EVM System Surveillance at NASA

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Agenda

- EVMS Surveillance
- EVMS Surveillance Drivers
- EVMS Surveillance Process
- EVMS Surveillance Results
- Additional Resources

EVMS Surveillance

Continuous process of reviewing the health of the EVM System (EVMS)

The EVMS is effectively used to manage cost, schedule, and technical performance

The performance data generated are accurate and reliable

Key elements of the system are repeatable on subsequent applications.

EVMS Surveillance History

GAO Audit: EVM Implementation across Major Spaceflight Projects is Uneven.

APMC Approves CAP to Include "Enhance EVM Implementation

NASA-led EVMS surveillance begins on NASA Centers – Orion, SLS and PACE

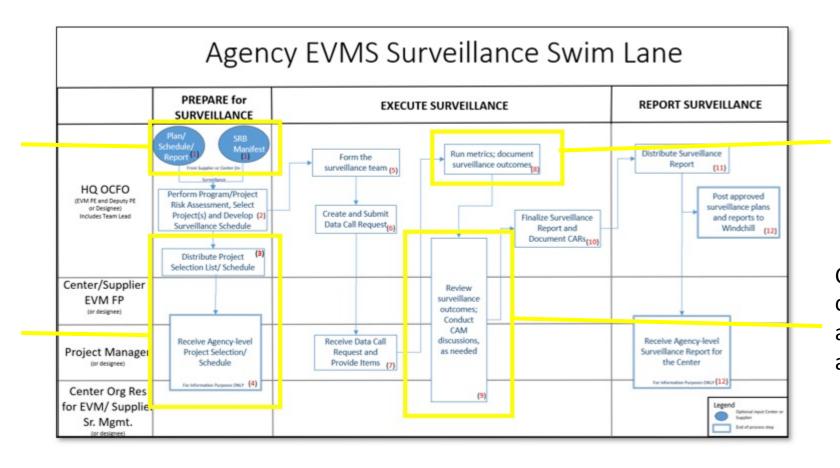**11/12**   **7/17**   **12/18**   **10/19**   **10/20**   **2/22**

EVM Surveillance Recommendation re-opened and identified as Priority

NASA-led EVMS surveillance begins at APL, JPL and SwRI

GAO formally closes audit recommendation

EVMS Surveillance Guiding Principles

Joint surveillance is encouraged

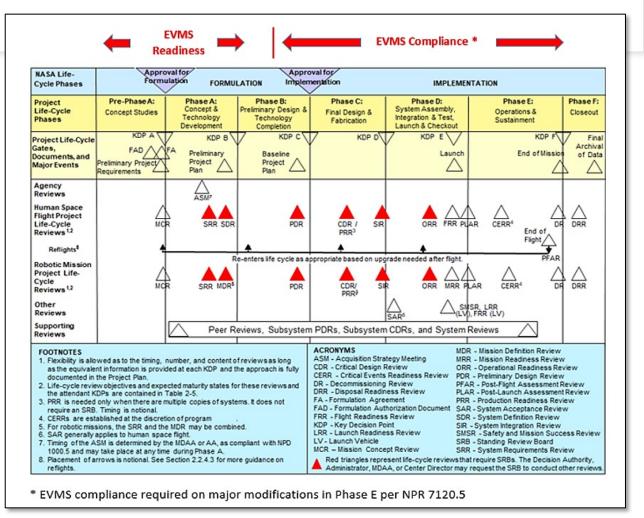Surveillance schedules will be developed and coordinated in advance

EVMS surveillance is modeled from DCMA data driven EVMS surveillance processes

CAM discussions only conducted when there are recurring data anomalies

Ensure Integrity of data/Minimize disruption to Suppliers and Centers

EVMS Surveillance over the Project Lifecycle

- Prior to EVM data availability, surveillance focuses on EVMS readiness
  - Team setup, training, tools and EVM implementation planning
  - Organizing, planning, scheduling, budgeting and accounting

- When EVM data is available, surveillance is focused on EVMS compliance
  - EVM analysis and management reporting, forecasting and revisions

FY22 EVMS Surveillance Schedule

- Schedule is developed on an annual basis
- All EIA-748 guidelines (32) are surveyed over a three (3) year period.
- Guidelines may be repeated, as needed.
- The same guidelines may be reviewed on multiple projects.

