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Sustainment of Commercially Off-The-Shelf (COTS) Equipment

Defense Acquisition University

Certification Training | Knowledge Sharing | Continuous Learning | Mission Assistance

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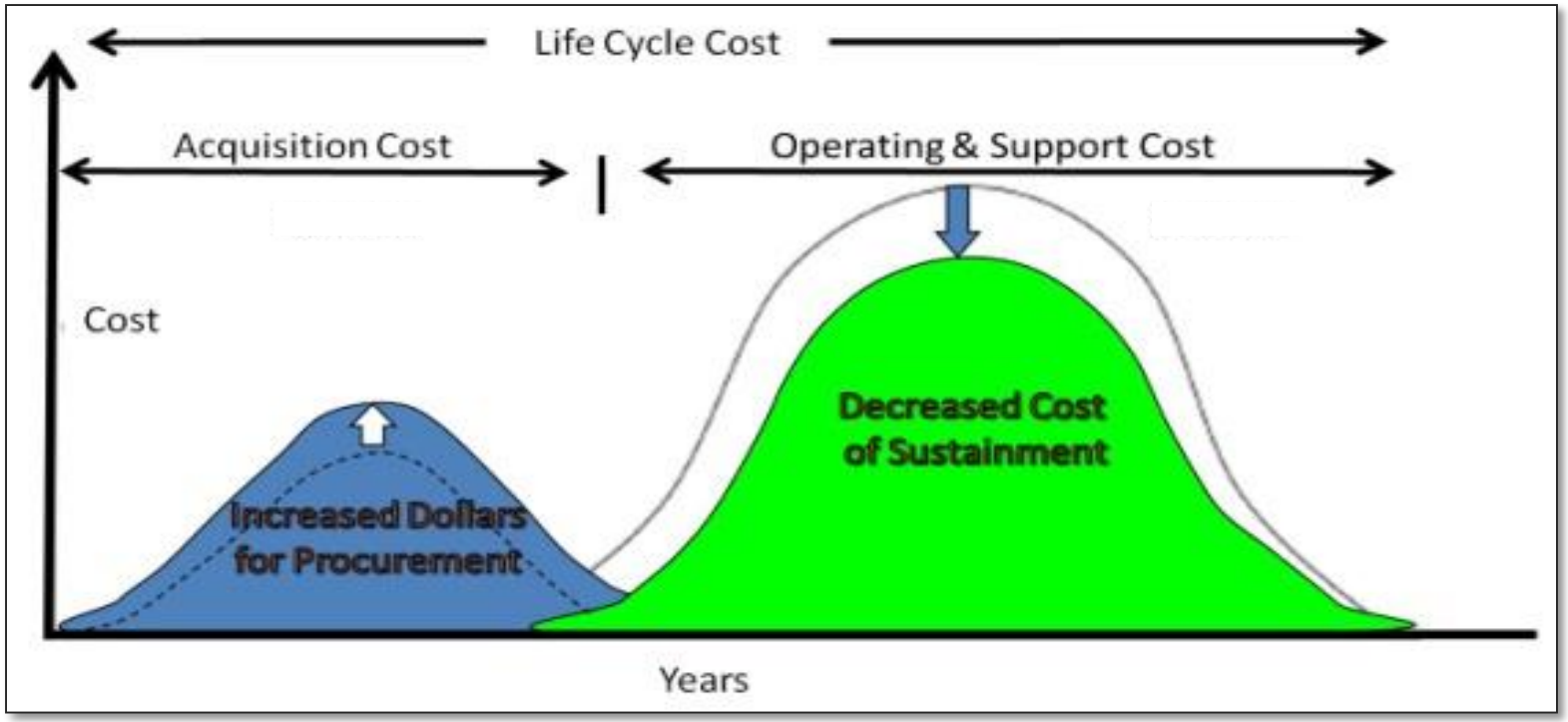
The Challenge

- *"Traditionally, development and procurement have accounted for about 28 percent of a weapon's total ownership cost, while* ***costs to operate, maintain, and dispose of the weapon system account for about 72 percent of the total****.*



