Agile & EVM: A Lean Approach to Implementing EVM on Agile Projects

Trends in Applying EVM to Government Agile Development Projects

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Agenda

- Trends in Applying EVM to Government Agile Development Projects
- Agile Fundamentals
- Applying EVM on Agile Development - Organizing and Planning
- Putting the Theory into Practice with Scheduling and EVM tools
- Project Execution and Performance Analysis
- Practices to Encourage and Avoid

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Dave Scott, Managing Director for Integrated Program Management (IPM) and Earned Value Management (EVM) solutions

Dave has more than 25 years of experience with both government and commercial customers in the implementation of systems and methodologies to improve management processes. He has extensive experience designing, implementing, and supporting compliant IPM/EVM Systems for both the U.S. Government and Government Contractors. In addition, he has provided EVMS assurance services supporting government contractors EVMS compliance with the ANSI/EIA 748 standard. He provides a unique perspective gained through his experience directly supporting Agency and Department of Defense (DOD) programs surveillance of contractors EVM reporting and EVM Systems. He has a B.B.A in Finance from Loyola Marymount University. dmscott@bdo.com, 973.349.2561

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As a global world class information technology and business process services leader, CGI has hands-on experience in combining Agile development and EVM on our own government programs. We help our clients succeed through outstanding quality, competence and objectivity, providing thought leadership and delivering the best services and solutions to fully satisfy client objectives in information technology, business processes and management.

David Comiskey, PMP, CSM, Director of Consulting, Service Delivery Manager
David is responsible and accountable for the coordinated management of multiple, concurrent projects directed toward strategic business and other organizational objectives. He is specifically experienced in designing and delivering cost effective, high-performance web solutions (Medicare.gov, MyMedicare.gov, and CMS.gov) in multi-stakeholder environment. He has introduced and implemented Agile best practices within his projects as well as established an Agile estimation model leveraged by multiple projects within CGI. He provides delivery oversight for cross-functional (technical, functional, and quality control) teams throughout the entire software development life cycle (SDLC) process. He has a B.A. in Communications from Virginia Polytechnic Institute & State University (Virginia Tech) in Blacksburg, VA. David.comiskey@cgifederal.com 703.227.4240.

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Laura Bier, PMP, Business Improvement Leader

Laura provides training, coaching and consultative guidance on performance management and process improvement to dozens of project teams and federal agencies. Specializing in business process re-engineering, and organizational change, she has broad experience in business and project operations; from opportunity management and procurement to performance measurement and project management. She has used this background to hone her ability to identify efficiencies generating cost savings for her clients. In her current role, Laura is Director of the Earned Value Management Office for CGI Federal (www.cgifederal.com). She has a B.B.A in Management from University of Technology, Sydney, Australia.

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Kathy Boatwright, PMP, Product Director

Kathy is a product leader specializing in product management, project management, earned value management, and software design and delivery. In her current role as a Product Director for Deltek (www.deltek.com) she defines and drives the product strategy and roadmap for PPM cost tools. She has over 20 years of experience within the project management industry including leading design and business analysis teams, advising on business and implementation strategies, and managing teams to deliver industry leading applications. In addition, she has worked within industry on major government contracts as part of PMO organizations delivering schedule and cost analysis. Kathy possesses an M.B.A from Colorado State University. kathyboatwright@deltek.com 703.865.4229

Project Success
2015 Standish Group Chaos Report

2015 report studied 50,000 projects around the world, ranging from tiny enhancements to massive systems re-engineering implementations.

- Project success: The project is completed on-time and on-budget, with all features and functions as initially specified.
- Project challenged: The project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified.
- Project Failed: The project is cancelled at some point during the development cycle.

MODERN RESOLUTION FOR ALL PROJECTS

	2011	2012	2013	2014	2015
SUCCESSFUL	29%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

The Modern Resolution (OnTime, OnBudget, with a satisfactory result) of all software projects from FY2011–2015 within the new CHAOS database. Please note that for the rest of this report CHAOS Resolution will refer to the Modern Resolution definition not the Traditional Resolution definition.

Project Success Rate by Size
2015 Standish Group Chaos Report

CHAOS RESOLUTION BY PROJECT SIZE

	SUCCESSFUL	CHALLENGED	FAILED
Grand	2%	7%	17%
Large	6%	17%	24%
Medium	9%	26%	31%
Moderate	21%	32%	17%
Small	62%	16%	11%
TOTAL	100%	100%	100%

The resolution of all software projects by size from FY2011–2015 within the new CHAOS database.

