Office of Inspector General
Audit Report

**FAA'S SAFETY DATA ANALYSIS AND
SHARING SYSTEM SHOWS
PROGRESS, BUT MORE ADVANCED
CAPABILITIES AND INSPECTOR
ACCESS REMAIN LIMITED**

Federal Aviation Administration

Report Number: AV-2014-017
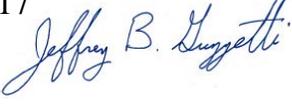*Date Issued: December 18, 2013*

Memorandum

**U.S. Department of
Transportation**

Office of the Secretary
of Transportation
Office of Inspector General

Subject: **ACTION:** FAA's Safety Data Analysis and
Sharing System Shows Progress, but More
Advanced Capabilities and Inspector Access
Remain Limited
Federal Aviation Administration
Report No. AV-2014-017

Date: December 18, 2013

From: Jeffrey B. Guzzetti
Assistant Inspector General
  for Aviation Audits

Reply to
Attn. of: JA-10

To: Federal Aviation Administrator

The Federal Aviation Administration (FAA) has been moving toward a data-driven approach for airline safety oversight for a number of years. As part of this initiative, in 2007, FAA implemented the Aviation Safety Information Analysis and Sharing (ASIAS) system, which collects and analyzes data from multiple databases to proactively identify and address risks that may lead to accidents. ASIAS enables authorized users to obtain data from confidential databases—including airline voluntary safety reporting programs—as well as publicly available data sources.

After the 2009 Colgan Air accident, Congress passed the Airline Safety and FAA Extension Act of 2010,[1] which directed our office to assess FAA's ability to establish a comprehensive information repository that can accommodate multiple data sources and be accessible to FAA safety inspectors and analysts[2] who oversee air carriers. Accordingly, our audit objectives were to assess FAA's (1) progress in implementing ASIAS and (2) access to and use of ASIAS data by FAA inspectors to assist in commercial air carrier safety oversight.

We conducted this review in accordance with generally accepted Government auditing standards. To conduct our work, we surveyed 26 of 39 randomly selected

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[1] Pub. L. 111-216 (2010).
[2] Analysts support safety inspectors by analyzing air carrier and inspection data to identify risk areas and trends.

FAA field offices responsible for oversight of Part 121[3] air carriers in 8 FAA regions. We also visited the Agency's ASIAS program office and Flight Standards offices at FAA Headquarters and three field offices, three Part 121 air carriers, three industry associations, and the MITRE Corporation (MITRE).[4] Exhibit A details our full scope and methodology, and exhibit B lists the specific organizations we visited or contacted.

RESULTS IN BRIEF

FAA has made significant progress with implementing ASIAS and is continuing to enhance the system. Since initiating the program in 2007, FAA has increased the number of participating commercial airlines from 11 original members to 44 and now captures key confidential voluntary safety data from 95 percent of all Part 121 operations. Ultimately, FAA intends for ASIAS to be used as a predictive tool that can identify risks before incidents or accidents occur. However, FAA's plans to achieve this predictive capability are still several years away due to challenges such as the time it takes to enhance automated capabilities and analytical methodologies. In the meantime, FAA is working to improve the quality of data that ASIAS receives, including standardizing data collection practices. Further, because FAA's initial focus was on safety data from commercial airline operations, ASIAS does not yet incorporate substantive data from other segments of the aviation industry, such as general aviation operations, which has a higher risk for accidents than Part 121 operations. FAA is beginning to collect these data and increase the types of voluntary safety data from air carriers already in the program in an effort to enhance the safety benefits that ASIAS could provide to all aviation sectors.

Currently, FAA does not allow its inspectors and analysts to use ASIAS's confidential data for their air carrier oversight. These data include those from air carrier Flight Operational Quality Assurance (FOQA)[5] programs and the Aviation Safety Action Programs (ASAP),[6] which, according to FAA, were never intended for use in air carrier surveillance. Yet, 74 percent of field inspectors and analysts

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[3] 14 CFR Part 121, Operating Requirements: Domestic, Flag, and Supplemental Operations. Part 121 air carriers are those airlines that generally operate larger aircraft with primarily scheduled flights.

[4] MITRE Corporation manages a research and development center for FAA, the Center for Advanced Aviation System Development, which serves as a trusted data steward and integrator for ASIAS data. MITRE's role is to maintain the confidentiality of all data transferred to it, and the calculation of all aggregated results as well as to protect these data exclusively for the purposes of information sharing as directed by the ASIAS Executive Board.

[5] FOQA is a voluntary safety program for the routine collection and analysis of digital flight data generated during aircraft operations.

[6] ASAP is a voluntary safety program that allows aviation employees to self-report safety violations to air carriers and FAA without fear of reprisal through legal or disciplinary actions.

who responded to our survey[7] and were familiar with ASIAS stated that access to national level ASAP/FOQA trends would improve air carrier safety oversight. According to inspectors, accessing trend data from confidential programs would allow them to gain awareness of safety issues for other air carriers and help them assess the potential for related risks at their own carriers. In 2009, FAA reported to our office that in 2010 it would expand access to ASIAS trending data to its Flight Standards personnel[8] for use in developing inspection guidance for field inspectors. In 2011, FAA also reported the same planned action to Congress. However, the Agency's planned implementation date has slipped 5 years to December 2015. Moreover, while FAA inspectors and analysts *do* have access to the *non*-confidential portions of ASIAS to aid in their air carrier oversight, most do not use the system—in part because they can obtain the data from other FAA databases. While FAA recently developed a process to provide the inspector workforce with some ASIAS information, it does not provide inspectors with trend data or a method for inspectors to provide feedback on the usefulness of the information. As a result, FAA may be missing opportunities to use ASIAS data to improve air carrier risk identification and mitigation, even within the confidential confines of the program.

We are making recommendations to enhance FAA's policies and processes for accessing and using ASIAS information.

BACKGROUND

Initiated in 2007, FAA's ASIAS program is a collaborative government-industry information sharing and analysis initiative that aids in the monitoring and identification of potential safety issues. The ASIAS system features data from a wide variety of data sources from both public (non-confidential) and protected proprietary (confidential) aviation data:

- **Non-confidential** data sources include publicly available data such as the NTSB Accident and Incident Data System, Bureau of Transportation Statistics database, and Service Difficulty Reports Database.

- **Confidential** sources include data from aircraft operators extracted from aircraft recorders (FOQA) and textual voluntary safety reports (ASAP) submitted by flight crews (see figure 1).

[7] Our results are based on a survey of FAA Part 121 air carrier inspectors and analysts. The survey was distributed to all (893) inspectors and analysts responsible for Part 121 operations at 26 randomly selected, statistically representative FAA field offices. We received 475 responses for a response rate of 53.2 percent. Of the 475 responses, 292 indicated they had some knowledge of ASIAS, and 216 of those 292 (74 percent) indicated safety oversight could be improved by access to national level FOQA and ASAP trends.
[8] FAA's Flight Standards lines of business represent those functions and personnel who set the standards for certification and oversight of airmen, operators, agencies, and designees and include FAA regional and field offices.

