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Achieving Affordability through High Fidelity ROM cost estimates

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Agenda

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- Attributes of a typical ROM cost estimate
- Enhancements to ROM cost estimates
- Value to Decision Makers
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Introduction

- According to GAO's 2015 High Risk Report, there are an increasing number of weapon system acquisition programs experiencing unanticipated cost overruns
  - Understanding your total life cycle costs and total ownership costs (TOC) is much more critical to program affordability and long term success
- Budget Control Act of 2011 (BCA) instituted "Sequestration" or automatic spending reductions of $1.2 trillion from FY2013 to FY2021 for the Department of Defense (DoD), Department of Homeland Security (DHS), and other government agencies
  - Today's austere budget environment acts as a forcing function for decision makers to consider total life cycle costs during early stages of the program

Affordability as a Mandate

- The DoD Better Buying Power (BBP) includes a focus on "Achieving Affordable Programs" which mandates affordability as a requirement
  - Programs must provide affordability caps for unit production cost and sustainment costs

- BBP includes a focus area of "Control Costs Throughout the Product Lifecycle" which is designed to implement a cost culture

- Affordability and cost management are becoming part of the major Federal acquisition culture

Understanding Total Life Cycle Costs is vital to achieving affordability

Definitions of Rough Order of Magnitude (ROM) cost estimates

- **Government Accountability Office (GAO) Cost Estimating Guidebook**
  - Developed when a quick estimate is needed and few details are available
  - Usually based on historical ratio information, it is typically developed to support what-if analyses and can be developed for a particular phase or portion of an estimate to the entire cost estimate, depending on available data
  - It is helpful for examining differences in high-level alternatives to see which are the most feasible
  - It is developed from limited data and in a short time, a rough order of magnitude analysis should never be considered a budget-quality cost estimate
- **U.S. Navy (NAVAIR Cost Guidebook)**
  - An estimate that must be produced quickly with little time for detailed analysis
  - This estimate relies heavily on analogy of similar system costs and subject matter expert opinions
  - Estimates developed using this approach are well suited for budgetary planning wedges or what-if type exercises

Industry Standards align with Government best practices

- ROM cost estimates that are used in both government and commercial industry contain the following common characteristics:
  - Produced in a short timeframe with limited data sets
  - Rely heavily on analogous systems (historical data) and subject matter expert opinion
  - Defined by the degree of fidelity in the analysis, not its breadth

- Role of ROM cost estimates:
  - Used to examine different alternatives and what-if analysis
  - Are not considered budget-quality (sometimes used for wedge estimates)

Attributes of a typical ROM cost estimate

- ROM cost estimates are usually developed when the Preliminary or Operational Requirements Documents are produced

- ROM cost estimates are usually based on analogous characters like weights, which only provide insight into a notional asset based on assumptions

- Impact: Program Manager's first insight into total lifecycle costs is the Program Life Cycle Cost Estimate (LCCE), which is typically performed after the Analysis of Alternatives (AoA)

Identifying the need for Enhancements to ROM cost estimates

- Recognize that getting higher accuracy in cost estimates early in the acquisition phase is very difficult because many program assumptions are not yet determined
  - ROM cost estimates fill the gaps by forcing broad based assumptions

- Decision makers have discovered that traditional unconstrained requirements analysis and ensuing ROM cost estimates can often miss the mark in providing them with accurate information
  - Especially true when making unconstrained trade-off decisions early in the acquisition cycle (Pre Milestone A or ADE-1)

- Performing earlier and increasing the fidelity of ROM cost estimates give federal entities to additional tools which should increase the quality of decision making

Enhancements to Rough Order of Magnitude (ROM) cost estimates

- Presenting enhancements to typical ROM cost estimates with the central goal of providing increased quality of information to decision makers

1. Earlier ROM cost estimates
   - Advocating ROM cost estimates be performed during the development of the requirements and Concept of Operations (CONOPS)

2. Higher Fidelity ROM cost estimates
   - Advocating ROM cost estimates assumptions built on multiple requirements and/or capabilities which produces cost trade offs related to mission execution

