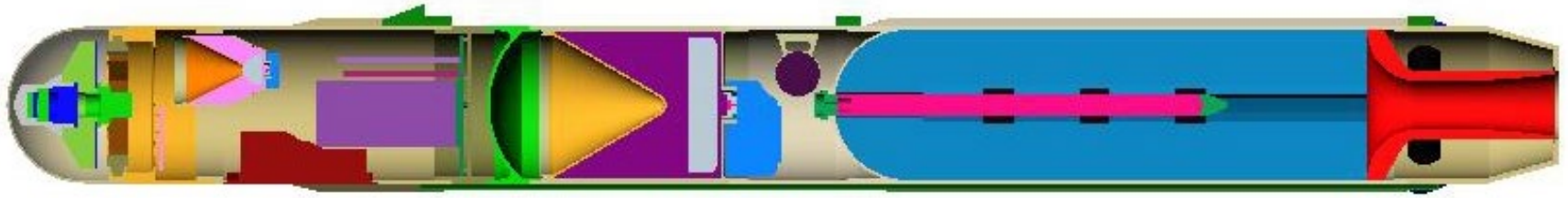
Cost Estimating and Affordability

Air-to-Ground Missile Case Study

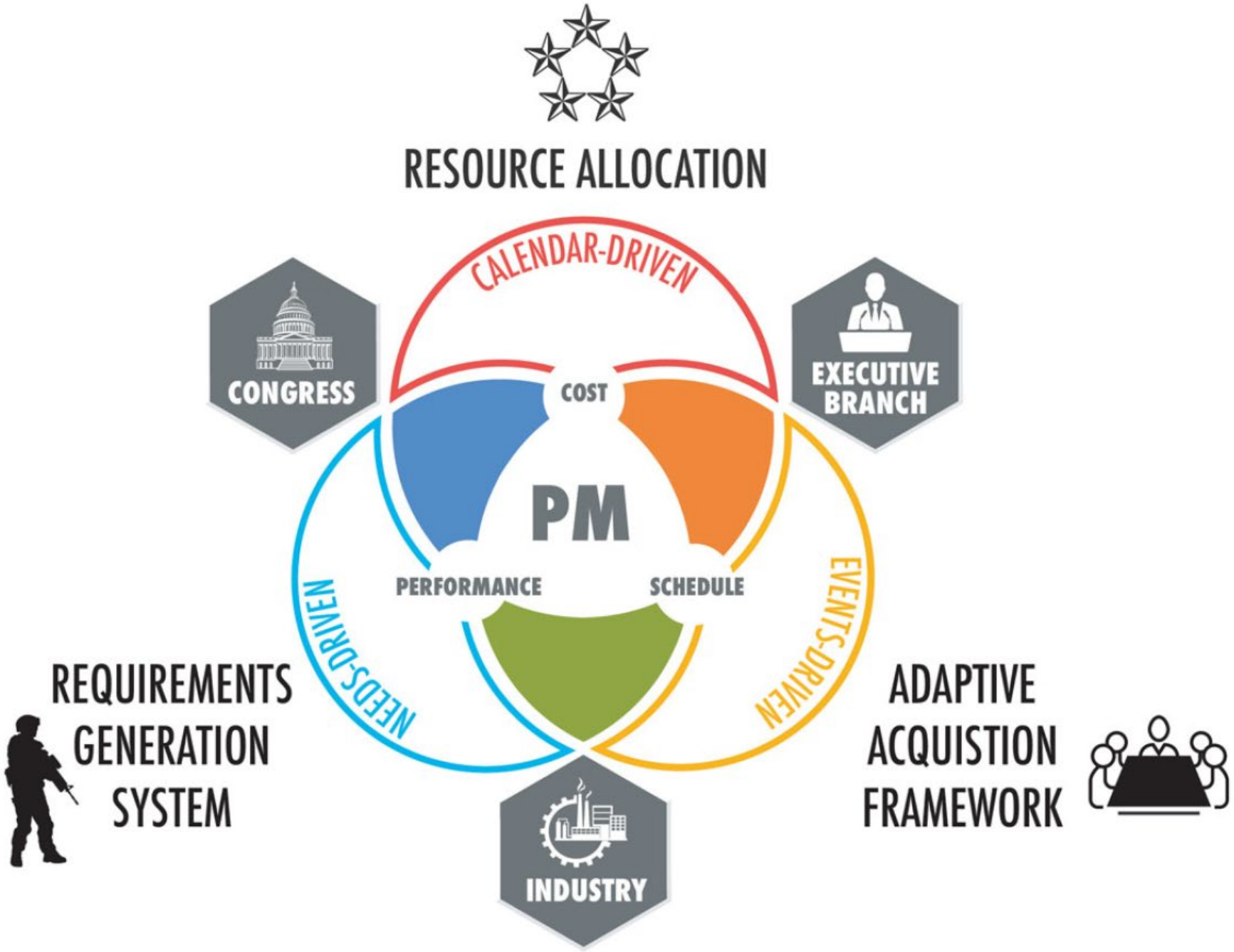
Joint Common Missile (JCM) Program



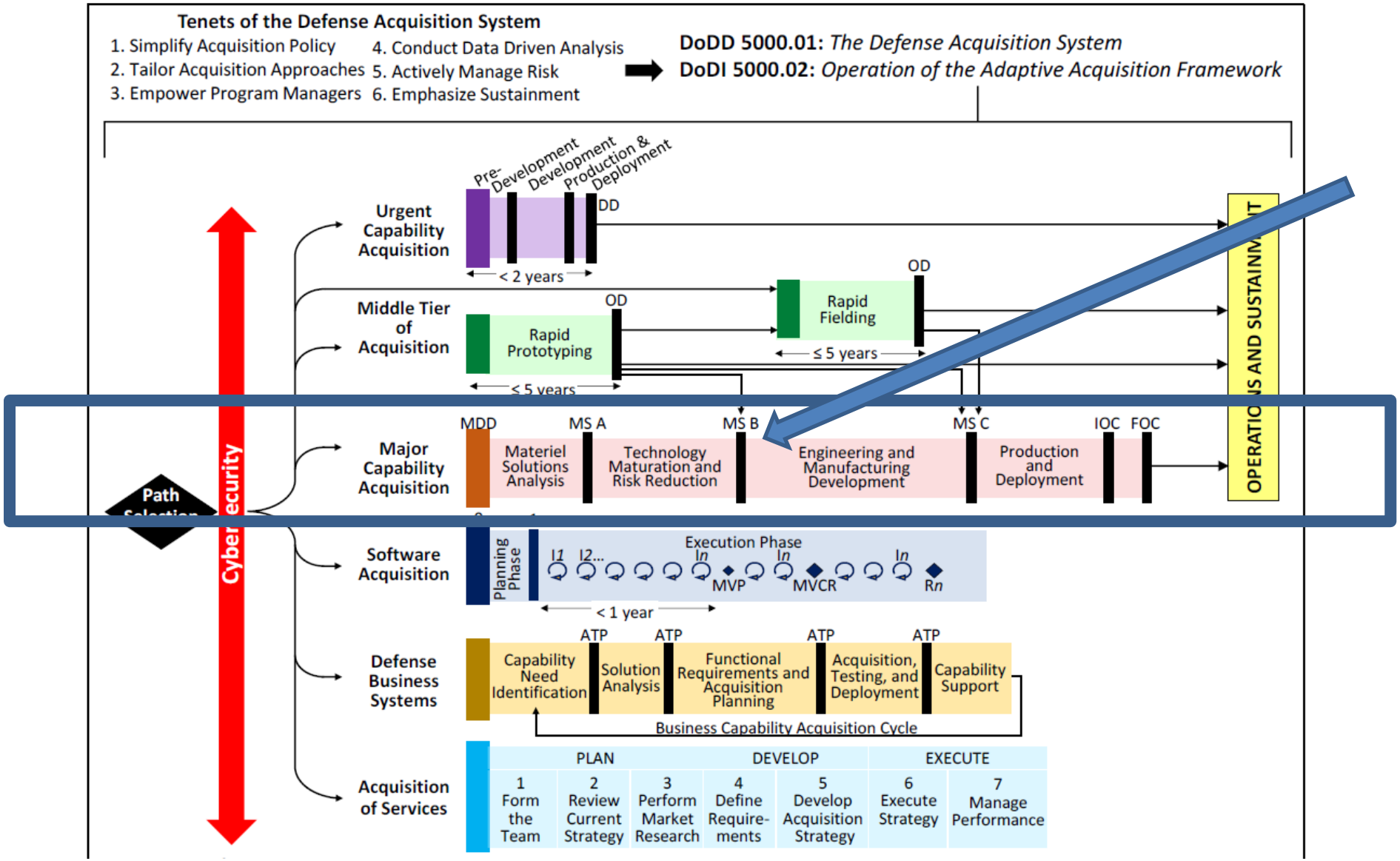
Dr. Bob Mortlock, Professor of the Practice, COL U.S. Army (Retired)

Cost Estimating and Affordability

- **General Approach:** Use the JCM program to enhance critical thinking and decision-making skills with respect to program cost estimating and affordability determinations.
- **Applicability:** Defense Acquisition professionals
- **Overall Learning Objectives:**
  - Analyze a program at a key decision point—***critical thinking***.
  - Identify and engage key stakeholders—***stakeholder engagement***.
  - Develop and compare alternative recommended strategies—***decision making***.
  - Identify second-order considerations of the recommended strategies—***strategic leadership***.


