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Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW





DoD Cost Estimating Guide v2

OFFICE OF THE SECRETARY OF DEFENSE Cost Assessment and Program Evaluation

Tecolote Research, Inc.

Send comments and questions to: osd.pentagon.cape.mbx.cost-assessment@mail.mil

UNCLASSIFIED

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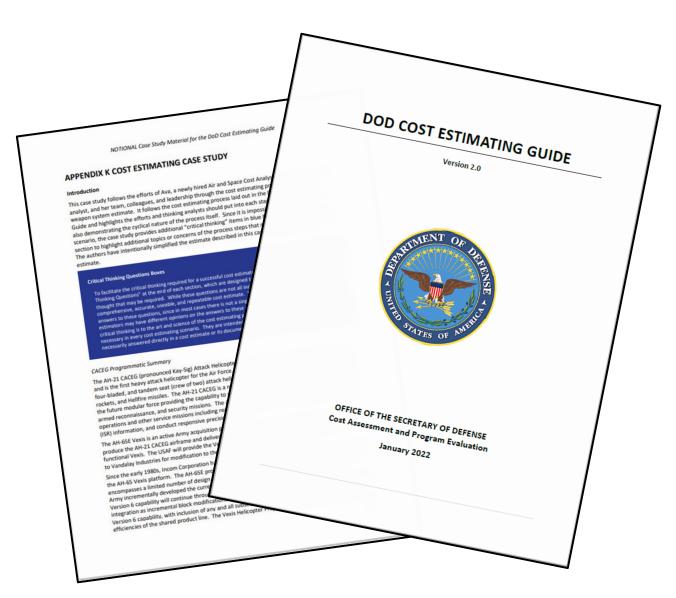
DoD Cost Estimating Guide

- Why a DoD Cost Estimating Guide?
- Benefits & Caveats
- Version 1 Background
 - Overview
 - Process and Alignment with GAO
- Version 2 Highlights
 - Changes to Version 1
 - Notional Case Study Purpose

Appendix K: Cost Estimating Case Study

- Building the Case Study
 - Challenges and Approach
 - Overarching Skills Demonstrated
 - Critical Thinking Boxes
- Programmatic Scenario & Cast of Characters
- Case Study Overview by Section

Poll & Conclusion





OSD Policy

OSD "How-To"

Presented at the 2022 ICEAA Professional Development & Training Workshop: www.iceaaonline.com/pit2022 Why a DoD Cost Estimating Guide?

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 Acquisition
 Cost Estimating

 10 USC § 4251
 10 USC § 4201
 10 USC §§ 3221-3226
 10 USC § 4325

 10 USC § 4252
 10 USC § 4323
 10 USC § 3227
 10 USC §§ 4371-4375

 10 USC § 4253
 10 USC § 3507
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As of January 2022, based on the FY2021 NDAA revisions.

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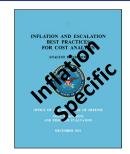










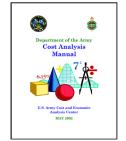




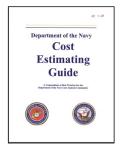














Component-Level



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Statutes (not exhaustive)

10 USC § 4251

10 USC § 4253

10 USC § 4201 10 USC § 4252 10 USC § 4323

Acquisition

10 USC § 3507

Cost Estimating

10 USC §§ 3221-3226 10 USC § 4325

10 USC § 3227 10 USC §§ 4371-4375

10 USC § 3507

As of January 2022, based on the FY2021 NDAA revisions.

OSD Policy













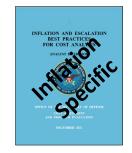
OSD "How-To"









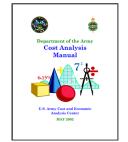




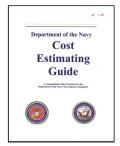














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Presented at the 2022 ICEAA Professional Development & Training Workshop: www.iceaaonline.com/pit2022 Benefits of a DoD Cost Estimating Guide

Benefits of the Guide

- DoD-level resource for consistency across the community
- Consistent understanding of DoD cost estimating requirements
- Use of consistent terminology/lexicon
- Provides cost estimating basics for new cost estimators
- Centralized resource for seasoned analysts
- Assists in cost analyst cross training
- Supports the DAWIA Cost Estimating competencies

