

June 2005

# INTELLECTUAL PROPERTY

## Key Processes for Managing Patent Automation Strategy Need Strengthening



G A O

Accountability \* Integrity \* Reliability



Highlights of [GAO-05-336](#), a report to congressional committees

## Why GAO Did This Study

The volume and complexity of patent applications to the U.S. Patent and Trademark Office (USPTO) have increased significantly in recent years, lengthening the time needed to process patents. Annual applications have grown from about 185,000 to over 350,000 in the last 10 years and are projected to exceed 450,000 by 2009 (see figure). Coupled with this growth is a backlog of about 750,000 applications.

USPTO has long recognized the need to automate its patent processing and, over the past two decades, has been engaged in various automation projects. Accordingly, GAO was asked to, among other things, assess progress to date and any problems facing USPTO as it develops the capability to efficiently handle patent information electronically.

## What GAO Recommends

To better position USPTO to improve its patent process through the use of automation, GAO is making recommendations to the Secretary of Commerce that address the agency's management of its patent automation strategy and related information technology investments. In commenting on this report, USPTO generally agreed with our findings, conclusions, and recommendations. However, the agency only partially agreed with several material aspects of our assessment.

[www.gao.gov/cgi-bin/getrpt?GAO-05-336](http://www.gao.gov/cgi-bin/getrpt?GAO-05-336).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Linda Koontz at (202) 512-6240 or [koontzl@gao.gov](mailto:koontzl@gao.gov).

# INTELLECTUAL PROPERTY

## Key Processes for Managing Patent Automation Strategy Need Strengthening

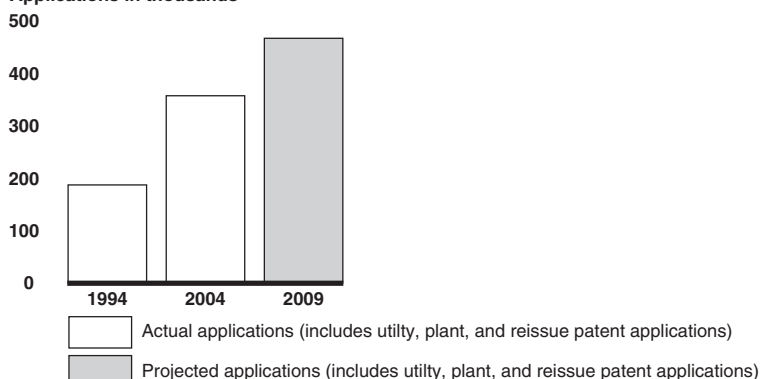
### What GAO Found

As part of its strategy to achieve a paperless, electronic patent process, USPTO had planned to deliver an operational patent system by October 2004. It has been able to deliver important capabilities, such as allowing patent applicants to electronically file and view the status of their patent applications and the public to search published patents. Nonetheless, after spending over \$1 billion on its efforts from 1983 through 2004, the agency's existing automation has not provided the fully integrated, electronic patent process articulated in its automation plans, and when and how this process will be achieved is uncertain. Key systems that USPTO is relying on to help reach this goal—an electronic application filing system and a document imaging system—have not provided capabilities that are essential to operating in a fully electronic environment. Contributing to this situation is that the agency took an ad hoc approach to planning and managing its implementation of these systems, in which it lacked effective analysis of system requirements, alternatives, and costs; made acquisition decisions based on management judgment; and acquired software that did not meet its needs.

USPTO's ineffective planning and management of its patent automation initiatives, in large measure, can be attributed to enterprise-level, systemic weaknesses in its information technology investment management processes. Although the agency had begun instituting essential investment management mechanisms, such as its enterprise architecture framework, it had not yet finalized its capital planning and investment control process nor established necessary linkages between the process and its architecture to guide the development and implementation of its information technology. The Under Secretary of Commerce for Intellectual Property and USPTO's chief information officer acknowledged the need for improvement, but specific plans for resolving problems have not yet been developed.

**Actual and Projected Patent Applications, Fiscal Years 1994–2009**

Applications in thousands



Source: USPTO data.

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**Abbreviations**

APS	Automated Patent System
OCIO	Office of Chief Information Officer
OCR	optical character recognition
PDF	portable document format
SIRA	Search and Information Resources Administration
TEAM	Tools for Electronic Application Management
USPTO	United States Patent and Trademark Office

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United States Government Accountability Office  
Washington, D.C. 20548

June 17, 2005

The Honorable Frank R. Wolf  
Chairman  
Subcommittee on Science, the Departments of State,  
Justice, and Commerce, and Related Agencies  
Committee on Appropriations  
House of Representatives

The Honorable F. James Sensenbrenner, Jr.  
Chairman  
Committee on the Judiciary  
House of Representatives

The United States Patent and Trademark Office (USPTO) helps to promote industrial and technological progress in the United States and to strengthen the national economy by administering the laws relating to patents and trademarks. A critical part of the agency's mission is to examine patent applications and issue patents. However, the rapid growth in both the volume and complexity of applications to USPTO has lengthened the time necessary to process patents and raised concerns about the quality of the patents that are issued. The number of patent applications filed annually has increased 91 percent over the last 10 years, from about 185,000 in 1994 to over 350,000 in 2004. Coupled with this growing workload is a 28-month backlog of approximately 750,000 applications.

USPTO has long recognized the need to improve its patent processing capability and, for the past two decades, has engaged in various efforts to automate its patent process. In light of the agency's actions, at your request, this report describes USPTO's strategy for automating its patent process and assesses its progress and any problems faced in developing and using electronic information and systems to achieve this capability. We plan to issue a separate report that will address the agency's progress in achieving its strategic milestones and maintaining a qualified workforce.<sup>1</sup>

To accomplish this objective, we reviewed USPTO's current and selected past initiatives to develop and implement automated patent processing capabilities. We analyzed programmatic and technical documentation

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<sup>1</sup>GAO, *Intellectual Property: USPTO Has Made Progress in Hiring Examiners, but Challenges to Retention Remain*, GAO-05-720 (Washington, D.C.: June 17, 2005).

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describing the agency's patent process, current electronic processing capabilities, and plans for future automation. We also evaluated available project management documentation, such as project plans, time lines, and status reports, to determine its progress in implementing a fully automated patent process. In addition, we assessed the agency's consideration of key information technology investment management processes and practices in planning and managing the patent automation initiatives. Further, we reviewed agency information on the cost of its automation efforts; however, we did not verify the accuracy of the cost data. To supplement our analysis, we interviewed senior patent officials, including the Deputy Commissioner for Patent Resources Planning and the USPTO chief information officer and, as part of a series of focus groups, selected patent examiners regarding the implementation and use of the systems supporting USPTO's patent process. We also discussed the patent automation efforts with the Under Secretary of Commerce for Intellectual Property (who serves as the director of USPTO). We conducted our study from June 2004 through April 2005 in accordance with generally accepted government auditing standards. Appendix I contains a detailed discussion of the scope and methodology of our review.

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## Results in Brief

USPTO is pursuing a long-standing strategy to implement a paperless, electronic patent process, with the goal of replacing the manual processing of applications with capabilities for electronically researching patent information and viewing and manipulating application text throughout all processing phases. To achieve this electronic process, the agency plans to integrate its existing systems that enable capabilities such as electronic filing of applications with new document imaging and text processing and sophisticated document management and workflow capabilities. As part of its 21st Century Strategic Plan, issued in 2002, the agency announced an acceleration of its goal of delivering an operational system to electronically process patents—from fiscal year 2006 to October 1, 2004.

USPTO has made progress in delivering functionality through information systems that it has implemented, such as electronic filing and patent application classification and search, as well as Internet access for patent applicants and the public, respectively, to view the status of their applications and to search existing published patents. Nonetheless, collectively, these automated functions have not provided the fully integrated end-to-end patent processing capability articulated in USPTO's automation plans. Two of the primary systems that the agency is relying on to enhance its capabilities—its electronic filing system and a document

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imaging system that it acquired from the European Patent Office called Image File Wrapper—have not yielded processing improvements that the agency had deemed essential to operate successfully in an electronic environment. Specifically, patent filers have stated that the electronic filing system is cumbersome, time-consuming, and costly, and does not meet their business and technical needs; thus, fewer than 2 percent of all patent applications are submitted to USPTO electronically. In addition, the Image File Wrapper has experienced performance problems and, according to patent officials, has not provided many of the capabilities deemed essential to eliminating manual actions and improving worker productivity. Contributing to this situation is that the agency took an ad hoc approach to planning and managing its implementation of these systems. Information technology best practices emphasize the need for agencies to undertake projects in a disciplined manner based on well-established business cases that articulate agreed-upon business and technical requirements; include analyses of project alternatives, costs, and benefits; and include measures for tracking project costs, schedules, and performance through their life cycle. However, patent officials did not rely on such critical measures to guide their implementation of these key initiatives.

