Conference Paper

Intelligence Mission Data Cost Methodology Guidebook

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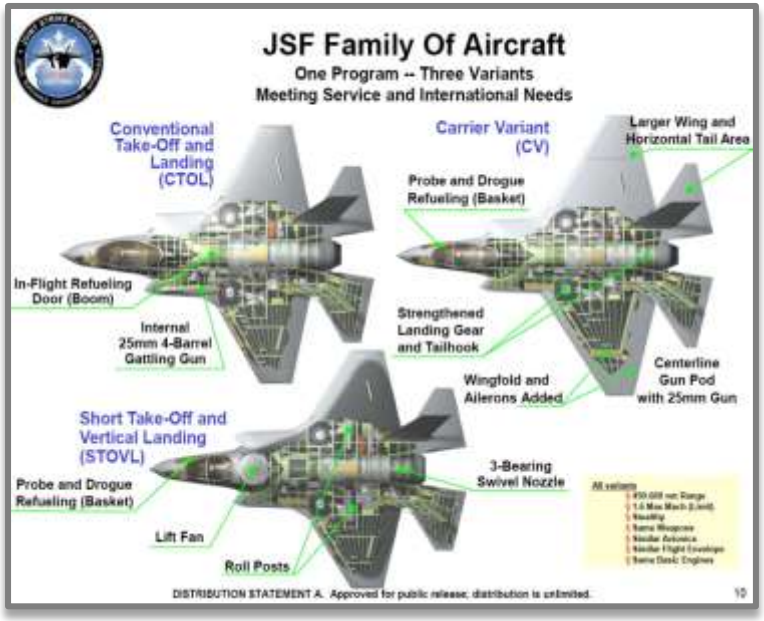
Introduction

Intelligence support to DoD Acquisition provides an understanding of foreign threat capabilities that is critical to the development and deployment of current & future U.S. Military platforms



Quantifying IMD costs helps manage Acquisition programs risk & long-term sustainability

Weapon Modernization

- The rise in complexity of modern DoD weapons systems has created an increasing demand for **Intelligence Mission Data (IMD)** to feed automated processes in supporting the Warfighter

Technology

- Technology initiatives for weapon system design, operations, and sustainment rely on IMD components to meet expected capability requirements
- 5th Generation Military Aircraft, Ground Vehicles, C4ISR, Space Systems, Missile Defense

Capability Enhancement

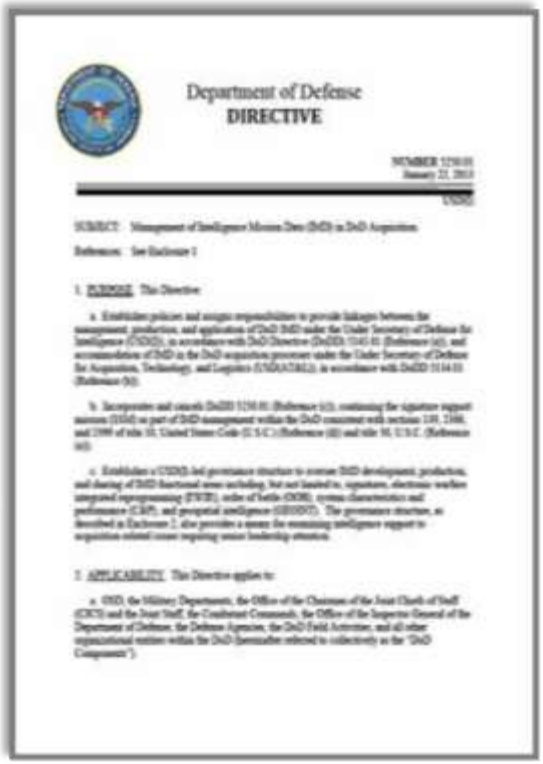
- Programs like the Joint Strike Fighter F-35 require IMD for combat Identification, collection, ISR, communications, targeting, & operational support
- IMD supports response to emerging threat environments

What is Intelligence Mission Data?