Current COTS Utilization

- Most systems being developed today use some COTS products (e.g., computer hardware, operating systems, database management systems, and even batteries, engines, and air conditioners)
- Currently, there is a wider availability of COTS products and a desire / need to increase the use of these products in DoD systems in order to provide the warfighter with the latest available technology

AGENDA

- Better Buying Power 3.0
- Definitions
- COTS in DOD Programs
- Potential Benefits
- Challenges
- Failures
- Risk Mitigation Strategies
- Successes
- Developing a Product Support Strategy
- Sustainment / Maintenance Options

Better Buying Power 3.0

Better Buying Power 3.0

1. **Achieve Affordable Programs**
   - **Continue to set and enforce affordability caps**
2. **Achieve Dominant Capabilities While Controlling Lifecycle Costs**
   - **Strengthen and expand "should cost" based cost management**
   - Build stronger partnerships between the acquisition, requirements, and intelligence communities
   - Anticipate and plan for responsive and emerging threats
   - Institutionalize stronger DoD level Long Range R&D Planning
   - Strengthen cybersecurity throughout the product lifecycle
3. **Incentivize Productivity in Industry and Government**
   - Align profitability more tightly with Department goals
   - **Employ appropriate contract types, but increase the use of incentive type contracts**
   - Expand the superior supplier incentive program across DoD
   - **Ensure effective use of Performance-Based Logistics**
   - **Remove barriers to commercial technology utilization**
   - Improve the return on investment in DoD laboratories
   - Increase the productivity of corporate IR&D
4. **Incentivize Innovation in Industry and Government**
   - Increase the use of prototyping and experimentation
   - **Emphasize technology insertion and refresh in program planning**
   - **Use Modular Open Systems Architecture to stimulate innovation**
   - Increase the return on and access to small business research and development
   - Provide draft technical requirements to industry early and involve industry in funded concept definition
   - Provide clear "best value" definitions to industry

5. **Eliminate Unproductive Processes and Bureaucracy**
   - Emphasize Acquisition Executive, Program Executive Officer, and Program Manager responsibility, authority, and accountability
   - Reduce cycle times while ensuring sound investments
   - Streamline documentation requirements and staff reviews
   - Remove unproductive requirements imposed on industry
6. **Promote Effective Competition**
   - Create and maintain competitive environments
   - **Improve DoD outreach for technology and products from global markets**
   - Increase small business participation, including more effective use of market research
7. **Improve Tradecraft in Acquisition of Services**
   - Strengthen contract management outside the normal acquisition chain
   - Improve requirements definition
   - Improve the effectiveness and productivity of contracted engineering and technical services
8. **Improve the Professionalism of the Total Acquisition Workforce**
   - Establish higher standards for key leadership positions
   - Establish stronger professional qualification requirements for all acquisition specialties
   - Strengthen organic engineering capabilities
   - Ensure development program leadership is technically
   - qualified to manage R&D activities
   - Improve our leaders' ability to understand / mitigate technical risk
   - Increase DoD support for STEM education

BETTER BUYING POWER 3.0

ACHIEVING DOMINANT CAPABILITIES THROUGH TECHNICAL EXCELLENCE AND INNOVATION

Achieve Affordable Programs

- Continue to set and enforce affordability caps

Achieve Dominant Capabilities While Controlling Lifecycle Costs

- Strengthen and expand "should cost" based cost management

Incentivize Productivity in Industry and Government

- Employ appropriate contract types, but increase the use of incentive type contracts
- Remove barriers to commercial technology utilization
- Ensure effective use of Performance-Based Logistics

Incentivize Innovation in Industry and Government

- Emphasize technology insertion and refresh in program planning
- Use Modular Open Systems Architecture to stimulate innovation

Promote Effective Competition

- Improve DoD outreach for technology / products from global markets

Definitions

What is a Commercial Item?

