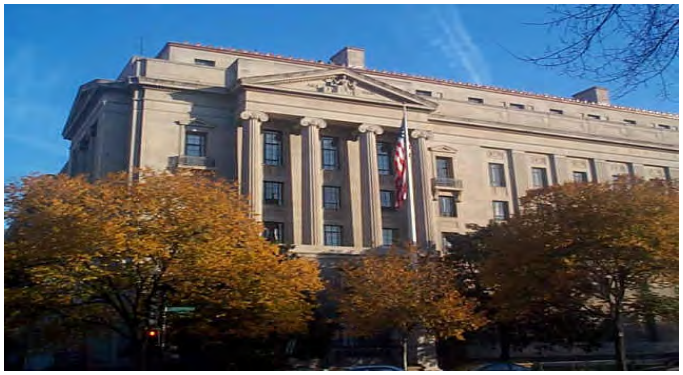

INTERIM REPORT ON THE FEDERAL BUREAU OF INVESTIGATION'S IMPLEMENTATION OF THE SENTINEL PROJECT

U.S. Department of Justice
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INTERIM REPORT ON THE FEDERAL BUREAU OF INVESTIGATION'S IMPLEMENTATION OF THE SENTINEL PROJECT

This is the ninth in a series of reports by the Department of Justice Office of the Inspector General (OIG) examining the Federal Bureau of Investigation's (FBI) progress toward developing and implementing Sentinel-the FBI's new information and investigative case management system.[1] This OIG report assesses a status report on Sentinel submitted by the Department of Justice (Department) that was prepared in response to a congressional directive.[2] Specifically, the *Consolidated and Further Continuing Appropriations Act, 2012* directed the Attorney General to "report to the Committees on Appropriations of the House of Representatives and the Senate a cost and schedule estimate for the final operating capability of the Federal Bureau of Investigation's Sentinel program, including the costs of Bureau employees engaged in development work, the costs of operating and maintaining Sentinel for 2 years after achievement of the final operating capability, and a detailed list of the functionalities included in the final operating capability compared to the functionalities included in the previous program baseline."[3] Our report provides an assessment of the Department's report on its Sentinel program. In the coming months, we also intend to issue a final report on deployment operations, transition, and maintenance of the Sentinel program.

While the Department stated in its July 3, 2012, report that it planned to complete Sentinel implementation at a total estimated cost of $441 million, this does not include costs for 2 years of operations and maintenance (O&M) after Sentinel is completed that was part of the original cost of $451 million that was projected for Sentinel in 2008. In addition, we found that the FBI continues to operate other IT systems that were to be

[1] The prior 8 reports have examined cost, schedule, and system performance since the project's initiation in 2006. Appendix II contains a list of prior OIG Sentinel reports.

[2] The FBI prepared the report submitted by the Department on July 3, 2012.

[3] Under Public Law 112-55, the Conference Report directed the Attorney General to report to the Committees within 120 days of enactment of the Act (enacted on November 18, 2011) and to submit the report to the OIG at the same time for our review. The Conference report also required the OIG to provide an assessment of the Department's report to the Committees on Appropriations within 60 days of receiving the Department's report. The Department provided its report – *Congressional Report on the Federal Bureau of Investigation's Next Generation Information and Case Management Program*, July 3, 2012 – to the Committees and to the OIG on July 9, 2012. See Appendix I.

subsumed by Sentinel because the FBI decided to not include certain functionality originally intended for Sentinel. As is to be expected with an IT system of Sentinel's complexity and extended development, the FBI added, deleted and modified Sentinel's requirements to adjust for changing business needs and technology as well as to simplify the system and adhere to the project's budget.

According to the FBI, it made Sentinel available to all users on July 1, 2012. Since that time, data provided by the FBI indicates that FBI employees routinely have been using Sentinel to perform their daily electronic workflow and investigative activities. Additionally, the FBI has continued to update Sentinel to fix problems that have been uncovered in the normal use of the system since its deployment and to make improvements in Sentinel's functionality.

In its July 2012 report, the Department stated that the FBI had completed 15 of 17 key program event milestones. For the 15 tasks that the FBI stated it had completed, we found that the information the FBI provided adequately supported the status of 8 tasks and partially supported the status of 4 tasks. However, the FBI did not provide us with adequate and relevant evidence to verify the status of 3 tasks labeled "complete". We will continue to evaluate and in a future report provide further assessment of the FBI's completion of Sentinel.

In our last report on Sentinel, issued in December 2011, we observed that while the FBI appeared to be within its $451 million budget, the FBI's development budget no longer included 2 years of O&M activities after development was scheduled to conclude. We expressed our concerns about the FBI's abilities to remain on schedule and within its budget, even when including the use of Sentinel's O&M funds for its development and deployment, because of the cost uncertainties associated with procuring new hardware and with the additional delay to Sentinel's development and deployment. We found that the performance deficiencies related to insufficient hardware capacity (identified during an FBI-wide test exercise of Sentinel in October 2011) caused the FBI to extend its already extended schedule for completing Sentinel's development from December 2011 to February 2012. In addition, the FBI extended Sentinel's deployment schedule from January 2012 to May 2012.

Sentinel Cost Estimate for Final Operating Capability

The FBI reduced its development costs by using an Agile development approach, significantly reducing the rate at which it expended funds on Sentinel development. However, as we noted in previous reports, the FBI did not include in its total Sentinel development the cost for 2 years of Sentinel O&M once the FBI fully deployed Sentinel to all users. These costs, as discussed below, account for approximately $60 million, which the Department does not include in its July 2012 report to Congress when stating its total Sentinel project costs of $441 million. The FBI's initial cost estimate in 2006 was $425 million.

Sentinel Development Costs

The FBI began development of the Sentinel case management system in March 2006 and estimated the entire project would be finished in December 2009. In October 2007, the FBI increased the cost estimate for Sentinel from $425 million to $451 million, based upon the results from Phase 1 of the project. However, when the FBI accepted Phase 2 as complete, the FBI estimated that it had spent approximately $405 million, about 32 percent over budget at that phase of the project. In August 2010, when the FBI adopted an Agile methodology to complete Sentinel, FBI officials said the revised method would allow the FBI to complete Sentinel development within the $451 million budget by re-using portions of FBI IT projects (including Sentinel technology previously developed), taking advantage of technological advances and industry best practices, and increasing reliance on FBI personnel to develop Sentinel.

In its July 2012 report to Congress, the Department stated that the anticipated total cost to fully deploy Sentinel to its agents and analysts was $441 million, $10 million below the available funding. The Department noted in the congressional report that if during testing of Sentinel prior to deployment it found that the Sentinel application required corrective actions, the remaining $10 million may be used to correct these unanticipated changes.

In assessing the FBI's cost estimate for the final operating capability of the Sentinel program, we noted that the $441 million figure does not account for O&M activities for 2 years after Sentinel is completed. The O&M costs would cover support services that originally were to be provided by Lockheed Martin as part of Sentinel's original $451 million budget. Also, the FBI's Sentinel costs do not include the cost of FBI personnel assigned to the Sentinel project. These costs are discussed below.

Operations and Maintenance Costs

In its July 2012 Sentinel congressional report, the Department stated that it will require approximately $30 million annually to fund O&M on Sentinel. The FBI's Chief Technology Officer (CTO) stated that the cost of operating Sentinel will include minor technical changes such as repairs to the system when hardware or software problems arise. For example, the FBI could make minor changes to either Sentinel's code or user interface.

Additionally, the FBI stated that it will make "perfective enhancements" to the system with the $30 million budgeted annually for Sentinel's operations. Perfective enhancements are improvements to system functionality developed after a system has been delivered and are permitted so long as the enhancements do not exceed the scope of the project's System Requirements Specification (SRS) by requiring completely new changes or additions to the system. The FBI's CTO stated that the FBI performs perfective enhancements on all of its major systems.

According to the FBI, perfective enhancements, including fixing any defects that are identified, could be deployed to Sentinel users on a quarterly basis beginning in October 2012. That schedule has not yet been finalized and it will depend on system and operational needs. However, regardless of the frequency of deployments to users, the FBI will continue to use an Agile methodology to conduct O&M and develop perfective enhancements.

The FBI stated that it will assign a combination of its own personnel and contractors to perform O&M and make perfective enhancements. However, it will not use any of the Sentinel O&M budget to fund the cost of FBI personnel who are assigned full-time to O&M and perfective enhancements functions. Instead, the O&M budget will be used to purchase updated software and hardware and pay for contractor personnel who will make up part of the Sentinel O&M team. Government personnel will lead the performance of these functions, but contractors will provide the overwhelming majority of the hours dedicated to executing these functions. While the time spent by FBI personnel on O&M and perfective enhancements will not be charged to the O&M budget, time billed by contractors will be charged to the O&M budget.

