How DCMA data driven metrics may be used for continuous EVMS process improvement

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BDO Program Optimization and Project Controls Solutions

BDO is the 5th largest public accounting firm in the world and the ISSG organization has 400+ government contractor clients

In addition to our cost accounting, FAR knowledge, CAS compliance, and business systems capabilities - we have many years of experience implementing, supporting, and providing compliance assurance for Project Controls Systems.

BDO’s support services include:

- Project and financial management assessment & requirements
- EVM Assessment vs. EIA-748 Standard
- Project Controls (EVM) System Design, Configuration, Integration, and Training
- Project Controls System Support Services
- Project Scheduling & Schedule Risk Analysis
- EVM System Surveillance and IBR Support

• IPM & EVM Applications
  - Deltek PM Compass - Process Automation
  - Deltek Cobra - EVM Cost Engine
  - wInsight Analytics - Analysis & Reporting

• Project Scheduling Applications
  - Deltek Open Plan
  - Deltek Acumen Fuse & Risk
  - Microsoft Project & Project Server
  - Oracle Primavera P6

https://www.bdo.com/industries/government-contracting/program-optimization-and-project-controls-solution
Learning Objectives

Understand the new DCMA automated & risk based EVMS surveillance process

Understand the challenges your organization will face to ensure your EVMS is compliant

Understand the processes and systems need to be implemented for EVMS continuous process improvement
Agenda

• Earned Value Management Fundamentals
• Introduction to DCMA Risk Based EVMS Surveillance
• Contractor Challenges
• EVMS Continuous Process Improvement
Earned Value Management Fundamentals
EV, EVM, and EVMS

Earned Value (n)

- A key project management metric that is based on a predetermined value assigned to work and earned when that work is performed
- It is compared with Planned Value and Actual Cost

Earned Value Management (EVM)

- Program/project management methodology and a performance measurement methodology that integrates scope (what) with schedule (how long) and budget (how much)
- The use of EV and other related performance measurement metrics to:
  - Identify and resolve scope, cost, and schedule variances
  - Forecast completion dates and derive estimates of costs at completion

Earned Value Management System (EVMS)

- Integrated set of people, processes, policies, trainings and tools that comprise an overall system for planning and controlling a project’s scope, cost, and schedule.
Traditional Project Management Approach
Budget vs. Actual Costs

How do we know how much work was accomplished? Based on how much was spent? The passage of time? Or do we measure performance on a educated guess?
Earned Value Management Approach
Budget (Planned Value) vs. Actual Costs vs. Earned Value

How do we know how much work was accomplished? EVM is an objective measure of performance.
Why is EV useful?

We analyze the past performance ...............to help us control the future

<table>
<thead>
<tr>
<th>Past</th>
<th>Present</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are we on Cost &amp; Schedule?</td>
<td>When will we finish?</td>
<td></td>
</tr>
<tr>
<td>What are the significant variances?</td>
<td>What will it cost at complete?</td>
<td></td>
</tr>
<tr>
<td>Why do we have variances?</td>
<td>How can we control the trend?</td>
<td></td>
</tr>
<tr>
<td>Who is responsible?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the trend to date?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Answer 2 key questions

1. Did we get what we wanted for what we spent?

2. At the end of the project, is it likely that the cost will be less than or equal to our original estimate?
In order to ensure the EVMS is providing accurate performance management information you must have these foundational elements:

1. Accurate & Objective Monthly Status
2. Cost Accounting & Accruals Aligned with the Period of Performance
3. PMB - Accurate Time Phased Budget Integrated with the IMS
What Does EVM Measure?

- Performance Measures
  - **Cost Variance (CV)**
    - The value of work performed - actual costs of performing the work
    - \( CV = EV - AC \) and \( CV\% = CV/EV \times 100 \)
  - **Schedule Variance (SV)**
    - The value of work performed - value of the work scheduled
    - \( SV = EV - PV \) and \( SV\% = SV/PV \times 100 \)
  - **Cost Performance Index (CPI)**
    - A measure of cost efficiency, how much work was performed for each dollar spent
    - \( CPI = EV/AC \)
  - **Schedule Performance Index (SPI)**
    - A measure of schedule efficiency, how much work was performed for each dollar planned
    - \( SPI = EV/PV \)
Earned Value Management System Components

**People**
- Project Managers, Control Account Managers, Schedulers, EV Analysts and Management
- Provide adequate training to understand roles and to gain buy in/ensure accountability for these roles

**Processes**
- Business processes should be updated to reflect implementation of earned value
- Processes should be documented and widely available

**Tools**
- Use proven and compliant tools that are right for your organization
- Spend time during the implementation to install and configure tools the right way
Introduction to DCMA Automated & Risk Based EVMS Surveillance
What is Surveillance?