Commercial Item (CI)

Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and—

- Has been sold, leased, or licensed to the general public; or
- Has been offered for sale, lease, or license to the general public *(FAR, subpart 2.101)*

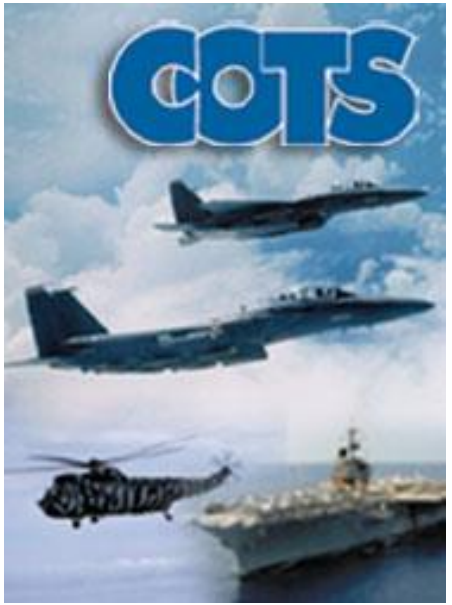
What is COTS?

Commercially Available Off-The-Shelf (COTS)

Any item of supply (including construction material) that is:

- A commercial item;
- Sold in substantial quantities in the commercial marketplace; and
- Offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace

(FAR, subpart 2.101)



COTS in DoD Programs

COTS Use in DoD

Individual Programs Use of COTS Products Varies

- Integration of a few COTS products within a largely custom-built DoD system
- COTS product from a single vendor that can largely replace a custom DoD system
- System that is integrated from multiple COTS products purchased from different vendors

COTS Affect on Programs

Deciding how COTS products affect a specific program depends on:

- Degree to which the program intends to use COTS
- Extent to which introducing the COTS product alters the physical characteristics of the system
- Complexity of integrating COTS and custom DoD items

Potential Benefits

Potential Benefits

- Cost Savings / Cost Avoidance
- Reduced Program Schedule / Timeline
  - Rapid Technology Insertion
- Vendor Technology Advances / Product Upgrades
- Proven Capability / Proven Product
- Industry Expertise / Skill Base

Challenges

Challenges of Using COTS

- Program mangers must expect to analyze requirements, evaluate COTS products, and design, integrate, and test the system at various points in the life of the system.

- Failure to evolve the architecture and reengineer the system to address changes in COTS products and the marketplace will potentially result in a system that cannot be maintained as vendors drop support for obsolete COTS products.

Challenges of Using COTS

- Product Volatility
- No / Little Insight into Product
- May Not Meet Program Requirements
- Program Life May Exceed Product Life
- System Incompatibilities
- Configuration Management for Multiple Products

Challenges of Using COTS (Cont.)

- Vendor Viability
- Maintenance
- Possible Testing Inadequacy
- Integration of COTS
- Upgrading COTS
- **Customization of COTS ***
- **Underestimated Total Life Cycle Costs***

Customization of COTS

- COTS Modification Results in Custom Items
  - Updates to a custom version may lag behind the vendor's commercial releases, and users may be forced to live with older (customized) versions of the COTS
  - Vendor may not be willing to maintain the unique version

Sustainment Costs of COTS

- Programs Frequently Underestimate the Unique Sustainment Cost Associated with COTS Products These cost include:
  - Market research
  - Evaluation Test and integration for version upgrade
  - COTS system replacement
  - Technology Refresh
  - Annual licensing fees

Failures

Examples of COTS Failures

- Vendors, program offices, and the contractors believed that COTS products **provided most of the required capability**, when in **reality the items provided limited capability**
- Program office **expectation that COTS products should be modified** to accommodate program requirements
- COTS product was substantially **enhanced to address unique DoD practices,** essentially delivering a **custom system**
- One program **attempted to finalize all system requirements in advance of market research**. This increased the gap between the COTS product offerings and the documented requirements.