Figure 1. Types of Data Currently Accessible for ASIAS Analyses

Source: FAA ASIAS Program Plan, January 2013

In 2007, FAA selected MITRE to develop and maintain the ASIAS system. MITRE assists in fusing confidential data with FAA, industry, and other government data sources to allow analysts to further understand the context of safety reports.[9] Air carriers remove aircrew and company identifying information before submitting data to ensure that data contributors cannot be uniquely identified.

The ASIAS Executive Board oversees all use of ASIAS data. The Board includes representatives from various FAA offices, the National Aeronautics and Space Administration, commercial airlines, manufacturers, and labor organizations. The ASIAS Executive Board assigns teams to conduct studies and various analyses (see table 1).

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[9] ASIAS participants sign a Memorandum of Understanding with MITRE outlining the responsibilities between parties for the collection, storage, use, and dissemination of shared data.

Table 1. Types of ASIAS Analyses

Analysis Type	Description
Vulnerability Discovery	Identification and validated assessments of previously unknown issues or accident precursors.
Directed Studies	In-depth assessments of special topics of interest to the ASIAS participants.
Known-Risk Monitoring	A set of continuously performed analyses to monitor known safety risks of interest to ASIAS participants.
Safety Enhancement Assessments	Development of metrics to identify and continuously monitor hazards and mitigating actions by industry and government participants to address known risks.
Benchmarks	Development of industry metrics applied to national, aggregated data sets to create a baseline for follow-on assessments of operations by ASIAS participants.

Source: FAA ASIAS Program Plan, January 2013

The ASIAS Executive Board also receives ASIAS study recommendations, approves all analyses, and sends findings and recommendations to the appropriate government-industry safety teams. For example, the Commercial Aviation Safety Team (CAST)[10] reviews all ASIAS-identified issues pertaining to commercial operations to decide whether industry or government should take action.

FAA HAS MADE SIGNIFICANT PROGRESS IN IMPLEMENTING ASIAS, BUT WORK REMAINS TO FURTHER DEVELOP ITS ADVANCED CAPABILITIES

Since 2007, ASIAS has grown in both air carrier participation and information sources. ASIAS now captures information from 95 percent of all Part 121 operations. However, more work remains before the program becomes the predictive tool that FAA has envisioned. In addition, FAA continues to face data quality and standardization challenges with voluntarily reported safety data in ASIAS. Finally, safety reporting for other important segments of the aviation industry, such as general aviation operations, is still evolving, and those segments have not yet realized the benefits of ASIAS participation.

The ASIAS System Has Grown Substantially in Recent Years

ASIAS has grown substantially since its inception 6 years ago, both in the number of participating air carriers and the amount of data available for analysis through

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[10] Founded in 1998, CAST is a government-industry partnership that has developed an integrated, data-driven strategy to reduce the Nation's commercial aviation fatality rate by analyzing causes of past accidents, identifying areas where changes may have prevented them, implementing safety enhancements, and measuring their results.

the system. When MITRE began managing ASIAS for FAA in 2007, there were 11 original member carriers—now there are 44 (see figure 2).

Figure 2. Number of Current ASIAS Members by Calendar Year
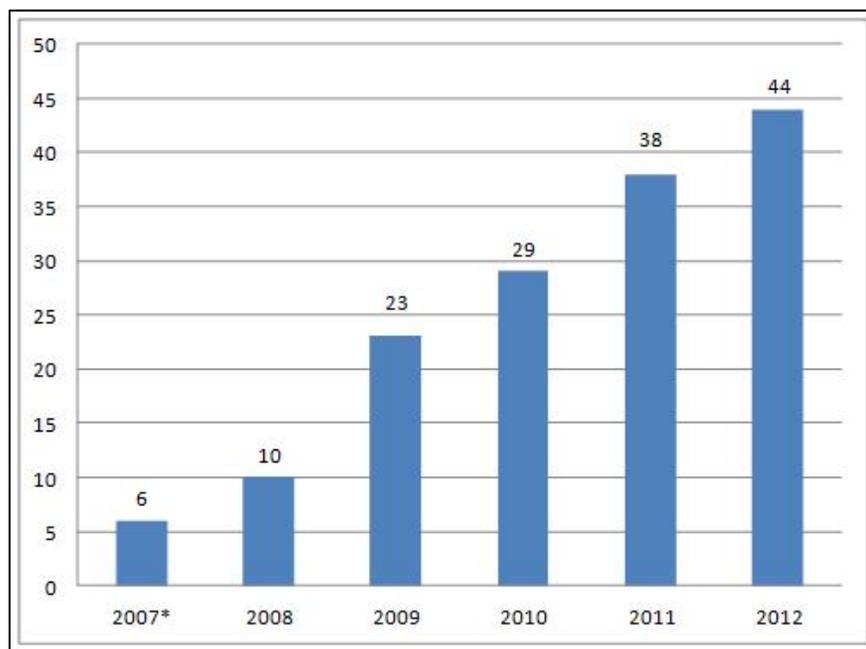
Source: FAA ASIAS Program Office
Note: This chart depicts membership dates of current ASIAS members (as of January 2013) and does not reflect carriers who may have left ASIAS (as a result of merger, for example).
* When MITRE inherited ASIAS in 2007, there were 11 members. Only six of these are current ASIAS members.

In response to the 2009 Colgan Air crash, FAA issued a Call to Action on Airline Safety and Pilot Training[11] encouraging air carriers to establish voluntary safety programs like ASAP and FOQA. Obtaining and analyzing ASAP and FOQA program data is important because it can provide insights into actual flight operations and highlight otherwise unavailable potential safety risks and precursors to accidents. Using these data, FAA and airlines can then improve safety by significantly enhancing training effectiveness, operational procedures, maintenance and engineering procedures, and air traffic control procedures. Including these data from a larger population of carriers in the ASIAS program allows for more comprehensive analyses of trends at a national level. Currently, 39 of the 44 ASIAS carriers submit airline pilot ASAP reports, with 3 additional carriers soon to be added. Additionally, 24 carriers submit FOQA data, with 12 more in the process of being added (see figure 3).

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[11] FAA's Call to Action Plan, announced on June 24, 2009 in response to the Colgan accident, consisted of 10 short- and mid-term initiatives to enhance pilot performance and training, increase air carrier participation in voluntary safety programs, and expand pilot records review.