NDIA - Integrated Program Management Division (IPMD) Surveillance Guide defines the following goals of an Earned Value Management System (EVMS) surveillance process:

1. Ensure that the organization’s EVMS has been effectively implemented in accordance with the organization’s EVMS documentation
2. Ensure the EVMS provides timely, accurate, and reliable integrated project management information for internal and customer use
3. Assess the project’s commitment and ability to maintain and use its EVMS as an integral part of its project management process

*It’s not a validation review or integrated baseline review - but uses the EIA-748 32 Guidelines and DOD EVMSIG as a roadmap to conduct surveillance* [https://www.acq.osd.mil/evm/#/home](https://www.acq.osd.mil/evm/#/home)
EIA-748 EVM Guidelines Overview

1) Define Work Scope (WBS)
2) Define Organization (OBS)
3) Integrate Subsystems
4) Identify Overhead Control
5) Integrate WBS & OBS
6) Schedule Work
7) Set Measurement Indicators
8) Set Time-Phased Budget
9) Budget by Cost Elements
10) Discrete Work Packages
11) Summary Work/Planning Pkg
12) Identify LOE Activities
13) Establish Overhead Budgets
14) Identify MR and UB
15) Reconcile to Target Cost
16) Record Direct Costs
17) Summarize into WBS
18) Summarize into OBS
19) Record Indirect Costs
20) Identify Unit & Lot Costs
21) Track & Report Material Costs
22) Calculate SV & CV
23) Identify Significant Variances
24) Analyze Indirect CV
25) Summarize Data & Variances
26) Implement Corrective Actions
27) Revise Estimate at Completion
28) Incorporate Change
29) Reconcile Budgets
30) Control Retroactive Changes
31) Prevent Unauthorized Change
32) Document PMB Changes

EIA-748 Compliant EVMS

- Organizing
- Planning & Scheduling
- Accounting
- Analyzing
- Revising
- DoD High Risk Guideline
Top DCMA Guidelines reporting the highest deficiencies or non compliance

- **Guideline 6**: Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.

- **Guideline 10**: To the extent it is practical to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.

- **Guideline 16**: Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

- **Guideline 27**: Develop revised estimates of cost at completion based on performance to date, commitment values for material, and estimates of future conditions. Compare this information with the performance measurement baseline to identify variances at completion important to company management and any applicable customer reporting requirements including statements of funding requirements.
Trend Towards Automated Surveillance

Department of Energy and DCMA are moving towards an automated surveillance process based on standard and proven metrics that are indicative of overall EVM System “health”

- DOE completing Consolidated Nuclear Security (CNS) Certification Pilot utilizing data driven metrics (Test Protocols)
- Self Governance Model eliminating the need for traditional certification review and enabling remote monitoring
- Supporting continuous contractor EVMS improvement
- DCMA has completed their Data Driven Metrics (DDMs) pilots and rolled out the use of metrics for surveillance
- Ensure consistency of surveillance and limits the need for onsite engagements
DCMA Business Processes

DCMA EVMS business practices (BP) and POCs:

- BP1 - Pre-Award EVM System Plan Review
- BP2 - Post Award Earned Value Management System Description - Initial and Changes
- BP3 - Contract Initiation Support
- BP4 - EVMS Surveillance
- BP5 - EVMS Review for Cause
- BP6 - Compliance Review Execution
- BP7 - EVMS Compliance Metric Configuration Control
New Surveillance Process

What projects are subject to Surveillance?
- Projects with EVM reporting requirement > $100M
- Projects identified for surveillance by the government program office
- Projects deemed to be high risk by the DCMA or stakeholders

DCMA is looking to modernize contractor oversight methods and practices to maximize effectiveness and create a standard benchmark, while simultaneously reducing costs
- Designed to streamline compliance oversight by generating a set of data tests and thresholds by which to adjudicate acceptable risk
- Facilitates the identification of high-risk contracts through an objective, automated process that allows for joint resolution of issues as they occur
- Contracts identified as high-risk are subject to a DCMA surveillance review
DCMA Business Practice 3
Contract Initiation Support

• Initial evaluation of a contractor’s Earned Value Management System (EVMS) for all new and existing contracts and programs that have the DFARS requirement; it may also be utilized on programs after incorporation of a significant baseline reprogramming such as an Over Target Baseline.

• Approved system, an unevaluated system, or a disapproved system operating under a Corrective Action Plan.

• Quantitative analysis techniques (64 Metrics) to identify risks and test the reliability of core management processes utilized during the initial stages of a program.

