ESD Control in the NASA STD-8739.6

Presented By: Alvin J Boutte
NASA Workmanship Standards Program Manager
Outline

• S20.20
• NASA S20.20 history
• Overview of NASA STD-8739.6 update
• Features of ESD Controls Section 7
• Conclusion
The ANSI/ESD S20.20

For the Development of an Electrostatic Discharge Control Program for –

Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

Electrically Discharge, Association
760 Zeck Road, Suite 3
Reno, NV 89512

An American National Standard
Approved July 31, 2014

ESD Association Standard for the Development of an Electrostatic Discharge Control Program for –

Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

Approved June 11, 2014
ESD/ESD Association, Inc.

Office of Safety and Mission Assurance
Electrostatic Discharge Association (ESDA) standards and publications are designed to serve the public interest by eliminating misunderstandings between manufacturers and purchasers, facilitating the interchangeability and improvement of products and assisting the purchaser in selecting and obtaining the proper product for his particular needs. The existence of such standards and publications shall not in any respect preclude any member or non-member of the Association from manufacturing or selling products not conforming to such standards and publications. Nor shall the fact that a standard or publication is published by the Association preclude its voluntary use by non-members of the Association, whether the document is to be used either domestically or internationally. Recommended standards and publications are adopted by the ESDA in accordance with the ANSI Patent policy.

Interpretation of ESDA Standards: The interpretation of standards in-so-far as it may relate to a specific product or manufacturer is a proper matter for the individual company concerned and cannot be undertaken by any person acting for the ESDA. The ESDA Standards Chairman may make comments limited to an explanation or clarification of the technical language or provisions in a standard, but not related to its application to specific products and manufacturers. No other person is authorized to comment on behalf of the ESDA on any ESDA Standard.
The ANSI/ESD S20.20

Electrostatic Discharge Association (ESDA) standards and publications are designed to serve the public interest by eliminating misunderstandings between manufacturers and purchasers, facilitating the interchangeability and improvement of products and assisting the purchaser in selecting and obtaining the proper product for his particular needs. The existence of such standards and publications shall not in any respect preclude any member or non-member of the Association from manufacturing or selling products not conforming to such standards and publications. Nor shall the fact that a standard or publication is published by the Association preclude its voluntary use by non-members of the Association, whether the document is to be used either domestically or internationally. Recommended standards and publications are adopted by the ESDA in accordance with the ANSI Patent policy.

Interpretation of ESDA Standards: The interpretation of standards in-so-far as it may relate to a specific product or manufacturer is a proper matter for the individual company concerned and cannot be undertaken by any person acting for the ESDA. The ESDA Standards Chairman may make comments limited to an explanation or clarification of the technical language or provisions in a standard, but not related to its application to specific products and manufacturers. No other person is authorized to comment on behalf of the ESDA on any ESDA Standard.
NASA and the ANSI/ESD S20.20 Timeline


Note: Most findings pre-2010 involve training or not using ANSI/ESD S20.20.

- 2010: NASA recognizes a need to supplement ANSI/ESD S20.20
- 2010: NASA develops and releases NASA HANDBOOK-8739.21

- 2012: NASA begins development of ESD Standard S20.21
- 2014: S20.21 standard changed to TR-19.1 due to ESDA feedback
- 2019: Supplemental ESD Section added to NASA STD-8739.6

Note: Since 2010 the majority of ESD findings were related to confusion around or mis-interpretation of ANSI/ESD S20.20.
Foreword

This NASA-HANDBOOK is published by the National Aeronautics and Space Administration (NASA) to provide standardized guidance for implementing ANSI/ESD S20.20 requirements. This document:

a. Describes basic considerations necessary to ensure ESD protection in work areas to be used with ESD-sensitive items.

b. Reinforces rigorous operator training best practice.

c. May be used by suppliers performing work for NASA to satisfy ANSI/ESD S20.20 ESD implementation plan requirements.