Figure 3. Number of ASIAS Members Providing Pilot ASAP and FOQA Data
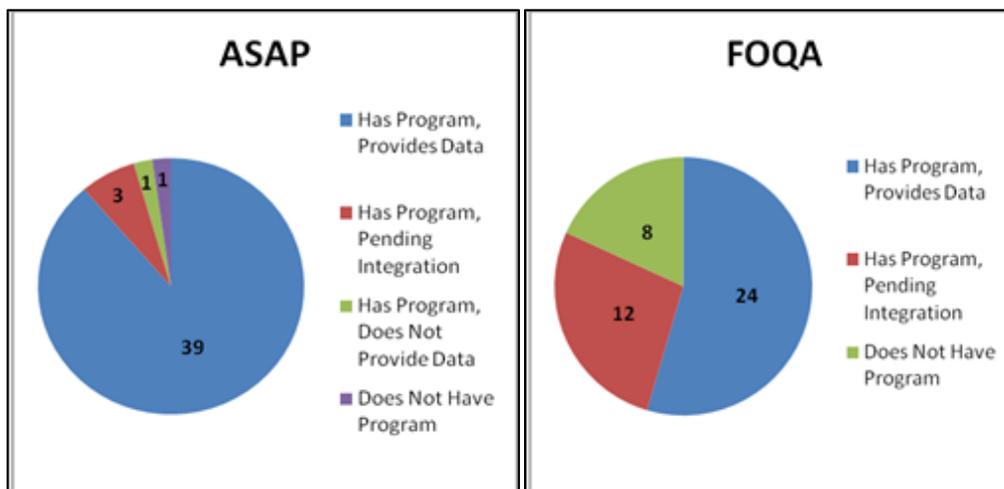
Source: FAA

As of January 2013, ASIAS had access to over 136,000 ASAP reports as well as FOQA data from over 9 million flights, up from a few hundred thousand flights in 2007. Additionally, the number of data sources has grown, including 142 non-confidential databases and other sources of information.[12]

Work Remains To Achieve FAA's Goals of Using ASIAS as a Predictive Tool

FAA plans to evolve ASIAS into a predictive tool that can identify risks before incidents or accidents occur. Although FAA has made progress in this area through efforts such as vulnerability studies to identify common precursors to accidents, the Agency will need to do more work to achieve this goal. FAA initially used ASIAS to assist with directed studies of special topics of interest to ASIAS participants rather than as a predictor of future risk. For example, one study involved reported increases of incorrect, nuisance, or overly conservative terrain awareness warning system (TAWS) alerts in Northern California. The study's findings were eventually used to identify other locations across the country with high frequencies of TAWS alerts. As of January 2013, FAA had completed seven directed studies using ASIAS data.

The Agency now believes that it has achieved sufficient results through its data quality efforts to begin moving towards predicting safety risks in commercial aviation. For example, FAA now uses ASIAS to identify operational risks that the Agency can mitigate when implementing new flight procedures and routes to

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[12] The number of databases ASIAS accesses changes frequently as non-needed databases are removed, new hybrid databases are created, or additional databases are added.

advance the Agency's Next Generation Air Transportation System (NextGen).[13] Specifically, FAA uses ASIAS to support NextGen efforts such as Optimization of Airspace and Procedures in the Metroplex[14] and Performance Based Navigation integration by providing data that can help ensure airspace changes do not result in unexpected safety issues. ASIAS has also enabled FAA to produce baseline models of the National Airspace System (NAS) to identify safety issues before they occur and assess the effects of potential changes in the NAS.

While these are promising examples of ASIAS's potential, according to FAA's Program Plan for ASIAS, several years of work remain before ASIAS becomes the predictive tool FAA envisions. FAA's current plan includes actions to enhance ASIAS's predictive capabilities through 2018 (some of which are outlined in table 2). As FAA strives to achieve this goal, continued close coordination between the Agency's safety and air traffic organizations will be essential.

Table 2. Examples of FAA Actions Planned To Enhance ASIAS's Predictive Capability

Year	Key Actions Planned for Predictive Capability
2013	• Deploy a capability to query multiple databases with better graphics and search capabilities. • Develop the ability to detect potential safety-related trends and changes in the system.
2014	• Deploy automated trend/anomaly detection to track vulnerabilities in the precursors of undesired aircraft states (e.g., loss of separation between aircraft) using FOQA data.
2016	• Deploy trend/anomaly detection and risk modeling to find high risk or abnormal flights not accounted for by current risk models. • Develop tools to uncover hard-to-find subgroups of flights with higher rates of safety precursor events.
2018	• Expand ASIAS studies to include risks identified by exploratory analysis performed on databases consisting of fused proprietary and publicly available data. • Estimate the overall likelihood of each undesired aircraft state and its precursors.

Source: FAA ASIAS Program Plan, January 2013

Quality and Standardization Challenges Hinder ASIAS Analyses

Ensuring data quality is a vital part of FAA's ASIAS efforts. Since the program's inception, FAA and MITRE have made progress in assisting carriers in improving both ASIAS data quality and standardization for voluntarily reported safety data,

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[13] NextGen is an umbrella term for the ongoing transformation of the National Airspace System. NextGen represents an evolution from a ground-based system of air traffic control to a satellite-based system of air traffic management.

[14] FAA has identified 21 metroplexes—geographic areas that include several commercial and general aviation airports in close proximity serving large metropolitan areas. By optimizing airspace and procedures in the metroplex, FAA provides solutions on a regional scale, rather than focusing on a single airport or set of procedures.

but challenges remain, particularly for voluntary safety data reported through FOQA and ASAP.

FOQA—Data transmission problems, sensor failures, and reduced collection rates have affected the quality of the FOQA data MITRE receives from air carriers, which limits the amount of data available for analysis. For example, representatives from one carrier stated that it only captures approximately 60 to 75 percent of data generated monthly due to the lack of maintenance personnel available to download FOQA data. While FAA and MITRE are able to identify and interpret data quality issues, they cannot improve the quality of FOQA data ASIAS receives.[15] These issues originate with the data providers; therefore, FAA and MITRE can only request that the data providers make needed improvements.

In 2011, FAA reported to Congress[16] that it would convene a working group to develop standards[17] for incoming FOQA data to reduce the amount of time required to incorporate FOQA data from new ASIAS members, thus shortening the time for members to receive benefits from ASIAS. FAA's goal is to establish and deploy new FOQA data standards to increase the type and quality of digital data available for ASIAS by 2014.

In addition, ASIAS currently contains FOQA data for only about 41 percent of all Part 121 operations.[18] According to MITRE, the sample size as of April 2012 was enough to represent the population of Part 121 carriers, which enable these data to be analyzed for safety trends. However, MITRE added that ASIAS is limited more by lack of data from particular airlines and aircraft types than it is by the total number of FOQA flights.[19] As of April 2012, ASIAS had FOQA data on most major fleet types, but there are some fleet types that operate between 100,000 and 360,000 flights per year in the NAS for which ASIAS has *no* data.[20] Until ASIAS can access FOQA data for those fleets and airlines that are not included in the current program, there will still be operations within the NAS that are under- or unrepresented in ASIAS.[21]

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[15] MITRE has also created methods by which members are able to compare their own data quality benchmarks with those of the rest of the ASIAS population, allowing them to identify where improvements can be made.

[16] FAA ASAP & FOQA Implementation Plan, P.L. 111-216, Section 214, January 28, 2011.

[17] According to FAA, MITRE held preliminary meetings with a FOQA analysis software vendor in 2012, and a government-industry working group met in May 2013 to review the ASIAS data standard and propose an update to include additional parameters from the raw FOQA data. FAA plans to present a final proposal to ASIAS stakeholders for formal approval in September 2013.

[18] Reasons for this include (but are not limited to): Not all carriers participate in ASIAS, not all ASIAS members have FOQA programs, some older aircraft are not equipped for FOQA, and some operations are not being captured due to data quality or downloading errors.

