



U.S. DEPARTMENT OF COMMERCE
Office of Inspector General



***United States
Patent and Trademark Office***

***Patent End-to-End
Planning and Oversight
Need to Be Strengthened
to Reduce Development Risk***

***Final Report No. OIG-11-033-A
September 29, 2011***

FOR PUBLIC RELEASE

Office of Audit and Evaluation





September 29, 2011

MEMORANDUM FOR: David Kappos
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office

FROM: Allen Crawley
Assistant Inspector General for Systems Acquisition
and IT Security

SUBJECT: *Patent End-to-End Planning and Oversight Need to Be
Strengthened to Reduce Development Risk*
Final Report No. OIG-11-033-A

Attached is our final audit report on USPTO's development of the Patent End-to-End (PE2E) system. Our audit objectives were to assess USPTO's readiness to successfully manage the PE2E project by determining the adequacy of its acquisition process and methodologies as well as the project's governance. We found that improvements need to be made to PE2E's long-term planning, acquisition strategy, and development oversight to avoid duplicating problems USPTO has had with past automation efforts.

In this report, we have summarized USPTO's comments on our draft report and have included the formal response as an appendix. We will post this report on OIG's website pursuant to section 8L of the Inspector General Act of 1978, as amended.

Under Department Administrative Order 213-5, you have 60 calendar days from the date of this memorandum to submit an audit action plan to us. The plan should outline the actions you propose to take to address each audit finding and recommendation.

We would like to extend our thanks to USPTO for the courtesies shown to us during our fieldwork. Please direct any inquiries regarding this report to me at (202) 482-1855 or Angela Hoffman, Director, Systems Acquisition and Development, at (202) 482-5337, and refer to the report title in all correspondence.

Attachment

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John B. Owens, II, Chief Information Officer, USPTO
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Report In Brief

U.S. Department of Commerce Office of Inspector General

September 29, 2011



Why We Did This Review

As part of the Office of Inspector General's FY 2010 audit plan, we conducted an audit of the PE2E project, USPTO's effort to develop a fully integrated, automated patent process. Our audit objectives were to assess USPTO's readiness to successfully manage the PE2E project by determining the adequacy of its acquisition process and methodologies as well as the project's governance.

Background

In December 1982, USPTO submitted to Congress an automation master plan for a "paperless" office. Since then, the agency has spent over \$1 billion on this effort and has made progress developing some automated capabilities, but it has not achieved its goal of a fully integrated, automated patent process. Past automation efforts have resulted in a combination of some four dozen aging systems that, according to USPTO, are difficult to maintain, unable to meet the demands of a growing user community and document database, and cumbersome for patent examiners to use.

PE2E is USPTO's latest effort to improve, integrate, and automate its patent process. The project is one of the most ambitious and complex multi-year IT investments USPTO has undertaken in several years, and it supports the agency's strategic goal of optimizing patent quality and timeliness.

U.S. Patent and Trademark Office

Patent End-to-End (PE2E) Planning and Oversight Need to Be Strengthened to Reduce Development Risk (OIG-11-033-A)

What We Found

USPTO has developed adequate short-term plans for the first segment of PE2E to be released; however, it began development of PE2E without developing a high-level prioritized list of requirements based on business and technical value for the entire project. In addition, although USPTO has planned for long-term technical needs, such as a hardware and software infrastructure that will be compatible with future PE2E development, it has not defined a high-level technical model of services to be implemented for the entire project. Unless USPTO improves its current long-term planning, it will not have a roadmap that guides the project's building and deployment strategies. This could result in unnecessary rework and delays.

In mid-May, USPTO approved an acquisition plan for obtaining contracting resources to augment its technical experience and project staffing for PE2E, but the plan does not adequately detail its strategies for acquiring resources or how USPTO will manage future acquisition risks. Not adequately defining the acquisition strategy to obtain this support could potentially delay the project's successful progression.

USPTO has established oversight reviews and implemented a governance structure for PE2E. However, it has not established key milestones and conditions for special reviews, and would benefit from independent expert advice as input into milestone reviews. USPTO should reinforce these oversight processes to better ensure that the project achieves its mission goals.

