

# **AUGUR**

## **Maintaining Baseline Control through a BCP**

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# Speaker Biography

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- Mr. Dave Ingalls, EVP
- Augur Consulting: CEO and Co-Founder
- Certified Earned Value Professional by AACE
- 15+ years providing cost engineering and schedule analysis services to DoD and DOE
- Supports DoD and DOE providing expertise on project controls, schedule management, and IBR's
- Avid cyclist, data nerd, Seahawks fan, and father to two young children



# Augur Introduction

Data Science/Data Analytics

## Cost Analysis

- Lifecycle Cost Estimating, PPB&E Support, Program Planning
- IGCEs, Source Selections, Vendor Negotiations
- Specialized Cost Analysis: AoAs, BCAs, CAIV, Should-Cost

## Schedule Analysis

- Schedule Construction and Maintenance
- Vendor Schedule Analysis, Schedule Health Assessments
- Schedule Risk Assessments, Critical Path Identification & Management

## Performance Management

- Earned Value Management (EVM) Analysis
- Integrated Baseline Reviews (IBRs) & IBR Training
- Contract and Vendor Management

- Augur is an SDVOSB based in the DC metro area
  - Founded 2012
  - Support government customers in DoD, DOE, & other government agencies
- Provide analysis aligned to 3 Core Competencies
  - Cost, Schedule, and Performance Management
  - All work is underpinned by data science capability

**Emphasis on Data Science has Inspired New Techniques for Problem Solving**

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- Problem Statement/Objective
- Section 1: Definitions and Guidance
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# Problem Statement

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## Problem Statement

- Program Managers (PMs) need to maintain fidelity and visibility into performance status even during uncertain/poor results
- BCP's may be value-add, but are disruptive to establish
- External stakeholders require funding traceability for projects

## Objective

- Review common rationale for a BCP or BCR requirement
- Highlight leading indicators that a BCP may be required
- Establish best practices to reduce disruption during BCP process
- Create guardrails to reduce chance of repeat BCPs on project

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# **Section 1**

## *Summary of BCP Definitions and Guidance*

# Rebaselining Definitions

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- **Rebaselining**
  - General term for the realignment of PMB to better correlate plan to execution
  - Meant to address situations when excessive variances or discrepancies between plan/execution limit the ability to track performance or take management action
  - May refer to either replanning or reprogramming
- *Replanning*
  - Realignment of schedule or budget within constraints of current contract
  - Does not impact total allocated budget (TAB) or delivery milestones
- *Reprogramming*
  - Comprehensive update to plan exceeding contractual budget and/or timeline

# Baseline Changes – Change Control Mgmt Guide

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- Project baseline change is any update to the PB or the PMB
  - Very easy to confuse these terms and related change control processes
  - PB: DOE CD-2 commitment for delivery on scope, schedule, and budget
  - PMB: EVM baseline measuring project cost and schedule performance
- Establishes BCP “Level” based upon signature authority
- Baseline change may refer to any of the following situations:
  - *Movement of budget within control account constraints, movement of budget between control accounts (within PMB constraints), movement of UB into control accounts, movement of MR into control accounts, movement of cost or schedule Contingency into contract performance baseline, Over Target Baseline (OTB), Over Target Schedule (OTS), KPP changes, TPC increase*



# “Baseline Changes” - EFCOG

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- Similar terminology, different meanings, varied guidance
- Baseline Change Revision (BCR)\*\*
  - BCR-P: Contractor internal replan within CBB
  - BCR-M: Contractor allocation of MR within CBB
  - BCR-C: FPD allocation of project contingency to CBB
- Baseline Change Proposal (BCP)\*\*
  - Documented change to Performance Baseline (PB)
  - Constructive change to scope affecting CBB
  - **Remediation of performance issues without changing CBB; governed by the Over Target Baseline (OTB) and Over Target Schedule (OTS) process**

\*\*Based on EFCOG feedback in 2013. Terms above identified for consistency

# Considerations for Constructive Changes

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- Changes to the scope of the contract require negotiation
  - Distribution of Contingency and changes to Key Performance Parameters (KPPs), contractual requirements, etc. must be mutually ratified
  - Requires Contracting Officer involvement to manage contract changes
  - M&O contracts require relatively fewer contract changes due to broad scope
- Negotiated changes to baseline follow separate process
  - For example, Request for Equitable Adjustment (REA) adjudication

