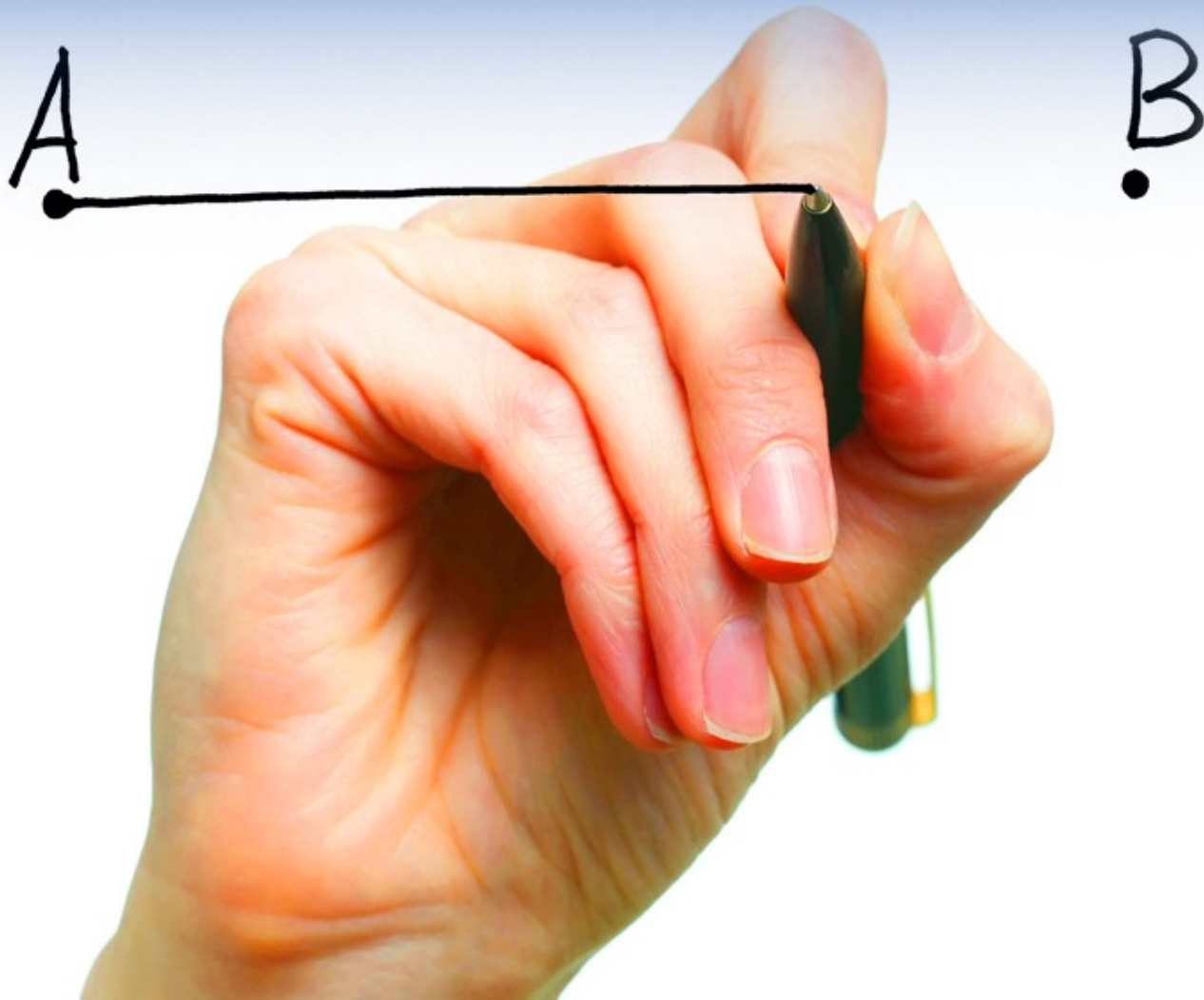# Understanding Objective Measures

2018 Spring IPM Division Meeting

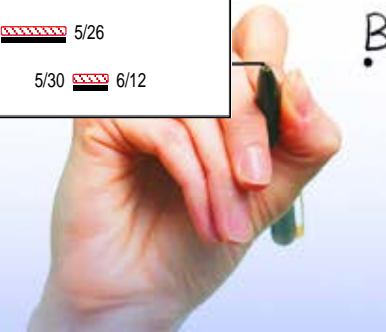# Determine Discrete Work & Objective Measures

- The EVT is selected based on how the work is planned and performance will be earned. The objective is to identify and plan authorized work within a CA using discrete, short-spanned WPs comprising all measurable effort.

