FLIGHT SAFETY FOUNDATION

GSIP
GLOBAL SAFETY INFORMATION PROJECT

Year One Report

OF THE GLOBAL SAFETY INFORMATION PROJECT

Presented to the Federal Aviation Administration, November 23, 2015

Year One Report

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1.0 Introduction

In its first year, Flight Safety Foundation's Global Safety Information Project (GSIP) conducted initial research for the U.S. Federal Aviation Administration (FAA) into the challenges of creating effective safety data collection and processing systems (SDCPS). Our research was focused on the Pan America and Asia and Pacific regions of the world, as defined by the International Civil Aviation Organization (ICAO). We quickly realized that the shift from reliance on reactive use of accident data, which have major limitations, to using SDCPS, which can involve voluminous, scattered and sometimes confusing analyses and conclusions, is no small transition for the aviation industry. For every great example of a high-quality analysis, we encountered several other examples of insights into safety issues obscured by poor data quality, or data biases not fully understood. Meanwhile, all types of stakeholders were moving toward collecting increasing amounts of safety data to make better assessments of risk. We found that even the smallest organizations and operations were being expected to utilize safety data to assess their current performance and risk indicators. The larger aviation community has recognized the value of safety management systems (SMS) and specifically the important risk management component. ICAO even has consolidated the various references to safety management into a single annex, 19. In addition, ICAO has proposed more amendments to strengthen its call for robust risk management systems under SMS standards and recommended practices (SARPs). As this is underway, Flight Safety Foundation believes there is an opportunity to assist the ICAO initiatives under Annex 19 and related SARPs that contribute to state and industry efforts to create a system for SDCPS and a legal framework for protections.

Communities of researchers in science and engineering have long taken advantage of evolving capabilities in the use of statistics and data analysis in which data are analyzed using a rigorous structure. In this project, we found many stakeholders begging for a common language for risk management practices so that one stakeholder can easily share its understanding of risk with others.

We are issuing this report, midway into the two-year project, to share what has been done to date and what we have learned. One of our first actions was to engage in an open and personal dialogue with stakeholders in their home cities. Although we collected some information through survey questions, we learned far more from the dialogue. In focus group discussions, which were governed by a defined privacy policy [see appendix, p. 33], we found a consensus on the importance of improving the capability to collect, analyze and share data. We heard from civil aviation authorities about their interest and experiences in gathering good data, and from airlines and other service providers about how they want to collaborate more with regulators on the data they have and the assessments they are making. Furthermore, we heard that most in the industry knew about and understood the components of an SMS but lacked guidance material on *how* to manage the SDCPS within an SMS or a state safety program (SSP). Finally, we determined that guidance materials must be all-inclusive, covering everything from the basics up to some of the most sophisticated techniques in handling data.

Confusion about SDCPS and what it means in the realm of risk management leads many people — inside and outside the aviation industry — to interpretations that fit their own objectives. Instead of being seen as presenting an opportunity for improvement, some results can be construed as only pointing out deficiencies and liabilities. Criminal prosecution is still possible in the event of an accident, even when unfortunate circumstances combine in ways that are very difficult to predict. In this first year, the Foundation and its partners have conducted preliminary research on the existing legal and regulatory frameworks in countries across the Pan America and Asia Pacific regions. This has helped us prepare for the next phase.

In the next phase, the Foundation will design tool kits with input from GSIP participants and other subject matter experts, and use online collaboration and live workshops to vet tool kit content. For example, preliminary plans call for the tool kit to detail a maturity curve process that enables stakeholders to compare their efforts with the risk-management processes and safety information protection implemented by peers in other ICAO member states. The tool kit also will provide detailed examples of best practices for advanced insights into types of risk analysis, data sharing and safety information protection already being used successfully. A legal protection framework under development for our tool kit is expected to provide specific assistance to states interested in advocating for legislative and regulatory changes that will provide assurances that critical safety information and the processes used to gather that information are protected from exploitation by the litigation process.

Flight Safety Foundation sees these issues as global concerns, not issues limited to stakeholders in these regions of our initial GSIP focus. As a result of the requirements of ICAO Annex 19 to implement SMS and SSP, counterparts from Europe, the Middle East, Africa and other regions have told us they are attempting to implement the same types of SMS elements — yet with sometimes conflicting approaches on the collection and processing of safety data. We believe there would be great benefit in preparing the tool kit and guidance materials so that there is a more common language across the globe. It will take time to organize, with the help of key experts in the field of SDCPS, but it is a necessary step in enhancing safety by learning from data before accidents happen.

