Integrated Project Management

Transforming Data into Information

26 June 2012

Presented to:

2012 SCEA Conference

Presented by:

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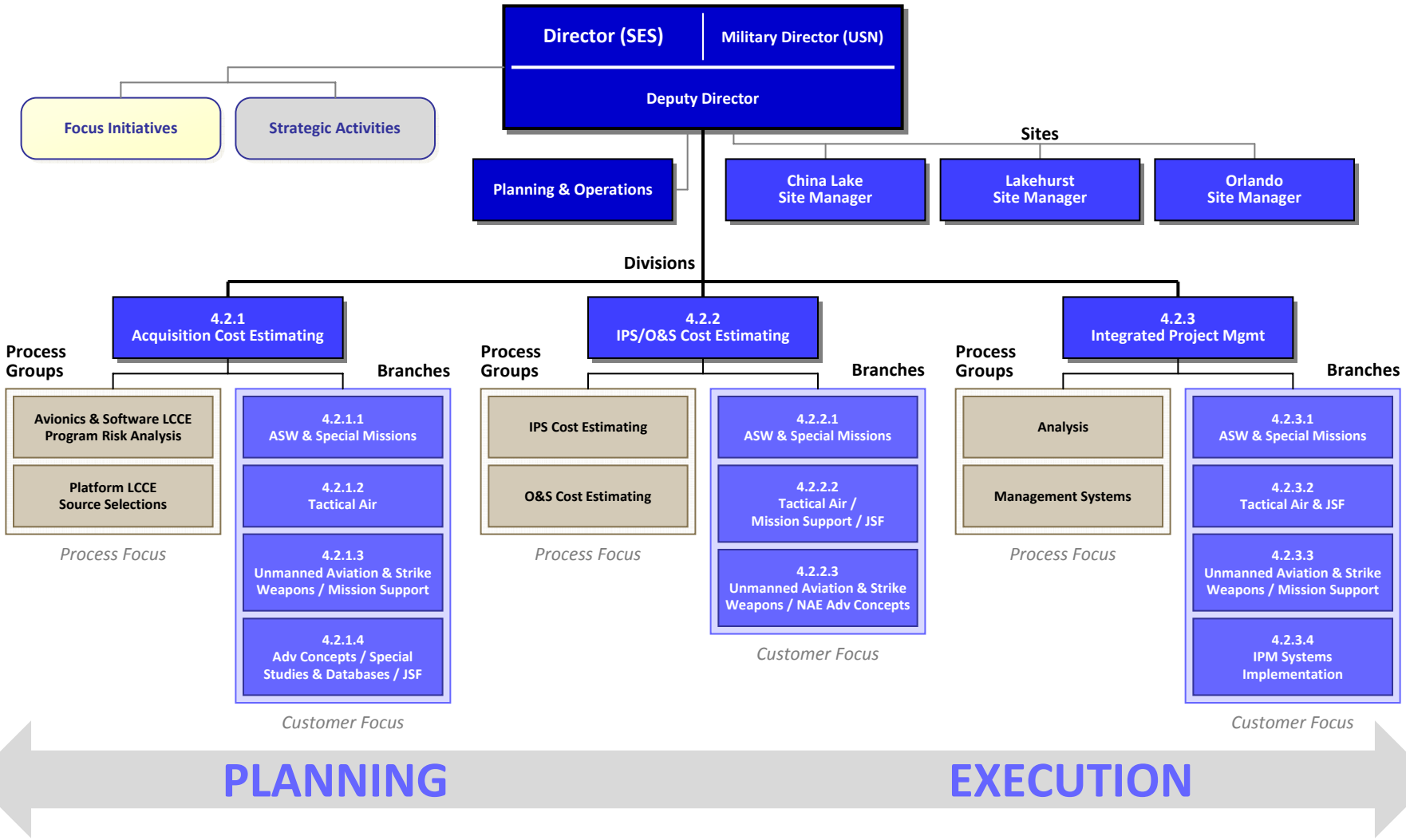
NAVAIR

NAVAIR COST DEPARTMENT (AIR-4.2)
ORGANIZATION CHART
(Jan. 3, 2012)



COST DEPARTMENT
VISION & MISSION SYNOPSIS

VISION

To be the *foremost leader* in Cost Estimating, Analysis and Earned Value Management, and the *provider of choice* for Cost-related products and services

MISSION

To Deliver Quality Cost Estimates and Analysis throughout the Life Cycle of Programs

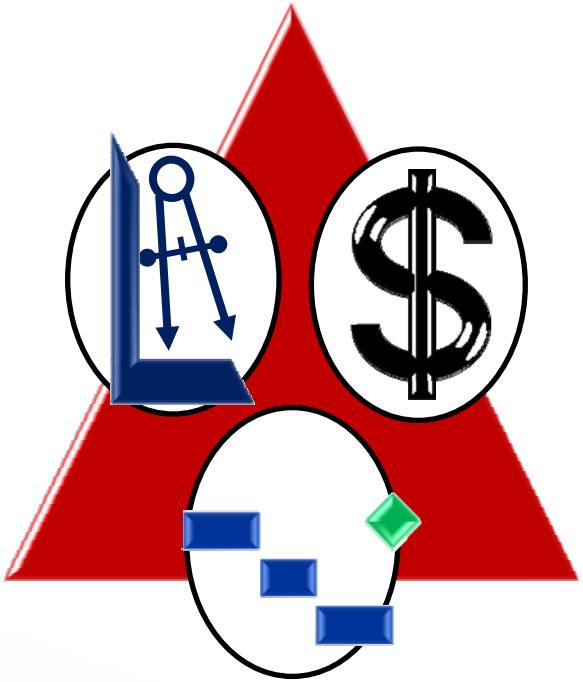
WHY

Support the Warfighter and Taxpayer

"TELLING PROGRAMS *WHAT THEY NEED TO HEAR,* NOT NECESSARILY WHAT THEY WANT TO HEAR"

Performance Triangle

Technical Performance



Cost

Schedule

EVM INTEGRATES THE COST, SCHEDULE, AND TECHNICAL PERFORMANCE – It's NOT just a report

Why care about IPM?

Transforming Data into Information

Data Transparency

PRODUCT	"DATA TRANSPARENCY" AT ALL LEVELS	CONSUMER & ACTIONS
Group Cockpit Chart NAVAIR Trends / PEO Trends	**STRATEGIC** **PORTFOLIO VIEW**	**AIR-00 & PEOs** *Oversight* *Milestone Decision* *Authorization to Proceed*
Project Cockpit Chart Project Trends	**OPERATIONAL** **CONTRACT VIEW**	**PEOs & PMAs** *Eliminate "Red' Rating* *Assess Progress* *Milestone Decisions* *Cost Reduction Initiatives* *Program Restructure*
Monthly Detailed Analysis Project Details	**TACTICAL** **"DAY TO DAY" MANAGEMENT**	**PMAs & IPTs** *Identify Risks* *Initiate Risk Mitigation* *Cost Reduction Actions* *Tradeoff Analysis*

Institutionalized Standard Suite of Development Metrics

Group Cockpit Chart – Portfolio View

PEO(A)

January 2012 ($ in M)

Significant Issues and Performance Factors

Significant Issues/Situational Awareness

PMA-ABC, Program Name 1. Unfavorable schedule performance was attributed to performance claimed the prior reporting period for work that was planned to be accomplished this month. As a result, the favorable schedule performance reported last month was offset. Also, late delivery of components for Ground Test Vehicle (GTV) and fatigue test specimen impacted schedule performance. An Integrated Baseline Review was conducted the week of 5-9 March 2012, with results briefed to the program office mid-March.

PMA-DEF, Program Name 2. Cumulative schedule performance degraded due to late delivery of Flight Control Subsystem and Rotor Group parts to the production line. In addition, several other parts/material items were available but not issued to the factory floor. These delays are not anticipated to impact aircraft delivery contractual dates. The AIR-4.2 Estimate at Completion (EAC) was recently updated to $1,792.5M which reflected a $53.2M under-run to the Total Allocated Budget (TAB) $1,845.7M. This EAC also reflected minor contract modifications to the baseline since October 2011.

PMA-GHI, Program Name 3. Cost performance and schedule performance remained unfavorable with unfavorable schedule performance remaining the primary concern. The delayed cabin delivery continued to impact the program with a projected delivery date of October 2012, a seven-month delay to the original baseline. This cabin delay will also impact Lot 7 aircraft delivery. Unfavorable schedule performance was also attributed to a five-month flight test delay for the 401C engine, which projects an April 2012 start. These schedule delays will likely result in increased costs.