RESOURCE ALLOCATION
CALENDAR-DRIVEN
CONGRESS
EXECUTIVE BRANCH
COST
PM
PERFORMANCE
SCHEDULE
NEEDS-DRIVEN
EVENTS-DRIVEN
REQUIREMENTS GENERATION SYSTEM
ADAPTIVE ACQUISTION FRAMEWORK
INDUSTRY

Adaptive Acquisition Framework

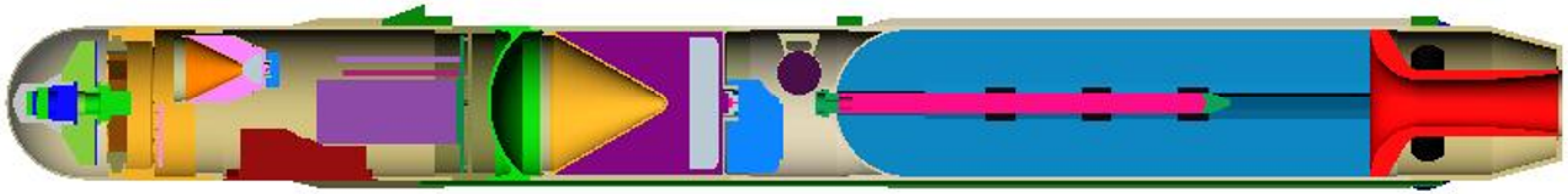


Case Study Learning Objectives

- Demonstrate understanding of what cost estimates and cost estimating methods are as well as how they are applied in acquisition program planning and decision-making.
- Demonstrate an understanding of the difference between the learning rate effect (improvement curve) and the production rate effect when applied in production cost estimates in acquisition programs.
- Develop recommendations for decision-making that are defensible based on data and the science of cost estimating.

Case Study Introduction

Joint Common Missile (JCM) Program



Case Dilemma: The JCM program is scheduled for a milestone decision review. The Milestone Decision Authority (MDA) has cancelled the review due to affordability concerns -- joint cost position and the independent cost estimate varied greatly. The program manager (PM) must explain and develop recommendation for a path forward to support the warfighter.

Joint Cost Position (JCP)

- Engineering and Manufacturing Development (EMD) at 48 months for $970M
- Production over 11 years at $6,023M
- Total Life Cycle Costs = $7,275M
- AUPC = $108K

Independent Cost Estimate (ICE)

- Engineering and Manufacturing Development (EMD) at 72 months for $1,350M
- Production over 11 years at $7,490M
- Total Life Cycle Costs = $9,130M
- AUPC = $153K

Thought Questions

- What were the key differences between the joint cost position (JCP) and the independent cost estimate (ICE), and why did those differences exist?
- What should the program manager recommend for the length of the engineering and manufacturing (EMD) phase?
- What's the difference between the learning rate effect and the production rate effect in estimating recurring production costs?
- For recurring production,
  - How was the cost estimated for a specific missile from the production schedule?
  - What were the assumed T1 values used in the JCP and ICE?
  - Why would the JCP and ICE assume different learning rate effect values and different production rate values?
- How can the MDA certify the JCM program as affordable and fully funded to Congress with the differences between the JCP and ICE?

Discussion Storyboard

Epilogue

Joint Common Missile (JCM) Program

- Program cancelled in 2004 as unaffordable
- Single-step acquisition strategy
- Extensive requirements:
  - Tri-mode seeker, multi-purpose warhead, common motor, four RW & FW platforms

Joint Air to Ground Missile (JAGM) Program

- Program started in 2015, deemed ***affordable***
- ***Incremental development*** strategy
- Reduced requirements:
  - Dual-mode seeker, Hellfire warhead and motor, two threshold platforms

The "Lost" Decade → Unresponsive Acquisition

Understanding the cost estimates and affordability might have helped avoid delivering no upgraded capability to the warfighter for over a decade

Triple Constraint: affordability decisions set cost and schedule → trading performance associated with low maturity technologies → Incremental Development Approach