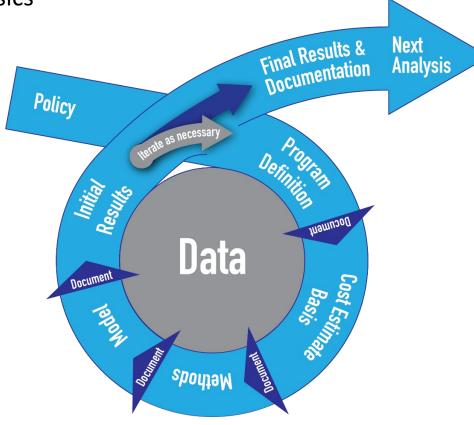
The DoD Cost Estimating Guide is NOT:

- New Policy from DoD
- A replacement for existing Component materials
- A checklist/scorecard for cost estimates
- Exhaustive to every cost estimating scenario

A guide centered around a generalized DoD Cost Estimating Process that:

- Provides description and explanation of cost estimating basics
 - Applies to all types of cost analyses
 - Non-Component specific
 - Very limited use of "must" and "shall"
- Consolidated lists of references and training resources
- Released publicly in January 2021

Chapter	Title		
1	Purpose, Policy, Properties, and Definitions		
2	The Cost Estimating Process		
3	Program Definition Cost Estimate Basis Identify, Collect, Validate, Normalize, and Analyze Data		
4			
5			
6	Select Cost/Schedule Estimating Methods		
7	 Build Cost Estimate Model (includes Initial Results) Final Results and Documentation 		
8			
9	Next Analysis		

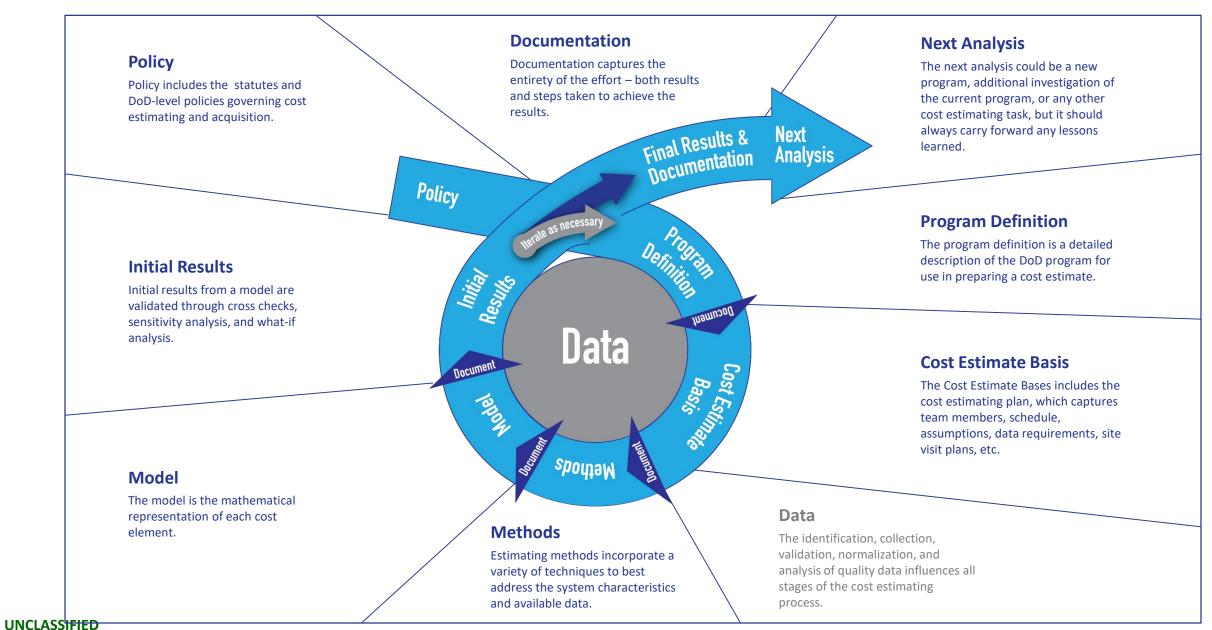


"The Snake"



