

Agile Project Management Controls

Issues with EVM and a Viable Alternative: Agile Project Management (PM) Tool

ICEAA Conference, June 2015
San Diego, CA

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Note: The data and analysis contained within this presentation is for illustrative purposes only and does not reflect actual data from any Booz Allen, Government, or Commercial project.

Discussion Topics

- ▶ Agile Summary
- ▶ Challenges Implementing EVM on Agile SW Dev. Projects
- ▶ Intro to the Agile PM Tool
- ▶ Comparing EVM and the Agile PM Tool
- ▶ Agile PM Tool Demo

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What is “Agile” software development?

- ▶ What is “Agile” Software Development?
 - A software development philosophy based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing, cross-functional teams
 - Promotes adaptive planning, evolutionary development and delivery, a time-boxed iterative approach, and encourages rapid and flexible response to change
- ▶ Agile Principles
 - Customer satisfaction through early and continuous delivery of valuable software
 - Welcoming changing requirements, even late in development
 - Deliver working software frequently
 - Working software is the primary measure of progress



We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

**Manifesto for Agile Software Development © 2001*

Agile Concepts and Terms

- **User Stories:** A description of a user-oriented capability containing just enough information so that developers can have a reasonable understanding of how they would need to implement
- **Complexity Points:** A relative measure of complexity that enables the team to quantify the scope or effort for an issue/artifact (e.g. story)
- **Sprint / Iteration / Release:** *Sprint* - Fixed time-box in which development occurs (usually 2 - 4 weeks); *Iteration* – Collection of sprints that result in prototype software demoed/tested with users; *Release* - Multiple iterations that fulfill a major subset of requirements constituting an operational product released to the users
- **Velocity:** Performance / productivity measure that indicates progress toward capability delivery (i.e., Complexity Points completed per sprint)
- **Project / Sprint Backlog:** A prioritized database that summarizes the issues/artifacts yet to be completed for a sprint or the entire project
- **Burndown:** The concept, often shown as a graph over time, of working off or “earning” Complexity Points toward iteration or delivery completion



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ANSI-748 (EVM Compliance) focuses on meeting requirements¹, which, in an Agile context, presents key operating challenges

Category	EVM Requirements	Agile Operating Challenge Description
Organization	<ul style="list-style-type: none"> ▶ Define specific work breakdown structure (WBS) and organize work into work packages that align to cost/schedule baseline 	<ul style="list-style-type: none"> ▶ Adhering to a WBS and work organized by CAMs is too restricting to an agile development team (<i>Responding to change over following a plan</i>)
Planning, Scheduling, and Budgeting	<ul style="list-style-type: none"> ▶ Establish and maintain a time-phased budget baseline and identify management reserves and undistributed budget and ensure that the contract budget base (CBB) is reconciled with the total allocated budget (TAB) 	<ul style="list-style-type: none"> ▶ Customer feedback and in-progress work/resource re-prioritizations would require constant budget re-baselines. EVM processes for allocating undistributed budget when needed would limit the agility with which an agile team can react to their changing environment. (<i>Customer collaboration over contract negotiation</i>)
Analysis and Management Report	<ul style="list-style-type: none"> ▶ Provide monthly reports that is reconcilable with the approved accounting system ▶ Provide variance reporting of budget (PV), earned value (EV), and actuals (AC) 	<ul style="list-style-type: none"> ▶ Requires compliant EVM software suite (e.g., Deltek COBRA combined with SAP) and approved process ▶ EV metrics are typically too high-level and time-lagged to provide adequate, timely insight into agile project progress or problem causes (<i>Individuals and interactions over processes and tools</i>)
Revisions and Data Maintenance	<ul style="list-style-type: none"> ▶ Incorporate authorized changes and record impacts in a timely manner ▶ Provide reconciliation and revision reports and control and document changes 	<ul style="list-style-type: none"> ▶ With the number of potential changes on an agile project on a sprint-by-sprint basis, a large amount of LOE is required of the performer to record, review, and receive approval for changes tied to a fluctuating WBS and schedule (<i>Working software over comprehensive documentation</i>)

(1) ANSI-748 has a set of 32 guidelines. For discussion purposes, we have identified operating challenges associated with an Agile development environment at a higher level in a few key areas.

EVM poses several problems for baselining and evaluating Agile software development projects

- **Estimate Product Backlog:** Counter to the way most Agile teams plan Sprints, EVM requires estimating the entire backlog
 - Changes in or additions to the backlog would necessitate a re-baseline of the PMB and re-estimation of the backlog

• Non-Intuitive Productivity Metrics:

EVM

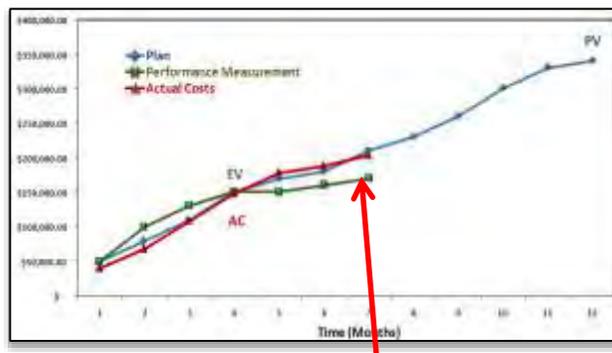
“The KTR’s current SPI of .95 indicates that they are slightly behind schedule. They require a TCPI of 1.18 to complete remaining work within budget.”

Versus

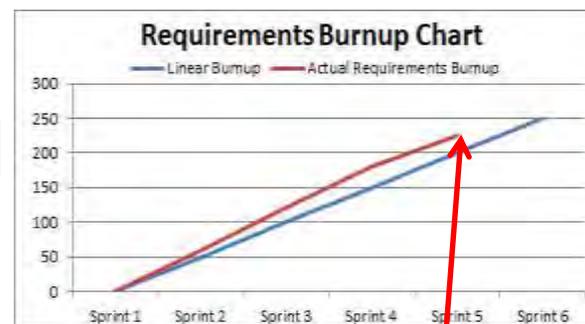
Agile Productivity Metric

“The contractor’s current velocity of 280 is 20 points below their historical average. They require a velocity of 320 to complete all req’ts within budget.”

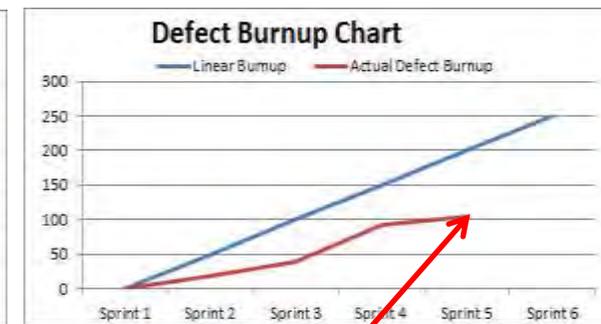
• Inadequate insight at the Issue/Artifact level:



Versus



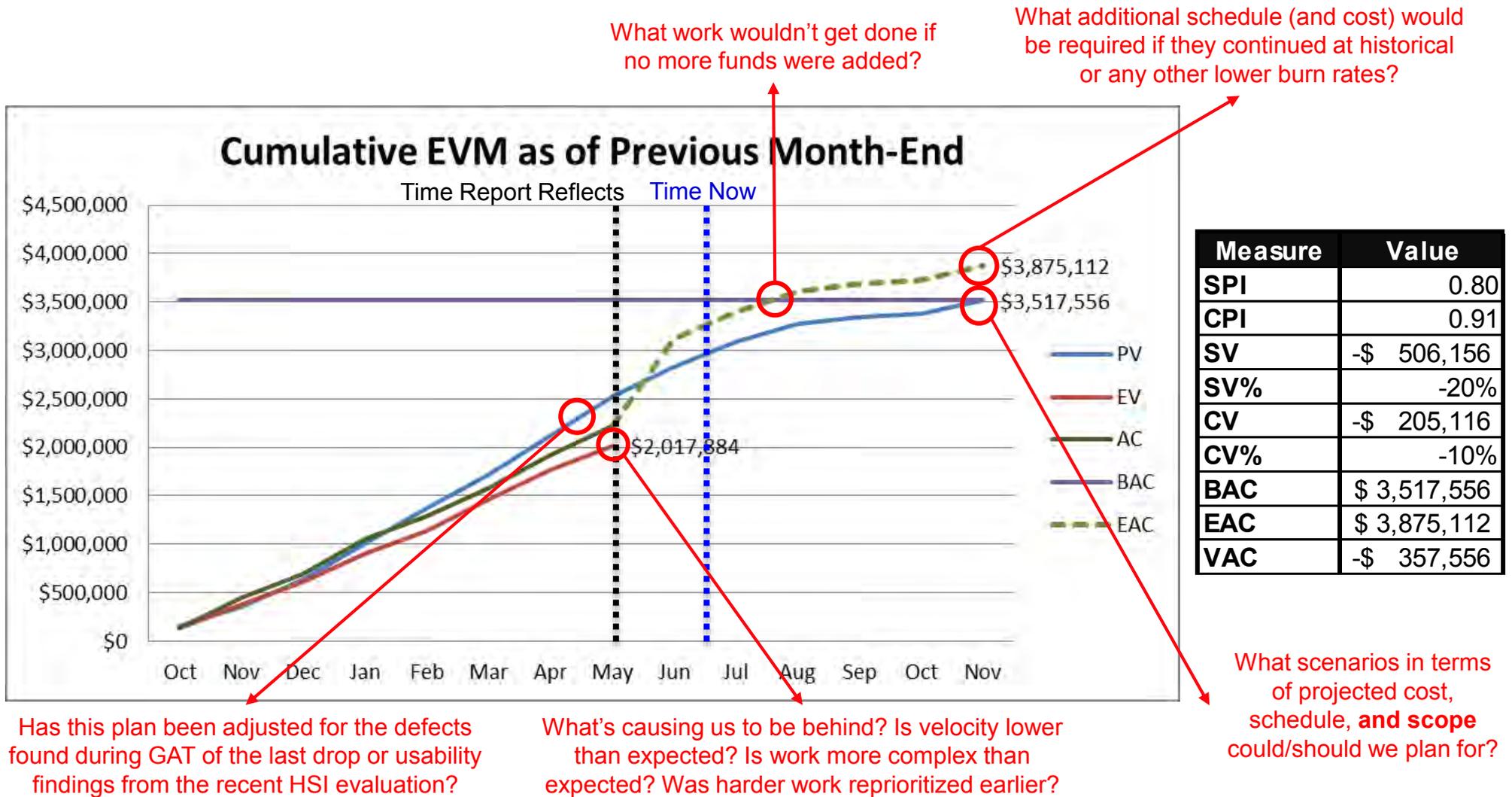
Ahead in completing Req'ts



Behind in correcting Defects

Overall project is behind

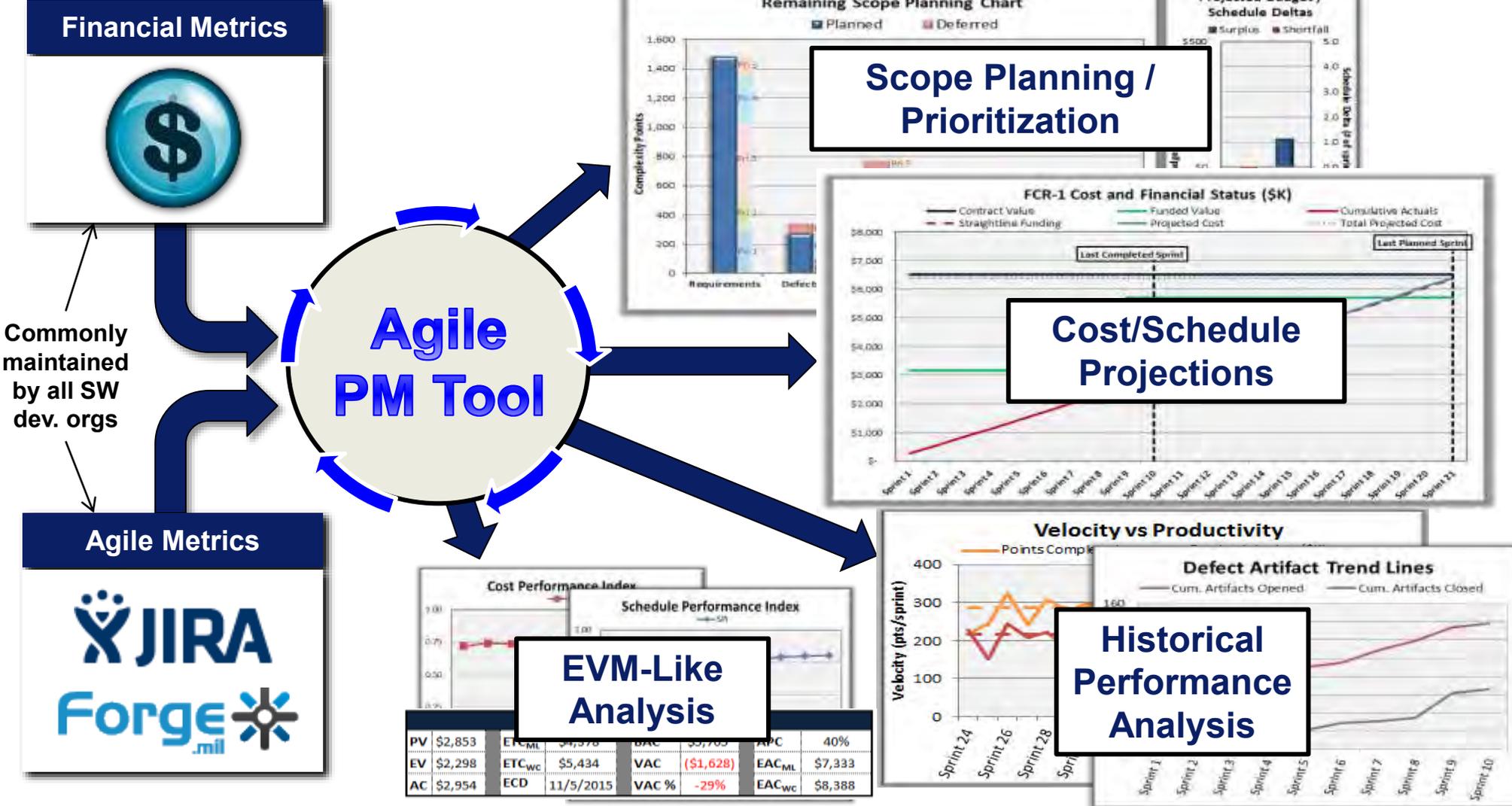
EVM reports are often too-time lagged and high-level to provide timely analysis on agile projects with any insight into problem causes



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The Agile PM Tool consumes financial/agile metrics and provides outputs for effectively managing cost, schedule, and scope