What We Recommended

We recommended that the USPTO Director direct the appropriate USPTO officials to

1. improve PE2E planning by developing a description and schedule of releases based on prioritized high-level requirements for the entire project and high-level designs for the project's service architecture;
2. update the current acquisition plan so that it describes the strategy for acquiring contracting resources, including overall approach, processes, means to motivate contractor performance, and risk management; and
3. improve oversight of PE2E by establishing a key milestone oversight review schedule, criteria for evaluating project progress at oversight reviews, and thresholds for convening special oversight reviews, as well as seeking independent expert advice on technical and project management for milestone reviews.

Contents

Introduction.....	1
Background.....	2
Findings	4
I. USPTO Has Started PE2E Development Without Sufficient Long-Term Planning	4
A. PE2E Lacks Prioritized, High-Level Requirements in Its Product Backlog.....	4
B. PE2E Lacks a High-Level Services Model.....	4
II. USPTO’s Acquisition Strategy for PE2E Is Not Adequately Defined.....	5
III. USPTO Should Improve Oversight of PE2E Development.....	5
A. Key Milestones and Conditions for Special Reviews Have Not Been Established.....	6
B. PE2E Oversight Would Benefit from Independent Expert Input to Milestone Reviews.	6
Summary of Agency Comments and OIG Response.....	8
Appendix A: Objectives, Scope, and Methodology	9
Appendix B: Response to OIG Draft Report	10

Introduction

The United States Patent and Trademark Office (USPTO) is the sole federal agency that grants patents and registers trademarks. Patents, the focus of this audit, account for the majority of USPTO’s business (see table 1 for FY 2010 patent statistics). Patents secure for inventors exclusive rights to their discoveries for a limited time in exchange for the public disclosure of an invention, which contributes to the vitality of the United States and the global economy.

USPTO receives patent applications from inventors, and patent examiners determine whether to grant or deny the patents based on their uniqueness and usefulness (see table 2 for a description of the patent process).

As part of the Office of Inspector General’s FY 2010 audit plan, we conducted an audit of the Patent End-to-End (PE2E) project, USPTO’s effort to develop a fully integrated, automated patent process. Our audit objectives, scope, and methodology are described in appendix A.

PE2E is one of the most ambitious and complex multi-year IT investments USPTO has undertaken in several years, and it supports the agency’s strategic goal of optimizing patent quality and timeliness. We began our audit activities at this early stage in the project’s lifecycle to provide proactive, value-added feedback in an effort to identify potential issues that might hamper the success of the overall project. We plan to monitor PE2E development and conduct reviews at key points in the project’s life cycle.

Patent Examiners	6,225
Patents Issued	233,127
Patent Applications Filed	509,367
Patent Application Backlog	726,331

Source: USPTO FY2010 Performance and Accountability Report.

Pre-Examination	Examination	Post-Examination
<ul style="list-style-type: none"> – Receives application (paper or electronic format) – Collect initial fees – Classify for routing – Check for completeness 	<ul style="list-style-type: none"> – Assign to tech center – Schedule for publication 18 months after filing date – Assigned to examiner’s docket – Search and examine – Issue office action: patent allowed or denied 	<ul style="list-style-type: none"> – Collect issuance fees – Patent granted and published

Source: OIG, adapted from USPTO documentation

Background

In December 1982, USPTO submitted to Congress an automation master plan for a “paperless” office.¹ Since then, the agency has made progress toward this goal, spending over \$1 billion on developing automated capabilities such as electronic filing of patents, examiner search systems, and public access to patents on the Internet; however, it has not achieved a fully integrated, automated patent process.²

Past automation efforts have resulted in a combination of some four dozen aging systems that, according to USPTO, are difficult to maintain, unable to meet the demands of a growing user community and document database, and cumbersome for patent examiners to use. Examiners must use 16 different system interfaces, documents must be cut and pasted to transfer them between systems, and retrieving a patent application can sometimes take several minutes.