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All the great things about v1 *PLUS*:

Fact of Life Changes

- Updated statute and policy references to incorporate NDAA FY2021 changes and OSD policy revisions
- Updated training course references to align with DAU course changes

Deferred Comments from v1

- Additional MTA discussion to highlight the cost estimator role in these programs
- Expanded WBS/CES examples for different commodities

Added Content

- A recommended reading list focused on cost estimating, acquisition, and weapon system commodities
- Expanded discussion of the cost community libraries
- AH-21 CACEG Case Study (notional program)

The DoD Cost Estimating Guide v2 was released to the public on February 10, 2022.

Available at: www.cape.osd.mil or www.cade.osd.mil/policy/costestimating.

Presented at the 2022 ICEAA Professional Development & Training Workshop: www.iceaaonline.com/pit2022 Notional Case Study Purpose

Goal of the case study is to apply the cost estimating process to a realistic scenario, in order to:

New Analysts

- Expose new analysts to the people, discussions, analyses, meetings, and decisions necessary during the cost estimating process
- Fill in the gaps of the everyday process and interactions that happen to complete a cost estimate
- Demonstrate the cyclical nature of the cost estimating process
- Highlight the balance of technical and soft skills required by the cost estimating profession
- Reinforce cost estimating competencies/DAU efforts

Experienced Analysts

- Assist in conversations with junior analysts
- Encourage methodology and data discussions for additional approaches
- Provide cross-training/ cross-pollination
- Encourage personal broadening

Managers

- Provide a realistic job preview during the hiring process
- Introduce new topics and concepts with their team
- Support discussions about data sources, different approaches, and methodologies

Industry

- Share the government analyst experience with industry counterparts
- Demonstrate one way that CSDR data is used by the DoD community

The DoD Cost Estimating Guide v2 Case Study has something for everyone!

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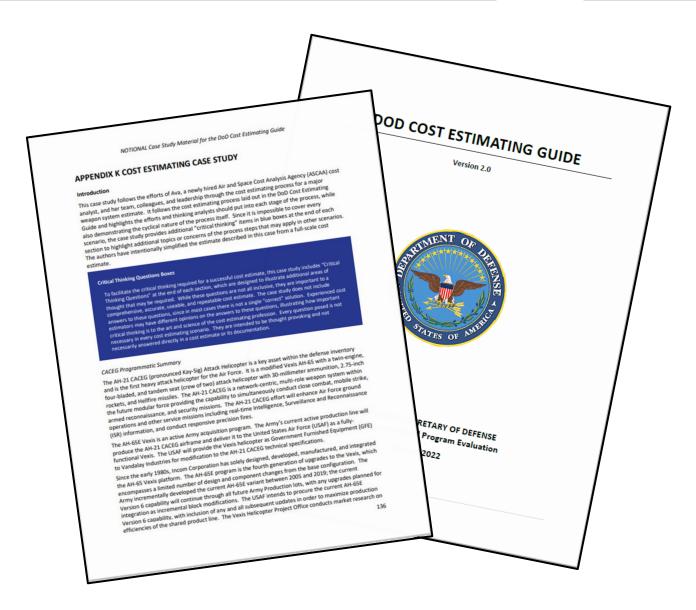
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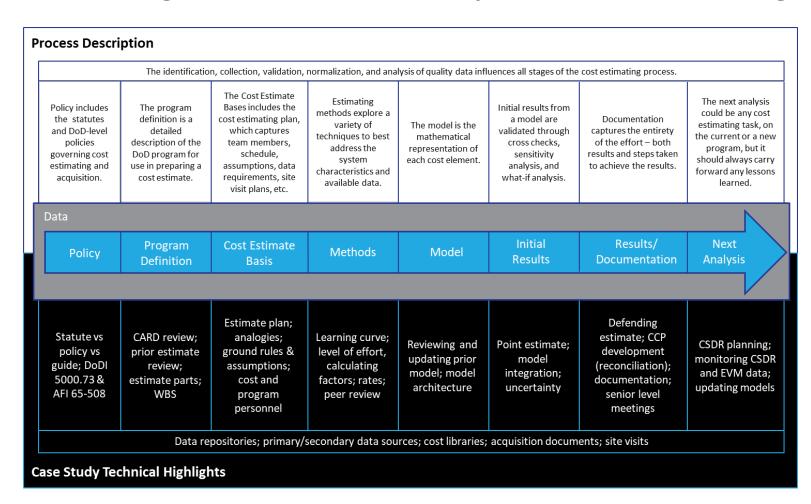