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The Agile PM Tool delivers similar metrics as EVM with additional benefits at a lower cost

Metrics and Analysis	EVM	Agile PM Tool
ANSI-748 Compliance	x	
a) PV	x	x
b) EV	x	x
c) AC	x	x
d) Cost Curve with PV, EV, and AC	x	x
e) Metrics: CV, CPI, SV, SPI, etc.	x	x
f) Variances > 10%	x	x
g) Performance Goals?	x	x
h) Corrective Actions	x	x
IBR	x	x
Dynamic Velocity and Productivity Projections		x
Scope Trade-off Analysis		x
Buffering for Pop-ups		x
Issue Tracking and Trendlines		x

- Task Order Requirement
- Additional Value-Added Info Provided by Agile PM Tool

▶ ANSI-748 Compliance

- High maintenance costs overtime
- Implements requirements that are restrictive to an Agile environment
 - i) Long-term maintenance of a WBS
 - ii) Difficult to trace progress at Sprint level
 - iii) Constant need to re-baseline
- Agile PM Tool Mitigations to Compliance Issues
 - i) Provide funding summary report to include cost in tool with PM overhead costs for auditability
 - ii) Documentation compliance by cataloging each sprint's backlog report for change history
 - iii) Trace back to Issue ID level for each Sprint

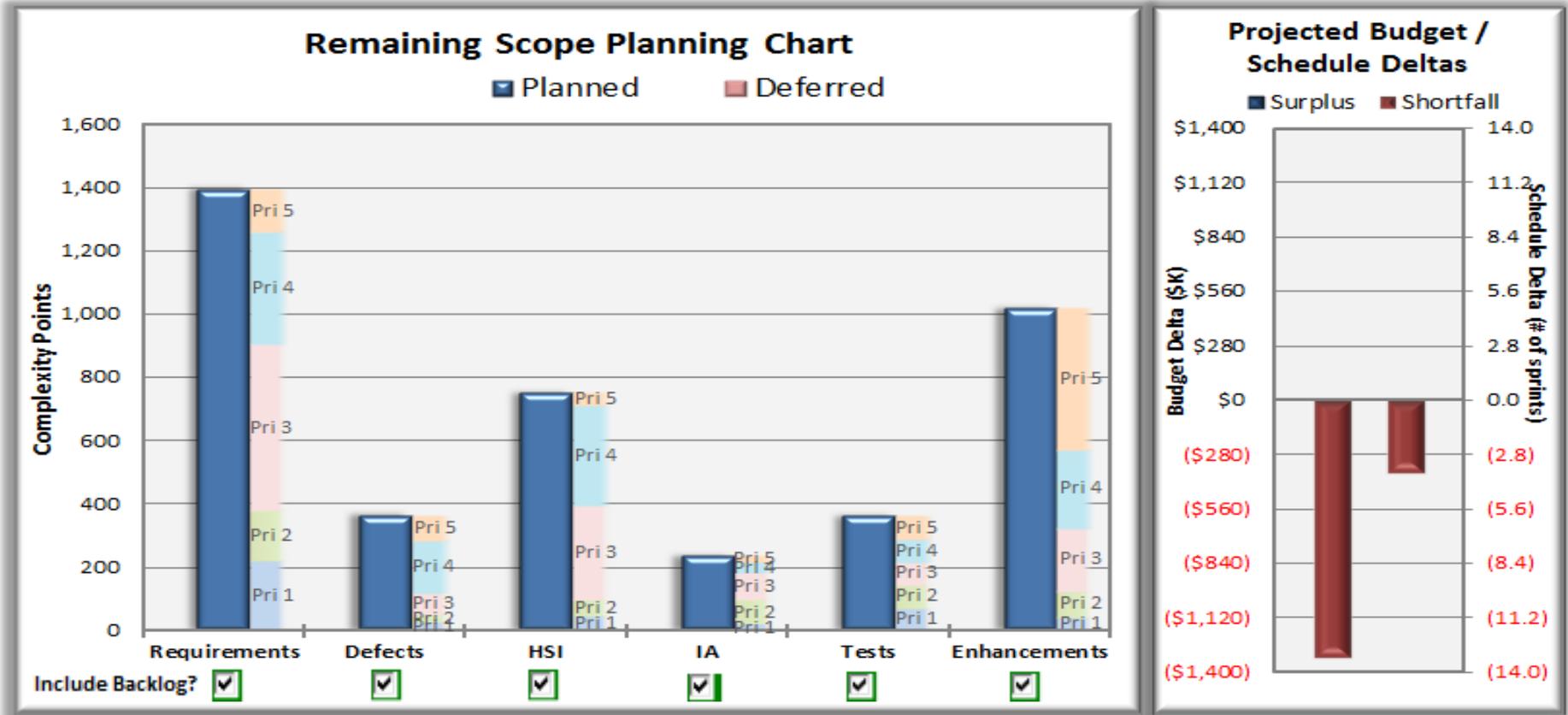
▶ Implementation and Maintenance of Agile PM Tool is less costly than EVM

- Est. EVM LOE (Small SW Project): **1.5 - 2.5 FTE**
- Agile PM Tool LOE: **0.25 - 0.5 FTE**

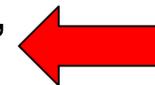
The following set of slides are an illustrative depiction of the type of analysis typically provided by the Agile PM Tool each sprint

- ▶ The following slides are for illustrative purposes only and are used to provide insight into the progress the software development team is making from a budget, cost, schedule, and scope perspective, including EVM-Like metrics and more
- ▶ All of the content within this presentation is obtained from a sample set of data from the Agile PM Tool
- ▶ Situation
 - ACME software development organization has just completed Sprint #10 out of a 20 Sprint project plan
 - Metrics and Analysis from Sprint #10 have been gathered and analyzed and projections have been completed

The Agile PM Tool outputs the additional cost and schedule required to complete entire project scope informed by issue-level detail