NOTE: For the purpose of this document, the term “supplier” is defined as civil servants and contractors who are building and delivering ESD-sensitive hardware for NASA Projects.
NASA and the ANSI/ESD S20.20 Timeline

Note: Since 2010 the majority of ESD findings were related to confusion around or mis-interpretation of ANSI/ESD S20.20.

2002  
NASA-STD-8739.7 replaced with ANSI/ESD S20.20-1999

Note: Most findings pre-2010 involve training or not using ANSI/ESD S20.20.

2010  
NASA recognizes a need to supplement ANSI/ESD S20.20

2012  
NASA develops and releases NASA HANDBOOK-8739.21

NASA begins development of ESD Standard S20.21

2014  
S20.21 standard changed to TR-19.1 due to ESDA feedback

NASA development of ANSI/ESD TR-19.1 falls apart

2017  
Supplemental ESD Section added to NASA STD-8739.6

2019  

Note: Since 2010 the majority of ESD findings were related to confusion around or mis-interpretation of ANSI/ESD S20.20.
QAAR ESD Findings History

**QAAR Audit Findings 2011-2018**
- S20.20: 52%
- Local Document: 48%

**Breakdown of S20.20 Findings**
- No ESD PM/Doc.: 35%
- Mat./Req. Verification: 24%
- Local Control Plan Issues: 17%
- Training: 10%
- Signage: 14%
Current Use of ANSI/ESD S20.20 at NASA
Future Use of ANSI/ESD S20.20 at NASA
What’s new?

5. TRAINING REQUIREMENTS

This section supersedes the Section 5 requirements of NASA Standards 8739.1, 8739.4, and 8739.5.

5.1 General Training

5.1.1 This section:

a. Establishes the training requirements for instructors.

7. ELECTROSTATIC DISCHARGE CONTROL STANDARD IMPLEMENTATION

7.1 Applicable ESD Standards

<table>
<thead>
<tr>
<th>Requirements for Soldered Electrical and Electronic Assemblies</th>
<th>IPC® J-STD-001G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space and Military Applications Electronic Hardware Addendum to IPC® J-STD-001G Requirements for Soldered Electrical and Electronic Assemblies</td>
<td>IPC® J-STD-001GS</td>
</tr>
<tr>
<td>Requirements and Acceptance for Cable and Wire Harness Assemblies</td>
<td>IPC® IPC/WHMA-A-620C</td>
</tr>
<tr>
<td>Space Applications Electronic Hardware Addendum to IPC/WHMA-A-620C, Requirements and Acceptance for Cable and Wire Harness Assemblies</td>
<td>IPC® IPC/WHMA-A-620C-S</td>
</tr>
</tbody>
</table>
Appendix A requirements moved to Section 5

APPENDIX A. REQUIREMENTS FOR WORKMANSHIP STANDARDS TRAINING PROGRAMS

A.1 General

A.1.1 This section:

a. Establishes the training requirements for workmanship operators, inspectors, and instructors.

b. Establishes the certification requirements for instructors who teach on behalf of a NASA Center’s SMA of training.

5. TRAINING REQUIREMENTS

This section supersedes the Section 5 requirements of NASA Standards 8739.1, 8739.4, and 8739.5.

5.1 General Training Requirements

5.1.1 This section:

a. Establishes the training requirements for workmanship operators, inspectors, and instructors.
# Updated Voluntary Consensus Standards

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements for Soldered Electrical and Electronic Assemblies</td>
<td>IPC® J-STD-001G</td>
</tr>
<tr>
<td>Space and Military Applications Electronic Hardware Addendum to IPC® J-STD-001G Requirements for Soldered Electrical and Electronic Assemblies</td>
<td>IPC® J-STD-001GS</td>
</tr>
<tr>
<td>Requirements and Acceptance for Cable and Wire Harness Assemblies</td>
<td>IPC® IPC/WHMA-A-620C</td>
</tr>
<tr>
<td>Space Applications Electronic Hardware Addendum to IPC/WHMA-A-620C, Requirements and Acceptance for Cable and Wire Harness Assemblies</td>
<td>IPC® IPC/WHMA-A-620C-S</td>
</tr>
</tbody>
</table>
Approved Solvents and Cleaners

NASA STD 8739.4 - 2011

6.9.2 Acceptable Solvents. The following solvents are acceptable when used for cleaning connectors, hardware, and other materials and parts in cables and harnesses. Other solvents require approval of the procuring activity prior to use.


b. Isopropyl alcohol, TT-I-735.