After the most recent attempt to more fully automate patent processing did not meet project objectives, the Office of Management and Budget (OMB) placed that project, the Patent File Wrapper, on its high-risk list in 2010. To obtain approval to proceed with development, USPTO was required by OMB to submit an improvement plan addressing difficulties it has had with past system development efforts. In response, in the fourth quarter of 2010, USPTO proposed the PE2E project to replace the Patent File Wrapper.³ PE2E is a significant departure from previous attempts to automate patent processing in that USPTO is using a modern system development methodology and technical design that industry and the federal government have adopted as ways to reduce development risk and build systems that can adapt to future needs.

Specifically, USPTO will use an Agile⁴ system development method to build PE2E. The Agile method reduces risk by dividing projects into increments that are deployed to end users throughout the development life cycle, rather than using the traditional “waterfall” approach in which all requirements are defined up front and all capabilities delivered at the end of the life cycle. The PE2E technical design will be based on service-oriented architecture principles,⁵ which increases the likelihood of developing systems that are adaptable to changing business and regulatory requirements.

¹ USPTO issued the automation plan in response to section 9 of Public Law 96-517 (the Dole-Bayh Act) passed in 1980 by the 96th Congress.

² GAO, *Intellectual Property: Key Processes for Managing Patent Automation Strategy Need Strengthening*, GAO 05-336, June 17, 2005, 2, 20.

³ USPTO submitted an improvement plan to OMB that described how challenges in past efforts to fully automate patent processing will be addressed in the PE2E project. See USPTO, November 10, 2010, *High Risk Project Review*, USPTO Patent File Wrapper (PFW) Program.

⁴ The Agile methodology USPTO is using is known as the *Scrum* methodology. Scrum is an iterative, incremental process that optimizes project predictability and controls risk by dividing large, complex projects into smaller, time-limited, development increments that are easier to manage.

⁵ A *service-oriented architecture* is an architectural style that organizes systems into a flexible suite of system services that can be reused by multiple business functions. Examples of reusable PE2E services could include searching for patents, retrieving patent applications, and checking the status of patent applications.

USPTO anticipates that this project will replace most, if not all, of the current patent processing systems and will result in a robust, flexible, maintainable, and scalable solution. USPTO is budgeting approximately \$130 million through fiscal year 2013 to complete this project; operations and maintenance afterwards is estimated to cost over \$15 million annually.

To address technical and contract management problems of past automation efforts, USPTO initiated a two-phased acquisition for the purpose of gaining technical input from industry and acquiring an integration contractor.⁶ Phase one, which was completed in March 2011, was a competition among three contractors to build prototypes of proposed PE2E “core” architecture and patent processing functions for USPTO to evaluate. USPTO stipulated that the contractors build the core architectures based on service-oriented architecture principles and that the core architectures should provide services for a simplified end-to-end patent process.

Phase two was to be the final selection of the PE2E integration contractor from those contractors that passed the phase one evaluation. However, in mid-March 2011, USPTO decided not to continue with this phase because, according to USPTO, none of the contractors met its expectations of demonstrating sufficient technical competency and understanding of the business priorities of patent processing. Therefore, USPTO decided to assume the responsibility of PE2E integrator. This decision places USPTO in the lead role for the technical design and makes it responsible for engaging contractors to augment its staff.

In keeping with recent OMB guidance⁷ for agencies to split projects into smaller, simpler segments that deliver demonstrable results, USPTO is developing the first release of PE2E for deployment by the end of FY 2011. To meet this deadline, USPTO decided to reduce the scope of the first release by foregoing the development of the core architecture for the end-to-end patent process as originally envisioned. Instead, USPTO is developing a more limited architecture to support a single patent process capability. The first release of PE2E will now provide limited case management functions that allow examiners to (1) view a list of patent application cases assigned to them, (2) view claims for each case, and (3) add notes to each case. Development of the user interface for the first release of PE2E began in April, and development of the architecture started in mid-June. USPTO has acquired a support contractor to assist in developing the first release of PE2E, but has not selected a contractor for development of future releases.

The first release of PE2E will be deployed to the Central Reexamination Unit, which consists of about 80 users. USPTO indicated that PE2E releases being piloted by this unit will be deployed to the much larger 6,000-member examination corps when the releases are mature enough to add value to the examination process.

⁶ According to USPTO’s initial PE2E solicitation, an integration contractor supports the entire development lifecycle and also manages sub-contractors.

