



# **Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation**

Recommendations from the GA Demo Project Team

December 31, 2015

*Provided to General Aviation Joint Steering Committee*

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# EXECUTIVE SUMMARY

## BACKGROUND

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On March 28, 2014, the Federal Aviation Administration (FAA) Administrator formally established the Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (GA Demo Project) as a 1-year project to demonstrate the capabilities of Aviation Safety Information Analysis and Sharing (ASIAS) for the general aviation (GA) community (GA ASIAS). In particular, the Administrator identified the implementation of initiatives aimed at reducing fatal GA accidents as a high priority. On June 9, 2014, a charter signed by representatives from the FAA and the General Aviation Joint Steering Committee (GAJSC) established the GA Demo Project team's objectives to "evaluate the value, benefits, and technical ability of ASIAS to assimilate GA data into its processes and procedures" (see appendix B to this report for the full charter).

## THE TEAM'S WORK

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The GA Demo Project team demonstrated the capabilities of GA ASIAS by—

- Collecting data using innovative GA flight data monitoring tools (detailed in section 2.0 of this report) designed for this demonstration project. These tools provided previously unavailable data useful for trend analysis and identification of hazards in the National Airspace System (NAS) specific to the GA community, and the community proved willing to participate and share in the ASIAS feedback loop by providing data using these flight data monitoring (FDM) tools.
- Introducing the FDM tools and GA ASIAS to the GA community through outreach efforts, including workshops and attendance at fly-ins, to increase awareness of the benefits of ASIAS participation.
- Performing three studies in which ASIAS analysts mined available ASIAS data and reported on findings specific to Phoenix, Arizona-area GA operators. Through these studies (detailed in section 3.0 of this report), the analysts identified possible precursors of risks in the NAS specific to GA.

Using an open exchange of information, member organizations reviewed the provided data and offered feedback and direction for further areas of investigation during the team's meetings. Additionally, member organizations provided presentations and information that added local context to the study areas. At each GA Demo Project team meeting, the GA community and the FAA shared data and provided feedback about what was and was not working in the local Phoenix system, demonstrating the feasibility of GA ASIAS.

## LESSONS LEARNED AND NEXT STEPS

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The GA Demo Project team noted the current success of a similar program developed for the air carrier community—commercial ASIAS—was not instantaneous and building confidence in the data protections offered by ASIAS took time. However, the team was able to leverage capabilities established by commercial ASIAS to demonstrate the value and applicability of

methodologies commercial ASIAs pioneered. The three studies outlined in section 3.0 of this report are examples of collaboration with the GA community on areas of interest for further investigation of safety hazards. Additionally, the success of these studies proves the feasibility of expanding this type of work in other areas of the country.

The GA Demo Project team demonstrated the value of using ASIAs data and working with key stakeholders in the GA community. GA ASIAs can become another tool to “break the chain” of fatal GA accidents by offering a proven methodology to proactively identify trends and hazards. The team was able to demonstrate how some of the tools developed for commercial ASIAs can be used to help mitigate GA accident and incident precursors, a stated goal of ASIAs and the GAJSC.

Following the demonstration period, the team emphasized the need to integrate the GA Issue Analysis Team (IAT) and GA Safety Analysis Team (SAT) into future GA ASIAs data collection and directed study activities.

# 1.0 INTRODUCTION

## 1.1 BACKGROUND

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On January 27, 2014, Federal Aviation Administration (FAA) Administrator Michael P. Huerta announced the Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (GA Demo Project) at the 2014 General Aviation Summit at FAA Headquarters. As a followup to this announcement, the Directors of Accident Investigation and Prevention (AVP-1) and Flight Standards Service (AFS-1) visited the Phoenix-Mesa Gateway Airport in Mesa, Arizona, to speak at the Annual Aircraft Maintenance Symposium on March 6 and 7, 2014. Local pilot groups in the Phoenix area also were briefed during this visit.

On March 28, 2014, the FAA Administrator formally established the GA Demo Project as a 1-year project to address this issue by demonstrating the capabilities of Aviation Safety Information Analysis and Sharing (ASIAS) for the general aviation (GA) community (GA ASIAS). In particular, the Administrator identified the implementation of initiatives aimed at reducing fatal GA accidents as a high priority. These initiatives include the work of the General Aviation Joint Steering Committee (GAJSC) and efforts to bring GA operations data into ASIAS. The FAA's general statement of policy supporting the ASIAS-for-GA initiative was issued in the Federal Register (79 FR 17638; March 28, 2014). This statement of policy contained information on the GA Demo Project's scope, as well as limitations on enforcement using data gathered for the demonstration (see appendix A to this report for the full statement of policy).

On June 9, 2014, a charter signed by representatives from the FAA and the GAJSC established the GA Demo Project team's objectives to "evaluate the value, benefits, and technical ability of ASIAS to assimilate GA data into its processes and procedures" (see appendix B to this report for the complete GA Demo Project charter).

## 1.2 SCOPE OF THE DEMONSTRATION PROJECT

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To demonstrate the capabilities of GA ASIAS and as one way to support the GAJSC's fatal accident reduction goal, ASIAS collected data using innovative GA flight data monitoring (FDM) tools specifically designed for this project (described in section 2.0 of this report). In addition, ASIAS and member organizations performed three studies in which they searched available ASIAS data and reported on findings specific to Phoenix-area GA operators. Through these studies (detailed in section 3.0 of this report), the analysts identified possible precursors of risks in the National Airspace System (NAS) specific to GA. Additionally, the team met in person or by teleconference six times over the course of the demonstration period.

### 1.3 SCOPE OF THIS REPORT

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The GA Demo Project was chartered to include the following information in this final report:

1. A description of all data sources used in the project;
2. A description of all issues that helped the demonstration project move ahead or hindered any part of the project;
3. A list of findings discovered in the Phoenix, Arizona, area as a result of the project;
4. A description of the process developed for the project and any changes made to the process over the course of the project; and
5. Any relevant lessons learned.

### 1.4 GAJSC

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The GAJSC is a voluntary safety committee composed of Government and industry members that manages efforts to reduce fatal GA accidents. The group analyzes data to identify emerging issues and threats to GA safety and develops mitigation strategies to address and prioritize safety issues to prevent accidents. Established in 1998 as part of the FAA's Safer Skies initiative to respond to the National Civil Aviation Review Commission's safety recommendations, the GAJSC reorganized in 2011 and uses industry implementation of safety enhancements (SE) to reduce the GA fatal accident rate. This is the same process the Commercial Aviation Safety Team (CAST) uses to reduce the commercial aviation fatal accident rate. These SEs consist of procedures, training, and/or equipment installations to mitigate potential fatality risk.

The GA fatal accident rate is one of the metrics FAA Aviation Safety monitors. While the FAA established a GA safety metric under the Safer Skies initiative based on the number of annual fatal accidents, industry and the FAA jointly transitioned to a rate-based metric in 2007.<sup>1</sup> The FAA and industry agreed to base the new metric on the 3 safest years in GA (2006–2008)<sup>2</sup> and plan for an annual improvement of a 1 percent reduction in the fatal accident rate. Meeting this reduction would result in a fatal accident rate of no greater than one fatal accident per 100,000 hours flown by 2018.

On September 1, 2012, the GAJSC's Loss of Control Working Group published a report containing SE 22, Flight Data Monitoring.<sup>3</sup> SE 22 encouraged the development of tools for the GA community that would grant GA operators benefits using FDM afforded to Title 14, Code of Federal Regulations (14 CFR) part 23 aircraft operators participating in approved Flight Operational Quality Assurance (FOQA) programs.

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<sup>1</sup> The FAA and industry jointly established a safety metric in the mid-1990s based on the number of fatal accidents in 1 year. At that time, industry and the FAA were reluctant to establish a rate-based metric because of limitations in the exposure data from GA. Through joint work under the GAJSC General Aviation Data Improvement team, the exposure data (hours flown) was improved and currently has an accuracy of approximately 1.6 percent Standard Error, which was deemed acceptable for transitioning to a rate-based metric and goal for GA safety for 2007–2018.

<sup>2</sup> The 3 years with the fewest fatal accidents since World War II were 2006–2008. Converted to a rate, these years experienced 1.12 fatal accidents per 100,000 hours flown.

<sup>3</sup> <http://www.gajsc.org/loss-of-control-approach-and-landing>. Last accessed November 18, 2015.

## 1.5 ASIAS

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To promote an open exchange of safety information for the continuous improvement of aviation safety, the FAA and the aviation industry worked in partnership to develop ASIAS. ASIAS is a collaborative information-sharing program supported by the aviation community to facilitate the proactive analysis of data from broad and detailed sources to advance safety initiatives and discover vulnerabilities in the air transportation system. The safety data ranges from public sector data collected by the FAA to proprietary data voluntarily submitted by ASIAS participants. ASIAS enables the aviation community and the FAA to view different data sources and analyze the aggregate data. This allows ASIAS participants to further analyze their data and make comparisons to industry norms. ASIAS benefits the FAA and the aviation industry by enabling the analysis and tracking of accident precursors and known safety hazards, as well as the identification and tracking of newly identified operational risks.

The ASIAS community consists of the FAA and private sector organizations, such as corporate operators, air carriers, manufacturers, and associations. ASIAS participants provide deidentified digital flight data and/or deidentified safety reports to ASIAS under various agreements.

## 1.6 GA DEMO PROJECT TEAM STRUCTURE AND COMPOSITION

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The GA Demo Project team was composed of subject matter experts from Government, industry, academia, and the GA community. Collectively, the members brought significant levels of experience and guidance to the project and helped demonstrate the value of an open exchange of safety information using ASIAS. Additionally, they brought their perspectives as stakeholders in the project, as well as their expertise in the following areas:

- GA flight operations,
- Digital flight data and pilot reporting programs, and
- Identification of major event causes and potential mitigations.

The GA Demo Project team included industry representatives from the Experimental Aviation Association (EAA); Arizona Pilots Association (APA); National Business Aviation Association (NBAA); General Aviation Manufacturers Association (GAMA); Air Line Pilots Association, International (ALPA); and National Air Traffic Controllers Association (NATCA). Academic membership included representatives from the University of North Dakota; Government membership included representatives from the National Aeronautics and Space Administration (NASA) and National Transportation Safety Board (NTSB).



## 2.0 GA DEMO PROJECT PROCESS

The GA Demo Project team used established ASIAs processes to organize and evaluate safety information relevant to GA pilots operating in the Phoenix Sky Harbor International Airport (KPHX) area. At each GA Demo Project team meeting, the GA community and FAA shared data and provided feedback about what was and was not working in the local Phoenix, Arizona, airspace. Specifically, ASIAs analysts and member organizations prepared three studies (detailed in section 3.0 of this report) and gave presentations to the team on available data for its areas of interest. Using this open exchange of information, member organizations reviewed the provided data and offered feedback and direction for further areas of investigation during the team's meetings. In addition to these data-sharing efforts, member organizations provided presentations and information that added local context to the team's study areas.

Furthermore, the GA community proved willing to participate and share in the Safety Life Cycle process (see figure 1 below) by providing data from newly introduced GA FDM tools as part of the information-sharing portion of the process. This information sharing from the GA community provided ASIAs unique data to be analyzed that was unavailable before the demonstration project and contributed to the GA Demo Project's success.

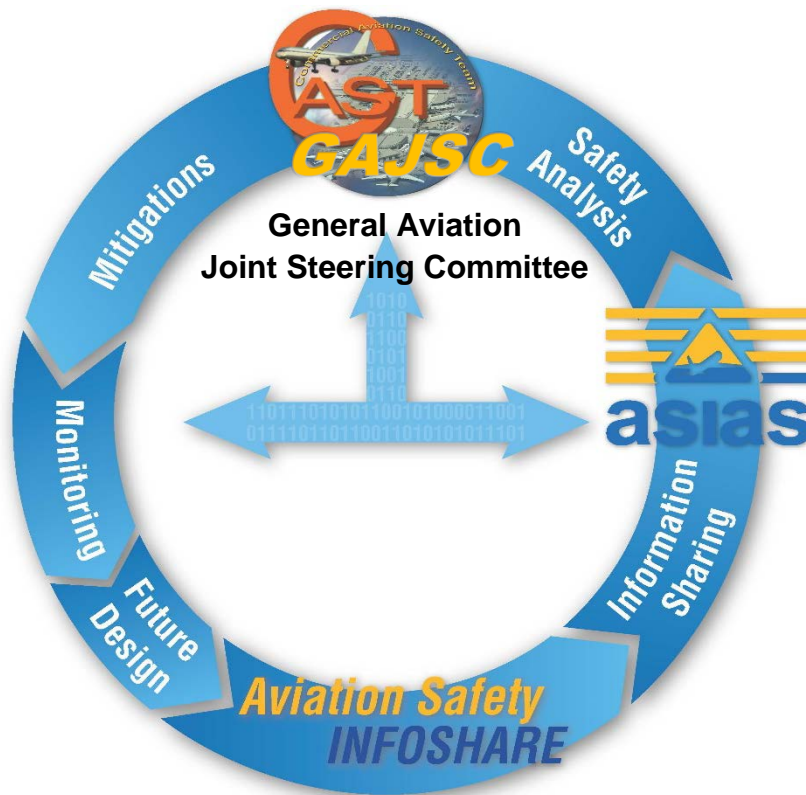


Figure 1. Safety Life Cycle

## 2.1 BUILDING GA ASIAS

### DATA-SHARING MECHANISMS FOR GA

Before the GA Demo Project, the GA pilot community primarily relied on the Aviation Safety and Reporting System (ASRS) to report NAS hazards. The GA Demo Project team encourages continued use of ASRS to report safety issues; however, unlike commercial ASIAs participants, most GA pilots, even those at large flight training schools, could not provide FOQA or Aviation Safety Action Program (ASAP)-like data to GA ASIAs for analysis and review because no mechanisms existed to collect and store this type of data. To resolve this problem and offer the opportunity to those in the GA community who wish to become ASIAs stakeholders and contribute to enhancing the safety of the air transportation system through flight data collection, the GA Demo Project team introduced the following GA FDM tools:

1. The National General Aviation Flight Information Database (NGAFID), developed by the Center of Excellence for General Aviation Research (CGAR), is a neutral mechanism to collect, archive, analyze, and disseminate deidentified flight data to participants.
2. The General Aviation Airborne Recording Device (GAARD™) mobile application (app), developed by ASIAs, gives users the ability to collect and upload specific flight data into NGAFID. Figure 2 below depicts the relationship between GAARD™ and NGAFID.