USPTO's ineffective planning and management of its patent automation projects, in large measure, can be attributed to enterprise-level, systemic weaknesses in the agency's overall information technology investment management processes. A key premise of the Clinger-Cohen Act of 1996<sup>2</sup> is that agencies should have established processes, such as capital planning and investment controls, to help ensure that information technology projects are implemented at acceptable costs and within reasonable and expected time frames, and contribute to tangible, observable improvements in mission performance. In addition, as our Enterprise Architecture Framework<sup>3</sup> stresses, information technology projects should show evidence of compliance with the organization's architecture. Although USPTO had begun instituting certain essential information technology investment management mechanisms, it had not yet finalized its capital planning and investment control process nor established necessary linkages between the process and its enterprise architecture to ensure that projects will comply with the architecture. Further, a study

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<sup>2</sup>40 U.S.C. sec. 11312.

<sup>3</sup>GAO, *Information Technology: A Framework for Assessing and Improving Enterprise Architecture Management* (Version 1.1), [GAO-03-584G](#) (Washington, D.C.: April 2003).

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commissioned by the agency in 2004 found that its Office of Chief Information Officer was not organized to help accomplish the automation goals set forth in its strategic plan and that the agency's investment management processes did not ensure appropriate reviews of automation initiatives. As a result, USPTO had not rigorously assessed its patent systems' compliance with the enterprise architecture, and it lacked reliable experience-based data to consistently demonstrate the costs and benefits of its systems.

In light of the problems that USPTO has encountered with its existing capabilities, we are recommending that the agency, before proceeding with any new patent automation initiatives, (1) reassess, and, where necessary, revise its approach for implementing and achieving effective uses of information systems supporting a fully automated patent process; (2) establish disciplined processes for planning and managing the development of patent systems based on well-established business cases; and (3) fully institute and enforce information technology investment management processes and practices to ensure that its automation initiatives support the agency's mission and are aligned with its enterprise architecture.

In its written comments on a draft of our report (reprinted in app. II), USPTO generally agreed with our findings, conclusions, and recommendations. The agency acknowledged weaknesses in its processes used to manage patent automation and agreed with the need for key improvements, such as (1) developing architectural linkages to the planning process, (2) implementing a capital planning and investment control guide, and (3) completing planned organizational changes. Nonetheless, the agency stated that it only partially agreed with several material aspects of our assessment. For example, the agency pointed to our awareness of it having initiated a review of the architectural linkages to its investments and key decision-making processes. However, during our study, agency officials did not inform us of any specific actions that had been taken in this regard. As the agency moves forward with actions to improve its patent automation, having firmly established and enforced investment management practices will be essential to achieving more effective use of its information technology.

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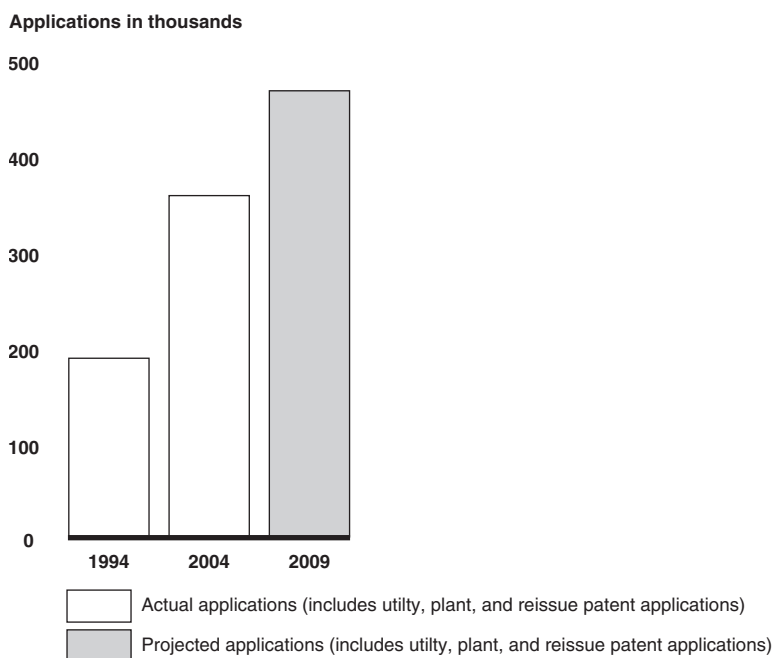
## Background

A patent is a property right granted by the U.S. government to an inventor who secures, generally for 20 years from the date of initial application in the United States, his or her exclusive right to make, use, offer for sale, or



sell the invention in exchange for disclosing it.<sup>4</sup> As indicated in figure 1, the number of patent filings to USPTO continues to grow and, by 2009, the agency is projecting receipt of over 450,000 patent applications annually.

**Figure 1: USPTO Actual and Projected Patent Applications, Fiscal Years 1994-2009**



Source: USPTO data.

USPTO has repeatedly cited the growing workload of patent applications and the difficulty in managing the volumes of paper associated with patent processing as impediments to carrying out its mission.

Patent processing essentially involves three phases: pre-examination, examination, and post-examination. The process begins when an applicant files a patent application and pays a filing fee. As part of the pre-examination phase, USPTO staff document receipt of the application and process the application fee, scan and convert the paper documents to

<sup>4</sup>According to 35 U.S.C. sec. 154(a)(1), a patentee may also exclude others from importing the patented invention into the United States.

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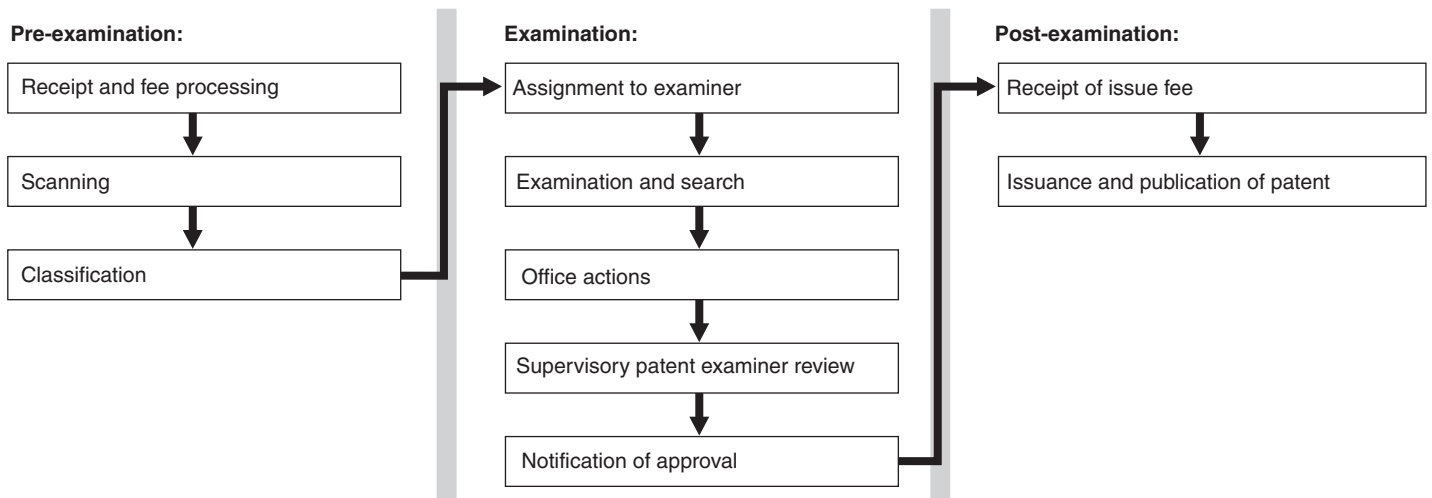
electronic format, and conduct an initial review of the application and classify it by subject matter. During the subsequent examination phase, the application is assigned to a patent examiner with expertise in the subject area,<sup>5</sup> who searches existing U.S. and foreign patents, journals, and other literature (called “prior art”) and sometimes contacts the applicant to resolve questions and obtain additional information to determine whether the proposed invention can be patented.<sup>6</sup> Examiners document their determinations on the applications in formal correspondence, referred to as office actions. Applicants may abandon their applications at any time during this process. After the examiner has determined that a patent is warranted, a supervisor reviews and approves the determination and the applicant is informed of the outcome. The application then enters the post-examination phase. Upon payment of an “issue fee,” a patent is granted and published. To keep the patent active, the patentee must pay maintenance fees at 3.5 years, 7.5 years, and 11.5 years. Historically, the time from the date that a patent application is filed to the date that the patent is either granted or the application is abandoned has been called “patent pendency.” Figure 2 summarizes USPTO’s patent process.

