Challenges

Typical challenges related to materials and parts assurance and counterfeit protection include:

**Not knowing the true source of the materials and parts in the supply chain:** when mechanical or electronic parts in the supply chain are mission critical, there is a large risk associated with the uncertainty around the true source of the materials and the parts.

**Unknowingly receiving counterfeit parts:** the mechanical or electronic replacement parts may appear to be identical to the original component, but the actual source and quality of that part is totally unknown.

The Solution

This solution provides a comprehensive analysis of the key parts in the designated supply chain, and provides recommendations for material and parts assurance and counterfeit protection.

Figure 1 illustrates three major legs to setting up a comprehensive plan, including trusted supplier programs, anti-counterfeiting technologies and chain of custody ePedigree.

**Examples of trusted supplier programs in include:**

Defense Microelectronics Activity (DMEA)
- The use of a trusted foundry
- The use of trusted integrated circuits

Defense Logistics Agency (DLA)
- The use of a Qualified Suppliers List Distributors (QSLD)
- Government-Industry Data Exchange Program (GIDEP) - Product Quality Deficiency Report (PQDR)
- Purchase from the original equipment manufacturer (OEM) or from a distributor, reseller or aftermarket supplier who is authorized or franchised by the OEM

SAE-AS 5553 Standard for Electronics Parts
- Standardizes requirements, practices, and methods related to parts management, supplier management, procurement, inspection, test/evaluation, and response strategies

**Anti-Counterfeiting Technology considerations include:**

The use of packaging, marking & seals
- Holograms and security seals
- Overt and hidden images
- Package modification
Electronic and chemical taggants applied to a product

- Forensic taggants such as:
  - Optical taggants
  - Chemical taggants
  - Nanotaggants

Mass Encoding

- Digital Mass Serialization or Encryption: Human Readable/Barcode/RFID
- Serialization with ePedigree or EPCIS: 2D Barcode/RFID

**Electronic Digital Pedigrees (ePedigree):**

An ePedigree is simply an electronic document which satisfies a pedigree requirement. The primary purpose of an ePedigree is to protect consumers from contaminated or counterfeit products or parts. As the product moves down the supply chain, each company is required to carry forward all previous ePedigree information. In this way, the final point of sale has the complete lineage of every unit. An ePedigree is built as the part or product moves through the supply chain as Illustrated in Figure 2.

![Figure 2: ePedigree Illustration](image-url)
Solution Benefits

There are significant business benefits to implementing a program that incorporates the right tools and methods to combat counterfeit parts; the primary benefit is the reduction in risk associated with providing a bad part to a mission critical weapons platform.

Implementation

The Professional Services required to implement this solution are as follows:

- **Phase 1 – Discovery**
  
  Determine the “as-is” state and business process for parts acquisition in the extended supply chain, targeting known high risk areas such as electronics.

- **Phase 2 – Analysis**
  
  Based on the scope of the discovery phase, the information is analyzed to establish options for consideration.

- **Phase 3 – Recommendations**
  
  Once analyzed, a findings report is prepared that is presented to management, including recommendations for risk mitigation.

- **Phase 4 – Implementation**
  
  Professional Services can be provided to support the recommended changes. A variety of specific technologies are available to address the targeted problems.

About the Electro-Optics Center

The Electro-Optics Center (EOC), a proud part of The Pennsylvania State University, is a hybrid between the best components of a university and those of private industry. This relationship allows us access to the university’s researchers and scientists, its state-of-the-art facilities and leading edge research.

Our staff, comprised primarily of former industry and DoD personnel, brings experience in exceeding sponsor and corporate expectations. Through the application of this hybrid model, the EOC is able to provide its sponsors with solutions that combine leading edge research with on-time and on-budget deliveries. Learn more at www.eoc.psu.edu.