Figure 2. Relationship Between GAARD™ and NGAFID

Because GAARD™ is an innovative addition unique to GA ASIAs, NGAFID and GAARD™ were beta-tested as part of the GA Demo Project. GAARD™ allows users to collect aircraft performance data during flight, including position, roll, pitch, and heading.<sup>4</sup> In addition, GAARD™ plots recorded performance data on a graph and overlays flight-track data onto a map for post-flight review. Using portable electronic devices (such as tablets or cellular phones) with the installed GAARD™ app, users can upload recorded performance data directly to NGAFID. This data is then deidentified and aggregated to help the GA community identify safety risks and emerging threats unique to GA. Individuals providing data are able to review their specific flight data and analyze it for trends and changes over time, allowing them to better understand their own data and subsequently improve their flying. As specified in the Federal Register notice (included as appendix A to this report), the FAA cannot access the raw data provided to NGAFID or use the data for FAA enforcement actions.

The GA Demo Project team recruited volunteer pilots for the NGAFID/GAARD™ beta test primarily from within 40 nautical miles (nmi) of KPHX. As the project progressed, a corridor up to Prescott, Arizona, was included in the beta-test area so Embry-Riddle Aeronautical University could participate in the data-gathering portion of the project.

### *Lessons Learned*

Over the course of its work, the GA Demo Project team learned lessons that can be integrated into GA ASIAs. These lessons learned include the following:

- The use of GAARD™ and NGAFID tools as a data collection option was met with reluctance by some GA Demo Project team members who expressed concerns that the FAA would use these systems to monitor individual flights for impropriety. Some members remain skeptical about the FAA's agenda, confidentiality, and data protections promised by the FAA regarding these data collection tools.
- At the GA Demo Project team's June 2014 meeting, NASA gave a presentation on ASRS, during which it explained it took ASRS 10 years to see consistent and active reporting into its system by industry members before the usefulness and confidentiality of the system was demonstrated to the user community. Additionally, NASA noted ASRS provides significant giveback to the user community in the form of an immunity policy that provides confidentiality, anonymity, and enforcement protections for a report filer who submits a safety occurrence. The NASA representative cautioned the team not to overemphasize immediate participation, placing more importance on improving participation year-over-year as users become more comfortable that the protections in the GA ASIAs system are trustworthy. As explained below, commercial ASIAs experienced a similar gradual participation rate.

### **TRUST BUILDING AND COMMUNITY OUTREACH**

Discussion among the GA Demo Project team members revealed developing the right message to communicate the benefits of GA ASIAs to the GA community took time. As a result, community participation in GA ASIAs was lower than initially expected during the

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<sup>4</sup> Currently roll and pitch are only recorded when GAARD is used in conjunction with an attitude and heading reference system (AHRS.)

demonstration period.<sup>5</sup> Commercial ASIAS faced a similar participation challenge; when it was presented to the industry in 2007, only four air carrier members elected to participate. Despite this initial reluctance, however, as of the date of this report, 44 air carriers (including major, regional, cargo, and on-demand air carriers) and 12 corporate operators have signed memoranda of understanding and now provide proprietary safety data to ASIAS. In addition, commercial ASIAS has never had a data breach and the FAA has never taken enforcement action against a participating pilot or operator as a result of submitted data. The team recommends emphasizing this track record of data protection when marketing NGAFID and GAARD™ to the GA community.

In addition to basic trust-building issues, the GA Demo Project team determined outreach to the GA community about the benefits of ASIAS presents many intrinsic obstacles not faced by commercial ASIAS. For example, special effort is needed to reach out to community members that do not participate in the large GA community organizations (for example, EAA, NBAA, and/or local pilot groups, such as the APA) or regularly interact with the FAA in outreach efforts, such as the FAA Safety Team (FAASTeam). The team discussed using the Safer Skies/GAJSC process methodologies (described in appendix G to this report) to increase GA ASIAS participation by reaching out to varied subgroups within the GA community. The team noted the GAJSC has tested these mechanisms to maximize participation and community engagement when announcing added safety benefits to the GA community.

The FAA, FAASTeam, APA, and Scottsdale, Arizona, Flight Standards District Office (FSDO) were reliable and effective communication outlets to reach local GA community members open to representing their community on the GA Demo Project team. In addition to helping find team members for the demonstration period, the FAASTeam provided a valuable partnership that helped maximize the GA Demo Project team's outreach efforts by offering credit toward the FAA's WINGS Pilot Proficiency Program<sup>6</sup> in exchange for participation in the data-gathering portion of the project.

### *Lessons Learned*

The GA community is less homogenized than 14 CFR part 121 air carriers, and therefore marketing approaches need to be more specifically directed at intended subgroups. Consequently, increased research, effort, and planning are needed regarding how to approach specific groups within GA to solicit their participation.

Effective outreach efforts during the demonstration period included the following:

- The FAASTeam provided booth space at the Copperstate Fly-In held in Casa Grande, Arizona, for GA Demo Project team representatives to pass out brochures and meet with prospective NGAFID and GAARD™ participants. (See appendix I to this report for a copy of the brochure.) The participating team members noted the casual setting offered by the fly-in format allowed direct interaction with the end users in a non-threatening environment, and the number of GAARD™ downloads increased following the team's participation at the fly-in.

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<sup>5</sup> However, approximately 10 percent of users who download the GAARD™ mobile app actively contributed data into the system; this was a good rate of participation for a pilot project.

<sup>6</sup> <https://www.faa.gov/WINGS/pppinfo/>. Last accessed July 9, 2015.

- The GA Demo Project team conducted educational outreach regarding the benefits, value, and use of NGAFID and GAARD™.
  - During the demonstration period, the team offered NGAFID/GAARD™ training courses in exchange for credit toward the FAA WINGS Pilot Proficiency Program. The FAAS team was an excellent resource to find participants interested in GA FDM tools, and these training courses provided both technical support and information about confidentiality, data collection, and the safety enhancements the tools offer.
  - The team reached out to the local maintenance community at a luncheon to launch the GA FDM tools and GA ASIAs. On the 1-year anniversary of the luncheon, many original participants returned for a status update on the project, indicating high interest in the progress of the tools.
- The team worked to develop a version of GAARD™ for flight schools with large cadres of students and aircraft, as opposed to individual users. In response to suggestions during the outreach efforts of this demonstration project, ASIAs, in coordination with the GA Issues Analysis Team (GA IAT), is in the process of developing a version of GAARD™ that will allow safety departments or analysts from an organization to track the flight data from their organization’s fleets. This app—tentatively called “*fleetGAARD™*”—allows the organization to analyze its data across its fleet.

### **INSIGHTS**

The GA Demo Project team recommends—

- The GAJSC develop and endorse an outreach plan and oversee educational efforts regarding the GA FDM tools NGAFID and GAARD™. The GAJSC and the GA IAT should be the primary points of contact for these outreach efforts. This action will emphasize and solidify the separation built into ASIAs to protect end users’ data identification and confidentiality by using the established Government and industry partnership of the GAJSC.
- Focusing on identifying groups likely to be early adopters of GA ASIAs, such as flight training organizations, to help prove the benefits of ASIAs to the greater GA community. The team notes some subgroups may find more value in GA ASIAs in the initial rollout following the completion of this demonstration period.
- The continued development of outreach materials clearly explaining to the end user the value and long-term benefits of participating in GA ASIAs and using NGAFID and GAARD™. Additionally, outreach materials may be needed to engage specific subcommunities within GA, as the team discovered each community has different perspectives when participating in GA ASIAs.
- GA ASIAs should stress the commercial ASIAs record of 100 percent data protection when conducting GA ASIAs outreach.

- The goal for GA ASIAs should be a GA community partnership with the GAJSC, which would leverage the established benefits of ASIAs, including the FAA’s sponsorship of research and the production of safety-related metrics and SEs that can assist in improving GA accident and fatality rates by proactively identifying trends and assessing the impact of changes within the NAS for GA users.

## 2.2 COMMUNITY STAKEHOLDER PARTICIPATION RETURNS

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### **GA ASIAs, NGAFID, AND GAARD™**

The GA Demo Project team found participation returns or “givebacks” from GA ASIAs, NGAFID, and GAARD™ need to be well-defined. When building GAARD™, the designers believed giving pilots recorded flight data and flight track would encourage them to participate in the program, but to better meet the needs of the GA community and provide more attractive givebacks, the features within NGAFID and GAARD™ may be expanded to include the following:

- Maps and graphs so end users can see their own flight parameters.
- Custom exceedance creation within the systems.
- Flight quality metrics to gain a sense of how an individual pilot compares to the larger community. Examples include—
  - Traffic pattern quality,
  - Route of flight (actual vs. planned), and
  - Other metrics of interest to individuals.
- Standardized aircraft types so users can compare aggregate flight data with other users flying the same types of aircraft.
- Aggregate NGAFID data combined with airspace and other pertinent flight-planning data to help pilots identify risks along their planned route of flight.
- An Airworthiness Compliance Automated Alert Tracking System (ACATS) addition to GAARD™ that may improve GA tracking of airworthiness compliance status (for more information, see appendix F to this report).

### **Lessons Learned**

GA aircraft and participants have equipment limitations that are different from commercial operators, which will affect the quality of data available to the average user and in possible givebacks in NGAFID and GAARD™. For example, attaching an optional AHRS to a mobile phone or tablet may be a limitation for some GA operators because of the cost of the AHRS unit and, without the AHRS, the amount of data GAARD™ can return is limited.<sup>7</sup> As stated above, giving GA pilots recorded flight data and flight track is not enough of an incentive for widespread participation in GA ASIAs, NGAFID, and GAARD™. To maximize participation, the givebacks need to be clearly defined and beneficial to the end user.

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<sup>7</sup> ASIAs is working to improve the GAARD™ app so the amount of data without an AHRS will be comparable.

## ***INSIGHTS***

The GA Demo Project team recommends—

- Pilot givebacks should be clearly defined and enhanced to increase GA community participation with GA ASIAs, NGAFID, and GAARD™.
- These givebacks should be vetted with the GA IAT and the GAJSC Safety Analysis Team (SAT).

## 3.0 STUDIES PERFORMED

Given the GA Demo Project team's limited timeframe to demonstrate the benefits of ASIAs to the GA community, ASIAs analysts prepared a preliminary air traffic data study regarding traffic density around KPHX before the team's first official meeting on March 25, 2014. At the meeting, a presentation on this study allowed team members to see the capabilities of ASIAs. Based on their knowledge about the local area, the members provided feedback on areas for further examination in KPHX airspace (summarized in section 3.1 of this report). Following intergroup discussions and presentations from the NTSB and local community about hazards specific to GA, the team requested ASIAs perform both the Terrain Study (summarized in section 3.2 of this report) and the FAA Wildlife Strike Database Study (summarized in section 3.3 of this report). Specific methodologies for each of the studies performed are located in appendix D to this report.

In addition to the studies mentioned above, ASRS provided 568 events that occurred in the study area from January 2013 to October 2014. Many of these reports are not publicly available and were provided to the GA Demo Project team to support ASRS and the GAJSC's shared goal of reducing accident and incident rates by identifying and responding to precursor events before accidents and incidents occur. ASRS analysts are investigating the best methodologies to use when data mining for a project of this type to maximize the number of reports returned for a particular study region. Therefore, the GA Demo Project team recommends expanding the GA search to a national level with ASRS data until more regional-level data becomes available. Currently, there is not enough data at the regional level to draw any substantive conclusions specific to the KPHX area. However, the reports retrieved from ASRS provided context to the studies conducted for this project and added another dimension to the analysis by integrating pilot perspectives and testimonials on areas of concern in the KPHX airspace.

