

Earned Value + Agile = Success

Glen B. Alleman, VP Program Controls, Lewis & Fowler

NDIA Information Systems Summit II

4/4/2011 – 4/6/2011

Hyatt Regency, Baltimore, Maryland

NDIA

National Defense Industrial Association

Promoting National Security Since 1919

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EARNED VALUE + AGILE = SUCCESS



Increasing the Probability of Program Success requires connecting the dots between EV and Agile Development.

Thank you for having me this morning. You've heard many speakers address way of developing software using agile development methods.

That is not the topic of this briefing.

I'm going to introduce a parallel topic to the development of software using agile methods.

This topic starts and ends with the requirement – a Federal Acquisition Regulation requirements – for the application of Earned Value Management for programs greater than \$20M and for the use of a DCMA validated system for programs greater than \$50M.

We'll see the sources of this guidance in a moment. But no matter what the guidance says, how it is applied – or not applied – I'm going to try and convince you that Earned Value Management is a good thing in the context of Agile Software Development and the directive that comes from the NDAA 2010, Section 804.

Today's Briefing

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- Can Agile Development methods increase the Probability of Program Success (PoPS)?
- How can Agile development be integrated with the FAR / DFAR and OMB mandates for program performance measures of Earned Value?
- What are the “touch” points (or possible collision points) between Agile and ANSI-748B compliance?
- What are the measures of success for applying Agile methods to DoD IT programs?

Before any of the current “agile” development methods were around, Earned Value Management provided information for planning and controlling complex projects by measuring how much “value” was produced for a given cost in a period of time. With the connection to the Business Value in agile, both technical performance and business performance can be used to guide the performance of an enterprise IT project.

The concept of Probability of Program Success is applied to other DoD Acquisition process in the Air Force, Army, and Navy. It asks and answers the question “what are the key performance parameters (KPP) for the success of the program?”

While agile’s contribution to the development of software is the topic of many of the speaker, I’d like to introduce the notion that projects and programs in the US Department of Defense are still subject to the Federal Acquisition Regulation (FAR) and Defense Federal Acquisition Regulation (DFAR) once the program has reached a predefined dollar value.

At some point in the IT procurement process, it is likely a DoD IT program will cross that threshold.

What Do We Mean When We Say Agile?

Being able to turn inside the loop of unfolding events. †



Pembroke Welsh Corgi in a goat herding competition, Boulder County Fair, Longmont Colorado
Chubby body, short legs, not “lean,” but able to turn “inside the loop” of the goat = “agile?”

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† Dr. Ashton Carter, Under Secretary of Defense for Acquisition, Technology and Logistics, Sep/Oct, 2010 *Defense AT&L*

There are lots of definitions of agile. Most come from the software development world. But let's have a definition that is meaningful to the problem at hand. That problem is defined in NDAA Section 804's instructions. If we haven't heard of NDAA Section 804, it's the National Defense Authorization Act 2010, Section 804. we'll see the details in a bit, but for now Section 804 says:

- SEC. 804. IMPLEMENTATION OF NEW ACQUISITION PROCESS FOR INFORMATION TECHNOLOGY SYSTEMS.
 - The Secretary of Defense shall develop and implement a new acquisition process for information technology systems. The acquisition process developed and implemented pursuant to this subsection shall, to the extent determined appropriate by the Secretary
 - Be based on the recommendations in chapter 6 of the March 2009 report of the Defense Science Board Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology; and
- (2) be designed to include—
- (A) early and continual involvement of the user;
 - (B) multiple, rapidly executed increments or releases of capability;
 - (C) early, successive prototyping to support an evolutionary approach; and
 - (D) a modular, open-systems approach.

The last four phrases should be sound familiar to any of you practicing agile software development.



What Is The “Real” Goal of Any Method – Agile or Traditional?

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Increase The Probability of Program Success

A New Approach for Delivering Information Technology Capabilities in the Department of Defense

Report of the Defense Science Board Task Force on

Department of Defense Policies and Procedures for the Acquisition of Information Technology

March 2009

Army PEO EIS

1.1 Acquisition, Logistics, and Technology Enterprise Systems and Services (ALTESS)

- 1.0 Communications and Computing Infrastructure
- 1.2 Army Knowledge Online (AKO) Defense Knowledge Online (DKO)
- 1.3 Computer Hardware, Enterprise Software, and Solutions (CHES)
- 1.4 Defense Communications and Army Transmissions Systems (DCATS)
- 1.5 Defense Messaging System-Army (DMS-A)
- 1.6 Defense Wide Transmissions System (DWTTS)
- 1.7 Force Protection Brokers (FPB)
- 1.8 Information Technology Systems (ITS)
- 1.9 Information Infrastructure Modernization Program (IIMP)
- 1.10 Joint Mobile Radio (JMR)
- 1.11 Network Enterprise Services (NES)
- 1.12 Network Service Center (NSC)
- 1.13 Satellite Communications Systems (SCS)
- 1.14 Vehicle Intercom System (VIS)
- 1.15 Videoconferencing (VCS)
- 2.0 Logistics
- 2.1 Army Enterprise Systems Integration Program (AESIP)
- 2.2 Global Combat Support System-Army (GCSS-Army)
- 2.3 Joint-Airborne Identification Technology (JAIDT)
- 2.4 Logistics Modernization Program (LMP)
- 2.5 Personnel Tracking System (PTS)
- 2.6 Transportation Information Systems (TIS)
- 2.7 Human Capital
- 3.1 Army Human Resources System (AHRS)
- 3.2 Distributed Learning System (DLS)
- 3.3 Force Management System (FMS)
- 3.4 HR Solution
- 3.5 Installation Management System-Army (IMS-A)
- 3.6 Integrated Personnel and Pay - Army (IPPA-A)
- 3.7 Reserve Component Automation System (RCAS)
- 4.0 Finance
- 4.1 Central Fund Enterprise Business System (CFEBS)
- 5.0 Medical
- 6.1 Medical Communications for Combat Casualty Care (MCC)
- 6.0 Acquisition
- 6.1 Acquisition Business (AcqBusiness)
- 7.0 Biometrics
- 7.1 Department of Defense (DoD) Biometrics (DoD Biometrics)
- 7.2 Biometrics Breeding Capability (BEC)
- 7.3 Tactical Biometric Systems (TBS)

Probability of Program Success Operations Guide

Guidance to increase the PoPs

No matter what the outcome is this conference, we must seek ways to increase the Probability of Program Success not just apply new methods

The PoPS Operations Guide for ALTESS is shown highlighted here.

Starting at the top means asking a simple, yet powerful question, of any procurement processes. The two documents with larger borders are guidance from the IT initiatives. The other documents provide actionable outcomes for “increasing the probability of program success”

What is the probability of success?