**Brief focuses on performance management, not contract management**

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## **Section 2**

### *BCP Indicators: Performance Forecasting*

# On-going Analysis

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- Monthly performance management is a shared responsibility
  - Both contractor and Federal teams should assess progress monthly
  - Monthly metrics, trend analysis, root cause, and what-if drills all vital
  - Multiple perspectives avoids optimism bias in plan evaluation
- Performance data should be the driving rationale for BCP
  - A good baseline enables valid analysis, but this is not always available
  - Alternatively, intent of a BCP is to re-establish a valid performance baseline
- Performing BCP is not a trivial manner
  - Significantly time-consuming: value must exceed investment
  - Should **not** be driven by desire to erase variances or “polish” metrics

# Data Sources

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- IMS
  - Analyze task performance to date and forecast schedule completion
  - Different approaches to evaluating critical path versus bulk activities
- IPMR (CPR)
  - Primary source for both work performance and actual cost data
  - Indicates efficiency of work performed and allows for cost (EAC) forecasting
- Risk register
  - Important artifact quantifying probability and impact of risks
  - Should align to independent observation of risk

**Schedule performance impacts OTS and OTB; Cost impacts OTB**

# Metrics - IMS

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- Critical Path / Driving Path Analysis
  - Review Zero Float (or Negative Float) Path to key milestones and “hand-offs”
  - Align understanding of task performance with technical risk
  - Schedule Margin consumption highlights impact of risk to critical path
- Near Critical Path Density
  - IMS with more tasks “near” (ex, <10d) critical path increases chance of delay
  - Concept of merge bias complicates success path – see SRA slide following Risk
- Monitor schedule compression; logic and duration changes
  - Analysis of resource loading may identify forthcoming task “bow-waves”
  - Overallocation of resources, unrealistic shift density, and aggressive IMS calendars may be another early indicator of future schedule pressure
- Critical path delay informs cost of schedule extension (hotel load)

# Metrics - Cost

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- Goal is to execute on budget; mandate is to forecast impact
  - Independent EAC forecast is needed to understand end cost position
  - Analysis should include metrics highlighting cost and schedule performance to understand cost impact of delays
- Compare historical performance (CPI) to required performance (TCPI)
  - TCPIe assesses reasonableness of contractor EAC
  - TCPIb evaluates validity of baseline budget plan (BAC)
- Leverage cost planning artifacts to better understand schedule status
  - Analysis of “bulk” task completion from IPMR contrasts IMS focus on critical path
  - SPI – Discrete measures the dollarized completion efficiency of PMB tasks
  - Earned Schedule highlights Duration to Complete of PMB in terms of time

# Metrics - Risk

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- Both IMS and Cost analyses are based on historical data
  - Projected issues that haven't occurred will *not* be reflected in data set
  - Balance actual performance metrics against expected performance trends
- Difficult to gauge sufficiency of MR; two approaches
  - Tracking and trending MR burndown – run-out date given avg consumption
  - Incremental comparison of “factored” Risk Register to MR remaining
- Goal to align technical knowledge to project performance data
  - Following the concept of a risk maturing into an issue; performance challenges associated with technical risk may drive the need for a BCP
  - BCP required when latent risk far exceeds the ability to mitigate risk