• Emphasizes the contractor’s Organization and Planning, Scheduling, and Budgeting processes, and also looks at Accounting and Estimate At Complete (EAC) processes. Engagement report with a risk assessment of the system application to the EIA-748 standard.
DCMA Business Practice 4
EVMS Surveillance

• Defines a uniform process to conduct ongoing assessments (surveillance) of contractor EVMS compliance to the Electronic Industries Alliance Standard-748 EVMS (EIA-748) guidelines.
• There are five (5) groups of metrics (104 Metrics) with different minimum suggested frequencies of evaluation.
• Intended to minimize the data inputs required from the contractor.
  • Group 1 metrics leverage automated data analysis using the Integrated Master Schedule (IMS) and the EV Cost Tool Data
  • Groups 2-5 are mostly manual and broken out to minimize the number of data calls.
• Will not replace the contractor’s internal EVMS surveillance process or in any way remove the contractor’s responsibility to implement and maintain an approved EVMS.
DCMA Business Practice 4
Tripped Metric Follow-Up & Close Out

If any metrics exceed the threshold the Team Member will evaluate the data anomalies causing the trip(s). Follow-up actions may include:

1. Discussions with the contractor and other stakeholders
2. Requests for data to support an expanded sample size or additional artifacts related to the data anomalies
3. Interviews with appropriate Control Account Managers and other contractor personnel

Tripped Metric Closeout - After metric follow-up actions are complete, the Team Member will determine if the metric trip represents a false indicator, in which case it should be closed out and annotated.

If it is not a false indicator the team member will take one of the following steps to close out the action:

1. Acceptance of the condition as the correct execution of the contractor system
2. Notation of a risk for future surveillance activities
3. Issuance of Corrective Action Request(s)
DCMA and PARCA Joint Electronic Data Strategy

- However, there is an ongoing effort to develop a file format (JSON) that allows for single source data analysis to meet DCMA surveillance and PARCA EVM-CR requirements.
- Currently referred to as the IPMR2, PARCA’s newly proposed electronic data will be presented in the JSON format, a machine-readable representation of the data described in the current IPMR Formats.
- The EVM-CR allows for the following:
  - Data quality validation status reports
  - Review of compliance reports real time
  - Access to view and download all files delivered by corporate Data Managers
JSON IPMR Contract Performance Dataset

Overview

Data Tables

Exchange Standard

File Format
The file format for an IPMR Format 7 is a ZIP file containing multiple text files. One text file conveys type and version information. All the other text files convey data represented in JSON. Each JSON file corresponds to a single data table.

### ZIP File Entries

<table>
<thead>
<tr>
<th>Name</th>
<th>Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAType.txt</td>
<td>[N/A]</td>
</tr>
<tr>
<td>ReportConfiguration.json</td>
<td>ReportConfiguration</td>
</tr>
<tr>
<td>ReportMetadata.json</td>
<td>ReportMetadata</td>
</tr>
<tr>
<td>SummaryCosts.json</td>
<td>SummaryCosts</td>
</tr>
<tr>
<td>PerformingEntities.json</td>
<td>PerformingEntities</td>
</tr>
<tr>
<td>WBS.json</td>
<td>WBS</td>
</tr>
<tr>
<td>OBS.json</td>
<td>OBS</td>
</tr>
<tr>
<td>ControlAccounts.json</td>
<td>ControlAccounts</td>
</tr>
<tr>
<td>WorkPackages.json</td>
<td>WorkPackages</td>
</tr>
<tr>
<td>ReportingCalendar.json</td>
<td>ReportingCalendar</td>
</tr>
<tr>
<td>BCWS_ToDate.json</td>
<td>BCWS_ToDate</td>
</tr>
<tr>
<td>BCWP_ToDate.json</td>
<td>BCWP_ToDate</td>
</tr>
<tr>
<td>ACWP_ToDate.json</td>
<td>ACWP_ToDate</td>
</tr>
<tr>
<td>BCWS_ToComplete.json</td>
<td>BCWS_ToComplete</td>
</tr>
<tr>
<td>EST_ToComplete.json</td>
<td>EST_ToComplete</td>
</tr>
<tr>
<td>ReprogrammingAdjustments.json</td>
<td>ReprogrammingAdjustments</td>
</tr>
</tbody>
</table>

### Conventions

#### Text File Encoding
Unless otherwise noted, all text files must be encoded in UTF-8.

#### Text Normalization
Unless otherwise noted, interpretation of text fields must include the following implicit normalization: whitespace must be removed from the beginning and end of the text, each whitespace character must be replaced by a space character (U+0020), and each sequence of space characters must be replaced by a single character.
# JSON IPMR Contract Performance Dataset - Work Package Table