Explanation of Enhanced ROM cost estimates

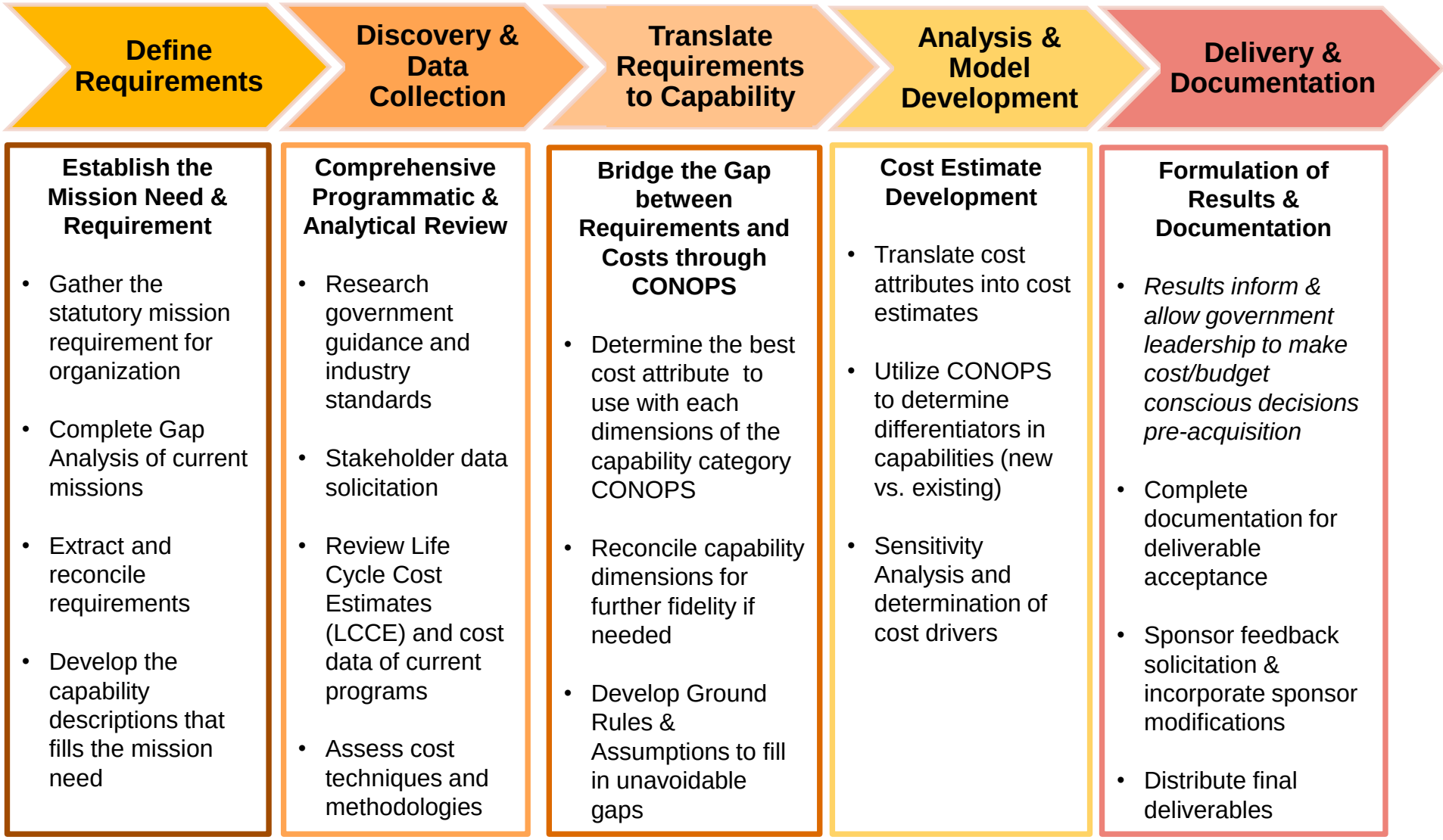
Characteristics of Early, Higher Fidelity ROM cost estimates:

- Fundamental assumptions on mission and requirements can be utilized for a higher fidelity in the cost estimates
- Allows users to build cost knowledge/awareness before all program assumptions are identified
- ROMs should include total life cycle costs, but not to the detail of a LCCE (For example including average annual O&S costs is useful to decision makers)

Benefits of an Enhanced ROM cost estimate:

- Attaching ROM cost estimates to Concept of Operations (CONOPS) allows additional visibility of cost into suitable material solutions that meet the mission needs
- Visibility into cost reduces wasted effort on nonviable material solutions due to prohibitive costs

Process for Enhanced ROM Cost Estimates



Enhanced ROM cost estimates allow Cost Trade Offs to be identified earlier in the acquisition process

Examples of Cost Trade Offs:

- Inclusion of Sensitive Compartmentalized Information Facility (SCIF) onboard a ship
- Inclusion of Flight Deck for manned and unmanned helicopters
- Speed (effects on propulsion and electrical system)
- Sea State capability (hull, structural support, and watertight compartment design considerations)
- Utilization of crew swaps or rotations

Enhanced ROM cost estimates currently being performed for Federal clients

Value to Decision Makers

- Since an Enhanced ROMs are built based on requirements enables decision makers insight into earlier stage material solution selection for mission accomplishment

- Allows federal agencies to do broad based planning and consider of alternatives predicated on knowledge of the cost ramifications and impact on mission

- Moves the federal entity away from unconstrained early acquisition planning by eliminating nonviable material solutions

Limitation and Conclusions

Limitations on Enhanced ROM cost estimate

- ROMs do not have the rigor to provide Budget Quality input
- ROMs may not move federal entities closer to the ultimate best solutions, but they can begin to identify systems or subsystems that are cost prohibitive
- Early stage higher fidelity ROM cost estimates won't replace later stage detailed cost estimates for final acquisition solutions

Conclusion

- Upfront efforts, like Enhanced ROM cost estimates, help identify cost trade offs early during requirements planning stage, which create a greater cost consciousness mindset and help achieve long term affordability

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Abstract

- Achieving affordability can be challenging especially if early decisions are made without proper cost estimates. Developing high fidelity ROM cost estimates and identifying capability tradeoffs during the requirements generation phase can be critical to the success of achieving long term affordability. We intend to demonstrate through analysis that preforming high fidelity ROM cost estimates with capability tradeoffs allow decisions makers to informed choices on mission requirements that achieve affordability for future programs.