

National Aeronautics and
Space Administration

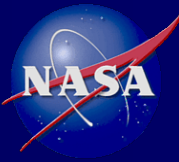


NASA EVM Update to NDIA

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Outline

- EVM Organizational Transition
- EVM Leadership
- NASA FAR Supplement (NFS) Update
- Procurement Class Deviation (PCD)
- When is EVM Required?
- NASA EVM Validation Approach for One-time Contracts
- NASA EVMS Validation and Surveillance Approaches
- Contact Info
- Questions
- Backups

EVM Organization Transition



- EVM, along with all PP&C functions, moved from the Office of the Chief Engineer (OCE) to the Office of the Chief Financial Officer (OCFO)
 - Expect personnel/functions to remain consistent with current approach
 - **Reviewing opportunities for synergy**, i.e., integrate cost estimating, PPBE, project planning, EVM, consolidated contracts, distributed/shared resources, etc.
 - **Appointed Presidential Position - CFO**
 - One of three within the agency
 - Expect more performance questions for projects going forward

NASA EVM Leadership





NFS Update

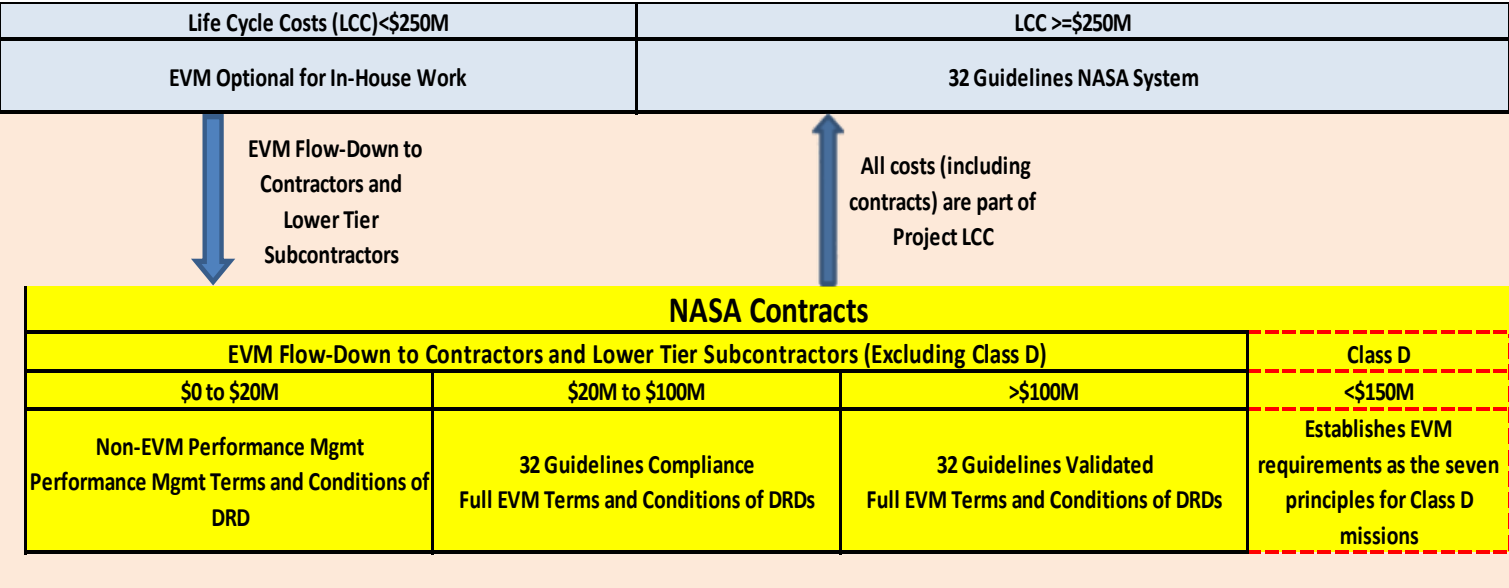
- **NFS Update** – currently NASA is awaiting DoD to submit its final DFAR language to OMB for comments prior to releasing our updated version
- Anticipated Changes
 - Changes thresholds from \$20M-\$50M to \$20M-\$100M
 - Changes Period of Performance from 12 months to 18 months
 - Previous wording was contracts, changed to contracts, task and delivery orders that meet the thresholds
 - **Contains development work scope, not cost type contracts (different from DoD)**
 - **Class D projects language, recent change resulting in a Procurement Class Deviation (PCD)**
 - **Typically cost capped type missions**
 - **Low cost, shorter development and operational phases and higher risks acceptable**

