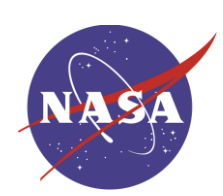


Cobra and Empower – EVM Tools Supporting Cost and Schedule Estimating

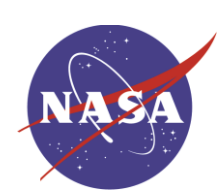
David Warren, NASA Cobra and Empower Administrator

Kristen Kehrer, KSC EVM Focal Point



Purpose & Agenda

- Purpose
 - Describe how EVM tools – Cobra and Empower – can be used to support the cost and scheduling communities
- Agenda
 - Cobra and Empower – What are they?
 - Cobra and Empower – How do they support cost and schedule communities?
 - Summary



What is Cobra?

- Consolidated
Omnibus
Budget
Reconciliation
Act



- Venomous snakes that are capable of raising the upper part of their body and producing a hood when dancing



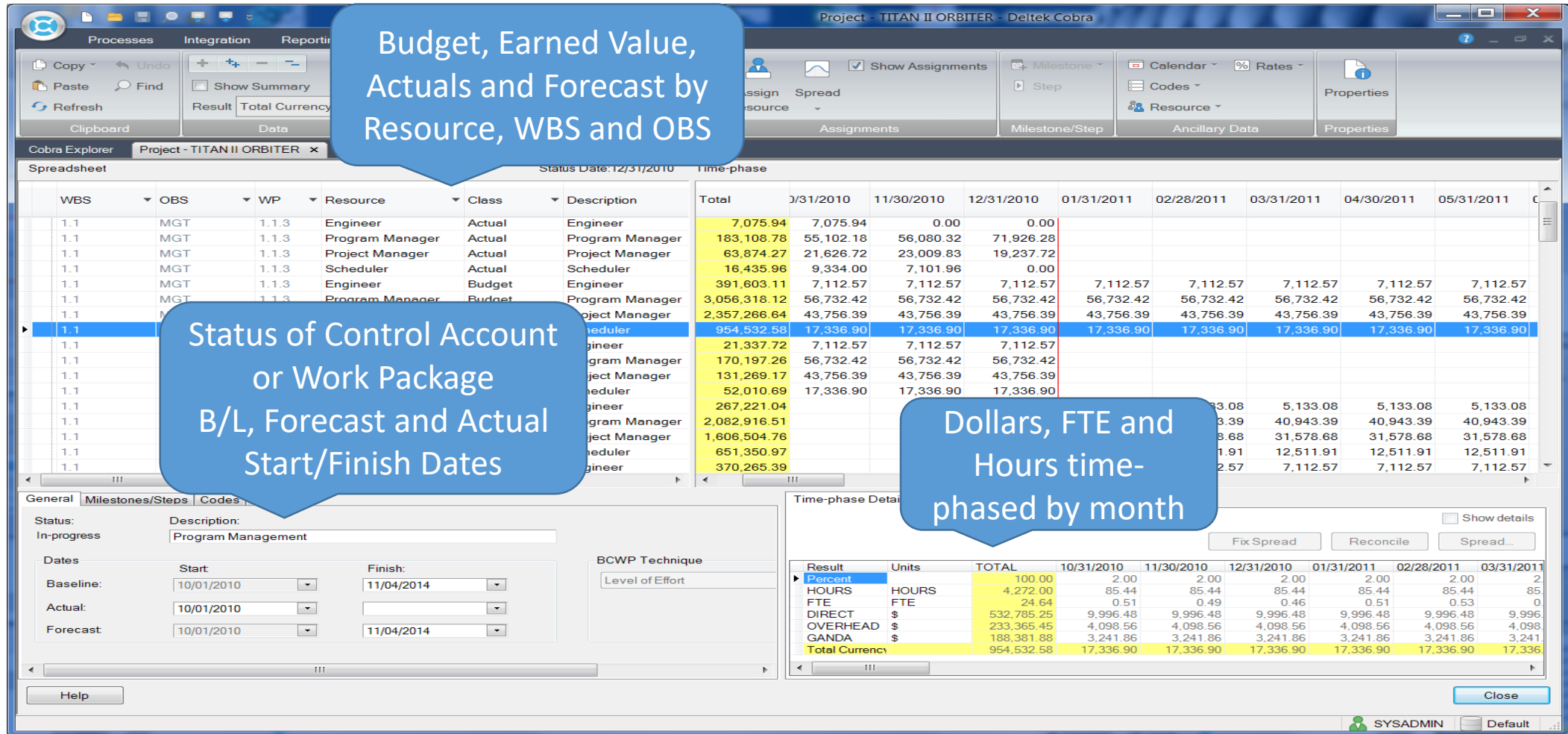
- Yoga pose designed to strengthen the spine and buttocks as well as stretch the chest, shoulders, and abdomen





Cobra Capabilities

- COTS software tool used for managing project costs, measuring earned value and analyzing budgets, actuals and forecasts



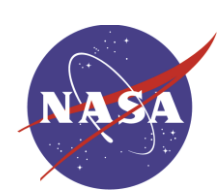
Budget, Earned Value, Actuals and Forecast by Resource, WBS and OBS

WBS	OBS	WP	Resource	Class	Description	Total	10/31/2010	11/30/2010	12/31/2010	01/31/2011	02/28/2011	03/31/2011	04/30/2011	05/31/2011
1.1	MGT	1.1.3	Engineer	Actual	Engineer	7,075.94	7,075.94	0.00	0.00					
1.1	MGT	1.1.3	Program Manager	Actual	Program Manager	183,108.78	55,102.18	56,080.32	71,926.28					
1.1	MGT	1.1.3	Project Manager	Actual	Project Manager	63,874.27	21,626.72	23,009.83	19,237.72					
1.1	MGT	1.1.3	Scheduler	Actual	Scheduler	16,435.96	9,334.00	7,101.96	0.00					
1.1	MGT	1.1.3	Engineer	Budget	Engineer	391,603.11	7,112.57	7,112.57	7,112.57	7,112.57	7,112.57	7,112.57	7,112.57	7,112.57
1.1	MGT	1.1.3	Program Manager	Budget	Program Manager	3,056,318.12	56,732.42	56,732.42	56,732.42	56,732.42	56,732.42	56,732.42	56,732.42	56,732.42
1.1	MGT	1.1.3	Project Manager	Budget	Project Manager	2,357,266.64	43,756.39	43,756.39	43,756.39	43,756.39	43,756.39	43,756.39	43,756.39	43,756.39
1.1	MGT	1.1.3	Scheduler	Budget	Scheduler	954,532.58	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90
1.1	MGT	1.1.3	Engineer	Budget	Engineer	21,337.72	7,112.57	7,112.57	7,112.57					
1.1	MGT	1.1.3	Program Manager	Budget	Program Manager	170,197.26	56,732.42	56,732.42	56,732.42					
1.1	MGT	1.1.3	Project Manager	Budget	Project Manager	131,269.17	43,756.39	43,756.39	43,756.39					
1.1	MGT	1.1.3	Scheduler	Budget	Scheduler	52,010.69	17,336.90	17,336.90	17,336.90					
1.1	MGT	1.1.3	Engineer	Budget	Engineer	267,221.04								
1.1	MGT	1.1.3	Program Manager	Budget	Program Manager	2,082,916.51								
1.1	MGT	1.1.3	Project Manager	Budget	Project Manager	1,606,504.76								
1.1	MGT	1.1.3	Scheduler	Budget	Scheduler	651,350.97								
1.1	MGT	1.1.3	Engineer	Budget	Engineer	370,265.39								