[19] MITRE Presentation to AEB, "Sampling, FOQA, and ASIAS." April 25, 2012.

[20] For example: Bombardier Q300, Beech 1900, De Havilland Canada Q100, and SAAB 340.

[21] It is important to note, however, that ASAP and FOQA are voluntary programs and FAA cannot require airlines to adopt them or require carriers to share data they do collect. In addition, some air carriers may not be able to participate in FOQA programs due to the cost of equipping older or smaller aircraft fleets.

ASAP—Data quality challenges have also hindered the integration of ASAP reports into ASIAS. For example, air carriers submit ASAP reports with inconsistent categorizations, and critical information in report narratives can be difficult to extract and aggregate. As shown in table 3, FAA and MITRE are actively working to address these problems. Moving forward, MITRE plans to develop a library of standardized ASAP report definitions for industry access.

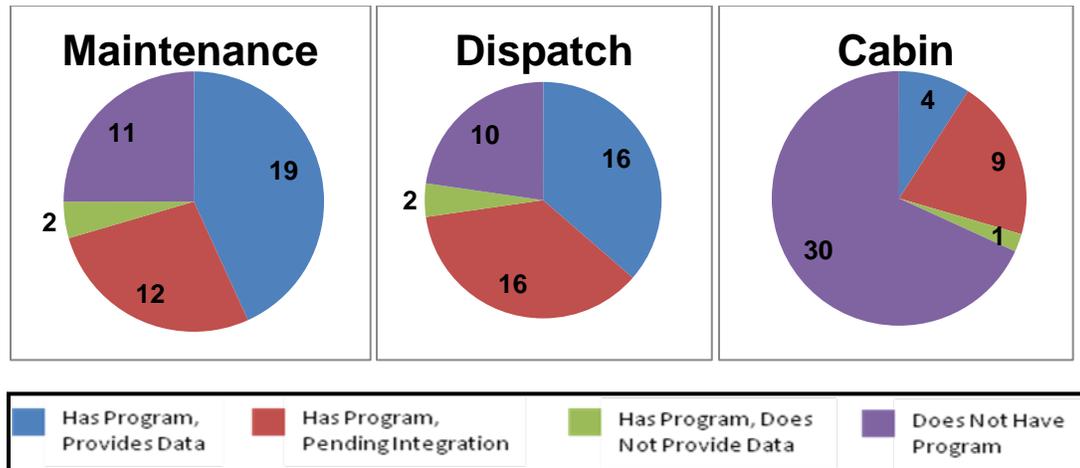*Table 3. ASAP Data Quality Challenges and Measures To Mitigate Them*

ASAP Data Quality Challenge	MITRE Measure Taken To Mitigate It
Varying data collection practices and taxonomies[22]	Data is transcribed into ASIAS using ASAP common taxonomy
Inconsistent airline categorization of reports	Automatic classification models are applied to standardize report identification
Location Information embedded in report narratives	Data extraction processes are used to capture location information referenced in reports
Inherent bias of voluntary safety reporting and rarity of high risk event reporting	Information is used as "indicators of potential risk" in conjunction with other, non-voluntary data sources

Source: MITRE June 2012 Presentation

While the amount of pilot ASAP reports in ASIAS has increased, there is not as much ASAP data for other key aspects of aircraft operations. For example, ASIAS contains pilot ASAP data for 39 of the 44 (89 percent) ASIAS-participating Part 121 carriers, but contains much less data for the dispatch, maintenance, and aircraft cabin crew ASAP programs (see figure 4).

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[22] Taxonomy is defined as a classification scheme of keywords and definitions and can be also considered the "safety language" of information systems. Common taxonomies and definitions establish a standard industry language, thereby improving the quality of information and communication.

Figure 4. ASIAS Members Providing ASAP Data by Program Type

Maintenance
- 19
- 12
- 2
- 11

Dispatch
- 16
- 16
- 2
- 10

Cabin
- 4
- 9
- 1
- 30

Has Program, Provides Data	Has Program, Pending Integration	Has Program, Does Not Provide Data	Does Not Have Program

Source: FAA ASIAS Program Office

There are fewer ASAP data in ASIAS for these other aspects of aircraft operations due to either air carriers not having these types of programs or, in some rare instances, carriers not providing data to ASIAS despite having the program. According to FAA, most ASIAS-participating air carriers have agreed to provide data in the near future for these other ASAP programs, but these data are not yet available to support ASIAS studies or data queries. FAA has set a goal to establish data standards for ASAP reports for all domains (e.g., flight crew, maintenance, and cabin crew) and ensure greater representation in ASIAS of other voluntary safety reporting programs by 2014.

Expansion of Non-Commercial Participants Has Not Kept Pace With ASIAS's Overall Growth

While the 44 air carriers participating in ASIAS account for 95 percent of Part 121 operations, participation by other segments of the aviation community—such as small airplane, helicopter, and business jet operations—is significantly lower. As of March 2013, only a few non-Part 121 operators are providing data to ASIAS, including two corporate operators and two general aviation flight schools. FAA focused the initial development of ASIAS only on Part 121 operations, as these carriers provide the majority of commercial transportation services to the flying public.

FAA officials acknowledge that obtaining data from other industry sectors is important because all facets of aviation share the same airspace. For example, there are frequent interactions between different segments of the industry in the airspace above and around New York City area. Commercial air carriers arriving and departing from LaGuardia, Newark, and JFK airports often intersect with business jet traffic around Teterboro airport and helicopter traffic from Manhattan

heliports. Additionally, higher risk aviation sectors such as general aviation (which has an accident rate many times greater than commercial aviation) that are not yet ASIAS participants do not receive the benefit of ASIAS safety analytics. To further expand the ASIAS system, FAA has begun to reach out to non-commercial segments of the industry. For example, the ASIAS Program Plan outlines a phased approach for incorporating non-Part 121 operations (see exhibit C for goals and examples).

FAA DOES NOT ALLOW INSPECTORS ACCESS TO ASIAS CONFIDENTIAL DATA ANALYSES THAT COULD IMPROVE SAFETY OVERSIGHT

FAA allows only limited access to ASIAS analyses for its field and headquarters inspectors through participation in ASIAS study teams and semiannual government/airline safety meetings known as InfoShare.[23] While inspectors are free to use the non-confidential parts of ASIAS for air carrier oversight, most inspectors we surveyed do not. Further, FAA has not developed a plan to provide inspectors with regular access to ASIAS trends that use confidential, voluntary air carrier safety data—leading to confusion as to the role of ASIAS at the Flight Standards level and throughout the inspector workforce. As a result, FAA may be missing opportunities for its inspectors and analysts to effectively leverage the important safety information available within the program.