PMA-JKL, Program Name 4. An Over-Target Schedule (OTS) was implemented to extend contract completion from May 2014 to February 2015. The new schedule, which addresses delays and risks in Flight Test and Fatigue Tests, will be budgeted with existing Management Reserve (MR). The current NAVAIR EAC of $6,182M was updated to a Not Less Than (NLT) EAC of $6,465M, using the cumulative Cost Performance Index (CPI) calculation. A formal AIR-4.2 EAC is planned for this summer. A Schedule Risk Assessment (SRA) and an Integrated Baseline Review (IBR) are planned in March and April, respectively.

Performance Factors

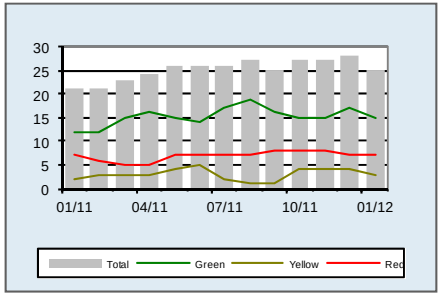
- 1 project added (Program Name 5).
- 0 projects renamed.
- 4 projects removed (Program Name 6, Program Name 7, Program Name 8, Program Name 9).

Cost Growth Data by Group

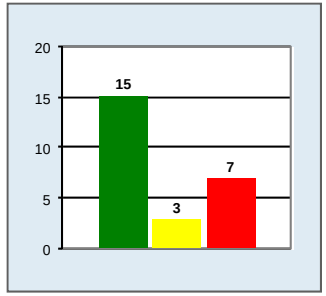
Group	Original CBB	Current CBB	4.2 EAC	Scope Growth	Overrun	Total Growth	%Scope Growth	%Overrun
PMA-261	$2,720	$2,724	$3,618	$5	$893	$898	0%	33%
PMA-274	$2	$3	$3	$0	$0	$0	17%	0%
PMA-275	$5,426	$5,976	$5,885	$550	$8	$459	10%	0%
PMA-276	$76	$114	$125	$37	$11	$48	49%	15%
PMA-290	$6,101	$7,228	$8,997	$1,127	$1,769	$2,896	18%	29%
PMA-299	$228	$233	$256	$6	$23	$29	3%	10%
PEO(A)	$14,553	$16,278	$18,884	$1,725	$2,705	$4,331	12%	19%

of Contracts

12-Month Trend

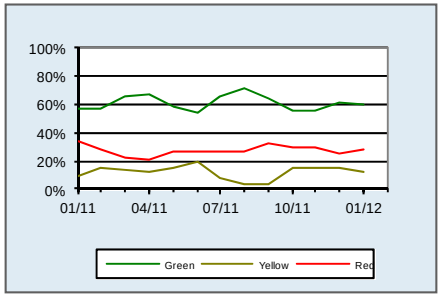


This Period



% of Contracts

12-Month Trend



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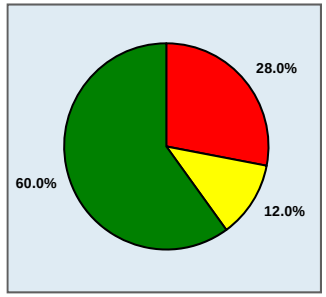
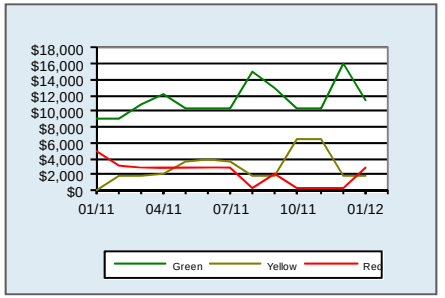


Current CBB

12-Month Trend



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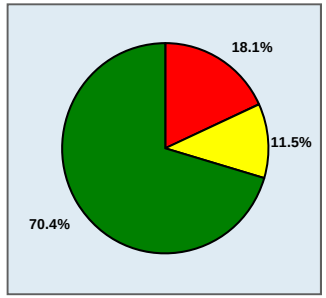
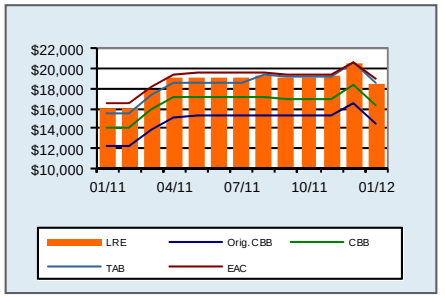


Cost Growth

12-Month Trend



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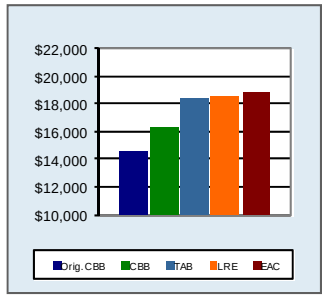
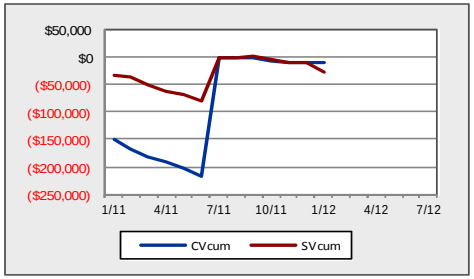


Project Cockpit Chart – Contract View

Project 123

January 2012 ($ in K)

Variances (Cum.)

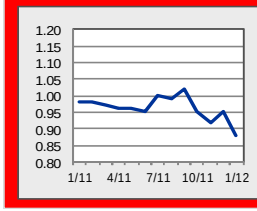


Status

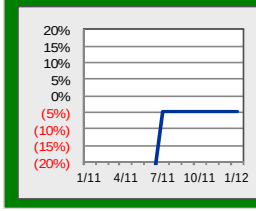
Management System Rating

CPI Cum	EVEN 0.95
TCPI LRE	1.04

SPI Cum	DOWN 0.88

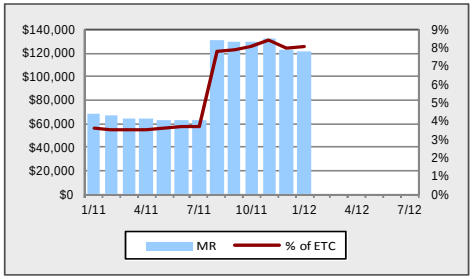


VAC%	EVEN (5%)

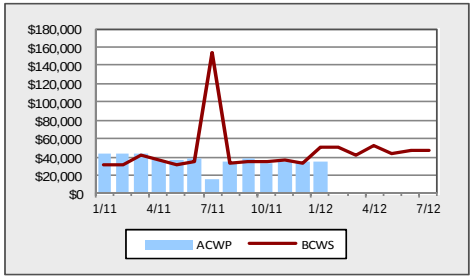


Cost	$inK	Progress	Pct.	Growth	Pct.
TAB	$3,450,000	Spent	64%	Scope (Realized)	0%
MR	$121,002	Schedule	64%	Overrun (Underrun)	33%
EAC	$3,617,657	Performed	63%	Schedule Behind (Ahead)	(2%)

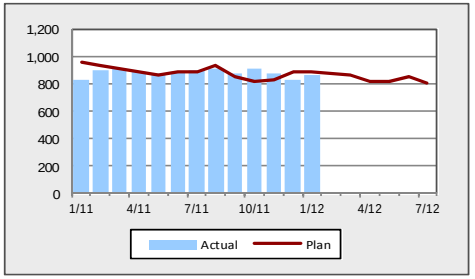
MR on Contract



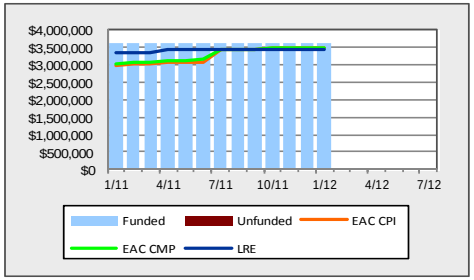
Burn Rate



Staffing (Prime)



Estimates



AIR 4.2 Assessment

Schedule & Cost Performance

Cumulative and Current Cost and Schedule Variances degraded this period. The contributors for the current period unfavorable Schedule Variance are concentrated in the areas of Fuselage and Rotors. The current period CV is driven by Program Management and Propulsion (Non Engines). The Current Execution Index continues to degrade which could lead to future cost/schedule impacts if not corrected. The cost increases in these areas also contributed to LRE cost growth. The January Estimate-at Completion (EAC) increased by $4.6M, net of an increase in Budget-at-Completion (BAC).