⁷ OMB Memorandum M-10-26. June 28, 2010. *Immediate Review of Financial Systems and IT Projects*, 2.

Findings

I. USPTO Has Started PE2E Development Without Sufficient Long-Term Planning

USPTO has developed adequate short-term plans for the first release of PE2E; however, it started development of the first release without a product backlog⁸ that included high-level requirements prioritized by business and technical value for the entire project. In addition, although USPTO has planned for long-term technical needs such as a hardware and software infrastructure that will be compatible with future PE2E development, USPTO has not defined the high-level technical model of services to be implemented for the entire project. USPTO did not perform these planning activities largely due to the limited time that was available to develop and deploy PE2E functionality to users by the end of FY11. As noted by GAO, when confronted with development deadlines in the past, USPTO has not planned sufficiently.⁹ Unless USPTO improves its current long-term planning, it will not have a roadmap that guides the project's building and deployment strategies. Unnecessary rework may result, leaving USPTO at risk of not achieving its goal of fully automating the patent process in a timely and economical fashion.

A. PE2E Lacks Prioritized, High-Level Requirements in Its Product Backlog

Although USPTO had a product backlog for the first release of PE2E, the backlog did not include prioritized high-level requirements for the entire project before development of the first release began. Agile development is an evolutionary process that allows for a wide degree of flexibility; that is, plans and requirements are expected to change. However, there is a common misconception that long-term planning is not necessary when using Agile methods. In fact, the first steps in Scrum, the Agile method USPTO is using—in particular for large, complex projects such as PE2E—are to define high-level requirements for the entire project and prioritize those requirements based on business and technical value in a product backlog.¹⁰ The requirements are then organized into a schedule of releases. Detailed planning occurs during development of the release. When completed, each release is deployed to end users who then provide feedback that is used to update the requirements in the backlog for future releases.

B. PE2E Lacks a High-Level Services Model

USPTO has not defined a high-level model of the services that will be included in the service-oriented architecture for the entire PE2E project. Instead, USPTO is designing services only for the first release of PE2E, the patent reexamination case management function. Best practices for service-oriented architectures indicate that a high-level model of fundamental reusable services, such as retrieving a patent application or checking its status, should initially be defined for the entire patent process rather than for a limited set of requirements for a single application.¹¹ These

⁸ A *product backlog* is a list of all features, functions, technologies, enhancements, and bug fixes for the current and future product releases. The backlog items are prioritized based on risk, value, and necessity.

⁹ GAO, June 17, 2005. *Intellectual Property: Key Processes for Managing Patent Automation Strategy Need Strengthening*, GAO 05-336, 16.

¹⁰ Cohn, Mike. 2010. *Succeeding with Agile*. Ann Arbor, MI: Addison Wesley, 242-249, 285.

¹¹ See for example, Gartner Group, *Twelve Common SOA Mistakes and How to Avoid Them*, http://www.gartner.com/it/content/754400/754413/twelve_common_soa_mistakes.pdf (accessed June 23, 2011).

services are defined by identifying technical and business functions that are repeated and are therefore good candidates for reuse.

If USPTO does not define this technical design before development starts on the next release, it could be more difficult to integrate PE2E into a cohesive system. While USPTO cannot be expected to create a detailed technical design up front when using an incremental development methodology such as Agile, it can still develop a high-level technical design that will be open to change as more is learned during the development process.

II. USPTO's Acquisition Strategy for PE2E Is Not Adequately Defined

Now that it has assumed the role of PE2E integrator, USPTO needs to contract for technical services to fill gaps in the agency's technical experience and PE2E project staffing. In mid-May, USPTO approved an acquisition plan for acquiring contracting resources for PE2E. However, the plan does not adequately describe the strategy for acquiring these resources or how USPTO will manage acquisition risks when the current contract for the development of the first release of PE2E ends in November 2011.

Although USPTO's acquisition guidelines recommend developing an acquisition plan, USPTO did not issue a plan for the initial two-phased acquisition. Further, the current plan, issued in May, does not describe the acquisition strategy for future PE2E development, specifically (1) whether USPTO is seeking long- or short-term engagements with one or multiple contractors, (2) how it will acquire contracting resources (e.g., the contracting vehicle, capabilities sought, and evaluation criteria), or (3) how it will motivate contractors through contract incentives to achieve high performance.