Status of Control Account or Work Package B/L, Forecast and Actual Start/Finish Dates

Dollars, FTE and Hours time-phased by month

Result	Units	TOTAL	10/31/2010	11/30/2010	12/31/2010	01/31/2011	02/28/2011	03/31/2011	04/30/2011	05/31/2011
Percent		100.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
HOURS	HOURS	4,272.00	85.44	85.44	85.44	85.44	85.44	85.44	85.44	85.44
FTE	FTE	24.64	0.51	0.49	0.46	0.51	0.53	0.53	0.53	0.53
DIRECT	\$	532,785.25	9,996.48	9,996.48	9,996.48	9,996.48	9,996.48	9,996.48	9,996.48	9,996.48
OVERHEAD	\$	233,365.45	4,098.56	4,098.56	4,098.56	4,098.56	4,098.56	4,098.56	4,098.56	4,098.56
GANDA	\$	188,381.88	3,241.86	3,241.86	3,241.86	3,241.86	3,241.86	3,241.86	3,241.86	3,241.86
Total Currency		954,532.58	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90	17,336.90



Budget, actuals, performance & forecasts

	WBS	OBS	WP	Resource	Class	Description	Total	1/30/2010	12/31/2010
..	1.2.6	XP01	1.2.6.6.1	EQUIPMENT	Budget	Frame Design	156,919.46	76,794.80	80,124.66
..	1.2.6	XP02	1.2.6.6.1	FTE	Budget	Propulsion Design	337,564.15	156,919.46	180,644.69
..	1.2.6	XP03	1.2.6.6.1	LABOR	Earned	Ergonomics Design	276,495.11	129,131.64	147,363.47
..	1.2.6	XP03	1.2.6.6.1	MATERIAL	Earned	Experiment Design	144,127.27	72,063.63	72,063.63
..	1.2.6	QD02	1.2.6.6.1	PROCUREMENTS	Earned	Landing Preparation	194,384.68	96,682.02	97,702.66
..	1.2.6	QD02	1.2.6.6.1	TRAVEL	ETC	Trajectory Formulation	110,995.20	52,722.72	0.00
..	1.2.6	XP50	1.2.6.6.1	LABOR	ETC	Emergency Rescue	96,565.82	0.00	0.00
..	1.2.6	XP50	1.2.6.6.1	LABOR	ETC	Software Design	428,441.47	99,618.19	143,183.81
..	1.2.6	XP50	1.2.6.6.1	EQUIPMENT	Forecast	Software Testing	112,660.13	22,129.67	43,253.44
..	1.2.6	XP50	1.2.6.6.1	FTE	Forecast	Systems Checks	174,040.47	34,186.52	66,819.11
..	1.2.6	XP50	1.2.6.6.1	LABOR	Forecast	Launch Preparations	479,513.14	81,650.84	159,590.29

Data available at lowest level of the WBS

Data is available back for entire period of performance (usually Phase C/D – but earlier if the tool is used)

Element Information

General | Milestones/Steps | Codes | Notes

Status: In-progress Description: Control Room

Dates

Baseline:	Start: 10/19/2007	Finish: 04/15/2008
Actual:	09/15/2007	
Forecast:	09/15/2007	04/15/2008
Early:	09/15/2007	04/15/2008
Late:	09/15/2007	04/15/2008
Pending:	10/19/2007	04/15/2008

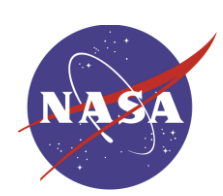
BCWP Technique: % Complete

% Completed: 50.00

Time-phasing of data

Time-phase Detail

Result	Units	TOTAL	OCT07	NOV07	DEC07	JAN08	FEB08	MAR08	APR08
▶ Percent		100.00	3.89	8.61	8.22	27.90	26.49	21.06	3.84
HOURS	HOURS	220.00	8.56	18.94	18.09	61.37	58.27	46.33	8.44
FTE	HEADS	1.28	0.05	0.11	0.10	0.35	0.36	0.25	0.05
DIRECT	DOLLARS	2,849.29	102.72	227.28	217.08	810.08	769.16	611.56	111.41
FRINGE	DOLLARS	99.72	3.60	7.95	7.60	28.35	26.92	21.40	3.90
OVERHEAD	DOLLARS	442.34	15.95	35.28	33.70	125.76	119.41	94.94	17.30
G&A	DOLLARS	339.14	12.23	27.05	25.84	96.42	91.55	72.79	13.26
COM	DOLLARS	304.47	10.76	23.80	22.74	86.97	82.58	65.66	11.96
Total Currency		4,034.96	145.26	321.36	306.96	1,147.58	1,089.62	866.35	157.83



Cobra Basis Of Estimate (BOE)

BOE Report in MS Excel

Statement of Work/WBS Dictionary

Code	Description
215.04.03	HGLDS
215.04.05	KGCS
215.04.07	RSCS
215.04.09	SDAS
215.04.11	Wx
215.04.13	LRS

Note: This WBS element summarizes all design, construction, fabrication, installation and integrated activation and validation required for the Sensor Data Acquisition Subsystem (SDAS) on the Night Hawk Project to support launch operations.

Basis of Estimate

Code	Description
215.04.03	HGLDS
215.04.05	KGCS
215.04.07	RSCS
215.04.09	SDAS
215.04.11	Wx
215.04.13	LRS

Note: Cost Basis of Estimate/Assumptions and Exclusions (\$)
The cost for the Sensor Data Acquisition System (SDAS) is based on a Cost Estimating Relationship (CER) of 8 hours per measurement. The CER was built on data from past similar space flight projects housed in the NASA Cost Database. The statement of work requires a total of 300 measurements. A contingency of 10% was added for potential growth in the number of measurements. For 330 measurements, it is estimated that it will take 2,640 hours. At an average \$150/hour burdened support contractor labor, the total cost for the SDAS is estimated at \$396,000.

Risks and Opportunities
The major risk associated with the SDAS is that the number of measurements required will grow. This is captured in the Active Risk Measurement (ARM) system as a 3x3 risk.

Contingencies
This estimate contains a contingency of \$36,000.