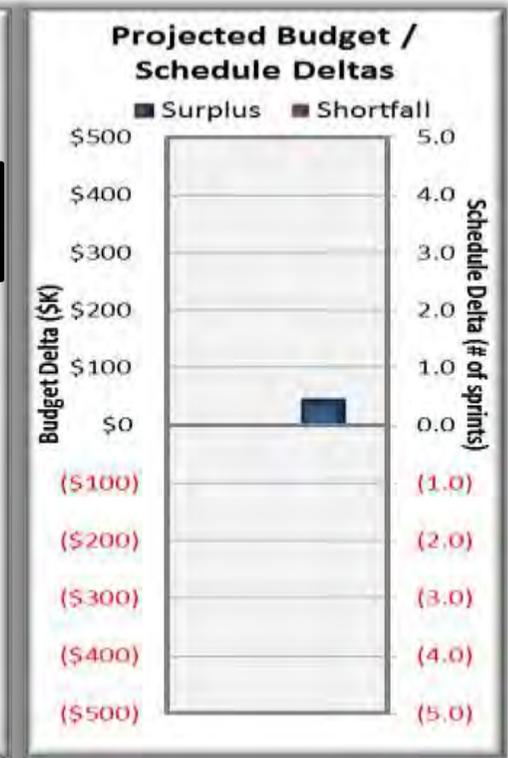
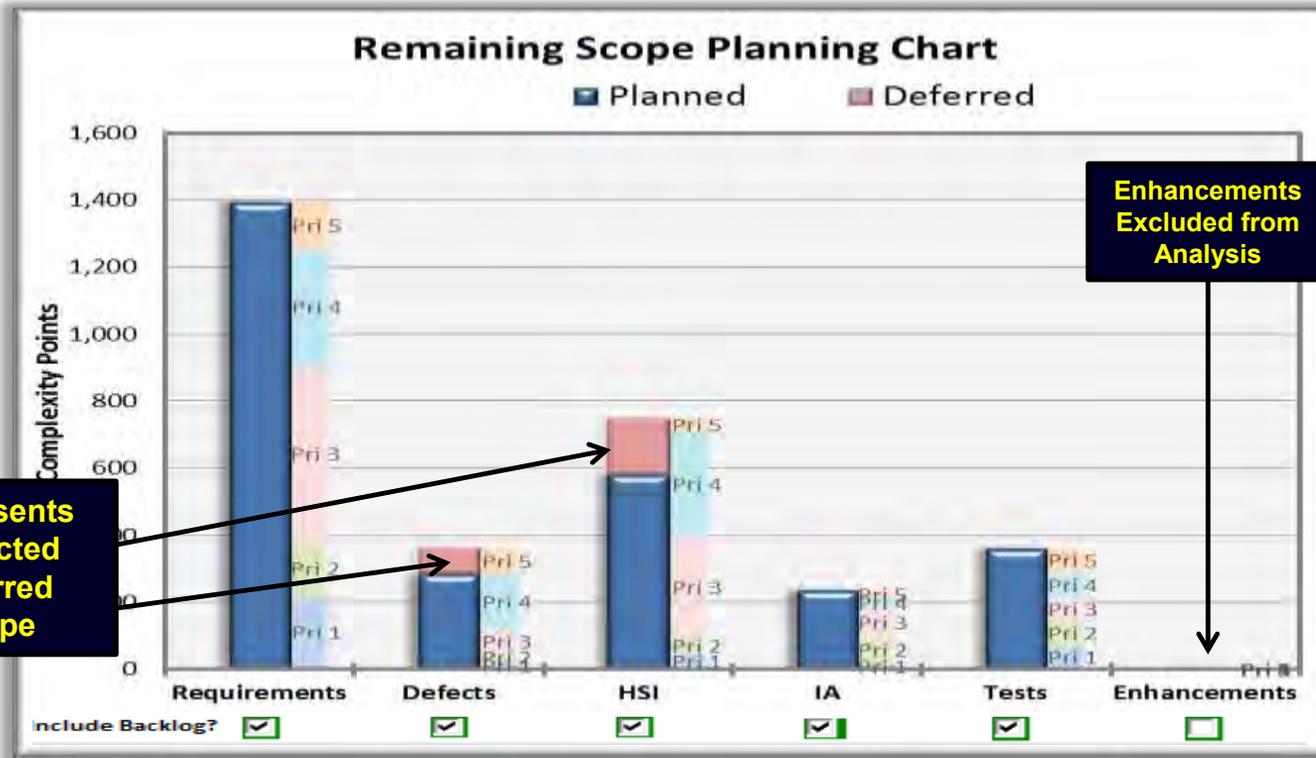


► In order to complete the entire scope on the project, ACME requires an additional \$1.3M above current funded value and an additional 4 sprints.



Budget Delta (\$K) - Surplus / (Shortfall) :	(\$1,323)
Schedule Delta (# sprints) - Surplus / (Shortfall) :	(3.7)

Constraints on the project budget and schedule require ACME to prioritize remaining effort/scope



ACME and the Government have agreed to focus on addressing all Requirements, Tests, and IA Issues and Pri 5 Defects, and some Pri 4 and all Pri 5 HSI Issues

Budget Delta (\$K) - Surplus / (Shortfall) :	\$1
Schedule Delta (# sprints) - Surplus / (Shortfall) :	0.5

The Agile PM Tool dynamically updates a list of specific scope items projected to be deferred as changes are made to the “Remaining Scope Planning Chart”

List of Defect Backlog Artifacts Deferred from Current Project

#	Artifact Code	Priority	Artifact Short Description
1	artf118868	5	Report doesn't generate properly when . . .
2	artf239908	5	The system crashes when . . .
3	artf232404	5	Incorrect data is displayed when . . .
4	artf135259	5	Input form doesn't launch when . . .
5	artf118864	5	Report doesn't generate properly when . . .
6	artf159298	5	The system crashes when . . .
7	artf222810	5	Incorrect data is displayed when . . .
8	artf206800	5	Input form doesn't launch when . . .
9	artf236958	5	Report doesn't generate properly when . . .
10	artf238840	5	The system crashes when . . .
11	artf239918	5	Incorrect data is displayed when . . .
12			
13			
14			
15			

Count of Dropped Artifacts: 11

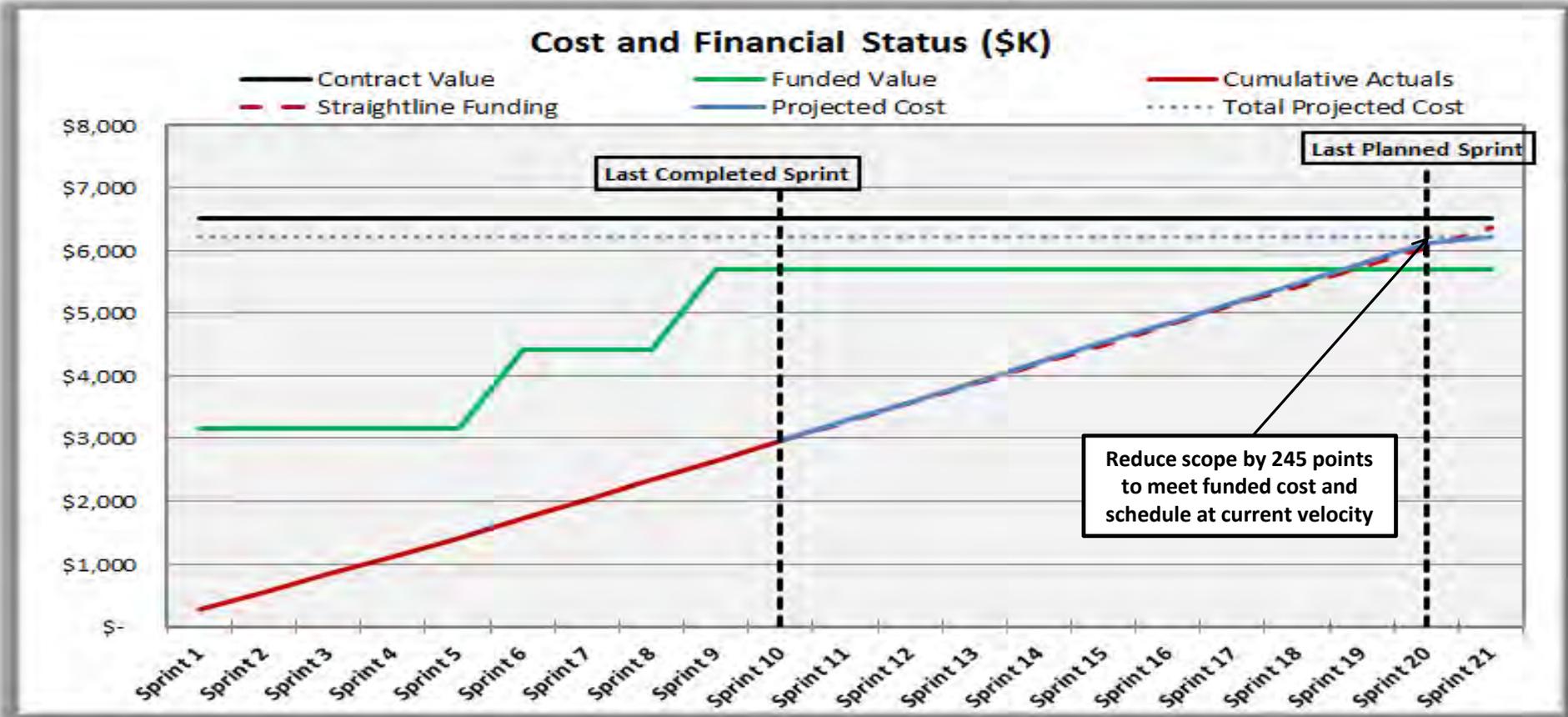
List of HSI Backlog Artifacts Deferred from Current Project

