EVMS Training Snippet Library:

Integrated Master Schedule (IMS)

Initial Baseline Review

Office of Acquisition and Project Management (OAPM) MA-60
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This EVMS Training Snippet, sponsored by the Office of Acquisition and Project Management (OAPM) covers how to review an Integrated Master Schedule (IMS) and highlights common areas of non-compliance with ANSI/EIA-748 guidelines. When the scheduling guidelines and requirements are implemented correctly, the results support creation of a realistic IMS and critical path the DOE can rely on to assess schedule performance, predictive analysis, and risk. This snippet is recommended whenever a schedule baseline is created or revised.

The Contract is the prevailing document regarding what Earned Value Management System requirements are required to be implemented, and as a result, the scheduling subsystem design. It should also include the requirements for implementation and delivery of the scheduling system artifacts. The scheduling system artifacts will be reviewed in accordance with the contractor's system description and other procedures.

Contract Compliance Typical Issues

- **Earned Value Management System Required**

    – Contractor's IMS does not meet DOE's requirements

    – Contractor's IMS does not meet ANSI/EIA-748 requirements

    – Contractor's IMS does not meet contract requirements

When a contract invokes the requirements of DOE 413.3B and ANSI/EIA-748, it is important to have a clear understanding of these requirements and their implications before reviewing the IMS.

Later in this snippet, we will discuss the areas of the guidelines that are often missed by the contractor in both the required documentation and the implementation of its systems.

For contracts that require a validated EVM system, there is a requirement for a System Description that meets the intent of the 32 guidelines described in ANSI/EIA-748. The system description may be the first level documentation describing how the contractor implements and maintains the IMS. If the system description is not detailed enough to fully explain the scheduling system application against the intent of the guidelines, or if it does not meet the specific contract requirements, the contractor may also develop lower level procedures that describe the scheduling system guidance in greater detail.

Reviewers of the IMS need to be familiar with the content of these documents to ensure an understanding of how the system is supposed to be implemented.

Another important document the contractor should provide for review and reference is a data dictionary. This describes the fields used in the IMS for elements such as the WBS, OBS, control accounts, and other important project codes. This will be the reviewers guide to how the schedule is organized and integrated with other EVMS subsystems.

Typical Issues with Contractor Documentation

- **Contractor System Description does not meet the intent of the ANSI / EIA 748 Schedule Guidelines**
  - Fails to address the intent of Guideline 3
    - Integration of EVMS Subsystems
  - Fails to fully address Guideline 6
    - Description of schedule tiers
    - Description of consistent approach to defining start and completion milestones
    - Fails to define traceability requirements
    - Fails to address the mechanics of a realistic critical path
  - Fails to adequately address Guideline 7
    - Fails to define interim measurements of progress

Per the guideline 3 requirements, the contractor should be able to demonstrate the integration of the EVMS subsystems. This integration is achieved through the use of identifiers coded in these subsystems. The system description should describe the identifiers that are used to demonstrate this integration. The underlying procedures should describe how this integration is accomplished. The data dictionary should identify the coding structures used and the location where they can be found in the IMS. We will discuss how to check for accurate implementation later in this session.

Per the Guideline 6 requirements, the contractor should be able to demonstrate traceability within the IMS. The system description documents what the contractor requirements are to accurately construct the IMS to include vertical and horizontal traceability, the definition of start and completion milestones, and what defining criteria are used for determining the milestones. The system documentation must also address how the IMS is used to support the development of the time phased budget.
The development of a realistic critical path is also required by guideline 6. The mechanics of the schedule including relationships, lags, leads, and constraints directly impact the ability of the IMS to produce the critical path. These are discussed later in this snippet.

Per the Guideline 7 requirements, the contractor's system should define planning the indicators to measure progress for deliverables or contract milestones. The system documentation often fails to address how the contractor will meet this intent and what standard measures will be applied.

The trace of contract work scope is probably one of the most difficult and subjective areas of the schedule review process. Contract Statements of Work or Project Execution Plans (PEPs) are often at such a high level that they do not indicate the activities required for the contractor to execute the work scope objectives. They simply state the expected results.

Use of the WBS dictionary is the starting point to review the contractor's IMS for completeness of work scope planning. It is the further breakdown of the Contract Scope of Work and describes in greater detail how the contract objectives will be met.

The final artifact that should be used to complete the work scope trace is the control account work authorization scope description. This should give further definition of the scope and may include how the Contractor will execute the work. This is then further defined to the work package and activity level in the IMS.