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<sup>5</sup>USPTO has eight technology centers that define its subject areas as follows: Biotechnology and Organic Chemistry; Chemical and Materials Engineering; Computer Architecture, Software, and Information Security; Communications; Semiconductors, Electrical and Optical Systems and Components; Designs for Articles of Manufacture; Transportation, Construction, Electronic Commerce, Agriculture, National Security and License and Review; Mechanical Engineering, Manufacturing, and Products.

<sup>6</sup>A proposed invention is patentable if it is a new or useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.

**Figure 2: USPTO's Patent Process**



Source: USPTO.

In 1999, Congress gave USPTO broad responsibility for managing its operations and controlling its budget allocations and expenditures, personnel decisions and processes, procurement, and information technology operations.<sup>7</sup> USPTO's Search and Information Resources Administration (SIRA) within the Office of Patent Resources Planning, along with its Office of Chief Information Officer (OCIO), are responsible for ensuring that the agency's goal of providing an automated patent process is met. SIRA is responsible for identifying patent processing business needs, ensuring that the systems developed meet those needs, and providing program resources. OCIO determines how best to use information technology to fulfill the identified business needs and is responsible for the acquisition, development, and integration of the information systems.

<sup>7</sup>The American Inventors Protection Act of 1999, 35 U.S.C. sec. 1(a) gave USPTO greater flexibility and independence for decisions regarding the management and administration of its operation, while the Secretary of Commerce retained policy direction. In addition, 35 U.S.C. sec. 2(b)(2)(F) empowered the USPTO director to establish regulations that provide for the development of a performance-based process that includes quantitative and qualitative measures and standards for evaluating cost-effectiveness and is consistent with principles of impartiality and competitiveness.

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Because of long-standing concerns about the increasing volume and complexity of patent applications, USPTO has been undertaking projects to automate its patent process for about the past two decades. One of the agency's most substantial undertakings was the Automated Patent System (APS)—a project begun in 1983 with the intent of automating all aspects of the paper-intensive patent process. With this system, USPTO anticipated significant improvements in patent quality and productivity. APS was to be deployed in 1990, maintained through 2002, and, when completed, consist of five integrated subsystems that would (1) fully automate incoming patent applications; (2) allow examiners to electronically search the text of granted U.S. patents and access selected abstracts of foreign patents; (3) scan and allow examiners to retrieve, display, and print images of U.S. patents; (4) help examiners classify patents; and (5) support on-demand printing of copies of patents.

In reporting on APS more than 10 years following its inception, we noted that USPTO had deployed and was operating and maintaining certain parts of the system, supporting text search, limited document imaging, order-entry and patent printing, and classification activities.<sup>8</sup> However, it had not yet developed the system that was expected to fully automate incoming applications and the management of these applications as they moved through USPTO, and the estimated date for full deployment of APS had been delayed 7 years, to 1997.

Our report raised concerns about USPTO's ability to adequately plan and manage this major project, pointing out that the agency's processes for exercising effective management control over APS were weak. We noted that the agency lacked reliable, experience-based data to show that patent quality had improved and expected benefits were being achieved and its officials were relying on management judgment alone in setting APS development and deployment priorities. In light of these concerns, we recommended to the Secretary of Commerce that USPTO establish a process for identifying and measuring expected benefits to users of the system, implement a systematic and repeatable process for estimating the system's costs, and monitor progress against baselines. USPTO agreed with the need for such measures.

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<sup>8</sup>GAO, *Patent and Trademark Office: Key Processes for Managing Automated Patent System Development Are Weak*, GAO/AIMD-93-15 (Washington, D.C.: Sept. 30, 1993).

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Through 2002, the agency continued to enhance its capabilities enabling examiners to search patent images and text, and upgraded its patent application classification and tracking systems.<sup>9</sup> It also began providing electronic bibliographic information from patents to the public. Nonetheless, USPTO never fully developed and deployed APS to achieve the integrated, end-to-end patent processing system that it envisioned. The agency reported spending approximately \$1 billion on the initiative from 1983 through 2002.<sup>10</sup>

In 1998, the agency added to its automated capability by implementing an Internet-based electronic filing system, enabling applicants to submit their applications online. It further enhanced the electronic filing system in 2002, and again in 2004. USPTO reported spending a total of \$10 million for this system.

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## USPTO Continues to Pursue a Fully Automated Patent Process, but Is Not Effectively Managing Its Strategy for Achieving This Capability

Recognizing that growth in the number and complexity of patent applications has outpaced its ability to meet demands and effectively manage its workload in a paper-based environment, USPTO has continued to pursue a strategic agenda emphasizing paperless, end-to-end, automated patent processing, as was its intent with APS. However, while progress has been made, the agency has not yet achieved a fully electronic patent processing capability. Key systems that USPTO is relying on to help achieve this capability have not yielded essential processing improvements, in part resulting from the agency's ad hoc approach to planning and managing their implementation. Contributing to this situation is that USPTO has not yet fully instituted disciplined processes and practices for managing its information technology investments.

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## USPTO's Strategy Called for a Fully Electronic Patent Process

As part of its automation strategy, USPTO planned to develop and integrate multiple systems that are intended to move all of its critical patent processing components to an electronic business environment. To support this strategy, in 2001, the agency undertook its Tools for Electronic Application Management (TEAM) automation project with the intent of

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<sup>9</sup>The initial deployment of USPTO's patent tracking system occurred in 1980. This system provides workflow tracking, status reporting, and examiner production information.

<sup>10</sup>The reported cost included system enhancements and maintenance through the end of the project's life cycle in 2002.

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delivering an end-to-end capability to process patent applications electronically by fiscal year 2006. TEAM was to support the entire patent application process in electronic mode, beginning with the filing of an application and proceeding through pre-examination, examination, and post-examination to electronic records archiving.

Under the TEAM concept, the agency had planned to integrate its existing electronic filing system and the classification and search capabilities from the earlier APS project with new document management and workflow capabilities, and with image- and text-based processing<sup>11</sup> of patent applications to achieve a sophisticated means of handling documents and tracking patent applications throughout the examination process. By implementing image- and text-based capabilities, USPTO had anticipated that patent examiners would be able to view and process applications online, as well as manipulate and annotate text within a patent application, thus eliminating manual functions and improving processing accuracy, reliability, and productivity, as well as the quality of the patents that are granted.

In 2002, USPTO altered its approach to accomplishing the patent automation with the issuance of its 21st Century Strategic Plan.<sup>12</sup> Developed partly in response to a recognized need to improve patent quality, aggressively implement electronic government,<sup>13</sup> and reduce the number of patent applications pending at any one time, the strategic plan identified, among other factors, the agency's high-level information technology goals for fully automating the patent process as part of an aggressive 5-year modernization effort. The plan incorporated the automation concepts from the TEAM project, but announced an accelerated goal of delivering an operational system to electronically

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<sup>11</sup>*Image-based processing* uses a graphic representation of documents produced by scanning paper documents or by converting electronic documents into images. To transform image content into text, optical character recognition (OCR) software is used to derive text from the image. OCR can convert image documents to hidden text, which is searchable. In *text-based processing*, the words and sentences in the document are retained as text and can be stored, processed, and retrieved by a document management system. Unlike image-based processing, text-based processing allows the text to be searched and extracted.

<sup>12</sup>USPTO's *21st Century Strategic Plan* was originally released in 2002 and updated in 2003.