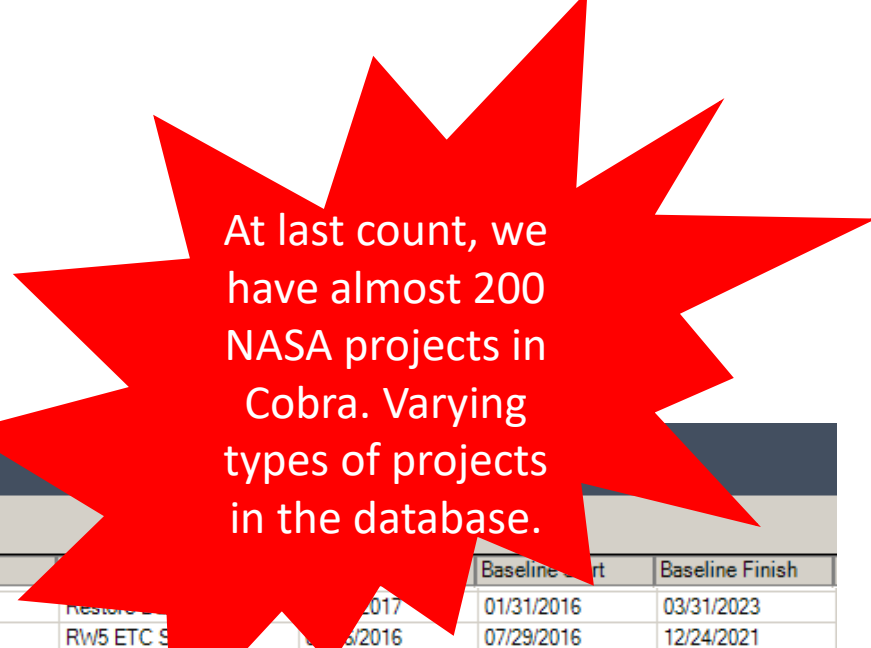
Code	Description	Basis of Estimate
215.04.09	SDAS	<p>Cost Basis of Estimate/Assumptions and Exclusions (\$) The cost for the Sensor Data Acquisition System (SDAS) is based on a Cost Estimating Relationship (CER) of 8 hours per measurement. The CER was built on data from past similar space flight projects housed in the NASA Cost Database. The statement of work requires a total of 300 measurements. A contingency of 10% was added for potential growth in the number of measurements. For 330 measurements, it is estimated that it will take 2,640 hours. At an average \$150/hour burdened support contractor labor, the total cost for the SDAS is estimated at \$396,000.</p> <p>Risks and Opportunities The major risk associated with the SDAS is that the number of measurements required will grow. This is captured in the Active Risk Measurement (ARM) system as a 3x3 risk.</p> <p>Contingencies This estimate contains a contingency of \$36,000</p>



Other Helpful Cobra Features

- User defined code fields to capture and report data (e.g. recurring/non-recurring, funding source, etc.)
- What-if analysis using different classes without interfering with the original baseline or estimates
- Data easily exports to MS Excel for manipulation
- Cobra log automatically tracks baseline changes and reasons for changes
- Standard Reports (IPMR, NF-533, etc.) as well as custom reporting capabilities
- Integrates seamlessly with scheduling tools and analysis tools
- Drives cost/schedule integration

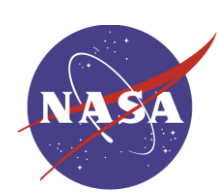
Project	Project	Description
43919PGMSUPT_Jul16	43919BEARER_Apr16	43919BEARER
43919PGMSUPT_Jun16	43919BEARER_Aug16	43919BEARER
43919PGMSUPT_Mar16	43919BEARER_Feb16	43919BEARER
43919PGMSUPT_May16	43919BEARER_Jul16	43919BEARER
43919PGMSUPT_Rw5Sep16	43919BEARER_Jun16	43919BEARER
43919PGMSUPT_Sep16	43919BEARER_Mar16	43919BEARER
43919S&P_Apr16	43919BEARER_May16	43919BEARER
43919S&P_Aug16	43919BEARER_Rw5Sep16	43919BEARER
43919S&P_Feb16	43919BEARER_Sep16	43919BEARER
43919S&P_Jul16	43919COSTADJ_Apr16	43919COSTADJ
43919S&P_Jun16	43919COSTADJ_Aug16	43919COSTADJ
43919S&P_Mar16	43919COSTADJ_Jul16	43919COSTADJ
43919S&P_May16	43919COSTADJ_Jun16	43919COSTADJ
43919S&P_Rw5Sep16	43919COSTADJ_May16	43919COSTADJ
43919S&P_Sep16	43919COSTADJ_Rw5Sep16	43919COSTADJ
43919SITE_Apr16	43919COSTADJ_Sep16	43919COSTADJ
43919SITE_Aug16	43919HARRIS_Apr16	43919HARRIS
43919SITE_Feb16	43919HARRIS_Aug16	43919HARRIS
43919SITE_Jul16	43919HARRIS_Feb16	43919HARRIS
43919SITE_Jun16	43919HARRIS_Jul16	43919HARRIS
43919SITE_Mar16	43919HARRIS_Jun16	43919HARRIS
43919SITE_May16	43919HARRIS_Mar16	43919HARRIS
43919SITE_Rw5Sep16	43919HARRIS_May16	43919HARRIS
43919SITE_Sep16	43919HARRIS_Sep16	43919HARRIS
AGSM	43919I&T_Apr16	43919I&T
ATLAS	43919I&T_Aug16	43919I&T
C5_Advanced	43919I&T_Feb16	43919I&T
C5_Demo	43919I&T_Jul16	43919I&T
C5_Proposal	43919I&T_Jun16	43919I&T
CJB_Test_Project	43919I&T_Mar16	43919I&T
Cobra 5 Test	43919I&T_May16	43919I&T
Comm	43919I&T_Rw5Sep16	43919I&T
CT	43919I&T_Sep16	43919I&T
CYGNSS Feb 2015	43919IA_Apr16	43919IA
CYGNSS Mar 2015	43919IA_Aug16	43919IA
CYGNSS Replan	43919IA_Feb16	43919IA
DEMOADV	43919IA_Jul16	43919IA
Dev Mgmt	43919IA_Jun16	43919IA
E-1	43919IA_Mar16	43919IA
EM-1 MSA	43919IA_May16	43919IA
Empower 4	43919IA_Rw5Sep16	43919IA
Europa	43919IA_Sep16	43919IA
EVA_CA	43919LOG_Apr16	43919LOG
EVAPROJ	43919LOG_Aug16	43919LOG
EVM-CAP	43919LOG_Feb16	43919LOG
EVM-SAP	43919LOG_Jul16	43919LOG
EVM-SAP2	43919LOG_Jun16	43919LOG
FCO 10-10-15	43919M&C_Apr16	43919M&C
FCO 12-4-14	43919M&C_Aug16	43919M&C
FCO 2-6-16	43919M&C_Feb16	43919M&C
FCO 3-5-16	43919M&C_Jul16	43919M&C
FCO 3-5-2015	43919M&C_Jun16	43919M&C
FCO 4-15-16	43919M&C_Mar16	43919M&C
FCO 4-4-15	43919M&C_May16	43919M&C
FCO 6-12-15	43919M&C_May16	43919M&C
FCO 6-21-15	43919M&C_Rw5Sep16	43919M&C
	43919M&C_Sep16	43919M&C
	43919PGMSUPT_Apr16	43919PGMSUPT
	43919PGMSUPT_Aug16	43919PGMSUPT
	43919PGMSUPT_Feb16	43919PGMSUPT
	43919PGMSUPT_Jul16	43919PGMSUPT



At last count, we have almost 200 NASA projects in Cobra. Varying types of projects in the database.