Table 6-1: Solvent and Cleaners

<table>
<thead>
<tr>
<th>Solvents and Cleaners</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl Alcohol</td>
<td>Per Federal Regulation 27 CFR Part 21, Subpart.35, Formula No. 3-A</td>
</tr>
<tr>
<td>Isopropyl Alcohol</td>
<td>TT-I-735A</td>
</tr>
<tr>
<td>Deionized Water</td>
<td>1 megohm-cm, minimum resistivity (See paragraph 6.9.8)</td>
</tr>
<tr>
<td>Detergent cleaners and saponifiers</td>
<td>(See paragraph 6.9.9)</td>
</tr>
</tbody>
</table>
6.7 Solvents and Cleaning

6.7.1 Deionized water and isopropyl alcohol are considered standard solvents and do not require approval prior to use for cleaning printed circuit boards, printed wiring assemblies, or soldered contacts, terminals, or splices. All other solvents require prior approval from the applicable NASA Technical Authority.
Addition of Section 7 ESD Control Requirements

7. ELECTROSTATIC DISCHARGE CONTROL STANDARD IMPLEMENTATION

7.1 Applicable ESD Standard

ANSI/ESD S20.20-2014 contains the baseline requirements.

ANSI/ESD S20.20-2014 requires the development of a Program Plan that serves as the principle document for ESD implementation activities.

ESD Product Qualification test data generated by manufacturers in accordance with ESDA product qualification test methods and used in qualification, analysis, and performance of NASA Centers as a part of their ESD Product Qualification.

Table 3. Summary of the ESD Control Verification Values

<table>
<thead>
<tr>
<th>#</th>
<th>ESD Control</th>
<th>Verification Values (Alternate Test Methods)</th>
<th>Recommended Verification Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work Surface Resistance</td>
<td>$10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S4.1)</td>
<td>Continuous Daily Monthly Biannual Annual</td>
</tr>
<tr>
<td>2</td>
<td>Work Surface Grounding</td>
<td>$10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S4.1)</td>
<td>×</td>
</tr>
<tr>
<td>3</td>
<td>Protective Floor Resistance</td>
<td>If Dissipative: $10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S7.1)</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If Conductive: $&lt; 10^6 \Omega$ (ANSI/ESD S7.1)</td>
<td>×</td>
</tr>
<tr>
<td>4</td>
<td>Protective Floor Grounding</td>
<td>If Dissipative: $10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S7.1)</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If Conductive: $&lt; 1 \Omega$ (ANSI/ESD S7.1)</td>
<td>×</td>
</tr>
</tbody>
</table>
## Clarified Technical Requirements

### 7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

1. **7.2.4.1.1** The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $<10^9 \Omega$. See Table 3, #1 for alternative verification methods.

   *Note: This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.*

2. **7.2.4.1.2** The resistance from the center of the work surface to the common point ground shall be $10^6$ to $<10^9 \Omega$. See Table 3, #2 for alternative verification methods.

3. **7.2.4.1.3** When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.

   *Note: Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.*
**Clarified Technical Requirements**

### 7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.4.1.1</td>
<td>The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $&lt;10^9\Omega$. See Table 3, #1 for alternative verification methods.</td>
</tr>
</tbody>
</table>

*Note: This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.*

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.4.1.2</td>
<td>The resistance from the center of the work surface to the common point ground shall be $10^6$ to $&lt;10^9\Omega$. See Table 3, #2 for alternative verification methods.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2.4.1.3</td>
<td>When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.</td>
</tr>
</tbody>
</table>

*Note: Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.*
Clarified Technical Requirements

7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

7.2.4.1.1 The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $10^9\Omega$. See Table 3, #1 for alternative verification methods.

