The Agile Project Management (PM) Tool
Effectively Managing the Three Dimensions of an Agile Project: Cost, Schedule, and Scope

Omar Mahmoud
Blaze Smallwood

Denver, CO
June, 2014
# Table Of Contents

- Agile Introduction
- Agile Concepts and Terms
- Intro to Agile PM Tool
- Benefits and Challenges
- Summary
- Agile PM Tool Demo
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

*Manifesto for Agile Software Development © 2001*
Table Of Contents

- Agile Introduction
- Agile Concepts and Terms
- Intro to Agile PM Tool
- Benefits and Challenges
- Agile PM Tool Demo
- Summary
Agile Concepts and Terms

- **User Stories**: A high-level definition of a requirement, containing just enough information so that the developers can produce a reasonable estimate of the effort to implement.

- **Complexity Points**: Quantification of a User story’s scope or effort, a relative measure of complexity.

- **Sprint / Iteration / Release**: *Sprint* - Fixed time-box in which development occurs (usually 2 - 4 weeks); *Iteration* - Minor subset of requirements designed to be released to the user community; *Release* - Multiple Iterations that fulfill a major subset of user requirements.

- **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 User Stories / Requirements yet to be complete for 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.
Table Of Contents

- Agile Introduction
- Agile Concepts and Terms
- Intro to Agile PM Tool
- Benefits and Challenges
- Summary
- Agile PM Tool Demo
What is the Agile PM Tool?

- Innovative, scenario-based Excel model that tracks project progress and projects future performance
- Provides dynamic outputs for cost, schedule, scope, and performance based on user inputs and historical performance metrics
- Identifies possible COAs for addressing projected cost/schedule shortfalls
- Provides innovative visualization tool for prioritizing remaining work
- Performs what-if excursions for point growth analysis
- Incorporates uncertainty analysis with confidence level based outputs
The model consumes historical financial/SW data and provides various COAs for managing future cost, schedule, and scope.

**Input financial info and SW metrics for each sprint**

<table>
<thead>
<tr>
<th>Release / Iteration</th>
<th>Sprint #</th>
<th>Date Started (MM/DD/YY)</th>
<th>Date Completed (MM/DD/YY)</th>
<th>Team Size (FTEs)</th>
<th>Hours Expended</th>
<th>Dollars Expended (CY $)</th>
<th>User Stories Completed</th>
<th>Story Points Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1-1 Sprint 1</td>
<td>1</td>
<td>4/14/2013</td>
<td>4/27/2013</td>
<td>10</td>
<td>920</td>
<td>$115,308</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>R-1-3 Sprint 3</td>
<td>3</td>
<td>5/12/2013</td>
<td>5/25/2013</td>
<td>10</td>
<td>920</td>
<td>$115,308</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>R-1-4 Sprint 4</td>
<td>4</td>
<td>5/28/2013</td>
<td>6/10/2013</td>
<td>10</td>
<td>828</td>
<td>$103,777</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>R-1-5 Sprint 5</td>
<td>5</td>
<td>6/9/2013</td>
<td>6/22/2013</td>
<td>10</td>
<td>920</td>
<td>$115,308</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>R-1-6 Sprint 6</td>
<td>6</td>
<td>6/23/2013</td>
<td>7/6/2013</td>
<td>10</td>
<td>828</td>
<td>$103,777</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>R-1-7 Sprint 7</td>
<td>7</td>
<td>7/10/2013</td>
<td>7/20/2013</td>
<td>10</td>
<td>920</td>
<td>$115,308</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

**PM Decision Analytics**

**COA 1: Scope**

“**What can we not get done within our original planned schedule and budget?”**

**COA 2: Sched**

“How much longer will it take to do everything we want to do at a constant annual budget?”

**COA 3: Cost**

“How much more money will we need to do everything within our original planned schedule?”

**Output projected cost/schedule & scope tradeoffs**

**FCR-1 Cost and Financial Status (SK)**

**Complexity Point Burndown**

Average Historical Velocity: 278

Project Velocity: 300

Planned Avg. Velocity: 285

Required Velocity to Achieve Planned Project Schedule: 287

Planned Defect Points: 314

Booz | Allen | Hamilton
Table Of Contents

› Agile Introduction

› Agile Concepts and Terms

› Intro to Agile PM Tool

› Benefits and Challenges

› Summary

› Agile PM Tool Demo
The Agile PM tool provides several benefits

- Utilizes metrics relevant to the development efforts; most likely being reported in performer reports / CDRLs

<table>
<thead>
<tr>
<th>CONTRACT DATA REQUIREMENTS LIST (CDRL)</th>
<th>Page 1 of 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Contract Item No.</td>
<td>E. Cb/Ml</td>
</tr>
<tr>
<td>B. Subcontract</td>
<td>F. Contract</td>
</tr>
<tr>
<td>C. Category (Check appropriate one):</td>
<td></td>
</tr>
<tr>
<td>TD/P</td>
<td>TU</td>
</tr>
<tr>
<td>Other X</td>
<td></td>
</tr>
<tr>
<td>D. System Item</td>
<td>G. Contract FF No.</td>
</tr>
<tr>
<td>1. Data Item No.</td>
<td>H. Subtitle</td>
</tr>
<tr>
<td>2. Title of Data Item</td>
<td>I. Subject</td>
</tr>
<tr>
<td>3. Description</td>
<td>J. Reporting Office</td>
</tr>
<tr>
<td>4. Authority</td>
<td>L. Contract Reference</td>
</tr>
<tr>
<td>5. Distribution Statement Required</td>
<td>M. Frequency</td>
</tr>
<tr>
<td>6. APP Code</td>
<td>N. As of Date (AGS)</td>
</tr>
<tr>
<td>7. OD 230/Rec'd</td>
<td>11. As of Date (AGS)</td>
</tr>
<tr>
<td>12. Date of Submission</td>
<td></td>
</tr>
<tr>
<td>13. Date of Subsequent Submission</td>
<td></td>
</tr>
<tr>
<td>14. Distribution</td>
<td></td>
</tr>
</tbody>
</table>

- Enables PMs to prioritize remaining scope while considering budget and schedule constraints simultaneously

- Produces in-progress metrics that makes it easier to assess project health / progress

- Produces dynamically adjusted COAs for what-if scenarios, uncertainty analysis, and confidence levels projections

- Relates effort to complexity, not software size, which is more intuitive to engineers that help scope the effort

\[
PM = \sum_{i=1}^{n} EM_i \times A \times Size^E
\]
There are also several challenges in implementing Agile PM Tool

- Many projects do not require performer to maintain or report data needed for input into the tool
- Each project likely has a different structure for backlogs that requires customization of the tool
- Mapping lower-level artifacts (stories, IA, HSI, etc) to requirements is often difficult, which can increase complexity of modeling within the tool
- Importing historical data into the tool is a time-consuming, manual process
- Subjectivity in complexity scoring and accounting for unplanned effort adds uncertainty to projections
Table Of Contents

- Agile Introduction
- Agile Concepts and Terms
- Intro to Agile PM Model
- Benefits and Challenges
- Summary
- Agile PM Tool Demo
Agile PM Tool is an invaluable resource that can enable PMs to more effectively monitor and manage their Agile software projects

- Delivers comprehensive, yet dynamic analysis giving PM unprecedented insight into all aspects of project progress
  - Cost
  - Schedule
  - Scope

- Provides innovative, intuitive input and visualization tools that enable objective, informed management decision making
One client implementation of Agile PM Tool to-date: Success!

- Client relied heavily on the tool for in-progress scope re-prioritization
- Tool projections proved to be very accurate

<table>
<thead>
<tr>
<th>In-Progress Brief (Project 50% Complete)</th>
<th>Final Status Brief (Project 95% Complete)</th>
<th>PM Tool Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agile PM Tool predicted costs would reach <strong>full contract value</strong></td>
<td>Contractor was funded to and is on track to burn to <strong>full contract value</strong></td>
<td>100%</td>
</tr>
<tr>
<td><strong>Schedule Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agile PM Tool predicted schedule slip of <strong>two months</strong></td>
<td>Schedule extended <strong>two months</strong> to finish test/fix cycle</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Scope Tradeoff Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agile PM Tool estimated 342 of ~6000 points (~6%) would be <strong>deferred</strong> from current release</td>
<td>Estimated 658 of ~6700 points (~10%) will be deferred from current release with one sprint to go</td>
<td>Accurate within ~5% of total point estimate</td>
</tr>
<tr>
<td><strong>Requirement Burndown</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agile PM Tool estimated all requirements would be completed by <strong>19th Sprint</strong></td>
<td>All requirements were either “<strong>closed</strong>” or “<strong>pending</strong>” at the end of <strong>19th Sprint</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>
Table Of Contents

- Agile Introduction
- Agile Concepts and Terms
- Intro to Agile PM Model
- Benefits and Challenges
- Summary

Agile PM Tool Demo
For further information . . .

Omar Mahmoud
Lead Associate
Booz Allen Hamilton Inc.
1615 Murray Canyon Rd
Suite 140
San Diego, CA 92108
Tel 714.421.1231
mahmoud_omar@bah.com

Blaze Smallwood
Associate
Booz Allen Hamilton Inc.
225 West Wacker Drive
Suite 2270
Chicago, IL 60606
Tel 309.359.3160
smallwood_blaze@bah.com
Back-up Slides
Comparison of Agile SW Dev metrics from two unique projects

**Project A**

**Cost per Point (CBY FY13 $)**

**Velocity (Points per Sprint)**

**Project B**

**Cost per Point (CBY FY13 $)**

**Velocity (Points per Sprint)**
Project A Scope Breakdown

% of Completed Points by Backlog

Non-Requirement Points as a % of Requirements

- Requirements
- Defect
- HSI
- Test
- Peer Review
- IA

% of Total Requirement Points

- Defect
- HSI
- Test
- Peer Review
- IA

Booz | Allen | Hamilton
Traditional vs. Agile Process Overview

Traditional (Waterfall) Approach
Sequential activity of one team
– Plan all of the requirements
– Design all of the requirements
– Develop all of the requirements
– Test all of the requirements

Agile Approach
Iterative approach where constant user interaction is preferred and highest priority items are completed first
– Determine arch/funct rqts
– Take each Iteration:
  • Design it, Develop it, Test it, Deploy it
– Each requirement can be designed, developed, and tested simultaneously along with other requirements

Users will receive end product once ALL requirements have been fully designed, developed, and tested

Agile doesn’t change the end product, only the way projects are scoped, managed and executed