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RAILROAD SAFETY:

Amtrak Has Made Progress in Implementing Positive Train Control, but Significant Challenges Remain

Report No. OIG-E-2013-003 | December 20, 2012

AMTRAK
NATIONAL RAILROAD
PASSENGER CORPORATION

Office of Inspector General

Memorandum

To: Donald A. Stadtler, Jr., Vice President, Operations

From: Calvin Evans, Assistant Inspector General, Inspections and Evaluations

Date: December 20, 2012

Subject: *Railroad Safety: Amtrak Has Made Progress in Implementing Positive Train Control, but Significant Challenges Remain* (Report No. OIG-E-2013-003)

In September 2008, near Chatsworth, California, a Metrolink commuter train ran through a stop signal and collided with an oncoming Union Pacific freight train, killing 25 people and injuring 101 others. Following this accident, Congress passed the Rail Safety Improvement Act of 2008 (RSIA),[1] which requires each railroad hosting intercity or commuter rail passenger service to install and operate a Positive Train Control (PTC) safety system by December 31, 2015. PTC technology is designed to control train movements to automatically prevent train-to-train collisions, derailments caused by excessive speed, and the movement of a train through a misaligned main-line track switch. PTC can also protect roadway workers by slowing or stopping trains from entering work zones. Amtrak currently plans to spend between approximately $300 million and $625 million to meet the deadline for this mandate.

Amtrak has made some notable progress in implementing PTC. On the Northeast Corridor (NEC), Amtrak is upgrading and expanding the use of the Advanced Civil Speed Enforcement System (ACSES), which Amtrak had been using in New England since 2000 to enforce speed restrictions and stops. The upgrades should improve the reliability, data capacity, and connectivity of ACSES between Amtrak and the commuter railroads that operate on the NEC. Amtrak also completed installation of its Incremental Train Control System on Amtrak's 97-mile Michigan line between Kalamazoo, Michigan, and Porter, Indiana, in February 2012, enabling speeds of up to 110 mph.

[1] Public Law 110-432, Division A, enacted October 16, 2008.

Further, Amtrak plans to deploy the Interoperable-Electronic Train Management System (I-ETMS) when the large freight railroads complete development of the system. Amtrak will install I-ETMS on the NEC to allow the operation of non-ACSES-equipped freight and commuter trains. Amtrak will also install I-ETMS on its locomotives that operate on other railroads' property, off the NEC.

The Deputy Chief Engineer for Communications and Signals in the Engineering Department was designated the project manager for PTC implementation. His office created a PTC Implementation Plan in response to federal regulations that implement the PTC clauses in RSIA (PTC rule).[2] According to Federal Railroad Administration (FRA) officials, Amtrak was the first railroad to have its PTC implementation plan approved, which occurred in August 2010. The plan described how Amtrak would deploy and use its PTC systems. The plan also identified and ranked several challenges to the successful implementation of PTC in order to prioritize and manage the associated risk that each posed. The plan recognized that some challenges were outside the control of Amtrak's Engineering Department.

Identification and mitigation of risk are components of a successful enterprise risk management framework. This is a widely used best practice that helps organizations manage risk and ensure that business processes are operating effectively. We recently recommended[3] that Amtrak adopt this system, which includes monitoring and periodically reassessing risks, understanding their relationships, and assigning ownership of risks to managers who can address them.

Therefore, we focused our work on Amtrak's efforts to identify and mitigate risks to the successful implementation of PTC by the December 31, 2015, deadline mandated by RSIA.[4] Specifically, our objective was to report on the extent to which Amtrak is addressing what are currently the most significant challenges to successful PTC implementation. For a detailed discussion of our evaluation methodology, see Appendix I.

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[2] 49 Code of Federal Regulations Part 236 Subpart I.

[3] See *Amtrak Corporate Governance: Implementing a Risk Management Framework is Essential to Achieving Amtrak's Strategic Goals* (OIG-A-2012-007, March 30, 2012).

[4] Congress considered two bills in 2012 that would delay implementation of PTC beyond the December 31, 2015, deadline, but neither bill was enacted.

SUMMARY OF RESULTS

Amtrak is attempting to mitigate the risks posed by current challenges to PTC implementation in various ways, but overcoming some of these challenges by the end of 2015 will require increased attention and emphasis. The four most significant challenges are (1) acquiring radio frequency spectrum along the NEC in a timely, cost-effective, and technically adequate manner; (2) developing complete and reliable cost estimates and budgeting for those estimated costs to attempt to ensure the availability of adequate funding; (3) obtaining timely FRA approval of planned upgrades to Amtrak's ACSES on the NEC; and (4) mitigating the potential effect on Amtrak's implementation of PTC due to delays in the freight railroads' development of I-ETMS.

The most serious challenge at this time to implementing PTC is acquiring radio frequency spectrum along the NEC. Radio frequency spectrum[5] is critical to the operation of ACSES because it enables the data radio network to transmit permanent and temporary speed limits to a train's on-board computers to slow or stop the train as needed. Amtrak must obtain licenses for spectrum about 18 months before the deadline to be able to complete upgrades to ACSES prior to putting it into service along the NEC. Amtrak has thus far been unsuccessful in its attempt to acquire spectrum from four different sources, including the Federal Communications Commission (FCC), and now faces the prospect of having to stitch together enough licenses in the 220 megahertz (MHz) range through piecemeal acquisitions, county-by-county, to ensure coverage along the NEC.

Amtrak officials believe, and we generally agree, that procuring spectrum in this manner could result in coverage gaps and will be considerably more expensive than obtaining the spectrum license from one vendor. We estimate that Amtrak has only about a year left to contract for sufficient spectrum to cover the NEC before the lack of spectrum affects Amtrak's ability to meet the deadline. This is because it could take an additional 6 months, but likely more than 12 months, for the FCC to review and approve the transfer of a vendor's license after an agreement is reached. If Amtrak

[5] Radio frequency spectrum is a natural resource that is used to enable wireless communications services. Spectrum is segmented into bands of radio frequencies typically measured in cycles per second (hertz), and the Federal Communications Commission manages the licenses of the bands to be used for PTC systems.

cannot find and reach agreements with potential vendors before the summer of 2013, it may need to engage the federal government to come up with a solution because it currently does not have a viable technical alternative if 220 MHz spectrum is unavailable.[6]

A second significant challenge is ensuring that Amtrak has enough funds available to implement PTC fully by the deadline. Amtrak cannot rely on the federal government to provide extra funds at the last minute for implementation; therefore, it needs to request and budget these funds properly, based on up-to-date and accurate estimates of the costs of implementation over the next 3 years. However, we could verify neither the Engineering Department's $188-million estimate of the full cost to install PTC on Amtrak property, nor the Transportation Department's estimate of between $115 million and $436 million for Amtrak's part of the costs to install PTC on host railroad property. Both estimates are, therefore, potentially incomplete and unreliable. Further, Amtrak has not included these estimates in its *Five-Year Financial Plan for FY 2012–FY 2016* published in January 2012, despite identifying the availability of funds as high-risk and being required to budget these costs by federal law. In addition, due to Amtrak's fragmented budgeting process for PTC, it remains unclear whether Engineering or Transportation is responsible for budgeting for the costs of installing PTC on host railroad property. These costs could consume a significant portion of either department's Fiscal Year (FY) 2014 or FY 2015 budgets.

