Fool's Gold

How Systemic Failures in Estimated Budget Tarnish Earned Value

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NASA Cost and Schedule Symposium

Peace Through Atomic Strength

Approved for Public Release

U.S. DEPARTMENT of ENERGY

National Nuclear Security Administration

Meet the Presenters



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Systemic Challenges in Program Health Visibility

- Earned Value Management (EVM) is treated as a “check-the-box” activity, fostering a checklist mentality instead of active performance management
- Weak baselines and inconsistent data quality are undermining the utility of the EVM system
- Current EVM metrics fail to accurately reflect program health, masking true performance and underlying trends
- These issues force a reactive management style, hindering early intervention and the ability to manage risks proactively

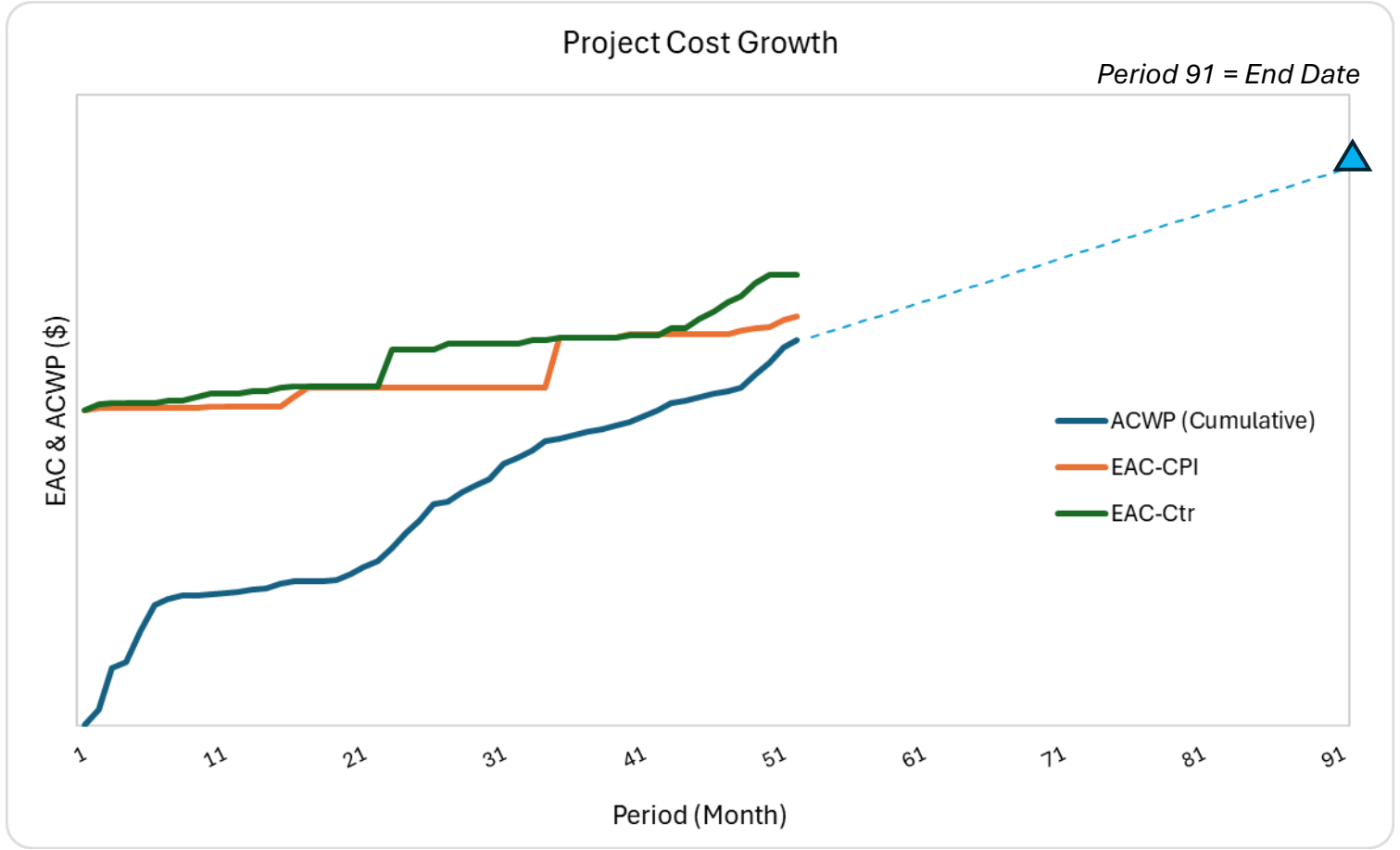
At the NNSA, Major Systems Projects are experiencing **4-6x cost growth** from initial estimate and **2x schedule growth**