In examining the annual $30 million costs to perform critical operations on the Sentinel system and underlying infrastructure, we found that some of the fiscal year (FY) 2012 money budgeted for Sentinel's O&M

was spent on hardware critical to Sentinel's initial full operating capability deployment. Instead of deploying Agile-developed capability to perform all critical case management functions completely within the Sentinel system at the end of September 2011 as it had planned, on October 6, 2011, the FBI conducted a testing exercise during which it determined that Sentinel's then current hardware infrastructure was inadequate.[4] As a result, in March 2012, the FBI installed the needed additional hardware, which cost $6.2 million.[5] According to the FBI CTO and the Sentinel Contracting Officer, the FBI paid for the new hardware with the $30 million O&M budget added to the FBI's base budget, and the cost was not included in the $441 million cited by the FBI as the total development cost of Sentinel.

Finally, according to the FBI, the $441 million cited as the total cost of Sentinel in the Department's July 2012 report to Congress included funding for Sentinel's O&M through May 2012. However, as previously stated, Sentinel's original budget included O&M costs for 2 years after its completion. Since the July 2012 congressional report notes that the FBI's base budget includes $30 million a year for Sentinel's O&M once it is deployed, the total cost for 2 years of O&M would amount to $60 million for Sentinel after it is fully deployed.

FBI Employee Costs

FBI employee costs are not included in the FBI's $441 million Sentinel development costs. The FBI stated that Congress provided the FBI its $451 million Sentinel budget for non-personnel project costs related to Sentinel.

[4] During the Agile development of Sentinel, the FBI revised its targeted dates for deploying interim functionality and the final system to users. At the beginning of Agile development in October 2010, the FBI planned to release new functionality to all users through four releases on a quarterly basis, with the releases completed by October 2011. That plan changed in the spring of 2011, when the FBI planned to release Sentinel functionality to users through two releases, the first in September 2011 and a final deployment in November 2011. The first deployment, called the System of Record Release and planned for September 2011, was to provide all Sentinel users with the capability to perform all critical case management functions completely within the Sentinel system. The final deployment, planned for November 2011 and called the Full Operating Capability Release, was to provide users with a fully-functional electronic case management system.

[5] We requested cost data to verify how the FBI has spent the remaining $23.8 million of the $30 million. The FBI stated that it is in the process of providing us this information, but we did not receive enough information by the time of this interim report to evaluate how the FBI spent the remaining $23.8 million.

The FBI estimated that upon deployment, approximately $30 million will have been spent on FBI employee costs for completing Sentinel. We requested from the FBI information on the breakdown and calculation of these costs. The FBI is in the process of providing this information. However, we did not receive enough information by the time of this interim report to evaluate the FBI's estimated cost for employees to complete Sentinel.

The FBI defines the term "directly contributed" as those government employees who are assigned on a permanent basis to the Sentinel project. It does not include personnel on temporary duty.[6] According to the FBI, the $30 million expended to cover the costs of those government employees assigned on a permanent basis to the Sentinel project were covered by the FBI's base funding and would have been expended on these employees even if they were not working on the Sentinel project.

Automated Case Support System Operations Costs

In implementing Sentinel, the FBI did not migrate all case data from its previous case management system – Automated Case Support (ACS) system – into Sentinel, as previously planned. According to the FBI, it has migrated millions of case files from ACS. The FBI will continue to house historical data within ACS for as-needed access or migration. In addition, the FBI stated that it must continue to maintain ACS because ACS and the National Name Check Program system share code.[7] An FBI official stated that the computer code of the National Name Check Program system is so intertwined with ACS that terminating ACS would make the National Name Check Program system incapable of functioning. The FBI stated that it intends to award a contract for its replacement of the National Name Check Program in fall of 2012, and it has not identified either a cost or schedule for

[6] We are aware that some employees have been assigned to the Sentinel project on a temporary duty, although the FBI has not provided us with the precise number. If the costs of the FBI employees assigned to Sentinel on a temporary basis were included, that number could possibly be higher.

[7] In response to a request from a federal, state, or local agency, the National Name Check Program queries FBI records to determine whether the person named in the request has been the subject of an FBI investigation or mentioned in an FBI investigation. In our December 2006 report on Sentinel, we identified the National Name Check Program system as a cost that could be considered as associated with Sentinel but was a separate project and therefore not included as part of Sentinel's then projected $425 million cost. We noted then that the implementation of Sentinel would require changes to the National Name Check Program system. The data system used by the program relies on the ACS system, which Sentinel is intended to replace. In December 2006, the FBI estimated cost of updating the existing name check system to work with Sentinel was over $10 million.

the replacement. As a result, the FBI will continue to operate ACS and will continue to incur costs associated with operating and maintaining ACS.[8]

Sentinel Schedule for Final Operating Capability

As stated previously, the FBI initially estimated that it would deploy an Agile-developed capability to perform all critical case management functions completely within the Sentinel system at the end of September 2011 and a fully functional electronic case management system in December 2011. Following its October 2011 test of the Sentinel system, the FBI again revised its estimate for completing Sentinel, planning to complete development in February 2012 and estimated a May 2012 system deployment to all users. In its July 2012 report, the Department stated that it initiated Sentinel deployment on May 29, 2012. The FBI stated to us that it made Sentinel available to all users on July 1, 2012. On July 31, 2012, the FBI announced publicly that it successfully deployed Sentinel to all users on July 1, 2012. Since that time, data provided by the FBI indicates that FBI employees routinely have been using Sentinel to perform their daily electronic workflow and investigative activities. Since deploying Sentinel to all users, the FBI has continued to update Sentinel to fix problems that have been uncovered in normal use of the system and to make improvements in Sentinel's functionality. We plan to further assess and report on Sentinel's user functionality in a future report.

Development Progress

A Sentinel project official who briefed the OIG on the Department's July 2012 report to Congress told us that "Go-Live", which the FBI defines as Sentinel's final operating capability available to users, was initiated on May 29, 2012, when the system contained current operational information. The FBI also stated that the "Go-Live" deployment activities continued throughout June 2012 and that Sentinel's final transition to O&M would occur on August 9, 2012. This Sentinel project official said that the FBI had to consider a number of instances where further enhancement or deployment of the system had to be put on hold due to operational concerns where there may be a heightened threat to national security.

On July 1, 2012, FBI personnel were granted access to Sentinel for use in investigative activities, and the FBI was no longer using ACS and its paper-based records system for current case management. As previously

[8] On August 15, 2012, we requested from the FBI its annual ACS O&M costs. The FBI is working to satisfy this request, but we have not yet received this information.

stated, the FBI publicly announced in a press release on July 31, 2012, that Sentinel's official deployment occurred on July 1, 2012.[9]

The FBI's Life Cycle Management Directive (LCMD) established policies and guidance applicable to all FBI IT programs and projects, including Sentinel. The LCMD contains 23 key support processes that help manage the development of IT projects within the FBI. The LCMD and its key support processes are designed to ensure that each project meets specific requirements before it obtains management approvals necessary to proceed to the next phase. However, in our December 2011 report on Sentinel, we reported that while the LCMD discusses several development approaches, it does not include criteria for the implementation of an Agile development methodology. As a result, some of the processes implemented were vague and ambiguous; for example, it was not clear which system documents Sentinel project personnel must submit to FBI IT project governance personnel and which reviews the project must pass to achieve compliance with the FBI's LCMD.

In its schedule estimate in the Department's July 2012 Sentinel congressional report, the FBI identified 17 key program event milestones and target dates leading to the deployment of Sentinel's final operating capabilities to all FBI Sentinel users. Of the 17 tasks listed, the FBI report labeled 15 tasks "complete", 1 "in progress", and the final task as "on target." To facilitate our assessment of the Sentinel schedule estimate in the FBI's report, for each of the 17 tasks listed we asked the FBI to provide a description of the task, support for the target completion date, and documentation or evidence to support the status listed in the FBI's report. The FBI submitted descriptions for all 17 tasks as well as supporting documentation.

For the 15 tasks that the FBI stated it had completed, we found that the information provided adequately supported the status of 8 tasks and partially supported the status of 4 tasks. However, the FBI did not submit adequate and relevant evidence to verify the status of 3 tasks labeled "complete". In a future report, we will report on the status of Sentinel as it was deployed.

[9] While the FBI's press release stated that Sentinel was deployed on July 1, 2012, the Department's report to Congress stated that the system's deployment was initiated on May 29, 2012. While we recognize that aspects of Sentinel were in place prior to the July date, FBI staff effectively were not using Sentinel as the FBI's official case management system until July 1, 2012.

In addition, the FBI stated in its July 2012 report that it achieved its Authority to Operate (ATO) milestone on May 25, 2012. Typically, an ATO milestone is achieved when an official evaluates a system's ability to meet electronic recordkeeping criteria and then signs a document granting the authority to operate the system as an official recordkeeping system. In support of the ATO milestone that the FBI stated it achieved on May 25, 2012, the FBI provided an ATO establishing that this milestone was achieved on May 25, 2012. This ATO is valid for 180 days.

We also found the FBI did not have a defined framework for measuring an Agile project's progress or how the status of key tasks should be evaluated. We are concerned that the lack of such a framework may adversely affect the quality of Sentinel or other FBI systems developed using an Agile methodology.