NASA EVM Surveillance Projects Schedule by Guideline FY 2022 by Month
updated: September 2021 (EV W0)

NASA Supplier/ Center	2.A. PROGRAM	2.B. PROJECT	KDP-C Date	JUL	AUG	QS4EP	OCT	NOV	QD1EC	JAN	FEB	QM2AR	APR	MAY	QJ3UN	JUL	AUG	QS4EP
				GL 01*, 02*, 03*, 06*			GL 03*, 05, 06*			GL 07, 08, 09, 10, 11			GL 12, 13, 14			GL 15, 16, 17		
							In coordination with IBR data GL 01, 02	In coordination with IBR data GL 01, 02	In coordination with IBR data GL 01, 02	GL 03, 06	GL 03, 06	GL 03, 06	TBD	TBD	TBD	TBD	TBD	TBD
					GL 23*			GL 03, 06, 23*			GL 28, 29, 30, 31, 32			GL 27			TBD
					GL 01, 02, 03			GL 05, 06			GL 08, 09, 10			GL 12, 16			
				GL 06, 22, 27, 29, 32													
				JPL Full Surveillance Subcontract Mgmt Process Group: GL 09, 10, 12, 16, 22, 23, 27 Change Incorporation Process Group: GL 28, 30, 31, 32 Follow Up Watch Items: GL 03, 06												
				IBR*** GL 02, 03, 05, 06, 14, 16, 29													

* Partial
** Schedule and Guideline selections are tentative and subject to change
*** IBR Dates are tentative & Guideline selections are based on anticipated data available at IBR

Approach to Selecting Projects
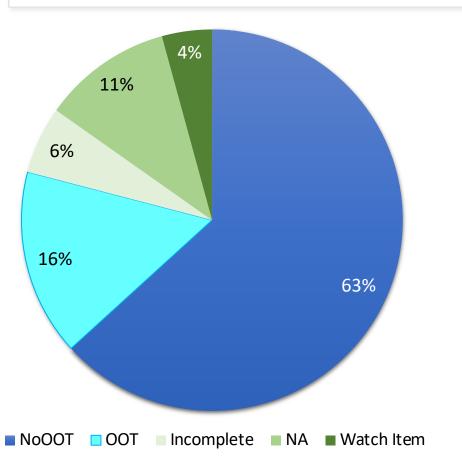
- **Approach**
  - Be as objective as possible
  - Reference existing resources from NDIA and DCMA
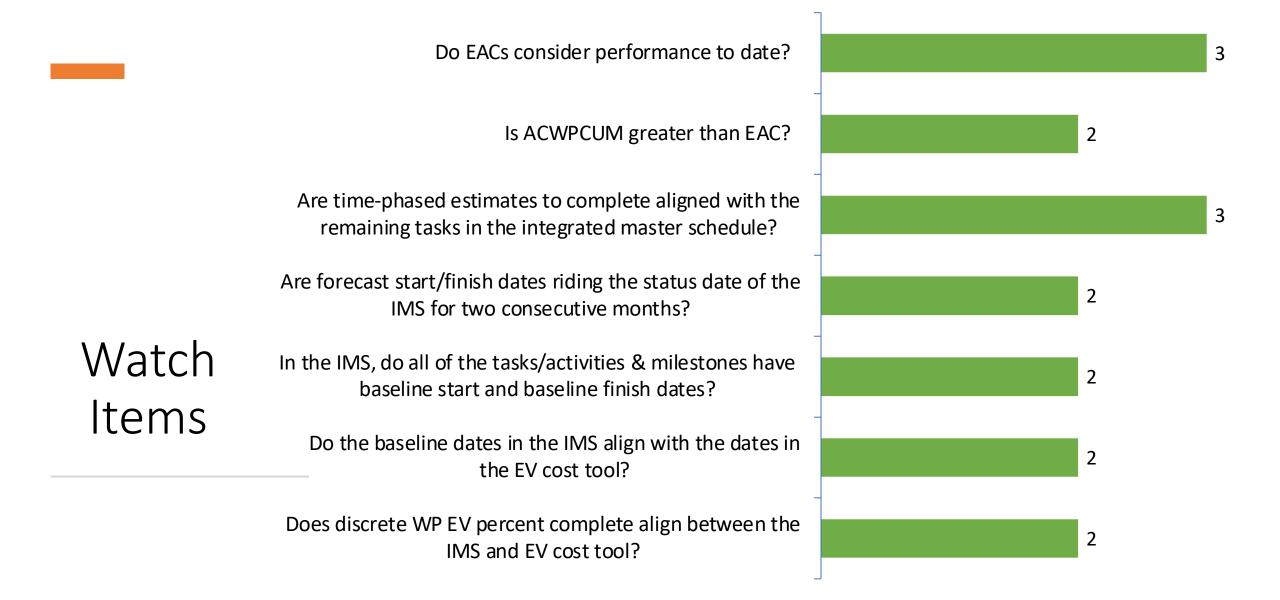 - Tailor for NASA's use
- **Selected projects based on**
  - Input from Mission Directorates
  - Input from Centers (joint surveillance)
  - Accommodate Agency-wide oversight requirement
  - Risk Scores from project selection and risk ranking matrix
  - Target three (3) projects (based on resources)

