

**DEPARTMENT OF TRANSPORTATION
INSPECTOR GENERAL
TOP MANAGEMENT CHALLENGES
FOR FISCAL YEAR 2014**

FEDERAL AVIATION ADMINISTRATION
YEAR END PROGRESS REPORTS

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2014 IG Management Challenges Actions Taken Report

Management Challenge: Improving FAA's Oversight of the Aviation Industry and the Operations of the National Airspace System

Issue: Advancing Initiatives to Improve Pilot Training, Mentoring, and Record Keeping

Section I: Why is this issue significant?

In August 2010, Congress passed the Airline Safety and FAA Extension Act (Public Law [P.L.] 111-216, "the Act"), which among other things, directed FAA to convene an aviation rulemaking committee to develop procedures for each air carrier operating under part 121 to establish flight crewmember mentoring programs and create professional development committees to oversee the mentoring programs. The purpose of the mentoring programs is to assist flight crewmembers to reach their maximum potential as safe, seasoned, and proficient flight crewmembers.

The Act directs FAA to establish an "FAA Pilot Records Database" (PRD) that must contain information collected by the FAA, air carriers and other employers of pilots, and the National driver register records. Air Carriers operating under parts 121 and 135, will be required to access and evaluate a pilot's record before allowing an individual to begin service as a pilot. This will improve upon the timeliness of the existing paper-based shared data instituted by the Pilot Record Improvement Act (PRIA) of 1996.

In February 2012, Congress passed the FAA Modernization and Reform Act of 2012 (P.L. 112-95), which directed the FAA through legislation to conduct additional rulemaking projects to improve aviation safety, including the safety of flight crewmembers, medical personnel, and passengers on board helicopter air ambulance operations, and the safety of flight crewmembers and passengers in commercial aviation.

Section II: Actions taken in Fiscal Year 2014:

FAA published the "Qualification, Service, and Use of Crewmembers and Aircraft Dispatchers" final rule on November 12, 2013, which revises the training requirements for pilots in part 121 air carrier operations. The regulations enhance air carrier pilot training programs by emphasizing the development of pilots' manual handling skills and adding safety-critical tasks such as recovery from stall and upset. The final rule also requires enhanced runway safety training and pilot monitoring training to be incorporated into existing requirements for scenario-based flight training and requires air carriers to implement remedial training programs for pilots.

Additionally, the final rule revises recordkeeping requirements for communications between the flight crew and dispatch, ensures that personnel identified as flight attendants have completed flight attendant training and qualification requirements, provides civil enforcement authority for making fraudulent statements, and, provides a number of conforming and technical changes to existing air carrier crewmember training and qualification requirements. The final rule also includes provisions that provide opportunities for air carriers to modify training program requirements for flightcrew members when the air carrier operates multiple aircraft types with similar design and flight handling characteristics.

On February 12, 2014, FAA published the "Prohibition on Personal Use of Electronic Devices on the Flight Deck" final rule. This rule prohibits flight crew members in operations under part 121 from using a personal wireless communications device or laptop computer for personal use while at their duty station on the flight deck while the aircraft is being operated. It is intended to ensure certain non-essential activities do not contribute to the challenge of task management on the flight deck or a loss of situational awareness due to attention to non-essential tasks.

On February 21, 2014, FAA published the "Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations" final rule. This final rule requires helicopter operators, including helicopter air ambulances, to have more strict flight rules and procedures, improved risk avoidance and operational control procedures, training, and additional on-board safety equipment.

In November 2013, FAA announced the establishment of a joint government and industry steering group—Air Carrier Training Rulemaking Committee (ACT ARC)—composed of safety experts from the airlines, crewmember unions, government and the aviation community. The purpose of the ACT ARC is to evaluate best practices from across the industry, review recommendations from previous FAA rulemaking advisory committees on training issues, and examine newly identified areas of risk in order to develop voluntary training guidelines for air carriers. Quarterly meetings of the ACT ARC began in April 2014. The ACT ARC provides a forum for the United States aviation community to discuss, prioritize, and provide recommendations to FAA concerning operations conducted by air carriers under parts 121 and 135, as well as by training providers under part 142¹.

The ACT ARC will review outstanding recommendations from past ARCs including:

- Air Carrier Safety and Pilot Training ARC;

¹ A part 121 air carrier generally operates larger aircraft to offer more seats and scheduled service to the public. They may fly passengers or cargo. Air carriers under part 135 generally use smaller aircraft and carry up to 30 passengers. Some are scheduled, but most offer unscheduled, "on-demand" service based on the needs of the customer. Air agencies regulated under part 142 offer pilot training using simulators.

- Stick Pusher, and Adverse Weather Event Training, and Loss of Control and Recovery ARCs;
- Training Hours Requirement Review ARC; and
- Performance-Based Aviation Rulemaking Committee (Including this ARC's collaborative work with the Commercial Aviation Safety Team to establish the Flight Deck Automation Working Group, led by FAA, ALPA and Industry Co-Chairs, and their report "Operational Use of Flight Path Management Systems" , published September 5, 2013.

Additionally, the ACT ARC will review outstanding recommendations from the National Transportation Safety Board (NTSB).

In July 2014, FAA published "Flight Simulation Training Device (FSTD) Qualification Standards for Extended Envelope and Adverse Weather Event Training" Notice of Proposed Rulemaking (NPRM). The primary purpose of the rule is to improve existing technical standards and introduce new technical standards for evaluating:

- A Flight Simulation Training Device (FSTD) for full stall and stick pusher maneuvers;
- Upset recognition and recovery maneuvers;
- Maneuvers conducted in airborne icing conditions;
- Takeoff and landing maneuvers in gusting crosswinds; and
- Bounced landing recovery maneuvers.

These new and improved technical standards are intended to fully define FSTD fidelity requirements for conducting new flight training tasks introduced through recent changes in the air carrier training requirements as well as to address various NTSB and ARC recommendations. The proposal also updates the FSTD technical standards to better align with the current international FSTD evaluation guidance and introduces a new FSTD level that expands the number of qualified flight training tasks in a fixed-base flight training device. The proposed changes would ensure that the training and testing environment is accurate and realistic, codify existing practice, and provide greater harmonization with international guidance for simulation.

In August 2014, FAA published new testing materials for the Pilot Certification and Qualification final rule, which was published in July 2013. These materials support the Airline Transport Pilot Certification Training Program (ATP CTP), which incorporates an introduction to stall and upset prevention recovery concepts and procedures in large transport airplanes.

FAA is also working on the "Safety Management Systems for Part 121 Certificate Holders" final rule, required under P.L. 111-216, sec. 215. This rule requires each certificate holder operating under part 121 to develop and implement a safety management system (SMS) to improve the safety of its aviation related activities. An SMS is a comprehensive, process-oriented approach to managing safety throughout an organization.

Section III: Actions remaining and expected completion date:

FAA continues to make progress on the Pilot Records Database (PRD) despite the complexity associated with this project (as noted in DOT OIG Report AV-2013-037 dated January 31, 2013). In March 2013, a Rulemaking Action Plan was approved, which outlines key issues associated with implementation of this rule. The PRD rulemaking team is currently drafting the NPRM document, which is scheduled for publication in Fall 2015.

FAA is currently engaged in rulemaking for "Applying the Flight, Duty, and Rest Requirements to Ferry Flights that Follow Domestic, Flag, or Supplemental All-Cargo Operations", which would require a flightcrew member who accepts an additional assignment for flying under part 91² from the air carrier or from any other air carrier conducting operations under part 121 or 135 of such title (e.g. a "tail-end ferry" with an empty aircraft that follows an all-cargo flight), to apply the period of the additional assignment toward any limitation applicable to the flightcrew member relating to duty periods or flight times. This rule is necessary as it will make part 121 flight, duty, and rest limits applicable to cargo operations. Estimated publication of the NPRM is January 2015.

FAA is engaged in rulemaking for "Pilot Professional Development", which would amend the regulations for air carrier training programs under part 121. The action is necessary to ensure that air carriers establish or modify training programs that address mentoring, leadership, and professional development of flight crewmembers in part 121 operations. The amendments are intended to contribute significantly to airline safety by reducing aviation accidents and respond to the mandate in P.L. 111-216. The FAA anticipates publication of the NPRM April 2015.

FAA is currently engaged in rulemaking to develop helicopter air ambulance (HAA) operations pilot training requirements and operational safety requirements for pilots and medical personnel. This is in response to the Congressional mandate in P.L. 112-95, section 306(e), which directs the FAA to initiate this second HAA rulemaking project not later than 180 days after the date of issuance of the "Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations Final Rule". The FAA has already initiated this rulemaking and anticipates publication of an NPRM in early 2016..

