Earned Value (EV) & Program Execution: Helping Program Managers Navigate Competing Goals

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Agenda

- Overview & Objectives
- Tactics for Maximizing SPI & CPI
- Tactics for Guiding Program Execution
- Summary

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Overview & Learning Objectives

- Maximizing EV is often a very high priority for Program Managers. Meeting contractual commitments is also a very high priority for Program Managers. How can these potentially conflicting priorities be reconciled to satisfy both objectives? This session will explain how to do just that.

- In our role as Finance Analysts and Program Schedulers we have the power to guide program execution by effectively communicating the right information to our Program Leadership. How we choose to present that information is also very important.

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Introduction: Competing Objectives

- Objective #1 –The PM and Control Account Managers (CAMs) want to maximize the Schedule Performance Index (SPI) and Cost Performance Index (CPI) in addition to satisfying contractual commitments.

- Objective #2 – The Program Manager (PM) wants to satisfy contractual commitments, likely as soon, and as inexpensively as possible, in addition to performing well on Earned Value measures of performance.

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Tactics for Satisfying Objective #1 – Maximize SPI & CPI

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EV Last Call; As the end of the fiscal month approaches . . .

- Goal is to communicate to each CAM what Earned Value they are potentially going to forfeit if they fail to start/finish certain tasks on time – with that time being before the fiscal accounting period closes.
- Write a filter for Baseline Start ≤ Status Date, AND %CP = 0%
- Sort by Baseline Work, Descending Order
- Can group by CAM, if desired.
- Similarly: Baseline Finish ≤ Status Date, AND %CP ≠ 100%

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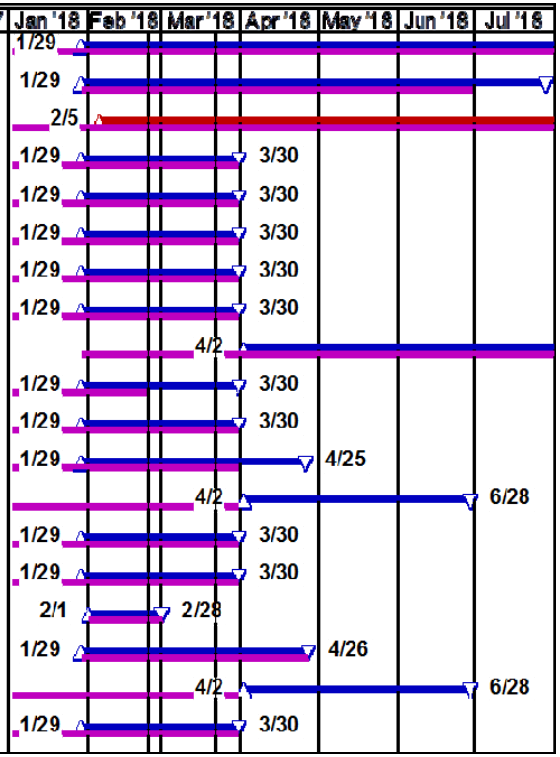
Message to CAMS: If possible, please Start these tasks by 2/23/18 (the last day in the fiscal period)

These are the unopened (0% complete), Work Pkgs that had Baseline Start dates on or before 2/23/18, sorted by the number of hours in each task.

These budgeted hours represent potential EV, if the task can be started by the end of the month.

ID	CAM	EVT	Name	Baseline Work	Baseline Start	Start
718	Greg H	%CP	task name	1,949 h	1/2/18	1/29/18
582	Doug G	%CP	task name	1,473 h	1/29/18	1/29/18
736	Greg H	%CP	task name	1,216 h	1/2/18	2/5/18
320	Matt S	%CP	task name	1,022 h	1/2/18	1/29/18
325	Matt S	%CP	task name	885 h	1/2/18	1/29/18
332	Matt S	%CP	task name	812 h	1/2/18	1/29/18
339	Matt S	%CP	task name	621 h	1/2/18	1/29/18
316	Matt S	%CP	task name	331 h	1/2/18	1/29/18
658	Mark W	%CP	task name	305 h	1/29/18	4/2/18
313	Matt S	%CP	task name	293 h	1/2/18	1/29/18
425	Nick N	%CP	task name	240 h	1/2/18	1/29/18
255	Nick N	%CP	task name	180 h	1/2/18	1/29/18
592	Doug G	%CP	task name	176 h	1/2/18	4/2/18
543	Stu L	%CP	task name	100 h	1/2/18	1/29/18
557	Stu L	%CP	task name	100 h	1/2/18	1/29/18
392	Nick N	0-100	task name	96 h	2/1/18	2/1/18
602	Doug G	%CP	task name	80 h	1/29/18	1/29/18
605	Doug G	%CP	task name	74 h	1/2/18	4/2/18
411	Nick					1/29/18



What about 0-100 EVT tasks?

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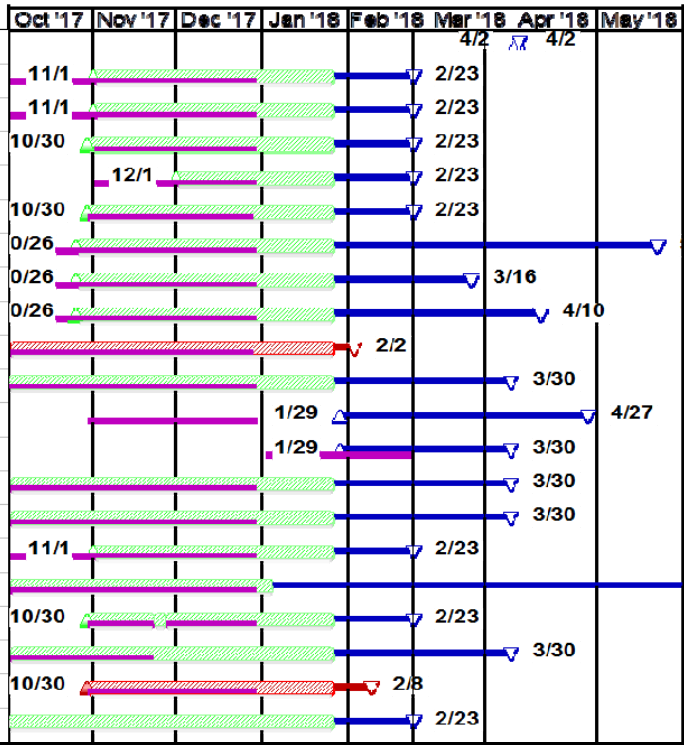
Message to CAMS: If possible, please Finish these tasks by 2/23/18 (the last day in the fiscal period)

These are the unfinished Work Pkgs that had Baseline Finish dates on or before 2/23/18, sorted by the number of hours in each task.