Project Success Rate by Method – 2015 Standish Group Chaos Report

CHAOS RESOLUTION BY AGILE VERSUS WATERFALL

SIZE	METHOD	SUCCESSFUL	CHALLENGED	FAILED
All Size Projects	Agile	39%	52%	9%
	Waterfall	11%	60%	29%
Large Size Projects	Agile	18%	59%	23%
	Waterfall	3%	55%	42%
Medium Size Projects	Agile	27%	62%	11%
	Waterfall	7%	68%	25%
Small Size Projects	Agile	58%	38%	4%
	Waterfall	44%	45%	11%

The resolution of all software projects from FY2011–2015 within the new CHAOS database, segmented by the agile process and waterfall method. The total number of software projects is over 10,000

National Defense Authorization Act 2010
Section 804

The DoD DCMO 804 report establishes five guiding principles:

1. Deliver early and often – aimed at changing the culture to embrace speed and responsiveness by deploying capabilities every 12-18 months.
2. Incremental and iterative development and testing – acknowledging these approaches will deliver better results than today's "big bang".
3. Rationalized requirements – recognizing user involvement as critical, but also noting that an enterprise focus, established standards and open modularity will drive and constrain designs.
4. Flexible/tailored processes – recognizing the variety of IT functions across the enterprise and providing multiple acquisition paths to address the differences.
5. Knowledgeable and experienced IT workforce – identifying that a cadre of highly trained professionals are a top priority.

OMB 25 POINT PLAN TO REFORM FEDERAL INFORMATION TECHNOLOGY MANAGEMENT

Part II addresses effectively managing large scale IT Programs.

"OMB found that many current IT projects are scheduled to produce the first deliverables years after work begins, in some cases up to six years later. In six years, technology will change, project sponsors will change, and, most importantly, program needs will change. Programs designed to deliver initial functionality after several years of planning are inevitably doomed."

OMB Guidance

- Critical Success Factor – Integrated Program Team (IPT) Collaboration between Agency IT, Program, Acquisition, & Finance to design, resource, and manage investments
- Modular approach to define high level requirements, prioritize requirements, refinement, and continual engagement of stakeholders and collection of feedback
- Investment Business Case establishes an estimated cost, schedule, performance baseline and achieve on average 90% of these goals
- Investment divided into stand alone projects of 6 months or less in duration which deliver functional systems
- Projects may be completed sequentially or in parallel. Subsequent projects may add incremental functionality or integration

From OMB Contracting Guidance to Support Modular Development, 06/14/12

Investment/Projects Example

Investment: System N		
Project	**Activities**	**Functionality**
Planning	Overall high-level requirements for investment or program	Roadmap of investment or program
Base System	Requirements and Design	
	Release 1	Base functionality: front-end and back-end, authentication
	Migration of legacy data and disposition of System Y	Application X takes over operations from the legacy system
	Release 2	Additional functionality
	Release 3	Additional functionality
Reports	Requirements and Design	
	Canned Reports – Release 1	Users can produce canned reports
	Ad-Hoc Reports – Release 2	Users can create ad-hoc reports
Application Interfaces	Requirements and Design	
	Interface 1 – Release 1	Application X can interact with system A
	Interface 2 – Release 2	Application X can interact with system B
	Interface 3 – Release 3	Application X can interact with system Z
Enhancements to Application Z	Requirements and Design	
	Release 1	Base functionality
	Release 2	Additional functionality
Interface Between Application X and Application Z	Requirements and Design	
	Interface 1 – Release 1	
	Simultaneous with Release 3 of Application X	Application X can interact with Application Z