FAA is currently developing revisions to FAA Advisory Circulars (AC) 135-14, "Emergency Medical Services/Helicopter", and AC 120-96, "Integration of Operations Control Centers into Helicopter Emergency Medical Services Operations". Both ACs provide information and guidance for Helicopter Air Ambulance operators.

² Part 91 covers general flight rules. General aviation pilots fly under part 91, but also state-owned aircraft such as the police. If a flight is not carrying passengers or cargo, then it is generally conducted under part 91 rules.

FAA is revising Order 8900.1, "Flight Standards Information Management System", to provide updated Flight Standards policy and guidance to aviation safety inspectors regarding helicopter and helicopter air ambulance operations.

Current rulemaking projects are in various stages of the process however, the rulemaking process is complex and lengthy as FAA must consider all aspects of impact and the input of stakeholders. Also, FAA faced challenges in completing the requirements of P.L. 111-216 and P.L. 112-95 such as short timelines, requirements between sections, and coordination activity with industry and other agencies before proposing a final rule.

Section IV: Results or expected results:

Recent FAA rules to increase pilot qualifications and improve training are major steps toward addressing the greatest known risk areas in pilot training. FAA expects that these new regulations will enhance an already effective safety partnership with air carriers and other industry stakeholders.

FAA has rooted this partnership in voluntary cooperation between government and industry. By encouraging transparency and analysis of safety issues in a collaborative atmosphere, U.S. air carriers have been able to reduce fatality risks to the lowest levels. We look forward to expanding this partnership in other areas and continuing to enhance aviation safety.

FAA expects that publication of the above-referenced rules and associated guidance material will increase the qualifications of flight and other crewmembers, reduce aviation incidents and accidents and, thus, increase public safety and confidence in the aviation industry.

Management Challenge: Improving FAA's Oversight of the Aviation Industry and the Operations of the National Airspace System

Issue: Improving Air Traffic Controller Training, Scheduling, and Performance

Section I: Why is this issue significant?

Controller Training

The FAA Air Traffic Organization (ATO) is experiencing a large number of air traffic controller retirements. Training to replace retirees is a key priority for the FAA. The Office of Safety and Technical Training is responsible for improving the training program for air traffic controllers.

While the FAA has taken action to improve its controller training program, such as moving the facility placement decision until after graduation from the FAA Academy, the Office of the Inspector General (OIG) has recommended that the FAA should track the progress of actions it has taken to improve controller training and establish mechanisms to assess their impact.

In order to resolve the controller training issues cited in the OIG report, the Technical Training Directorate will:

- Implement policy to identify and measure training initiatives. Our primary measures are always student pass rate and time to certify. However, depending on a particular initiative, other measures may be appropriate to include or supplant. The policy will be established in a Technical Training (AJI) Order.
- Collect and analyze data from agency systems to measure the effectiveness of initiatives taken to improve technical training.
- Publish the results of training initiatives analysis semiannually in the Training Performance Report.

Fatigue Risk Management

The FAA Air Traffic Organization (ATO) operates a Fatigue Risk Management System (FRMS) directed by a collaborative management/Labor Fatigue Safety Steering Committee (FSSC), made up by representatives from our employee labor unions and FAA management. The unions involved are National Air Traffic Controllers Association (NATCA) and the Professional Aviation Safety Specialists (PASS). The FRMS is responsible for ensuring the following activities are completed:

- Fatigue related policy and documentation is developed, documented and communicated to the field.
- Fatigue risk management is conducted to identify hazards, assess risk and develop and implement controls and/or mitigations.
- Fatigue safety promotion is conducted to ensure all controllers have an adequate level of knowledge of fatigue safety and countermeasures.

- Fatigue safety assurance is conducted to measure and analyze mitigation compliance and effectiveness.

The FRMS ensures that all employees are aware of fatigue-related policy changes and can take positive action to implement new policy in both the operational work environment and at home.

Section II: Actions taken in FY 2014:

Controller Training

- In 2014 the FAA ATO published and made public FAA Order 3000.22. This Order defines the requirements for the design and development of ATO outcomes-based technical training, from identification of the training need through delivery, evaluation, and revision of the training curricula. Under the evaluation section of the Order, AJI will publish semiannual reports on Training Performance. The first report that will contain the identification and analysis of training improvement initiatives will be published by December 15, 2014.

Fatigue Risk Management

- During FY14 the FAA ATO used data from the Controller Alertness and Fatigue Monitoring Study, Air Traffic Safety Action Program and business intelligence event-related data to identify fatigue hazards in the ATO operational work environment and develop appropriate countermeasures. As a result, in March changes were made to FAA Order JO 7210.3X, paragraph 2-6-13, Single Person TRACON/Tower Midnight Operations, establishing new coordination procedures that require the positive hand-off of traffic between facilities (non-automated). In July changes were also made to the JO 7210.3X, paragraph 2-6-7, Basic Watch Schedule, that limit fatigue-inducing consecutive midnight shifts, 10-hour midnight shifts, and start times for early day shifts that precede midnight shifts. These changes were fully communicated to the field via national telcons, supported by educational videos and question and answer documents, to ensure all field personnel fully understood the changes and were able to support their implementation.
- Also during FY14 the FAA ATO completed a safety assurance analysis of the effectiveness of Fatigue Awareness and Countermeasures Training delivered to approximately 30,000 operational employees in the Air Traffic Organization during FY13. Conducted by researchers from the Civil Aerospace Medical Institute, this study concluded that knowledge of fatigue awareness significantly increased by 26 percent for Air Traffic Control Specialists and 24 percent for Air Traffic Safety Specialists. Future training effectiveness can now be assessed against these knowledge improvement metrics, and these assessments will be used as tools to ensure the ongoing effectiveness of fatigue-related training delivered to FAA ATO employees.

- Also during FY14 the FAA ATO initiated a multi-year *Fully Charged* culture change initiative. *Fully Charged* is a collaborative management/labor campaign that is intended to provide all ATO employees with information about fatigue and alertness management, healthy sleep, and how to take full advantage of recent policy changes to improve operational alertness. Various FAA, National Air Traffic Controllers Association and Professional Aviation Safety Specialist communications channels are used to ensure all employees are reached. The *Fully Charged* website address is: https://my.faa.gov/org/linebusiness/ato/safety/fully_charged.html.

Section III: Actions remaining and expected completion date:

Controller Training

- Continue to publish semiannual Training Performance reports containing evaluation of the training improvement initiatives.

Fatigue Risk Management

- During FY15 measurement of implementation compliance with the recent changes to the JO 7210.3X, paragraphs 2-6-7 and 2-6-13 will be conducted under Fatigue Safety Assurance processes and the results will be briefed to the ATO FSSC for review and action planning. Also during FY15 ongoing fatigue awareness communications will be distributed under the *Fully Charged* campaign to enhance controller fatigue awareness and countermeasure knowledge and their ability to apply fatigue countermeasures both in the workplace and at home.

Section IV: Results or expected results:

Controller Training

- The analysis of the results of training improvement initiatives will produce information to resolve issues with existing deployed curriculum, curriculum development and delivery. In addition, the information will be used to guide future initiative investment decisions.

Fatigue Risk Management

- The FRMS provides the organization with a comprehensive understanding of fatigue and the development of mitigations to minimize its impact on job performance. Improvements in overall understanding of existing fatigue-related policies and intent, reinforced in varied communications channels via *Fully Charged*, help ensure mitigation effectiveness.

Management Challenge: Improving FAA's Oversight of the Aviation Industry and the Operations of the National Airspace System

Issue: Implementing a Risk-Based Approach for Repair Station Oversight

Section I: Why is this issue significant?

The Office of the Inspector General (OIG) report titled "FAA Continues to Face Challenges in Implementing A Risk-Based Approach for Repair Station Oversight", dated May 1, 2013, identifies FAA's risk based oversight system ineffective in targeting surveillance to areas of higher risk. It states FAA's oversight does not include accurate and timely risk assessments of domestic and foreign repair stations. The report indicates FAA has yet to provide inspectors with comprehensive data needed for analytic reviews of repair stations performance. Instead, FAA aviation safety inspectors (ASI) rely on their personal knowledge of repair stations to conduct oversight, rather than using comprehensive and standardized procedures for conducting and communicating the results of inspections. Thus, FAA's oversight lacks consistency necessary to identify deficiencies and verify corrective actions.

