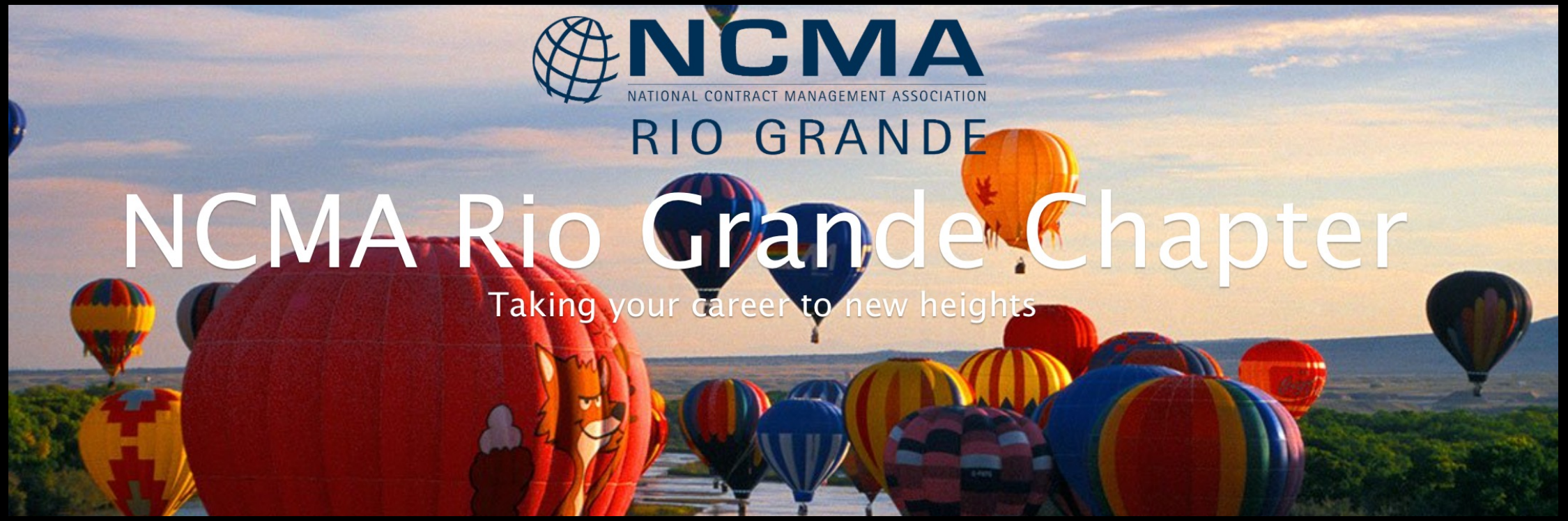
EARNED VALUE MANAGEMENT

An overview for Contracts and Project Managers

The Contract Coach

https://contract-coach.com



FROM YOUR COLLEAGUES AT ….

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The Contract Coach

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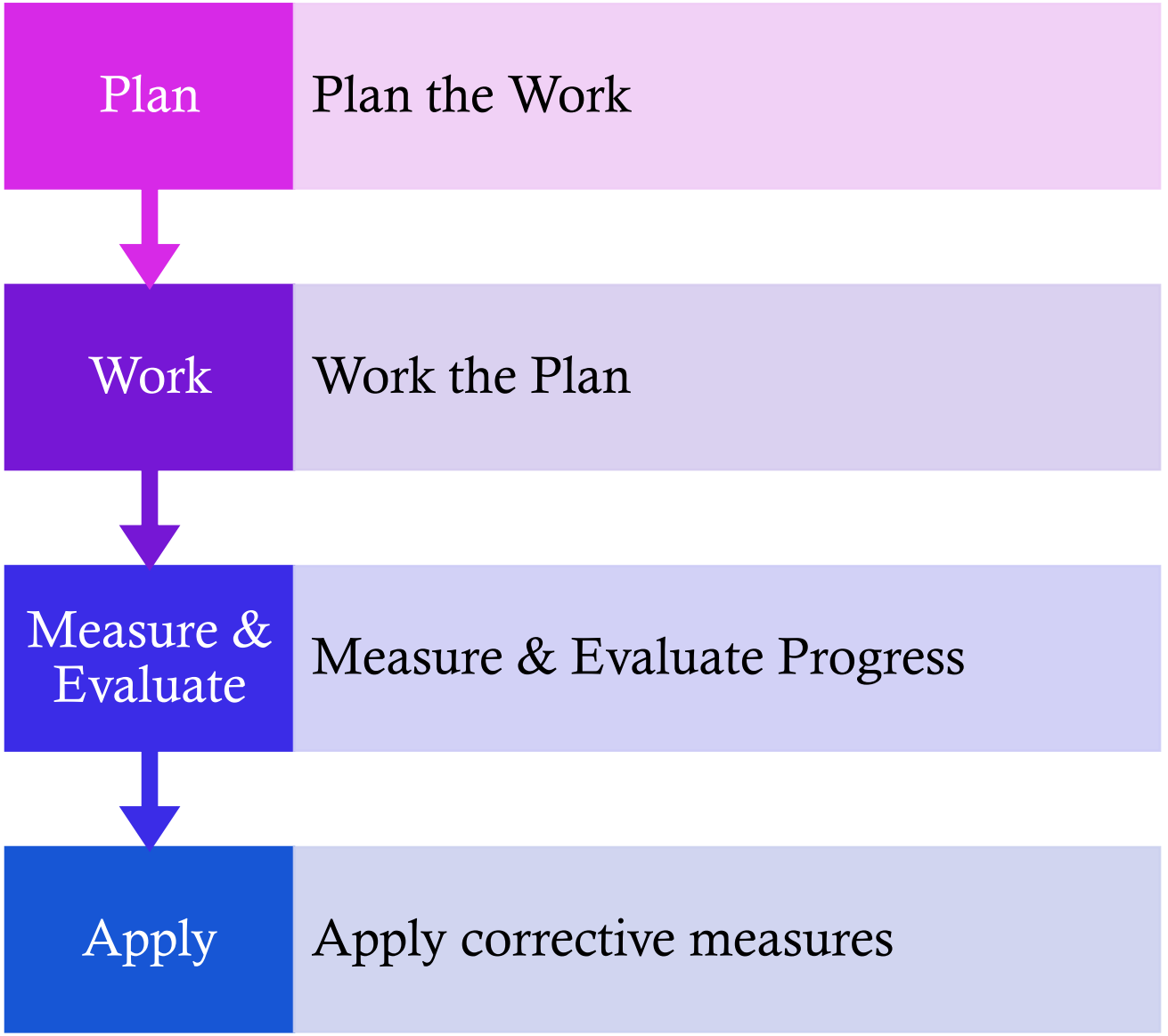
CREDIT TO MY CO-AUTHORS

EVM OR EVMS?

- EVM is a management technique using Earned Value to monitor and control performance
- EVMS is a Management system that formally implements EVM and integrates it with the other Business systems.

BOTTOM LINE UP FRONT

This is what you should remember about EVM when we are done.



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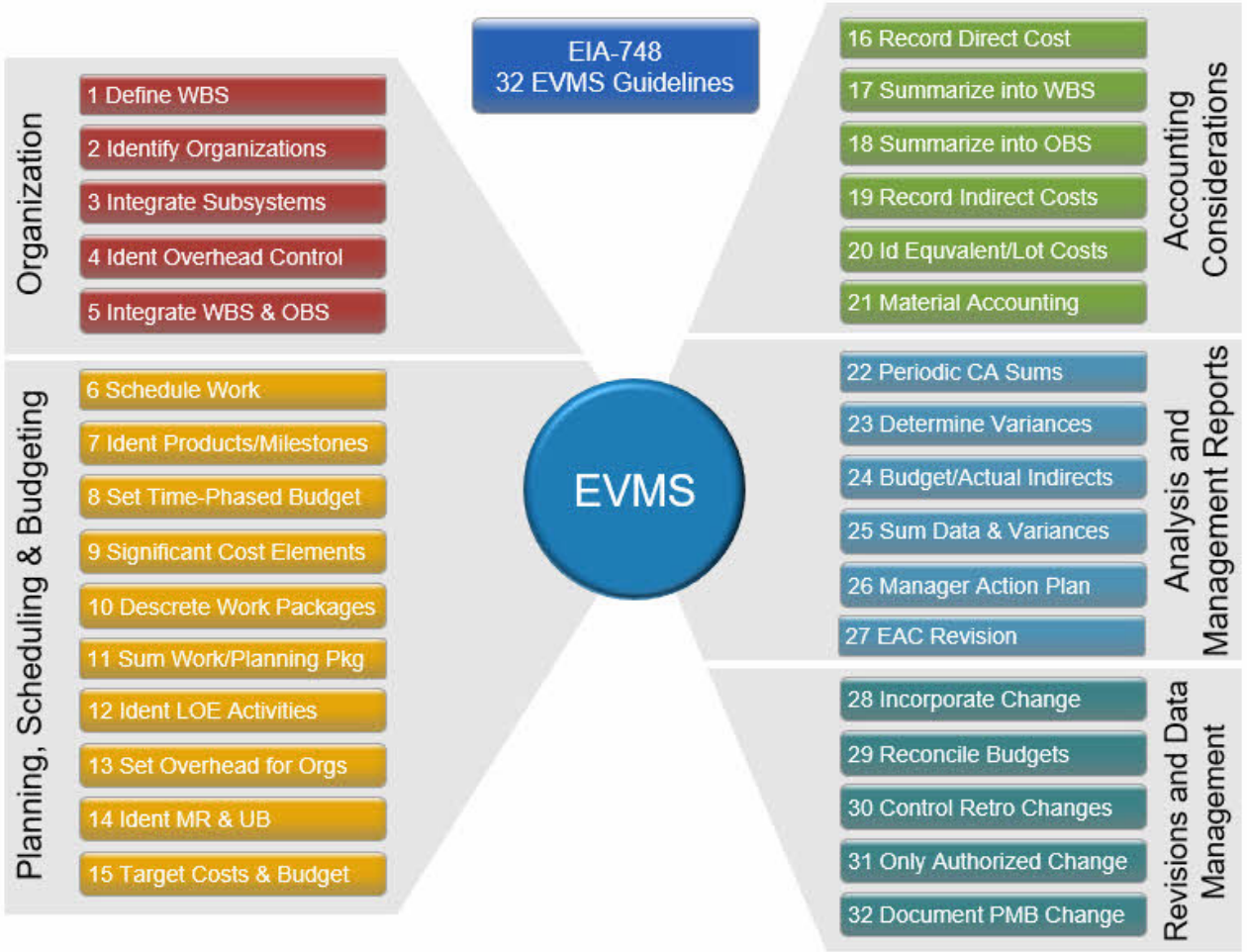
EVMS IS A MATURE PROCESS THAT IMPLEMENTS EVM AND INTEGRATES IT WITH OTHER BUSINESS SYSTEMS



NDIA

EIA 748 D Earned Value Management System

- Published by the National Defense Industries Association
- 32 Guidelines

PLANNING

Step 1 is to plan the work

PLANNING OVERVIEW

- Identify the requirements
  - Statement of Work
  - Specifications
  - Milestones
- Create Planning Documents
  - Work Breakdown Structure
  - Integrated Master Plan
  - Integrated Master Schedule
- Evaluate Risks and Opportunities

READ THE FULL SOLICITATION

- Technical Requirements
  - Performance
  - Quality
- Excerpt
  - Who
  - What
  - When
  - Where
  - How many