In addition, the plan does not address how USPTO will manage acquisition risks. For example, it does not describe how USPTO will minimize the time needed to acquire new contractors so that long project delays are avoided. This became an issue when USPTO decided in March 2011 to act as the PE2E integrator; it was unable to acquire a support contractor to develop the architecture for the first release of PE2E until mid-June. Further, because USPTO has indicated that its procurement office is understaffed, the plan should outline how the office will manage solicitation and administration of multiple contracts. The plan should also provide solutions for potential problems, such as difficulties USPTO has had in the past with managing multiple contractors working on a single deliverable.

III. USPTO Should Improve Oversight of PE2E Development

The Clinger-Cohn Act of 1996 requires agencies to establish effective and efficient capital planning processes for selecting, managing, and evaluating the results of all of its major investments in information systems.¹² To address this requirement, GAO has developed a three-phased approach for capital planning and investment control of IT investments: *selecting* IT projects to invest in, *controlling* the development of the project, and *evaluating* whether

¹² 40 U.S.C. § 11303(b) (2) (A) (2011), Public Law 104-106, Division E, "Information Technology Reform Act," February 10, 1996.

deployed technologies are meeting mission goals.¹³ USPTO has established an oversight board, the Information Technology Investment Review Board (ITIRB), which recommends approval or disapproval of IT project funding, receives project status reports, and periodically reviews project progress to comply with Clinger-Cohn. USPTO has also established a governance structure for PE2E that decides the direction the project should take. However, USPTO needs to reinforce its procedures for controlling the development of PE2E.

A. Key Milestones and Conditions for Special Reviews Have Not Been Established

USPTO has not updated the ITIRB key milestone review schedule in the PE2E business case¹⁴ as required by its oversight policy. At these reviews, the ITIRB should evaluate whether USPTO is prepared to move forward to the next phase of the PE2E life cycle. Specifically, the ITIRB should (1) ensure certain criteria are met to move the project forward, such as whether adequate staff resources are available or adequate planning has been done; and (2) compare project performance against planned schedule and cost, as well as other performance measures, such as the quality of the deliverables. Federal agencies with mature oversight practices, such as the Department of Defense and National Aeronautical and Space Administration, have established processes that incorporate key milestones and criteria for senior executives to evaluate IT investments. Also, recent studies—for example, a 2010 review performed by the National Research Council of the Department of Defense’s information technology acquisition—have confirmed that key milestone reviews are important for projects, such as PE2E, that are being developed using Agile development methods.¹⁵

Additionally, USPTO has not adequately defined project conditions that would require convening special executive oversight reviews, although a federal best practice. Such reviews are triggered when a project’s performance varies from the project planned schedule, cost, or other performance measures by a predefined amount, or when a serious risk is realized. For example, the Veteran’s Administration’s new oversight policy for Agile development projects has established a threshold for taking special actions: special oversight reviews are triggered if deadlines for three consecutive incremental system releases have been missed.¹⁶

B. PE2E Oversight Would Benefit from Independent Expert Input to Milestone Reviews

PE2E is essential to improving patent processing. However, oversight of the program will result in numerous challenges for USPTO. PE2E is one of the most ambitious and complex multi-year IT investments USPTO has undertaken in several years, and the agency does not have recent experience overseeing large IT projects such as PE2E. Oversight will also have to adapt to the Agile development methodology USPTO is using to build PE2E because it has different life cycle phases than traditional development methods do.

¹³ GAO, March 2004. *Information Technology Investment Management, A Framework for Assessing and Improving Process Maturity*, GAO-04-394G. Washington, D.C., 8.

¹⁴ At USPTO, capital investment business cases (the rationale for initiating a business project or task) are documented in a Capital Investment Decision Paper.

¹⁵ National Research Council of the National Academies. 2010. *Achieving Effective Acquisition of Information in the Department of Defense*. Washington, DC: The National Academies Press.

¹⁶ Department of Veteran Affairs, March 2010, *Project Management Accountability System (PMAS) Guide*.