Section II: Actions taken in Fiscal Year (FY) 2014:

Throughout FY 2014, FAA continued to accomplish the planned actions to rectify performance gaps that contributed to the issues identified in the OIG report.

- On January 15, 2014, FAA held a teleconference with OIG to deliver the status of FAA's actions;
- In February 2014, extensive revisions to the FAA Order 8900.1 were published that incorporate comprehensive guidance to improve the FAA ASIs use of the current risk management and surveillance system. The newly revised version of the part 145 FAA Repair Station course (21058) became available in April 2014; and
- In May 2014, the OIG performed its final review of FAA actions and all actions were found acceptable. All nine of the OIG recommendations were closed on June 17, 2014.

The following summarizes the nine OIG recommendations and the FAA's actions completed in the interim to the full deployment of the new risk-based oversight system named Safety Assurance System (SAS):

- **1: Modify its oversight system so that all inspection elements are considered in inspector risk assessments of repair stations.** The Flight Standards regional technical branch managers and their staff were briefed, as well as the division managers on the use of risk management oversight. The importance of managerial review of inspector work programs was stressed to ensure activities identified as elevated risks are prioritized and properly mitigated. The FAA Order 8900.1 was extensively enhanced to improve the ASI's use of risk management and surveillance systems currently in place. Recurrent training requirements were added to the Airworthiness and Avionics Inspectors training profile. It

covers the use of the Repair Station Assessment Tool (RSAT), Risk Management Process (RMP), and Outsource Oversight Prioritization Tool (OPT).

- **2: Implement a risk-based system suitable for oversight of foreign repair stations.** The guidance for conducting foreign repair station inspections in FAA Order 8900.1 was revised and improved for identifying areas of concern or criticality specific to foreign repair stations. The revised guidance requires documentation through the Program Tracking Reporting System (PTRS) and management of identified risks through the Risk Management Process (RMP). The "EASA Sampling Inspection Risk Assessment Checklist" was developed to facilitate in identifying areas of elevated risk for the purpose of conducting sampling inspections of aviation authorities (AA) with oversight responsibility. The Flight Standards technical regional branch managers and staff were briefed with additional instructions to insure the International Field Offices (IFO) understood the use of the risk management process.
- **3: Modify the risk assessment tool so that inspectors can document changes to their surveillance plans as soon as they are made.** Revised FAA Order 8900.1 to emphasize that the Risk Management Process (RMP) tool should be used whenever warranted to document mitigation of elevated risks and instruct ASI's to modify work programs focusing on identified risks. Recurrent training requirements were added to the Airworthiness and Avionics Inspectors training profile, which covers the use of the Repair Station Assessment Tool (RSAT), Risk Management Process (RMP), and Outsource Oversight Prioritization Tool (OPT). The Flight Standards regional technical branch managers and their staff were briefed to emphasize the ASI's ability to modify their work program at any time during the fiscal year based on an identified risk.
- **4: Develop a control that will ensure inspectors prioritize inspections to those repair stations determined to have increased risk.** Revised FAA Order 8900.1 to expand on the Assessment and Planning Tool (APT) component procedures used when prioritizing surveillance plans. The "EASA Sampling Inspection Risk Assessment Checklist" was developed to effectively aid both the Flight Standards International Field Office (IFO) and Regional Divisions in prioritizing aviation authorities (AA) and/or approved maintenance organizations (AMO) for sampling inspection planning.
- **5: Enhance training to inspectors so that they understand the importance of using the available tools for assessing and trending risk.** The newly revised version of the Part 145 Repair Station course was delivered in April 2014. The extensive revision stresses the understanding of the tools available and their importance for risk mitigation. Recurrent training requirements were added to the Airworthiness and Avionics Inspectors

training profile. The training covers the use of the Repair Station Assessment Tool (RSAT), Risk Management Process (RMP), and Outsource Oversight Prioritization Tool (OPT).

- **6: Develop the Repair Station Data Package and provide training to all inspectors on how to use it.** Revised FAA Order 8900.1 to define the composition of a data package and expand guidance on the use of the Safety Performance Analysis System (SPAS) application for risk assessment. The Certification and Surveillance of Part 145 Repair Station course was amended to deliver an effective step-by-step procedure to develop a useful data package.
- **7: Develop a standardized checklist that all inspectors can use to improve the consistency in the way they perform and report their inspection findings.** The FAA Order 8900.1 was revised to refine the repair station checklist for each of the 16 surveillance elements in the Repair Station Assessment Tool (RSAT). The revised repair station checklist and guidance was incorporated into the FAA Certification and Surveillance of Part 145 Repair Station course. Recurrent training requirements were added to the Airworthiness and Avionics Inspectors training profile. This training covers the use of the Repair Station Assessment Tool (RSAT), Risk Management Process (RMP), and Outsource Oversight Prioritization Tool (OPT).
- **8: Provide training for inspectors to improve their review and acceptance of repair station corrective plans.** The FAA Order 8900.1 was revised to include guidance on the review and acceptance of a corrective action plan (CAP). The requirement for ASI's to verify deficiencies noted in previous CAPs, was presented to the Flight Standards technical regional managers, field office managers, and ASI's. The CAP procedures and requirements were incorporated in the FAA Certification and Surveillance of Part 145 Repair Station course.
- **9: Develop guidance and training to inspectors on how to conduct comprehensive briefings to repair station officials on inspection findings.** Revised FAA Order 8900.1 to incorporate detailed procedures on conducting a thorough and complete repair station briefing on inspection findings. The Flight Standards technical regional managers, field office managers, and ASI's were briefed on how to conduct a comprehensive pre and post inspection briefing. The briefing procedures were incorporated into the FAA Certification and Surveillance of Part 145 Repair Station course.

The guidance material of the new certification and surveillance system named Safety Assurance System (SAS) for FAA ASIs was incorporated into the Flight Standards Information Management System (FSIMS) and three SAS deployment training sessions of the "SAS for Inspectors and

Field Office Management” course were delivered in June 2014. FAA began the deployment of SAS in July 2014.

Section III: Actions remaining and expected completion date:

- Full deployment of the new risk-based oversight system – SAS. Expected completion date is FY 2015.

Section IV: Results or expected results:

FAA achieved a risk-based oversight system that is more refined and provides a comprehensive and effective oversight for all U.S. repair stations. This was accomplished through revised guidance and enhanced oversight tools; improved inspector training; and standardized procedures for reporting audit findings. These developments will result in more consistent inspection practices that will improve the detection of systemic deficiencies and increase the effectiveness of repair station safety oversight of those facilities most at risk. Positive changes will be more apparent through the completion of each inspection cycle. FAA continues to make steady progress towards the deployment of SAS.

Management Challenge: Improving the Federal Aviation Administration's (FAA's) Oversight of the Aviation Industry and the Operations of the National Airspace System (NAS)

Issue: Enhancing Runway Safety

Section I: Why is this issue significant?

The Federal Aviation Administration's (FAA) top priority is maintaining safety in the National Airspace System (NAS). Safety in the NAS hinges on maintaining integrity, security, and efficiency where multiple safety responsibilities converge—the nation's airports. The goal for runway safety is to improve safety by decreasing the number and severity of runway incursions and serious surface incidents.

It is important to note that airport surface safety was not on the 2014 National Transportation Safety Board's (NTSB's) Most Wanted List. The Most Wanted List represents the NTSB's advocacy priorities. It is designed to increase awareness of and support for the most critical changes needed to reduce transportation accidents and save lives.

Section II: Actions taken in FY 2014:

FAA's Runway Safety Group continues to track all reported runway incursions and categorizes them in terms of severity. FAA continues to meet its goal to reduce the rate of serious runway incursions (Category A and B)—those in which a collision was avoided.

The FAA ATO Runway Safety Group works in collaboration with FAA stakeholders, industry, and the NTSB to assess risk and promote risk based mitigation strategies. This model of collaboration is shared with the International Civil Aviation Organization Air Navigation Service Providers.

Notable achievements in FY14 include the publication of the *2015-2017 National Runway Safety Plan* in July 2014. The Plan directly supports the FAA Administrator's priorities to make aviation safety and smarter by moving to risk-based decision making; enabling the safe and efficient integration of Next Generation Air Transportation Systems (NextGen); and demonstrating global leadership in improving air traffic safety and efficiency through data-driven solutions that shape international standards.

The *2015-2017 National Runway Safety Plan* introduces the Top Focus Airport program to focus efforts and coordinate resources to address safety hazards at specific airports. In Fiscal year 2014, this program leveraged existing safety-data and analysis to identify nine Top Focus Airports for 2014.