PLANNING ARTIFACTS

Documents and products created during the planning activity

REQUIREMENTS MATRIX

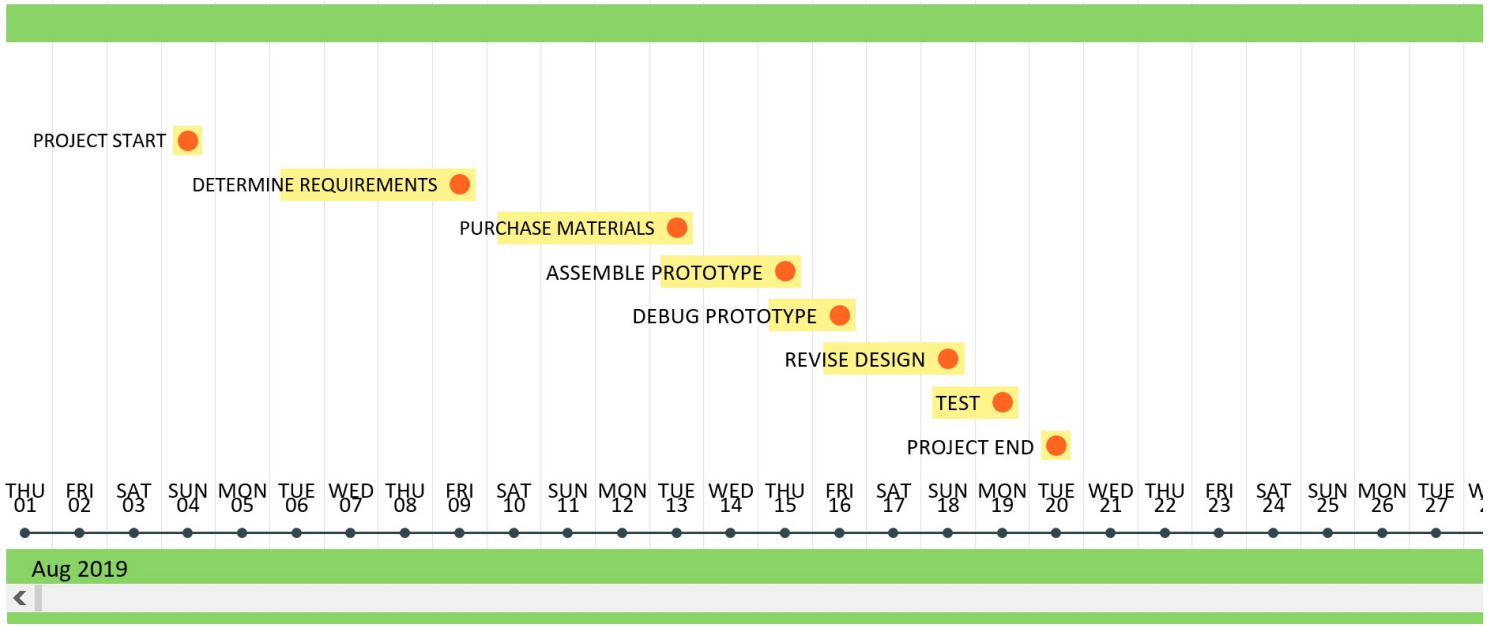
RFP Section	RFP Para.	Requirement	Proposal Vol.	Proposal Para.	How Met
C	3.1	The Contractor shall propose a schedule based on the requirements outlined in this SOW and the solicitation to achieve the deployment, installation and acceptance by the (Agency) of the quantity of (Product) systems and any optional components, beginning no later than May 1, 2014 and completing no later than May 1, 2016 at a consistent rate of deployment.	Tech	3	A preliminary schedule meeting the requirements of the Solicitation has been developed and is attached at Appendix A for (agency) review. All program milestone dates and the deliverable dates for key items proposed is per the most recent contractual direction. This schedule represents a consistent deployment rate of x systems per month with a two month production ramp-up.
C	3.1	Note: The Contractor shall ensure the deployment scheduling complies with the restrictions stated in Section 5.2 contained herein.	Tech	3	The proposed schedule has been constructed with full consideration and compliance of the restrictions stated in section 5.2 of the SOW. Specifically, installation will commence on a Monday of the week scheduled unless the Monday is a Federal holiday, in which case the installation will commence the following day. All installations have been planned so as to take place during normal working hours, Monday thru Friday exclusive of holidays. No weekend or holiday work has been included in the schedule as per Section 5.2 of the SOW

RACI MATRIX

Phase	Activity	Responsible	Accountable	Consulted	Informed
Phase 2 - Solicitation Preparation and Release	Prepare Solicitation Documents				
	• *Determine applicable EVM Clause(s) to include*	PCO/CO	PCO/CO	EVMA, PM	
	• *Determine Reporting Requirements and Frequency*				
	○ *Prepare Draft CDRLs or data submittal requirements*	PCO/CO	PCO/CO	EVMA, PM, ENG, BFA	
	○ *Identify IPMDAR Format(s), WBS, IMP, CFSR, CSDR and other CDRL requirements*	PCO/CO	PCO/CO	EVMA, PM	
	Publicize Opportunity	PCO/CO	PCO/CO		
	Obtain Industry Feedback (e.g. Conduct Industry Day)	PCO/CO	PCO/CO	EVMA, COR, PM, ENG, BFA	
	Release Draft Solicitation(s) and Final Solicitation	PCO/CO	PCO/CO		
	Answer Industry Questions and resolve ambiguities	PCO/CO	PCO/CO	EVMA, COR, PM, ENG, BFA	

R	Responsible – The person assigned to do the work
A	Accountable – The one who makes the final decision and has ultimate Ownership
C	Consulted - those who provide input before action is taken
I	Informed - those who are made aware of the actions being taken

Wayne's Excellent Project



ENTER START DATE: 8/1/2019

ACTIVITY	START	END	Duration	Cost	Resource
Project Start	8/4/2019			$ -	
Determine Requirements	8/6/2019	8/9/2019	2.00	$ 1,200.00	Engineer
Purchase Materials	8/10/2019	8/13/2019	3.00	$ 4,500.00	
Assemble Prototype	8/13/2019	8/15/2019	2.00	$ 1,200.00	Engineer
Debug Prototype	8/15/2019	8/16/2019	1.00	$ 600.00	Engineer
Revise Design	8/16/2019	8/18/2019	2.00	$ 1,200.00	Engineer
Test	8/18/2019	8/19/2019	1.00	$ 600.00	
Project End	8/20/2019	8/20/2019		$ 9,300.00	

MILESTONE CHART

- Milestones are key program (contract) events
- Usually associated with a deliverable item or a major program decision
- Together they provide an overview of the program (contract) activities

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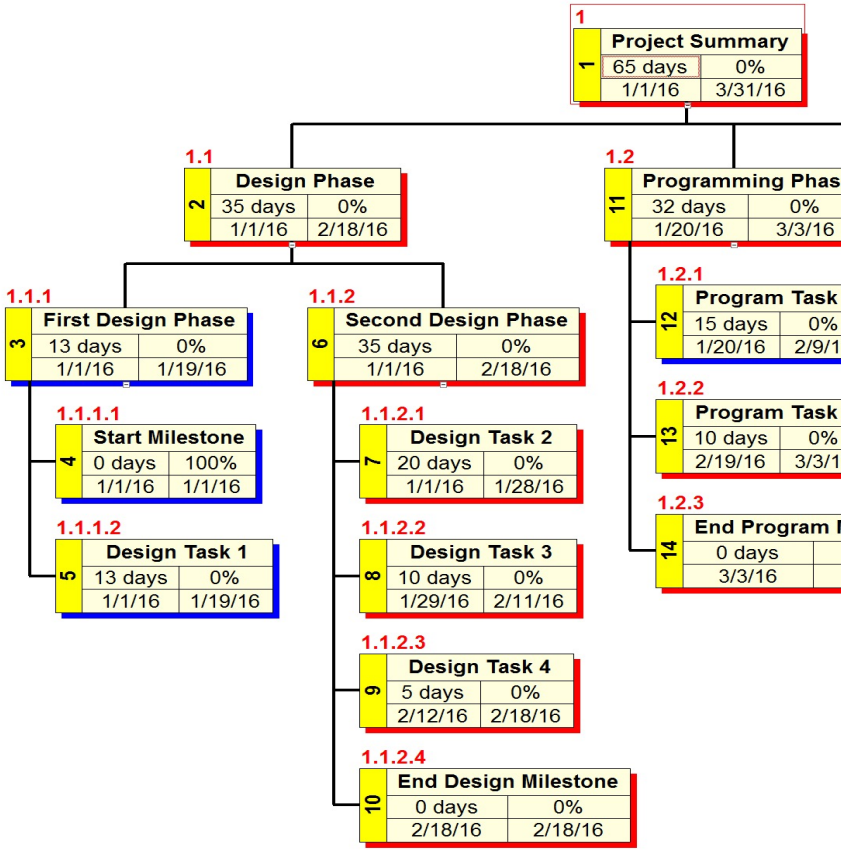
WORK BREAKDOWN STRUCTURE (WBS)



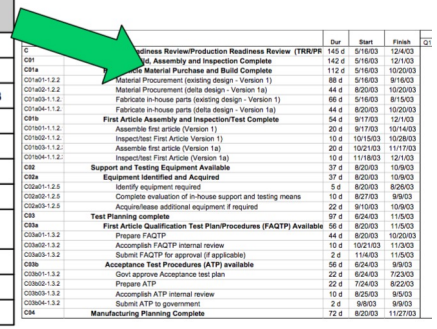
- The WBS contains at least 3 levels of indenture
- It is flexible and tailored for each unique program
- The 100-percent rule applies—i.e., the sum of the children equals the parent
- The WBS defines all cost elements and includes all relevant costs and deliverables
- In addition to hardware and software elements, the WBS contains common elements to capture all the effort
- Each system has one program WBS, but it may have several contract WBSs that are extended from the program WBS, depending on the number of subcontractors
- The WBS is standardized so that cost data can be used for estimating future programs
- It is updated as changes occur and the program becomes better defined
- It provides for a common language between the government program management office, technical specialists, prime contractors, and subcontractors

WBS DICTIONARY

- Defines each element and how it relates to others in the hierarchy
- Clearly describes what is and is not included in each element
- Describes resources and processes necessary to produce the element
- Links each element to other relevant technical documents

WBS Level	WBS Code	Element Name	Definition	Entry Criteria	Exit Criteria	Cost Control Number	Responsible Organization
2	1.1	Project Start	Milestone event to signify beginning of project.	None	Signed Project Charter from the VP Engineering authorizing the project and appointing a project manager.	N/A	VP Engineering
2	1.2	Design Phase	This element includes all labor required to collect, identify, and document prototype system requirements, create a conceptual design fulfilling those requirements, conduct a peer-level preliminary design review, and then create the drawings, specifications, and other engineering documents needed to obtain adesign approval during a Critical Design review.	Completion of Milestone 1.1	Completion of CDR and delivery of all design documents		System Engineer
3	1.2.1	Preliminary Design	This element includes all effort required to identify, document, and compile project requirements into a product requirements matrix. It also includes all effort required to produce a prototype conceptual design linking requirements to prototype design features. The Prototype design will be reviewed during a peer review process at a Preliminary Design Review and adjustments or corrections to the preliminary design made to incorporate comments made during the PDR	Completion of Milestone 1.1	Completion of the Preliminary Design Review including incorporation of recommendations and comments.		System Engineer
3	1.2.2	Detailed Design	This element is inclusive of all mechanical, electrical, and controls engineering (less software or firmware) needed to completely define the materials and design of the prototype system hardware.	Completion of PDR and delivery of conceptual design documents	Completion of the CDR and delivery of the prototype detailed design, Bill of materials, drawings, and specifications.		Hardware Engineering
2	1.3	Create Prototype Hardware	This element includes all materials and effort needed to procure, assemble, and produce the prototype system hardware components into a functional prototype breadboard system capable of being programmed and tested.	CDR and delivery of prototype design documents	Delivery of a functional prototype conforming to the product specifications and requirements.		Hardware Engineering

Activity #	Event Accomplishment Criteria	WBS REF
A	Event A – Post-Award Conference/Baseline Design Review (PA/BDR) Conducted	-
A01	Management Planning Reviewed	-
A01a	Program Organization Established	1.2.1
A01b	Initial Configuration Management Planning Complete	1.2.2, 1.2.3
A01c	Program Schedule Reviewed	1.2.1
A01d	Risk Management Program Reviewed	1.2.1
A02	Baseline Design Reviewed	-
A02a	Requirements Baseline Complete	1.3.1
A02b	Review Of Existing Baseline Engineering/Kit Drawings Complete	1.1.1
A03	Post-Award Conference/Baseline Design Review Conducted	-
A03a	PA/BDR Meeting Conducted	1.2.1
A03b	PA/BDR Minutes And Action Items Generated	1.2.1