#	Artifact Code	Priority	Artifact Short Description
1	artf224149	4	User needs to enter PIN too many times.
2	artf225224	4	It takes too long to fill out form XYZ.
3	artf225217	4	Process to fill in user input for XYZ is non-intuitive.
4	artf222396	4	Text on page XYZ is too small . . .
5	artf222371	4	Button XYZ should be on the left vs. the right . . .
6	artf222368	4	User needs to enter PIN too many times.
7	artf222387	4	It takes too long to fill out form XYZ.
8	artf215730	4	Process to fill in user input for XYZ is non-intuitive.
9	artf224144	4	Text on page XYZ is too small . . .
10			
11			
12			
13			
14			
15			

Count of Dropped Artifacts: 9

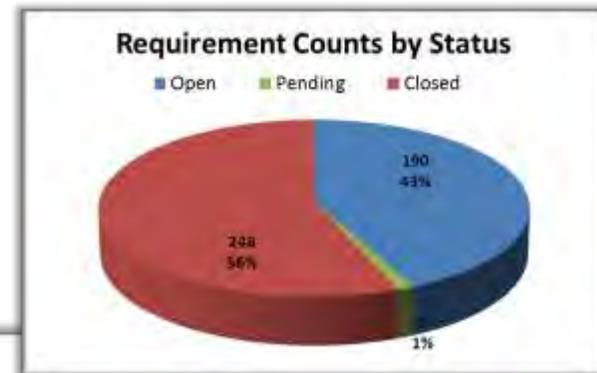
The “Money Chart” provides in-depth analysis on actual and projected costs, contract and funded values, and scope variability

As of Sprint 10 (\$)	Contract Value	Funded Value	Actuals Thru 30 Sep 2014	Percent Contract - Funding	Percent Spent - Funding	Percent Spent - Contract Value	Percent Complete - Requirements
Total	\$6,500,000	\$5,705,000	\$2,954,000	88%	52%	45%	57%

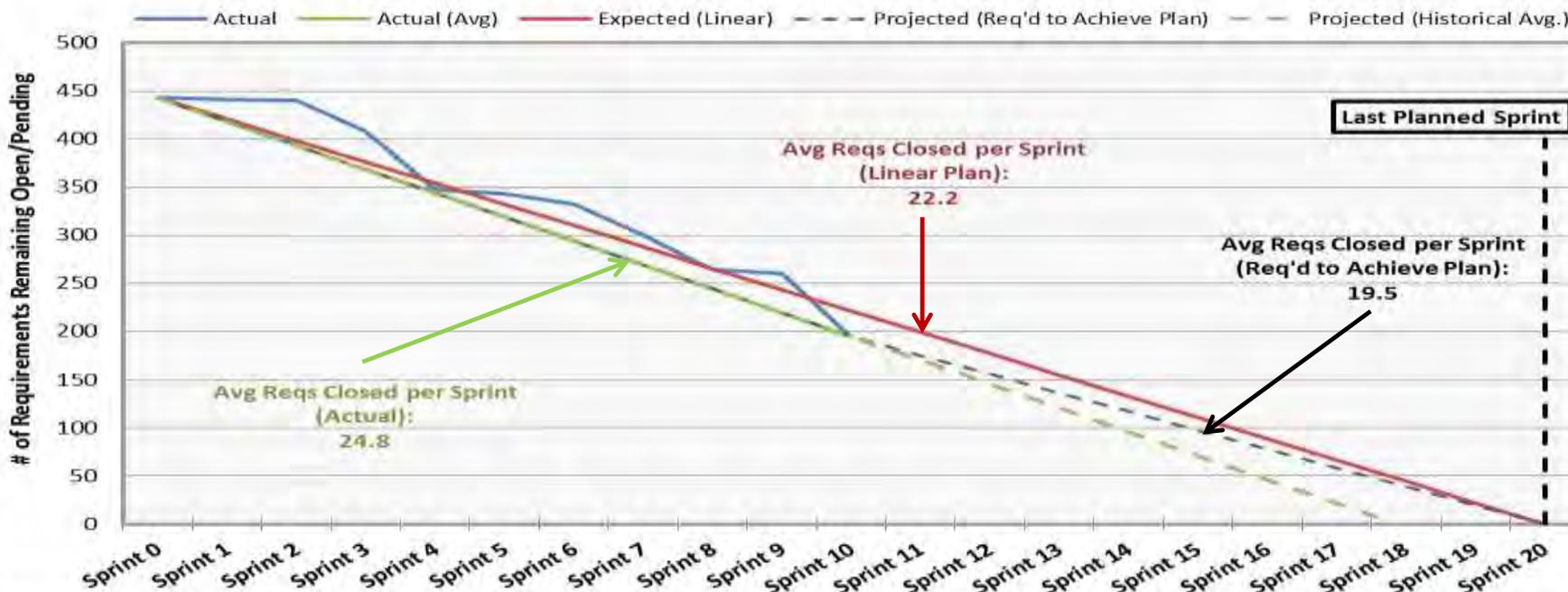


Requirements status, actual burndown, and completion projections are key measures to evaluate current and projected project success

- ▶ Requirement Status as of Sprint 10
 - 56% (248 reqs) have been completed
 - 43% (190 reqs) are in open status
 - 1% (5 reqs) are awaiting gov't acceptance testing

