TACOM
Life Cycle Management Command

Strategies for Developing a Drill-Friendly Cost Model

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Agenda

- Purpose
- Scope of Program / LCCE Model
- Typical Drill Scenario
- Coding Structures that Caused Problems
- Lessons Learned
  - #1: Standard Structure
  - #2: Naming Conventions
  - #3: Documentation
  - #4: Phasing
  - #5: Simple/Efficient Code
- Questions

Purpose

- Strategies for developing an ACE Life Cycle Cost Estimate (LCCE) model for complex programs that will allow for flexibility and quick modifications in a time-sensitive drill scenario.
- Lessons learned from a joint pre-Major Defense Acquisition Program (MDAP) program and cost model will be covered.
- The presentation will demonstrate techniques that turned out to be inefficient in implementing drill modifications and provide alternative structure and coding strategies that will allow for more efficient drill modifications.

Scope of Program / LCCE Model

- Complex program with a high level of visibility:
  - Joint/multi-service program
  - International participation in current phase and expected for future phases
  - Pre-MDAP/ACAT 1D program
  - Program is for a Family of Vehicles with multiple sub-configuration and various associated equipment
- Model is used by many cost analysts:
  - 3-5 analysts do the majority of the drills
  - Up to 13 different analysts may work on estimates/work with the model
- Update is currently in process:
  - Old model was about 9k lines
  - Updated model expected to be 10-15k lines

Typical Drill Scenario

- Limited information provided to complete a drill :
  - Updated EMD program schedule
  - Updated information on required prototype system quantities for EMD test
  - Occasionally updated information on procurement production quantities or rates changes
  - Many of the drills also had to take into account the significant FOV changes
- Drills must be turned around in minimal time:
  - Usually less than 1 day
  - Sometimes 1-5 days

Coding/Structures that Caused Problems

(1 of 2)

- Roll-ups & category codes that were not easy to maintain resulted in errors that made them inefficient to use
- Unit cost calculations that produced fatal errors when quantities were deleted
- % phasing method was time consuming and inefficient to modify
- Manual phasing adjustments to cost estimates are time consuming and inefficient

Coding/Structures that Caused Problems

(2 of 2)

- Very complex coding was more difficult to modify quickly
- Inconsistent variable names & estimate structures increased inefficiency
- Structure did not always align to answering drill request
- Incomplete documentation impacted ability to modify costs

Lessons Learned #1 : Standard Structure

(1 of 2)

- Develop a standard structure rules
  - Service order
  - Sub-configuration order
  - Consistent structure format:

Structure Rules Example:

Army Cost Element Structure (CES)
Service *(always direct child to Army CES)*
Phase *(in RDTE funded section only, TD or EMD)*
Contractor or Government
Acceptable level to add children
Sub-configurations *(always lowest level)*

Lessons Learned #1 : Standard Structure

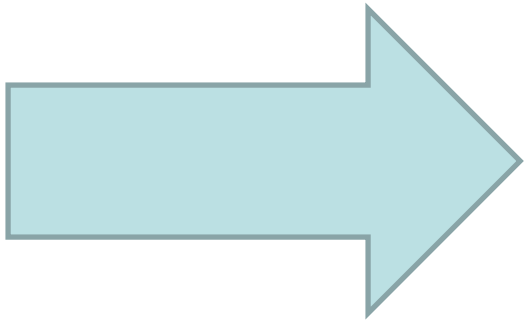
(2 of 2)

- When determining a structure consider information requests / cost estimates the file will have to support:
  - Budget requests
    - R Forms
    - P Forms
    - Weapon System Reviews
  - Reports
    - SAR
    - DAES
    - Unit Cost Reporting
  - Common questions
    - System Unit Cost
    - Total Contract Values
- Avoid basing the structure off of the information that you are basing your estimate off of (rather than the questions you will have to answer)
- Try to make roll-ups/summaries inherent to the structure

Example of Improved Structure

Structure Based off of Government Design Concept Weight Reporting Structure

RECURRING PRODUCTION
MANUFACTURING
SERVICE
VEHICLE - Type #1
HARDWARE
HARDWARE
STRUCTURE
AUX AUTOMOTIVE
RING MOUNT
SUSPENSION
PPDT
GFE
GPK
BII
KITS
ARMOR B Kit
Integration and Assembly
G&A and FEE



Better Structure for Reporting Vehicle Unit Cost

RECURRING PRODUCTION
MANUFACTURING
SERVICE
VEHICLE - Type #1
HARDWARE
HARDWARE
STRUCTURE
AUX AUTOMOTIVE
RING MOUNT
SUSPENSION
PPDT
Integration and Assembly
G&A and FEE
GFE
GPK
BII
KITS
ARMOR B Kit

Lessons Learned #2: Naming Conventions

- Develop a standard naming conventions
  - Standard abbreviations for FoV sub-configurations
  - Standard abbreviations for Services
  - Standard naming order for unique IDs

Naming Order Example:

1.) Cost Element Descriptor
2.) Phase
3.) Sub-configuration
4.) Service
5.) Variable Endings

  - Standard unique ID endings/meanings:

Unique ID Endings Examples:

- $ for a cost
- % for percentages or factors
- Sch for schedules
- Hrs for hours

Lessons Learned #3: Documentation

- Develop a standard documentation template with guidance on how to complete the documentation:

Standard Documentation Format Example:

- Scope of the Estimate
- Ground Rules and Assumptions (GR&A)
- Supporting Data & Data Sources
- Methodology for CES element
- Cost Estimate/Analysis work
- Uncertainty Analysis
- Summary Information (summary tab)
- Structure for labeling of proprietary data

Lessons Learned #4: Phasing

- Develop model/phasing of costs based off of limited number of schedule variables
- For development programs, highly likely that you will have to run schedule drill excursions
- Requires that drills assumptions be worked out in advance:
  - For example: does the lengthening / shortening of Development Engineering duration mean that the same estimated costs will happen in a different time period or will the estimate change?
  - Defining phasing relatively in terms of other events
- Example: Phasing procurement estimate based on vehicle production & first production award year schedules:
  - Vehicle_PSch = FYCVal(@Input_Vehicle_PSch , FYYR - (Prod1stAwdYr-FYCFirstYr(@Input_Vehicle_PSch)))
  - Phase all costs off of Vehicle_PSch

Lessons Learned #5: Simple/Efficient Code

- Try to maximize simplicity and efficiency in coding because it will be easier to understand and modify in a drill scenario
- Be realistic about building up estimates, roll-ups, categories and other reporting calculations in the file
  - Simple code to build more drill-friendly model:
    - If fielding plan is not well-defined, it does not make sense to build-up a specific fielding schedule in model
    - Can use FYCVal(@ Vehicle_PSch, FYYR-LeadTimeVehYrs) to develop a generic fielding schedule that lags vehicle field time based on a production lead time value
  - Try to define roll-ups and reports on mandatory or consistent columns/categories; like SumIf on appropriations (for services rather than unique service categories)
  - Limit the amount of categories that you add to the file to what is practical to use and maintain
  - For unit cost reports, develop code that works with zero quantity:
    - IF(Vehicle_PSch=0,0,Total_Vehicle_Manu$/Vehicle_PSch)

Questions?

- Are there any questions?