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Navy Mobile Apps Acquisition: Doing It in Weeks, Not Months or Years

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Panel 6. Considerations in Software Modeling and Design

Wednesday, May 4, 2016	
1:45 p.m. – 3:15 p.m.	**Chair: John Zangardi,** Deputy Assistant Secretary of the Navy for Command, Control, Communications, Computers, Intelligence, Information Operations, and Space ***Achieving Better Buying Power for Mobile Open Architecture Software Systems Through Diverse Acquisition Scenarios*** Walt Scacchi, Senior Research Scientist, Institute for Software Research, UC Irvine Thomas Alspaugh, Project Scientist, Institute for Software Research, UC Irvine ***Architecting Out Software Intellectual Property Lock-In: A Method to Advance the Efficacy of BBP*** Maj Chris Berardi, USAF; Bruce Cameron, Lecturer, MIT; Daniel Sturtevant, CEO, Silverthread, Inc.; Carliss Baldwin, Professor, Harvard Business School; and Edward Crawley, Professor, MIT ***Navy Mobile Apps Acquisition: Doing It in Weeks, Not Months or Years*** Jacob Aplanalp, Assistant Program Manager, My Navy Portal, PEO EIS; Dave Driegert, Senior Technical Advisor, PEO EIS; Kevin Burnett, Technical Manager, PEO EIS; and Kenneth Johnson, Technical Director, PEO EIS

Navy Mobile Apps Acquisition: Doing It in Weeks, Not Months or Years

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Abstract

Private industry and the Military both recognize the need to develop mobile applications (apps) to meet the growing demand for delivering content in a way that supports end-users' needs and preferences. The U.S. Navy has been examining all the conceivable strategic, policy, and security issues surrounding mobile application development and deployment, but limited Navy commands have had success implementing a policy and development methodology for meeting widespread end-user needs.

One exception has been the Program Executive Office (PEO) for Enterprise Information Systems (EIS), a U.S. Navy Program Executive Office whose mission is developing and sustaining business Information Technology (IT) systems for the Navy. One of their primary customers, the Chief of Naval Personnel, challenged PEO EIS to develop a strategy and development methodology for quickly developing mobile applications to meet a variety of Navy Human Resource (HR) needs.

PEO EIS, through a designation to one of its Program Management Offices (PMOs)—PMW 240, or the "Sea Warrior" Program—employed an innovative approach for design, development, and acquisition of mobile applications that has allowed it to field multiple mobile applications in just 8–12 weeks per application given strong customer engagement. To date, PMW 240 has fielded eight applications in the past year with dozens more in the planning and development phases.

This paper will share the innovative methodology, Systems Engineering Technical Review (SETR) process, and Federal Acquisition Regulation (FAR) insights that have allowed PMW 240 to field mobile apps rapidly. It will also discuss some of the challenges and next steps to expanding the Navy HR mobile application capabilities. Since PMW 240 is an acquisition executor, all processes, innovations, and insights will be presented from a practitioner perspective in hopes of benefiting other practitioner organizations that require mobile application deployment for their end-users.

Background

There has been an unprecedented level of interest across the U.S. Navy to rapidly investigate and enhance existing mobile technology capabilities, primarily due to their familiarity, convenience, ease of use, and productivity benefits. This investigation is considering implementations that leverage Government Furnished Equipment (GFE) and "Bring Your Own Device" (BYOD) models.

As the lead organization for Navy Enterprise mobility, the Deputy Chief of Naval Operations for Information Warfare held a Mobility Summit in October 2014, which laid the path to develop a holistic view of Navy enterprise mobility efforts—supporting afloat, ashore, and forward deployed operating environments. As a result, the Enterprise Mobility Integrated Product Team (EMIPT) stood up in January 2015 to serve as the Navy's designated advisory and action group for all matters pertaining to Navy enterprise mobility efforts. The team defined Enterprise Mobility as

> the suite of technologies and solutions that provides Navy personnel access to information any time, any place, and from any device. Access may be provided via government and/or commercial infrastructure utilizing multiple device capabilities, and related network and applications capabilities. (Department of the Navy, 2012)

Notwithstanding the demand for mobile application availability, there are significant information assurance and other technical and policy issues being actively addressed across the Navy. Leveraging existing guidance, Navy Manpower, Personnel, Training, and Education (MPT&E) leadership initiated its Mobile Application Management effort using the support of the Program Executive Office for Enterprise Information Systems (PEO EIS)/PMW 240 Sea Warrior Program to develop and deploy mobile applications for the MPT&E domain. A key element of the PMW 240 tasking is to build on government and commercial best practices, document its business and technical management processes, and lay out a path for institutionalizing MPT&E mobile application management practices. This tasking is being performed by the MPT&E Mobility Team, staffed by PMW 240.

