

**Conference on Quality in the Space and  
Defense Industries  
March 2009**

**- Quality Threats -**

**There is Nothing Voluntary about  
Voluntary Consensus Standards**

Brian Hughitt  
NASA Headquarters  
Office of Safety & Mission Assurance

Breaking News

Dow Climbs Almost 400 Points on Good News About Citigroup's Profits

Technology & Science

Home > Technology & Science

# NASA Satellites Get 'Counterfeit' Parts; Taxpayers Pay

Agency Chief Says Suppliers Sometimes Skip Safety Tests

By NED POTTER  
March 7, 2009



15 comments

Maybe it was something he didn't mean to say. Or maybe NASA has a problem.



At a House subcommittee hearing on NASA's cost overruns, the agency's acting administrator, Christopher Scolese, was

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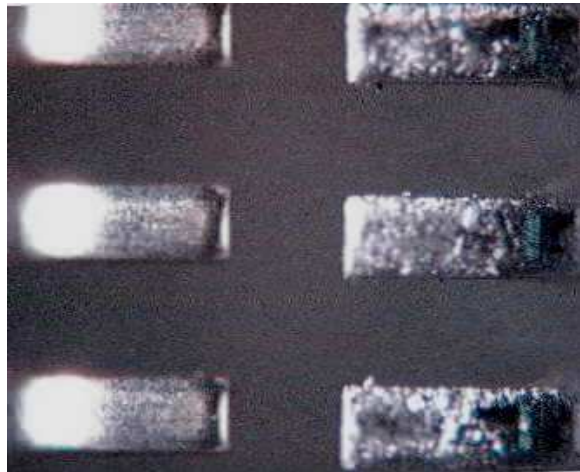


WATCH: Facebook and Myspace Dominate E-Mail

# Counterfeit Electronic Parts

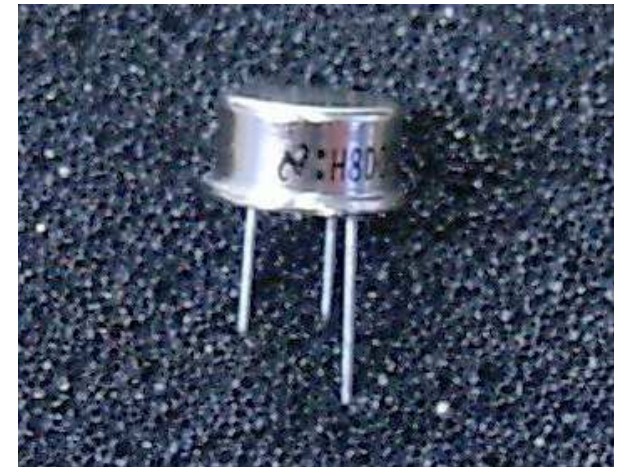


New versus Refurbished leads

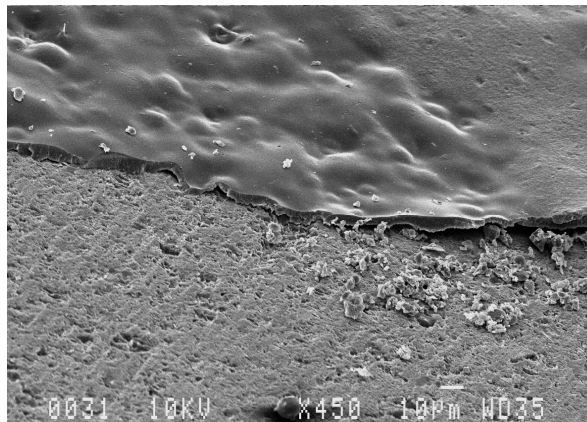


National Semiconductor does not use “ : ” in part numbers

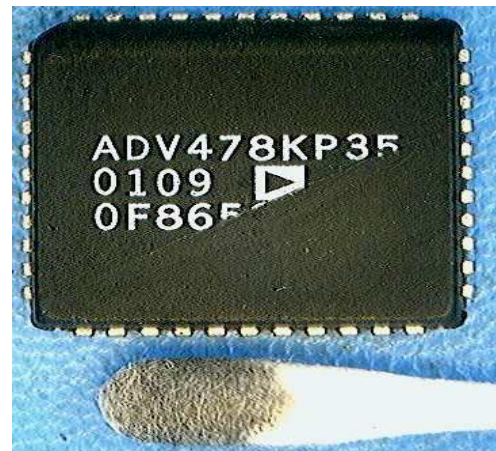
Dual Markings



Backtop peeling away. Sand marks evident



Acetone Swipe



Missing Serial Number





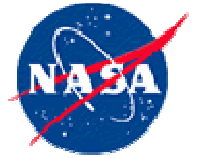


Workers extract plastics from discarded electronics in Guiyu, a few hours' drive northeast of Hong Kong. The city has 5,500 family workshops handling e-waste.  
© 2006 The Seattle Times Company