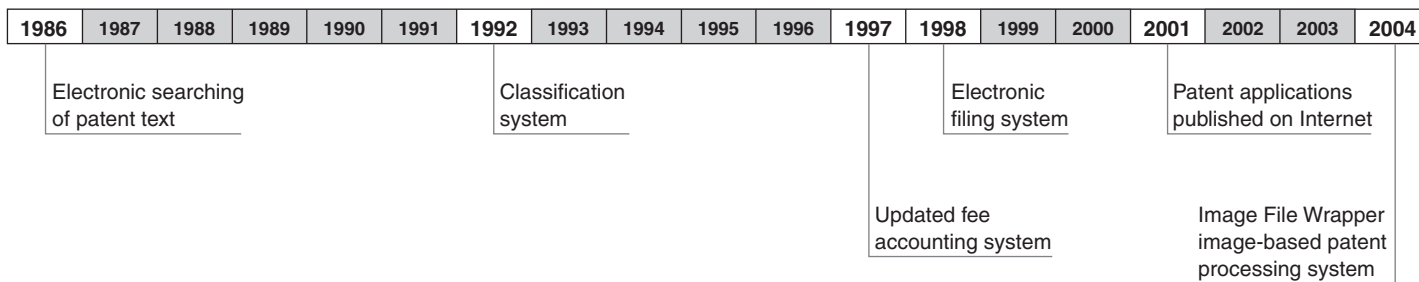
<sup>13</sup>Electronic government refers to the use of information technology to enhance the access to and delivery of government information and service to citizens, business partners, and employees, and among agencies at all levels of government.

process patent applications earlier than had been scheduled under TEAM—by October 1, 2004.

### Progress Made, but Ad Hoc Implementation of Key Systems Has Prevented Achieving Full Electronic Processing of Patent Applications

In carrying out its patent automation plans, USPTO has made progress toward delivering important processing capabilities through the various information systems that it has implemented. For example, an automated search capability, available since 1986, has eliminated the need for patent examiners to manually search for prior art in paper files, and the classification and fee accounting capabilities have helped with assigning applications to the correct subject areas and with managing collections of applicable fees. In addition, using the electronic filing system that has existed since 1998, applicants can file their applications with the agency via the Internet. Also, using the Internet, patent applicants can review the status of their applications online and the public can electronically access and search existing published patents. Further, as a result of an imaging system implemented in August 2004, known as the Image File Wrapper, USPTO currently has the capability to scan patent applications and related documents, which can then be stored in a database and retrieved and reviewed online. Figure 3 illustrates the agency’s progress in implementing its automated patent functions.

**Figure 3: USPTO’s Patent Automation Progress**



Source: USPTO.

Nonetheless, even with the progress that has been made, collectively, USPTO’s automated functions have fallen short of providing the fully integrated, electronic patent processing capability articulated in the agency’s automation plans. Two of the key systems that it is relying on to

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further enhance its capabilities—the electronic filing system and the Image File Wrapper—have not yielded the processing improvements that the agency has deemed essential to successfully operate in a fully integrated, electronic environment.

Specifically, in implementing its electronic filing system in 1998, USPTO had projected significant increases in processing efficiencies and quality by providing patent applicants the capability to file online, thus alleviating the need for them to send paper applications to the agency or for patent office staff to manually key application data into the various processing systems. However, even after enhancements in 2002 and 2004, the electronic filing system has not produced the level of usage among patent filers that the agency had anticipated. While USPTO's preliminary justification for acquiring the electronic filing system had projected an estimated usage rate of 30 percent in fiscal year 2004, patent officials reported that, as of April 2005, fewer than 2 percent of all patent applications were being submitted to the agency via this system. As a result, anticipated processing efficiencies and quality improvements through eliminating the manual re-keying of application data have not yet been realized.

In September 2004, USPTO convened a forum of senior officials representing the largest U.S. corporate and patent law firm filers to identify causes of patent applicants' dissatisfaction with the electronic filing system and determine how to increase the number of patents being filed electronically. According to the report resulting from this forum, the majority of participants viewed the system as cumbersome, time-consuming, costly, inherently risky, and lacking a business case to justify its usage. Specifically, among the barriers to system usage that the participants identified were (1) users' lack of a perceived benefit from filing applications electronically, (2) liability concerns associated with filers' unsuccessful use of the system or unsuccessful transmission of patent applications to USPTO, and (3) significant disruptions to filers' normal office/corporate processes and workflow caused by factors such as difficulty in using the automated tools and the inability to download necessary software through firewalls.

Further, forum participants identified features that they considered critical to increasing their use of the electronic filing system. These included implementing a more user-friendly system supported by Web-based processes; introducing a system that accepts portable document format



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(PDF) files;<sup>14</sup> and enabling electronic filing of all documents, versus requiring paper filings of certain parts of the application, as is necessary with the current system. As incentives to increasing system usage, the participants suggested, among other strategies, that USPTO make electronic filings of applications a priority over paper filings, reduce the fee for electronic filings, and confirm the date on which the agency receives electronic applications.

Several concerns raised during the forum mirrored those that USPTO had earlier identified in a 1997 analysis of a prototype for electronic filing. However, as of April 2005, the agency had not yet completed plans to show how they would address the concerns regarding use of the electronic filing system.

Beyond electronic filing, the Image File Wrapper also has not resulted in critical patent processing improvements. Patent officials explained that, to meet the accelerated date for delivering an operational system as outlined in the strategic plan, the agency had decided in 2002 to acquire and use a document-imaging system owned by the European Patent Office, called ePhoenix, rather than develop the integrated patent processing system that had been described in the agency's automation plans. The officials stated that the director, at that time, had considered ePhoenix to be the most appropriate solution for further implementing USPTO's electronic patent processing capabilities given (1) pressures from Congress and from customers and stakeholders to implement an electronic patent processing system more quickly than originally planned and (2) the agency's impending move to its new facility in Alexandria, Virginia, which did not include provisions for transferring and storing paper patent applications.<sup>15</sup>

Accordingly, in November 2002, patent officials had signed a memorandum of agreement with the European Patent Office, in which that office agreed to provide USPTO with a license to use its patent processing software and to provide technical assistance in customizing the software to meet USPTO's needs. In turn, USPTO agreed to reimburse the European Patent

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<sup>14</sup>PDF is a file format that helps reduce errors when files are transferred from one user to another. A PDF file can contain fonts, images, printing instructions, keywords, and other information related to document production.

<sup>15</sup>In December 2003, USPTO began relocating its headquarters from Arlington (Crystal City), Virginia, to Alexandria, Virginia, with the intent of consolidating all of its major operations in a central facility. The agency anticipates completing this move in approximately July 2005.

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Office for the cost of modifying the software. It began deploying the system—which it renamed Image File Wrapper—in July 2003 and completed implementation in August 2004, at a reported total cost of approximately \$14 million.<sup>16</sup>

The system includes image technology for storage and maintenance of records associated with patent applications and currently provides the capability to scan each page of a submitted paper application and convert the pages into electronic images. According to comments made by patent examiners in a majority of the focus groups that we conducted, the system has provided them with the ability to easily access patent applications and related information. In addition, patent officials stated that the system has enabled multiple users to simultaneously access patent applications.

However, patent officials acknowledged that the system has experienced performance and usability problems. Specifically, in speaking about the system's performance, patent officials and agency documentation stated that, after its implementation, the Image File Wrapper had been unavailable for extended periods of time or had experienced slow response times, resulting in decreased productivity. In commenting on this matter, the USPTO director stated that the system's performance has improved over the last 6 months. Further, in discussing the system's performance, OCIO and patent officials acknowledged this system problem, and told us that they had recently taken measures to alleviate its impact by, for example, developing a backup tool, which can store images of an examiner's most recent applications so that the applications can be accessed when the examiner cannot use the Image File Wrapper. However, given the recent (February 2005) implementation of this tool, the officials were not able to show any quantitative benefits from its use.

Regarding the usability of the system, patent officials and focus group results indicated that the Image File Wrapper does not fully meet processing needs. Specifically, the officials stated that, as an image-based system, the Image File Wrapper does not fully enable patent examiners to electronically search, manipulate, or track and log changes to application text, which are key processing features emphasized in the agency's automation plans. The agency's documentation also indicated that patent examiners have to print images to paper to perform certain functions such

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<sup>16</sup>The \$14 million represents a compilation of costs—provided by USPTO—for the Image File Wrapper system.

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as signing their names to office actions. The examiners commented that a limited capability to convert images to text, which was intended to assist them in copying and reusing information contained in patent files, is error-prone, contributing to their need to download and print the applications for review. In addition, examiners in the focus groups expressed concerns about the Image File Wrapper's capability to manage their workload and route documents to and from examiners, noting that these capabilities are confusing and difficult to use. Further, because the office's legacy systems are not integrated with the Image File Wrapper, examiners are required to manually print correspondence from these systems, which then must be scanned into the Image File Wrapper in order to be included as part of an applicant's electronic file.