Procurement Class Deviation



- Increases EVM thresholds for Class D projects to \$150M
- EIA-748 EVM not required up to \$150M (excluding launch vehicle)
 - EVMS is not required provided tailoring and streamlining processes are utilized
 - Class-D missions should tailor and streamline processes, including performance measurements consistent with the NASA SMD Tailor/Streamlining Decision Memorandum dated March 23, 2018 found at https://soma.larc.nasa.gov/standardao/pdf_files/CAT3-ClassD-Letter.pdf
- EVM seven principles are required as documented at
- Typically, Class D projects are cost capped missions
 - cancelled if cost goals not being met or expected EAC growth
 - Low cost, with shorter development and operational lifecycles, higher risks acceptable
- New contracts as of March 2018
 - Removal of EVM requirements on existing contracts will result in the appropriate consideration for lessen requirements
- Deletes the Contract Performance Report (CPR) and Integrated Master Schedule (IMS) and replace these reports with an Integrated Program Management Report (IPMR)

When is EVM required?

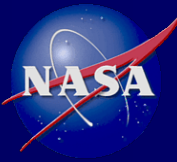


Projects considered major acquisitions (>=\$250M) by the Office of Management and Budget (OMB) require Earned Value Management. Projects that are valued to have a LCC >=\$250M anytime prior to KDP-C require EVM.

New Validation Approach for One-time Contracts



- EVM System (EVMS) acceptance and surveillance on small Agency space flight projects one time contracts with universities/small contractors can pose challenges for projects to meet requirements
- **Universities or small businesses with one time contracts**
 - Validation **Performed by Program** with support from Agency
 - What is gained with the new approach:
 - Improves consistency of expectations in the proposal process and implementation
 - Improves NASA and contractor communication and shortens the acceptance and surveillance process time
 - Focuses efforts on improved project data integrity and performance analysis, versus rigorous compliance requirements
 - **Only applies to the current contract, not corporate EVMS**



Acceptance & Surveillance Approaches

1. **Large industry contractors** with large contracts with both NASA and DoD (e.g., Boeing, Lockheed, etc)
 - Performed by the Defense Contract Management Agency (DCMA) via MOU
2. **Universities and/or Labs with multiple NASA contracts** (e.g., APL, SwRI)
 - Performed by Agency EVM Lead and NASA wide team
 - Validation reviews follow the DCMA model
 - Surveillance more Data Driven, with deep dives as required
3. **Universities, not-for-profits, small businesses, etc. with one time contracts** for small projects
 - Performed by Program with support from Agency

EVM Contact Information



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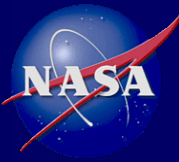
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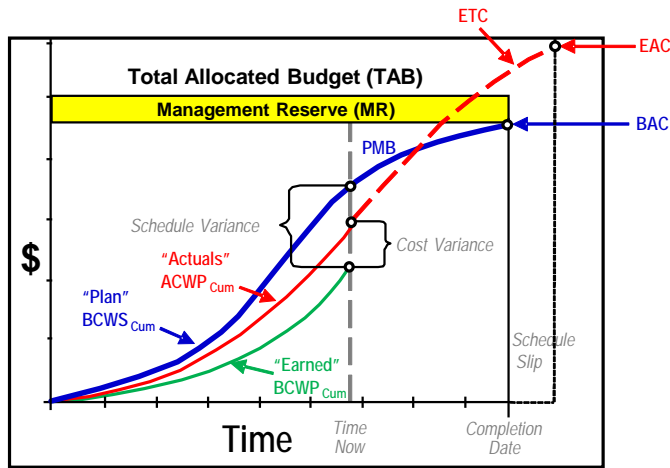


Questions?