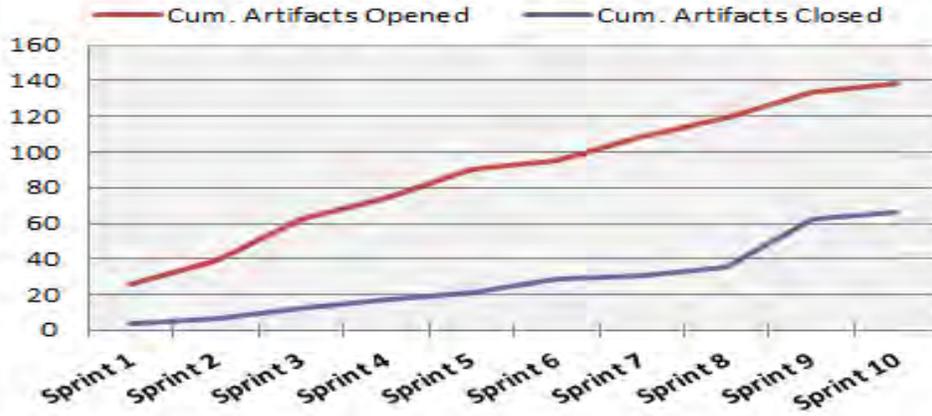


Requirements Burndown History/Projections

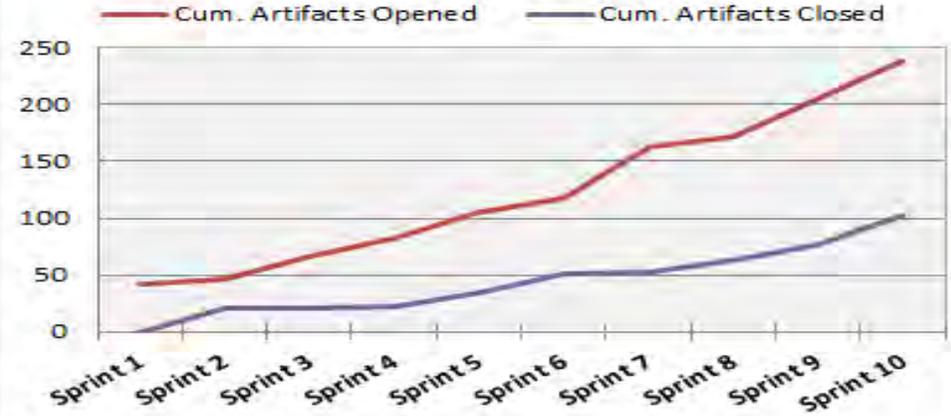


Issue trend line charts provide insight into status of all issue types, providing more detailed insight into problem causes than EVM

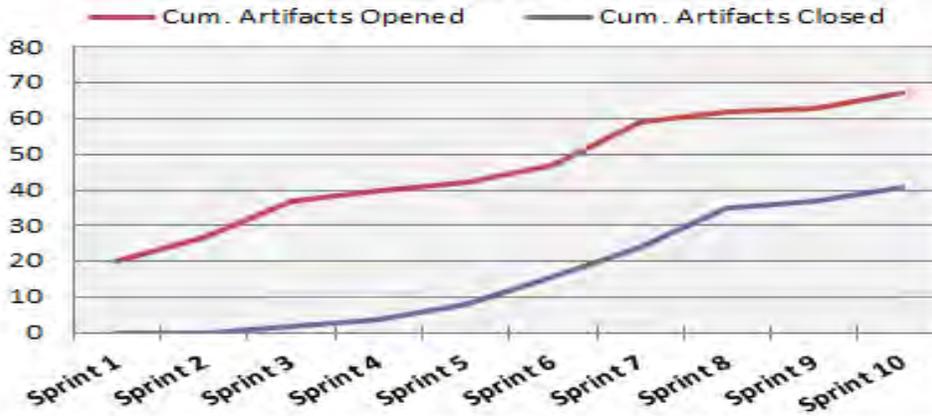