The GA Demo Project team noted these types of studies may benefit other geographic areas in the NAS. They emphasized some of the data provided by ASIAs is not publicly available and, therefore, gave the participants additional insight into their immediate community operations, such as traffic hotspot identification, terrain/controlled flight into terrain risk, and wildlife hazard statistics. These studies and the insight they provided are discussed in more detail in the following sections.

### 3.1 SIMULATED AIR TRAFFIC DATA STUDIES IN THE PHOENIX AREA

#### **BACKGROUND**

On August 8, 2009, a Eurocopter AS350 BA helicopter and a Piper PA-32R-300 airplane collided in midair over the Hudson River.<sup>8</sup> As a result, the NTSB recommended a review of all class B airspace<sup>9</sup> to identify where aviation safety could be improved. During this analysis, the FAA identified a corridor in KPHX class B airspace similar to the GA corridor that resulted in the Hudson River midair collision (MAC).

<sup>8</sup> <http://www.nts.gov/investigations/AccidentReports/Reports/AAR1005.pdf>. Last accessed July 9, 2015.

<sup>9</sup> [http://www.nts.gov/news/press-releases/Pages/Safety\\_Board\\_Issues\\_Recommendations\\_Regarding\\_Hudson\\_River\\_Class\\_B\\_Exclusion\\_Area.aspx](http://www.nts.gov/news/press-releases/Pages/Safety_Board_Issues_Recommendations_Regarding_Hudson_River_Class_B_Exclusion_Area.aspx). Last accessed July 9, 2015.



In 2010, in response to this accident and the NTSB's investigation, ASIAs analysts conducted a comprehensive review of the 30 areas of class B airspace in the United States. The analysts looked for areas where pilot training and special flight rules would improve safety, as suggested by the NTSB. In preparation for the GA Demo Project team's first meeting in March 2014, ASIAs analysts used information from the 2010 study and searched ASIAs data for GA-specific events between 1998 and 2008 in the KPHX area (see appendix D to this report). Using proven ASIAs methods, analysts organized the collected data into known CAST/ICAO<sup>10</sup> Common Taxonomy Team (CICCT) occurrence categories<sup>11</sup> and examined the output for risks that would lend themselves to further investigation for this project. The analysts determined the MAC risk (which was higher than the national average in the KPHX area), coupled with the findings in the May 2011 Airspace Study and local pilot information, warranted further investigation into air traffic risks for the GA Demo Project.

### **METHODOLOGY**

The visual flight rules (VFR) aircraft corridor and MAC risk in the KPHX area led ASIAs to use the ASIAs Traffic Collision Avoidance System (TCAS) emulator<sup>12</sup> tool to evaluate whether two flight tracks might have generated a TCAS resolution advisory (RA) using actual TCAS algorithms. The study team attempted to isolate simulated RAs involving GA aircraft by limiting the study parameters to VFR/VFR or instrument flight rules (IFR)/VFR<sup>13</sup> encounters only. Using these study tools, the objective of the simulated air traffic data studies was to identify areas of close-proximity events specific to GA for the KPHX area.

### **INITIAL STUDY FINDINGS**

As a result of the simulated air traffic data studies performed by ASIAs analysts, the GA Demo Project team identified areas with an increased number of close-proximity encounters specific to GA aircraft. Members of the team confirm there is risk in the system, but the identified areas were not surprising or unanticipated. The team recommended improving awareness as the path forward. With the verified accuracy of the TCAS emulator and with input from local GA operators, the emulator data could be used to produce supplemental charts or area maps with close-proximity encounter data to improve awareness of airspace MAC risk areas in the NAS. Identification of these areas could assist non-local pilots with situational awareness, flight schools with planning for where it might be safest to conduct specific training maneuvers, and corporate pilots with their risk assessment during the flight planning process.

### **INSIGHTS**

The GA Demo Project team recommends—

- GA ASIAs conduct close-encounter air traffic studies for areas of interest in the NAS to identify air traffic close-proximity encounter areas specific to GA aircraft operators and update this information on a regular basis to monitor the effect of identification of these areas.

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<sup>10</sup> International Civil Aviation Organization.

<sup>11</sup> [http://www.cast-safety.org/pdf/cicct\\_occurrence-category0804.pdf](http://www.cast-safety.org/pdf/cicct_occurrence-category0804.pdf). Last accessed July 9, 2015.

<sup>12</sup> The specific technical methodology for the simulations contained in this section is located in appendix D to this report.

<sup>13</sup> VFR aircraft squawking 1200 and not under radar control.

- GA ASIAS investigate and explore the best and most efficient way to disseminate this air traffic close-proximity data to pilots operating in and around areas of interest in the NAS identified as areas of higher traffic density. Possible information distribution methods include air traffic close-proximity encounter plots on the back of sectionals, aviation websites, and via in-cockpit apps.
- ASIAS data sources be used to identify specific areas in the NAS for further study.

## 3.2 TERRAIN STUDY IN THE PHOENIX AREA

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### **BACKGROUND**

On November 23, 2011, an Aero Commander impacted terrain in the Superstition Mountains near Apache Junction, Arizona, during night visual meteorological conditions.<sup>14</sup> The airplane was destroyed and all six people onboard were fatally injured. Following group discussion about risks unique to the KPHX airspace for GA operators, the GA Demo Project team identified the terrain around the KPHX class B airspace as an area of interest for further investigation into close terrain encounters. The team requested ASIAS investigate how the terrain surrounding the KPHX class B airspace affects GA operators and emphasized the importance of identifying areas where the class B altitude restrictions and terrain height might pose hazards to GA operators. Team members also wanted to determine if aircraft are flying too close to Superstition Mountain.

The initial examination of data for the terrain study used the ASIAS Ground Proximity Simulator tool, which was abandoned during the project after it produced unreliable results. Subsequently, ASIAS analysts developed a new interactive mapping tool that displays radar data overlaid on a terrain map; the tool also has terrain proximity capabilities making it applicable to future terrain studies of this nature.

### **METHODOLOGY**

ASIAS analysts used radar and terrain data from August 2014 to identify events of concern (that is, events in which GA aircraft were within 1,000 feet of terrain) and where in the KPHX airspace those events tended to cluster. The analysts filtered radar-based trajectory data covering the NAS to select local GA tracks—

1. Within 100 nmi of KPHX,
2. Flown by aircraft squawking 1200, and
3. Flown in the month of August 2014.

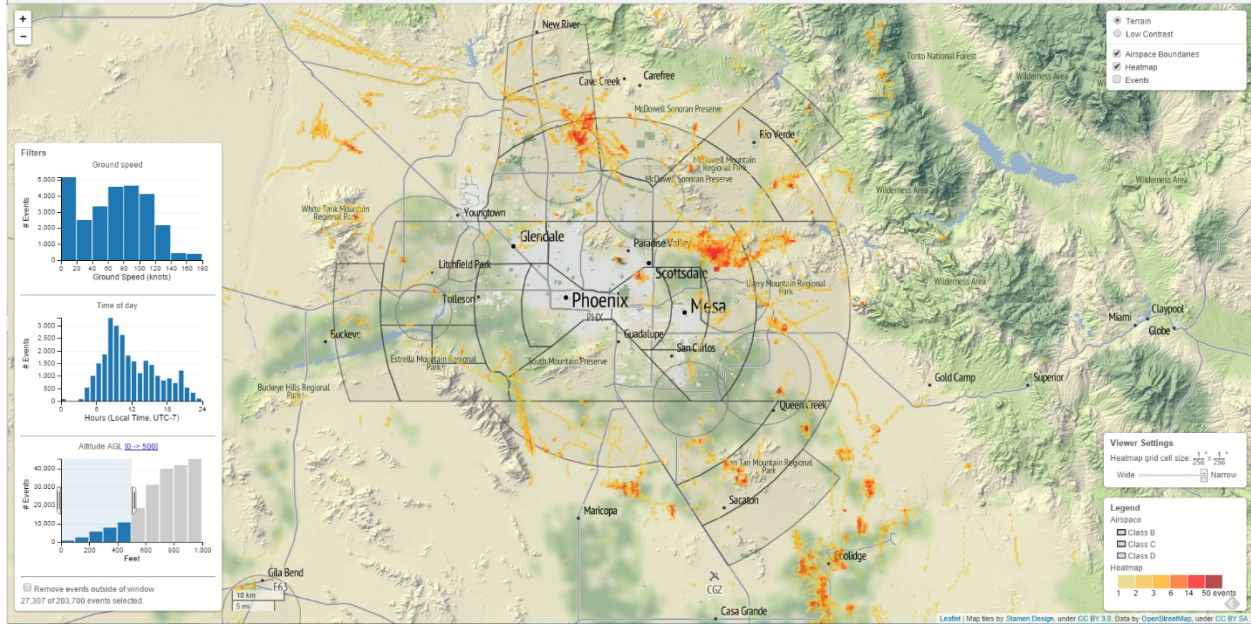
From those flights, the analysts identified as terrain proximity events points at which the aircraft was—

1. At an altitude less than 1,000 feet above ground level (AGL), and
2. Not within 2 nmi of a landing facility.

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<sup>14</sup> <http://ftpcontent.worldnow.com/kpho/KPHO%20NEWS/ntsbreport.pdf>. Last accessed July 9, 2015

To analyze the identified events and further determine which events were causes for concern, the analysts built an interactive web tool that displayed the frequency of events on a map, as shown in figure 5 below. The tool allows users to filter the events by height above terrain, ground speed, and time of day.

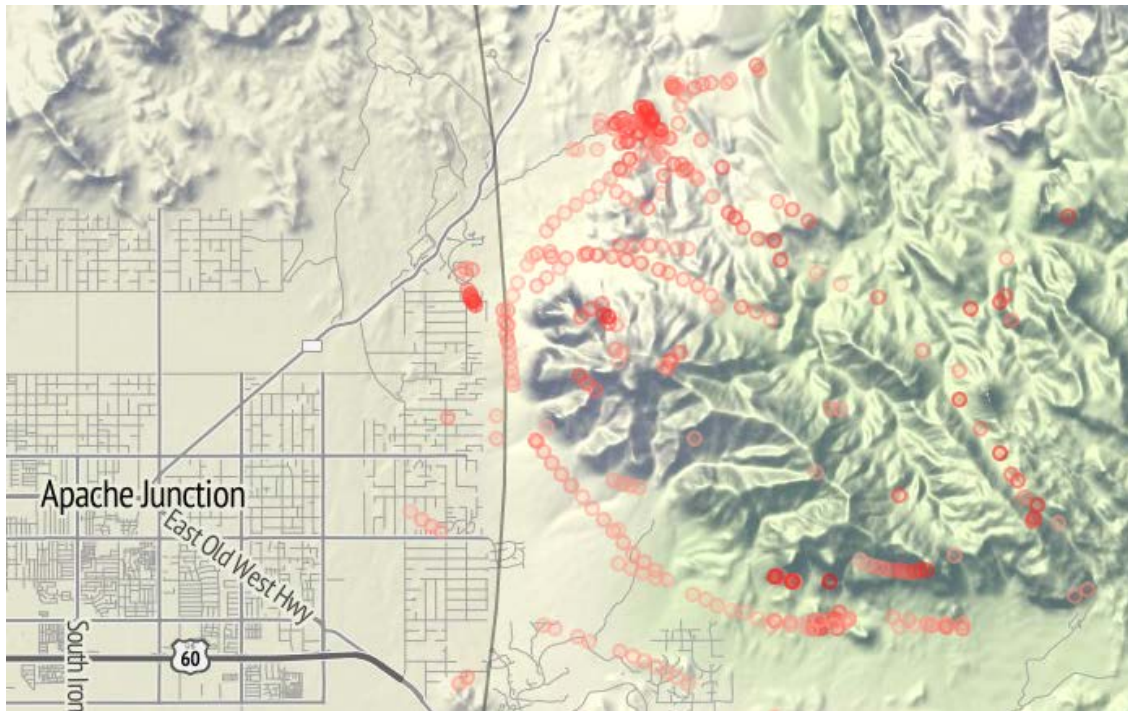


**Figure 3. Frequency of Concerning Events**

The histogram, overlaid on a terrain map, is the primary visualization of terrain proximity hotspots. The histogram partitions the display area into square tiles (whose size is adjustable between  $1/8^\circ$  and  $1/256^\circ$ ), and the color of each tile varies from light yellow (indicating 1–2 events observed in that square during the study month and satisfying the user-chosen filters) to dark red (indicating more than 50 events observed). In addition, the map displays individual terrain proximity events, color-coded based on proximity to terrain: red represents events that occurred below 500 feet and yellow represents events that occurred between 500 and 1,000 feet. Because the number of events is very large, only a random sample of events is actually displayed on the map. The number of events shown in an area is proportional to the relative frequency of events in that area (compared to other areas in the study domain).

