voiding. This year we discussed and compiled several examples of x-ray concerns from various programs for presentation at JEDEC.

- **Remote DLA Audit & Inspection Support Options (Covid-19 Impacts)**

- ✓ Captured and reviewed lessons learned from actual virtual audits with two DLA MIL-PRF-19500 manufacturing facilities.
- ✓ Reviewed and discussed potential hardware to assist in virtual audits.

- **Hybrid Working Group (HWG) Support**

- ✓ Non-destructive Wire-bond testing
- ✓ WCCA requirements / Lot Homogeneity discussion

- **Thinning metallization DPA requirements (for CMP processes)**

- ✓ Review of details for MIL-STD-883 TM2018 compliance.
- ✓ Confirmed TM does allow for CMP process alternate method of inspection.
- ✓ DLA actually reviewed and approved the specific alternate method.

- **Supply chain shortage awareness and discussion.**

- ✓ Various including He, Fluke safety alert, Kr-85, etc...

# JEDEC/SAE Support Details

- **JEDEC/SAE CE-11/12 Virtual Meeting Preparation**

- ✓ Summarized topics of interest and outstanding NEPAG, GWG, and HWG action items for group review and discussion.
- ✓ Presented a summary of radiographic escapes that GWG users have experienced on their programs at the January 2022 CE-12 Space Subcommittee. Our goal was to inform the JEDEC/SAE community of the problems the government still sees and to invite comment / feedback to improve our radiographic standards and practices. Thanks to Jerry Martinez (NASA JPL) for help with the presentation.

- **SAE / NAVAIR Wire Specifications and Qualification**

- ✓ Discussion of SAE's intention to qualify non-us wire sources has the GWG concerned about possible discrepancies for US military requirements. This is an ongoing development and GWG has been monitoring the status of these discussions and proposed changes throughout the year.

- **Relifing Parts**

- ✓ CE-12 asked the GWG to discuss unacceptable "relifing" requests from customers/programs. These requests often have a 5yr or less time requirement after assembly. Currently no relifing requirements are in the MIL-PRF documents GWG reviewed a recently updated document that address relifing for ESA, and some of the material could be used for military specs. GWG recommended the best place to discuss this was in a CE-12 task group.



## JEDEC/SAE Support Details (cont.)

- **WCCA Questionnaire**

- ✓ JC-13.5 (Hybrids subcommittee) action for GWG to create a less complex questionnaire regarding Worst Case Circuit Analysis (WCCA) required by MIL-PRF-38534. The HWG did the heavy lifting on this task! DLA distributed the questionnaire in Dec 2021 and compiled the comments. Comments were discussed at the GWG in March 2022.

- **Mil PRF-38534/38535 Definitions**

- ✓ JC-13.2 (ICs subcommittee) action for GWG to provide input on what needs changed.
- ✓ 13.2 closed their task group and provided their recommended changes to MIL-PRF-38535
- ✓ GWG provided the government's agreed wording to both DLA and 13.5 on clarified language for MIL-PRF-38534.
- ✓ Provided interim guidance to DLA on the Gov. position, until spec updates can be sent out in draft.
- ✓ Expect this to be discussed in Sept JEDEC 13.5 subcommittee.

# Guidelines & Specification Support Details

## GUIDELINES:

- DSPO PMWG COTS Checklist was finalized and presented to GWG for comment and feedback.

## STANDARDS:

- MIL-STD-38535 Rev M Draft review
- MIL-PRF-19500/746 second supplier Radiation Qualification
- MIL-STD-883-2 Ch1 Draft review – especially TM 2017 Internal Visual
- MIL-STD-1285 Notice 4 “Marking of Electrical and Electronic parts”
- MIL-STD-750 TM1001 Barometric Pressure Test Clarifications
- MIL-STD-750-1 TM1080 Worst Case testing
- MIL-STD-750 Rad Hard requirements for Schottky Diodes - Potential new TM

## Engineering Practice Studies (EPS):

- EPS: MIL-DTL-83528 Gasketing Material – Silicone supply shortage
- EPS: MIL-STD-750 TM2076 Radiography
- EPS: MIL-PRF-83726 Hybrid and Solid State Relay – Thermal shock testing requirement
- EPS: MIL-PRF-750-2 TM2074 Internal Visual Inspection

## Continuous Improvement:

- DLA VID program update – Gov concerns and Next-Gen Enhanced Product (NEP)
- MIL-PRF-POLY updated status and discussed concerns
- MIL-PRF-19500 proposal to update RH requirements
- MIL-STD-1580 – providing continuous improvement



# Questions?

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