The PMW 240 Mobility Team develops, oversees IA accreditation, tests, deploys, and supports mobile applications based on requirements from the MPT&E user community. The PMW 240 Mobility Project allows for the rapid development and deployment of mobile applications to meet both end user and Navy leadership demand signals, with the unique focus of providing these applications on BYOD versus GFE platforms and devices.

PMW 240's specific involvement in mobile application development began when the Chief of Naval Personnel (CNP) challenged PMW 240 to build two Navy lieutenants' mobile application concept for Division Officers. Six months later, PMW 240 not only delivered the eDIVO (electronic Division Officers; see Figure 1) application, but also the framework for all future MPT&E mobile applications. PMW 240 has delivered eight more information and training mobile applications since eDIVO, achieving a normal time to deliver from concept approval in less than four months, with the development pipeline queue filled with mobile applications from Sailors and functional business owners.

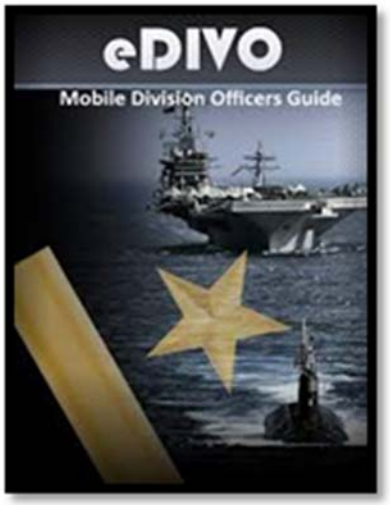

Figure 1. eDIVO Guide

Problem Statement

PMW 240 was tasked with quickly developing and delivering MPT&E mobile applications to Sailors on their personal mobile devices. However, unlike most commercial mobile leaders who can define and streamline their own procurement processes, a specific mobile application acquisition process did not exist separately from the standard weapon system acquisition processes that PMW 240 could leverage. Using the standard processes which were developed for large-scale Department of Defense (DoD) weapon systems would have returned lengthy development schedules and increased costs, which was unacceptable to the Chief of Naval Personnel and PEO EIS.

Innovative Solutions Approach

To address the challenges articulated by the problem statement, PMW 240 recognized it had to acquire mobile applications quickly and inexpensively. To achieve this goal, PMW 240 decided to use a robust framework provided by an acquisition process already tailored for IT—the Abbreviated Acquisition Programs (AAP) and Non-Designated Program process. This IT acquisition process was a necessary first step, but PMW 240 also recognized that it needed to "fine tune" and adapt that existing framework into one that could successfully deliver lightweight and secure mobile applications to their end users within months of initial conception without compromising the appropriate quality control and security checks inherent in the current process. Figure 2 illustrates how PMW 240 innovatively tailored the standard weapon system acquisition process to address its mobile application delivery challenge.