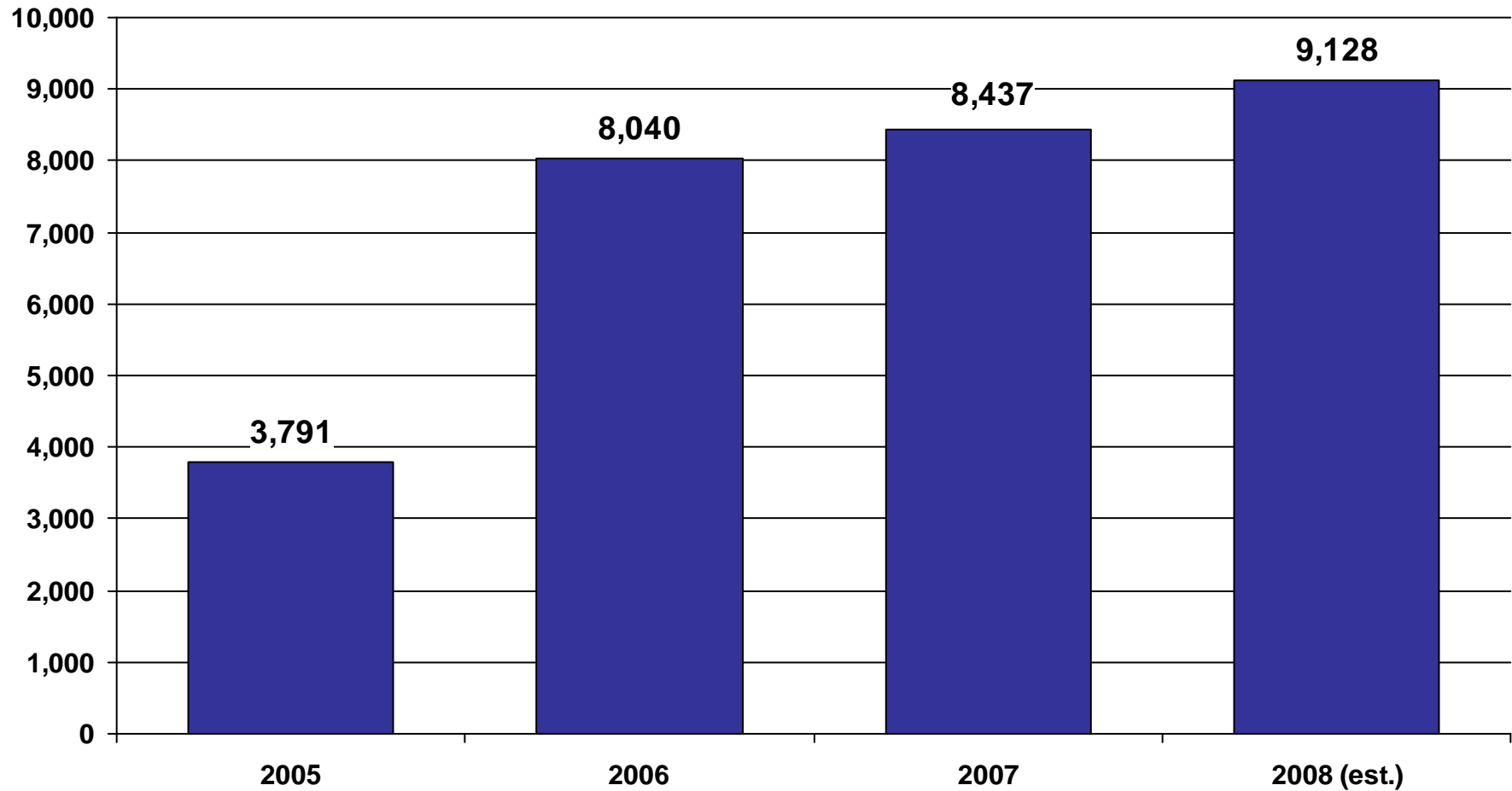


Laborer de-soldering circuit boards over a coal-fired grill. Rock in the box is where boards are hit to remove solder. Pliers are used to pluck off chips which go into various buckets. The boards are then tossed into a pile for open burning. © BAN