These budgeted hours represent unclaimed EV, if the task is not finished by the end of the month.

ID	CAM	EVT	Name	Baseline Work	Baseline Finish	Finish
2134	Elise F.	PP	task name	2,428 h	3/6/17	4/2/18
1243	Vickie F.	%CP	task name	1,755.92 h	12/29/17	2/23/18
1252	Vickie F.	%CP	task name	1,701.35 h	12/29/17	2/23/18
2110	Kyle C.	%CP	task name	1,432 h	12/29/17	2/23/18
2113	Kyle C.	%CP	task name	1,071 h	12/29/17	2/23/18
1151	Kyle C.	UD%	task name	1,006 h	12/28/17	2/23/18
1149	Kyle C.	%CP	task name	888 h	12/29/17	5/22/18
1147	Kyle C.	%CP	task name	697 h	12/29/17	3/16/18
1148	Kyle C.	%CP	task name	661 h	12/29/17	4/10/18
311	Matt S.	%CP	task name	641 h	12/28/17	2/2/18
605	Kyle C.	LOE	task name	450 h	12/29/17	3/30/18
1176	Mark V.	%CP	task name	301 h	12/29/17	4/27/18
313	Matt S.	%CP	task name	293 h	2/22/18	3/30/18
591	Doug G.	%CP	task name	293 h	12/29/17	3/30/18
604	Doug G.	%CP	task name	293 h	12/29/17	3/30/18
1266	Vickie F.	%CP	task name	216.57 h	12/29/17	2/23/18
403	Nick N.	LOE	task name	151 h	12/29/17	6/4/18
1164	Mark V.	%CP	task name	140.03 h	12/29/17	2/23/18
734	Keith K.	UD%	task name	140 h	11/22/17	3/30/18
1203	Kyle C.	%CP	task name	132 h	12/29/17	2/8/18
812	Vickie F.	LOE	task name	128 h	9/29/17	2/23/18



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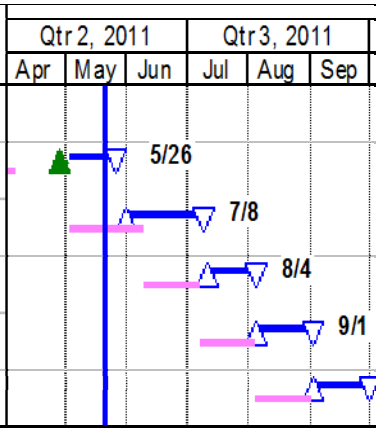
Analyze Schedule Data to help CAMs Baseline Wisely

ID	Baseline Work	Total Slack	Task Name	Baseline Start	Baseline Finish
1198	**744h**	**59d**	**NB control FPGA**	**4/21/11**	**8/31/11**
1199	56h	59d	NB control FPGA Spec	3/28/11	4/5/11
1200	200h	59d	NB control FPGA Coding	5/2/11	6/8/11
1201	168h	59d	NB control FPGA Coding	6/9/11	7/6/11
1202	160h	59d	NB control FPGA Verification	7/7/11	8/3/11
1203	160h	59d	NB control FPGA Lab test	8/4/11	8/31/11



During the base-lining process (e.g., initial, rolling wave) are there tasks that have sufficient Total Slack so as to render them candidates to have baselines set later than originally notionally planned?

Once baselined, have there been contract modifications that make re-baselining an option?

Must ensure new dates are supporting a contractually compliant baseline, and changes adhere to an approved System Description Document.

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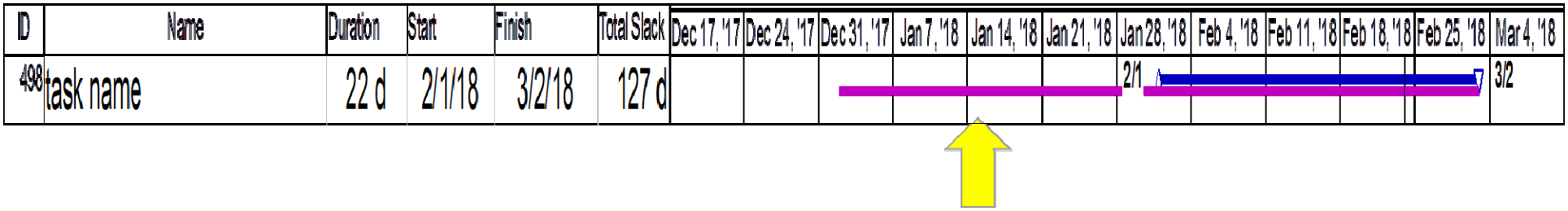
Tasks Sliding off of their Baseline – Variance, Total Slack (TS), and Forecasted Finish Date



Question: Is this task late?

Answer: It depends.

- Yes, to its Baseline Start.
- No, assuming proper logic, delay to Start Date will not impact program execution. Note both the Total Slack on this task, as well as the fact that the projected Finish Date remains equal to the Baseline Finish Date.

Legend:

Fuchsia is baseline

Blue is forecast

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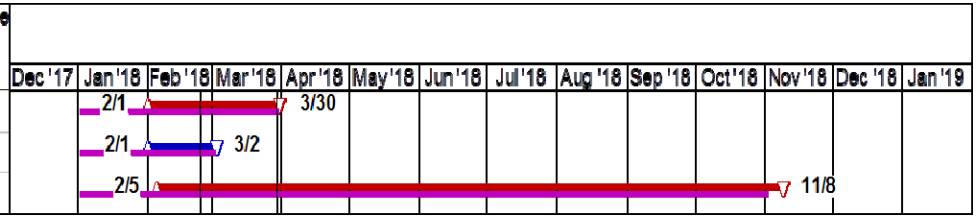
Tasks Sliding off of their Baseline – Variance vs. Total Slack

ID	Unique ID	Total Slack	Name	% Comple	Baseline Start	Start	Start Variance
497	5755	0 d	task name	0%	1/2/18	2/1/18	22 d
498	5758	127 d	task name	0%	1/2/18	2/1/18	22 d
736	4894	-5 d	task name	0%	1/2/18	2/5/18	24 d



All of these Start Variances are very similar: 22d, 22d, and 24d. That is, each task has failed to start, per it's Baseline Start Date, by 22 or 24 days.