- **Definition: DoD intelligence used for programming platform mission systems in development, testing, operations, & sustainment including the functional areas of:**
  - **Signatures**
  - **Electronic Warfare Integrated Reprogramming (EWIR)**
  - **Order of Battle (OOB)**
  - **Characteristics and Performance (C&P)**
  - **Geospatial Intelligence (GEOINT)**
- **DoD Directive 5250.01 "Management of IMD in DoD Acquisitions"**

For an acquisition program, IMD is a system component just like wheels, wings, or electronics across the program lifecycle

DoDD 5250.01 IMD Costing Requirements



Department of Defense
DIRECTIVE

Signed by DEPSECDEF on 22 January 2013; Available on DAU DoDD 5250.01 Website

Functional Responsibilities

- IMD dependent acquisition programs must submit a LMDP that details all IMD requirements
- Intelligence Production Centers (IPCs) are to assess requirements & are responsible for developing IMD availability & costing shortfall estimates
- Requires all IMD producers use a standardized costing methodology for each functional area when developing cost estimates
- Costing requirements apply to only Potentially Available IMD: IMD that is not currently available but can be produced given current technical capabilities and legal authorizations

DIA-Intelligence Mission Data Center

- **Lead DIA organization tasked with the implementation DoD Directive 5250.01**
  - Serves as the enterprise focal point for IMD development, production, discovery, and sharing
  - Identifies common IMD requirements across acquisition programs, efforts, and operational systems
  - Provides support to 250+ major defense acquisition programs
- **Specific to the IPCs assessment of gaps and costs, the IMDC developed and published the IMD Cost Methodology Guidebook in February 2013**
  - Implemented costing process that ensure IMD cost estimates are compliant with Office of the Secretary of Defense Cost Assessment and Program Evaluation (OSD CAPE) standards
  - Assist IPCs in the development of a repeatable & streamlined response to LMDPs which includes standardized templates

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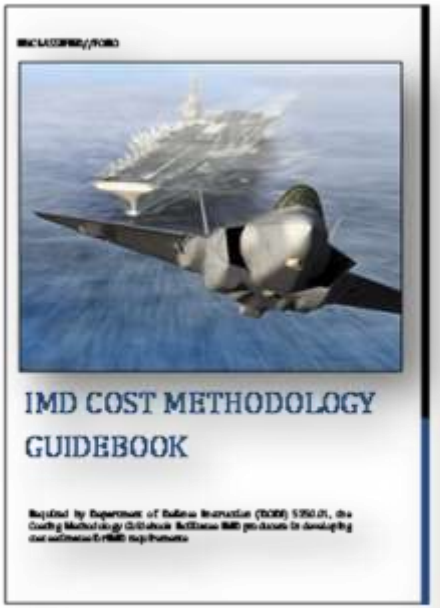
IMD Cost Methodology Guidebook

In 2013, Booz Allen Hamilton developed the IMD Cost Methodology and the Guidebook on behalf of the DIA IMDC

Guidance

- Modeled after 2009 GAO Cost Estimating and Assessment Guide
- Provides the "blueprint" to credible cost estimating procedures, applying them to the IMD problem set
- Serves as the official costing manual for lifecycle mission data planning, required by DoDD 5250.01
- Establishes IMD cost guidance that aligns to OSD CAPE & GAO compliant standards
- Provides explanation on how to conduct sensitivity, risk, uncertainty, O&S, analysis on IMD



DAU Link: https://acc.dau.mil/CommunityBrowser.aspx?id=289687

Highlights

- Version 1.0 published 15 Feb 2013
- Represents the latest USG guidance for creating high-quality & credible cost estimates
- Considered living guidance", to be updated at the direction of OUSD(I) & DIA
- Approving bodies included OUSD(I), DCAPE, & DIA IMDC
- Over 100+ copies have been disseminated across the DoD & IC
- Available on DAU DoDD 5250.01 Website

Chapter Summary & Contents

Chapter I : Introduction

- Purpose, scope, intended audience & availability
- Policy Imperatives: MDAPs, WSARA,
- Department of Defense Directive 5000.01 series,
- Acquisition Lifecycle,
- DoD"Better Buying Power" Initiative & Affordability

Chapter II: Cost Analysis Overview

- USG Cost Estimating Best Practices & Characteristics of Credible Cost Estimates
- Identification of Common Pitfalls
- Case Study 1: Joint Strike Fighter F-35 IMD, Operations and Sustainment