Based on the documentation provided to the OIG, we can determine that some of Sentinel's activities leading up to deployment occurred on schedule, as listed in the FBI's July 2012 report. However, we could not determine that all activities occurred in a timely manner or if their completion was based on comparison to rigorous criteria because the FBI did not provide us sufficient documentation in support of these achievements. Further, while the Department's report was provided to Congress on July 3, 2012, the FBI only provided documentation to support the completion of the tasks by the date when the Department's report was prepared. Therefore, we were unable to verify the actual date the tasks were completed.

Sentinel Functionality (Final Operating Capacity vs. Original Program Baseline)

In our October 2010 report on Sentinel, we noted that Sentinel's technical requirements were 6 years old, and there had been significant advances in technology and changes to the FBI's work processes.[10] We recommended that the FBI: (1) reassess the functionality described in Sentinel's requirements, including the requirement to migrate all case data from the Automated Case Support (ACS) system into Sentinel, and update the requirements as necessary; and (2) prioritize the remaining requirements so that if the FBI cannot afford to meet all of them, it can

[10] U.S. Department of Justice Office of the Inspector General, *Status of the Federal Bureau of Investigation's Implementation of the Sentinel Project*, Report 10-22 (March 2010). In September 2011, the FBI stated it completed a review of the SRS requirements in accordance with a recommendation in the Office of the Inspector General's October 2010 report on Sentinel.

focus on those requirements that have the greatest impact on its agents and analysts. As is to be expected with an IT system of Sentinel's complexity and extended development, the FBI added, deleted and modified Sentinel's requirements to adjust for changing business needs and technology as well as to simplify the system and adhere to the project's budget. However, we found that the FBI did not adjust its cost baseline when it transferred requirements to other FBI information systems or when it removed significant development efforts from the requirements such as the requirements to build controlled interfaces with other FBI systems.

The FBI defined "full operating capability" as the specific requirements that Sentinel must meet as detailed in the Sentinel's System Requirements Specification (SRS). According to the FBI, the initial version of the SRS, dated June 2005, contained 1,129 requirements. In the 7 years since the initial SRS was approved, changes to the FBI's business processes and IT infrastructure and significant advances in technology led the FBI to reassess and update Sentinel's requirements and functionality. From February 2009 through December 2011, the FBI's Executive Steering Committee (ESC), which is comprised of the FBI's Deputy Director, Associate Deputy Director, and five Executive Assistant Directors approved additions, deletions, and modifications to the original SRS requirements.[11] Documentation provided by the FBI showed that it added 90 SRS requirements, deleted 172 SRS requirements, and modified 119 SRS requirements reducing the SRS requirements to 1,047. According to the FBI, the rationale for the changes to the SRS requirements fell into the following three categories: (1) changes in approach to providing the needed functionality, (2) negative business consequences, and (3) clarification or simplification of the requirements. Some of the deleted requirements included functional areas such as search capabilities (34 deletions), case management (20 deletions), and task management (11 deletions). We believe that in a program of Sentinel's importance, complexity, and cost such an evolution is not unusual.[12]

[11] The role of the ESC is to approve or disapprove any additions, deletions, and modifications to the Sentinel SRS proposed by Sentinel program leadership. The ESC's role and responsibility is not exclusive to the Sentinel program. It also provides oversight for other FBI IT programs.

[12] For example, the Sentinel requirements included a specification on the size of a web page, but Sentinel later divided screens into multiple web pages, eliminating the need for a single web page requirement. In another example of a requirement change, the FBI determined that a requirement in the original specification that provided for notifications every time case information was changed would have led to users being flooded with notifications and would have adversely affected the speed of Sentinel's performance.

The Department reported in its July 2012 Congressional report that as of February 10, 2012, the Sentinel program had completed over 97 percent of the current 1,047 SRS requirements. In addition, the FBI reported that it satisfied the functional intent of all 16 of Sentinel's functional areas detailed in the Sentinel SRS. Each of these functional areas includes a narrative describing the business need underlying the functional area and the numbered requirements related to the functional area. The following table shows requirements added, deleted, and modified by functional area.

CHANGES TO SENTINEL'S REQUIREMENTS BY FUNCTIONAL AREA[13] AS OF FEBRUARY 2012

Functional Area	Requirements in Functional Area	Additions	Deletions	Modifications
Architecture	68	3 (4%)	6 (9%)	10 (15%)
Case Management	117	10 (9%)	20 (17%)	9 (8%)
Collected Items Management	85	0 (0%)	5 (6%)	0 (0%)
Crisis Case Management	15	0 (0%)	15 (100%)	0 (0%)
Indexing	38	2 (5%)	2 (5%)	19 (50%)
Interface	29	25 (86%)	3 (10%)	2 (7%)
Records Management	103	0 (0%)	1 (1%)	0 (0%)
Reports	36	0 (0%)	7 (19%)	0 (0%)
Search	108	1 (1%)	34 (31%)	14 (13%)
Security	194	3 (2%)	30 (15%)	20 (10%)
Task Management	57	0 (0%)	11 (19%)	3 (5%)
User Interface	199	28 (14%)	8 (4%)	23 (12%)
Work Item Authoring	101	4 (4%)	22 (22%)	15 (15%)
Work Flow	69	14 (20%)	8 (12%)	4 (6%)
TOTAL	**1,219[14]**	**90**	**172**	**119**

Source: FBI

[13] The table shows 14 functional areas, and does not include the functional areas: Enterprise Portal and Project Management. It appears that the requirements for these two areas were combined with the requirements for these 14 functional areas.

[14] The total number in the column for Requirements in Functional Area reflects the original 1,129 requirements plus the 90 additions, or 1,219 requirements. This 1,219 figure minus the 172 deleted requirements equals 1,047 – the number of requirements in the February 2012 version of the Sentinel specifications.

As shown in the previous table, all of the Crisis Management functional area requirements were deleted because the capability described in those requirements is met by the Operational Response and Investigative Online Network (ORION), a system which interfaces with Sentinel. In addition, the Search functional area had a high percentage of its requirements deleted – 31 percent.[15] The Case Management and Work Item Authoring functional areas also had a significant percentage of deleted requirements, 17 percent and 22 percent respectively.[16] The Interface functional area had the largest percentage of added requirements, 86 percent.[17]

We reviewed documentation provided by the FBI that described the deleted requirements and the justification for the deletion. The documentation included the ESC meeting minutes, which recorded the ESC's approval of the changes to the SRS and the Request for Changes for modifications of the SRS. The deleted requirements were approved by Senior FBI Leadership and provided a justification for their removal. However, for a majority of cases the documentation did not include an assessment of the cost of adding, deleting or modifying the requirements. We believe an assessment is vital for updating the budget baseline against which Sentinel's cost performance is measured and capturing cost savings and increases associated with deleting and adding a requirement.[18]

For example, as mentioned above, the FBI eliminated all 15 SRS requirements in the Crisis Management functional area because the ORION system, which was deployed in July 2008, would interface with Sentinel. The FBI decided it was not necessary or cost effective for Sentinel to

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[15] The search function is the capability to locate information contained in Sentinel. This function includes multiple ways in which the results of searches can be examined, formatted, saved, and passed on to other users.

[16] The FBI uses cases to provide control oversight of investigative or administrative activity and to associate relevant documents to cases. The Case Management functional area includes the lifecycle of cases as well as how the information flows into a case through the case management function and how a case is organized. The Work Item Authoring functional area relates to authoring, which is the capability to create, read, update and delete any and all parts of a work item.

[17] The user Interface functional area includes the requirements related to the graphical user interface that Sentinel users experience.

[18] In our August 2007 report on Sentinel, following the completion of Phase 1 of Sentinel, we recommended that the FBI negotiate decreases in the cost of future phases if requirements are deferred in that phase. The FBI agreed and formed a Requirements Working Group to address our recommendation.

replicate ORION's functionality.[19] However, in May 2012, the FBI awarded a $19 million contract to operate and maintain ORION for 8 years. The FBI's CTO told us that future versions of Sentinel may replace ORION. We are concerned that costs originally intended to be borne by Sentinel were transferred to ORION and that future Sentinel funding will be used to replace ORION.

Forty-four of the 172 deleted requirements were transferred to the other FBI IT systems, including:

ORION: Fifteen requirements related to crisis management were deleted because they duplicated functions provided by ORION.

Data Integration and Visualization System (DIVS): Ten requirements related to Sentinel's search capabilities were deleted because they overlapped with DIVS. Deployed in 2011, DIVS is a search tool capable of searching the FBI's most-used databases.

Case Document Access Review: Five requirements related to the capability of Special Agents to monitor who views the documents within their cases were deleted because Sentinel did not subsume the Case Document Access Review.[20]

Delta: Six requirements were deleted because Delta subsumed two legacy human intelligence systems that were originally to be subsumed by Sentinel. Delta is a confidential human source management system that provides FBI agents and intelligence analysts a uniform means of handling the administrative aspect of maintaining human sources.

In addition, the FBI's Guardian system allows for the intake, tracking, searching and analysis of terrorist threat incident or suspicious activity reports. The utility of this database is that it is easily searchable and allows for pattern analysis. The initial Sentinel SRS stated, "Guardian system was

[19] ORION provides cases management and related information processing capabilities to support federal, state, local, and tribal law enforcement agencies in a coordinated response to crises at special events or critical incidents – anything from political party conventions to the Super Bowl to terrorist attacks.

