

# SPECIAL MISSIONS



**RAPID RESPONSE  
PROVEN SOLUTIONS**

## Overcoming Obsolescence and Upgrading Integrated Small Arms – Abstract 13982

**16 May 2012**

**Joseph Burkart**

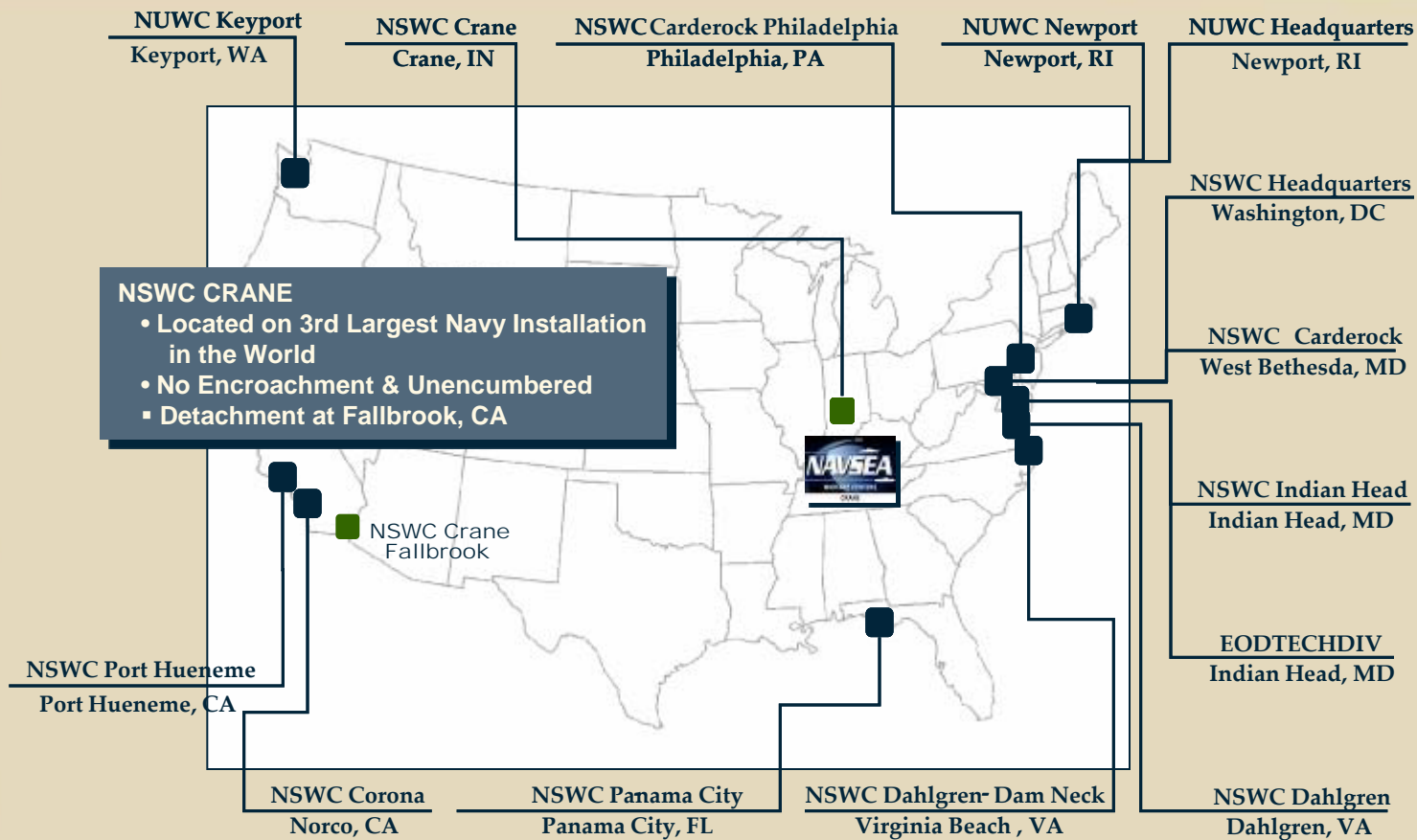
**Crane Division, Naval Surface Warfare Center (NSWC Crane)**

Com (812) 854-1654

DSN 482-1654

[joseph.burkart@navy.mil](mailto:joseph.burkart@navy.mil)

# NSWC Crane Division



**Stewards of  
14 NAVSEA Technical Capabilities**



**NSWC Crane Mission Focus Areas:**

- Special Missions*
- Strategic Missions*
- Electronic Warfare / Information Operations*

**Four Outputs:**

- Knowledge
- Contracts
- Hardware
- Software



- **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



Approved for Public Release; Distribution is unlimited.