In FY14, the FAA began working with MITRE to develop criteria for the Top Focus Airport program for FY15. Moving forward, the program will utilize risk-based Safety Management System (SMS) processes that leverage the combined collection and analysis of relevant surface safety data, identify causal and contributory factors, communicate safety issues, implement corrective action plans and monitor feedback loops. The new criteria were established in September 2014.

This fiscal year, the FAA established the Surface Safety Initiatives Team (SSIT) to improve collaboration between lines of business and provide a process to assess options and prioritize surface safety initiatives. The goal is to improve coordination between all stakeholders to identify and implement technology and procedural solutions that are right-sized, affordable, and mitigate hazards associated with airport surface operations in areas of the highest risk.

The SSIT has oversight of the Comprehensive Airport Review and Assessment (CARA) teams. In an effort to decrease the risks associated with surface incidents, runway incursions and/or runway excursions, the CARA teams are tasked to produce the Comprehensive Airport Review Plan (CARP). This plan identifies, validates, and prioritizes root cause operational issues that contribute to runway safety shortfalls at each of the sites within the purview of the SSIT. The plan also helps identify and understand hazards and their root causes. The SSIT reviews and assesses the CARP to ensure that procedures, practices and documentation are being applied in accordance with applicable requirements.

SSIT Actions in FY14

SSIT Charter finalized	Completed 2/2014
Initial CARA Teams formed	Completed 6/2014
Boston CARP delivered	Completed 6/2014
Reno initial CARA meeting held	Completed 8/2014
San Francisco initial CARA meeting held	Completed 8/2014
Dallas/Ft. Worth initial CARA meeting held	Completed 8/2014

The Surface Risk Analysis Process (SRAP) tool was developed in FY 2014 to evaluate and score selected surface events. This tool introduces data driven scoring methods for event assessment and will add other functionalities to accommodate NAS requirements. The SRAP tool factors in the effects of proximity, closure rates, barriers and other systemic and non-systemic factors to determine severity, controllability and repeatability of a Runway Incursion event.

SRAP Actions in FY14

Initial development of the SRAP prototype tool	Completed 12/2013
Verification and validation of the SRAP prototype tool	Completed 3/2014
SRAP Beta version completion	Completed 5/2014
Verification and validation of the SRAP web-based tool	Completed 9/2014

Improved Technologies in FY14

FAA continues to deploy technology that could help prevent collisions on runways. The Airport Surface Detection Equipment-Model X (ASDE-X) system is deployed at 35 major airports, providing detailed information to air traffic controllers regarding aircraft operations on runways and taxiways.

While ASDE-X is a step in the right direction, it does not provide alerts directly to pilots, a longstanding NTSB recommendation. To address this shortcoming, FAA is integrating ASDE-X with two other systems—Runway Status Lights (RWSL) and Automatic Dependent Surveillance-Broadcast (ADS-B)—to simultaneously alert controllers and pilots of potential ground collisions. However, progress toward these enhancements depends on a number of other actions, such as

establishing requirements for technical upgrades, testing system integrity, and determining whether ASDE-X capabilities will meet FAA's goals of increasing capacity while improving safety.

The FAA's Surveillance and Broadcast Services program began implementing a new surface technology, Airport Surface Surveillance Capability (ASSC), at ASDE-3/AMASS sites that did not receive an ASDE-X system. ASSC will bring enhanced surface situational awareness and advanced warning of potential runway incursions to nine United States airports for increased safety and efficiency. (The sites include: Anchorage, Andrews Air Force Base, Cincinnati/Northern Kentucky, Cleveland, Kansas City International, New Orleans, Pittsburgh, Portland, and San Francisco, with options for additional sites).

Each ASSC deployment will incorporate a number of sensors (ADS-B and multilateration, but not primary radar which is used for non-cooperative vehicles/aircraft) and software for a single, fused view of the airport runways and taxiways. The flexible nature of the ASSC system architecture enables future airport surface safety enhancements, such as RWSL, and airport surface movement data distribution to other approved systems and users.

In addition, the Surveillance and Broadcast Services (SBS) system introduced an enhancement to the ASDE-X system to perform multilateration surveillance on the Universal Access Transfer data link. This upgraded capability provides a layered approach for surveillance of 978MHz equipped aircraft and vehicles and was completed in 2013.

Lastly, ADS-B provides the additional surveillance layer for surface operations with both aircraft and vehicles and enables advanced cockpit applications and improved data sharing for surface management. The deployment and integration of the ADS-B system in the surface domain was completed in 2014 at ASDE-X sites and is scheduled to be complete in 2017 at ASSC sites.

Technology Actions in FY14

Begin Site Acceptance Test for ASSC at San Francisco key site	Completed 5/2014
Achieve Initial Operating Capabilities (IOC) for ADS-B Surface Advisory Services at 35 ASDE-X sites	Completed 9/2014
Achieve Operational Readiness Demonstration (ORD) at Dulles, Phoenix, and Houston Intercontinental	Completed 9/2014
Achieve ORDs at two additional RWSL sites.	Completed 9/2014

Note: The program surpassed the goal by achieving IOC at three additional sites: Minneapolis, Seattle, and Las Vegas.

Section III: Actions remaining and expected completion date:

The current process of classifying events using Severity Categories will continue and will be conducted concurrently with SRAP while this tool is being further developed and refined. When the SRAP tool matures and is shown to meet the needs and requirements of the ATO, the legacy process will be discontinued.

In FY14, the completion of the web-based SRAP tool will allow the concurrent use of the legacy system and the SRAP tool to simultaneously assess surface events. In future years, the SRAP tool will be used by all three ATO Service Areas to accomplish coherent and expeditious assessment of surface events across the NAS.

Additional SRAP functionalities will be developed and implemented in future years to allow for analysis of other surface events such as taxiway landings or departures, wrong runway landings, runway excursions, etc... (FY15 and beyond).

The SSIT will continue to form CARA teams to examine selected airports and produce a CARP for each airport. The SSIT will then assess solution alternatives and define business cases for possible solutions. Site specific plans with implementation schedules will be developed for each airport. The SSIT and CARA work for the selected airports will be completed at the end of FY 15.

The resulting ASDE-X Technical Refresh program will deploy the recommended solutions to ensure the continued operation of the ASDE-X System. The ASDE-X Technical Refresh Program will deploy parts replacements from FY14 thru FY18. These surface technologies will be deployed by the FY17 timeframe.

The SSIT will oversee the development of a concept of operations, program requirements, alternatives analysis and benefits cases for site specific solutions (both business and technical), based on the operational shortfalls and priorities identified by the CARA teams.

The SSIT will review (for quality and consistency), comment, and ultimately put forward a joint recommendation across the selected sites to FAA leadership for addressing operational shortfalls with (likely) a combination of business and technology investments.

By the end of FY14, validation of the sustainment solution will be completed. In FY15-FY18, the FAA will implement the proven solution into all ASDE-X sites.

ASSC will increase safety and efficiency and will introduce a new capability to drive the RWSL at San Francisco. The ASDE-X Technical Refresh Program will ensure operational effectiveness of systems currently in operation.

RWSL integrates airport lighting equipment with approach and surface surveillance systems to provide a visual signal to pilots and vehicle operators indicating that it is unsafe to enter, cross, or begin takeoff on a runway. In July 2013, the Joint Resources Council made the decision to reduce the quantity of airports that would receive a RWSL system from 23 to 17.

All IOCs and ORDs at these 17 sites are scheduled to be complete by FY17. The remaining sites will be addressed in a second phase of the program in which the agency will analyze technology and non-technology alternatives to directly address runway incursions at any future airport sites. Since the program re-baseline, the RWSL program has made steady progress with the implementation of the system.

Section IV: Results or expected results:

The FAA is focused on the development of the interagency strategic processes to transition from event-based safety to risk-based safety using multiple data sources and stakeholder subject matter experts to assess current risk, predict future risk, and establish relevant metrics that measure the reduction in risk.

Developing a corporate approach to surface safety that embraces the concept of using multiple sources of data from operators, airlines, and regulators to identify an expanding number of upstream precursors to events is the objective. This is a fundamental shift in aviation safety thinking and will require informed education as well as communication with internal and external stakeholders.

Building on the success of past years, the FAA is adopting a corporate, risk-based approach that incorporates the rapidly expanding availability of FAA data, analytical capabilities, multi-media communications and training applications within a robust SMS.