But look at he Total Slack values - they vary wildly.

Educate your CAMs & PMs on what a Start/Finish Variance is, as well as Total Slack. The Start/Finish Variance = Start/Finish - Baseline Start/Finish (e.g., 22d = 2/1/18 – 1/2/18). The Total Slack is the amount of time a task's finish date can be delayed without delaying the project's finish date.

Legend:
Fuchsia is baseline
Blue is forecast
Red is critical forecast

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Durations – Helping the PM understand CAM Behavior

- The CAM establishes a Baseline Duration for each task based on his/her knowledge of the task, and their personal style.
- Once execution is underway each opened task will accrue elapsed duration days.
- The Duration Variance measures the difference between the Baseline Duration and the elapsed Duration. The variance can be positive (current Duration exceeds the Baseline Duration) or negative (current Duration is presently less than what was planned).
- Focus on positive Duration Variance for opened tasks: the CAM has already exceeded the Baseline Duration.

Note: What is Total Slack for these tasks? Was an Early Start taken? Variance might be perfectly fine.

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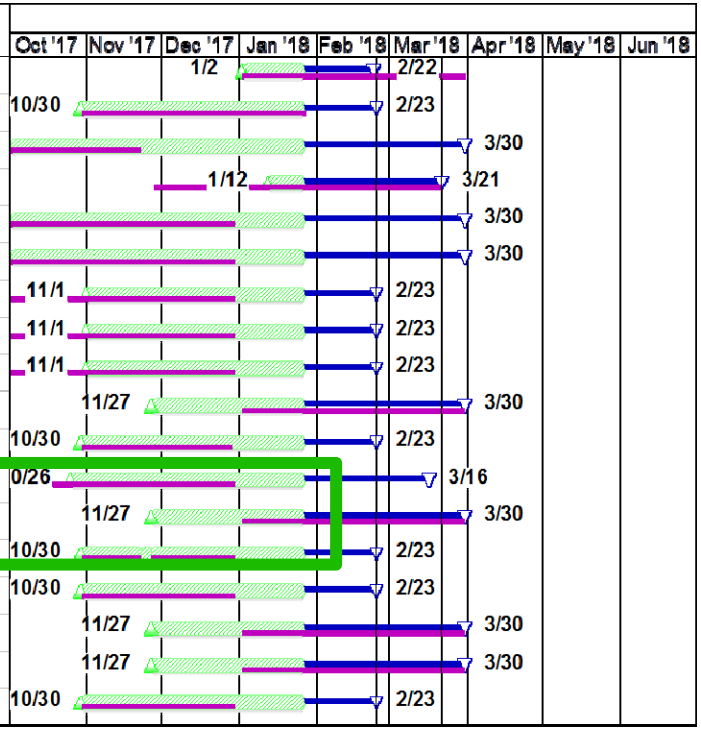
Baseline Duration vs. Duration: Actively Influence Schedule Realism

ID	CAM	Name	Baseline Duration	Duration	Duration Variance	% Complete
510	Stu L.	task name	64 d	38 d	-26 d	47%
343	Matt S.	task name	61 d	82 d	21 d	74%
734	Keith K.	task name	78 d	127 d	49 d	64%
585	Doug G.	task name	80 d	49 d	-31 d	20%
591	Doug G.	task name	63 d	127 d	64 d	64%
604	Doug G.	task name	63 d	127 d	64 d	64%
1243	Vickie F.	task name	41 d	80 d	39 d	74%
1252	Vickie F.	task name	63 d	80 d	17 d	74%
1288	Vickie F.	task name	41 d	80 d	39 d	74%
1189	Mark V.	task name	64 d	88 d	24 d	48%
1151	Kyle C.	task name			41 d	74%
1147	Kyle C.	task name			26 d	64%
1153	Kyle C.	task name			24 d	48%
1184	Mark V.	task name			39 d	74%
1182	Mark V.	task name	43 d	82 d	39 d	74%
1158	Kyle C.	task name	64 d	88 d	24 d	48%
1156	Kyle C.	task name	64 d	88 d	24 d	48%
1173	Kyle C.	task name	24 d	82 d	58 d	74%



Is this ok?
Early Start. . .

Base Lined Duration

Duration (so far!)

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Other Helpful EV Metrics

- SPI & CPI
  - Current Period, Inception to Date
  - Labor / Material / ODC Mix – Consider examining individually
  - Consider excluding LOEs from calculations
- To Complete Performance Index (TCPI)
- Current Execution Index (CEI)
- Earned Schedule
- Independent Estimated Completion Date

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Tactics for Satisfying Objective #2 - Guide Program Execution