# Scope / Magnitude of Counterfeiting



## Total EEE Counterfeit Incidents: 2005-2008

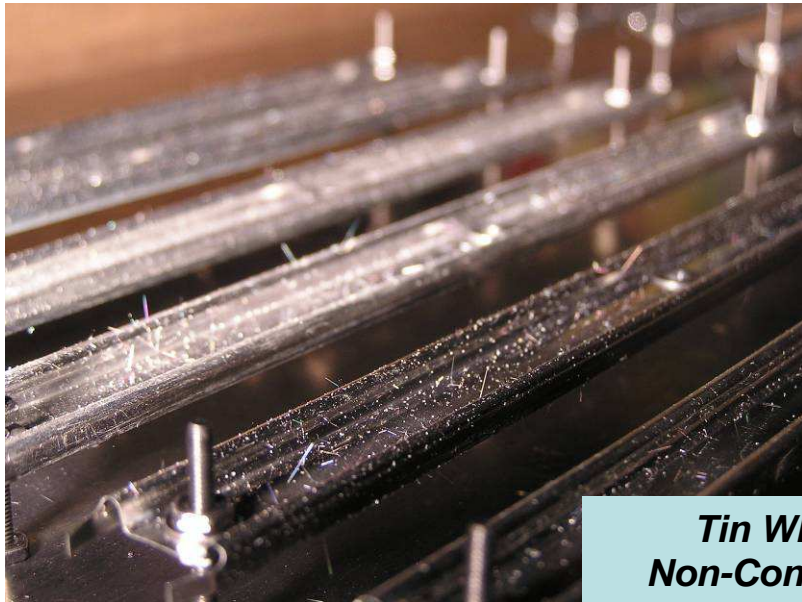
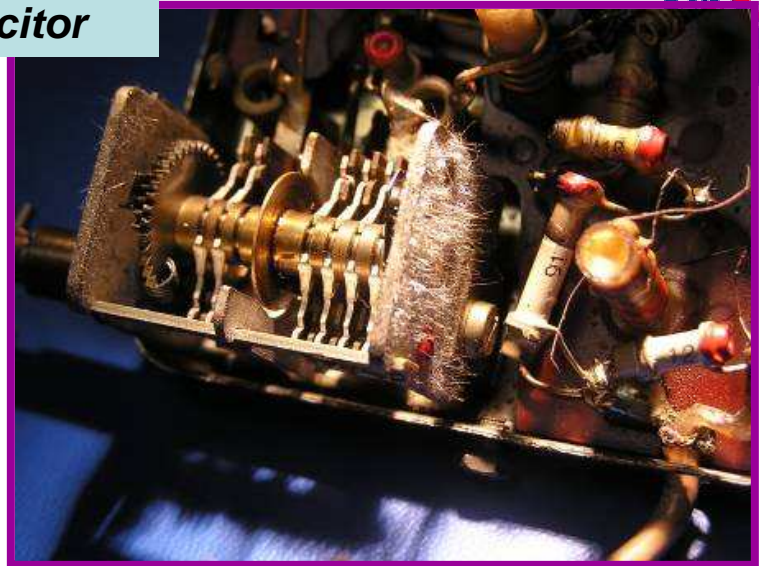