		Dur	Start	Finish
C	**Readiness Review/Production Readiness Review (TRR/PR**	145 d	5/16/03	12/4/03
C01	**Fabrication, Assembly and Inspection Complete**	142 d	5/16/03	12/1/03
C01a	**Long Lead Material Purchase and Build Complete**	112 d	5/16/03	10/20/03
C01a01-1.2.2	Material Procurement (existing design - Version 1)	88 d	5/16/03	9/16/03
C01a02-1.2.2	Material Procurement (delta design - Version 1a)	44 d	8/20/03	10/20/03
C01a03-1.1.2	Fabricate in-house parts (existing design - Version 1)	66 d	5/16/03	8/15/03
C01a04-1.1.2	Fabricate in-house parts (delta design - Version 1a)	44 d	8/20/03	10/20/03
C01b	**First Article Assembly and Inspection/Test Complete**	54 d	9/17/03	12/1/03
C01b01-1.1.2	Assemble first article (Version 1)	20 d	9/17/03	10/14/03
C01b02-1.1.2	Inspect/test First Article Version 1)	10 d	10/15/03	10/28/03
C01b03-1.1.2	Assemble first article (Version 1a)	20 d	10/21/03	11/17/03
C01b04-1.1.2	Inspect/test First Article (Version 1a)	10 d	11/18/03	12/1/03
C02	**Support and Testing Equipment Available**	37 d	8/20/03	10/9/03
C02a	**Equipment Identified and Acquired**	37 d	8/20/03	10/9/03
C02a01-1.2.5	Identify equipment required	5 d	8/20/03	8/26/03
C02a02-1.2.5	Complete evaluation of in-house support and testing means	10 d	8/27/03	9/9/03
C02a03-1.2.5	Acquire/lease additional equipment if required	22 d	9/10/03	10/9/03
C03	**Test Planning complete**	97 d	6/24/03	11/5/03
C03a	**First Article Qualification Test Plan/Procedures (FAQTP) Available**	56 d	8/20/03	11/5/03
C03a01-1.3.2	Prepare FAQTP	44 d	8/20/03	10/20/03
C03a02-1.3.2	Accomplish FAQTP internal review	10 d	10/21/03	11/3/03
C03a03-1.3.2	Submit FAQTP for approval (if applicable)	2 d	11/4/03	11/5/03
C03b	**Acceptance Test Procedures (ATP) available**	56 d	6/24/03	9/9/03
C03b01-1.3.2	Govt approve Acceptance test plan	22 d	6/24/03	7/23/03
C03b02-1.3.2	Prepare ATP	22 d	7/24/03	8/22/03
C03b03-1.3.2	Accomplish ATP internal review	10 d	8/25/03	9/5/03
C03b04-1.3.2	Submit ATP to government	2 d	9/8/03	9/9/03
C04	**Manufacturing Planning Complete**	72 d	8/20/03	11/27/03

Integrated Master Plan (IMP)

- ***Event-based plan***
- ***Contractual document***
- ***Relatively top level***

Integrated Master Schedule (IMS)

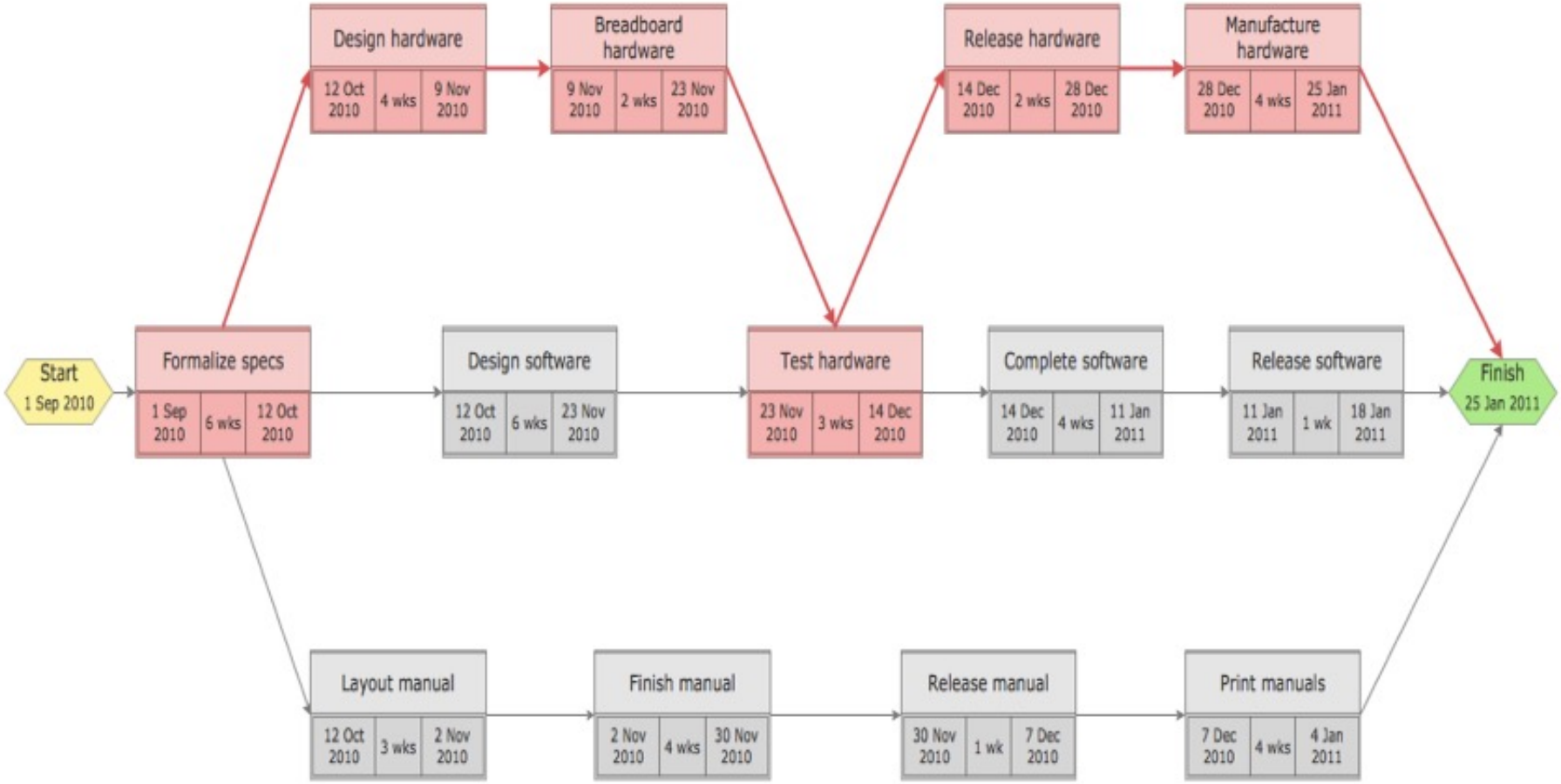
- ***Task and calendar-based schedule***
- ***Not contractually binding***
- ***Level of detail necessary for day-to-day execution***

Activity Number	Activities
A	IMP Event
A01	IMP Accomplishment
A01a	IMP Criteria
A01a01 - n	IMS Task
A	PDR Completed
A01	Requirements Analysis Completed
A01a	Avionics Requirements Analysis Completed
A01a01	Perform Avionics Requirements Analysis
A01a02	Develop Avionics Draft Specification
A01a03	Coordinate Avionics Draft Specification for Review
A01a04	Publish Avionics Specification

INTEGRATED MASTER PLAN & SCHEDULE

PROJECT SCHEDULE PERT CHART

- Project Evaluation and Review Technique
- "Network Diagram"



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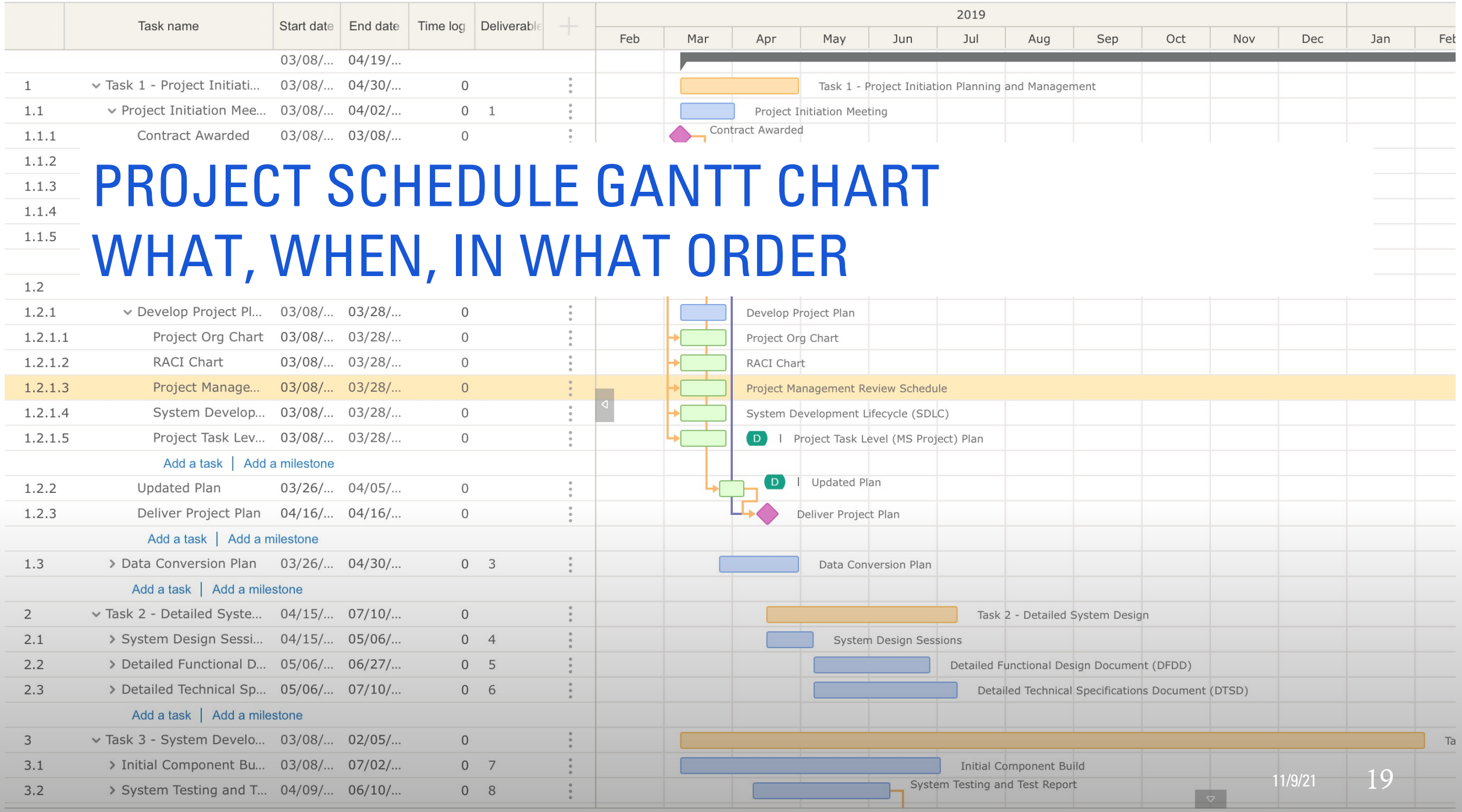
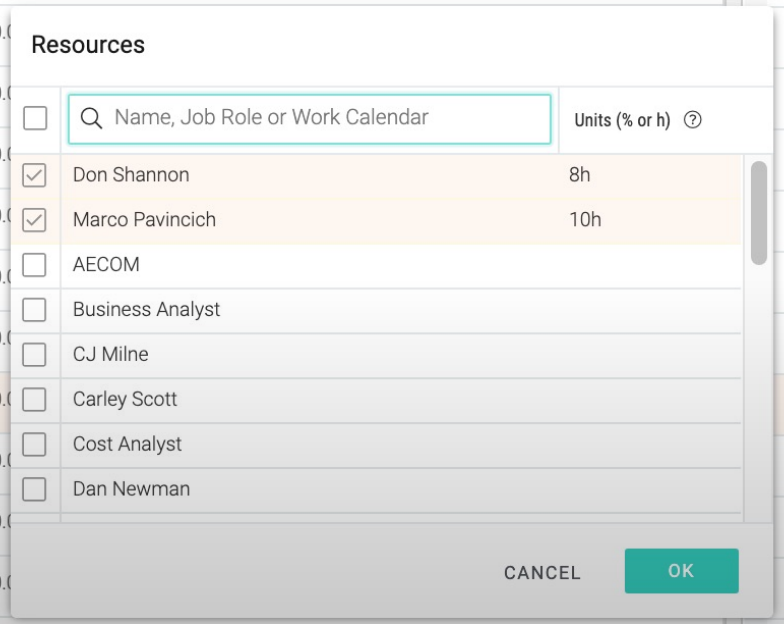
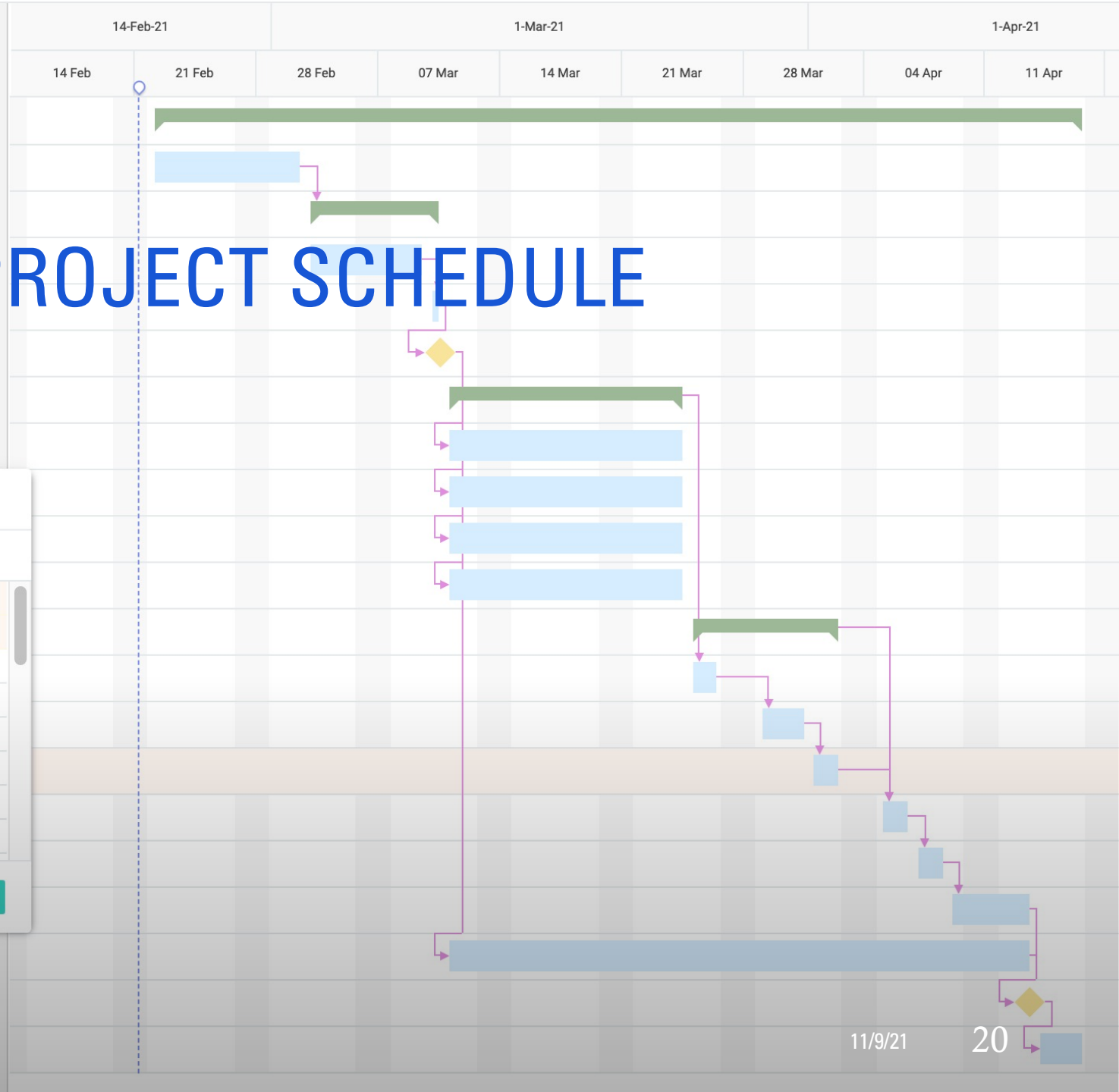
PROJECT SCHEDULE GANTT CHART
WHAT, WHEN, IN WHAT ORDER