Project	Description	Status Date	Baseline Start	Baseline Finish
Financial Pace	Financial Pace	03/31/2023	09/30/2016	09/30/2026
FSOI	FSOI	06/30/2017	08/31/2013	06/30/2019
Functional Checkout	Functional Checkout		02/28/2013	02/28/2013
GEDI-9	GLOBAL ECOSYSTEM D	06/30/2017	10/01/2014	12/31/2025
GEDI-9 Test	GLOBAL ECOSYSTEM D	06/30/2017	10/01/2014	12/31/2025
GENERIC	Setup Project	05/31/2009	08/02/2006	11/30/2014
GFAST	GFAST	06/30/2017	08/31/2013	06/30/2019
GFAST TCR 0033	GFAST	04/03/2015	07/31/2014	09/30/2018
GSE	GSE	06/30/2017	08/31/2013	06/30/2019
GSFC SIMPLE	Simple Project for GSFC			
Int Ops	Int Ops			
Inter-Planet Shuttle	Inter-Planet Space Shut			
Landsat 9	Landsat 9			
LCRD Project	LCRD Project			
LEARN	Learning Cobra Demon			
LETF	LETF			
Logistics	Logistics			
L & R	L & R			
L-R GSE	L-R GSE			
LVO	LVOPE			
ML	ML			
ML EGSE Fab	ML EGSE Fabrication			
MPCV Test	MPCV Test			
OCI	Ocean Color Instrument			
O-PROJ1	Orion Project			
Orion	Orion Non-Prime			
Orion FY12 Forward	Orion Non-Prime			
ORION P2 PM DEC16A	DEC16 PM Archive File			
PACE	Plankton, Aerosol, Cloud			
PACE-Test	Plankton, Aerosol, Cloud			
Pad	Pad			
Payload Adapter	Payload Adapter			
PCO	PCO			
PPC	PPC			
Range	Range			
Restore_L_Base	Restore L			
Restore_L_02_2016 Feb	February			
Restore_L_03_2016 Mar	March			
Restore_L_04_2016 Apr	April			
Restore_L_05_2016 May	May			
Restore_L_06_2016 Jun	June			
Restore_L_07_2016 Jul	July			
Restore_L_08_2016 Aug	August			
Restore_L_09_2016 Sep	September			
Restore_L_10_2016 Oct	October			
RestoreL_2016_02 Feb				
RestoreL_2016_03 Mar				
RestoreL_2016_04 Apr				
RestoreL_2016_05 May				
RestoreL_2016_06 Jun				
RestoreL_2016_07 Jul				
RestoreL_2016_08 Aug				
RestoreL_2016_09 Sep				
RestoreL_2016_Base	Restore L FY16 + Labor			
RL_2016_04_Apr	Restore L 2016 Apr			
RL_2016_05_May	Restore L 2016 May			
RL_2016_06_June	Restore L 2016 June			
RL_2016_07_July	Restore L 2016 July			
RL_2016_08_Aug	Restore L 2016 August	08/31/2016	01/31/2016	03/31/2023
RL_2016_09_Sep	Restore L 2016 September	09/30/2016	01/31/2016	03/31/2023
RL_2016_10_Oct	Restore L 2016 October	10/31/2016	01/31/2016	03/31/2023

Project	Baseline Start	Baseline Finish
RL_2017_06_June	06/30/2017	01/31/2016
RW5 ETC	06/30/2016	07/29/2016
RW5 ETC_Sep16	09/30/2016	12/24/2021
RW5 ETC_Jul15	07/29/2016	12/24/2021
SA AMO Program	09/30/2016	09/30/2016
SA AMO Program	09/30/2016	11/30/2018
SCCS	06/30/2017	08/31/2013
SCV	06/30/2017	08/31/2013
SEI	06/30/2017	08/31/2013
SEIO	06/30/2017	08/31/2013
SGSSOTBSEP16HARRIS	09/30/2016	09/03/2010
SGSSOTBSEP16HARRIS	09/30/2016	09/03/2010
SGSSOTBSEP16HARRIS_RW5	09/30/2016	09/03/2010
Ship	Ship Program	01/31/2009
SIT	SIT	06/30/2017
SLS	SLS	03/31/2017
SLS SEIO	SLS Systems Engineering	05/31/2017
SMA	SMA	06/30/2017
SOPE	SOPE	06/30/2017
Space Off Ops	Space Off Ops	06/30/2017
SSPD 3	Restore L FY16 + Labor +	02/29/2016
SSPD 4c		01/31/2016
SSPD Restore L 7	Restore L Test Load by Hc	03/31/2016
SSPD Restore L Test	Restore L Test Load Envir	03/31/2016
TESS GSFC	TESS GSFC	06/30/2017
VAB	VAB	06/30/2017

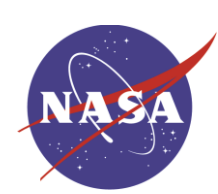


What is Empower?

- Browser-based analytical tool that integrates earned value, schedule, work authorization, and other key performance data to enable proactive management of complex projects

The screenshot displays the Empower software interface for the project 'NiteHawk 12/30/16 WBS Dollars'. The interface includes a menu bar (File, Options, Charts, Reports, Inputs, Dashboards, Views, Prefilters, Admin, Help) and a toolbar with various analysis tools. A red box highlights the 'Dataset' button in the toolbar, with an arrow pointing to an 'Open Dataset' dialog box. The dialog box shows a list of datasets with '12/30/16' selected, and 'WBS' and 'Dollars' selected in the filters. The main area contains a data table with columns for HIER, LL, WBS, Description, % CMP, ET, SV, CV, VAC, BCWS, BCWP, ACWP, SV, SV %, SPI, CV, CV %, CPI, BAC, EAC, and VAC. A blue callout box labeled 'Earned Value Data' points to the CV, SV, and SPI columns. Below the table is a 'Cumulative Variance Chart' showing 'NiteHawk 12/30/16 WBS Dollars [00000000 : NiteHawk] Cumulative Variance (Millions)'. The chart has three lines: SCHED [-2.97] (blue), COST [-14.47] (red), and VAC [-31.83] (purple). A blue callout box labeled 'Charts' points to the chart area. To the right is an 'AI Narrative Report' for 'NiteHawk 12/30/16 WBS Dollars [00000000 : NiteHawk] AI Narrative'. The report includes a 'Summary' section stating the effort is behind schedule and over cost, and an 'EAC Analysis' section. A blue callout box labeled 'Reports' points to the report content.

