Implementing an Effective Use of the Integrated Program Management Tools

ICEAA Workshop 2021

Mike Thompson
We use Integrated Program Management (IPM) Tools, all of the Time

Both in our professional and personal lives, the basic concepts of IPM are present in our decision making. Whether we are buying groceries or completing a Life Cycle Analysis on a program, the components of IPM are present.
Technical Requirements fulfill the “What are we going to do,” portion of the program. It is through the Technical Requirements that we are able to create a PWS, a WBS, a Schedule, and a Cost Estimate.

Without tight Technical Requirements an accurate PWS, WBS, Schedule, or Cost Estimate would be impossible. These products are components of EVM, Schedule, and Cost.
Earned Value Management

Often maligned as the “bearer of bad news,” EVM actually provides the rules and processes for Planning, Reporting, and Predicting the outcome of a program.

The purpose of EVM is to ensure sound planning and resourcing of all tasks required for contract performance.
“Bag O’ Money Procurement”

During the 60’s and 70’s the Army was having Bell Helicopter build 300 UH-1s per month.

The Army would give Bell money and Bell would let the Army know when they needed more…..
Sometimes a Firm Fixed Price Contract doesn’t shift the risk

- The A-12 Avenger II program was a prototypical example of contractors promising too much in exchange for too little. Designed to replace the Navy’s A-6 Intruder, the A-12 contained too much unproven technology for its fixed-price $4.8 billion contract.
- Ultimately Earned Value Management revealed that the program was overrun and unlikely to recover and ultimately cancelled.
EVM is an important part of Project Management
Earned Value Management System Blueprint
Integrated Program Management

Earned Value Components of Integrated Program Management

- Organization
- Plan
- Direct
- Control
Organization

- Organization involves:
  - The development of an organization which will manage the project
  - Outline of the deliverable components of the project.

- This is the development of the Organization Breakdown Structure (OBS) and Work Breakdown Structure (WBS).
Aircraft WBS Example

Level 1

Aircraft System

Level 2

Air Vehicle
- Airframe
- Propulsion
- Application Software
- System Software
- Com/Identification
- Navigation/Guidance
- Central Computer
- Fire Control
- Data Display and Controls
- Survivability
- Reconnaissance
- Automatic Flight Control
- Central Integrated Checkout
- Antisubmarine Warfare
- Armament
- Weapons Delivery
- Auxiliary Equipment

SE/ Program Mgmt
- DT&E
- OR & T&E
- Mockups
- T&E Support
- Test Facilities

System T&E
- Equipment Services
- Facilities

Training
- Tech Pubs
- Engrg Data
- Support Data
- Management Data
- Data Depository

Data
- Test and Measurement
- Equipment Support
- and Handling Equipment
- Test and Measurement
- Equipment Support
- and Handling Equipment

Peculiar Support Equipment
- System Assembly,
- Installation and
- Checkout on Site
- Contractor Tech Support
- Site Construction
- Site/Ship Vehicle
- Conversion

Common Support Equipment
- Construction/Conversion/Expansion
- Equipment Acquisition
- or Mod Maintenance

Ops/ Site Activation
- Initial Spares and
- Initial Repair Parts

Industrial Facilities

Level 3

Aircraft Systems WBS
(MIL-HDBK-881)
Organization Breakdown Structure
Example
Plan

- Planning involves Estimating the hours, dollars, and time it will take to complete the project.
- At this point a cost estimate and schedule are tied to the OBS and WBS.
- At the completion of this phase the project has a Baseline Cost, Baseline Hours, and an Integrated Master Schedule (IMS).
THE COST PROCESS

STEPS FOR ACCOMPLISHING A COST ESTIMATION PROCESS

IPM Organize and Plan

01
Develop the Estimating Plan

02
Define the WBS

03
Establish Technical & Baseline, Ground Rules, Assumptions

04
Obtain the Data

05
Build the Initial Model

06
Develop the Point Estimate

07
Determine Methodologies

08
Develop Life Cycle Cost Estimating

09
Conduct Risk Analysis

10
Final Report

PREPARE

DEVELOP THE ESTIMATE

FINAL STEPS

Contract Budget Baseline

Conduct Sensitivity Analysis

Contract Negotiations
Direct

- Direction involves the Program Office (PMO) leading the effort to Authorize, Assign, and Direct the Project Work.
- The following artifacts may be the output of this phase:
  - Work Authorization, Control Account Managers, and an alignment with the:
    - WBS and OBS,
Work Authorization Example

[Project Name] Statement of Work

Who is authorizing the work

Level 3 or 4 of the WBS

What is planned to be delivered

Authorized Budget

Purpose

Scope

Deliverables

Cost Estimates

Authorized Budget
### WBS Dictionary Example

Differs from the WBS because it includes the WBS Description and the PWS/SOW Mapping reference.