1.1 GSIP Origins and Outputs

A cooperative agreement between the U.S. Federal Aviation Administration (FAA) and Flight Safety Foundation contains the background and purpose of the project. In this document, five specific work activities (WAs) are defined and specific outputs are required. Those deliverables are:

- WA1 – Coordinate with ICAO to name an FSF representative to the Regional Aviation Safety Group–Asia and Pacific Regions (RASG-APAC);
- WA2 – Conduct a comprehensive assessment of the current status of national, regional and global SDCPS;
- WA3 – Develop a voluntary safety reporting program tool kit for states;
- WA4 – Begin tactical work to facilitate the implementation of the legal framework according to guidance added by ICAO in Attachment B, "Legal guidance for the protection of information from safety data collection and processing systems" to Annex 19, *Safety Management;* and,
- WA5 – Conduct FSF external project promotion and communication.

These GSIP work activities remain the main elements of all current work being conducted and presented in public forums. The Foundation further describes this project as having three main work objectives, rephrasing Work Activities 2, 3 and 4 above more precisely as follows:

- Perform assessments of today's work on SDCPS;
- Conduct workshops that introduce the GSIP tool kit about SDCPS and safety information protection (SIP); and,
- Complete a basis for the legal framework that enables implementation of related ICAO initiatives.

This document is the Foundation's first-year status report to the FAA, covering every original work activity but devoting the most detail to results in the three main work objectives.

1.2 Definitions

Asia Pacific — After a first reference to the official name *ICAO Regional Aviation Safety Group–Asia and Pacific Regions (APAC)*, this report refers to associated regional GSIP participants/stakeholders by the term *Asia Pacific*. States grouped as the ICAO Asia and Pacific Regions are: Afghanistan; Australia; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; China; Hong Kong, China; Macao, China; Cook Islands; Democratic People's Republic of Korea; Fiji; India; Indonesia; Japan; Kiribati; Lao People's Democratic Republic; Malaysia; Maldives; Marshall Islands; Federated States of Micronesia; Mongolia; Myanmar; Nauru; Nepal; New Zealand; Pakistan; Palau; Papua New Guinea; Philippines; Republic of Korea; Samoa; Singapore; Solomon Islands; Sri Lanka; Thailand; Timor-Leste; Tonga; Vanuatu; and Vietnam. ICAO maintains liaison in this geographic area with the non-contracting state of Tuvalu and with the territories of other states, including Chile (Easter Island); France (French Polynesia, New Caledonia, Wallis and Futuna Islands); New Zealand (Niue); United Kingdom (Pitcairn Island); and United States (American Samoa, Guam, Johnston Island, Kingman Reef, Midway, Northern Mariana Islands, Palmyra, and Wake Island).

Cooperative agreement — The form of contract between the FAA and Flight Safety Foundation under which GSIP activities are funded.

Flight data monitoring — One type of automated data-collection system typically used by aircraft operators for recording and

analyzing selected, aircraft-generated data parameters from routine flight operations, also known among GSIP participants as flight data analysis and flight operational quality assurance.

Just culture — As defined by human factors expert James Reason, an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information, but in which they are also clear about where the line must be drawn between acceptable and unacceptable behavior.

Maturity curve — A scale of increasing complexity and capability using certain defined process elements. For risk management, the level of collaboration with other industry stakeholders may be one of the defined elements in the higher stages of maturity.

Pan America — After a first reference to the official name *ICAO Regional Aviation Safety Group–Pan America (PA),* this report refers to associated regional GSIP participants/stakeholders by the term *Pan America.* States and territories of states grouped as the ICAO Pan America Region comprise those in the Central American and Caribbean Region (Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Bonaire, Cayman Islands, Costa Rica, Cuba, Curaçao, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Nicaragua, Puerto Rico, Saba, Saint Barthélemy, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Saint Eustatius, Saint Maarten, Trinidad and Tobago, Turks and Caicos Islands, and Virgin Islands); the North American Region (Bermuda, Canada, Saint-Pierre and Miquelon, and United States) and the South American Region (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela). Territories include those of France (French Antilles [Guadeloupe, Martinique and Saint Barthélemy]); Netherlands (Aruba, Curaçao, Saint Maarten, Bonaire, Saba and Saint Eustatius); United Kingdom (Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, and Turks and Caicos Islands); and United States (Puerto Rico and Virgin Islands).