US Department of Commerce  
Preliminary Data, Nov 2008

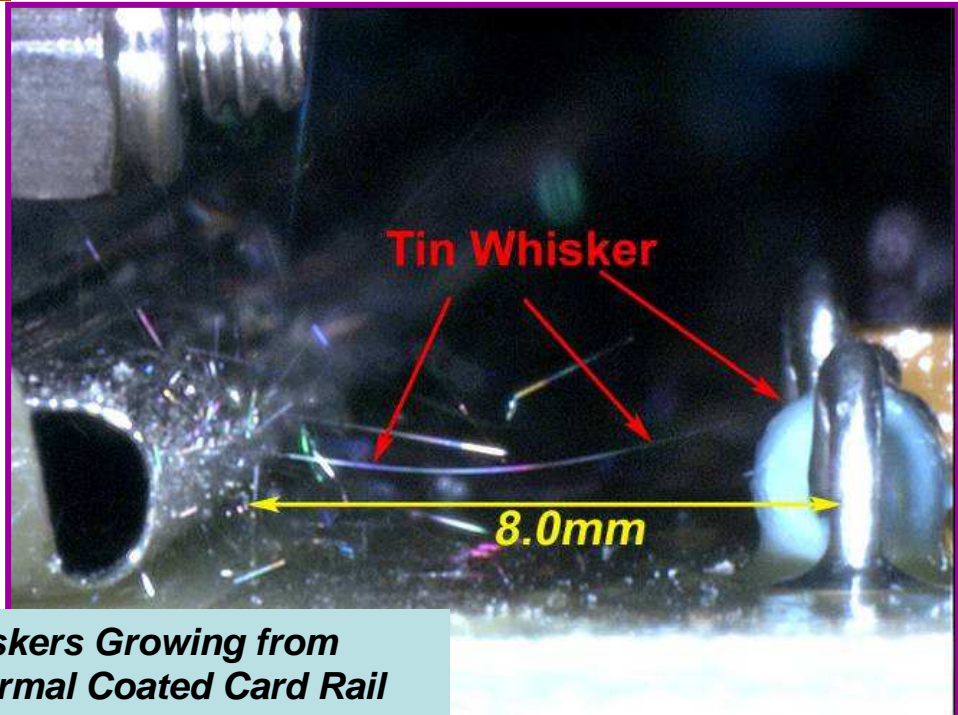




**Tin Whiskers on 1960's Era  
Variable Air Capacitor**



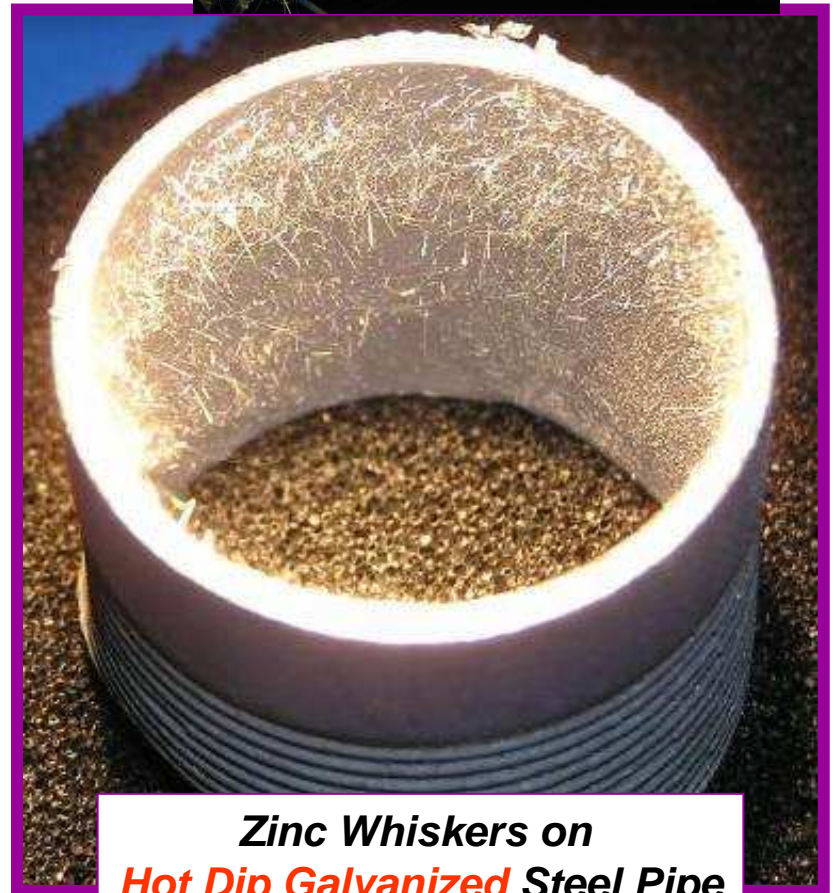
**Tin Whiskers Growing from  
Non-Conformal Coated Card Rail**



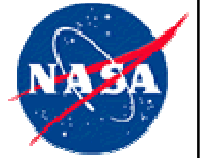




***Tin Whisker on Electromagnetic Relay  
Shorting Terminal to Case***

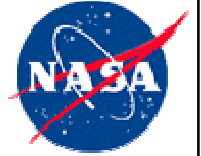


***Zinc Whiskers on  
Hot Dip Galvanized Steel Pipe***



# How to counter quality threats?



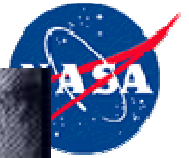


**Synergy: a mutually advantageous  
conjunction or compatibility of distinct  
business participants**

**Merriam-Webster's  
Collegiate Dictionary-  
Eleventh Edition**



## OFFICE OF MANAGEMENT AND BUDGET



### CIRCULAR NO. A-119

#### MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

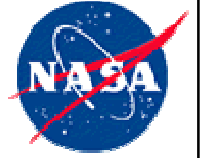
SUBJECT: Federal Participation in the Development and Use of Voluntary  
Consensus Standards and in Conformity Assessment Activities

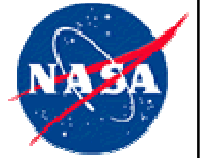
Your agency must use **voluntary consensus standards** in its regulatory and procurement activities in lieu of government-unique standards unless use of such standards would be inconsistent with applicable law or otherwise impractical.

- (1) "Use" means incorporation of a standard in whole, in part...
- (2) "Impractical" includes circumstances in which such use would fail to serve the agency's program needs; would be infeasible; would be inadequate, ineffectual, inefficient, or inconsistent with agency mission; or would impose more burdens, or would be less useful.



# US Code of Federal Regulations

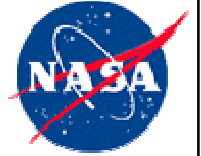




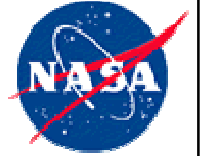
**Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives.**