- Where long duration WPs are unavoidable, interim milestones representing measurable, technical accomplishment (Objective Measures) are required for performance measurement .

- Common EVTs for WPs with longer durations
  - Incremental (Weighted) Milestones
  - Percent Complete with Quantifiable Back-up Data (QBD)

- Is EVTs at the detailed task level another option?

Incremental (Weighted) Milestone EVT

- Is an EV technique where specific tasks which represent milestone activities, are assigned weights and BCWP is earned when those tasks/milestone activities are completed.

- At a minimum, WP start and completion Milestones are established, requires the identification of specific completion criteria for each milestone, there must be at least one milestone per month and If a milestone is not completed in a given month, no BCWP is earned for it.

ID	CA#	WP #	MS #	Task Name	EVT	EV%	Dur	Baseline Start	Baseline Finish	Schedule (2017)
4	1.1.01			Control Account 1		0	115 days	1/2/17	6/12/17	6/12
9	1.1.01	1.1.01.5		Work Package 5	IM	0	90 days	2/6/17	6/12/17	2/6 — 6/12
10	1.1.01	1.1.01.5	1.1.01.5.01	Milestone 01		0	15 days	2/6/17	2/24/17	2/6 — 2/24
11	1.1.01	1.1.01.5	1.1.01.5.02	Milestone 02		0	10 days	2/27/17	3/10/17	2/27 — 3/10
12	1.1.01	1.1.01.5	1.1.01.5.03	Milestone 03		0	15 days	3/13/17	3/31/17	3/13 — 3/31
13	1.1.01	1.1.01.5	1.1.01.5.04	Milestone 04		0	20 days	4/3/17	4/28/17	4/3 — 4/28
14	1.1.01	1.1.01.5	1.1.01.5.05	Milestone 05		0	20 days	5/1/17	5/26/17	5/1 — 5/26
15	1.1.01	1.1.01.5	1.1.01.5.06	Milestone 06		0	10 days	5/30/17	6/12/17	5/30 — 6/12

Questions for Incremental (Weighted) Milestone EVT

- Is a requirement to create start milestones or allow %Start/%Complete against tasks (50/50, 25/75, etc.), based on the work/resources to be performed in the period?
  - Do we need to include a Technical Accomplishment for determining the %Start?
  - Without a Start milestone how do we reflect accurate schedule variances and align ACWP with BCWP?

- When a task occurs over two consecutive accounting periods and can't be broken into two separate monthly tasks can %Start/%Complete be used to claim some BCWP?
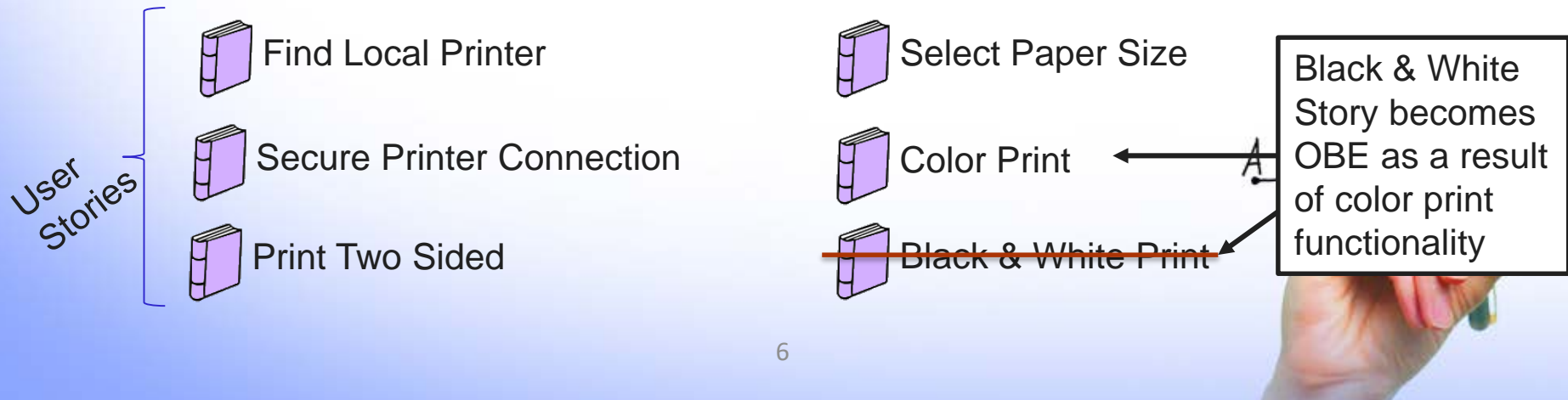 - Is Technical Accomplishment needed for %Start?