Pillsbury —The law firm of Pillsbury Winthrop Shaw Pittman LLP

Risks vs. hazards — Hazards are the events/situations/occurrences/threats/errors that could lead to an undesired outcome. Risks refer to calculated probability of how often the undesired outcomes will happen. Fatal risks are the probability of how often an event resulting in fatalities will happen.

Safety data pooling — Hazard information that is shared among organizations, often by a third party, and used for joint risk analysis.

Safety data sharing — Hazard and risk information that is shared among organizations in any form.

Safety data vs. safety information — The following description could be used to describe basic differences between data and information in the English language. Data are raw, unorganized facts that need to be processed. Data can be simple and seemingly random and useless until they are organized. When data are processed, organized, structured or analyzed in a given context so as to make them useful, the result is called *information*. With this common definition, any sort of analytical/statistical results may be thought of as information because they are derived from data.

In describing safety data, the aviation industry often refers to accident event records, safety reports, data captured from a flight data recorder or extracted via flight data monitoring systems, audit findings and even survey responses. Safety information is derived from this data through some kind of processing to arrive at rates of occurrences, general category groupings, terrain and topography clustering, trends over time, etc. Since some processing is automatic and occurs before any hazard is identified, some data elements or intermediate statistical results — such as speeds or acceleration — have to be derived by combining onboard inputs. In that case, there is a tendency to mislabel those inputs as safety information, whereas in the aviation safety community, they are considered safety data until results of the risk-analysis process actually have turned them into useful information.

Service Providers — In the context of this report, the term *service provider* refers to organizations listed in ICAO Annex 19, *Safety Management*, Chapter 3, 3.1.3., and includes approved training organizations in accordance with Annex 1, *Personnel Licensing*; operators of airplanes or helicopters authorized to conduct international commercial air transport in accordance with Annex 6, *Operation of Aircraft*; approved maintenance organizations providing services to those operators; organizations responsible for the type design or manufacture of aircraft in accordance with Annex 8, *Airworthiness of Aircraft*; air traffic service providers in accordance with Annex 11, *Air Traffic Services*; and operators of certified airports in accordance with Annex 14, *Aerodromes*. International general aviation operators are not considered to be service providers in the context of Annex 19.

State — A term synonymous with *country* or *nation* in ICAO documents.

Acronyms

ADS-B — Automatic dependent surveillance–broadcast

AIN — Aviation International News

ALTA — Latin American and Caribbean Air Transport Association

ANSP — Air navigation service provider

APRAST — Asia Pacific Regional Aviation Safety Team, a subgroup of RASG-APAC

ASIAS — FA A Aviation Safety Information Analysis and Sharing program, which has access to 185 data sources, including voluntary safety data, partners with the U.S. Commercial Aviation Safety Team (CAST) and General Aviation Joint Steering Committee to monitor known risk, evaluate the effectiveness of deployed mitigations, and detect emerging hazards.

BCAST — Brazilian Commercial Aviation Safety Team

CAA — Civil aviation authority

CAR — ICAO Central American and Caribbean subregion of Pan America

CASA — Civil Aviation Safety Authority, Australia

EGPWS — Enhanced ground-proximity warning system

ESC — Executive Steering Committee

FAA — U.S. Federal Aviation Administration

FDA/FDM — Flight data analysis/flight data monitoring

FDX — International Air Transport Association's Flight Data eXchange is an aggregated de-identifeid data base of FDA/FOQA type events that allows the user to identify commercial flight safety issues for a variety of safety topics, for numerous aircraft types, and allows for the proactive identification of safety hazards.

FOIA — Freedom of Information Act

FOQA — Flight operational quality assurance

FSF — Flight Safety Foundation

GSIP — FSF Global Safety Information Project

HTML — hypertext markup language

IATA — International Air Transport Association

ICAO — International Civil Aviation Organization

IOSA — IATA Operational Safety Audit

LAC — FSF Legal Advisory Committee

LOSA — Line operations safety audit

NA — ICAO North America subregion of Pan America

RA — Resolution advisory

RASG-APAC — Regional Aviation Safety Group–Asia and Pacific Regions (see Definitions for further detail)

RASG-PA — Regional Aviation Safety Group–Pan America (see Definitions for further detail)

SAM — ICAO South American subregion of Pan America

SARPs — ICAO standards and recommended practices

SDCPS — Safety data collection and processing systems

SIP — Safety information protection

SMS — Safety management system

SSP — State safety program

STEADES — IATA's Safety Trend Evaluation, Analysis and Data Exchange System is one of the of the data sources of the Global Aviation Data Management (GADM) and includes a database of de-identified airline incident reports. It offers airlines a secure environment to pool safety information for benchmarking and analysis needs.