FAA Limits Access to ASIAS Confidential Data

Due to the confidentiality of voluntary safety program data, the ASIAS Executive Board has established detailed protections of ASIAS that limit access to important safety data to relatively few FAA employees. MITRE developed and implemented a password-protected online portal to provide the participating ASIAS communities access to specific portions of ASIAS, including results of ASIAS studies and information sharing activities, based on a user's permission levels. According to MITRE personnel, the primary intended use of the ASIAS online portal is for air carriers to view *their own* data, so they can benchmark their performance against aggregate data from other similar airlines. FAA access is limited to only about 70 separate ASIAS confidential data accounts—primarily for members of CAST, ASIAS program management, the ASIAS Executive Board, and a few subject matter experts for particular ASIAS working groups. FAA officials told us that they believe access to ASIAS is only appropriate to support the ongoing requirements of the CAST and the ASIAS Executive Board. However, the Agency could approve additional accounts on a case-by-case basis

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[23] Infoshare is a semiannual, closed-door meeting of more than 500 airline safety professionals that facilitates sharing of safety information, including ASIAS data.

to support specific initiatives if additional staff-level access were required for those initiatives.

Most FAA inspectors never see or access any data from confidential programs in ASIAS. As an exception, some air carriers choose to allow FAA inspectors to view their voluntary safety data to ensure Agency representatives are aware of ongoing carrier safety efforts. In addition, some inspectors participate—with very specific non-disclosure rules—in ASIAS Executive Board-approved studies of ASIAS data when the study relates to their assigned carrier. However, in general, most inspectors do not benefit from these studies because their results have only been provided in limited distribution reports and high-level discussions at FAA-sponsored Infoshare meetings held twice a year. Moreover, participation in InfoShare by inspectors is not mandatory, and FAA does not provide copies of briefing slides to attendees. Therefore, field-level inspectors may be missing important safety information applicable to their assigned air carrier.

FAA Inspectors and Analysts Do Not Widely Use Non-Confidential ASIAS Data for Air Carrier Oversight

While they are limited from accessing the confidential portions of ASIAS, inspectors and analysts may access the *non*-confidential parts of ASIAS, which contain publicly available information, including non-proprietary aviation safety and performance data. FAA officials stated that 515 Flight Standards Service personnel have active non-confidential accounts in the ASIAS system. However, most inspectors do not use them. Specifically, 78 percent of the inspectors and analysts who responded to our survey and were familiar with ASIAS stated they do not use ASIAS non-confidential data for air carrier oversight.

FAA inspectors and analysts we interviewed told us that they do not use ASIAS because they can obtain the same data from other FAA databases. For example, FAA's guidance recommends that inspectors use FAA's Safety Performance Analysis System (SPAS), an automated decision support system used to aid in targeting inspection and certification resources on those areas that pose the greatest aviation safety risks. Additionally, some inspectors stated that SPAS was more user-friendly than ASIAS. Further, approximately 37 percent of the inspectors and analysts who responded to our survey had no knowledge of ASIAS or its capabilities.

FAA Does Not Have a Plan to Regularly Provide ASIAS Trends to Flight Standards Offices

FAA does not have a plan in place to allow its Flight Standards offices—including inspectors and analysts responsible for air carrier oversight—direct access to ASIAS confidential air carrier data. According to FAA officials, these data were never intended to be used for air carrier surveillance. However, analyses of these

data could be a valuable tool to aid inspectors in air carrier risk identification and mitigation. For example, if ASIAS identifies safety trends associated with a certain aircraft type, inspectors with carriers that operate those type of aircraft can be alerted to potential risk. Seventy-four percent of inspectors and analysts who responded to our survey[24] and were familiar with ASIAS stated that access to national level ASAP/FOQA trends would improve air carrier safety oversight (see figure 5).

Figure 5. Percentage of FAA Inspector and Analysts Who Stated They Would Benefit From ASIAS Trends
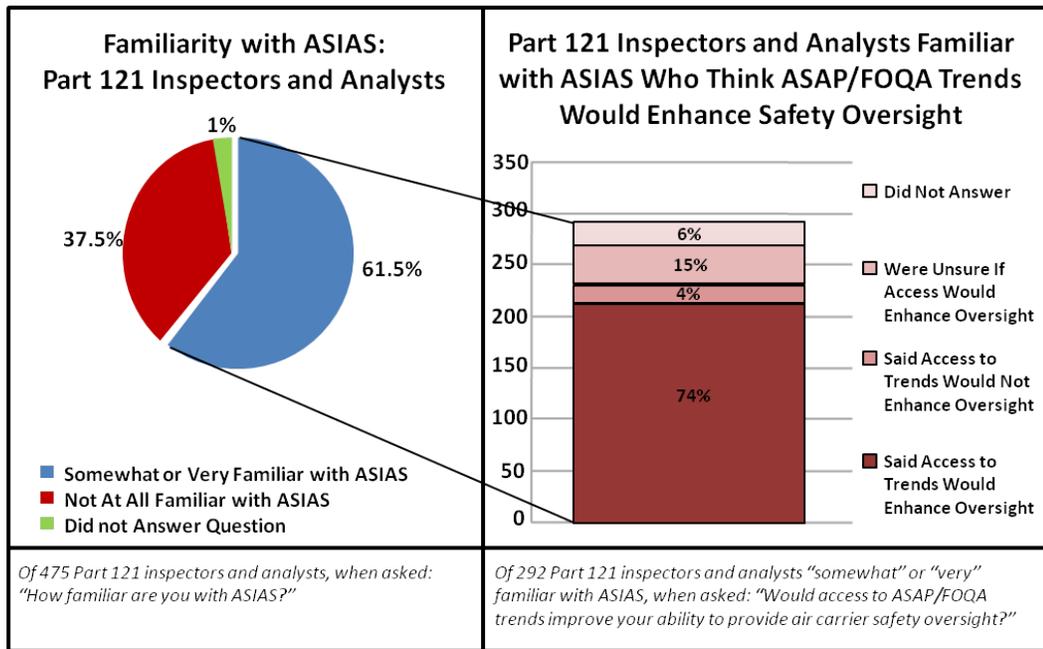
Source: OIG survey of FAA Part 121 air carrier inspectors and analysts, December 2012

Specifically, field-level inspectors believe that an awareness of the safety issues experienced by similar carriers and aircraft fleets is important to air carrier surveillance. For example, inspectors stated that access to trend data from the confidential portions of ASIAS would help with tailoring an important automated risk-assessment tool used in FAA's current oversight system.[25] Inspectors could then use the tool to better identify potentially higher risk areas for their air carrier and focus their surveillance activities accordingly. Without national-level trend information from ASIAS confidential data, inspectors may be missing the ability

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[24] Of the 475 survey responses we received, 292 indicated they had some knowledge of ASIAS and 216 of those 292 (74 percent) indicated safety oversight could be improved by access to national-level FOQA and ASAP trends.

[25] The tool referenced by the inspectors is the Air Carrier Assessment Tool (ACAT). ACAT is an automated tool used to record assessment of elements using risk indicators and to calculate a risk score. The risk score is used to prioritize resource elements for planning certification and oversight activities. ACAT is integral to FAA's current oversight system—the Air Transportation Oversight System (ATOS)—and ATOS is FAA's mechanism to conduct safety inspections and provide regulatory oversight of Part 121 air carriers.

to assess important risk indicators that could enhance their air carrier surveillance at critical junctures, such as when their assigned carrier is entering new markets or operating at new airports.