Patent and OCIO officials largely attributed the system's performance and usability problems to the agency's use of the software that it acquired from the European Patent Office. They indicated that the original design of the ePhoenix system had not been compatible with USPTO's technical platform for electronic patent processing. Specifically, they stated that the European Patent Office had designed the system to support only the printing of files for subsequent manual reviews, rather than for electronic review and processing. The officials also stated that the system had not been designed for integration with other legacy systems or to incorporate additional capabilities, such as text processing, with the existing imaging capability. Further, an official of the European Patent Office noted that ePhoenix had supported their office's much smaller volume of patent applications.<sup>17</sup> Thus, with USPTO's patent application workload being approximately twice as large as that of its European counterpart, the agency placed greater stress on the system than it was originally designed to accommodate. OCIO officials overseeing the Image File Wrapper told us that, although they had tested certain aspects of the system's capability, many of the problems encountered in using the system were not revealed until after the system was deployed and operational.

The European Patent Office official serving as liaison to USPTO identified similar technical problems with the Image File Wrapper. The official acknowledged that the version of the ePhoenix software that USPTO had acquired did not provide some of the capabilities that the agency wanted, such as text processing. He added that the European Patent Office was

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<sup>17</sup>Over the past 2 years, the European Patent Office reported processing about 160,000 to 170,000 patent applications per year using ePhoenix.

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developing a newer version of the software that would include text- and image-based processing capabilities. At the time of our discussion, the official said that USPTO officials had not informed them of their plans to use the newer version of the software.

Patent and OCIO officials acknowledged the problems with the Image File Wrapper and that the agency had acquired ePhoenix, although senior officials were aware that the original design of the system had not been compatible with USPTO's technological platform for electronic patent processing. They stated that, despite knowing about the many problems and risks associated with using the software, the agency had nonetheless proceeded with this initiative because senior officials, including the former USPTO director, had stressed their preference for using ePhoenix in order to expedite the implementation of a system. The officials also acknowledged that management judgment, rather than a rigorous analysis of costs, benefits, and alternatives, had driven the agency's decision to use the system.

In January 2005, patent officials told us that, given the performance and usability problems, they planned to begin replacing the Image File Wrapper in September 2005 with a system that would provide the capabilities, including text- and image-based processing, that were outlined in the agency's automation plans. Preliminary information that the agency provided about the replacement system indicated that it would cost approximately \$56 million over 6 years, and would not include continued use of the European Patent Office's software. However, while having made this determination about a new system, the agency had not developed a supporting business case—based on requirements, cost/benefit, and alternatives analyses—to justify this particular acquisition, or a project plan to guide the system's implementation. Thus, it is difficult to gauge the soundness of this planned investment or how it will enable USPTO to accomplish its automation plans. In response to our concerns about the lack of project documentation to support the planning and management of this initiative, the officials stated that they would reconsider their approach to planning and carrying out this project.

USPTO's difficulty in realizing intended improvements through its electronic filing system and Image File Wrapper can largely be attributed to the fact that the agency has taken an ad hoc approach to planning and managing its implementation of these systems, driven in part by its accelerated schedule for implementing an automated patent processing capability. The Clinger-Cohen Act, as well as information technology best

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practices and our prior reviews, emphasize the need for agencies to undertake information technology projects in a disciplined manner, based on well-established business cases that articulate agreed-upon business and technical requirements; effectively analyze project alternatives, costs, and benefits; include measures for tracking projects through their life cycle against cost, schedule, benefit, and performance targets; and ultimately, provide the basis for credible and informed decision making and project management. Yet, patent officials did not rely on established business cases to guide their implementation of these key automation initiatives.

With its ad hoc approach to implementing the electronic filing system and the Image File Wrapper, USPTO has continued a practice of ineffective project management that characterized its implementation of APS of two decades ago. The absence of sound project planning and management for these initiatives has left the agency without critical capabilities, such as text processing, and consequently, impeded its successful transition to an integrated and paperless patent processing environment. By continuing to implement information systems in this manner, USPTO undermines the intent of its patent automation strategy and jeopardizes its credibility regarding improving the efficiency of the patent process. At the conclusion of our review, the Under Secretary of Commerce for Intellectual Property, who also serves as the director of USPTO, stated that he recognized and intended to implement measures to address the weaknesses in the agency's planning and management of its automated patent systems.

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## **USPTO's Patent Automation Is Not Supported by Essential Information Technology Investment Management Processes**

USPTO's ineffective planning and management for its patent automation projects, in large measure, can be attributed to enterprise-level, systemic weaknesses in the agency's information technology investment management processes. A key premise of the Clinger-Cohen Act is that agencies have established processes, such as capital planning and investment control, to help ensure that information technology projects are implemented at acceptable costs and within reasonable and expected time frames, and contribute to tangible, observable improvements in mission performance. Such processes guide the selection, management, and evaluation of information technology investments by aiding management in considering whether to undertake a particular investment in information systems and providing a means to obtain necessary information regarding the progress of an investment in terms of cost, capability of the system to meet specified requirements, timeliness, and quality.

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Further, as emphasized in our Enterprise Architecture Framework, information technology projects should show evidence of compliance with the organization's enterprise architecture, which serves as a blueprint for systematically and completely defining an organization's current (baseline) operational and technology environment and as a roadmap toward the desired (target) state. Effective implementation of an enterprise architecture can facilitate an agency by serving to inform, guide, and constrain the decisions being made for the agency, and subsequently decrease the risk of buying and building systems that are duplicative, incompatible, and unnecessarily costly to maintain and interface.

At the time of our study, USPTO had begun instituting certain essential information technology investment management mechanisms, such as a framework for its enterprise architecture and components of a capital planning and investment control process. However, it had not yet established the necessary linkages between its enterprise architecture and its capital planning and investment control process to ensure that its automation projects will comply with the architecture or fully instituted enforcement mechanisms for investment management. For example, USPTO drafted a capital planning and investment control guide in June 2004 and issued an agency administrative order requiring unit heads to use the guide in February 2005. However, according to senior agency officials, many of the processes and procedures in the guide had not been completed and fully implemented. In addition, while the agency had completed the framework for its enterprise architecture, it had not aligned its business processes and information technology in accordance with the architecture. Also, according to OCIO officials, the architecture review board responsible for enforcing compliance with the architecture was not yet in place; thus, current architecture reviews are only of an advisory nature and are not required for system implementation. Our analysis of architecture review documents that system officials provided for the electronic filing system and Image File Wrapper confirmed that the agency had not rigorously assessed either of these systems' compliance with the enterprise architecture.

Beyond these concerns, USPTO lacked reliable, experienced-based data and a process for consistently demonstrating that expected benefits of the systems are being achieved. As noted in our prior work, key system development decisions should be based on reliable data showing that resource investments will produce commensurate value, and as systems are developed, expected benefits and estimated costs should be periodically validated through actual experience. Although patent officials

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asserted that processing improvements had resulted from the automation that had been implemented, they acknowledged that the agency had not established performance metrics to aid in measuring the impact of the automation or validated actual experiences against established baselines. Rather, patent officials told us, they had based their accounts of performance improvement, such as reductions in the number of lost or destroyed paper patent applications as a result of the Image File Wrapper, largely on ad hoc occurrences and/or feedback from patent examiners and clerical and administrative staff. As a result, the agency lacked a basis for substantiating benefits from its automation efforts.

In addition, USPTO lacked reliable cost data for the patent automation initiatives due to weaknesses in the agency's processes for tracking and reporting project expenses. Our guide on agencies' information technology investment decision-making stresses the need for reliable and current project cost data to aid management in making critical investment decisions.<sup>18</sup> While the agency had systems in place to track the costs of specific tasks, particularly those assigned to its contractors, it did not have an effective means of providing aggregate cost information for its overall patent automation effort. Patent officials stated that they faced difficulties in accessing and providing comprehensive cost information for the patent systems because the agency had modified its approach to capturing and reporting cost information, along with the information systems containing this information. The difficulty that USPTO management faced in providing comprehensive information on its patent automation costs could compromise the agency's ability to provide a credible accounting for its investments and make informed management decisions about them.

Adding to these conditions, a study commissioned by USPTO's senior management in 2004 found that OCIO was not organized to help USPTO achieve its mission or accomplish the goals set out in its automation strategy.<sup>19</sup> The study, undertaken by an independent contractor, noted that the agency's investment management processes did not ensure appropriate reviews of automation initiatives and that the chief information officer's organization lacked sufficient credibility with its business units to ensure an effective partnership. During our review, USPTO's director made

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<sup>18</sup>GAO, *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-making*, GAO/AIMD-10.1.13 (Washington, D.C.: February 1997).