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Building a cost estimate is complex – and so is building a cost estimating case study!



Our biggest challenges?

- Turning an iterative process into linear story
- Keeping language clear and explanatory without sounding like a policy document
- Keeping the scenario realistic, but not overly complicated
- Choosing which estimating challenges are most universal

Our approach:

- Keep the primary target audience (new analysts) in mind
- Isolate soft and technical skills for each section and craft the story line around those
- Use our personal experiences
- Keep the story flexible enough to allow for later expansions
- Allow our fictional analysts to make mistakes
- · Don't try to include everything

Writing the CACEG case study was a combination of technical and creative writing!

Technical Skills

- Cost estimating in the context of the acquisition process
- Applying the cost estimating process
- Understanding prior estimates
- Identifying and collecting data (CADE, libraries, site visits, PMO)
- Selecting analogies and methodologies
- Considering primary, secondary, tertiary effects
- Utilizing data and modeling tools
- Building effective model architecture
- Planning for CSDR data collection
- Documentation/Technical Writing
- Presenting results to leadership

Communication

- Compromise
- Curiosity
- Initiative/Motivation
- Confidence
- Time Management
- Configuration Control
- Planning

Soft Skills

- Teamwork
- Organization
- Flexibility
- Comprehension/Application
- Big Picture Thinking

The case study seeks to demonstrate the breadth of technical and soft skills necessary to be a successful cost estimator.



Since the case study cannot cover every scenario, each section of the case study (corresponding to a step in the cost estimating process) ends with "critical thinking questions"

- Starting point for additional analyst discussion about options and best practices
- Not every question applies to every estimate
- Sample (from the Data section):

Critical Thinking Questions – Identify, Collect, Validate, Normalize, and Analyze Data

- What is good, or defendable, data? Who gets to decide that?
- How can gaps in CSDR data be handled?
- Were there any Over Target Baseline (OTBs) or Over Target Schedule (OTSs) in the EVM data?
- What type of contract (FFP, CPFF) were used across your data sources? What are the different considerations that accompany each different contract type?
- Is my data representative of cost or price? Why does it matter?
- Where the reference programs competitive procurements or sole-sourced? Why does it matter?
- Are you able to map between Contractor WBS and the MIL-STD 881?
- Were there any major modifications to the Contractor's Accounting System within CWBS items between contracts, but in support of the same program?
- What industrial base considerations are important? Have there been any major contractor consolidations that are relevant to the data being used?



CACEG AH-21 Rotary Wing Aircraft program

- Air Force
- Milestone C decision
- 75 new attack rotary wing aircraft for the Air Force Special Forces
 - Buy base airframe from existing Army AH-65 Vexis OEM (Incom)
 - Provide to Vandalay Industries as GFE for modification into final configuration
 - Associated program office activities

ASCAA (the fictional Air Force Cost Agency) must:

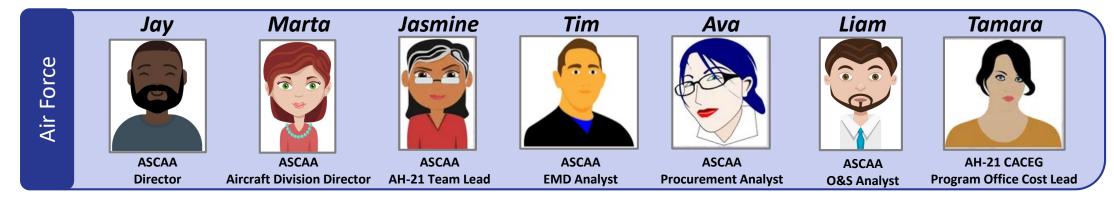
- Complete a Life Cycle Cost Estimate (LCCE)
- Reconcile it with the Program Office Estimate (POE)
- Recommend a Component Cost Position (CCP)