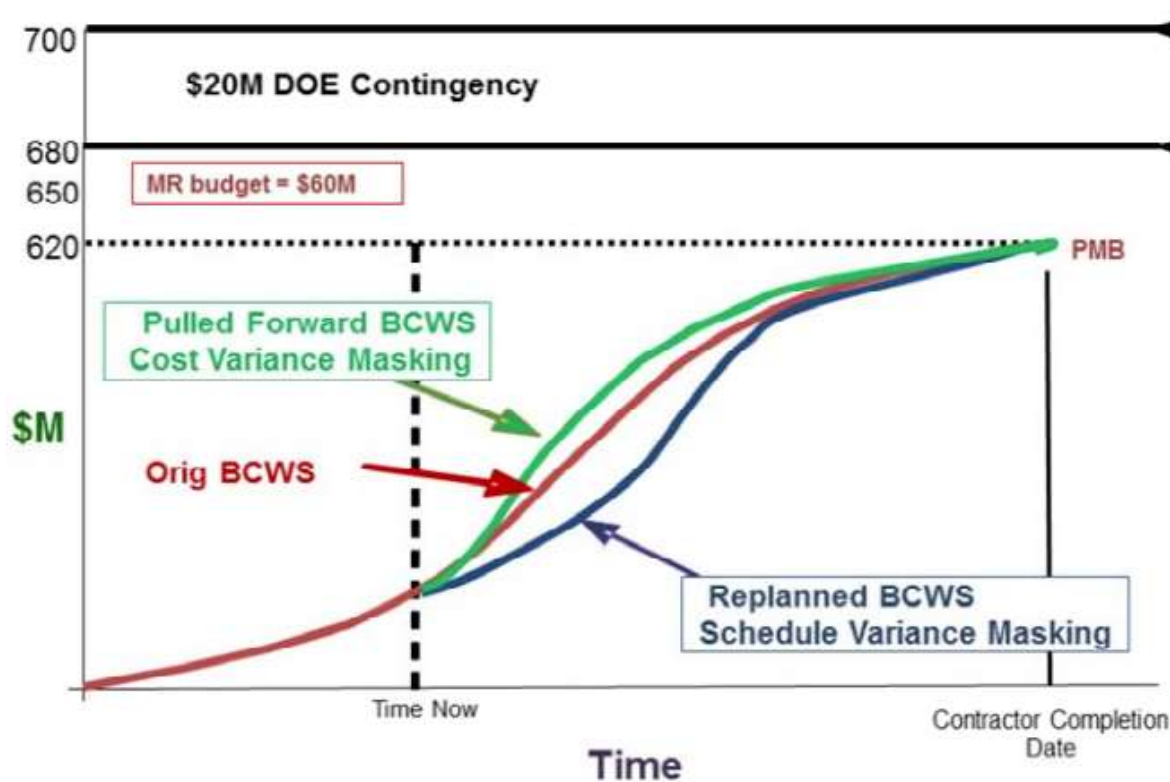


# Metrics – Schedule Risk Analyst (SRA)

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- SRA compares deterministic vs. probabilistic outcomes
  - Implement risk & uncertainty into IMS to identify potential delays
  - Model risk events to represent possible discrete incidents
  - Utilize uncertainty to capture range of possible outcomes
  - Assess probabilistic schedule utilizing Monte Carlo simulation
  - Leverage probable outcomes to calculate schedule contingency
- Completion milestones should be reasonably probable
  - IMS with a very low probability of meeting delivery milestones may serve as indicator to replan (align PMB to execution) or reprogram (OTS)

# Rubber Baseline



- Green Text (Surfing): Over-planning LOE work packages to gain “bonus” BCWP and mask CV
- Blue Text (Snowplowing): Constant deferral of BCWS to avoid registering schedule delays and -SV

Source: DOE-PM EVMS Training  
Snippet “Baseline Control Methods”