In the last three Annual Weapons Assessments, GAO found **more than half** of the Major Defense Acquisition Programs experienced schedule delays:

2025	2024	2023
24 of 30	**15 of 25**	**18 of 26**
80%	60%	70%

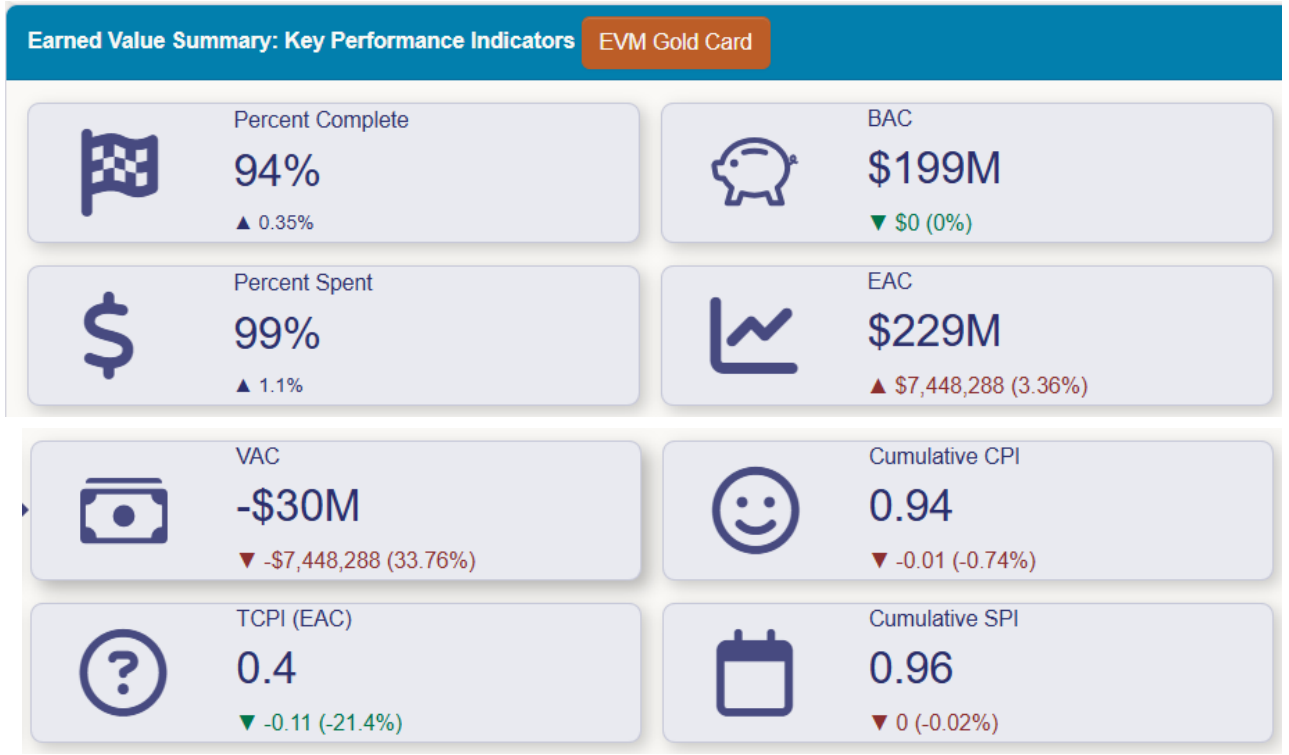
Project Growth is Not Captured by Gold Card EACs