HIER	LL	WBS	Description	% CMP	ET	SV	CV	VAC	BCWS	BCWP	ACWP	SV	SV %	SPI	CV	CV %	CPI	BAC	EAC	VAC
1		00000000	NiteHawk	75.73		←	→	→	45,397,074	42,430,837	56,905,689	-2,966,237	-6.53	0.935	-14,474,852	-34.11	0.746	56,027,919	87,860,220	-31,832,302
11		1	CLIN1	96.65		↑	→	→	25,482,854	25,322,498	39,359,119	-160,356	-0.63	0.994	-14,036,620	-55.43	0.643	26,199,095	45,000,934	-18,801,839
111		1.1	Design, Develop	94.82		↑	→	→	14,934,950	14,829,719	20,014,063	-105,231	-0.70	0.993	-5,184,344	-34.96	0.741	15,639,589	25,073,329	-9,433,740
1111	x	1.1.1	Program Management	98.50		→	→	→					0.34	0.997	-1,424,179	-30.96	0.764	4,669,469	9,331,861	-4,662,391
1112	x	1.1.2	Systems Engineering	98.82	C	↑	→	→					0.30	0.997	-1,343,988	-20.20	0.832	6,732,216	8,424,894	-1,692,677
1113	x	1.1.3	RTR NiteHawk Design	97.79		↑	→	→					1.95	0.980	-2,482,823	-70.72	0.586	3,589,759	7,316,575	-3,726,816
1117	x	1.1.9	Swing Clause	10.28	C	→	→	→					0.00	1.000	66,646	100.00	0.000	648,145	0	648,145
112		1.2	STA Manufacturing	99.89		↑	→	→					0.00	1.000	-9,382,036	-116.79	0.461	8,042,151	17,441,346	-9,399,195
1121	x	1.2.1	Program Managemt	99.60		→	→	→					0.00	1.000	-956,539	-44.95	0.690	2,136,758	3,084,730	-947,972
1122	x	1.2.2	Systems Engineering	100.00	C	→	→	→	622,342	622,342	186,120	0	0.00	1.000	436,222	70.09	3.344	622,342	186,120	436,222
1124	x	1.2.4	RTR NiteHawk Manufacturing	100.00		↑	→	→	5,031,899	5,031,899	14,016,406	0	0.00	1.000	-8,984,507	-178.55	0.359	5,031,899	14,042,132	-9,010,233
1125	x	1.2.5	Logistics & Tracking	100.00		→	→	→	147,546	147,546	71,154	0	0.00	1.000	76,392	51.78	2.074	147,546	71,154	76,392

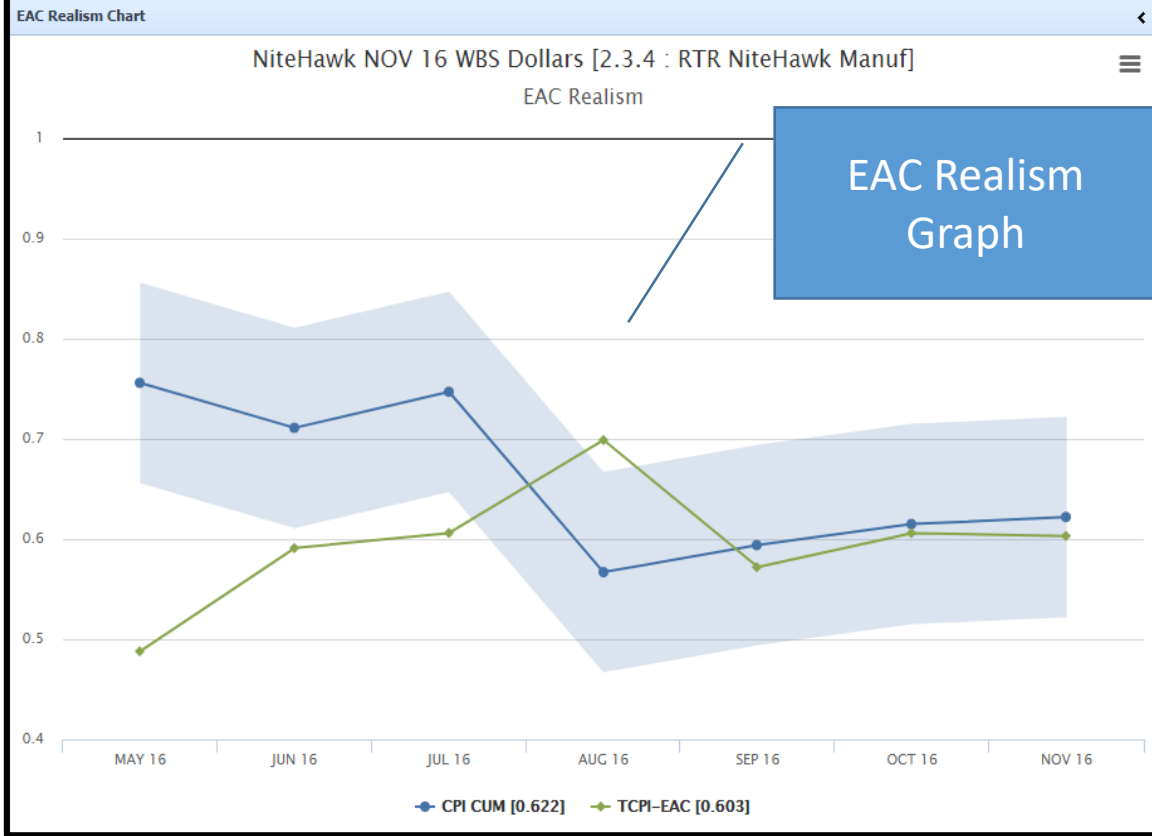


Empower – Estimate At Complete (EAC) and Variance Analysis

EAC Projections

Variance Explanations

HIER	LL	WBS	DESCRIPTION	BCWS	BCWP	ACWP	CpiCum	TcpiLre	CpiSpi	CumCpiFc	Micom	MovAvg3	MovAvg6	Etc	BAC	LRE
1214	x	2.3.4	RTR NiteHawk Ma	4,673,968	3,649,694	5,868,364	0.622	0.603	8,714,498	8,090,784	9,113,931	7,556,761	8,402,683	2,291,789	5,031,877	8,160,152
1215	x	2.3.5	Logistics & Tra	364,050	364,050	31,130	11.694	0.080	38,585	38,585	41,759	42,237	41,759	1,091,070	451,225	1,122,201
1216	x	2.3.6	Closeout	0	0	0	0.000	1.259	76,681	76,681	76,681	76,681	76,681	60,897	76,681	60,897



VAR Narrative Report

NiteHawk NOV 16 WBS Dollars [2.3.4 : RTR NiteHawk Manuf]

VAR Narrative Report

Element: 2.3.4 / RTR NiteHawk Manuf CAM: Heather Wilson	Current Period	Cumulative to Date
SCH VAR	195,770	-1,024,274
SCH VAR %	159.94 %	-21.91 %
COST VAR	-135,122	-2,218,670
COST VAR %	-42.47 %	-60.79 %
VAC		-3,128,275
VAC %		-62.17 %
VAR Required	scSCV	

Current Schedule Variance: 195,770

BCWS	BCWP	SV	SV %	SPI
122,400	318,170	195,770	159.94	2.599

Cause

The current period SV is because of the reduced work force productivity resulting from recent organizational realignment. Reorganization activities occupied work force time that was planned to be used to accomplish work in the control account.