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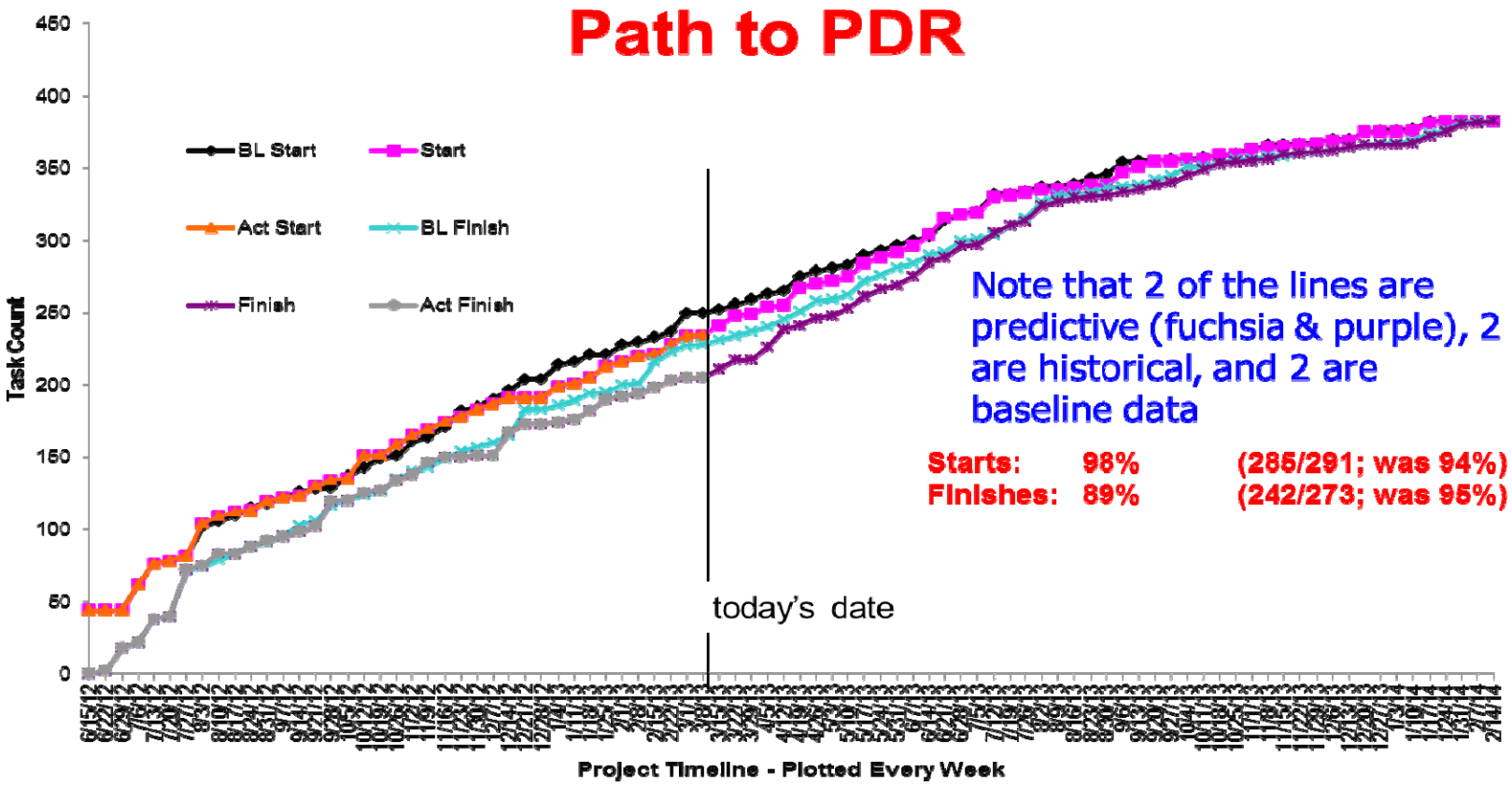
Progress to a Milestone – Work with the program team to identify relevant tasks within the IMS, and flag/filter accordingly.



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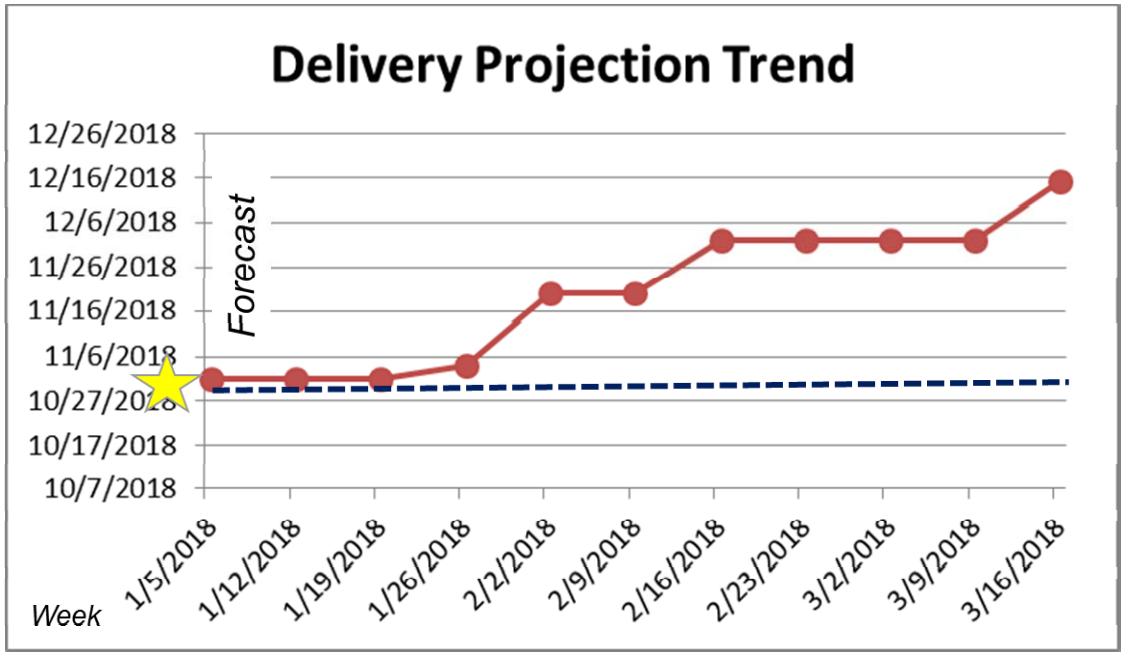
We'll Deliver When? Is that what we said last week? Last month?

Contractually Due: 11/1/18
Projection: 12/15/18

Total Slack: -31 days

Can easily plot growth/erosion of Schedule Margin as well.



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Critical Path Length Index (CPLI) – Probability of Executing to Plan

How Feasible is CP? CPLI = [(Critical Path + Total Float)/Critical Path]

Example:

Today's Date:	5/1/18
Delivery Projection:	12/15/18
CP Length =	160 working days
Total Float =	-31 days

CPLI = [(160+(-31))/160] = 0.81

> .95 = Green; < 0.95 is a trip wire indicating that the schedule is in jeopardy of not completing on time.

CPLI focuses exclusively on the tasks that have the power to accelerate, or delay, meeting the milestone on time. It is a measure of the efficiency required on remaining critical tasks to meet contract's end date.