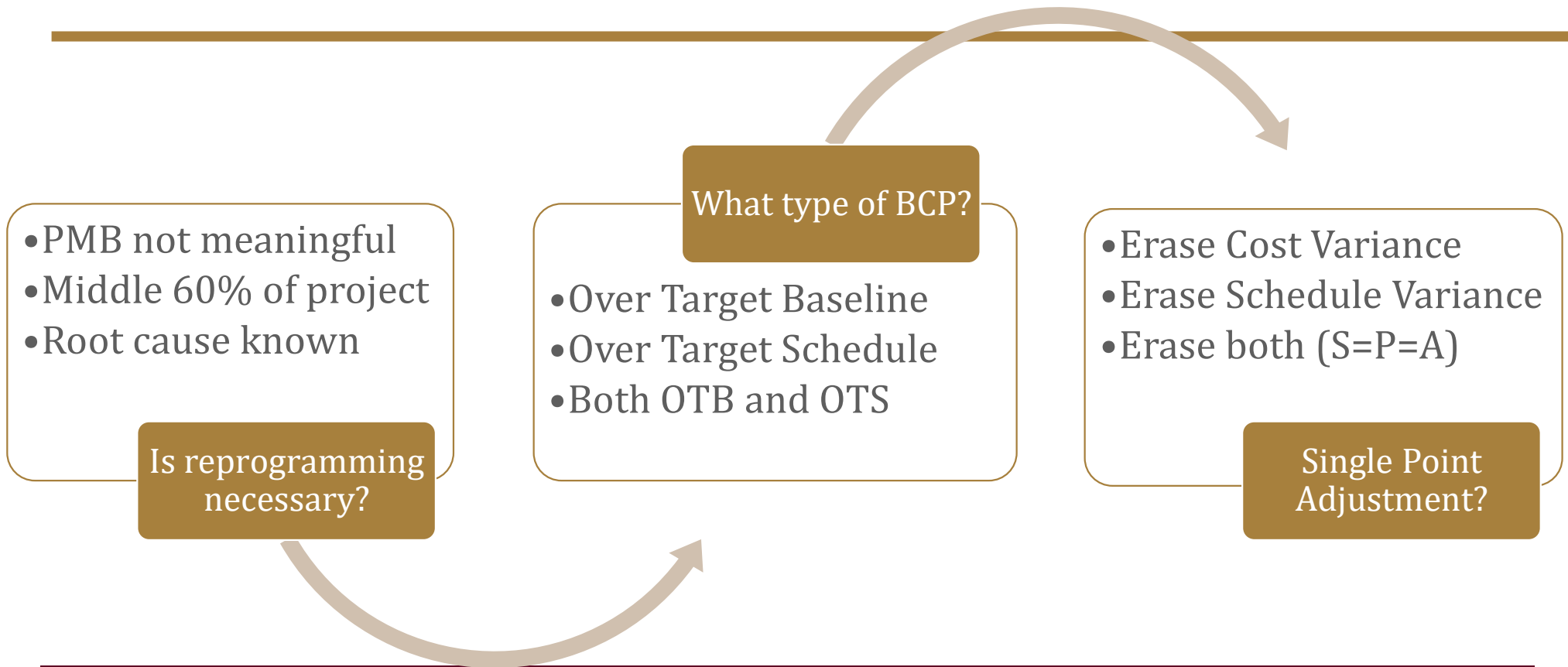
**PMB maintenance is important, but over-grooming is a risk indicator**

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## **Section 3**

### *BCP Methodology & Process*

# Decision Points



*Learn why execution failed, build lessons into new plan, avoid repeat reprogramming*

# Decision Point 1: Reprogram?

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- Performance analysis should inform decision trade-space
- Stage of project should generally be 20-80% Complete
  - Balance of sufficient trending data against effort required to rebaseline
  - These are rules of thumb, not iron mandates. PMB must remain sufficient for data analysis and management control
  - Goal will be a balance of % Complete vs. % Impact of PMB misalignment
- Conducting a BCP is a major effort
  - Likely to require 3-6 months at an increased commitment by PCE staff
  - Make sure the pain is worth the gain...

**Conduct a BCP when change is unrecoverable and PMB is no longer meaningful**

## Decision Point 2: Type of Performance BCP

### Over Target Baseline (OTB)

- Indicated by an overrun to CBB
- Adjudicated by addition to PMB
- May include MR increase as well
- Does not increase fee pool
- Total Allocated Budget (TAB) now calculated as CBB+OTB
- Variances may be adjusted

### Over Target Schedule (OTS)

- Allows for tasks time-phased beyond contractual completion date
- Does not change delivery incentives on contract obligations / milestones
- Typically involves a budget increase given cost of schedule extension
- Variances may be adjusted