### **INITIAL STUDY FINDINGS**

The terrain study identified several potential areas of concern. Figure 6 below depicts a random sampling of events below 500 feet AGL in August 2014. The arc cutting vertically through the center of the picture is the class B airspace boundary. Because August is a relatively slow month for GA activity in the area, the number of observed events is particularly troubling.



**Figure 4. Events Below 500 Feet AGL in August 2014**

ASIAS analysts have found terrain proximity analysis requires input from experts in the local GA community to better understand the areas of concern and the large number of observed proximity events; for example—

- Local experts identified several hotspots that were likely because of low-flying agricultural operations.
- A hotspot near San Tan Mountain Regional Park (southeast of KPHX) was tentatively attributed to aerobatic flying.
- A small, but salient hotspot was observed at Superstition Mountain; 12 flights were found to have been under the 500-foot AGL threshold within 3 miles of its peak.

Using the web tool’s interactive capability to adjust the parameters in real time would aid the analysis. Furthermore, individual tracks could be isolated and displayed as cross-sections to better understand their trajectories. Next steps would also include analyzing a much larger data set and working to better understand and identify possible false positives in the observed events. For example, including terrain gradient or closure rate in the event selection process may eliminate low-altitude flights over flat terrain where there is relatively low risk.

### ***INSIGHTS***

The GA Demo Project team recommends—

- GA IAT perform terrain studies using methods tested in this demonstration in other areas of high rates of close encounters with terrain in the NAS.

- GA IAT design a method to disseminate this data to the GA community, airspace designers, and air traffic controllers.
- GA IAT include individuals with knowledge of the area being studied as participants in future terrain study teams because local knowledge is required to identify areas of “expected” close-proximity terrain flight, such as helicopters, agriculture operations, and transponder-equipped balloons. Specifically, the GA Demo Project team recommends selecting for participation local, active GA community flying members and air traffic control (ATC) personnel who can—
  - Identify areas of local concern with system issues, as well as opportunities for improvement (for example, ATC communication issues).
  - Eliminate or explain local false positives unique to the study area.

### **3.3 FAA WILDLIFE STRIKE DATABASE<sup>15</sup> STUDY**

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#### ***BACKGROUND***

At the June 2014 GA Demo Project team meeting, members expressed concern that the number and rate of wildlife strikes in Arizona, and in the Phoenix area in particular, were higher than in other parts of the United States. The team requested ASIAs analysts examine Arizona wildlife data and operations and present the findings at a subsequent meeting. The analysis was a way to leverage ASIAs data to serve the GA community by testing the team’s hypothesis that wildlife encounters were higher than average in the Phoenix area. By using the Enhanced Traffic Management System (ETMS) to study 14 airports, ASIAs was able to establish that the Phoenix area was comparable to other cities with high amounts of air traffic in the United States and demonstrate how these tools could be used to improve local hazard awareness by sharing available information. The study also demonstrated the use of publicly available data sources and their possible applicability to the local GA community, which was a stated goal of the GA Demo Project.

#### ***INITIAL STUDY FINDINGS***

Data analysis confirmed 1,775 bird strikes were reported during the study time period of calendar year (CY) 2000 to CY2014. Figure 7 below depicts bird strikes based on the number of airport operations.

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<sup>15</sup> <http://wildlife.faa.gov/>. Last accessed July 9, 2015



**Figure 5. Bird Strikes 2000–2014**

**FURTHER INQUIRY**

When the above results were provided to the GA Demo Project team, members asked what effect adding other wildlife (non-bird) strikes would have on the original results. To answer this question, ASIAs analysts used the same databases for the same set of 14 airports. They again used ETMS to obtain the operations data. The data analyzed was CY2000 through CY2014. For context, analysts reviewed the report “Wildlife Strikes to Civil Aircraft in the United States 1990–2013”<sup>16</sup> for GA strike information relevant to the study area.

A review of all the data pulled from the Wildlife Strike Database showed the following (see table D–2 in appendix D to this report for more details):

**Table 1. Non-Bird Wildlife Strikes CY2000–CY2014**

Airport Identifier	Non-Bird Strikes Reported
KFFZ, KGEU, KGYR, KIFP, and KSDL	0
KCHD, KDVT, and KRYN	1
KPRC	2
KGCN	4
KTUS	21
KIWA	29
KPHX	40

<sup>16</sup> <http://wildlife.faa.gov/downloads/Wildlife-Strike-Report-1990-2013-USDA-FAA.pdf>

## **SUMMARY**

This study found wildlife strikes are not as frequent or as large a fatality risk as the GA Demo Project team initially hypothesized. The wildlife reporting in this study was done by a variety of people, including pilots, airport staff, and maintenance personnel, and these reporters varied by airport. The amount of detail in each wildlife report also varied, sometimes limiting the lessons learned and the data analysis that can be performed. In fact, some airport communities are more likely to report wildlife strikes than others.<sup>17</sup>

## **INSIGHTS**

The GA Demo Project team recommends—

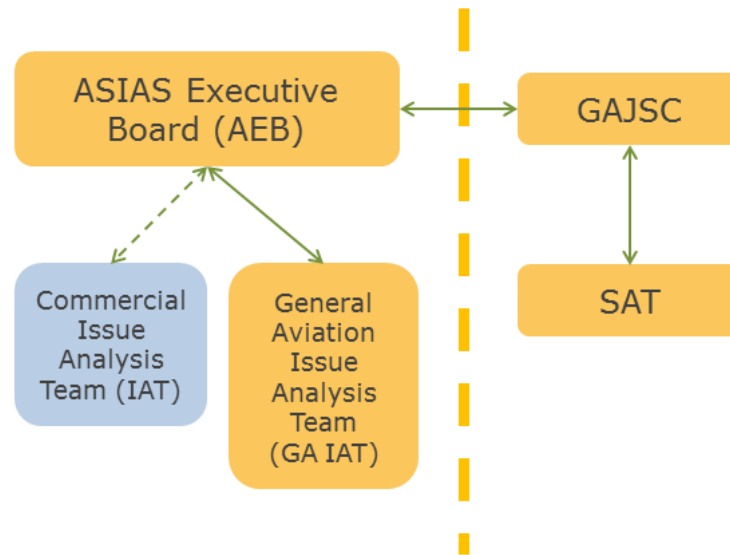
- GA ASIAs continue to promote publicly available data sources and applicable uses to the GA community. The team emphasizes the value of increasing awareness of publicly available aviation data tools to GA community members. Many publicly available data sources provide enhanced situational awareness for GA operators.
- All airmen continue reporting wildlife strikes.

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<sup>17</sup> For instance, 14 CFR part 139 airports are required to conduct daily inspections and sometimes find carcasses, at which point, they report the exact location where it was found. However, GA pilots may not be aware of the Wildlife Strike Database or the new, easier reporting methods. Additionally, reporting may be influenced by the presence of local pilot associations or FAASTeam at an airport.

## 4.0 NEXT STEPS

Following this demonstration period, the GA Demo Project team emphasized the need to integrate the GA IAT and GA SAT into future GA ASIAs data collection and directed study activities. This integration would facilitate clear governance of these GA ASIAs data collection and directed study efforts because the GA IAT operates as a function of the ASIAs Executive Board and the SAT operates under the GAJSC.



**Figure 6. GA Organizational Relationships**

### **INSIGHTS**

The GA Demo Project team recommends—

- Augmenting the GA IAT membership to reflect the segments of the GA community participating in GA ASIAs; members would be selected who can and are willing to represent their particular segment. Currently, the GA IAT’s membership consists of corporate, business, GA FOQA, and/or ASAP specialists; representatives from The MITRE Corporation; and other appropriate stakeholders, such as aircraft manufacturers, air traffic controllers, air traffic managers, other FAA technical experts, and others as requested by the GA IAT.
- Industry and Government providing subject matter experts to GA ASIAs for studies and data analysis by the GA IAT.
- Submitting directed study results from the GA IAT to the GA SAT for review, validation, and next steps before they are presented to the GAJSC for approval.
- Releasing the GA FDM tools nationally to pilots, operators, and organizations for their use.



# APPENDIX A—ASIAS FOR GA PROJECT DEMO FEDERAL REGISTER NOTICE



17638

Federal Register / Vol. 79, No. 60 / Friday, March 28, 2014 / Notices

telephone number of the person presenting the testimony; and (2) a short (one or two paragraph) summary of the presentation, including the subject matter and, as applicable, subjects to be discussed. A copy of the testimony must accompany the notification. Remarks at the hearing should be limited to no more than five minutes to allow for possible questions from the TPSC. Persons with mobility impairments who will need special assistance in gaining access to the hearing should contact Yvonne Jamison at (202) 395-3475.

#### Requirements for Submissions

Persons submitting comments must do so in English and must identify (on the first page of the submission) “Environmental Goods Agreement”. In order to be assured of consideration, comments should be submitted by 11:59 p.m., May 5, 2014. In order to ensure the timely receipt and consideration of comments, USTR strongly encourages commenters to make on-line submissions using the [www.regulations.gov](http://www.regulations.gov) Web site. To submit comments via [www.regulations.gov](http://www.regulations.gov), enter docket number USTR-2014-0004 on the home page and click “search.” The site will provide a search-results page listing all documents associated with this docket. Find a reference to this notice and click on the link entitled “Comment Now!” (For further information on using the [www.regulations.gov](http://www.regulations.gov) Web site, please consult the resources provided on the Web site by clicking on “How to Use This Site” on the left side of the home page).

The [www.regulations.gov](http://www.regulations.gov) Web site allows users to provide comments by filling in a “Type Comment” field, or by attaching a document using an “Upload File” field. USTR prefers that comments be provided in an attached document. If a document is attached, it is sufficient to type “See attached” in the “Type Comment” field. USTR prefers submissions in Microsoft Word (.doc) or Adobe Acrobat (.pdf). If the submission is in an application other than those two, please indicate the name of the application in the “Type Comment” field. For any comments submitted electronically containing business confidential information, the file name of the business confidential version should begin with the characters “BC”. Any page containing business confidential information must be clearly marked “BUSINESS CONFIDENTIAL” on the top of that page. Filers of submissions containing business confidential information must also submit a public version of their comments. The file name of the public

version should begin with the character “P”. The “BC” and “P” should be followed by the name of the person or entity submitting the comments or reply comments. Filers submitting comments containing no business confidential information should name their file using the name of the person or entity submitting the comments. Please do not attach separate cover letters to electronic submissions; rather, include any information that might appear in a cover letter in the comments themselves. Similarly, to the extent possible, please include any exhibits, annexes, or other attachments in the same file as the submission itself, not as separate files.

As noted, USTR strongly urges submitters to file comments through [www.regulations.gov](http://www.regulations.gov), if at all possible. Any alternative arrangements must be made with Ms. Jamison in advance of transmitting a comment. Ms. Jamison should be contacted at (202) 395-3475. General information concerning USTR is available at [www.ustr.gov](http://www.ustr.gov). Comments will be placed in the docket and open to public inspection, except business confidential information. Comments may be viewed on the [www.regulations.gov](http://www.regulations.gov) Web site by entering the relevant docket number in the search field on the home page.

Douglas Bell,  
Chair, Trade Policy Staff Committee.  
[FR Doc. 2014-06631 Filed 3-27-14; 8:45 am]  
BILLING CODE 3290-F4-P

## DEPARTMENT OF TRANSPORTATION

### Federal Aviation Administration

#### Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (ASIAS for GA Project Demo)

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** General statement of policy.

**SUMMARY:** This document announces a one-year program to demonstrate the capabilities of Aviation Safety Information Analysis and Sharing (ASIAS) for the general aviation community. The document also states the FAA’s policy concerning enforcement during this demonstration program.

**DATES:** This Notice becomes effective on March 28, 2014. The ASIAS for GA Project Demo expires one year after the date of publication of this notice.

**FOR FURTHER INFORMATION CONTACT:** Corey Stephens, Federal Aviation

Administration, 800 Independence Avenue SW., Washington, DC 20591; Telephone: (202) 493-4258 and [corey.stephens@faa.gov](mailto:corey.stephens@faa.gov).

#### SUPPLEMENTARY INFORMATION:

##### Background

In recent years, the General Aviation (GA) community has experienced little to no decrease in the number of fatal accidents over the last five years. As a result, the Administrator has identified the implementation of initiatives aimed at reducing GA fatal accidents as a high priority. These initiatives include the work of the General Aviation Joint Steering Committee (GA JSC) and bringing GA operations into ASIAS.