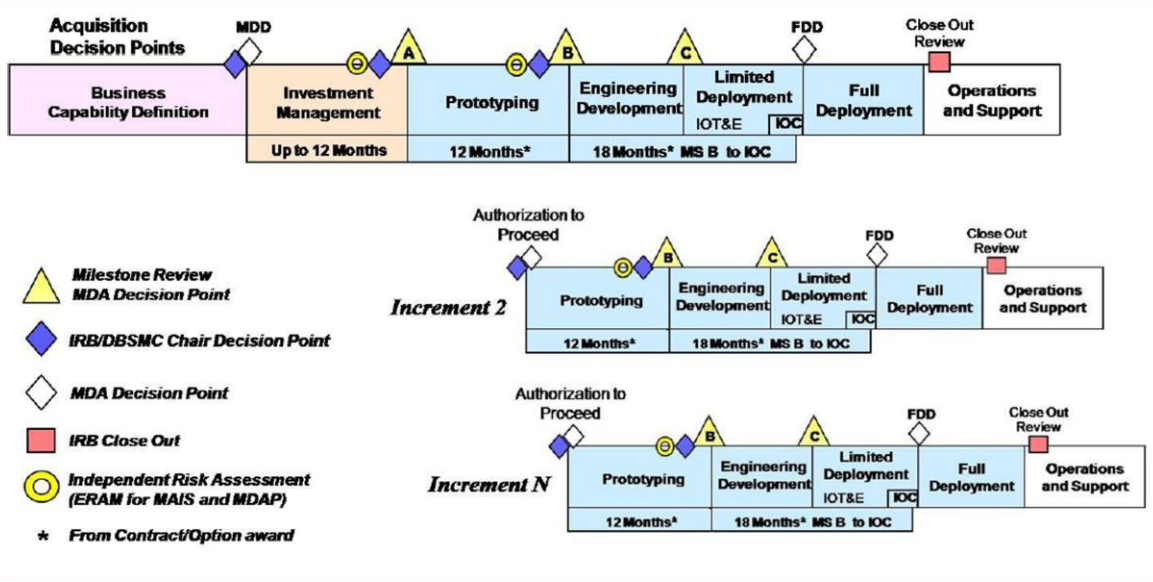
This is a legitimate question for any endeavor that evolves risk.

The processes and methods being described over the 3 days of this conference should be asking and answering the question:

- *how can we increase the probability of program success PoPS?*
- *How can we “connect the dots” between the proposed methods – agile methods – and the increase in PoPS?*
- *Same question needs to be asked of Earned Value, or for that matter any process – existing or proposed.*

A Quick View of the DoD IT Acquisition Lifecycle's Impact on Agile

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Before we go any further, let's establish the connection between the need for agility in DoD IT procurement and Earned Value Management.

Page 30, Table 3 of *A New Approach for Delivering Information Technology Capabilities in the Department of Defense*.

this document, which you can find on the web, is from the Deputy Secretary of Defense, Office of the Deputy Chief Management Officer,

Earned Value requirement is stated in Table 3, Pg. 30, *A New Approach for Delivering Information Technology Capabilities in the Department of Defense*

TITLE VIII--ACQUISITION POLICY, ACQUISITION MANAGEMENT, AND RELATED MATTERS

Subtitle A--Acquisition Policy and Management

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SEC. 804. IMPLEMENTATION OF NEW ACQUISITION PROCESS FOR INFORMATION TECHNOLOGY SYSTEMS.

(a) *New Acquisition Process Required.*--The Secretary of Defense shall develop and implement a new acquisition process for information technology systems. The acquisition process developed and implemented pursuant to this subsection shall, to the extent determined appropriate by the Secretary--

(1) be based on the recommendations in chapter 6 of the March 2009 report of the Defense Science Board Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology; and

(2) be designed to include--

- (A) early and continual involvement of the user;
- (B) multiple, rapidly executed increments or releases of capability;
- (C) early, successive prototyping to support an evolutionary approach; and
- (D) a modular, open-systems approach.

Do these sound familiar?

They are part of the 12 principles of Agile Software Development

So if we're looking for a higher motivation in our search for corrective actions to being over budget and behind schedule, we need look no further than the current NDAA.

Here's the actual worlds from the NDAA. If you have not read this, it would worthwhile. The NDAA is interesting in that it is a "directive" from SecDef to the DoD IT community.

It provides clear and concise statements about what to search for. A, B, and C say it in clear terms.

- Early and continuous user involvement
- Rapidly executed increments or released of capability. Capability is a DoD term (Capability Based Planning is a DoD process). Capability means "I can do something with the thing you just gave me."
- Early successive prototyping to support an evolutionary approach – means what it says. Early – not late, evolutionary – not big bang, prototyping – partially complete things that can be examined to see if that's what we really want.

Is The Department of Defense Ready To Embrace Agile Methodologies?

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It seems so...

A New Approach for Delivering
Information Technology Capabilities
in the Department of Defense

Report to Congress



November 2010

Office of the Secretary of Defense

Pursuant to Section 804 of the
National Defense Authorization Act for Fiscal Year 2010

*Using iterative tactics to
split projects into small
partitions, and the second is
testing in the field to
improve the results of trial
procedures.*

Elizabeth McGrath, Deputy Chief Management
Officer And Performance Improvement Officer at
the U.S. Department of Defense[†]

[†] AFCEA NOVA, January 25, 2011

In the presence of all these myths – procurement, DoD IT, and Agile Software Development, here is ample evidence DoD IT is headed down the path of agile acquisition and development.

Mrs. McGrath spoke at a recent AFCEA NOVA lunch I attended and laid out where she was going in her office.

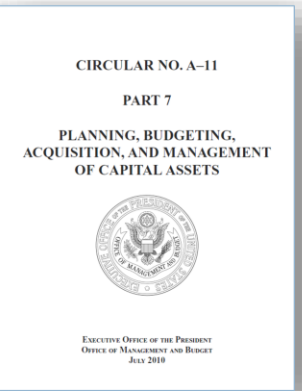
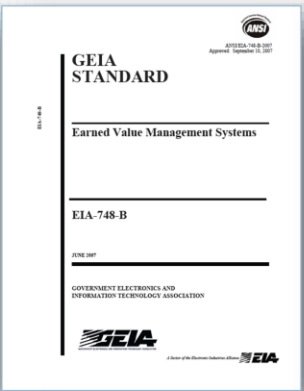
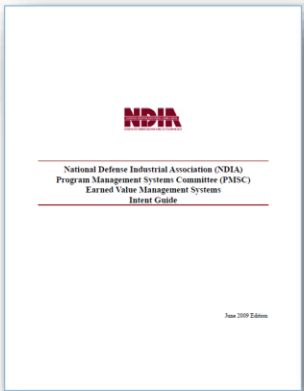
But we still need to “connect the dots” between the Governance of DoD IT programs and the technical activities we find in the development of software. As mentioned earlier “writing software” is not the same as “managing the writing of software.”

No matter the examples in the commercial worlds, where the development teams are “self managed,” that is likely too big a leap for FAR / DFAR compliant programs to take. There will always be the requirement for Program Management processes based on Earned Value for contract awards greater than \$20M.

While seeking to fulfill the directives of NDAA §804 ...

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... let's not forget these directives too.



Plus a few more ... FAR 52.234-2, 34.201, 34.202, OMB Memo(s) M-05-23, M-04-24, DFAR 252.234-7002, DoD Instruction (DoDI) 5000.02, Defense Acquisition Guidebook, Chapter 11, Section 11.3.1.3.

So now that we've had a good tour of agile some myths busted or confirmed, and the interaction of agile with the project and the development of software, let's revisit that some guidance that is in place no matter what software development we're using now or want to use in the future.

We come to the elephant in the room.

For programs in the DoD (or for that matter any government agency) that have award values greater than \$20M the FAR, DFAR, and OMB (White House) requires Earned Value management, guided by ANSI 748-B.

I'll wait for the shudder in the room to settle (if there is one).

The two logos on the left are from the Defense Contract Management Agency and the Defense Contract Audit Agency. They are accountable for looking after the money issued to contractors for the acquisition of services and materials in the US Government. They are one of those overworked agencies that are always looking for ways to make your life unpleasant at inconvenient times.

They do this with a "politically correct word" surveillance – which mean audit – enabled by the regulations and guidance listed at the bottom of this chart.

Rule for Earning Value in Agile

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Each Release in Agile is a “value earning” opportunity

The next step is to connect Agile’s definition of “value” with Earned Value’s definition of value

Business Value ↔ BCWP

Let’s bring the discussion back to some simple, clear, and concise terms.

What are we after when I suggest Earned Value Management can be used with Agile Development?

Actually in the Federal procurement domain, it’s agile being used with Earned Value.

The answer is “how can we recognize that value – business value – is being EARNED in exchange for spending time and money?”

This is a core question, in the same way to previous question – what is the probability of program success – is a core question.

If we proceed further without understand the importance of these core questions, we have heard and seen some very clever tools and approaches. But we won’t understand WHY they are clever. And most importantly if they are in fact the appropriate approaches to the problem.

And we all understand the problem right?

We’re over budget, behind schedule, and off the technical performance measures on many programs in IT and other DoD procurement domains.

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Before Going Further, Let's Bust Some Myths



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So let's change course here for a bit.

There are lots of "myths" around agile software development. Just like there are lots of myths around Earned Value and Earned Value Management.

Let's look at some of these to get a sense if these myths have any validity to them.

If not let's bust them.

If so, let's use them to make improvements in our understanding of what to do next to Increase the Probability of Program Success.

Remember that phrase. That's the phrase we want to start using to keep everyone honest.

How does your suggested improvement Increase the Probability of Program Success?

A Few Myths of Defense Acquisition[†]

11

MYTH vs. REALITY

- | | |
|---------------------------------------|--|
| 1. One size fits all. | 1. Different situations require different tools. |
| 2. This system won't last long. | 2. If it works, it stays. |
| 3. Requirements creep is bad. | 3. Requirements creep is inevitable and good. Plan for it. |
| 4. We Know the Concept of Operations. | 4. Users are creative and innovative. |
| 5. Development is for the pro's. | 5. Hobby shops can provide excellent systems. |
| 6. We can learn from experience. | 6. We seldom see the long-term results of our actions. |

[†] "Modern Acquisition Myths," Capt. Dan Ward, USAF, *Program Management*, Mar/Apr, 2003

Let's start with some myths on the Defense Acquisition side.

These come from then Capt. Dan Ward, now Lt. Col Dan Ward, USAF.

Dan and I have shared ideas for awhile around what it means to be agile and adaptive in the weapons system procurement business.

Dan writes articles for the Acquisition, Technology and Logistics journal – a real page turner if anyone is interested.

Dan also has a Blog and writes books about management, especially program management.

Most of Dan's work can be found on the Defense Acquisition University's Community of Practice portal.

These myths are self evident. Meaning when you state them, you can figure pretty quickly if they can be "busted" or not. There are 6 here, all "busted."

3 Ways To “Connect the Dots”

12



Measures progress in units of “physical percent complete.”	Each iteration produces 100% working products.
Forecast future performance using past performance.	Forecast performance in units of products produced.
Take a systems approach to the development of products and connecting Cost, Schedule, and Technical Performance.	Increasing fidelity of product and problem understanding takes place after each iteration and release.

Both EV and Agile Measure Progress as Physical Percent Complete

We’re getting close to the half way point in this briefing, so let’s have a process check.

First where have we come from? We’ve seen agile is being mentioned inside the walls of the DoD.

We’ve seen there are external guiding regulations and documents that impact DoD procurement no matter what method is being used to develop the software.

So let’s take the first attempt to “connect the dots,” between those two worlds.

Here’s three ways they can be connected.

- Measuring progress
- Forecasting future progress
- Integrating the performance reporting in a form needed by the government.

12 Principles of the Agile Manifesto

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01 Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.

02 Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

03 Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

04 Business people and developers must work together daily throughout the project.

05 Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

06 Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

07 Working software is the primary measure of progress.

08 The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

09 Continuous attention to technical excellence and good design enhances agility.

10 Simplicity—the art of maximizing the amount of work not done—is essential.

11 The best architectures, requirements, and designs emerge from self-organizing teams.

12 At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

One of the difficulties with the Agile Manifesto besides the term “over,” is it is not directly actionable.

If we look at these 12 “principles” and remove the term “agile” there is not one of them that we would not want on any project.

How would not want...

- To satisfy the customer with early and continuous delivery of value
- To have business and developers work together.
- To frequently deliver working products.
- To have continuous attention to technical excellence.

11 Critical Criteria for Earned Value Management

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- The 32 EVM Criteria are all designed to deliver value.
- These 11 are the basis of “connecting the dots.”



ANSI-748-B defines 32 criteria needs for a FAR/DFAR compliant Earned Value Management System.

These criteria address 5 areas of Earned Value Management

1. Organization
2. Planning and Budgeting
3. Accounting
4. Analysis
5. Revisions

These areas are the 5 critical success factors for any program whether it is managed with Earned Value or not and whether Agile Software development methods are used or not.

These 5 program management processes are the basis of Increasing the Probability of Success of any program.

But there are 11 critical criteria that must be present not matter what approach is taken to the management of a program.

They ask and answer questions that provider actionable information to the Program Manager.

It is these 11 critical criteria that we'll connect with the principles of Agile Software Development.

Here's A Quick Look at the Connections

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#	EVM Criteria	Agile Approach
1	Define WBS	Features and Stories define tasks
2	Identify Organization	Self organizing teams
5	Integrate WBS and OBS	Self organized teams with a customer
6	Schedule Work	Iterations and Releases
7	Identify Products & Milestones	Working software at the end of iterations
8	Set time phased budget	Fixed length iterations and releases
16	Record direct costs	Fixed staff = Level of Effort
23	Determine variances	Velocity measures missed features
25	Sum data and variance	Missed features moved to next iteration
26	Manage action plans	Replan missed features, adjust velocity
28	Incorporate changes	Replan missed features, adjust velocity

Describing how to make these connections and deploying them on actual programs is beyond the scope of this brief introduction.

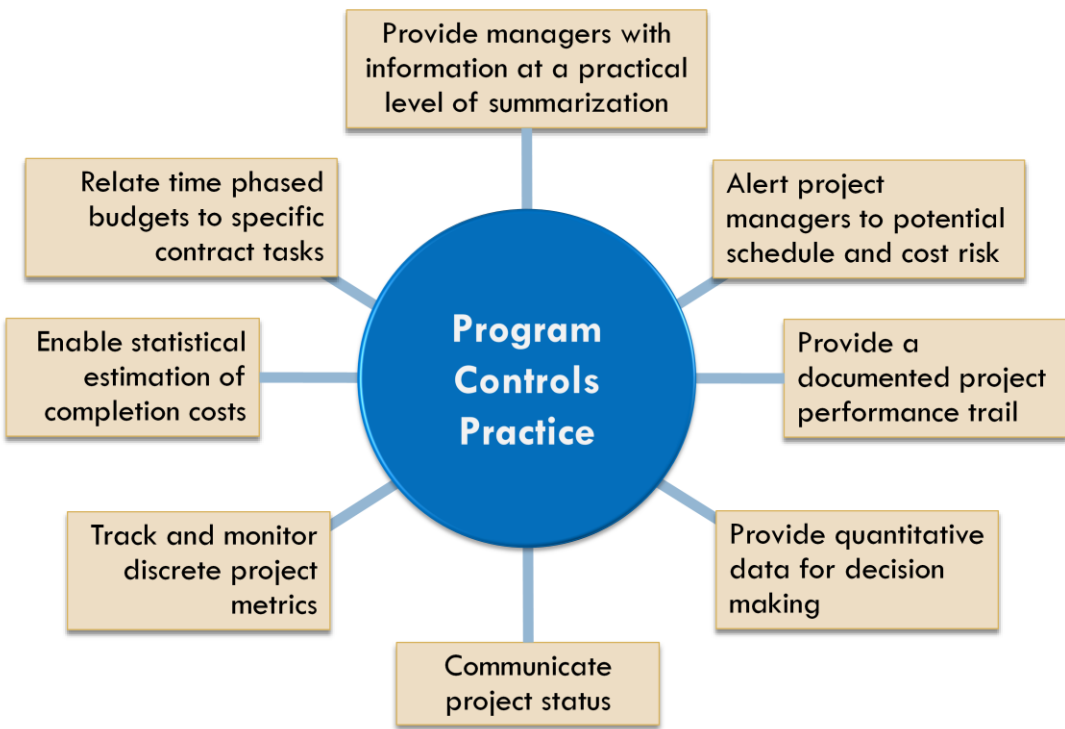
But here is a quick look at how the connections are related.

In Agile Software Development the 12 principles that we saw previously fit nicely with the 11 Earned Value Management criteria.

Both Earned Value and Agile Software Development share several important principles:

1. Progress is measured through physical measures of complete.
2. Planning is incremental and iterative.
3. Measures of Effectiveness and Measures of Performance are developed through customer interaction.
4. Work is organized to produce tangible outcomes.
5. Changes are managed with the full involvement of the customer.
6. Adjusts to forecasted performance are made from measures of past performance.

But First, Let's Look At The Business Management Practices ...



No matter how we connect the dots between Earned Value Management and Agile Software Development, there is principles of business management that must be in place. These principles must drive the deployment of both Agile Software Development and Earned Value Management.

They are obvious when arranged in this way. No credible IT manager would object to the application of these principles.

So no matter how we proceed with the integration of Agile Development on DoD IT programs, processes should be in place that provide this information to the decision makers.

16 ...That Must To Be Present Before Connecting Agile and EVM

Call to Action



- ✓ Measure tangible evidence of progress to plan as “Physical Percent Complete”
- ✓ Define what “done” looks like in fine grained increments before starting the work.
- ✓ Define the planning horizon to be inside your ability to control the future.
- ✓ Learn how Earned Value Management integrated with Agile Software Development provides the needed “program controls” to forecast future performance.

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How a suggested approach to moving forward with the integration of Agile Software Development in the domain of DoD IT Acquisition.

1. Assure all performance measurement baselines measure progress as “physical percent complete” in units of measure meaningful to the decision makers.
2. Define what “done” looks like on fine grained boundaries with tangible evidence, agreed to before starting the work.
3. Use Rolling Waves to bound the planning horizon inside our ability to control the future.
4. Integrate Agile Software Development into the DoD Program Controls paradigm it increase the visibility of performance to the decision makers.

A Take Away[†]

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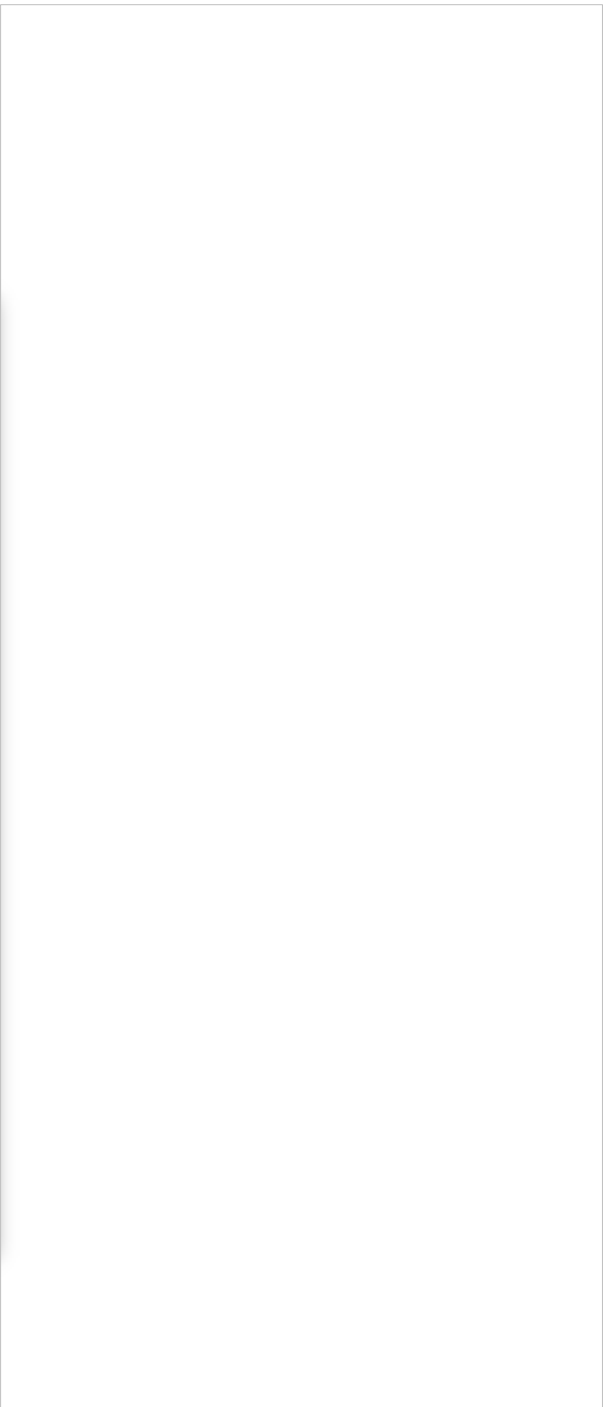
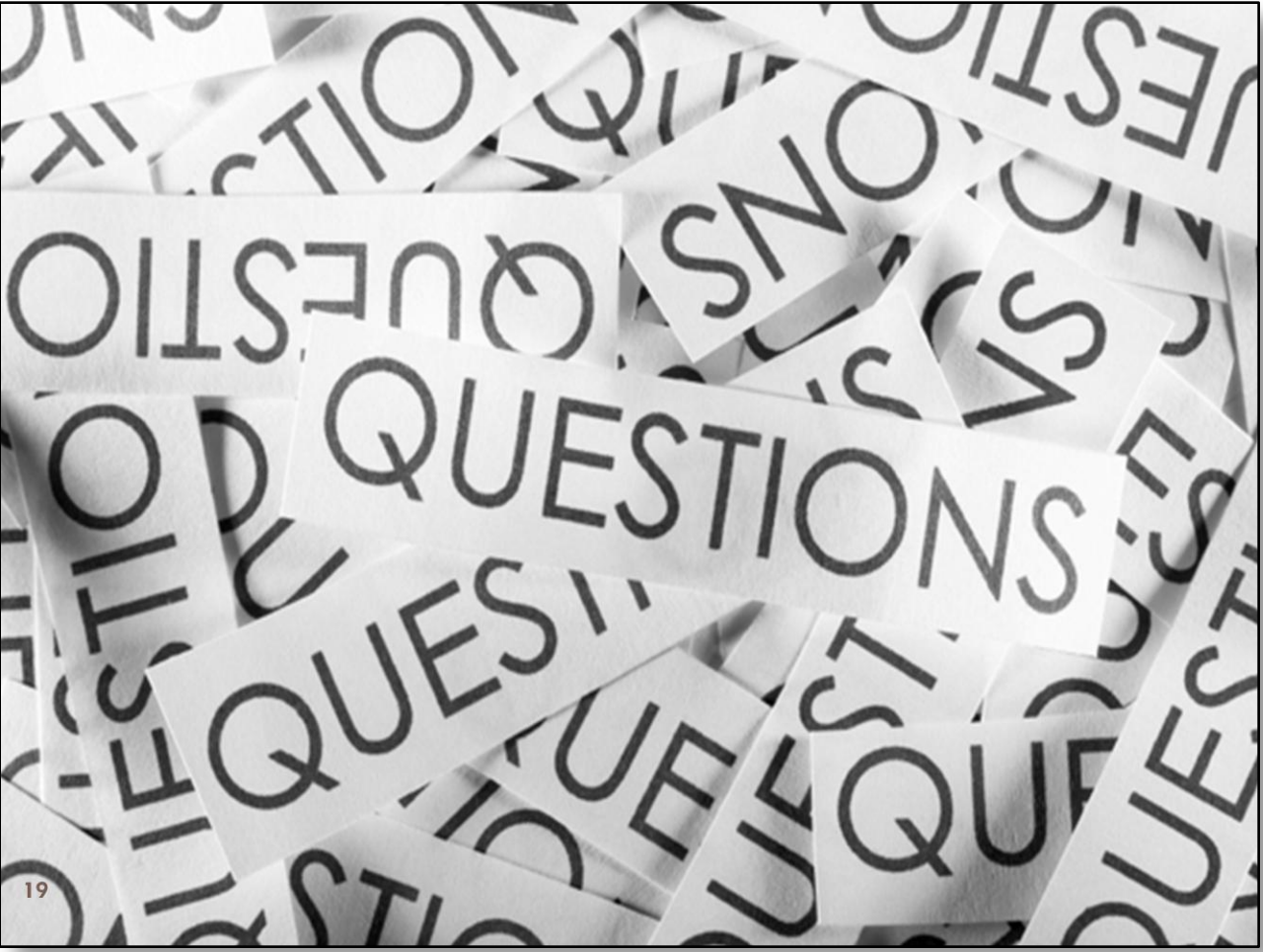
... As the PM community proceeds to build an integrated program management model, working with other functional communities, ... , other program management processes will be identified that should be integrated.

As in evolutionary or spiral development, each step towards integration will both make the next step more achievable, and will make the next step clearer.

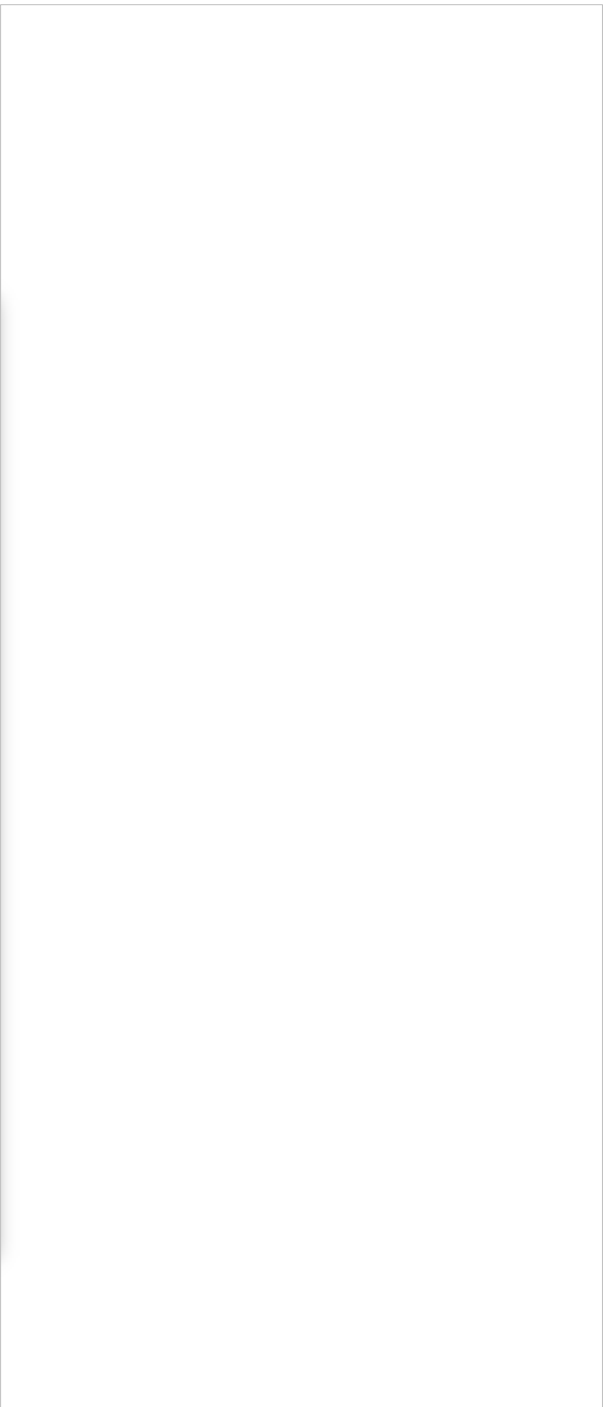
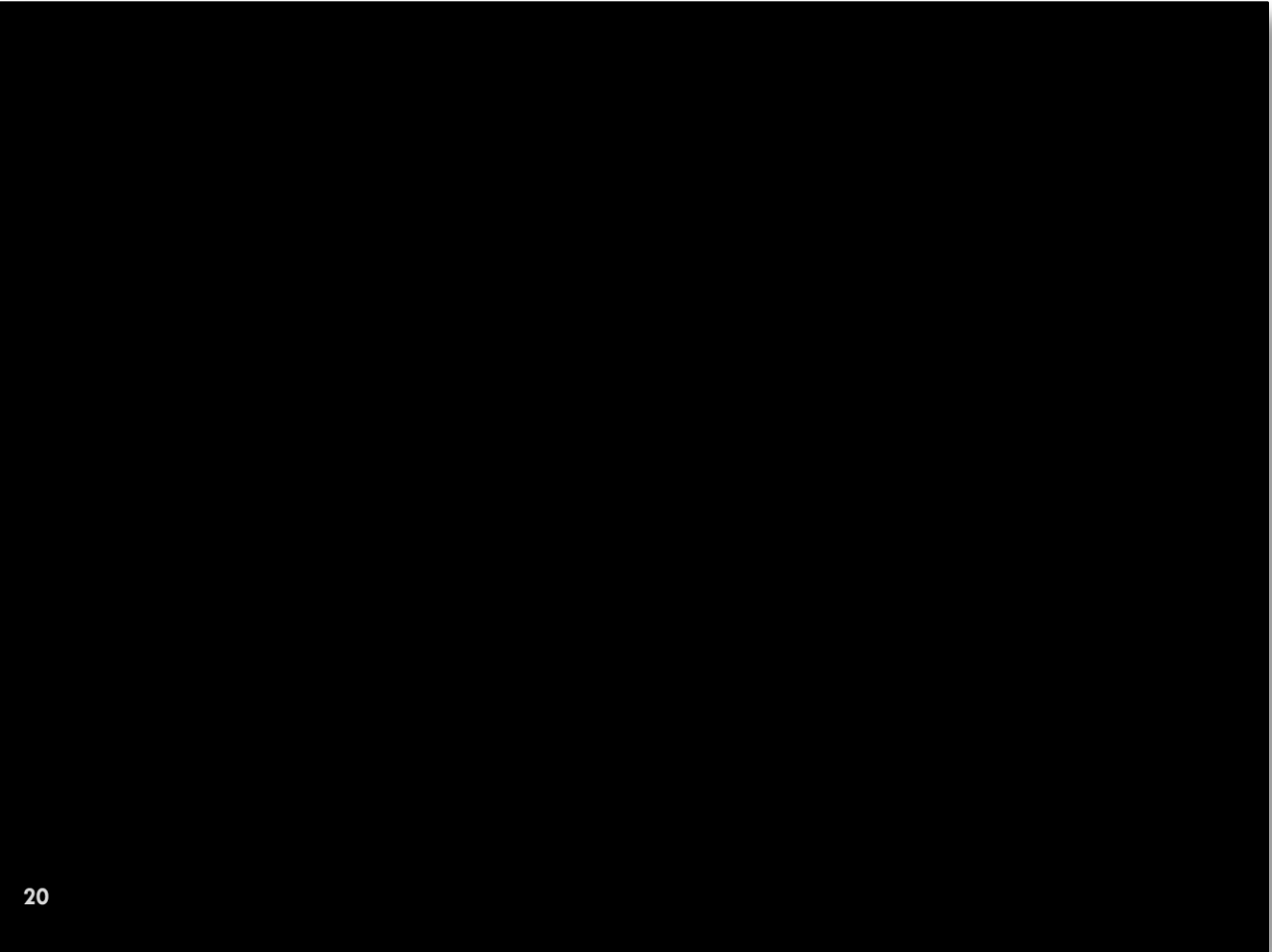
Agile Offers Unique Benefits To Earned Value

[†] Integrating Risk Management with Earned Value Management, NDIA,
http://www.ndia.org/Divisions/Divisions/Procurement/Documents/PMSCCommittee/CommitteeDocuments/WhitePapers/Integrating_RM_with_EVM.pdf

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Putting These Ideas To Work

Using the Earned Value Management Intent Guide (EVMIG), here's how to connect the dots at the next level down.

The 11 criteria of Earned Value connected with the 12 principles of Agile.

With the 11 748-B Criteria, let's go down one more level and see how Agile Software development practices can be connected, using the NDIA Earned Value Management Intent Guide (EVMIG).

The numbers in the title section of the following pages are from the EVMIG.

2.1.a: Define Authorized Work Elements

22

Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control, is commonly used in this process.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Work Breakdown Structure (WBS). 	<ul style="list-style-type: none"> Road Map & Release Plan consisting of Capabilities, Product Backlog & Iteration Backlog.
<ul style="list-style-type: none"> WBS dictionary (may or may not be used, but a method to reconcile the statement of work to the WBS structure must be demonstrated). 	<ul style="list-style-type: none"> WBS dictionary: agile user stories are deliverables that you can measure “done” for, therefore user stories satisfy wbs dictionary.

2.1.a describes how to define what work is to be performed on the project. In the Agile paradigm this work might be considered “emerging.” But during an iteration and during a release planning session, the defined work should be clear.

The same is true for a Rolling Wave planning process.

In 748-B we need a Work Breakdown Structure. For EV programs this is defined in MIL-STD-881C (coming out in June of 2011). For Agile, the release planning process produces artifacts that describe what is to be produced. These can be “sticky” notes all the way up to reports from supporting tools.

The WBS Dictionary is a narrative of what is to be delivered during the work efforts. Agile provides “stories” or other narrative forms that perform the same function.

2.1.b: Identify Program Organizational Structure

23

Identify the program organizational structure, including the major subcontractors responsible for accomplishing the authorized work, and define the organizational elements in which work will be planned and controlled.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Organization Breakdown Structure (OBS). 	<ul style="list-style-type: none"> CAM just builds a team as usual, but the team needs to be persistent, and not interchangeable parts.
<ul style="list-style-type: none"> OBS intersections with the WBS. 	<ul style="list-style-type: none"> Team hierarchy definition with resources associated with their sub-teams. Done at the level of granularity to support the basis of estimate (BOE). Persistent teams are needed to apply throughput benchmarks to product backlogs to validate plans.

2.1.b defines who is working on the project. In the Earned Value world this issue is more complex, because people come and go on the project. The Organizational Breakdown Structure provides this information.

On Agile projects, the staff is fixed for the most part during the iteration and possibly across the release cycle.

The artifacts in Agile that describe the staff can be simple and be posted in the wall.

The motivation for the OBS and the WBS in 2.1.a in Earned Value is to define the Control Account and the Control Account Manager (CAM) responsible for the delivery of the items in the Control Account.

Depending on the size of the project, similar formal processes will be needed for Agile.

2.1.e: Integrate WBS and OBS

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Provide for integration of the program work breakdown structure and the program organizational structure in a manner that permits cost and schedule performance measurement by elements of either or both structures as needed.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> ▪ Control accounts. 	<ul style="list-style-type: none"> ▪ Evidence that the CA meets the 90% discrete work rule. ▪ Defend schedule & cost performance at the CA level? ▪ Agile CA = one release. ▪ Actuals captured at the story level.
<ul style="list-style-type: none"> ▪ Responsibility Assignment Matrix (RAM). 	<ul style="list-style-type: none"> ▪ Done at too high a level for the SW development approach to make a difference.
<ul style="list-style-type: none"> ▪ Contract Performance Reports (CPRs), if applicable. 	<ul style="list-style-type: none"> ▪ Given an objective of X stories in iteration Y, completed stories are earned; all unearned return to backlog and a new ETC is developed from the benchmarks & backlog.

The intersection of the OBS and WBS is the Control Account (CA) with the related Control Account Plan (CAP) and lower level Work Package – Work Authorizations.

This of course is outside the process domain found in Agile, but inside the process domain of Earned Value Management – guide by 748B.

So Agile has contributions to these documents, in ways not normally found on “agile only” projects.

The formality of a Contract Performance Report - DI-MGMT-81466A – is also outside the domain of Agile, but firming connected to DoD programs using Earned Value (> \$20M).

Agile provide objective evidence of progress to plan needed to produce the CPR.

2.2.a: Schedule the Work

25

Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Integrated network schedules including master, intermediate (if any), and detailed schedules. 	<ul style="list-style-type: none"> CAM's agile roadmap becomes the auditable intermediate schedule demonstrating significant accomplishments (SA).
<ul style="list-style-type: none"> MRP or ERP schedules, or planned order reports. 	<ul style="list-style-type: none"> Each task in IMS has associated resources.
<ul style="list-style-type: none"> Control account plans (may be separate plans or detail schedules). 	<ul style="list-style-type: none"> CAM creates schedules compliant to DCMA 14 point assessment.
<ul style="list-style-type: none"> Work authorization documents. 	<ul style="list-style-type: none"> Nothing different.

The notion of scheduling in Agile is straight forward. Iterations with fixed durations and fixed staff and a candidate list of features, stories, or other outcomes.

The staff works on fixed boundaries. This is not always possible in integrated programs where software is only part of the deliverable.

So scheduling needs to consider the paradigm of Agile as well as the work processes of the large program.

2.2.b: Identify Products and Milestones

26

Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Integrated schedules including master, intermediate (if any), and detailed schedules that identify contract milestones and key events. 	<ul style="list-style-type: none"> Agile dev performance reporting follows the approved program system description Apportioned technical performance milestones to reduce risk & roll up intermediate technical performance.
<ul style="list-style-type: none"> MRP or ERP production planned order reports. 	<ul style="list-style-type: none"> Not relevant to sw development.
<ul style="list-style-type: none"> Control account plans (may be separate plans or detail schedules) 	<ul style="list-style-type: none"> Not relevant to sw development because we are reporting tasks as physical % complete, which will automatically roll up.

The products and milestones are the assessment points in any program. Agile does this naturally with the defined outcome of “working software” at the end of the iteration.

On large programs this seems to be more difficult. This is the primary reasons for the inclusion of Agile in the IT intensive program development world for DoD.

It forces the discussion of what “done” looks like in terms of tangible working outcomes.

2.2.c: Set Time Phased Budget

27

Establish and maintain a time-phased budget baseline, at the control account level, against which program performance can be measured. Initial budgets established for performance measurement will be based on either internal management goals or the external customer negotiated target cost including estimates for authorized but undefinitized work.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Control account plans. 	<ul style="list-style-type: none"> Time phased budget created for the current iteration(s) and future work.
<ul style="list-style-type: none"> Summary level planning packages. 	<ul style="list-style-type: none"> Agile summary level planning documented in road map. Comprises capabilities, features and stories Agile planning packages driven by persistent teams with proven benchmarks.
<ul style="list-style-type: none"> Performance Measurement baseline. 	<ul style="list-style-type: none"> Is there a target threshold for future work as described in a PMB? Within 10% OTB?
<ul style="list-style-type: none"> Undistributed budget logs. 	<ul style="list-style-type: none"> Does this have anything to do with SW dev approach?
<ul style="list-style-type: none"> Notification to the customer of an over-target baseline. 	<ul style="list-style-type: none"> Does this have anything to do with SW dev approach?
<ul style="list-style-type: none"> Work authorization document. 	<ul style="list-style-type: none"> Does this have anything to do with sw dev approach?

Agile has it simple. The time phasing is on fixed boundaries, with nearly fixed expenditures (fixed labor loads), and predefined measures of “done.”

On larger EV programs more needs to be done to model the Agile approach. This starts with Technical Performance Measures (TPM) for each deliverable from the Work Package. Traditionally the TPMs were assigned to “large grained” deliverables from the program. The end items, the big chunks of software or metal.

This of course is a mistake and one of the reasons for Agile, to get away from that “big chunk” approach to planning and measuring progress.

2.3.a: Record Direct Costs

28
 Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Reconciliation of project costs with the accounting system. 	<ul style="list-style-type: none"> CAM would follow program direction on these. These are not impacted by sw dev approach
<ul style="list-style-type: none"> Actual costs are reported at the control account level at a minimum. 	<ul style="list-style-type: none"> Not impacted by SW development approach.
<ul style="list-style-type: none"> Reconciliation of subcontract reported actual costs to subcontract payments. 	<ul style="list-style-type: none"> Not impacted by SW development approach.
<ul style="list-style-type: none"> Internal and external performance reports for subcontractors. 	<ul style="list-style-type: none"> Not impacted by SW development approach.
<ul style="list-style-type: none"> Subcontractor control account plans, when utilized. 	<ul style="list-style-type: none"> Not impacted by SW development approach.

All projects have budgets. No matter is they are Agile or standard EV.

Some form of budget management is needed for all projects.

In more formal projects an accounting system captures and manages these costs. On Agile projects the budget management is straight forward.

The connections between Agile and EV are shown here are simple enough.

2.4.b: Determine Variances

29

Identify, at least monthly, the significant differences between both planned and actual schedule performance and planned and actual cost performance, and provide the reasons for the variances in the detail needed by program management.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> Variance analyses (budget based schedule variances and cost variances). 	<ul style="list-style-type: none"> Can track & report variances per the approved program system description
<ul style="list-style-type: none"> Management action plans. 	<ul style="list-style-type: none"> Actionable recovery plans per issue.
<ul style="list-style-type: none"> Updated schedule task completion and cost-completion forecasts. 	<ul style="list-style-type: none"> Scrum Agile has a POD and Plan for Iteration. CAM's monthly EAC reporting follows the approved program system description
<ul style="list-style-type: none"> Project schedules and schedule analysis outputs. 	<ul style="list-style-type: none"> PM tracks the dynamic backlog, which will go up and down based on sponsor feedback

Again Agile has an advantage here. Fixed iterations with a fixed staff makes capturing actual costs simple.

Not always the case in other paradigms.

No matter what the paradigm, the actual costs – direct cost – needs to be captured in a time phased approach. That is the actual cost capture timeline must be the same as the budgeted baseline cost plan (BCWS).

This is the definition of the Performance Measurement Baseline – a time phased cost.

2.4.d: Summarize Variances

30

Summarize the data elements and associated variances through the program organization and/or work breakdown structure to support management needs and any customer reporting specified in the project.

EVMIG Objective Evidence	Agile Objective Evidence for EV
▪ Variance analyses.	▪ There is nothing in Agile’s approach to SW development that precludes reporting variances at the WP level. ▪ Agile is more dynamic than EVM so variances are less the issue than the evolving baseline, as approved in governance. The sponsor will want to track accumulating business value and variances to total product needs.
▪ Schedule and cost performance reports.	▪ Similar – but measures of performance not usually in dollars
▪ Management action plans.	▪ Similar – but less formal. Collaborative discussion of what actions to take include the customer.
▪ Updated schedule and cost forecasts.	▪ Similar – but less formal. Planning processes include the customer.

Summarize means pretty much the same things on Agile and EV. Variances means the same thing too.
As shown here there is nothing in Agile that prevents reporting variances in the same way we do in EV.

2.4.e: Implement Management Plan

31

Implement managerial action taken as the result of earned value information.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> To-Complete Performance Index (TCPI). 	<ul style="list-style-type: none"> $TCPI = \text{Work Remaining} / \text{Cost Remaining} ((BAC - BCWP_{cum}) / (EAC - ACWP_{cum}))$. In Agile, work remaining is the product backlog. Backlog is $BAC - BCWP$.
<ul style="list-style-type: none"> Independent completion estimates. 	<ul style="list-style-type: none"> No longer used in 2010
<ul style="list-style-type: none"> Risk management data and similar metrics. 	<ul style="list-style-type: none"> Qualitative Risk Burn-down Chart (risk rating)
<ul style="list-style-type: none"> Management action plans and review briefings. 	<ul style="list-style-type: none"> Agile approach called Commitment Based Planning – where the SCRUM team makes and meets its time phase BCWS commitments. Any team, when behind, gives voice to the customer when evaluating/reweighting the triple constraint.
<ul style="list-style-type: none"> Variance analyses. 	<ul style="list-style-type: none"> This is an issue of cost mgmt and system description would define when and where team members would bill

Once the variances are determined, management action is needed to make corrections.

In Agile this is not talked about that much. It makes little sense that each Agile iteration completes all the features or stories complete every time.

If they are completed every time, then there might be too much slack in the schedule.

2.5.a: Incorporate Changes (1)

32

Incorporate authorized changes in a timely manner, recording the effects of such changes in the budgets and schedules.

EVMIG Objective Evidence	Agile Objective Evidence for EV
<ul style="list-style-type: none"> ▪ Contractual change documents. 	<ul style="list-style-type: none"> ▪ Bug reports, new user stories, but not necessarily cost sized. ▪ User stories above baseline are tracked as new scope (with a valid BOE) and require BCWS
<ul style="list-style-type: none"> ▪ Change control logs (management reserve, undistributed budget, performance measurement baseline, and contract budget base). 	<ul style="list-style-type: none"> ▪ New or materially altered features or stories are changes.
<ul style="list-style-type: none"> ▪ Control account/work package/planning package plans. 	<ul style="list-style-type: none"> ▪ Product and iteration backlogs are frozen during the development period

When variances appear, corrective action is needed.

Making changes to the baseline is part of the corrective, after fixing the things that are simply not being right.

But any changes need to be approved, recorded and tracked for compliance.

This is the case in both agile and EV. In agile the formality still needs to be done in some way.

On EV projects the this is mandatory in the ANSI-748B guidelines.

In all cases it's simply good management.

2.5.a: Incorporate Changes (2)

33

Incorporate authorized changes in a timely manner, recording the effects of such changes in the budgets and schedules.

EVMIG Objective Evidence	Agile Objective Evidence for EV
▪ Master schedules, intermediate schedules (if any), and detailed schedules.	▪ Iterations and evolutionary planning at the detailed levels merges with the end to end planning for agile.
▪ Statement of work, WBS, and WBS dictionary.	▪ Customer owner and Planning processes identify requires work and its description.
▪ Work authorization documents.	▪ Planning sessions, authorize a set of Stories to be developed during the iteration.
▪ Management reports (contract performance reports or other applicable management reports).	▪ Big Visible Charts, “sticky notes” display progress to plan for the agile team.

Making the changes is a management process. Here’s some ways to have it done right in both agile and EV.

Earned Value + Agile = Success

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