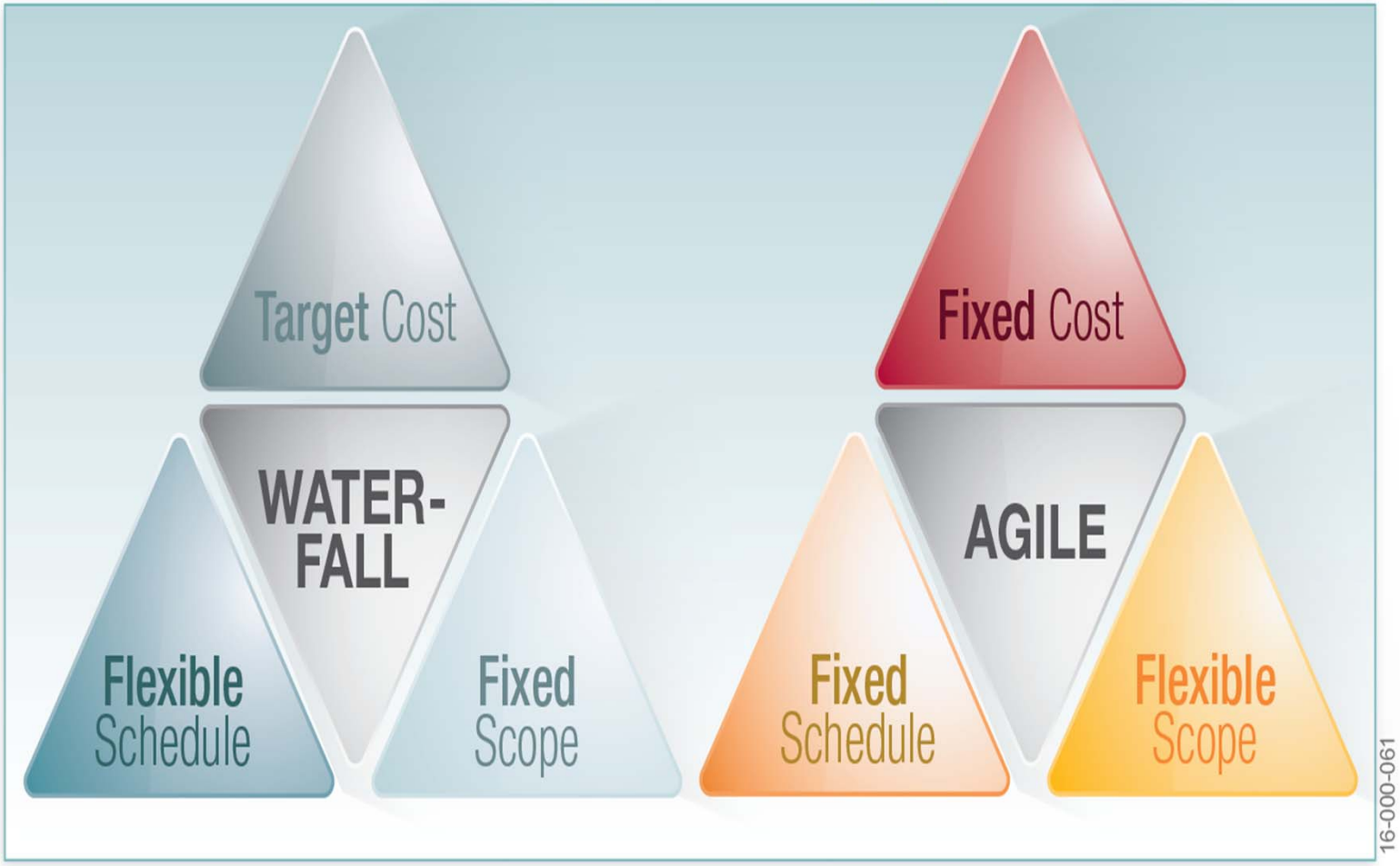
From OMB Contracting Guidance to Support Modular Development, 06/14/12

Modular Development Best Practices

- OMB - Federal IT programs must be structured to deploy working business functionality in release cycles no longer than 12 months, and, ideally, less than six months, with initial deployment to end users no later than 18 months after the program begins.
- DOD - National Defense Authorization Act 2010 Section 804 - Deliver early and often – aimed at changing the culture to embrace speed and responsiveness by deploying capabilities every 12-18 months.

Incremental and iterative development and testing, acknowledging these approaches will deliver better results than today's "big bang".