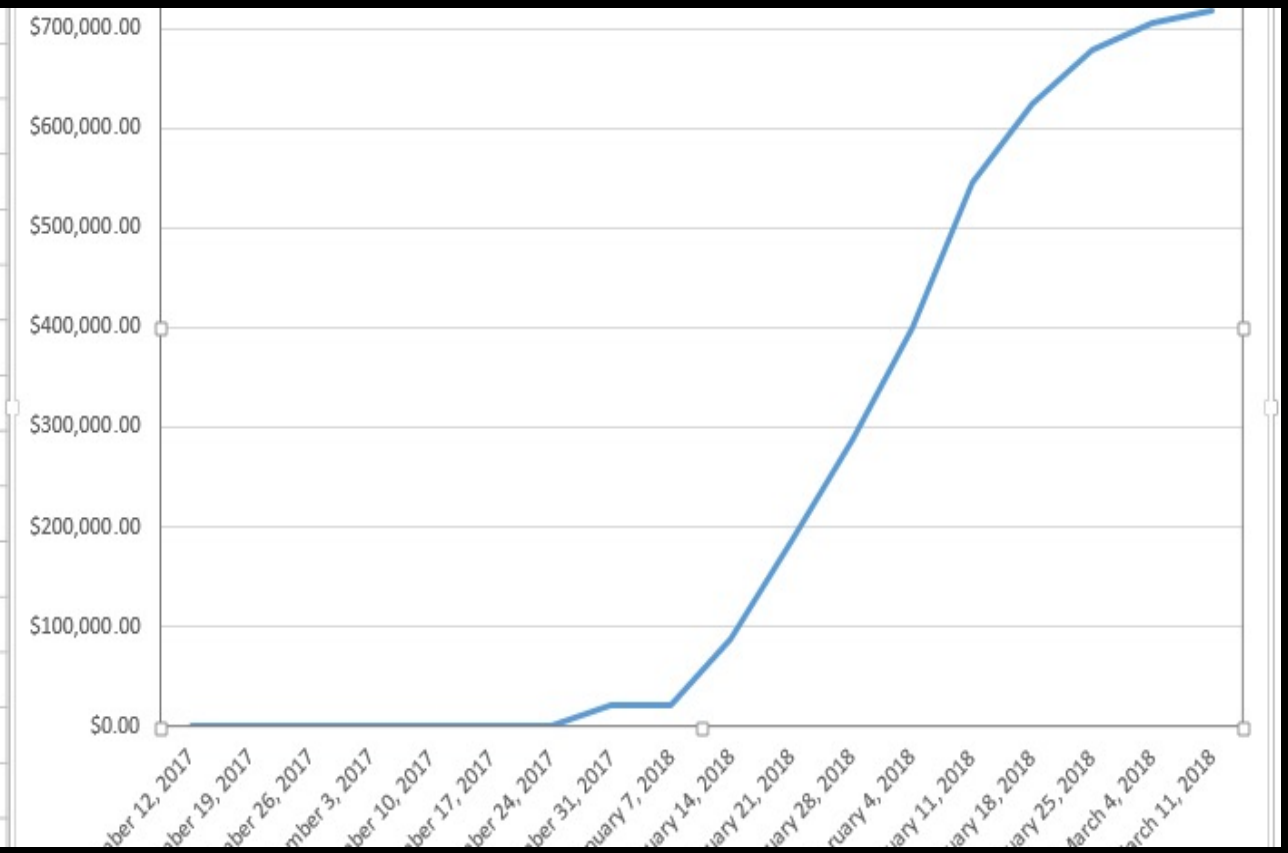
RESOURCE LOADED PROJECT SCHEDULE

Planned Effort	Planned Labor Cost	Planned Non-Labor Cost	Planned Cost	Predecessors	Resources
120.00	$ 14,739...	$ 18,800...	$ 33,539...		
14.00	$ 1,994.90	$ 0.00	$ 1,994.90		Don Shannon[10h], Marco Pavincich[4h]
0.00	$ 0.00	$ 0.00	$ 0.00	2	
0.00	$ 0.00	$ 0.00	$ 0.00		
0.00	$ 0.00	$ 0.00	$ 0.00		
0.00	$ 0.00	$ 0.00	$ 0.00	5	
0.00	$ 0.00	$ 9,300.00	$ 9,300.00		Marco Pavincich[10h]
0.00	$ 0.00	$ 7,000.00	$ 7,000.00	6	
0.00	$ 0.00	$ 0.00			
0.00	$ 0.00	$ 2,000.00			
0.00	$ 0.00	$ 300.00			
30.00	$ 3,387.56	$ 0.00			
6.00	$ 571.80	$ 0.00			
6.00	$ 571.80	$ 0.00			
18.00	$ 2,243.96	$ 0.00			
16.00	$ 2,053.36	$ 3,800.00			
16.00	$ 2,053.36	$ 4,500.00			
12.00	$ 1,540.02	$ 0.00			
20.00	$ 2,566.70	$ 0.00	$ 2,566.70	6	Don Shannon[10h], Marco Pavincich[10h]
0.00	$ 0.00	$ 0.00	$ 0.00	19;18	
12.00	$ 1,143.60	$ 1,200.00	$ 2,343.60	20	Marco Pavincich[12h]





Solicitation Released	$0.00
Proposal Due Date	$0.00
Solicitation Review	$12,400.00
Gate Review	$1,800.00
Authority to Propose	$0.00
Develop Proposal Architecture	$23,560.00
Develop and Define Technical Solution	$162,600.00
Identify Teaming Partners and Potential Subs	$42,520.00
Develop Proposal Outlines	$73,440.00
Draft Proposal Content	$60,920.00
Update Draft Proposal content	$23,200.00
Red Team Review	$4,200.00
Incorporate Red Team Recommendations	$10,320.00
Reproduce Final Copy	$6,200.00
Conduct Pricing Exercise	$31,480.00
Identify and Document Program Cost	$232,520.00



COST BUILD-UP FROM RESOURCE LOADED SCHEDULE

WORK THE PLAN

- Assign resources
- Authorize Work
- Do the work according to the plan
- “Business as usual”

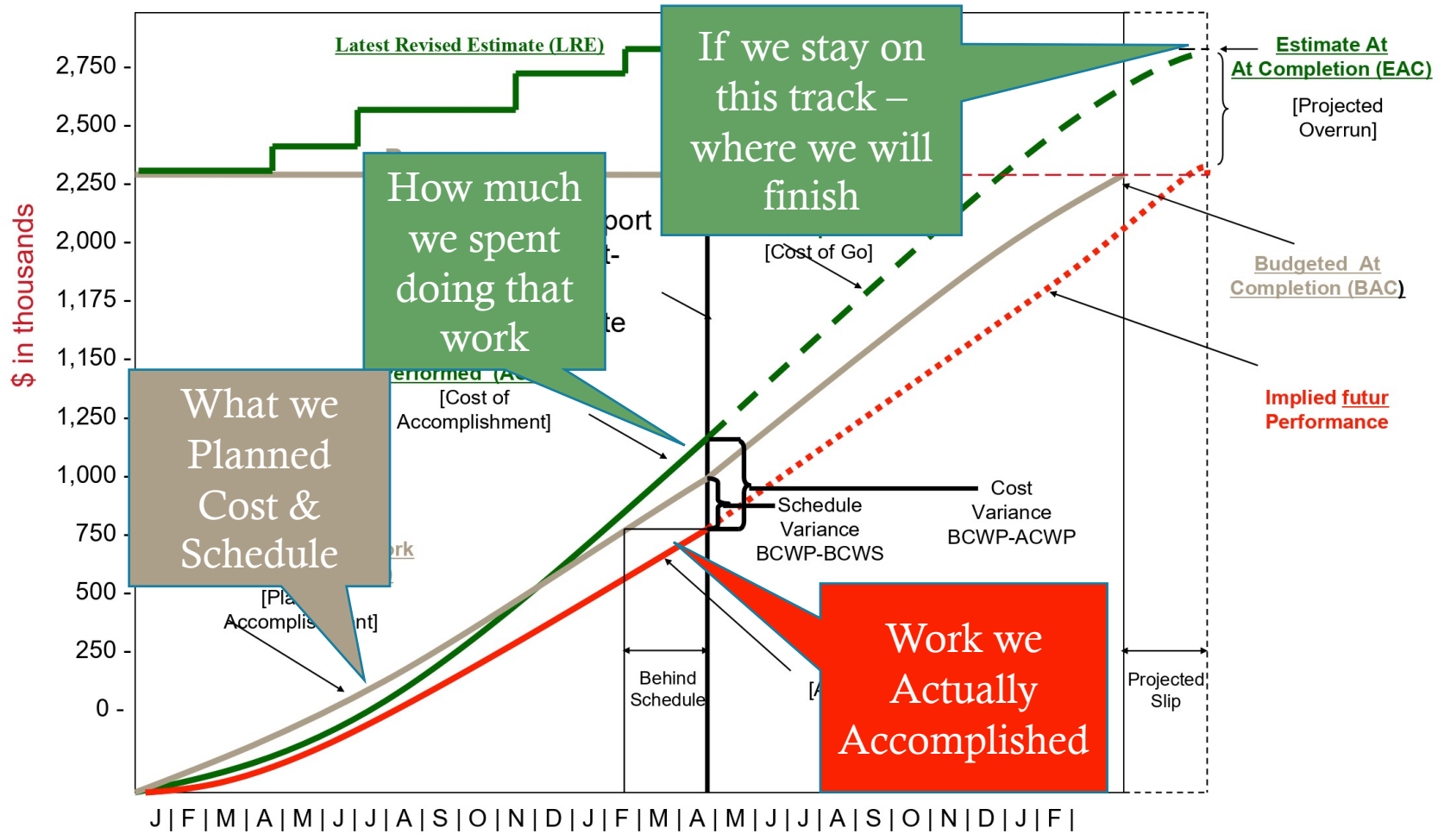
MEASURE AND EVALUATE PROGRESS

- How are you performing according to the plan?
  - Cost
  - Schedule

PERFORMANCE ANALYSIS

- Did I get a dollar's worth of work for each dollar I spent?
- Did I do a day's worth of work each day?
- How does my actual performance measure up to the planned performance
- Where am I drifting off the planned path?