The Vice President of Safety and Technical Training oversees the maintenance of the ATO's SMS. As a group within ATO Safety and Technical Training, the Runway Safety Group (RSG) is the focal point for runway safety initiatives in the NAS. Evolving technology, increasing complexity, and the implementation of the NextGen's gate-to-gate concept of operation make it imperative to develop risk-based decisions using processes housed inside the SMS framework.

The four components of the SMS—Safety Policy, Safety Risk Management, Safety Assurance, and Safety Promotion—work in harmony to enable the FAA to find, analyze, mitigate, and monitor risk throughout the NAS, including the nation's airport surfaces. The RSG is leveraging the emerging capabilities of the SMS processes to develop a multilayered approach to identify and address risk on the nation's runways. In addition to reducing the rate and severity of surface events, another key success metric for the FAA is the measure of how many causal and contributory issues have been identified and corrected.

Using this risk-reduction strategy, the expectation is to achieve a safer runway environment.

Management Challenge: Improving FAA's Oversight of the Aviation Industry and the Operations of the National Airspace System (NAS)

Issue: Improving Data Collection and Analysis To Identify and Mitigate Risks With Aircraft Separation Losses and Air Carrier Operations

Section I: Why is this issue significant?

At any given time, there are roughly 7,000 aircraft occupying U.S. airspace. To help maintain safe distances between aircraft, while under the control of air traffic controllers, FAA established minimum separation standards based on the aircraft's phase of flight and size. Controllers are responsible for providing instructions to pilots.

The OIG has been reporting on separation losses for over a decade. Historically, FAA's oversight of operational error self-reporting has been problematic. Our previous work (see exhibit C) on operational errors has repeatedly raised concerns that nearly 300 FAA terminal facilities relied solely on controllers to self-report errors. In some cases, we found that the self-reporting process was subject to intentional manipulation.

In response to OIG reports, the FAA has undertaken a number of efforts to provide better oversight of and minimize separation losses.

Section II: Actions taken in FY 2014:

In order to improve data collection, analysis and the identification of risk safety trends, the FAA fully implemented the Traffic Analysis and Review Program (TARP); which electronically captures quantitative data relating to all occurrences that involve losses of airborne separation. TARP was fully implemented in terminal radar facilities in September 2012 and in July 2013 for all En Route Facilities.

The tools include: the Comprehensive Electronic Data Analysis and Reporting (CEDAR) tool, the FALCON 3 radar playback tool, Compliance Verification (CV) Tool, Terminal Area Regeneration Evaluation and Target Simulation (TARGETS) and TARP. We also utilize the Risk Analysis Process (RAP) to analyze airborne losses of separation in which less than 2/3 of required separation is maintained.

In FY14 the Air Traffic Organization (ATO) added loss of surface separation and the Technical Operations Service Integrity analyses into the RAP. The RAP identifies the severity and likelihood of systemic risks which are the primary data source that drive the ATO's Annual Top 5 High Risk Hazard mitigation and corrective action program. Detailed analysis is conducted to aggregate the data and identify significant and common hazards that contribute to risk in the NAS.

Additionally, the ATO has established FAA and Industry Summit Forums creating collaborative efforts to reduce identified safety risk while addressing the concerns of air carrier and other NAS operators.

During FY14, the ATO's data collecting processes continue to mature and improve the oversight of separation loss data collection and analysis. These improvements will be accomplished through the implementation of quality management system (QMS) standards to the Quality Assurance (QA) Standard Operating Procedures (SOP), the development of a Quality Control (QC) Program Handbook and/or Safety Guidance, the development of a National QA/QC Training Course and through the published revisions to the ATO QA and QC Orders (JO 7210.633, "Air Traffic Organization Quality Assurance Program" and JO 7210.634, "Air Traffic Organization Quality Control").

With the full implementation of our reporting systems we have recognized a significant increase in safety data and are working diligently to share this unprecedented level of reported information with employees and industry to include air carrier and other stakeholders. While constant improvements will continue each year, the ATO anticipates major improvements throughout 2014.

Specific Activities taken in FY2014 include:

- Hosting FAA/Industry Forums to collaboratively address identified safety risks. As of August 2014, the ATO has hosted three FAA/Industry Forums regarding the subject of Converging Runway Operations and FAA Safety Enhancements for Air Traffic (September 24-25, 2013, November 14-15, 2013, and March 13, 2014).
- Reviewing Mandatory Occurrence Report /Electronic Occurrence Report at the Safety and Technical Training Service Area Offices to identify high risk hazards, trends, and systemic issues within the NAS. This activity continues to be conducted daily in FY14.
- Using RAP to identify causal factors that contribute to the most severe airborne and surface losses of separation and system integrity degradations. Each QA Service Area continues to utilize the Risk Analysis Process identify airborne and surface losses and system integrity degradations as deemed by its Standard Operating Procedures.
- Revising the QA SOP to comply with QMS requirements: completed in January 2014.
- Developing the QC Program Handbook and/or Safety Guidance to help field facilities develop and implement effective local quality control programs. This was completed in April 2014.

Section III: Actions remaining and expected completion date:

As a result of the ATO's Quality Assurance safety risk trend analysis, the FAA has initiated national Corrective Action Requests (CARs) for procedures regarding Opposite Direction Operations and Converging Runway Operations. In addition, the FAA is currently developing a new Instructor led Quality Assurance/Quality Control course at the FAA Academy and developing Safety Guidance for facility Quality Control programs.

We are in the final stages of coordinating revisions to QC, QA and occurrence reporting guidance. This action is an ongoing collaborative effort. Numerous Document Change Proposals to existing QA, QC orders have been issued and are in the official coordination process.

We are also continuing the development and implementation of a National QA/QC Training Course. Due to contractual negotiations regarding the development of certain technological tools and platforms the timeline has been modified by 60 days. The modified schedule is as follows: the Course Walk-Through will be conducted in October 2014, Operational Try-outs will be conducted in November 2014 (for ATO Leadership) and the Course will be conducted for credit in January 2015.

Section IV: Results or expected results:

Following our Safety Management System which requires continuous improvement of our processes, the ATO is making improvements to our safety programs, such as Quality Assurance and Quality Control, as well as sharing the ATO's safety data with Aviation Safety Information Analysis and Sharing (ASIAS) for analysis of air traffic control and aircraft data. FAA believes that combining air traffic and aircraft data offers opportunities to improve aviation safety with industry best practices.

Management Challenge: Identifying and Addressing Root Causes of Problems With NextGen and Setting Investment Priorities

Issue: Identifying and Addressing the Underlying Causes of Delays

Section I: Why is this issue significant?

NextGen is a major modernization effort underway to transform the legacy National Airspace System (NAS). It's important for the FAA to track the progress of key NextGen planning activities and investment priorities to ensure its successful implementation. The agency has taken a series of actions to effectively document and set NextGen investment priorities.

Section II: Actions taken in FY 2014:

- **NAS Enterprise Architecture (EA):** The NAS EA documents levels of planning in keeping with the maturity of the investment, the likely path for the evolution of the NAS, and projected milestones with schedules and cost based estimates for near-and long-term investments. On February 28, 2014 the 2014 NAS EA was published on the NAS EA Portal. This publication includes updates to the NAS Service Roadmaps, Infrastructure Roadmaps, the NAS Segment Implementation Plan (NSIP), and mid-term EA views.
- **NAS Segment Implementation Plan (NSIP):** The NSIP is updated annually to reflect the evolution of program management to support portfolio-level decision-making. The NSIP 2014 was published on February 28, 2014. The NSIP identifies and helps manage incremental improvements necessary to develop, integrate, and implement NextGen capabilities and NAS sustainment activities. This year the NSIP was virtualized into an integrated web-accessible platform which allows NSIP updates to be managed and reported in real-time.
- **Portfolio Management Reviews (PfMRs):** This year, we continued to host regular PfMRs across the multiple Lines of Business (LOBs) within the FAA to promote information flow and communication. The PfMRs ensure transparency and provide updates on current portfolio activities. Each portfolio is briefed quarterly and status reports are given to the NextGen Management Board (NMB) on a quarterly basis. We plan to continue hosting such PfMRs in FY15 to further monitor and communicate agency efforts regarding NextGen investment priorities.

Section III: Actions remaining and expected completion date:

We will continue to update the NAS EA and the NSIP annually to reflect key planning initiatives to ensure the successful implementation of NextGen. We will continue to conduct regular PfMRs to examine, evaluate, and communicate NextGen activities and milestones.