Typical Issues with Scope Traces

- **IMS does not reflect contracted work**
  - Missing or Ambiguous Scope
  - Scope is planned not within the contract
- **Work package activities do not describe work execution steps sufficiently**
  - Activities are at too high of a level
  - Common descriptions for unique work scope.
- **Planning package activities do not adequately describe scope content**
  - IMS activities are not broken down to a level that describes the work scope content
  - Activity descriptions are vague and not definitive

In many instances, there are issues with the contractor being able to demonstrate that all contract work scope is included and planned in the IMS. A cross reference code field should be used to identify activities in the schedule; these codes should be traceable to the contract statement of work paragraph numbers. If this is not included in the contractor's coding structure, the WBS identifier assigned to activities should be used in conjunction with the WBS dictionary and the control account work authorization scope description. The reviewer should also ensure the work scope planned in the IMS contains only that scope of work the contractor is authorized to perform. Unauthorized work should never be found in the schedule.

Another issue commonly found in the scope trace of the IMS is that work packages are not clearly and concisely defined by the activities in the IMS. Often these activity descriptions are at too high of a level, are used for other similar work in different WBS elements or work packages, and the unique work scope cannot be distinguished. For example, quality inspection and material are found in the same schedule activity with no identifier to indicate what is being inspected or procured. The schedule may have tens of thousands of activities and each task needs to be uniquely identified.

Even without being an expert in the area you are reviewing, the activities and the content of those activities should be at a level that reflects the way the work scope will be executed. Always keep in mind when reviewing for scope that the IMS is used to monitor the progress toward project objectives.

On multiyear projects, planning packages are an essential part of the IMS. Long range activities may not be able to be clearly defined if the work scope is not going to be executed

for months or years. However, planning packages should contain activities with enough detail to clearly describe the work scope content and what work will be executed with the planning package budgets. When a planning package is converted to work packages, the work scope should be the same as that contained in the planning package.

Reviewing for Deliverables

C.5 SUMMARY OF CONTRACT DELIVERABLES

Table C.5, Summary of Contract Deliverables summarizes the specific products the Contractor shall submit to DOE , the type of action DOE ' will perform, the associated DOE response time, and the date/timeframe that the Contractor is required to submit the product.

Deliverables are considered Contractor endpoints, work scope completions, products, reports or commitments that shall be delivered to DOE

The types of DOE- action are defined as:

• Approve – The Contractor shall provide the deliverable to DOE for review and

Activity ID	Description

writ
Con
doc
app
con

• R
and
pro
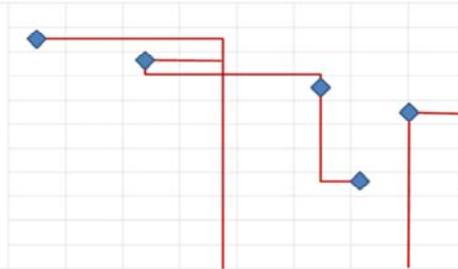
Delivery schedules come in many forms depending on the contract type. Items to be delivered may be equipment, test reports, consent decrees or verifications of completion. Most contracts will contain a schedule of deliverables or will later have modifications that expand on the deliveries; these should be established as milestones in the IMS.

Typical Issues with Contract Deliverables

- **Missing deliverables**
  - Deliverables not found in the IMS
- **Dates not aligned**
  - IMS dates not on or Before Contract Deliverable Dates
- **Interim Milestones not identified**
  - Spans between project milestones

The delivery schedules in the basic contract and any contract modifications that have been issued should be reviewed. These may include consent decrees that were not established at the time of the initial contract award.

It should be verified that all deliverables required by the contract are identified with program milestones in the IMS and that the dates of those milestones meet the contractual requirements.

Guideline 7 requires the contractor to establish interim milestones to report progress against contract deliverables. These are often overlooked or are not included in the IMS by the contractor. As a result work can be executed for extended periods without adequate progress reporting or visibility into the contractor's ability to meet delivery dates.