Defect Issue Trend Lines



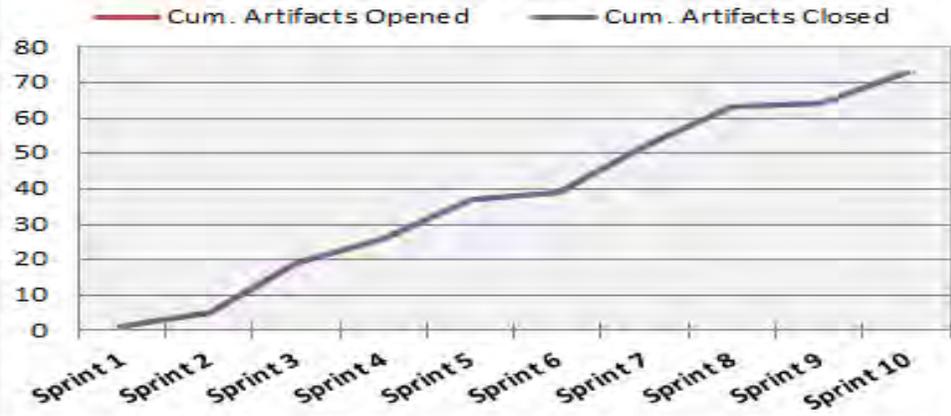
HSI Issue Trend Lines



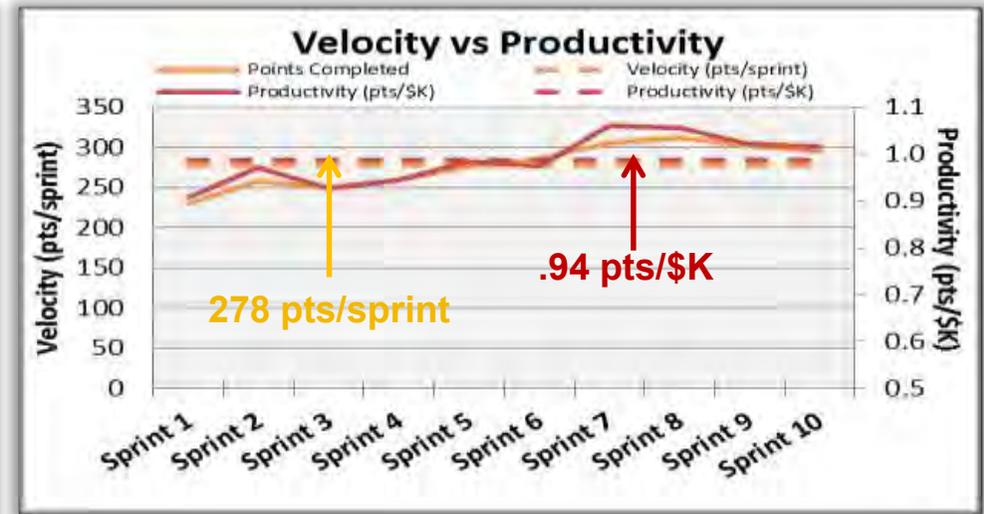
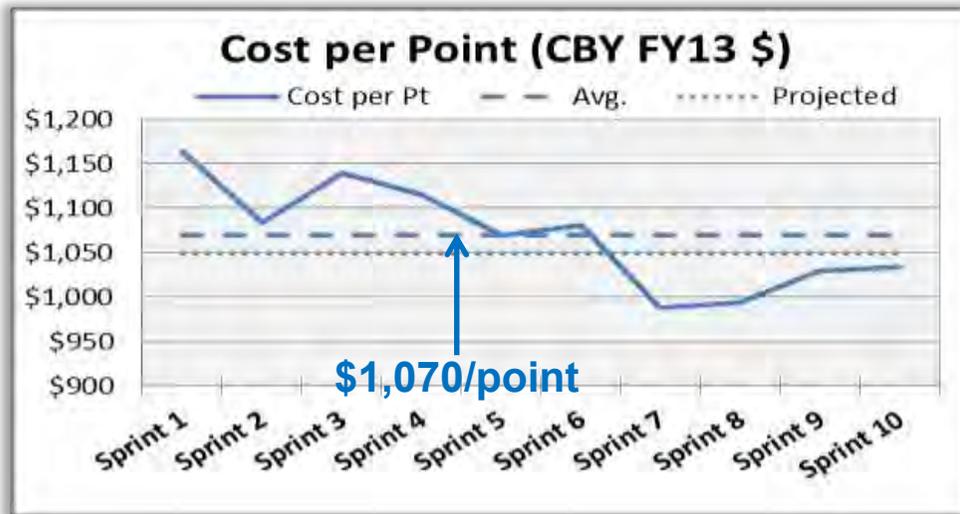
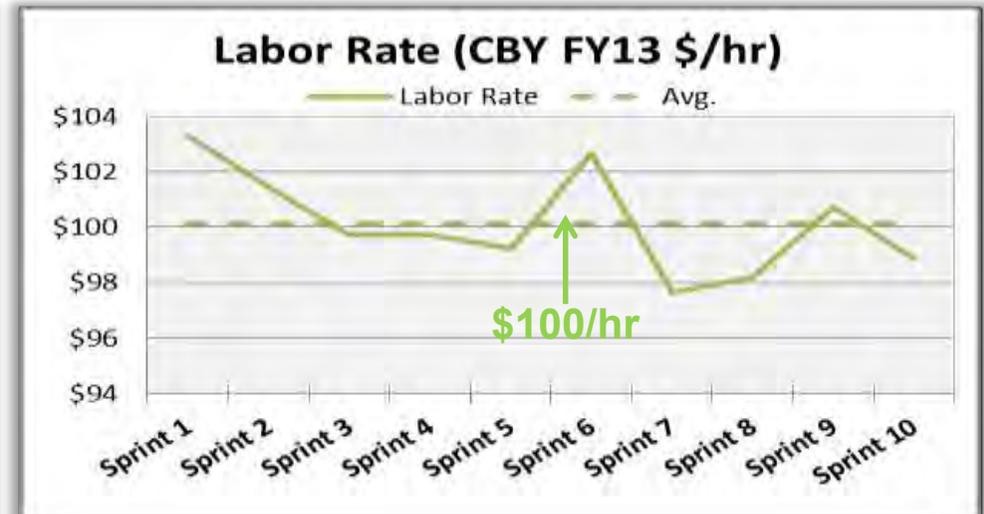
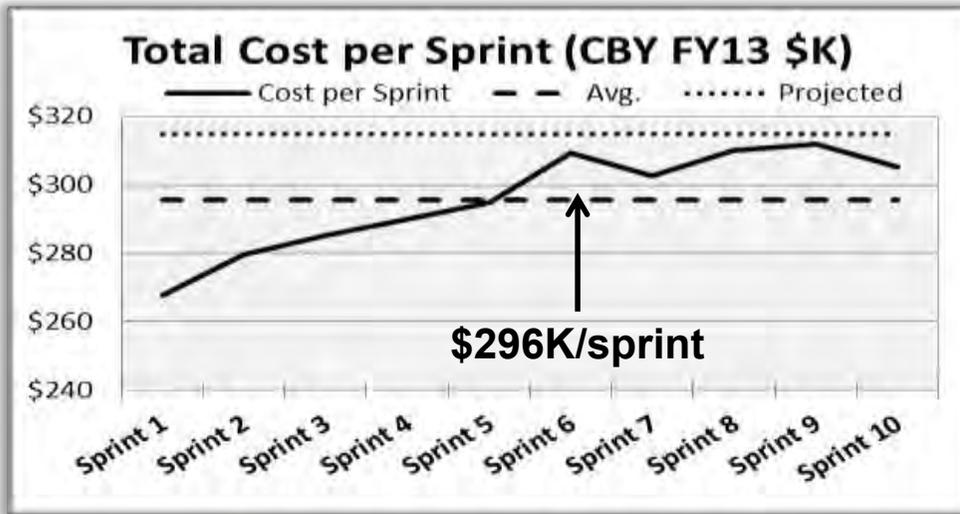
IA Issue Trend Lines



