“Organized Chaos “
2012 ERAI Executive Conference
Mark Northrup (VP Advanced Technical Operations & Strategy)

Counterfeit

Definition

- Made in imitation of something else with intent to deceive , mislead, or defraud.

  - Synonyms - bogus, fake, false, forged, inauthentic, phony, sham, synthetic, nonfunctioning, simulated, fabricated, (**Shanzai** or **Shan zhai -** pirated brands and goods, particularly electronics**)**

  - Antonyms – authentic , genuine , bona fide, real, unfaked, certifiable, legitimate, validated, verified, legal, lawful.

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Risk

Definition

- Possibility of loss or injury or exposure to the risk of being injured, destroyed, or lost.
  - Synonyms - hazard, imminence, menace, peril, pitfall, danger, threat, trouble
  - Antonyms – safeness, safety, secureness, security

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Organized

Definition

- To arrange by systematic planning and united effort.

  - Synonyms - arrange, array, classify, codify, dispose, draw up, lay out, marshal (*also* marshall), order, range, systematize.

  - Antonyms - derange, disarrange, disarray, disorder, mess (up), muss (up), rumple, upset .

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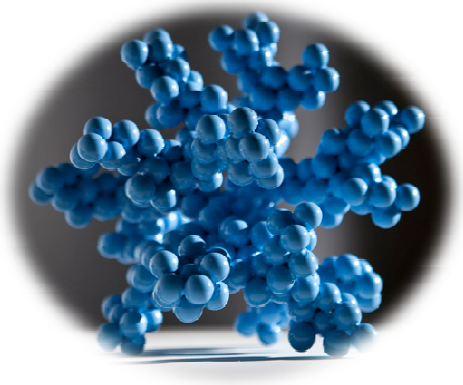
Chaos

Definition

- A state of utter confusion.
  - Synonyms - chance-medley, confusion, disarrangement, disarray, dishevelment, disorder, disorganization, free-for-all, havoc, mess, muss, shambles.
  - Antonyms – order, orderliness



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Electronic Component Obsolescence & Risk Mitigation

Electronic Component Obsolescence & Risk Mitigation

1 Scope

1.1 Executive Summary

The risk of procuring counterfeit components and thus having them enter into the supply chain is ongoing and a daily occurrence. The task of verifying the authenticity of electronic components through processes related to supplier management, purchasing, laboratory analysis, and electrical testing is never ending. The goal is to create a strategy to keep ahead of this challenge.

Parts obsolescence is a driving factor in the growth of the counterfeit parts market. Having a proactive strategy to analysis a program and a system to mitigate the risks in advance is the foundation for success in the current high reliability electronics manufacturing environment.

The IEC Health Analysis & Obsolescence Risk Mitigation program establishes a proactive process for predicting, identifying and managing the obsolescence impacts that affect a customer's product. Processes defined within the IEC Health Analysis & Obsolescence Risk Mitigation program will provide the customer with an advance notice of obsolescence, the degree of impact, recommendations for mitigation, and an assessment of how soon the problem will impact the customer's product availability and component testing for authenticity. Impacts are to be presented with potential solutions in accordance with the Health Analysis &

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Electronic Component Obsolescence & Risk Mitigation

Department of Defense (DOD), Standards such as AS5553, IDEA-1010, MIL-STD-883 testing and other industry partners. Continuous communication will be maintained between IEC and the customer in order to take advantage of the synergy from all sources.

2 Applicable Documents

The following serve as references to this plan to the extent identified herein. For undated references, the latest edition of the normative document referred to applies.

ANSI/J-STD-001	Requirements for Soldered Electrical and Electronic Assemblies.
IPC-A-610	Acceptability of Electronic Assemblies.
SAE AS9100	Quality Systems – Aerospace – Model For Quality Assurance In Design, Development, Production, Installation And Servicing.
ANSI/ASQC Q9000	Quality Management and Quality Assurance Standards.
A Special Report Counterfeit Parts: Increasing Awareness and Developing Countermeasures	March 2011© 2010 Aerospace Industries Association of America, Inc. 1000 Wilson Boulevard, Suite 1700, Arlington, Virginia 22209
MIL-STD-1580	Destructive Physical Analysis for Electronic, Electromagnetic, and Electromechanical Parts (w/Change Notice 2) Revision: B, Dated: 15 November 2010
MIL-STD -883	Test Method Standard, Microcircuits Revision: H, Dated: 26 February 2010
MIL-STD -750	Test Method Standard Test Methods for Semiconductor Devices Revision: E, Dated: 20 November 2006
MIL-STD -202	Test Method Standard, Electronic and Electrical Component Parts (with Notice 1 Incorporated) Revision: G, Dated: 8 February 2002
IDEA-1010	Acceptability of Electronic Components Distributed in the Open Market
AS5553	Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
AS6171	Test Methods Standard; Counterfeit Electronic Parts

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Electronic Component Obsolescence & Risk Mitigation

5 Avoid the Risk if Possible

5.1 Part Qualification and Customer Approval

Candidate replacement parts require the IEC & Customer Mitigation Team to obtain customer acceptance for use and subsequent inclusion into the EPL/BOM.

The level and extent of qualification and the requirements for customer approval depends upon the nature of the substitution relative to the originally qualified part. The source of components must also be considered. OEM and authorized distribution should be the first option using "gray market" or broker parts as a last resort.

The practical resolutions for a problem are greatly dependent on where the component, or supported system, is in its life cycle. However, it is possible that a single component could support several systems that are at different points in their life cycle, resulting in a much more intense analysis of alternatives and an offset of costs and benefits to any single solution. Possible resolutions include:

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Electronic Component Obsolescence & Risk Mitigation

6.4 Three Step Component Risk Mitigation Procedure

A three step Component Risk Mitigation Procedure requires the following custom approach:

Step 1 – Define the Severity of the Final End Component Application

Figure 2 – Severity of Final End Component

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Electronic Component Obsolescence & Risk Mitigation

Step 2 – A Component Test Procedure and Validation Plan is Defined

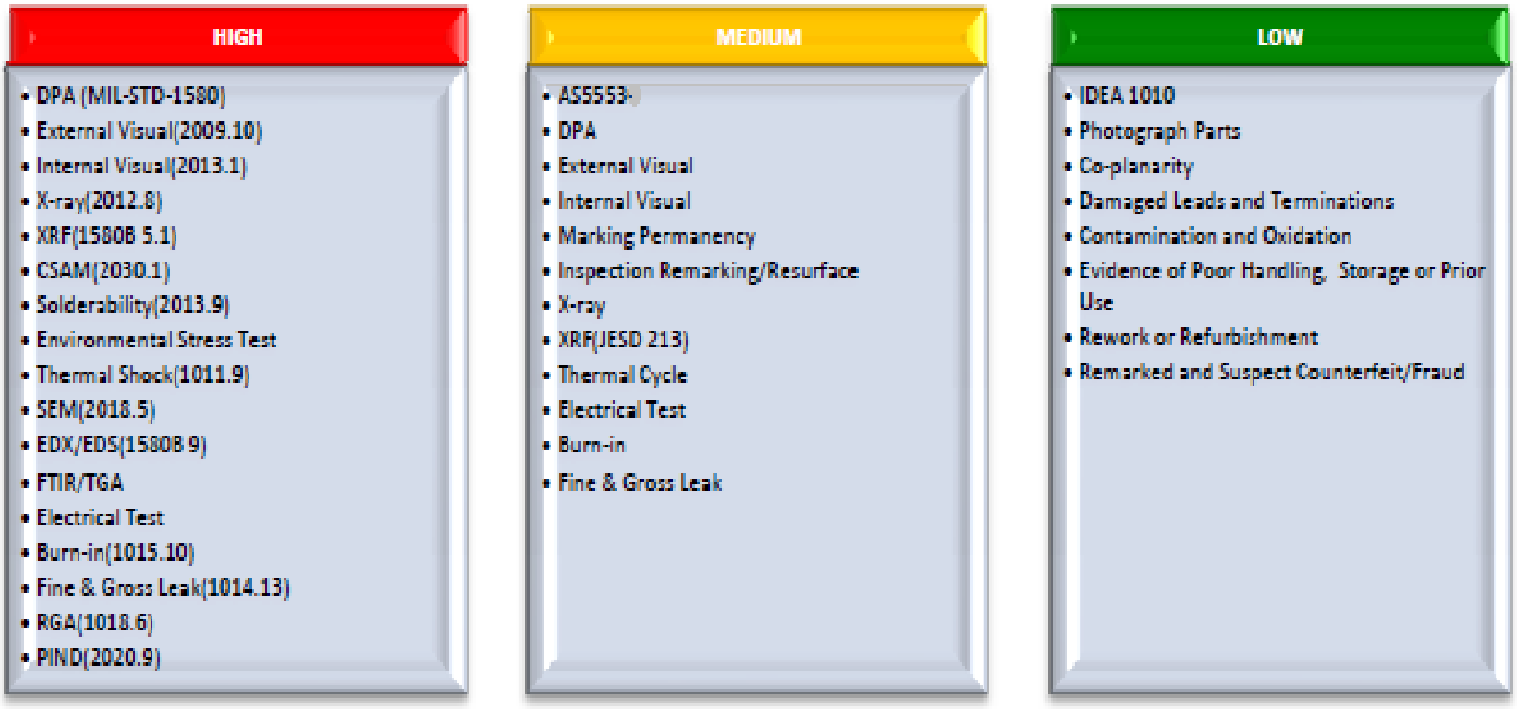

Figure 3 – Test Procedure and Validation Plan

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Electronic Component Obsolescence & Risk Mitigation

Step 3 – Acknowledgement of the Amount of Risk to be accepted

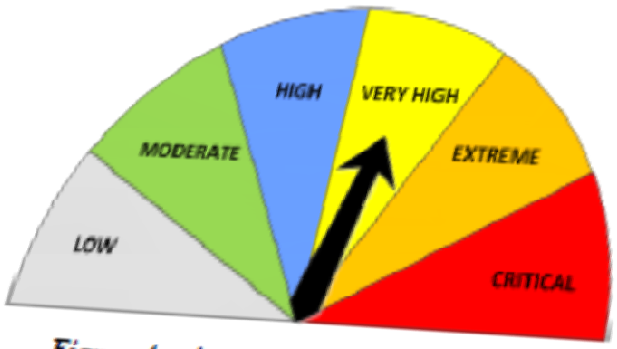

Figure 4 – Amount of Risk to Accept

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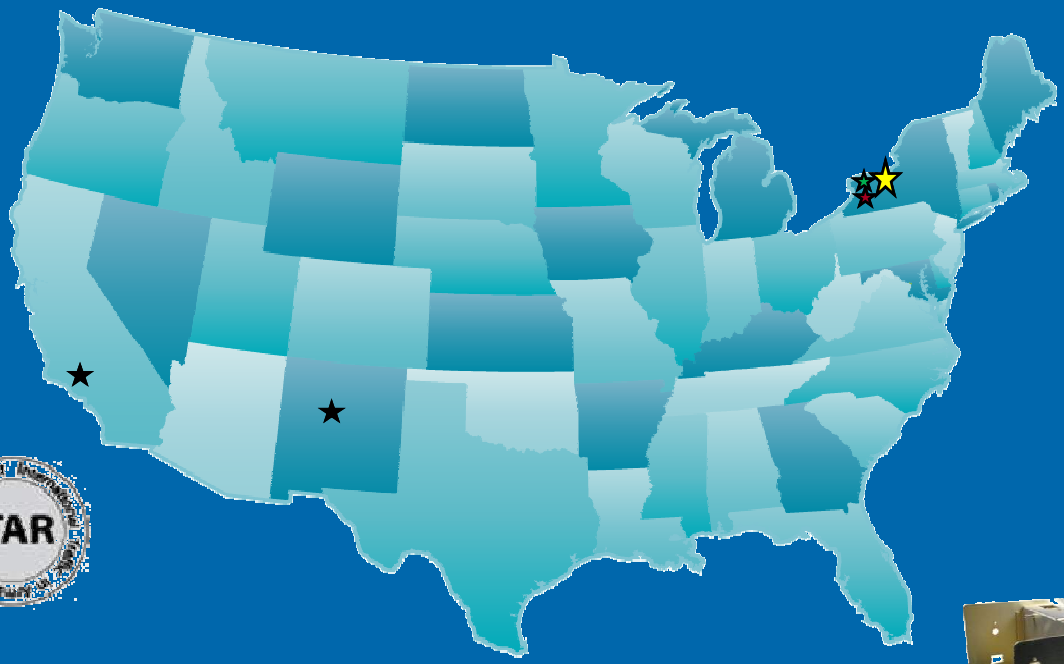
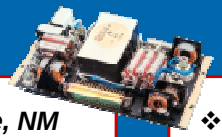
IEC Electronics Corporate Overview

AS 9100 | ISO 9001 | ISO 13485

Nadcap

ITAR





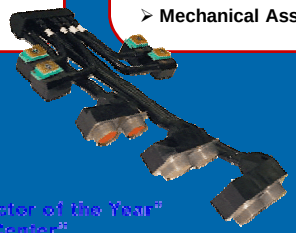
❖Newark, NY
- *300,000 sq. ft Facility*
- *12 SMT Lines*
- *Advanced SMT*
- *Box Build/Direct Ship*
- *Dedicated Prototype*

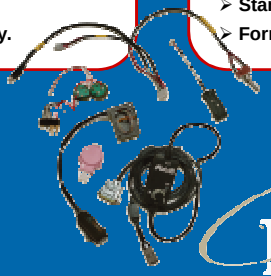
❖Albuquerque, NM
- 72,000 sq. ft Facility
- 3 SMT Lines
- Mixed Technology
- Box Build
- Obsolescence Mgmt.

❖Bell Gardens, CA
- 50,000 sq. ft Facility
- Design Engineering Center
- Clean Room Mfg
- Braided/Molded Cables
- NASA/Mil-Aero Centric

❖Victor, NY
- 18,000 sq. ft Facility
- Cable Assembly
- Wire Harnessing
- Over-molding
- Mechanical Assy.

❖Rochester, NY
- 48,000 sq. ft Facility
- Precision Sheet
- Metal Fabrication
- Stamping
- Forming & finishing





NASA

"2013 Small Business Sub-Contractor of the Year"
"Marshall Space Flight Center"

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Dynamic Research and Testing Laboratories, LLC

Dynamic Research and Testing Laboratories, LLC is located in Albuquerque New Mexico. The Laboratory is within the Electronic Contract Manufacturer "IEC Electronics, Inc"

2011

2011

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Dynamic Research and Testing Laboratories, LLC

Mark Northrup
Laboratory Director

Clifton Aldridge
Laboratory Manager

Rachel Garcia
Device Analyst

Areas of Responsibility
Incoming Insp, Optical Microscopy, Cross-Sectioning, Decapsulation, RIE, Wire Pull, Die Shear, Seal, PIND, Wet Chemical Deprocessing, SEM

Andrew Buchan
Electronics Engineer
Calibration & ESD Coordinator

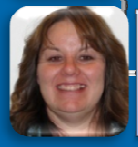
Areas of Responsibility
CSAM, FTIR , XRF, PWB Cross-sectioning, Assembly Level Failure Analysis

JR Lucero
Device Technician

Areas of Responsibility
HAST, Humidity Test, Solderability, Electrical Test, Temperature Cycle

Chris Hoover
Quality Assurance
(Consultant)

Christine Glomski
(Shared Resource)
Internal Auditor



Karin Zimmerer
(Shared Resource)
Doc Control Administrator

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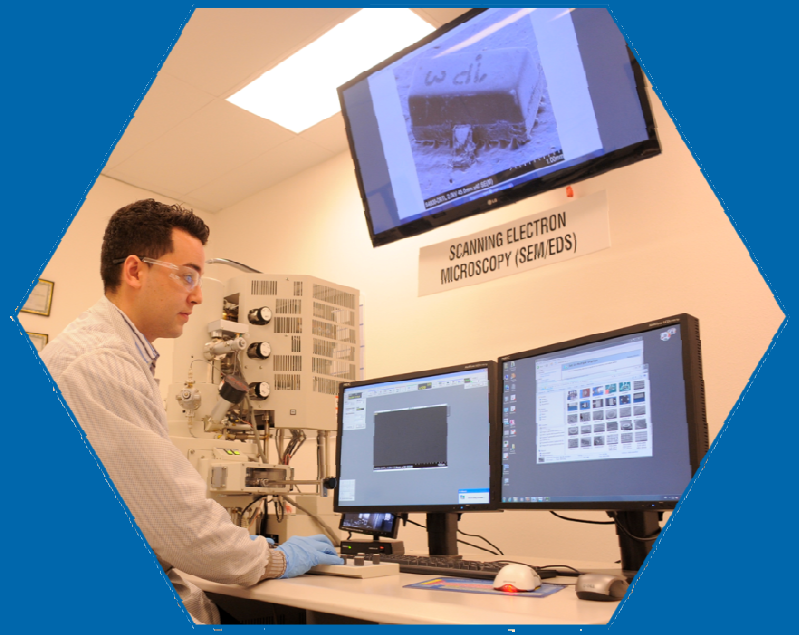
DRTL Capabilities

Dynamic Research and Testing Laboratories (DRTL)

- Component Risk Mitigation
- Destructive Physical Analysis
- Failure Analysis
- Parts Screening
- Product Qualifications
- Material Qualifications
- Consulting Services



Our staff offers highly respected technical expertise, personable service, and quick response.

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DRTL SERVICES - Comparison

DRTL Risk Mitigation Testing Strategies
(IDEA-1010, AS5553, Mil-std-1580, Modified)

Quality = What is ISO 17025?

ISO/IEC 17025 is the main standard used by testing and calibration laboratories. Originally known as ISO/IEC Guide 25, ISO/IEC 17025 was initially issued by the International Organization for Standardization (ISO) in 1999. There are many commonalities with the ISO 9000 standard, but ISO/IEC 17025 adds in the concept of competence to the equation. And it applies directly to those organizations that produce testing and calibration results. Since its initial release, a second release was made in 2005 after it was agreed that it needed to have its quality system words more closely aligned with the 2000 version of ISO 9001. The contents of ISO/IEC 17025 - The ISO/IEC 17025 standard itself comprises five elements that are Scope, Normative References, Terms and Definitions, Management Requirements and Technical Requirements. The two main sections in ISO/IEC 17025 are Management Requirements and Technical Requirements. Management requirements are primarily related to the operation and effectiveness of the quality management system within the laboratory. Technical requirements includes factors which determines the correctness and reliability of the tests and calibrations performed in laboratory. Laboratories use ISO/IEC 17025 to implement a quality system aimed at improving their ability to consistently produce valid results. [2] It is also the basis for accreditation from an Accreditation Body(i.e., ILAC, A2LA, ACLASS, L-A-B, IAS, NVLAP and PJLA). Since the standard is about competence, accreditation is simply formal recognition of a demonstration of that competence. A prerequisite for a laboratory to become accredited is to have a documented quality management system. The usual contents of the quality manual follow the outline of the ISO/IEC 17025 standard.

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DRTL SERVICES - Comparison

DRTL Risk Mitigation Testing Strategies (IDEA-1010, AS5553, Mil-std-1580, Modified)

Requirements Comparison: ISO 17025 vs. AS9100 Rev C vs. ISO 9001:2008

Clause	ISO 17025	AS 9100 Rev C	ISO 9001: 2008
Legend:	*Same / Similar to* ▯ *Significant Disparity* ⊘		
4	Management requirements	▯	▯
4.1	Organization	▯	▯
4.2	Management system	▯	▯
4.3	Document control	▯	▯
4.4	Review of requests, tenders and contracts	▯	▯
4.5	Subcontracting of tests and calibrations	▯	▯
4.6	Purchasing services and supplies	▯	▯
4.7	Service to the client	▯	▯
4.8	Complaints	▯	▯
4.9	Control of nonconforming testing and/or calibration work	▯	▯
4.10	Improvement	▯	▯
4.11	Corrective action	▯	▯
4.12	Preventive action	▯	▯
4.13	Control of records	▯	▯
4.14	Internal audits	▯	▯
4.15	Management reviews	▯	▯

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DRTL SERVICES - Comparison

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(IDEA-1010, AS5553, Mil-std-1580, Modified)

Requirements Comparison: ISO 17025 vs. AS9100 Rev C vs. ISO 9001:2008

Clause	ISO 17025	AS 9100 Rev C	ISO 9001: 2008
Legend:	*Same / Similar to* ▯ *Significant Disparity* ⊘		
5	Technical requirements	▯ ⊘	▯ ⊘
5.1	General	▯	▯
5.2	Personnel	⊘	⊘
5.2.1	Personnel Certification	⊘	⊘
5.2.4	Job Description – minimum requirements	⊘	⊘
5.3	Accommodation and environmental conditions	▯	▯
5.4	Test and calibration methods and method validation	⊘	⊘
5.4.2	Standard Method	⊘	⊘
5.4.3	Lab-developed Method	⊘	⊘
5.4.5	Non-standard Method	⊘	⊘
5.4.6.2	Testing Laboratory - measurement uncertainty estimation	⊘	⊘
5.5	Equipment	▯	▯
5.6	Measurement traceability	▯	▯
5.7	Sampling	▯	▯
5.8	Handling of test and calibration items	▯	▯
5.9	Assuring the quality of test and calibration results Proficiency Testing Program - 3rd party, inter- or intra-lab	⊘	⊘
5.10	Reporting the results	⊘	⊘
5.10.5	Opinions and Interpretations	⊘	⊘

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ISO 17025 Field of Tests

Scope of Accreditation to ISO/IEC 17025:2005

FIELD OF TEST	SPECIFIC TESTS OR PROPERTIES MEASURED	SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED	*DETECTION LIMIT/ RANGE/ EQUIPMENT
Non-Destructive Testing (NDT)	Elemental content by XRF (Lead, tin, etc.)	JESD213	Fischerscope XDAL
Non-Destructive Testing (NDT)	Radiographic Examination / Inspection	MIL-STD-883, Method 2012 MIL-STD-750, Method 2076 MIL-STD-202, Method 209	X-TEK Model: Orbita
Non-Destructive Testing (NDT)	Acoustic Microscopy (CSAM) Examination / Inspection	IPC/JEDEC, J-STD-035	Sonix Echo
Mechanical	SEM Examination / Inspection	MIL-STD-750, Method 2077 MIL-STD-883, Method 2018	Hitachi S-4800
Mechanical	Internal Examination / Inspection	MIL-STD-883, Method 2010 and 2013 MIL-STD-750 Method 2072	Olympus BX50
Mechanical	Particle Impact Noise Detection (PIND)	MIL-STD-883, Method 2020 MIL-STD-750, Method 2052	Spectral Dynamics PTI Model: 4511 I
Mechanical	Die Shear Grams of Force	MIL-STD-883, Method 2019 MIL-STD-750, Method 2017	Dage 4000

http://www.DRTLonline.com

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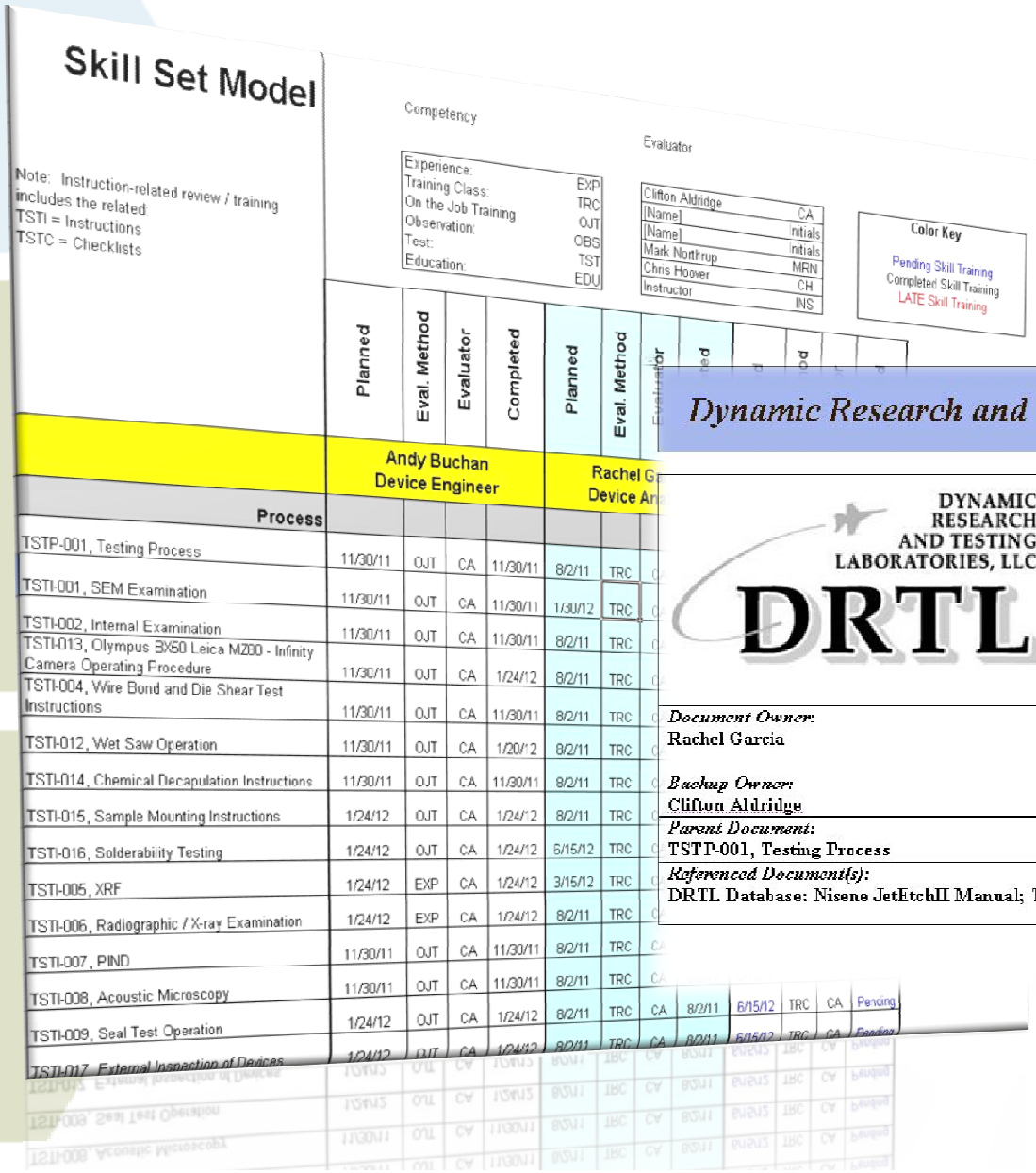
ISO 17025 Skill Set Model



Skill Set Model

Note: Instruction-related review / training includes the related:
TSTI = Instructions
TSTC = Checklists

Competency

Experience:	EXP
Training Class:	TRC
On the Job Training	OJT
Observation:	OBS
Test:	TST
Education:	EDU

Evaluator

Clifton Aldridge	CA
[Name]	initials
[Name]	initials
Mark Northrup	MRN
Chris Hoover	CH
Instructor	INS

Color Key
Pending Skill Training
Completed Skill Training
LATE Skill Training

Process	Andy Buchan Device Engineer				Rachel G Device An			
	Planned	Eval. Method	Evaluator	Completed	Planned	Eval. Method	Evaluator	
TSTP-001, Testing Process	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-001, SEM Examination	11/30/11	OJT	CA	11/30/11	1/30/12	TRC		
TSTI-002, Internal Examination	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-013, Olympus BX50 Leica MZ00 - Infinity Camera Operating Procedure	11/30/11	OJT	CA	1/24/12	8/2/11	TRC		
TSTI-004, Wire Bond and Die Shear Test Instructions	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-012, Wet Saw Operation	11/30/11	OJT	CA	1/20/12	8/2/11	TRC		
TSTI-014, Chemical Decapulation Instructions	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-015, Sample Mounting Instructions	1/24/12	OJT	CA	1/24/12	8/2/11	TRC		
TSTI-016, Solderability Testing	1/24/12	OJT	CA	1/24/12	6/15/12	TRC		
TSTI-005, XRF	1/24/12	EXP	CA	1/24/12	3/15/12	TRC		
TSTI-006, Radiographic / X-ray Examination	1/24/12	EXP	CA	1/24/12	8/2/11	TRC		
TSTI-007, PIND	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-008, Acoustic Microscopy	11/30/11	OJT	CA	11/30/11	8/2/11	TRC		
TSTI-009, Seal Test Operation	1/24/12	OJT	CA	1/24/12	8/2/11	TRC	CA	8/2/11
TSTI-017, External Inspection of Devices	1/24/12	OJT	CA	1/24/12	8/2/11	TRC	CA	8/2/11

			6/15/12	TRC
				CA
				Pending

Dynamic Research and Testing Laboratories – Business Instruction

DYNAMIC RESEARCH AND TESTING LABORATORIES, LLC
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	Document Title: **Chemical Decapsulation Instruction**
	Document Number: **TSTI-014, Rev A**
Document Owner: Rachel Garcia *Backup Owner:* Clifton Aldridge	*Approver(s):* Clifton Aldridge
Parent Document: TSTP-001, Testing Process	*Notify of Changes:* Dynamic Research and Testing Laboratories Employees
Referenced Document(s): DRTL Database: Nisene JetEtchII Manual; TSTC-021, Jet Etch II Chemical Decapulation Checklist	

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DRTL and IEC Electronics

IDEA – 1010 ?

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ERAI/IHS Membership

Counterfeit Part Analysis

We would all prefer to follow the standards of the U.S. Government Industry Data Exchange Program (AS5333 – Counterfeit Electronic Parts, Avoidance, Detection, Mitigation, and Disposition) or the Independent Distributors of Electronics Association (IDEA-STD-1010-A). Unfortunately, many of us cannot use an approved vendor due to long lifecycle product demands, requiring us to perform Component Risk Mitigation Testing Methodology. Our contention is that the term "Counterfeit Parts Analysis" is better served via a Component Risk Mitigation Test Plan by using existing Destructive Physical Failure, Construction, and Electrical Analysis practices.

Legislative Advocacy

DRTL is focused on addressing the most pressing issues facing today's procurement of electronic components. We are strong advocates of the U.S. governments' push on legislative changes to detect and avoid counterfeit parts leaking into our supply chain, as referenced in the National Defense Authorization Act for Fiscal Year 2012 (Sec. 818 – Detection and Avoidance of Counterfeit Electronic Parts, and Sec. 2320 – Trafficking in Counterfeit Goods or Services) and the recent Government Accountability Office Report (DoD Supply Chain – Suspect Counterfeit Parts Can Be Found on Internet Purchasing Platforms).

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What The GAO Found?

GAO
U.S. Government Accountability Office

United States Government Accountability Office

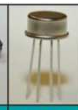
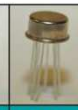
GAO

Report to the Committee on Armed Services, U.S. Senate

February 2012

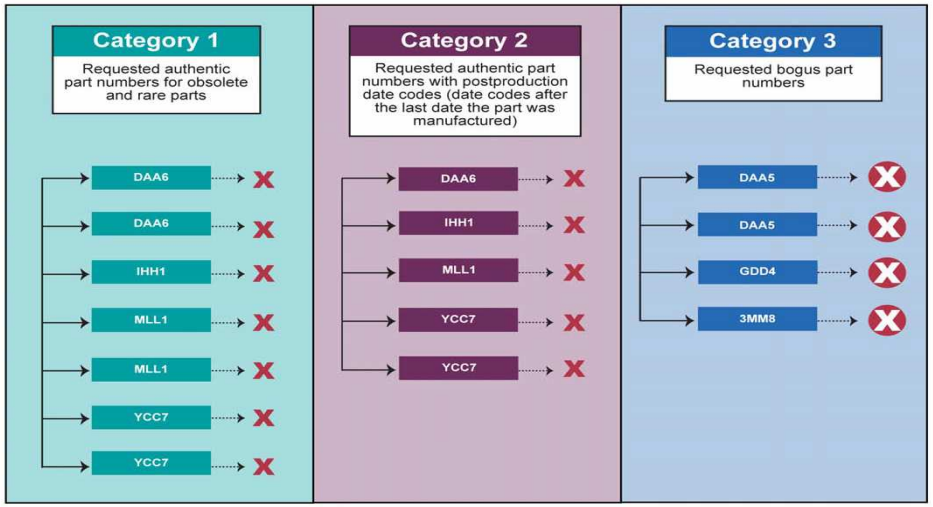
DOD SUPPLY CHAIN

Suspect Counterfeit Electronic Parts Can Be Found on Internet Purchasing Platforms

Category 1 Requested authentic part numbers for obsolete and rare parts							
Analysis performed	**DAA6**	**DAA6**	**IHH1**	**MLL1**	**MLL1**	**YCC7**	**YCC7**
Visual Inspection	Fail	Fail	Fail	Fail	Fail	Fail	Fail
Resistance to Solvents (RTS) and Scrape Test	N/A	N/A	Fail	N/A	N/A	Pass	Pass
Package Configuration and Dimensions	Pass	Pass	Pass	Pass	Pass	Pass	Fail
X-Ray Florescence Elemental Analysis	Fail	Fail	Pass	Fail	Fail	Pass	Pass
Real-Time X-ray Analysis	Pass	Fail	Pass	Pass	Pass	Fail	Pass
Scanning Electron Microscopy (SEM) Analysis	Fail	Fail	Fail	Pass	Pass	Fail	Fail
Solderability Test	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Dynasolve Test	N/A	N/A	Fail	N/A	N/A	N/A	Fail
Delidding and Die Microscopy	Fail	Fail	Fail	Fail	Fail	Fail	Pass
			Yes	Yes	Yes	Yes	Yes

SMT test results.

own have been altered from the part numbers used for purchasing.
analysis was not performed because the unique properties of the part
able or prevent the test from being performed.



X - Suspect counterfeit part

X - Bogus part

Source: GAO analysis of SMT test results.

Note: Part numbers shown have been altered from the part numbers used for purchasing.

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DRTL Supports SAE G19 Proposed Test Flow Summary

TABLE --- ACTIVE DEVICES RISK MITIGATION SCREENING FLOW PRELIMINARY
(microcircuits & semiconductor devices)

Steps	Mechanical/Environmental/Electrical Inspections/Tests	4 Critical Risk	3 High Risk	2 Moderate Risk	1 Low Risk	0 Very Low Risk
1	External visual Inspection, EVI_S (General)	Y	Y	Y	Y	Y
2	Remarking & Resurfacing	Y	Y	Y	Y	Y
3	XRF	Y	Y	Y	Y	Y
4	External visual Inspection, EVI_D (Detailed)					
5	Delid Physical Analysis					
6	SEM/OPTICAL					
7	Radiographic/X-RAY					
8	Acoustic Microscopy (AM)					
9	Miscellaneous					
10	Seal (hermetic devices)					
11	Temp cycling/ End point electrical					
12	DC Curve Trace					
13	Full DC Test, Ambient Temp					
14	DC,Key(AC,Switching, Functional),Ambier					
15	DC,Key(AC,Switching, functional), Ambie					
16	DC,Key(AC, Switching, Functional), over T					
17	Burn-In & Final Electricals with Limits & Delta Limits					

Key: Y – Yes, test performed
AN-As necessary

Component Test Plan Defined

HIGH RISK

- DPA (MIL-STD-1580)
- External Visual
- Internal Visual
- X-ray
- XRF
- CSAM
- Solderability
- Environmental Stress Test
- Thermal Shock
- SEM
- EDX/S
- FTIR/TGA
- Electrical Test
- Burn-In
- Fine & Gross leak
- RGA
- PIND

MEDIUM RISK

- AS5553
- DPA
- External Visual
- Internal Visual
- Marking Permanency
- X-Ray
- XRF
- Thermal Cycle
- Electrical Test
- Burn-In
- Fine & Gross Leak

LOW RISK

- IDEA 1010
- Photograph Parts
- Co-planarity
- Damaged Leads and Terminations
- Contamination and Oxidation
- Evidence of Poor Handling, Storage or Prior Use
- Rework or Refurbishment
- Remarked and Substandard

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XRF Section (SAE G-19 Counterfeit Detection Committee)

8. Risk level inspection tests

	Critical Risk	High Risk	Moderate Risk	Low Risk
	4	3	2	1
Optically Inspect/Photo document	X	X	X	X
Wire Pull	X	X	X	(optional)
Die Shear (hermetic)	X	X	(optional)	(optional)
Ball Shear	X	X	(optional)	(optional)
SEM Inspection	X	(optional)	(optional)	(optional)
Perform EDX	X	(optional)	(optional)	(optional)
Unlayer/Inspect Metalization	X	(optional)	(optional)	(optional)
Glassivation Layer Integrity Testing	X	(optional)	(optional)	(optional)

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April 25th AIA CP-IPT Meeting

Summary

- Sixty People Attended
- Speakers from DOD (Jim Stein GIDEP/ LeAntha Sumpter DPAP)
- CP-IPT Assignments to submit to OSD-DPAP
    1. Definitions
        - Counterfeit
        - Suspect Counterfeit
        - Trusted Supplier
        - Reasonable Effort
        - Other undefined terms in Sec. 818 of the NDAA?
    2. Best Practices
        - AIA Whitepaper
    3. GIDEP Reporting
        - Critical Characteristics
    4. Traceability
        - Must be RISK and Application Based

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April 25th AIA CP-IPT Meeting Summary

Draft Timeline

- May 2 First Draft Due
- May 3 QAC Review
- May 4 Full CP-IPT Review
- May 15, Review Comments / Begin Consensus process
- May 21, Cut-off Date
- May 25 , Submit Responses to LeAntha Sumpter DPAP

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Defense Trusted Integrated Circuits Strategy (DTICS)

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Defense Trusted Integrated Circuits Strategy (DTICS)

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Defense Trusted Integrated Circuits Strategy (DTICS)

Trusted Foundry Program

As of 16 APR 2012

Accredited Suppliers

Important: Many of the following suppliers have a standard commercia
"Trusted Product Flow" must be explicitly requested from the points of
trusted. A trusted supply chain begins with trusted design and continu

Supplier	CAGE Code	Facility Location	Scope of Accreditation
Abraxas Corporation	5GW01	Annapolis Junction, MD	Design
Advotech Company, Inc.	4GBU7	Tempe, AZ	Packaging/Assembly
Aeroflex Colorado Springs	6V812	Colorado Springs, CO	Broker; Design; Aggregation; Packaging/Assembl Test

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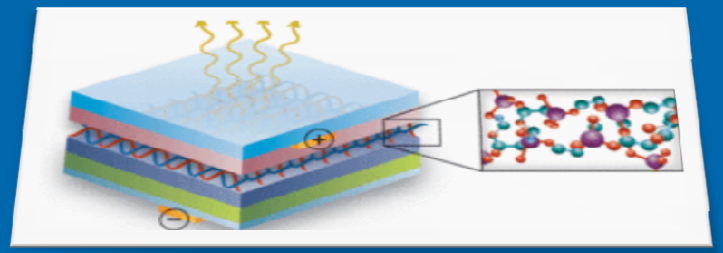
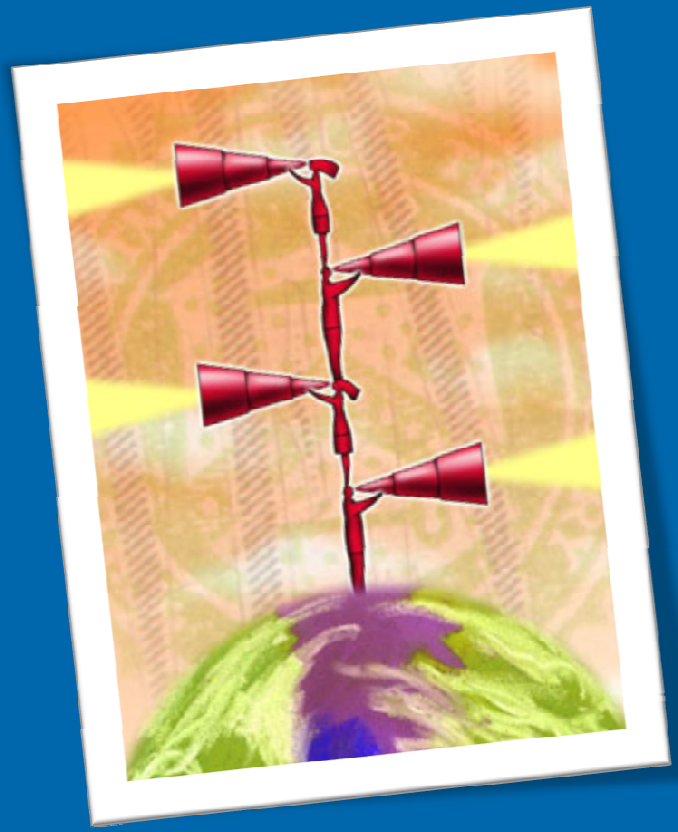
Anti-Counterfeiting Defense via Traceability ?

DNA Technologies





ChromoLogic

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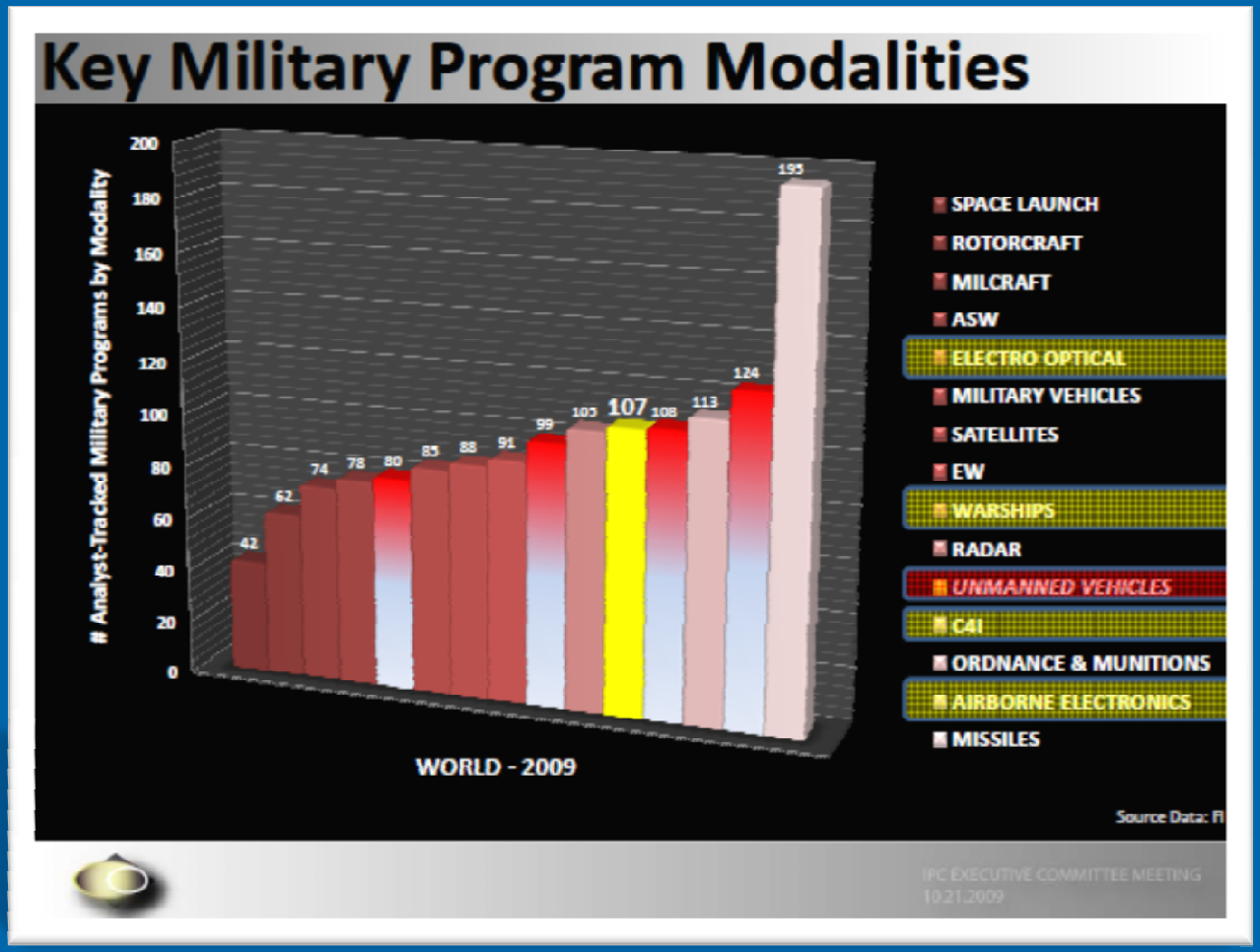
Anti-Counterfeiting Defense via Design Out or Shut-down ?



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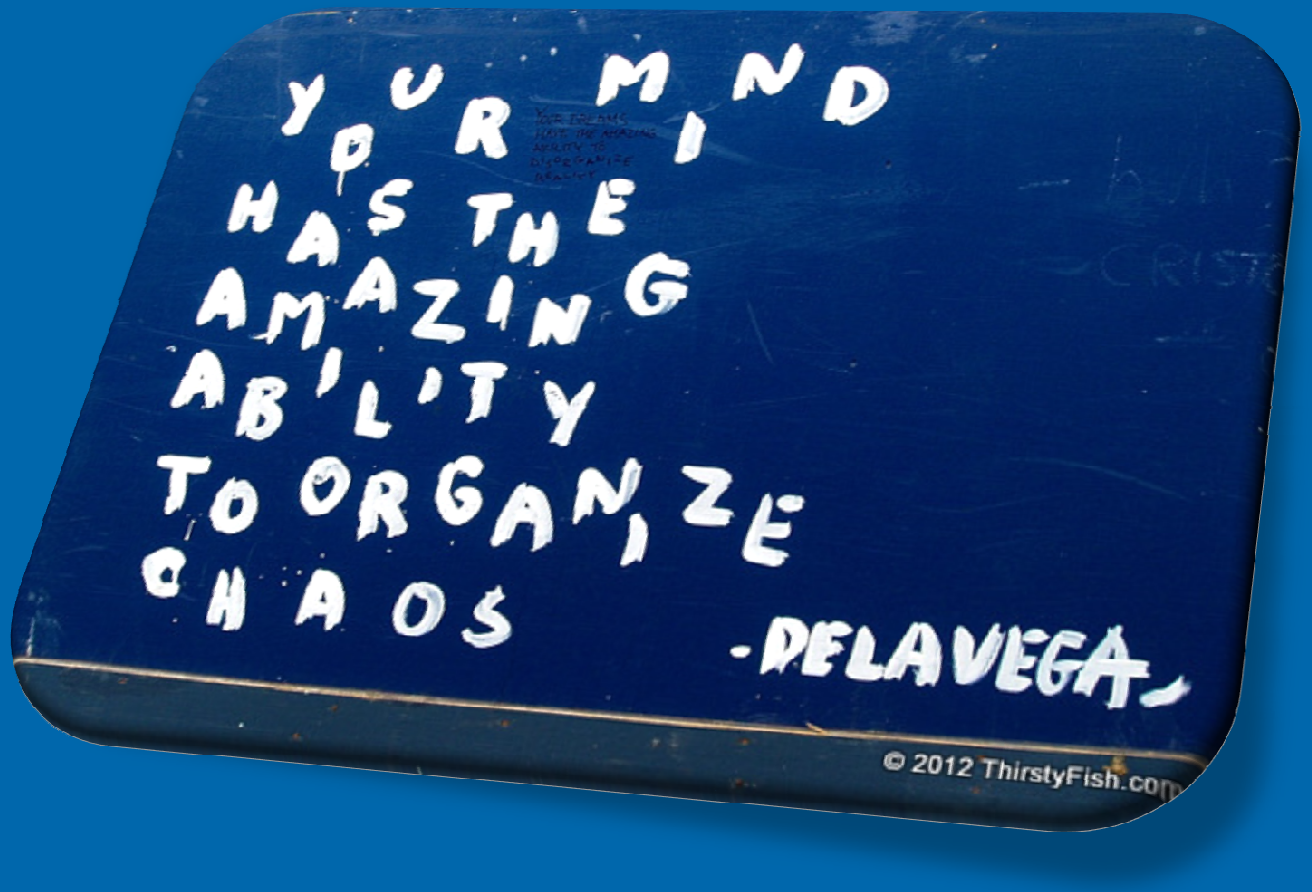
Question & Answers ?



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