- **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



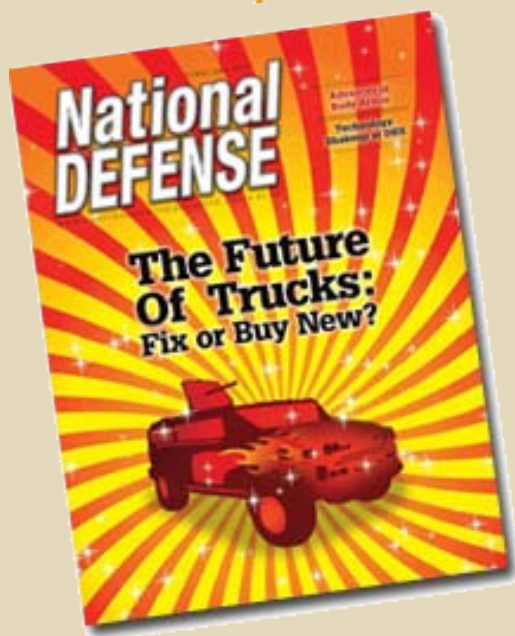
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# Buy New vs. Upgrade

- 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

February 2011



March 2012



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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**



- **Avoid**
  - **“New is Better”-itis**
    - Distracted by Shiny 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

# Not Just for A-Cat I Anymore

- Tailored to Appropriate Level Based on Utility to Project

Naval Air  
Systems Command  
NAVAIR  
Systems Engineering Guide

Systems Engineering Guide for Systems of Systems



Version 1.0  
August 2008

Director, Systems and Software Engineering  
Secretary of Defense (Acquisition and Technology)  
Office of the Under Secretary of Defense  
Acquisition, Technology and Logistics

Systems Engineering Plan  
Preparation Guide



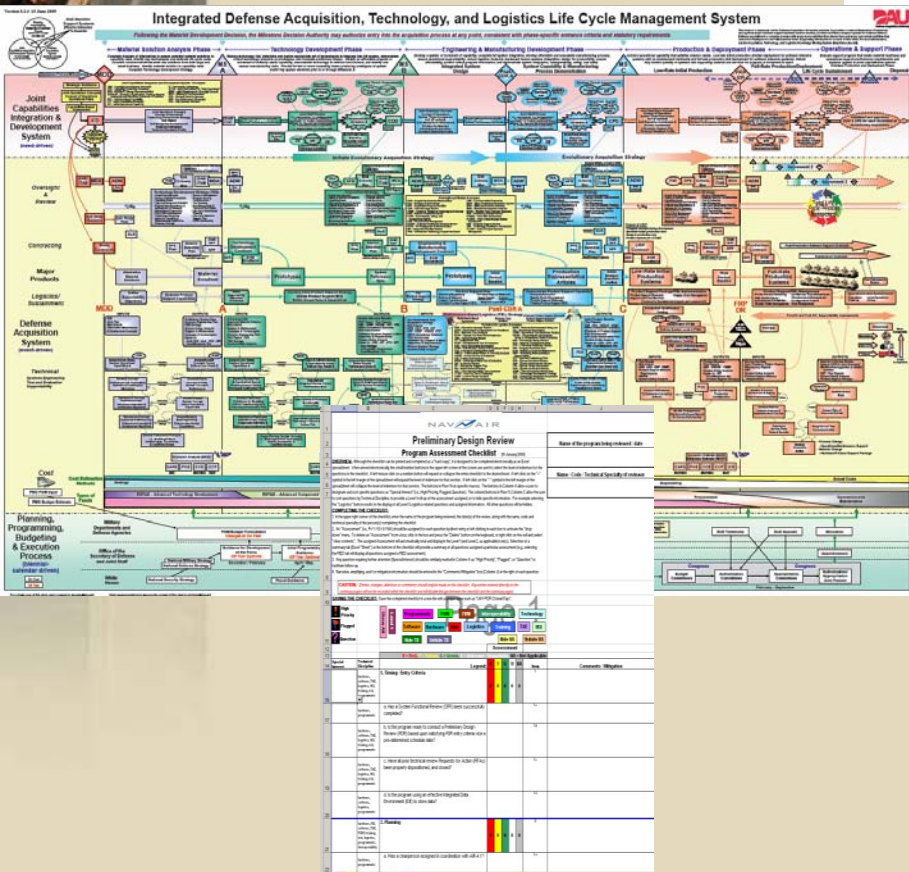
"Technical Planning for Mission Success"

Version 2.01  
April 2008

Department of Defense

Office of the Deputy Under Secretary of Defense for  
Acquisition and Technology

Systems and Software Engineering  
Enterprise Development



## SYSTEMS ENGINEERING FUNDAMENTALS



January 2001

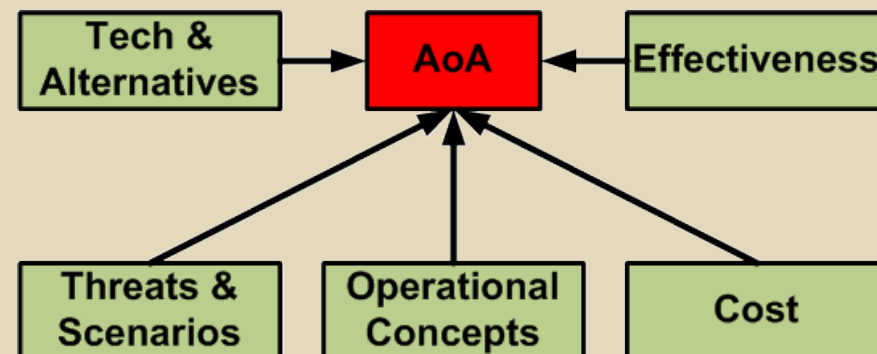
SUPPLEMENTARY TEXT  
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FORT BELVOIR, VIRGINIA 22060-5565

- **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**



- **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**

- 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



- **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 -Don't Count On It-

- **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



- **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)**

**Thank you for your time and attention!**



For more information on NSWC Crane, please visit [www.crane.navy.mil](http://www.crane.navy.mil)

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