- Estimate at Complete (EAC) increases of this magnitude indicate deeper, systemic issues within project management and cost estimating
  - Trends suggest major growth still expected
  - Actual Cost of Work Performed (ACWP) nears EAC with 40 months remaining
- What could be causing this growth?
  - Inadequate initial baselines
  - Lack of rigorous or independent Integrated Baseline Reviews (IBRs)
  - Insufficient risk management
  - Scope creep



Current Gold Card Metrics Can Be Misleading

- This project's EVM metrics do not paint the whole picture:
  - 94% complete
  - SPI (Cumulative): 0.96
  - CPI (Cumulative): 0.94
  - TCPI (EAC): 0.4
- It's nearly done and on track, right? Unfortunately, **no**:
  - 64% complete (based on milestones)
  - TCPI (BAC): 1.67
  - BAC grew over 8% without a re-baseline
  - SPI (Cumulative): 0.92 without pre-baseline LOE included



CPI/SPI = Cost/Schedule Performance Index
TCPI = To-Complete Performance Index

False EVM Data Delivers False Confidence

- Inadequate, or incorrect EVM data undermines decision-making:
  - Control Accounts showing “2000% complete”
  - Data driven by a single Work Package
  - BAC decreasing from $60M to $1.6M
  - Gaining millions of dollars of performance, with $0 cost associated (not during a single-point adjustment)
- Distorted data feeds into the EAC, making predictions unreliable
- “If errors are detected, then the [EVM] data will be inaccurate, resulting in bad decision-making.” (GAO)

Out of 11 NNSA projects analyzed:

11 had actuals spent on completed work
10 had earned value recorded with no actuals
8 had negative earned value
8 had negative budgets (BACs)
1 had earned value exceeding budget

GAO’s 2023 review of the **F-35 Joint Strike Fighter** found the program had consistent data anomalies. “Reliable EVM data are important to generate estimates at completion.”

Our Approach to Address EVM Challenges

The Problem	The Solution
Gold Card EACs are unable to capture NNSA project growth	Implement data-driven EAC models and validate them against historical trends
Gold Card metrics can be misleading	Recalibrate metrics and create visuals that reflect true performance and trend, not superficial contractor compliance
EVM data quality is lacking and unreliable for decision-makers	Develop comprehensive Data Quality Indicators (DQIs) to audit data quality; Summarize in an executive-level report

EARNED VALUE MANAGEMENT
'GOLD CARD'