EVMS - THE VIEW FROM 50,000 FEET



Common analysis for Program and IPT/CAM level

SPI Value	Implication
> 1.05	**BLUE** ("too good?") - Exceptional performance, but can also indicate a higher likelihood of poor planning (overly-conservative) and/or poor prioritization ("cherry-picking")
1.00 - 1.05	**GREEN** ("on track) - On average, the effort is progressing on or slightly ahead of plan
0.95 - 0.99	**YELLOW** ("caution") - On average, the effort is progressing slightly behind the plan
< 0.95	**RED** ("warning") - Indication of poor execution and/or poor planning (overly-aggressive)

INTERPRETING PERFORMANCE METRICS

- See NDIA Publication *A Guide to Managing Programs Using Predictive Measures*
- Understand the limitations and meaning of the various KPI's
  - SPI becomes less informative after about 65 - 75% complete
  - Cumulative values for CPI and SPI may vary little after about 30% complete however the CPI and SPI for the performance period are still usable.

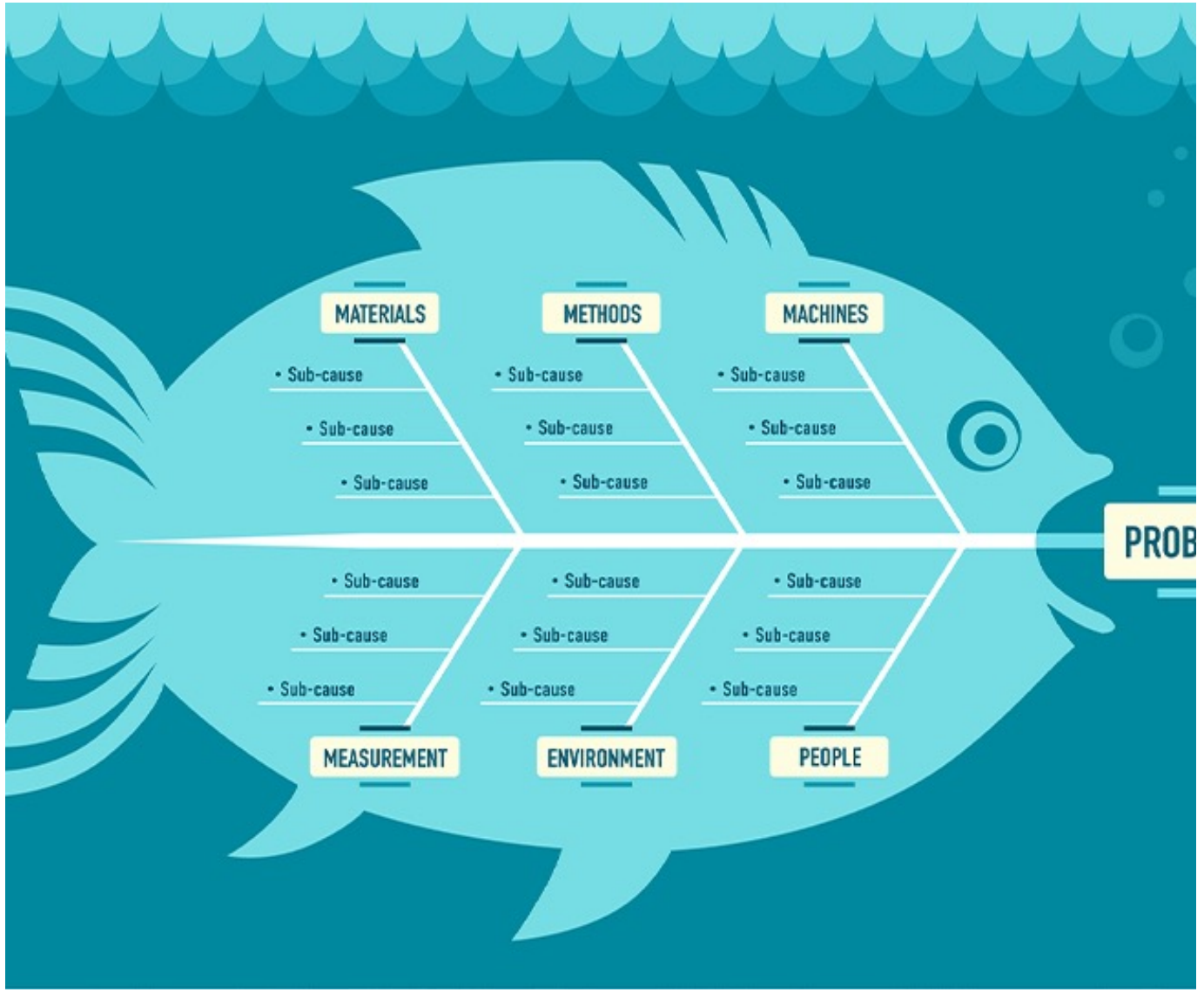
Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

APPLY CORRECTIVE MEASURES

Find the problems and fix them

WHY DID DEVIATION OCCUR & HOW TO PREVENT FUTURE OCCURRENCE

- Perform analysis to identify root cause(s) of the performance variance
- Develop measures to prevent reoccurrence
- Develop plan to get back on track



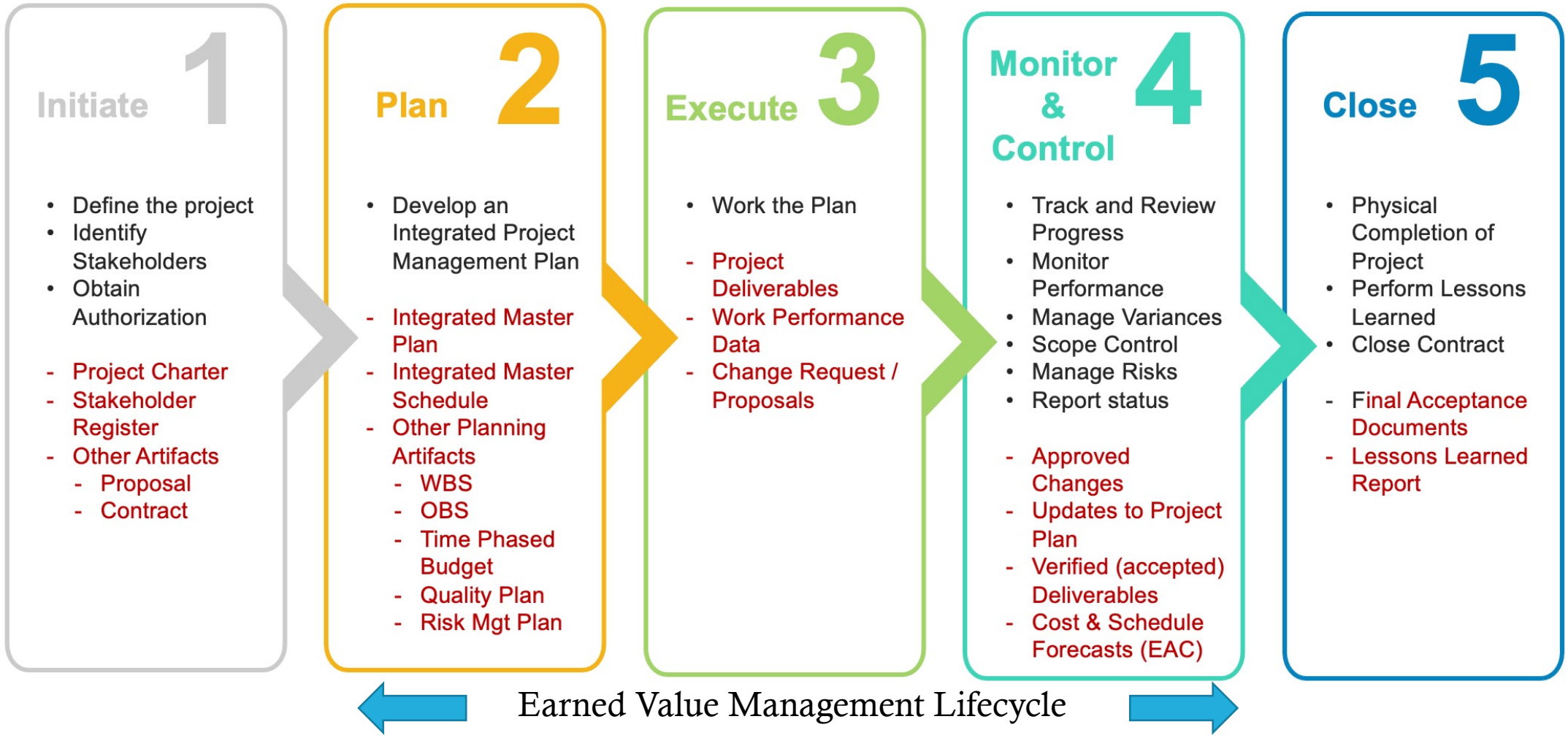
APPLY CORRECTIVE MEASURES

- Schedule
  - Add resources
  - Resolve potential conflicts
  - Prioritize critical tasks
- Budget
  - Review resource costs
  - Adjust resource mix
  - Review delays

PROJECT MANAGEMENT FUNDAMENTALS

Using EVMS to enhance project management

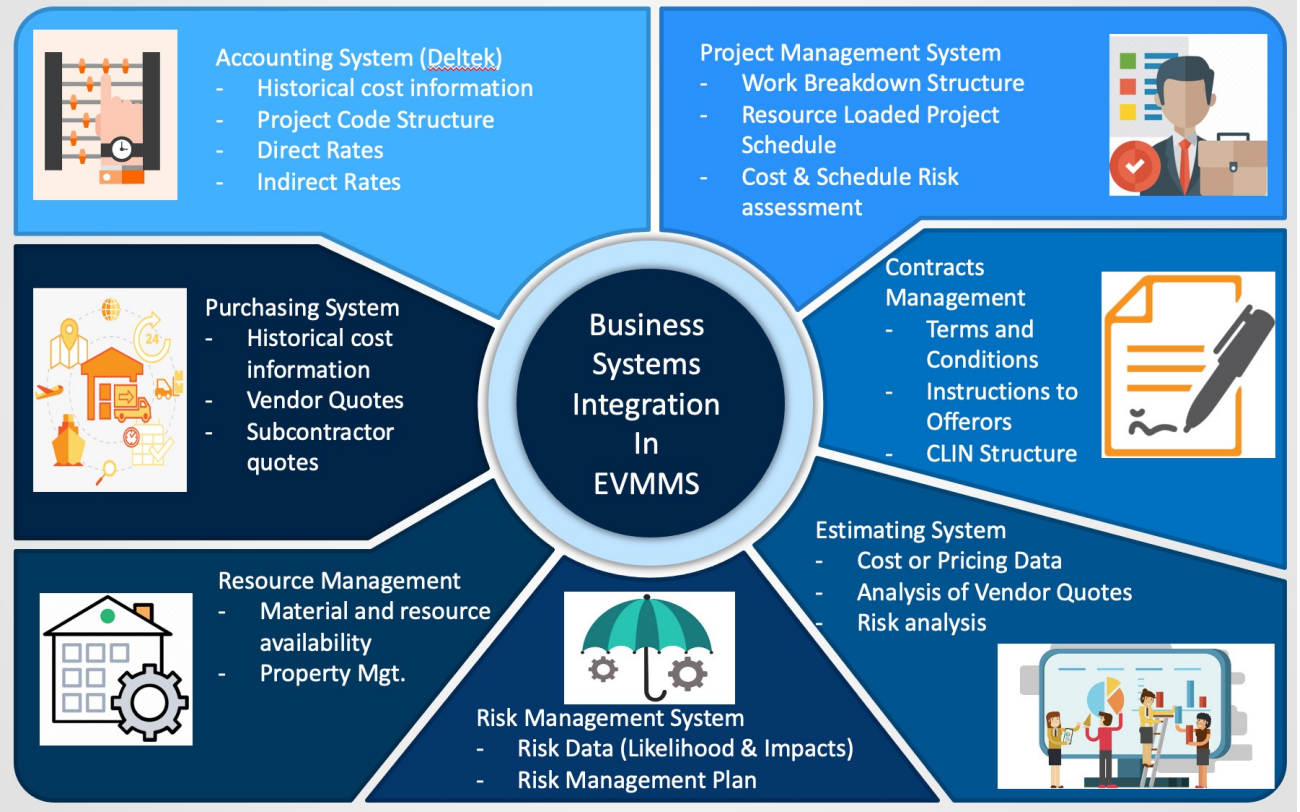
THE PROJECT MANAGEMENT LIFECYCLE



Earned Value Management Lifecycle

BUSINESS SYSTEMS INTEGRATION

Earned Value Management is often associated with Integrated Program Management in that it touches on and combines data from multiple business systems.



