

December 2010

INFORMATION
TECHNOLOGY

Veterans Affairs Can
Further Improve Its
Development Process
for Its New Education
Benefits System



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Highlights of [GAO-11-115](#), a report to the Committee on Veterans' Affairs, House of Representatives

Why GAO Did This Study

The Post-9/11 GI Bill was signed into law in June 2008 and provides educational assistance for veterans and members of the armed forces who served on or after September 11, 2001. The Department of Veterans Affairs (VA) is responsible for processing claims for these new education benefits. VA concluded that its legacy systems and manual processes were insufficient to support the new benefits and, therefore, began an initiative to modernize its benefits processing capabilities. The long-term solution was to provide a fully automated end-to-end information technology (IT) system to support the delivery of benefits by December 2010. VA chose an incremental development approach, called Agile software development, which is intended to deliver functionality in short increments before the system is fully deployed.

GAO was asked to (1) determine the status of VA's development and implementation of its IT system to support the implementation of education benefits identified in the Post-9/11 GI Bill and (2) evaluate the department's effectiveness in managing its IT project for this initiative.

What GAO Recommends

To help guide the full development and implementation of the long-term solution, GAO is recommending that VA take five actions to improve its development process for its new education benefits system. VA concurred with three of GAO's five recommendations and provided details on planned actions, but did not concur with the remaining two.

View [GAO-11-115](#) or key components. For more information, contact Valerie C. Melvin at (202) 512-6304 or melvin@gao.gov.

INFORMATION TECHNOLOGY

Veterans Affairs Can Further Improve Its Development Process for Its New Education Benefits System

What GAO Found

VA has made important progress in delivering key automated capabilities to process the new education benefits. Specifically, it deployed the first two of four releases of its long-term system solution by its planned dates, thereby providing regional processing offices with key automated capabilities to prepare original and amended benefit claims. In addition, the Agile process allowed the department the flexibility to accommodate legislative changes and provide functionality according to business priorities. While progress has been made, VA did not ensure that certain critical tasks were completed that were initially expected to be included in the second release by June 30, 2010. For example, the conversion of data from systems in the interim solution to systems developed for the long-term solution was not completed until August 23, 2010. Because of the delay, VA planned to reprioritize the functionality that was to be included in the third release. Further, while VA plans to include full self-service capabilities to veterans, it will not do so in the fourth release as scheduled; instead it intends to provide this capability after the release or in a separate initiative. VA reported obligations and expenditures for these releases, through July 2010, to be approximately \$84.6 million, with additional planned obligations of \$122.5 million through fiscal year 2011.

VA has taken important steps by demonstrating a key Agile practice essential to effectively managing its system development—establishing a cross-functional team that involves senior management, governance boards, key stakeholders, and distinct Agile roles. In addition, VA made progress toward demonstrating three other Agile practices—focusing on business priorities, delivering functionality in short increments, and inspecting and adapting the project as appropriate. Specifically, to ensure business priorities are a focus, VA established a vision that captures the project purpose and goals and established a plan to maintain requirements traceability. To aid in delivering functionality, the department established an incremental testing approach. It also used an oversight tool, which was intended to allow the project to be inspected and adapted by management. However, VA could make further improvements to these practices. In this regard, it did not (1) establish metrics for the goals or prioritize project constraints; (2) always maintain traceability between legislation, policy, business rules, and test cases; (3) establish criteria for work that was considered “done” at all levels of the project; (4) provide for quality unit and functional testing during the second release, as GAO found that 10 of the 20 segments of system functionality were inadequate; and (5) implement an oversight tool that depicted the rate of the work completed and the changes to project scope over time. Until VA improves these areas, management will lack the visibility it needs to clearly communicate progress and unresolved issues in its development processes may not allow VA to maximize the benefits of the system.

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Abbreviations

IT	information technology
OI&T	Office of Information and Technology
PMAS	Project Management Accountability System
SPAWAR	Space and Naval Warfare Systems Center—Atlantic
VA	Department of Veterans Affairs
VBA	Veterans Benefits Administration

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G A O

Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

December 1, 2010

The Honorable Bob Filner
Chairman
The Honorable Steve Buyer
Ranking Member
Committee on Veterans' Affairs
House of Representatives

In June 2008, Congress passed the Post-9/11 Veterans Educational Assistance Act of 2008¹ (commonly referred to as the Post-9/11 GI Bill or Chapter 33). This act amended Title 38 United States Code to include Chapter 33, which provides educational assistance for veterans and members of the armed forces who served on or after September 11, 2001. The Department of Veterans Affairs (VA) is responsible for processing claims for the Chapter 33 education benefit, which is a three-part benefit—tuition and fee payments, housing allowance, and book stipend.

In considering its implementation of the legislation, the department concluded that it did not have a system capable of calculating the new benefit. As a result, the department undertook an initiative to modernize its education benefits processing capabilities. This initiative involved an interim solution that augmented existing processes by providing temporary applications to manually collect data and a long-term solution to deliver automated processing capabilities. The department intended to complete enough of the system functionality in the long-term solution to replace the interim solution by June 2010, and to include additional capabilities, such as interfaces to legacy systems,² to provide a fully automated end-to-end system to support the delivery of education benefits by December 2010.

¹Pub. L. No. 110-252, Secs. 5001-5003, June 30, 2008.

²VA's legacy systems, among others, include a financial payment system, an education information system, and a veteran demographic and service data system. These legacy systems contain essential information required for calculating the benefit, such as prior benefit payments, academic institution rates, and veterans' service dates. VA planned to complete interfaces to all legacy systems except for its financial payment system, which is planned for the third release.

To develop the system for its long-term solution, VA is relying on contractor assistance and is using an incremental development approach, called Agile software development,³ which is to deliver software functionality in short increments before the system is fully deployed. Agile software development stresses the use of key practices such as working as one team to define business priorities and, based on those priorities, delivering work in short increments. Each increment of work is inspected by the team and the project's plans and priorities are adapted accordingly.

Given the importance of delivering education benefits to veterans and their families, we were asked to review the long-term solution to

- determine the status of VA's development and implementation of its information technology (IT) system to support the implementation of education benefits identified in the Post-9/11 GI Bill, and
- evaluate the department's effectiveness in managing its IT project for this initiative.

As agreed with your offices, on September 13, 2010, we provided briefing slides that outlined the results of our study to staff of your Subcommittee on Economic Opportunity. The purpose of this report is to provide the published briefing slides to you and to officially transmit our recommendations to the Secretary of Veterans Affairs. The slides, which discuss our scope and methodology, are included in appendix I.

We conducted our work in support of this performance audit at the Department of Veterans Affairs headquarters in Washington, D.C., and at a contractor's facility in Chantilly, Virginia, from November 2009 to December 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

³Agile software development is not a set of tools or a single methodology, but a philosophy based on selected values, such as, the highest priority is to satisfy customers through early and continuous delivery of valuable software; delivering working software frequently, from a couple of weeks to a couple of months; and that working software is the primary measure of progress. For more information on Agile development, see <http://www.agilealliance.org>.

In summary, our study highlighted the following:

- VA has made important progress in developing and implementing the first two of four releases of software planned for its new education benefits processing system as scheduled, with these deployments occurring on March 31, 2010, and June 30, 2010. In doing so, the department provided its regional processing offices with key automated capabilities to prepare original and amended benefit claims. It also responded to legislative changes and provided for housing rate adjustments. While VA did not previously estimate cost for these releases and, as such, could not track estimated to actual costs, it reported that about \$84.6 million had been obligated through July 2010. The department noted that its Agile process allowed the flexibility to adapt to legislative changes and provide functionality according to business priorities.

However, VA did not ensure that certain critical tasks were completed that were initially expected to be included in the second release by June 30, 2010. Specifically, the department did not complete the conversion of data from systems in the interim solution to the systems developed for the long-term solution because it was found to be more complex than the department had anticipated. The department also did not complete the development of interfaces between the new system and legacy systems. Program officials stated that data conversion was included along with housing rate adjustments in a sub-release that was later deployed on August 23, 2010. Because of these delays, VA planned to reprioritize what functionality would be developed in its third release by September 30, 2010. For its fourth release, it intends to reduce its planned functionality of providing full self-service capabilities to veterans by December 31, 2010. The department intends to provide this capability after its fourth release or under a separate initiative. As such, VA estimates that the total system development actual and planned obligations through 2011 will be about \$207.1 million.⁴

- VA has demonstrated key Agile practices that are essential to effectively managing its system development, but certain practices can be improved. Specifically, the department ensured that teams represented key stakeholders and that distinct Agile roles were fulfilled. For example, the teams consisted of subject matter experts, programmers, testers, analysts, engineers, architects, and designers. The department also made progress

⁴This number represents actual expenditures, obligated funds, and planned obligated funds through fiscal year 2011.

toward demonstrating the three other Agile practices—focusing on business priorities, delivering functionality in short increments, and inspecting and adapting the project as appropriate. However, VA can improve its effectiveness in these areas.