Waterfall & Agile Approaches



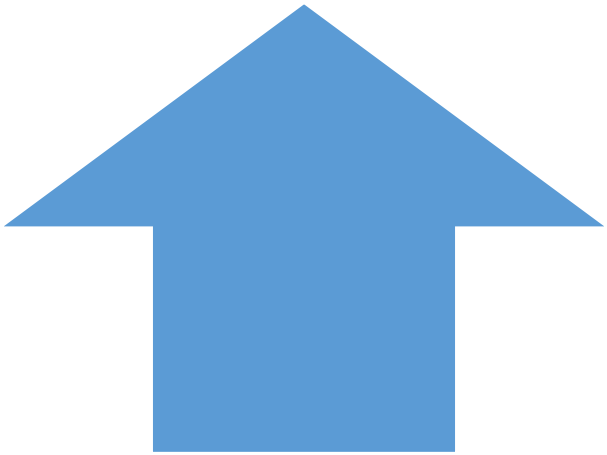
Balancing EVM and Agile

Compliance and Project Controls

- OMB Circular A11 Part 7, Capital Programming Guide
- FAR 34.201 & 34.202 EVMS
- DFARS 252.234-7001 Notice of EVM & -7002 Mgmt. Procedures

Agile Core Principles

- Identify value and eliminate waste
- Prioritize features
- Deliver early and often
- Constant inspection
- Empower the team



OSD PARCA – Agile and EVM

Program Managers Desktop Guide

"EVMSIG is flexible enough to allow the use of a disciplined Agile development approach, and that Agile and EVM, properly implemented, are complimentary in enabling a robust program management process"

1. **Organization and the Work Breakdown Structure (WBS)**

- DOD *Mil Std 881C WBS standard* is a product based structure that supports an Agile WBS with mission capabilities at the control account (CA) level and features rolling up to the CAs; the latter identifies product features at level 4 of the WBS rather than product activities/ deliverables
- System requirements must be traceable and documented as they are broken down into capabilities and features; each level of decomposition must have clear and documented completion acceptance criteria

OSD PARCA – Agile and EVM

Program Managers Desktop Guide (cont.)

2. **Planning and Scheduling**

- Decomposition of scope is achieved by the hierarchical relationship between capabilities, features, and user stories which have been defined to develop features.
- Time phasing of all work is required and more immediate releases should be time phased in terms of features. Future releases may have planning packages containing capabilities and features. A rolling wave approach is acceptable.
- The Integrated Master Schedule (IMS) should have the sufficient detail to provide actionable information and a critical or driving path through milestones.
- An Agile tool may be used to manage tasks or activities required to complete milestones. Progress in the IMS may be summarized from completed work in the Agile tool.

OSD PARCA – Agile and EVM

Program Managers Desktop Guide (cont.)

3. Measuring Progress

- Measurement of progress should be tied to the completion of technical scope and not the completion of ‘time boxed’ events like sprints.
- Agile processes which occur below the feature level in the IMS must be traceable to the Agile system.
- The completion of technical scoped must be supported by Quantifiable Backup Data (QBD). The use of stories to measure progress in the Agile system is acceptable but must be disciplined and consistent. Story points as a measure of complexity of the user story should not change. Stories may be added or removed from QBD. The use of an EVT in conjunction with Stories should be documented in the EVM System Description.
- Features are expected to span multiple accounting months which are often used for EVM reporting.
- The Agile tool should be used to support ‘bottoms up’ forecasts and estimates to complete as required by the EVMSIG.

OSD PARCA – Agile and EVM

Program Managers Desktop Guide (cont.)

4. Baseline Maintenance

- Product backlog changes must be documented. As the baseline is established at the feature level any changes should be documented in accordance with processes defined in the organization's EVM System Description and the EVMSIG.
- The guide also suggests in the interest of customer collaboration and transparency that the buyer should have access to the contractor's Agile tools.

NDIA Integrated Program Management Division (IPMD)

- An Industry Practice Guide for Agile on Earned Value Management Programs
- WBS
  - Represents all scope and is the basis for the Product Backlog
  - EPIC's/Capabilities & Features form the PMB
  - Releases and Sprints represent the time box for completing work
  - Agile EVM application to establish a product based WBS based on the MIL-STD-881templates

NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs

- Work Breakdown Structure (WBS)
  - Represents all scope and is the basis for the Product Backlog
  - Agile EVM application to establish a product based WBS based on the MIL-STD-881templates
  - EPIC's/Capabilities & Features form the PMB
  - User Story's represent the work process to complete Features and are not in the WBS
  - Releases and Sprints represent the time box for completing work