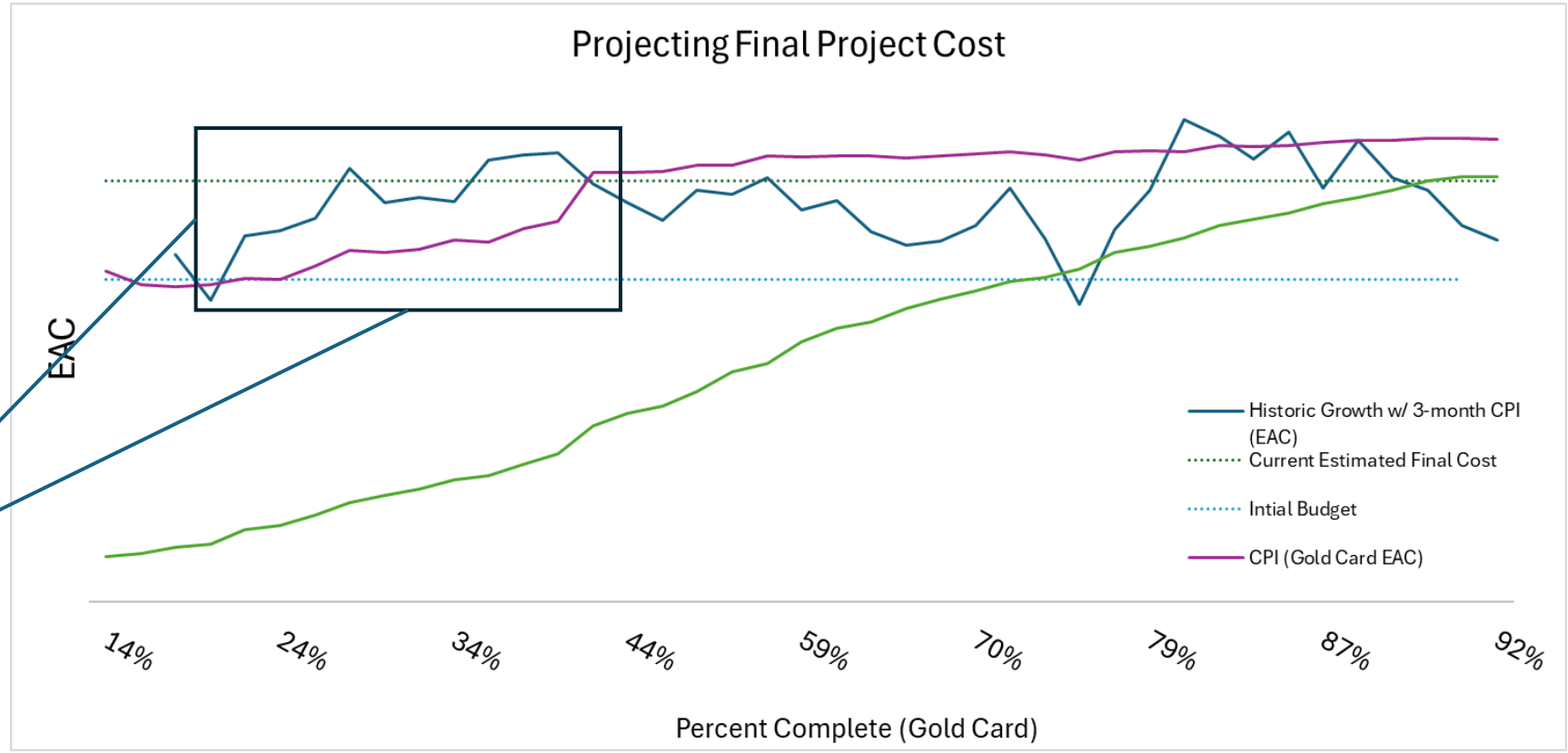


EARNED VALUE MANAGEMENT
'PLATINUM CARD'

Better Estimates Using Historic Performance

- We developed an **EAC Library** to test novel methods on NNSA completed & active infrastructure and weapons programs
- Gold Card EACs only uses performance of current project; Completed programs can provide a view into trends otherwise ignored