A third challenge Amtrak faces is having its planned upgrades to ACSES approved by FRA in time to meet the deadline. Engineering assumed that because it had years of operational experience with ACSES, any upgrades would require minimal documentation and testing. However, some of the planned ACSES upgrades are significant enough to require full safety reviews, which will necessitate significant time for review and approval by FRA. Although Amtrak has revised its completion date for the review, approval, and installation of new ACSES components to September 30, 2013, our analysis shows this timeline to be overly optimistic. We estimate that review, approval, and installation of the upgrades will take until the end of March 2014 at the

[6] Amtrak's two potential options have such limited capability that they could cause trains to stop unnecessarily at control points, resulting in significant trip delays.

earliest, assuming that Amtrak can concurrently submit the upgrades for review and that FRA has the staff available to perform the reviews while examining other railroads' submissions. This estimate also assumes that the upgrades are not technically complex (requiring more time for review) and that Amtrak does not experience any unforeseen technical design problems that could delay submission of the upgrade for review.[7] Moreover, given the long potential lead time for acquiring spectrum, and the 18 months needed to complete implementation of ACSES upon acquiring spectrum, Amtrak cannot risk lengthy delays associated with the regulatory approvals of ACSES upgrades. Assuming the rest of FRA's reviews go smoothly, we currently estimate that Amtrak will not be able to meet the connectivity requirements of the PTC rule until about June 2015, only about 6 months before the deadline.[8]

Finally, delays in the freight railroads' development of I-ETMS pose a challenge to Amtrak's having enough time to implement PTC by the deadline on the NEC or in its locomotives that operate off the NEC. The freight railroads are significantly behind schedule in the development of I-ETMS. Amtrak is taking action to mitigate this risk, which may prove difficult to manage because it has very limited control over any of the other developmental delays that could further disrupt its schedule. Additionally, Amtrak appears to have little control over ensuring that technical challenges that could affect passenger train operations are addressed in a timely manner. Amtrak cannot absorb any further significant delays to development of I-ETMS if it expects to meet the statutory deadline.

While formidable in and of themselves, these four challenges are interrelated; successfully addressing them will require a well-coordinated and integrated effort across several Amtrak departments in order to implement PTC by the deadline and achieve the safety benefits derived from PTC systems envisioned in RSIA. Therefore, we are making eight specific recommendations to improve the management of PTC implementation, including that the Vice President, Operations, designate a senior executive to manage the overall program, or fully empower the Deputy Chief Engineer

[7] This is not a criticism of FRA's approval process, but is based on our analysis of the complexities involved in the process to ensure that the upgrades meet safety standards.
[8] See Appendix II for a timeline estimating and illustrating the relationship between the acquisition of radio spectrum and FRA's approval of upgrades to ACSES.

for Communications and Signals with clear responsibility and authority to manage implementation of PTC as an integrated program.

Amtrak's Vice President, Operations, provided us with comments on a draft of this report on December 12, 2012, wherein he concurred with all of our recommendations and established time frames in which Amtrak will implement the recommendations (see Appendix III). We consider his comments responsive to our recommendations and we will follow up on their implementation.

CHALLENGES IN ACQUIRING RADIO SPECTRUM POSE SERIOUS RISKS TO PTC IMPLEMENTATION

Amtrak's inability to obtain radio frequency spectrum along the NEC is the most significant challenge it faces in implementing PTC by the statutory deadline. Following the passage of RSIA, the large freight railroads acquired licenses in the 220 MHz spectrum and established this frequency as the industry standard.[9] As shown in Figure 1, PTC systems use radios in the 220 MHz spectrum for wayside-to-train[10] communications to transmit information about speed restrictions. Radio spectrum is critical to the operation of ACSES because it enables the data radio network to transmit permanent and temporary speed limits to a train's on-board computers in order to slow or stop the train, as needed. Moreover, we estimate that Amtrak needs this spectrum about 18 months prior to the deadline so that it can activate the 220 MHz data radio network on its existing ACSES system in New England, change its trains to the new data radio system, and conduct final testing of the upgraded ACSES system before placing it in service across the NEC.[11]

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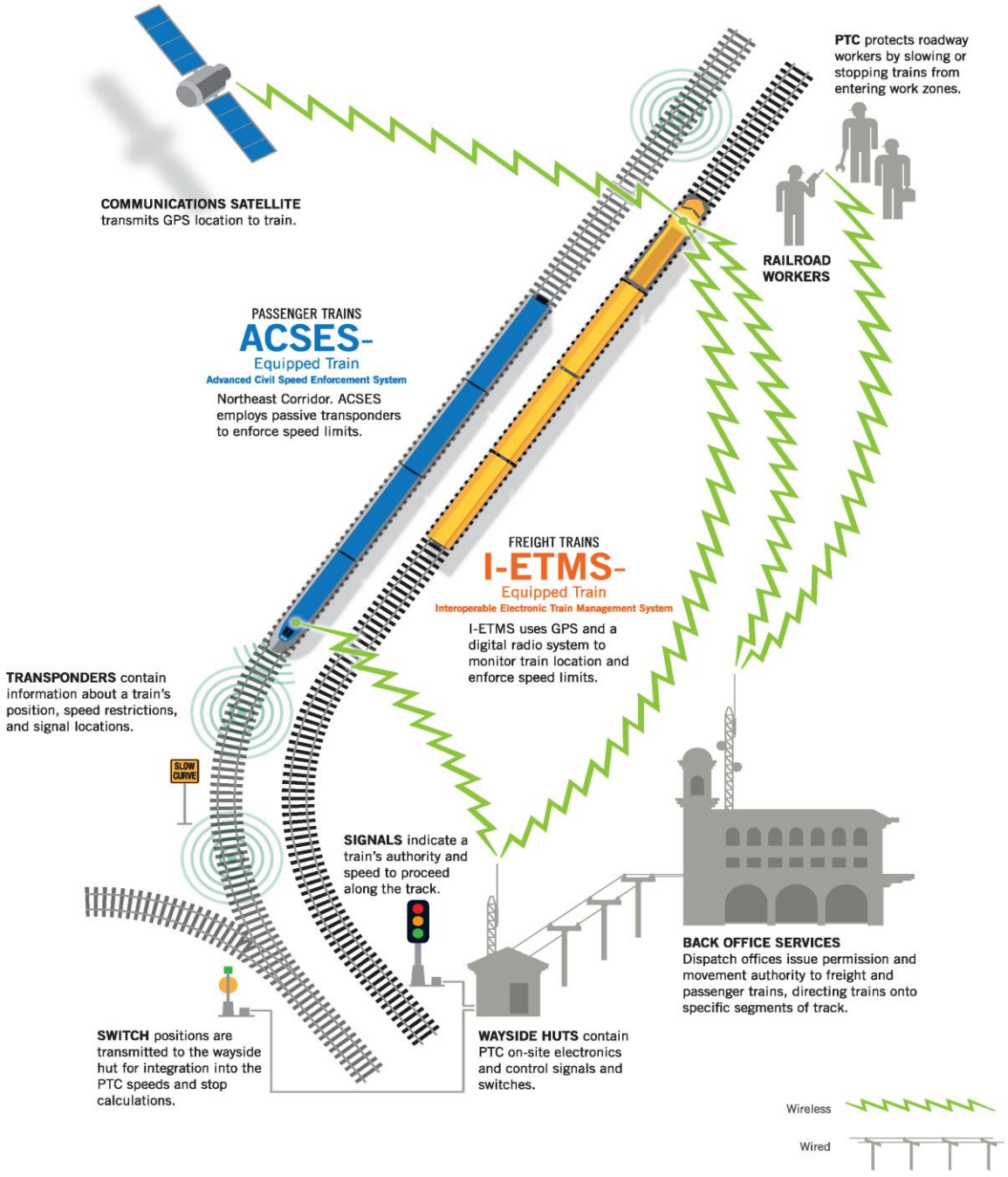
[9] Although the industry commonly refers to the 220 MHz band as the standard, PTC systems will communicate across a range of frequencies, from 217 MHz through 222 MHz.

[10] The wayside is defined as the portion of the railroad's right-of-way that is next to the track, for the purposes of this report.

[11] In May 2010, FRA approved ACSES as deployed in New England for use as a PTC system. However, when Amtrak decided to expand ACSES to the rest of the NEC to meet the PTC mandate, it formed a PTC users group for tenant commuter railroads on the NEC to share information and establish technical standards among the railroads. From this group, Amtrak determined that it would need to upgrade ACSES to improve reliability, data capacity, and connectivity with the tenant railroads.

Figure 1. PTC on the NEC



Source: Amtrak Office of Inspector General (OIG) analysis of ACSES and I-ETMS design documents

In the implementation plan, Engineering did not identify spectrum as a risk to PTC implementation, believing that it had several means available for acquiring spectrum; however, this has proved not to be the case. Amtrak found that FCC has already licensed much of the spectrum in this band to other parties, and has made several unsuccessful attempts to obtain 220 MHz radio spectrum licenses over the last 2 years from these parties. These efforts have involved Engineering, the Law Department, the Office of Government Affairs and Corporate Communications, and Amtrak's Procurement Services office. For example:

- Amtrak tried to acquire spectrum through a general solicitation in July 2010. A vendor stated that it had a block of spectrum covering the NEC; however, Amtrak later learned that the vendor's licenses may not be available for sale for several years because of a legal challenge questioning the vendor's qualifications to hold the licenses and a bankruptcy proceeding filed after the vendor submitted its bid proposal to Amtrak. Depending on the outcome of these legal actions, the licenses may not be available at all. After consultation with Amtrak's legal counsel, along with outside counsel specializing in FCC matters, Amtrak decided not to purchase the spectrum from the vendor until the issue was settled. As a result, Amtrak did not pursue this option.

- Amtrak also attempted to acquire spectrum from the consortium—called PTC-220, LLC—set up by the freight railroads to manage its spectrum licenses. However, according to a Law Department official, PTC-220 declined to sell spectrum to Amtrak in June 2011, citing potential technical difficulties in using the same spectrum on the NEC for both I-ETMS and the ACSES network.

- Amtrak attempted another general solicitation on October 5, 2011. According to an Amtrak official, only one vendor offered licenses in all 35 counties along the NEC; other responders offered licenses in only a limited number of counties. After analyzing the proposal and conducting a "title search" of its licenses, Amtrak determined that the offeror may not own all of the licenses included in its proposal and, therefore, it might not be able to provide a sufficient amount of spectrum to meet Amtrak's requirements. Amtrak canceled the transaction on July 26, 2012.

A Law Department official stated that Amtrak has been communicating with the FCC on this issue since the fall of 2010 and has met with FCC officials on multiple occasions. In May 2011, the FCC asked the railroads and other interested parties to comment on

their spectrum needs related to the implementation of PTC. In response, Amtrak provided comments in June 2011, requesting that FCC reallocate spectrum in the 218-219 MHz band[12] for PTC use, thus making spectrum licenses available to Amtrak. Amtrak also met with FCC officials in August 2011 to provide a presentation on Amtrak's need for additional spectrum and the availability of spectrum in the 218-219 MHz band in FCC's inventory that could be reallocated and licensed for PTC.

Amtrak officials met with the FCC again in July 2012 to discuss Amtrak's difficulties in acquiring spectrum on the secondary market. According to an Amtrak official, FCC officials stated at the meeting that Amtrak should be able to obtain spectrum from other parties with noncontiguous spectrum licenses across the NEC. According to both Engineering and the Law Department, this approach would necessitate piecemeal, county-by-county acquisitions with the hope that Amtrak could stitch together enough licenses in the 220 MHz range to ensure coverage along the NEC. Faced with limited options, in September 2012 Amtrak started to identify spectrum vendors that could provide coverage limited to the New England area. Amtrak officials believe, and we generally agree, that procuring spectrum in this manner could result in significant technical problems resulting from gaps in coverage, and would likely cost more (although Amtrak has not conducted a full analysis to determine this). Further, according to a Law Department official, it could take an additional 6 months—but likely more than 12—for the FCC to review and approve the transfer of vendors' licenses once Amtrak contracts for the spectrum. Since Amtrak needs to obtain spectrum before the 18-month set-up period can begin, we estimate that the company has only about a year left to contract for sufficient spectrum to cover the NEC before the lack of spectrum starts affecting Amtrak's ability to meet the deadline.

To help mitigate this, Amtrak's Office of Government Affairs and Corporate Communications has begun to work with Congress to address the availability of spectrum. In May 2012, Amtrak provided the office of Senator Frank Lautenberg (New Jersey) with information to support an inquiry to the FCC on the availability of 220 MHz spectrum. Amtrak also met with the staff of the Senate Commerce Committee in late August 2012 to discuss radio spectrum. Amtrak plans to continue to meet with

[12] Amtrak believes that spectrum in this range may be available and generally provides the same capability as the 220 MHz band. However, license owners of this spectrum have commented to the FCC that it would be unfair to reallocate spectrum they purchased in a competitive bidding process.

congressional officials, along with tenant and commuter railroads, to discuss a plan of action on the availability of spectrum. This is the start of what is likely to be a long process to obtain PTC-dedicated radio frequency spectrum.

Obtaining this spectrum is also important because Amtrak does not have a viable alternative for the NEC if 220 MHz spectrum is unavailable. When we asked Engineering for possible alternatives, officials discussed two potential options, while endorsing neither because of their limited capabilities. According to Engineering officials, one option would be to operate its 220 MHz radios under its low-wattage licenses, but these are secondary licenses and the low-wattage spectrum is susceptible to interference from primary license-holders using the spectrum. Additionally, this option will not provide complete coverage along the NEC, and could cause trains to stop unnecessarily at some interlockings[13] and other control points, resulting in significant delays. The other option is using Engineering's existing 900 MHz ACSES radio system in conjunction with the upgrades, but this system has significant reliability problems that could also cause trip delays. Further, a change from the 220 MHz radio spectrum may require redesign, testing, and installation of a new data radio network, triggering a separate FRA review. According to an Engineering official, such a change would also require tenant and commuter railroads on the NEC to change their radios. If Amtrak had to pursue one of these less capable options, it could jeopardize the company's ability to implement ACSES by the end of 2015.

CHALLENGES IN ENSURING AVAILABILITY OF FUNDS POSE SIGNIFICANT RISKS TO PTC IMPLEMENTATION

Ensuring that Amtrak has enough funds available to implement PTC by the statutory deadline is a challenge because of Amtrak's weak cost estimates and fragmented budgeting process. Two different Amtrak departments are responsible for estimating the costs of PTC, depending on whether the installation is on Amtrak property or host railroad property. Engineering's estimate of the cost to install PTC on Amtrak property and equipment may be unreliable because supporting documentation for the estimate is lacking and because an updated estimate has not been provided to anyone outside of

[13] An interlocking is an arrangement of switches and signals that safely controls train movement across track junctions or crossings.

Engineering since 2010. Transportation's estimate of the costs to install PTC on host railroad lines may also be unreliable because it is based on limited information from early 2010. Most important, funds may not be available to complete implementation of PTC by the deadline because Amtrak did not include all of the funds it needs to implement PTC in either its 5-year financial plan or its FY 2013 legislative and grant request to Congress. Full funding was not included in these documents even though (1) federal law, Amtrak policy, and sound business practices require funding needs to be identified; and (2) the program office identified the likelihood of not receiving adequate funds as a high-risk issue.

Estimates of Installation Costs on Amtrak Property May be Unreliable

Engineering's estimates of the cost to install PTC on Amtrak property and equipment were not detailed enough to determine whether estimated costs were accurate and reliable. According to Engineering officials, their current estimate of $188 million includes costs from FY 2009 through FY 2015 for installing ACSES and I-ETMS on the NEC and installing I-ETMS on Amtrak's 305 locomotives that operate off the NEC.[14] Engineering based its estimate on its professional experience and a review of the costs for originally installing ACSES on segments of the NEC between 2000 and 2008. Engineering briefed this estimate to Amtrak's Board of Directors on March 18, 2010.

Engineering could not provide any detailed documentation to support its estimate. Fully documenting and detailing the methodology used to develop an estimate is one of the 12 components of a high-quality cost estimate that both industry and government use, according to the U.S. Government Accountability Office.[15] For example, the documentation supporting a cost estimate should show all assumptions, descriptions, methods, and calculations used to develop the estimate, and explain why methods and data sets were chosen. There also should be enough detail so that the documentation provides for clear tracking of the program's costs as it moves through execution. None

[14] This total also includes costs for installing the Incremental Train Control System in Michigan and I-ETMS at Chicago Union Station.

[15] For more information on all 12 steps of a high-quality cost estimate, see the U.S. Government Accountability Office's *Cost Estimating and Assessment Guide*: *Best Practices for Developing and Managing Capital Program Costs* (GAO-09-3SP, March 2, 2009).

of this documentation was available from Engineering and therefore its estimate may not provide a reliable basis for projecting total program costs.

Another aspect of a high-quality cost estimate is the continuous monitoring of estimated costs, comparing them with actual costs to ensure that the estimate is relevant and current. According to Engineering, it has reviewed its costs each year since the estimate was developed and although incurred costs through May 2012 have been slightly lower than expected, Engineering is experiencing many problems with PTC implementation that will likely increase its overall costs. For example, Engineering allotted $12 million for spectrum over the course of FY 2012 and FY 2013, but, as discussed, acquiring radio spectrum could cost much more than this. However, Engineering has not provided a revised estimate to anyone outside of its own department. Given this and other challenges discussed below, we believe that the cost for installing PTC on Amtrak property and equipment may rise, thereby increasing the risk that Amtrak could need more funds to implement PTC than currently planned.

Estimates of PTC Installation Costs on Host Railroad Property May be Unreliable

According to an Amtrak Transportation Department official, the Department has not updated its estimate for the costs that Amtrak may be required to reimburse host railroads for installing PTC on the host railroads' lines, despite several new developments since 2010. Consistent with its authorizing legislation,[16] Amtrak may need to reimburse host railroads for costs they incur for installing PTC if those costs are due solely to Amtrak's running passenger trains on those lines. In 2010, Transportation estimated a range of these costs from a low of $115 million to a high of $436 million, and briefed this estimate to the Amtrak Board of Directors on March 18, 2010.

A Transportation official stated the range in estimates was due to potential changes to the PTC rule. Not only does RSIA require host railroads to install PTC on lines that carry passenger trains, it also requires them to install PTC on lines over which it ships poison or toxic-by-inhalation hazardous materials, such as chlorine. These railroads sought, and FRA granted, a change in the PTC rule—effective July 13, 2012—modifying

[16] 49 U.S.C. 24308.

the baseline year for determining which lines require PTC, from 2008 to 2015. Amtrak based its low estimate on the 2008 baseline and the high estimate on the 2015 baseline.[17] The effect of this rule change could allow host railroads to reroute hazardous materials shipments, thereby exempting them from having to install PTC on lines that would no longer carry trains with hazardous materials. If these lines now require PTC installation solely because of Amtrak trains, this could cause Amtrak to bear the costs for installing PTC on these lines.

Amtrak does not yet know the full effect of the rule change because FRA considers the information about specific route changes "security-sensitive" and has not made the information available to Amtrak. Although Amtrak officials currently believe the costs to be closer to the high end of this range ($436 million), an Association of American Railroads estimate showed that this rule change might affect only about 1,600 passenger route miles, with an estimated PTC installation cost of about $50,000 per mile. Using this estimate, we calculated that Amtrak could be liable for up to only about $80 million in additional costs to the 2008 baseline (for a total of $195 million) if Amtrak trains were the sole reason that PTC had to be installed along all 1,600 miles. This would significantly decrease the high end of Transportation's estimate. However, neither Amtrak nor we have the information necessary to judge the accuracy of the Association's estimate.

Amtrak has not pursued obtaining additional details on the hazardous materials route changes from the host railroads. According to a Transportation official, Amtrak wants to negotiate these costs only after the host railroads approach Amtrak with a cost estimate or bill for installing PTC. Consequently, we found no one in Amtrak who could explain with any specificity the costs that Amtrak may incur due to the PTC rule change.

In addition, Transportation's estimate does not include the cost of other access fees, such as using host railroads' radio spectrum when traveling over their lines. PTC-220, the freight railroad consortium, notified the FCC on July 19, 2012, that it plans to charge

[17] These estimates assumed that Amtrak and host railroads would apply for and FRA would grant potential exceptions to installing PTC on some host mainlines due to minimal rail traffic, slow speeds, or other restriction already in place on these lines. According to a Transportation official, Amtrak helped some of its host railroads prepare these exceptions, which FRA has approved.

nonmembers a fee for access to its 220 MHz spectrum. Therefore, Amtrak may be at risk for charges to access host railroad spectrum needed to operate Amtrak trains equipped with I-ETMS off the NEC.

Amtrak Has Not Included Total Funding for PTC in Its Financial Plan or Congressional Funding Requests

Amtrak did not include its total estimated costs for PTC implementation in its 5-year financial plan published in January 2012. It also did not include its total estimated costs for FY 2013 in its FY 2013 budget request submitted to Congress in February 2012. As a result, Amtrak is at risk of not having adequate funds to complete PTC installation.

- While Amtrak is required to submit its 5-year financial plan to Congress annually, pursuant to the Passenger Rail Investment and Improvement Act of 2008, it did not include its total funding requirements in its January 2012 submission.[18] The plan is required to include all projected expenditures for Amtrak over the period. Additionally, Amtrak's own capital programming policy requires multi-year programs, such as PTC, to include projected costs over the 5-year budget cycle. Despite these requirements, and Amtrak's having cost estimates available since March 2010, the funding required to install PTC on Amtrak property ($188 million) was not included in the *Five-Year Financial Plan for FY 2012–FY 2016* published in January 2012.

- Instead, Amtrak identified only the amount of funds it had spent installing PTC from FY 2009 through FY 2011 ($64 million)[19] and the amount it planned to spend in FY 2012 and FY 2013 to install ACSES and I-ETMS on the NEC ($27.5 million). The plan did not include the balance of Engineering's estimated costs for installing PTC on Amtrak property in FY 2014 and 2015 (about $96.5 million), and did not include any estimated costs for installing PTC on host railroad property (between $115 million and $436 million).

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[18] Public Law 110-432.

[19] Amtrak used part of the $1.3 billion provided to it through the American Recovery and Reinvestment Act of 2009 (Public Law 111-5) for the repair, rehabilitation, or upgrade of railroad assets or infrastructure to fund PTC implementation from FY 2009 through FY 2011. We will be reporting on Amtrak's accounting of these funds separately.

- Amtrak also did not include all of its funding requirement for 2013 in its FY 2013 legislative and grant request submitted to Congress in February 2012 as part of its annual legislative and grant request. The Consolidated Appropriations Act of 2010[20] required Amtrak to include the funding required for the projects for each fiscal year in its budget request submitted to Congress. According to Engineering officials, they planned to spend about $31.9 million installing PTC on Amtrak property and equipment in 2013, but Amtrak included only $5.4 million in its FY 2013 congressional funding request.[21] Amtrak did not include any funds to install PTC on host railroads' property in this request.

Despite the high-profile nature of PTC, and legal requirements to include funding requirements in Amtrak's 5-year financial plan and annual budget requests, neither Engineering nor Finance could explain why the total estimated costs of installing PTC on Amtrak equipment and property were not included in these documents. An Engineering official thought his department had included the money in its capital budget submission, and stated that he had briefed Finance on the costs of the program through FY 2015 after the March 2010 briefing to the Board of Directors, but could not explain the omission. The official acknowledged that it was Engineering's responsibility to include this information in the budget. According to a Finance official, Engineering did not include the full funding required for PTC in its budget submissions, but Finance was unable to provide the documentation that Engineering submitted.

Further, a Transportation official stated that his department purposely omitted PTC installation costs on host railroad lines from Amtrak's 5-year plan and annual budget requests. He cited his belief that including these costs in the budget would weaken Amtrak's negotiating position with the host railroads because it would alert the railroads to the amount of money that was potentially available to pay these costs. Instead of alerting the host railroads that they should be tracking these costs, Transportation officials plan to negotiate these costs and develop a payment plan when approached by the individual host railroad. For example, according to Transportation officials, they are currently negotiating Kansas City Terminal Railroad's original claim of $48 million for PTC installation. Following reviews by Amtrak and further

[20] Public Law 111-117, Consolidated Appropriations Act 2010, December 16, 2009.
[21] This figure is included in the $27.5 million in the *Five-Year Financial Plan for FY 2012–FY 2016*.

negotiations, Kansas City Terminal significantly reduced the original claimed amount, and discussions are ongoing. Regardless of Transportation's rationale, we question why Finance agreed to keep these costs out of the budget, when doing so does not meet the requirements in the laws governing Amtrak's budget requests to Congress.

Amtrak's revised budget for FY 2013, approved in September 2012, added some funds for PTC implementation, but still did not fully fund the amount Engineering projected spending in FY 2013. As a result, a significant portion of the costs for PTC implementation will be pushed into FY 2014 and FY 2015. For example, the revised budget includes only about $24.2 million for installing PTC on Amtrak property ($7.7 million less than the $31.3 million Engineering planned for FY 2013). This means, according to an Engineering official, that Engineering will need to add about $8 million for installing I-ETMS on Amtrak's locomotives that it planned to spend in FY 2013 to the FY 2014 budget, in order to meet the PTC deadline. In addition, the revised budget only includes about $1 million for installing PTC on host railroad property, meaning that Amtrak will need to incorporate almost all of the estimated costs for installing PTC on host railroad property into future budgets.

In addition, it remains unclear what type of funds will be used and who is responsible for budgeting for the cost to install PTC on host railroad property. According to a Transportation official, the Department typically pays host railroads out of operating funds for the costs they incur solely due to Amtrak's running trains on their lines, which may now include costs for PTC installation. Although Engineering included $1 million in its capital budget for this for FY 2013, an Engineering official stated that they do not plan to include any funds for PTC installation on host railroad property in future years' budgets. These costs could potentially consume a significant portion of either Engineering's or Transportation's FY 2014 and FY 2015 budgets, even if Amtrak spreads the payments out over several years, and could unnecessarily force Amtrak into making significant budget tradeoffs between PTC and other priorities if these costs are not properly included in budget estimates and funding requests. According to a Finance official, Amtrak probably would request more money from the federal government if it could not come up with the funds to pay for PTC. We believe that this is a potentially risky position to take, given the realities of the federal budget outlook.

Amtrak Has Not Addressed the Risk of Funds Not Being Available

Engineering officials disclosed in the PTC implementation plan that the availability of funding to complete implementation was a major risk. According to an Engineering official, Engineering completed the risk assessment in accordance with the Department's own project control procedures for capital construction projects rather than in response to the PTC rule. This guidance requires Engineering to assess both the likelihood of a negative event occurring during the project and the magnitude of its potential consequences in order to address project risk appropriately. Where risk is high, Engineering would be required to develop a plan to mitigate the risk. However, the implementation plan stated that funding would be addressed through other channels because it was beyond the scope of Engineering's control. Therefore, Engineering did not develop a mitigation plan for this risk, or alert other parts of Amtrak that such might be needed. While we generally agree that funding PTC is beyond the control of Engineering, the Department nevertheless had an obligation to raise this issue to an appropriate level.[22] No other department or office within Amtrak was accountable for ensuring that enough funds would be available to complete PTC implementation.

CHALLENGES IN MEETING REGULATORY REQUIREMENTS POSE SIGNIFICANT RISKS TO PTC IMPLEMENTATION

Amtrak has had significant difficulty in obtaining FRA approval for upgrades to ACSES. Under the PTC rule, FRA must approve any modification to existing PTC systems to ensure that they meet PTC requirements and general safety standards by the statutory deadline. Engineering assumed that because it had years of operational experience and because FRA had already approved ACSES for use as a PTC system, any upgrades to ACSES would require minimal documentation. Accordingly, in the PTC implementation plan, Engineering identified and ranked four risks associated with

[22] The enterprise risk management framework we recommended in March 2012 establishes a process for each manager to assess risks and raise those beyond his or her control to the next level, so that all significant risks can be addressed. See *Amtrak Corporate Governance: Implementing a Risk Management Framework is Essential to Achieving Amtrak's Strategic Goals* (OIG-A-2012-007, March 30, 2012).

ACSES upgrades, but none concerned regulatory approval. This assumption proved initially true when Amtrak presented two sets of ACSES upgrades to FRA in early 2011. These two upgrades related to new transponder models and software changes to the on-board display. FRA approved these upgrades within 60 days. Since approval, Engineering had installed about 94 percent of the transponders as of August 8, 2012.[23]

However, the third proposed set of upgrades to ACSES, in July 2011, was more complex. Engineering bundled several technical changes into one request for approval, notifying FRA of Amtrak's intent to replace the ACSES on-board display units and change the on-board data radios, along with associated software revisions. FRA responded that these changes were significant enough to require full safety reviews because these components had no operational history. Amtrak and FRA exchanged letters for several months before setting up informal meetings, also known as workshops, to discuss technical issues and requirements before formally submitting ACSES upgrades for approval. Amtrak held several workshops with FRA to discuss this request. In February 2012, Engineering split the submission into two separate requests for the on-board display unit upgrade and the data radio upgrade (which also included train and wayside communication managers). FRA approved the on-board display unit upgrade on August 8, 2012, but Amtrak has still not submitted the second request. Amtrak officials are currently conducting workshops with FRA concerning the second request. As of September 13, 2012, Engineering believed these workshops would lead to a formal submission to upgrade the data radio in the fall of 2012 and FRA approval by the end of January 2013.

In April 2012 Engineering revised the installation schedule for the remaining ACSES components from late 2012 to September 2013. Engineering determined that it had numerous additional technical changes and upgrades that would require FRA review and approval. Engineering intends to bundle these changes into four requests for approval to FRA: three are for upgrades of ACSES components, and the fourth upgrade is for connectivity (interoperability[24]) of ACSES with commuter railroads. Engineering

[23] In addition to the transponders, Amtrak has also completed, or substantially completed, the installation of radio huts, antennas, and fiber cables along the NEC.
[24] The PTC rule defines interoperability as the ability of a locomotive to communicate with and respond to the host railroad's PTC system, enabling uninterrupted movement over property boundaries.

based this September 2013 installation date on an assumption that each revision will take 3 months for FRA approval.

This was the first time since FRA approved the implementation plan that Engineering had revised its schedule. Engineering did not follow project control procedures, which called for the development of an overall master project schedule and other detailed plans identifying tasks, resources, and dependencies needed to complete the project. Instead, an Engineering official said that he developed a general listing of tasks for each site where work was to be performed because the situation had been too dynamic. Had Engineering followed its guidance and performed periodic reviews of its schedule and risk assessment, it likely would have seen that this schedule revision did not include enough time for FRA approvals.

Our analysis shows that, based on actual experience, the September 2013 completion date is overly optimistic. FRA's review of the on-board display unit took 13 months, and approval of the data radios is still pending. This is in contrast to Amtrak's latest schedule showing 3 months for each FRA review. Although both Amtrak and FRA officials said that recent changes to the review process, including the introduction of workshops, should lead to reduced review times, we estimate that FRA approval of Engineering's requests for proposed upgrades to ACSES will take about 9 months each. We base this on a timeline of about 90 days to prepare the submission documents after Engineering completes design, development, procurement, and prototyping. The estimate also includes another 90 days for FRA to review and respond to the initial request under the new framework using the workshops.[25] Then, we estimated 30 days for Engineering to respond to FRA's questions, and 60 days for FRA to review and approve Engineering's final response. We currently estimate that Amtrak will not complete installation of its upgrades until about March 2014.

We believe that this is a more likely scenario than Amtrak's estimates. However, our estimate assumes that Engineering can submit the upgrades concurrently, rather than sequentially as with the on-board computer and data radio upgrades, and that FRA has sufficient staff to review these requests concurrently (at the same time that 37 other railroads could be submitting requests for approval). We also assume that the upgrades are not technically complex, which could precipitate a more lengthy review. Finally, we

[25] According to an FRA official, it takes them about 90 days to review a request.

assume that Amtrak does not experience any unforeseen technical problems that could postpone submission of the upgrades for approval. While we realize that Engineering may be able to compress some steps, if any of our assumptions turns out to be wrong, approval of the upgrades could take much longer.

Amtrak's timeline also assumes minimal technical difficulties with purchased equipment or during installation, although Engineering has already experienced unforeseen technical issues with equipment on the project. For example, Amtrak had significant problems with the wayside interface units that provide information to trains about signal indications and switch positions. After initially delivering the units between November 2010 and January 2011, Alstom, the vendor, discovered that the wayside interface units did not meet safety and performance standards and notified Amtrak. According to an Engineering official, Alstom fixed the problem and began redelivering the 252 units in June 2012, about 19 months after the original delivery date. Engineering has started installing the units, and estimated that it will take about a year to install all required units across the remaining seven of the eight ACSES line segments on the NEC. (Amtrak already installed legacy units on line segment 3 in New England.) Figure 2[26] shows NEC ACSES line segments.

[26] Although Engineering has already started installing the units, officials stated that they would not activate wayside interface units until FRA provided final approval.

Figure 2. NEC ACSES Line Segments

Source: OIG analysis of Amtrak technical documents

Approval of the individual upgrades is not the last step in the process. FRA officials have indicated that ACSES could need a full system review following the installation of all the new components before it agrees that the system meets all safety requirements. To meet the RSIA interoperability mandate, FRA will also need to approve Amtrak's planned upgrades to ensure connectivity with tenant commuter railroads. We estimate that Amtrak will not be ready for FRA to certify ACSES' interoperability with tenant commuter railroads—assuming spectrum is available—until about July 2015. Although FRA's approval process is potentially time-consuming, it ensures that ACSES and other PTC systems meet safety standards; Amtrak needs to account for this process properly if it expects to implement ACSES in time to meet the requirements in RSIA by the end of 2015.

CHALLENGES IN THE DEVELOPMENT OF I-ETMS POSE SIGNIFICANT RISKS TO PTC IMPLEMENTATION

Amtrak may not have enough time to meet the deadline for implementation of PTC if delays in the development of I-ETMS continue. Amtrak intends to install I-ETMS on line segments 1, 2, 4, and 5 of the NEC that are used by tenant railroads deploying I-ETMS (see Figure 2), and on its locomotives that operate off the NEC, if the system is developed before the end of 2015.[27] In the implementation plan, Engineering stated that it would work closely with the freight railroads during the development of I-ETMS to address any technical problems.

When developing the implementation plan, Engineering assumed that the 26 I-ETMS specifications needed for full system development were in the final stages of approval and that I-ETMS installation would follow on the heels of ACSES installation. In 2010, the Association of American Railroads reported that the freight railroads would complete these specifications by January 2011. However, an August 2012 FRA report states that only seven of these 26 specifications are complete.[28] Amtrak's plan states that

[27] Amtrak is installing I-ETMS on the NEC to meet the interoperability requirements of the PTC rule. However, Engineering stated that tenant railroads might need to equip their locomotives with ACSES in order to operate on the NEC if the freight railroads delay development of I-ETMS past the end of 2015.
[28] *Federal Railroad Administration Report to Congress: Positive Train Control Implementation Status, Issues, and Impacts*, FRA, August 2012.

it would require 26 months to install I-ETMS on the NEC, starting in October 2012 and completing work by December 2014. The delay in the completion of the I-ETMS specifications has the effect of pushing back Amtrak's implementation of I-ETMS.

To mitigate this delay, Amtrak is attempting to move forward with installing I-ETMS on the NEC through an outside contractor. On February 17, 2012, Amtrak issued a request for proposals for the installation of I-ETMS on the NEC despite the lack of complete specifications, availability of hardware and software, or FRA approval of the system. The request requires the potential contractor to prepare its proposal based upon the current state of I-ETMS, to conduct the work in phases as I-ETMS is developed, and calls for a firm-fixed-price contract. An Amtrak official stated that the intention is to shift the risk to the contractor. We believe that moving forward with this contract has its own significant risks because the potential contractor has no basis on which to develop a fair and reasonable fixed price proposal due to the lack of information. Therefore, Amtrak may end up paying more for the work than anticipated due to future contract modifications that become necessary to complete the work, despite any precautions Amtrak builds into the contract. Engineering officials, however, believe this phased implementation approach is less risky than delaying implementation until the full development of I-ETMS.

Technical challenges in the implementation of I-ETMS off the NEC could also pose a risk to Amtrak's schedule. For example, a concern within the rail industry, including Amtrak, is how well I-ETMS will predict train-stopping distances. In January 2011, Amtrak and BNSF Railway conducted stopping-distance tests under multiple conditions on BNSF's Red Rock Subdivision in Oklahoma. Results indicated that trains stopped well short of their intended targets. Similarly, tests conducted on Amtrak's *Heartland Flyer* in Fort Worth, Texas, identified other technical problems using an I-ETMS prototype for revenue service. Further, according to FRA, another round of tests conducted in July 2012 showed problems with the communications and software in one of the developmental stages of I-ETMS.

Although both Amtrak and FRA officials stated that these technical problems will eventually be overcome, the implementation plan identified interoperability outside of the NEC as a risk. According to Engineering, because I-ETMS development was outside of its control, it did not plan to mitigate the risk and consequently no one in Amtrak is accountable for mitigating the potential risks posed by delays in the development of I-ETMS. Although the plan stated that Amtrak would work closely with the freight

railroads during the development of I-ETMS, Amtrak is only a nonvoting member in several I-ETMS working groups, including the Association of American Railroads PTC working group and Interoperable Train Control working group. Therefore, we question Amtrak's ability to influence either group to develop solutions to these problems in a timely manner. Moreover, Amtrak has not yet assigned an individual to continuously monitor and assess the risks associated with the development of I-ETMS.

CONCLUSIONS

Amtrak is attempting to mitigate the risks posed by current challenges to PTC implementation in various ways, but overcoming some of these challenges by the December 31, 2015, deadline will require increased attention and emphasis. If Amtrak cannot meet its needs for radio spectrum within the next year, it may need to engage the federal government in devising a solution because it does not currently have a technically viable alternative to using the 220 MHz radio frequency spectrum. In addition, Amtrak cannot rely on the federal government to provide extra funds at the last minute for implementation and therefore needs up-to-date, accurate estimates of the costs of implementation over the next 3 years, including the cost of installing PTC on host railroad lines, to properly request and budget for PTC implementation. Further, Amtrak cannot risk delays associated with regulatory approvals of ACSES upgrades, nor can it absorb further delays to development of I-ETMS, particularly for technical problems that affect passenger trains, if it expects to meet the statutory deadline.

While formidable in and of themselves, all four of these challenges are interrelated, requiring the integration of efforts across departments to address them in order to implement PTC by the deadline and achieve the safety benefits derived from PTC systems envisioned in RSIA. Amtrak will have a better chance of successfully accomplishing this if overall responsibility and accountability for these challenges are assigned to a senior manager who has the authority to address them.

RECOMMENDATIONS

To address the challenges Amtrak is facing in implementing PTC, we recommend that

1. The Vice President, Operations, designate a senior executive to manage the overall program, or fully empower the Deputy Chief Engineer for Communications and Signals with clear responsibility and authority to manage the implementation of PTC as an integrated program; this would include the clear authority to address all of the challenges involved, regardless of the departments they pertain to, and the ability to make strategic and budgetary tradeoffs among the challenges.

2. The program manager designated by the Vice President, Operations, ensure that Amtrak

    a. periodically reassesses the risks to PTC implementation and mitigates those risks, as necessary;

    b. conducts a full analysis of the technical risks and costs associated with obtaining spectrum licenses in a piecemeal fashion, to determine the appropriate level of support needed, if any, from the federal government, to obtain spectrum in a technically adequate, cost-effective manner, or begin to develop a viable alternative if 220 MHz spectrum is unavailable;

    c. updates and improves the reliability and accuracy of its cost estimates and includes the full amount of required funding in the 5-year financial plan and the annual legislative and grant funding request to complete implementation of PTC by the deadline;

    d. develops a master project schedule that includes detailed tasks and dependencies and periodically revises it;

    e. reconsiders the risks associated with the plan to award a fixed price contract to install I-ETMS;

    f. remains engaged with FRA to increase the likelihood that the FRA review process stays on schedule; and

g. engages sufficiently at the appropriate level with host railroads and others in the industry to influence developments with I-ETMS that affect Amtrak.

MANAGEMENT COMMENT AND OIG ANALYSIS

Amtrak's Vice President, Operations, provided comments on a draft of this report on December 12, 2012, wherein he concurred with all of our recommendations and established time frames in which Amtrak will implement the recommendations (see Appendix III). We consider his comments responsive to our recommendations and we will follow up on their implementation.

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We appreciate the courtesies and cooperation that Amtrak representatives extended to us during the course of this review. If you have any questions, please contact me (Calvin.Evans@amtrakoig.gov, 202.906.4507) or Jason Venner, Senior Director (Jason.Venner@amtrajoig.gov, 202.906.4405).

cc: Joseph H. Boardman, President and Chief Executive Officer
Eleanor D. Acheson, Vice President, General Counsel and Corporate Secretary
Gordon L. Hutchinson, Acting Chief Financial Officer
Joseph H. McHugh, Vice President, Government Affairs and Corporate Communications
Bruce R. Pohlot, Chief Engineer
E. Keith Holt, Deputy Chief Engineer, Communications and Signals
Paul E. Vilter, Assistant Vice President, Host Railroads
William J. Auve, Jr., Assistant Controller, Capital and Costing

Appendix I

SCOPE AND METHODOLOGY

This report provides the results of our evaluation of Amtrak's implementation of PTC systems. We focused our work on Amtrak's efforts to identify and mitigate risks to the successful implementation of PTC by the statutory deadline of December 31, 2015. Specifically, our objective was to report on the extent to which Amtrak is addressing what are currently the most significant challenges to successful PTC implementation. We performed our work in Washington, D.C.; Wilmington, Delaware, and Philadelphia, from October 2011 through September 2012.

To address the extent to which Amtrak is addressing challenges in acquiring radio spectrum, we obtained and analyzed plans and procurement documents to acquire spectrum. We also interviewed officials from Engineering, the Law Department, the Office of Governmental Affairs and Corporate Communications, and Amtrak's Procurement Services office, to gain an understanding of the challenges Amtrak is facing in acquiring 220 MHz radio frequency spectrum. We also reviewed Amtrak's analysis of spectrum licenses included in contractors' bid proposals and reviewed documents in the FCC docket regarding availability of spectrum on the NEC.

To address the extent to which Amtrak is addressing funding challenges, we obtained and analyzed cost estimates and spending plans for installing PTC on Amtrak and host railroad property and equipment, budget documents for FY 2013, and Amtrak's FY 2012–2016 *Five-Year Financial Plan*. We reviewed and evaluated Amtrak's assessment of its funding risks in its PTC implementation plan. We met with officials from Engineering, Transportation, and Finance, to gain an understanding of their cost estimating methodologies and Amtrak's budgeting process. We compared Engineering's actual cost estimating methodology with both its project control guidance for capital construction costs and the U.S. Government Accountability Office's *Cost Estimating and Assessment Guide*.

To address the extent to which Amtrak is dealing with challenges in meeting regulatory requirements, we reviewed Amtrak's PTC implementation plan to gain an understanding of how Engineering planned to develop and deploy ACSES and its associated risks. We also reviewed Engineering's submissions of ACSES upgrades and correspondence with FRA. We met with Engineering and FRA to gain an

understanding of the regulatory review process. We also met with Amtrak's Procurement Services office and obtained documents from it to review issues with the acquisition of ACSES components. Further, we obtained and reviewed Engineering's project status reports and other project management documents.

To evaluate the extent to which Amtrak is addressing delays in the development of I-ETMS, we analyzed the PTC implementation plan to gain an understanding of how Engineering planned to deploy I-ETMS and its associated risks. We discussed the development of I-ETMS with Engineering and officials from the Association of American Railroads. We also obtained and analyzed Amtrak's request for proposals for installation of I-ETMS on the NEC. To determine problems and concerns that Amtrak officials had with I-ETMS equipment, we obtained and reviewed testing information from several braking and functionality tests conducted with BNSF during 2011 and 2012 and met with Engineering and Transportation to discuss the results of these tests. We also discussed Amtrak's participation in I-ETMS working groups with officials from Engineering.

We performed this evaluation in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the evaluation to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our evaluation objectives.

Use of Computer-Processed Data

We did not use computer-processed data to determine our findings or conclusions in this report.

Internal Controls

In conducting the evaluation, we reviewed project management controls for the implementation of PTC within the context of our objectives. We also examined other Amtrak controls associated with estimating, budgeting, and funding capital construction projects. We determined that a deficiency in internal controls existed due

to Amtrak's noncompliance with reporting requirements in the Passenger Rail Investment and Improvement Act of 2008. We presented the results of our review in the body of this report.

Prior Reports

We relied on the following FRA, Congressional Research Service, Department of Transportation OIG, Amtrak OIG, and U.S. Government Accountability Office reports in conducting our evaluation:

Federal Railroad Administration Report to Congress: Positive Train Control Implementation Status, Issues, and Impacts (Federal Railroad Administration, August 2012)

Positive Train Control (PTC): Overview and Policy Issues, Congressional Research Service (R42637, July 30, 2012)

Amtrak Corporate Governance: Implementing a Risk Management Framework is Essential to Achieving Amtrak's Strategic Goals, Amtrak OIG (OIG-A-2012-007, March 30, 2012)

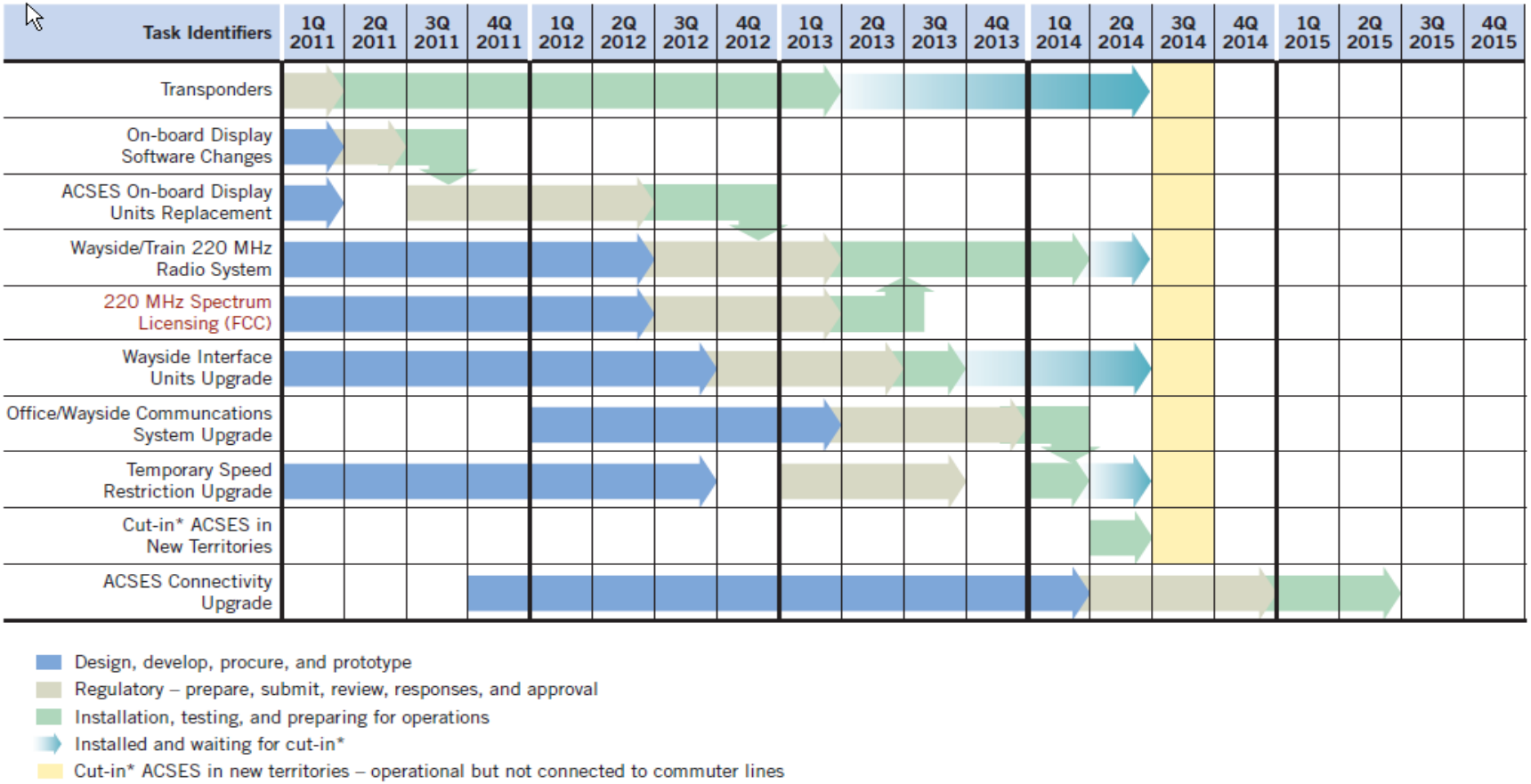
Annual Report on Amtrak's Budget and Five-Year Financial Plan, Department of Transportation OIG (J-2012-002, March 28, 2012)

Rail Safety: Federal Railroad Administration Should Report on Risks to the Successful Implementation of Mandated Safety Technology, U.S. Government Accountability Office (GAO-11-133, December 15, 2010)

Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs, U.S. Government Accountability Office (GAO-09-3SP, March 2, 2009)

Appendix II

ACSES IMPLEMENTATION SCHEDULE



Source: OIG analysis of Amtrak technical documents
* "Cut-in" is the process of integrating the components and turning the system on for service.

Appendix III

COMMENTS FROM AMTRAK'S VICE PRESIDENT, OPERATIONS

NATIONAL RAILROAD PASSENGER CORPORATION
60 Massachusetts Ave NE., Washington, DC 20002

Memo

AMTRAK

Date December 12, 2012

From D.J. Stadtler, Vice President Operations

To Calvin E. Evans, Assistant Inspector General, Inspections and Evaluations

Subject Response to Draft Evaluation Report 005-2012

cc Eleanor D. Acheson
Gordon L. Hutchinson
Joseph H. McHugh
Bruce R. Pohlot
Keith Holt
Paul E. Vilter
Melantha Paige

This memo is Amtrak Management's Response to the October 18, 2012 Draft Evaluation Report #005-2012 titled *Railroad Safety: Amtrak Has Made Progress in Implementing Positive Train Control, but Significant Challenges Remain.*

Amtrak has been a leader in Positive Train Control (PTC) implementation for over a decade. The ACSES system was the first PTC system certified by FRA and has been in operation for over 10 years with train speeds up to 150 mph and without a wrong side failure. Amtrak has also operated the ITCS PTC system in Michigan for a number of years and received approval from FRA this year to increase speeds to 110 mph on the Michigan Line.

In many respects PTC is still in the Research and Development phase across the United States. The Class I railroads have acknowledged that it is highly unlikely that they will be able to meet the December 31, 2015 deadline. FRA also acknowledged this in its report to Congress this fall and has recommended an extension to the deadline. Amtrak has an advantage over the Class I railroads in that ACSES and ITCS are further along the development timeline that I-ETMS yet Amtrak still has challenges to overcome. These challenges will be met and Amtrak will complete the implementation of PTC.

The following details Amtrak's detailed responses to the recommendations outlined in your report:

Recommendation - The Vice President, Operations (shall) designate a senior executive to manage the overall program, or fully empower the Deputy Chief Engineer for Communications and Signals with clear responsibility and authority to manage the implementation of PTC as an integrated program; this would include the clear authority to address all of the challenges involved, regardless of the departments they pertain to, and the ability to make strategic and budgetary tradeoffs among the challenges.

Management Response – Management concurs with this recommendation. Under the supervision of Amtrak's Chief Engineer, the Deputy Chief Engineer Communications and Signals (C&S) has been designated as the person responsible for PTC with clear responsibility and authority to manage its implementation as an integrated program.

Recommendation - The program manager designated by the Vice President of Operations should ensure that Amtrak:

a) periodically reassesses the risks to PTC implementation and mitigates those risks, as necessary;
b) conducts a full analysis of the technical risks and costs associated with obtaining spectrum licenses in a piecemeal fashion, to determine the appropriate level of support needed, if any, from the federal government, to obtain spectrum in a technically adequate, cost-effective manner, or begin to develop a viable alternative if 220-MHz spectrum is unavailable;
c) updates and improves the reliability and accuracy of its cost estimates and includes the full amount of required funding in the 5-year financial plan and the annual legislative and grant funding request to complete implementation of PTC by the deadline;
d) develops a master project schedule that includes detailed tasks and dependencies and periodically revises it;
e) reconsiders the risks associated with the plan to award a fixed price contract to install I-ETMS;
f) remains engaged with FRA to increase the likelihood that the FRA review process stays on schedule; and
g) engages sufficiently at the appropriate level with host railroads and others in the industry to influence developments with I-ETMS that affect Amtrak.

Management Response – Management concurs with this recommendation. The Deputy Chief Engineer C&S will re-evaluate the costs and risks associated with the completion of the implementation of PTC on Amtrak property, the equipping of Amtrak's locomotive fleet and the probable costs of implementing PTC on Host Railroads where hosts may assert that there are incremental costs that Amtrak should repay. These estimates will be completed by March 15, 2013 and presented to the VP Operations to review with the executive committee for establishment of a budget to meet the mandated implementation. The Deputy Chief Engineer C&S will be directed to update these estimates on a quarterly basis along with the identification of all risks and his plan to mitigate these risks.

Additionally, the Deputy Chief Engineer C&S will conduct a full analysis of the technical risks and costs associated with obtaining spectrum licenses for PTC by March 15, 2013 and provide a report to the executive committee on any progress made, any plans to obtain the spectrum not yet obtained and all risks involved. Amtrak's Government Affairs Department will assist him with obtaining any assistance from governmental agencies or contacts with Congressional Committees.

Furthermore, the Deputy Chief Engineer C&S will develop a master schedule that will include detailed tasks and dependencies and will update and/or revise this schedule on a monthly basis. The master schedule will be completed by March 15, 2013.

Throughout the PTC development process, the Deputy Chief Engineer C&S has been engaged with the freight railroads, commuter railroads and others to address development and interoperability issues pertaining to PTC and will continue to do so. He will assign members of his team to represent Amtrak on all or the ITC committees to participate with the Class I railroads in continuing the development I-ETMS

specifications. His PTC team will also continue to conduct testing with the Class I railroads and commuter railroads as they roll out their test beds.

Management will also stress that the Deputy Chief Engineer C&S will continue to maintain a very good working relationship with the FRA and will continue to work closely with them through the review process for all changes to ACSES and ITCS. To date, he and the FRA have agreed on a workshop process that is working very well as changes are being rolled out. These workshops will continue to keep the FRA involved through the design and testing process so that they have a good understanding of the proposed changes when formal documentation is submitted for approval.

The I-ETMS contract referred to in the recommendations will be scaled back to an I-ETMS test bed to be installed in Maryland on the NEC. Amtrak has an FRA grant for this test bed and will not proceed with a contract to install I-ETMS on the remaining portions of the NEC until the system has been more fully developed.

Finally, engineering and finance will develop a budget for PTC that will be included in Amtrak's annual and 5 year budget plan(s). Together they will also develop a funding plan for PTC implementation. The budget for PTC will necessarily be preliminary and based on very limited information until the freight railroads over which Amtrak operates identify PTC costs that they assert should be paid by Amtrak as incremental costs."

We thank you for your work in this area. Should you require any additional information please feel free to reach out to me.

Appendix III

ABBREVIATIONS

ACSES	Advanced Civil Speed Enforcement System
FCC	Federal Communications Commission
FRA	Federal Railroad Administration
FY	fiscal year
GAO	Government Accountability Office
GPS	global positioning system
I-ETMS	Interoperable-Electronic Train Management System
MHz	megahertz
NEC	Northeast Corridor
OIG	Office of Inspector General
PTC	Positive Train Control
RSIA	Rail Safety Improvement Act of 2008

Appendix IV

OIG TEAM MEMBERS

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George Binns, Jr., Senior Operations Analyst

Timothy Wells, Principal Operations Analyst

James Quinn, Evaluator

Courtney Catanzarite, Auditor

OIG MISSION AND CONTACT INFORMATION

Amtrak OIG's Mission

Amtrak OIG's mission is to

- conduct and supervise independent and objective audits, inspections, evaluations, and investigations relating to Amtrak programs and operations;
- promote economy, effectiveness, and efficiency within Amtrak;
- prevent and detect fraud, waste, and abuse in Amtrak's programs and operations;
- review security and safety policies and programs; and
- review and make recommendations regarding existing and proposed legislation and regulations relating to Amtrak's programs and operations.

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