<table>
<thead>
<tr>
<th>Table</th>
<th>WorkPackages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity</td>
<td>WorkPackage</td>
</tr>
<tr>
<td>Fields</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>IsPlanningPackage</td>
</tr>
<tr>
<td></td>
<td>ID</td>
</tr>
<tr>
<td></td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>BaselineStartDate</td>
</tr>
<tr>
<td></td>
<td>BaselineEndDate</td>
</tr>
<tr>
<td></td>
<td>ForecastStartDate</td>
</tr>
<tr>
<td></td>
<td>ForecastEndDate</td>
</tr>
<tr>
<td></td>
<td>ActualStartDate</td>
</tr>
<tr>
<td></td>
<td>ActualEndDate</td>
</tr>
<tr>
<td></td>
<td>EarnedValueTechniqueID</td>
</tr>
<tr>
<td></td>
<td>OtherEarnedValueTechnique</td>
</tr>
<tr>
<td></td>
<td>ControlAccountID</td>
</tr>
</tbody>
</table>

**Primary Key**
- ID

**Foreign Keys**
- EarnedValueTechniqueID: EarnedValueTechniqueEnum(ID)
- ControlAccountID: ControlAccount(ID)

**Use Constraints**
- If omitted, the IsPlanningPackage field has a default value of False.
- OtherEarnedValueTechnique must be null unless EarnedValueTechniqueID has a value of OTHER.
Sample Automated Metrics

Guideline 10
- To the extent it is practicable to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units.
- Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes.

Guideline 11
- Provide that the sum of all work package budgets plus planning package budgets within a control account equals the control account budget.

Full list of current metrics available at: http://www.dcma.mil/HQ/EVMS/
## Test Metric Specification

### EVMS Test Metric Specification

|-----------------|----|---------------------------|--------|--------------|-----------|--------------|---------|

5. **Attribute:**
   - 10A3: Planning packages have the following characteristics:
   - Are the logical aggregations of work within a control account, normally the far-term effort that can be identified, budgeted, and time-phased in baseline planning, but cannot yet be detail planned into work packages.

6. **Test Step:**
   - Have PPs incurred actual costs?

7. **Test Metric:**
   - \( X = \text{Count of PPs with ACWP}_{\text{CM}} \)
   - \( Y = \text{Total count of PPs} \)

8. **Metric Threshold:**
   - \( X/Y \leq 2\% \)

9. **UN/CEFACT Required DEI(s):**

10. **Data Elements Required:**
    - EV Cost Tool Data
    - 13C ACWP\(_{\text{CM}}\)
    - 13AT Planning Package UIDs

11. **Assumptions:**
    - ACWP\(_{\text{CM}}\) is collected at the WP/PP level

12. **Instructions:**
    - 1. Identify and count the total number of PPs; this is the denominator (\( Y \)) of the test metric.
    - 2. Identify and count PPs that have incurred actual costs (ACWP\(_{\text{CM}}\) is not zero); this is the numerator (\( X \)) of the test metric.
    - 3. Calculate the test metric (Block 7): \( X \) divided by \( Y \).
    - 4. If the result is within the threshold (Block 8), the metric passes.

13. **Numerator Code**

14. **Denominator Code**

---

Details of each test metric is published so that there is a common understanding of the test and associated thresholds.
### Sample Manual Metrics

Refers to the EIA-748 guidelines that the metric is testing

<table>
<thead>
<tr>
<th>Test Metric</th>
<th>Test Metric ID</th>
<th>Revised</th>
<th>Attribute</th>
<th>Current Template Rev Date</th>
<th>Test Steps</th>
<th>Test Metric Denominator (Y)</th>
<th>Metric Threshold</th>
<th>Min Freq</th>
<th>Artifacts</th>
<th>Test Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01A101b</td>
<td>NEW</td>
<td>01A1</td>
<td>v3.0</td>
<td>23-Mar-17</td>
<td>Is there a single product-oriented WBS?</td>
<td>X = Occurrence of a WBS that is not product-oriented</td>
<td>X = 0</td>
<td>A</td>
<td>08, 20, 38, 46</td>
</tr>
<tr>
<td>2</td>
<td>01A201a</td>
<td>x</td>
<td>01A2</td>
<td>v5.0</td>
<td>23-Mar-17</td>
<td>Are SOW requirements included in the WBS?</td>
<td>X = Count of sampled SOW paragraphs identifying scope that are not in the WBS</td>
<td>Y = Total count of sampled SOW paragraphs identifying scope</td>
<td>X/Y = 0%</td>
<td>Initial no more than annual</td>
</tr>
<tr>
<td>3</td>
<td>02A101a</td>
<td>x</td>
<td>02A1</td>
<td>v3.0</td>
<td>23-Mar-17</td>
<td>Is there a single OBS used on the contract?</td>
<td>X = Count of mistakes between the program organizational breakdown and the program work breakdown structure</td>
<td>n/a</td>
<td>X = 0</td>
<td>A</td>
</tr>
<tr>
<td>4-5</td>
<td>02A102a</td>
<td>x</td>
<td>02A1</td>
<td>v3.0</td>
<td>23-Mar-17</td>
<td>Are all major subcontractors and intra-organizational work with an EVMS DFARS clause flow down requirement included in the OBS reporting requirements in Format 2?</td>
<td>X = Count of major subcontractors and intra-organizational elements with an EVMS DFARS clause flow down requirement not identified in the OBS reporting requirements in Format 2</td>
<td>n/a</td>
<td>X = 0</td>
<td>A</td>
</tr>
<tr>
<td>6-7</td>
<td>03A101a</td>
<td>x</td>
<td>03A1</td>
<td>v3.0</td>
<td>23-Mar-17</td>
<td>Is control account data traceable between system artifacts including schedule, cost data, and work authorization documents?</td>
<td>X = Count of sampled incomplete CAs with IMS baseline dates outside the WAD POP</td>
<td>Y = Total count of sampled incomplete CAs with IMS baseline dates outside the WAD POP</td>
<td>X/Y ≤ 5%</td>
<td>Q</td>
</tr>
</tbody>
</table>