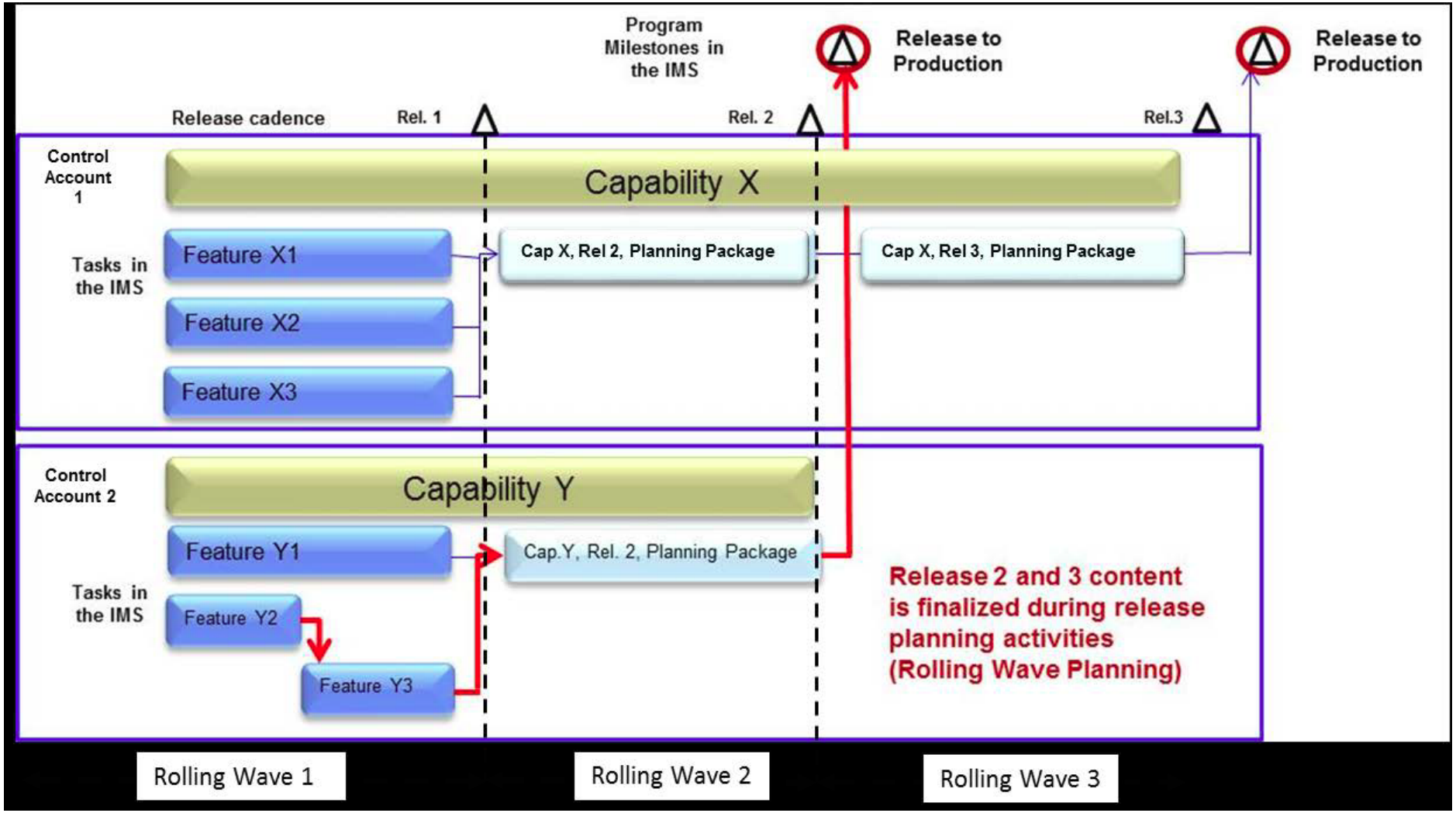
NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs

- Integrate Master Plan (IMP)
  - Product-oriented WBS Statement of Work aligned with the Statement of Objectives, and Concept of Operations
  - IMP Program Events describe Epics/Capabilities of the product
  - Program Events include major customer milestones and Capability Releases
  - Events are supported by specific accomplishments and their related acceptance criteria

NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs

- Integrate Master Schedule (IMS)
  - Epic/Capability delivers one or more Features
  - Feature delivers one or more Stories, and a Story is implemented with one or more Story Tasks
  - Larger programs, one or more “sub-Epics” may exist between Epics and Features to manage the product decomposition to usable sizes.
  - Features are the logical lowest level product to be included in the IMS.
  - Stories and Story Tasks are the implementation details of the Feature and are maintained by the development teams outside the IMS in the Agile development tool
  - Features are networked and span multiple Sprint with Quantifiable Backup Data (QBD) for the Agile tool

NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs



NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs

- Considerations
  - DCMA 14 Point Assessment
    - Schedule logic and Critical Path is supported but care must be taken in developing the initial program vision and roadmap to define dependencies between Epics/Capabilities, and between Features
    - Longer tasks and a large percentage tasks may be modeled in parallel decreases the number of Finish-to-Start relationships below the 90% threshold
  - Freeze Period
  - EVM System Description should be changed to provide guidance that accommodates the Agile planning cycle
  - Customer direction to allow changes in the freeze period
  - Involvement of the customer in product & release planning

NDIA IPMD - Industry Practice Guide for Agile on Earned Value Management Programs

Agile Planning Levels Related to EVM Processes

Increasing Precision

Planning Level	Planning Frequency	Planning Horizon	Planning Precision	Planning Artifact	EVM Processes
Product Planning	Project startup; updates throughout the project	Project Duration	Capabilities Releases	Product Backlog; Prod Roadmap, Minimal Viable Product (MVP)	IMP planning of Epics/ Capabilities to Releases (Cadency and Capability).
Release Planning	Each Cadence Release	Cadence Release	Feature /Stories	Product Backlog Updates Release Plan	IMS planning of Features to Work & Planning Packages. Networking them to Capabilities and Releases.
Sprint Planning	Each sprint	Weeks	Stories/Tasks	Sprint Backlog	Defining measure of effort and duration for Work and Planning Packages based on Release Sprint Story alignment to Features.
Daily Planning	Daily	Day	Tasks	Updated Sprint Backlog	Update story status in order to determine EV for each Work Package

PO/CAM Size, Productivity Estimates, and Resource Plans to develop time phase budgets for CA's and PP's

Beyond Compliance: Why use EVM for Project Controls? Pt. 1

Federal programs need to answer several questions on a regular basis.

- How much has been spent relative to funding?
- What is the current estimated cost to complete the program?
- What is the estimated completion date?

Agile performance measures help assess the team's technical performance, whereas EVM expresses performance in terms of costs. As an even greater benefit, project costs in the EVMS can be analyzed many different ways; by resource, by element of cost, by period and more.

Beyond Compliance: Why use EVM for Project Controls? Pt. 2

- Agile forecasts depend on accurate measures of each teams' velocity (based on the teams' historical technical performance, which is expressed in terms of the average number of story points completed per sprint).
- However, velocity is a volatile metric because it's dependent upon having a stable team without a lot of turnover or reassignment of personnel.

EVM by contrast allows for forecast to be calculated statistically using a variety of formulas and can provide a good counterpoint to validate the realism of the CAM's forecast.

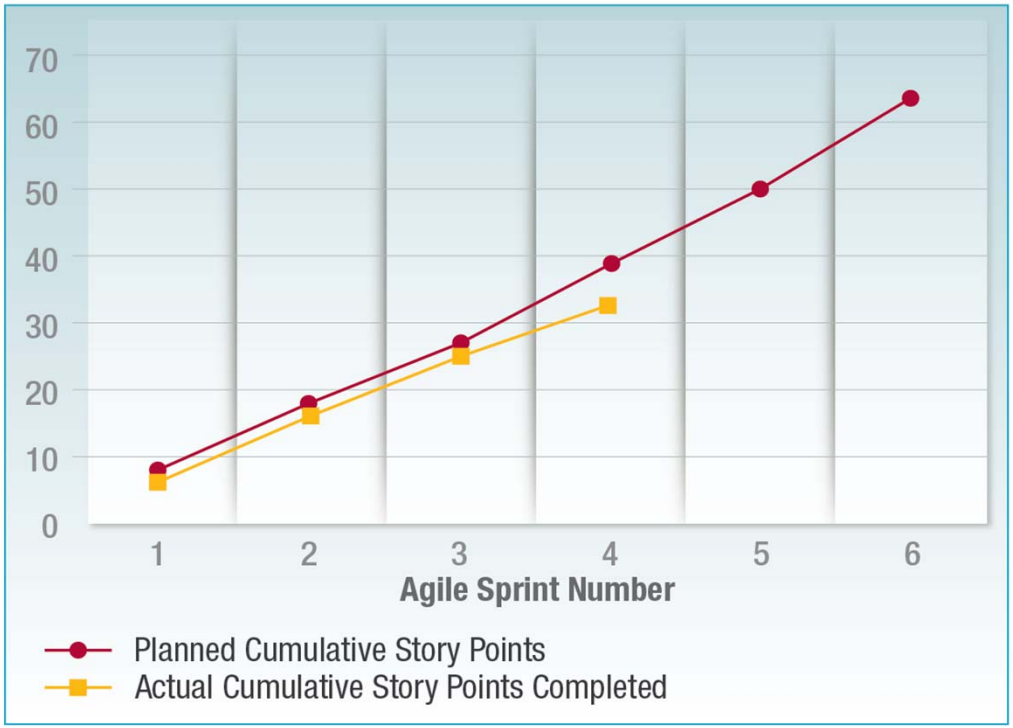
Beyond Compliance: Why use EVM for Project Controls? Pt. 3