- *Business priorities.* To ensure business priorities are a focus, a project starts with a vision that contains, among other things, a purpose, goals, metrics, and constraints. In addition, it should be traceable to requirements. VA established a vision that captured the project purpose and goals; however, it had not established metrics for the project's goals or prioritized project constraints. Department officials stated that project documentation is evolving and they intend to improve their processes based on lessons learned; however, until it identifies metrics and constraints, the department will not have the means to compare the projected performance and actual results of this goal. VA had also established a plan that identified how to maintain requirements traceability within an Agile environment; however, the traceability between legislation, policy, business rules, and test cases was not always maintained. VA stated that its requirements tool did not previously have the capability to perform this function but now provides this traceability to test cases. Nonetheless, if the department does not ensure that requirements are traceable to legislation, policies, and business rules, it has limited assurance that the requirements will be fully met.
- *Deliver functionality in short increments.* To aid in delivering functionality in short increments, defining what constitutes completed work (work that is “done”) and testing functionality is critical.⁵ However, VA had not established criteria for work that was considered “done” at all levels of the project. Program officials stated that each development team had its own definition of “done” and agreed that they needed to provide a standard definition across all teams. If VA does not mutually agree upon a definition of “done” at each level, confusion about what constitutes completed work can lead to inconsistent quality and it may not be able to clearly communicate how much work remains. In addition, while the department had established an incremental testing approach, the quality of unit and functional testing performed during Release 2 was inadequate in 10 of the 20

⁵One of the key Agile principles is that the delivery of completed software be defined, commonly referred to as the definition of “done.” This is critical to the development process to help ensure that, among other things, testing has been adequately performed and the required documentation has been developed.

segments of system functionality we reviewed. Program officials stated that they placed higher priority on user acceptance testing at the end of a release and relied on users to identify defects that were not detected during unit and functional testing. Until the department improves testing quality, it risks deploying future releases that contain defects which may require rework.

- *Inspect and adapt.* In order for projects to be effectively inspected and adapted, management must have tools to provide effective oversight. For Agile development, progress and the amount of work remaining can be reflected in a burn-down chart, which depicts how factors such as the rate at which work is completed (velocity) and changes in overall product scope affect the project over time. While VA had an oversight tool that showed the percentage of work completed to reflect project status at the end of each iteration, it did not depict the velocity of the work completed and the changes to scope over time. Program officials stated that their current reporting did not show the changes in project scope because their focus was on metrics that are forward looking rather than showing past statistics for historical comparison. However, without this level of visibility in its reporting, management may not have all the information it needs to fully understand project status.

Conclusions

VA deployed the first two of four releases of its long-term system solution by its planned dates, therefore providing improved claims-processing functionality to all regional processing offices, such as the ability to calculate original and amended benefit claims. In addition, the Agile process allowed the department the flexibility to accommodate legislative changes and provide functionality according to business priorities, such as housing rate adjustments. However, key features of the solution were not completed as intended in the second release because the department found some functionality to be more complex than anticipated. Specifically, interfaces to legacy systems and the conversion of data from systems in the interim solution were not completed as intended in the second release. Due to these delays, VA planned to reprioritize what functionality would be included in its third release. Also, for its fourth release, the department had reduced a significant planned functionality—veteran self-service capability. While VA intends to provide this capability after the fourth release within the long-term system solution or under a separate initiative, it is unclear what functionality will be delivered in the remaining two releases when it deploys the system in December 2010.

In using an Agile approach for this initiative, VA is applying lessons learned and has taken important first steps to effectively manage the IT project by establishing a cross-functional team that involves senior management, governance boards, and key stakeholders. However, the department had not ensured that several key Agile practices were performed. Measurable goals were not developed and the project progressed without bidirectional traceability in its requirements. Additionally, in developing the system, VA did not establish a common standard and consistent definition for work to be considered “done” or develop oversight tools to clearly communicate velocity and the changes to project scope over time. Testing deficiencies further hindered VA’s assurances that all critical system defects would be identified. Until VA improves these areas, management does not have the visibility it needs to clearly communicate progress to stakeholders and estimate when future system capabilities will be delivered. Additionally, reduced visibility and unresolved issues in its development processes may result in the department continuing to remove functionality that was expected in future releases, thus delivering a system that does not fully and effectively support the implementation of education benefits as identified in the Post-9/11 GI Bill.

Recommendations for Executive Action

To help guide the full development and implementation of the Chapter 33 long-term solution, we recommend that the Secretary of Veterans Affairs direct the Under Secretary for Benefits to take the following five actions:

- establish performance measures for goals and identify constraints to provide better clarity in the vision and expectations of the project;
- establish bidirectional traceability between requirements and legislation, policies, and business rules to provide assurance that the system will be developed as expected;
- define the conditions that must be present to consider work “done” in adherence with agency policy and guidance;
- implement an oversight tool to clearly communicate velocity and the changes to project scope over time; and
- improve the adequacy of the unit and functional testing processes to reduce the amount of system rework.

Agency Comments and Our Evaluation

We received written comments on a draft of this report from the Secretary of Veterans Affairs and VA's Assistant Secretary for Information and Technology. In the Secretary's comments, reproduced in appendix II, VA concurred with three of our recommendations and did not concur with two recommendations. Specifically, the department concurred with our recommendation to establish performance measures for goals and identify constraints to provide better clarity in the vision and expectations of the project. VA noted that it plans to develop performance measures consistent with automating the Post-9/11 GI Bill by March 2011. While this is a positive step, as we noted, it is also important that the department identify any project or business constraints to better clarify the vision and expectations of the system. VA also concurred with our recommendation that it establish bidirectional traceability between requirements and legislation, policies, and business rules to provide assurance that the system will be developed as expected. The department stated that it plans to establish traceability between its business rules for the long-term solution and the legislation by June 2011. Additionally, VA concurred with our recommendation to define the conditions that must be present to consider work "done" in adherence with department policy and guidance. VA noted that the initiative's fiscal year 2011 operating plan outlines these conditions at the project level and that it intends to clarify the definition at the working group level by December 2010.

VA did not concur with our recommendation that it implement an oversight tool to clearly communicate velocity and the changes to project scope over time. The department indicated that development metrics and models had already been established and implemented to forecast and measure development velocity. In this regard, as our briefing noted, department officials stated that they previously reported project-level metrics during the first release, and based on lessons learned, decided to shift to reporting metrics at the development team level. While it is important that VA established the capability to track team-level metrics, it is also important to track and clearly report how changes to the system development at the team level affect the overall project-level scope over time. Specifically, without the overall velocity—a key mechanism under the Agile methodology—VA does not have the information to understand the expected effort to complete the total scope of work and the associated length of time to do so. The overall velocity provides an understanding of the complexity and difficulty in accomplishing tasks and provides VA management with information to better understand project risks. This visibility is a key concept of the Agile methodology that VA has chosen to implement for this project. Without this level of visibility in its reporting, management and the development teams may not have all the information

they need to fully understand project status and generate the discussion and feedback necessary for continuous process improvement. Therefore, we continue to believe that our recommendation for VA to clearly communicate velocity and project scope changes can only strengthen the department's development process to be more in line with Agile system development practices.

VA also did not concur with our recommendation to improve the adequacy of the unit and functional testing processes to reduce the amount of system rework. While the department noted that its testing approach is compatible with Agile development, it also acknowledged in other technical comments the department provided that there were instances of inconsistencies of user stories for capabilities being marked "done" and the user stories we reviewed during the second release showed significant weaknesses in the quality of testing performed. While we agree that VA's testing approach is consistent with Agile methodology, these weaknesses we identified demonstrate ineffective testing and the need for a consistent and agreed-upon definition of "done." Further, the program officials noted that their approach focused on users identifying defects at the end of the release, which, as we have noted, can be problematic because it is difficult for users to remember all the items and parameters needed for functionality.⁶ Without increased focus on the quality of testing early in the development process, VA risks delaying functionality and/or deploying functionality with unknown defects that could require future rework that may be costly and ultimately impede the claims examiners' ability to process claims efficiently. Therefore, we continue to believe that our recommendation to improve the adequacy of unit and functional testing is needed to improve the effectiveness of VA's process called for in the Agile methodology. This would provide stakeholders greater assurance that functionality developed during each iteration is of releasable quality before it is presented to users as completed work in accordance with Agile system development practices.

In addition, VA provided other technical comments on a draft of this report. In the comments, the department provided additional clarification on why there were delays to functionality and how they affected the release schedule. Specifically, the department stated that the governance

⁶GAO, *Business Modernization: Improvements Needed in Management of NASA's Integrated Financial Management Program*, [GAO-03-507](#) (Washington, D.C.: April 30, 2003).

structure it established for the initiative provided the necessary management, support, and prioritization of development efforts to balance desired functionality within the development challenges and constraints. The department noted that, among other things, delays in the first two releases were a result of additional functionality prioritized and developed, such as housing rate adjustments and the ability to automatically generate letters for veterans as well as unanticipated challenges, such as the complexity of data conversion tasks. Further, it noted that decisions and prioritizations were primarily made to minimize impact on field offices and to support fall enrollment and that they impacted the development capacity to support the capabilities that could be developed in the third release. VA also offered other technical comments which were incorporated as appropriate.

Beyond the department's comments on our recommendations, the Assistant Secretary for Information and Technology provided additional written comments, reproduced in appendix III, which noted concerns with our draft report. In these comments, the Assistant Secretary stated that the department believes we fell short of meeting the objectives for this report by omitting key facts and presenting an unnecessarily negative view of VA's status and effectiveness to Congress. In particular, the Assistant Secretary stated that VA had successfully converted all processing of new Post-9/11 GI Bill claims to the long-term solution prior to the commencement of the fall 2010 enrollment process and that processing with the new system has been nearly flawless. He added that Veterans Business Administration claims processors like the new system and find it easy and effective to use. We are encouraged to hear that the department is experiencing positive results from the system development efforts that have been accomplished. However, as noted in our briefing, system functionality that was envisioned to (1) provide self-service capabilities to veterans and (2) end-to-end processing of benefits by December 2010 was deferred. Further, as the vision for its new education benefits system evolves, it is essential that the department documents these changes to ensure that its expectations and goals for the system are measurable and aligned at all levels.