Section IV: Results or expected results:

- Development of a comprehensive segmented approach to develop and baseline programs to manage major capital acquisitions
- Reduction of risk and incremental implementation of operational capabilities
- Increased intra-agency communication and collaboration
- Streamlined and standardized agency program plans

- Increased transparency
- Common understanding of portfolio activities

Management Challenge: Identifying and Addressing Root Causes of Problems with NextGen and Setting Investment Priorities

Issue: Integrating New Performance-Based Navigation Routes to Maximize Near-Term Benefits and Gain User Support

Section I: Why is this issue significant?

The Office of the Inspector General (OIG) states that the implementation and airlines' use of performance based navigation (PBN) procedures has been inconsistent, pointing to high usage of required navigation performance (RNP) procedures at some small to medium-sized airports and low usage at larger, busier airports. The OIG suggested that the lack of updated PBN policies and procedures for controllers, a lengthy flight procedure development process, and the lack of controller tools to manage and sequence aircraft are all attributed to inconsistent use of PBN procedures. The FAA concurs that an improved and standardized process for evaluating and prioritizing procedures (regardless of whether a new or revised procedure is being proposed) is vital to managing the development and maintenance of the PBN procedures currently in place. The FAA believes that the required updates are addressed by the adoption of the streamlined "Five Phase Process", detailed in the PBN Implementation Process order (7110.41).

Section II: Actions taken in FY 2014:

In April 2014, The FAA implemented the PBN Implementation Process order. The order provides for a standardized process for evaluating and prioritizing procedure development work. In addition, the FAA is revamping software adaptation and training for the Time Based Flow Management (TBFM) system, and fielded enhancements. The FAA is working to implement a Terminal Spacing and Sequencing (TSS) solution to enable higher utilization of RNP procedures at higher volume airports. The FAA also issued directives, guidance, and training for "Climb Via/Descend Via" clearances to establish or reinforce procedures, enabling more consistent use of efficient flight profiles. The FAA developed standardized educational material for a national joint pilot/controller training effort. The FAA has completed draft training templates for ATC based on the "Climb Via" and "Descend Via" DCPs for the updated 7110.65 Handbook and developed the pilot training component that was also implemented in April 2014. In 2014, two Metroplex initiatives were completed implementing PBN procedures, Houston Metroplex (May 2014) and North Texas Metroplex (Sept 2014).

In September of 2014, the FAA implemented planned enhancements to controller tools. Such enhancements included more precise adaptation and scheduling on PBN procedures, extended metering, and Ground-Interval Management-Spacing (GIM-S). The GIM-S and extended metering enhancements were implemented for Initial Operating Capability (IOC) at Albuquerque Center.

Section III: Actions remaining and expected completion date:

The FAA is working to implement Terminal Sequencing and Spacing (TSS), a robust automation tool that supports sequencing and spacing in a mixed equipage terminal airspace environment. TSS is a set of advanced algorithms and visual aids for the terminal controller to support the routine use of PBN procedures. The FAA and the National Aeronautics & Space Administration have formed a team to work on developing the TSS concept and requirements. TSS is expected to reach the Joint Resources Council for Final Investment Decision in December 2014. Once funding is established, earliest key site deployment is notionally scheduled for 2018. The FAA is also working to benchmark usage of the TBFM system to identify best practices and utilization challenges. This effort is expected to be completed in the Fall of 2015. And, by summer of 2015, two more Metroplexes will complete implementation, Northern California and Washington DC Metroplex.

Section IV: Results or expected results:

Having addressed the OIG's observation that the procedure development process is lengthy with rollout of the PBN Implementation Process Order and the provision of updated policies and procedures for PBN operations, the results that are to be expected in the future include the fielding of the controller tools necessary to allow for metering and spacing decisions to be made that involve both PBN and conventional procedures being used concurrently.

Management Challenge: Identifying and Addressing Root Causes of Problems With NextGen and Setting Investment Priorities

Issue: Implementing an Integrated Master Schedule for NextGen Programs

Section I: Why is this issue significant?

The Integrated Master Schedule (IMS) helps to assess progress, establish priorities, and make trade-off decisions between various programs. The OIG has stated that without an IMS the FAA will continue to be challenged in assessing progress with NextGen efforts.

Section II: Actions taken in FY 2014:

- Completed the update of the National Airspace System (NAS) Segment Implementation Plan on (NSIP) December 20, 2013. The sections updated included the Success Criteria, the Portfolio Overview, and the Systems Interaction as well as the schedules which feed the Integrated Master Schedule (IMS). The FAA's NextGen Management Board (NMB) ratified the final version of NSIP 2014 on February 24, 2014; and NSIP 2014 was published in the NAS Enterprise Architecture (EA) Portal on February 28, 2014.
- The FAA continued to align the IMS with the NSIP. The FAA populated the IMS with the Segment Alpha schedules and dependencies. As of March 2014, the Segment Bravo schedules are being refined in the IMS.
- The FAA briefed the OIG on the IMS status and conducted a demonstration showing the Separation Management portfolio schedule linkages to the Program Management Organization's (PMO) Advanced Technologies and Oceanic Procedures (ATOP) schedule on November 6, 2013.
- The FAA developed an IMS Draft Concept of Operations/Governance document in December 2013.
- The final IMS Concept of Operations/Governance document was published on February 14, 2014. The NextGen IMS Concept of Operations/Governance document provides a high-level overview of the NextGen IMS, including the purpose, stakeholders, roles and responsibilities, process and tools.
- The FAA briefed OIG on the IMS status and conducted a demonstration showing NextGen portfolio schedules linked to the PMO's NextGen program schedules on April 4, 2014. We also provided OIG with copies of the final IMS Concept of Operations/Governance document.
- Continued linking NextGen increments to their respective PMO programs/systems. Populated the IMS with the relevant milestones NextGen program schedules in December 2013. The main purpose for creating the NextGen IMS is to integrate the

NextGen portfolio schedules and the PMO program schedules within a common toolset to accurately and consistently track the progress of the new NextGen capabilities.

- The NMB was provided with monthly reports during 2014 and also with quarterly Progress Reviews of key NextGen initiatives.
- Quarterly Portfolio Management Reviews (PfMRs) for each NSIP Portfolio were conducted in November 2013 (1st QTR FY14); February 2014 (2nd QTR FY14); and May 2014 (3rd QTR FY14). Milestone dates, key activities, accomplishments and challenges such as sequestration impacts were discussed and statused. Mitigation strategies were identified/ implemented.

Section III: Actions remaining and expected completion date:

- Refine NextGen funded portfolio Bravo schedules in IMS and complete linkages to the PMO program schedules by December, 2014
- Continue to update the NSIP annually
- Continue to conduct PfMRs in FY15

Section IV: Results or expected results:

- The NSIP 2014 was virtualized and integrated into the NAS Enterprise Architecture (EA) resulting in a more robust and efficient architecture planning product which reduced the data calls, increased access to information and improved the quality of portfolio details and timelines. The FAA expects to further align the IMS with the NSIP once the NextGen Bravo schedules have been completed (refined) and linked to the associated PMO program schedules.
- The NextGen IMS tool, when fully populated to include Segment Bravo information, will capture and track portfolio-level activities and milestones, including dependencies between multiple programs and the impacts to the overall NextGen implementation timeline.

Management Challenge: Identifying and Addressing Root Causes of Problems With NextGen and Setting Investment Priorities

Issue: Mitigating Implementation Risks With Key Automation Systems That Controllers Rely on To Manage Air Traffic

Section I: Why is this issue significant?

Increasing airspace capacity and reducing flight delays depend on the successful implementation of the En Route Automation Modernization program (ERAM)—a \$2.4 billion system to replace hardware and software at Federal Aviation Administration’s (FAA’s) facilities that manage high-altitude traffic. FAA originally planned to complete ERAM by the end of 2010. However, software problems have impacted the system’s ability to safely manage and separate aircraft and raised questions as to what capabilities ERAM will ultimately deliver. FAA has taken steps to get ERAM on track and is using the system on either a full-time or part-time basis at all planned sites—a significant step in moving the agency towards completion of ERAM deployment by March 2015. Progress at sites has allowed FAA to phase out their legacy air traffic control systems. However, other facilities continue to identify software problems, and FAA will likely encounter these and other issues when it implements ERAM at some of the Nation’s busiest facilities. Prolonged delays with ERAM will directly impact the overall cost and pace of NextGen. Without ERAM, the benefits of several other programs, such as a new satellite-based surveillance system and data communications for controllers and pilots, will not be possible.

The Terminal Automation Modernization/Replacement (TAMR) program involves about \$1 billion through 2018 to replace aging displays and processors with a single automation platform that controllers rely on to manage takeoffs, landings and most critical phases of flight. The TAMR Program is modernizing the terminal automation systems in phases as a result of the size and complexity of this modernization effort. The initial part of Phase I was completed in 2004 and is now in a Tech Refresh Phase. Phase II was completed in 2009 and Phase III is currently underway. At the time of the program’s final investment decision, the Phase III Segment 1 program segment was baselined at a cost of \$438M. A gap analysis identified 94 gaps that were prioritized and formed the foundation of the TAMR program requirements baseline. Since establishing the program baseline, additional discovery identified challenges related to system engineering and software requirements, hardware challenges, and overall site implementation needs. Although, the FAA anticipated the need for developing some software and hardware requirements that are critical for successfully replacing the Common Automated Radar Terminal System (CARTS) with the Standard Terminal Automation Replacement System (STARS), as the TAMR program transitions to deployment to STARS at the 11 large, complex Terminal Radar Approach Control Facilities (TRACONS), the expectation is that there will be more gaps identified, that could further increase costs.

Section II: Actions taken in FY 2014:

The ERAM program continues to apply its processes and standards for packaging and deploying builds using a collaboratively-managed process between the program office, second level engineering, the National Air Traffic Controllers Association (NATCA), and site teams to deploy software. This process ensures upstream planning beginning more than three months in advance of software test dates to ensure that the necessary plans, resources, and sites are aligned to ensure robust verification and validation of software in 'like-operational' conditions.

The program office also continues to use the standing work group within the construct of the contract between the FAA and NATCA, as well as Professional Aviation Safety Specialists, to collaborate on program strategy, software content, site implementation needs, and a range of other activities. This improves transparency and communication for developing buy-in to the program, and has enhanced the ability of the program to successfully achieve key programmatic milestones.

Through the implementation of a new schedule waterfall strategy the program achieved live air traffic operations on ERAM at the most complex of the remaining sites. This has allowed the program to facilitate any potential early software discovery at these sites while affording time in the schedule to address these needs, within the parameters of the established cost and schedule baseline.

The program also implemented a System Enhancements and Technical Refresh (SE/TR) program baseline, which has furthered facilitate capturing and planning for implementation of enhancements. This will help ERAM implementation sites and stakeholders focus on fixes needed to complete the waterfall and defer enhancements to the system into later releases.

Additionally, the program assessed potential earlier integration of some software code from other NextGen programs into ERAM to facilitate reduction of the number of concurrent software baselines needed for development and test, ultimately having the potential to reduce specific test and deployment cost elements.

Finally, the ERAM program has either met or surpassed FY14 implementation plans. The program achieved Initial Operational Capability (IOC) at the two remaining sites (Atlanta and Jacksonville) during the fiscal year. Additionally, ERAM surpassed its goal of Operational Readiness Date (ORD) at four (4) sites by achieving ORD at five (5) sites (Cleveland, Fort Worth, Memphis, Miami, and Boston) prior to fiscal year end. The total number of sites that have achieved ORD is 16 sites. The remaining four (4) sites (New York, Washington, Atlanta and Jacksonville) are scheduled to achieve ORD during FY 2015, with a last site ORD by Q2 FY2015.

The Program Management Office (PMO) of the FAA created process standards for requirements management. This process is detailed in the document entitled Standard Operating Procedures

(SOP) Requirements Management Process (PMO-SOP-0005) dated May 2014. Working with that guidance, the TAMR program is revising its existing requirements management artifact to align the TAMR practices with the PMO practices. In addition, the revised document will address the role of the new Article 48 Working Group that was established in May 2014 to provide governance of System Technical Reports Working Group (STRWG) recommendations. The STRWG validates proposed changes to the TAMR baseline and translates them into specific contractual requirements as a formal work plan for the contractor. The STRWG also ensures that all contract requirements are formally introduced via Engineering Change Proposals to the STARS System and Subsystem Specification.

Since January 2014, the TAMR program has established processes for collaborative meetings known as the STARS User Team Events and met the objective of holding five (5) events during 2014. The events included participants from all the Phase 3 Segment 1 sites, CARTS Subject Matter Experts (SMEs), STARS SMEs and representatives from Terminal Second Level Engineering (TSLE), Technical Operations, Requirements, NATCA, and the STARS training team. These events identified additional functionality needed for operational suitability and engage stakeholders in regular communications to promote a smooth transition to STARS.

The events met with great success. They validated the need for the previously identified functionality planned for future software builds and determined that few additional requirements would be required. The events also further improved the process of familiarizing the site participants with their new system.

The program's efforts to facilitate a series of planning workshops with multiple stakeholder communities have yielded additional clarity on level of risk associated with the requirements baseline for the program. This additional information was used to develop a software estimate to complete that remains under review by PMO and FAA Executives. The program plans to conclude this review cycle by Q3 FY15.

The TAMR program continues to incorporate controls and preventative measures to reduce future financial risk. These efforts include 1) requirements and issue disposition, 2) software estimation and forecast and 3) requirements and issues tracking and reporting.

In the area of software testing, the TAMR program is also incorporating lessons learned from the ERAM program. The test strategy for TAMR includes a range of structured events with entrance and exit criteria for deploying new software to TRACONs. This includes: a) early user involvement events involving controller system testing prior to government acceptance; b) informal risk mitigation testing involving the program office and vendor prior to software delivery at the William J. Hughes Technical Center test facility; and c) formal operational test and evaluation including software bug fixes, engineering change verification, regression tests, and operational evaluation by users prior to software delivery to the sites.

Section III: Actions remaining and expected completion date:

Many actions planned in FY14 have been completed. Moving forward, the following strategies are planned for FY15:

- The ERAM program will continue to utilize the SE/TR program to further facilitate capturing and planning for implementation of enhancements.
- The remaining four (4) sites (New York, Washington, Atlanta and Jacksonville) will achieve ORD during FY 15, with a last site ORD by Q2 FY15.
- The TAMR requirements management SOP based on the PMO document of May 2014 is in process. Work is underway on the revisions and a final document is planned for December 31, 2014.

Section IV: Results or expected results:

The ERAM program is expecting to see improvements in schedule and cost performance, thus addressing the issues raised in the report. The program has seen a decline in software and technology related issues (such as high reliability and a drastic reduction in discrepancies and trouble tickets from the sites), and is expecting to see more improvements. Additionally, ERAM's collective approach has helped to resolve early challenges and assisted in aligning programs to deliver NextGen initiatives with integration into ERAM software build processes and collaboration with the user community.

Similarly, the TAMR program is expecting to see improvements in schedule and cost performance. In addition to the previously mentioned methodologies, TAMR also expects to establish a new Terminal Automation Systems Enhancement budget line for FY16 and FY17 within the Capital Investment Plan to accommodate post-ORD enhancements in STARS. These combined efforts will help lessen current and long term risks related to requirements challenges and help ensure timely integration of this foundational program.

Management Challenge: Identifying and Addressing Root Causes of Problems with NextGen and Setting Investment Priorities

Issue: Further Developing and Implementing Consolidation and Modernization Plans

Why is this issue significant?

Section 804 of the FAA Modernization and Reform Act of 2012 required the FAA to develop a National Facilities Realignment and Consolidation Report to support the transition to NextGen and reduce costs without affecting safety. The FAA and Labor established a collaborative workgroup to develop criteria and the process for future realignment decisions.

Actions taken in FY 2014:

The workgroup presented the realignment analysis process to Congress in December 2013 and received approval to begin. In January 2014, the workgroup initiated analysis for the first set of realignment scenarios using a fully collaborative process including the FAA, National Air Traffic Controllers Association, and Professional Aviation Safety Specialists representation, as well as facility and stakeholder input.

In FY 2014, the workgroup held working sessions, conducted site surveys, developed technical documentation for the 25 facilities involved in Year 1 analysis, inclusive of 11 potential realignment candidates (transfers), and 14 potential receiving facilities. The workgroup initiated pre-decisional business case analysis for those scenarios for which data gathering and requirements development activities were completed.

Actions remaining and expected completion date:

The collaborative workgroup is preparing to complete site surveys and analysis for Year 1 scenarios in October 2014, and will begin drafting the remaining business cases. Business case analyses are being initiated and the workgroup will draft the Year 1 report once the recommendations are approved.