**William A. Foster**





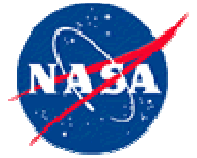
**Break for special topics sessions**



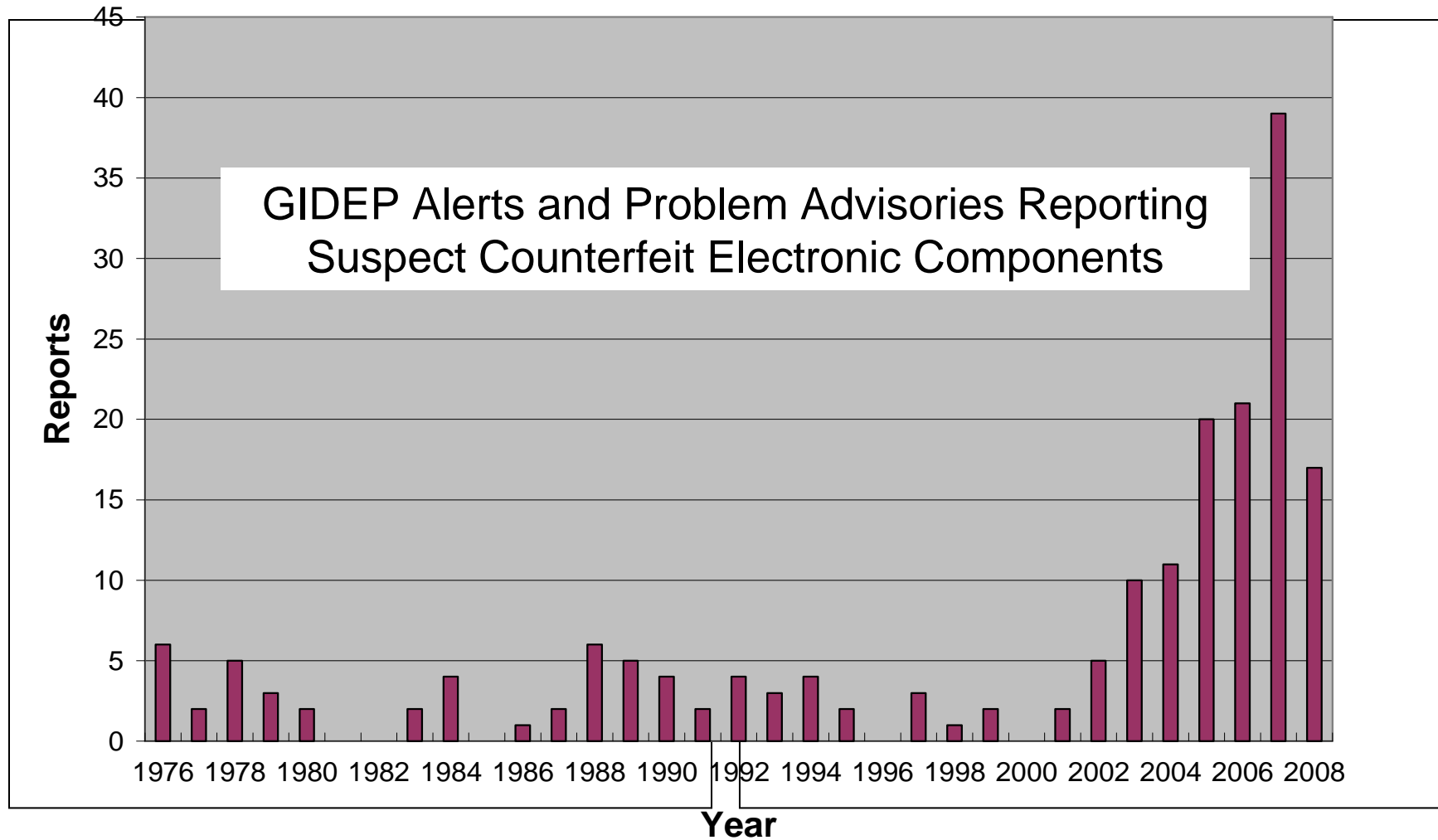
## **BusinessWeek Video Clip**

**[http://www.businessweek.com/magazine/content/08\\_41/b4103034193886.htm](http://www.businessweek.com/magazine/content/08_41/b4103034193886.htm)**

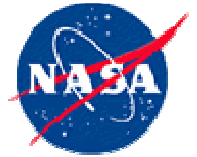




## *Scope / Magnitude of Counterfeiting*



# *Scope / Magnitude of Counterfeiting*



## *- ERAI Data -*

From: erai.com  
Sent: Tuesday, November 18, 2008 1:40 PM  
To: Hughitt, Brian (HQ-GD000)  
Subject: RE: ERAI Notifications

This year we have averaged 50+ new incidents per month. The least number this year was 36 incidents in February. The most incidents occurred in May 2008 with 128 incidents.

With that said, think about this.

ERAI has approximately 800 independent distributor Members alone. There are believed to be around 5,000 legitimate independent distributors worldwide which means only 16% of the independent community belongs to ERAI.

The number of Members that actually share data with ERAI is likely in the neighborhood of 15-20%. (This is an educated guess only) Many Members only use our data but never contribute and most if not all of them have had problems, but they keep their affairs private. Imagine if each of my Members reported every counterfeit or substandard occurrence, now multiply that times the number of global distributors who are not Members. The numbers we have are believed to be just the tip of the iceberg Brian.

We can not underestimate the size of this problem.

**ERAI**



## ***Scope / Magnitude of Counterfeiting***

### ***- Semiconductor Manufacturer Survey -***

In June 2006, the Semiconductor Industry Association (SIA) established the Anti-Counterfeiting Task Force (ACTF) consisting of semiconductor manufacturing company members involved in the investigation of counterfeiting and coordination with law enforcement.

Semiconductor Manufacturer disclosures ...

- Company A: Over 100 part numbers have been counterfeited in last 3 years.
- Company B: 19 cases reported involving 97,000 units.
- Company C: Since June 2006, there have been 4 seizures of counterfeits of our products by U.S. Customs; units seized ranged from 6000 to 60,000.
- Company D: “We estimate that 2-3 percent of purchases of our brand are counterfeit”
- Company E: A broker website indicated 40,000 of our devices available, but our company had only made less than 200 units of that device with the specified date code. If all 40K were available it would result in a \$34 million loss.



## OFFICE OF MANAGEMENT AND BUDGET



### CIRCULAR NO. A-119

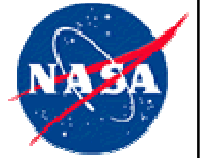
#### MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