[20] We requested from the FBI information on whether Sentinel has the functionality that allows Special Agents to have knowledge of all persons who access case documents, but the FBI has not provided us a response to this inquiry. Without this functionality Sentinel does not have a basic control to detect and mitigate the insider threat from persons who access files without a need to know.

developed as an intermediate solution until full Sentinel functionality is available." However, Sentinel did not subsume Guardian as planned. Therefore, the FBI has to maintain and operate two systems to track and record investigative activity and information when assessing threats and performing investigations.

In addition to the deleted requirements that transferred requirements to other IT systems, the FBI also significantly modified Sentinel's requirements to interface with other IT systems. Specifically, the SRS originally required Sentinel to build controlled interfaces for systems that need to share information between different security domains. However, in 2009, the FBI determined that this functionality was an FBI enterprise responsibility and that Sentinel would not build controlled interfaces. This decision eliminated 17 requirements and modified 9 other requirements.[21] Also, Sentinel's requirements originally listed 35 systems with which Sentinel would interface. However, the FBI decided that "rather than specifying a definitive list of interface[s] the system will communicate with, a decision was made to rewrite these requirements to a list of services that Sentinel will provide. Other systems may then avail themselves of these services."[22]

Conclusion

In its July 3, 2012, report to Congress on its Sentinel system, the Department stated that it planned to complete Sentinel implementation on August 9, 2012, at a total estimated cost of $441 million. While this amount is less than the $451 million most recently budgeted for Sentinel, we note that the $441 million does not include costs that were included within the original scope of the project, particularly O&M costs for 2 years after Sentinel was implemented. On July 31, 2012, the FBI announced publicly that it had deployed Sentinel to all FBI employees on July 1, 2012. Data provided by the FBI indicates that FBI employees routinely have been using Sentinel to perform their daily electronic workflow and investigative activities.

In assessing the FBI's discussion of Sentinel's functionalities, we found that several of the system's requirements have been modified or deleted and that additional requirements were added over the course of Sentinel's

[21] We requested data from the FBI on the cost impact on Sentinel of eliminating the 17 requirements and implementing them at the FBI enterprise level, but the FBI did not provide the cost information because the FBI stated that it does not record costs at the requirement level.

[22] Sentinel Request for Change, number 2015, approved by the Executive Steering Committee on May 24, 2011.

development. Additionally, some requirements were transferred to other FBI systems. We plan to conduct a more detailed assessment and report on Sentinel's user functionality in a future report.

THE DEPARTMENT OF JUSTICE'S JULY 2012 REPORT TO CONGRESS

Congressional Report on The Federal Bureau of Investigation's Next Generation Information and Case Management Program

Submitted to:

Committees on Appropriations of the United States House of Representatives and the United States Senate

Prepared by:
Federal Bureau of Investigation
Department of Justice

July 2012

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I. Overview of Reporting Requirement

This Federal Bureau of Investigation (FBI) report responds to the Congressional reporting requirement related to the Fiscal Year (FY) 2012 Appropriation as required by the Joint Explanatory Statement P.L. 112-284, Consolidated and Further Continuing Appropriations Act of 2012:

> "Sentinel – Within 120 days of enactment of this Act the Attorney General shall report to the Committees on Appropriations of the House of Representatives and the Senate a cost and schedule estimate for the final operating capability of the Federal Bureau of Investigation's Sentinel program, including the costs of Bureau employees engaged in development work, the costs of operating and maintaining Sentinel for 2 years after achievement of the final operating capability, and a detailed list of the functionalities included in the final operating capability compared to functionalities included in the previous program baseline."

II. Background of the Sentinel Program

Sentinel, the FBI's next generation information and case management program, has been in development since March 2006. When fully operational, Sentinel will replace the FBI's aging and outdated Automated Case Support (ACS) System. It will also transform the way the FBI conducts business by moving it from a primarily paper-based case management system to an electronic workflow-based management system of records. This will help the FBI manage information beyond the case focus of the existing ACS system and provide enhanced information sharing, search, and analysis capabilities. Furthermore, Sentinel will facilitate information sharing with law enforcement and Intelligence Community members, including the Department of Justice (DOJ) and the Department of Homeland Security.

On March 16, 2006, Lockheed Martin (LM) was awarded the Sentinel contract. LM planned to develop and deploy Sentinel in four phases – with each phase introducing new capabilities. On June 19, 2007, the FBI announced the successful enterprise-wide deployment of the first phase of Sentinel. Phase 1 provided a user-friendly, web-based interface to access information currently in the FBI's ACS system with information pushed to users and available through hyperlinks. It featured a personal workbox that summarized a user's cases and leads, put more information at the user's fingertips, and moved employees from dependence on paper-based files. Additionally, it provided user-friendly search capabilities, which was an improvement over the cumbersome mainframe system. Phase 1 also made available a squad workbox that enabled supervisors to better manage their resources and workflow, and made it easier to assign leads. After the Phase 1 deployment, LM released 14 system builds that improved efficiency and enhanced the user's Sentinel experience. Many of these enhancements were a direct result of addressing user feedback received via the Sentinel website, focus groups, office visits, and other outreach efforts.

Based on lessons learned during Phase 1, FBI leadership decided to change the developmental approach from a waterfall (strict phases) to an incremental development methodology that divides the four phases into segments. This results in a more rapid delivery of capabilities, rather than deploying all capabilities at the end of a phase.

In April 2008, all four segments of Phase 2, Segment 1 were delivered ahead of schedule and within budget. Two of the segments in Phase 2 delivered the Sentinel Enterprise Portal and a

number of administrative, infrastructure, and security enhancements. Additionally, Phase 2, Segment 2 successfully deployed critical hardware that increased the system's performance on July 16, 2008.

The Sentinel's new user interface was launched in September 2009. The streamlined design provided the foundation to support future functionality, including electronic workflow and web-based case management. Enhancements included a navigation panel that offered quick access to online help, searches, and internal links; easier access to user workloads; the ability to open and view multiple cases and serials within one screen; and a more cohesive supervisory workbox.

On December 2, 2009, the FBI conditionally accepted delivery of Sentinel's Phase 2, Segment 4, from LM, which included three of the eight electronic forms and their associated workflows. Because this segment was delivered with serious performance and usability issues, and received negative user feedback during testing with FBI special agents and intelligence analysts, Segment 4 was not deployed to FBI employees in December 2009.

On March 3, 2010, the FBI directed a partial stop work of Phase 3 and all Phase 4 activities to focus on the deployment of Phase 2, Segment 4. The focus transitioned from operations and maintenance activities back to the development phase. Three pilots were held in May and June 2010 with the FBI's Critical Incident Response Group (CIRG), and at the Richmond and Tampa Field Offices. The goal of the pilots was to test Sentinel's new forms and workflow capabilities that were part of Phase 2, Segment 4.d

On July 12, 2010, the FBI extended the March 3, 2010, partial stop work order to include the remainder of Phase 3. On July 26, 2010, the FBI's Information and Technology Branch (ITB) deployed Phase 2, Segment 4, which provided new and enhanced capabilities. These capabilities included the creation of case documents online; the efficient flow of those documents electronically through submission, collaboration, vetting, and approval; the capability to search across all case-related information; and an easy-to-use interface. In all, Segment 4 included two new forms (i.e., FD-1036 Import Form and FD-1038 Lead Request) and two modified forms (i.e., FD-1057 Electronic Communication and FD-302 Interview Form).

In September 2010, the FBI announced changes for bringing Sentinel to full operational capability. This new direction was based on a comprehensive assessment by subject matter experts of Sentinel's past performance, current state, and future requirements. As a result, it was decided that the future Sentinel development efforts would use an Agile approach and would be managed directly by the FBI's Information Technology Engineering Division (ITED) versus LM.

The Agile approach to software development focuses on the frequent delivery of capabilities through the close collaboration of users, stakeholders, developers, and testers. The Agile development approach seeks to deliver value to users quickly. For the FBI, system requirements are addressed through functionalities that are developed in two-week increments called *"Sprints." At the conclusion of each Sprint a new development is demonstrated and tested.*

On October 18, 2010, the ITED kicked off the new development approach to complete Sentinel: Agile development with Scrum methodology. This approach involves working quickly in small teams to deliver regular updates to the system. The Agile model ensures that the latest technologies and best practices are integrated into Sentinel's development process to address remaining requirements in an effective, prioritized manner. Operations and maintenance of the

system's current capabilities were transitioned to the FBI's Information Technology Services Division. LM continues to support the FBI as a Sentinel subject matter expert as well as supporting Sentinel operations and maintenance.