##### Aviation Safety Information Analysis and Sharing (ASIAS)

To promote an open exchange of safety information for the continuous improvement of aviation safety, the FAA and the aviation industry working in partnership developed ASIAS. ASIAS is a collaborative information sharing program supported by the aviation community to facilitate the proactive analysis of data from broad and extensive sources for purposes of advancing safety initiatives and discovering vulnerabilities in the air transportation system. The sources of safety data range from public sector data that the FAA collects to proprietary data that ASIAS participants voluntarily submit. ASIAS enables the aviation community and the FAA to jointly view different data sources and analyze the aggregate data. This allows ASIAS participants to further analyze their own data and make comparisons to industry norms. ASIAS benefits the FAA and the aviation industry by enabling them to analyze and track accident precursors and known safety hazards and to identify and track newly identified operational risks.

The ASIAS community consists of the FAA and private sector organizations such as corporate operators, airlines, manufacturers and pilot associations. ASIAS participants currently provide de-identified digital flight data and/or de-identified safety reports to ASIAS under various agreements.

ASIAS is managed by a group of government and aviation industry representatives through the ASIAS Executive Board (AEB). The AEB oversees the ASIAS program, including policy and process development, and approves all studies undertaken by ASIAS. The AEB established and tasked a subcommittee known as the Issue Analysis Team (IAT) to perform detailed analyses and effectiveness monitoring of specific safety issues using aggregated

ASIAS data. The IAT submits de-identified study results to the AEB, and the AEB determines how best to disseminate the results to the appropriate stakeholders, including the GA JSC.

#### ASIAS for General Aviation

The GA JSC is reaching out to the GA community directly and through several GA associations to educate pilots and other stakeholders on the benefits of sharing collected safety data with ASIAS in a protected non-punitive manner, in a manner similar to programs for commercial aviation. In addition, the GA JSC continues its work to maximize safety in GA operations. For example, to date, it has proposed 26 safety interventions to address loss of control. However, analysis shows that more comprehensive data sources from the GA community resulting from a GA ASIAS data sharing program would improve understanding of contributing factors to safety risks in the system.

Early in 2014, the steering committee will embark on a demonstration to evaluate the value and benefits of ASIAS for the broader GA community. One of the purposes of the demonstration will be to allow the GA JSC to gain a better understanding of safety risks and emerging threats for the GA community. The project will explore potential new information sources such as General Aviation flight data (recorded through avionics suites, data recorders and new common technologies such as iOS and Android devices), voluntary safety reports, and manufacturer reports.

#### ASIAS for GA Demonstration Project

The Administrator announced the GA ASIAS Demonstration Project at the General Aviation Summit at FAA Headquarters on January 27, 2014. The purpose of this demonstration project is to test the technical ability to bring GA data into ASIAS. This project will also demonstrate the value of ASIAS to the GA pilot community and industry (associations, manufacturers, instructors, type clubs, etc.).

To fully demonstrate the ASIAS capabilities for GA, ASIAS needs to collect safety information from voluntary safety reporting systems (digital flight data from Flight Operations Quality Assurance (FOQA)/ Flight Data Monitoring (FDM) programs, pilot and other safety reports, etc.).

As part of the GA ASIAS Demonstration Project, pilots who voluntarily submit their flight data will do so through the National General Aviation Flight Information Database (NGAFID) which is maintained by the University of North Dakota. Pilots who

submit their data will be able to review information for their own flights through the NGAFID; however, a pilot may not access another pilot's data. Additionally, the FAA will not have access to this data while it contains information identifying a pilot.

De-identified data will be regularly transferred to ASIAS. In this de-identified state, the data cannot be linked to the specific pilot, aircraft, or flight. This de-identified data is then aggregated and used by the ASIAS community for safety purposes only.

For the period of this project, data will be collected voluntarily from the GA community in the area surrounding Phoenix, Arizona. Volunteers who are based within a 40 nautical mile ring surrounding KPHX will be sought to participate in the demonstration project. Additional information can also be found at [www.GAJSC.org](http://www.GAJSC.org).

#### Enforcement Policy

The ASIAS for GA Demonstration Project is an important safety initiative and the FAA supports and encourages wide participation. This document is issued in order to alleviate any concerns that any voluntarily submitted data may be used for enforcement purposes. The FAA recognizes that it is important to promote the voluntary submittal of data during the demonstration project. Therefore, none of the data that is being collected during this demonstration project will be accessed or otherwise used for any enforcement activities.

Should an accident or incident occur involving a participant or non-participant in the demonstration project, standard FAA policy for accident or incident investigation will apply. Any data collected will derive solely from routine investigation procedures. No data that is voluntarily submitted in connection with the demonstration project will be accessed for an accident or incident investigation.

The ASIAS for GA Demonstration Project will be in effect for one year beginning on the date of publication of this notice.

Dated: Issued in Washington, DC on March 21, 2014.

Michael G. Whitaker,  
Deputy Administrator.

[FR Doc. 2014-06960 Filed 3-27-14; 8:45 am]

BILLING CODE 4910-13-P

## DEPARTMENT OF TRANSPORTATION

### Federal Highway Administration

#### Notice of Final Federal Agency Actions on Proposed Highways in Texas

AGENCY: Federal Highway Administration (FHWA), DOT.

ACTION: Notice of limitation on claims for judicial review of actions by FHWA and other Federal agencies.

**SUMMARY:** This notice announces actions taken by the FHWA and other Federal agencies that are final within the meaning of 23 U.S.C. 139(l)(1). The actions relate to a proposed highway project, State Highway (SH) 360 from East Sublett Road/West Camp Wisdom Road to U.S. Highway 287 in the counties of Tarrant, Ellis, and Johnson in the State of Texas. Those actions grant licenses, permits, and approvals for the projects.

**DATES:** By this notice, the FHWA is advising the public of final agency actions subject to 23 U.S.C. 139(l)(1). A claim seeking judicial review of the Federal agency actions on the highway project will be barred unless the claim is filed on or before August 25, 2014. If the Federal law that authorizes judicial review of a claim provides a time period of less than 150 days for filing such claim, then that shorter time period still applies.

**FOR FURTHER INFORMATION CONTACT:** Salvador Deocampo, District Engineer, Texas Division, Federal Highway Administration, 300 E. 8th Street, Federal Building Room 826, Austin, Texas 78701, 8:00 a.m. to 5:00 p.m. Monday through Friday, 512-536-5950, [salvador.deocampo@dot.gov](mailto:salvador.deocampo@dot.gov). Mr. Carlos Swonke, Director Environmental Affairs Division, Texas Department of Transportation, 118 E. Riverside, Austin, Texas 78704; 512-416-2734; email: [carlos.swonke@txdot.gov](mailto:carlos.swonke@txdot.gov). Texas Department of Transportation normal business hours are 8:00 a.m. to 5:00 p.m. (central time) Monday through Friday.

**SUPPLEMENTARY INFORMATION:** Notice is hereby given that the FHWA and other Federal agencies have taken final agency actions by issuing licenses, permits, and approvals for the highway project in the State of Texas: State Highway (SH) 360 from East Sublett Road/West Camp Wisdom Road to U.S. Highway 287 in Tarrant, Ellis, and Johnson Counties. Project Reference Number: TxDOT CSJ: 2266-02-136. Project Type: The project will transition from the existing 4-lane (two mainlanes in each direction) roadway to an 8-lane (four mainlanes in each direction) divided tollway from 1,310 feet north of E. Sublett Road/W.

## APPENDIX B—ASIAS GA DEMO PROJECT CHARTER

Subject: Aviation Safety Information Analysis and Sharing Project Demonstration  
for General Aviation (ASIAS GA Demo Project)

### Purpose of this Charter

This charter establishes a 1-year program to demonstrate the capabilities of Aviation Safety Information Analysis and Sharing (ASIAS) for the general aviation (GA) community in conjunction with the General Aviation Joint Steering Committee (GA JSC). The GA JSC's purpose will be to evaluate the value, benefits and technical ability of ASIAS to assimilate GA data into its processes and procedures.

### Background

The GA community has experienced little to no decrease in the number of fatal accidents over the last 5 years. As a result, the Administrator has identified the implementation of initiatives aimed at reducing GA fatal accidents as a high priority. These initiatives include the work of the GA JSC and bringing GA operations into ASIAS.

### GA JSC

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The GA JSC is a voluntary safety committee comprised of Government and industry members that manages efforts to reduce fatal GA accidents. The GA JSC proactively analyzes data to identify emerging issues and threats to GA safety and develops mitigation strategies to address and prioritize safety issues to prevent accidents. Established in 1998 as part of the Federal Aviation Administration's (FAA) Safer Skies initiative to respond to the National Civil Aviation Review Commission's safety recommendations, the group reorganized in 2011 and follows the same approach to reduce the GA fatal accident rate as used by the Commercial Aviation Safety Team to reduce the commercial aviation fatal accident rate—through industry implementation of safety enhancements (SEs). These SEs consist of procedures, training, and/or equipment installations to mitigate potential fatality risk. GA JSC's goal is to reduce the GA fatal accident rate per 100,000 flight hours by 10 percent from January 1, 2009, to December 31, 2018, with no more than one fatal accident per 100,000 flight hours by 2018.

### ASIAS

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To promote an open exchange of safety information for the continuous improvement of aviation safety, the FAA and the aviation industry working in partnership developed ASIAS. ASIAS is a collaborative information sharing program supported by the aviation community to facilitate the proactive analysis of data from broad and detailed sources for purposes of advancing safety initiatives and discovering vulnerabilities in the air transportation system. The sources of safety data range from public sector data collected by the FAA to proprietary data voluntarily submitted by ASIAS participants. ASIAS enables the aviation community and the FAA to view different data sources and analyze the aggregate data. This allows ASIAS participants to further analyze their data

and make comparisons to industry norms. ASIAs benefits the FAA and the aviation industry by enabling the analysis and tracking of accident precursors and known safety hazards and the identification and tracking of newly identified operational risks.

The ASIAs community consists of the FAA and private sector organizations such as corporate operators, air carriers, manufacturers, and pilot associations. ASIAs participants provide de-identified digital flight data and/or de-identified safety reports to ASIAs under various agreements.

## ASIAs GA Demo Project

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In March 2014, the Administrator officially announced the formation of the ASIAs GA Demo Project team. This team will reach out to the GA community directly and through several GA associations to educate pilots and other stakeholders on the benefits of sharing collected safety data with ASIAs. This data will be collected in a protected, non-punitive manner and the technical ability of ASIAs to assimilate GA data into its processes and procedures will be assessed.

To demonstrate the capabilities of ASIAs for the GA community and to support the fatal accident reduction goal of the GA JSC, ASIAs needs to collect safety information from voluntary safety reporting systems such as digital flight data from Flight Operations Quality Assurance/Flight Data Monitoring programs, pilot and other safety reports. These data can be used to help determine the implementation level and success of the GA JSC SEs as well as identifying possible precursors to fatal accidents.

### Team Membership and Pilot Volunteers

The ASIAs GA Demo Project review team will include members from GA JSC, comprised of industry and other lines of business within the FAA, as well as the local Phoenix, Arizona, aviation community.

The team will include representatives with the appropriate technical, managerial, and operational backgrounds. Most positions on the team will be filled with members who have ties to segments of the GA community who will be contributing data to the project or serve as necessary SMEs. ASIAs GA Demo Project team members should have knowledge including the following:

- GA flight operations,
- Digital flight data and pilot reporting programs,
- Identification of major event causes and potential mitigations, and
- The perspectives of the stakeholders who will be participating in this study.

For the period of this project, data will be collected voluntarily from the GA community in the areas surrounding Phoenix and Prescott, Arizona. Volunteers based within a 40 nautical mile ring surrounding Phoenix International Airport (KPHX) and the corridor up to and including Prescott, Arizona, will be sought.

Pilots who volunteer in this study will only need to submit their data as it accumulates. There will be no additional workload for the pilot community other than the process to

collect and upload their data. Guidance on these procedures will be distributed to the volunteers as part of the study. Volunteering pilots will eventually be able to view their own flights and conduct any analysis or replay they desire through the National General Aviation Flight Information Database (NGAFID). Pilots are encouraged to review their own data and replays to learn as much as they can from their own flights.

#### ASIAS GA Demo Project Team Tasks

Team tasks include (but are not limited to) the following:

1. Prototype the technical ability and develop the methodology for bringing GA data into ASIAS by using the established capabilities to process and analyze commercial aviation data.
2. Demonstrate the value of bringing GA data into ASIAS and demonstrate the value of ASIAS to the GA pilot community and industry fostering trust and confidence in the process.
3. Explore the feasibility of new data sources in a protected manner to improve GA safety including digital flight data, GA pilot reporting, and other data sources from participating organizations.
4. Collaborate with the GA JSC and ASIAS to review data and potential issues discovered in the data sources used in this project.
5. Regularly brief the GA JSC, GA JSC Safety Analysis Team, ASIAS Executive Board, and the Phoenix, Arizona, GA community on the progress and status of the demonstration project.
6. Provide the GA JSC with a final report containing all findings of the ASIAS GA Demo Project.