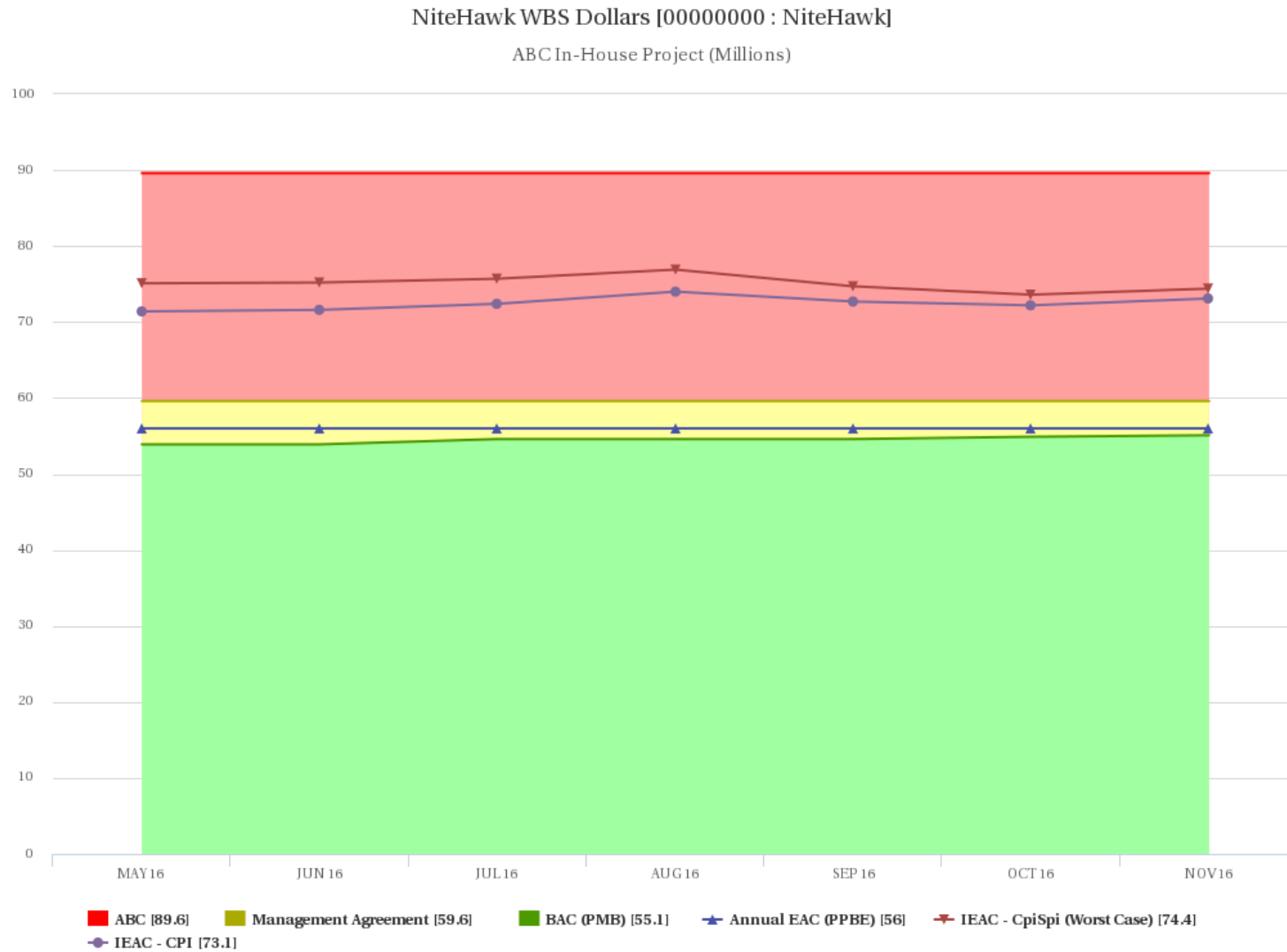
Impact to Immediate Task

We will make this up using overtime, but it will affect the costs.