<sup>19</sup>We did not independently assess the results of this study, but USPTO's chief information officer generally concurred with its findings.

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changes in key leadership positions within OCIO and the Patent Resources and Planning Office, which he considered essential to defining and implementing the patent automation strategy and bringing stability to the agency's operations. However, officials had not yet begun to improve the investment management processes to ensure appropriate reviews of the agency's automation initiatives.

USPTO has an explicit responsibility for ensuring that the automation initiatives that it is counting on to enhance its overall patent process are consistent with the agency's priorities and needs and are supported by the necessary planning and management to ensure that they are successfully accomplished. USPTO's 21st Century Strategic Plan was intended to help the agency accomplish a smooth transition to performance-based operations, and having firmly established and enforced investment management practices will be crucial to achieving this. At the conclusion of our review, USPTO's director and the new chief information officer, appointed in February 2005, told us that they were aware of organizational and management weaknesses within OCIO and acknowledged the need to strengthen the agency's investment management processes and practices and effectively apply them to USPTO's patent automation initiatives.

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## Conclusions

USPTO has been attempting to implement an integrated, paperless patent process for about two decades and, in the process, has delivered important automated capabilities. Nonetheless, after spending over a billion dollars on its efforts, the agency is still not yet effectively positioned to process patent applications in a fully automated environment; moreover, when and how it will actually achieve this capability remains uncertain. System performance and usability problems, resulting largely from ineffective planning and management of its automated capabilities, have limited the effectiveness of key systems that the agency has implemented to support critical patent processes. USPTO's director and new chief information officer have recognized the need to improve the agency's planning and management of its automation initiatives. However, weaknesses in key information technology management processes needed to guide the agency's investments in patent automation, such as incomplete capital planning and investment controls and a lack of reliable cost data, could preclude its ability to successfully accomplish this. Under such circumstances, USPTO risks continuing to implement information technology that does not support the agency's needs, and that threatens its overall goal of achieving a fully electronic capability to process its growing patent application workload.



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## Recommendations for Executive Action

To more effectively position USPTO to achieve key patent processing improvements through the use of information technology, we recommend that the Secretary of Commerce direct the Under Secretary of Commerce for Intellectual Property to take the following actions before proceeding with any new patent automation initiatives:

- reassess, and where necessary, revise the approach for implementing and achieving effective uses of major information systems to support a fully automated patent process, including electronic filing and image- and text-based patent processing capabilities;
- establish disciplined processes for planning and managing the development of patent systems based on well-established business cases that articulate agreed-upon business and technical requirements; include analyses of project alternatives, costs, and benefits; and include measures for tracking projects through their life cycle against cost, schedule, benefit, and performance targets; and
- fully institute and enforce at the enterprise level, information technology investment management processes and practices to ensure that automation initiatives support the agency's mission and are aligned with the agency's enterprise architecture, to include (1) finalizing and implementing a capital planning and investment control guide, (2) establishing an architecture review board and requiring its oversight of major information technology investments, (3) establishing a process to identify expected benefits to internal and external users of information systems and to measure performance against expected benefits, and (4) establishing a process for tracking and reporting aggregate cost information for automation initiatives.

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## Agency Comments and Our Evaluation

In written comments on a draft of this report, the Under Secretary of Commerce for Intellectual Property and Director of USPTO generally agreed with our findings, conclusions, and recommendations. The agency acknowledged weaknesses in its processes used to manage patent automation and agreed with the need for key improvements, such as (1) developing architectural linkages to the planning process, (2) implementing a capital planning and investment control guide, and (3) completing planned organizational changes. The Under Secretary emphasized that USPTO had already initiated reforms to ensure more effective implementation of its automation projects, including personnel

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changes in key patent-management positions, and indicated that the agency would rely on the results of our study in conjunction with other assessments that have been conducted to further improve management processes guiding the agency's use of information technology.

Nonetheless, the agency only partially agreed with several specific aspects of our assessment. The Under Secretary pointed out, for example, that in February 2005, USPTO had issued an agency administrative order covering its information technology investment review board and reemphasizing its commitment to integrated investment decision practices. In addition, the agency pointed to our awareness of it having also initiated a review of the architectural linkages to its investments and key decision-making processes being implemented. Further, it stated that it had instituted investment decision papers to provide its investment review board members with improved documentation, including more thorough financial, technical, and alternatives analyses, to assist in making appropriate investment decisions.

The actions that USPTO stated that it has taken could help to improve its overall investment management and decision making. In mid-April 2005, patent officials provided us with a finalized copy of the agency administrative order requiring unit heads to use the capital planning and investment control guide in selecting, controlling, and evaluating information technology investments. However, they stated that the agency had not yet completed the capital planning and investment control processes and procedures. Nonetheless, we have revised our report to reflect the agency's issuance of this order. Further, during our study, agency officials did not inform us of any specific actions that had been initiated to review architectural linkages to investments and gave no indication that the agency had instituted investment decision papers to improve information technology investment documentation and related decision making. Therefore, we lack a basis for evaluating and/or commenting on these particular actions.

USPTO also provided comments on the recommendations contained in our report. Specifically, regarding our recommendation to reassess, and where necessary, revise the approach for implementing and effectively using information systems to support a fully automated patent process, the agency commented that it was changing the method of implementing and achieving effective use of its information technology. The agency stated that it had chosen to follow a more systematic and phased approach to using information technology, in which alternatives are thoroughly

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considered and evaluated against architectural standards, implementation costs, and the ability to effectively meet users' needs, and that detailed investment decision papers are being prepared for all major investments. It added that future patent development initiatives, including those for electronic filing and text-based processing capabilities, would be subjected to this approach to ensure that automated systems are used most effectively to achieve patent program goals. As the agency takes action to achieve more effective use of its information technology, we look forward to monitoring its use of these measures to successfully implement future patent automation initiatives.

Regarding our recommendation to establish disciplined processes for planning and managing the development of patent systems based on well-established business cases, USPTO stated that it was in the process of improving its capital planning and investment control process. For example, it stated that an already-established committee had proposed a format for developing improved business cases that would articulate business needs and expected benefits, require consideration of alternative solutions, and reflect compliance with the agency's enterprise architecture. As stressed in our report, such measures are essential to ensuring effective management of the agency's information technology initiatives and to achieving patent processing improvements through the use of information technology.

Finally, in commenting on our recommendation that the agency fully institute and enforce information technology investment management processes and practices at the enterprise level, USPTO (1) reiterated its actions toward improving its capital planning and investment control process; (2) stated that its Office of Applications Architecture and Services functions as the agency's architectural review board with responsibility for ensuring that information technology systems' designs comply with the enterprise architecture; (3) stated that it would, upon completion of its capital planning and investment control guide, formally establish procedures for reviewing its investments' performance against expected benefits; and (4) stated that it is refining its tools to more completely capture the total cost of its information technology investments.

Such measures, if successfully applied, could substantially improve USPTO's accountability for its information technology investments. However, it is important to note that, during our study, the agency could not provide evidence of a functioning architecture review board. Patent officials told us that such an organization had not been established and that

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reviews had not been required to ensure that planned information technology projects were consistent with the enterprise architecture. As stated earlier in this report, our analysis of documentation supporting the electronic filing system and Image File Wrapper determined that the agency had not rigorously assessed either of these systems' compliance with the enterprise architecture. Given this finding, we continue to stress the need for the agency to enforce its architecture review board's oversight of major information technology initiatives.

Beyond these points of discussion, USPTO offered detailed comments on its Image File Wrapper. While agreeing with the need for more rigorous decision making to support its implementation of this system, the Under Secretary nonetheless believed that moving forward with this initiative was an appropriate step that had fulfilled the agency's promise to provide electronic (paperless) processing of patent applications, and that had provided numerous benefits for the agency in a short period of time. For example, the Under Secretary stated that the Image File Wrapper had eliminated the agency's need for space to house paper patents and, in conjunction with Internet access to patent applications, had alleviated problems associated with lost application files and file integrity. As such, the agency did not see a need to assess the key management processes guiding its decision to undertake this investment.