Similarly, in its final report on the 2009 Colgan Air accident investigation,[26] NTSB also cited the benefit of sharing confidential FOQA data with field inspectors. NTSB noted that even though Colgan Air did not have a fully implemented FOQA program at the time of the accident, the company might have benefited from other carriers' information about the accident aircraft.[27] Further, NTSB officials stated that FAA could better monitor industry trends in aircraft operations and target resources to address operational risk by using FOQA data. NTSB also noted that analysis of FOQA program data could result in safer company procedures, better checklists, and improved training.

In 2009, we reported that FAA did not have a process for collecting, analyzing, and trending ASAP data to identify potential precursors to accidents and incidents.[28] In response to our recommendation, FAA committed to developing a central database of all air carriers' ASAP reports for trend analysis at a national level, stating that its ASIAS system could meet the intent of our recommendation and that ASIAS would be used to disseminate national-level trends to the field. However, FAA has not yet determined exactly when and how inspectors and others at the Flight Standards level may access confidential ASIAS data or view related trends. FAA stated that its Flight Standards office would develop a method by which to communicate ASIAS trending of ASAP reports to field inspectors by December 2010, but the Agency has since delayed its target date for implementing our recommendation to December 2015 to ensure it properly integrates national data obtained from ASIAS with its new Flight Standards Safety Assurance System (SAS),[29] currently under development.

Additionally, in April 2011, FAA reported to Congress that SAS will enable the identification of operational trends from voluntary safety program data, including national data obtained from the ASIAS program. FAA stated that these trends would be used to produce national-level safety guidelines that would, in turn, be used to generate inspection protocols for FAA field inspectors. However, FAA has already delayed SAS implementation by 2 years from fiscal year 2013 until fiscal

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[26] National Transportation Safety Board, "Loss of Control on Approach, Colgan Air, Inc., Operating as Continental Connection Flight 3407, Bombardier DHC-8-400, N200WQ, Clarence Center, New York, February 12, 2009. NTSB/AAR-10/01." Washington, DC, 2010.

[27] NTSB determined Colgan Air flight 3407 experienced an aerodynamic stall from which the airplane did not recover. In its final report on the accident, the Agency noted that the company did not have a functioning FOQA program and that it may have benefited from other air carriers' information (including stall warnings) about the accident aircraft.

[28] *FAA Is Not Realizing the Full Benefits of the Aviation Safety Action Program* (OIG Report No. AV-2009-057), May 14, 2009.

[29] FAA's current oversight system is the Air Transportation Oversight System (ATOS). ATOS is FAA's mechanism to conduct safety inspections and provide regulatory oversight of Part 121 air carriers.

year 2015. In addition, FAA has not established the specific linkages between ASIAS and SAS, or how the systems will be integrated.

Furthermore, it remains unclear which office at FAA Headquarters would be responsible for disseminating these safety trends. Officials from FAA's Flight Standards Analysis and Information Program Office, who would be responsible for developing the inspection protocols for field inspectors, told us that they could not effectively accomplish their mission of identifying emerging national safety trends due to a lack of access to the ASAP and FOQA data available within ASIAS. However, ASIAS program officials told us that they currently cannot provide this office direct access to voluntary safety data contained within ASIAS due to the data's confidential nature. These differing views have created confusion within some FAA headquarters offices as to the role ASIAS should play at the Flight Standards level.

To address these issues, FAA has developed a process for providing ASIAS-related information to its workforce. This process outlines how the Agency intends to routinely disseminate all CAST Safety Enhancements,[30] some of which involve the use of ASIAS analysis, to field inspectors. FAA has not traditionally communicated these enhancements to field-level inspectors and analysts who are not directly involved with the CAST. However, FAA's recently released guidance does not address access to ASIAS voluntary safety program trend data, which FAA promised in reports to our office and Congress. In addition, the success of FAA's process will depend on how effectively inspectors can use the information to aid in their air carrier oversight. FAA has not established a means for receiving inspector feedback or how frequently the Agency will disseminate the CAST reports.

CONCLUSION

FAA's efforts to maintain and enhance the Nation's excellent aviation safety record depend on effectively leveraging its many valuable safety data sources. As such, the ASIAS program plays a vital role in FAA's safety efforts by providing FAA and carriers with complex data analyses, identification of previously unknown risks in aviation operations, voluntary safety enhancements to mitigate these risks, and automated monitoring to evaluate risk reduction effort effectiveness. As FAA transitions from its current oversight system to the Safety Assurance System and redesigns air traffic management through NextGen, the information available in ASIAS will continue to be critical and in high demand. FAA must determine how it can most effectively harness ASIAS's valuable

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[30] Since 2007, CAST has identified 76 safety enhancements, 5 of which were implemented as a result of confidential ASIAS data. For example, based on one of the ASIAS directed studies, FAA developed a safety enhancement aimed at reducing or eliminating the number of terrain warning alerts.

confidential data to improve safety while protecting proprietary interests and maintaining the confidence of air carriers participating in the program.

RECOMMENDATIONS

To enhance FAA's use of ASIAS information, we recommend that FAA:

1. Identify the FAA office with responsibility for disseminating aggregated de-identified ASIAS trends to both field and headquarters levels.

2. Establish a mechanism for providing access to aggregated, de-identified ASIAS trends to each level of Flight Standards in a protected manner, including specific reporting frequency.

3. Develop and issue guidance on how inspectors are to use aggregated, de-identified ASIAS trends to enhance air carrier safety risk identification and mitigation, including how ASIAS will interact with SAS.

4. Include in its planned process to distribute CAST Safety Enhancement information a method for inspectors to provide feedback on the utility of the information provided and how frequently FAA intends to transmit these enhancements.

AGENCY COMMENTS AND OFFICE OF INSPECTOR GENERAL RESPONSE

We provided FAA with our draft report on September 20, 2013, and received its response on December 9, 2013. FAA's response is included in its entirety as an appendix to this report. FAA concurred with all four of our recommendations. For recommendations 2, 3, and 4, FAA provided reasonable timeframes for completing the appropriate planned actions, and we consider these recommendations resolved pending completion of the planned actions.

For recommendation 1, FAA concurred and requested that the recommendation be closed, stating the Agency believes it has now clearly defined the organizational responsibility for ASIAS. FAA stated that the Office of Accident Investigation and Prevention is responsible for identifying trends based upon ASIAS information, and that this office is also responsible for providing actionable information to the Flights Standards Service for dissemination. However, FAA did not provide evidence that it has clearly defined and communicated the organizational responsibility for disseminating ASIAS trends to its workforce. Therefore, we request that FAA provide additional information describing how the Agency

clarified the roles and responsibilities for ASIAS data for its workforce so that confusion about ASIAS is avoided in the future.

ACTIONS REQUIRED

FAA's planned actions for recommendations 2, 3, and 4 are responsive, and we consider these recommendations resolved but open pending completion of the planned actions. We are requesting additional information for recommendation 1, as detailed above. In accordance with DOT Order 8000.1C, please provide this information within 30 days.

We appreciate the courtesies and cooperation of FAA representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-0500 or Robin Koch, Program Director, at (404) 562-3770.