To ensure the Sentinel application would meet the users' needs, the Sentinel management team established a Sentinel Advisory Group (SAG) to preview Sentinel capabilities during the process and provide feedback on new functionality. The SAG consisted of FBI employees with a variety of skill sets and case management experience. Additionally, a variety of beta sessions, demonstrations, and hands-on orientations were conducted from May—July 2011. More than 550 users participated in beta testing or received a demonstration of Sentinel. These include:

- **March 30-31** -- The SAG 1 (In-person beta) (18 employees).
- **June 15-17** – The SAG 2 (Remote beta) (21 employees).
- **June 15-17** – The Sentinel Coordinators and Sentinel Training Advisors (Remote beta) (125 employees).
- **June 22-24** – Washington Field Office employees (in-person beta testing) (158 employees).
- **July 5-8** – Chicago and Memphis Field Office employees (Remote beta testing) (152 and 50 employees respectively).
- **July 12-13** – The Communications Training Team (CTT) demonstrated new Sentinel functionality to Sentinel Support Unit Help Desk employees at the Criminal Justice Information Service Division located in West Virginia (4 employees).
- **July 28** – The CTT provided a hands-on demonstration of Sentinel to the Records Management Division Help Desk employees to familiarize them with the new features within Sentinel (25 employees).
- Bi-weekly development team demonstrations of the latest Agile Sentinel build to FBI executives, managers, and external oversight entities (an average of 18 employees over 21 demonstrations).

Additionally, prior to the October 6, 2011, Sentinel Functional Exercise (SFE), the Sentinel team briefed a variety of audiences, with some attendees receiving hands-on experience with the Sentinel application. Events included:

- **September 1** – Beta session for 19 Directorate of Intelligence and Counterterrorism Division employees at FBI Headquarters.
- **September 6** – A lengthy demonstration to members of CIRG during scenario discussions for the SFE.
- **September 15** – Two beta sessions with users from Criminal Investigative Division, International Operations Division, Counterintelligence Division, and the Weapons of Mass Destruction Directorate (approximately 19 employees for each session).
- **September 19** –A Sentinel demonstration to more than 55 attendees during the Legat Conference.
- **September 26** – A beta session for more than 25 employees from the Director's Advisory Groups (Special Agents Advisory Committee, Mid-level Management Advisory Committee and AEGIS).

- **September 27-28** – Live Meeting training for Sentinel Coordinators/Sentinel Training Advisors in preparation for the upcoming SFE.

On October 6, 2011, the ITB conducted a nationwide SFE with more than 700 employees. This exercise proved invaluable because it allowed the field to have hands-on experience with the application and its available functionality. It also helped leadership to determine that although the application functionality and design were well-received, some of the hardware (e.g., database servers) used to support Sentinel needed to be replaced because they were originally purchased in 2007 and had become outdated. The new hardware is in line with the original architecture allowing Sentinel to take advantage of the improved performance from the current generation equipment. The Sentinel development team continued to refine and develop additional functionality through two week development periods (also known as Sprints), with Sprint 27 completed in December 2011. In January 2012, the ITED ordered the new hardware to accommodate the Sentinel application.

III. Schedule Estimate

The following table, as of June 1, 2012, provides the key program event milestones and target dates remaining between the date of this report and the deployment of Sentinel's final operating capabilities to all FBI Sentinel users. The date when Sentinel's final operating capability will be made available to all FBI end-users is referred to as the "Go-Live" date. Go-Live was initiated in May 2012 and deployment activities will continue throughout June 2012.

Task	Target Completion Date	Status
Advisory Group Assessments of Sentinel Software Functionality	1/11/12	Complete
Receipt of FY 2012 Technical Refresh Hardware	2/6/12	Complete
Assessment of Sentinel Software Functionality in Comparison to Sentinel Requirements Specification (SRS)	2/10/12	Complete
Assessment of Readiness for the Sentinel Advocacy Orientation	2/14/12	Complete
Integration of the Software and the Technical Refresh Hardware	3/2/12	Complete
Sentinel Advocacy Orientation	3/9/12	Complete
Performance Tuning of Technical Refresh Hardware	3/16/12	Complete
Demonstrations for FBI end-users	3/20/12	Complete
Installation of Technical Refresh Hardware	3/22/2012	Complete

Task	Target Completion Date	Status
Test Readiness of Sentinel Final Operating Capability Hardware	3/29/12	Complete
Second Sentinel Functional Exercise	4/25/12	Complete
System Readiness Checklist Complete – Authority to Deploy	4/25/12	Complete
Organizational Readiness Verification	5/9/12	In Progress
Final Assessments for Certification, Accreditation, Recordkeeping and Privacy Impact	5/25/12	Complete*
Obtain "Authority to Operate"	5/25/12	Complete
Initiate Deployment of Final Operating Capability to all FBI End Users – "Go Live"	5/29/12*	Complete
Post Deployment Operations and Transition	8/9/12	On target

*Note PIA is still under review

IV. Cost Estimate

The FBI has complied with the language included in the House report regarding the expectation that the FBI will continue all necessary periodic oversight reviews in accordance with recommendations from the Inspector General. The FBI has also adhered to the language in the Senate report regarding the prohibition of exceeding $451 million on development without first providing notification to the Committees on Appropriations and developing a work breakdown (schedule).

Deployment of the software, performance testing, and optimization occurred using the foundation provided by the hardware technology refresh. This effort began upon receipt of the hardware on February 6, 2012, and was completed by March 23, 2012. In parallel, the Sentinel team is focused on organizational change management activities, which address a wide range of FBI user groups with the objective of preparing end users and support the organization during the transition to the Sentinel system. The system Go-Live transition was initiated in May 2012, and may continue through summer 2012, as case information is migrated from the legacy ACS system into the Sentinel system upon user request.

The current anticipated total cost of Sentinel through the Go-Live transition is $441 million, which is $10 million below the available funding. Should testing prove that the deployment of the Sentinel application onto the refreshed infrastructure requires mitigation due to an as-yet-unknown operational risk, the remaining $10 million may be required to implement corrective active options.

V. Cost of Direct Contributions to Development Work by FBI Employees Development

At the outset of the program in 2005/2006, an estimated cost rate was established based on the average salary of GS13-15 employees, and doubled as a rough measure of estimating the total cost of FBI employees who "directly contributed" to the development and deployment of Sentinel. The initial average rate has been updated by applying a yearly cost of living escalation.

The cost of the direct contribution from FBI employees has been included as a distinct part of the program's Office of Management and Budget (OMB) 300 submissions – separate from the $451million total contracted budget – since the inception of the program. Based on the most recent OMB 300 submission, the FBI estimates that upon Go-Live deployment, approximately $30 million will have been spent on such FBI employee costs for completing Sentinel.

VI. Post Final Operating Capability Costs

The legacy Sentinel system has been in use since the spring of 2007, and currently services approximately 11,000 users per month. The cost of operations and maintenance support since April 2007 (through May 2012) is funded from the $451 million total contracted program budget.

After Sentinel's final operating capabilities are deployed, the FBI will require approximately $30 million per year to perform critical steady state operations on the Sentinel system and underlying infrastructure to ensure its successful continued operation. This funding is currently in FBI's base.

VII. Functionalities (Final Operating Capability vs. Original Program Baseline)

Development of the Sentinel system with final operating capability was initiated in 2006 and was preceded by a business process reengineering activity that provided input to the development of the Sentinel Requirements Specification (SRS). The initial SRS listed 1,122 requirements and was reduced to 1,047 requirements. Throughout the duration of the program, requirements engineers from this initial effort have been a consistent part of the program's staff. Additionally, an Executive Steering Council (ESC) was formed, which consisted of the FBI's Deputy Director, Associate Deputy Director, and five Executive Assistant Directors. This ESC was responsible for all modifications to the SRS. Any changes to numbered SRS requirements had to be approved by the ESC. The staff consistency, in addition to the ESC process whereby change was authorized at an executive level, enabled the program to maintain direct traceability to the initial functional intent.

As expected, changes have been made to a number of individual SRS requirements to adapt to operational needs of the organization. The FBI has updated the requirements as necessary. These efforts took into consideration the fact that the organization's business practices and technology have continued to evolve during the six years that have passed since the SRS was initially generated in 2005.

The adjustments have largely fallen into three broad categories:

1. Changes in approach, to make use of technology improvements and to align with the current strategic information management goals of the FBI. This approach better reinforces the service-oriented approach intended for Sentinel and the FBI as a whole.
2. Elimination of requirements to avoid potential unintended negative business consequence if they were implemented as written.
3. Clarification or simplification of requirements that were of marginal benefit to users and would result in unnecessary spending.

As of February 10, 2012, the program has achieved the functional intent of over 97 percent of the numbered official 1,047 SRS requirements, based on a comprehensive assessment of Sentinel final operating capability software functionality in comparison to the SRS. As a result, the Sentinel program has satisfied all of the originally-intended major functionalities to be a fully automated, web-based case management system designed to support both our law enforcement and intelligence missions.

The breakdown of the point-by-point accounting of each of the current 1,047 SRS would be too long for this report.[1] The following table provides a summary of each of Sentinel's 16 functional areas. These sections are summarized from the current SRS, and the text in quotes is taken directly from the current SRS. All the functionality described below has been achieved, with some explanations provided for areas where implementation was different from what was originally envisioned. Additional information that was provided to vendors for clarity has been marked with "N/A" in place of a checkbox because it is not something that the Sentinel system will perform.