As reflected in this report, we recognize that the Image File Wrapper, along with Internet access to patent applications, has provided USPTO with important capabilities to support the processing of patents. However, patent officials and examiners acknowledged that performance and usability problems had rendered the system incapable of fully meeting processing needs. Further, patent and OCIO officials had largely attributed the system's problems to known limitations in the design of the software that the agency had acquired from the European Patent Office. They added that, given the performance and usability problems, the agency planned to replace the Image File Wrapper. Thus, while certain benefits should be inherent from having this system in place, in our view, the agency could nonetheless take important lessons from the ad hoc approach in which this investment was undertaken. USPTO opted to undertake this initiative in a manner that did not ensure that it had fully evaluated its patent processing requirements against the most cost-efficient and effective solution for addressing its needs. Moreover, in undertaking the initiative without full consideration of potential alternatives, costs, and benefits, the agency put itself at risk of not fully realizing desired outcomes in terms of improved processing of patent applications.

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Appendix II contains the text of USPTO's comments on our draft report. The agency also provided technical comments, which we have incorporated, as appropriate.

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We are sending copies of this report to the Secretary of Commerce, the Under Secretary of Commerce for Intellectual Property, and the Director, Office of Management and Budget. Copies will also be available at no charge on our Web site at [www.gao.gov](http://www.gao.gov).

Should you have any questions on matters contained in this report, please contact me at (202) 512-6240. I can also be reached by email at [koontzl@gao.gov](mailto:koontzl@gao.gov). Contact points for our Office 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 III.



Linda D. Koontz  
Director, Information Management Issues

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# Scope and Methodology

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To accomplish our objective, we reviewed USPTO's 21st Century Strategic Plan, Tools for Electronic Application Management project documentation, and related information technology plans to determine the agency's vision for and approach to automating its patent process. We also assessed current and selected past initiatives that USPTO has undertaken to develop and implement its automated patent processing capabilities. Specifically, we analyzed programmatic and technical documentation describing the agency's patent process, current electronic patent processing capabilities, and plans for future automation. We evaluated available project management documentation, such as project plans, time lines, and project status reports to determine the agency's progress in implementing a fully automated patent processing system. In addition, to assess key decisions and actions related to the USPTO's development and use of specific electronic information and systems to support patent processing, we examined the agency's consideration of key information technology investment management procedures and practices, such as capital planning and investment control, enterprise architecture, and risk management, in planning and managing the patent automation initiatives. Further, we examined cost information for USPTO's patent automation initiatives, as provided by the agency; however, we did not verify the accuracy of this reported information.

As part of our review, we also examined internal reports documenting an independent contractor's assessment of USPTO's information technology organization. We did not independently validate the findings contained in the reports; however, in discussing their contents with us, USPTO's chief information officer generally concurred with the findings. In addition, we reviewed relevant reports discussing the patent operations that had been prepared by the Department of Commerce's Office of Inspector General.

To supplement our analysis, we interviewed senior patent officials, including the Deputy Commissioner for Patent Resources Planning; the Administrator, Search and Information Resources Administration; and the USPTO chief information officer, who was appointed in February 2005. We also discussed the agency's patent automation efforts with the Under Secretary of Commerce for Intellectual Property, who serves as the director of USPTO. In addition, we met with relevant systems officials who were involved in or knowledgeable about the development and implementation of the automated patent capabilities and with patent managers in charge of the systems' operations. We also interviewed officials of the European Patent Office who worked with USPTO on its implementation of the Image File Wrapper and representatives of the

patent examiners union. In these interviews, we discussed USPTO's strategy and supporting plans for automating the patent processes and elicited their views about and understanding of key management decisions and challenges associated with the automation initiatives.

Further, as part of a series of 11 focus groups undertaken by GAO, we obtained patent examiners' views of and experiences with the automated patent processes. The focus groups consisted of from 6 to 11 employees each and included supervisory patent examiners (3 groups) and patent examiners (8 groups). In total, 91 examiners participated in the focus groups. The 91 participants were randomly selected from the seven technical areas at USPTO's two locations (in Crystal City and Alexandria, Virginia), and all participants had been employed at the agency for at least 9 months. A GAO facilitator led each focus group. The responses were then systematically analyzed using a content analysis.

We conducted our study from June 2004 through April 2005, in accordance with generally accepted government auditing standards.

# Comments from the U.S. Patent and Trademark Office



**UNITED STATES PATENT AND TRADEMARK OFFICE**

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

JUN - 2 2005

Ms. Linda D. Koontz  
Director, Information Management Issues  
U.S. Government Accountability Office  
441 G Street, NW  
Washington, D.C. 20548

Dear Ms. Koontz:

Thank you for the opportunity to comment on the Government Accountability Office (GAO) draft report titled, "Intellectual Property: Key Processes for Managing Patent Automation Need Strengthening." We very much appreciate the effort your team made in reviewing the United States Patent and Trademark Office's (USPTO) processes for managing patent information technology (IT) initiatives.

When I became the Acting Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office in January 2004, I was fortunate to have had exposure to the management culture of the USPTO. Since joining the USPTO in 2002 as the Deputy Under Secretary, I observed the way in which USPTO's Patent management, Office of the Chief Information Officer (OCIO) management, and other senior managers handled decisions on IT investment and planning.

I first came to the USPTO as the Deputy Under Secretary. Then Under Secretary James Rogan made clear that a critical priority was to re-establish USPTO's reputation as an agency that makes promises and keeps promises. A key aspect of re-establishing credibility was fulfilling the commitment, made almost thirty years ago, that the USPTO would electronically process patent applications. Begun during Under Secretary Rogan's tenure in 2002, I was proud to announce fulfillment of the electronic-processing promise in August 2004 with the availability of Internet access to patent application files, just two years after beginning this historic project.

For me, an unanticipated aspect of the IFW process was exposure to the deeper issues that had prevented USPTO from fulfilling its promises and achieving its potential. During the planning and implementation of IFW, and other IT-related Strategic Plan initiatives, I better understood what needed to be changed, and why.

P.O. Box 1450, Alexandria, Virginia 22313-1450 - [www.USPTO.GOV](http://www.USPTO.GOV)



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**Appendix II**  
**Comments from the U.S. Patent and**  
**Trademark Office**

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Based on my observations and experience, when I became the Acting Under Secretary, I was determined to make changes to comport with my personal commitment to accountability, transparency, and results, as a steward of the USPTO on behalf of the American people.

Initially, I worked with the existing Patent and OCIO management, to encourage “change from within.” However, as the head of an agency that is the repository of great technical expertise, I soon appreciated that expert advice of a different nature was necessary. Therefore, in April 2004, I directed my personal staff in the Office of the Under Secretary to conduct, using an outside, independent consulting firm with a national reputation for excellence in the field of IT organizational analysis, a complete review of USPTO’s IT operations, with a focus on delivery capability to our business areas: Patents; Trademarks; Office of General Counsel; Office of the Chief Financial Officer; and Office of the Chief Administrative Officer.

As Deputy Under Secretary, I had directed an independent review of a discrete IT project -- the electronic filing forms for the Madrid Protocol (a trademark treaty). The results of that review were magnified in the larger OCIO assessment, which was formally concluded in early 2005, but whose significant findings were available to me as early as July 2004.

Based both on the earlier, discrete review, and the comprehensive organizational assessment I requested, it was clear to me that significant management changes were necessary. By October 2004, USPTO was conducting a nationwide search for a new CIO, and by early December 2004 we had identified an experienced candidate, who ultimately became our new CIO.

The OCIO organizational assessment pointed out challenges in the business areas as well. Again, based in part on information received from that comprehensive study, as well as on my observations of certain executives’ responses to the GAO’s own efforts, I realized that wider management changes were necessary. Therefore, in January 2005, I made personnel changes in key Patent-management positions, including the SES position responsible for Patent IT projects.

When GAO’s study was announced, I was grateful because I was certain the study would function as yet another independent assessment of the USPTO’s patent IT management practices, giving us even more useful data with which to work. Based on my own reform efforts, I am fully aware that our current team of managers is faced with the challenging, but achievable, task of rebuilding confidence in the USPTO’s IT systems, its methods of implementation and expenditure, and its relationship with the user community. I am proud that we have in fact changed our approach.

Specifically, I have put in place managers who are committed to service, to accuracy, to integrity, and to transparency. Further, I am confident that our new CIO and our Acting Commissioner for Patents are fully committed to my vision of a USPTO that is completely accountable. They are already implementing reforms, mindful of the risk that too much change too quickly can lead to its own set of problems.