Vertical Traceability
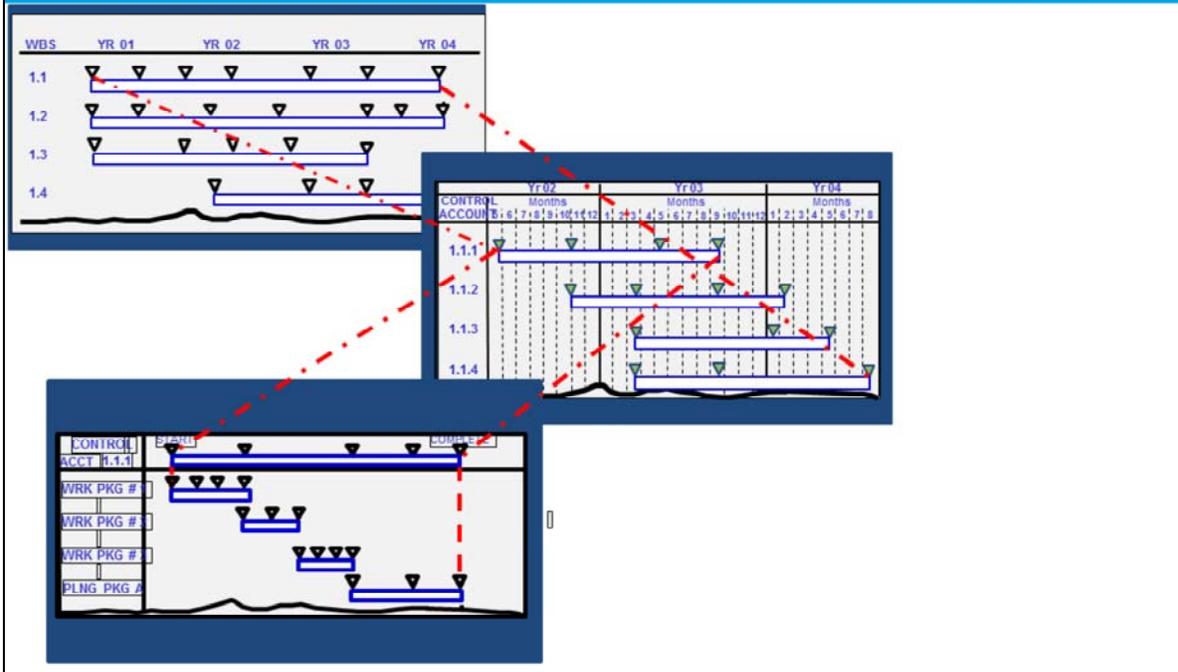
Vertical traceability is the contractor's ability to demonstrate the roll-up from the detail schedule level activities to project level deliverables through the WBS and the OBS structure. Vertical traceability of the schedule also needs to demonstrate that the detail schedule activities support the project deliverable dates and meet the schedule requirements of the contract objectives. If included in the contract, vertical traceability must also support the Integrated Master Plan.

Typical issues with Vertical Traceability

- **Required levels of schedule not producible**
  - Omission or errors in the WBS and or OBS
- **Lower Level Activities do not support project milestones**
  - Activities that contribute to completion of milestones fall outside the milestone date
- **WBS / OBS hierarchy not supported**
  - Non–hierarchical (flat) codes used

Typical issues that are found with vertical traceability are the contractor's inability to demonstrate a roll-up of the schedules from the detail to the various levels of schedules per the system description requirements. Tier 2 or intermediate level schedules are often not available at the required level. This is usually because of omissions or errors in the WBS or OBS.

If logic is missing or not developed properly, lower level detail activities in the IMS may not support the timeframe for the contract deliverables.

Often the WBS and OBS hierarchy are not supported by the coding structures that are applied to the IMS activities. These are often done with the flat structure rather than with the hierarchical structure which cannot be rolled up to the levels of schedules needed.

Horizontal Traceability

Hand-off

Construction

Engineering
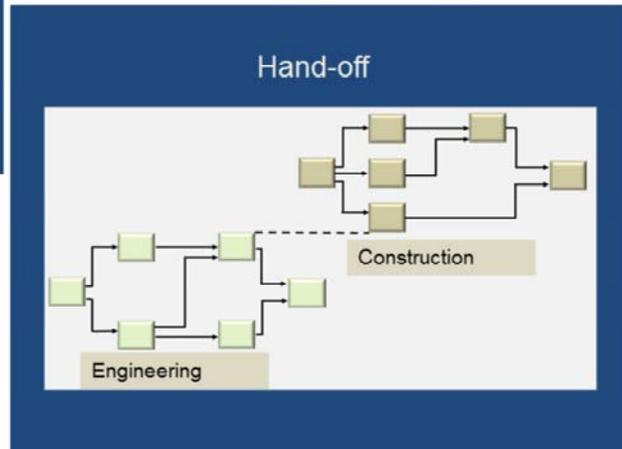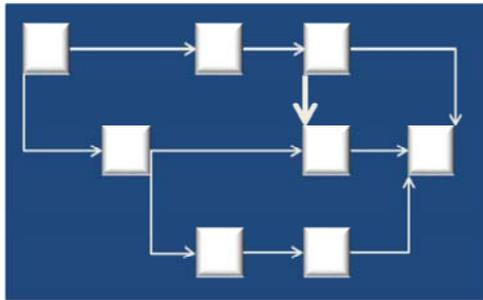
Horizontal traceability is the ability of the contractor to demonstrate dependencies between activities and milestones in the IMS. While the missing logic schedule metric looks at a statistical count, it is important to note that just because an activity has a successor and predecessor does not mean they are the correct successor or predecessor.