- Agile performance measures are focused on team performance rather than program performance.
- Because the basis of this performance measurement is the team's velocity, Agile doesn't provide a reliable roll up of performance for a large program with multiple teams working simultaneously with multiple release cycles.

EVM provides a consistent metric which can be rolled up by release and program. It will also provide an early warning regarding the cost and schedule impact of a delay in one team's technical performance versus plan on another work stream

Agile & EVM Performance

Release Burn up Chart



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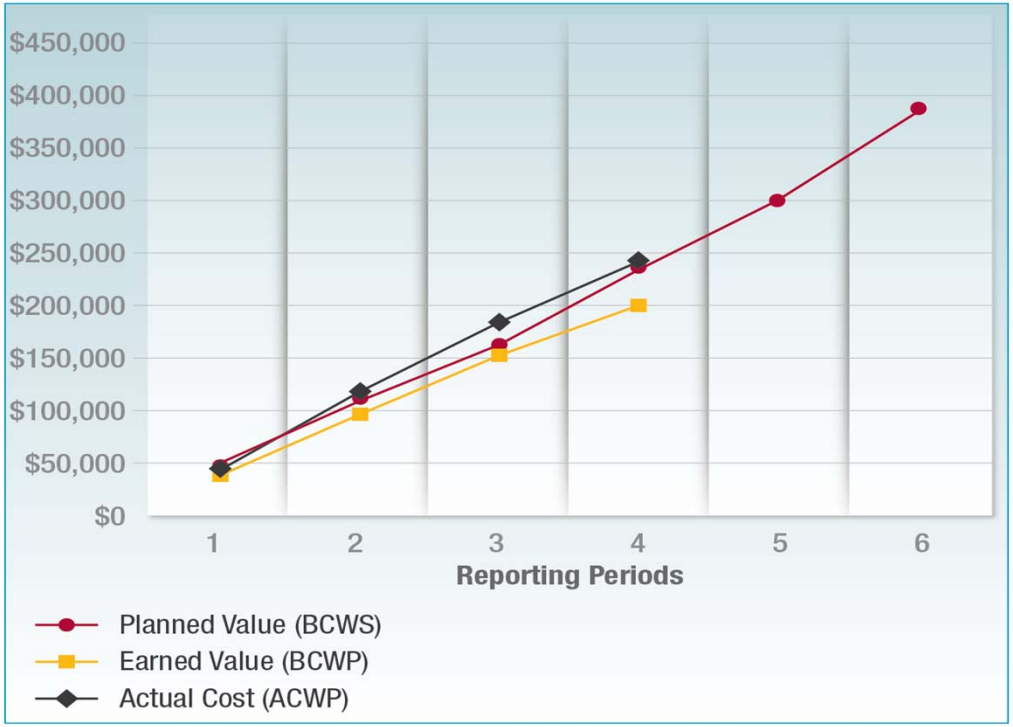
- ***Agile measures technical performance based on story points***
- ***As User Stories are completed their associated Stories Points are tracked against the overall product backlog***
- ***The team appears to be falling behind***

Earned Value Management Chart



- ***EVM measures cost, schedule, & technical performance on a cost basis***
- ***Enables forecasting as well as stakeholder and compliance reporting***
- ***PV > EV = Behind Schedule***
- ***AC > EV = Cost Overrun***