**Guideline 1**
- Define the authorized work elements for the program. A Work Breakdown Structure (WBS), tailored for effective internal management control, is commonly used in this process.

**Guideline 2**
- Identify the program organizational structure, including the major subcontractors, responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.

**Guideline 3**
- Provide for the integration of the planning, scheduling, budgeting, work authorization and cost accumulation processes with each other, and as appropriate, the program work breakdown structure and the program organizational structure.

### Sample DOE Test Protocols - GL 1

#### Guideline 1 - Define the authorized work elements for the project. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.

A Work Breakdown Structure (WBS) is the structure and code that integrates and relates all project work (scope, schedule, and cost). It is the cornerstone of effective project planning, execution, control, status, and reporting. All the work contained within the WBS is to be identified, estimated, scheduled, and budgeted. The WBS contains the scope baseline necessary to achieve the technical objectives of the work described. It is generally a multi-level framework that organizes and graphically displays elements representing the work to be accomplished in logical relationships. Relationships among WBS elements and detailed descriptions of each element are presented in the WBS dictionary accompanying the hierarchical diagram.

<table>
<thead>
<tr>
<th>#</th>
<th>Interpretive Discussion</th>
<th>Test Steps</th>
<th>Test Metric</th>
<th>Metric Threshold</th>
<th>Artifacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.A.1</td>
<td>Is a single product-oriented WBS used for a given project extended to the control account level as a minimum?</td>
<td>Manual Tests: 1. Review the WBS and verify only one WBS structure is used for the project.</td>
<td>a. Compare the WBS Index to the WBS structure in the RAM, WADs, IMS, EVM Cost Tool, Control Account Plan (CAP), and the IPMR/CPR Format 1 and verify the WBS structure is consistent through the system.</td>
<td>Document all discrepancies as compliance concerns</td>
<td>Project WBS Index, WBS Dictionary, RAM, WADs, IMS, EVM Cost Tool, CAP, IPMR/CPR (CDRL)</td>
</tr>
<tr>
<td>1</td>
<td>The key aspect of this GL LOI is a single, product-deliverable-oriented WBS extended to the CA level at a minimum to integrate, plan, and manage the project work scope, schedule and budget requirements.</td>
<td></td>
<td>b. Using the previous trace artifacts, verify the WBS is extended to the control account level at a minimum.</td>
<td></td>
<td>Project WBS Index, WBS Dictionary, RAM, WADs, IMS, EVM Cost Tool, CAP</td>
</tr>
<tr>
<td>2.1</td>
<td>IMPACT OF NONCOMPLIANCE</td>
<td></td>
<td>c. Verify the WBS is a product oriented WBS consistent with the DOE PM WBS Handbook. Compare the WBS/Dictionary structure with the DOE PM WBS Handbook guidance. Trace all levels of the current WBS.</td>
<td></td>
<td>Project WBS Index, WBS Dictionary, DOE PM WBS Handbook</td>
</tr>
<tr>
<td>3</td>
<td>Without a single WBS that contains all authorized project work, the project cannot be properly planned, managed, and executed.</td>
<td></td>
<td>d. Identify any WBS elements that are not part of the project scope. If present, these WBS elements should not be considered for purposes of this LOI.</td>
<td></td>
<td>Project WBS Index, WBS Dictionary, SOW, Performance Work Statement</td>
</tr>
</tbody>
</table>
Initial DCMA Findings

- 8 reviews in 2016/2017 time period
- Total of 58 deficiencies noted against the guidelines
  - Includes both compliant and non-compliant guideline
- GLs 6, 10, 27, or 29 had deficiencies in over 50% of reviews
- Total of 10 deficiencies were determined to be significant in the 8 reviews
  - GL 6 - non compliant in 2 of 8 reviews
  - GL 27 - Non compliant in 2 of 8 reviews
  - In 3 of 8 reviews contractor systems were determined to be compliant in initial assessment
- Contractors concurred with 92.3% of the 65 total determination findings in FY16-17
  - Materiality is often contested (likely due to withholdings)
  - If significant finding is issued, tends to be closed quickly, level 2 tends to take longer
Initial DOE Findings