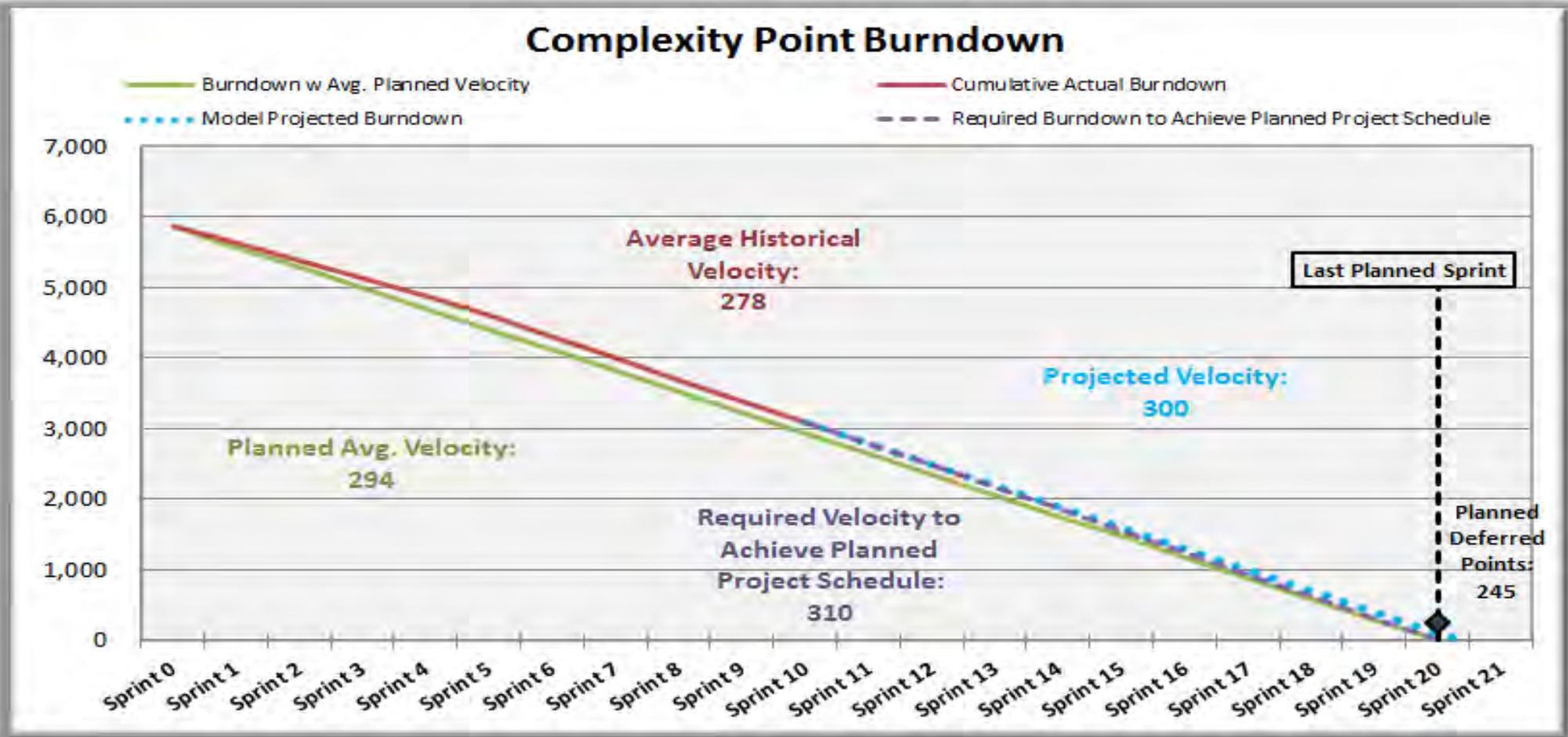
Test Issue Trend Lines



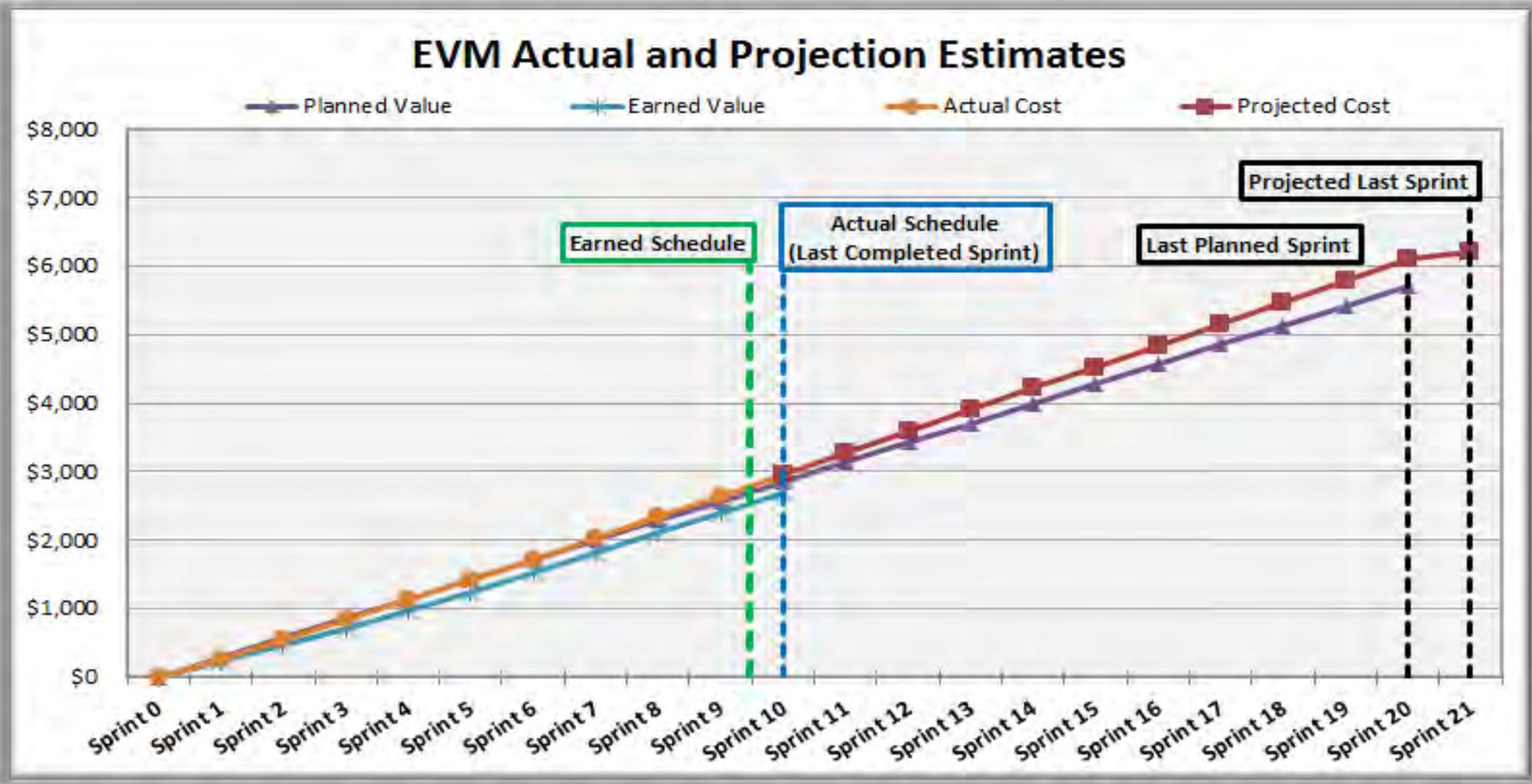
Agile PM Tool provide detailed visualizations of historical performance indicators specific to an agile project



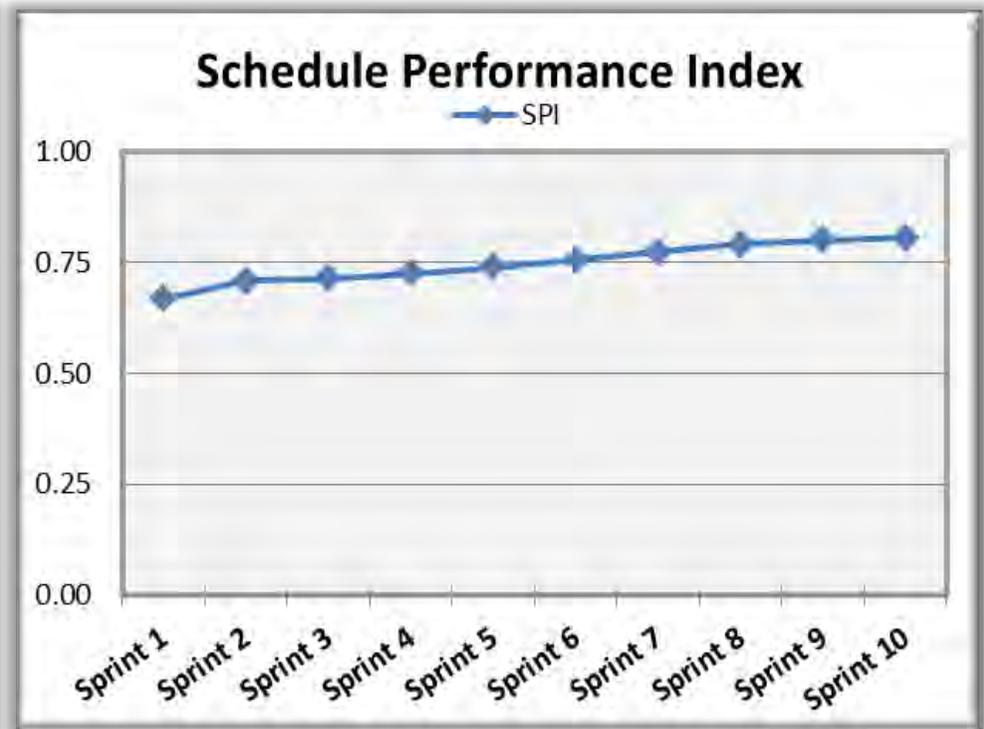
ALM (e.g. JIRA) and EVM reports do not show complexity point burndown with as much detailed analysis as the Agile PM Tool



The Agile PM Tool plots actual and projected EVM metrics as PV, EV, AC, ES, and Projected Cost for each sprint



The Agile PM Tool even provides insight into other EVM metrics



Variance and Performance Indices			
Cost		Schedule	
CV	(\$656)	SV	(\$554)
CV %	(23%)	SV %	(19%)
CPI	78%	SPI	81%

EVM Metrics							
PV	\$2,853	ETC _{ML}	\$4,378	BAC	\$5,705	APC	40%
EV	\$2,298	ETC _{WC}	\$5,434	VAC	(\$1,628)	EAC _{ML}	\$7,333
AC	\$2,954	ECD	11/5/2015	VAC %	-29%	EAC _{WC}	\$8,388

Agile PM Tool tracks data at a level that allows for additional insight into cost and schedule variances

- ▶ **CV % (-23%)** - The addition of systems engineering and project management overhead resulting from Issues found during Lab Integration as it relates to vendor provided Hardware and network infrastructure have caused additional cost to be incurred on the project. Currently working on a resolution with vendor and expecting to increase our CPI during the coming Sprint.
- ▶ **SV %(-19%)** - Sprint 8 User demo and feedback increased project scope by 15% resulting in an additional 25 more HSI Issues and 13 more Enhancements Issues.
- ▶ **VAC % (-29%)** - Vendor related issues presented additional unanticipated cost. Project is currently funded to 88% of the contract value. Fully funding the project to the contract value results in a current VAC of **-13%**. Expected increase of CPI from Sprint 11 and out should adjust the VAC to reflect a more accurate projection going forward.
 - Note: Projected cost is expected to exceed current funded value by Sprint 19.

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For further information . . .

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