Often activities are linked incorrectly just to meet the statistical requirements of an assessment. One of a reviewer's responsibilities is to verify that the logic used in the IMS portrays the sequence of the activities as they should be executed and supports a valid critical path analysis.

One of the more important areas to focus on during the horizontal trace are the hand-offs between organizations. These should be identified by the contractor and negotiations of hand-off dates between organizations should be documented.

Typical issues with Horizontal Traceability

- **Statistical Analysis**
  - Logic is not found
  - Use of excessive lags and leads
  - Use of excessive constraints
- **Sequence of activities do not flow to a rationale conclusion**
  - Logic ties do not meeting the intent of the milestones
  - Predecessors are not logically linked to the successors
- **Activities do not support completion of project milestones**
  - Completion criteria for milestones not supported
- **Hand-off Milestones between organizations not documented**
  - Interface are not identified and monitored
- **Excessive and systemic float indicate that the schedule has no horizontal traceability**

Using the DOE PARSII Schedule Analysis reports to analyze the data extracted from the contractor's IMS will identify statistical issues with the logic in the IMS. Discussion of these will be covered in more detail in a later presentation. They include, but are not limited to, no logic, excessive use of lags and leads, and excessive use of constraints. As a reviewer, the analysis of the statistical issues will help lead you to the areas that need further review, but they do not validate that the IMS is well constructed. Just because an IMS has the ability to pass the statistical analysis thresholds, does not mean there are not issues with the construction of the schedule. The contractor may also be able to provide internal schedule health check metrics that may be of value.

It is important to look at how the logic flows through the IMS. Does the sequence of activities flow to a natural conclusion? Only by looking at the IMS will the reviewer be able to determine if the sequence of activities makes sense and if the milestone or conclusion of the flow is supported and correct.

Another area to be investigated is, do the activities associated with the completion of a project milestone support the milestone? It is often tempting to pick a convenient milestone to tie activities to, or even create milestones that are associated with a calendar event (end of a fiscal year), rather than the conclusion of a specific work scope or a contract deliverable.

Hand-offs or interfaces between different organizations is another area that needs to be investigated when reviewing the IMS for horizontal traceability. Questions such as: Is there sufficient level of detail in the schedule to identify significant handoffs? Are they identified and monitored? Was there an agreement between the sender and receiver on the dates of

these hand-offs? The reviewer should be able to find the answers to these questions in the process used by the contractor to identify and document interface or hand-off milestones.

Excessive total float or systemic high float across the project indicates the schedule lacks horizontal integration and missing logical relationships throughout the IMS.

Historical Traceability
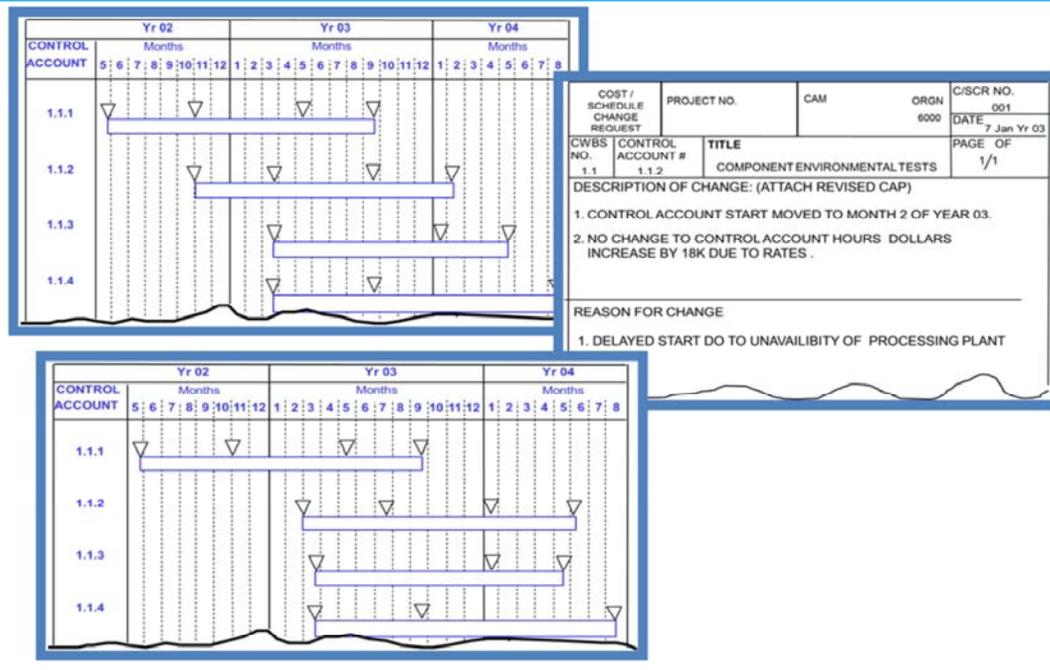
There are 2 types of historical traceability. The first is the before and after analysis of any baseline change that results in changes to the IMS. An implementation of an OTB/OTS will also require a baseline change and a historical trace.