TCAS — Traffic-alert and collision avoidance system

WAs — GSIP work activities

2.0 FSF GSIP Coordination with ICAO Regional Aviation Safety Groups

Flight Safety Foundation intended that all GSIP work be tightly coordinated with the ICAO's regional aviation safety groups for Pan America and Asia Pacific. We recognized that both are dynamic safety initiatives and that their working groups need to know the details of GSIP activities. In many cases, the stakeholders from the states in these regions are participants in the RASGs' leadership or working groups, especially representatives of each state's civil aviation authority who have direct responsibilities for implementation of the ICAO state safety programs.

GSIP Work Activity 1 was completed specifically for the RASG-APAC, but additional work has kept both RASGs fully informed on our project. The following actions were specifically ICAO-related travel and briefing activities to satisfy the FSF-ICAO coordination requirements of the FAA.

1. A working paper (RASG-PA ESC/22 — WP/04, "Global Safety Information Project") was presented to the 22nd meeting of the RASG-PA Executive Steering Committee (ESC) in Rio de Janeiro, in November 2014 by Frank Jackman, editor-in-chief of the Foundation's *AeroSafety World* journal and vice president, communications, of the Foundation. The ESC agreed to support GSIP and to include it on RASG-PA updates for the CAR (Central American and Caribbean) and SAM (South American) regions.
2. An information paper (IP/2) on the project was presented to the sixth meeting of the RASG-APAC's Asia Pacific Regional Aviation Safety Team (APRAST/6) in Bangkok in April 2015 by Greg Marshall, the Foundation's vice president, global programs. APRAST encouraged the Foundation to present updates on the project.
3. FSF President and CEO Jon Beatty updated RASG-PA on GSIP progress at ESC/22 in March 2015 in Miami.
4. Mark Millam, FSF vice president, technical, and GSIP project manager, met with ICAO South American Office Director General Franklin Hoyer and Deputy Director Oscar Quesada in Lima, Peru, in May 2015 to be introduced as the GSIP project manager. The shift from surveys to focus groups was explained to them, as well as the urgency of Pan American work heavily targeted in South America.
5. Millam presented an information paper (RASG-PA ESC/24 IP/02, "Global Safety Information Project Status Update") at RASG-PA ESC/24 in Medellín, Colombia, in June 2015.
6. An information paper (IP/04) was presented to the RASG-APAC's APRAST/7 in Bangkok in September 2015.
7. Millam presented a working paper (WP/30) to the fifth meeting of RASG-APAC (APAC/5) in Manila, Philippines, in October 2015. The paper requested support for the planned workshops in 2016. RASG-APAC agreed to the support.

3.0 Initial Assessment Work on SDCPS and Safety Information Protection

3.1 Choice of Assessment Methodology

Flight Safety Foundation's project proposal to FAA, as of the September 2014 cooperative agreement, anticipated conducting one questionnaire-based survey as the primary method of gathering facts, opinions and experiences regarding SDCPS from stakeholders in Pan America and Asia Pacific. As originally envisioned, this survey would have been issued to civil aviation authorities (regulators), aviation industry associations and aircraft/engine manufacturers to identify and quantify their levels of experience with SDCPS. Examples of the types of questions to be developed for the questionnaire were included, and the survey instrument design was intended to improve existing understanding of what safety data are collected, how safety data are processed and analyzed, and, above all, how the results of these analyses are shared.

At the first stage of work — the assessment phase — under the cooperative agreement, the Foundation began drafting the proposed survey questionnaire, instructions for respondents and research procedures. We quickly realized that the number and complexity of the written questions in English likely would far exceed the typical stakeholder organization's capability and patience to provide useful information. Each survey response would require several hours of work, and many of the draft questions likely would produce excessively varied responses based on the individual respondents' interpretations of the wording. Therefore, with the concurrence of the FAA, the Foundation changed the methodology of the assessment phase.