**BCP may include components of both OTB and OTS!**

# Decision Point 3: Single Point Adjustment

- Eliminate Cost Variance Only
  - Set  $BCWP = ACWP$ , Preserve  $SV$
  - $EAC = BAC$ ,  $BCWR = ETC$ , but  $SPI < 1.0$
  - Most uncommon approach to variance adjustment
- Eliminate Schedule Variance Only
  - Set  $BCWS = BCWP$ , Preserve  $CV$
  - $BCWR = ETC$ , but  $CPI < 1.0$  and  $EAC \neq BAC$
  - Allows unperformed work to be replanned into the future
- Eliminate Both Cost and Schedule Variance
  - Set  $BCWP = BCWS = ACWP$
  - $EAC = BAC$ ,  $BCWR = ETC$ ,  $CPI$  and  $SPI = 1.0$

**Trades visibility into trends for flexibility in planning**

# Mechanics of BCP (a 12 Step Program)

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- Step 1: Contractor identify need and develop implementation plan
- Step 2: Customer approval to proceed with OTB/OTS
- Step 3: Mutually agree on remaining scope elements
- Step 4: Develop revised IMS and perform SRA
- Step 5: Review and mutually concur to IMS assumptions and milestones
- Step 6: PM provides CAM guidance on Control Accounts and Variances
- Step 7: Prepare ETC using resource forecasts
- Step 8: Input ETC into EVM System (tool)
- Step 9: Final CAM review of ETC – ETC “Scrub”
- Step 10: Set BCWR to equal ETC for a realistic plan
- Step 11&12: Final Senior Management Review and OTB/OTS Publication

\*Derived from OTB/OTS Handbook guidance



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## **Section 3**

### *BCP Outcomes*

# Results of a BCP

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- Create realistic and executable baseline plan
  - Reaffirm “solid ground” for plan, reset meaning of 1.0
- Restore confidence and reestablish “buy-in”
  - Confidence in the plan, the contractor, and the EV data
  - Credibility that prior issues are understood and future tasking is reasonable
  - Adequate reserves to mitigate known and unknown risks (MR and Schedule)
- Performance indicators that are meaningful
  - Without the BCP, it is challenging to distinguish “bad” from “really bad”
  - Analysis must rely on trending data to avoid masking of key metrics
  - Cumulative metrics must specify before and after phases of BCP

# Best Practices

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- Reporting during a BCP
  - Reasonable for contractor to request reduction in reporting burden
  - Allows for project controls team to focus on the replan effort
  - At minimum, ACWP should continue to be reported
- Visibility and traceability following a BCP
  - Reprogramming columns should be leveraged to document changes
  - Avoids the scenario of “erasing program performance”
  - Submit 2x IPMR’s in month of BCP – one with change, one without
- Integrated Baseline Review



# Rolling Wave Planning

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- Management strategy to mature detailed plans during execution
  - All scope must be addressed, allowing for progressively less granularity
  - Detailed plan for near-term activities, summary plan for downstream scope
  - Recognizes challenge in creating a meaningful plan for years-long projects
- Planning schema keeps scope and budget meaningfully aligned
  - Planned scope organized as Work Packages under Control Accounts, future scope held in Planning Packages or Summary Level Planning Packages
- Detailed plans must exist through subsequent planning windows
  - Documented planning horizon maintains thorough, meaningful PMB

# Conclusion

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- Replanning should be consistent; reprogramming rarely used
- Focus of effort from both parties should be meaningful baseline
  - Serves as the basis for performance data validity
  - Enables management action based on clear understanding of the plan
  - Avoid rubber baseline “surfing” and “snowplowing”
- “BCP” terminology is varied and somewhat confusing
  - Should not prohibit quality performance management or contracts management

# Sources

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- DOE PM BCP/BCR Training Snippet:
  - [https://www.energy.gov/sites/prod/files/2015/12/f27/Snippet\\_4.6\\_with\\_notes.pdf](https://www.energy.gov/sites/prod/files/2015/12/f27/Snippet_4.6_with_notes.pdf)
- OSD AT&L (PARCA) OTB and OTS Guide
  - [https://www.acq.osd.mil/asda/ae/ada/ipm/docs/OTB-OTS\\_Guide\\_121205.pdf](https://www.acq.osd.mil/asda/ae/ada/ipm/docs/OTB-OTS_Guide_121205.pdf)
- DOE Change Control Management Guide (DOE G 413.3-20)
  - <https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-20-admchg1/@@images/file>