Please note that while the schedule dates in an OTB may not change, the resources surely will. As a result, like any change to the IMS baseline that affects the scope, schedule or resources, traceability of the before and after must be maintained.

The other type of historical traceability required is in the event of a project reset / replan. The progress in work scope in the WBS / Control account must be clearly traceable from the last reporting period before the replan to the new remaining work effort after the replan.

Typical issues with Historical Traceability

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- **In-process activities**
  - Remaining work scope not adequately described
  - Remaining work scope over or under stated
  - Analysis does not meet contract delivery requirements
- **Future activities**
  - Work scope changes without baseline change control
  - Period of Performance changes without baseline change control

Whether it is a baseline change or replan, when the schedule is reset the baseline change documentation should demonstrate the following process steps:

For any in-process activities it is important that scope, schedule, and resources in the IMS for the remaining efforts be transferred to the new baseline in a manner consistent with the original plan. In some cases, the approach of using the bottom-up Estimate to Complete or ETC may be used to replan the remaining work in the IMS. The contractor needs to be able to demonstrate reconciliation of the old baseline to the new baseline.

For future activities that have not yet started the same applies. The scope, schedule, and resources associated with future work effort should be planned in a manner consistent with the original baseline.

Many times as a reviewer, you will see shifts in the period of performance on future activities without adequate documentation. These shifts should be driven by something other than a "replan" and should indicate the reason for the shift. If the bottom-up Estimate to Complete includes a schedule adjustment, the reasons should be clearly documented in the Basis of Estimate and the baseline change documentation.

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The EVMS subsystems must be integrated per Guideline 3. The manner in which subsystems are integrated are through codes such as the WBS, OBS and other elements. The contractor should have a matrix developed that explains these integration points used on the subsystem artifacts. For the codes residing in the IMS, the Data Dictionary should contain the codes and their locations. The subsystem artifacts we expect to find contain integration points and may include, but are not limited to, the Work Authorization Document, the Control Account Plan, the IMS, and the data dictionary. The contractor should provide the documentation for the integration points for all system artifacts.

Typical Integration issues with other EVMS Subsystems (WBS, OBS, CA, WP)

- **Code Identifiers are missing or incorrect**
  - WBS
  - OBS
  - CAM
  - Control Account
  - Work Package
  - Statement of Work paragraph
  - Integrated Master Plan (IMP) if contractually required

Typical issues that are found are omissions of the integrating code fields in the IMS. As a reviewer you should know what fields in the IMS should contain which codes and the accepted values. Identify the activities in the schedule that have either omitted the integrating codes or have an incorrect code.

Common findings are usually the omission of the OBS as a hierarchical structure, meaning the CAMs are a single level of the OBS noted in the IMS and the management levels above are not traceable. Another example is the CAM identifier is different in the IMS from the CAM identifiers found on the RAM, in the work authorization documents and the control account plans.

Another common area of omission is the Statement of Work or SOW paragraph. The work in the IMS should be traceable back to the contract statement of work paragraph number.

IMS Integration with EVMS Subsystems (Period of Performance)

Ties to the period of performance are one of the areas where anomalies are most often found. Period of performance integration of the work authorization, the cost, and the schedule baselines is essential for valid EVM reporting. One of the first traces that should be run is to ensure the work is planned within the Work Authorization period of performance and that work scheduled in the IMS is reflected, and time phased in the Cost Baseline consistent with the IMS.

Typical Integration issues with EVMS Subsystems (Period of Performance)

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- **Period of Performance does meet contract objectives**
  - Work scope not within project phase
  - Work scope not within contract period of performance
- **Period of Performance not Authorized**
  - IMS baseline start and finish dates outside of Work Authorization dates
- **Period of Performance not supported by the PMB**
  - Period of performance baseline start and finish dates in the IMS do not match
    - Control Account Level
    - Work Package Level
- **Period of performance not aligned with procurement schedules**
  - Procurements need dates are not aligned with IMS required dates

Alignment of the IMS with the contract period of performance is a requirement. There are often issues associated with this alignment, either the contractor does not plan the entire scope of work authorized in the IMS, or it may plan beyond the authorized period of performance. It is important to trace the IMS to the contract level authorized period of performance.

Regardless of the work authorization level being reviewed, the IMS baseline start and baseline finish dates of the activities associated with the work scope need to reflect the period of performance on the work authorization. This can be at the project level, the organization level and at the control account level. Since very few EVMS tool sets electronically integrate the work authorization and the IMS, this is an area where there can be significant issues if the contractor does not have a good manual check and balance system in place.