We decided that focus group sessions — a valid qualitative methodology — would better suit the GSIP information-gathering process and yield the desired insights into the state of the industry regarding SDCPS. Focus group sessions could be completed in a mini-workshop style with typical participants meeting close to their own organizations' headquarters or home cities. The focus group methodology was expected to encourage discussion of actual SDCPS concerns and experiences among several stakeholders at a time, and to provide us a better understanding of the needs and desires of regulators, airlines, manufacturers and air navigation service providers. In conjunction with each focus group session, the Foundation's researchers would have opportunities to share with participants their awareness of industry best practices. We also anticipated opportunities to build regional interest in the creation of the GSIP tool kit and in related workshops expected to be held in the future, as discussed in our proposal to the FAA.

Nevertheless, we concluded that it also would be useful to supplement this qualitative interview research with other data gathering performed in a structured way. So forms were created to get background information from each focus group session participant, to conduct self-assessments on the SDCPS work being performed, and to include open-ended questions on the direction and priority for stakeholders as they worked to formalize or enhance their SDCPSs.

Therefore, in this report, the focus group activity section covers the information we gathered and analyzed from the written registration surveys, our comprehensive notes taken during the focus group discussions, the written SDCPS self-assessments and the written stakeholder needs and priorities surveys.

3.2 Background on Safety Data Collection Systems

Flight Safety Foundation conducted research into worldwide safety data collection systems with special emphasis on those involving stakeholders in GSIP's two targeted geographic regions. Researchers identified systems and structures currently in place, and also sought details of programs that are under development. Participants in GSIP focus group sessions added information about programs such as Chile's *Sistema Anónimo de Reportes de Seguridad de Vuelo (SARSEV)* [Flight Safety Anonymous Reporting System] and the Bahamas'

Voluntary Confidential Reporting (VOL-CON) system. Following their compilation of basic facts about such systems (Table 3.1), researchers sought process documents, guidance material and information on associated regulations. The information gathered will be used to support the scheduled GSIP tool kit development.

Safety Information Protection: Focus Group Meetings and Information Sheets

As part of Work Activity 2, and to help the Foundation conduct the GSIP focus group sessions in a number of RASG-APAC and RASG-PA states, The Foundation's legal advisors conducted preliminary research on existing SIP frameworks and distributed to participants information sheets that contained civil aviation background information; facts about any reporting system in place; references to existing legislation, regulations and policies governing SIP; and other SIP notes related to the procedure of protection for voluntary reports (analysis and sharing of safety information) and recent news on SIP in the state, if any.

The background section of the information sheets assessed the civil aviation system of each state, including how civil

State	System Name	Organization	URL
Anguilla, British Virgin Islands, Montserrat, St. Helena	Mandatory/Voluntary Occurrence Reporting	Air Safety Support International	http://www.airsafety.aero/Safety-Information-and-Reporting/Mandatory-Voluntary-Occurrence-Reporting.aspx
Australia	REPCON Aviation Confidential Reporting Scheme	Australian Transport Safety Bureau	https://www.atsb.gov.au/voluntary/repcon-aviation.aspx
Bahamas	Voluntary Confidential Reporting System (VOL-CON)	Bahamas Civil Aviation Authority	http://www.bcaa.gov.bs/sms-volcon/
Brazil	Relatorio ao CENIPA para Segurança de Voo (RCSV) [Flight Safety Report to CENIPA]	Centro de Investigação e Prevenção de Acidentes Aeronáuticos (CENIPA) [Center for Aviation Accident Investigation and Prevention]	http://www.cenipa.aer.mil.br/cenipa/paginas/rcsv&usg=ALkJrhgprGjx0HXxQXa8ojU8XHXKDF176A
Chile	Sistema Anónimo de Reportes de Seguridad de Vuelo (SARSEV) [Flight Safety Anonymous Reporting System]	Dirección General de Aeronáutica Civil de Chile (DGAC Chile) [General Directorate of Civil Aviation] and Círculo de Pilotos de Chile [Chilean Pilots Social Group]	http://www.sarsev.cl
China	Sino Confidential Aviation Safety Reporting System (SCASS)	Civil Aviation University of China	http://www.cauc.edu.cn/scass/
Colombia	Reporte Voluntario de Seguridad Operacional – Aeropuerto Internacional Matecaña [Voluntary Safety Report – Matecaña International Airport, Pereira, Colombia]	Aeropuerto Internacional Matecaña	http://www.aeromate.gov.co/reporte-voluntario-de-seguridad-operacional
Colombia	Reporte Voluntario de Seguridad Operacional [Voluntary Safety Report]	Aeropuerto Internacional El Dorado Luis Carlos Galán Sarmiento [El Dorado Airport, Bogotá, Colombia]	http://www.opain.co/formReporteVoluntario.php
Colombia	Registro de Peligros Seguridad Operacional [Safety Hazards Registry]	Aeronáutica Civil de Colombia, Unidad Administrativa Especial [Special Administrative Unit, Civil Aviation Authority, Colombia]	http://www.aerocivil.gov.co/AAeronautica/PSOESSPSMS/Paginas/Registro-de-peligros-seguridad-operacional.aspx
Colombia	SIRVE	SADI Helicópteros	http://sadi.com.co/reporte-sirve/
Colombia	SMS Reporting System	Delta Helicópteros	http://www.deltahelicopteros.com/sms/
Colombia	SMS Reporting System	Helifly Colombia	http://heliflycolombia.com/seguridad-operacional-05/
Costa Rica	Informe Confidencial de Identificación de Peligros [Confidential Hazard Identification Report]	Dirección General de Aviación Civil de Costa Rica (DGAC Costa Rica)	http://www.dgac.go.cr/servicios/formulario/formulariopeligros.html