In addition, the Assistant Secretary stated that limited exposure to the Agile methodology possibly caused us to present incorrect assumptions as facts, such as our evaluation of the department's testing. Our audit team, which included a trained ScrumMaster, examined the department's use of Agile Scrum practices against documented and accepted methodologies and consulted with an expert in the field that is not only a ScrumMaster, but also an Agile Scrum trainer that has extensive experience in evaluating

Agile system development projects. At the initiation of our study, we discussed our evaluation approach with program officials and throughout the study, held meetings with them to ensure our full understanding of the department's requirements and testing processes. We did not take issue with the Agile testing approach used by VA. However, we found deficiencies in testing. Further, we presented the results of our observations to program officials in June 2010, at which time they did not express any such concerns, or otherwise comment on our evaluation of the testing. Further, given the evolving nature of Agile system development, it is important to ensure that work that is presented as "done" and demonstrated to the users at the end of an iteration has undergone adequate testing to prevent inaccurate information from being provided. In addition to weaknesses we identified in the testing of select user stories, the department identified a number of defects during the development of the second release. In our view, VA has an opportunity to improve the adequacy of its unit and functional testing which occurs during each iteration to help identify and resolve any defects before any related functionality is presented to users as completed work at the end of the iteration. As we noted, the department agreed that they needed to clarify their definition of "done" and ensure it is being applied consistently. As such, the definition often includes fully tested functionality that has no defects. During our review, we observed on multiple occasions work being presented as "done" without having completed all testing. Improved testing up front can reduce the amount of defects found later in user acceptance testing and production that would require more costly rework.

Further, the Assistant Secretary stated that the department believes that we missed a substantial opportunity to positively influence real change by not focusing on the fact that VA had adopted the Agile methodology after many failings with other IT systems development efforts that used waterfall development methodologies. We agree that VA has taken an important step toward improving its development capability and that it has developed significant segments of its new education benefits system with its new methodology. However, as we noted in our briefing, the department had not fully established metrics for its goals, which are essential to fully gauge its progress beyond past initiatives.

While we believe that VA has made substantial progress in implementing a new process to develop its system, we stand by our position that there is still an opportunity for the department to improve its new development process in accordance with our recommendations. Doing so would further increase the likelihood that VA fully develops and delivers the end-to-end

benefits processing capabilities envisioned to support the Post-9/11 GI Bill and the needs of veterans.

We are sending copies of this report to appropriate congressional committees, the Secretary of Veterans Affairs, and other interested parties. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staffs have questions about this report, please contact me at (202) 512-6304 or melvinv@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.



Valerie C. Melvin
Director, Information Management and
Human Capital Issues

Appendix I: Briefing for Staff Members of the Subcommittee on Economic Opportunity, Committee on Veterans' Affairs, House of Representatives



Information Technology: Veterans Affairs Can Improve Its Development Process for Its New Education Benefits System

Briefing for Staff Members of the
Subcommittee on Economic Opportunity
Committee on Veterans' Affairs
House of Representatives
September 13, 2010



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Introduction

In June 2008, Congress passed the Post-9/11 Veterans Educational Assistance Act of 2008¹ (commonly referred to as the Post-9/11 GI Bill or Chapter 33). This act amended Title 38 United States Code to include Chapter 33, which provides educational assistance for veterans and members of the armed forces who served on or after September 11, 2001.

The Department of Veterans Affairs (VA) is responsible for processing claims for the Chapter 33 education benefit, which is a three-part benefit—tuition and fee payments, housing allowance, and book stipend. The benefit is determined based upon an individual's aggregate qualifying active duty service.

A key milestone in the Chapter 33 legislation was the requirement that VA provide the new educational assistance benefits to service members and veterans beginning on August 1, 2009. In considering its implementation of the legislation, the department concluded that it did not have a system capable of calculating the new benefit. As a result, the department undertook an initiative to modernize its education benefits processing capabilities.

¹Pub. L. No. 110-252, Secs. 5001-5003, June 30, 2008.



Introduction

VA's initiative to modernize its education benefits processing involved interim and long-term solutions to deliver new processing capabilities. According to the department, the interim solution was intended to augment existing processes by providing temporary applications and tools, such as a spreadsheet that aided claims examiners in manually collecting data from VA legacy systems and to calculate the new benefits.²

At the same time that it began the interim solution, the department also initiated a long-term solution that was intended to fully automate the manual processes for calculating education benefits for service members and veterans. Specifically, the long-term solution was intended to provide a system to replace the interim solution as well as provide automated interfaces with existing legacy systems. The department intended to complete enough of the functionality in the long-term solution to replace the interim solution by June 2010, and to include additional capabilities for full deployment of the new education benefits system by December 2010.

²VA's legacy systems, among others, include a financial payment system, an education information system, and a veteran demographic and service data system. These legacy systems contain essential information required for calculating the benefit, such as prior benefit payments, academic institution rates, and veterans' service dates.



Introduction

To develop the system for its long-term solution, VA is relying on contractor assistance and is using an incremental development approach, called Agile software development,³ which is to deliver software functionality in short increments before the system is fully deployed. Agile software development has key practices such as working as one team. This one team is to define business priorities and, based on those priorities, deliver work in short increments. Each increment of work is inspected by the team and the project's plans and priorities are adapted accordingly.

Historically, VA has experienced significant IT development and delivery difficulties. In the spring of 2009, the department reviewed its inventory of IT projects and identified ones that exhibited serious problems with schedule slippages and cost overruns. The department noted that an incremental approach, such as Agile software development, was considered to be an effective way to support the long-term system solution development.

³Agile software development is not a set of tools or a single methodology, but a philosophy based on selected values such as, the highest priority is to satisfy customers through early and continuous delivery of valuable software, delivering working software frequently, from a couple of weeks to a couple of months, and that working software is the primary measure of progress. For more information on Agile development, see <http://www.agilealliance.org>.



Objectives

Given the importance of delivering education benefits to veterans and their families, we were asked to review the long-term solution to

- determine the status of VA's development and implementation of its information technology (IT) system to support the implementation of education benefits identified in the Post-9/11 GI Bill and
- evaluate the agency's effectiveness in managing its IT project for this initiative.



Scope and Methodology

To determine the status of VA's development and implementation of IT system to support the implementation of education benefits identified in the Post-9/11 GI Bill, we

- reviewed VA and contractor plans for system development, observed project status meetings, and compared the actual status of development and implementation to the planned status, and
- discussed the department's plans and implementation with VA and contractor officials to determine the functionality completed and demonstrated.

To evaluate VA's effectiveness in managing its IT project for this initiative, we

- reviewed current Agile literature and interviewed experts in the field to identify key Agile practices applicable to the department's project;
- evaluated and compared the department's IT project management practices to industry standards, best practices, and disciplined processes, such as Agile software development, and applicable federal laws,⁴ policies, and guidance;⁵

⁴Pub. L. No. 110-252, Secs. 5001-5003 and Pub. L. No. 111-32, Sec. 1002.

⁵VA Project Management Accountability System (PMAS) Guide 1.0, March 2010.



Scope and Methodology

- analyzed requirements and testing artifacts for 20 segments of system features developed to determine the traceability of requirements and testing coverage;
- observed key agency and contractor development meetings such as daily discussions, bi-weekly software reviews and planning meetings, where management decisions were made and Agile practices were demonstrated; and
- interviewed department and contractor officials about the management and oversight of requirements, testing, and transition plans.

The information on cost estimates and costs that were incurred for long-term solution development were provided by VA officials. We did not audit the reported costs and thus cannot attest to their accuracy or completeness.

We conducted this performance audit at the Department of Veterans Affairs headquarters in Washington, D.C., and at a contractor facility in Chantilly, Virginia, from November 2009 to September 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.



Results in Brief

VA has developed and implemented the first two of four releases of software planned for its new education benefits processing system as scheduled, with these deployments occurring on March 31, 2010, and June 30, 2010. In doing so, VA provided its regional processing offices with key automated capabilities to prepare original and amended benefit claims. In addition, VA responded to legislative changes and provided for housing rate adjustments. While VA did not previously estimate costs for these releases and, as such, could not track estimated to actual costs, it has reported that about \$84.6 million has been obligated through July 2010. The department noted that its Agile process allowed the flexibility to adapt to legislative changes and provide functionality according to business priorities. However, VA did not ensure that certain critical tasks were performed that were expected to be part of the second release. Specifically, it did not complete the conversion of data from systems in the interim solution to the systems developed for the long-term solution and did not complete the development of interfaces between the new system and legacy systems.⁶

⁶VA planned to complete interfaces to all legacy systems except for its financial payment system, which is planned for the third release.



Results in Brief

Further, because of these delays, VA is in the process of determining and prioritizing what functionality will be developed in its third release by September 30, 2010. For its fourth release, it intends to reduce its planned functionality of providing full self-service capabilities to veterans by December 31, 2010. However, VA intends to provide this capability after its fourth release or under a separate initiative. As such, VA estimates that the total system development actual and planned obligations through 2011 will be about \$207.1 million.⁷

⁷This number represents actual expenditures, obligated funds, and planned obligated funds through fiscal year 2011.