The IMS and the Performance Measurement Baseline (PMB), or the cost baseline, must be time phased with the same baseline dates down to the work package and planning package level. This is another area that may not have an electronic interface. As a result, if the contractor has not developed good processes for ensuring this alignment, this can lead to significant findings. The baseline alignment must go to the work and planning package level in the PMB and the IMS.

Another area that could have issues is the IMS and the procurement schedules. The IMS should be used to drive the procurement need dates for purchase of materials and services. The planning of the material resources in the IMS also needs to be reflected in accordance with the system description's section on material planning, and the points in the

procurement process where earned value is taken.

CONTROL ACCOUNT PLAN

WBS: 1.1.1
Control Account: 1.1.1.2
CAM
Orginazation # 4000 Baseline Start: 01 Ma
Revision #
Revsion Dat
Baseline Finis

Workpackage No.	EVT	Resource	2013 J F M A M J J A S O N D	2014 J F M A M J J A S O N D
1.1.1.2.1		ENG 1	160 80 80 80 40	
		ENG 2	40 40 40 40 40	
		Staff 2	320 320 320 320 160	
		Total Hrs	520 440 440 440 240	
1.1.1.2.2		Resource Trades X	320 640 640 320 160 80	
		Trades Y	180 320 320 320 180 120	
		Total Hrs	500 960 960 640 340 200	
1.1.1.2.2		Resource Insp 1	160 160 160 160 160 160	

Work package 1.1.1.2.1

Integrated Master Schedule

Activity	WBS	CA	CAM	ORG	WP	Baseline Start	Baseline Finish	2013 J F M A M J J A S O
	1.1.1	1.1.1.2		4000	1.1.1.2.1	1-Mar-13	31-Jul-13	
A001	1.1.1	1.1.1.2		4000	1.1.1.2.1	1-Mar-13	30-Apr-13	
A002	1.1.1	1.1.1.2		4000	1.1.1.2.1	15-Apr-13	15-Jun-13	
A003	1.1.1	1.1.1.2		4000	1.1.1.2.1	15-May-13	31-Jul-13	
	1.1.1	1.1.1.2		4000	1.1.1.2.2	15-Apr-13	30-Sep-13	
A004	1.1.1	1.1.1.2		4000	1.1.1.2.2	15-Apr-13	30-Jun-13	
A005	1.1.1	1.1.1.2		4000	1.1.1.2.2	1-Jul-13	30-Sep-13	
A006	1.1.1	1.1.1.2		4000	1.1.1.2.2	15-Aug-13	30-Sep-13	

1.1.1.2.1		
ENG 1	160 80 80 80 40	
ENG 2	40 40 40 40 40	
Staff 2	320 320 320 320 160	
Total Hours	520 440 440 440 240 0 0 0	

DOE Order 413.3B requires a resource-loaded schedule. The resources and the resource profiles found in the IMS need to be reflected in the cost baseline, or the PMB, using the same profile. This is especially important if the IMS is going to be the basis for calculating Earned Value. This comparison is not in the statistical analysis list and is often over looked by reviewers.

- **PMB time phasing of resources not aligned with IMS resources**
  - Hours / dollars per month
- **Missing or inconsistent resource identified**
  - Resources not applied
  - Resources not traceable to resources used in the PMB
- **Element of Cost Type do not match**
  - Labor hours planned for direct dollars
- **Resource quantities in the schedule do not reconcile to PMB**
  - Total resources / costs at WBS levels do not reconcile

The PMB, or the cost baseline, should have the same time phasing as the resources in the IMS. For example, if the activity (or activities) in the IMS shows 100 hours in month 1 and 400 hours in month 2 for a work package, the Cost baseline should have the same resource profile. If there is a difference this would indicate the IMS, which is the plan to execute the work, is not truly represented in the cost baseline and is therefore not providing accurate reporting.

An important thing to keep in mind when running this trace is the fiscal month used by the contractor for the development of the PMB as it may differ from the calendar month in the IMS. As a result, a lower level of detail for the analysis may be required to ensure you are comparing apples to apples.

Traceability of the resource codes used in the PMB and the IMS should be demonstrated. If resources are missing, or traceability from the nomenclature in the IMS to the PMB is not available, the contractor should be able to address the differences.

Another area where data anomalies are often found is in the Element of Cost for resources in the IMS. These may differ from the element of cost for the resources in the cost baseline. This is often seen when outside labor is used. It may be classified and planned as hours in the IMS and shown as material dollars in the cost baseline. Once again, this can be a significant issue if the IMS is used to report EV status.

If the resources in the IMS do not summarize up through the WBS/OBS levels consistent with the summarization at the same levels in the PMB, this would be a finding in the contractor's implementation. Either the resources are not assigned properly or the codes

for the WBS / OBS are not correct.