* Assessed in September 2015. URLs are subject to change.

Table 3.1

State	System Name	Organization	URL
Dominican Republic	Sistema Integral Automatizado de Gestión Aeronáutica–Reporte Voluntario y Confidencial (SIAGA-RVC) [Integral Automated System for Aviation Management–Voluntary and Confidential Report]	Instituto Dominicano de Aviación Civil (IDAC) [Dominican Republic Civil Aviation Institute]	http://ssp.idac.gov.do/SiagaSSP/ssp/identificacionDePeligros.jsf;jsessionid=D5B4B83CECC441F269E7DE8D7DEBBA6C
Ecuador	Programa de Seguridad Operacional del Ecuador - Reporte Voluntario [Ecuador Voluntary Safety Reporting Program]	DGAC Ecuador	http://www.ssp.aviacioncivil.gob.ec/reportes/reporte-obligatorio/
El Salvador	Reporte Voluntario [Voluntary Report]	Aeropuerto Internacional El Salvador [El Salvador International Airport, San Salvador]	http://www.aeropuertoelsalvador.gob.sv/contenido.php?cont=177&id=217
India	Voluntary Reporting System (VRS)	DGCA India	http://dgca.nic.in/sms/ssp-india.pdf
Indonesia	Voluntary Confidential Report	Ministry of Transportation of the Republic of Indonesia	http://ssp.hubud.dephub.go.id/id/it/faq/what-is-the-voluntary-confidential-report
Japan	Aviation Safety Information Network (ASI-NET)	Association of Air Transport Engineering and Research	http://www.atec.or.jp
Republic of Korea	Aviation Safety Hindrance Reporting System	Korea Transportation Safety Authority	http://www.ts2020.kr/eng/html/tsw/Reporting.do
Macao	Macao Confidential Aviation Reporting System (MACCARES)	Autoridade de Aviação Civil [Civil Aviation Authority of Macao SAR (Special Administrative Region, China)]	https://www.aacm.gov.mo/maccares/english/maccares_intro.php
Mexico	Reporte Voluntario de Seguridad Operacional	DGAC Mexico	http://www.sct.gob.mx/transporte-y-medicina-preventiva/aeronautica-civil/seguridad-aerea/sms/reporte-voluntario/
Mexico	Reporte Voluntario de Seguridad Operacional	Aeropuertos del Sureste [Southeast Airports]	http://www.asur.com.mx/es/globales/sistema-sms.html
Mexico	Reporte Voluntario de Seguridad Operacional	Aeropuerto Intercontinental de Querétaro	http://www.aiq.com.mx/reportevoluntario.php
Mexico	Reporte Voluntario de Seguridad Operacional	SOALA Soluciones Aéreas de la Laguna [La Laguna Aviation Solutions, Ciudad Lerdo, Durango, Mexico]	http://www.solucionesaereas.mx/index.php/sms/rvso
Peru	Sistema de Notificación Voluntario de Incidentes y Ocurrencias (SINIOR) [Voluntary System for Notification of Incidents and Occurrences]	DGAC Peru	http://dgac.mtc.gob.pe/sinior/
Peru	Reporte Voluntario de Seguridad Operacional	Aeropuerto Internacional Jorge Chávez	http://s7.lima-airport.com/lap_gso/
Philippines	Philippine Aviation Incident Reporting System	Civil Aviation Authority of the Philippines	http://www.caap.gov.ph/index.php/major-programs-and-projects/products-and-services/aircraft-accident-investigation-and-inquiry-board/the-pairs-program
Singapore	Singapore Confidential Aviation Incident Reporting (SINCAIR) Programme	Ministry of Transport	http://www.mot.gov.sg/About-MOT/Air-Transport/AAIB/The-SINCAIR-Programme/
Taiwan	Taiwan Confidential Aviation Safety Reporting System (TACARE)	Aviation Safety Council	http://www.tacare.org.tw/sub_en/index.aspx?uid=371&pid=371
Venezuela	Reporte de Identificación de Peligro [Hazard Identification Report]	Bolivariana de Aeropuertos (BAER) [State enterprise for airports under the Ministry of the People's Authority for Marine and Air Transportation]	http://ailc.baer.gob.ve/index.php/sms/reporte-de-riesgos