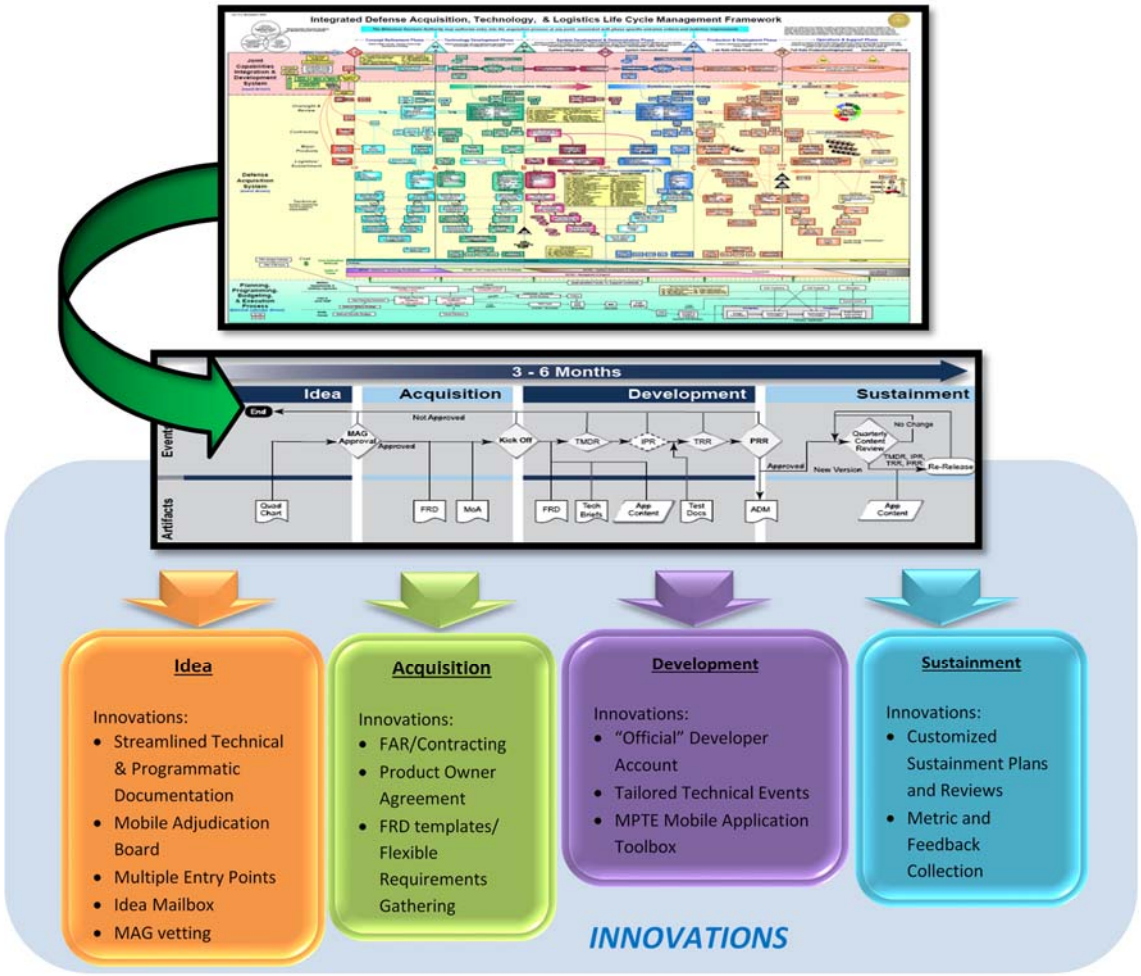

Figure 2. Robust DoD IT Acquisition Lifecycle Process Tailored to the PMW 240 Mobile Application Process and Innovations

PMW 240 has now successfully implemented the acquisition lifecycle process outlined in Figure 2. The remainder of this section will outline specific activities of the Idea, Acquisition, Development, and Sustainment phases of this process, identify core principles upon which mobile application acquisition is being executed, and discuss specific acquisition-related innovations in each of the four phases of the Figure 2 lifecycle process (Cochrane & Brown, 2010).

Mobile Acquisition Lifecycle Overview

The High-Level Operational Concept graphic in Figure 3 depicts the streamlined process the PMW 240 Mobility Team uses to identify mobile application requirements, then progressively lead those requirements through a series of executable systems engineering and project management phases and decisions to a fully functioning and sustainable mobile application (PMW 240 Sea Warrior Program, 2015b).

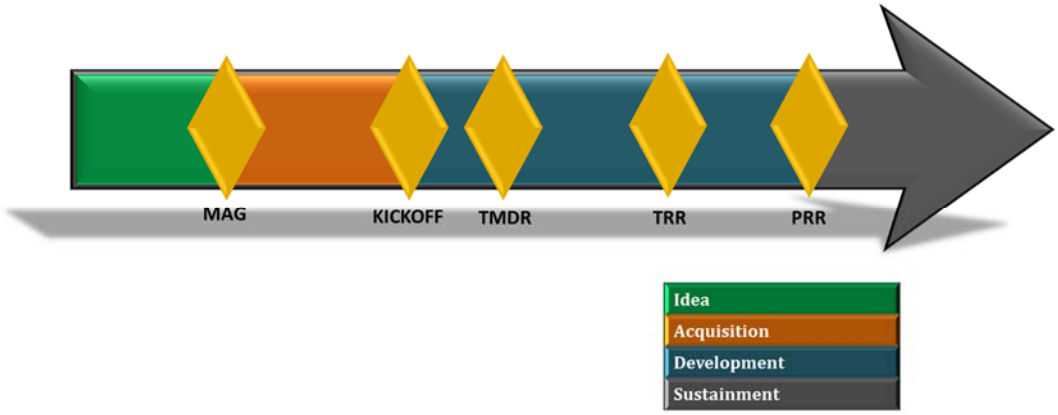

Figure 3. PMW 240 Mobile Application Development Process

The entire mobile application development process flows from left to right through the Idea, Acquisition, Development, and Sustainment phases, with specific and important activities involving both functional owners (customers) and PMW 240 in each phase.

The process starts in the Idea phase with the generation of ideas for new apps being presented to and evaluated by the Mobile Application Group (MAG), a governance body that prioritizes mobile application development. MAG approved applications are assigned to the PMW 240 Mobility Team for acquisition (PMW 240 Sea Warrior Program, 2015e).