Reviewing for Subcontracts Integration

Subcontractor Integrated Master Schedule

Activity ID	WBS	CAM	ORG	Baseline Start	Baseline Finish	2013 / 2014
	2.1.3		4000	2-Oct-13	30-Jun-14	
SC001	2.1.3		4000	2-Oct-13	31-Jan-14	
SC002	2.1.3		4000	1-Dec-13	28-Feb-14	
SC003	2.1.3		4000	3-Jan-14	30-Mar-14	
SC004	2.1.3		4000	1-Feb-14	30-Apr-14	
SC005	2.1.3		4000	1-Mar-14	31-May-14	
SC006	2.1.3		4000	1-Apr-14	30-Jun-14	
SC007	2.1.3		4000	2-Oct-13	30-Jun-14	

Integrated Master Schedule

Activity	WBS	CA	CAM	ORG	WP	Baseline	Baseline Finish	2013 / 2014
	1.1.1	1.1.1.2		7000		2-Oct-13	30-Jun-14	
SC001	2.1.3	2.1.3.		7000	2.1.3.1	2-Oct-13	30-Jun-14	
SC002	2.1.3	2.1.3.		7000	2.1.3.1.1		30-Jun-14	
A0020	2.1.3	2.1.3.		4000		2-Oct-13	30-Jun-14	
A0030	2.1.3	2.1.3.		4000	1.1.1.2	2-Oct-13	30-Jun-14	
XXXX	XXX	XXX		XXXX	XXXXX	XXXX	XXXX	
XXXX	XXX	XXX		XXXX	XXXXX	XXXX	XXXX	
XXXX	XXX	XXX		XXXX	XXXXX	XXXX	XXXX	
XXXX	XXX	XXX		XXXX	XXXXX	XXXX		
XX				XXXX	XXXXX			
				XXXX	XXXXX			

The contractor's system description should address when subcontract schedules are required and how they are integrated in the IMS. The acceptable integration methods are; 1) a full up integration where the subcontractor's schedule is brought in total into the IMS, 2) a represented integration where summarized activities are brought into the IMS that end in a subcontract deliverable or event, or 3) the milestone method which inserts the deliverables or events from the subcontractor's purchase order, or contract, into the IMS. Regardless of the method used, the subcontractor's information should be found and traceable in the prime contractor's IMS.

Issues with Subcontracts Integration

- **Subcontract integration not documented**
  - System documentation does not define the requirements for subcontractor IMS submission
  - System document does not define methodology for incorporating subcontractor IMS submissions
- **Subcontract Period of Performance not contained in the IMS**
  - Subcontractor work scope is not identified in the IMS for the contracted period of performance
- **Reconciliation of Subcontract reported dates and IMS not demonstrated**
  - IMS does not reflect the same dates as the Subcontractor submission.
- **Subcontract not adequately integrated into project level critical path**
  - A single line for a significant subcontractor is inadequate.
  - Not every task from the subcontractor is required; however, an intermediate level to adequately drive the critical path is required

The system documentation should define the contractor's requirements to handle subcontract schedule data. This should include defining if a schedule submission is required and the frequency of that submission. Often this is not made clear in the command media or even the purchase order /subcontract. As a result, the process to incorporate subcontract information in the IMS is inconsistent or not done at all.

When the contractor's subcontract integration process documentation is not comprehensive it is also common to find the complete scope of work is not represented in the IMS. While some significant activities or deliverables may be incorporated, the entire subcontract period of performance may not be included.

When reviewing the integration of subcontract information, the dates in the contractor's IMS should be reconcilable to the submission from the subcontractor.

One common issue of concern is the level that the subcontractor is integrated. A major subcontractor cannot be integrated with a single line in the prime contractor's IMS. The subcontractor must be integrated at a sufficient level to drive a realistic critical path.

Commitment Report

Control Account	Work Package	Charge Number	Vendor	Required Date	Promise Date	Part Number	Quantity	Unit Cost	Total
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/20/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXX
7.3.2.1	7.3.2.1.1	XXXX	XXXXX	10/15/2013	10/1/2013	XXXXX	XXXXX	XXXXX	XXXX
7.3.2.2	7.3.2.1.2	XXXXX	XXXXX	12/20/2013	12/20/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.3	7.3.2.1.2	XXXXX	XXXXX	12/20/2013	12/20/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.4	7.3.2.1.2	XXXXX	XXXXX	12/20/2013	12/20/2013	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.5	7.3.2.1.3	XXXXX	XXXXX	1/18/2014	2/1/2014	XXXXX	XXXXX	XXXXX	XXXXX
7.3.2.6	7.3.2.1.3	XXXXX	XXXXX	1/18/2014	1/18/2014	XXXXX	XXXXX	XXXXX	XXXX
7.3.2.7	7.3.2.1.3	XXXXX	XXXXX	1/18/2014	1/18/2014	XXXXX	XXXXX	XXXXX	X