* Assessed in September 2015. URLs are subject to change.

Table 3.1 (continued)

aviation activities are regulated and how the relevant competent authorities cooperate on SIP. The safety data and information reporting system section included information on any existing reporting system, whether mandatory or voluntary, and the level of protection afforded to safety reports under that system. A section on current SIP provisions listed the existing legislations, laws, regulations, policies and advance arrangements. When available, the main issues discussed regarding legal protection were the confidentiality of the reports, applicable evidentiary laws, protection against the disclosure of safety data and information, and the provisions on the assurance against prosecution or punishment. The final section, presenting further notes on the reporting systems, discussed the procedure of safety information analysis and sharing, and recent developments related to safety information reports and protection.

3.3 Focus Group Activity

3.3.1 Focus Group Participant Registration Surveys

GSIP focus group participants were asked to complete a survey questionnaire during the registration process before each focus group session began. The survey version depended on the category of the respondent's organization. Forty-nine questionnaires were received, with varying levels of completion. Flight Safety Foundation analyzed and summarized the responses prior to the sessions, and the summaries were presented and discussed during the sessions. This dialogue added a depth of understanding to the survey results. Questions common among the questionnaire versions and summaries of these responses are presented below:

If money and resources were not an issue, what would you like to achieve in safety?

- Increase the quantity and rate of safety reporting;
- Reduce accident and incident rates;
- Achieve full SMS and/or SSP implementation;
- Create proactive safety and learning cultures;
- Add employees dedicated specifically to safety; and,
- Implement improvements in training for employees and contractors.

What are your current organization's written objectives in 2015 about safety?

- Targeted event/incident/accident rates;
- Quantitative risk reduction;
- SMS and/or SSP implementation;
- Increased voluntary reporting rates;
- Flight data monitoring (FDM) program initiation or improvement;
- Implementation of ICAO SARPs; and,
- Training and education to drive the maturation of safety cultures.

What kind of information that you lack today would be the most beneficial for managing safety risks in your organization?

- Line operations safety audit (LOSA) observational data;
- Data sharing between service providers to enable benchmarking;
- Historical occurrence data;
- FDM program data;
- Increased voluntary reporting; and,
- Accident and incident report data, as well as access to other types of safety reports.

If you could have world-class knowledge on hazards and risks in your operation, where do you think you could improve safety performance the most, and how much?

> Responses to this question included flight and ground operations, air traffic control and maintenance. The diverse range of answers indicates that world-class knowledge of hazards and risks in operations would improve safety performance in virtually any domain.

3.3.2 Focus Group Discussions

Asia Pacific

Safety Data Collection. Participants in GSIP focus groups for the RASG–APAC states told Flight Safety Foundation that use of SDCPS has increased throughout the geographic area. They also identified the benefits that SDCPS has had on the safety of their flight operations. However, the participants also questioned how well stakeholders actually can utilize current safety data collection and analysis to understand the inherent risks of aviation from a big-picture perspective. The Asia Pacific participants noted that safety event reporting, which generates data ideally suited to reactive responses, and safety auditing, which generates data ideally suited to proactive risk mitigation, both need to be utilized in monitoring overall safety performance.

These focus group participants described many positive outcomes they have experienced using automated data collection and reporting systems. These systems — particularly FDM, also known in the regions as flight data analysis (FDA)

and flight operational quality assurance (FOQA) — routinely record digital flight data recorder parameters, which then can be automatically shared inside air carriers for analysis. This feedback system allows for timely operational improvements or procedural corrections to be made, they said. For example, analytical results from hard-landing parameters are communicated directly to flight crews via landing printouts. This feedback helps to improve human performance factors among flight crews in subsequent flight operations. The automated systems bypass the need for human intermediaries to relay the information to all those affected, reducing delays in the feedback loop.