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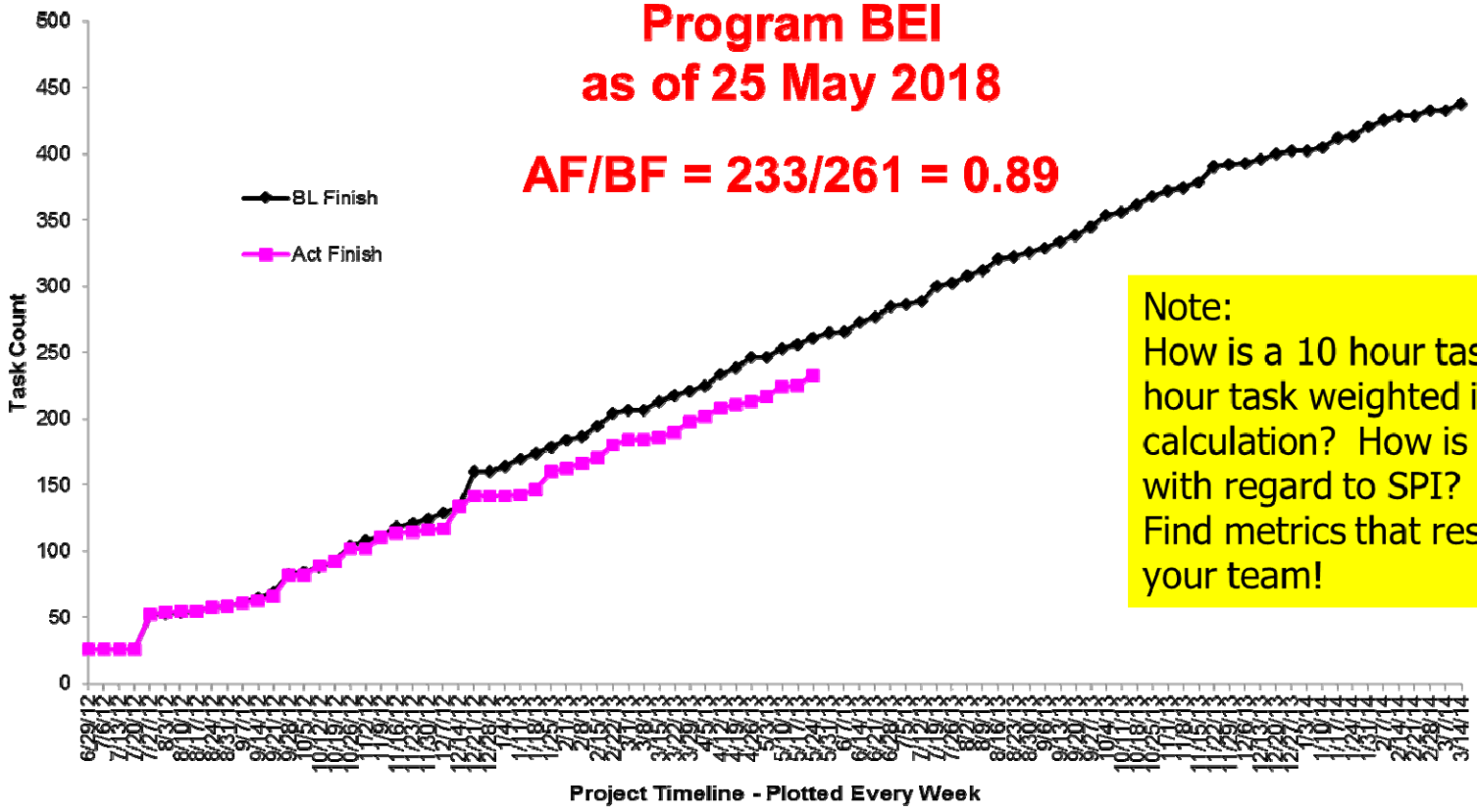
Baseline Execution Index (BEI) Trend



Note:
How is a 10 hour task vs. a 300 hour task weighted in the BEI calculation? How is it weighted with regard to SPI?
Find metrics that resonate with your team!

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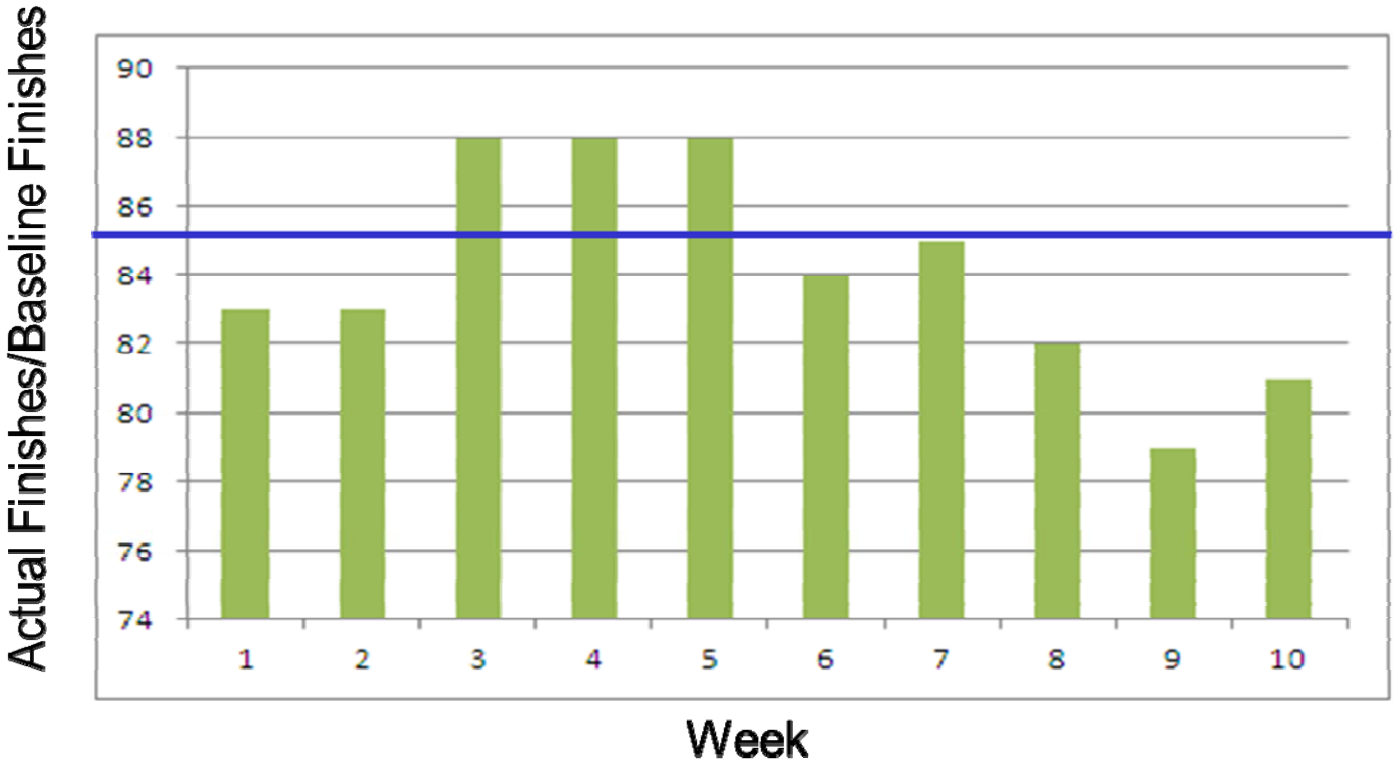
BEI: Keep the focus on finishes



85% =
DCMA tripwire;
BEI < 0.85 leads
to additional
reporting reqmts

Frequently easier to claim a task has started, vs. finished. Finishes are the exclusive focus of the BEI .