Examples of COTS Failures

- Program **expected that the COTS would provide necessary maintenance capabilities**. However, the vendor's commercial support strategy **did not provide the spares, training, or repair cycles** necessary for military use.
- Another Program struggled because **they did not evaluate the vendor's financial stability ands strategic direction**, the volatility of the technology on which the COTS product was based, or the frequency of COTS product releases

Risk Mitigation

COTS Fundamentals

Increased Reliance on COTS Implies a Different Paradigm of System Acquisition

- Fundamental 1: Adapt to the Marketplace
  - Many programs continue to follow traditional models and attempt to fully specify requirements before design alternative / marketplace is considered
  - **Goal in designing a COTS system must be to adapt requirements to the capabilities available in the marketplace rather than adapting the commercial capabilities to DoD requirements**

- Fundamental 2: What Drives Development of COTS?
  - **Marketplace, not the program manager, drives development**
  - Primarily driven by the vendors' perceptions of what will sell to the largest number of potential users

COTS Fundamentals

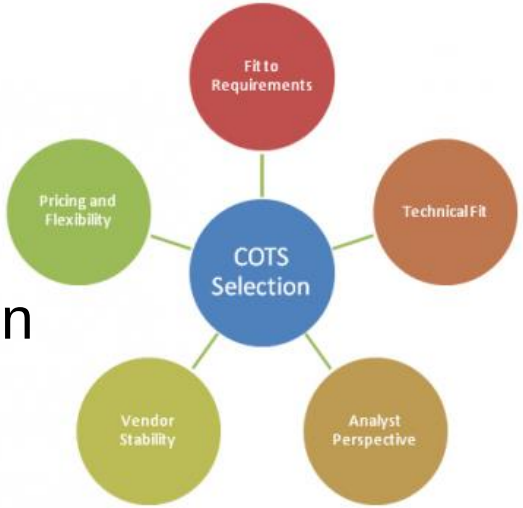
- Fundamental 3: COTS Versus Custom Development
  - **Recognizing difference between integrating COTS and developing a custom capability** is a key component of managing COTS
    - Custom development and integration
    - COTS acquisition and integration
- Fundamental 4: Planning for the Life of a Program
  - Using COTS means that **many acquisition activities are repeated** throughout the life of the program
  - Frequent changes driven by the marketplace are likely to make activities typical of sustainment necessary even before initial system delivery
  - **Activities typical of development may be repeated** after system deployment because a system based on COTS is never really “complete”

Risk Mitigation

- **Extensive Market Research Required**
  - Evaluate capabilities of available COTS products
  - Evaluate performance of vendors
  - Evaluate relative size of the program to the vendor's business base
  - Gain extensive product knowledge prior to baselining requirements
  - Conduct business viability analysis
- **Establish Business Relationships with Contractors / Vendors**
  - Early contractor / vendor involvement throughout the life cycle
  - Ensure that program needs are communicated in a manner that maximizes the program's leverage
  - Use / Identify redundant vendors as needed
  - Determine how important the program is to the specific vendor
  - Institute meaningful and open communication among the vendors, the contractors, and all of the program stakeholders

Risk Mitigation

- **Embrace Commercial Business Practices** that are embedded in the COTS product
- **Gain Knowledge of Vendor's Expectations** on how it will be used including:
  - Concept of operation it supports
  - Interface and data standards
  - Architecture and design
  - Characteristics of form, fit, and function
- **Bridge the Gap**
  Between the DoD System Context and the Commercial Use



Risk Mitigation

- **System Engineered to Accommodate Marketplace**
  - Driven changes to COTS products throughout the system life cycle
- **Flexible Requirements / Flexible Architecture**
- **Establish COTS Standards for the Program**
- **Verification / Validation Plans**
- **Prototyping**
- **Product Modeling / Simulation**
- **Using a Test Bed for Evaluation**

Successes

Examples of COTS Successes

- Stakeholders of a successful program made a firm **decision to modify system requirements** and not COTS
- DoD Program **pared down requirements** to reflect essential, as opposed to customary or preferred, business practices
- Organization built a number of systems based on COTS products by **refusing any modification of COTS product** as not maintainable at reasonable cost

Product Support Strategy

What Is a Product Support Strategy?