#	Type	Risk Factors	Instructions	Weight	High = 3	Medium = 2	Low = 1
9	Process	Special Review Required	If a special review occurs, excluding a normal Compliance Review, then the program is considered High Priority for surveillance. In house projects are reviewed by OIG, Mission Directorate, etc. Tip: Count audits that are active or released within the past year. Tip: HQ EVM Surveillance team will reference OCFO HQ SID Programmatic Audit Tracker (updated by Kevin Gilligan).	0.05	Review for Cause, Implementation Review, "External Breach Review", or Other Special Review Required	NA	Normal Compliance Review
10	Process	EVMS Surveillance and CAR Status	Internal EVMS surveillance in place, is routine and documented. Corrective Action Requests (CAR) term used generically to identify any open actions or issues with the EVMS.	0.10	No EVMS surveillance in place or EVMS surveillance in place with ≥ 5 CARS	Approved, Deficiencies Identified or ≥ 2 - 4 CARS	EVMS Surveillance in place or ≤ 1 CAR
11	Process	Integrated Cost and Schedule and EVM Data in NASA Central	Project submitting the integrated master schedule (IMS) to and EVM data to the NASA EVM central repositories?	0.05	Integrated Cost and Schedule and EVM Data is NOT in NASA Central Repository	NA	Project has Submitted Integrated Master
12	Programmatic						
13	Programmatic						