Given these circumstances, it would be beneficial for USPTO to seek independent expert advice on technical and project management—another federal best practice—for PE2E milestone reviews. Because independent experts do not have vested interests in projects, they are more apt to provide unbiased advice.¹⁷

Recommendations

1. Before development starts on the next (second) release of PE2E, the USPTO Director should direct the appropriate USPTO officials to improve PE2E planning by developing
 - a. a description and schedule of releases based on prioritized high-level requirements for the entire project, and
 - b. high-level designs for the service architecture for the entire project.
2. The USPTO Director should direct the appropriate USPTO officials to update the current acquisition plan before seeking contractor support for future PE2E releases. The plan should describe
 - a. the strategy for acquiring contracting resources that includes the overall acquisition approach, the process for acquiring, and how it will motivate contractor performance, and
 - b. how USPTO will manage risks to avoid development delays, overcome limited resources for soliciting and administering multiple contractors, and successfully manage multiple contractors.
3. The USPTO Director should direct the appropriate USPTO officials to improve oversight of PE2E by
 - a. updating USPTO oversight procedures for PE2E by establishing
 - the key milestone oversight review schedule,
 - criteria for evaluating project progress at oversight reviews, and
 - thresholds for convening special oversight reviews
 - b. seeking independent expert advice on technical and project management for input into milestone reviews and defining the rules of engagement for independent reviewers, including when advice will be sought and access given to project artifacts and personnel.

¹⁷ NASA describes independent reviewers as “unbiased and outside the advocacy chain of the program/project.” See NASA, Effective Date: November 03, 2008; Expiration Date: November 03, 2013, *NASA Procedural Requirements: NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements*, NPR 7120, 7-8.

Summary of Agency Comments and OIG Response

We reviewed USPTO's official response to our draft report dated September 21, 2011. In its response, USPTO provided background on the PE2E project, including project status, development approach, and challenges. However, USPTO also incorrectly characterized our review as an "incomplete snapshot of a single PE2E development cycle." The objective of our review was to assess USPTO's readiness to successfully manage PE2E; as such, our work provides the appropriate basis for assessing factors that will have an impact on USPTO's readiness. These factors include the long-term planning, acquisition, and project governance for PE2E in preparation for initial development. Such fundamentals are important to PE2E in order to avoid excessive rework, obtain needed resources, and effectively and economically meet the project's overall objectives.

USPTO's specific comments about the findings and recommendations are noted below. USPTO also provided technical comments separately, which we have addressed in the report where appropriate.

- **Recommendation 1:** USPTO concurred with this recommendation. It noted that it needed to explicitly define long-term development goals, a schedule of releases based on prioritized high-level requirements for the entire project, and high-level designs for the services architecture and database model.
- **Recommendation 2:** USPTO concurs with this recommendation and agreed to identify, schedule, and document appropriate procurement vehicles and procurement plans to facilitate continued development needs of PE2E for FY2012.
- **Recommendation 3:** USPTO concurs with this recommendation. USPTO has stated in its response that it has established milestone oversight review schedules and triggers for further reviews. It also agreed to continue to refine its review criteria and processes for conducting independent reviews, as well as engage independent experts to advise on PE2E development.

Appendix A: Objectives, Scope, and Methodology

Our audit objectives were to assess the U.S. Patent and Trademark Office's (USPTO's) readiness to successfully manage the Patent End-to-End (PE2E) project by determining the adequacy of its acquisition process and methodologies as well as the project's governance. The scope of this audit initially included phases one and two of the PE2E project; specifically, those activities performed at USPTO's Alexandria, Virginia, headquarters. However, as the approach and scope of the project changed, we adjusted our audit scope to include those changes.

Our audit methodology included interviewing key executives and managers, reviewing supporting documentation, and walkthroughs of the acquisition process, methodologies, and project governance. Specifically, we assessed the following:

- acquisition guidelines,
- project management methodology,
- program management office structure and staffing,
- project status reporting, and
- risk management and executive oversight.

This audit was performed under the authority of the Inspector General Act of 1978, as amended, and Department Organization Order 10-13, dated August 31, 2006. We conducted the performance audit 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.

