Overcoming Obsolescence and Upgrading Integrated Small Arms – Abstract 13982

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NSWC Crane Division

NSWC CRANE
• Located on 3rd Largest Navy Installation in the World
• No Encroachment & Unencumbered
  ▪ Detachment at Fallbrook, CA

NSWC Crane Mission Focus Areas:
Special Missions
Strategic Missions
Electronic Warfare / Information Operations

Four Outputs:
- Knowledge
- Contracts
- Hardware
- Software

NSWC Crane Division

Stewards of
14 NAVSEA Technical Capabilities

NSWC Crane
Crane, IN
NSWC Carderock
Philadelphia, PA
NSWC Corona
Norco, CA
NSWC Panama City
Panama City, FL
NSWC Dahlgren
Dam Neck
Virginia Beach, VA
NSWC Crane
Fallbrook
NSWC Port Hueneme
Port Hueneme, CA
NSWC Keyport
Keyport, WA
NSWC Newport
Newport, RI
NUWC Headquarters
Newport, RI
NSWC Indian Head
Indian Head, MD
EODTECHDIV
Indian Head, MD
NSWC Carderock
West Bethesda, MD
NSWC Headquarters
Washington, DC
NUWC Keyport
Keyport, WA
NUWC Newport
Newport, RI
NUWC Headquarters
Newport, RI
NSWC Panama City
Panama City, FL
NSWC Dahlgren
Dahlgren, VA
NSWC Corona
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Small Arms Air Platform Integration

• Who are we?
  – We are a team of engineers, logisticians, and technicians with vast crew served weapons and electronics integration experience.
  – We have the capability to support the full life cycle of the systems we deploy.
  – We support multiple platform offices and team with industry partners.
  – We take great pride in providing high quality support to our customers in a timely manner.

• What do we do?
  – Design and integrate weapon systems for various aircraft.
  – Fabricate prototype parts for fit checks and testing.
  – Support flight certification process through the NAVAIR Performance Monitors.
  – Provide Finite Element Analysis (FEA) modeling for fatigue and crash loads.
  – Procure production hardware through GOV contracts.
  – Receive, inspect, kit, and deploy high quality systems.
  – Provide interim supply support.
  – Provide depot support
  – Capability to support OEM designed weapon systems
  – Provide engineering and logistics support to fielded systems
Various Air Platforms Supported
Obsolescence

- Old Does Not Mean Obsolete
- Parts Obsolescence
  - When a part is no longer procurable
  - Best Case: Part for Part Swap (Class II ECP)
  - Worst Case: Changing Part Requires Redesign (Class I ECP)
    - A Life Time Buy of a Part was $380k; New Part Would Have Cost $35M to Incorporate
  - High Part Obsolescence Costs Should Trigger the Discussion to Maintain, Upgrade, or Purchase New
- System Obsolescence
  - The System Can No Longer Effectively Perform its Intended Mission
Buy New vs. Upgrade

- Not a New Topic
- No Secret Formula
- No Global Answer
- Hot Topic with a lot of Opinions from Everyone
- Systems Engineering Should Always be Employed

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Balancing Operator Requirements with Programmatic Issues

- Cost
- Schedule
- Certifications

- As Budgets Shrink Cost Has More Weight
- Operator Requirements Should Never Be Weightless
Upfront Systems Engineering

• Avoid
  – “New is Better”-itis
    • Distracted by Shinny Things
    • Always Changing Requirements
  – “User’s Just Like to Complain” Syndrome
    • Never Update CONOPS
    • Take Change Personally

• Always Employ a Robust Systems Engineering Process to Take a Life-Cycle Perspective
  – Life-Cycle Cost Will Continue to Increase in Importance
  – Reality Based Keeping Current and Future Funding/Threat in View
  – Upfront Planning is Key
  – “Since 2004, nearly 30,000 vehicles have been refurbished at a cost of approximately 35 percent of the value of a new production light-utility vehicle, according to a November 2010 report by the [GAO].”
    • Sandra Erwin; National Defense, Feb 2011, p. 32
Systems Engineering Processes

Not Just for A-Cat I Anymore

• Tailored to Appropriate Level
  Based on Utility to Project
Defining the Problem

• Deficiency Reports
  – NAVAIR Developmental Deficiencies Can be Applied to Fielded Systems
    • Part I, I*, or I** -Unable to Accomplish Mission
    • Part II -Correction Will Result in Increase Effectiveness
    • Part III -Annoyance, Avoid in Future Designs

• JONS / UONS
• JCIDS
• Design Reference Mission / CONOPS
• Analysis of Alternatives
• Increased User Involvement
Design Reference Mission

- Define Stakeholders
- Capability Need
- CONOPS
- Operating Environment
- Operating Conditions
- Potential Threat
- Mission Success Requirements
- Mission Definition
- Operational Activities
- Mission Execution
- Scenarios
- Situations
- Use Case Scenarios
- Requirements Derivation
- System Architecture
- Concept Generation
- Concept Selection
- Observations
- Recommendations
Analysis of Alternative

- Define Problem
- Develop Analysis Plan
- Identify Assumptions
- Gather & Review Data
- Crunch the Numbers
- Analyze the Results
- Package Results
- Requirements/Acquisition Issues
- Alternatives
- Determination of Effectiveness Measures
- Effectiveness Analysis
- Cost Analysis
- Compare Alternatives
- Military Utility/Worth
- Sensitivity Analysis
Increased User Involvement

• 10 Users with 11 Opinions
• Crew Systems Working Groups
• Late User Input
  – Always Treat with Respect
  – Does it Delay a Milestone?
  – Does it Enhance Capability?
  – Does it Support a Written Requirement?
  – Does it Increase/Decrease Cost?
• Document User Recommendations and Critical Design Decisions
  – System/Subsystem Design Description
• Grandfather Clause
  – The Old System was Certified so the New System Will Automatically be Certified
  – “We’re only changing a few things”
  – “The change is simple, there should be no issues”

• Certification Requirements Need to be Addressed Upfront and in Detail
  – The Amount of Recertification Can Have a Major Impact on Cost, Schedule, and Play a Key Role in the New vs. Upgrade Decision

• Old Standards vs. New
• Old Waivers vs. New
• What Changes are In/Out of Bounds That Would Invalidate Any Certifications?
• What Interface Can/Cannot Be Changed
  – Interface Control Document
Summary

• Anything More Than a Class II ECP Should Have Some Type of Systems Engineering Involvement
• Increased Upfront Systems Engineering will help with the New vs. Upgrade Decision
• Systems Engineering is the Best Tool to Aid in the Balancing of User Requirements and Project Constraints
• Do Not Underestimate Obsolescence
• Never Count on Grandfather (for certifications)
Small Arms Air Platform Integration

Thank you for your time and attention!

For more information on NSWC Crane, please visit www.crane.navy.mil

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