*Note: This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.*

7.2.4.1.2 The resistance from the center of the work surface to the common point ground shall be $10^6$ to $10^9\Omega$. See Table 3, #2 for alternative verification methods.

7.2.4.1.3 When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.

*Note: Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.*
Clarified Technical Requirements

7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

7.2.4.1.1 The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $<10^9 \Omega$. See Table 3, #1 for alternative verification methods.

*Note: This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.*

7.2.4.1.2 The resistance from the center of the work surface to the common point ground shall be $10^6$ to $<10^9 \Omega$. See Table 3, #2 for alternative verification methods.

7.2.4.1.3 When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.

*Note: Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.*
Clarified Technical Requirements

7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

7.2.4.1.1 The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $<10^9 \Omega$. See Table 3, #1 for alternative verification methods.

**Note:** This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.

7.2.4.1.2 The resistance from the center of the work surface to the common point ground shall be $10^6$ to $<10^9 \Omega$. See Table 3, #2 for alternative verification methods.

7.2.4.1.3 When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.

**Note:** Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.
Clarified Technical Requirements

7.2.4.1 Work Surfaces

Work surfaces in EPAs are those that will be used to physically host the ESDS item and may be used as a ground path for items that can be grounded but do not contain a Groundable Point (Gp). The work surface shall meet the following requirements:

7.2.4.1.1 The resistance of work surface where ESDS items are handled shall be in the dissipative range, from $10^6$ to $<10^9\Omega$. See Table 3, #1 for alternative verification methods.

*Note: This should be measured between two points 10” apart on the Work Surface and 2” from the edge in the commonly used area.*

7.2.4.1.2 The resistance from the center of the work surface to the common point ground shall be $10^6$ to $<10^9\Omega$. See Table 3, #2 for alternative verification methods.

7.2.4.1.3 When conductive surfaces must be used as an ESD work surface, control methods to prevent an ESD event shall be documented by the ESD Control Program Plan.

*Note: Conductive surfaces, grounded or ungrounded, can enable ESD events to occur.*
<table>
<thead>
<tr>
<th>#</th>
<th>ESD Control</th>
<th>Verification Values (Alternate Test Methods)</th>
<th>Continuous</th>
<th>Daily</th>
<th>Monthly</th>
<th>Biannual</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work Surface Resistance</td>
<td>$10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S4.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Work Surface Grounding</td>
<td>$10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S4.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Protective Floor Resistance</td>
<td>If Dissipative: $10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S7.1)&lt;br&gt;                     If Conductive: $&lt; 10^6 \Omega$ (ANSI/ESD S7.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Protective Floor Grounding</td>
<td>If Dissipative: $10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S7.1)&lt;br&gt;                     If Conductive: $&lt; 1 \Omega$ (ANSI/ESD S7.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Wrist Strap Check</td>
<td>Go/No Go functional check</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Wrist Strap Resistance range</td>
<td>From $800k\Omega$ to $1.2M\Omega$ per <em>ANSI/ESD S20.20-2014</em>&lt;br&gt;(ANSI/ESD S1.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Wrist Strap Ground Point Resistance</td>
<td>$&lt; 1 \Omega$ or $&lt; 1.2 \times 10^6 \Omega$ if measured through a CMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Foot Grounding Device Integrity</td>
<td>$&lt; 3.5 \times 10^7 \Omega$ (ANSI/ESD STM97.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>ESD CMS</td>
<td>Calibration is required</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Stool / Chair Grounding</td>
<td>$10^6$ to $&lt; 10^9 \Omega$ (ANSI/ESD S12.1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.2.1 General ESD Control Program Plan Requirements

7.2.1.1 The baseline ESD Control Program Plan shall be fully traceable to ANSI/ESD S20.20-2014 and the requirements herein.