Chapter III: 12 Steps to High Quality Cost Estimating

- Overview of 12 Step Credible Cost Estimating Process
- Review of Costing Methodologies: Analogy, Parametric, Engineering, Extrap of Actuals
- Case Studies 2-4: Acquisition Intelligence Lifecycle Cost Estimating Structure (AILCES), Metrics for TECHELINT and EWIRDB Production, NASIC Joint Strike Fighter F-35 IMD Cost Estimate
- EK-38 Merganser Vignettes

Chapter IV: Agency & Service Cost Estimating Guidance

- Overview of USG cost agencies (e.g. OSD CAPE, ODNI CAIG, AFCAA, NCCA)
- IMD cost estimating functions, roles, & responsibilities
- Data sources, material resources, & POC information

Chapter V: Appendix

- Glossary, Terms of Reference
- IPT Charter & Abstract
- IMD Cost Estimating Reporting Templates

IMD Credible Cost Estimating Process

- **Adopted the 12 Steps to High Quality Cost Estimates process outlined in the 2009 GAO Cost Estimating Guidebook**
  - Represents a credible framework & the most basic structure for developing cost estimates
  - Several elements of the GAO processes were modified slightly to conform to specific IMD cost estimating requirements

Steps 1-2: Define the Purpose & Cost Estimating Plan

Steps 3-4: Define IMD Requirements & Develop Cost Estimating Structure

Step 5: Identify Ground Rules & Assumptions

Steps 6-7: Obtain Cost Data & Develop Point Estimate

Steps 8-9: Conduct Sensitivity, Risk, & Uncertainty Analysis

Steps 10-11: Document the Estimate & Present for Approval

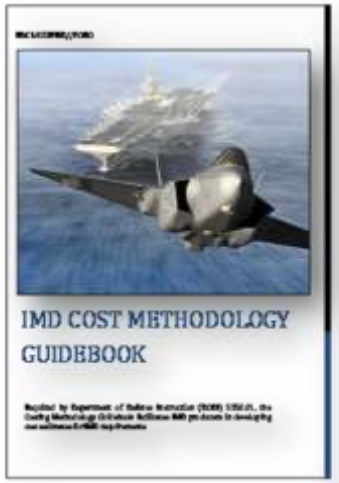
Step 12: Update Estimate to Reflect Actuals

Benefits and Objectives of the Cost Guidebook

Provides Uniform Cost Guidance for IMD

Establishes Credible Cost Methodology Procedures

Facilitates Decision Making



Bridges perspectives from acquisition, intelligence, and requirement communities to create a common IMD costing reference

Benefits to Stakeholders

- Presents standardized approaches for developing credible IMD cost estimates
- Focuses on major cost drivers within the IMD Lifecycle Management Process
- IMD cost estimates serve as important inputs to and components of Acq. programs LCCEs, CARDs, & ICEs
- Supports DIA business goals & performance measures to make smart decisions

Supports Congressional and DoD Policies …

Current Activities and Future Initiatives

IMD Costing Efforts	Created a 50+ IMD Costing Standards Working Group; designed to tackle a variety of complex issues facing IMD
	Provided technical cost assistance and training to IPCs
	Developed the first ever IMD Costing Requirements Workbook
	Established a prioritization process for LMDPs entry into the availability and costing phase
	Refined processes to aggregate and conduct analysis on IPC costing shortfall data; 7 programs assessed to date (i.e. AMDR, IFPC, 3DELRR)
	Monitor emerging JSF F-35 IMD requirements (June-Aug)
	Conduct cross program IMD analysis of MDAPs going through LMDP phases (July-Aug)
	Update IMD Cost Methodology Guidebook (Aug-Oct)

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Summary

- **The generation of reliable IMD cost estimates is critical to supporting both DoD's acquisition & intelligence programmatic processes**
  - Enables comparability analysis to identify efficiencies
  - Provides cost-saving opportunities across the DoD Enterprise
- **The capture of IMD shortfalls & gap analysis is presented in multiple ways to support:**
  - Acquisition program's risk assessments
  - OIPT & DAB processes
  - Resource justifications for decision makers
- **Developing a deeper understanding of the IMD costs associated with intelligence support to acquisition improves the DoD & ICs' ability to validate budgetary requirements & manage resources more effectively**

Questions

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Back Up Slides

Summary -12 Cost Estimating Steps (1-4)