Integrated Master Schedule

Activity ID	WBS	CA	CAM	ORG	WP	Baseline Start	Baseline Finish	2013 J A S O N D	2014 J F M A M J J A S O N
	7.3.2	7.3.2.1		8000		2-Oct-13	30-Jun-14		
A0010	7.3.2	7.3.2.1		8000	7.3.2.1.1	15-Oct-13	15-Oct-13		
A0011	7.3.2	7.3.2.1		8000	7.3.2.1.2	20-Dec-13	20-Dec-13		
A0012	7.3.2	7.3.2.1		8000	7.3.2.1.3	18-Jan-14	18-Jan-14		
A0013	7.3.2	7.3.2.1		8000	7.3.2.1.4	2-Oct-13	30-Jun-14		
A0014	7.3.2	7.3.2.1		8000	7.3.2.1.5	1-Mar-14	31-May-14		
A0015	7.3.2	7.3.2.1		8000	7.3.2.1.6	1-Apr-14	30-Jun-14		
SC007	7.3.2	7.3.2.1		8000	7.3.2.1.7	2-Oct-13	30-Jun-14		

System documentation should define the thresholds for material classification. This will determine how the materials are to be planned in the IMS. For example, materials defined as low dollar value can be planned as level of effort (LOE) or percent complete based on the estimated consumption, while high dollar value materials have several different points for measuring performance. If not defined by the contractor's system description, then all material is expected to be planned as high dollar value. The performance measurement points for material would then all be either: at receipt or acceptance, payment, at transfer into inventory, at usage or disbursement from inventory, or at final distribution (transfer to the customer). The initial development of the IMS should provide the "required dates" for procurement and have relationships to both the requesters and the activities requiring and using the material.

Issues with Materials Integration

- **Material integration not documented**
  - Thresholds for type not defined
  - Point(s) for earning performance not defined by type
- **Materials not identified as resources**
  - Resource for material types not found in the IMS
- **Material planning not reconciled to the Procurement System**
  - Material need dates in procurement system not found in the IMS

If materials are not brought into the IMS, the need dates cannot be fully determined. When compared to the procurement system (commitment reports), the material need dates in the IMS should support the procurement need dates that have been given to the vendors. Once the project has started, the promise dates should support the forecast or estimate at completion.

Issues with Critical Path Validity

- **Poor schedule quality**
  - Statistical assessment
- **Use of constraints**
  - Constraints used to "hold" milestones in place
- **Use of non-sequential logic**
  - Logic does not support the work flow
- **Baseline schedule contains negative float; forecast schedule has repeated negative float without corrective action**
  - Negative float indicates a constrained milestone will not meet the required date
  - It is eliminated in ~~the~~ forecast by moving commitment date

The use of the critical path analysis is the heart of schedule management. The critical path is key to the project's ability to be managed by exception. Poor schedule quality can greatly impact the usefulness of the IMS. Another module in this training will address the quality checks, or statistical assessment, of the IMS. If this statistical assessment finds an excessive use of constraints, this can impact the validity of the critical path analysis by overriding the calculations driven by logic. As a reviewer, it is import to ensure the logic in the critical path supports the actual work flow. For example, if LOE is included in the schedule, logic ties to those activities could drive or influence the critical path while the discrete activities that should be monitored are not included. They could also have negative float that would be deceptive. So the LOE should not be linked to discrete work.

A baseline schedule should never contain negative float. If negative float is found in the baseline, this means the contractor cannot meet the contractual delivery requirements. Negative float, when excessive, is also a concern in the forecast schedule if not addressed. Negative float means a constrained task is not going to be met. If this is a DOE milestone, then the contractor is forecasting that it cannot meet the required date. Negative float should be understood and addressed with appropriate corrective actions.

Additional Schedule Information

- Snippet 3.1B – Integrated Master Schedule Monthly Review
- Snippet 3.2 – Schedule Health Metrics
- Snippet 3.3 – Schedule Guidance and Resources
- Snippet 5.3 – PARS II Analysis: Schedule Health Assessment Reports

For additional schedule information, please refer to other the following Snippets:

- Snippet 3.1B – Integrated Master Schedule Monthly Review
- Snippet 3.2 – Schedule Health Metrics
- Snippet 3.3 – Schedule Guidance and Resources
- Snippet 5.3 – PARSII Analysis: Schedule Health Assessment Reports

For information relative to EVMS procedures, templates, helpful references, and training materials; please refer to OAPM's EVM Home page. Check back periodically for updated or new information.

Thank You