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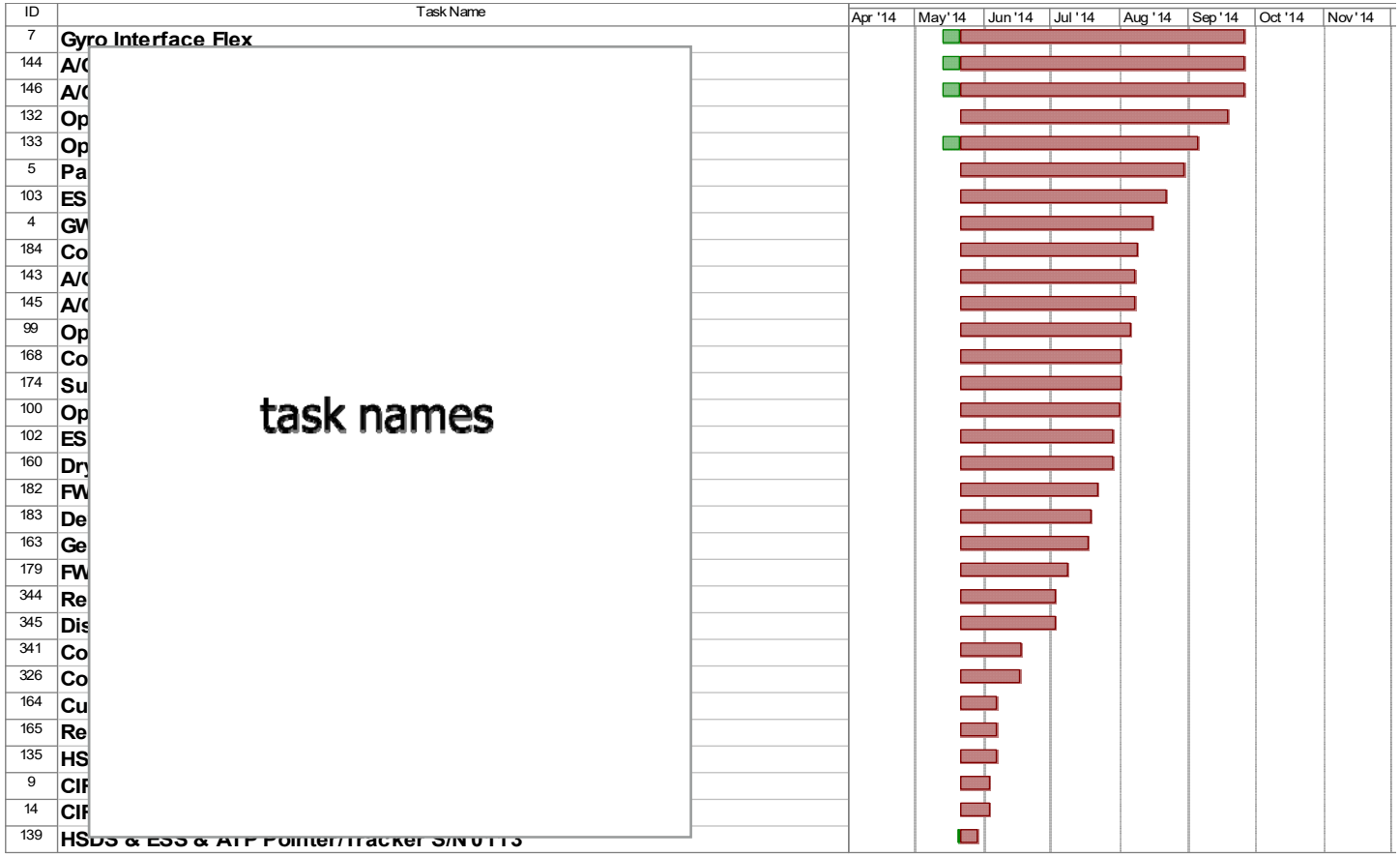
Tornado Chart (Sensitivity Analysis)



The red & green bars meet at the finish date which would occur if the task finished in it's most likely (vs. min or max) duration. → Indicates where risk mitigation efforts are likely to have the greatest impact.

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Driving/Critical Paths – Understanding the Primary, Secondary, Tertiary, etc. Values

- In mathematics, the **absolute value** or **modulus** |x| of a real number x is the non-negative value of x without regard to its sign.

- If a Driving Path has a Total Slack of +13, understanding that value is just the beginning. What is immediately behind that path?
  - TS of +12? (watch out!)
  - Or TS of +46? (focus on the +13 string of activities)

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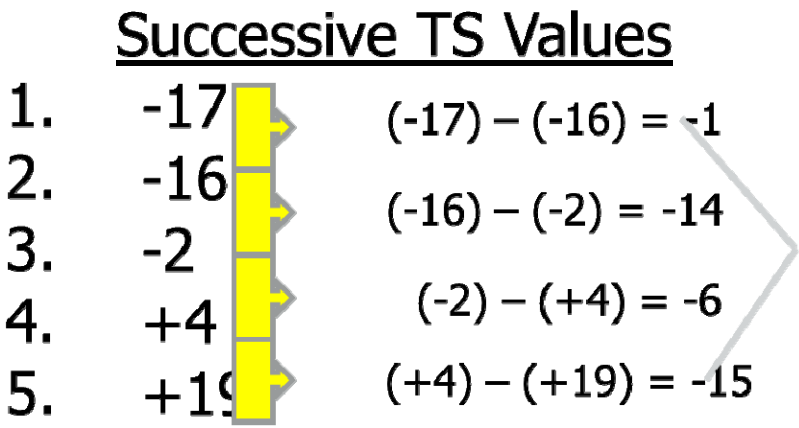
Driving/Critical Paths – Understanding the Primary, Secondary, Tertiary, etc. Values

Example:



Goal is to calculate the absolute values between Driving/Critical Paths.