Appendix B: Response to OIG Draft Report



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

September 21, 2011

MEMORANDUM FOR: Allen Crawley
Assistant Inspector General for Systems Acquisition
and IT Security

FROM: John B. Owens, II 
Chief Information Officer

SUBJECT: Response to Draft Report: *"Patent End-to-End Planning
and Oversight Need to Be Strengthened to Reduce Development
Risk" (August 2011)*

Executive Summary

The United States Patent and Trademark Office (USPTO) appreciates the effort that the Office of the Inspector General (IG) has made in assessing the management methodologies and acquisition of the Patent End-to-End (PE2E) project. The first phase of PE2E continues to deliver solid results on time and within budget, despite significant challenges, demonstrating that the USPTO's approach is succeeding beyond expectations. Nevertheless, every project has room for improvement. The USPTO has carefully considered the three recommendations made in the draft report and concurs with the recommendations.

Background

PE2E has made tremendous progress. Release 1.0 is on schedule and within budget despite such challenges as a protest of the planned procurement vehicle, budgetary constraints imposed by multiple continuing resolutions as well as the final budgetary agreement, the emergent need to bring development in-house to ensure that PE2E meets USPTO business needs, the adoption of a "new-to-the-Federal-Government" Software Development Life Cycle (SDLC) based on Agile development methodologies, the introduction of Agile development methodologies into our software development and budgetary processes, and the introduction of a completely new technology stack consisting of industry-leading software platforms and services. The USPTO's experience overcoming these challenges demonstrates that PE2E is on the path to success. Subsequent milestones remain on track to build on the first deliverable. We believe the success of the first deliverable is a strong indication of long-term PE2E health.

The Inspector General's review concluded as we were transitioning from the planning phase to implementation of PE2E 1.0. Thus the review captures an incomplete snapshot of a single PE2E development cycle. Since work on PE2E has been ongoing, the USPTO was already in the process of executing several of the report's recommendations by the time the draft report was issued. Specifically, the USPTO has developed a detailed user-story backlog for FY 2012 development, is continuing work on a plan for solution procurement for the FY 2012 deliverables, and is re-engaging independent experts that have been involved with earlier stages of PE2E planning and development.

Before the IG started its fieldwork, the USPTO engaged in a series of OMB-sponsored TechStat reviews of the PE2E project with the Federal Chief Information Officer (CIO), Vivek Kundra, and his staff. TechStat reviews and their recommendations are part of the CIO's 25-point plan for improving IT in the Federal Government.¹ The top recommendations of these reviews were: 1) hire a dedicated program manager to be fully in charge of PE2E, 2) get stakeholder buy-in before beginning, 3) use wireframes and other forms of user centered design to create the design, and 4) build a usable subset of functionality quickly and get real users using it for real work as soon as possible. The USPTO and OMB agreed to target having software in production by the end of FY 2011.

The PE2E project has met all these goals. The USPTO hired a dedicated program manager for PE2E in February 2011. The user research activities achieved widespread buy-in with the internal stakeholder community including the Patent Office Professional Association, the union representing patent examiners. Wireframes and user stories describe the designs from a user-centered perspective, and PE2E's first deliverable will be in production at the end of FY 2011. The USPTO's response to each recommendation follows.

Response to Recommendations

IG Recommendation (1): Before development starts on the next (second) release of PE2E, the USPTO Director should direct the appropriate USPTO officials to improve PE2E planning by developing a) a description and schedule of releases based on prioritized high-level requirements for the entire project; and b) high-level designs for the services architecture for the entire project.

USPTO Response:

The USPTO concurs with this recommendation. From the beginning, PE2E has emphasized long-term, high-level planning as a key to ensure a usable, integrated end result. Many high-level plans were explicitly recorded and considered by the IG during their review. In their report, the IG identifies areas where certain aspects of high-level planning were not recorded. This planning was performed by USPTO implicitly rather than explicitly. The USPTO agrees that making certain of these plans more explicit can aid PE2E development. Accordingly, we are developing more written user stories to explicitly define long-term development goals, a schedule of releases based on prioritized high-level requirements for the entire project, and explicit high-level designs for the services architecture and database model.