Quantifiable Back-up Data (QBD)

- An EV technique where the CAM defines detailed steps that are measureable outputs or technical accomplishments that need to be completed
  - Each step must be weighted to properly reflect progress as work is completed
  - As each step is completed the full value of that step is earned
  - Steps do not have to occur in series but can be done in any order within the planned Work Package period of performance (POP).

- The QBD WP is represented in the IMS as a single line which reflects the cumulative percentage complete for the WP.
  - If there is a need to track at a lower level of detail in support of a desired level of tracking or IMS logic (giver/receiver points to support critical path logic) steps are gathered under sub-activities
  - This will result in a QBD WP being represented in the IMS as a summary with sub-activities as children and identified within the QBD

QBD Changes without a baseline change

- How the scope of a work package is completed may evolve through execution - No change to the WP POP and total budget -
  - As the work is executed some steps may no longer be necessary to complete the scope of the work package
  - Steps overcome by events are not deferred to another work package
  - A necessary step that was overlooked may be required to fulfill the scope of the work package
  - The base or denominator , # of planned units, may change
- Example: Print from Mobile Device (Feature Work Package-Agile)
  - Scope: The ability to securely print from my smart phone with three preferences.

User Stories

Find Local Printer

Secure Printer Connection

Print Two Sided

Select Paper Size

Color Print

Black & White Print

Black & White Story becomes OBE as a result of color print functionality

Questions for QBD

- If QBD steps aren't baselined, are any additional approvals required to update QBDs?

    – How does the approval or documentation keep the process flexible?

- Are QBD requirements different for Agile development programs versus traditional waterfall?

- If steps are added or removed is the entire weighting redistributed or just the remaining weights?

EVTs below the work package

- The EVT is assigned at the detailed task level
  - Earned Value Techniques (EVTs) are assigned to Tasks not to the Work Package (WP)
  - The detailed task under the WP may have various EVTs based on how the work is planned and performance will be earned.
  - EV% Complete is claimed at the Task level and is summarized to the WP
  - IMS Tasks Contain objective entrance and exit criteria, are logically linked to a predecessor task (predominantly with finish to start relationships)
  - Once the work package begins the assigned EVT for the detailed task is not changed
  - If the detailed task uses QBD there is a separate QBD sheet that provides the EV % complete value

EV Below the WP example

Instructions

Please update dates for tasks with a red indicator in Columns P for Start Dates and Column V for Finish Dates.
Enter Forecast late changes in Column L and Column R. Enter "Yes" in the Actual Start and Actual Finish, column M and S respectively.
Make sure there are no Red cells in Columns P & V. Always provide Reason and Rational in Column Y for date changes or other notes.