In this example they are: 1, 14, 6, and 15.

The team should be aware that the Secondary Path is a mere 1 day off of the first path – the 1 above. The Tertiary Path is 14 days off of, or behind, the Secondary Path – the 14 above. 6 days separate paths #3 & #4, and 15 days separate paths #4 & #5.

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Driving/Critical Paths – Understanding the Primary, Secondary, Tertiary, etc. Values

- Calculate and communicate, at least the first 3 paths – not only their activities and owners, but their values.
- Critical/Driving Paths are dynamic. Therefore, they should be re-created after each status cycle.
- Lead a team meeting if dates are not favorable (internally or contractually) to see if execution roadmap can be reconfigured.
- This offers the team insight into both short-term and long term decision making strategies.

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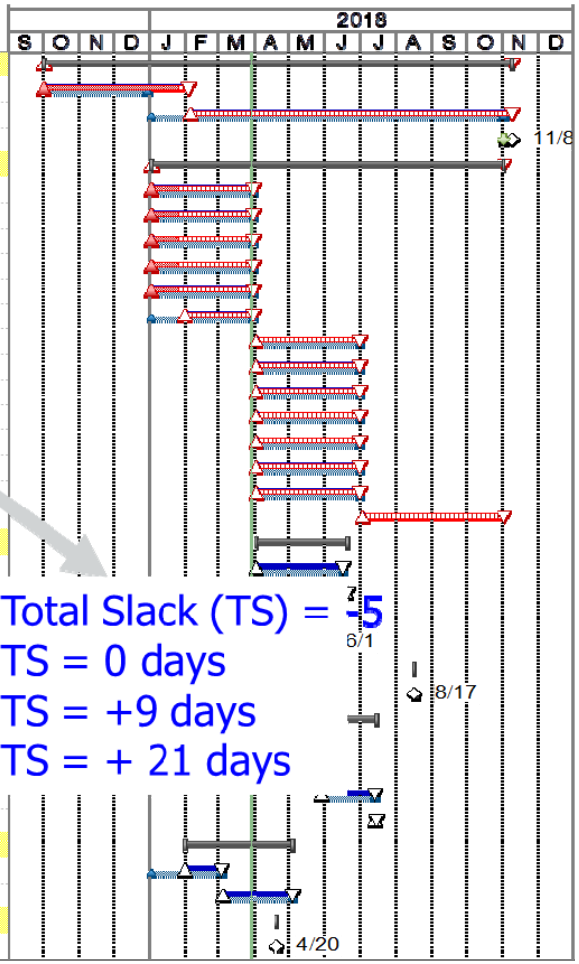
The Absolute Value – Driving Paths

ID	UID	CAM	Task Name	Slack	Dur	Start	Finish
			Total Slack: -5 d	**-5 d**	**283d**	**10/2/17**	**11/8/18**
311	*4771*	*Matt S.*	*task name*	*-5 d*	*87 d*	*10/2/17*	*2/2/18*
736	*4894*	*Greg H*	*task name*	*-5 d*	*196 d*	*2/5/18*	*11/8/18*
17	*4572*	*Stu L.*	*task name*	*-5 d*	*0 d*	*11/8/18*	*11/8/18*
			Total Slack: 0 d	**0 d**	**215d**	**1/2/18**	**11/1/18**
484	*5743*	*Stu L.*	*task name*	*0 d*	*64 d*	*1/2/18*	*3/30/18*
485	*5749*	*Stu L.*	*task name*	*0 d*	*64 d*	*1/2/18*	*3/30/18*
486	*5748*	*Stu L.*	*task name*	*0 d*	*64 d*	*1/2/18*	*3/30/18*
495	*5752*	*Stu L.*	*task name*	*0 d*	*64 d*	*1/2/18*	*3/30/18*
496	*5754*	*Stu L.*	*task name*	*0 d*	*64 d*	*1/2/18*	*3/30/18*
497	*5755*	*Stu L.*	*task name*	*0 d*	*42 d*	*2/1/18*	*3/30/18*
488	*5746*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
489	*5744*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
490	*5750*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
500	*5753*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
501	*5756*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
502	*5757*	*Stu L.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
601	*4909*	*Doug G.*	*task name*	*0 d*	*64 d*	*4/2/18*	*6/29/18*
738	*5751*	*Stu L.*	*task name*	*0 d*	*87 d*	*7/2/18*	*11/1/18*
			Total Slack: 9 d	**9 d**	**55d**	**4/2/18**	**6/18/18**
601	6837	Mark W.	task name	9 d	54 d	4/2/18	6/15/18
504	6838	Stu L.	task name	9 d			
			Total Slack: 21 d	**21 d**			
737	5742	Mark R.	task name	21 d			
			Total Slack: 54 d	**54 d**			
99	6852	Stu L.	task name	54 d			
			Total Slack: 78 d	**78 d**			
510	5630	Stu L.	task name	78 d			
511	6992	Stu L.	task name	78 d			
513	7019	Stu L.	task name	78 d			
514	5762	Stu L.	task name	78 d	1 d	7/13/18	7/13/18
			Total Slack: 127 d	**127 d**	**66d**	**2/1/18**	**5/3/18**
498	5758	Stu L.	task name	127 d	22 d	2/1/18	3/2/18
503	5759	Stu L.	task name	127 d	44 d	3/5/18	5/3/18
			Total Slack: 137 d	**137 d**	**0d**	**4/20/18**	**4/20/18**
98	6853	Stu L.	task name	137 d	0 d	4/20/18	4/20/18



Primary Path: Total Slack (TS) = -5
Secondary Path: TS = 0 days
Tertiary: TS = +9 days
Fourth: TS = + 21 days