Data shows performance improvements over time as a result of a formal Self-Governance program.
Contractor Challenges
Contractor Challenges

Data Configuration

- Integrating data from multiple sources for analysis
- Automating metrics when possible through coding of EVM data

Toolset Implementation & Processes

- Reviewing the metrics in an automated manner requires the implementation of a new toolset
- Processes must be reviewed and updated to account for new tools and execution of internal surveillance

Internal Surveillance & Training

- DCMA’s intention is that contractors will perform internal surveillance and use the test metrics to review data quality prior to monthly submissions
- Requires qualified resources readily available to address the new data requirements and assess any potential risks before you submit your data to the DCMA
Data Configuration

• Metrics look for inconsistencies across schedule, EV data, and work authorization data
• Automate as many of these tests as possible but it requires the following integrated systems and data:

  1. Project Schedule data
  2. EVM Cost Management data
  3. Work Authorization Document Data

• Need a unifying identifier such as WBS/OBS or Unique ID
Automating Metrics Example

<table>
<thead>
<tr>
<th>EVMS Test Metric Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
</tr>
</tbody>
</table>

5. Attribute:
03A1: The planning, scheduling, budgeting, work authorization and cost accumulation systems are integrated with each other via a common coding structure and, as appropriate, with the Contract Work Breakdown Structure (CWBS) and the Organizational Breakdown Structure (OBS) at Control Account (at a minimum) through the total contract level.

6. Test Step:
Is control account data traceable between system artifacts including schedule, cost data, and work authorization documents?
- Do baseline dates align between the work authorization documentation (WAD) and IMS? (count)

7. Test Metric:
\[ X = \text{Count of sampled incomplete CAs with IMS baseline dates outside the WAD POP} \]
\[ Y = \text{Total count of sampled incomplete CAs in IMS} \]

8. Metric Threshold:
\[ \frac{X}{Y} \leq 5\% \]

9. UN/CEFACT Required DER(s)

10. Data Elements Required:
- 09 Work Authorization Documentation (WAD)
  - 09C Baseline Finish
  - 09D Baseline Start
- 11 Integrated Master Schedule (IMS)
  - 11G Baseline Finish
  - 11J Baseline Start

11. Assumptions:
1. Test metric is based on a sample of incomplete CAs
2. If BAC and BCWP are within $100 (1 hour), then CA is complete

12. Instructions:
1. Identify a sample of incomplete CAs in the IMS; this is the denominator (Y) of the metric.
2. Identify the baseline start and baseline finish dates in the WADs for the sampled CAs.
3. Compare the baseline start and the baseline finish dates for each incomplete CA between the WAD and the IMS.
4. Count each instance where at least one of the baseline dates (baseline start, baseline finish, or both) is outside the WAD POP in the IMS; this is the numerator (X) of the metric.
5. Calculate the test metric (Block 7): \( X \) divided by \( Y \).
6. If the result is within the threshold (Block 8), the metric passes.

13. Numerator Code

14. Denominator Code

Currently Manual, done Quarterly, and on a sample of Control Accounts in the IMS. Can be automated, monthly, and across all elements if IMS and WAD data is integrated.
Additional Coding and Data Improvements

- Tag Control Accounts and Summary Level Planning Packages
- Tag Work Packages and Planning Packages
- Identify Elements of Cost
- Flag recurring costs
- Identify the Performing Entity
Toolset Implementation & Processes

- Metrics are all based on relatively simple math calculations that *could* be in excel. However, this introduces additional risk:
  - Hand calculation errors
  - Increased timeline to complete analysis
  - Smaller sample size - DCMA may select different WBS elements for their analysis
  - Lack of trending data which DCMA will use in their EVAS tool
  - Limited drill-down capabilities for root cause analysis
- Desk guides and training will be necessary to support new tools or even existing tools with new functionality
In each period, there are between 1-6 WPs/PPs that do not have corresponding tasks in the schedule.

Review each WP/PP, starting with the near term:
- Are the WPs/PPs in the EV tool or schedule correct?
- Are tasks coded correctly in the schedule?
- How can be corrected going forward?
Control Account BAC in EV Tool does not match CA BAC in WADs - 100% of CAs do not match for each period in the project!