PROCESS GROUPS ALIGNED WITH EVMS

- A Program Management Process Group is a logical grouping of project management processes to achieve specific project objectives.
- Process Groups are independent of project phases.
- The five process areas we will address in this guide are shown here

Organization

Planning

Accounting Considerations

Analysis and Management Approach

Revisions and Data Management

ORGANIZATION

These processes focus on fundamental preparations for planning and executing the program

The SOW and Technical Specifications define the work to be accomplished

The contractor will further decompose the work into manageable pieces

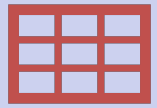
Earned Value Management requires that the technical plan address all the contract's technical scope, allowing the program manager to track progress against the contract requirements.

The work breakdown structure provides a structure for the contractor to hierarchically define and estimate the work to perform the contract

The Organization Structure will define who is responsible for accomplishing the work.

PLANNING, SCHEDULING AND BUDGETING

- These processes describe how the program will develop plans and strategies to achieve the desired program cost, schedule, and technical objectives.
- The result of these processes is shown here



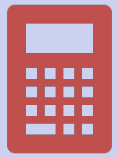
The Integrated Master Schedule,

The Performance Measurement Baseline (PMB),

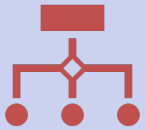
The Control Account Plans showing the work to be done by each Control Account Manager

ACCOUNTING CONSIDERATIONS

These processes ensure all costs, direct and indirect, associated with accomplishing the program work scope, can be tracked and reported at the level the work is performed.



The accounting system will be set up for each program



The system will capture and report actual costs at the lowest level of the WBS/Control account hierarchy, referred to as a Work Package.

ANALYSIS AND MANAGEMENT APPROACH

These processes describe how to use Earned Value Management performance data to identify and act on early technical, schedule, and/or cost deviations from the Performance Measurement Baseline.

The baseline plan will define objective criteria for success from which to claim progress.

The Integrated Program Management Report (IPMR) (DI-PM….) describes how to report the monthly earned value management data.

The IPMR includes the following information:

- 1) reporting of cost against the WBS;
- 2) cost against the OBS;
- 3) significant changes to the baseline;
- 4) a staffing projection;
- 5) a textual description of substantial variances and corrective action plans;
- 6) a schedule in a raw data format; and finally
- 7) a raw digital data file containing all the information, allowing the ability for using off-the-shelf applications for detailed analysis

REVISION AND DATA MANAGEMENT

This category's processes describe the configuration management process for maintaining the Performance Management Baseline throughout the program's performance period.

Baseline replans due to rolling wave planning.

Re-setting the baseline because the plan has drifted too far from the existing baseline

Engineering Change Proposals

CONTRACTING WITH EVMS FUNDAMENTALS

A very quick overview of the topic

CONTRACT MANAGEMENT LIFECYCLE

Pre-Award

Acquisition Planning
Develop Solicitation
Develop Offer
Determine EVM Requirements

Award

Determine Responsibility
Discussions or Negotiation
EVM System Compliance

Post Award

Perform Contract
Integrated Baseline Review
System Surveillance
Close Contract

Note: Text in Red denotes added activities when EVMS is required.

IS AN EVMS REQUIRED

- When is an EVMS System Contractually Required?
  - The decision to impose EVMS requirements on a particular contract action is driven by a Contracting Officer decision concerning the legal and regulatory requirements balanced against the countering administrative and cost burdens associated with that decision.
  - Mandatory vs. Optional implementation
  - Agency specific guidelines

THRESHOLDS BY ORGANIZATION

- Note: Although FAR Part 34 does not establish specific dollar thresholds for EVMS applicability, there is other guidance in both industry publications and agency supplements to guide the CO in their determination.
- *"…All major acquisitions with development effort will include the requirement for the contractor to use an Earned Value Management System (EVMS) that meets the guidelines in EIA Standard—748 to monitor contract performance"…* (OMB Circular A-11)

Regulation	Dollar Threshold For ANSI/EIA 748 Guideline Compliance	Dollar Threshold for EIA 748 Cognizant Federal Agency (CFA)-Reviewed System
FAR Part 34	Agency-Specified	Agency-Specified
DFARS Part 234	$20 Million	$100 Million
HHSARS Part 334	$20 Million	$50 Million
NFS Part 1834	$20 Million	$50 Million

BENEFITS TO CONSIDER

Greater management efficiency possible through more and better reporting of cost and schedule data.

- Early warning of cost overruns or late completion
- Trend lines and analysis techniques provide insight into ‘get-well’ initiatives
- Easy to forecast forward funding requirements

Enforces a disciplined and repeatable management process

- The techniques and methodology are broadly applicable to most projects
- The process can be tailored where needed to fit smaller or less complex projects

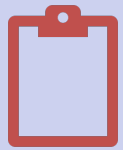
TRADE STUDY

- Imposing EVMS requirements is a necessary discussion between the Program team and the Contracting Officer concerning program execution risk:
  - What data the team needs to effectively manage the program
  - Cost of acquiring that data
  - Likelihood of poor cost/schedule performance
  - Impacts
    - $$$$$$
    - Mission capability/readiness

SOLICITATION REQUIREMENTS WHEN EVMS IS USED

UNIQUE FAR CLAUSES CONCERNING EVMS

- The FAR Clauses shown here are called for by FAR Part 34
  - FAR 52.234-2 and FAR 52.234-3 are mutually exclusive provisions
  - FAR 52.234-4 is the contract Clause



FAR 52.234-2 Notice of EVMS-Pre-Award IBR

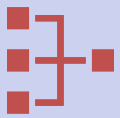
FAR 52.234-3 Notice of EVMS-Post Award IBR

FAR 52.234-4 Earned Value Management System

UNIQUE DFARS CLAUSES CONCERNING EVMS

DFARS 252.234-7001, Notice of Earned Value Management System

DFARS 252.234-7002, Earned Value Management System



DFARS 252.242-7005, Contractor Business Systems

- **The DFAR Clauses and Provisions replace the associated FAR clauses for DoD Contracts**
- **DFARS 252.234-7002 is the EVMS Contract Clause**
- **DFARS 252.242-7005 provides a means for withholding payment if the contractor does not obtain or maintain an approved system**

SOLICITATION REQUIREMENTS: PROVISIONS & CLAUSES

- … provide documentation that the proposed earned value management system (EVMS) complies with the EVMS guidelines in Electronic Industries Alliance Standard 748 (EIA-748)
- If offeror does not have compliant system - submit a comprehensive plan for compliance with the EVMS guidelines
- … identify the major subcontractors, or major subcontracted effort, planned for application of the guidelines.
- Must advise of the requirement for an Integrated Baseline Review
- Include the basic EVMS Clause at 52.234-4

SOLICITATION SECTION C

- Require the development of a Contract Work Breakdown Structure at a level adequate for management and contract control
- That the contracted technical effort to use a guidelines-compliant EVMS
- That the prime contractor designate critical subcontractors by name for EVM compliance and flow down of EVMS compliance to subcontractors
- The requirement for and timing of Integrated Baseline Reviews (IBRs)
- Reference to EVMS data items (i.e., CDRLs) as part of Integrated Program Management Reporting

SOLICITATION SECTION J

The buyer should insert instructions concerning EVMS Contract Data Requirements (CDRLs)

Reference the appropriate Data Item Description (e.g., IPMR DI-MGMT-81861) Including appropriate references to the reporting requirements/formats to be used.

Consideration should also be given to other reporting requirements

Contract Funds Status Reports
Contract Work Breakdown Structure.

Tailoring of these requirements may be considered consistent with the risks involved.

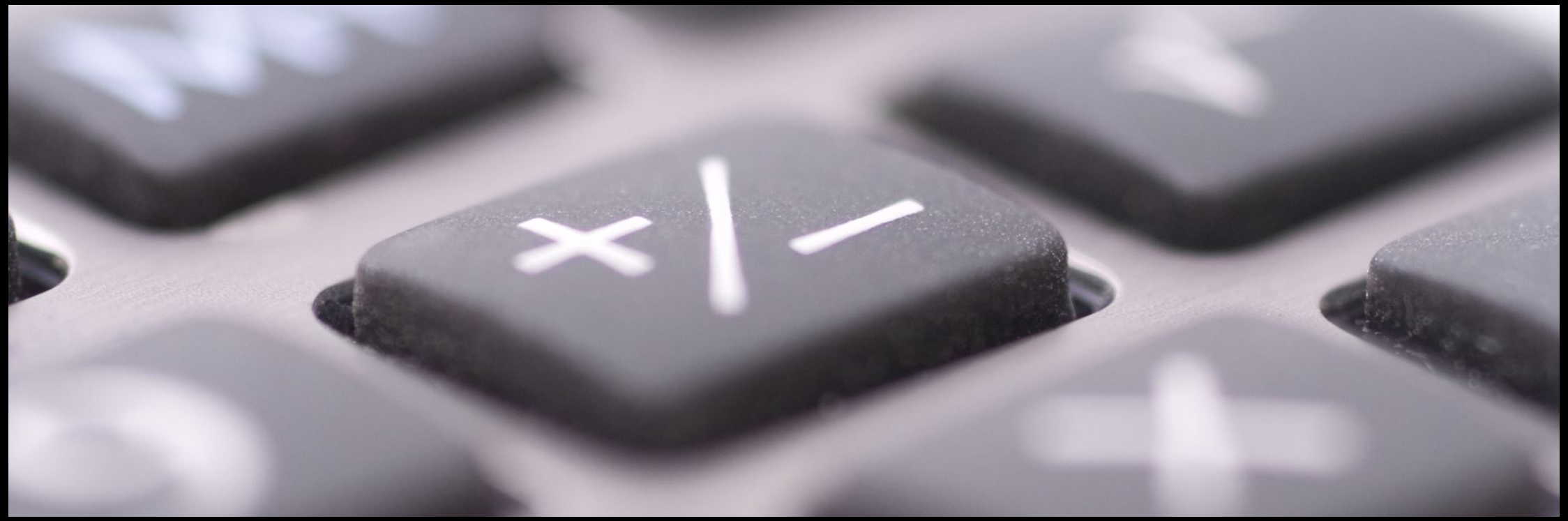
SOLICITATION SECTION L

- Offerors will be required to provide:
  - A description of the offeror's EVMS System that will be used to manage the contract.
  - Proof of compliance such as a Contracting Officer's Final Determination etc.
  - If such a system does not exist, then the offeror must provide information concerning their actions that will be taken to obtain a compliant system and the timeline for its implementation.
  - A written summary of the proposed EVMS reference in sufficient detail to show how it addresses all 32 EIA-748 EVMS guidelines

INTEGRATED BASELINE REVIEW

PRE-AWARD/POST AWARD INTEGRATED BASELINE REVIEW

- Integrated Baseline reviews are required by OMB Circular A11 and the FAR
- Should be conducted initially and then annually thereafter
- Purpose is: "… to jointly assess technical areas, such as
  - the Contractor's planning,
  - to ensure complete coverage of the contract requirements,
  - logical scheduling of the work activities,
  - adequate resources,
  - methodologies for earned value (budgeted cost for work performed (BCWP)), and
  - identification of inherent risks



EVM KEY PERFORMANCE INDICATORS

EVMS BASIC TERMINOLOGY

- Planned Value /BCWS Planned Value (PV) (also known as Budgeted Cost of Work Scheduled) describes how far along project work is supposed to be at any given point in the project schedule. It is a numerical reflection of the budgeted work that is scheduled to be performed, and is it the established baseline (PMB) against which the actual progress of the project is measures. Once established, this baseline may only change to reflect cost and schedule changes necessitated by changes in the scope of work.
- Earned Value/BCWP Earned Value (EV) also known as the Budgeted Cost of Work Performed (BCWP), reflects the amount of work that has actually been accomplished to date (or in a given time period), expressed as the planned value for that work.
- Actual Cost/ACWP Actual Cost (AC), also known as the Actual Cost of Work Performed (ACWP), is an indication of the level of resources that have been expended to achieve the actuals work performed to date (or in a given time period).
- Budget at Completion Budget at Completion (BAC) represents the total Planned Value for the project, this is the final data point on the PMB.
- Schedule Variance The Schedule Variance (SV) determines whether a project is ahead of or behind schedule. It is calculated by subtracting the Planned Value or BCWS from the Earned Value or BCWP. A positive value indicates a favorable condition and a negative value indicates and unfavorable condition. SV = BCWP - BCWS The Schedule Variance can be expressed as a percentage by dividing the SV by the PV or BCWS. SV% = SV / BCWS
- Schedule Performance Index The Schedule Performance Index (SPI) indicates how efficiently the project team is using its time. SPI is calculated by dividing the Earned Value by the Planned Value or BCWP by the BCWS. SPI = BWCP / BCWS