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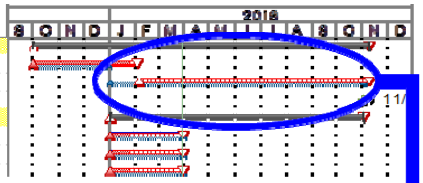
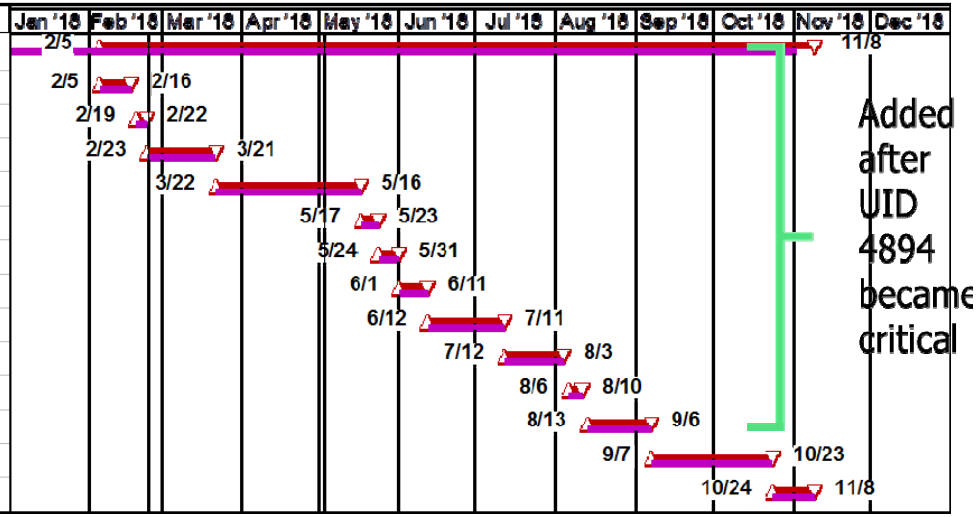
Driving Paths are Dynamic; Actively Manage

ID	UID	CAM	Task Name	Slack	Dur	Start	Finish
			Total Slack: -5 d	-5 d	283d	10/2/17	11/8/18
311	4771	Matt S.	task name	-5 d	87 d	10/2/17	2/2/18
736	4894	Greg H	task name	-5 d	196 d	2/5/18	11/8/18
17	4572	Stu L.	task name	-5 d	0 d	11/8/18	11/8/18
			Total Slack: 0 d	0 d	215d	1/2/18	11/1/18
484	5743	Stu L.	task name	0 d	64 d	1/2/18	3/30/18
485	5749	Stu L.	task name	0 d	64 d	1/2/18	3/30/18
486	5748	Stu L.	task name	0 d	64 d	1/2/18	3/30/18



ID	Unique ID	Name	Duration	Start	Finish
739	4894	task name	196 d	2/5/18	11/8/18
740	7028	child task 1	10 d	2/5/18	2/16/18
741	7029	child task 2	4 d	2/19/18	2/22/18
742	7030	child task 3	19 d	2/23/18	3/21/18
743	7031	child task 4	40 d	3/22/18	5/16/18
744	7032	child task 5	5 d	5/17/18	5/23/18
745	7033	child task 6	5 d	5/24/18	5/31/18
746	7034	child task 7	7 d	6/1/18	6/11/18
747	7035	child task 8	21 d	6/12/18	7/11/18
748	7036	child task 9	17 d	7/12/18	8/3/18
749	7037	child task 10	5 d	8/6/18	8/10/18
750	7038	child task 11	18 d	8/13/18	9/6/18
751	7039	child task 12	33 d	9/7/18	10/23/18
752	7040	child task 13	12 d	10/24/18	11/8/18



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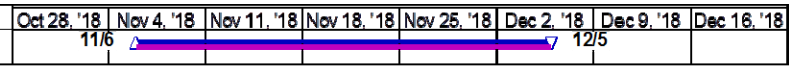
Add Tasks to the IMS to Gain Insight

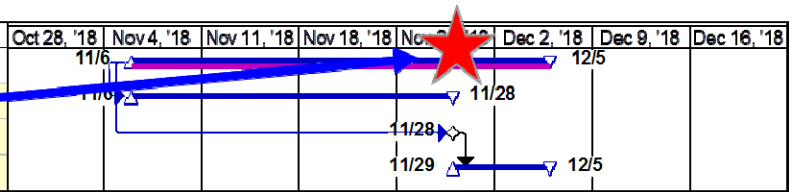
The original task: What if key dependencies are embedded in a large duration?

ID	Name	Duration	Start	Finish
668	Software Integration - MDFG Updates	20 d	11/6/18	12/5/18



The task can be decomposed to reflect inability to proceed, e.g., Beyond receipt of key Hand-in at Day 15 of 20. (New tasks = pre & post Hand-in efforts)

ID	Name	Duration	Start	Finish
668	Software Integration - MDFG Updates	20 d	11/6/18	12/5/18
669	Initial SW Integration - MDFG Updates	15 d	11/6/18	[illegible]
670	Key Hand in Arrives	0 d	11/28/18	11/28/18
671	Remaining SW Int - MDFG Updates post Key Hand-in	5 d	11/29/18	12/5/18



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Add Tasks to the IMS to Gain Insight

ID	Name	Duration	Start	Finish
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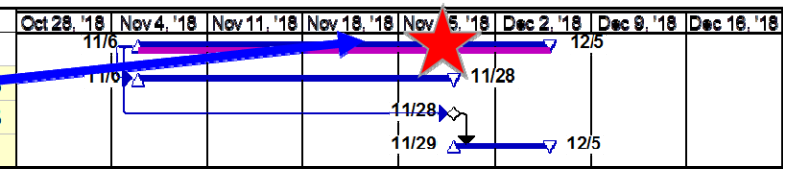

- Consider decomposing a %CP Earned Value Technique task if it is on a Driving/Critical Path.

- Program Manger may want to show the impact of Hand-in if it is coming from a customer. The schedule can quantify, and illustrate, the impact of a customer delay (or schedule acceleration).

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Key Takeaways

- Always act Compliantly. Adhere to the IPMR DiD, a company specific System Description Document, contractual requirements, etc. Compliance is non-negotiable.
- Think & Act like a Program Execution Coach.
- Inform & Educate Program Manager so that he/she can make wise decisions. Specific examples of data and metrics to calculate and present to your team have been shared.
- Communicate consequences and benefits of actions in both the near and long term (e.g., values of successive Driving Paths).
- Exercise professional responsibility: in our role as Finance Analysts and Program Schedulers we have the power to guide program execution by effectively communicating the right information to our Program Leadership.

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Thank you

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