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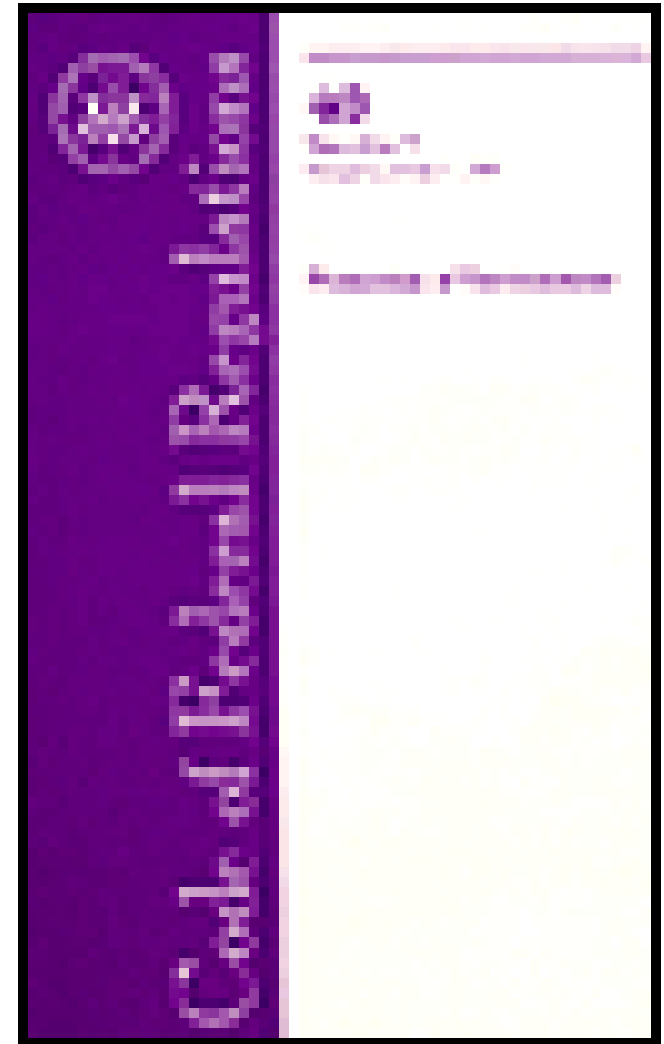




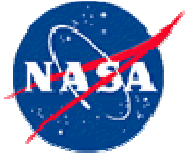
## Code of Federal Regulations: Title 15, Part 287 Guidance on Federal Conformity Assessment

Each agency should:

- Coordinate its conformity assessment activities with those of other appropriate government agencies and with those of the private sector
- Use the results of other governmental and private sector conformity assessment activities to enhance the safety & efficacy of proposed **new conformity assessment requirements** & measures



# ***Voluntary Consensus vs NASA Standards***



## ***- NASA Administrator Comments -***

From: Lloyd, James D. (HQ-GA000)

Sent: Tuesday, June 26, 2007 8:05 AM

To: Hughitt, Brian (HQ-GD000); Oconnor, Bryan (HQ-GA000)

Cc: Stamatelatos, Michael G. (HQ-GD000); Malone, Roy W. (MSFC-QD01)

Subject: RE: CxP Workmanship Standards Status

Brian and Bryan,

I went to a CxP brief to the Administrator on Friday ... and Mike clearly and repeatedly indicated that NASA does not have the market cornered on how to do everything related to space. In general, in some cases he said we are far behind the free market! He wants the preference to be national consensus, government consensus (looking closely at DOD specs and standards), NASA standards and, lastly, center-based unique standards. His premise is that being unique without reason and when not warranted is costing money. The risks need to be fully understood for complying or not complying with this order of precedence.

Jim



# Transitioning to Voluntary Consensus Standards

## J-STD-001 Space Addendum (Soldering):

NASA Proposal in Industry Coordination.  
CxP requirements carried in parallel.

Address gaps:

- a) Additional requirements
- b) Modification to VCS

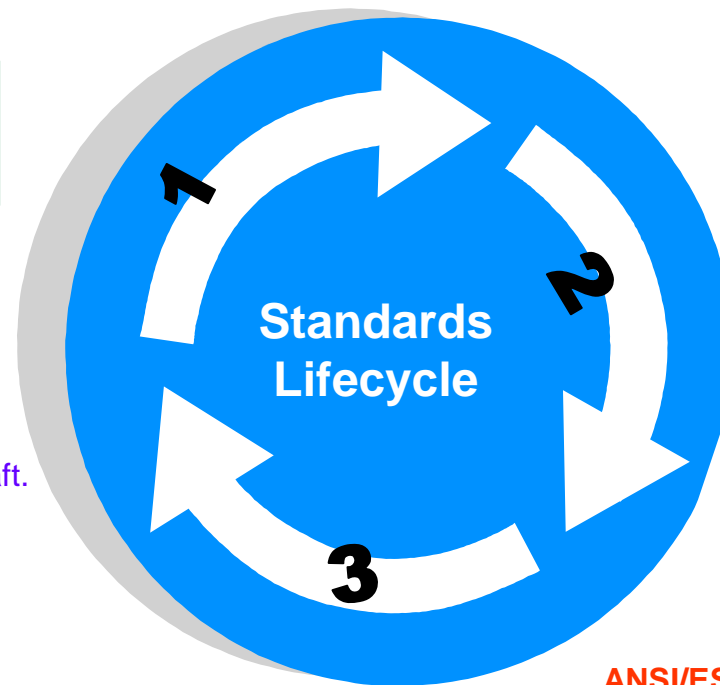
Gap analysis to ensure technical adequacy

Widespread & Consistent Usage

## IPC-A-620 Space Addendum (Harness Mfrg):

Preparing "shall" list in preparation for gap analysis of forthcoming draft.