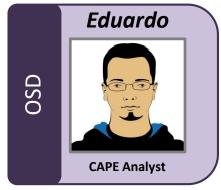




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Additional Characters (by title only)

- Air Force PEO representative
- CACEG Program Manager
- CACEG Acquisition Lead
- CACEG Engineering Lead
- CACEG Business Financial Manager
- Vandalay cost account managers

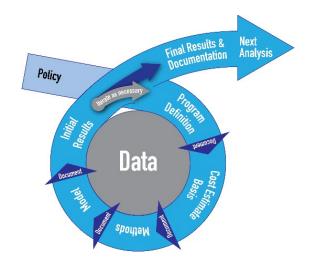
- SAF/AQ representative
- DCMA representative
- ASCAA peers
- SAF/FMC
- SAF/FMB
- OIPT and DAB membership

Reggie Industry **Vandalay Industries Contractor Lead**

Characters represent the typical personnel involved in a weapon system cost estimate.



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Policy Storyline

- Ava, a newly-minted ASCAA analyst, is assigned to an estimating team after attending in-house training.
- Having been exposed to numerous DoD guides, manuals, and instructions during her training, Ava investigates the policy governing her work and the guidance available to help her accomplish it.
- Ava reviews DoD and Air Force instructions to understand the roles and responsibilities of ASCAA, Program Office, and CAPE players and the process governing Jasmine's estimating schedule.
- When she gets confused between DoD and Air Force policy and guidance, she goes to her teammates to ask for further explanation.







Statute (Congress) or Executive Order (POTUS)





Skills **Technical**

Terms

- Understanding the relationship between Statute, Policy, and Guidance
- Understanding role of cost estimating within the Acquisition framework
- Understanding the roles of the CAPE, Service, and program office cost estimators

Helicopter nomenclature

- Sunk cost
- Cost Analysis Requirements Description (CARD)

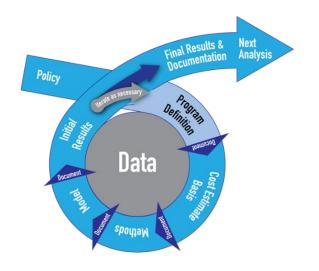
- Curiosity
- **Initiative**
- **Planning**
- Resourcefulness



Soft Skills

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Program Definition Storyline

- Ava reviews CARD guidance and the CACEG MS B CARD for historical perspective.
- The team reviews the new MS C CARD and organizes questions and feedback within a Comment Resolution Matrix (to be shared with their CAPE analyst).
- The team strategizes to integrate phase estimates in a single LCCE model.
- Jasmine introduces how CACEG will use the Army AH-65E Program Office Estimate within Ava's Incom production estimate (for the GFE aircraft).
- Jasmine and Ava outline a high-level methodology for each portion of Ava's estimate: Incom build of the AH-65E, Vandalay modifications, and Program Office production activities.

Technical Skills

Reviewing the CARD narrative and tables

- Learning appropriate levels of detail by acquisition phase
- Completing a Comment Resolution Matrix (CRM)
- Planning for an integrated LCCE model
- Assessing production impacts on common product lines
- Understanding personnel support categories
- Building effective model architecture
- Understanding different Work Breakdown Structures (WBS)

Ferms

Life cycle phases

- Acquisition Program Baseline (APB)
- Program of Record (PoR)

- Program WBS/Contract WBS
- Future Years Defense Program (FYDP)
- Constant year \$/Program base year

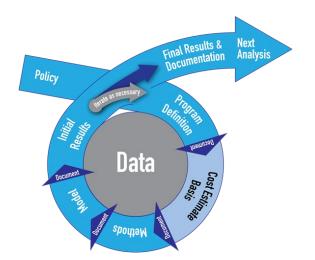
Soft Skills

- Initiative
- Organization
- **Teamwork**
- **Planning**
- **Coordination with** related/dependent programs
- **Big Picture Thinking**
- Attention to detail
- Prioritization