The Acquisition Phase starts when approved ideas are more formally defined through the generation of acquisition documents and data. Through PMW 240's streamlined acquisition process and document templates, the team is able to rapidly move on these application ideas. The PMW 240 team then identifies an acquisition strategy, works with the application product owner (Navy subject matter expert organization who will own the content of the application after development) to create a functional requirements document (FRD), executes a Product Owner Agreement (POA) with that owner, and conducts a project kick-off with application product owners to ensure their understanding and support of the application's readiness for development.

After project kickoff, PMW 240 enters the Development phase by conducting a series of tailored systems engineering technical review (SETR) events that guide the project through requirements refinement, design, development, test, and production readiness decisions before the app is deployed for use. Those SETR events will be described in more detail later in this paper. Applications may be developed internally by Navy software developers, by PMW 240 contracted software developers, or externally by third party developers who are sponsored by Navy MPT&E functional leads or independent submitters. The outputs of the Acquisition/Development Phase are a fielded mobile application published on designated application stores.

In the Sustainment Phase, the Product Owner provides updated content as needed to the developer who updates the mobile app for publication via the app store. Both the Product Owner and the PMW 240 Mobility Team monitor feedback on content, functionality, usability, and user experience to determine upgrades or retirement for the app.

Mobile Application Core Principles

In addition to the overarching acquisition lifecycle and development process it developed and is following, PMW 240 recognized that it needed to identify and follow some core principles to also guide its mobile application acquisition efforts. These core principles provide a solid strategic foundation on which PMW 240 bases its mobile application

acquisition and ensure that certain performance and compliance requirements are met (PMW 240 Sea Warrior Program, 2015a). These principles are

- Simplicity and Rapid Deployment—Mobile application projects should be designed with rapid deployment and simplicity in mind, wherever possible.
- Performance—The application must follow standard iOS and Android development practices to ensure a normal level of memory consumption.
- Security—The application must adhere to requirements and specifications outlined in the Cybersecurity Mobile Application Checklist, Fortify scans, and their respective references.
- Compliance—The application must comply with standard mobile platform vendor development guidelines outlined in official licensing and distribution agreements.
- User Documentation and Training—The application should make all documentation, lifecycle management, and training information publically available as needed. Application tutorials are a preferred method for training users of mobile applications how to perform necessary functions to utilize the application effectively.
- Maintenance/Sustainment—Mobile application projects should be designed to reduce the burden of maintenance and other sustainment actions. Before using any feature or supporting software, a developer must first search for reports indicating software and support will not sunset in the near future. Also, the developer must compare alternatives with respect to proven software and support longevity, and reputation for ease of maintenance.
- Feedback—The user must have the capability to email feedback directly to the NAVY 311 helpdesk. In addition, mobile application projects will use a Commercial Off the Shelf (COTS) capability to capture feedback within the application and subsequently collate, tag, and send that data to NAVY 311 when appropriate.
    - Each application will be issued its own email address to facilitate communication between the COTS software and NAVY 311.
    - The COTS software also provides the capability to capture feedback from various App Stores, Facebook, Twitter, and other social media resources, creating tickets from the feedback it discovers.

Idea Phase Innovations

Although the Idea phase of the lifecycle is relatively short and simple, PMW 240 has applied innovative guidance and tools to both accelerate and simplify this phase.

Streamlined Technical and Programmatic Documentation

Agile Mobility Plan

PMW 240 developed the Agile Mobility Plan (AMP) to provide technical information related to the development, cybersecurity, testing, deployment, and sustainment of PMW 240 mobile applications. The information contained in the document represents what is common to all PMW 240 mobile application investments. The AMP is the blueprint for the technical conduct and control of PMW 240 mobile applications from inception through sustainment. As a lightweight, tailored version of the PMW 240 Systems Engineering Plan (SEP), this 25-page document (innovatively short and concise) highlights only the aspects of systems engineering that are prevalent to the mobile application lifecycle. This allows for a

purposeful, pointed document resulting in the rapid development and deployment of mobile applications to meet both end user and Navy leadership demand signals (PMW 240 Sea Warrior Program, 2015b).

Agile Mobility Management Plan

PMW 240 also developed the Agile Mobility Management Plan as a companion document to the AMP. The Agile Mobility Management Plan provides for management and governance of PMW 240 mobile application investments. The document specifies and delegates the Mobility Project Decision Authority (MDA) from the PMW 240 Program Manager down to a lower level, the Principal Assistant Program Manager (PAPM), for expedited decisions and more availability. Through delegation of this authority within the program office, project milestones, management policies, and governance decisions occur at a more rapid pace, permitting the PMW 240 team to deliver more applications in less time (PMW 240 Sea Warrior Program, 2015a).