Management System

The Management System Rating remains red primarily driven by a DCMA level three Concern Area Report (CAR). There continues to be concern with the IMS including CDRLs driving the critical path to program completion and the appropriateness of the Risk Mitigation tasks.

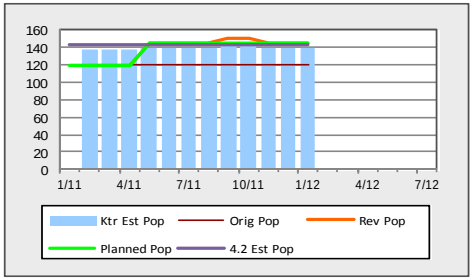
Upcoming Reviews

An Integrated Baseline Review and a Schedule Risk Analysis is scheduled for March 5-9, 2012.

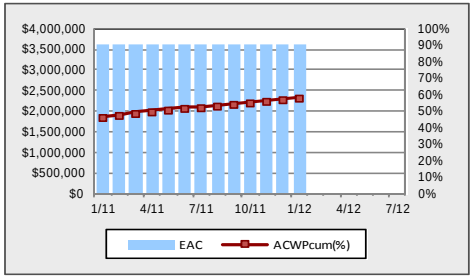
AIR-4.2 Recommendation

Discuss the schedule margin and potential methodologies for using it appropriately in the IMS; Begin preparing for SRA/IBR; Continue working with Contractor and DCMA to close out all open CARs.

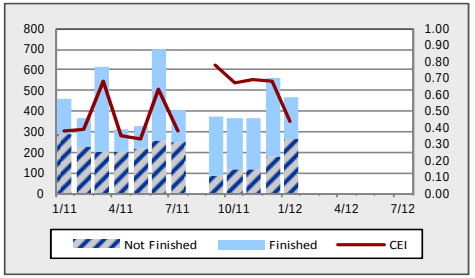
Schedule Growth (Cum. Months)



Mtigation Opportunity



Current Execution



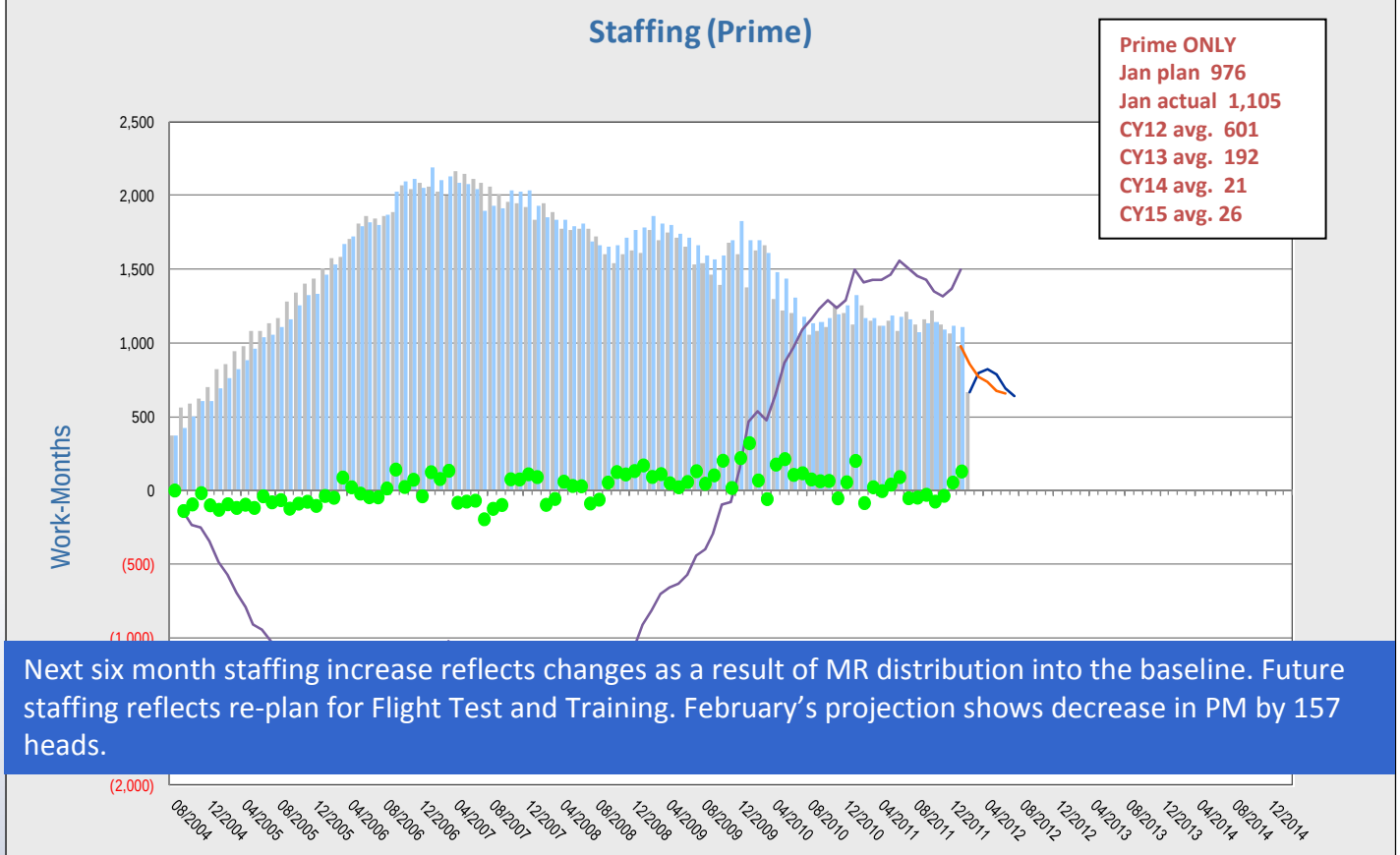
Contract Profile

Vendor	Vendor			PMA	PMA
Contract	Contract	Org Award	$3,052,184	Current	$3,056,657
Type	CPIF	Category	I	Total OTB	1
Start Date	1/3/2006	Last Award Fee	9/30/2010	Last OTB	8/1/2011
Est End Date	2/15/2018	Next Award Fee	9/30/2011	Next OTB	NA

Leading Indicators

Staffing

Project B
January 2012 ($ in K)