Review the Control Accounts by period and compare each BAC:
- Which system is correct?
- What is causing the discrepancy?
- Is it a user error or issue with the tool?
- How can it be corrected going forward?
EVMS Continuous Process Improvement
## 3 Steps to Data Driven Surveillance

<table>
<thead>
<tr>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
<td><strong>Data and Process Design</strong></td>
<td><strong>Implementation &amp; Training</strong></td>
</tr>
<tr>
<td>- Project plan review and assessment of current EVMS capabilities to support DDM</td>
<td>- Design coding changes, such as Planning Package/Work Package flags, Control Account/Summary Level Planning Package flags and identifying elements of cost</td>
<td>- Installation and configuration of analysis tool</td>
</tr>
<tr>
<td>- Review current schedule and cost management capabilities to identify sources of data and recommend enhancements as required to support metrics and tool implementation</td>
<td>- Design process changes to support the monthly reporting timeline and support corrective action planning</td>
<td>- Project test of metrics, reporting, and root cause analysis</td>
</tr>
<tr>
<td>- Additional data analysis and assessment of manual sources of data like Work Authorization Documents (WADs)</td>
<td></td>
<td>- Data clean up and additional changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Training on DDM, government processes, and selected tool</td>
</tr>
</tbody>
</table>
**Surveillance by Exception**

Similar approach to managing project analysis but for surveillance

Surveillance is more efficient because you don’t need to review every metric, every month

Focus on:

- Metrics associated with top GL deficiencies
- “At-a-glance” assessment of metric health
- Metrics that have been red for several periods
- Metrics that are trending negatively
## Favorite Metrics for Top GL Deficiencies

<table>
<thead>
<tr>
<th>Unique Test Metric ID</th>
<th>Test Steps</th>
<th>Test Metric Numerator (X)</th>
<th>Test Metric Denominator (Y)</th>
<th>Metric Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>06A101a</td>
<td>Does each discrete WP, PP and SLP have task(s) represented in the IMS?</td>
<td>X = Count of incomplete discrete WPs, PPs and SLPPs in the EV cost tool that are not in the IMS</td>
<td>Y = Total count of all incomplete discrete WPs, PPs, and SLPPs in the EV cost tool</td>
<td>X/Y = 0%</td>
</tr>
<tr>
<td>06A209a</td>
<td>Are schedule network constraints limited?</td>
<td>X = Count of incomplete activities (tasks and milestones) with hard constraints</td>
<td>Y = Total count of incomplete activities (tasks and milestones)</td>
<td>X/Y = 0%</td>
</tr>
<tr>
<td>06A213a</td>
<td>Are activity interdependencies defined?</td>
<td>X = Count of incomplete activities (tasks and milestones) with either missing predecessors or missing successors</td>
<td>Y = Total count of incomplete activities (tasks and milestones)</td>
<td>X/Y ≤ 10%</td>
</tr>
<tr>
<td>06A501a</td>
<td>In the IMS, do all of the activities (tasks and milestones) have baseline start and baseline finish dates?</td>
<td>X = Count of activities (tasks and milestones) without baseline dates</td>
<td>Y = Total count of activities (tasks and milestones)</td>
<td>X/Y ≤ 5%</td>
</tr>
<tr>
<td>10A102a</td>
<td>Are EVTs assigned to WPs?</td>
<td>X = Count of incomplete WPs without an assigned EVT</td>
<td>Y = Total count of incomplete WPs</td>
<td>X/Y ≤ 5%</td>
</tr>
<tr>
<td>10A109a</td>
<td>Does each WP/PP have an assigned budget?</td>
<td>X = Count of in-process and remaining WPs and PPs with BAC ≤ 0</td>
<td>Y = Total count of in-process and remaining WPs and PPs</td>
<td>X/Y ≤ 5%</td>
</tr>
<tr>
<td>27A104a</td>
<td>Are ETCs generated for WPs, PPs, and SLPPs?</td>
<td>X = Count of incomplete WPs, PPs, and SLPPs without ETC</td>
<td>Y = Total count of incomplete WPs, PPs, and SLPPs</td>
<td>X/Y &lt; 10%</td>
</tr>
<tr>
<td>27A106a</td>
<td>Do EACs consider performance to date?</td>
<td>X = Count of incomplete CAs where</td>
<td>Y = Total count of incomplete CAs</td>
<td>X/Y &lt; 25%</td>
</tr>
<tr>
<td>29A401a</td>
<td>Are there changes to open WPs?</td>
<td>X = BAC for WPs where current month BAC ≠ previous month BAC</td>
<td>Y = Total BAC for open WPs</td>
<td>X/Y &lt; 5%</td>
</tr>
<tr>
<td>29I401a</td>
<td>Are baseline dates being updated to mask legitimate variances?</td>
<td>X = Count of sampled baseline date changes without substantiation</td>
<td>Y = Total count of sampled baseline date changes</td>
<td>X/Y &lt; 10%</td>
</tr>
</tbody>
</table>
“At-A-Glance” View

Evaluate overall metric health as the first step of monthly analysis:

- How many metrics are red and yellow?
- Are there new issues?
- Are the red/yellow metrics critical issues?
- Are there data corrections to be made before CAM analysis begins?
- If corrective actions were implemented in a prior period, do the metrics confirm the action was successful?
- Do we have documentation from prior periods to explain or justify ongoing issues?