Mobile Adjudication Board

PMW 240 established the Mobility Adjudication Board (MAB) to manage requirements, defect resolution, and other mobile application project issues as required; it is also a forum used to implement the fundamental change management process of configuration control during planning, development, deployment, and sustainment. The Mobility Adjudication Board Charter (MABC) enables a disciplined approach and visibility for the approval, disapproval, and prioritization of new or existing requirements. It is a critical component to maintaining the known configuration and ensuring all changes are approved prior to implementation.

The MABC has the Scope of Authority (SoA) for mobile app changes to the configuration baseline during the planning, development, deployment, and sustainment phases of the program. Mobility projects normally progress at a higher rate of speed than standard web application endeavors. For this reason, a single, very lightweight governing structure handles configuration management oversight during development (normally, more cumbersome Program Review Board [PRB] or Configuration Control Board [CCB] structures in full IT system acquisitions). This innovatively lightweight structure ensures issues are handled in a timely manner by the appropriate oversight and combines two traditional processes—PRB and CCB—into a single efficient review team (PMW 240 Sea Warrior Program, 2015d).

Multiple Entry Points

PMW 240 receives mobile applications that fall under various states of maturity within the lifecycle and allows for all to enter into its lifecycle process. Most applications are proposed in the form of less mature ideas, but some are maturing and already in some phase of a development state, or are fully built and ready to be published into the application store. To conserve resources and recognize the lifecycle maturity of these various applications, PMW 240 considers the current state of the application to determine where and how to categorize it. This allows for a customized yet expedited entry into the application store while verifying the application meets the proper exit criteria for deployment.

Idea Mailbox

PMW 240 acquires application ideas through a variety of sources, including leadership direction, command interest, and line of business owner ideas. PMW 240 also utilizes a digital mailbox advertised on Navy media. This innovative mailbox, seen in Figure 4, navyapps@navy.mil, receives ideas for new applications from both civilians and Sailors and is checked on a weekly basis to ensure new and fresh ideas for applications from

practitioners are in the forefront of application development consideration. This mailbox is an innovative approach to soliciting mobile application ideas directly from the end-users who will benefit from them.

Figure 4. PMW 240's Application Mailbox

Mobile Action Group Review and Approval

On a quarterly basis, PMW 240 briefs the collected application ideas to the Mobile Application Group (MAG) for investment approval. If an application is not chosen for immediate investment, an informational quad chart detailing salient information for each application idea is entered into the Mobility Team's application backlog and will be reconsidered by the MAG at the following quarterly meeting. If the MAG approves an application idea, the PMW 240 Mobility Team performs required contracting actions which signal the beginning of the acquisition phase. Using a quarterly time-driven review period keeps the investments current and provides PMW 240 with regular direction on applications to best align with the leadership and end-user interest. Such frequent review of requirements and prioritization is innovative for IT acquisition, to say nothing of standard DoD 5000 weapon systems prescribed processes (PMW 240 Sea Warrior Program, 2015e).

Acquisition Phase Innovations

The acquisition phase of anything the DoD procures is not generally considered to be a space where innovation can flourish. However, PMW 240 has implemented innovative approaches to allow agility in acquiring new mobile applications.

FAR/Contracting

Per the Federal Acquisition Regulation (FAR), contract negotiation and execution can require extensive effort and wait time for an initial contract award and additional time for follow-on task order awards against an Indefinite Delivery/Indefinite Quantity (ID/IQ) or Multiple Award Contract (MAC) vehicle. To support rapid mobile application development, PMW 240 quickly recognized it needed a very flexible and responsive contracting strategy and associated vehicle that FAR-prescribed competitive or negotiated contracting procedures might not allow.

As a result of the unique MNP mobile app development needs, PMW 240 conducted market research to identify industry standard timelines and costs for developing the types of mobile apps under consideration. Based on that data, PMW 240 alpha-negotiated an ID/IQ contract vehicle with an economically-disadvantaged woman-owned small business. That vehicle contained Firm-Fixed Price (FFP) Contract Line Item Numbers (CLINs) for small, medium, and large application development, as well as for maintenance tasking on an app by app basis. The CLIN values were based on the industry standard costs and allow PMW 240 to award new task orders (TOs) selecting the needed CLINs in a matter of days. That

TO award speed significantly decreases the overall acquisition phase time requirements (PMW 240 Sea Warrior Program, 2015a).

Product Owner Agreement

Prior to beginning any development, the Mobility Team works with the Product Owners to negotiate the Product Owner Agreement (POA). The POA is a lightweight document comparable to a larger program's Memorandum of Agreement (MOA) that explains the responsibilities of the Product Owner and PMW 240 throughout the application lifecycle and ensures that an application is maintained following publication into the application stores. The POA explains that the Product Owner is responsible for any content-related changes, including notifying the PMW 240 team of any policy, link, or material updates, and the PMW 240 team is required to handle any technical changes, such as bug fixes and operating system updates. This document is negotiated and signed by the two participating teams and reposed under configuration control. The lightweight nature of the POA is innovative in that it allows signature at a lower organizational level, so it requires less oversight, allowing the development on the application to begin sooner (PMW 240 Sea Warrior Program, 2016a).