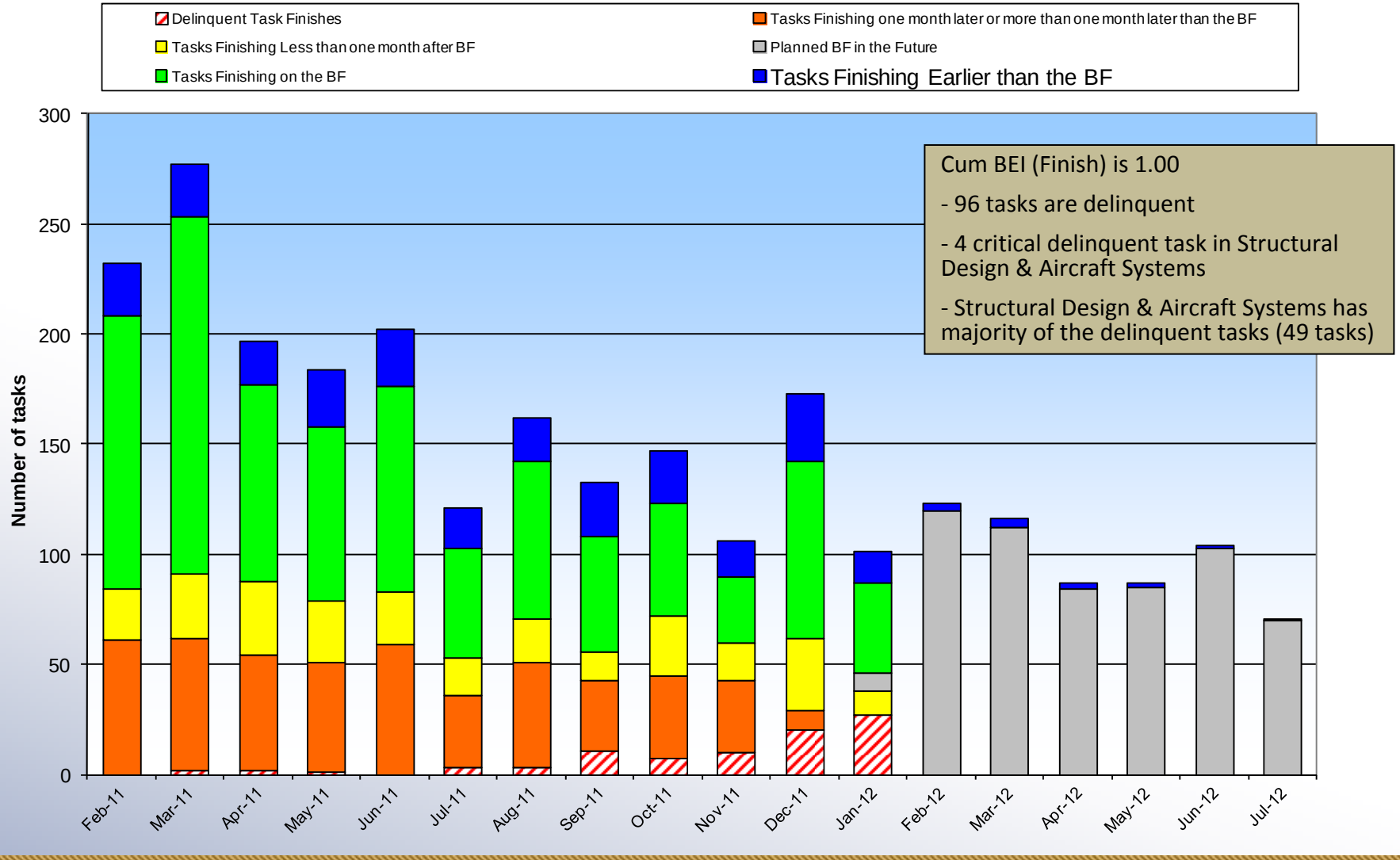


Next six month staffing increase reflects changes as a result of MR distribution into the baseline. Future staffing reflects re-plan for Flight Test and Training. February's projection shows decrease in PM by 157 heads.

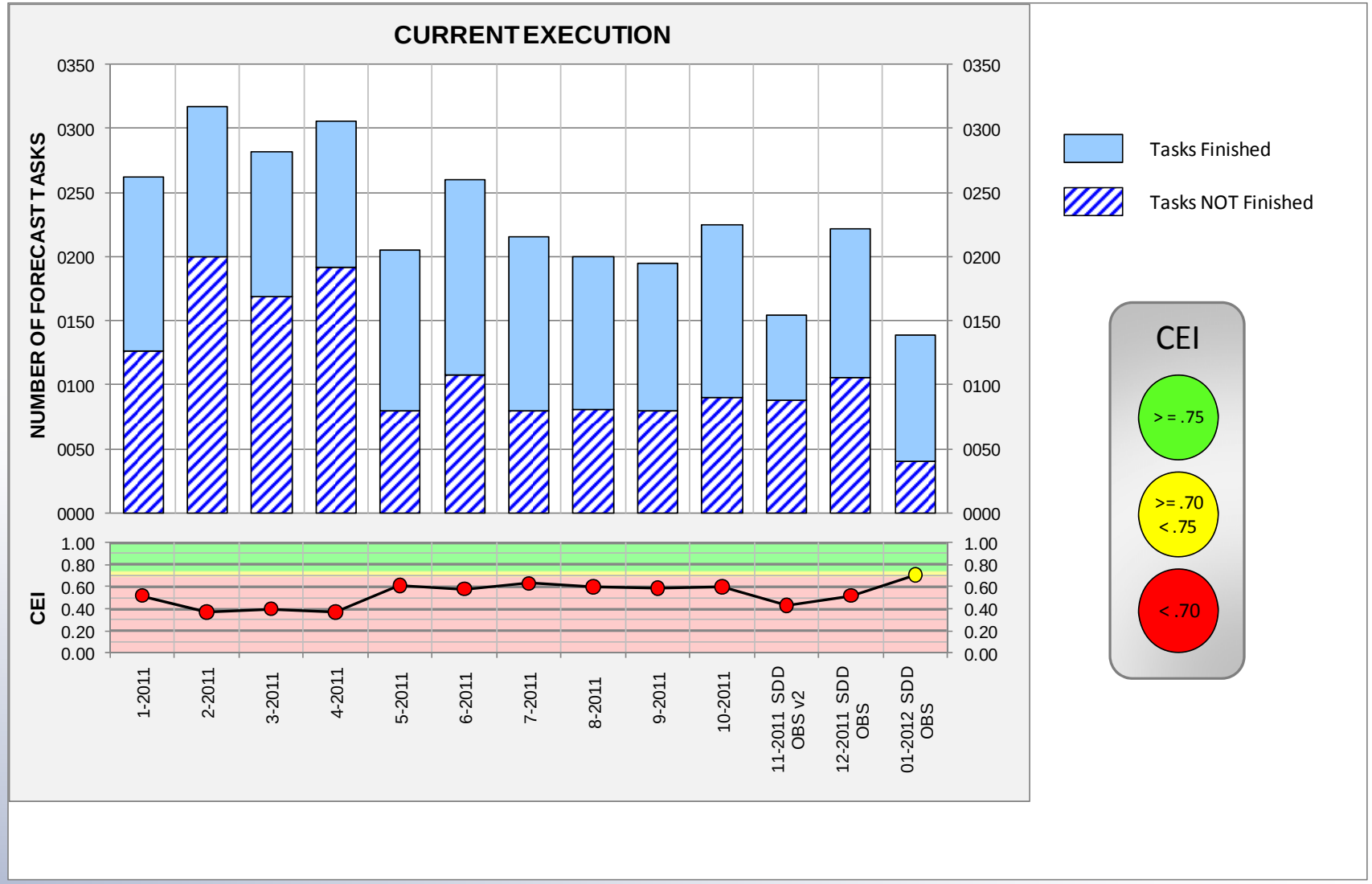
Next 6 Months Average (Plan):	734.00	Last 6 Months Average(Actuals):	1112.00
Adjustment to Reach 6 Mon.Avg:	(0.34)	Cumulative Over(Under)Staffing:	1501.00
		Potential Months Ahead(Behind)	1.35