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Metric</th>
<th>Test</th>
<th>Value</th>
<th>Total</th>
<th>Percent</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>03A1</td>
<td>01a</td>
<td>Number of incomplete CAs with IMS POP outside WAD POP</td>
<td>6</td>
<td>50</td>
<td>12.0%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>01b</td>
<td>WAD BAC of incomplete CAs with IMS POP outside WAD POP</td>
<td>6,828.4</td>
<td>48,505.1</td>
<td>14.1%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>01c</td>
<td>Number of incomplete CAs where BAC &lt;&gt; WAD BAC</td>
<td>2</td>
<td>50</td>
<td>4.0%</td>
<td>&lt; 20%</td>
</tr>
<tr>
<td></td>
<td>01d</td>
<td>ABS(BAC - WAD BAC) of incomplete CAs where BAC &lt;&gt; WAD BAC</td>
<td>764.2</td>
<td>48,269.3</td>
<td>1.6%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>01f</td>
<td>Number of incomplete WPs where EVMS baseline does not match WAD baseline POP</td>
<td>10</td>
<td>187</td>
<td>5.3%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>01g</td>
<td>Number of incomplete CAs with EVMS baseline POP outside WAD baseline POP</td>
<td>2</td>
<td>50</td>
<td>4.0%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>05A1</td>
<td>02a</td>
<td>Number of CAs with no CAM assigned</td>
<td>1</td>
<td>53</td>
<td>1.9%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>06A1</td>
<td>01a</td>
<td>Number of incomplete discrete work and planning packages not represented in IMS</td>
<td>20</td>
<td>142</td>
<td>14.1%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td></td>
<td>01a</td>
<td>Number of activities with actual start or finish past status date</td>
<td>0</td>
<td>563</td>
<td>0.0%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td></td>
<td>02a</td>
<td>Number of activities with forecast start or finish before status date</td>
<td>6</td>
<td>443</td>
<td>1.4%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td></td>
<td>03a</td>
<td>Number of SF relationships on incomplete activities</td>
<td>0</td>
<td>696</td>
<td>0.0%</td>
<td>&lt; 2%</td>
</tr>
<tr>
<td></td>
<td>04a</td>
<td>Number of GS and FF relationships on incomplete activities</td>
<td>84</td>
<td>666</td>
<td>12.1%</td>
<td>&lt; 15%</td>
</tr>
<tr>
<td></td>
<td>05a</td>
<td>Number of relationships with lags on incomplete activities</td>
<td>20</td>
<td>696</td>
<td>2.9%</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td></td>
<td>06a</td>
<td>Number of relationships with leads on incomplete activities</td>
<td>0</td>
<td>696</td>
<td>0.0%</td>
<td>&lt; 2%</td>
</tr>
<tr>
<td></td>
<td>08a</td>
<td>Number of summary schedule tasks with logic</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
<td>&lt; 5%</td>
</tr>
</tbody>
</table>
Metric Trending

Track metrics by category, over time to identify trends and highlight areas to focus on.

Contract level chart to view exceptions by contract.
Develop a Culture of Continuous Process Improvement

- **Commit**
  - Management commitment to automated surveillance to drive actionable EV results

- **Develop Routine**
  - Include surveillance by exception in monthly process

- **Share Resp.**
  - Assign responsibility to all project team members

- **Measure Results**
  - Share metric trends and improvements

- **Be Patient**
  - Continuous process improvement takes time
# People Drive Change - Not The Change Itself

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Purpose</th>
<th>Particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Driven Surveillance</td>
<td>✅ Utilize DCMA or DOE data drive surveillance metrics to conduct internal surveillance and continuous improvements</td>
<td>✅ Assess current processes and tools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✅ Create and Implement design changes as necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✅ Deliver training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ Control Account Managers</td>
</tr>
<tr>
<td>✅ Program Managers</td>
</tr>
<tr>
<td>✅ Program Planning &amp; Scheduling</td>
</tr>
<tr>
<td>✅ Program Finance</td>
</tr>
</tbody>
</table>

If people don’t change: ultimately won’t achieve your PURPOSE

If people don’t change: the change PARTICULARS don’t matter
Benefits of Data Driven Metrics

• Encourages a commitment to automate your organization’s internal EVMS surveillance processes
• Focused approach to reviewing, trending and analyzing metrics for a streamlined process
• Continuously improve EVMS processes, enhancing project performance management by identifying project controls weaknesses
BDO is pleased to offer a complimentary review of your data driven metrics and explore how they can be used to improve the effectiveness of your EVMS!

• BDO will analyze a project dataset from your organization to identify and troubleshoot some of the metrics
• We will develop and present a briefing regarding the key metrics and potential areas of improvement

For additional information please contact Dave Scott at dmscott@bdo.com