WE: 4/13/2018

Contract Name: GSMP

| Unprotect | Refresh | Copy IMS | Copy EV | iQBD Checks |

CAM	WBS ID	UID	Task Description	EV Method	Previous EV % Comp	Current EV % Comp	Baseline Start	Baseline Finish	Start	Actual Start	Current Forecast Start	Late	Early	Finish	Actual Fin	Current Forecast Finish	Late	Early
Jean Chung	141-GXX-0101-LBR	278	Initial Backlog Development and Prioritization	50/50	100.00%	100.00%	8/1/2016	9/30/2016	8/1/2016	Yes	8/1/2016			9/30/2016	Yes	9/30/2016		
Jean Chung	NA	1245	Start User Cockpit Working Groups	No EV	100.00%	100.00%	8/18/2016	8/18/2016	8/18/2016	Yes	8/18/2016			8/18/2016	Yes	8/18/2016		
Jean Chung	141-GXX-0101-LBR	2289	Develop Draft Software Development Plan (SDP)	0/100	100.00%	100.00%	9/6/2016	9/29/2016	9/12/2016	Yes	9/12/2016			9/29/2016	Yes	9/29/2016		
Jean Chung	141-GXX-0101-LBR	2348	Develop First Draft Software Master Build Plan	0/100	100.00%	100.00%	9/22/2016	9/27/2016	9/12/2016	Yes	9/12/2016			9/15/2016	Yes	9/15/2016		
Jean Chung	141-GXX-0101-LBR	3382	Integrate Draft SDRL 3088-10 into SW Master Build Plan	50/50	100.00%	100.00%	9/28/2016	10/3/2016	9/16/2016	Yes	9/16/2016			9/21/2016	Yes	9/21/2016		
Jean Chung	NA	2417	Submit First Draft Master Build Plan (90DAC)	No EV	100.00%	100.00%	9/30/2016	9/30/2016	9/20/2016	Yes	9/20/2016			9/20/2016	Yes	9/20/2016		
Jean Chung	NA	2349	Submit First Draft Master Build Plan (90DAC)	No EV	100.00%	100.00%	10/3/2016	10/3/2016	9/21/2016	Yes	9/21/2016			9/21/2016	Yes	9/21/2016		
Jean Chung	NA	2590	Submit Management Plan - Transition from Legacy MCEs/LREs to GSMP Facility (90DAC)	No EV	100.00%	100.00%	9/29/2016	9/29/2016	9/29/2016	Yes	9/29/2016			9/29/2016	Yes	9/29/2016		
Jean Chung	141-GXX-0101-LBR	2351	Develop First Draft SOA Governance Plan	% Complete	100.00%	100.00%	9/30/2016	11/21/2016	9/30/2016	Yes	9/30/2016			11/21/2016	Yes	11/21/2016		
Jean Chung	141-GXX-0101-LBR	280	SW Development	% Complete	91.09%	91.09%	10/3/2016	2/23/2018	10/3/2016	Yes	10/3/2016			6/28/2018		6/28/2018		
Jean Chung	141-GXX-0101-LBR	2320	Develop Draft Software Test Plan (STP)	50/50	100.00%	100.00%	10/3/2016	11/23/2016	10/3/2016	Yes	10/3/2016			11/23/2016	Yes	11/23/2016		
Jean Chung	NA	2272	SVT- Sprint 1	No EV	100.00%	100.00%	10/3/2016	10/28/2016	10/3/2016	Yes	10/3/2016			10/28/2016	Yes	10/28/2016		
Jean Chung	141-GXX-0101-LBR	2352	Develop First Draft Software Master Build Plan	50/50	100.00%	100.00%	10/11/2016	11/14/2016	10/11/2016	Yes	10/11/2016			11/21/2016	Yes	11/21/2016		
Jean Chung	141-GXX-0101-LBR	2518	Develop Initial Draft Interface Requirements Specification (IRS)	% Complete	100.00%	100.00%	10/24/2016	12/13/2016	10/24/2016	Yes	10/24/2016			1/10/2017	Yes	1/10/2017		
Jean Chung	NA	1250	GS Preliminary Dry-Run Testing Start from RTN	No EV	100.00%	100.00%	10/28/2016	10/28/2016	10/28/2016	Yes	10/28/2016			10/28/2016	Yes	10/28/2016		
Jean Chung	141-GXX-0101-LBR	2527	Update SDP with System Engineering Inputs	% Complete	100.00%	100.00%	10/31/2016	12/12/2016	10/31/2016	Yes	10/31/2016			1/26/2017	Yes	1/26/2017		
Jean Chung	141-GXX-0101-LBR	2305	Develop Draft Software Requirements Specification (SRS)	% Complete	100.00%	100.00%	10/31/2016	12/13/2016	10/31/2016	Yes	10/31/2016			1/10/2017	Yes	1/10/2017		
Jean Chung	NA	2273	SVT- Sprint 2	No EV	100.00%	100.00%	10/31/2016	11/23/2016	10/31/2016	Yes	10/31/2016			11/23/2016	Yes	11/23/2016		
Jean Chung	141-GXX-0101-LBR	3954	Develop Software Development Kit (SDK)	% Complete	100.00%	100.00%	11/28/2016	2/24/2017	11/28/2016	Yes	11/28/2016			5/22/2017	Yes	5/22/2017		
Jean Chung	141-GXX-0101-LBR	2293	Develop Draft System/Subsystem Design Description (SSDD)	% Complete	100.00%	100.00%	10/20/2016	12/2/2016	11/28/2016	Yes	11/28/2016			1/20/2017	Yes	1/20/2017		
Jean Chung	NA	2274	SVT- Sprint 3	No EV	100.00%	100.00%	11/28/2016	12/22/2016	11/28/2016	Yes	11/28/2016			12/22/2016	Yes	12/22/2016		

QBD Ver.	1.1			QBD BAC	QBD BCWP	PCQBD		1/3/2017
Refresh	Unprotec	Update BCWP Here		72,927.28	#VALUE!	#VALUE!		1/3/2017
								1/3/2017