Baseline Execution

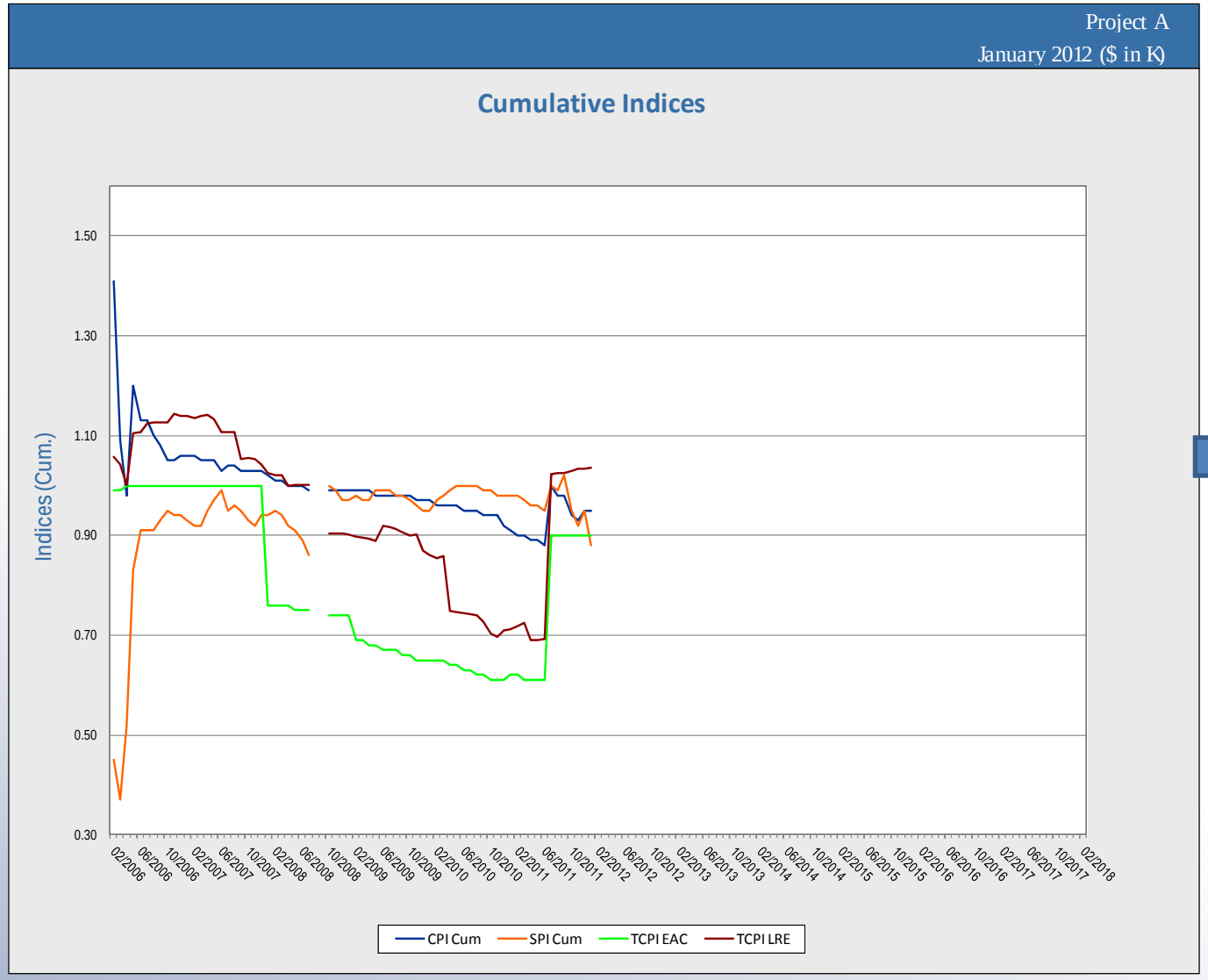
Baseline Execution



Current Execution



Past Performance Trends



Past performance trends CAN be a leading indicator of future performance

Contract Heat Matrix

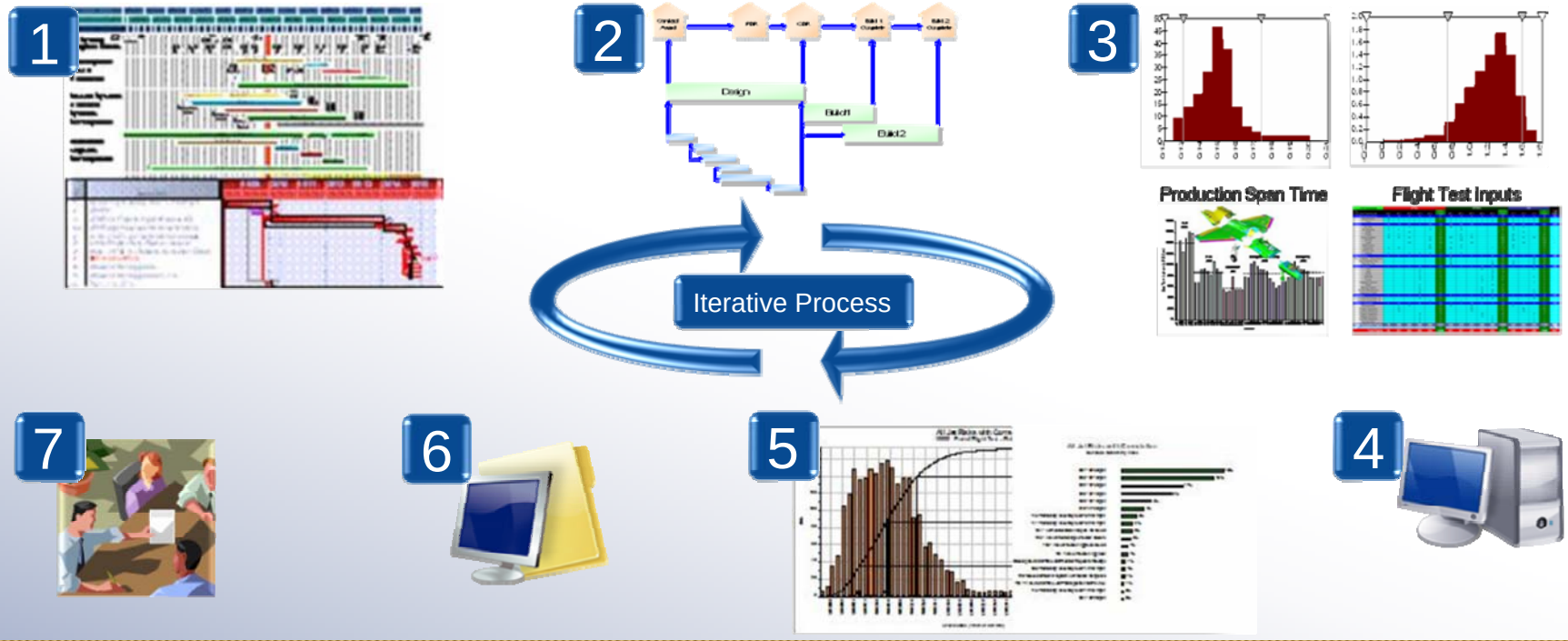
		WORK REMAINING			COST				SCHEDULE							
		% Complete	BCWR	ETC	VAC %	CV %	CPI	TCPI (KTR)	BE Starts	BE Finishes	DurG	SPI	CEI Starts	Volatility Starts	CEI Finishes	Volatility Finish
WBS 1	SD & AS Summary	98.37%	337	387	-28.11%	-28.33%	0.779	0.871	#N/A	#N/A	#N/A	1.000	#N/A	#N/A	#N/A	#N/A
WBS 2	Airframe IPT	92.91%	131,516	130,427	-2.04%	-2.26%	0.978	1.008	1.001	0.997	1.264	0.997	0.350	0.850	0.520	0.800
WBS 3	Ground Test	81.03%	33,505	33,432	-5.81%	-7.22%	0.933	1.002	1.002	0.994	1.473	0.999	0.820	0.410	0.480	1.190
WBS 4	Interiors	87.24%	7,334	7,429	-2.09%	-2.20%	0.978	0.987	1.000	0.998	1.156	1.002	0.000	0.670	0.000	1.000
WBS 5	Mechanical Systems	89.26%	31,116	30,605	-0.75%	-1.04%	0.990	1.017	0.998	0.994	1.117	0.944	0.150	1.220	0.800	0.800
WBS 6	Wiring	93.20%	5,606	5,423	-7.99%	-8.82%	0.919	1.034	0.999	0.999	1.024	0.995	0.000	0.760	0.600	0.400
WBS 7	MS Summary Level Data	91.97%	187	198	3.91%	4.76%	1.050	0.944	#N/A	#N/A	#N/A	1.000	#N/A	#N/A	#N/A	#N/A
WBS 8	Sensors	93.45%	18,648	19,812	-8.06%	-8.18%	0.924	0.941	1.000	0.999	0.824	1.005	#N/A	#N/A	0.000	2.000
WBS 9	MCDS	97.13%	12,312	12,340	4.93%	5.08%	1.053	0.998	1.000	1.001	1.091	1.005	0.670	0.000	1.000	0.070
WBS 10	Communications/IBI	88.52%	10,989	10,908	5.78%	6.44%	1.069	1.007	1.000	0.999	1.006	1.019	#N/A	#N/A	0.860	0.430
WBS 11	Integration & Test	94.26%	14,460	12,320	1.89%	1.11%	1.011	1.174	1.000	1.000	1.165	0.998	0.620	0.380	0.910	0.270
WBS 12	Acoustics	97.81%	1,791	1,931	-23.35%	-23.70%	0.808	0.927	0.966	0.971	0.701	0.997	0.080	0.830	0.500	0.930
WBS 13	Flight Avionics	92.64%	10,259	9,867	-10.97%	-12.15%	0.892	1.040	0.997	0.996	1.079	0.982	0.290	0.710	0.900	0.200
WBS 14	Armament & SMS	82.44%	16,662	16,897	-1.69%	-1.75%	0.983	0.986	0.997	0.977	1.507	0.913	0.670	0.330	0.430	0.570

- Provides analysts and the PMA a tool to visually assess cost/schedule performance
- Instills ownership and accountability at the IPT level
- Provides the ability to analyze possible systemic issues (i.e.- unrealistic LREs)

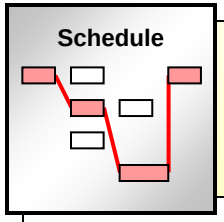
Schedule Risk Assessment (SRA)

What is an SRA?