- The objective of the **Product Support Strategy (PSS)** is to achieve and sustain warfighter operational readiness outcomes
  - Achieving these outcomes is dependent on optimizing the **integrated product support elements** that constitute the support strategy
- **Product support strategy should support and/or improve product's:**
  - Availability
  - Reliability
  - **Affordability**
  - Supportability

Can be transactional and/or outcome-based

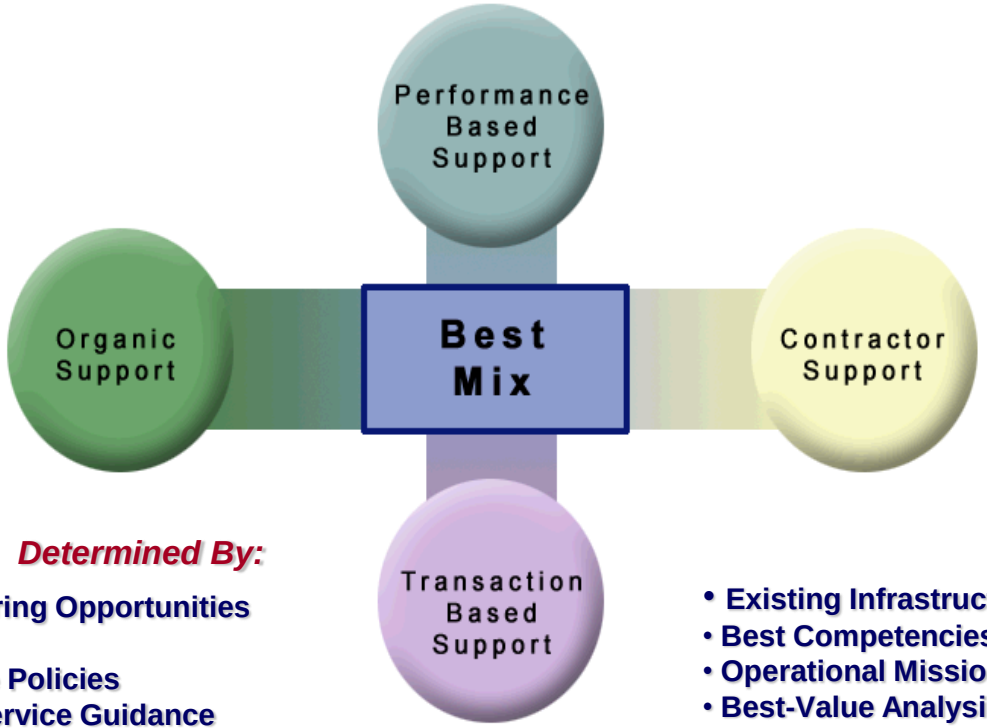
COTS Product Support Considerations

- **Has the item been modified?**
  - Extensive modification may limit feasibility for total contractor support
- **Where will the item be used?**
  - Environment may change item's reliability / maintainability and thus reduce maintenance options
- **How long will the system be used?**
  - System service life will drive the support structure / options
- **How much of the software is mature?**
  How much is customer unique?
  - Software takes time to mature
- **Can the in-house support structure keep up with changes in the system and modify the support strategy accordingly?**
  - If not, then contractor support is preferred
- **Why is a commercial item being selected?**
  - If reason is to take advantage of advanced technology, then contractor preferred
  - If reason is availability of proven, stable design, then organic may be preferred

Product Support Concerns

- Quality of and Alternatives for Product Support
- Supportability of COTS Product
- Maintenance Planning
- Suitability of COTS Product for Military Use
- Vendor Performance / Stability
- Product Changes / Upgrades
- Technical Data / License Agreements
- Training and Manuals

SPECTRUM OF SUPPORT OPPORTUNITIES



Determined By:

- Partnering Opportunities
- Title 10
- Service Policies
- OSD/Service Guidance

- Existing Infrastructure
- Best Competencies
- Operational Mission
- Best-Value Analysis

Summary / Requirements for Success

- **Paradigm Shift Required from Traditional Acquisition**
- Extensive / Ongoing Market Research
- Build Strong Business Relationships
- Systems Engineering to Accommodate Marketplace
- Requirements Must Be Flexible / Negotiable
- Testing is Essential
- Effective Life Cycle Cost Estimation Critical
- Logistician Involvement Upfront / Early / Throughout

QUESTIONS?

References

- **Defense Acquisition Guidebook - https://dag.dau.mil**
- **Continuous Learning Module (CLM 025) - "COTS Acquisition for Program Managers";** Defense Acquisition University
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