PERFORMANCE MANAGEMENT REFERENCE CARD

Revised November 2015



VARIANCES Positive is Favorable, Negative is Unfavorable

Cost Variance $CV = BCWP - ACWP$
 (-)=over (+)=under budget $CV \% = (CV / BCWP) * 100$
 Schedule Variance $SV = BCWP - BCWS$
 (-)=behind (+)=over schedule $SV \% = (SV / BCWS) * 100$
 Variance at Completion $VAC = BAC - EAC$
 $VAC \% = (VAC / BAC) * 100$

OVERALL STATUS*

% Schedule $= (BCWS_{CUM} / BAC) * 100$
 % Complete $= (BCWP_{CUM} / BAC) * 100$
 % Spent $= (ACWP_{CUM} / BAC) * 100$

*Note: For total contract, budget at completion should include management reserve and undistributed budget

EFFICIENCIES

Cost Efficiency $CPI = BCWP / ACWP$ Favorable is > 1.0 , Unfavorable is < 1.0
CPI: For every \$1.00 of actual cost, we earned \$X worth of work planned
 Schedule Efficiency $SPI = BCWP / BCWS$ Favorable is > 1.0 , Unfavorable is < 1.0
SPI: For every \$1.00 of work planned (scheduled), \$X worth of work was accomplished or earned.

Baseline Execution Index (BEI) & Hit/Miss Task % (Favorable is > 1.0 , Unfavorable is < 1.0)

$BEI = \text{Total Baseline Tasks Completed} / (\text{Total Tasks with Baseline Finish On or Prior to Current Report Period})$
 $\text{Hit / Miss Task \%} = 100 * (\text{Tasks Completed ON or PRIOR to Baseline Finish} / \text{Tasks Baselined to Finish within Current Report Period})$

CALCULATED ESTIMATE AT COMPLETION = Actuals to Date + [(Remaining Work) / (Performance Factor)]

Examples:

$EAC_{CPI} = ACWP_{CUM} + [(BAC - BCWP_{CUM}) / CPI_{CUM}]$ – typically a best case
 $EAC_{Composite} = ACWP_{CUM} + [(BAC - BCWP_{CUM}) / (CPI_{CUM} * SPI_{CUM})]$ – typically a worst case

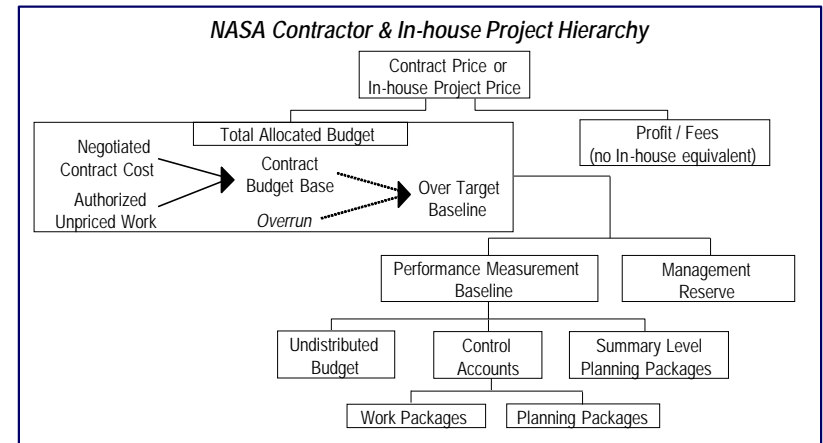
TO COMPLETE PERFORMANCE INDEX (TCPI) § #

$TCPI_{Target} = \text{Work Remaining} / \text{Cost Remaining} = (BAC - BCWP_{CUM}) / (\text{Target} - ACWP_{CUM})$

TCPI: For every \$1.00 of cost, estimate to earn \$X worth of work planned to finish on EAC

§ To Determine the TCPI for BAC or EAC; Replace TARGET with BAC or EAC

To Determine the Contract Level TCPI for EAC, You May Replace BAC with TAB



EVM REGULATIONS/REQUIREMENTS

Refer to the [NASA Earned Value Management](http://evm.nasa.gov/) website <http://evm.nasa.gov/>

- [OMB Circular A-11, Appendix J](#)
- [NASA NPD 7120.4D – NASA Engineering and Program/Project Management](#)
- [NPR 7120.5 – NASA Space Flight Program and Project Management Requirements](#) - defines when EVM is required and requires projects with EVM requirements to use an EVM system that complies with the [32 Guidelines](#) found in the EIA-748 Earned Value Management System (EVMS) Standard
- [NPR 7120.7 – NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements](#)
- [NPR 7120.8 – NASA Research and Technology Program and Project Management Requirements](#)
- [NASA Procurement Class Deviation \(PCD\) 15 -05, Class Deviation to NFS 1834.2, 1834.203 -70, 1852.234-1 and 1852.234-2 – EARNED VALUE MANAGEMENT SYSTEM, November 10, 2015](#)
- [NASA Procurement Information Circular \(PIC \) 10-17, Class Deviation to NFS 1816.405 -274: Award Fee Evaluation Factors are not Directly Tied to EVM Metrics , November 15, 2010](#)
- [NASA PIC 15-06, Guidance on the Integrated Program Management Report \(IPMR\) for EVM, April 28, 2015](#)
- [NASA EVM Contract Requirements Checklist](#)
- [NASA/Defense Contract Management Agency Memorandum of Understanding](#)