FRD Templates/Flexible Requirements Gathering

In addition to the POA, PMW 240 requires a Functional Requirements Document (FRD) to be completed and signed before beginning development. The Mobility Team has three FRD templates depending on the type of the application to be built: an aggregated content application, a training application, and a hybrid application (content and training). The most fitting template is then customized through a series of rapid meetings with the PMW 240 team and the Product Owners and reviewed by the development team for any needed clarification. Once all parties are confident that the FRD captures the vision for the application, the document is signed out and the development phase can begin with the Tailored Mobile Design Review (TMDR). This innovatively rapid requirements gathering and clarification process using these pre-defined templates generally requires no more than 10 business days, which is an extremely short timeline compared to standard IT and weapon systems acquisitions timelines for similar activities (PMW 240 Sea Warrior Program, 2015c).

Development Phase Innovations

The Development phase of the lifecycle is usually the longest phase of any acquisition, and it is for PMW 240 mobile applications as well. To decrease required development time as much as possible, PMW 240 has implemented innovative guidance and oversight.

"Official" Developer Account

With a diverse set of product owners working with PMW 240 to develop the applications, it is important to adhere to specific standards and meet certain thresholds when it is time for production. PMW 240 established developer accounts for the public application stores (Apple and Google) and is the clearing house for all official Navy MPT&E mobile applications. The streamlined process for publication and production ensures each application meets the exit criteria for the PMW 240 process and the entrance criteria for these public application stores. The efficiency of this singular clearing house point provides a structured process and effective release methodology.

Tailored Technical Events

The PMW 240 Technical Event Process (TEP) guidebook provides guidance for planning Systems Engineering Technical Reviews (SETR) events. However, that document generally guides development through a waterfall approach that requires months and even

years of technical events to deliver working software. PMW 240 innovatively tailored the SETR guidance to match the agile methodology it has implemented to deliver MPT&E mobile apps in weeks and months instead of years. The following are the critical tailored technical events required to track progress for each mobile application. Each of the four technical events listed below are one hour in length and require participation from the Product Owners, PMW 240, the development team, and representatives from Cybersecurity, the Public Affairs Office (PAO), Enterprise Change Management (ECM), Configuration Management (CM), Test, and Logistics.

- **Kickoff Meeting (KO)**—After a mobile app project receives MAG approval, a Kickoff meeting is held to introduce team members from different competencies and stakeholders to establish the expectations for development/deliver, general procedures to be followed, priorities, schedule, and clear assignment of roles and responsibilities.
- **Tailored Mobile Design Review (TMDR)**—The TMDR is a tailored combination of three standard technical reviews: System Requirements Review (SRR), System Functional Review (SFR), and Preliminary Design Review (PDR). Conducted by the Mobility Assistant Project Manager-Engineer (APM-E), this review ensures the preliminary design of the application meets all functional requirements and the initial and allocated baselines for development, test, and deployment have been established. Combining these events allows PMW 240 to shorten the data collection and review timeline to only pertinent information.
- **Test Readiness Review (TRR)**—The Mobility APM-E conducts this review once the application's initial development effort has been completed. This review will assess the application's readiness to begin initial formal testing procedures. These procedures include testing the application on PMW 240-owned mobile devices (including both smartphones and tablets), as well as on mobile platform simulator software. It also includes conducting needed security scans.
- **Production Readiness Review (PRR)**—The Mobility APM-E and Mobility PD conduct the Production Readiness Review (PRR) following the completion of initial testing on PMW 240-owned smartphones and tablets. This review will analyze the application's readiness to begin the migration process to the target mobile application stores. This analysis will include further testing of the application on personally-owned devices to ensure the integrity of its performance.

The PMW 240 Mobility Project Team works with the mobile application developer to ensure the evaluation criteria for entrance and exit of particular technical events are appropriate to the level of effort, cost, schedule, and complexity of the mobile application.

The 240 mobility project team reviews developer-crafted test cases to ensure they prove completion of capabilities they are written to test. The contractor performs a final quality assurance testing phase after the final development iteration. After this final testing iteration, the government enters the final acceptance testing procedures. The PMW 240 Mobility Project Team also integrates security and usability testing and evaluation into the development process to streamline testing cycles and overall impact to cost and schedule. The developer ensures that prior to each iteration release, the developed application has gone through a cycle of developer level testing to ensure functionality intended for demonstration and preview is functioning as expected.