¹ <http://www.cio.gov/documents/25-Point-Implementation-Plan-to-Reform-Federal%20IT.pdf>

Before the USPTO began PE2E development, it engaged in seven months of user research to develop and evaluate three interactive prototypes that defined front-end interfaces for end-to-end patent examination solutions. The USPTO solicited evaluations of the resulting prototypes from patent examiners and developed extensive multimedia training materials to assist with the evaluation. The USPTO received and analyzed more than 2,000 examiner responses, allowing the USPTO to settle on one prototype to represent the high-level, long-range functional requirements of the PE2E system.

The selected front-end prototype fully documents high-level, user-centered, functional requirements for the entire foreseeable scope of the PE2E system. The USPTO uses screenshots of the prototype to portray the functional scope of major PE2E's functional areas. Furthermore, the prototype has provided a concrete basis for the USPTO to craft user-story backlogs for FY 2011 and FY 2012 with careful attention to the requirements of long-range functionality. This provides the source of the user-story backlog for USPTO's successful FY 2011 release, the sizable high-level backlog defined for FY 2012 PE2E development, and the long-range backlogs to be created in compliance with this recommendation.

These illustrative uses of well-crafted prototypes that embody user consensus to guide long-term development plans represent a substantial improvement over our previous efforts to plan technology projects. Such prototypes are complementary to text-only representations of functional needs provided by user stories.

IG Recommendation (2): The USPTO Director should direct the appropriate USPTO officials to update the current acquisition plan before seeking contractor support for future PE2E releases. The plan should describe: a) the strategy for acquiring contracting resources that includes the overall acquisition approach, the process for acquiring, and how it will motivate contractor performance; and b) how USPTO will manage risks to avoid development delays, overcome limited resources for soliciting and administering multiple contractors, and successfully manage multiple contractors.

USPTO Response:

The USPTO concurs with this recommendation. During development of the first deliverable, the USPTO dealt with all of the challenges described in the Background section of this document. Not only did the USPTO successfully define a strategy for acquiring and managing contracting resources, but also successfully overcame significant obstacles which posed substantial risks to the development schedule, including several identified by the IG's second recommendation.

With this experience in hand, the USPTO is confident that our acquisition strategies going forward will meet or surpass the IG's recommendations. The knowledge gained will be sufficiently documented in written PE2E plans as needed. In particular, the USPTO will identify, schedule, and document appropriate procurement vehicles and procurement plans to facilitate continued development needs of PE2E for FY 2012.

IG Recommendation (3): The USPTO Director should direct the appropriate USPTO officials to improve oversight of PE2E by: a) updating USPTO oversight procedures for PE2E by establishing the key milestone oversight review schedule, criteria for evaluating project progress at oversight reviews, and thresholds for convening special oversight reviews; and b) seeking independent expert advice on technical and project management, such as input into milestone

reviews and defining the rules of engagement for independent reviewers, including when advice will be sought and access given to project artifacts and personnel.

USPTO Response:

The USPTO concurs with this recommendation, and has established milestone oversight review schedules and triggers for further reviews. These include monthly reviews by the Office of Management and Budget (OMB), quarterly reviews by the USPTO's Capital Planning and Investment Control Review Board, quarterly reviews by the Patent Public Advisory Committee (PPAC), biannual reviews by the USPTO's Information Technology Investment Review Board (ITIRB), and audits by the Department of Commerce Office of Inspector General and the Government Accountability Office. The USPTO will continue to refine its review criteria and the processes for conducting independent reviews.

The USPTO believes in the value of independent technical and management expertise as a key to PE2E's success. Early in the PE2E development process, the USPTO retained a world-class expert in business architectures with 30 years' experience delivering IT to major corporations to review and advise on PE2E. Key PE2E personnel were also hired specifically for their private-sector expertise with building IT systems. The USPTO has also sought expert advice from PPAC and USPTO's ITIRB. It will continue seeking opportunities for independent experts to advise on PE2E development. For example, the USPTO intends to re-engage the world-class expert in business architectures for further independent management and technical advice.

Conclusion

The USPTO again thanks the Assistant Inspector General for Systems Acquisition and IT Security for the report. We are working diligently to meet or exceed the recommendations in this report, and we will gratefully consider further suggestions as we move forward to ensure that the PE2E project fulfills the strategic goals and needs of the United States Patent and Trademark Office.