Results or expected results:

The workgroup anticipates submission of the first set of realignment recommendations to Congress in 2015. Additional time and funding will be required to implement recommendations and ensure safe and smooth transition of facilities, services, and workforce. Per the current labor contract agreement, employee realignment notification is required at least one year prior to any staff realignments. The FAA anticipates that the first realignment could be conducted in mid-year 2017, provided the realignment recommendation is agreed to by the collaborative workgroup, and is not disapproved by Congress upon submission of the report.

Management Challenge: Identifying and Addressing Root Causes of Problems with NextGen and Setting Investment Priorities

Issue: Safely Integrating Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS)

Section I: Why is this issue significant?

The *FAA Modernization and Reform Act of 2012* (FMRA) requires FAA to integrate UAS into the NAS by 2015. In addition, UAS integration is forecasted to have significant positive direct economic benefits for the U.S. economy.

Section II: Actions taken in Fiscal Year (FY) 2014:

On November 7, 2013, FAA published the first edition of the UAS Roadmap. The Roadmap outlines the effort needed to safely integrate UAS into the NAS. It discusses items such as new or revised regulations, policies, procedures, guidance material, training, and understanding of systems and specifications to support routine UAS operations. The Roadmap is updated annually.

FAA announced the six test site locations in December 2013. The first Certificate of Waiver or Authorization (COA) was issued in April 2014. All six test sites are now operational with at least one COA. FAA authorized two commercial operations over the Arctic. ConocoPhillips began using Insitu's ScanEagle for its marine mammal and ice surveys. In June 2014, BP began using AeroVironment's Puma AE to survey its pipeline, roads, and equipment at Prudhoe Bay, AK, the largest oilfield in the United States.

In June 2014, FAA published its interpretation of Section 336 of the FMRA for public comment. This was in effort to better clarify guidance for model aircraft operations. The comment period was extended to September 23, 2014; as of mid-August, FAA has received more than 30,000 comments.

FAA has been executing on planned research requirements and is coordinating research activities with other Federal agencies, including National Aeronautics and Space Administration (NASA) and the Department of Defense (DOD). Research focus areas include Sense and Avoid (SAA) and Command and Control (C2). In conjunction with RTCA, the FAA launched a new Special Committee (SC-228) which will focus on standards development for Sense (Detect) and Avoid (SAA) and Command and Control (C2) systems (ongoing).

Section III: Actions remaining and expected completion date:

FAA continues to make progress in integrating UAS into the NAS. A major initiative will be the release of the small UAS Notice of Proposed Rulemaking (NPRM). The delay in the release of this document is due to ongoing editing and coordination. We anticipate publishing the NPRM in Calendar Year 2014.

Additionally, Section 333, Special Rules for Certain Unmanned Aircraft Systems, grants FAA limited statutory flexibility to expedite requirements for the safe operation of certain aircraft

systems in the NAS. FAA continues to receive petitions for exemptions in order to operate UAS for commercial purposes. The UAS Integration Office is evaluating approximately 40 petitions for exemption and it anticipates a decision on at least two petitions by the end of the Calendar Year 2014.

Section IV: Results or expected results:

Integration of UAS into the NAS will be incremental. It is important to note that the integration of UAS is not a destination but a continuous journey. As the NextGen systems come on-line in the NAS, higher and higher levels of UAS integration will be possible. The NAS is constantly evolving and changing and with those changes aircraft will also evolve, allowing even greater integration and utilization.

Management Challenge: Identifying and Addressing Root Causes of Problems with NextGen and Setting Investment Priorities

Issue: Ensuring Taxpayer Dollars Are Invested and Administered Wisely on Major Contracts

Section I: Why is this issue significant?

Air Traffic Control Optimum Training Solution (ATCOTS)

In 2010, The OIG made several recommendations to improve the Federal Aviation Administration's (FAA) management of its ATCOTS contract, which was awarded in 2008 to provide controller training support, reduce total training time and costs, and develop training innovations. Despite FAA's efforts to address recommendations from the OIG 2010 report, they continue to identify weaknesses in program and contract management. Notably, FAA did not identify training needs, as the OIG recommended, before exercising an option to continue the contract even though it experienced \$89 million in cost overruns for the first 4 years. While FAA reduced the number of contractor instructors by 44 percent to prevent future cost overruns, this required FAA to perform more internal training—a cost FAA has not quantified.

In addition, FAA was unable to achieve key contract goals to reduce controller training times or produce sufficient training innovations, as the average time to certify controllers increased by 41 percent from fiscal year 2009 through fiscal year 2012. Finally, FAA did not effectively use cost incentives to control contract spending for the first 4 years, and award fees were not linked to the achievement of contract goals.

- **Section II: Actions taken in FY 2014:**The Quality Reliability Officer has participated in 14 site audits (FY14) with the contractor to verify Contractor performance and compliance with contract requirements.
- Bi-weekly meetings are held between the Office of Acquisitions, Safety and Technical Training, the Program Management Office, and the Office of Chief Counsel.
- Issuance of market survey/Request for Information was completed in November 2013.
- Assign an Acquisition Category level to the ATCOTS follow-on contract was completed in February 2014.
- Determination to issue a solicitation for a new controller training contract was made in March 2014.
- Monthly Performance Cost Board and Quarterly Performance Management Review meetings are held to monitor contractor's performance.
- Implementation of the Field Planning Tool Workbooks provides the Field Monthly training requirements as a supplemental tool in developing the Work Plan.

Monthly update to the Annual Work Plan provides a forecast of Air Traffic Controller schedule of qualification, proficiency and development training services at the Academy and within the Field.

Section III: Actions remaining and expected completion date: Request for Proposal (RFP) is scheduled to be released for full and open competition by the end of FY14

Section IV: Results or expected results:

The steps taken in FY14 will put in place the mechanisms and procedures to better manage the ATCOTS contract while executing a competitive RFP to select the best options to continue to deliver and modernize Air Traffic Controller training delivery.

Management Challenge: Building a Secure and Modern Information Technology Infrastructure

Issue: Protecting Sensitive Information

Section I: Why is this issue significant?

Personally Identifiable Information (PII) data in the FAA's Civil Aviation Registry, was not encrypted or adequately protected from compromise through strong authentication techniques. Numerous configuration deficiencies in the system's software rendered the Registry vulnerable to attacks and unauthorized access.

FAA stated that it would implement upgrades to correct the software vulnerabilities and establish data encryption by the end of 2013.

Section II: Actions taken in FY 2014:

The FAA moved the Registry database from an outlying building into one of FAA's enterprise datacenters. As part of this move, FAA implemented a one-way trust between the registry data and any non-credentialed users. This restricted access adds additional security to the data at rest.

FY 14 initiated FAA's IT shared services which provides enterprise development processes. The Registry Modernization System (RMS) planning and development was transferred of the management, planning, and development of the replacement for the to the Information Technology Solutions Delivery Directorate.

Section III: Actions remaining and expected completion date:

Mainframe

Encryption is currently not feasible due to technical limitations within the mainframe database space allocation. A system replacement is under development (RMS 2.0) by the FAA Solutions Delivery Directorate, which will utilize traditional server infrastructure and facilitate the data-at-rest encryption requirement.

Clients and servers

In the imaging component of the Registry Modernization System (RMS), the FAA implemented strong access controls utilizing the UNISYS proprietary format for the Tagged Image File Format (TIFF) image files. This format only allows viewing with the proprietary software. Access to the UNISYS system is restricted within the Registry organization to a limited number of staff. This staff must utilize a username and password following FAA Policy to access the UNISYS system. A security assessment was completed (and is conducted annually) which tested the current

security settings for the RMS system and was signed by the Authorizing Official. The image files are not stored in a database, but stored in a separate directory structure in a separate network/domain, which allows only specific user IDs to gain access. File names within this structure have no indicators which can be associated to an airman or aircraft.

Encryption of the PII data in the Enterprise Data Center (EDC) production database will be accomplished with Transparent Data Encryption (TDE), FY15. TDE is a real time encryption protecting data at rest by utilizing encryption keys to access the data.

Section IV: Results or expected results:

In FY 2015: The storage housing data replicated from the mainframe which is hosted at the enterprise data center where the data at rest will be encrypted with Transparent Data Encryption on August 29, 2015. The risks identified during the security assessment which are not in accordance with the DOT Privacy Policy of encryption of the RMS data at rest will be implemented remediating the cross-scripting and other identified risks.

The mainframe component of the Registry system will be phased out, during FY15, with the transition of the Registry applications to a non-mainframe based solution, including upgrades of the operating systems hosting the imaging component within Registry Modernization System (RMS) to Windows Server 2008 and SQL 2008.