Functional Area #1 - Work Item Authoring

Overall Status Summary: Implementation Complete ☒

Sentinel Functionality	Complete?
"This section describes the authoring tool and the authoring of each Work Item. Authoring is the capability to create, read, update, and delete any and all parts of a Work Item throughout the unique lifecycle of a Work Item. The authoring tool will support all Work Item authoring except for notifications which are system generated."	☒
"A Work Item is a container of information. The container makes it possible to organize, present, and manage the information related to an event, person, or topic. The way data is organized and presented in the container provides meaning and context to the information. A Work Item could have attachment such as a form, letter, spreadsheet, memorandum, photograph, video clip, or report."	☒
"Work Items are routed by Workflow and appear in the Workboxes of Sentinel Users (Section 3.2.10 provides a detailed description of Workboxes.)."	☒
"Work Items memorialize the work that has been accomplished, is in process, or will be accomplished on specific Cases."	N/A
"Documents - These are used to open Cases, record Case decisions (investigations and other	☒

[1] The current version is 5.2 dated December 2011.

Sentinel Functionality	Complete?
activities), and close Cases. Most Documents are analogous to paper documents in use prior to Sentinel. All approved Documents will be Serialized and placed in the Official Case File. Capturing these documents electronically helps organize the information for ease of access, use, and management control."	
"Document-related Work Items - Most of these provide important supporting information to specific Documents. The Package is an exception, as it is only a transitory vehicle for Workflow routing to facilitate Document approval. These Work Items are not to be serialized."	☒
"Management-related Work Items - These support FBI management and communications and are not serialized."	☒

Functional Area #2 - Workflow

Overall Status Summary: Implementation Complete _Sentinel Functionality	Complete?
"The system will provide robust, integrated tools for Authors, Co-Authors, Reviewers, and Approvers to create, read, update, and delete Documents and other Work Items."	☒
"The authoring tools will facilitate the creation of high quality Work Items with such features as spell check, grammar check, automatic formatting, style sheets, versioning, and rich text formatting found in commercially-available word processing packages."	☒
"The authoring tools need to support entering of data in foreign languages especially in fields that require foreign names."	☒
"The authoring tools will also facilitate data entry by providing defaulted data, validation checking, and informative feedback to correct data entry errors."	☒
"Once Documents have been approved and serialized, they must be saved in an immutable form, such as PDF."	☒
"In addition, however, there is a need to use a serial as a starting point (sometimes referred to as a "pony") for another similar Document."	☒
"The use of a pony will reduce the need for a user to reenter information when two Documents are similar."	☒
"The design must be able to support both of these uses for a serialized Document."	☒
"It is conceivable and acceptable for the design to store two versions of the Document: one flattened immutable version, such as PDF, for Records Management purposes; and another context-sensitive version, such as XML, for Work Item Authoring purposes."	☒

Functional Area #3 - Package Management

Overall Status Summary: Implementation Complete _Sentinel Functionality	Complete?
"Sentinel Users can either be Resident to a Case, a Sub-case, a Package, a Lead, or any combination."	☒
"Sentinel Users will typically author Work Items not Resident to a Case or Sub-case when they anticipate that a new Case must be opened."	☒
"If the Sentinel User is Resident to a Case, Sub-case, Package, or Lead, the system will enter default values for some Case metadata."	☒
"If the Sentinel User is not Resident to a Case, Sub-case, Package, or Lead, the Sentinel User may enter the same Case-related information or it will be provided with the Filing Instructions."	☒
"The Sentinel User may change any of this data."	☒
"Sentinel Users may add Attachments to Work Items."	☒
"Attachments may be existing electronic files generated outside of Sentinel (i.e., PDF files, digital pictures, word processing files, spreadsheets, etc.), or they may be new digital files captured with the Digital File Importing Tool (Additional details are provided in Section 3.2.10.4.10, Digital File Importing Tool.)."	☒
"Sentinel Users may also reference external physical objects."	☒
"The system will support the Sentinel User by generating unique identifiers for labeling and referencing these external objects."	☒
"Upon Serialization, Work Items authored Resident to a Case or Sub-case will appear in that Case or Sub-case."	☒
"Document-related Work Items not subject to Serialization (Accomplishments & Techniques, Collected Item Records, Leads, and Lead Responses) will appear in the Cases and Sub-cases of their related Documents. Management-related Work Items will appear in the Dashboard and Workbox of each Sentinel User."	☒

Functional Area #4 - Case Management

Overall Status Summary: Implementation Complete ☒

Sentinel Functionality	Complete?
"The FBI uses Cases to provide control oversight of investigative or administrative activity, as well as to associate relevant Documents to Cases. This section discusses the lifecycle of a Case, how information flows into the Case through the Case Management function, and how a Case is organized."	N/A
"A Case is an abstraction that holds references to all of the data and Work Items (Business Constructs) related to that Case. Exhibit 3.2.4-1 lists items that are typically associated with a Case."	N/A

Functional Area #5 - Collected Item Management

Overall Status Summary: Implementation Complete ☒

Sentinel Functionality	Complete?
"In Collected Item Management, Sentinel will support documentation of the collection, storage, and tracking of physical items, identified as Collected Items (CIs), related to investigative and administrative cases."	☒
"Exhibit 3.2.5-1 illustrates the process by which CIs are entered into Collected Item Management. As shown in the illustration, there are two parallel activities related to the CIs. The primary activity is the creation of a Collected Item Record (CIR)."	☒
"The CIR is a set of data contained within Sentinel that documents a particular CI and maintains a history of its acquisition, storage, handling, and disposal."	☒
"The creation and maintenance of the CIR takes place in the Collected Item Management functions described in this section."	☒

Functional Area #6 - Task Management

Overall Status Summary: Implementation Complete[2] ☒

Sentinel Functionality	Complete?
"One of the primary ways the FBI conducts its business, whether an investigation of a terrorism case or the setting up of a new Resident Agency, is through the cooperative efforts of Bureau personnel. These efforts are coordinated and tracked through the use of Leads and Action Items. Sentinel will provide the capability for users to task individuals and Groups in these ways, allowing improved visibility, control, and tracking of work. Leads are the formal manner of tasking groups and/or individuals. Leads are a formal mechanism to track accountability to perform certain actions. Action Items are less formal defined tasks to be delivered at some future date. Internal to Sentinel, Leads are associated with a Case, while Action Items are not formally associated with a case."	N/A

[2] The Leads capabilities have been fully implemented. Action Items were determined to be more appropriately addressed via the existing Microsoft Outlook email capabilities.

Functional Area #7 -Records Management (RM)

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"The FBI is required under the Federal Records Act, specifically, 44 U.S.C. § 31 Records Management by Federal Agencies, to establish a records management program, defined as a planned, coordinated set of policies, procedures, and activities needed to manage an agency's recorded information. Governing guidance includes Chapter 36 of the Code of Federal Regulations, i.e., 36 CFR 1194 Electronic and Information Technology Accessibility Standards and 36 CFR 1234 Management of Electronic Records. OMB Circular A-130, Management of Federal Information Resources, and 36 CFR 1222.20 require that agencies integrate records management into their overall Information Resources Management program."	N/A
"This section describes records management requirements for judicious preservation and disposal of records in accordance with 44 U.S.C. § 29 Records Management by the Archivist of the United States and the Administrator of General Services, 44 U.S.C. § 33 Disposal of Records, and guidance and implementing regulations promulgated by the National Archives and Records Administration (NARA), specifically, 44 U.S.C. § 21 National Archives and Records Administration, 2000. Other pertinent references from the Federal Records Act for this section include 44 U.S.C. § 31 Records Management by Federal Agencies and 44 U.S.C. § 35 Government Paperwork Elimination Act (Coordination of Federal Information Policy). Records Management requirements found in the documents listed in Section 2 must be included in Sentinel, even if they are not specifically repeated in the SRS."	☒
"These requirements are based on DoD Standard 5015.2, Design Criteria for Electronic Records Management Applications, which has been endorsed by NARA and the FBI's Record Management Division. Records Management Capability will be included as part of Sentinel from its initial Phase rollout through its final Phase of development."	☒
"Sentinel will undergo Electronic Record Keeping Certification as each Phase is rolled out."	☒
"The graphical depiction of records management functionality in this document is notional and should not be considered to represent how records management should be architected in the Sentinel design. Generally speaking, records management in the SRS is used only to identify a specific repository in which records will be maintained according to DoD 5015.2 specifications. This does not imply that records management requirements or functionality are limited to that specific repository."	N/A
"The SRS identifies various Business Constructs as records that must be filed in the Official Case File. However, other Business Constructs (e.g., audit logs) as described in Exhibit 3.1.1-4 meet the definition of Federal records and must be managed as such. Sentinel must provide the ability to do so as part of the system."	☒
"A complete list of such records will be developed during design."	☒
"Unless otherwise specified, Documents and other Business Constructs created as part of the Case File development process must be managed from their creation onwards."	☒
"Exhibit 3.1.1-4 in Section 3.1.3 identifies Business Constructs that will be administered by the system as part of the Official Case File."	☒
"At a minimum, the RM function is required to manage those records that comprise the Official Case File."	☒