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**Appendix II**  
**Comments from the U.S. Patent and**  
**Trademark Office**

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Based on my comments above, it will come as no surprise to find that we agree with GAO's conclusion that there have existed weaknesses in the management process used to direct patent automation, especially when viewed in the broad time frame from GAO's last review of the process in the early 1980s. However, we can only partially agree with several material aspects of GAO's assessment.

As noted above, I directed a comprehensive assessment of the Office of the CIO, one result of which was the hiring of our new CIO. In February 2005, we issued an Agency Administrative Order (AAO) covering the IT Investment Review Board. The AAO reemphasizes the agency's commitment to integrated investment decision practices. As you know, we have also initiated a review of the architectural linkages to investments, and the key processes for decision-making, which is currently under way. Further, we have instituted Investment Decision Papers (IDP) to provide the Investment Review Board members with improved investment documentation. The IDPs give the board members more thorough financial and technical analysis, and offer a variety of viable options and alternatives, to help the Board make appropriate investment decisions.

The following are our comments on the specific recommendations contained in the Draft Report:

**Recommendation 1** – *“reassess, and where necessary, revise the approach for implementing and achieving effective uses of major information systems to support a fully automated patent process, including electronic filing and image- and text-based patent processing capabilities;”*

The USPTO is changing the method of implementing and achieving effective use of IT. We have elected to follow a more systematic, phased implementation, rather than the prior holistic approach. Alternatives are being thoroughly considered, and evaluated against architectural standards, costs of implementation and support, and the ability to effectively deliver an IT solution that meets the needs of the users. Detailed Investment Decision Papers are being prepared for all major IT investments. These papers are being reviewed by USPTO's Management Council, which sits as the Investment Review Board (IRB). The Management Council/IRB approves all major IT investments. Any future patent development initiatives, including those for electronic filing and text-based processing capabilities, will be subject to this more systematic, phased implementation in order to ensure that automated systems are used most effectively to achieve patent program goals.

**Recommendation 2** – *“establish disciplined process for planning and managing the development of patent systems based on well-established business cases that articulate agreed-upon business and technical requirements; include measures for tracking projects through their life cycle against cost, schedule, benefit, and performance targets;”*

A committee has been established to improve the Capital Planning and Investment Control (CPIC) process at the USPTO. This committee has already proposed a format for business cases that recites the business need and expected benefits; that requires the consideration of at least three viable alternatives, and the total cost of each alternative; and that indicates

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**Appendix II**  
**Comments from the U.S. Patent and**  
**Trademark Office**

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compliance with the enterprise architecture, including whether the investment is based on current, emerging, twilight or sunset architecture. The business case must be accompanied by an investment schedule that includes a list of milestones with dates; a listing of assumptions, constraints, and a risk assessment with mitigation strategies; and a list of critical success factors for the project. Finally, the investment schedule must explain how the proposed approach aligns with the USPTO's *21<sup>st</sup> Century Strategic Plan*, and with the President's Management Agenda (PMA).

Following approval of the business case and selection of the preferred alternative, project plans will be developed, and schedules, costs and progress will be managed against these plans, using Earned Value Management (EVM). All investments will also be evaluated against the proposed benefits.

As a result of the independent assessment conducted at my direction, we realized the need to strengthen our IT planning and management processes. Our new CIO is engaged in implementing organizational improvements that will focus on Quality Management and overall IT process improvements.

**Recommendation 3** – *“fully institute and enforce at the enterprise level, information technology investment management processes and practices to ensure that automation initiatives support the agency's mission and are aligned with the agency's enterprise architecture, to include (1) finalizing and implementing a capital planning and investment control guide, (2) establishing an architecture review board and requiring its oversight of major information technology investments, (3) establishing a process to identify expected benefits to internal and external users of information systems and to measure performance against expected benefits, and (4) establishing a process for tracking and reporting aggregate cost information for automation initiatives.”*

In reference to item 1, as noted in our response to the previous recommendation, the USPTO is addressing its CPIC process. Once this is made final, the existing capital planning and investment control guide will be updated to reflect the enhanced procedures.

Concerning the second item, IT project architectures are currently reviewed by the Office of Applications Architecture and Services. This office is responsible for ensuring compliance of IT systems' designs with the USPTO Enterprise Architecture. This group executes the functions performed by an architectural review board.

Regarding item 3, as the committee completes the CPIC guide, it will formally establish the procedures for review of the expected benefits from an IT investment and the evaluation of the performance of the investment against providing those expected benefits.

Finally, concerning item 4, the USPTO has the tools in place to aggregate the cost information for automation initiatives, and is refining use of those tools to more completely capture the total cost of any IT investment.

**Image File Wrapper (IFW)**

Given the importance of IFW to the USPTO, it is appropriate to offer detailed comments on this undertaking.

We agree that the IFW decision-making and implementation process could have been more rigorous, and would have benefited from more rigor. However, we are certain that both GAO and Congress recognize the very positive results, for our examiners and the public, which resulted from the timely deployment of the IFW system.

First, in 2004, the USPTO fulfilled a decades-old promise to the public by finally providing a working paperless system for processing patent applications. In the space of two years, USPTO concluded an effort that had been promised since the 1980s. Second, at a very practical level, IFW eliminated the need for USPTO to retain space to house the patent paper collection stored at the USPTO's Crystal City campus. Because of the IFW system, the USPTO did not have to relocate paper patent application files to our Alexandria headquarters. Third, both examiners and the public have seen the benefits of IFW since multiple users can access the same file at the same time. There is no need to wait to see an electronic file.

In addition, our Public PAIR tool offers Internet access to published patent applications, allowing users around the globe the ability to review information. Private PAIR offers patent applicants the same type of access to their unpublished application files, in a secure Internet environment. It goes without saying that the issue of lost papers or application files has been monumentally reduced. Further, problems with file integrity, that is, problems created when papers were returned to a file out of order, ripped or otherwise degraded through wear, or even lost completely, have been virtually eliminated. As a practical matter, the need to photocopy has been greatly reduced, since files can be printed directly.

To reiterate, in the space of two years, the USPTO presented the public and our examiners with historic electronic access. The manifold benefits of IFW would almost certainly not be available today had USPTO moved at a more traditional pace.

As a lesson of IFW, USPTO fully appreciates that implementation of automation and additional automated tools for both our examiners and public users must be preceded and accompanied by careful planning and documentation. But we make no apologies for having fulfilled promises and provided access and convenience for customers and employees alike.

In light of the progress that the USPTO has made even during the period of GAO's assessment, we do not believe that such significant gaps exist as to warrant a pause and reassessment of our key management processes.

We have also included an enclosure with a list of specific comments that clarify and/or correct certain points covered in your report.

**Appendix II**  
**Comments from the U.S. Patent and**  
**Trademark Office**

6

We do agree with GAO's finding that key improvements need to be made, such as:

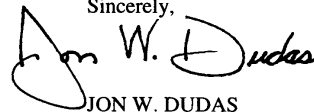
- Improving architectural linkages to the planning process;
- Making final and implementing the draft Capital Planning and Investment Control (CPIC) Guide; and
- Completing planned organizational changes.

Before concluding this letter, I would like to express personal thanks to GAO, and to mention Mary J. Dorsey, Vijay D'Souza, Valerie Melvin, Evan Gillman, Nancy Glover and J. Michael Resser. I understand that Ms. Dorsey and Mr. D'Souza, in particular, spent many hours talking to USPTO employees, conducting interviews, and of course, reviewing documents and writing the draft report itself. We are fortunate to have had the opportunity to work with such dedicated fellow civil servants.

Actions speak louder than words. As Under Secretary, I have taken the painful measures necessary to correct problems I saw with our patent automation strategy, including making personnel changes in key USPTO management positions. However, difficult as an organizational assessment and resulting personnel changes have been, they were and are the correct course of action and will result in a USPTO that is able to deliver and support, in a timely and cost-effective manner, the electronic tools that will see our Nation's patent and trademark office through the 21<sup>st</sup> Century.

Again, we appreciate this opportunity to comment on the GAO's draft report.

Sincerely,



JON W. DUDAS  
Under Secretary and Director

Enclosure

# GAO Contact and Staff Acknowledgments

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## GAO Contact

Linda D. Koontz (202) 512-6240

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## Staff Acknowledgments

In addition to the individual named above, Valerie Melvin, Mary J. Dorsey, and Vijay D'Souza made significant contributions to this report. Evan Gilman, Nancy Glover, and J. Michael Resser also contributed to this report.

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