Results in Brief

VA has demonstrated key Agile practices that are essential to effectively managing its system development, but certain practices can be improved. Specifically, the department has ensured that teams represent key stakeholders and that specific Agile roles were fulfilled. For example, the teams consist of subject matter experts, programmers, testers, analysts, engineers, architects, and designers. The department has also made progress toward demonstrating the three other Agile practices—focusing on business priorities, delivering functionality in short increments, and inspecting and adapting the project as appropriate. However, VA can improve its effectiveness in these areas. Specifically:

- To ensure business priorities are a focus, a project starts with a vision that contains, among other things, purpose, goals, metrics, and constraints. In addition, it should be traceable to requirements. VA has established a vision that captures the project purpose and goals; however, it has not established metrics for the project's goals or prioritized project constraints. VA officials stated that project documentation is evolving and they intend to improve their processes based on lessons learned; however, until it identifies metrics and constraints, the department will not have the means to compare the projected performance and actual results of this goal. VA has also established a plan that identifies how to maintain requirements traceability within an Agile environment; however, the traceability between legislation, policy, business rules, and test cases was not always maintained. VA stated its



Results in Brief

requirements tool did not previously have the capability to perform this function and now provides this traceability to test cases. Nonetheless, if VA does not ensure that requirements are traceable to legislation, policies, and business rules, it has limited assurance that the requirements will be fully met.



Results in Brief

- To aid in delivering functionality in short increments, defining what constitutes completed work (work that is “done”) and testing functionality is critical.⁸ However, VA has not yet established criteria for work that is considered “done” at all levels of the project. Program officials stated that each development team has its own definition of “done” and agreed that they need to provide a standard definition across all teams. If VA does not mutually agree upon a definition of “done” at each level, confusion about what constitutes completed work can lead to inconsistent quality and it may not be able to clearly communicate how much work remains. In addition, while the department has established an incremental testing approach, the quality of unit and functional testing performed during Release 2 was inadequate in 10 of the 20 segments of system functionality we reviewed. Program officials stated that they placed higher priority on user acceptance testing at the end of a release and relied on users to identify defects that were not detected during unit and functional testing. Until the department improves testing quality, it risks deploying future releases that contain defects which may require rework.

⁸One of the key Agile principles is that the delivery of completed software be defined, commonly referred to as the definition of “done.” This is critical to the development process to help ensure that, among other things, testing has been adequately performed and the required documentation has been developed.



Results in Brief

- In order for projects to be effectively inspected and adapted, management must have tools to provide effective oversight. For Agile development, progress and the amount of work remaining can be reflected in a burn-down chart, which depicts how factors such as the rate at which work is completed (velocity) and changes in overall product scope affect the project over time. While VA has an oversight tool that shows the percentage of work completed to reflect project status at the end of each iteration, it does not depict the velocity of the work completed and the changes to scope over time. Program officials stated that their current reporting does not show the changes in project scope because their focus is on metrics that are forward looking rather than showing past statistics for historical comparison. However, without this level of visibility in its reporting, management may not have all the information it needs to fully understand project status.

To help ensure successful implementation of the Chapter 33 initiative, we are recommending that VA establish performance measures for goals and identify constraints; establish traceability between requirements and legislation, policies, and business rules; define the conditions that must be present to consider work “done;” review and improve the unit and functional testing processes; and implement an oversight tool to clearly communicate velocity and the changes to project scope over time.



Results in Brief

We received oral comments on a draft of this briefing from VA officials, including the Deputy Assistant Secretary for Congressional and Legislative Affairs and the Assistant Secretary for Information and Technology. In their comments, the officials stated that the department was not in a position to concur or not concur with our recommendations, but planned to provide formal comments on our final report. The officials also provided technical comments, which we have incorporated in the briefing as appropriate.



Background

In recognition of their service to our country, VA provides medical care, benefits, social support, and lasting memorials to veterans, service members, and their families. VA is the second largest federal department with more than 270,000 employees. In fiscal year 2009, the department reported incurring more than \$100 billion in obligations for its overall operations.

The Veterans Benefits Administration (VBA), one of VA's three line administrations,⁹ provides assistance and benefits, such as educational assistance, through four veterans' regional processing offices.¹⁰ In 2009, the department reported that it provided more than \$3.5 billion in educational assistance benefits to approximately 560,000 individuals. In 2011, it expects the number of all education claims to grow by 32 percent over 2009, increasing from 1.7 million to 2.25 million.

Prior to the passage of the Post-9/11 GI Bill, VA delivered education benefits by relying on a combination of manual processes and legacy IT systems. However, the department concluded that the educational assistance required by the statute would be complex to calculate and would involve a multitude of factors, such as the beneficiary's length of service, the type of education being pursued, and the geographic location of the academic institution. Accordingly, the department determined its legacy systems were

⁹VA's two other line administrations are the Veterans Health Administration and the National Cemetery Administration.

¹⁰The regional processing offices are located in Atlanta, Georgia; Buffalo, New York; Muskogee, Oklahoma; and St. Louis, Missouri.



Background

insufficient to support the demands for processing the new benefit.

In October 2008, VA established its Chapter 33 initiative to develop the capability to process the new education benefit. The initiative involved both an interim and long-term solution:

- The interim solution, deployed in November 2009, provided applications and tools, such as a spreadsheet that aided claims examiners in manually collecting data from VA legacy systems to calculate the new education benefit.
- The long-term solution was expected to be complete enough to replace the interim solution by June 2010 and to include additional capabilities to provide a fully automated end-to-end system to support the delivery of education benefits by December 2010.



Background

Among other features, by December 2010, the new education benefits system was to

- modernize processing of new Chapter 33 awards and amended existing Chapter 33 claims, to include automated calculations of benefits, such as tuition and fee payments, housing allowance, and book stipends;
- increase claims processing efficiency to all regional offices, such as providing capability to automatically access veteran demographic and service data;
- interface with VA's existing legacy systems that contain information required to calculate benefits, such as a financial payment system; and
- create veteran self-service capabilities such as the capability to estimate and apply for benefits online.



Background

To oversee the development and implementation of the new education benefits system, VA has formed a governance structure that includes executive level management from VBA and the department's Office of Information and Technology (OI&T). The VBA Under Secretary of Benefits has primary responsibility for coordinating the Chapter 33 initiative. For example, the Under Secretary ensures collaboration for the effective management and coordination of VA resources in support of the Chapter 33 implementation.

To develop and implement the long-term solution, VA's OI&T entered into an interagency agreement with the Department of Defense's Space and Naval Warfare Systems Center–Atlantic (SPAWAR) to develop the long-term solution. SPAWAR is managing multiple contractors¹¹ to develop the system and is providing technical, information assurance, and program management services. SPAWAR is also providing operational services and engineering, planning, and analysis to support application development. VA and SPAWAR work together to manage and develop the system. Specifically, VBA subject matter experts and OI&T technical representatives are part of the system development teams.

¹¹Among others, contractors such as Agilex Technologies, Inc., Booz Allen Hamilton, GeoLogics, and Lockheed Martin, support the Chapter 33 system development.



Background

Chapter 33 Implementation Approach

To develop and implement the new system, VA also is following its Project Management Accountability System (PMAS)¹² framework which was established in June 2009. PMAS requires that the department's IT projects adopt an iterative release schedule in which system features are delivered within firm, 6-month (or less) cycles. Consistent with the framework, the department established four release dates for the Chapter 33 long-term solution. Each release was to deploy incremental capabilities that would expand upon previously developed functionality.

¹²VA Project Management Accountability System (PMAS) Guide 1.0, March 2010.



Background
Chapter 33 Implementation Approach

The following table shows VA's planned schedule for deploying the four releases and the associated functionality.

Release	Planned deployment date	Planned functionality
1	March 31, 2010	Provide improved claims-processing functionality, such as the ability to calculate new original awards, amend awards, and convert beneficiary data from systems supporting the interim solution to the new system. To be deployed to a limited number of claims examiners in the regional processing offices.
2	June 30, 2010	Increase automation and efficiency to all regional processing offices, as well as develop interfaces to legacy systems (excluding the financial system).
3	September 30, 2010	Develop an interface between the new system and the department's legacy financial system.
4	December 31, 2010	Provide other end user features to further improve processing efficiencies, such as self-service functionality aimed at improving the veteran's experience.

Source: VA.

While VA did not originally estimate the total cost to implement the long-term solution, nor estimate its cost by release, as of July 2010, program officials reported actual and planned obligations of approximately \$207.1 million through fiscal year 2011.¹³

¹³This estimate does not include maintenance costs past the end of fiscal year 2011 because program officials stated this will be budgeted under a different VBA initiative.



Background

Chapter 33 Implementation Approach

To develop and implement the long-term solution according to the planned release schedule, VA is using an Agile software development approach, which places an emphasis on collaboration between developers and stakeholders and produces a system in an iterative and incremental fashion. Agile software development is recognized as having fundamental differences from traditional methods.¹⁴ For example, it is an iterative process in which each output (which can range between 1 and 8 weeks in duration) provides a segment of system functionality that is developed, tested, and demonstrated to users so that early feedback can be considered. A segment of functionality could be a computer screen to display the amount a beneficiary would be entitled to. However, with a traditional approach, the complete product is often delivered at the end of the development phase of the system lifecycle and is not performed in short iterative segments.

¹⁴Carnegie Mellon Software Engineering Institute, Mary Ann Lapham, et al., *Considerations for Using Agile in DOD Acquisition* (Pittsburgh, Penn., April 2010).



Background

Chapter 33 Implementation Approach

Although iterative and incremental development approaches have been used for many years,¹⁵ the Agile movement officially began in February 2001 with the creation of the Agile Manifesto.¹⁶ According to current Agile literature,¹⁷ an Agile approach emphasizes the following four key practices:

Work as one team. In Agile development, project participants view themselves as one team aimed at a common goal. However, while the participants should work together as one whole team, there are specific roles on the team.