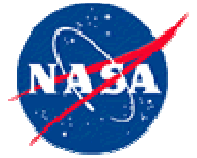
**ANSI/ESD S20.20 (Electrostatic discharge):**  
Implementation Plan for Cross-Agency Use



Document Stewardship

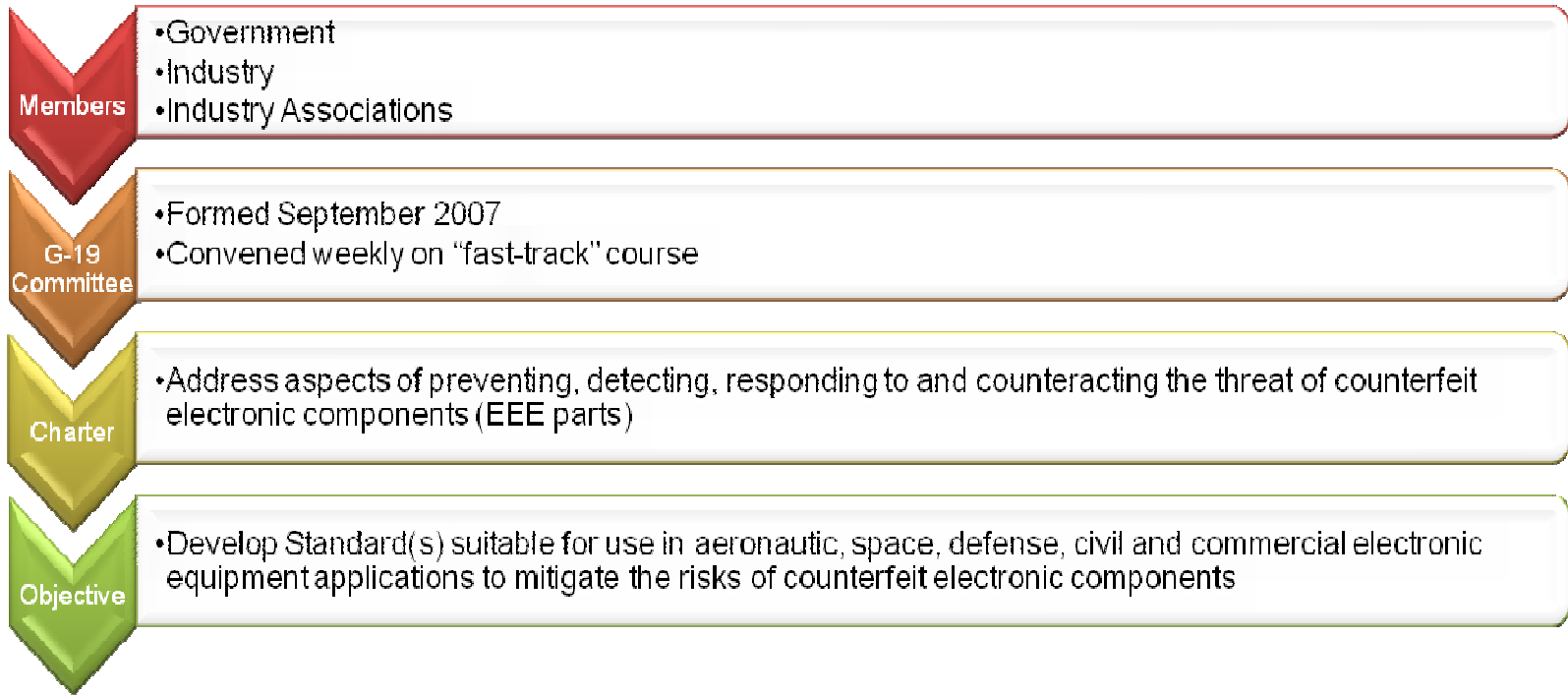
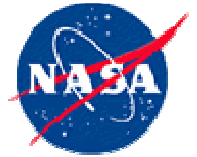
**ANSI/ESD S20.20:**  
Currently examining requirements for tools & gloves





# ***Voluntary Consensus Standards Adopted by NASA***

- **Soldering (Workmanship) –** **J-STD-001D / DS**
- **Non-Destructive Evaluation –** **NAS/ASTM/SAE (various)**
- **Metrology / Calibration –** **ANSI/NCSL Z540.3**
- **Electrostatic Discharge Protection –** **ANSI/ESD S20.20**
- **First Article Inspection –** **SAE AS9102**
- **QMS for Maintenance Organizations –** **SAE AS9110**
- **QMS for Distributors –** **SAE AS9120**
- **Inspections Sampling Procedures –** **ANSI/ASQC Z1.4/Z1.9**
- **Variation Management –** **SAE AS9103**
- **Contract Quality Clauses –** **SAE ARP9009**
- **Counterfeit Parts Avoidance -** **SAE AS5553**
- **Mitigating tin Whiskers -** **GEIA-STD-005-2**
- **Transition to Lead-Free Electronics -** **GEIA-HB-005-1**
- **Guidelines for Lead-Free Electronics -** **GEIA-HB-005-2**



Provides Requirements and Guidance:

## **Counterfeit Electronic Parts Control Plan**

- Component Management
- Procurement
- Test/Evaluation Methods
- Response strategies when suspect or confirmed counterfeit components are detected.