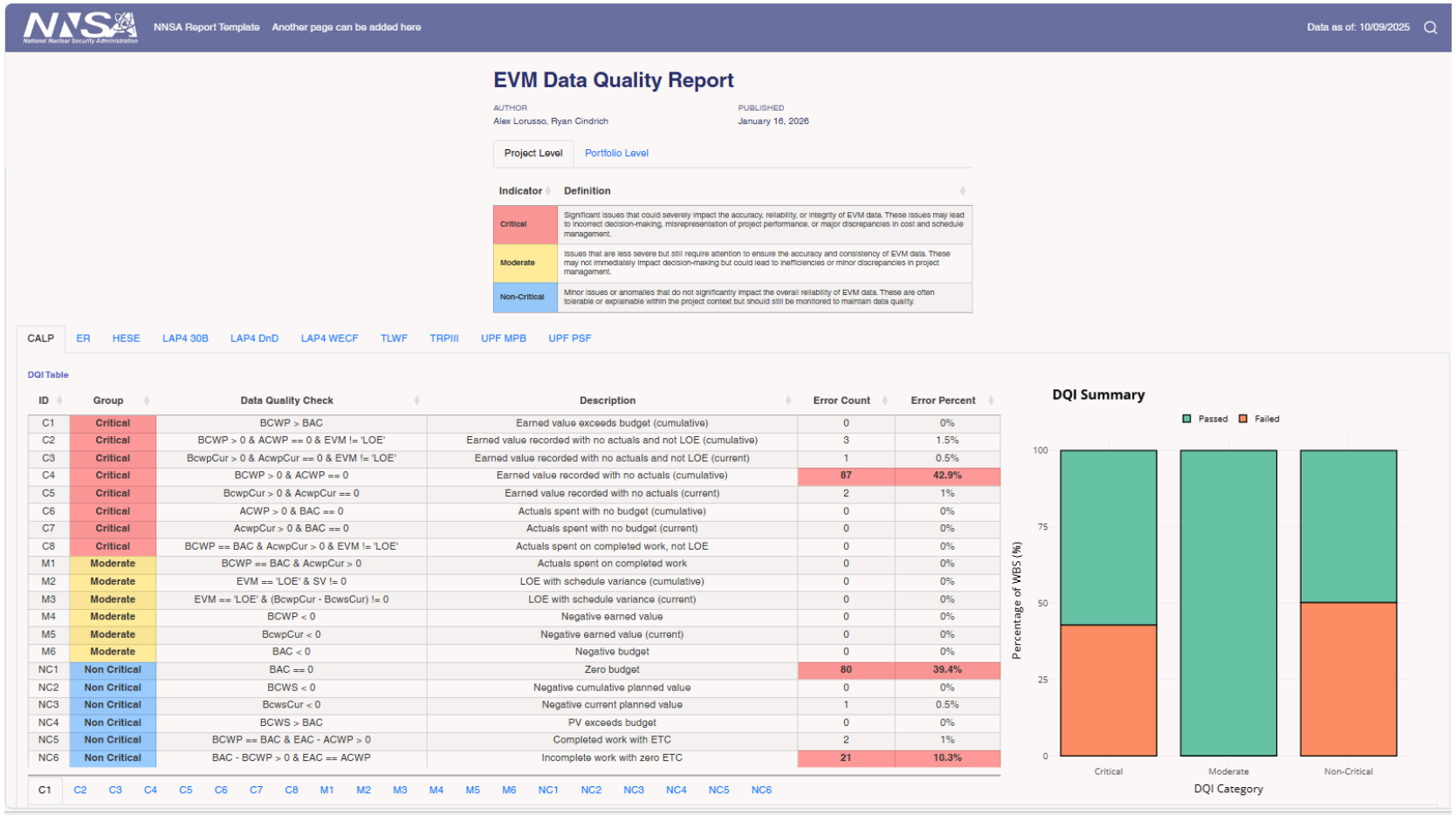




Historic Growth EACs may detect cost growth earlier than the Gold Card EAC

Better EVM Starts with Better Data

- We identified 22 **Data Quality Indicators** (DQIs) to assess all projects with EVM data
- We developed a **Data Quality Report** (DQR) in HTML that is user-friendly, shareable, and summarizes DQI findings at the Project and Portfolio levels for executives
- We can improve overall data quality and feel more confident using EV in our estimates by flagging issues early, addressing responsible parties, and mitigating impactful errors



NNSA Report Template Another page can be added here Data as of: 10/09/2025

EVM Data Quality Report

AUTHOR: Alex Lorusso, Ryan Cindrich PUBLISHED: January 16, 2026

Project Level | Portfolio Level

Indicator	Definition
Critical	Significant issues that could severely impact the accuracy, reliability, or integrity of EVM data. These issues may lead to incorrect decision-making, misrepresentation of project performance, or major discrepancies in cost and schedule management.
Moderate	Issues that are less severe but still require attention to ensure the accuracy and consistency of EVM data. These may not immediately impact decision-making but could lead to inefficiencies or minor discrepancies in project management.
Non-Critical	Minor issues or anomalies that do not significantly impact the overall reliability of EVM data. These are often tolerable or explainable within the project context but should still be monitored to maintain data quality.