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cc: DOT Audit Liaison, M-1
     FAA Audit Liaison, AAE-100

EXHIBIT A. SCOPE AND METHODOLOGY

We conducted this review between May 2012 and September 2013 in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Our audit objectives were to assess FAA's (1) progress in implementing ASIAS and (2) access to and use of ASIAS data by inspectors to assist in commercial air carrier oversight.

To assess FAA's progress in implementing ASIAS, we reviewed FAA's program documentation and interviewed FAA headquarters representatives responsible for administering ASIAS to obtain information on the ASIAS system, including program status, number of current and projected program participants, number of current data sources, and ongoing goals and activities. We also visited MITRE Corporation staff to better understand how they receive, secure, and handle the data they receive for FAA as well as to discuss how they facilitate studies and analysis approved by the ASIAS Executive Board. Those discussions also provided a better understanding of current challenges involving data analysis (architecture, quality, fusion, and access).

To assess FAA's access to and use of ASIAS data by FAA inspectors to assist in commercial air carrier oversight, we reviewed the responsibilities for FAA administrative offices related to access and use of voluntary safety program data, and leadership intent for sharing of ASIAS confidential and non-confidential data and information. We conducted an internet-based survey of FAA Part 121 inspectors and analysts from 26 out of 39 randomly selected field offices representing all 8 FAA Regions to get feedback on ASIAS access, use, and concerns. This questionnaire contained 32 questions and was distributed to all 893 Part 121 inspectors and analysts from the statistically representative field offices. We received 475 responses for a response rate of 53.2 percent. We also visited three Certificate Management Offices (CMO) and their respective air carriers to review how FAA field personnel and air carriers use ASIAS. We selected these carriers (large carrier, regional carrier, and cargo carrier) for review as indicative of all other carriers of similar size and function and followed that up by verifying our findings with their respective industry associations.

For industry associations, we met with representatives of Airlines for America, the Air Line Pilots Association, and the Regional Airline Association to understand their respective member concerns related to ASIAS. We also contacted representatives from the Professional Aviation Safety Specialists to discuss their views on ASIAS. Lastly, we interviewed a senior NTSB official to better

understand the Board's request for ASIAS access, the status of that request, and any concerns the Board might have regarding the ASIAS program.

The scope of work on internal controls was limited to gaining an understanding of the FAA's operating procedures for ASIAS and FAA's approval process for access to the ASIAS data base. No deficiencies were found during our examination of these controls.

Exhibit A. Scope and Methodology

EXHIBIT B. ORGANIZATIONS VISITED OR CONTACTED

Federal Aviation Administration (FAA) Headquarters

Flight Standards, Air Transportation Division	Washington, DC
Voluntary Safety Programs Branch	Washington, DC
Flight Standards National Field Office	Dulles, VA
Analysis and Information Program Office	Dulles, VA
Office of Accident Investigation and Prevention	Washington, DC
Aviation Safety Analytical Services Division	Washington, DC
Safety Management and Research Planning Division	Washington, DC

FAA Flight Standards District Offices (FSDO)

Albany FSDO	Latham, NY
Baltimore FSDO	Glen Burnie, MD
Boston FSDO	Burlington, MA
Chicago FSDO	Des Plaines, IL
Denver FSDO	Denver, CO
East Michigan FSDO	Belleville, MI
Greensboro FSDO	Greensboro, NC
Indianapolis FSDO	Plainfield, IN
Las Vegas FSDO	Las Vegas, NV
Memphis FSDO	Memphis, TN
Minneapolis FSDO	Minneapolis, MN
San Jose FSDO	San Jose, CA
St. Louis FSDO	Saint Ann, MO
Windsor Locks FSDO	Windsor Locks, CT

FAA Certificate Management Offices (CMO)

Alaska Airlines CMO	SeaTac, WA
Atlanta CMO	Hapeville, GA
Dallas/Ft. Worth CMO	Irving, TX
Delta Air Lines CMO	Hapeville, GA
Denali CMO	Anchorage, AK
FedEx CMO	Memphis, TN
Honolulu CMO	Honolulu, HI
Phoenix CMO	Phoenix, AZ
SkyWest CMO	Salt Lake City, UT
South Florida CMO	Miramar, FL
United Parcel Service CMO	Louisville, KY
US Airways CMO	Coraopolis, PA

FAA Certificate Management Unit (CMU)

Pinnacle Airlines CMU   Memphis, TN

Air Carriers

Delta Air Lines   Atlanta, GA
FedEx Express   Memphis, TN
Pinnacle Airlines   Memphis, TN

Industry Groups

Air Line Pilots Association   Washington, DC
Airlines for America   Washington, DC
Regional Airline Association   Washington, DC

Other Organizations

MITRE Corporation   McLean, VA
National Transportation Safety Board   Washington, DC
Professional Aviation Safety Specialists   Washington, DC

Exhibit B. Organizations Visited or Contacted

EXHIBIT C. GOALS FOR NON-COMMERCIAL ASIAS PARTICIPATION

Existing ASIAS Programs

U.S. Operators
2014 – Establish ASIAS participation goals for other (non-commercial) U.S. aviation communities
2015-2017 – Establish outreach to operators in aviation community who can fill goals.
2017 – Ensure ASIAS participation meets goals for other (non-commercial) aviation communities.
Corporate/Business Aviation
2012-2013 – Establish ASIAS participation goals based upon risk analysis; Ensure AEB governance
2015 – Establish participation in ASIAS of corporate/business operators.
International Aviation
2013 – Ensure AEB has approved governance for international operator participation.
2014 – Establish ASIAS international participation goals for locations in the U.S. where international operators can provide additional data and locations outside the U.S. where U.S. carriers operate.
2014 – Deploy data standards for international operators participating in ASIAS.
2015 – Establish initial data sharing agreements with at least one international carrier operating in U.S. airspace.

Parallel ASIAS Programs

General Aviation (GA) ASIAS
2014 – Determine GA ASIAS data sharing requirements.
2015 – Establish governance structure for GA ASIAS.
2015 – Deploy a GA ASIAS in which directed studies, known-risk monitoring, and information sharing among GA operators can be conducted for issues related to GA community.
Rotorcraft ASIAS
2014 – Develop the rotorcraft generic event set; Evaluate what data is required to analyze event set.
2015 – Develop ASIAS standards for rotorcraft flight data sharing and requirements for data analysis tools.
2017 – Obtain flight data from one or more rotorcraft operators to begin prototype testing.
2018 – Establish initial participation for a rotorcraft ASIAS.