- A Schedule Risk Assessment (SRA) is a process which uses statistical techniques to identify technical and programmatic risk in a program and quantifies the impact of those risks on the program's schedule.

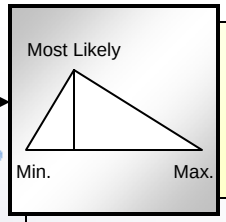


SRA 7-Step Process



1. **Develop a complete critical path network and prepare for SRA.**

2. **Identify critical milestones for risk quantification.**

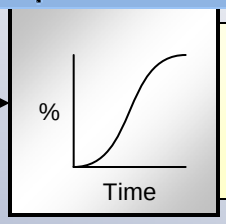


3. **Enter risk parameters.**

   (Contractor CAM's responsibility, IPT validation)

4. **Run schedule simulation & quantify impact of risk on schedule.**

Incorporate into Risk Management Processes

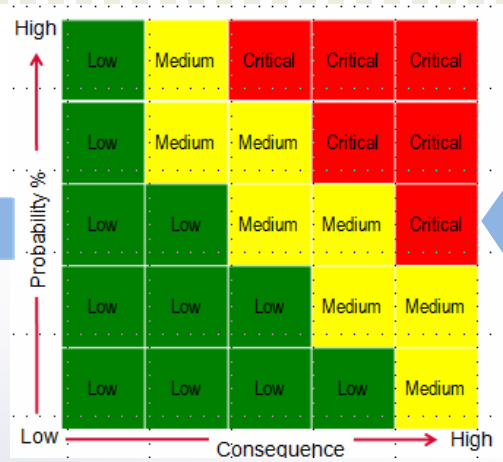


5. **Analyze schedule results.**

The final process steps involve the schedule analyst preparing a report and presenting an SRA position.

6. **Document results.**

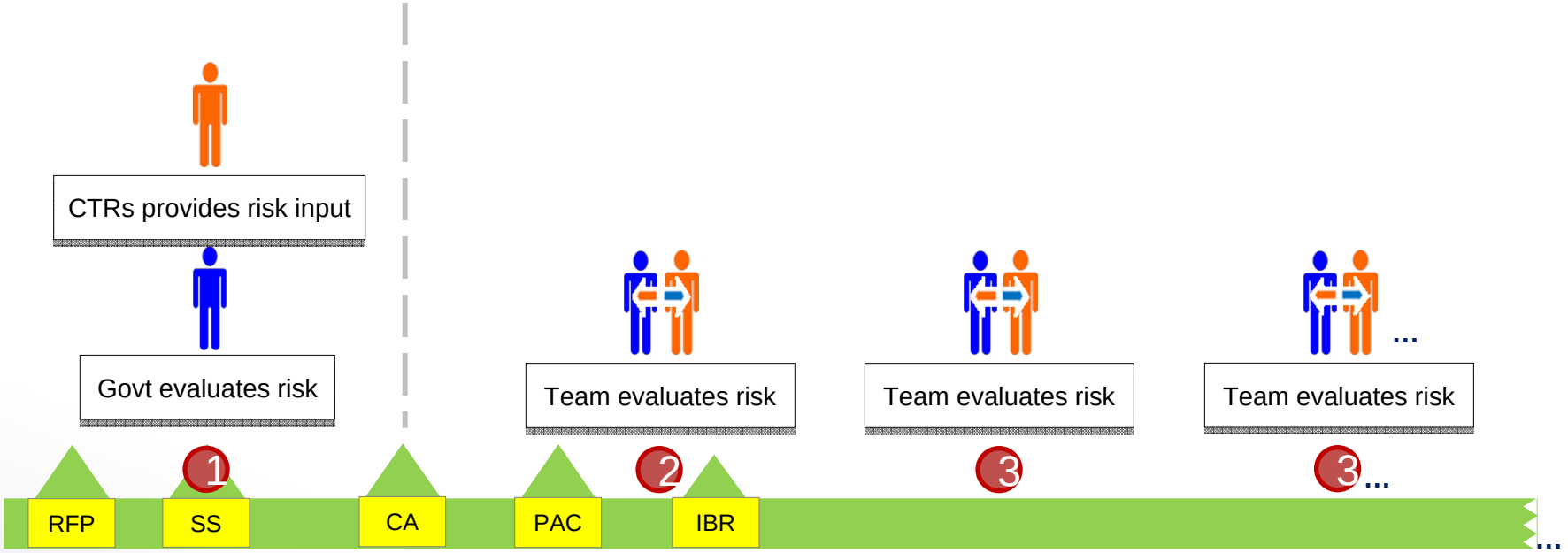
7. **Present position to program office. IPT's develop risk mitigating actions.**



Why is a SRA Useful?

- Existing Program Integrated Master Schedule (IMS) represents forecasts of BASELINE PLAN
- SRA identifies and quantifies where RISKS OR OPPORTUNITIES CAN BE REALIZED
- The SRA results WILL NOT force changes to the schedule; it will only help isolate areas that should be addressed by management and technical leads to lessen the impact of risk on the schedule

When are SRAs Conducted?



1. **Source Selection SRA**
- Pre-Solicitation evaluation
- Section L instructs CTR data provision
- Govt IPT teams evaluate risk
- Completed during Source Selection
- Output: Risk identification and Engineering Notices (ENs) provided to CTR

2. SRA during IBR process
- Program execution evaluation
- IMS DI-MGMT-81650 CDRL directs
- CTR & Govt IPT teams evaluate risk
- Completed post Management System Assessment (MSA) and before IBR
- Output: Risk mitigation actions

3. Recurring SRAs
- Program execution evaluation
- IMS DI-MGMT-81650 CDRL directs
- CTR & Govt IPT teams evaluate risk
- Recurring per CDRL through contract completion (e.g., semi-annual)
- Output: Risk mitigation actions

Who Participates in the SRA?

- SRA Preparation
  - Program Leadership
    - Govt and Contractor define SRA milestones and develop key assumptions
  - Contractor CAMs
    - Understand Process
    - Develop Risk Inputs
    - Document Assumptions
  - Government IPT/Engineers
    - Review and Validate Contractor Assumptions
  - Schedule Analyst Support
    - Gov't and Contractor prepare schedule, facilitate process

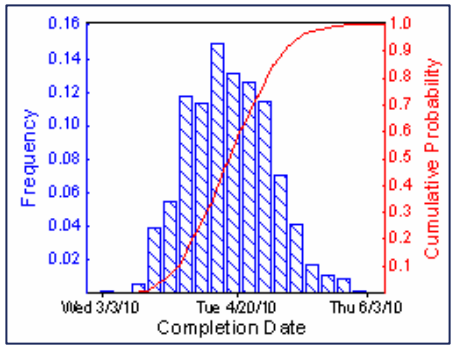
- SRA Event
  - Lead Program Engineer
    - Gov't Class Desk
    - "Calibrate" risk inputs
  - Contractor CAMs & Gov't IPTs
    - Review Critical/Driving Paths
    - Discuss any Discrepancies
    - Come to a consensus
  - Schedule Analyst Support
    - Document discussion
    - Finalize risk inputs
    - Run Simulation

SRA Preparation | SRA Event

What are the outputs of an SRA?