CALP | ER | HESE | LAP4 30B | LAP4 DnD | LAP4 WECF | TLWF | TRPIII | UPF MPB | UPF PSF

DQI Table

ID	Group	Data Quality Check	Description	Error Count	Error Percent
C1	Critical	BCWP > BAC	Earned value exceeds budget (cumulative)	0	0%
C2	Critical	BCWP > 0 & ACWP == 0 & EVM != 'LOE'	Earned value recorded with no actuals and not LOE (cumulative)	3	1.5%
C3	Critical	BcwpCur > 0 & AcwpCur == 0 & EVM != 'LOE'	Earned value recorded with no actuals and not LOE (current)	1	0.5%
C4	Critical	BCWP > 0 & ACWP == 0	Earned value recorded with no actuals (cumulative)	87	42.9%
C5	Critical	BcwpCur > 0 & AcwpCur == 0	Earned value recorded with no actuals (current)	2	1%
C6	Critical	ACWP > 0 & BAC == 0	Actuals spent with no budget (cumulative)	0	0%
C7	Critical	AcwpCur > 0 & BAC == 0	Actuals spent with no budget (current)	0	0%
C8	Critical	BCWP == BAC & AcwpCur > 0 & EVM != 'LOE'	Actuals spent on completed work, not LOE	0	0%
M1	Moderate	BCWP == BAC & AcwpCur > 0	Actuals spent on completed work	0	0%
M2	Moderate	EVM == 'LOE' & SV != 0	LOE with schedule variance (cumulative)	0	0%
M3	Moderate	EVM == 'LOE' & (BcwpCur - BcwsCur) != 0	LOE with schedule variance (current)	0	0%
M4	Moderate	BCWP < 0	Negative earned value	0	0%
M5	Moderate	BcwpCur < 0	Negative earned value (current)	0	0%
M6	Moderate	BAC < 0	Negative budget	0	0%
NC1	Non Critical	BAC == 0	Zero budget	80	39.4%
NC2	Non Critical	BCWS < 0	Negative cumulative planned value	0	0%
NC3	Non Critical	BcwsCur < 0	Negative current planned value	1	0.5%
NC4	Non Critical	BCWS > BAC	PV exceeds budget	0	0%
NC5	Non Critical	BCWP == BAC & EAC - ACWP > 0	Completed work with ETC	2	1%
NC6	Non Critical	BAC - BCWP > 0 & EAC == ACWP	Incomplete work with zero ETC	21	10.3%

C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | M1 | M2 | M3 | M4 | M5 | M6 | NC1 | NC2 | NC3 | NC4 | NC5 | NC6

DQI Summary

Passed Failed

Percentage of WBS (%)