During the government's acceptance testing, the government solicits the necessary testing resources that align with the application's target audience, and the Test Team lead verifies all application functionality works as designed.

Final application approval and permission to release the application is at the discretion of the PMW 240 Mobility Team Decision Authority after the Development Team adjudicates and addresses submitted defects and comments.

Compared to normal weapon system and IT SETR events and timelines, this process tailored for PMW 240 mobile applications is highly innovative and extremely fast in delivering capability to end-users (PMW 240 Sea Warrior Program, 2015b).

MPT&E Mobile Application Toolbox

In an effort to encourage application proliferation for the Navy MPT&E community, PMW 240 developed a "toolbox" that is accessible to civilian, active duty, and reserve members of the Navy. While PMW 240 would still be the clearing house and publishing authority, the toolkit provides tips, style guidance, information on development environments, and tricks for building specific application components for any development audience that wishes to build mobile applications that look, feel, function, and are compatible with those PMW 240 has built for the Navy MPT&E community. The toolbox is designed as a self-sustaining wiki, meaning that developers can use the site to post questions, read topic forums, and even contact the PMW 240 mobility team for specific questions. The website will highlight sample projects and serve as an additional execution arm to the work being completed in PMW 240. The use of a toolkit, shown in Figure 5, allows developers to structure their application to appear and operate as an official U.S. Navy application, yet encourages development by third parties. It is an extremely innovative and collaborative approach that allows any capable entity to develop MPT&E approved mobile applications, instead of restricting that ability to one single vendor or in-house Government development team (PMW 240 Sea Warrior Program, 2016b).

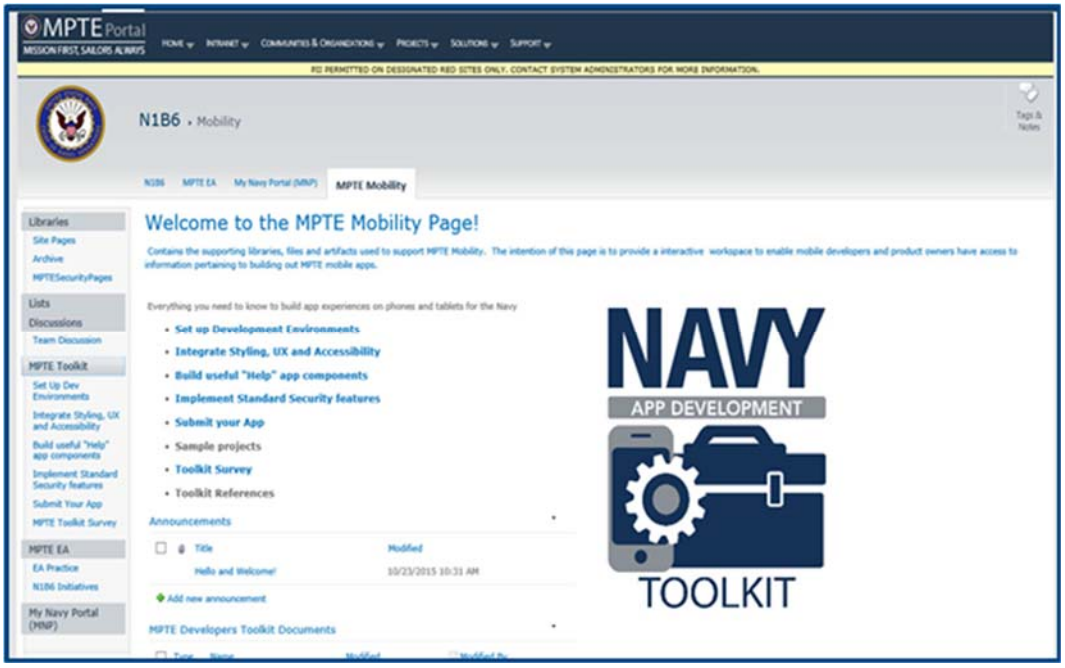

Figure 5. MPT&E Mobility Toolkit

Sustainment Phase Innovations

Although the Idea phase of the lifecycle is relatively short and simple, PMW 240 has applied innovative guidance and tools to both accelerate and simplify this phase.

Customized Sustainment Plans and Reviews

Once an application has been released for use, PMW 240's primary task is to ensure the content and technology is current, functional, and accessible to the user base. As discussed previously, each Product Owner signs a POA before development begins, and the POA is followed throughout sustainment of the application. On a quarterly basis, the application is reviewed to assess the value of the investment. Along with metrics and feedback, discussed below, the internal PMW 240 team reviews the need for any updates (either content-related or technical) to determine whether an application's state is acceptable. On a biannual basis, the Product Owners are invited to the reviews and discuss the feasibility of an upgrade, application usage, alignment with the Product Owner's team, and to decide whether the application's status warrants continued sustainment funding. Monitoring and evaluating the applications every three months prevents stagnant content, unwarranted investment, and insightful trend analysis, and fosters the relationship with the Product Owners—all on an innovatively manageable level and with a minimal time investment.