Risk Histogram

Provides the probability of a milestone occurring on or before an associated date if no mitigation was taken



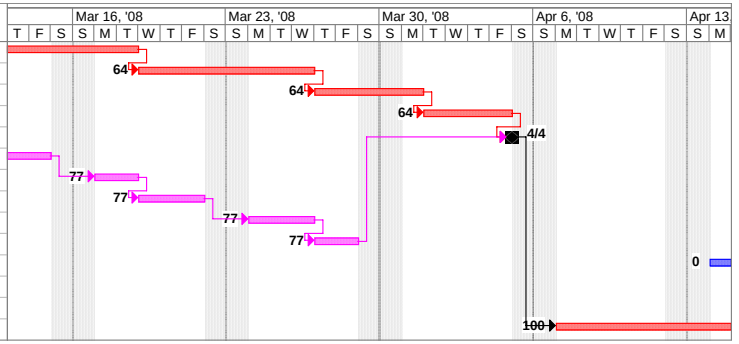
Completion Probability Table

Prob	Date	Prob	Date
0.05	Thu 3/25/10	0.55	Wed 4/21/10
0.10	Tue 3/30/10	0.60	Thu 4/22/10
0.15	Thu 4/1/10	0.65	Mon 4/26/10
0.20	Tue 4/6/10	0.70	Tue 4/27/10
0.25	Thu 4/8/10	0.75	Thu 4/29/10
0.30	Fri 4/9/10	0.80	Fri 4/30/10
0.35	Tue 4/13/10	0.85	Tue 5/4/10
0.40	Wed 4/14/10	0.90	Fri 5/7/10
0.45	Fri 4/16/10	0.95	Thu 5/13/10
0.50	Mon 4/19/10	1.00	Thu 6/3/10

Criticality Index

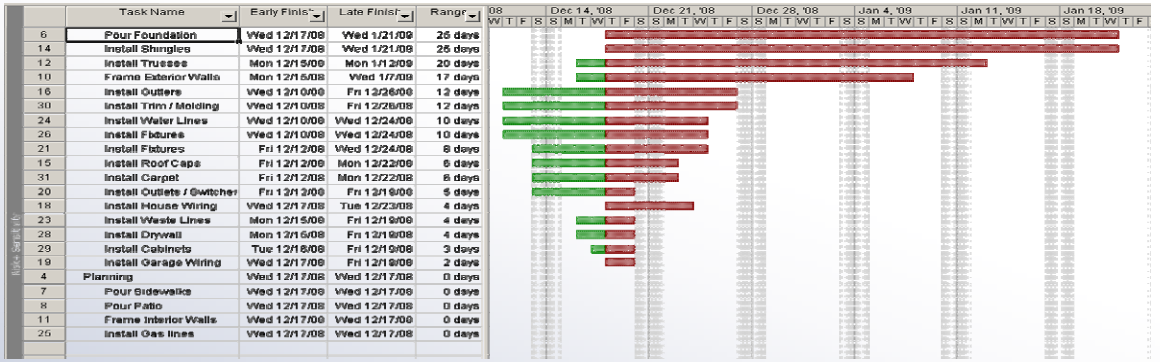
Percentage of times that task appeared on the driving and/or critical path after risk was introduced

ID	Task Name	Total Slack	Critical	% Critical	Risk Critical
1	A	0 days	Yes	64	No
2	B	0 days	Yes	64	No
3	C	0 days	Yes	64	No
4	D	0 days	Yes	64	No
5	MS	0 days	Yes	100	No
6	E	5 days	No	77	Yes
7	F	5 days	No	77	Yes
8	G	5 days	No	77	Yes
9	H	5 days	No	77	Yes
10	J	5 days	No	77	Yes
11	K	248 days	No	0	No
12	L	248 days	No	0	No
13	M	248 days	No	0	No
14	Dummy	0 days	Yes	100	No



Sensitivity Analysis

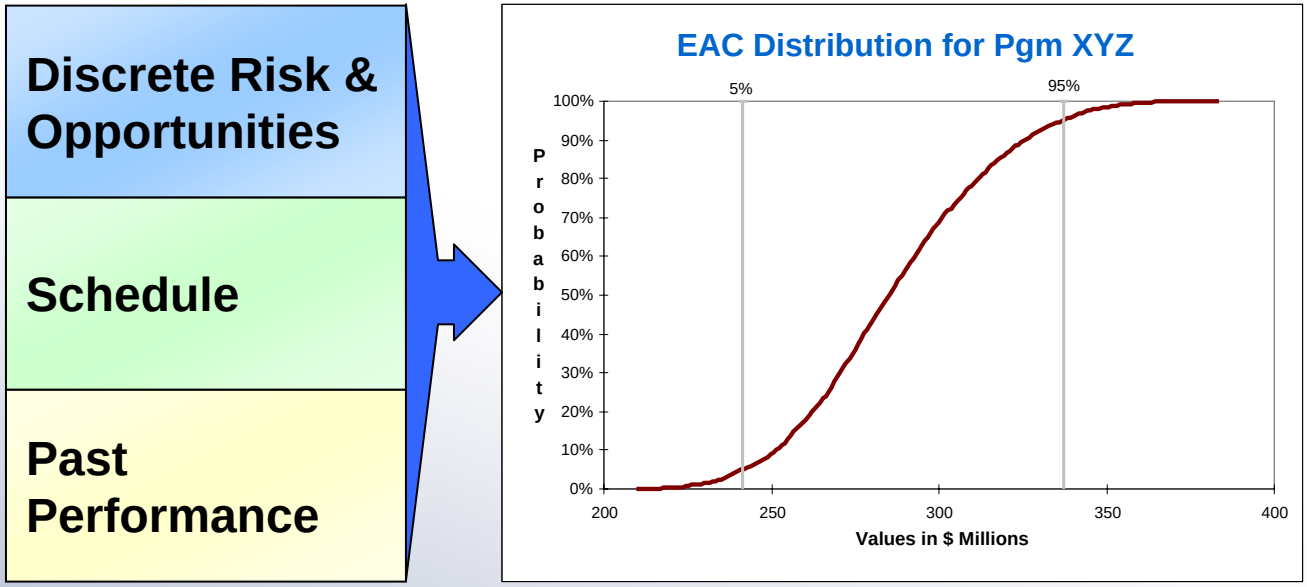
Determines each tasks' impact on the end date if the minimum (optimistic) or the maximum (pessimistic) durations come true



Estimate at Completion (EAC)

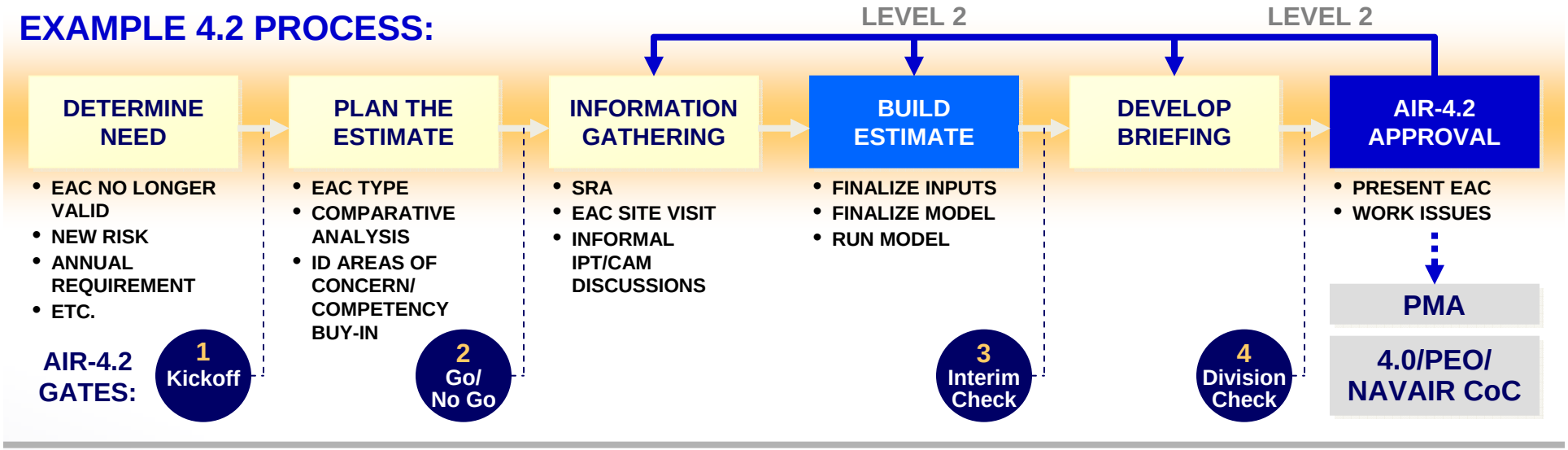
What is an EAC?