- *Product owner.* The product owner's primary duties include making sure that all team members are pursuing a common *vision* for the project, establishing priorities so the highest-valued functionality is always being worked on, and making decisions that lead to a good return on investment.

¹⁵For a brief history on iterative and incremental development and the origins of Agile methods, see Carnegie Mellon Software Engineering Institute, Hillel Glazer, et al., *CMMI® or Agile: Why Not Embrace Both!* (Pittsburgh, Penn., November 2008).

¹⁶The Agile Manifesto was written and signed by a group of methodologists, who called themselves the Agile Alliance. Basic principles are set forth in this document and include, for example, that business people and developers must work together daily and throughout the project. For more information on the creation of the Agile Manifesto, see [http:// agilemanifesto.org/history.html](http://agilemanifesto.org/history.html).

¹⁷Mike Cohn, *Succeeding with Agile: Software Development Using Scrum* (Boston, Mass.: Pearson Education, Inc., 2010); *Agile Estimating and Planning* (Upper Saddle River, N.J.: Pearson Education, Inc., 2006); *User Stories Applied* (Boston, Mass.: Pearson Education, Inc., 2004); and Ken Schwaber, *Agile Project Management with Scrum* (Redmond, Wash.: Microsoft Press, 2004).



Background

Chapter 33 Implementation Approach

- *Team member.* The team member's role often includes programmers, testers, analysts, database engineers, usability experts, technical writers, architects, and designers. The team members are responsible for developing high-quality functionality as prioritized by the product owner.
- *Project manager.* The project manager focuses more on leadership than on management and is a facilitator for the team working together. In addition, he or she is responsible for removing project obstacles that may impede the team's performance.

Additionally, best practices state that it is essential for a systems development team to have involvement from other stakeholders, such as executive level management and senior management.¹⁸ Such involvement helps to minimize project risk by ensuring that key requirements are identified and developed, problems or issues are resolved, and decisions and commitments are made in a timely manner.

¹⁸Institute of Electrical and Electronics Engineers (IEEE), Systems and software engineering – software life cycle processes, IEEE Std. 12207-2008, (Piscataway, N.J., January 2008) and Carnegie Mellon Software Engineering Institute, CMMI for Development, Version 1.2, CMU/SEI-2006-TR-008 (Pittsburgh, Penn., August 2006).



Background

Chapter 33 Implementation Approach

Focus on business priorities. Agile teams demonstrate customer collaboration and commitment to business priorities in two ways. First, the product owner prioritizes and determines the order in which features will be developed. A release plan is then created that states how much work the team can accomplish by a certain date. Second, Agile teams focus on completing and delivering user-valued features, usually in the form of user stories, which are a way of expressing software requirements. A *user story* is a brief description of functionality as viewed by a user or customer of the system. User stories are gathered and documented throughout the development process.



Background

Chapter 33 Implementation Approach

Work to deliver functionality in short iterations. Agile practices focus on delivering functionality in short increments as opposed to delivering at the end of the development phase of the system lifecycle; however, the functionality is based on a product vision, which is important for motivating a team and creating a long-term connection between those developing the product and those using it. Most Agile teams work in iterations of 2 to 4 weeks long, during which time a team transforms one or more user stories into coded and tested software. All work (for example, analysis, design, coding, and testing) is performed concurrently within each iteration.

During the iteration, each piece of functionality or feature worked on should be determined to be of releasable quality, before it is presented as completed work. The criteria for making the determination is the definition of *done*. Only work that is completed should be presented during a review meeting that takes place at the end of an iteration. Because a single iteration does not usually provide sufficient time to complete enough new functionality to satisfy user or customer desires, a *release*, which is typically 2 to 6 months and is comprised of one or more iterations, identifies a desired set of functionality and the projected time frame it will be ready for users and customers.



Background

Chapter 33 Implementation Approach

Inspect and adapt. Agile teams demonstrate the value of responding to change by incorporating knowledge gained in the preceding iteration and adapting plans accordingly at the start of the next iteration. This is intended to facilitate continuous process improvement. For example, the accuracy of the release plan may be affected by the team's discovery that it has overestimated or underestimated its rate of progress in that software development is more time consuming; therefore, the release plan should be revisited and updated regularly. Further, it may be the case that based on seeing the software from an earlier iteration, the product owner learns that users would like to see more of one type of feature and that they do not value another feature as much as originally planned. The value of the plan could be increased in this case by moving more of the desired features into the release and postponing some of the lesser-valued features. This recognizes that planning is an ongoing process that takes place during the entire project in order to deliver a valuable solution to the users.



Background

Chapter 33 Implementation Approach

These practices are important to any Agile framework, including the one VA has chosen to implement called Scrum.¹⁹ Scrum emphasizes developing software in increments and producing segments of functionality that are tested and demonstrated to users. In addition, Scrum teams are interactive and cross-functional in developing these segments throughout each iteration. See attachment I for a discussion of the specific practices and predefined roles within the Scrum framework for managing software development.

¹⁹One of the widely used methodologies of implementing Agile values is Scrum. For more information on the Scrum approach see <http://www.scrumalliance.org/>.



Objective 1
Status of Development Efforts

VA Has Delivered Key Automated Capabilities in Its Long-Term Solution, but Has Reduced Its Planned Functionality to Accommodate Recent Development Delays

While VA deployed Release 1 and 2 as scheduled and plans to meet Release 3 and 4 scheduled deployment dates of September 30, 2010, and December 31, 2010, system functionality was reduced and delayed to meet its scheduled release dates. VA reported obligations and expenditures for these releases, through July 2010, to be approximately \$84.6 million—\$59.8 million for SPAWAR and contractor support and \$24.8 million for VA program operations. (For a breakout of SPAWAR and VA obligations and expenditures by release, see attachment II.)

VA deployed Release 1 of the long-term solution on March 31, 2010, as scheduled, providing a limited set of claims examiners at the four regional processing offices the ability to calculate tuition, housing allowance, books, stipends, and fees for processing original awards of education benefits. However, the release did not provide planned functionality to process claims for amended awards or to convert and transfer beneficiary data from systems that were part of the interim solution to systems for the long-term solution. VA officials stated that the processing of amended awards and the data conversion task were found to be more complex than they had originally anticipated and therefore, the functionality was delayed for completion in Release 2.



Objective 1
Status of Development Efforts

The department subsequently deployed Release 2 on June 30, 2010, as scheduled. This release extended the basic award capability to all claims examiners at each of the four regional processing offices. Department officials noted that the Agile process allowed them the flexibility to reprioritize the functionality that would be included in the release. As such, the release provided key automated capabilities including the ability to generate three different types of letters to veterans, to process amended awards, and the capability to process benefits for legislative changes, such as Fry Scholarships.²⁰ However, the planned development of an interface to the legacy systems was not fully completed. For example, VA did not fully develop the interface that was intended to automate the verification of student enrollment data.

In addition, despite having delayed the conversion of data from the interim solution to the long-term solution until Release 2, this task was not completed. As a result, VA created a sub-release, Release 2.1, with the intent of completing data conversion and adding selected functionality, such as the 2010 housing rate adjustments, by July 26, 2010; however, program officials stated that Release 2.1 was actually deployed on August 23, 2010. With this release, program officials stated that approximately 30,000 out of 550,000

²⁰Pub. L. No. 111-32, Sec. 1002, June 24, 2009, amended the Post-9/11 Educational Assistance Act of 2008 by adding the Marine Gunnery Sergeant John David Fry Scholarship (see 38 U.S.C. § 3311), which includes in the act benefits for the children of service members who died in the line of duty on or after Sept. 11, 2001. Eligible children attending school may receive up to the highest public, in-state undergraduate tuition and fees, plus a monthly living stipend and book allowance under the program.



Objective 1
Status of Development Efforts

records were not converted. The officials added that they intend to make a decision in mid-September on when and how the remaining records will be converted.

Further, program officials stated that the department has not yet decided how the delay of Release 2.1 will affect the interfaces that were to be developed in Release 3, which is still planned to be deployed by September 30, 2010. As such, program officials stated that they would decide in September how much of the Release 3 functionality could be completed by the scheduled date. In addition, they also stated that they have reduced functionality of the system and the self-service capability will not be included as planned in Release 4 when it is deployed in December 31, 2010. However, the department plans to provide this self-service capability after Release 4 within the long-term system solution or under a separate initiative. The department is in the process of defining what the self-service capability will include.



Objective 2

VA's Effectiveness in Managing Its New System

VA Has Established a Team to Support System Development, but Management Can Improve Other Key Agile Practices

To provide effective management for an Agile project, such as the development of the Chapter 33 long-term solution, a key component for success is demonstrating effective use of the Agile practices: working as one team, focusing on business priorities, delivering functionality in short increments, and inspecting and adapting the project as appropriate. While VA has taken an important step to effectively manage its development of the system for processing Chapter 33 educational benefits by establishing a cross-functional team, it has not yet fully ensured business priorities are a focus, demonstrated that it is delivering quality functionality in short increments, or provided mechanisms to enable inspection and adaptation of the project. As a result, VA does not have the visibility it needs to clearly communicate progress to stakeholders and may not be able to generate feedback necessary for effectively establishing project priorities and continuous process improvements.