The ASIAS GA Demo Project team will include the following in a final report:

- A description of all data sources used in the ASIAS GA Demo Project,
- A description of all issues that helped the demonstration project move ahead or hindered any part of the project,
- A list of findings discovered in the Phoenix, Arizona, area as a result of the ASIAS GA Demo Project,
- Description of the process developed for the ASIAS GA Demo Project and any changes made to the process over the course of the project, and
- Any relevant lessons learned.

#### Limitations

No member of the ASIAS GA Demo Project team will release any information that has not been briefed and cleared by the GA JSC. All data submitted to the ASIAS GA Demo Project will be protected from use in enforcement action and all data transferred to ASIAS from the NGAFID will be de-identified. Any pilot volunteer can withdraw from the demonstration program at any time; the ASIAS GA Demo Project members only

requests email notification that the pilot will no longer be submitting data. All data a pilot chooses to upload will be collected by ASIAS. For the purposes of this demonstration, only data falling inside the 40 nautical mile ring of KPHX and the corridor extending up to Prescott, Arizona will be used. For this study there is a need for volunteers from a broad spectrum of pilots participating in recreational flying, business operations, and flight training. In many cases pilots may be involved in two or more of these operation types.

As part of the ASIAS GA Demo Project, pilots who voluntarily submit their flight data will do so through the NGAFID, which is maintained by the University of North Dakota. Pilots who submit their data will be able to review their own flights through the NGAFID but not anyone else's data, nor will the FAA have access to this data. De-identified data will be regularly transferred to ASIAS. In this de-identified state, the data cannot be linked back to a specific pilot, aircraft, or flight. This de-identified data is then aggregated and used by the ASIAS community for safety purposes only.

#### Cost and Compensation

All travel costs for Government employees will be the responsibility of the employee's organization. Non-Government members of the team serve without Government compensation and bear the costs of their own travel.


#### Team Term

The ASIAS GA Demo Project team became an entity with the publication of Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (ASIAS for GA Project Demo), 79 FR 17638, Mar. 28, 2014. The ASIAS GA Demo Project team will expire March 28, 2015.

#### Resources

Participating organizations agree to provide the financial, logistical, and personnel resources to carry out this charter and any implementation strategies developed by the demonstration team and approved by the GA JSC.

  
\_\_\_\_\_  
*General Aviation Joint Steering Committee Government co-chair*

  
\_\_\_\_\_  
*General Aviation Joint Steering Committee Industry co-chair*

## APPENDIX C—INSIGHTS

**Table C–1. Recommendations Summary**

Corresponding Report Section	Recommendation	Proposed Responsible Entity
<b>General</b>		
3.3	Continue reporting wildlife strikes.	All airmen
<b>Outreach</b>		
2.1	Develop and endorse an outreach plan and oversee educational efforts regarding the general aviation (GA) flight data monitoring (FDM) tools National General Aviation Flight Information Database (NGAFID) and General Aviation Airborne Recording Device (GAARD™). The General Aviation Joint Steering Committee (GAJSC) and the GA Issue Analysis Team (GA IAT) should be the primary point of contact for these outreach efforts. This action will emphasize and solidify the separation built into Aviation Safety Information Analysis and Sharing (ASIAS) to protect end users' data identification and confidentiality by using the established Government and industry partnership of the GAJSC.	GAJSC
2.1	Focus on identifying groups likely to be early adopters of GA ASIAS, such as flight training organizations, to help prove the benefits of ASIAS to the greater GA community. The team notes some subgroups may find more value in GA ASIAS in the initial rollout following the completion of this demonstration period.	GA IAT
2.1	Continue developing outreach materials clearly explaining to the end user the value and long-term benefits of participating in GA ASIAS and using NGAFID and GAARD™. Additionally, outreach materials may be needed to engage specific communities within GA, as the team discovered each community has different needs when participating in GA ASIAS.	GA IAT
2.1	Stress the commercial ASIAS record of 100 percent data protection when conducting GA ASIAS outreach.	GA ASIAS
3.2	Designing a method to disseminate study results to the GA community, airspace designers, and air traffic controllers.	GA IAT

Corresponding Report Section	Recommendation	Proposed Responsible Entity
3.3	Continue to promote publicly available data sources and applicable uses to the GA community. The team emphasizes the value of increasing awareness of publicly available aviation data tools to GA community members. Many publicly available data sources provide enhanced situational awareness for GA operators.	GA ASIAS
<b>Stakeholders</b>		
2.1	Establish a GA ASIAS goal of a GA community partnership with the GAJSC, which would leverage the established benefits of ASIAS, including the Federal Aviation Administration’s (FAA) sponsorship of research and the production of safety-related metrics and safety enhancements (SE) that can assist in improving GA accident and fatality rates by proactively identifying trends and assessing the impact of changes within the system for GA users.	Supporters of GA ASIAS
3.2	<p>Include individuals with knowledge of the area being studied as participants in future terrain study teams because local knowledge is required to identify areas of “expected” close-proximity terrain flight, such as helicopters, agriculture operations, and transponder-equipped weather balloons. Specifically, the Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (GA Demo Project) team recommends selecting for participation local, active GA community flying members and air traffic control (ATC) personnel who can—</p> <ul style="list-style-type: none"> <li>• Identify areas of local concern with system issues, as well as opportunities for improvement (for example, ATC communication issues).</li> <li>• Eliminate or explain local false positives unique to the study area.</li> </ul>	GA IAT
<b>Tools and Capabilities</b>		
2.2	Clearly define and enhance pilot givebacks to increase GA community participation with GA ASIAS, NGAFID, and GAARD™.	GA IAT
2.2	Vet pilot givebacks with the GA ASIAS community and the GAJSC Safety Analysis Team (SAT).	GA IAT



Corresponding Report Section	Recommendation	Proposed Responsible Entity
4.0	Augment the GA IAT membership to reflect the segments of the GA community participating in GA ASIAs; select members who can and are willing to represent their particular segment. Currently, the GA IAT's membership consists of corporate, business, GA Flight Operational Quality Assurance (FOQA), and/or Aviation Safety Action Program (ASAP) specialists; representatives from The MITRE Corporation; and other appropriate stakeholders, such as aircraft manufacturers, air traffic controllers, air traffic managers, other FAA technical experts, and others as requested by the GA IAT.	GAJSC
4.0	Release the GA FDM tools nationally to pilots, operators, and organizations for their use.	GA IAT
<b>Studies</b>		
3.0	Expand the GA search to a national level with Aviation Safety and Reporting System (ASRS) until more regional-level data becomes available. Currently, there is not enough data in the regional level to draw any substantive conclusions specific to the Phoenix Sky Harbor International Airport (KPHX) area. However, the reports retrieved from ASRS provided context to the studies conducted for this project and added another dimension to the analysis by integrating pilot perspectives and testimonials on areas of concern in the area being studied.	FAA
3.1	Conduct close encounter air traffic studies for areas of interest in the National Airspace System (NAS) to identify air traffic close-proximity encounter areas specific to GA aircraft operators and update this information on a regular basis to track the effect of identification of these areas.	GA ASIAs
3.1	GA ASIAs should investigate and explore the best and most efficient way to disseminate the simulated air traffic close-proximity data study (section 3.1) to pilots operating in and around areas of interest in the NAS identified as areas of higher traffic density. Possible information distribution methods include air traffic close-proximity encounter plots on the back of sectionals, aviation websites, and on in-cockpit apps.	GA ASIAs
3.1	Use ASIAs data sources to identify specific areas in the NAS for further study.	GA IAT
3.2	Performing terrain studies using methods tested in this demonstration in other areas of high rates of close encounters with terrain in the NAS.	GA IAT
4.0	Provide subject matter experts to GA ASIAs for studies and data analysis by the GA IAT.	GAJSC

Corresponding Report Section	Recommendation	Proposed Responsible Entity
4.0	Submit directed study results from the GA IAT to the GA SAT for review, validation, and next steps before they are presented to the GAJSC for approval.	Study Working Groups

## APPENDIX D—METHODOLOGIES OF STUDIES PERFORMED

### *METHODOLOGY OF INVESTIGATION OF AVAILABLE DATA FOR THE KPHX AREA*

The Federal Aviation Administration (FAA) Office of Accident Investigation and Prevention (AVP) identified events of interest within 40 nautical miles (nmi) of the Phoenix Sky Harbor International Airport (KPHX) (using a current sectional chart) when developing the initial Pareto chart (see section 3.1 of this report) by using the following data parameters:

- Events occurred between 2010 and 2013;
- Report Status: Final;
- Highest Degree Injury: Fatal;
- Event Type: Accident;
- Aircraft Type: Airplane; and
- Flight conduct codes—
  - Title 14, Code of Federal Regulations (14 CFR) part 91;
  - 14 CFR part 135, unscheduled;
  - 14 CFR part 137;
  - Public Use; and
  - Unknown.

Data, using the above parameters, was extracted from the following databases and the queries yielded these reports:

**Table D–1. Number of Reports by Database**

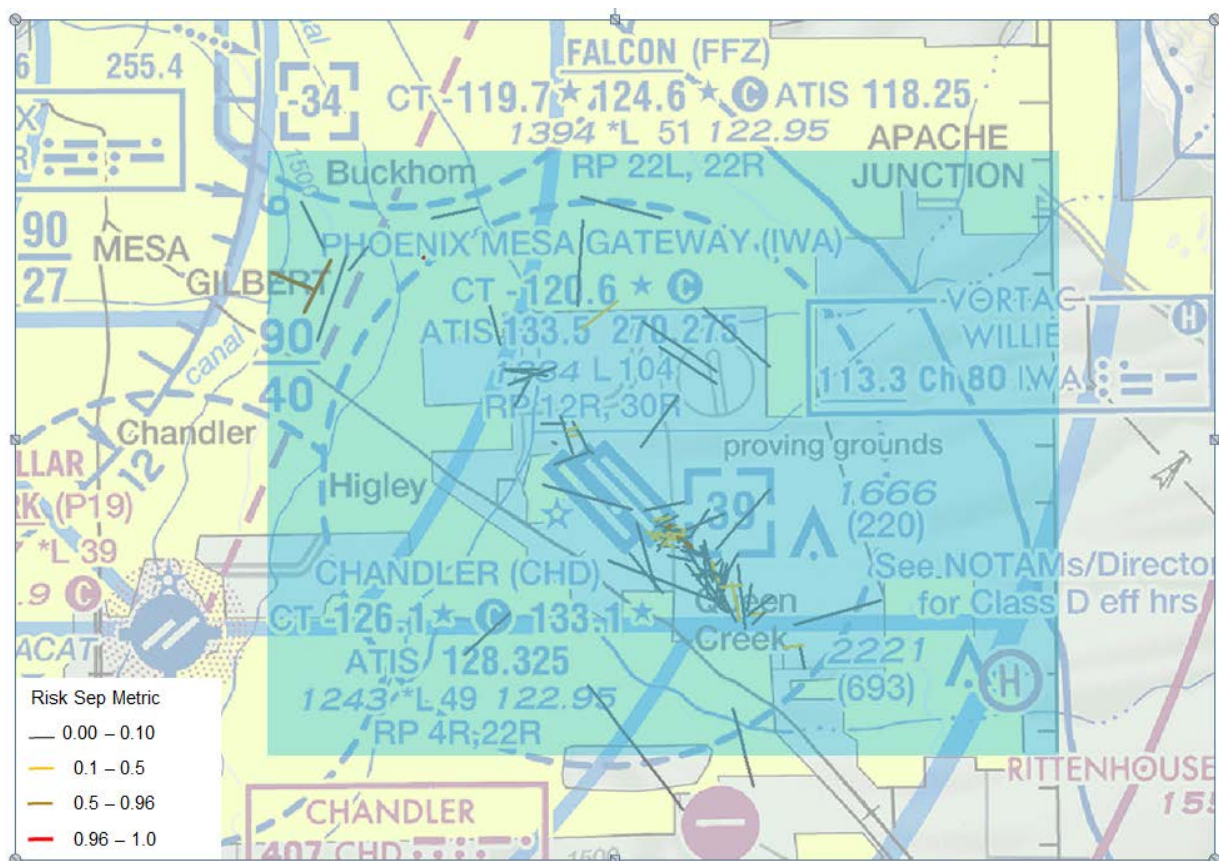
Database	No. Reports
Ascend Database (ASCEND)	17
Aviation Safety Reporting System (ASRS)	145
FAA Accident and Incident Database (AIDS)	152
FAA Wildlife Strike Database (WLD)	331
National Transportation Safety Board (NTSB)	89
Near Mid-Air Collision Database (NMAC)	10
Pilot Deviations (PD)	464
Runway Incursion Database (RI)	231
Vehicle Pedestrian Deviation Database (VPDS)	26

This data was then organized into a chart for evaluation by Aviation Safety Information Analysis and Sharing (ASIAS) analysts for areas of further investigation for the Aviation Safety Information Analysis and Sharing Project Demonstration for General Aviation (GA Demo Project).