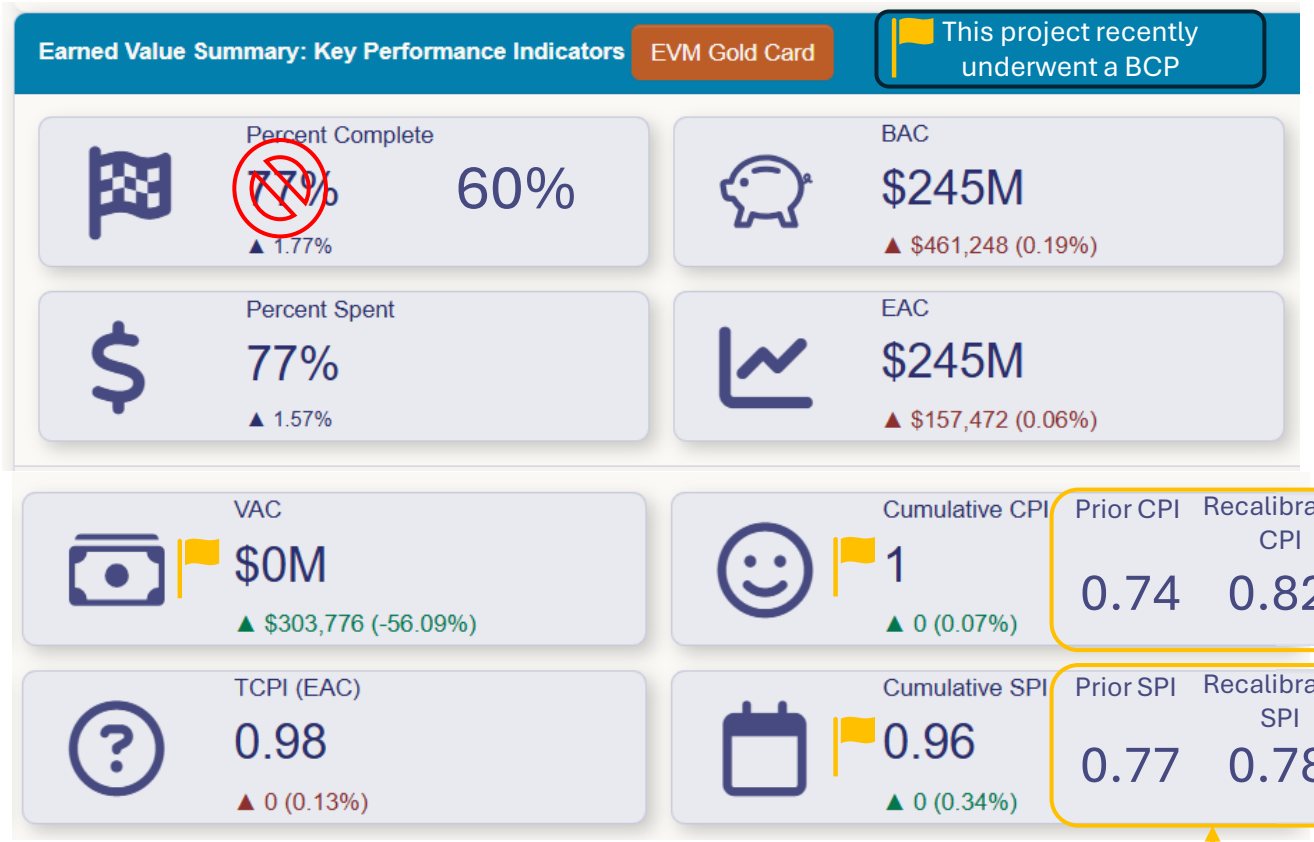
100 / 75 / 50 / 25 / 0

Critical Moderate Non-Critical

DQI Category

We Can Reframe Gold Card Reporting

- This project's Gold Card metrics show success:
  - 77% complete
  - BAC = EAC (VAC: 0)
  - CPI (Cumulative): 1.0
- But this project is missing targets:
  - 60% complete (based on scope)
  - Initial BAC = $124 M
  - BAC growth is 97%
  - Project re-baselined at 75% complete
  - CPI prior to rebaseline is 0.74
  - SPI on downward trend from 0.99 to 0.96
- Metrics may look good, but reframing and including additional context helps leaders understand the issues encountered to date



Platinum Card Shifts EVM to Proactive Management

- We can bring advanced, analytical capabilities to complex, high-risk projects by:
  1. Developing tailored EV metrics that highlight true project performance
  2. Enabling predictive, accurate, and actionable cost and schedule analysis
  3. Leverage DQIs to assess EV data integrity and collaborate with contractors to correct root causes of poor data

- While not a complete fix for broader project performance challenges, the Platinum Card approach represents a critical first step toward meaningful improvements