# **SAE G-19 Counterfeit Parts Committee**



**Barry Birdsong**

**Brian Hughitt**

**Charlie Whitmeyer**

**Dan DiMase**

**Daryl Hatano**

**David Meshel**

**Debra N. Eggeman**

**Erick Prause**

**Fred Schipp**

**Greg Worthington**

**Henry C. Livingston**

**Jay Myers**

**John Denning**

**John O'Boyle**

**Mark Goins**

**Mike Sampson**

**Phil Zulueta**

**Trevor A. Devaney**

**William Scofield**

**Debra Eggeman**

**Missile Defense Agency**

**NASA Headquarters**

**Orbital Sciences Launch Systems Group**

**Electronic Resellers Association International (ERAI)**

**Semiconductor Industry Association (SIA)**

**The Aerospace Corporation**

**Independent Distributors of Electronics Association**

**Jabil Circuits (Headquarters)**

**Naval Surface Warfare Center Crane**

**Lockheed Martin Space Systems Company**

**BAE Systems Electronics & Integrated Solutions**

**SAE Aerospace**

**Northrop Grumman Space Technology**

**QP Semiconductor**

**Department of Homeland Security**

**NASA Goddard Space Flight Center**

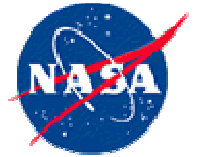
**Jet Propulsion Laboratory**

**Hi-Rel Laboratories**

**The Boeing Company**

**Independent Distributors Electronics Association**





# SAE AS5553 Implementation

## Counterfeit Parts Control Plan: Parts Availability

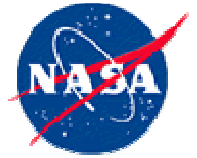
“... The process shall maximize availability of authentic, originally designed ... parts throughout the product's life cycle, including management of part obsolescence...”

### 4.1 Counterfeit Electronic Parts Control

The organization shall develop a control plan that documents its processes for the control of counterfeit parts. The control plan shall be developed in accordance with 4.1.1 through 4.1.7 below.

#### 4.1.1 Parts Availability

The processes shall maximize availability of authentic, originally designed and/or qualified parts throughout the product's life cycle, including management of parts obsolescence. Information and guidance for ensuring parts availability is provided in Appendix A, Parts Availability.



# SAE AS5553 Implementation

## Counterfeit Parts Control Plan: Purchasing Process

### Source of Supply

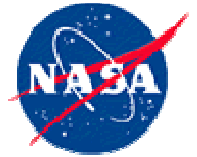
- Determine risk of receiving counterfeit part...
- Actions may include surveys, audits, review...
- Specify a preference to procure directly from OCMs...

### Approved Suppliers

- Maintain a register of approved suppliers
- Guidance on source selection and approval process
- Assure sources of supply are maintaining processes for counterfeit risk mitigation

### Risk Mitigation

- Mitigate the risks of procuring counterfeit parts from sources other than OCMs...
- Specify supply chain traceability to the OCM...
- Specify flow down of applicable requirements to contractors and sub-contractors...



# SAE AS5553 Implementation

## Counterfeit Parts Control Plan: Purchasing Information & Verification

“ ...This documented process **shall specify contract/purchase order quality requirements** ... ”

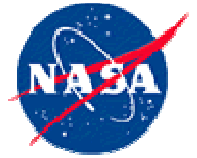
### 4.1.3 Purchasing Information

The documented process shall minimize the risk of being provided counterfeit parts. Requirements and clauses are provided in the contract/purchase order.

### 4.1.4 Verification of Purchased Product

The documented process shall assure detection of counterfeit parts prior to formal product acceptance. Examples of verification methods include visual inspection, X-ray, destructive testing, and other methods concerning the potential for counterfeit parts. E, Product Assurance.

“ ...The documented process **shall assure detection of counterfeit parts** prior to formal product acceptance... ”



# SAE AS5553 Implementation

## Example Procurement Clause

### D.3.1 Test and Inspection Requirements

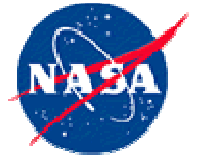
"The seller shall establish and implement test and inspection activities to assure the authenticity of purchased product.

- Traceability and documentation verification
- Visual examination
- [see Appendix E of this Aerospace Standard for test and inspection activities]

Tests and inspections shall be performed in accordance with clearly delineated accept/reject criteria provided or approved by <BUYER>. The seller shall prepare and provide to the <BUYER> records evidencing tests and inspections performed and conformance of the product to specified acceptance criteria.

Tests and inspections shall be performed by persons that have been trained and qualified concerning types and means of electronic parts counterfeiting and how to conduct effective product authentication."

“...The seller shall **establish and implement test and inspection activities** necessary to assure the authenticity ...”



# SAE AS5553 Implementation

## Counterfeit Parts Control Plan:

### In Process Investigation

Shall address the detection, verification, and control of ... counterfeit parts.



### Material Control

Shall control ... nonconforming parts from entering supply chain

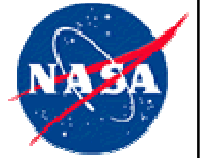
Control counterfeit parts to preclude their use ...



### Reporting

Shall assure that all occurrences of counterfeit parts are reported...





***The very essence of human progress is applying new knowledge in new ways, continuously making the old way of doing things obsolete. Organizations don't make progress, people do. The organization is just a vehicle for human cooperation.***

**Francis Guillard and James Kelly**