<table>
<thead>
<tr>
<th>WBS Level</th>
<th>WBS Code</th>
<th>WBS Name</th>
<th>WBS Description</th>
<th>PWS/SOW Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Aircraft System</td>
<td>X Series Aircraft System to fly to the moon</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.1</td>
<td>Air Vehicle</td>
<td>X Series Air Vehicle to fly to the moon</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.1.1</td>
<td>Air Frame</td>
<td>X serise air frame</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.1.2</td>
<td>Avionics</td>
<td>Brains behind the air frame</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.1.2.1</td>
<td>Comms</td>
<td>Communications</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1.1.2.1.1</td>
<td>Antenna</td>
<td>Thingsing to pick up signals</td>
<td>1.1, 1.2, 1.3.1, 1.13.1</td>
</tr>
<tr>
<td>5</td>
<td>1.1.2.1.2</td>
<td>Receiver</td>
<td>Box to interpret signals picked up by Antenna</td>
<td>1.1, 1.2, 1.13.2</td>
</tr>
<tr>
<td>5</td>
<td>1.1.2.1.3</td>
<td>Transmitter</td>
<td>Box to send out signals when we talk</td>
<td>1.1, 1.2, 1.3.1, 1.13.3</td>
</tr>
<tr>
<td>4</td>
<td>1.1.2.2</td>
<td>Navigation</td>
<td>Back seat driver</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.1.2.3</td>
<td>Fire Control</td>
<td>Off/Def weapons in case we run into aliens</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1.1.3</td>
<td>Propulsion</td>
<td>Engine to propel X series air frame</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
<td>Training</td>
<td>Training for operation and maintenance of X Series Air Vehicle</td>
<td></td>
</tr>
</tbody>
</table>

Sometimes there will be a column for the Dollar Value of the WBS Element.
Control

- Control, or Program Control is where the activities take place that are most often associated with EVM.
  - **Measuring Progress**, using EVM guidelines, schedules, or completed milestones
  - **Analyzing the Progress vs. Plan and Actual**, utilizing performance reporting or schedules
  - **Development of Estimates to Complete**, based on the actual work completed and how long it will take to complete all of the work
  - **Development of Risk Analysis**, utilizing burn rates, the percentage complete, and time remaining, what are the chances the project will complete on time
Data Should be Shared and Used by Both the Stakeholder and Contractor

• Data sharing between Technical, Schedule, and Cost Systems that permits:
  • Concurrent review of project technical, schedule and cost requirements to provide a readily visible picture of program plans, status, and risk
  • Program Planning:
    • How much time will it take to complete the program
    • How much will it cost and when are the dollars needed
  • Status:
    • Enables the timely surfacing of program problems on a management by exception basis and the application of appropriate corrective actions
  • Risk:
    • Are the risks shared between the stakeholders and the contractor
    • What is the likelihood that the program will complete on schedule and on budget

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Conducting Risk Analysis

**Determine Discrete Risks and Score with a 5x5 Matrix**

1. Complete the first draft of the life cycle cost estimate
2. Determine the discrete risks relative to the technical, programmatic, or cost/schedule risks
3. Subjectively rate the probability/likelihood and consequence/impact of each risk (score 1-5)
4. Evaluate and determine the type of distribution for the Monte Carlo simulation and the associated dollar amount
5. Run the Monte Carlo simulation
6. Include the resulting costs of the risk analysis in the total life cycle cost estimate
DETERMINING UNCERTAINTY IN THE ESTIMATE

Rating the line items with uncertainty about the estimated value or method

Manage Risk - Control.

01 Point Estimate
Assess the point estimate to address the line items that could be effected by uncertainty

02 Score Uncertainty
Work with the technical/programmatic people to score the uncertainty as L/M/H

03 Distribution Type
Based on the type of estimating method, determine the distribution type for that risk

04 Monte Carlo
Run the Monte Carlo simulation to develop costs for the uncertainty based on the scoring and distribution

05 Confidence Level
Select the confidence level required for the program to allow uncertainty $’s to be built into the estimate
Developing Policy for EVM
Earned Value Management Division of Acquisition, Analytics and Policy

Earned Value Management (EVM), a division of Acquisition, Analytics and Policy (AAP) within the Acquisition Enablers organization serves as the Department of Defense (DoD) focal point for all policy, guidance, and competency relating to EVM. Earned Value Management is one of DoD’s and industry’s most powerful program planning and management tools.
• The Stages of a Project
  • Optimistic estimating – “I think we got the right numbers.”
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The Stages of a Project

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Grim realization

In Control
Grim realization – “What can we do to get back on track?”

Lack of Control
Grim realization – “What did we get ourselves into”

Problems follow a predictable sequence from a technical problem to a schedule problem to a cost problem.
• The Stages of a Project
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  • Punishment of the innocent
The Stages of a Project

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- Grim realization – “What did we get ourselves into”
- Angry denial – “I never said that we could do it that fast”
- Disaster and finger pointing – “It wasn’t me, man”
- Search for the guilty – “Where’s the Programmers?”
- Punishment of the innocent
- Promotion of the non-participants
Questions?