- An Estimate at Completion (EAC) is an estimate of the final cost at completion of a product being developed and/or produced
- Actuals (ACWP) + Estimate to Complete (ETC) = EAC

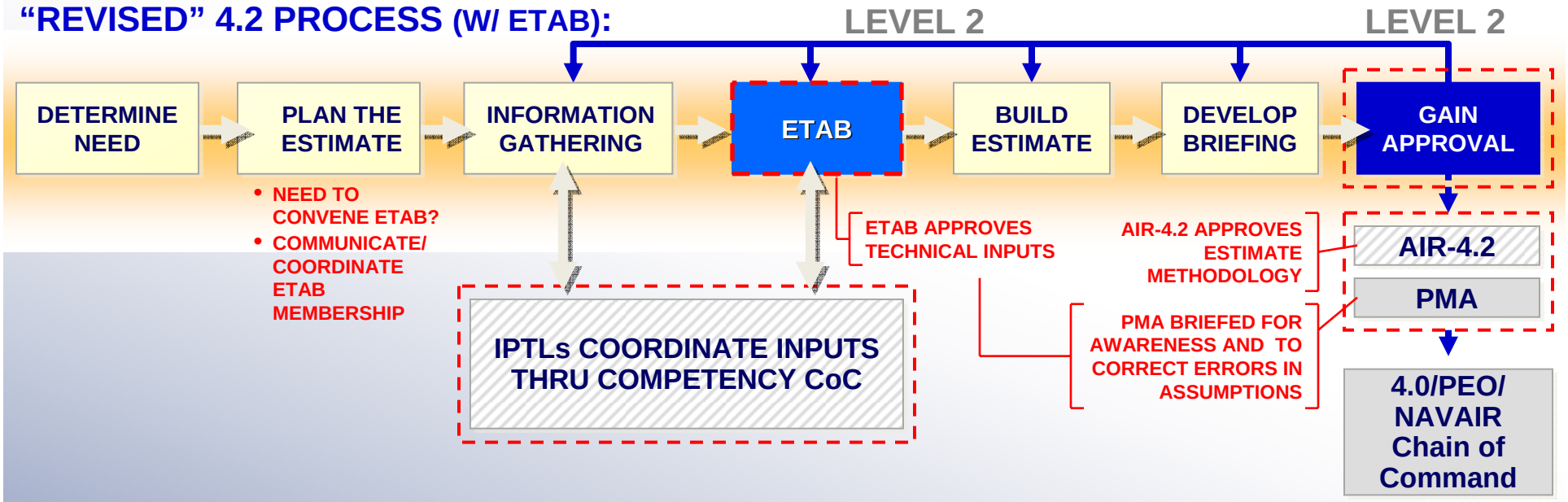


EAC Process

EXAMPLE 4.2 PROCESS:



"REVISED" 4.2 PROCESS (W/ ETAB):



Why is an EAC Useful?

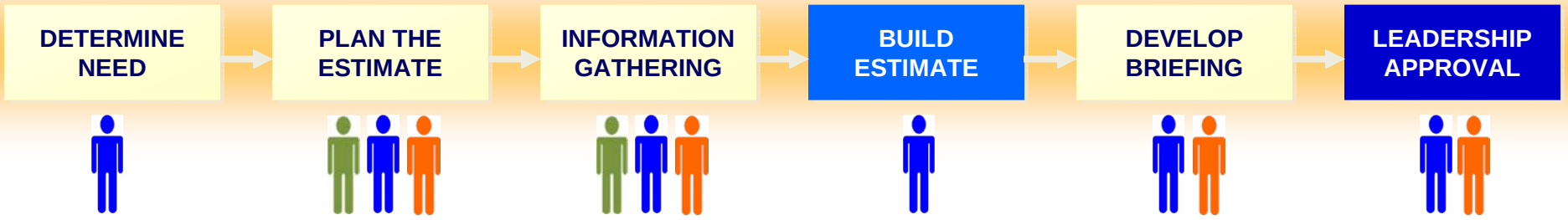
- An EAC helps to *quantify risk* for Program Management (PM) and to evaluate potential impacts if the current path is not changed
- Provides PM with what they *need to hear*, not necessarily what they want to hear
- Provides *knowledge* of the cost, schedule, and technical information for the Integrated Product Teams (IPTs)
- Helps to stress the importance of *accountability* and ownership
- Supports the budget submissions

Timely risk assessment provides program managers and other senior managers the information they need to **change** the current course of action

When is an EAC Conducted?

- Significant or trending contract cost and/or schedule indicators
- Significant risk items identified
- Program schedule no longer attainable
- Contract modifications
- Support program reviews or events
- Annual or following contractor update

Who Participates in the EAC?



Analyst

- EAC need
- POA&M development
- Comparative Analysis
- Focus Areas
- Ground Rules
- Model Build
- SRA incorporation
- MR and Rates estimation
- Obtain three-point estimates
- Cost Risk Analysis
- Time phase the estimate
- Developing the slides

Technical/Mgmt

- Concurrence with POA&M
- Interview Preparation
- Provide three-point estimates
- Provide backup technical data
- Mitigation steps for risk areas

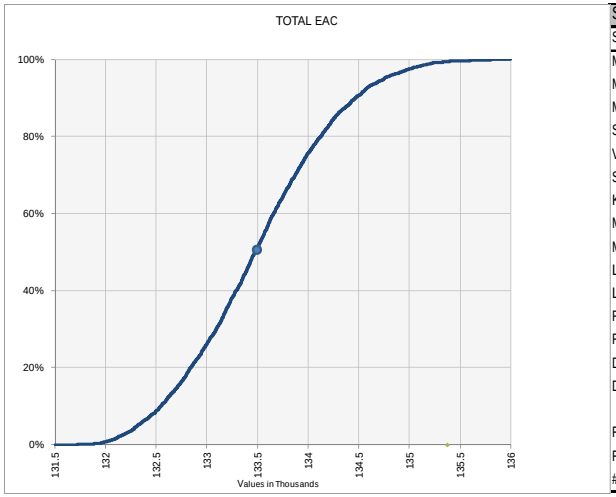
Contractor

- Data requests for EAC
- Possible Interviews with three point estimates and rationale

What are the outputs of an EAC?

Cumulative Distribution Function (S-Curve)

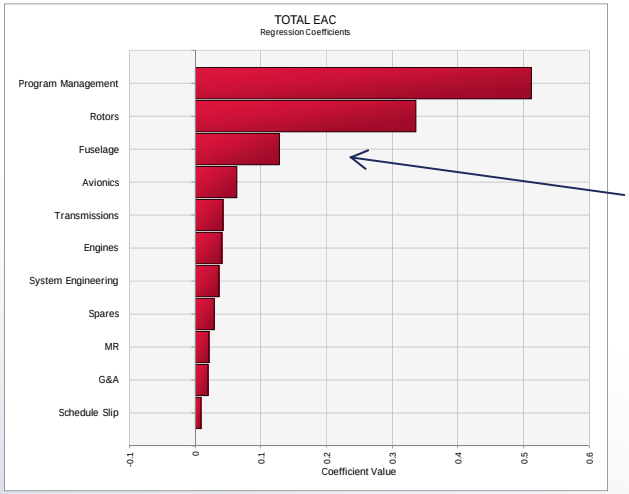
Denotes the range of the cost to complete a given effort, along with the associated cumulative probability



Summary Statistics for TOTAL EAC			
Statistics		Percentile	
Minimum	$ 131,649.44	5%	$ 132,316.34
Maximum	$ 135,954.26	10%	$ 132,548.03
Mean	$ 133,498.85	15%	$ 132,710.40
Std Dev	$ 729.44	20%	$ 132,839.37
Variance	532077.3678	25%	$ 132,970.55
Skewness	0.205279703	30%	$ 133,094.74
Kurtosis	2.712335654	35%	$ 133,190.44
Median	$ 133,481.35	40%	$ 133,291.11
Mode	$ 133,345.63	45%	$ 133,391.47
Left X	$ 132,316.34	50%	$ 133,481.35
Left P	5%	55%	$ 133,571.12
Right X	$ 134,751.31	60%	$ 133,660.88
Right P	95%	65%	$ 133,763.71
Diff X	$ 2,434.97	70%	$ 133,874.38
Diff P	90%	75%	$ 133,985.89
		80%	$ 134,128.95
Filter Min	Off	85%	$ 134,266.54
Filter Max	Off	90%	$ 134,470.53
#Filtered	0	95%	$ 134,751.31

Uncertainty Analysis (Tornado Chart)

Identifies those inputs that contribute the most to an output's variability during the Monte Carlo simulation



Provides the most opportunity of reducing potential cost growth if mitigating action is taken

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Questions