#	Type	Risk Factors	Instructions	Weight	High = 3	Medium = 2	Low = 1
1	Performance	Cum SV %, Cum CV %, Cum VAC%	Score determine if one or more of the three % trip the threshold. Tip: If the project had re-programming, score may be from that point forward. Tip: Source should be Empower data. Project is responsible for informing the Agency (Empower Admin) of the reprogramming date (to prevent manual calculations).	0.10	> (+/-) 10%	(+/-) 5% to 10%	< (+/-) 5%
2	Performance	% Complete	% Complete = (BCWPcum / BAC) * 100	0.10	0 - 20%	21% - 84%	> 85%
3	Performance	LOE Risk	Amount of LOE Tip: If the project had a reprogramming (S=P=A), calculate LOE% only since reprogramming.	0.05	LOE > 60 %	30 % - 60 % LOE	LOE < 30 %
4	Performance	EAC Realism (TCPI-CPI)	Calculate TCPI = (BAC - BCWPcum) / (EAC - ACWPcum) CPI = BCWPcum / ACWPcum If TCPI - CPI is greater than .5, then the contractor's EAC may be unrealistic and needs to be further investigated. Tip: If the project had re-programming, score may be from that point forward.	0.10	> .1	.05 to .1	< .05
5	Performance	Baseline Volatility/ Modifications and Changes	Evaluate historical and future volatility based on current month and 6 months prior and 6 months future by taking the average. The average is calculated by taking the sum of percentage change by the total number of reporting periods (past, current, future). Tip: Use Empower Report "BCWS Volatility" (based on OSD Trip Wire Metric)	0.05	> 15%	5 - 15%	< 5%
6	Schedule	Missed Milestones	Based on key project milestones and the number of months slipped. As per NPR 7120.5, milestones include systems requirements review (SRR), preliminary design review (PDR), critical design review (CDR), system integration review (SIR), operational readiness review (ORR), flight readiness review (FRR), and post-launch assessment review (PLAR) and other project-provided equivalent review milestones. Tip: Provide justification if rating is not consistent with Agency KDP Memo	0.10	One or more Program Major Milestones > 6 Months Behind Original Baseline	One or more Program Major Milestones 3 and 6 Months Behind Original Baseline	One or more Program Major Milestones < Months Behind Original Baseline
7	Schedule	Schedule Barometer	Scores are compared to similar completed projects (stored in Acuman cloud) to suggest a probability of success. Use Deltek Acumen Benchmark: Fuse Schedule Index	0.10	0-39 FSI	40-71 FSI	>72 FSI
8	Process	Risk and Opportunity Mgmt	Score based on level of risk/EVMS integration. Tip: Examples of risk/EVMS integration includes risk/opportunity incorporation into EAC; evaluation of MR; risk/opportunity in the plan and IMS. Evidence includes linking identified risks to WBS/scope.	0.05	R&O Register Not quantified or EVMS integrated	R&O Register Not maintained or quantified or EVMS integrated	R&O Register Quantified and EVMS integrated

Surveillance Findings (FY20 Q1 through FY22 Q1)

Pie chart: NoOOT 63%, OOT 16%, Incomplete 6%, NA 11%, Watch Item 4%

Legend: NoOOT, OOT, Incomplete, NA, Watch Item

Outcome	Term Used	Abbreviation	Description
Test Failed	Out of Threshold (DCMA term)	**OOT**	Threshold not met. No significant risk to EVM data credibility. Prospective re-test within 3-year cycle.
Test Passed	Not Out of Threshold (DCMA term)	**NoOOT**	Threshold met. No significant risk to EVM data credibility. Prospective re-test within 3-year cycle.
Test Passed or Failed	Watch Item	**WatchItem**	Demonstrated significant risk to EVM data credibility for informed decision making. Non-compliant to Guideline. Monitored for resolution. Prospective Corrective Action Request (CAR).
Not Applicable	Not Applicable	**NA**	Not able to run test due to unobtainable data (e.g., requires a subcontractor, IMP)
Incomplete	Incomplete	**Incomplete**	Not able to complete test due to temporary lack of data/knowledge. Note: not included in Test Metric counts (quarterly).

Watch Items

Question	Value
Do EACs consider performance to date?	3
Is ACWPCUM greater than EAC?	2
Are time-phased estimates to complete aligned with the remaining tasks in the integrated master schedule?	3
Are forecast start/finish dates riding the status date of the IMS for two consecutive months?	2
In the IMS, do all of the tasks/activities & milestones have baseline start and baseline finish dates?	2
Do the baseline dates in the IMS align with the dates in the EV cost tool?	2
Does discrete WP EV percent complete align between the IMS and EV cost tool?	2

Conducted 689 DECM tests, covered 31/32 guidelines, deployed to four Centers, three suppliers, and 14 projects

EVMS Surveillance Vision

- CAP is fulfilled and NASA is removed from the GAO High Risk List
- Routine DECM driven internal surveillance at Suppliers and Centers institutionalized
- Foundation in place to reduce the need for Agency-level surveillance
- Support EVMS reciprocity
- Minimal or no data integrity issues

Additional Resources

- NASA EVMS Website [Earned Value Management (EVM) | NASA](#)

- NASA OCFO SID MAX [EVMS Acceptance and Surveillance - National Aeronautics and Space Administration - MAX Federal Community](#)

- DCMA EVMS Center [DCMA Data-Driven Earned Value Management System Compliance Pilot](#)

- EVM Focal Points [NASA EVM Working Group | NASA](#)

Questions