EVM REPORTS (<http://evm.nasa.gov/reports.html>)

- The [Integrated Program Management Report \(IPMR\)](#), Data Item Description DI-MGMT-81861 (latest version) at <http://www.acq.osd.mil/evm/resources/PG-DIDs.shtml>, is a consolidation of the Contract Performance Report (CPR) and the Integrated Master Schedule (IMS). See [NASA IPMR Data Requirements Description \(DRD\) Guide](#) for preparation of the IPMR DRD.
- [Sample Standard Analysis Package](#)
- Reporting for Non-EVM Contracts - see Appendix E of the [NASA/SP-2012-599 Earned Value Management \(EVM\) Implementation Handbook for sample DRDs](#)
- [Instructions for Requesting Access to Empower](#)
- To request the NASA Schedule Test and Assessment Tool (STAT) application software, go to the NASA Software Catalog at <https://software.nasa.gov/software/MFS-32602-1>

EVM IMPLEMENTATION HANDBOOKS (<http://evm.nasa.gov/handbooks.html>)

- [NASA/SP-2012-599 EVM Implementation Handbook](#)
- [NASA/SP-2010-3406 Integrated Baseline Review \(IBR\) Handbook](#)
- [NASA/SP-2010-3403 NASA Schedule Management Handbook](#)
- [NASA/SP-2010-3404 NASA Work Breakdown \(WBS\) Structure Handbook](#)
- [NASA/SP-2015-3708 EVM Reference Guide for Project Control Account Managers](#)

ACRONYMS

- ACWP Actual Cost of Work Performed** – Cost actually incurred in accomplishing work performed aka Actual Cost (AC)
- AUW Authorized Unpriced Work** – Work formally authorized, but not yet negotiated/definitized
- BAC Budget At Completion** – Total budget for total project/contract thru any given level
- BCWP Budgeted Cost for Work Performed** – Value of completed work in terms of the work’s assigned budget aka *Earned Value (EV)*
- BCWS Budgeted Cost for Work Scheduled** – Time-phased Budget Plan for work currently scheduled aka *Planned Value (PV)*
- BEI Baseline Execution Index** – Similar to the SPI, the metric used to indicate the efficiency with which actual work has been accomplished when measured against the baseline. It compares the cumulative number of baselined tasks actually completed each month to the cumulative number of baselined tasks scheduled to be completed each month. To assess whether the tasks actually completed as planned during a current month, calculate the *Hit/Miss Task %*.
- CA Control Account** – Lowest WBS element assigned to a single focal point to plan & control scope / schedule / budget
- CBB Contract Budget Base** – Sum of the negotiated project/contract cost plus the estimated cost of authorized unpriced work. It includes the PMB and MR. Customer approval is generally required to change it.
- CPI Cost Performance Index** – A measure of cost efficiency. Worth of work for every dollar spent. It compares BCWP to the actual cost to perform that work (*CPI = BCWP / ACWP*).
- CPM Critical Path Method** – A sequential path of tasks in a network schedule that represents the longest overall duration from “time now” through project completion. Any slippage of the tasks in the critical path will increase the project duration.
- DRD Data Requirements Description** – The document that describes the specific data required for supplier/contract management and reporting.
- EAC Estimate At Completion** – Estimate of total cost for project/contract thru any given level generated by Supplier (Ktr), PMO, DCMA, etc. = $EAC_{Ktr / PMO / DCMA}$. The Supplier’s EAC is also known as **Latest Revised Estimate (LRE)**.
- ETC Estimate To Complete** – Expected/anticipated costs needed to complete the remainder of work on project/contract.
- IBR Integrated Baseline Review** – A risk-based review conducted by Program/Project Management to ensure mutual understanding between the customer and supplier of the risks inherent in the supplier’s performance measurement baseline (PMB) and to ensure the PMB can be accomplished within the authorized schedule and budget.
- IPMR Integrated Program Management Report** – Consists of seven formats containing data for measuring cost and schedule performance on Government acquisition contracts (Formats 1-5 formerly the Contract Performance Report (CPR)):
 Format 1 defines cost and schedule performance data by product-oriented WBS elements.
 Format 2 defines cost and schedule performance data by supplier’s organization structure.
 Format 3 defines changes to the Performance Measurement Baseline (PMB).
 Format 4 Defines staffing forecasts.
 Format 5 is a narrative report used to provide the required analysis of data contained in Formats 1-4 and 6.
 Format 6 defines and contains the Integrated Master Schedule (IMS).
 Format 7 defines the time-phased historical and forecast cost submission.
- LOE Level of Effort** – Effort of a general or supportive nature that does not produce definite end products. Examples include supervision, program administration and contract administration.
- NCC Negotiated Contract Cost** – Contract Price Minus profit or fee(s). For In-house projects, the agreed to value.
- OTB Over Target Baseline** – Sum of CBB + additional budget approved for remaining work.
- PAC Price At Completion** – EAC Plus Adjusted Profit or Fee(s).
- PMB Performance Measurement Baseline** – The time-phased budget plan for authorized work.
- PP Planning Package** – Far-term effort not yet defined into WPs.
- SLPP Summary Level Planning Package** – Far-term contract activities not yet defined into CAs.
- SPI Schedule Performance Index** – A measure of schedule efficiency. It compares the BCWP to the work scheduled ($SPI = BCWP/BCWS$). An index of 1.0 means the work is being performed right to the schedule. $SPI > 1.0$ means that the work is ahead of schedule. $SPI < 1.0$ means that the work is behind schedule.
- TAB Total Allocated Budget** – Sum of all budgets for work on in-house project or contract = NCC, CBB, or OTB.
- UB Undistributed Budget** – Budget associated with specific work scope or authorized changes that have not been assigned to a CA or lower level WBS element.
- UFE Unallocated Future Expenses** – Estimated cost that cannot be allocated to WBS elements due to risk and future needs.
- VAC Variance at Completion** – Comparison of the BAC to the EAC through any given level (expected overrun or underrun of total costs)
- WP Work Package** – Near-term, detail-planned activities within control account; unit of work at level work is performed.
- WBS Work Breakdown Structure** – A hierarchical product-oriented division of program tasks depicting the breakdown of work scope for work authorization, tracking, and reporting purposes.