Impact to the Contract



ABC and MA Tracking



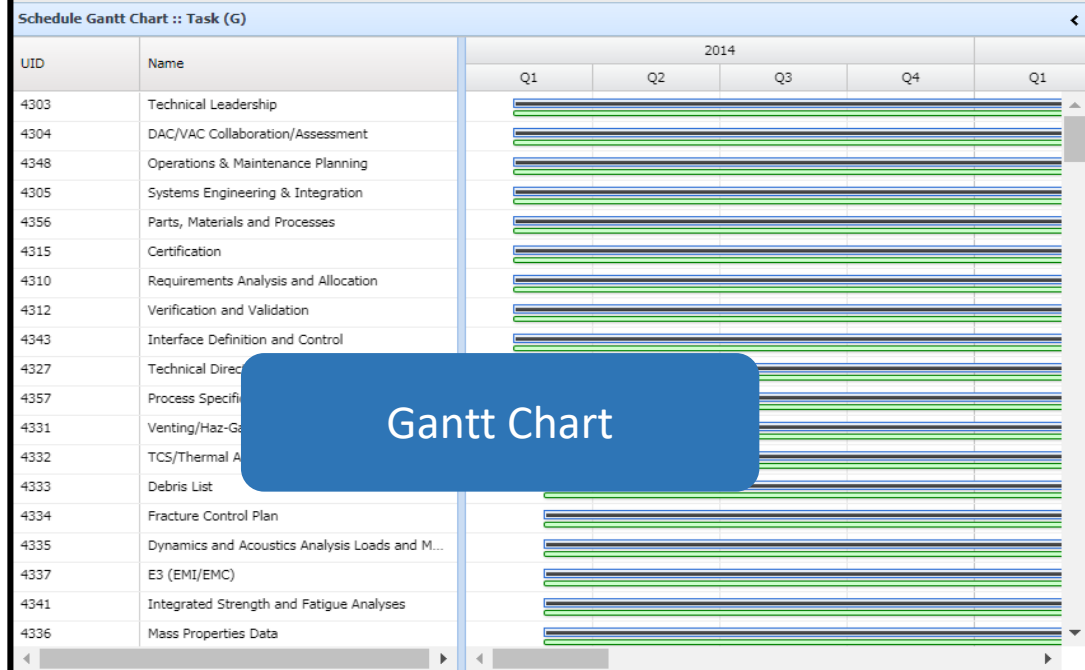


Empower with Schedule Data

NiteHawk 12/30/16 WBS Dollars :: Empower Schedule

HIER	LL	Elem	WBS	Description	% CMP	BEI	BeiPlan	BeiAct	BEI Delta	Slips	TotalFloat	Slips	HitIndex	SV	CV	VAC	BCWS	BCWP	ACWP	SV	SV %	SPI
1		1	00000000	NiteHawk	75.73	0.959	1363	1307	56	263	0.00	263	0.154	↔	↔	↔	45,397,074	42,430,837	56,905,689	-2,966,237	-6.53	0.93
11		2	1	CLIN1	96.65	0.978	1147	1122	25	85	0.00	85	0.167	↑	↔	↔	25,482,854	25,322,498	39,359,119	-160,356	-0.63	0.99
111		3	1.1	Design, Develop	94.82	0.948	402	381	21	50	0.00	50	0.000	↔	↔	↔	14,934,950	14,829,719	20,014,063	-105,231	-0.70	0.99
1111	x	4	1.1.1	Program Management	98.50	1.000	18	18	0	6	332.40	6	1.000	↔	↔	↓	4,615,093	4,599,460	6,023,639	-15,633	-0.34	0.99
1112	x	4	1.1.2	Systems Engineering	98.82	0.730	63	46	17	23	112.40	23	0.000	↔	↓	↔	6,672,849	6,653,080	7,997,069	-19,769	-0.30	0.99
1113	x	4	1.1.3	RTR NiteHawk Design	97.79	0.988								↑	↔	↑	3,580,361	3,510,533	5,993,356	-69,828	-1.95	0.98
1117	x	4	1.1.9	Swing Clause	10.28	1.000								↔	↔	↔	66,646	66,646	0	0	0.00	1.00
112		3	1.2	STA Manufacturing	99.89	1.000								↑	↔	↔	8,033,543	8,033,543	17,415,579	0	0.00	1.00
1121	x	4	1.2.1	Program Managemt	99.60	1.000								↔	↔	↔	2,128,150	2,128,150	3,084,689	0	0.00	1.00
1122	x	4	1.2.2	Systems Engineering	100.00	1.000	40	40	0	12	340.40	12	1.000	↔	↔	↔	622,342	622,342	186,120	0	0.00	1.00
1124	x	4	1.2.4	RTR NiteHawk Manufacturing	100.00	1.000	619	619	0	4	0.00	4	1.000	↑	↔	↔	5,031,899	5,031,899	14,016,406	0	0.00	1.00
1125	v	4	1.2.5	Logistics & Tracking	100.00	1.000	1	1	0	0	0.00	0	1.000	↔	↔	↔	147,546	147,546	71,154	0	0.00	1.00

Earned Value Data



Gantt Chart

Schedule Assessment Report

NiteHawk 12/30/16 WBS [1.1.2 : Systems Enginee]
Schedule Assessment

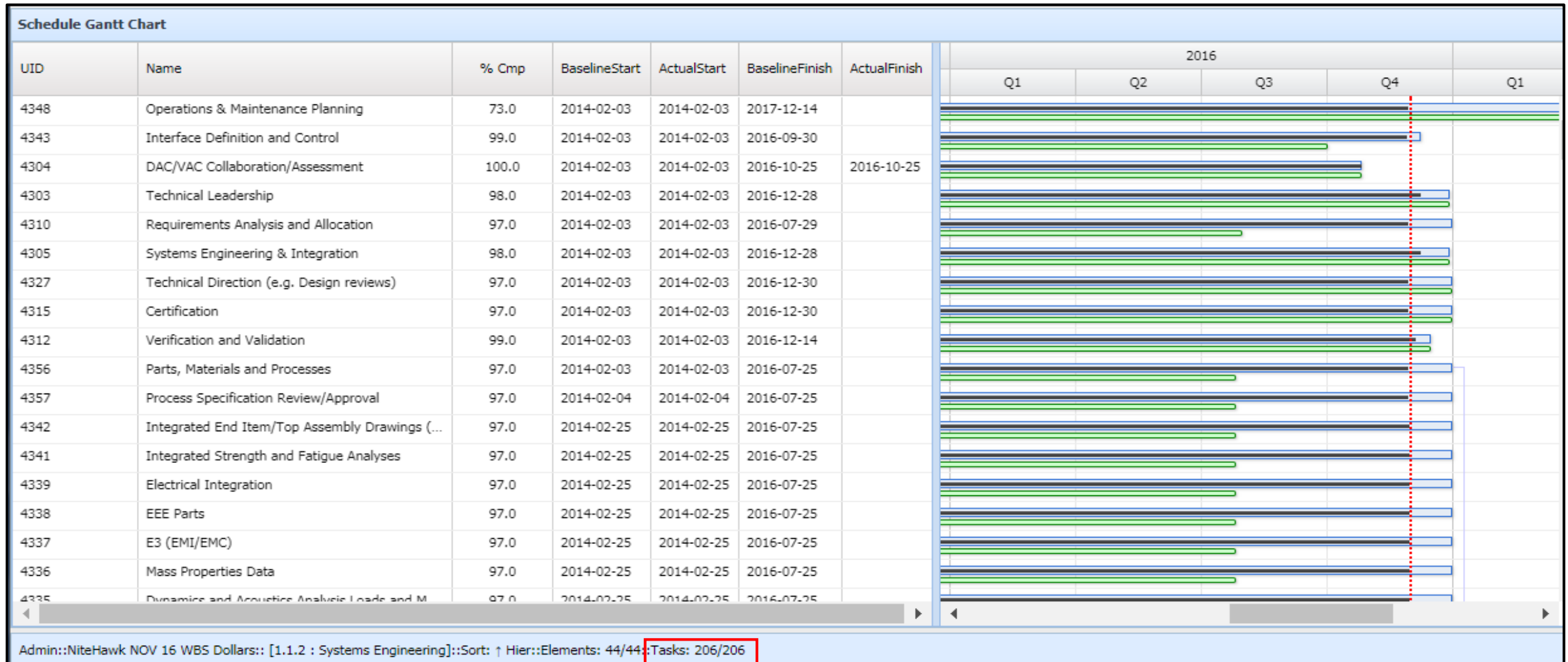
Linked Tasks	Complete Tasks	Incomplete Tasks	Incomplete Discrete Tasks	Planned Completions	Actual Completions	Relationship Count
206	156	50	45	63	46	61

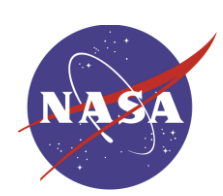
Metric	Description	Goal	Percent	Count
Logic	Missing predecessors, successors or both	<= 5 %	0.00 %	0
Leads	Number of leads	0 %	6.56 %	4
Lags	Number of lags	0 %	13.11 %	8
Relationship Type	Finish To Start	> 90 %	67.21 %	41
	Finish To Finish	10 %	32.79 %	8
	Start To Start	0 %	0.00 %	12
	Start To Finish	0 %	0.00 %	0
Hard Constraints	Maximum Lag	<= 5 %	0.00 %	0
High Float	Total Float > 44 Days	<= 5 %	100.00 %	50
Negative Float	Total Float < 0 Days	0 %	0.00 %	0
High Duration	Baseline Duration > 44 Days	<= 5 %	42.22 %	19
Invalid Dates	Invalid Forecast Start/Finish Dates	0 %	0.00 %	0
	Invalid Actual Start/Finish Dates	0 %	0.00 %	0
Missed Tasks	Tasks not performing to baseline plan	<= 5 %	36.51 %	23

Schedule Reports



Gantt Chart showing schedule information...you can also filter and sort on any columns





Schedule Assessment

Schedule Assessment Report						
NiteHawk NOV 16 WBS [1.1.2 : Systems Enginee] Schedule Assessment						
Linked Tasks	Complete Tasks	Incomplete Tasks	Incomplete Discrete Tasks	Planned Completions	Actual Completions	Relationship Count
206	155	51	46	61	46	62
Metric	Description			Goal	Percent	Count
Logic	Missing predecessors, successors or both			<= 5 %	0.00 %	0
Leads	Number of leads			0 %	6.45 %	4
Lags	Number of lags			0 %	14.52 %	9
Relationship Type	Finish-To-Start			> 90 %	67.74 %	42
	Finish-To-Finish			<= 10 %	32.26 %	8
	Start-To-Start					12
	Start-To-Finish			0 %	0.00 %	0
Hard Constraints	MSON, MFON, SNLT, FNLT			<= 5 %	0.00 %	0
High Float	Total Float > 44 Days			<= 5 %	100.00 %	51
Negative Float	Total Float < 0 Days			0 %	0.00 %	0
High Duration	Baseline Duration > 44 Days			<= 5 %	41.30 %	19
Invalid Dates	Invalid Forecast Start/Finish Dates			0 %	0.00 %	0
	Invalid Actual Start/Finish Dates			0 %	0.00 %	0
Missed Tasks	Tasks not performing to baseline plan			<= 5 %	29.51 %	18
Baseline Execution Index	Performance relative to baseline			> 95 %	75.41 %	46 / 61
Inconsistent Status	No Actual Finish but Percent Complete = 100 %			0 %	0.00 %	0
	Actual Finish with Percent Complete < 100 %			0 %	0.00 %	0
	Out of sequence status			0 %	0.00 %	0