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Cost Estimating Basis Storyline

- Ava prepares a Cost Estimate Plan and maps the CACEG cost estimate schedule into preceding tasks required to meet each event.
- Tim and Liam help Ava to understand analogous data and consider sources specific to the AH-21 helicopter and Vandalay.
- Ava clearly identifies some Ground Rules and Assumptions but struggles with how to identify cost assumptions based upon the CACEG CARD.
- The Cost IPT holds the CACEG MS C cost estimate kickoff meeting with ASCAA and CAPE.



		_					
	Policy	Policy		,	DoDI 5000.73 - Cost Analysis Guidance and Procedures (dated 13 Mar 2020)		
			USAF		AFI 65-508 - Cost Analysis Guidance and Procedures (dated 6 Dec 2018)		
	Purpose and Scope	ıd	Purpos	e	Program Life-Cycle Court		
			Scope		decision and Low-Rate Initial Production (LRIP) decision Program life-cycle costs from TMMR through O&S Disposal excluded per draft MS C CARD dated 16 Mar 2021 Production Estimate to be divided into separate efforts for Boeing production (labor, material, etc.) and Vandalay modification (labor, material, etc.)		
	Estimate Structure	L	Structure				
		\perp	WBS	1 1	VBS as defined within draft MS C CARD dated 16 Mar 2021		
	Process / Approach	s	ummary	A es	ASCAA Production Estimate focuses on Vandalay modification estimate (per AFI 65-508 Section 3.3.3.5); plan to leverage Army AH-lasmine - Team Lead Im - Sunk Cost & EMD To Go Vaa - Production & Deployment		
T	eam Members	A	ISCAA	Tin Ava			
	Travel			uar	n- 0&s		

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AH-21 : AH-65E :: AH-65E : AH-65D

Technical Skills

• Establishing a cost estimate schedule

- Using Data availability to drive Estimating Methods and Approach
- Choosing appropriate analogous systems/data
- Writing estimate documentation and maintaining its currency
- Establishing Ground Rules, Framing Assumptions, and Cost Estimating **Assumptions**
- Understanding program dependencies
- Establishing common expectations among stakeholders

Terms

- Learning curve
- Ground Rules and Assumptions (GR&A)

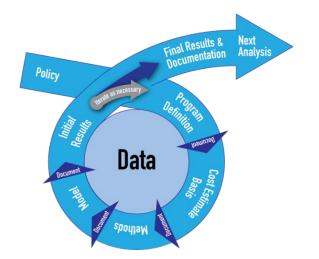
oft Skills

Leverage of historical documentation

- Planning
- Organization
- Curiosity
- Communication
- Prioritization
- **Preparedness**







Data Storyline

- Ava learns about the constant nature of data collection and consideration throughout the estimating process.
- Ava reviews historical CACEG estimates and explores data repositories for relevant CSDRs, SARs, and EVM reports.
- Ava meets with Jasmine to discuss her data findings and the strengths and weaknesses of various sources.
- Jasmine and Ava outline cost contributors by contracting effort and cost contributors for her full Production estimate.
- The team meets with the AH-21 Program Office and visits the Vandalay production site.

Technical Skills

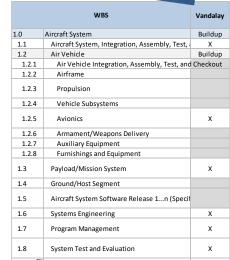
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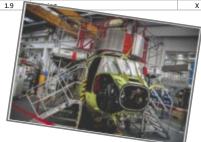
- Using DoD Data Repositories
- **Allocating Sunk Costs**
- Conducting data normalization
- Using Acquisition documents as data sources
- Interpreting Contract WBS allocations from Internal Accounting systems
- Dealing with ongoing programmatic changes
- Recognizing file types and usefulness
- Recognizing primary and secondary data sources
- Maturing methodologies as program matures
- Acquisition cost
- Cost contributor
- Touch labor
- "Below-the-line" elements
- Full Time Equivalent (FTE)
- Estimate at Completion (EAC)
- Contract Data Requirements List (CDRL)
- Cost and Software Data Report (CSDR)