EVM APPLICATION AND THRESHOLDS

EVM system compliance and use is required on all acquisitions for development designated as major in accordance with OMB Circular A-11 and the Capital Programming Guide, and for development or production projects/contracts and subcontracts, including those for flight and ground systems, insitutional requirements (facility, information technology, investment, etc.) valued at or greater than \$20 million. The primary consideration for EVM applicability is the nature of the work, associated risks, and the value of the effort. EVM is not recommended on Firm Fixed Price contracts or contracts that are exclusively LOE.

Refer to the [NASA Earned Value Management](http://evm.nasa.gov/) website at <http://evm.nasa.gov/>

Development/ Production Contract (Total Estimated Value)	EIA-748 EVMS (PCD 15- 05)	NASA EVMS Solicitation & Contract Clause (PCD15-05)	IPMR DRD (PIC 15-06)	WBS DRD	Project Cost Report DRD (Non- EVM)	Supplier Flow Down (EVM)
Cost or Incentive Type ≥ \$100M	Validation Required	Required: NFS 1852.234-1 & NFS 1852.234-2	Required: Formats 1, 3, 5 and 6 (IMS); Recommended: Formats 2, 4 and 7	Required	Not Required	Prime contractor responsible for EVMS requirements on sub-contractors using same rules as applied to prime contract.
Cost or Incentive Type \$20M but < \$100M	Compliance with guidelines; validation not required	Required: NFS 1852.234-1 & NFS 1852.234-2 with Alternate	Required: Formats 1, 3, 5, and 6 (IMS); Optional: Formats 2, 4, and 7	Required	Not Required	
Cost or Incentive Type < \$20M; Major Acquisition Non-development contracts	Not required (optional at discretion of PM)	Not required unless PM elects to require EVM; then apply NFS 1852.234-1 & NFS 1852.234-2 with Alternate	Required: Format 6 (IMS) Recommended: Format 5 (Formats 1, 3 and 7 not required unless PM elects to require EVM)	Required	Required if EVMS and IPMR <u>not</u> required	
Firm Fixed Price > \$20M	Not required	Not required	Required: Format 6 (IMS); Recommended: Format 5	Required	Not required	

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Source: NASA EVM Website www.evm.nasa.gov



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