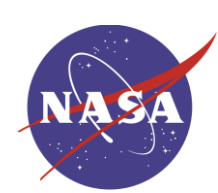
Data Quality Indicators

Six Period DQI Trends Report

NiteHawk NOV 16 WBS Dollars [1.1.2 : Systems Enginee]
Six Period DQI Trends

Data Quality Indicator	CAT	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	NOV 16
Time-phased BCWS not equal to BAC	E						
Time-phased ETC not equal to EAC	E						
Negative ACWP CUR	E						
CPI-TCPI > 0.1	F						
Leads	S						
Lags	S	15					
SS relationship	S	12	12	12	12	12	12
FF relationship	S	8	9	9	8	8	8
High float	S	55	54	54	52	51	51
High duration	S	18	18	19	19	19	19
Missed target finish date	S	2	16	16	18	18	18
BEI Incomplete	S		13	13	15	15	15
CEI Incomplete	S				1		
Out of sequence status	S	1	1	1	1		
LOE activity with discrete successor	S	6	6	6	6	6	6
Activity in IMS without IMP code	S	57	55	55	53	52	51
Forecast finish before last ACWP/ETC	I	1	1	1	1	1	1
Baseline finish after last BCWS	I	1	1	1	1	1	1

Can I trust the data to develop cost and schedule estimates?



Current Contracts in Empower

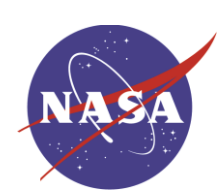
At last count, over 175 NASA projects in Empower

ContrID	ContrName	ContrName	ContrName	ContrName	ContrName	ContrName
3	104965	GED I	J-2X4	LVSA	Orion Non-Prime	SP
491	105749-Mars	GFAST	J-2XCL1	LWS	PACE	SOPE
493	106188-PIXL	GPIM	J-2XCL1R	LWS-2	PCO	SPACE
494	106189-SHERLOC	GPS III - COps	J-2XCL1R-BW	Landsat 9 -Test	PPC	SPACE PROGRAM
492	106190-MOXIE	GPS III - PRODUCT	JPSS - 3,4 OMP	Living with a Star (LW	PROJECT ABC	SPOC3
4	1K642	GPSIII	JPSS - OMPS J1	Logistics	Pad	SWRI
194	828928	GSDO	JPSS ATMS 3-4	ML	Payload Adapter	Space Launch System Stages
269	ABCALLBCWP	GSE	JPSS Flight OMP	ML EGSE Fab	R25ABX1	Space Network Ground Segment Sustainment
463	AEPS	Heavy Ion Sensor	JPSS-ATMS	MMS12	R25ABX1-BW	Space Off Ops
511	AEPSBXX	Heavy Ion Sensor-	JPSS-DISTRIBU	MMS1201	R25ABXX	Space Propulsion
150	AGSM	ICESAT-2-REPLAN	JPSS-Ground	MMSPFB	RCTABXX	SpaceShuttle
325	AIT LOE	ICESat-2	JPSS-VIIRS	MMSPFB-Original	RCTABXX-BW	Stages
5	APL EVMS Review	ICON - EXCEL	JPSS2-XML1	MOH-2	Range	TDRS
535	ARRM	ICON - NEW	JUICE-UVS CD	MOH-4	Restore L	TDRS K
199	C3R LOE	IDQABXX	JWST	MOMA	SAGE III	TDRS K CY09
217	CLV - Upper Sta	IDQABXX-BW	JWST-Orig	MOMA-REB	SCCS	TDRS K II
219	CLV_US_MPS 8	ILC08 SPP Phase C	L-R	MWGOLD_Master	SCV	TDRS K Old
180	CT	ILCGP SPP Phase C	L-R GSE	NICER	SEI	TDRS M
390	CYGNSS	ISR CrIS JPSSTC	LANDSAT 9 Col	NICERALLBCWP	SEIO	TESS GSFC
169	Comm	ISR CrIS JPSSTD	LANDSAT-9	NiteHawk	SGSS	TESS GSFC-dcw
109	Consolidated_A	ISR CrIS JPSSTD-O	LCRDCUR	Notional Project	SGSS - 7	TESS MIT
373	Dev Mgmt	ISR JWST NASA	LCRDCUR-Old	OCAMS6	SGSS - 7 - TEST	TESS ORBITAL
80	E-I	ISR RBI BD	LCRDJPL	OLI-2	SGSS-II	TESSCUR
116	E2E	ISR RBI BD CLIN 1	LCRDSIMPLE	OLI-2-Burdened	SGSSOTB	Test
399	EM-1 MSA	ISR_CRIS_JPSS_3-	LETF	OMPSJ3J4	SGSS_L7	The Ionospheric Connection Explorer (ICON)
192	EXAMPLE	Int Ops	LM OSIRIS REx	OPI LOE	SIT	The Ionospheric Connection Explorer (ICON)-Orig
543	Empower 4	J-2X	LR	ORION P2 WORKING	SLS	Total and Spectral Solar Irradiance Sensor
374	FSOI	J-2X Clin 1 and 2	LR GSE	ORION-2	SLS - Aug 2016	VAB
		J-2X Clin 1 and 4	LVO	Orion New Current	SLS In-House	VIIRS JPSS J3 J4
						VIL LOE



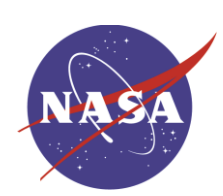
Other Helpful Empower Features

- Data can be imported from any system exporting the UN\CEFACT XML format
- Format 6 schedule data can be imported into the EV data to achieve cost and schedule integration
- You can track action items assigned to individuals in the system
- You can submit, track, approve or reject VAR explanations
- Export charts and reports
- Export sort window data to Excel to work off-line
- Create custom views, charts and reports to meet reporting requirements



Summary

- Cobra and Empower can both be used to support the cost and schedule communities
 - Basis of Estimate (BOE) Documentation (Cost and Schedule)
 - Change Tracking and Variance Analysis
 - Data mining to develop Cost Estimating Relationships (CERs), support CADRe, and prepare proposals and early preliminary estimates
 - Analyze and forecast cost and schedule at completion for in-process work scope, e.g. Standing Review Board (SRB) analysis
- Both tools are available in the Integrated Collaborative Environment (ICE)
 - Tools, implementation support and training are free
 - Access is requested through NAMS and controlled by the programs and projects



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