Element Type	UID	Completed ?	Cum % Weighte	Task Value %	Work Package	Task Name	QBD BAC	QBD BCWP	PCQBD	Notes	1/11/2017
W	280	Summary lir	84.54%	84.54%	141-GXX-0101-LBf	SW Development Through Dry-Run SW FQT (Agile Sprint 1-15)	61,654.28	56,162.33	91.09%		
W	1319	Summary lir	91.58%	7.03%	141-GXX-0101-LBf	Ground Segment Integration Defect Correction & Support (RB)	5,130.00	0.00	0.00%		
QBD		No	0.00%	0.00%		Will Take EV off Test Points. Will create detailed QBD near start of Task	0.00	0.00			
W	282	Summary lir	95.82%	4.25%	141-GXX-0101-LBf	System Verification (SYS III) Defect Correction & Support	3,098.00	0.00	0.00%		
QBD		No	0.00%	0.00%		Will Take EV off Test Points. Will create detailed QBD near start of Task	0.00	0.00			
W	283	Summary lir	95.82%	0.00%	141-GXX-0101-LBf	COD Build- SW Defect Correction & Support	0.00	#VALUE!			
W	2527	Summary lir	95.84%	0.01%	141-GXX-0101-LBf	Update SDP with System Engineering Inputs	8.00	8.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	0.80	0.80			
QBD		Yes	50.00%	40.00%		Compile and Update Data	3.20	3.20			
QBD		Yes	90.00%	40.00%		Internal Peer Review	3.20	3.20			
QBD		Yes	100.00%	10.00%		Complete Draft	0.80	0.80			
W	2291	Summary lir	95.85%	0.01%	141-GXX-0101-LBf	Update Draft SDP	8.00	8.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	0.80	0.80			
QBD		Yes	50.00%	40.00%		Compile and Update Data	3.20	3.20			
QBD		Yes	90.00%	40.00%		Internal Peer Review	3.20	3.20			
QBD		Yes	100.00%	10.00%		Complete Draft	0.80	0.80			
W	2294	Summary lir	95.86%	0.01%	141-GXX-0101-LBf	Incorporate Gov't Comments into SDP	8.00	8.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	0.80	0.80			
QBD		Yes	50.00%	40.00%		Compile and Update Data	3.20	3.20			
QBD		Yes	90.00%	40.00%		Internal Peer Review	3.20	3.20			
W	2293	Summary lir	95.89%	0.03%	141-GXX-0101-LBf	Develop Draft System/Subsystem Design Description (SSDD)	24.00	24.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	2.40	2.40			
QBD		Yes	50.00%	40.00%		Compile and Update Data	9.60	9.60			
QBD		Yes	90.00%	40.00%		Internal Peer Review	9.60	9.60			
QBD		Yes	100.00%	10.00%		Complete Draft	2.40	2.40			
W	2298	Summary lir	95.90%	0.01%	141-GXX-0101-LBf	Update Draft SSDD	8.00	8.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	0.80	0.80			
QBD		Yes	50.00%	40.00%		Compile and Update Data	3.20	3.20			
QBD		Yes	90.00%	40.00%		Internal Peer Review	3.20	3.20			
QBD		Yes	100.00%	10.00%		Complete Draft	0.80	0.80			
W	2300	Summary lir	95.91%	0.01%	141-GXX-0101-LBf	Incorporate Gov't Comments into SSDD	8.00	4.00	50.00%		
QBD		Yes	10.00%	10.00%		Review historical data	0.80	0.80			
QBD		Yes	50.00%	40.00%		Compile and Update Data	3.20	3.20			
QBD		No	90.00%	40.00%		Internal Peer Review	3.20	0.00			
QBD		No	100.00%	10.00%		Complete Draft	0.80	0.00			
W	2305	Summary lir	95.95%	0.03%	141-GXX-0101-LBf	Develop Draft Software Requirements Specification (SRS)	24.00	24.00	100.00%		
QBD		Yes	10.00%	10.00%		Review historical data	2.40	2.40			
QBD		Yes	50.00%	40.00%		Compile and Update Data	9.60	9.60			
QBD		Yes	90.00%	40.00%		Internal Peer Review	9.60	9.60			
QBD		Yes	100.00%	10.00%		Complete Draft	2.40	2.40			

Setup EV S

Questions for EVT below the WP

- Can EVTs be set at the detailed task level?

- If allowed what techniques can be used as the detailed task level within the work package?

- If using EVTs at the Detailed task level how long can the WP be?