Step 1: Define Purpose & Scope	Step 2: Develop Estimating Plan
▪ Identify required level of detail, overall scope of the estimate, and who will receive the estimate. ▪ Level of detail & overall scope will vary based on maturity of acquisition program. ▪ Estimates will be delivered to PMs and decision-makers to inform resourcing and risk strategies.	▪ Identify cost estimating team, outline approach and develop timeline ▪ Teams should include broad participation (mix of IMD producers & resource managers in consultation with acquisition programs, acq-intel personnel and IMD functional area board.
Step 3: Define IMD Requirements	**Step 4: Determine Cost Estimating Structure**
▪ Determine the appropriate specificity of IMD requirements for the program or effort's level of maturity and development. ▪ IMD producers will identify available, potentially available, and unobtainable requirements. ▪ IMD producers, the IMDC, and acquisition effort sponsors should agree on the potentially available IMD requirements and the scope of the cost estimate.	▪ Describe the level lower system characteristics, configuration, quality factors, operational concept, and the risks associated with the system. ▪ Select estimating method for each WBS element. ▪ Define a WBS and describe each element in a WBS dictionary. ▪ Identify potential cross-checks for likely cost and schedule drivers. ▪ Develop an IMD cost estimating checklist.

Summary - 12 Cost Estimating Steps (5-8)

Step 5: Identify Ground Rules & Assumptions	Step 6: Obtain Data
▪ Identify global GR&As that apply to the entire estimate and determine which ones carry most risk. ▪ Collaborate with the IMDC to identify existing data or processes to be leveraged during GR&A development. ▪ Identify any schedule or budget constraints, inflation assumptions, and miscellaneous costs. ▪ Understand tech. refresh cycles/assumptions.	▪ Create a data collection plan with emphasis on collecting current and relevant technical, programmatic, cost, and risk data. ▪ Collect data and normalize them for cost accounting, inflation, learning, and quantity adjustments. ▪ Analyze the data for cost drivers, trends, and outliers. ▪Interview data sources and document pertinent info.
Step 7: Develop Point Estimate	**Step 8: Sensitivity Analysis**
▪ Develop the cost model by estimating each WBS element, using best methodologies. ▪ Include all estimating assumptions in the cost model. ▪ Add WBS elements to develop the point estimate. ▪ Validate the estimate by looking for errors like double counting and omitted costs. ▪ Perform cross-checks on cost drivers to see if results are similar. ▪ Update the model as more data become available	▪ Test the sensitivity of cost elements to changes in estimating values and key assumptions. ▪ Identify effects on the overall estimate of changing the program schedule or quantities. ▪ Determine which assumptions are key cost drivers and which cost elements are affected most by changes. ▪ Ensure consistency of tested elements with key ground rules and assumptions. ▪Sensitivity analysis permits decisions that influence design, production, and operations.

Summary - 12 Cost Estimating Steps (9-12)

Step 9: Conduct Risk & Uncertainty Analysis	Step 10: Document the Estimate
▪ Determine and discuss with technical experts the level of cost, schedule, and technical risk associated with each WBS element. ▪ Analyze each risk for its severity and probability. ▪ Determine type of risk distributions and reason for their use. ▪ Use an acceptable statistical analysis methods. ▪ Identify the amount of contingency funding and add this to the point estimate to determine the risk-adjusted cost estimate.	▪ Document all steps used to develop the IMD cost estimate. ▪ Document the purpose of the estimate, the team that prepared it, and who approved the estimate and on what date. ▪ Include auditable and traceable data sources for each cost element and document for all data sources how the data were normalized. ▪ Describe the results of the risk, uncertainty, and sensitivity analyses.
Step 11: Present Estimate for Approval	**Step 12: Update Estimate to Reflect Actuals**
▪ Develop a briefing that presents the documented life-cycle cost estimate. ▪ Focus on the largest cost elements and drivers. ▪ Make the content clear and complete so that those who are unfamiliar with it can easily comprehend the competence that underlies the estimate results. ▪ Act on and document feedback from management. Request acceptance of the estimate.	▪ Update the estimate to reflect changes in technical or program assumptions or keep it current as the program passes through new phases or milestones. ▪ Report progress on meeting cost and schedule estimates. ▪ Document lessons learned for elements whose actual costs or schedules differ from the estimate. ▪ Document all changes to the program and how they affect the cost estimate.