

Agile Management for Rapid Acquisition

ICEAA 2019 Professional Development and Training Workshop

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I. Executive Summary

Rapid acquisition was presented as the theme of the 2018 Department of Defense Cost Analysis Symposium (DoDCAS). While the DoD is actively encouraging rapid acquisition to increase the speed of capabilities reaching the warfighter, Middle Tier Acquisition (Section 804) and other changes to the acquisition process resulting from the Fiscal Year (FY) 2016 and FY 2017 National Defense Authorization Acts (NDAAs) are driving changes to the status quo. The regulations and procedures presented within the DoD Directive 5000.01 and DoD Instruction 5000.02 are not necessarily mandatory for all programs, leaving cost analysts unsure how their role remains relevant and impactful in an environment that is no longer clearly defined by policy. Guidance recently presented for Program Managers (PMs) and the cost community relative to Agile management fits nicely with rapid acquisition. Agile program management and cost estimating best practices from industry and the DoD can and should be applied to rapid acquisition programs in order to successfully measure program progress and success.

II. Evolution of Rapid Acquisition

The standard Major Defense Acquisition Program (MDAP) process is reputed to be daunting and cumbersome. The acquisition life cycle compliance chart posted on the Defense Acquisition University (DAU) website, shown below, reinforces this reputation.

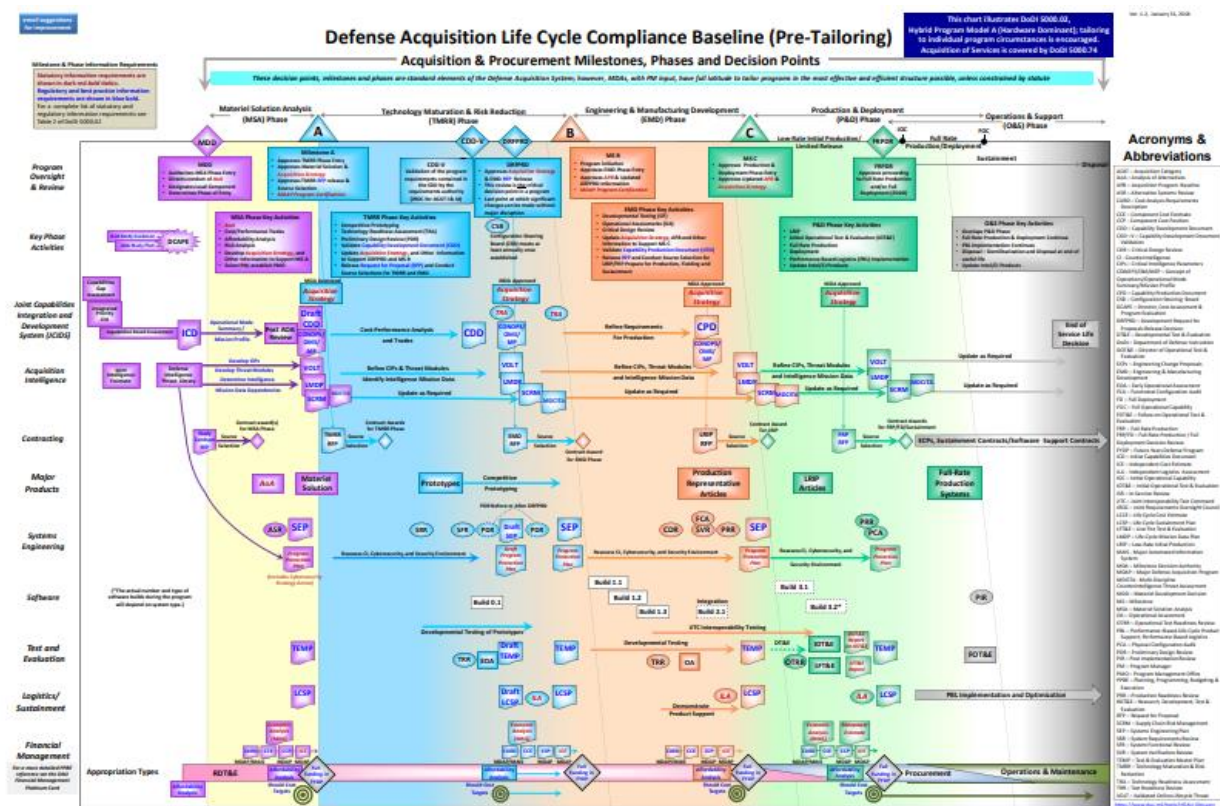


Figure 1: Acquisition Life Cycle¹

While some rumors exist that MDAPs in the DoD are taking longer than they used to, that is not the case. In 2016, the Institute for Defense Analyses (IDA) published multiple reports assessing weapon

¹ Defense Acquisition Life Cycle Wall Chart. DAU, 14 Feb 2018. <https://www.dau.mil/tools/t/Department-of-Defense-Acquisition-Life-Cycle-Chart>

system acquisition cycle times for the Assistant Secretary of Defense for Acquisition. In one of these, IDA found that the median time for an MDAP to reach Initial Operational Capability (IOC) or IOC-equivalent is 8 years, and this cycle time has neither improved nor worsened since the late 1980s. There is, however, a noticeable upward trend in cycle time for the programs that are spending the most money, and therefore have the most visibility across Government leadership. The following chart displays this observation.

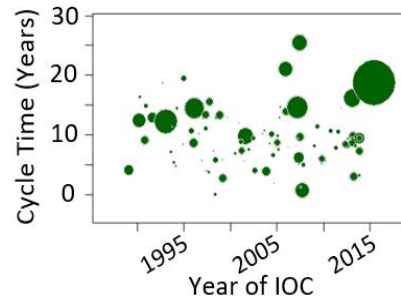


Figure 2: Cycle Time by IOC Year Showing Relative Program Size²

While there is no evidence that the DoD is taking any longer than it used to in order to reach IOC, the acquisition processes in place do require a significant amount of time to complete. DoD Directive 5000.01 asserts the operation of the defense acquisition system through DoD Instruction 5000.02, which was last updated in 2017. The phases of the generic acquisition process are provided below, as displayed within DoDI 5000.02. Tailoring within this structure is encouraged to accelerate programs in some cases. Note that in 2012 and 2013, DOD Directive 5000.71 and DOD Instruction 5000.71 released new guidance pertaining to rapid fielding in response to Urgent Operational Needs (UONs). This information was updated and incorporated into an update of DODI 5000.02 in January 2015.

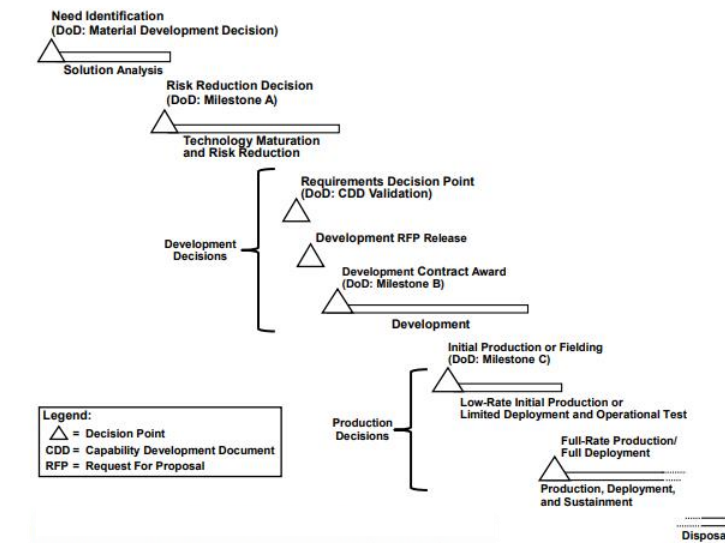


Figure 3: Generic Acquisition Phases and Decision Points³

² Tate, David M. *Acquisition Cycle Time: Defining the Problem (Revised)*. Institute for Defense Analyses, October 2016. https://www.ida.org/idamedia/Corporate/Files/Publications/IDA_Documents/CARD/2016/D-5762.ashx

³ *Department of Defense Instruction 5000.02 (DODI 5000.02): Operation of the Defense Acquisition System*. Under Secretary of Defense for Acquisition, Technology, and Logistics (USD AT&L), 7 Jan 2015, last updated 10 Aug 2017. <http://acqnotes.com/wp-content/uploads/2014/09/DoD-Instruction-5000.02-The-Defense-Acquisition-System-10-Aug-17-Change-3.pdf>

In the phases described above, there are numerous acquisition documents that require development and maintenance in order to move on past each milestone. For an MDAP to move past Milestone A, according to the DAU Milestone Document Identification (MDID) tool, the program must fulfill 17 statutory and 24 regulatory milestone or phase information requirements. An Acquisition Category (ACAT) III or below program has 11 statutory information requirements, and 21 regulatory information requirements. Some regulatory requirements may potentially be waived through the Milestone Decision Authority (MDA) in traditional acquisition approaches, while statutory requirements may not.

Jumping through the hoops defined for the current acquisition process and completing development efforts through Operational Test (OT) currently requires a median time of eight years. Since 2003 there has been a public push from the Government and DoD leadership to pursue accelerated or rapid acquisition programs in order to reduce this time in response to the Urgent Operational Needs (UONs) that are constantly arising within agencies. More recently, the FY2016 National Defense Authorization Act (NDAA) attempted to provide more rapid ways for the DoD to acquire goods and services, impacting statutory requirements specifically as follows⁴:

- *expanding the use of rapid acquisition authority to support specific military operations*
- *requiring the DoD to develop guidance for rapid acquisition of “middle tier” programs for rapid prototyping or rapid fielding*
- *requiring the development of streamlined alternative acquisition paths to maximize flexibility under the law for acquisition of critical national security capabilities*
- *authorizing the Secretary of Defense in certain circumstances to waive any provision of acquisition law or regulation if:*

(1) The acquisition of the capability is in the vital national security interest of the US;

(2) The application of the law or regulation to be waived would impede on the acquisition of the capability in a manner that would undermine the national security of the US; and

(3) The underlying purpose of the law or regulation to be waived can be addressed in a different manner or at a different time.

In response to the DoD’s desire to pursue accelerated or rapid acquisition, the Air Force, Army, and Navy have all responded differently within their agencies. The common thread across them is the public push to move faster by creating specific offices for rapid acquisition. These offices guide programs through tailoring the traditional acquisition process and/or waiving specific policies in order to move along as quickly as possible.

The Air Force Rapid Capabilities Office (RCO) was activated in April 2003 to meet counter-terrorism objectives⁵. In 2017, the Air Force developed a charter to lay out a model that makes all mainstream Air Force acquisition programs look more like its RCO programs. In other words, the Air Force aims to have all of its acquisition programs geared towards rapid acquisition. According to Lt.

⁴ Schwartz, Moshe and Peters, Heidi. *Acquisition Reform in the FY2016-FY2018 National Defense Authorization Acts (NDAAs)*. Congressional Research Service, 19 Jan 2018. <https://fas.org/sgp/crs/natsec/R45068.pdf>

⁵ US Air Force. *Fact Sheet Display*. Air Force Rapid Capabilities Office, 28 Aug 2009. <https://www.af.mil/About-Us/Fact-Sheets/Display/Article/104513/rapid-capabilities-office/>

Gen. Arnold Bunch, “The goal of this is cross functional, multi-disciplinary teams... smaller teams that are empowered to make decisions and go forward.”⁶

In 2018, the Air Force released two formal memorandums relative to rapid acquisition policy. The first memorandum was released in April and provides seven ‘steps’ for incorporating rapid prototyping into acquisition. Specifically the memorandum requires programs to: (1) have an aggressive goal, (2) bound your risks, (3) be aggressive but not greedy, (4) constrain time and budget, not the final performance, (5) work as a team to go fast, (6) obtain signature from the Assistant Secretary of the Air Force for AT&L, and (7) go fast.⁷ The second memorandum in June outlines policy for rapid acquisition activities using rapid prototyping or rapid fielding authorities from Section 804 of the FY 2016 NDAA. The memorandum in June states that, “Our ‘Century Challenge’ is removing 100 years of total schedule from the Air Force acquisition portfolio; then we will go further.” While these documents introduce aggressive goals for rapid acquisition, they do not specify the expectations for the cost community and its practices.⁸

The Army’s RCO was established in August 2016 and is separate from the Army Rapid Equipping Force, which delivers specific equipment to meet the UONs of forward-deployed units within a typical cycle of less than one year. The Army RCO is focused on delivering operational effect for its highest priority requirements within one to five years by acting as an “agent of change” and “challenging traditional approaches.” The key operating principles of the organization are to implement a chain of command that is short and narrow, involve warfighters early and prominently, use a collaborative integrated team of functional specialists, and provide overarching programmatic insight.⁹

In 2018, the Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology released policy outlining Middle Tier Acquisition for Rapid Prototyping and Rapid Fielding programs leveraging Section 804. In this, the Army states that Middle-Tier Acquisition programs are not MDAPs regardless of dollar value and are not subject to the Joint Capabilities Integration Development System (JCIDS) manual, DoDD 5000.01, or DoDI 5000.02.¹⁰ The PEO/PM responsible for a candidate Middle-Tier program is to submit their request through the Deputy for Acquisition and Systems Management (DASM) to the Army Acquisition Executive (AAE) for approval, and the AAE becomes the Decision Authority for approved Middle-Tier programs. PMs then provide a program strategy through the PEO to the AAE, which is supposed to include estimated lifecycle cost in addition to defined cost, schedule, and performance metrics. This policy does not define the amount of rigor or the performing parties required for the cost analyses behind this program strategy, however, it does specify that cost, schedule, and performance data must be reported in accordance with any Cost Assessment and Program Evaluation (CAPE) requirements.

⁶ Insinna, Valerie. *Air Force Wants to Apply Success of Rapid Capabilities Office to Other Weapons Programs*. Defense News, 12 Oct 2017. <https://www.defensenews.com/air/2017/10/12/air-force-wants-to-apply-success-of-rapid-capabilities-office-to-other-weapons-programs/>

⁷ Roper, William B. *Memorandum for the Acquisition Workforce: Seven Steps for Incorporating Rapid Prototyping into Acquisition*. Office of the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics (AT&L). Department of the Air Force, 10 April 2018.

⁸ Roper, William B. *Memorandum for Distribution C: Air Force Guide Memorandum for Rapid Acquisition Activities*. Office of the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics (AT&L). Department of the Air Force, 13 June 2018.

⁹ US Army. *About Us*. Army Rapid Capabilities Office, Accessed 28 Dec 2018. <https://rapidcapabilitiesoffice.army.mil/about/>

¹⁰ Jette, Bruce D. *Memorandum for See Distribution: Office of the Secretary of the Army (Acquisition, Logistics, and Technology) Middle Tier Acquisition Policy*. Department of the Army, 25 Sep 2018.

The Navy Maritime Accelerated Capabilities Office (MACO) was established in 2016 to create an acquisition ‘speed lane’.¹¹ In 2018, the Chief of Naval Operations (CNO) published policy to replace the MACO with the Maritime Accelerated Acquisition (MAA) Process.¹² In order to achieve ‘speed to the fleet,’ programs are able to submit requests to the Accelerated Acquisition Board of Directors (AA BoD) for approval to be an MAA program. These programs are few, and report directly to the AA BoD as their MDA. Program Managers then have the ability to define their own decision-points and success criteria with fewer levels of bureaucracy involved than they would face within the traditional acquisition process.

III. Introduction to Agile Development

The term Agile as we use it today comes from *The Manifesto for Agile Software Development*, developed in 2001 by seventeen developers from across the software industry who aimed to provide end-items to users faster and more efficiently than standard development methodologies allowed.¹³ Agile, as they described it, was a ‘movement’ rather than a methodology or process. While the purpose of this specific movement was relative to software, Agile has values and principles that are applicable to any development.¹⁴

As a general rule, flexibility and collaboration are more highly regarded than standard procedures within the Agile movement. Specifically, the Agile Manifesto defines the following values, where the topic described first in each bullet is prioritized over the second.¹⁵

- *Individuals and Interactions* > *Processes and Tools*
- *Working Software* > *Comprehensive Documentation*
- *Customer Collaboration* > *Contract Negotiation*
- *Responding to Change* > *Following a Plan*

There are twelve principles defined by the Agile Manifesto, which are provided below.¹³ While these principles specifically refer to software, they can be adapted for application to any industry by simply reading the word ‘software’ as ‘product’ or ‘end-item’ wherever it is encountered.

1. *Customer satisfaction by early and continuous delivery of valuable software*
2. *Welcome changing requirements, even late in development*
3. *Deliver working software frequently (weeks rather than months)*
4. *Close, daily cooperation between business people and developers*
5. *Projects are built around motivated individuals, who should be trusted*
6. *Face-to-face conversation is the best form of communication (co-location)*
7. *Working software is the primary measure of progress*
8. *Sustainable development, able to maintain a constant pace*
9. *Continuous attention to technical excellence and good design*
10. *Simplicity – the art of maximizing the amount of work not done – is essential*
11. *Best architectures, requirements, and designs emerge from self-organizing teams*

¹¹ Insinna, Valerie. *Navy Establishing Maritime Accelerated Capabilities Office as Acquisition Fast Track*. Defense Daily, 10 Mar 2016. <http://www.defensedaily.com/navy-establishing-maritime-accelerated-capabilities-office-as-acquisition-fast-track/>

¹² Richardson, J.M. *OPNAVINST 5000.53A: US Navy Maritime Accelerated Acquisition (MAA)*. Department of the Navy, N9, 19 Oct 2018.

¹³ Stark, Ed. *Agile Project Management Quick-Start Guide*. ClydeBank Media LLC, 2017.

¹⁴ Goncalves, Marcus and Heda, Raj. *Fundamentals of Agile Project Management*. American Society of Mechanical Engineers, 2011.

¹⁵ Beck, Kent, et al. *Manifesto for Agile Software Development*. Agile Manifesto, 2001. <https://agilemanifesto.org/>

12. Regularly, the team reflects on how to become more effective, and adjusts accordingly

IV. Approaching Rapid Acquisitions as Agile

A. Commonality

Rapid acquisition aims to do exactly what the Agile movement describes. The goal is to remove any barriers to providing the user, in this case the warfighter, with a working product or system faster and more efficiently. The same Agile values described earlier in this paper can be directly applied to rapid acquisition with very little adjustment. Specifically:

- *Individuals (PMs) and Interactions (with their overseeing Agency) > Processes and Tools (DoDI 5000.2)*
- *Working Software (System) > Comprehensive Documentation*
- *Customer (Warfighter) Collaboration > Contract Negotiation*
- *Responding to Change > Following a Plan*

We can also apply the same Agile principles to rapid acquisition, as follows:

1. *Customer (Warfighter) satisfaction by early and continuous delivery of valuable software (product)*
2. *Welcome changing requirements, even late in development*
3. *Deliver working software (product) frequently*
4. *Close, daily cooperation between business people (Government) and developers*
5. *Projects are built around motivated individuals, who should be trusted*
6. *Face-to-face conversation is the best form of communication (co-location)*
7. *Working software (product) is the primary measure of progress*
8. *Sustainable development, able to maintain a constant pace*
9. *Continuous attention to technical excellence and good design*
10. *Simplicity – the art of maximizing the amount of work not done – is essential*
11. *Best architectures, requirements, and designs emerge from self-organizing teams*
12. *Regularly, the team reflects on how to become more effective, and adjusts accordingly*

B. Importance of Cost Estimating and Reporting

At the beginning of a program, PMs will work with their MDA to define the milestones and/or decision points required for themselves. If the program is approved to be a rapid acquisition, every typical piece of the acquisition process and policy will be on the chopping block by assessing whether it adds time or money that could be better spent elsewhere. This means that any process, documentation, or data reporting that is perceived as cumbersome or expensive is likely to be avoided by the program.

As cost estimators we worry about these implications, since a formal Program Life Cycle Cost Estimate (PLCCE), Integrated Program Management Reports (IPMRs), and Cost and Software Data Reports (CSDRs) are habitually undervalued and avoided by some PMs even when their hands are tied by traditional acquisition policy. However, what needs to be recognized and socialized early is that cost estimates and real-time cost and schedule data is even more important in a rapid acquisition scenario than in traditional development. Without them, it is impossible to monitor progress and respond flexibly during the execution of a program's plan. In a traditional scenario without reporting and without an actively maintained cost estimate (with fully integrated cost and schedule uncertainty), leadership may not be aware there is problem

until it is too late to respond and alter course back to a successful path. In this scenario with an accelerated timeline, these types of problems could break the program entirely.

C. Agile Management Guidance

Industry has been working through the challenges and nuances of managing Agile developments for well over a decade, but Agile management has yet to become commonplace across the DoD. While many programs contain software or hardware developments that leverage Agile approaches, Agile-specific guidance in DoD acquisition has been lacking.

In March 2018, the DoD Inspector General (IG) found that the Air Force F-22 modernization program was improperly managed due to the Government Program Management Office's failure to use an appropriate contracting strategy for its contractor when using an Agile software development approach referred to as Scaled Agile Framework (SAFe).¹⁶ As a result, the program faced schedule delays and it may fail to deliver the F-22 modernization capabilities required by the warfighter. The IG also pointed blame towards the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD AT&L) for not having issued policy for the implementation of Agile software development methods on weapon system acquisitions. This made no mention of Agile hardware development, however, which should similarly be addressed.

A month following the scathing IG report on the F-22 Modernization program's mismanagement of its Agile acquisition, USD AT&L Performance Assessments and Root Cause Analyses (PARCA) published guidance titled *Agile and Earned Value Management: A Program Manager's Desk Guide*. In this report, PARCA acknowledges that there is currently no DoD standard for any Agile terms, processes, or artifacts. PARCA puts the onus on the Government Program Management Office (PMO) to work with the contractor in order to define Agile terms and processes at the beginning of negotiations for a contracted effort. Further, PARCA stated that the contractor should be responsible for providing information to the PMO relative to the implementation of Agile processes within their Earned Value Management System (EVMS).¹⁷

The issue, however, is that PARCA's Agile EVM guidance does not address Agile until after a Statement of Work (SOW) has reached a contractor. The contracting strategy itself may not address Agile acquisition, and the PMO may or may not have much knowledge of Agile terminology to begin with, as no standards have been released within DoD channels. Due to this, the PMO is likely woefully underprepared to understand the implications of Agile in relation to contract execution and program success. To best manage the program's cost, schedule, and technical capability, Agile needs to be addressed at the inception of the program, when the Government PMO is first developing its acquisition and contracting strategy. Agile-specific training is also necessary, so that the PMO is informed and effective. In the meantime, DoD PMO staff have DAU Agile courses, PARCA EVM guidance, and industry best practices available to help guide them.

¹⁶ Inspector General (IG). *Contracting Strategy for F-22 Modernization*. US Department of Defense, 21 Mar 2018. Report No. DODIG-2018-089. <https://media.defense.gov/2018/Mar/26/2001894248/-1/-1/1/DODIG-2018-089.PDF>

¹⁷ McGregor, John S. *Agile and Earned Value Management: A Program Manager's Desk Guide*. Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD AT&L) Performance Assessments and Root Cause Analyses (PARCA), 16 Apr 2018. <https://www.acq.osd.mil/evm/docs/PARCA%20Agile%20and%20EVM%20PM%20Desk%20Guide.pdf>

V. Agile Management for Rapid Acquisition

DoD and industry guidance regarding Agile management should be applied to rapid acquisition, if not for the fact that no rapid-specific guidance relative to DoD acquisition has been published, then due to the clear overlap between the goals, principles, and characteristics of Agile and rapid acquisition. These same mindsets - avoiding unnecessary procedures, documentation, and/or policies in order to provide products to users more quickly - yield the same potential pitfalls in acquisition. In order to avoid running over schedule and failing to deliver the required capability, rapid programs need to manage themselves as though they are Agile.

Regardless of whichever milestone events or decision points are decided by the program, the PMO will need to undertake the iterative fundamental steps required to acquire a good or service. These are as follows:

1. **Planning** – Developing the acquisition plan for a defined requirement, to include contracting strategy.
2. **Soliciting** – Communicating information to industry through Requests for Information (RFIs) and/or Requests for Proposals (RFPs).
3. **Awarding** – Evaluating contract proposals and negotiating all terms and conditions with the selected contractor(s).
4. **Executing** – Monitoring and controlling execution of the awarded contract(s).
5. **Closing/transitioning** – Confirming all contract terms have been successfully met and documenting lessons learned.

In the Planning stage of an acquisition, the PMO must define how it intends to function as a unit moving forward. Specifically, they must determine what size Government team and what composition of functional specialties will be required at which points of the acquisition process, as well as what type of contracting arrangement(s) that team will need to develop with industry in order to achieve success. This involves defining the roles and expectations of the cost and schedule analysts on the team, and it is imperative for these functional specialists to be involved in defining and tailoring their role to the specific needs of each program. This also requires defining what success means for this program throughout its acquisition, with specific decision or checkpoints to measure progress and pave the way forward. Similar to the approach leveraged by Agile programs, software-based management tools accessible by all teammates are most suited to achieve success.

In the Soliciting stage, the PMO has the opportunity to explore and assess the realm of the possible. This includes beginning to understand the limits of what will be reasonable to successfully achieve while balancing cost, schedule, and capability. In a rapid acquisition, this is likely to be consolidated into the planning stage.

In the Awarding stage of a rapid acquisition, a sole source environment is much more likely than a competitive one due to the urgency of the program. Non-traditional contract scenarios may also arise due to tendencies towards the use of Undefinitized Contract Actions (UCAs) and/or Indefinite Delivery Indefinite Quantity (IDIQ) vehicles in order to start work quickly. This introduces significant ambiguity in tasking during what is possibly the most critical time of the contract – at the start. As in Agile, frequent and comprehensive communication between the user (warfighter), business people (PMO), and industry is required to steer kick-off in the appropriate direction without wasting valuable time and funding. The Executing stage is the one for which DoD Agile guidance to-date has focused, specifically relative to contract management. However, there should also be more program checkpoints throughout this stage, which assess program progress relative to user (warfighter) needs and business (PMO) expectations.

These check-in points during contract execution are arguably the most impactful way to leverage Agile to iteratively assess and correct the program during a rapid acquisition scenario.

The Closing or Transitioning stage is the PMO's opportunity to assess how the program succeeded or failed at fulfilling its requirements and document any lessons learned. If additional increments or adaptations of the capability are pursued, this documentation will help the PMO leverage useful corporate knowledge to improve future acquisitions.

VI. Example (WHATIF)

Assume that We Have Accelerated Through IOC and FOC (WHATIF) is a Navy program which needs to field an urgent capability within five years. Preliminary Rough-Order-Magnitude (ROM) estimates indicate costs will breach ACAT IC level thresholds, and WHATIF has been approved by the AA BoD to be an accelerated acquisition. As such, the program will leverage the following accelerated acquisition pathway.

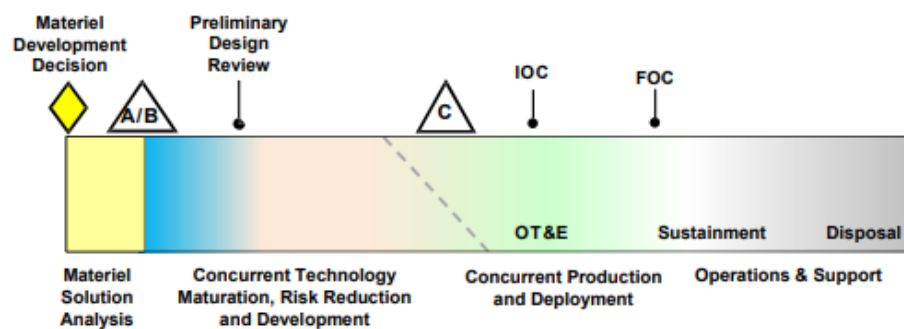


Figure 4: Accelerated Acquisition Pathway¹⁸

The WHATIF PMO forms at the yellow diamond in Figure 4, with five years to reach IOC. The PMO is enthusiastic about Agile development approaches and decides to plan their way forward by leveraging Agile themselves. After debating between various Agile Program Management tools to adopt for use (i.e. Agilean, Trello, JIRA, Planbox), they settle on using Notional software (fabricated for example purposes only) as their one-stop tool for Agile management. All PMO functional groups (contracts, cost, finance, systems engineering, logistics, test) join the PMO program analysts as users of the Notional tool and begin populating their plans forward.

After researching Agile best practices, the PMO team implements two-week sprint durations from start through IOC in order to map the way forward. As shown below, the plan results in 120 sprints across the five year plan, and the tasking they map within these sprints will need to support three sole-source contract actions through two milestone events and three key decision checkpoints - defined as Preliminary Design Review (PDR), Operational Test (OT) readiness, and IOC readiness. Each team must define the products and actions they will need to contribute at each of these five checkpoints, and map them within Notional software. The PM is delighted that she is able to continuously access the program technical requirements, consolidated plan, and identified risks from all contributors at a high-level, which allows her to quickly assess and communicate the program's status and way forward.

¹⁸ *Defense Acquisition Life Cycle Wall Chart*. DAU, 14 Feb 2018. <https://www.dau.mil/tools/t/Department-of-Defense-Acquisition-Life-Cycle-Chart>

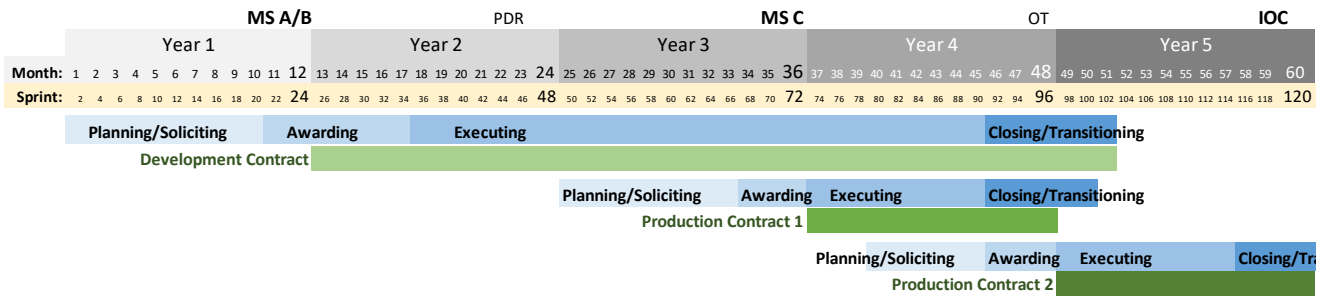


Figure 5: WHATIF Roadmap

The cost team, like the all of the other functional groups, is responsible for developing their own story points and incorporating them into the roadmap. The team starts off with identifying the tasking required at the first checkpoint (MS A/B). Ordinarily, a formal PLCCE is required at Milestone A and B, but the AA BoD and PMO (to include the cost team) agree that a Fiscal Year Development Plan (FYDP) cost estimate will be sufficient for their needs. Additionally, the cost team will need to support RFP release and contract negotiations in this timeframe. Since the development contract award is planned to be a UCA, cost work prior to award will support cost requirements for the RFP and Not to Exceed (NTE) value estimation based on the SOW for the contract. A full proposal evaluation to support contract definitization will not be required until after the first checkpoint.

Through identifying each of the discrete steps (stories) required to provide the MS A/B cost estimate, RFP support, and UCA NTE estimation, the cost team quantifies the work required for each of these cost products (features). The Notional tool requires story points that use doubling, meaning that a task (story) can be quantified as 1, 2, 4, or 8 points. Story points are not discretely numbered 1+ in order to minimize the subjectivity and arbitrariness inherent in point selection. For the cost team, 4 points are perceived to be achievable by one person within a week, or 8 points per person across one two-week sprint. Each team will have their own tempo and plan, which necessitates minimizing staffing turnover within each team throughout the program and especially between checkpoints.

Due to the acceleration of the program, the typical Cost Analysis Requirements Description (CARD) requirement is not applicable for WHATIF, but the PMO has agreed to develop a Technical and Programmatic Baseline (TPB) document which will provide all necessary inputs for the FYDP estimate. The TPB will not be ready until the start of the third month (Sprint 6), so the cost team decides to prioritize planning and supporting RFP stories within the first five sprints. Additionally, the final SOW and CDRLs for the UCA will not be available until month 6 (Sprint 12) to allow cost team NTE support. The resulting storyboard for the first checkpoint is shown in the following figure. This lists the stories required to reach the first checkpoint while associating the quantified points, defining the planned sprint for completion, and noting which feature the story contributes toward. Each of the functional groups develops and maintains the same type of storyboard to allow WHATIF to map the comprehensive plan across all functional teams within Notional software.

| Story | Points | Feature | Sprint |
|--|--------|---------------|--------|
| IPMR CDRL Development | 4 | RFP Support | 3 |
| CDSR/FCHR CDRL Development | 2 | RFP Support | 2 |
| SRDR CDRL Development | 1 | RFP Support | 2 |
| WBS Development - CSDR Plan | 4 | RFP Support | 4 |
| TPB Familiarization | 4 | Cost Estimate | 6 |
| WBS Development - Estimate | 4 | Cost Estimate | 7 |
| Define Ground Rules & Assumptions | 4 | Cost Estimate | 8 |
| Data Collection - Initial | 8 | Cost Estimate | 9 |
| Data Analysis - Initial | 8 | Cost Estimate | 10 |
| Define Model Inputs | 4 | Cost Estimate | 11 |
| Model Point Estimate Logic | 8 | Cost Estimate | 13 |
| Conduct Sensitivity Analysis | 2 | Cost Estimate | 14 |
| Apply Uncertainty to Model | 2 | Cost Estimate | 14 |
| Conduct Estimate Crosschecks | 2 | Cost Estimate | 14 |
| Develop Documentation - Draft | 8 | Cost Estimate | 17 |
| Develop Documentation - Final | 2 | Cost Estimate | 18 |
| Final SOW/CDRL Familiarization | 4 | UCA NTE | 12 |
| Analyze Development Contract Cost Estimate | 4 | UCA NTE | 15 |
| Document NTE Recommendation | 4 | UCA NTE | 16 |
| Total | 79 | | |

Figure 6: WHATIF Notional Cost Storyboard to Checkpoint 1

The storyboard is mapped by Notional software to quickly display the ‘burn-up’ plan for the cost team to deliver all three features within the timeline required for the first checkpoint. The burn-up chart for the cost team is provided below. The team’s progress will be mapped against this plan after each sprint to display the ‘sprint velocity’. This will show quickly whether the team is ahead or behind schedule and allow their support to ramp up or down in order to correct progress to the first checkpoint. Each functional group’s storyboard automatically generates this chart within Notional software, and the PM is able to access a consolidated picture which will allow her to assess overall progress during execution of the plan.

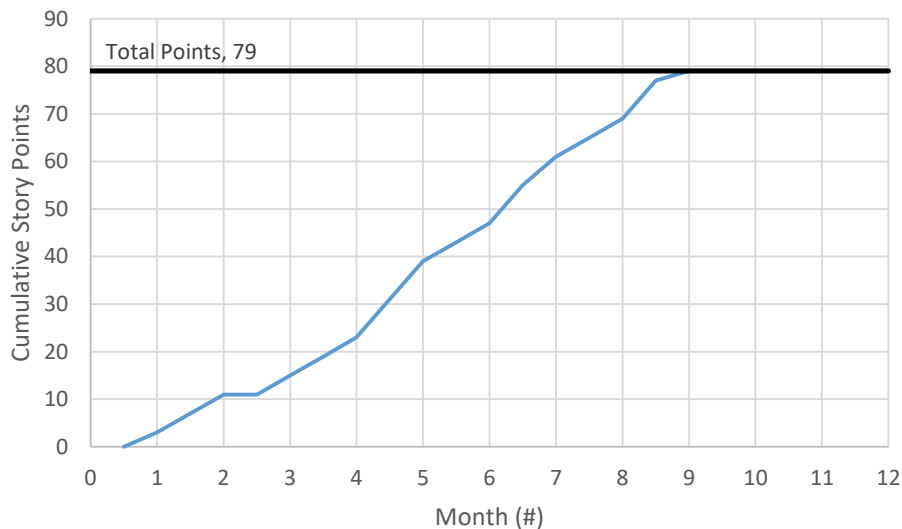


Figure 7: WHATIF Notional Cost Team Burn-Up to Checkpoint 1

Once the team reaches the first checkpoint, they regroup to develop the storyboard for the second checkpoint. The cost team’s storyboard is developed to achieve three features for Checkpoint 2, including the development of a formal proposal evaluation in support of UCA definitization, IPM analysis

for the development contract, and an update to the FYDP cost estimate. This cost team storyboard and associated burn-up chart are provided below, and show progress as of month 16. The chart shows that the cost team is running behind. Based on their sprint velocity, if they do not take action to seek course correction, the team will impact schedule success for WHATIF.

| Story | Points | Feature | Sprint |
|--|------------|---------------|--------|
| BOE Evaluation - Discrete SW Labor | 8 | Prop Eval | 26 |
| BOE Evaluation - Discrete HW Labor | 8 | Prop Eval | 27 |
| BOE Evaluation - SE/PM Labor | 4 | Prop Eval | 28 |
| BOE Evaluation - Material | 4 | Prop Eval | 28 |
| Model Contract Pricing | 2 | Prop Eval | 29 |
| Conduct Uncertainty Assessment | 2 | Prop Eval | 29 |
| Document Findings | 2 | Prop Eval | 29 |
| Develop IBR Handbook | 2 | IPM Dev | 30 |
| IBR Preparation Analysis | 4 | IPM Dev | 33 |
| IBR Event | 4 | IPM Dev | 35 |
| IBR Documentation | 2 | IPM Dev | 36 |
| IPM Analysis - Contract Month 4 | 8 | IPM Dev | 32 |
| IPM Analysis - Contract Month 5 | 8 | IPM Dev | 34 |
| IPM Analysis - Contract Month 6 | 8 | IPM Dev | 36 |
| Incorporate new data & program updates - Midyear | 8 | Cost Estimate | 37 |
| IPM Analysis - Contract Month 7 | 8 | IPM Dev | 38 |
| IPM Analysis - Contract Month 8 | 8 | IPM Dev | 40 |
| IPM Analysis - Contract Month 9 | 8 | IPM Dev | 42 |
| IPM Analysis - Contract Month 10 | 8 | IPM Dev | 44 |
| IPM Analysis - Contract Month 11 | 8 | IPM Dev | 46 |
| Incorporate new data & program updates - End of year | 8 | Cost Estimate | 47 |
| Total | 122 | | |

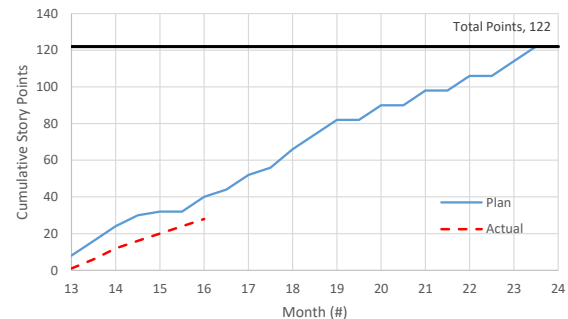


Figure 8: WHATIF Notional Storyboard and Burn-Up Chart

The teams continue this iterative process of assessing the tasks necessary to successfully meet the requirements within each checkpoint period, and chart progress along the way. The Development Contractor has its own profile setup within Notional software, which allows the Government full insight into contract status while limiting the Contractor’s access to Government information. As a result, Notional software reports allow the PM to meet and communicate comprehensive program status with the AA BoD throughout WHATIF execution. Additionally, the cost team has constant awareness of program schedule progression and risks throughout the life cycle of the program. This heightened awareness yields more informed cost estimates with fewer obstacles in the way of the cost analysts.

VII. Conclusion

Rapid acquisition leverages the same goals and intentions of Agile, but at this time is largely uncharted territory. PMOs and cost estimators can and should apply Agile best practices to rapid acquisition in order to support the DoD’s goal of providing incremental and accelerated products to the warfighter. Specifically, this requires no change to cost data reporting requirements, but does require a change to the way that the PMO approaches acquisition, to include cost estimators and analysts. Instead of a waterfall acquisition cycle with significant up-front tasking, an incremental acquisition approach leveraging no less than annual decision points or checkpoints should be used to allow for flexibility and provide useful insight into program status.

Some key Agile best practices to ensure success in managing a rapid acquisition include:

- Maintain small, active, consistent (low turnover), closely-knit, and co-located teams within both the Government and industry. There should be no large ‘standing army’ of level-of-effort type support across multiple sites. Communication within and across all teams must be frequent and comprehensive. This will improve the cost analyst’s ability to communicate and collaborate within the team, which results in being intimately attuned to program

- assumptions, risks, and schedule. This in turn makes cost estimating a much smoother and simpler task than the ‘pulling teeth’ for information that is often faced.
- Leverage an Agile-based Program Management tool to facilitate forming and controlling a collaborative plan across the entire program, to include both the Government and industry. Everyone on the program should have access to this tool in order to plan their roadmaps, document risks, and view their own impacts to the overall program. The cost analyst will have all of the real-time program details and information they need at their fingertips.
 - Agree on Agile terminology and specific approach across all teams at the onset of the program and maintain consistency throughout the acquisition life cycle. This avoids future confusion, and allows the cost team to be in sync with the PMO.
 - Be flexible and adaptable in the approach for typical acquisition products – focus on what needs to be done to achieve a successful program over what is ‘typically’ done in a program. This includes the documentation format and typical scope of cost estimating products. By responding to the need for urgency, the cost team will demonstrate their dedication to the greater mission and reinforce their working relationship with the PMO.
 - Quantify the effort of discrete tasking using story points that leverage a commonly used Agile approach (i.e. doubling, Fibonacci, etc) rather than using subjective or arbitrary sizing approaches. This allows all members of the team to communicate their own status in a meaningful way throughout execution of the program. Cost analysts can communicate when their next product or task will be complete with ease and without confusion or surprises from the PMO.
 - Assess team and program status based on story and capability/feature completion, not duration (sprint) completion. Keep close attention to any movement of planned stories, as well as changes to the backlog. Failure to do so will result in incorrect and misleading interpretations of progress or status.
 - Receive continuous user (warfighter) feedback through active engagement with the funding sponsor and user representatives to ensure that current requirements (tracked in the Agile Program Management tool) are up-to-date and effective. This is necessary to ensure that the cost analysts are estimating the appropriate specifications for the program, and that the warfighter receives a useful product at completion.

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Acronym List

| | |
|----------|---|
| AA BoD | Accelerated Acquisition Board of Directors |
| AAE | Army Acquisition Executive |
| ACAT | Acquisition Category |
| CARD | Cost Analysis Requirements Description |
| CNO | Chief of Naval Operations |
| CSDR | Cost and Software Data Report |
| DASM | Deputy for Acquisition and Systems Management |
| DAU | Defense Acquisition University |
| DoD | Department of Defense |
| DoDCAS | Department of Defense Cost Analysis Symposium |
| EVM | Earned Value Management |
| EVMS | Earned Value Management System |
| FOC | Full Operational Capability |
| FYDP | Fiscal Year Development Plan |
| IDA | Institute for Defense Analyses |
| IDIQ | Indefinite Delivery Indefinite Quantity |
| IG | Inspector General |
| IOC | Initial Operational Capability |
| IPMR | Integrated Program Management Report |
| JCIDS | Joint Capabilities Integration Development System |
| MAA | Maritime Accelerated Acquisition |
| MACO | Maritime Accelerated Capabilities Office |
| MDA | Milestone Decision Authority |
| MDAP | Major Defense Acquisition Program |
| MDID | Milestone Document Identification |
| MS | Milestone |
| NDAA | National Defense Appropriation Act |
| NTE | Not To Exceed |
| OT | Operational Test |
| PARCA | Performance Assessments and Root Cause Analyses |
| PDR | Preliminary Design Review |
| PLCCE | Program Life Cycle Cost Estimate |
| PM | Program Manager |
| PMO | Program Management Office |
| RCO | Rapid Capabilities Office |
| RFI | Request for Information |
| RFP | Request for Proposal |
| ROM | Rough Order of Magnitude |
| SAFe | Scaled Agile Framework |
| SOW | Statement of Work |
| TPB | Technical and Programmatic Baseline |
| UCA | Unfixed Contract Action |
| UON | Urgent Operational Need |
| USD AT&L | Under Secretary of Defense for Acquisition, Technology, and Logistics |
| WHATIF | We Have Accelerated Through IOC and FOC |