EVMS BASIC TERMINOLOGY

- Cost Variance A project's Cost Variance (CV) shows whether a project is under or over budget. This measure is determined by subtracting the actual cost or ACWP from the Earned Value or BCWP. CV = BCWP – ACWP This number can be expressed as a percentage by dividing the Cost Variance (CV) by the Earned Value or BCWP. CV% = CV / BCWP
- Cost Performance Index Earned Value (BCWP) and Actual Cost (ACWP) can also be used to calculate the cumulative Cost Performance Index (CPI), which is one of the clearest indicators of the cumulative cost efficiency of a project. CPI gauges how efficiently the team is using its resources. It is determined by dividing the Earned Value (BCWP) by the Actual Cost (ACWP). CPI = BCWP / ACWP
- Estimate at Completion / Estimate to Complete The calculated Estimate at Completion (EAC) projects for the team the final cost of the project if current performance trends continue.
- The Estimate to Complete (ETC) shows what the remaining work will cost. One way to develop the ETC is by workers and/or managers based on analysis of the remaining work. The management ETC can be added to the Actual Cost (ACWP) to derive the management EAC. EAC = ETC + ACWP As a check on these management estimates, organizations can use calculated ETC based on the efficient-to-date measured by the CPI. ETC = (BAC-BCWP) / CPI

EVMS BASIC TERMINOLOGY

- Control Accounts/Control Account Managers - Lowest Level of managerial authority Responsible for Scope, Schedule, Budget, Cost, Risk and Technical Execution
- Work Packages - Detailed, short-span tasks, or material items, required to accomplish the Control Account objectives, typically in the near term

REPORTING & INTERPRETING THE RESULTS

SCHEDULE PERFORMANCE INDEX (SPI)

$$SPI = \frac{BCWP}{BCWS}$$

SPI Value	Implication
> 1.05	**BLUE** ("too good?") - Exceptional performance, but can also indicate a higher likelihood of poor planning (overly-conservative) and/or poor prioritization ("cherry-picking")
1.00 - 1.05	**GREEN** ("on track) - On average, the effort is progressing on or slightly ahead of plan
0.95 - 0.99	**YELLOW** ("caution") - On average, the effort is progressing slightly behind the plan
< 0.95	**RED** ("warning") - Indication of poor execution and/or poor planning (overly-aggressive)

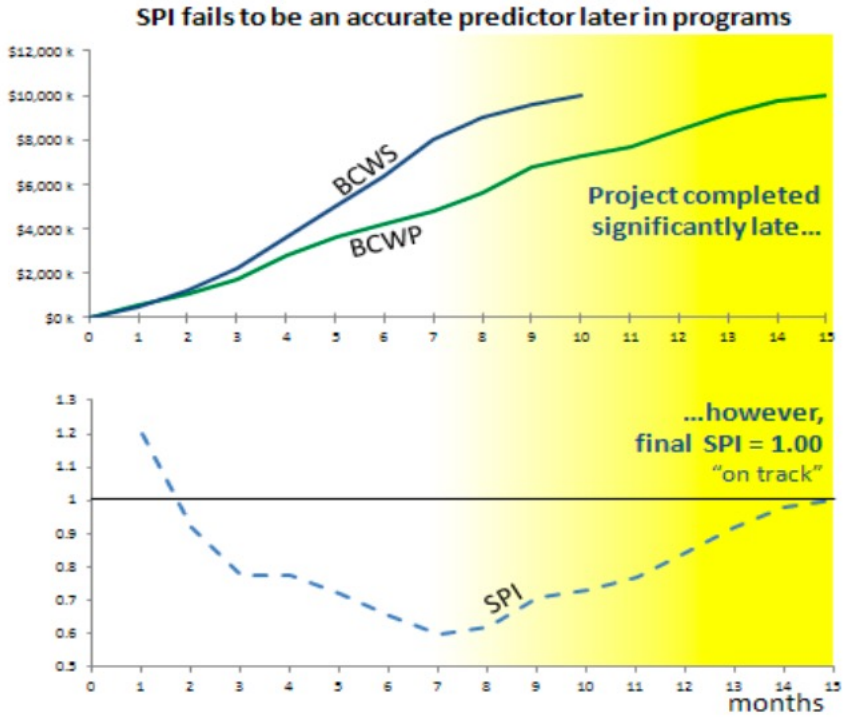
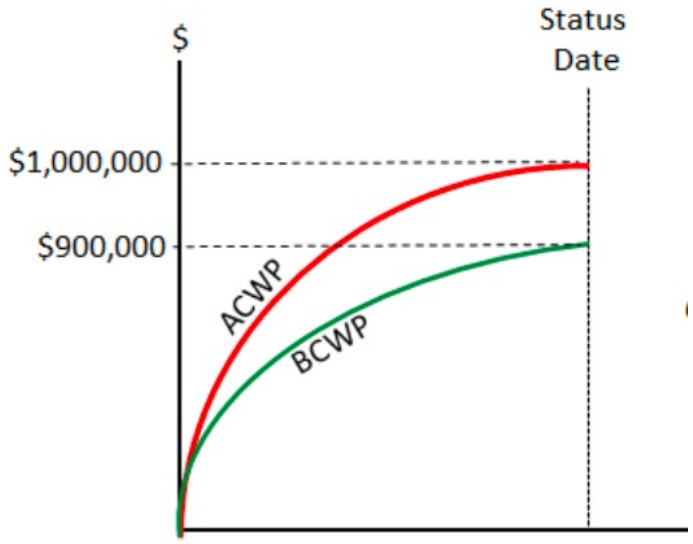


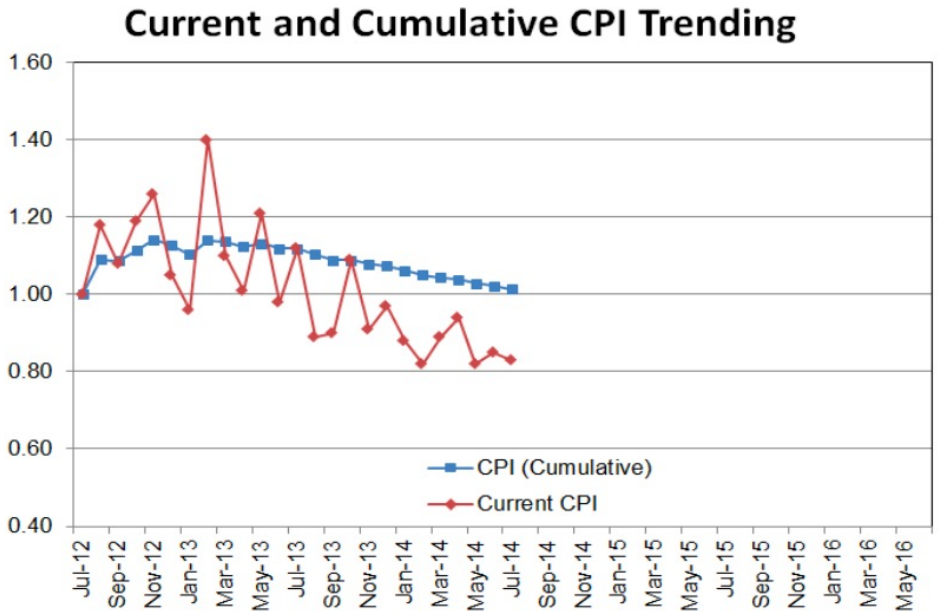
Figure 2. SPI Limitations

Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

COST PERFORMANCE INDEX

$$CPI = \frac{BCWP}{ACWP}$$



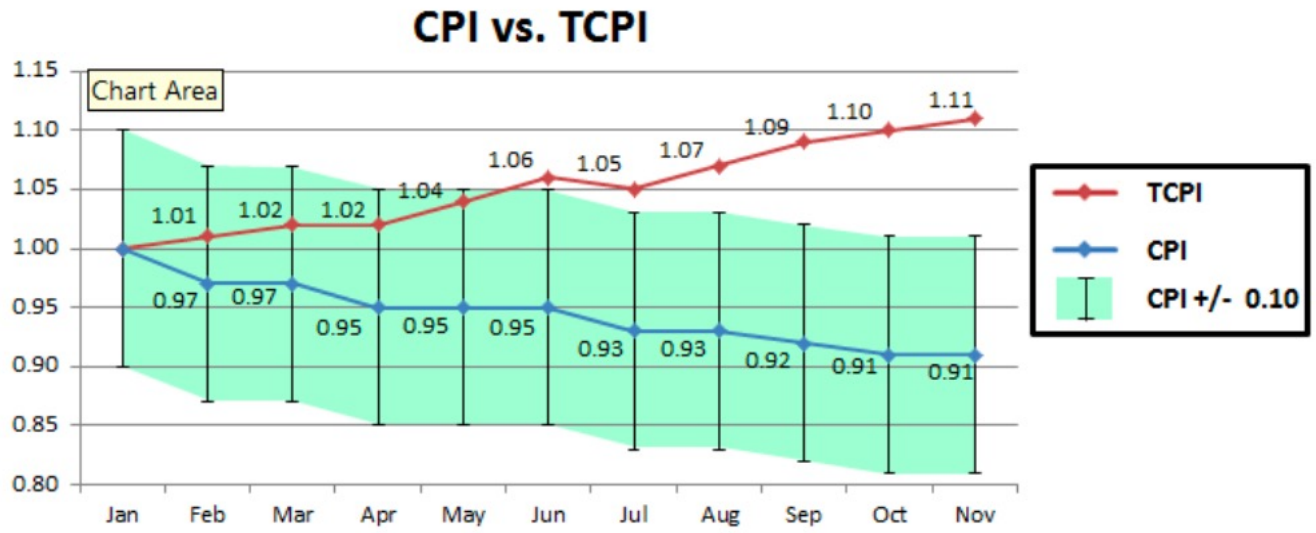


CPI Value	Implication
> 1.05	**BLUE** ("too good?") - Exceptional efficiency and/or poor planning ("padded" budgets)
1.00 - 1.05	**GREEN** ("on track) - On average, the effort is being accomplished at or slightly ahead of the planned efficiency
0.95 - 0.99	**YELLOW** ("caution") - On average, the effort is being accomplished slightly less efficiently than planed
< 0.95	**RED** ("warning") - Indication of poor efficiency and/or poor planning (overly "challenged" budgets)

Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

TO COMPLETE PERFORMANCE INDEX (ESTIMATE TO COMPLETE) $TCPI_{(EAC)}$

$$TCPI(eac) = \frac{BAC - BCWP}{EAC - ACWP} = \frac{BCWR}{ETC}$$



- What efficiency is required to achieve the forecast budget at complete
- If $TCPI_{(EAC)}$ is > 1 it means the contractor must work at more than 100% cost efficiency (CPI >1) to finish on budget
- Values > 1.05 are suspect.
- CPI - $TCPI_{(EAC)}$ values should be +/- 0.10 to be credible

Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

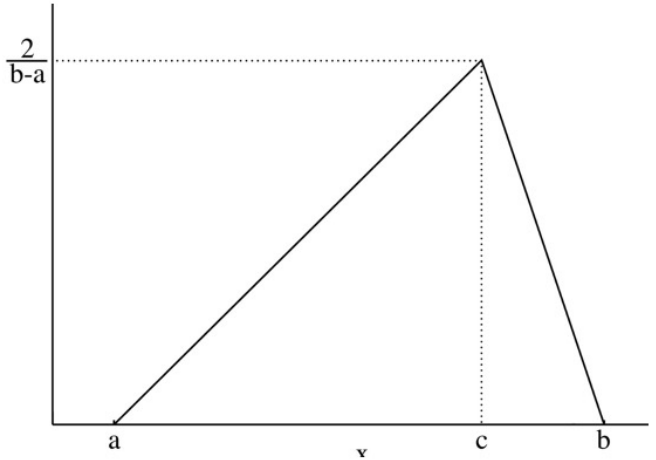
INDEPENDENT ESTIMATE AT COMPLETE (IEAC)