## METHODOLOGY OF THE AIR TRAFFIC PROXIMITY STUDIES

The database of simulated Traffic Alert and Collision Avoidance System (TCAS) Resolution Advisories (RA) is generated from radar data from 157 terminal facilities around the National Airspace System (NAS). The radar data runs through a TCAS simulator algorithm, which determines whether any two flight tracks may have generated a TCAS RA.

Subsequently, each TCAS RA is also given a risk separation metric. This separation metric is on a continuous scale from 0.0 to 1.0, where a 0.0 is least severe and 1.0 is most severe based on the different sensitivity levels used for normalization from the TCAS RA logic. As the slant range and vertical separation decreases, the risk is always increasing. Figure D–1 below uses Phoenix-Mesa Gateway (KIWA) with search area and close-proximity events for 2014 as a graphic example of the output from this process:



**Figure D–1. Search Area and Close Proximity for Events in the Phoenix-Mesa Gateway Area in 2014**

## **METHODOLOGY OF THE TERRAIN STUDY FOR THE PHOENIX, ARIZONA, AREA**

The MITRE Corporation's (MITRE) Threaded Track trajectory data was used to identify terrain proximity events. This data source fuses together multiple trajectory sources into a single synthetic trajectory. Flight metadata is also fused to the synthetic trajectory, including (when available) aircraft type and beacon code. For the terrain study, analysts identified all trajectory points within 100 nmi of KPHX during August 2014. Events within 2 nmi of a landing facility (airfield or heliport) were removed from this sample. The 2-mile radius was determined by general aviation (GA) experts to be the approximate distance at which the aircraft would be below 1,000 feet above ground level (AGL) during safe operation. The National Flight Data Center database was used to identify all landing facilities in the Phoenix sectional chart area. The trajectory algorithm also joins flight metadata to the synthetic trajectory, including (when available) aircraft type and beacon code. For the terrain study, only trajectories with a 1200 beacon code, producing a set of trajectories approximating the set of all visual flight rules (VFR) trajectories in the study area that are candidates for unsafe terrain proximity were used.

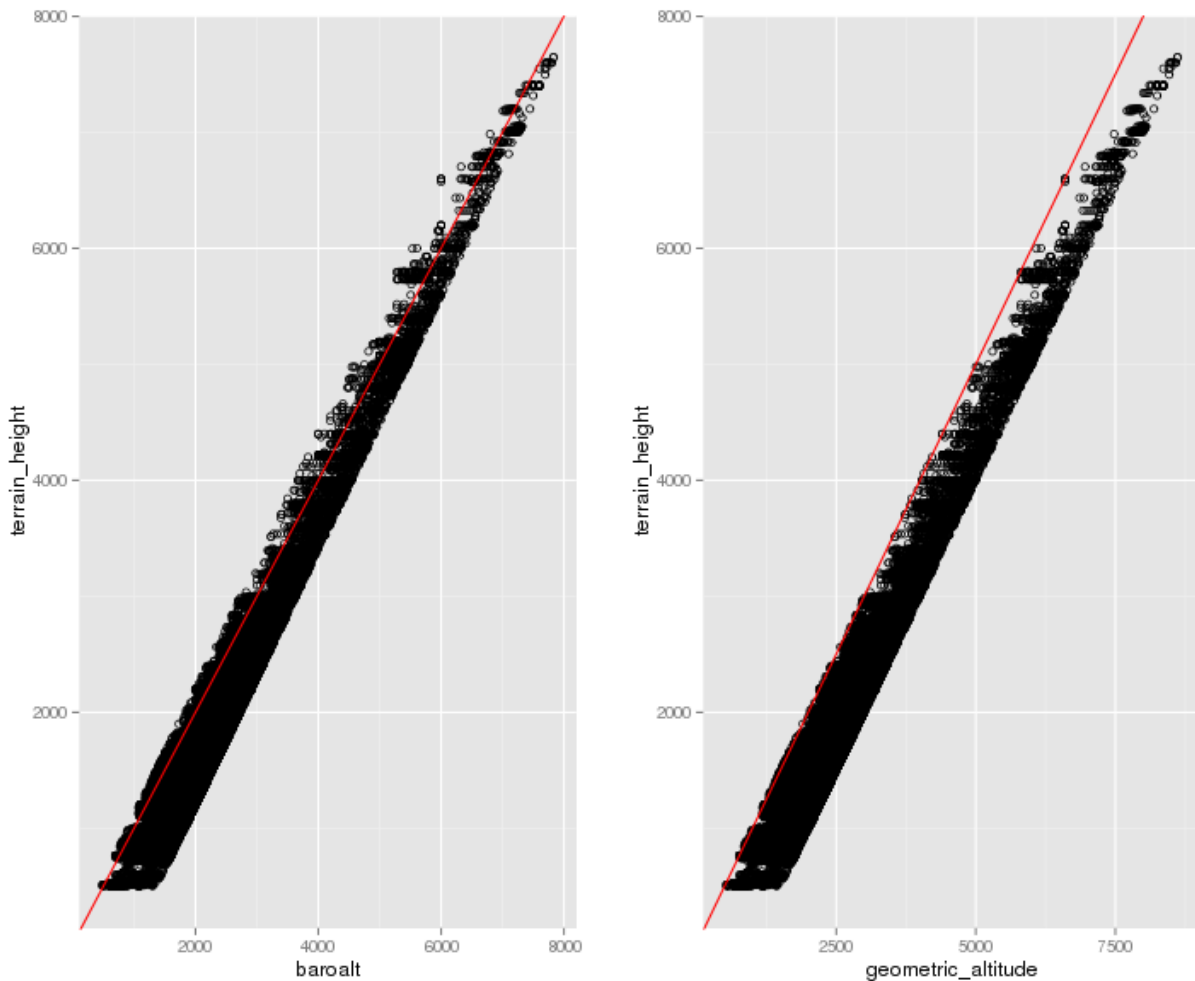
To identify AGL altitude for a trajectory, analysts fused terrain elevation above mean sea level (MSL) to each track point. The terrain fusion algorithm used the following prioritized list of terrain sources. For a particular track point, the highest source on the list was used if it contained data at that point. If not, the next source on the list was queried, and so on.

1. National Elevation Data (NED)—1 and 3 arcsecond resolution
2. Shuttle Radar Topography Mission (SRTM)—1 and 3 arcsecond resolution
3. Digital Elevation Data (DEM)—30 arcsecond resolution

The trajectory altitude above MSL was estimated from the pressure altitude using the simple model—

$$\text{geometric\_altitude} = \text{pressure\_altitude} * C$$

where  $C=1.1$ . The pressure altitude was determined from measured barometric pressure (referenced to 29.92 inches of mercury (inHg)) and converted by the ground automation system using the appropriate local reference pressure to provide a better approximation of geometric altitude valid near the airport surface. This approximation assumes a standard temperature of 15° Celsius; for every 15° rise above standard, the theory predicts the geometric altitude will be 5.2 percent higher than pressure altitude. Analysts found, for Phoenix in August 2014, a 10 percent correction was needed to produce altitudes less than 1 foot AGL for trajectory point on the KPHX runway. Figure D-6 below shows pressure altitude (left) and the geometric altitude model (right) vs. terrain altitude for each event. The diagonal line represents 0 feet AGL in each case; the minimum AGL value computed in our geometric altitude model was 0.03 feet.



**Figure D-2. Geometric Altitude Model**

Multiple sources of error and uncertainty remain in the altitude model:

- The total error in the above model is likely to be large over the entire space-time region of analysis.
- The pressure altitudes in the data assume the pilot has dialed in local reference pressure; analysts do not know how often this is untrue for GA.

Finally, the trajectory altitude MSL was joined with the terrain elevation MSL to derive an approximation to AGL altitude for each track point in the study set described above. All point altitudes less than 1,000 feet AGL were identified as proximity events. These events were made available for analysis via the interactive web tool. The set of all events is shown in section 3.2 of this report.

## **METHODOLOGY FOR WILDLIFE STRIKE STUDY ANALYSIS**

For the initial Wildlife Analysis, only birdstrikes were reviewed. A comprehensive query was written to pull reports from AIDS, NTSB, U.S. Department of Agriculture, Wildlife Strike Database, Service Difficulty Reporting System, and ASRS. The time period considered was 2000 through 2014. To calculate the strike rate, airport operations data was pulled from the Air Traffic Enhanced Traffic Management System (ETMS). The analysis was restricted to 14 airports with towers in Arizona and thus had operations data in ETMS. The airports were Chandler Municipal (KCHD), Ernest A. Love Field (KPRC), Falcon Field (KFFZ), Flagstaff Pulliam (KFLG), Glendale Municipal (KGEU), Grand Canyon National Park (KGCN), Laughlin/Bullhead International (KIFP), Deer Valley (KDVT), Goodyear (KGYR), KPHX, KIWA, Ryan Field (KRYN), Scottsdale (KSDL), and Tucson International (KTUS).

Data limitations for this particular study included the following:

- Geographic limitations (geometric fencing of KPHX);
- Lack of GA data because of underreporting;
- Some wildlife strikes were not reported when they occurred, but rather when the strike was detected (that is, during a subsequent pre/post-flight or by finding a carcass on the airport); and
- Difficulty isolating GA in the Wildlife Strike Database (lack of CFR part filter).

There was uncertainty as to whether non-bird strikes (for example, mammals, reptiles) are more likely to be reported because they are likely to be more damaging and possibly more traumatic. Therefore, a follow-on study was conducted using the same methodology as the initial Wildlife Analysis, but included wildlife strikes.

The table below shows wildlife comparison data for the 14 airports in the study.

**Table D–2. Strike Totals from 14 Arizona Airports**

Airport	Total No. of All Wildlife Strikes	Total No. of Non-Bird Strikes	Percent of All Wildlife Strikes that were Non-Bird	Total No. of GA Wildlife Strikes	Total No. of GA Non-Bird Strikes	Percent of All GA Wildlife Strikes that were Non-Bird	Percent of All Strikes that are GA	Percent of all Non-Bird Strikes that are GA
KCHD	11	1	9%	11	1	9%	100%	100%
KDVT	64	1	2%	58	0	0%	91%	0%
KFFZ	18	0	0%	16	0	0%	89%	0%
KFLG	24	3	13%	4	1	25%	17%	33%
KGCN	17	4	24%	10	2	20%	59%	50%
KGEU	14	0	0%	10	0	0%	71%	0%
KGYR	18	0	0%	11	0	0%	61%	0%
KIFP	8	0	0%	1	0	0%	13%	0%
KIWA	331	29	9%	38	2	5%	11%	7%
KPHX	1272	40	3%	9	1	11%	1%	3%
KPRC	45	2	4%	34	1	3%	76%	50%
KRYN	3	1	33%	3	1	33%	100%	100%
KSDL	17	0	0%	16	0	0%	94%	0%
KTUS	382	21	5%	9	0	0%	2%	0%

Although it appears the percentage of non-bird strikes are high at KGCN and KRYN, the number of strikes is not great, especially at KRYN, where only three strikes were reported for the entire time period. Overall, the analysis showed adding non-bird strikes to the data does not significantly change the results.



# APPENDIX E—ARIZONA PILOTS ASSOCIATION (APA) NEWSLETTER CALL FOR ASIAs VOLUNTEERS



JULY 2014

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APA  
Newsletter

Temperatures  
are rising

APA has new  
challenges

Volunteers needed



Piper Tri-Pacer



## ASIAS

### Aviation Safety Information and Analysis Sharing Volunteers Needed

In March of this year the FAA announced the launch of a one-year program to demonstrate the capabilities of the Aviation Safety Information and Analysis Sharing (ASIAS) system to the GA community. The goal of the project is to explore using data to assist the GA community in reducing the number of fatal accidents

ASIAS is a collaborative information-sharing program supported by the aviation community and the FAA. ASIAS enables the proactive analysis of data from many sources to advance safety.

In addition to using the many data resources available to ASIAS, the project is launching a set of tools that will be available for beta testing to pilots that operate within Arizona. These tools will use mobile applications to record real-time flight data on tablets or mobile phones. Also included in the toolset is the capability to upload and analyze data collected on G1000 avionics suites that are capable of recording data. The tools allow some basic analysis and playback of selected flights. Data submitted through these tools is confidential, deidentified, and will not be used for enforcement purposes. Currently, the project is seeking volunteers to beta test and provide feedback on the tools.

Why you should help:

- The project's end goal is to increase the safety of GA for pilots, flight schools, and other operators.
- You can analyze and play back your own flight data.
- The uploaded data will only be identifiable to the pilot submitting the data, ensuring anonymity.
- Analysis of the deidentified aggregate data will be used by the GA community to identify safety risks and help develop solutions.
- *Pilots, aircraft and specific flights cannot be identified or tracked.*

We are excited for your possible involvement with the project. Most importantly, these tools will enable pilots, regardless of aircraft avionics, to participate and analyze their own data.

For more information on the project and how to participate, please contact Corey Stephens at [Corey.Stephens@faa.gov](mailto:Corey.Stephens@faa.gov).