Sentinel Functional Area	Complete?
"Other records contained in Sentinel may be maintained by the RM function or through procedures using other Sentinel functionality."	☒
"This determination will be made during design."	☒

Functional Area #8 - Search

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"The Search function will provide a versatile capability to locate different types of information contained within Sentinel."	☒
"It will support the preparation and execution of a multitude of different search queries."	☒
"This capability will be both flexible and powerful to accommodate the substantial volume and wide variety of information available for retrieval in Sentinel."	☒
"The Search function will also offer multiple ways in which the results of queries and searches can be examined, formatted, saved, and passed on to other users and external entities."	☒
"Search results will be available as sets of result entities (with hyperlinks to the target Work Items) and as files with the results presented in plain text."	☒
"The Search function will allow the user to perform searches either immediately in real-time or on a delayed basis in a batch mode.***"	☒
"The system will provide a personal Search Workbox, in which each user will be able to store all search-related files, including sets of search query parameters that can be saved, edited, and reused. All search results generated by the system will be stored for the user in this Search Workbox."	☒
"The system will support the submission of search results, in whole or in part, to the Document Approval and Serialization process."	☒
"In association with the Search function, Sentinel will provide an Information Profile Service, which will inform system users when new information is added to Sentinel that is relevant to their particular interests. Section 3.2.8.14 describes the Information Profile Service."	☒

Functional Area #9 - Indexing

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"In the Indexing function, the system will collect and maintain investigative and administrative information about Persons, Organizations, Locations, Incidents, Property, and Communication Accounts (POLIPCA)."	☒
"This capability for centralized storage and sharing of structured information has a long history within the FBI, dating back to the days when this type of data was stored on paper index cards (hence, the use of the term "indexing"). In recent years, the ACS system has been providing a similar capability through its Universal Index functionality."	N/A
"This section addresses the functionality related to the collection and maintenance of the POLIPCA information, which is known as "Index" data. An essential associated capability is that of searching this Index information, which is described in Section 3.2.8, Search."	N/A
"Document Index data (see Section 3.2.9.1)."	☒
"Case Index data (see Section 3.2.9.2)."	☒
"A set of Document Index data is associated with each individual Serialized Document in the system."	☒
"A set of Case Index data is associated with each Case in the system."	☒
"From the users' perspective, it is only the Case Index objects that are important. Document Indices exist purely to facilitate the creation of Case Indices. System design may use two sets of metadata repositories or a single index data repository with appropriate attributes and pointers."	N/A
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: Persons"	☒
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: • Organizations"	☒
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: • Locations"	☒
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: • Incidents"	☒
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: • Property"	☒

Sentinel Functional Area	Complete?
"The data contained in either a Document Index or a Case Index will consist of a sequentially numbered set of Objects, with each Object being one of the following types: • Communication Accounts"	☒
"For each of these Object types, a fixed set of possible data fields will be allowed in the Object."	☒
"Each individual Object in an Index will consist of a subset of these possible fields of data values, as appropriate to the information that is known about the specific entity being described."	☒
"The specific data fields to be available in the various types of Objects will be identified in the Sentinel Data Model. Exhibit 3.2.9-1 illustrates the concept of an Index consisting of Index Objects that contain fields of data values."	☒
"The Document and Case Indices will also support the establishment of relationships between the objects within each index."	☒
"This will allow, for instance, the ability to record that a Person Object was observed to be "at" a particular Location Object. The possible relationships between Objects will be limited to a finite set of system-defined values that are to be identified in the Sentinel Data Model. Exhibit 3.2.9-1 includes an illustration of the concept of a relationship between two Index Objects."	☒

Functional Area #10 - User Interface

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"This section contains the system requirements related to the Graphical User Interface (GUI) that Sentinel will provide to its users."	☒
"It is expected that the design of the User Interface (UI) will incorporate the expertise of experienced website layout designers, including Human Factors Engineers, to create design standards for use within the Sentinel application. Note: Sample screens in this section are provided to better illustrate user concepts and do not constitute design considerations or constraints."	☒
"The user interface, which presents to and collects information from the users, does not need to strictly adhere to organization, formatting and labeling of sample screens presented in this or other sections of this document. For instance, the concept of Packages will be presented to the user simply as draft Documents with their associated Work Items. The workflow engine routes items to be worked into a theoretical workbox. However, the end user uses already existing Case information when processing those items. User interface presentations need to be oriented around Use Cases rather than simply items that have progressed through work-flow. Therefore, the concept of Workboxes may be presented as information organized into tabs, portlets, or other visual cues."	N/A
"Users will navigate to specific Work Item or Business Constructs for both analysis and action."	☒

Sentinel Functional Area	Complete?
"The Sentinel system will provide multiple mechanisms to navigate to any given Work Item or Business Construct."	☒
"In addition, these mechanisms or GUI widgets need to be arranged such that a user can navigate to the desired Work Item in a minimum number of keystrokes."	☒
"The amount of information and functions within Sentinel require a rich UI."	☒
"The UI will provide consistent methodologies to navigate within the system, along with clear and concise information on where the user is within the site map."	☒
"The UI will make extensive use of single-inheritance hierarchical information (e.g., organizational structure, Case Classification taxonomy, Cases, Views, and Leads)."	☒
"The tree structure will allow the user to quickly navigate to a node within the hierarchy."	☒
"Hierarchical Nesting – Human factor studies have shown that users prefer menus that support five to seven choices. Furthermore, within hierarchical menus, users prefer fewer menus that are dense over more menus that are sparse."	☒
"Hyperlinked Business Constructs– The display of an abbreviated representation of a Business Construct (e.g. Case, Serial, Lead, Collected Item, and Notification) should include the use of a hyperlink allowing the user to navigate directly to the presentation of the Business Construct. An indication will be provided on the user interface for items that are hyperlinked."	☒
"Direct Access– Users will frequently know the unique identifier presented with a Business Construct (e.g., Case number, Serial number within a Case, Lead number within a Case, and Collected Item number within a Case). Therefore, the UI will allow users to navigate directly to a Business Construct by specifying that unique identifier."	☒
"Since the Sentinel system is web enabled, user access to the system will be via a browser window on a client."	☒
"Users of the Sentinel system will need to navigate to and use different data and functionality of the system simultaneously."	☒
"The system will allow a user to open multiple Sentinel windows and to cut and paste information between them."	☒
"These browser windows will support the following concepts: Minimize and maximize"	☒
"These browser windows will support the following concepts: Resize handles"	☒
"These browser windows will support the following concepts: Copy and paste"	☒

Functional Area #11 - Reports

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"A report is the output resulting from one of a set of defined inquiries of the Sentinel system, each designed to produce a specific set of information formatted in accordance with both FBI policy and user needs. A report request may either allow or require the user to enter criteria for ordering and/or filtering the content that is to be included in the report. This section contains a description of the reporting capabilities needed for Sentinel. Included are the report categories, each with a list of specific reports to be produced, where such lists are applicable. Each report is described with requirements and report formats in the Sentinel Reports Specification."	☒

Functional Area #12 - Logs

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"The Sentinel system will record information such as changes of state for Business Constructs or for fields within the Business Constructs."	☒
"These records of changes are described as logs, histories, and/or version-able documents. Records of changes are kept for two distinct purposes. Data is kept for the System or Security Administrators to perform forensic analysis of the system."	☒
"Examples of this are system logins or logs of search criteria and results. Data is also kept for the users to be able to display the history of a given Business Construct, data element, or delegation."	☒
"Examples of this are Lead histories or lists of Case Owners over time. These two categories are referred to as security audit data and historical data, respectively."	N/A

Functional Area #13 - Administration

Overall Status Summary: Implementation Complete[3] ☒

Sentinel Functional Area	Complete?
"For the Sentinel system to continue to operate effectively and efficiently after initial configuration, a significant amount of maintenance must occur, primarily within the area of organizational hierarchy and how entities are related to taxonomy, functions, roles, and geography. The Sentinel administrative functions will be designed to conduct this and other application maintenance functions such as entity maintenance, lead routing, lookup table maintenance, business rule table maintenance, keyword watch list maintenance, delegations, and system settings."	N/A
"Sentinel administration will provide two levels of maintenance access – local and Enterprise."	☒
"Local administrators will have the purview to modify data pertaining to the Office in which they are primarily assigned."	☒
"Enterprise administrators will have the authority to modify data pertaining to all Offices as well as system settings."	☒
"This section discusses requirements that are necessary for the administration and maintenance of the Sentinel system."	N/A

Functional Area #14 - Security

Overall Status Summary: Implementation Complete ☒

Sentinel Functional Area	Complete?
"Sentinel will comply with all Federal and agency security guidelines and requirements that are applicable to the development and operation of Sentinel."	☒
"These include the DOJ Order 2640.2E; the FBI's Manual of Investigative Operations and Guidelines."	☒
"Sentinel will operate in the System High mode and will not store or process any information classified higher than SECRET."	☒
"In addition, Sentinel will support labeling requirements, traditionally associated with the multi-level security mode of operation, to address the requirements for Sentinel to interface with systems of differing classifications via controlled interfaces."	☒

[3] Currently, many administration functions are available to general field support personnel via a unique interface. These include: adding lead routing rules; managing organization names and locations; and assigning personnel to divisions, squads, etc. Business rules and keyword watch lists currently must be maintained via system administrators and or development resources.