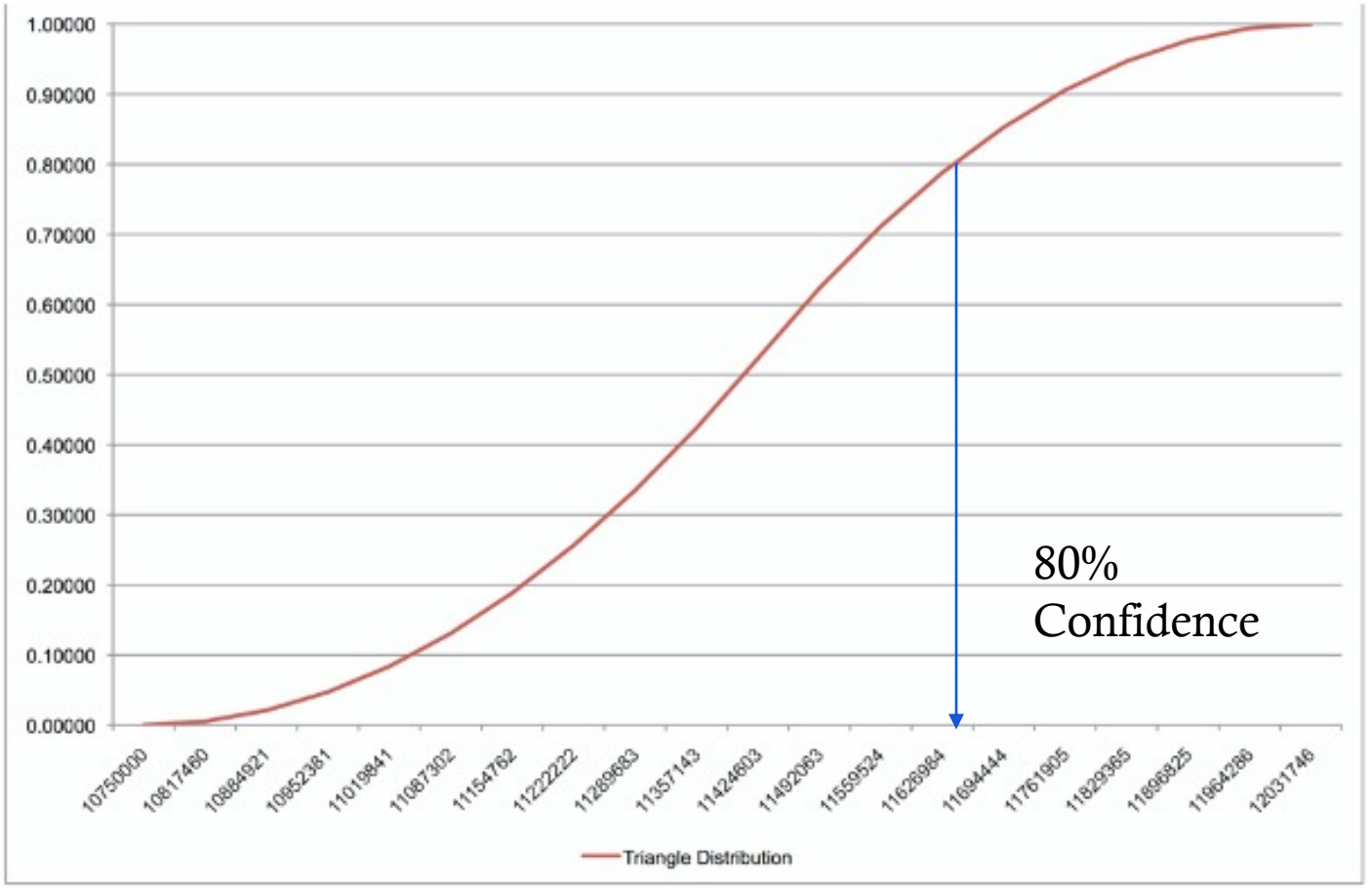
IEAC	Formula	Assumption	Comments
IEAC1	$= ACWP + \frac{BAC - BCWPcum}{CPI}$	Future cost performance will be the same as all past cost performance.	"Best Case" when CPI is less than 1.0 and "Worst Case" when CPI is greater than 1.0.
IEAC2	$= ACWP + \frac{BAC - BCWPcum}{SPI}$	Future cost performance will be influence by past schedule performance.	Use with caution as SPI is diluted by LOE and loses accuracy over the last third of the project.
IEAC3	$= ACWP + \frac{BAC - BCWPcum}{SPI \times CPI}$	Future cost performance will be influence by past schedule and cost performance.	In contrast to IEAC1, this calculation typically yields the "Worst Case" when SPI and CPI are less than 1.0.
IEAC4	$= ACWP + \frac{BAC - BCWPcum}{(0.2 \times SPI) + (0.8 \times CPI)}$	Similar to IEAC3, except increased weight is placed on CPI.	More reliable than IEAC3 late in a project since less weight is given to SPI.

Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

CALCULATING THE ODDS

Metric	Data
BAC	$10,000,000
ACWP(Cum)	$6,000,000
BCWP(Cum)	$5,250,000
CPI(Cum)	0.8750
SPI(Cum)	0.9000
	Results
EAC	$10,750,000
EAC(CPIcum)	$11,428,571
EAC(Composite)	$12,031,746





STAFFING PROFILE

- How stable are staffing levels over time
- Common to see “ramp-up” and ”ramp down” over project
- Abnormal bumps or lumps require added management attention

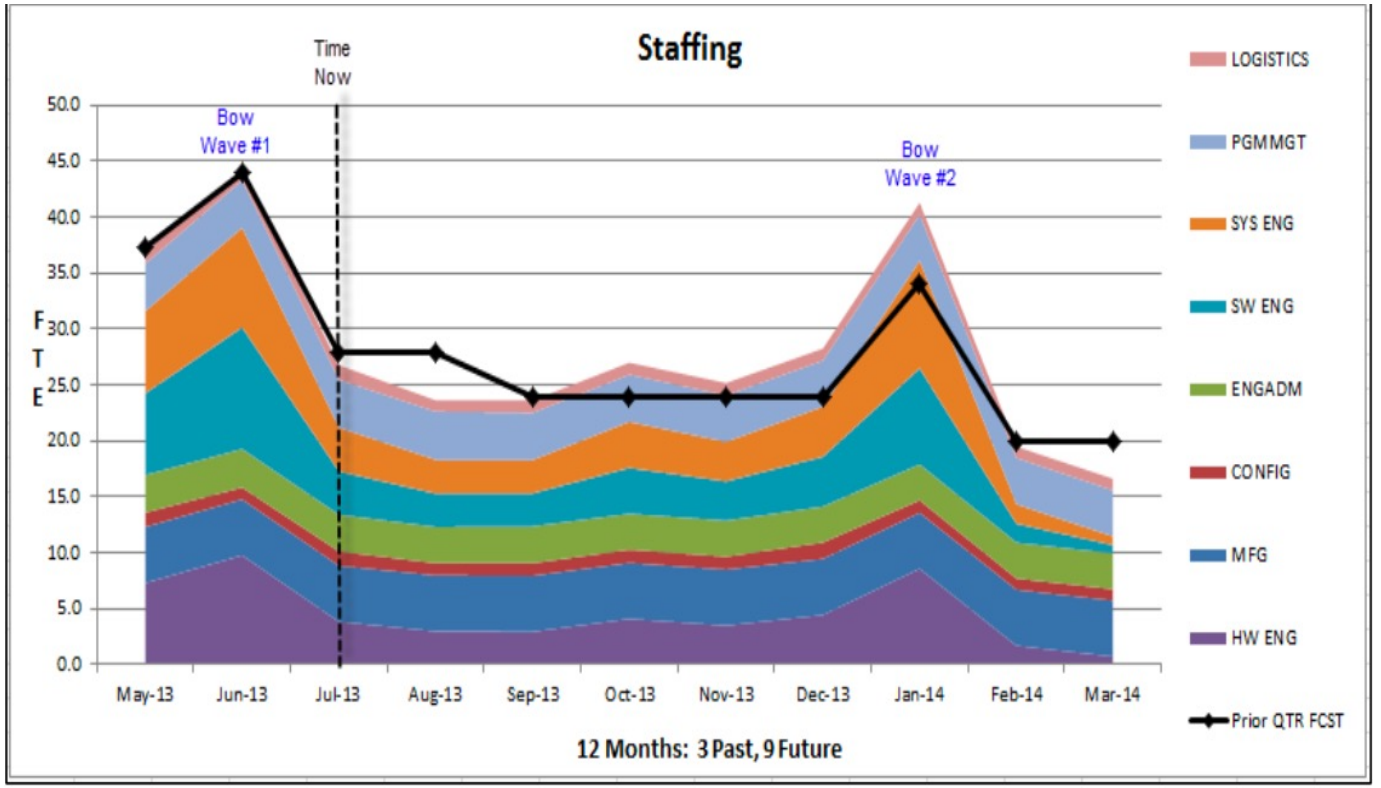
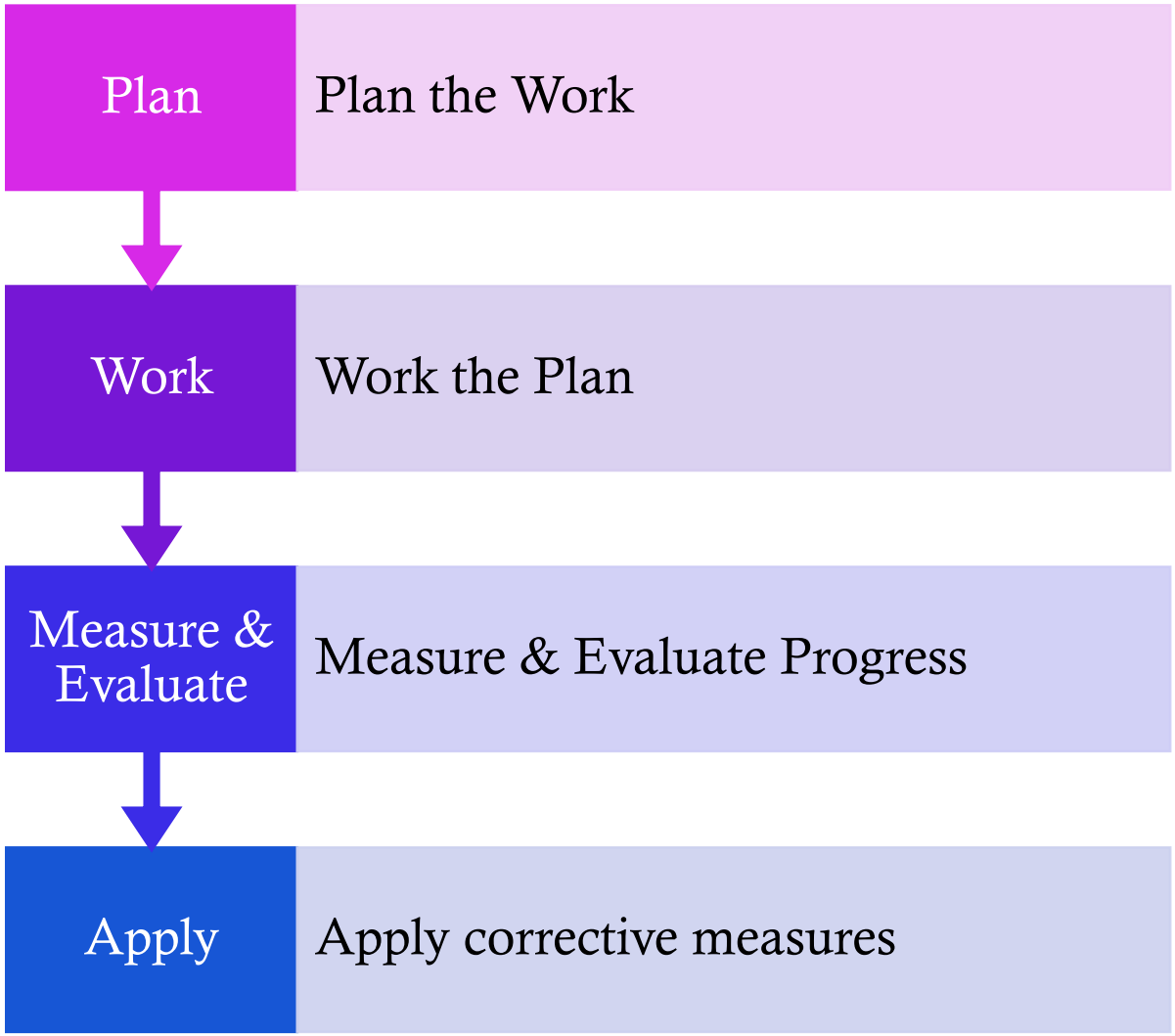


Image Credit: NDIA A Guide to Managing Programs Using Predictive Measures

SUMMARY


Plan
Plan the Work
Work
Work the Plan
Measure & Evaluate
Measure & Evaluate Progress
Apply
Apply corrective measures