*Corey*



# APPENDIX F—GAARD™/ACATS—AIRWORTHINESS COMPLIANCE AUTOMATED ALERT TRACKING SYSTEM

## INTRODUCTION

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The Next Generation Air Transportation System (NextGen) is the Federal Aviation Administration (FAA) vehicle for a series of inter-linked programs, systems, and policies that implement advanced technologies and capabilities to dramatically change the way the current aviation system is operated. The General Aviation Airborne Recording Device (GAARD™) mobile application (app) provides an additional technological platform that provides a network enabling interface in real time with current and future general aviation (GA) aircraft maintenance tracking and operational reporting programs.

The GAARD™ technology could be used to facilitate an Airworthiness Compliance Automated Tracking System (ACATS). ACATS is an automatic transfer/transmission of flight time and cycle data to an aircraft maintenance tracking program to update the airworthiness compliance status in real time. The resultant output in the form of an alert and updated compliance status of the aircraft is then transmitted to be acknowledged by the owner/operator.

Many GA maintenance compliance status tracking programs are web-based and range from small single-engine aircraft to large multiengine turbojet-powered aircraft in applicability and complexity. The real-time automation of these existing programs could be a giant step for the GA industry. GAARD™ could be the platform that introduces this innovation.

## ELIMINATE ERROR AND REDUCE RISK

---

Historically, flight time and landing calculation errors are common. By eliminating the human element involved in such errors, the potential for overflight of a life limit, required inspection, or airworthiness directive (AD) is virtually eliminated. And the safety risks associated with these potential overflights are dramatically reduced as well.

GAARD™ records flight data and makes it available to the owner/operator through Aviation Safety Information Analysis and Sharing (ASIAS). The GAARD™/ACATS network/app provides applicable portions of that data to the designated airworthiness compliance tracking program. This system addresses the regulatory requirement for current status of life-limited items, required inspections, and ADs while mitigating the risk associated with compliance status errors for the owner/operator.

Safety critical regulatory compliance data is updated immediately after every flight by replacing the current latent and error prone process associated with the conventional method of pen-and-paper aircraft total time and landings recordkeeping. The fax or email transfer/transmission of flight time and cycles to a maintenance tracking program or operational control center is also replaced by GAARD™/ACATS automation.

## **INCREASED OPERATIONAL CONTROL AND SITUATIONAL AWARENESS**

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GAARD™/ACATS would make it possible to determine the airworthiness compliance status of an aircraft on the network/app with a modern cell phone in real time. Continued operational safety is enhanced by ensuring the regulatory requirements are met in real time using the benefits of accuracy, mobility, and efficiency.

When the system detects the threshold of a non-compliant status or potential for overflight of an airworthiness limitation, required inspection, or AD, a message could be automatically sent using a mobile or network/app (through GAARD™/ACATS). That message would be displayed for the owner/operator to view (read only) or acknowledge according to owner/operator (user)-defined privileges.

Flight schools, dispatchers, maintenance directors, and aviation department managers would benefit from the decrease in administrative activity with the ability to have access to critical compliance data in real time via the GAARD™/ACATS network/app. In addition, other types of owner/operator databases could be incorporated into the network/app. Automatic updating of such information as crew duty times, pilot flight time, and fuel burns increases efficiencies and the operator's ability to maintain positive operational control.

## **INCREASE CURRENT AND NEXTGEN CAPABILITIES**

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GAARD™/ACATS airworthiness compliance automation could be integrated into current and NextGen policies, best practices, and emerging avionics technologies. A fully functional integrated system in an aircraft would provide preflight risk assessment and post-flight analysis. When the aircraft is powered up, the airworthiness compliance status of the aircraft could be automatically displayed and acknowledged by the flightcrew as part of the preflight planning/briefing and risk-assessment process or procedure. After landing and before shutdown, recorded owner/operator (user)-defined aircraft systems data or flight profile exceedances could be displayed and acknowledged.

The majority of GA maintenance tracking and reporting programs are currently web-based, but not automated in real time. Therefore, only the updating portion and automated transmission of flight time, landing cycle data, and alerts would have to be integrated into those individual maintenance tracking programs. Expanding those existing program capabilities and developing new programs to incorporate the GAARD™/ACATS network/app is the next step to automating and streamlining the process of updating the airworthiness compliance status databases and records for GA aircraft.

The FAA NextGen and Destination 2025 vision requires innovative technology, new equipment, advanced system oversight, and global integration. Capitalizing on the industry partnerships established through the General Aviation Joint Steering Committee (GAJSC) and the Project Demonstration for General Aviation (GA Demo Project) team and others, the GAARD™/ACATS app could be developed within NextGen policies to enhance the GA culture by increasing the accuracy, reliability, and efficiency through automation of the GA maintenance tracking programs.

GAARD™/ACATS accomplishes many of the Destination 2025 NextGen goals by closing a critical gap that exists in the current way GA aircraft maintenance, airworthiness compliance data, and other critical GA aircraft operations information is updated, tracked, and provided to the owner/operator.

GAARD™/ACATS promotes and expands safety information-sharing efforts and safety practices, including better use of safety data to prioritize safety efforts through enhanced capabilities for identification, analysis, and mitigation of risk using this safety-related data to address hazards before they lead to accidents.

GAARD™/ACATS is a NextGen GA innovation that increases the GA owners'/operators' ability to maintain compliance with regulatory requirements. The GAARD™/ACATS app enhances current and future capabilities by building on continued operational safety concepts within the GA safety system and can make a credible contribution to reducing the rate of GA accidents.

## APPENDIX G—GAJSC SAFETY ENHANCEMENT SUMMARIES

These safety enhancement (SE) summaries are provided as examples of methods the General Aviation Joint Steering Committee (GAJSC) uses to reach members of the general aviation (GA) community through their SE procedures. A full list of proposed and implemented SEs can be found at <http://www.gajsc.org/safety-enhancements/>.

### **Safer Skies/GAJSC**

29 SEs developed to date

12 completed/17 underway

Updated January 23, 2015

\* Completed = All GAJSC actions have been completed

\* Underway = All GAJSC actions have not been completed

### **SE 3: LOSS OF CONTROL**

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#### ***AERONAUTICAL DECISION MAKING (ADM) (UNDERWAY)***

This SE develops and implements a public education campaign raising awareness of the need for ADM, with an emphasis on preflight planning. The initiative will focus on ADM in preflight planning, professional decision making, Flight Risk Assessment Tools, and stabilized approaches, missed approaches, and go-arounds.

### **SE 33: LOSS OF CONTROL**

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#### ***SAFETY CULTURE (UNDERWAY)***

This SE improves the safety culture of GA to include industry promotion of local flying clubs and pilot associations to help foster an environment of education and mentoring for pilots.

### **SE 34: LOSS OF CONTROL**

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#### ***OUTREACH (UNDERWAY)***

This SE calls for new, improved, and effective communication to the pilot community on the following topics:

- Importance of abiding by limitations and knowledge of aircraft performance;
- Primary duty of a pilot being to fly the aircraft—aviate/navigate/communicate;
- Scenario-based training for handling spatial disorientation;
- Need for training and currency when flying in mountainous areas; and
- Importance of certified flight instructors and airmen establishing, maintaining, and adhering to personal minimums.

## APPENDIX H—GA DEMO PROJECT PRESS RELEASE

### THE GAJSC KICKS OFF PROJECT TEAM TO DEMONSTRATE AVIATION SAFETY INFORMATION ANALYSIS AND SHARING (ASIAS)

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March 28, 2014 – The GAJSC formally kicked off a project team to demonstrate capabilities of the Aviation Safety Information Analysis and Sharing (ASIAS) for the general aviation (GA) community.

GAJSC members met with the GA community in Phoenix, AZ to launch this demonstration project and discuss how different data sources can be utilized together to identify potential risks in GA. The GA pilot and flight instructor communities along with air traffic controllers and aircraft manufacturers will be working together to bring the GA community into ASIAS.

The team will now begin further outreach to frequent pilots flying within 40 nautical miles of Phoenix Sky Harbor International Airport. This area was selected based on its diverse range of GA users and significant volume of general aviation traffic.

#### **AVIATION SAFETY INFORMATION ANALYSIS AND SHARING**

In 2007, the FAA launched the Aviation Safety Information Analysis and Sharing (ASIAS) program to help transform safety analysis from a forensic approach, looking at accidents or incidents after they occurred, to a predictive approach, allowing for proactive discoveries of safety concerns before they lead to significant events.

Working with the Commercial Aviation Safety Team (CAST), nearly 50 air carrier members now participate in ASIAS – this captures almost the entire commercial aviation sector. ASIAS members work within a clear governance structure and a non-punitive sharing environment, and have contributed to the CAST’s work to reduce the commercial fatal accident rate by 83 percent.

Analysis shows that richer data sources from the GA community would provide for improved understanding of contributing factors to safety risks in the system. By expanding ASIAS to the GA community the GAJSC can gain a better understanding of safety risks and emerging threats. To date, the GAJSC developed 26 safety interventions to address loss of control.

The project will explore potential new information sources such as General Aviation Flight Data Monitoring, voluntary safety reports, manufacturer reports, and information collected from avionics using new common technologies such as personal electronic devices (for example, iOS and Android devices).

The GAJSC expects to complete and publish a report by 2015.

An FAA Federal Register Notice is published announcing the one-year demonstration project, more information at: <http://www.gpo.gov/fdsys/pkg/FR-2014-03-28/pdf/2014-06960.pdf>.

# APPENDIX I—ASIAS GAJSC TRIFOLD BROCHURE



## Overview of GAJSC

The GAJSC, which was revitalized in 2011, works to improve general aviation safety through data-driven risk reduction efforts that focus on education, training, and enabling new equipment in general aviation aircraft.

GAJSC participants include industry stakeholders such as pilot organizations, instructors, mechanics, builders and manufacturers, and the FAA.

For more general information on the GAJSC—  
[GAJSC.org](http://GAJSC.org)



## What is the ASIAS Program?

- ASIAS is a collaborative information sharing program supported by the aviation community to improve safety.
- ASIAS enables the aviation community to analyze multiple data sources such as radar data, ASRS data, voluntarily submitted pilot reports, and flight data.

More information about the ASIAS program can be found at: <http://www.gajsc.org/2014/03/gajsc-kicks-project-team-demonstrate-aviation-safety-information-analysis-sharing-asias/>



# Flight Data Analysis Tools to Help You and the GA Community



GA JSC and ASIAS Working in Partnership to Improve GA Safety



# How Can I Help Make GA Safer?

By participating in the Aviation Safety Information Analysis and Sharing (ASIAS) General Aviation Demonstration Project!



## Safety

### Why should I participate in the GA Demonstration Project?

- You can replay your own flights and view your data to identify potential safety risks.
- Pilots in safety programs are less likely to be involved in an accident (GAO 13-36, pg. 13).
- Attitude data can be collected, giving you enhanced feedback to improve your skills.
- Your data can help the whole GA community.

### How will this project benefit the GA community?

- By working together, the community will identify risks and safety hazards specific to the general aviation environment.
- The general aviation community can develop and implement solutions to recognized problems.

### What is digital Flight Data Monitoring (FDM)?

FDM is the recording of flight-related information. Analysis of FDM data can help pilots, instructors, or operator groups improve performance and safety.

As with the commercial ASIAS program, the data collected for the demonstration project **cannot** be used for FAA enforcement actions.

<http://www.regulations.gov/#!documentDetail;D=FAA-2013-0259-0385>



## Protection

### How will this data be protected?

An individual pilot, flight, or aircraft cannot be identified using the submitted data.

Identifying information is removed before the data is transferred to ASIAS.

### Pilot Protections

ASIAS data cannot be used by the FAA for enforcement or other legal actions.

An individual pilot, flight, or aircraft cannot be identified using the submitted data.

### How do I upload my data and where does it go?

Data will upload either by moving from your avionics through a computer to a Web browser or straight from a mobile app.

The data goes to the National General Aviation Flight Information Database, which is managed by the GAJSC.

### Do I have to upload all my flights?

**No!** You choose which flights to upload. Uploading your flights to the system is optional.

### Can my data be used against me?

**No!** Your data cannot be used by the FAA for enforcement or other legal actions.



## Participation

### What is the ASIAS GA Demonstration Project?

The GA Demonstration project is an expansion of the commercial ASIAS program designed to improve safety by incorporating new voluntary GA data sources submitted by the community.

This project will—

- Serve as the basis for an individual pilot to directly contribute to improving aviation safety.
- Provide tools to analyze their own data.
- Use new data from GA such as—
  - Pilot safety reports.
  - Manufacturer reports, and
  - Flight data from mobile devices.

### How can I participate?

You can participate in two ways. Data can come from either your onboard avionics (for example, a G1000 or data recorder) or using a newly developed mobile app—on your smartphone or tablet.



To sign up for an account or Web-based tools: <http://fdm.und.edu/account/>

iOS (iPhone or iPad): <https://itunes.apple.com/us/app/general-aviation-airborne/id929718718?mt=8>



FDM Login

User Name:

Password: