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Project Management
Construction Management

Cost and Schedule Integration: An Industry Update

Construction CPM Conference

January 27-30, 2013
Sheraton New Orleans

Outline

- Speaker Introduction
- Government Contracting Perspective
- Commercial Contracting Update
- Conclusion

Introduction

- Michael R. Nosbisch, CCC, PSP
  - Currently
    - PT&C Vice President and EVMS Practice Lead
    - Immediate Past President of AACE International
    - Active member of NDIA's Program Management Systems Committee (PMSC)
  - Formerly
    - Vice President of EVM for SM&A
    - VP of Project Controls for Parsons Government Services

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Government Contracting Perspective

DI-MGMT-81861 states clearly that …

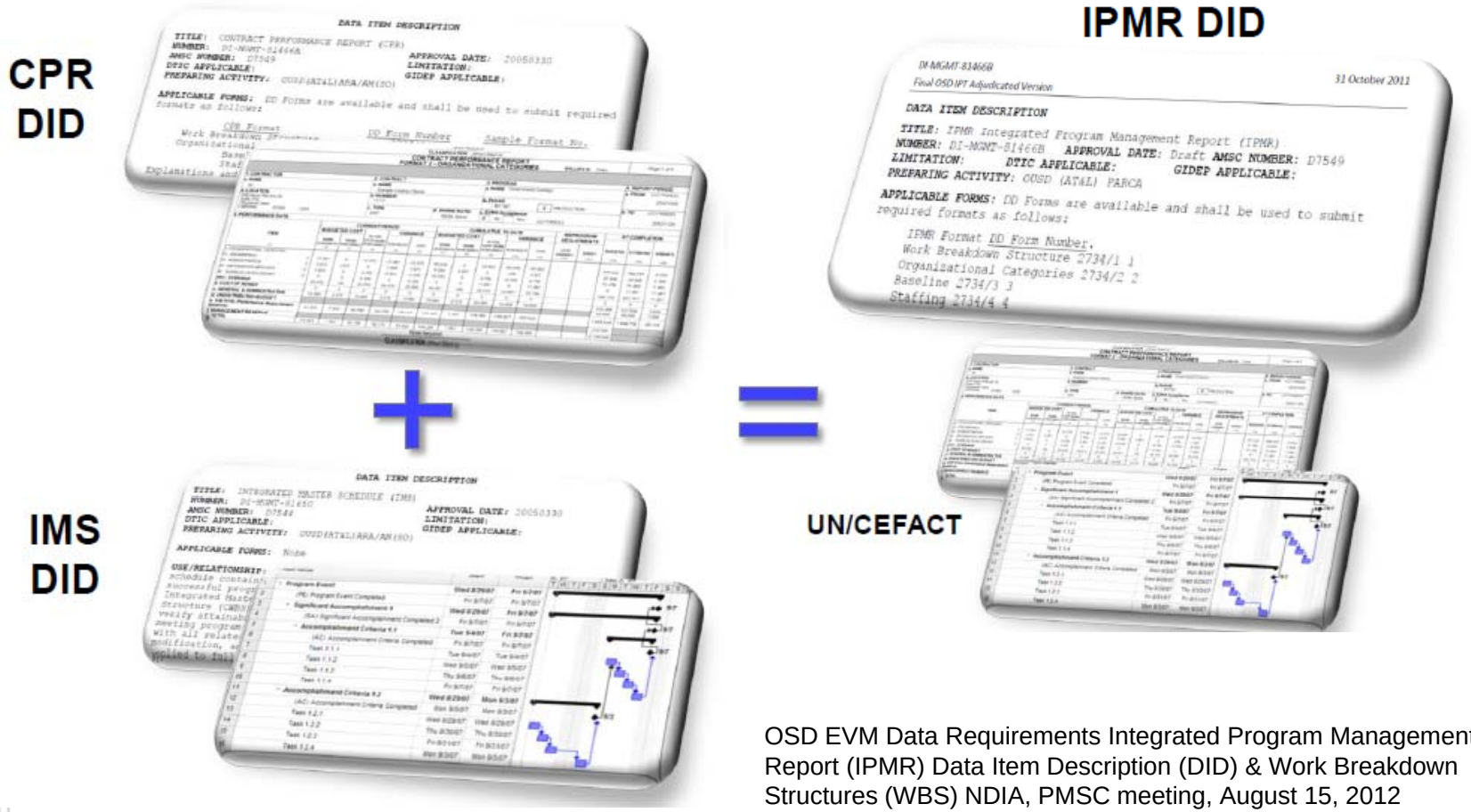
DATA ITEM DESCRIPTION

Title: Integrated Program Management Report (IPMR)
Number: DI-MGMT-81861 **Approval Date:** 20120620
AMSC Number: D7549 **Limitation:**
DTIC Applicable: No **GIDEP Applicable:** No
Preparing Activity: OUSD (AT&L) PARCA
Applicable Forms: Forms are available to be used to submit required formats as follows:

1.2. The IPMR's primary value to the Government is its utility in reflecting current contract status and projecting future contract performance. It will be used by the DoD component staff, including program managers, engineers, cost estimators, and financial management personnel, as a basis for communicating performance status with the contractor. DoD will also use the IPMR data for the following purposes:

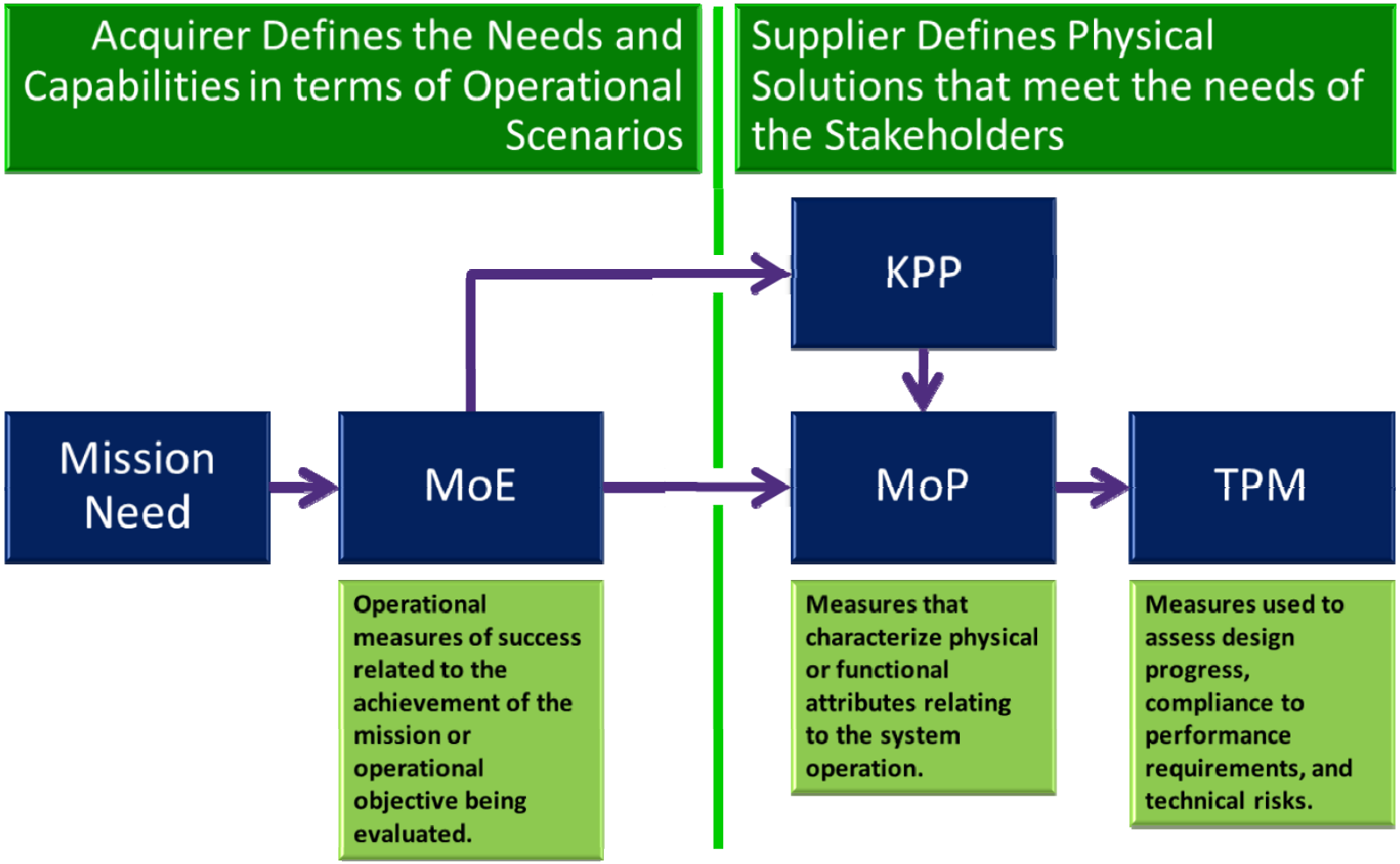
1.2.1 Integrate cost and schedule performance data with objective technical measures of performance.

The 100,000 foot view of what is new …



OSD EVM Data Requirements Integrated Program Management Report (IPMR) Data Item Description (DID) & Work Breakdown Structures (WBS) NDIA, PMSC meeting, August 15, 2012

How can we measure performance?



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Integrated CPR, IMS, CSFR

- Format 1 – WBS
- Format 2 – OBS
- Format 3 – Baseline
- Format 4 – Staffing
- Format 5 – Explanations and Problem Analysis
- Format 6 – IMS
- Format 7 – History and Forecast

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IPMR Format	Form Number	Format No.
Work Breakdown Structure	2734/1	1
Organizational Categories	2734/2	2
Baseline	2734/3	3
Staffing	2734/4	4
Explanations and Problem Analyses	N/A	5
Integrated Master Schedule	N/A	6
Electronic History and Forecast File	N/A	7

1.0. USE/RELATIONSHIP:

1.1. The IPMR contains data for measuring cost and schedule performance on Department of Defense (DoD) acquisition contracts. It is structured around seven formats that contain the content and relationships required for the electronic submissions.

1.1.1. Format 1 defines cost and schedule performance data by product-oriented Work Breakdown Structure (WBS).

1.1.2. Format 2 defines cost and schedule performance data by the contractor's organizational structure (e.g., Functional or Integrated Product Team (IPT)).

1.1.3. Format 3 defines changes to the Performance Measurement Baseline (PMB).

1.1.4. Format 4 defines staffing forecasts.

1.1.5. Format 5 is a narrative report used to provide the required analysis of data contained in Formats 1-4 and 6.

1.1.6. Format 6 defines and contains the contractor's Integrated Master Schedule (IMS).

1.1.7. Format 7 defines the time-phased historical & forecast cost submission.

1.2. The IPMR's primary value to the Government is its utility in reflecting current contract status and projecting future contract performance. It will be used by the DoD component staff, including program managers, engineers, cost estimators, and financial management personnel, as a basis for communicating performance status with the contractor. DoD will also use the IPMR data for the following purposes:

1.2.1. Integrate cost and schedule performance data with objective

One Big Hitter – *Variance Analysis*

- Formal variances are limited to a total of 15 WBS Elements.
- Two methods allowed for determining which variances are addressed
  - Top 15 WBS Elements approach
  - Allows for Government selection approach or a defined contractor process that covers all aspects (current, cumulative and at-complete)
- Allows contractor or government to temporarily increase the number of reported variances to cover emerging tread(s)
- Linked Formats 1–4 and 6 discussions to Format 5
  - Significant Format 6 changes. Require SRA, Health Assessment and drivers as applicable
- Reconcile Best/Worst/Most Likely EAC

The IMS has one new format …

- The Integrated Master Schedule (IMS) had been a separate deliverable with its own DID
  - Now merged with the CPR as Format 6 in the IPMR
  - IMS analysis requirements will be submitted as part of Format 5
- Added significant language to eliminate most needs for statement of work clarification
  - Defined minimum level of subcontractor integration
  - Reached agreement on the definition of Schedule Margin and Schedule Visibility Tasks (SVTs)
  - Required disclosing of justification for Leads, Lags and most Constraints
  - Defined minimum fields
  - Expanded when SRA is required and how it is reported

Format 6

- Consistency with Format 1 Addressed
  - Included "The WBS numbering system in the IMS must be consistent with the Format 1 structure."
- Schedule Margin
  - Allowed before program events. §3.7.2.4.
- Critical & Driving Paths
  - Included definition that tasks with "0" or negative total float are not by default the critical path §3.7.1.3.5.9.
  - ***Driving path*** and interim milestones defined (not in 2005 IMS DID) §3.7.1.3.5.8.
  - Excessive constraints and incomplete, incorrect, or overly constrained logic shall be avoided.§3.7.1.3.5.9.

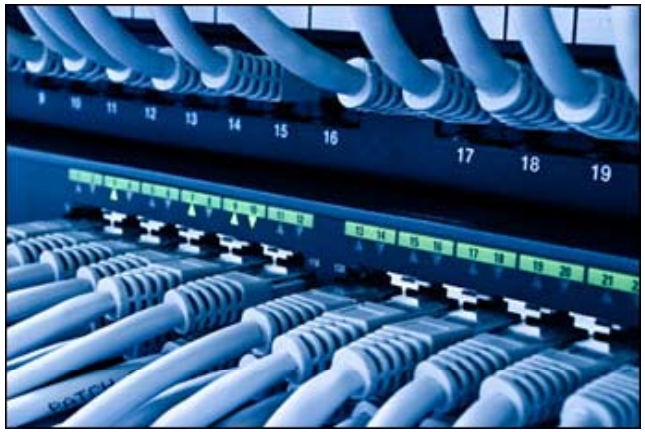
Format 6 (cont'd)

- Relationships & Float
  - All non-constrained discrete tasks/activities/milestones shall have at least one predecessor and successor, except the start and end of the program or interim delivery
- Subcontractor Integration
  - Subcontractor discrete work shall be incorporated as tasks within the prime IMS at a level necessary for a realistic critical path
- Calendars
  - The IMS shall contain all calendars that define working and nonworking time periods or other information that may impact the schedule

New Format 7

- New requirement not in CPR DID, but similar information was previously required by the EVM Central Repository (called historical file)
- Time phased BCWS, BCWP, ACWP, ETC from contract award to completion as applicable
- Must reconcile with Format 1 BAC and EAC for the month submitted
- Due as a minimum annually, at the same time as other Formats. Recommend quarterly according to the government fiscal calendar.
- Purpose to support Government planning cycle

Commercial Contracting Perspective



Commercial Contracting Perspective

- General Observations
- The Contractors' Side
- The Owners' Side
- Recommended Practice(s)

General Observations

- Commercial contracting environment much more reliant on FFP/FUP contract types for large projects
  - Cost and performance risk “transferred” from owners to contractors
  - Nuances will exist between different project delivery methods
- Schedules usually integrated with cost only when contractually required as basis for pay applications
  - Formalizes requirement to perform monthly updates
  - Often times leads to secondary “field schedule”

The Contractors' Side

- Parsons Corporation
  - A current Acumen customer
  - Began as engineering-specific, now full scope design-build/EPC contractor
    - Specializes in first of a kind, one of a kind projects
  - Three primary business units
    - Parsons Government Services (formerly PI&T)
    - Parsons Environment & Infrastructure
      - Commercial Technology
      - Water & Infrastructure
    - Transportation Group

The Contractors' Side

- Summary of Parsons Requirements
  1. Hierarchical Work Breakdown Structure (WBS) and WBS Dictionary
     - Unique WBS numbers assigned to the lowest level elements of the WBS
     - One responsible individual for each WBS element (one person can manage multiple WBS elements)
  2. Metrics identified for consistently establishing physical progress
     - Budgets match the structure and detail of the metrics used for physical progress

The Contractors' Side

- Summary of Parsons Requirements (cont'd)
  3. Logic-based schedules that identify the sequence of work and significant task relationships
     - WBS reflected within schedule so that activities can be associated with specific control accounts
  4. Time-phased budget baselines (i.e. overlay or budget-load the schedule)
     - Both cost and revenue required to generate cash flow curve for large projects during proposal review
     - Level-of-effort activities are identified and isolated in a separate control account

The Contractors' Side

- Summary of Parsons Requirements (cont'd)
  5. Baseline plan is controlled
     - Prevent unauthorized changes
     - Ensure that authorized changes are immediately incorporated
  6. Monthly or more frequent comparison of progress and costs to the baselines
     - Calculation of cost *and schedule* variances and indexes, with explanations provided for significant variances
     - Corrective actions implemented as appropriate

The Owners' Side

- Orange County Sanitation District
  - Responsible for safely collecting, treating and disposing the wastewater generated by 2.5 million people living in a 479-square-mile area of central and northwest Orange County (CA)
  - Ongoing Capital Improvements Program comprised of multiple rehabilitation and expansion projects totaling app. $3 billion
    - Most projects are FFP, design-bid-build
- OCSD Scheduling Specification Review
  - Submittal/acceptance of baseline schedule
    - Required for full payment of mobilization line item
    - $300K or 10% of line item

The Owners' Side

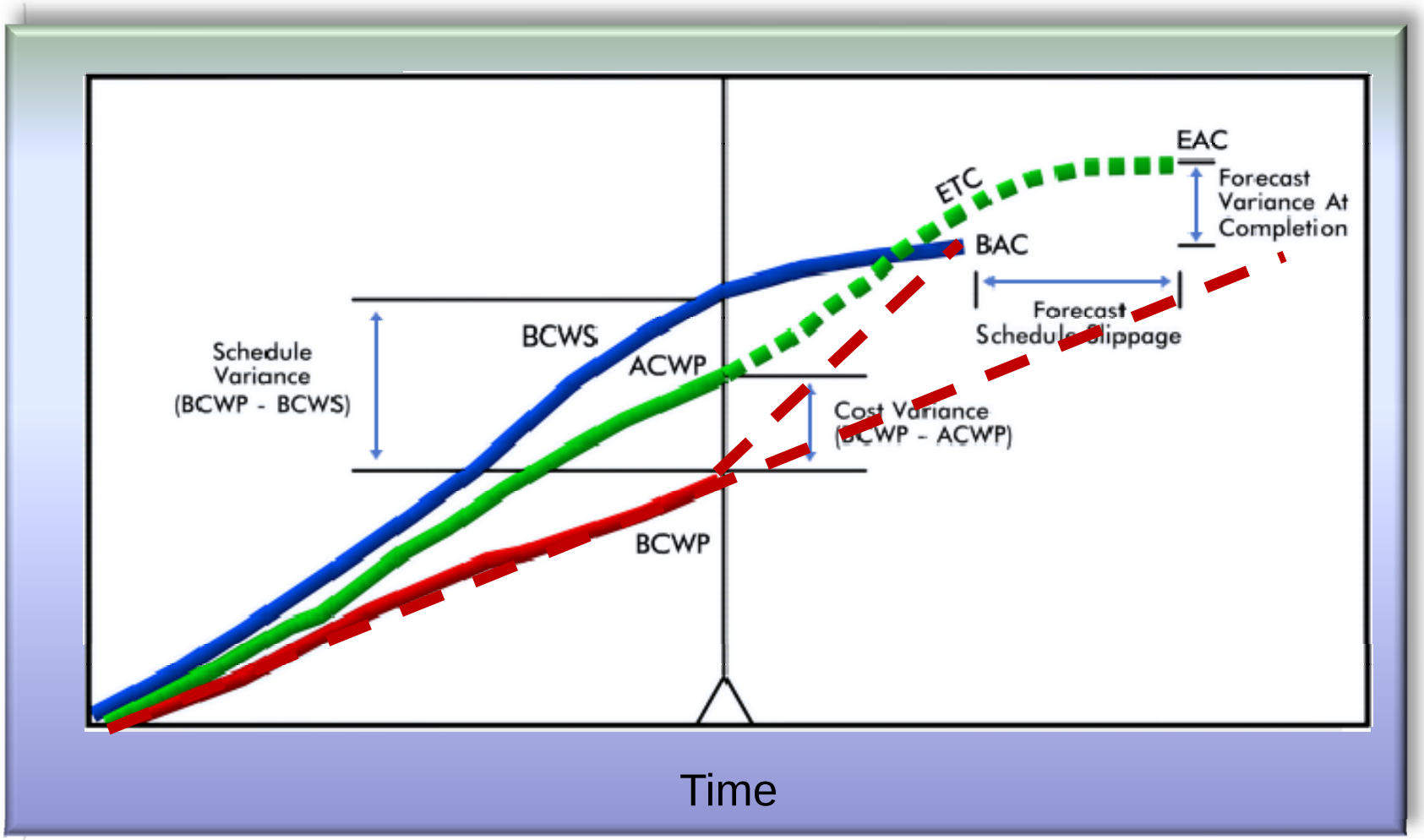
- OCSD Scheduling Specification Review (cont'd)
  - Cost loading of activities
    - Required on all discrete work activities
      - Not procurement and submittal preparation/review (except for baseline schedule)
    - Cost loading should be equal to value of contract price (revenue)
      - Not required to be integrated with resource loading (crew-based)
      - Overhead/profit prorated and added to each activity
      - Cost (revenue) curve required as separate submittal
      - Schedule updates used as basis for progress payments, **but not exclusively**

Recommended Practice(s)

- Contractors' Side
  - If internal decision is made to cost load schedule, should be performed at summary (control account) level only
    - Should not be integrated with resource loading to allow for more flexibility
  - In addition to initial cash flow curve generated by cost loaded schedule, "earned value" curves should be developed
    - Based on what has been approved ("earned revenue") for monthly progress payment
    - Facilitates trend for how much work is required on monthly basis to complete in accordance with forecasted date in CPM schedule

Recommended Practice(s)

- Owners' Side
  - Specifying cost (revenue) loading as basis of progress payments helps to ensure timely schedule updates
    - Should also specify that each discrete activity be subdivided into "substantial completion" and "final completion" to prevent widespread out-of-sequence progress
    - Should allow for overhead/profit to be loaded outside of discrete activities
      - Also, should be loaded in activity with fixed duration equal to contractual PoP (not hammocked over entire schedule)
      - Will allow contractor to recover overhead/profit as originally planned, lessening cash flow impact of delays/claims



Source: SM&A EVMS Seminar

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Conclusion and Questions

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