Metric and Feedback Collection

PMW 240 collects metrics and feedback from each of the applications in order to better assess the status of any particular application and use the results to determine continued investment. Metrics are aggregated from the application stores and a built-in feedback mechanism within the application. From the public stores, PMW 240 can see star ratings, comments, number of downloads per day, and devices that use the application. From the inherent mobile applications feedback mechanism, PMW 240 can view, respond to, and route comments to the development or product owner team for consideration. Comments are often in the form of suggestions for additional content/functionality or reports of bugs. The above-mentioned feedback is collected on a weekly basis, and the compiled version is distributed on a monthly basis for review. The PMW 240 team can actively monitor an application's usage, end user reactions, and any issues and incorporate any resulting changes into future builds of the application. This innovatively thorough yet rapid and easy-to-decipher data collection and monitoring allows for a direct feedback loop and response adjudication to better serve the end user's needs.

Challenges and Next Steps

Mobility within the Navy will continue to grow and reach a broader audience. With this growth, the demand for more mobile capabilities, including transactional applications that interact with current DoD systems, will increase. There are, however, a number of challenges facing the Navy—particularly in the use case of BYOD mobile platforms—to ensure its workforce can fully utilize mobile capabilities for all their mission requirements. Some of these challenges include using Derived Credentials, opening an Official Navy App Store, and implementing a Mobile Application Management (MAM) framework.

Derived Credentials

Supporting secure access to mobile devices through 'Derived Credentials' (a National Institute of Science and Technology coined term to describe cryptographic credentials derived from Personal Identity Verification [PIV] and Common Access Cards [CACs]) is one of the Navy's and U.S. Government's biggest challenges for enabling its mobile workforce to securely access and authenticate mobile devices interacting with

Government data. The current use of physical CACs and card readers limits the use cases of usable mobile devices and is un-scalable, resulting in high costs to implementation. Using software, micro-hardware, or other cryptographic methods of access and authentication will have to be developed, tested, and put into production before the Navy fully realizes the full suite of mobile capabilities currently available to the commercial world.

Navy App Store

Providing Sailors and civilians access to a full suite of official Navy mobile applications, designed to enable their day-to-day work, will ensure they have access to officially authorized Navy information and applications. If and when realized, this "Navy App Store" could serve both GFE and BYOD platforms/devices. Establishing this app store will provide a single location for Sailors and civilians to access Navy applications and content without fear of downloading a fake or malicious Navy application in the open commercial app stores.

MAM Framework

Along with an official Navy application store, utilizing a MAM service to manage the growing number of Navy applications will be vital to sustainment. Keeping applications up to date with their respective operating system and hardware platforms, as well as content updates, will ensure the applications end-users will have fully operational apps with current information. A MAM can also provide robust security for Navy applications when loaded to a Sailor's personal device which may allow for transactional applications that connect securely with DoD systems while restricting access to any personal data on the device. PMW 240 is currently performing a Material Solutions Analysis (MSA) on various MAM vendors and will assess potential application use cases for future production.

Conclusion

PMW 240 has developed a streamlined and agile process to securely acquire and deliver high quality mobile MPT&E applications to Sailors and civilians. As the appetite for mobile applications and information consumption continues to grow, PMW 240 will continue to be flexible and scalable with its acquisition and associated mobile application fielding processes to meet end user and Department of the Navy future needs while maintaining information security and assurance standards.

References

Cochrane, C., & Brown, B. (2010). *Integrated defense acquisition, technology, and logistics life cycle management system* (Ver. 5.4). Defense Acquisition University.

Department of the Navy. (2012*). Department of the Navy (DoN) enterprise mobility integrated product team (EMIPT).* Retrieved from Chief Information Officer website: http://www.doncio.navy.mil/uploads/0612CQL24138.pdf

PMW 240 Sea Warrior Program. (2015a). *Agile mobility management plan* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2015b). *Agile mobility plan* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2015c). *Functional requirements document template* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2015d). *Mobile application board charter* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2015e). *MPTE mobile application group charter* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2015f). *MSA guidance MAM suite* (Ver. 1.0). Arlington, VA.

PMW 240 Sea Warrior Program. (2016a). *Mobile app POA template_Feb102016* (Ver. 1.5). Arlington, VA.

PMW 240 Sea Warrior Program. (2016b). *Navy application development toolkit*. Retrieved from https://mpte.portal.navy.mil/sites/OPNAV-N1/N15/N1B6/SitePages/Mobility.aspx

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