7.2.1.2 Tailoring is permitted, as the requirements in Section 7 of this document may not be applicable in all situations. Tailoring is accomplished by evaluating the applicability of, or the risk of not implementing, a requirement for a specific application or scenario (e.g., mission class, R&D project, facility limitations, etc.). Upon completion of the evaluation, requirements may be deleted or modified outside the limits of this standard for technical or logistical reasons with ESD Control Program Manager approval. Tailoring decisions shall be documented in the ESD Control Program Plan and include rationale, risk assessments, and technical justifications.
ESD Control Plan Requirements

7.2.3 Baseline ESD Control Program Plan Requirements

7.2.3.1 The Certification, Recertification, and Compliance Verification Plan requirements of ANSI/ESD S20.20-2014 apply with the following additions and modifications:

7.2.3.1.1 The ESD Control Program Plan shall define the baseline sensitivity level addressed by the EPA requirements (e.g., HBM 1A) as well as any other EPA sensitivity levels considered to be within the scope of the plan (e.g., HBM 1B, HBM 0, CDM C1).

7.2.3.1.2 The ESD Control Program Plan shall define the criteria for when ESDS hardware is to be handled within a certified EPA (e.g., mission risk class, R&D status, commercial off-the-shelf ground support equipment, etc.).

7.2.3.1.3 All EPA certifications shall be performed by the ESD Control Program Manager, or their representative.
Certified ESD Control Program Manager

7.2.2.1 Personnel Training and Certification

7.2.2.1.1 The ESD Control Program Manager shall have formal training in:

(a) the technical requirements in Chapter 8 of ANSI/ESD S20.20-2014

(b) static charge prevention and mitigation methods for operators and EPAs

(c) processes for certification and verification of ESD control materials and ESD protected areas

Note: ESDA, iNARTE, or other third-party ANSI/ESD S20.20 training courses are recommended to meet this requirement. This may also be accomplished via documented on-the-job training.
The ANSI/ESD S20.20

ANSI/ESD S20.20-2014

CAUTION NOTICE

Electrostatic Discharge Association (ESDA) standards and publications are designed to serve the public interest by eliminating misunderstandings between manufacturers and purchasers, facilitating the interchangeability and improvement of products and assisting the purchaser in selecting and obtaining the proper product for his particular needs. The existence of such standards and publications shall not in any respect preclude any member or non-member of the Association from manufacturing or selling products not conforming to such standards and publications. Nor shall the fact that a standard or publication is published by the Association preclude its voluntary use by non-members of the Association, whether the document is to be used either domestically or internationally. Recommended standards and publications are adopted by the ESDA in accordance with the ANSI Patent policy.

Interpretation of ESDA Standards: The interpretation of standards in-so-far as it may relate to a specific product or manufacturer is a proper matter for the individual company concerned and cannot be undertaken by any person acting for the ESDA. The ESDA Standards Chairman may make comments limited to an explanation or clarification of the technical language or provisions in a standard, but not related to its application to specific products and manufacturers. No other person is authorized to comment on behalf of the ESDA on any ESDA Standard.
6.2 ESD Control Program Manager or Coordinator
An ESD Control Program Manager or Coordinator shall be assigned by the Organization to verify the compliance of the Program in accordance with the requirements of this document.

7.1 ESD Control Program Plan
The Organization shall prepare an ESD Control Program Plan that addresses each of the requirements of the Program. Those requirements include:

- Training
- Product Qualification
- Compliance Verification
- Grounding / Equipotential Bonding Systems
- Personnel Grounding
- ESD Protected Area (EPA) Requirements
- Packaging Systems
- Marking
Conclusion

• The update to the NASA STD-8739.6 includes:
  – Reorganization of training requirements
  – Adoption of most recent revisions of J-STD001GS and IPC/WHMA-A-620C-S
  – Re-addition of denatured ethyl alcohol as a standard solvent
  – Administrative and technical ESD requirements to supplement ANSI/ESD S20.20 and clarify commonly misunderstood requirements
Questions