

# Trusted Sources, Supply Challenges and Solutions

---



**Sydney Pope**  
**AT&L (Industrial Policy)**  
**October 16, 2009**  
[Sydney.pope@osd.mil](mailto:Sydney.pope@osd.mil)



# Presentation Outline

---

- **Trusted Microcircuit Challenge**
- **Cyber-Security Strategy**
- **Policy Development**
- **Counterfeiting Implications**
- **Government and Industry Interactions**
- **Thoughts for Consideration**



# The Microelectronics Challenge

## Increased DoD use / reliance for (“Smart” systems)

- Essential technology for all military missions
  - Strategic, tactical, C4I, special ops
  - “Critical” DoD technology
- Enabling technology for adaptive operations, transformational opportunities & spiral development



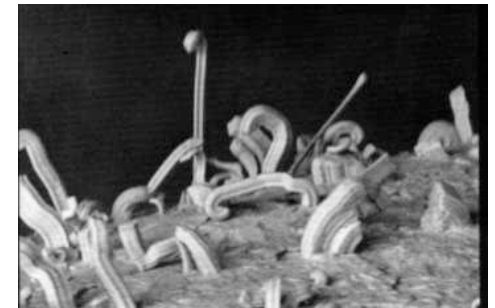
## Extended system life cycles (20 – 40 years)

- Rapidly evolving, expanding missions
  - Asymmetric threats
  - New capability requirements
- Increased system reliability and maintainability issues
- Diminishing Manufacturing Sources (DMS)
  - Obsolescence cycles of 18 months or less
  - Over 90% of all DoD DMS cases are electronics



## Commercial market dictates the technology

- Very high volumes for short terms
- Off shore manufacturing
- Lower environmental - quality thresholds & EU RHOS (lead-free solder) mandates





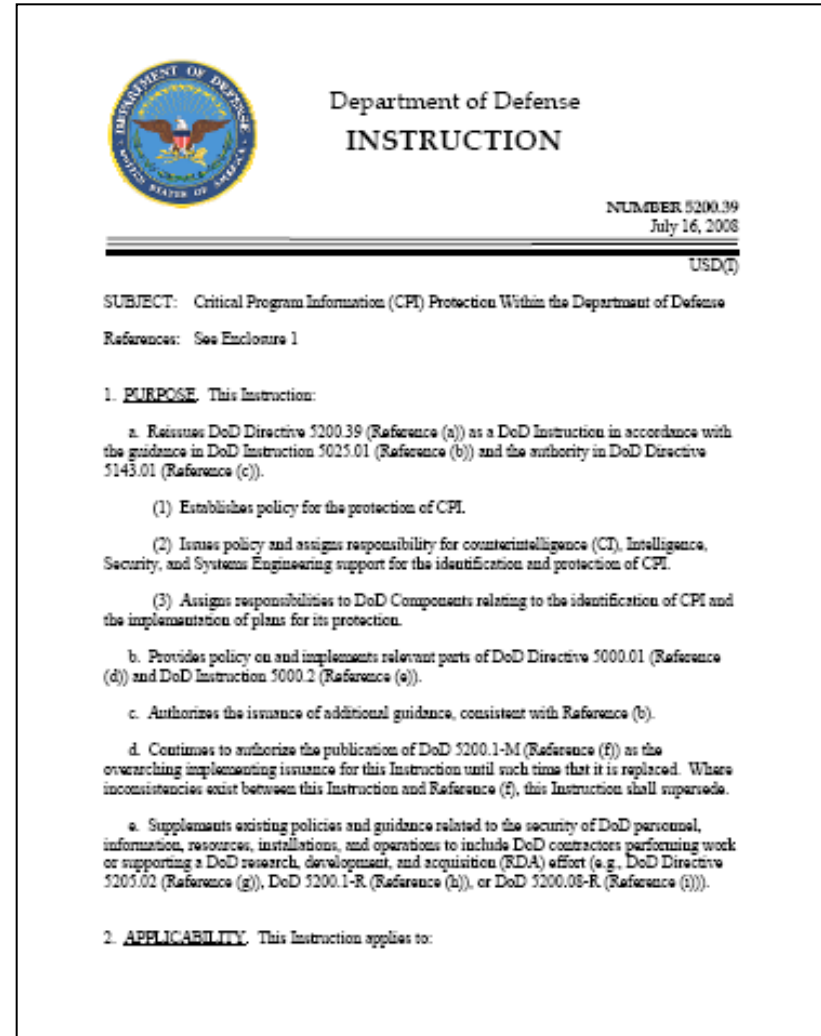
# Trust Sources are Element of Cyber-Security Strategy

## Mission critical IT and Weapon Systems

## Systems Assurance Addressed in DODI 5200.39 Revision

### Defines broadly what needs to be done

- Critical Program Information defined by taking into account horizontal protection
- Covers confidentiality, but also defines technology, components and material needing protection
- Program Protection Plan defines strategy for employing mitigating approaches for protecting CPI



[Critical Program Information \(CPI\) Protection Within The Department Of Defense, 5200.39, Issued 7/16/2008](#)



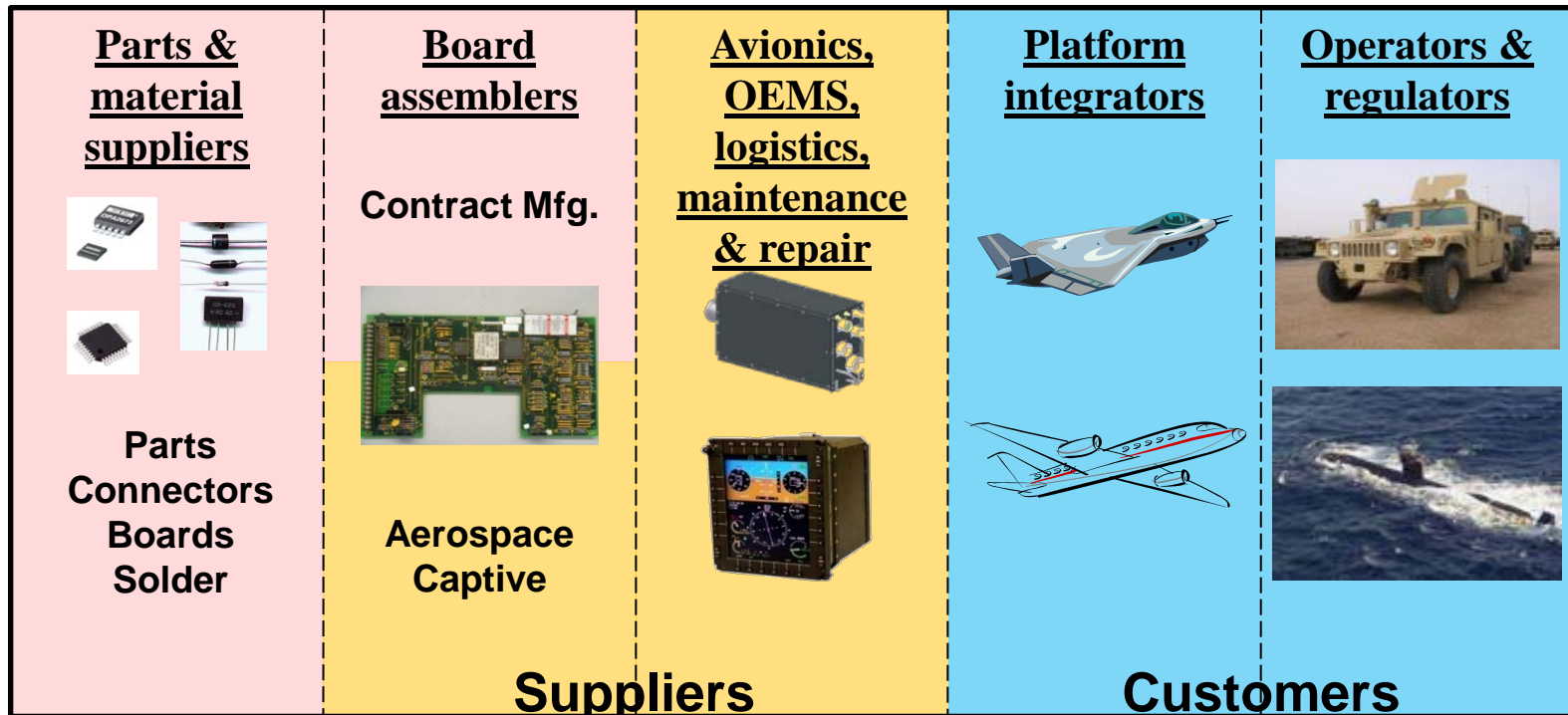
# Supply Chain Risk Management



Comprehensive  
National Cyber  
Security  
Initiative

- **Executive and Legislative Guidance**  
CNCI Initiative 11 - Directed Improved  
Supply Chain Risk Management 1-8-08

...but in reality



8/28/2009 **Outside Control**

**Able to Control**



# Trust Microelectronics Policy

## DepSecDef & AT&L 2004 Policy Letters

- Trust is minimum requirement for defense systems
- Beyond critical Application Specific ICs, policy needed that provides a comprehensive, viable, cost-effective, and realistic approach for preserving system-level trust
- Trust should include multi-layered defense-in-depth as a practical strategy involving people, technology, and operations



OFFICE OF THE SECRETARY OF DEFENSE  
WASHINGTON, DC 20301



JAN 27 2004

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS  
DIRECTOR, DEFENSE INFORMATION SYSTEMS  
AGENCY  
DIRECTOR, DEFENSE INTELLIGENCE AGENCY  
DIRECTOR, NATIONAL GEOSPATIAL-INTELLIGENCE  
AGENCY  
DIRECTOR, NATIONAL SECURITY AGENCY  
DIRECTOR, DEFENSE SECURITY SERVICE  
DIRECTOR, NATIONAL RECONNAISSANCE OFFICE  
DIRECTOR, MISSILE DEFENSE AGENCY  
DIRECTOR, DEFENSE ADVANCED RESEARCH  
PROJECTS AGENCY

SUBJECT: Interim Guidance on Trusted Suppliers for Application Specific Integrated Circuits (ASICs)

The Department of Defense is implementing a "Defense Trusted Integrated Circuits Strategy (DTICS)," as approved by the Deputy Secretary of Defense on October 10, 2003. Trust is the confidence in one's ability to secure national security systems by assessing the integrity of the people and processes used to design, generate, manufacture, and distribute national security critical components (i.e., microelectronics). The DTICS is intended to address the Department's concerns that defense systems relying upon advanced integrated circuits (ICs) for critical capabilities may be vulnerable or compromised if not produced in a trusted manner, thereby jeopardizing our current technical advantages. Consequently, the Department is acting quickly to address this vulnerability and threat to our warfighting capabilities.

As a first element of this strategy, policy is being developed that shall require all trusted systems of category 1 (Attachment 1) to employ only trusted foundry service(s) to fabricate their custom designed ICs. Programs that wish to seek a waiver of this policy are required to perform a thorough risk and vulnerability assessment of the fabrication of their critical ICs and submit this assessment, with a mitigation strategy, to OUSD (AT&L) for approval. The key metric to be considered is the protection of sensitive applications, where a functional compromise would cause severe interference or stoppage of warfighter operations and/or direct mission support operations. Some of these trusted systems that use foundry services have already been identified (Attachment 2). It is essential that these ICs be fabricated or obtained from sources that have been certified as trusted. This policy is a logical extension of recently implemented Information Assurance (IA) policy contained in the 8500 series of DoD Directives.





# Trusted Supplier Program

- **Interim Guidance Jan 04, required highly sensitive acquisitions to manufacture ASICs in a trusted foundry.**
  - DoD/NSA establish a funded Trusted Foundry Program
  - IBM established early on as trusted ASIC source
  - DMEA Certified **25** suppliers (design, foundry, pkging) participating (8/09)
  - Has not fundamentally changed how most systems acquire





# Section 254 Trusted Def Systems\*

(FY09 Defense Authorization Act)

## Vulnerability Assessment

- Identify (ID) program vulnerabilities within IT & electronic systems
- Prioritize potential vulnerabilities and effects

## Verification Methods

- ID verification methods for verifying microelectronic circuit trust
- ID additional R&D needed

## Integrated Strategy

- ID Lead person(s) to develop integrated strategy
- Develop integrated strategy for managing supply chain risk

## Acquisition Policy

- Formalize strategy for ensuring dependable, continuous, long term access and trust of mission-critical circuits, foreign and domestic sourced

**PCB trust is a concern as well**

\* Section 256 Requires DoD to Establish Printed Circuit Board Exec. Agent

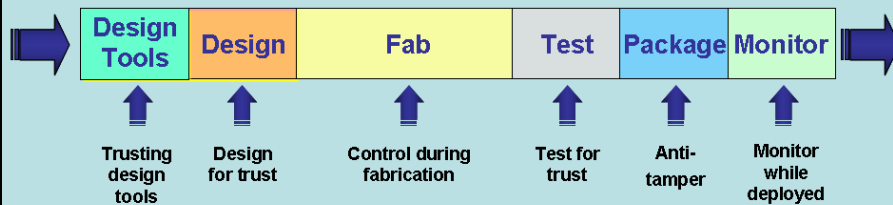


# Design Verification



## Ensuring Trustworthiness of Weapon System Integrated Circuits

Trusted IC Development/Deployment Process Flow



- DARPA developing new techniques to verify IC designs perform only operation intended
- FPGAs & ASICs primary focus
- Destructive methods only way now available to confirm design
- Malicious circuits can be inserted in OEM ICs and Counterfeits

**The TRUST Program Will Enhance the Trustworthiness of IC's Regardless of Where They are Manufactured**



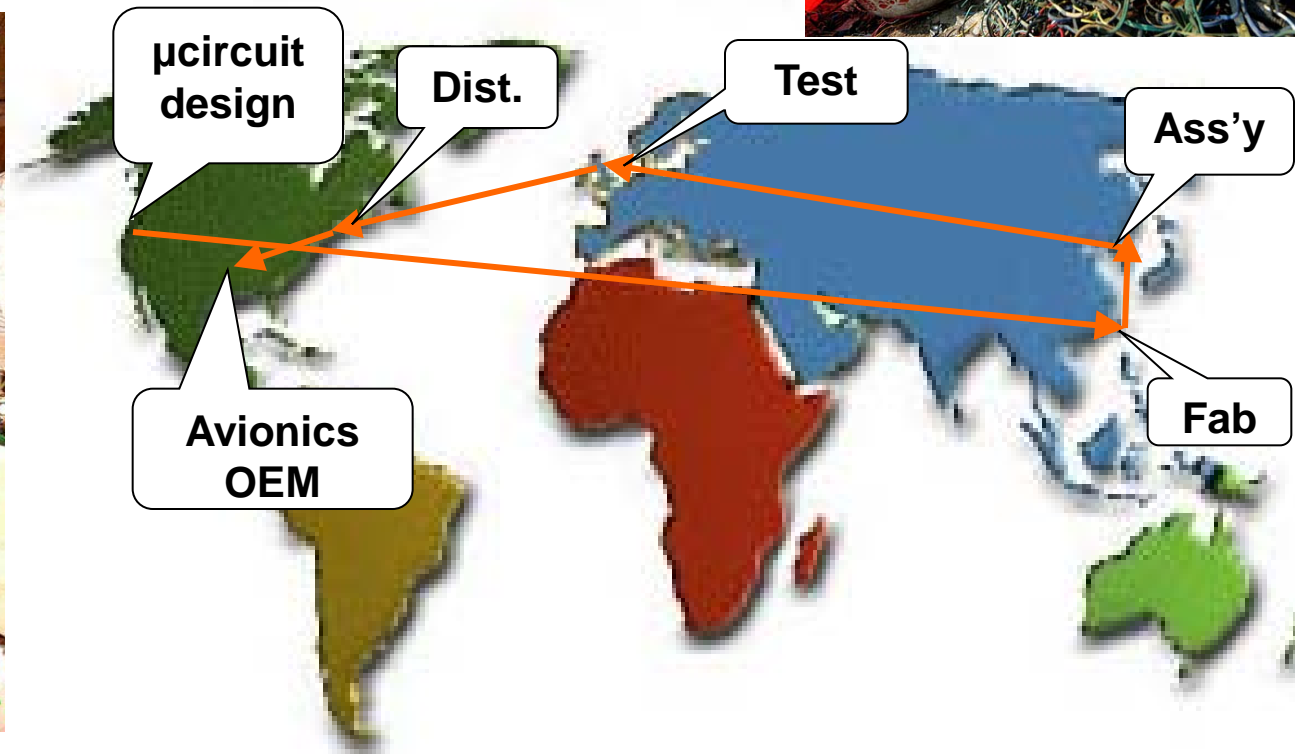
# Trust Implications From Counterfeiting

- **Tampering ---→ To Engage in Espionage or Sabotage**
- **Counterfeiting--→ Economics --→ Greed**
  
- **Both Lead to Intentionally Compromised Devices**
  - May be Impossible to Detect
  - Can Jeopardize Both Mission and Life
  
- **Ways To Address Counterfeiting Risk:**
  - Buy from Established Sources (OEMs, Authorized Distributors, etc.)
  - Conduct Independent Testing and Inspection
  - Establish Controls and Common Language and Methods for Performance Requirements and Criticality of End Use
  - Adopt Traceability Mechanisms (Tagging, etc.)
  - Report instances of Counterfeiting to law enforcement and GIDEP



# “Typical” Microcircuit Product Flow

The microcircuit chain is...circuitous. The number of potential combinations of links is large, and growing. Ability to “control” shrinking.





# BusinessWeek



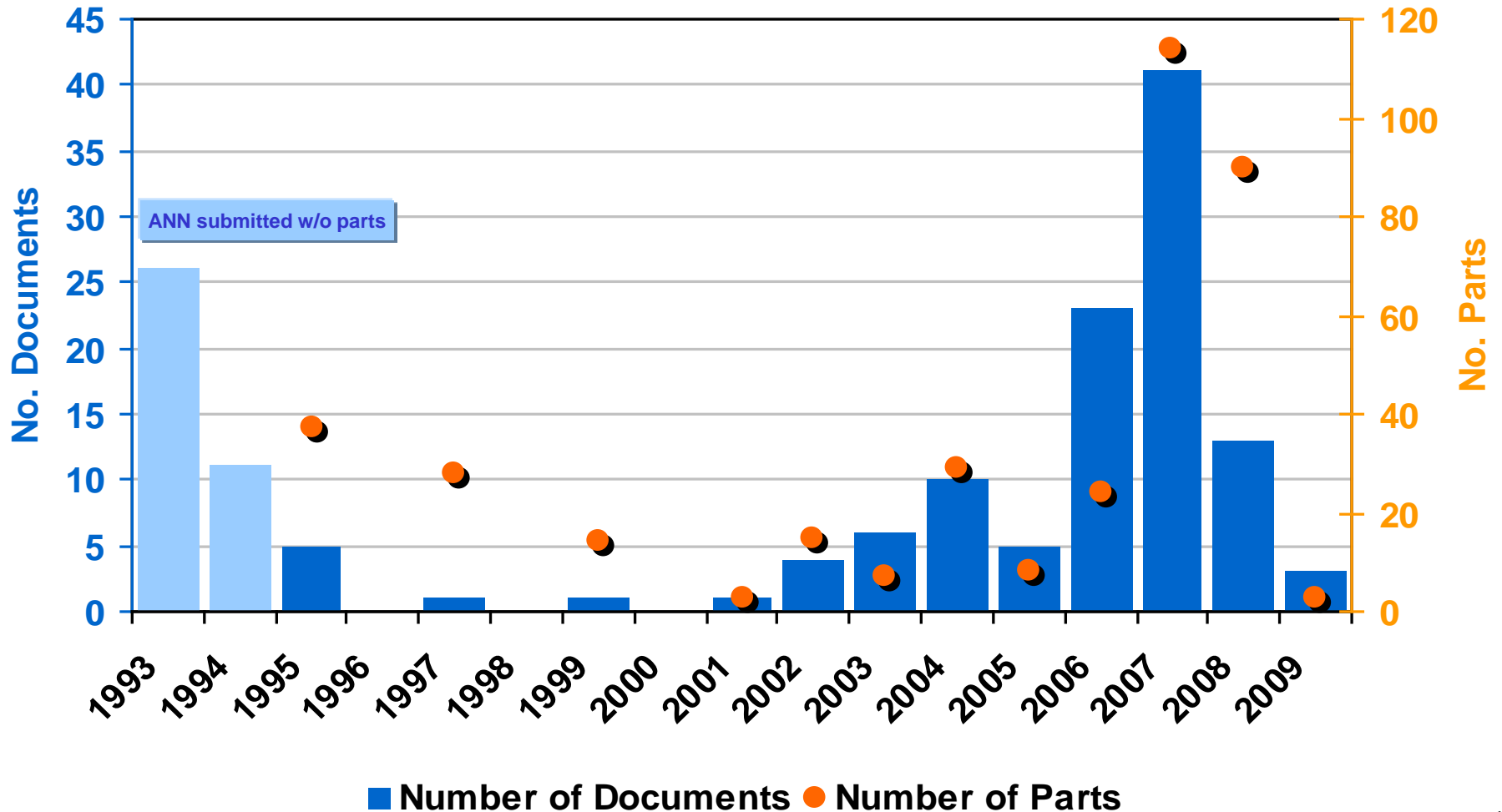
October 2, 2008

- General William G.T. Tuttle Jr., former chief of the Army Materiel Command and now a defense industry consultant, agrees: *“What we have is a pollution of the military supply chain.”* Much of that pollution emanates from the Chinese hinterlands.
- A *BusinessWeek* analysis of a contracting database identified at least 24 active brokers that list residential homes as their place of business. Several have won chip contracts for “critical applications,” which the Pentagon defines as “essential to weapon system performance...or the operating personnel.” In many cases these entrepreneurs comb Web sites such as brokerforum.net and netcomponents.com, which connect them with traders in Shenzhen and Guiyu.
- The brokers sell either directly to Pentagon depots or via suppliers to defense contractors such as BAE.



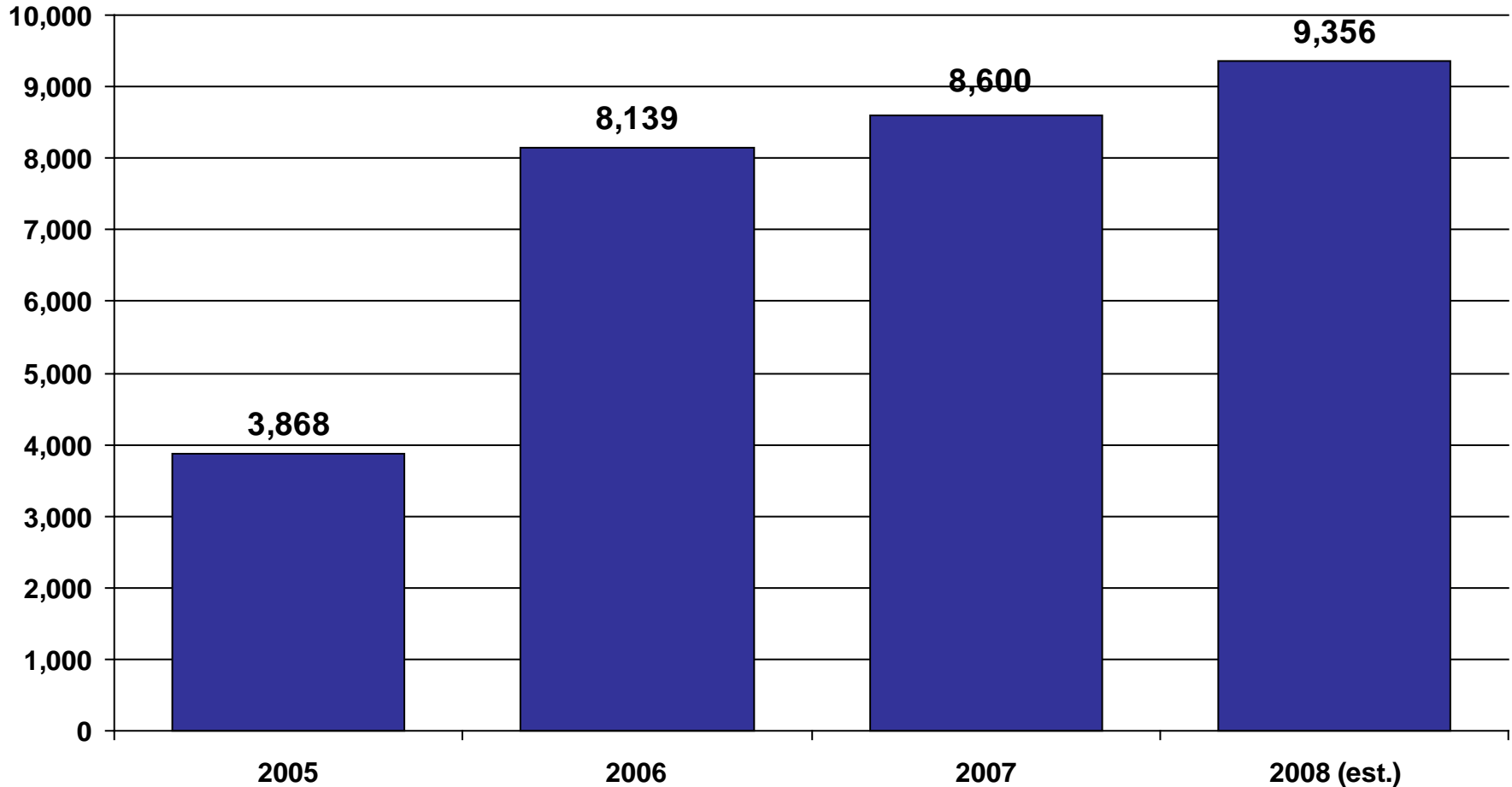
# GIDEP Counterfeit Reporting

## Number of Documents & Parts





# Total Counterfeit Incidents: OCMs, Distributors, Board Assemblers, Prime/Sub Contractors 2005 - 2008



U.S. Department of Commerce – Preliminary Data (as of March 4, 2009)



# Diminishing Manufacturing Sources and Material Shortages

ATL Memo, August 16, 2004



## Business Objectives

To address this challenge, I direct the Total Life Cycle Systems Management (TLCSM) Executive Council to form a subgroup to achieve the following objectives:

1. Define DoD microcircuit requirements (short and long term) and develop a technology roadmap for all weapon systems
2. Create consistent predictive techniques for testing, configuration database management, preferred parts lists, and preferred suppliers to control product development, upgrades, and redesigns
3. Develop and manage the industrial base and organic capability necessary to assure product availability.
4. Optimize the relationship between organic supply and redesign repair capabilities.
5. Make recommended changes to organization, policy, procedures and design rules to fulfill the above.



# Microcircuits and Semiconductors (FSC 5962/5961)



**95,260 Individual Material Numbers (NSNs)**

Within the last year:

12,500 (13.1%) NSNs are Active

- 68,400 Orders per year
- 447,000 Parts
- \$26.6M Annual Demand Value

4,300 (5%) NSNs Drive

- 55,700 Orders per year
- 351,000 Parts
- \$23.6M Annual Demand Value

Managing a high risk environment

- DoD does not drive the market
- Aging weapon systems leading to obsolescence
- Large distributor network, few OEMs



# Qualified Suppliers List Distributors (QSLD)

- DSCP using QSLD to qualify metal, fastener, rivet and textile distributors
- DSCC has also developed list of qualified distributors for the supply of Integrated Circuits (5962), Transistors and Diodes (5961).
  - Both military and commercial grade product.
  - Franchised/Independent Distributors and Brokers can apply
  - Status: Six distributors approved as of 8-28-09



**L&MR, DLA & Service-wide Counterfeit IPT,  
initiated April 09 . . .**

**Looking into all commodity areas**



# CISCO Router Case





# FAR Case 2008-019; Authentic Info Tech Products, 73 Fed. Reg. 68373 (Nov 18, 08)

- DoD, GSA, & NASA Sponsored Proposal Post-CISCO 2004 Router Counterfeiting Event
- OEM in “Gatekeeper” role to assure Hardware & Software
- May extend to components / other
- Offeror represents products as Authentic / Not Counterfeit
- No limitation on Contractor liability
- Industry initial response negative

BILLING CODE 6560-50-P

---

## DEPARTMENT OF DEFENSE

### GENERAL SERVICES ADMINISTRATION

### NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

48 CFR Parts 2, 4, 12, 39, and 52

[FAR Case 2008-019; Docket 2008-0001;  
Sequence 1]

RIN 9000-AL11

### Federal Acquisition Regulation; FAR Case 2008-019, Authentic Information Technology Products

**AGENCIES:** Department of Defense (DoD),  
General Services Administration (GSA),  
and National Aeronautics and Space  
Administration (NASA).

**ACTION:** Advance notice of proposed  
rulemaking and public meeting.

---

**SUMMARY:** The Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) are seeking comments from both Government and industry on whether the Federal Acquisition Regulation (FAR) should be revised to include a requirement that contractors selling information technology (IT) products (including computer hardware and software) represent that such products are authentic. The Councils are also interested in comments regarding contractor liability if IT products sold to the Government, by contractors, are not authentic. Additionally, the Councils are seeking comments on whether contractors who are resellers or distributors of computer hardware and software should represent to the Government that they are authorized by the original equipment manufacturer (OEM) to sell the information technology products to the Government. Finally, the Councils invite comments on (1) whether the measures contemplated above should be extended to other items purchased by the Government; and (2) whether the rule should apply when information technology is a component of a system or assembled product.



# Draft AIA Plan of Action

To Prevent introduction of counterfeits in aerospace, space, and defense, the Counterfeit Parts Integrated Project Team (IPT) proposes ( as of Aug 4, 09)

1. Create standards to manage counterfeit risk w/o sacrificing benefits of buying commercial products
2. Enforcement of Laws to avoid counterfeit introduction in the U.S.
3. Use GIDEP as forum for receiving/disseminating counterfeit reports
4. Government relieve purchaser of counterfeits from payment and retain as evidence
5. Fund approaches to eliminate/mitigate use of obsolete components
6. DoD Supply Centers, Depots and Arsenals apply preference for OCM or authorized/franchised distributors, and apply countermeasures when buying from brokers
7. Provide training to increase awareness of counterfeit risk



# Industry Published Documents

***“...ensure that only new and authentic materials are used in products delivered...only purchase from Original Component Manufacturers (OCMs), franchised distributors, or authorized aftermarket manufacturers... present compelling support procured are authentic/conforming parts.”***

TechAmerica  
Engineering  
Bulletin

Counterfeit Parts &  
Materials Risk Mitigation

TechAmerica-TB-0003

February 2009



 An SAE International Group	<b>AEROSPACE STANDARD</b>	<b>SAE AS5553</b>
	Issued 2009-04	
Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition		

#### RATIONALE

This standard was created in response to a significant and increasing volume of counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks.

This standard was created to provide uniform requirements, practices and methods to mitigate the risks of receiving and installing counterfeit electronic parts.

#### FOREWORD

To assure customer satisfaction, aerospace industry organizations must produce, and continually improve, safe, reliable products that meet or exceed customer and regulatory authority requirements. The globalization of the aerospace industry and the resulting diversity of regional/national requirements and expectations has complicated this objective. End-product organizations face the challenge of assuring the quality and integration of product purchased from suppliers throughout the world and at all levels within the supply chain. Aerospace suppliers and processors face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

This document standardizes requirements, practices, and methods related to: parts management, supplier management, procurement, inspection, test/evaluation, and response strategies when suspect or confirmed counterfeit parts are discovered.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2009 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-406-7222 (inside USA and Canada)

Tel: 724-776-4870 (outside USA)

Fax: 724-776-4790

Email: CustomerService@sae.org

SAE WEB ADDRESS: <http://www.sae.org>

SAE values your input. To provide feedback on this Technical Report, please visit <http://www.sae.org/technical/standards/AS5553>



# Thoughts for Consideration

- **Cyber security, trust and counterfeit component risk jeopardizing IT, mission and life-critical systems**
- **DoD and industry share interrelated SCRM and DMSMS challenges**
- **Acquisition and sustainment solutions need to be worked simultaneously and collaboratively**
- **Consensus and leadership is needed to be successful**