Soft Skills

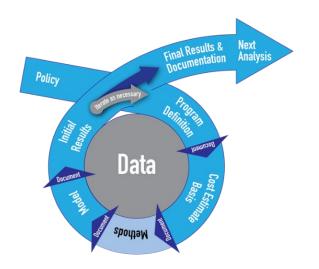
- Curiosity
- Initiative
- Comprehension/Application
- **Big Picture Thinking**
- **Flexibility**
- Organization
- **Planning**
- Confidence
- **Time Management**
- Collaboration

Increasing Frequency of Submission SAR 1921 EVM Program & CTR Initial & Final only Limited to contra quantity doesn't



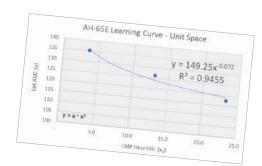


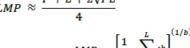




Methods Storyline

- Ava executes primary methodologies and potential crosschecks for each portion of the Production estimate.
 - SPO labor build-up and extrapolation of historical travel requirements
 - Vandalay production estimate, including development of a learning curve and choosing appropriate rates and factors for material, SEPM, T&E, and training
- Ava meets with the Army cost analyst to review the throughput estimate being provided for the AH-65E GFE aircraft (by Incom).
- The ASCAA team receives feedback via the ASCAA midterm review and peer review; they conduct midterm reconciliation with the Program Office analyst.



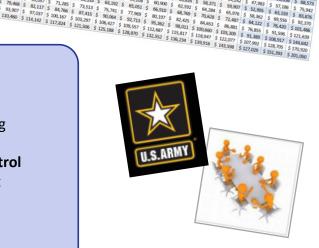


Technical Skills

- Discerning between Government and Contractor personnel types
- Understanding contract proposal vs execution labor rates
- Applying General Schedule (GS) and Civilian Fringe Benefit rates
- Applying Lot Midpoint (LMP) and Unit Learning Theory calculations
- Utilizing the CADE Library
- Choosing a modeling tool
- Using Program Risk & Opportunity Registers
- Involvement in the CSDR planning process
- Fully burdened cost of labor
- Request for Proposal (RFP)
- "Peanut butter spread" allocation
- Bill of Materials (BOM)
- Subject Matter Expert (SME)

Soft Skills

- Organization
- Initiative
- Planning
- **Big Picture Thinking**
- Teamwork
- **Configuration Control**
- Time Management
- Flexibility
- Confidence
- Compromise

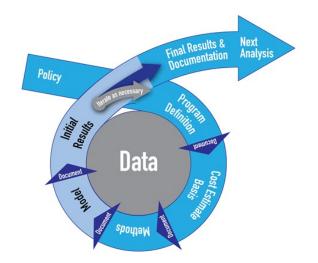


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Terms

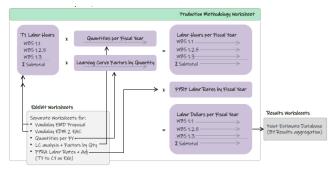
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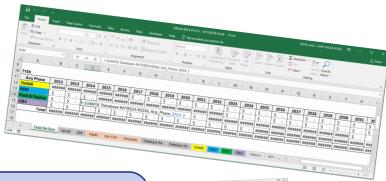
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Model & Initial Results Storyline

- Tim and Ava update the MS B model framework for MS C.
- Ava builds her Production estimate, documenting sources and GR&A as she goes.
- Tim and Ava integrate the Sunk Cost and EMD To Go estimate with Ava's Production estimate to create an Acquisition cost model, then incorporate Liam's O&S estimate to create an LCCE model.
- Jasmine and Ava develop uncertainty assumptions for the Production estimate.
- Jasmine and Ava integrate the Army throughput estimate for the Incom airframe to complete the LCCE model.