Source: ASIAS Program Plan, January 2013

Exhibit C. Goals for Non-Commercial ASIAS Participation

EXHIBIT D. MAJOR CONTRIBUTORS TO THIS REPORT

Name	Title
Robin Koch	Program Director
William Leary	Project Manager
Galen Steele	Senior Auditor
Jeannette McDonald	Senior Analyst
Sara Gragg	Senior Analyst
Manuel Ramos	Auditor
Audre Azuolas	Writer/Editor
Petra Swartzlander	Senior Statistician
Megha Joshipura	Statistician

Federal Aviation Administration

Memorandum

Date: December 9, 2013

To: Jeffery B. Guzzetti, Assistant Inspector General for Aviation Audits

From: H. Clayton Foushee, Director, Office of Audit and Evaluation, AAE–1

Subject: Federal Aviation Administration's (FAA) Response to Office of Inspector General (OIG) Draft Report: FAA's Implementation of the Aviation Safety Information Analysis and Sharing (ASIAS) System

The FAA continues to foster significant advances in aviation safety by leading the aviation community in a comprehensive initiative focused upon the identification of risk-based indicators and appropriate corrective actions before they lead to incidents and accidents. The FAA, working collaboratively with industry, continues to develop the ASIAS system as part of a strategy to promote and expand safety information sharing efforts and best practices. ASIAS is part of the overall agency philosophy of concentrating its safety initiatives on higher priority risk factors.

The success of ASIAS depends upon the continued voluntary participation of the aviation community and the willingness of participants (such as commercial aviation operators) to provide proprietary and sensitive information, which historically has not been available to the FAA. Although ASIAS is still in the early years of development, it has already provided invaluable insight into emerging risks that may not have been otherwise detected.   As a result, the FAA, working in collaboration with the Commercial Aviation Safety Team[1] (CAST), has been able to proactively identify and adopt 16 major safety initiatives[2] designed to mitigate high-priority risks.

The OIG has noted that ASIAS data should be made more available to FAA aviation safety inspectors, and the agency is committed to improving the dissemination of significant ASIAS data to the inspector workforce. The OIG is correct that proprietary data from voluntary safety programs in ASIAS was never intended for use in air carrier surveillance. However, such information is indirectly shared with the safety community through CAST, as well as other venues. Over the next two years, the FAA will implement new initiatives to improve the communication of ASIAS identified risk factors with the inspector workforce. These new initiatives will provide actionable information that will enable FAA inspectors to focus their surveillance activities on higher priority risk areas. This information will serve as an important supplement to data that inspectors already have access to in the voluntary safety programs at their assigned air carriers.

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1. CAST is a government/industry partnership focused on reducing accidents by using a proactive, data-driven strategy to enhance safety in the National Airspace System (NAS).
2. These initiatives are documented on www.skybrary.aero/index.php/Portal:CAST_SE_Plan.

RECOMMENDATIONS AND RESPONSES

Recommendation 1: Identify the FAA office with responsibility for disseminating aggregated de-identified ASIAS trends to both field and headquarters levels.

FAA Response: Concur. The Office of Accident Investigation and Prevention (AVP) is responsible for identifying trends based upon ASIAS information and providing actionable information to the Flights Standards Service (AFS) for dissemination. Trends focused upon high priority risk areas that provide insight on the effectiveness of deployed mitigations along with emerging risk factors can facilitate the ability of ASIs to more effectively prioritize their work programs.

The audit report cited confusion as to the office responsible for ASIAS information dissemination. This may have been due to an organizational restructuring that occurred in the Office of Aviation Safety (AVS). The Office of Aviation Safety Analytical Services was originally tasked with the development of the ASIAS system and was subsequently merged with the Office of Accident Investigation to establish the new AVP organization in November 2009. We believe that the organizational responsibility for the ASIAS program has now been clearly defined. The FAA requests that this recommendation be closed.

Recommendation 2: Establish a mechanism for providing access to aggregated, de-identified ASIAS trends to each level of Flight Standards in a protected manner, including specific reporting frequency.

FAA Response: Concur. The FAA agrees that knowledge gained through ASIAS analyses would help ASIs identify and address safety trends. Accordingly, the FAA has several initiatives underway to help improve awareness of safety risks and deployed mitigations. On June 26, 2013, the FAA provided all inspectors overseeing Part 121 commercial operations information on the CAST Safety Portfolio, that included the top-level commercial aviation systemic risk areas in the National Airspace System (NAS), as well as the associated mitigation strategies completed and underway. The FAA also intends to provide its general aviation inspector workforce the General Aviation Joint Safety Council (GAJSC) Safety Portfolio, containing the top-level general aviation systemic risk areas and associated mitigation strategies both completed and underway. These safety portfolios provide the inspector workforce with actionable information that can be used to discuss safety issues with the organizations they oversee. AVP will provide subsequent updates as CAST and GAJSC routinely modify their safety portfolios.

ASIAS and other FAA safety-related databases contain large volumes of data, and analyzing all the relevant data is a laborious process. By September 30, 2014, the FAA will identify aggregate trend information that will be both useful and actionable for the inspector workforce. The FAA believes that by that time, processes and metrics will be more fully developed and useful trend information will be more readily available.

Appendix. Agency Comments

Recommendation 3: Develop and issue guidance on how inspectors are to use aggregated, de-identified ASIAS trends to enhance air carrier safety risk identification and mitigation, including how ASIAS will interact with the Safety Assurance System (SAS).

FAA Response: Concur. AFS provided appropriate guidance for the use of safety information contained in the dissemination of the CAST Safety Portfolio on June 26, 2013. AFS will review the information available from ASIAS to establish additional guidance for use of the information and ensure appropriate protections by September 30, 2014.

The National Flight Standards Work Program Guidelines (Order 1800.56) and Air Transportation Oversight System (ATOS) policy (Order 8900.1, Volume 10) provide guidance for inspectors on the evaluation of safety data to support work program planning and revision. Within 90-120 days after receiving AVP's aggregated, de-identified ASIAS trends, AFS will review and evaluate the information and determine what guidance needs to be modified. AFS will issue a Notice within 90-120 days after completing its evaluation of the aggregated, de-identified ASIAS trend data. The Notice will provide interim guidance instructing inspectors to consider ASIAS's trend information when evaluating and constructing their work programs.

Once SAS is fully implemented, ASIAS information will be integrated into SAS at both the local and national levels. AVP's aggregated de-identified ASIAS trends will alert Certificate Management Teams (CMT) to possible safety hazards, allowing CMT to determine appropriate actions within their oversight programs. These trends will also provide input into evaluations performed within the National Safety Analysis function to identify hazards and develop risk mitigation strategies at the national level.

AFS will revise FAA Order 8900.1, Volume 10, ATOS policy within 6 months of the Notice publication and FAA Order 1800.56 within 12 months. AFS will also ensure that similar guidance using AVP-supplied aggregated de-identified ASIAS data is incorporated into SAS policy, which is currently under development.

Recommendation 4: Include in its planned process to distribute CAST Safety Enhancement information a method for inspectors to provide feedback on the utility of the information provided and how frequently FAA intends to transmit these enhancements.

FAA Response: Concur. As noted in our responses to recommendations 2 and 3, on June 26, 2013 the FAA provided inspectors overseeing Part 121 commercial operations information on the CAST Safety Portfolio that included the top-level commercial aviation systemic risk areas in the NAS and voluntary mitigation strategies completed or underway. CAST has recently adopted new safety enhancements, and an updated safety portfolio will be provided to the inspector workforce, as will all subsequent enhancements. As part of the process of implementing new CAST safety enhancements, inspectors will have the opportunity to provide feedback on the utility of the information. The updated CAST Safety Portfolio and the feedback process will be completed by December 31, 2013.

Appendix. Agency Comments