Functional Area #15 -Reserved Section

Overall Status Summary: Implementation Complete ☒

Note: The requirements from this section regarding Crisis Case Management were removed via ESC request for change process. This capability is currently supported by the ORION system with an interface to Sentinel.

Functional Area #16 - Enterprise Portal

Overall Status Summary: Implementation Complete[4] ☒

Sentinel Functional Area	Complete?
"This section contains the system requirements related to the enterprise portal that Sentinel will incorporate in its design."	☒
"Users will be able to customize the portal (e.g., hide or display any portlet to which they have access)."	☒
"The Sentinel portal will evolve to allow FBI Intranet (FBINet) users to search and access other Bureau information and applications, eventually becoming the Sentinel Enterprise Portal (SEP)."	☒
"The SEP will provide a variety of information, tools, applications and access points through a single mechanism."	☒
"Therefore, it must have the ability to host portlets both native and non-native to the Sentinel application."	☒
"The goal is to evolve all FBI applications to utilize the Sentinel look and feel as well. This will also facilitate a consistent security model and Single Sign-On capability to all FBINet applications."	☒
"This long term vision will be implemented over time. Sentinel will produce an initial portal and implement the long term vision over time using engineering trade-offs as appropriate."	☒
"A governance process to include standards will need to be developed and executed."	☒

VIII. Conclusion

The FBI deployed Sentinel's final operating capabilities May 2012 and will continue deployment to all FBI users during the summer of 2012. In partnership with DOJ and OMB, Sentinel's effort from the fall of 2010 to the summer of 2012 has resulted in the creation of the functionality that meets the needs of the organization. This important technological enhancement in case and

[4] The concept of an enterprise portal was an adaptation added as a part of Phase 2 planning. Enterprise Portal is a technology-based approach to address user-facing GUI capabilities. It was added to support the phased development and delivery approach. While successfully implemented during Phase 2, the long term GUI has been upgraded using the EXTJS framework allowing for significantly more flexibility, and reduced integration efforts. The implementation of this long term vision has resulted in an improved user experience.

records management provides a significant and vital tool in the FBI's ongoing information technology modernization.

The new Sentinel system will provide FBI employees with a modern web-based application that will improve investigative case management functions and provide faster workflow routing, secure digital signature and the administration of electronic records. The new functionality is a major step in the right direction of reducing the administrative burden of our workforce, creating more flexible and adaptive organization structures, and helping the FBI defend against the types of threats we face as a nation.

PRIOR OFFICE OF THE INSPECTOR GENERAL SENTINEL REPORTS

REPORT DATE	REPORT NUMBER	REPORT TITLE
February 1, 2005	05-07	The Federal Bureau of Investigation's Management of the Trilogy Information Modernization Project
December 1, 2006	07-03	Sentinel Audit II: Status of the Federal Bureau of Investigation's Case Management System
August 28, 2007	07-40	Sentinel Audit III: Status of the Federal Bureau of Investigation's Case Management System
December 18, 2008	09-05	Sentinel Audit IV: Status of the Federal Bureau of Investigation's Case Management System
November 9, 2009	10-03	Sentinel Audit V: Status of the Federal Bureau of Investigation's Case Management System
March 30, 2010	10-22	Status of the Federal Bureau of Investigation's Implementation of the Sentinel Project
October 19, 2010	11-01	Status of the Federal Bureau of Investigation's Implementation of the Sentinel Project
December 22, 2011	12-08	Status of the Federal Bureau of Investigation's Implementation of the Sentinel Project

DESCRIPTION OF THE FBI'S AGILE DEVELOPMENT APPROACH FOR DEVELOPING SENTINEL

Agile software development is not a set of tools or a single methodology, but an approach that leverages close collaboration between representatives of system users, system developers, and testers to deliver functionality in a compressed timeframe and on a continuous basis. The delivery of working software is the primary measure of progress, and satisfying customers through the delivery of valuable software is treated as the highest priority during development.

While an Agile methodology can be implemented in a variety of ways, the FBI used a variation called Scrum, an iterative methodology which breaks the development effort into increments called sprints, each of which the FBI decided would last 2 weeks.[23] At the conclusion of each sprint, User Stories – functions that a system user would typically perform – along with Architecture Stories – qualities that define the system software architecture and configuration – are planned and completed, and it is the successful completion of these stories that is measured as progress for the project.[24]

[23] Sprints can last from 2 weeks to 4 weeks. The FBI has chosen for its sprints to last 2 weeks.

[24] User Stories define functions that a system user would typically perform such as opening and closing a case or completing a form. Architecture Stories identify the hardware that the FBI will use to build Sentinel. These stories also describe the way in which the FBI will configure that hardware.

FEDERAL BUREAU OF INVESTIGATION RESPONSE TO THE DRAFT REPORT

U.S. Department of Justice

Federal Bureau of Investigation

Washington, D. C. 20535-0001

September 5, 2012

The Honorable Michael E. Horowitz
Inspector General
Office of the Inspector General
U.S. Department of Justice
950 Pennsylvania Avenue, Northwest
Washington, D.C. 20530

Dear Mr. Horowitz:

The Federal Bureau of Investigation (FBI) appreciates the opportunity to review and respond to your office's report entitled, *Interim Report on the Federal Bureau of Investigation's Implementation of the Sentinel Project* ("Report").

The FBI successfully deployed its next generation information and case management system, Sentinel, on July 1, 2012. As noted in the Report, since deployment, "FBI employees routinely have been using Sentinel to perform their daily electronic workflow and investigative activities." With Sentinel, the FBI moved from a paper-based case management system to a digital system of record. Sentinel uses a modern web-based application for entry, review, approval, and research of case intelligence information.

Sentinel is helping the FBI to work smarter and more efficiently. Sentinel significantly advances our Information Technology and our intelligence information sharing process. Sentinel's capabilities have already improved FBI's operations by enabling agents and analysts to disseminate critical case information more quickly.

We are grateful for your office's recognition that, "[t]he FBI reduced its development costs by using an Agile development approach, significantly reducing the rate at which it expended funds on Sentinel development." As noted in the Report, upon adopting an Agile approach, FBI officials expected the revised process would allow the FBI to complete Sentinel development within the $451 million budget. As the FBI reported to Congress this past July, the Sentinel team delivered just that, coming in several million dollars below the budget.

In the Report, your office noted that the FBI's statement of the total Sentinel project cost does not include post-deployment operations and maintenance expenses ("O&M"). The original five-year contract envisioned deployment in year three and two years of post-deployment O&M. However, the contract was modified during the course of development to eliminate the post-deployment provision, and, instead, to require a total of five years O&M.[1] After deploying Phase I of Sentinel in 2007, the FBI commenced O&M to operate and maintain

[1] Originally, O&M was referred to as pre and post-final operating capability ("FOC"). Modification 40, dated July 27, 2010, detailed the change to the contract from 2 years post-FOC to option years 3 and 4.

the system as further development continued. The FBI has since fully received five years of O&M within the $451 million budget. In addition, given the use of Agile development and the successful in-house deployment and adoption of Sentinel, the FBI is where we envisioned being at the conclusion of the original five-year contract.

In conclusion, the FBI appreciates the professionalism exhibited by your staff as they worked to complete this review on an expedited basis.

Sincerely yours,

Kevin L. Perkins
Associate Deputy Director

OFFICE OF THE INSPECTOR GENERAL ANALYSIS OF THE FEDERAL BUREAU OF INVESTIGATION'S RESPONSE TO THE REPORT

The OIG provided a draft of this report to the Department of Justice, including the Federal Bureau of Investigation (FBI). The FBI provided a response to the draft report, which is incorporated as Appendix IV of this report. The following provides the OIG analysis of the response.

In its response to our report, the FBI stated that while it had originally planned to fund 2 years of post-deployment operations and maintenance activities using its $451 million project budget, the FBI eliminated that provision in July 2010. According to the FBI, it planned and paid for 5 years of operations and maintenance activities regardless of the date of deployment. In its response the FBI stated that it had received fully those 5 years of operations and maintenance within its $451 million budget. The FBI stated in its response that the FBI is where the FBI envisioned being at the conclusion of the original 5-year contract.

We agree with the FBI that its initial plan and budget for implementing Sentinel included 2 years of post-deployment operations and maintenance activities. We also agree that the FBI incurred costs to maintain the completed portions of Sentinel that it implemented with limited functionality prior to deploying a fully functional version of Sentinel on July 1, 2012.

However, because the remaining funds of the FBI's Sentinel budget are not sufficient to cover 2 years of post-deployment operations and maintenance activities, we disagree with the FBI's assessment that it is where it envisioned it would be at the conclusion of Sentinel's development. The FBI estimates that Sentinel operations and maintenance will cost $30 million annually.