Technical Skills

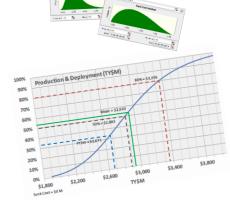
Terms

- Effectively utilizing Excel capabilities
- Building flexible cost model architecture; reducing unnecessary complexity
- Maintaining model documentation
- Understanding Obligations vs Expenditures in Sunk Data
- **Producing Uncertainty Estimates**
- Interpreting model results

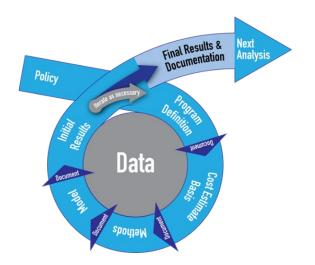
Pass-through/throughput

Soft Skills

- Planning
- Teamwork
- Organization
- Comprehension/Application
- Initiative
- Flexibility
- · Time Management



Case Study Overview — Final Results & Documentation

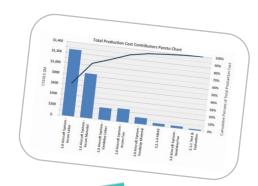


Final Results & Documentation Storyline

Program Acquisition Unit Cost (PAUC)

Average Procurement Unit Cost (APUC)

- Ava develops documentation slides using her cost estimate plan, a programmatic data summary, estimate methodologies, uncertainty assumptions, and results.
- The team briefs their estimate to various levels of ASCAA leadership.
- The ASCAA team must reconcile their estimate with the Program Office team to recommend a Component Cost Position (CCP).
- Since the recommended CCP is a hybrid of the POE and ASCAA methodologies, the teams prepare an updated CCP estimate model and documentation
- The draft CCP is provided to CAPE.
- The Cost Review Board considers both the CCP and CAPE ICE; during the DAB, the CCP is approved for use as the new AH-21 APB.





Technical Skills

• Developing briefing content for different audiences

- Developing final documentation content
- Developing effective graphics
- Reconciling multiple estimates to recommend a Component Cost Position (CCP)

- Organization
- Time Management
- Planning
- Flexibility
- Communication
- Confidence
- Compromise

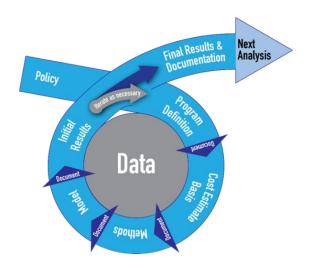
Terms

- Component Cost Position (CCP)
- Spruill chart
- "Bumper sticker"





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Next Analysis Storyline

- The team celebrates completing the MS C cost estimate!
- Ava wonders what comes next. Tim and Liam explain that their work will shift into performance monitoring and data maintenance mode in order to stay informed and prepare for the AH-21 Full Rate Production (FRP) decision just two years away.
- Ava considers how rewarding it will be to eventually see the AH-21 production aircraft in action.





 $MS C \rightarrow IOC \rightarrow FRP \rightarrow Sustainment Reviews$



Technical Skills

Terms

- Engagement in CSDR planning prior to contract award
- Monitoring contract performance via EVM and CSDR submissions
- Estimate Maintenance in preparation for next milestone decision

- Organization
- Collaboration
- Time Management
- Planning



Soft Skills



Presented at the 2022 ICEAA Professional Development & Training Workshop: www.iceaaonline.com/pit2022 POII — POSSIBLE NEXT VERSIONS OF THE Case Study

0 S D

A.

to include the cost model with complementary acquisition documents and dataset

В.

Expand current case study to include EMD and O&S elements

_

Show CACEG MS C from the Program Office and/or CAPE perspective

D.

Build the CACEG MS B estimate

E.

for an MTA (or other non-MCA) program

F.

Create a case study focused on advanced data techniques

Provide your feedback to: osd.pentagon.cape.mbx.cost-assessment@mail.mil



OSD

The DoD Cost Estimating Guide v2 is publicly available via the CAPE or CADE websites:

www.cape.osd.mil

www.cade.osd.mil/policy/costestimating

WE WANT YOUR FEEDBACK!



Email at any time:

osd.pentagon.cape.mbx.cost-assessment@mail.mil

Questions?

DOD COST ESTIMATING GUIDE

Version 2.0



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