Objective 2

VA's Effectiveness in Managing Its New System

VA Has Established a Cross-Functional Team

As discussed earlier, Agile practices value the importance of organizations developing a cross-functional team that includes all key stakeholders. Specific Agile roles such as product owner, team member, and project manager should be included in the development. In addition, there needs to be involvement from executive level management, senior management, and users. Such involvement helps to minimize project risk by ensuring that key requirements are identified and developed.²¹

VA has established a team of executive level management that fulfills the role of the product owner. For example, the team consists primarily of executives and senior managers from VBA and the department's OI&T, who are members of two decision-making bodies for the initiative: the Joint Executive Board and Executive Steering Committee. They meet weekly to discuss the vision and make decisions on functionality, schedule, and cost issues. VA has also established additional workgroups that provide daily leadership, oversight, and operations management for the systems development effort and serve as extensions of the product owner to identify and prioritize requirements. (For detailed information about the responsibilities and leadership

²¹Institute of Electrical and Electronics Engineers (IEEE), Systems and software engineering – software life cycle processes, IEEE Std. 12207-2008, (Piscataway, N.J., January 2008) and Carnegie Mellon Software Engineering Institute, CMMI for Development, Version 1.2, CMU/SEI-2006-TR-008 (Pittsburgh, Penn., August 2006).



Objective 2

VA's Effectiveness in Managing Its New System

of the decision-making bodies in the governance structure, see attachment III.)

The department has also established multiple, cross-functional teams to develop the system. These teams consist of VA subject matter experts as well as contractors that are programmers, testers, analysts, database engineers, architects, and designers. These teams hold daily Scrum meetings to discuss work that has been planned and accomplished, and any impediments to completing the work. At the completion of each iteration, which in VA's case is every 2 weeks, a review meeting occurs between the cross-functional teams and VA stakeholders to review and demonstrate completed system functionality. Following this meeting, planning sessions are held to discuss the work to be accomplished in the next iteration based on the next highest-prioritized requirements contained in user stories.

In addition, VA has identified project managers from both VA and SPAWAR that focus on leadership of the initiative. These project managers monitor and facilitate meetings and provide clarification to contractors, subject matter experts, and other developers. They are also responsible for addressing impediments discussed at the review meetings.

With this involvement from key stakeholders, VA has established a team structure that fulfills the key roles within an Agile team and has better positioned itself to effectively manage the initiative.



Objective 2

VA's Effectiveness in Managing Its New System

Although VA Has a Vision for Its Business Priorities, Key Elements Are Missing

Under an Agile methodology, to ensure business priorities are a focus, a project starts with a vision of the system that is communicated to the team by the product owner. This vision should clearly state the purpose and goals of the project; the goals should be measurable; and constraints should be identified and prioritized to establish project parameters related to scope, cost, and schedule. In addition, well-defined and managed requirements are a cornerstone of effective system development. According to recognized guidance, disciplined processes for developing and managing requirements can help reduce the risks of developing a system that does not meet user and operational needs.²² Such processes include establishing policies and plans for managing changes to requirements and maintaining bidirectional requirements traceability.²³ As such, the project vision should be traceable to requirements and functionality developed, which is contained in user stories.

²²Carnegie Mellon Software Engineering Institute, Capability Maturity Model® Integration for Development, Version 1.2 (Pittsburgh, Penn., August 2006), and Software Acquisition Capability Maturity Model® (SA-CMM®) version 1.03, CMU/SEI-2002-TR-010 (Penn., March 2002); and the Institute of Electrical and Electronic Engineers (IEEE), 1362-1998, IEEE Guide for Information Technology—System Definition—Concept of Operations Document (New York, N.Y., 1998).

²³Maintaining bidirectional requirement traceability means that system-level requirements can be traced both backward to higher-level business or operational requirements, and forward to system design specifications and test plans.



Objective 2

VA's Effectiveness in Managing Its New System

VA has established a vision document that captures the project purpose and goals. Specifically, the stated purpose of the department's long-term solution is to develop a system that ensures timely and accurate benefit payments to beneficiaries and achieves the following goals: maximizes the user experience, provides a flexible architecture to support benefit changes, provides an efficient workflow, and provides a model and framework that supports code reuse across future VA projects.

However, the department has not established metrics for the project's goals, prioritized project constraints, or ensured that requirements were fully traceable to legislation, policies, and business rules. Specifically, the goals that VA has established do not have metrics for determining the progress towards achieving the goals. For example, for VA's goal to maximize the user experience, the department has not established a quantifiable, numerical target or other measurable value to facilitate future assessments of whether the goal was achieved. As a result, the department does not have the means to compare the projected performance and actual results of this goal.



Objective 2

VA's Effectiveness in Managing Its New System

Further, the department has not clearly identified and prioritized constraints for the project that would impact how decisions affecting the scope, cost, and schedule for the system should be made. Although its vision document states that VA will identify constraints, it has not yet documented them. Without having clearly identified and prioritized constraints, stakeholders may not agree or understand what factors should drive the decisions and adjustments made in system development to achieve the project's goals.

VA also did not always ensure that requirements for Release 2 were traceable. While the department has established a plan that identifies the process that the team is to follow to transform requirements into user stories and the tools it is to utilize to maintain traceability, our review of selected user stories in Release 2 found that traceability between legislation, policy, business rules, and test cases was not always maintained and, therefore, could not be verified. For example, requirements in the 20 user stories we reviewed in Release 2 were not traceable to legislation, nor were we able to observe how requirements were traceable to all the test cases that covered the complete requirement.



Objective 2

VA's Effectiveness in Managing Its New System

With regard to these deficiencies, VA officials stated that project documentation is evolving and they intend to improve their processes based on lessons learned. However, until the department fully establishes goals that are measurable and identifies and prioritizes constraints, it may not have the ability to clearly communicate progress to stakeholders.

Further, officials acknowledged that the department's requirement tool did not have the capability to fully establish software traceability for Release 2, but that VA has since upgraded its tool.²⁴ The officials stated the department will be able to provide this level of traceability to test cases in future releases. While program officials acknowledged the importance of traceability and the need to improve their process, they have not identified how the department will effectively establish bidirectional traceability between system requirements and legislation, policy, and business rules. Until the department can effectively ensure that requirements are fully traceable to legislation, policies, business rules, and test cases it will continue to have a limited ability to reasonably assure that the Chapter 33 requirements will be completely met.

²⁴Department officials noted that prior to this upgrade, they were able to establish traceability to test cases manually.



Objective 2

VA's Effectiveness in Managing Its New System

VA Delivers Functionality in Short Iterations, but Needs to Ensure Standards Are Defined and Met

To ensure that the product is potentially shippable at the end of every increment, work should adhere to an agreed-upon definition of “done.” If the definition is not agreed upon, the quality of work may vary and teams may inappropriately consider work as completed, thus unreliably reporting progress. Stakeholders should agree to a definition of completed work that conforms to an organization’s standards, conventions, and guidelines. These standards often include fully tested functionality that has no defects. Furthermore, we have highlighted in our prior work that effective testing is an essential component of any system development effort.²⁵

While the department has defined some criteria for work that is considered “done” at the release level, VA has not defined what it means at the user story, iteration, or project level. We observed multiple cases during Release 2 development in which user stories were presented as “done,” but had varying amounts of work completed. For example, at three iteration review meetings, we observed at least one development team that

²⁵GAO, *Year 2000 Computing Crisis: A Testing Guide*, GAO/AIMD-10.1.21 (Washington, D.C.: November 1998); *Information Technology: Customs Automated Commercial Environment Progressing, but Need for Management Improvements Continues*, GAO-05-267 (Washington, D.C.: Mar. 14, 2005); and *Homeland Security: Visitor and Immigrant Status Program Operating, but Management Improvements Are Still Needed*, [GAO-06-318T](#) (Washington, D.C.: Jan. 25, 2006).



Objective 2

VA's Effectiveness in Managing Its New System

presented user stories as “done” without having completed all testing.

Program officials stated that each development team has their own definition of “done” and agreed that they need to provide a standard definition across all teams. If VA does not mutually agree upon and document this definition at each level and ensure it conforms to the department’s standards, conventions, and guidelines, confusion about what constitutes completed work could lead to inconsistent quality and unreliable performance and progress reporting. Further, in the absence of an agreed-upon definition, VA is not able to clearly communicate how much work remains for completing the system.



Objective 2

VA's Effectiveness in Managing Its New System

With regard to testing, VA has established an incremental testing approach that calls for automated unit and functional testing to be conducted on work completed during iterations.²⁶ In addition, it has also established user acceptance testing that is performed before a release is delivered. Nonetheless, we found that the unit and functional testing performed during Release 2 was inadequate. Specifically, in reviewing the testing conducted for 20 user stories, we identified the testing to be inadequate for 10 of them. For these 10 user stories, we identified a total of 19 deficiencies covering a range of issues.

²⁶For further information on unit and functional testing, see GAO, *Indian Trust Funds: Challenges Facing Interior's Implementation of New Trust Asset and Accounting Management System*, GAO/T-AIMD-99-238 (Washington, D.C.: Jul. 14, 1999) and GAO, *Financial Management Systems: Additional Efforts Needed to Address Key Causes of Modernization Failures*, [GAO-06-184](#) (Washington, D.C.: March 27, 2006).



Objective 2

VA's Effectiveness in Managing Its New System

For example, 7 user stories were not fully tested for expected values or boundary conditions specified in their associated requirements documents. These testing deficiencies may hinder VA's ability to identify critical defects. VA and contractor system development and testing teams subsequently identified a number of defects during Release 2. Specifically, program officials stated that 218 of the 423 defects that were to be corrected in Release 2 were classified as high priority.²⁷ For example, user acceptance testing found that an award letter included the incorrect date for a student's enrollment period. Program officials stated that all of the high-priority defects were corrected or closed as invalid and that they are working toward correcting the remaining defects in future iterations.

²⁷Defect numbers were reported as of June 29, 2010. Program officials described high-priority defects as defects that could "break" the system and must be fixed.



Objective 2

VA's Effectiveness in Managing Its New System

Program officials also stated that they placed higher priority on user acceptance testing at the end of a release and relied on users to identify defects that were not detected during unit and functional testing. However, as we have noted, relying on subject matter experts to perform user acceptance testing is not a realistic solution because it is difficult for them to remember all the items needed for functionality.²⁸ Further, while program officials stated that many of the defects were closed before Release 2 was fully deployed, due to the inadequate testing the potential exists for a significant number of additional defects to be found after deployment, thus requiring system rework which can increase costs and affect schedule.²⁹ Until the department improves testing quality, it risks deploying future releases that contain defects which may require rework and extend the completion date for the project. Ultimately, this could increase the risk of delayed functionality that would impede the ability for claims examiners to process claims efficiently.

²⁸GAO, *Business Modernization: Improvements Needed in Management of NASA's Integrated Financial Management Program*, GAO-03-507 (Washington, D.C.: April 2003).

²⁹For more information on how defects result in unplanned rework and increased costs, see [GAO-06-184](#).



Objective 2

VA's Effectiveness in Managing Its New System

VA Has Not Fully Implemented Tools to Inspect and Adapt the Project

In order for projects to be effectively inspected and adapted, management must have tools to provide visibility to communicate progress to stakeholders. Under the Scrum framework, project visibility is achieved through the use of specific tools. For example, progress and the amount of work remaining across the release is demonstrated by a burn-down chart. Specifically, a burn-down chart can depict how factors such as the rate at which work is completed (velocity) and changes in overall product scope affect the project over time. This information can be forecasted to estimate how long a release will take to complete. Further, when compared to the project rate of work completion, the chart can provide visibility into the actual project status and can be used for continuous process improvement such as increasing the accuracy of estimating story points for future user stories.



Objective 2

VA's Effectiveness in Managing Its New System

VA's burn-down chart did not include elements that aided in communicating progress. While the department used a burn-down chart in Release 2 that showed the percentage of work completed to reflect project status at the end of each iteration, this chart did not depict the velocity of the work completed and the changes to scope over time.³⁰ Program officials stated that their current reporting did not show the changes in project scope because their focus was on metrics that are forward looking rather than showing past statistics for historical comparison. However, such a chart is essential to team members' understanding of progress made and provides a continuous feedback loop. In addition, it can also provide management visibility into the project and changes over time.

Since the department did not use a burn-down chart to report performance over time, management and stakeholders cannot clearly discern the actual amount of work completed relative to the amount of work that was expected to be completed. Without this level of visibility in its reporting, management and the development teams may not have all the information they need to fully understand project status and generate the discussion and feedback necessary for continuous process improvement.

³⁰Program officials stated that they had previously used a burn-down chart that showed velocity for all teams in Release 1. However, in Release 2, they decided that they would provide burn-down charts at the team level, but not at the overall project level.



Conclusions

VA deployed the first two releases of its long-term system solution by its planned dates, therefore providing improved claims-processing functionality, such as the ability to calculate new original awards in Release 1. Additionally, it increased automation to all regional processing offices with automated capability to process amended awards in Release 2. Critical long-term system solution features were not completed because VA reprioritized its work to accommodate for legislative changes and because the department found some major functions more complex than anticipated. As such, interfaces to legacy systems and the conversion of data from systems in the interim solution were not completed in Release 2. VA added an additional sub-release to address this incomplete functionality, but it has not yet concluded how these delays will affect the functionality that will be developed in Release 3. Also, for Release 4, VA has reduced a significant planned functionality—veteran self-service capability. While VA intends to provide this capability after Release 4 within the long-term system solution or under a separate initiative, it is unclear what functionality will be delivered in the remaining 2 releases when it deploys the system in December 2010.



Conclusions

In using an Agile approach for this initiative, VA is applying lessons learned and has taken important first steps to effectively manage the IT project by establishing a cross-functional team that involves senior management, governance boards, and key stakeholders. However, the department has not yet ensured that several key Agile practices were performed. Measurable goals were not developed and the project progressed without bidirectional traceability in its requirements. Additionally, in developing the system, VA did not establish a common standard and consistent definition for work to be considered “done” or develop oversight tools to clearly communicate velocity and the changes to project scope over time. Testing deficiencies further hinder VA’s assurances that all critical system defects will be identified. Until VA improves these areas, management does not have the visibility it needs to clearly communicate progress to stakeholders and estimate when future system capabilities will be delivered. Additionally, reduced visibility and unresolved issues in its development processes may result in the department continuing to remove functionality that was expected in future releases, thus delivering a system that does not fully and effectively support the implementation of education benefits as identified in the Post-9/11 GI Bill.



Recommendations for Executive Action

To help guide the development and implementation of the Chapter 33 long-term solution, we recommend that the Secretary of Veterans Affairs direct the Under Secretary for Benefits to take the following five actions:

- establish performance measures for goals and identify constraints to provide better clarity in the vision and expectations of the project;
- establish bidirectional traceability between requirements and legislation, policies, and business rules to provide assurance that the system will be developed as expected;
- define the conditions that must be present to consider work “done” in adherence with agency policy and guidance;
- improve the adequacy of the unit and functional testing processes to reduce the amount of system rework; and
- implement an oversight tool to clearly communicate velocity and the changes to project scope over time.



Agency Comments and Our Evaluation

We received oral comments on a draft of this briefing from VA officials, including the Deputy Assistant Secretary for Congressional and Legislative Affairs and the Assistant Secretary for Information and Technology. In the comments, the Deputy Assistant Secretary stated that the department was not in a position to concur or not concur with our recommendations but planned to provide formal comments on our final report. The officials provided additional clarification on why the department experienced delays in data conversion. Specifically, they noted that, consistent with Agile practices, the department reprioritized work and adapted the system to add selected functionality, such as the 2010 housing rate adjustments. They added that the Joint Executive Board had made this decision to ensure that claims examiners would have the most recent rate to process benefits for the fall 2010 enrollment season. Additionally, the department recognized lessons learned with the Agile approach, and it intends to incorporate them in future development work. The officials provided other technical comments, which we have incorporated as appropriate.

In further comments, the Assistant Secretary for Information and Technology emphasized that using Agile system development for this initiative allowed the department to provide significant system functionality incrementally that had far exceeded its past IT initiatives. Specifically, he noted that the project had delivered working software close to schedule and had been more successful than past system development efforts.



Attachment I

Description of the Scrum Framework Being Used by VA

The Scrum framework is an Agile method that contains sets of practices and predefined roles. The following describes the key terminology used within the framework being utilized by VA for the Chapter 33 long-term solution system development:

Scrum teams. These teams are to be cross-functional groups of about seven individuals that are developers, subject matter experts, and managers that perform analysis, design, implementation, and testing of specific pieces of functionality. The product owner acts as an interface between stakeholders and Scrum teams and is also responsible for translating requirements into work lists, maintains the work list, and maintains a backlog of requirements (i.e. user stories), called a *product backlog*.

Sprint. Each team works in iterations that typically last 2 to 4 weeks; these blocks of time are known as sprints. During a sprint, each Scrum team creates a *potentially shippable product* (for example, working and tested software). These products are developed based on the user stories in the product backlog that are prioritized by the product owner and team. Each user story is assigned a level of effort, called *story points*. Story points are used as a relative unit of measure to communicate complexity and progress between the business and development sides of the project. Each sprint builds on the previous sprint to generate a working system. After a predetermined number of sprints, a release of the system goes into production.



Attachment I

Description of the Scrum Framework Being Used by VA

Sprint planning meeting. Held prior to each sprint, this meeting is where user stories are communicated to the team and the team then commits to an amount of work it will complete for the next sprint. After the product owner agrees, user stories are then finalized for that sprint.

Daily Scrum meeting. During each sprint, Scrum teams meet every day and hold a daily Scrum meeting. This meeting is short and concise and its purpose is to ensure that team members understand the work that has been completed since the last stand up meeting, what work is planned for the current day, and any problems that would prevent the team from achieving that work. Each team has a *ScrumMaster*, who is responsible for facilitating the meetings by maintaining the process and promoting resolution of problems identified by the team.

Sprint review. After each sprint, teams demonstrate completed work and discuss work that was not finished with stakeholders. They also identify any problems that were encountered in completing the work. Feedback and priority is solicited from stakeholders so that it can be incorporated into future sprints.

**Appendix I: Briefing for Staff Members of the
Subcommittee on Economic Opportunity,
Committee on Veterans' Affairs, House of
Representatives**



Attachment II

VA and SPAWAR Costs for Chapter 33 System Development

VA and SPAWAR Chapter 33 Costs (in millions) by Release as of July 31, 2010

Type of Cost ^a	Release 1 ^b	Release 2	Release 2.1	Release 3	Release 4	Post-Release 4	Total
SPAWAR expenditures	\$39.8	\$14.4	\$3.3	\$2.3	\$0.0		\$59.8
VA program obligations	\$20.7	\$3.8	\$0.0	\$0.3	\$0.0		\$24.8
Total	\$60.5	\$18.2	\$3.3	\$2.6	\$0.0		\$84.6
Funds obligated and transferred to SPAWAR but not yet expended				\$45.5 ^c			
Planned and obligated costs to complete Release 3 (VA and SPAWAR program costs)				\$24.0			
Planned but not obligated FY2011 cost to complete Release 4 (VA and SPAWAR program costs)					\$1.3		
Planned but not obligated FY2011 cost for post-Release 4 systems development activities (VA and SPAWAR program costs)						\$51.7 ^d	
Total funds expended, obligated, and planned obligations for Chapter 33 interim and long-term solution development							\$207.1

Source: VA.

^a These costs represent actual expenditures, obligated funds, and planned obligated funds. VA could not provide estimated project costs to compare to these costs.

^b Release 1 costs include both interim and long-term solution costs. VA did not provide the cost accounting to account for these separately.

^c As of September 4, 2010, VA could not provide a breakout between Release 3 and 4.

^d While VA has estimated this funding, it could not describe what these costs will represent.



Attachment III

VA's Governance and Oversight for the Chapter 33 Initiative

VA established a governance structure for the Chapter 33 initiative in October 2008. The table below shows the decision-making bodies and their responsibilities for the initiative.

Title	Description
Joint Executive Board	Co-chaired by the Under Secretary for Benefits and the Assistant Secretary for Information and Technology, this senior governing body provides executive-level oversight and strategic guidance for implementation of the initiative. It is responsible for ensuring that communications, strategies, planning, and deliverables enable the initiative to meet its mission, goals, and objectives.
Executive Steering Committee	Co-chaired by the Director of Education Service and the Program Manager, the Steering Committee advises the Joint Executive Board on requirements, policies, and standards. It is responsible for the oversight of program planning and execution to ensure that the strategic vision is incorporated into the business operations.



Attachment III

VA's Governance and Oversight for the Chapter 33 Initiative

Title	Description
Working Group	Co-chaired by the Leader of the Veterans Benefits Administration (VBA) Education Service Program Executive Office and the Dependency Lead, Office of Information and Technology, Chapter 33 Program Management Office, the Working Group provides oversight and governance to workgroups leading programmatic and technical interests of the initiative. It defines and prioritizes business requirements, identifies and escalates issues and risks, and makes recommendations to the Executive Steering Committee on which requests to approve and resource.
Workgroups	Eight workgroups, led by Education Service and Office of Information and Technology staff, provide daily operations management and ensure that requirements areas are identified and defined for each of the following areas: Benefits Delivery Network/Financial Accounting System, Business Requirements, Certification and Accreditation/Security, Infrastructure, Interfaces, Strategic Planning, Training, and the Security Review Board.

Source: VA.

Appendix II: Comments from the Department of Veterans Affairs



THE SECRETARY OF VETERANS AFFAIRS
WASHINGTON

November 12, 2010

The Honorable Gene Dodaro
Acting Comptroller General of
the United States
Washington, DC 20548

Dear Mr. Dodaro:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, ***"INFORMATION TECHNOLOGY: Veterans Affairs Can Improve its Development Process for its New Education Benefits System"*** (GAO-11-115).

Since this GI Bill's implementation in 2009, which gives veterans with active duty service on, or after, September 11, 2001, enhanced educational benefits that cover more educational expenses, provide a living allowance, money for books and the ability to transfer unused educational benefits to spouses or children, over 360,000 Veterans and family members have enrolled in college. When you include all other college education programs, that number exceeds 600,000. This new GI Bill is important—not only for the numbers who are accepted into schools—but for the numbers who will be graduating from them in the years ahead. That's the measure of success.

Implementation of this program continues to be a high priority to the Department and we have made great progress in fulfilling its objectives. The enclosure contains comments on GAO's draft report and responds to your recommendations.

Sincerely,

A handwritten signature in black ink, appearing to read "Eric K. Shinseki".

Eric K. Shinseki

Enclosure

Enclosure

Department of Veterans Affairs (VA) Comments to
Government Accountability Office (GAO) Draft Report
***INFORMATION TECHNOLOGY: Veterans Affairs Can Improve its
Development Process for its New Education Benefits System***
(GAO-11-115)

GAO Recommendation: To help guide the development and implementation of the Chapter 33 long-term solution, we recommend that the Secretary of Veterans Affairs direct the Under Secretary for Benefits to take the following five actions:

Recommendation 1: Establish performance measures for goals and identify constraints to provide better clarity in the vision and expectations of the project.

VA Response: Concur. The Office of Information and Technology (OIT) will develop performance measures consistent with automating the Post-9/11 GI Bill in order to evaluate SPAWAR and hold them accountable for achieving these goals.
Target Completion Date: March 1, 2011.

Recommendation 2: Establish bidirectional traceability between requirements and legislation, policies, and business rules to provide assurance that the system will be developed as expected.

VA Response: Concur. VA believes that GAO's statement incorrectly implies that requirements traceability was not occurring when it in fact was being carefully documented, missing only the legislation element, which will require the assistance of legal experts to be correctly accomplished. VBA and OIT will work together to trace the rules on the long-term solution back to the legislation.
Target Completion Date: June 30, 2011.

Recommendation 3: Define the conditions that must be present to consider work "done" in adherence with agency policy and guidance.

VA Response: Concur. The fiscal year 2011 Automate GI Bill Operating Plan outlines the conditions that will allow the project to be declared a success. At the Chapter 33 (CH33) working group level (VBA and OIT), VA will clarify the definition of "done" and ensure that it is being applied consistently.
Target Completion Date: December 1, 2010.

Recommendation 4: Implement an oversight tool to clearly communicate velocity and the changes to project scope over time.

VA Response: Non-Concur. Development metrics and models were established and implemented to forecast and measure development velocity. Based on lessons learned, these models were expanded to forecast and measure velocity at each scrum team.

1

Enclosure

Department of Veterans Affairs (VA) Comments to
Government Accountability Office (GAO) Draft Report
***INFORMATION TECHNOLOGY: Veterans Affairs Can Improve its
Development Process for its New Education Benefits System***
(GAO-11-115)

Recommendation 5: Improve the adequacy of the unit and functional testing processes to reduce the amount of system rework.

VA Response: Non-Concur. VA's testing approach is compatible with Agile development, where unit, functional, and end-user testing are collaboratively accomplished and all significant errors are identified and resolved prior to deployment.

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Appendix III: Comments from the Veterans Affairs' Assistant Secretary for Information and Technology



DEPARTMENT OF VETERANS AFFAIRS
ASSISTANT SECRETARY FOR INFORMATION AND TECHNOLOGY
WASHINGTON DC 20420

November 12, 2010

Ms. Valerie Melvin
Director, Information Management
And Human Capital Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Melvin:

The Department of Veterans Affairs (VA) has reviewed the Government Accountability Office's (GAO) draft report, **"INFORMATION TECHNOLOGY: Veterans Affairs Can Improve its Development Process for its New Education Benefits System"** (GAO-11-115) and has concurred on three recommendations and non-concurred on two recommendations. As we expressed during our phone call on September 11, 2010, VA has some concerns regarding GAO's draft report.

Chairman Filner's request to GAO was to "determine the status of VA's development and implementation" and to "evaluate the agency's effectiveness in managing its information technology for this project". VA believes GAO fell short of meeting this charge by omitting key facts, and presenting an unnecessarily negative view of our status and effectiveness to Congress.

Despite unanimous predictions to the contrary, VA successfully converted all processing of new Post-9/11 GI Bill claims to the Long Term Solution (LTS) prior to the commencement of the Fall 2010 enrollment process. Since installation, processing with the new system has been nearly flawless, with no significant "bugs" encountered. The Veterans Benefits Administration claims processors like the new system and find it easy and efficient to use. By dramatically changing its development processes, adopting the Agile methodology for this project, VA also dramatically changed its system development results. Prior to GAO's initial presentation to Congress, VA officials provided GAO with this information and we believe that GAO should have included all of these facts in its report to accurately present "the status of VA's development and implementation" of the new GI Bill LTS.

Additionally, because Agile methodologies are not broadly used in the federal sector, this may have been the first exposure the GAO team performing this audit had to this methodology. Limited exposure to Agile methodology possibly caused GAO to present incorrect assumptions as facts. A specific example is the statement that "...the quality of unit and functional testing performed during Release 2 was inadequate..." VA

Page 2

Ms. Valerie Melvin

utilized a testing approach compatible with Agile development, where unit, functional, and end-user testing were collaboratively accomplished, which ensured that all significant errors were identified and resolved prior to deployment. While different from traditional "waterfall" development techniques used on large systems development programs throughout government, the results speak for themselves. All three releases deployed during the GAO audit were installed with no significant (defined as severity 1 or 2) errors.

Finally, we believe that GAO missed a substantial opportunity to positively influence real change in the results of information technology (IT) systems development across the federal government. As GAO noted as recently as May 2010, use of waterfall development methodologies within VA had caused continual, largescale systems development failures. An objective evaluation of VA's effectiveness in managing its IT for this project would focus on the fact that VA recognized its failings and adopted Agile methodologies, with the result being a stunning and unpredicted success. If VA, with one of the worst track records in systems development (as amply documented over many years by VA's Inspector General and GAO), has been able to achieve such positive results, what are the implications for failing IT programs across government?

The enclosure provides specific comments to the draft report and discusses each of the recommendations. VA appreciates the opportunity to comment on your draft report.

Sincerely,



Roger W. Baker

Enclosure

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Valerie C. Melvin, (202) 512-6304 or melvinv@gao.gov

Staff Acknowledgments

In addition to the contact named above, key contributions to this report were made by Christie M. Motley, Assistant Director; Rebecca E. Eyler; David A. Hong; Ashley D. Houston; John C. Martin; and Charles E. Youman.

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