Automated data collection and reporting systems also ensure that mandatory reports of operational/regulatory deviations are submitted directly to the regulator. This provides a steady stream of rich data to those who require it. Having raw, unprocessed FDM data is valuable for making comparisons of normal vs. non-normal events, some participants said.

The focus groups discussed voluntary safety reporting systems that, unlike automated systems, require willing participants to have strong familiarity and confidence in those systems. Typically, participation increases with trust in the rules and processes for providing nonpunitive reports to employers and regulators, participants said. Over time, a just culture can produce highly successful voluntary reporting systems.

While many safety-related successes were described involving both the automated and voluntary reporting systems, participants identified different challenges in collecting data in these two modes. Lack of standardization in how some automated data are collected makes the next stage of information management especially challenging, some said. Participants noted some inconsistencies in how the FDM parameter data fields are automatically collected. These inconsistencies have created differences between whether soft-alert or hard-alert events are generated, possibly affecting timing and prioritization of any response.

The success of voluntary reporting systems hinges on a few critical factors throughout the Asia Pacific, according to focus group discussions. Understanding the potential value of these systems in the first place is among those critical factors. Participants reported that some airlines fail to understand the benefit of the voluntary safety reporting systems. In practice, some said, they see a large amount of data flowing into the reporting systems, but they experience very little direct operational benefit as a result.

Interestingly, participants who stated that their airlines philosophically believed in the concept of voluntary reporting systems also reported seeing valuable outputs from the system. Organizations that have failed to see the value of voluntary reporting systems may be lacking the just culture of trust and confidence to which other organizations attribute their success, some said.

One clear challenge described by participants in the Asia Pacific focus groups is a lack of understanding of what happens with collected reports. Aircraft operator data collected and analyzed by regulators seem, from the standpoint of some participants, to have produced no visible actions. Furthermore, employees at some organizations can submit a voluntary report, but cannot access the regulator's analysis of the report or view the database of such reports. Several participants expressed the need for a state-run voluntary safety reporting system for the aviation industry. Others said that this might provide a more visible platform to demonstrate the usefulness of reporting systems and might serve as an endorsement for voluntary reporting systems of all types.

Some organizations in the region said that the volume of reporting is lower than desired. Potential reporters may be reluctant to submit voluntary reports because of concerns about punitive consequences, some said. Many agreed with the Foundation's premise that understanding how a system utilizes information and protects information from people or organizations who would seek to utilize it punitively or for non-safety-enhancing purposes can instill confidence in the reporters, whose participation is fundamental to the success of the system. Focus group participants said that by simplifying the reporting form and clearly describing confidentiality aspects of reporting, they have seen a positive impact on reporting. A well-designed voluntary reporting system addresses the users' needs for proven usefulness, ease of use, trustworthiness and protection from unwarranted punitive action or reassurance that submitting a report will not result in punitive action.

Another challenge noted in SDCPS was that although many participants cited a significant benefit associated with keeping the system simple, the quantity and complexity of available data sources has proved to be anything but simple. With numerous sources of data across the industry comes a high likelihood of duplication of effort and redundancy of SDCPS programs, some noted. Without a high level of standardization, some participants anticipated issues with finding the right balance of the quality and quantity of information that is collected. However, they suggested that the unique characteristics of each aviation entity collecting data create an inherent lack of standardization.

The focus groups summarized their priority future needs as:

- Guidelines for automated and voluntary data collection that support effective data analysis; and,
- Inclusive data collection standards representative of stakeholders.

Safety Data Analysis. The capability of conducting data analysis that leads to the development of effective risk mitigations greatly depends on the quality of the data collection, according to these focus group discussions. Many Asia Pacific participants acknowledged successful examples of safety data analysis in their organizations. For example, raw (unprocessed) FDM data are used by organizations to make risk comparisons between different and like types of flight operations. These comparisons allow for the identification of the most effective risk mitigations and targeting specific types of operations.

Asia Pacific participants described three primary challenges associated with analyzing safety data:

- The dynamic environment of conducting safety assessments;
- Accurate analysis of data trends; and,
- Management of the volume of available safety data.

The hazards and risks that impact each flight are dynamic in nature, and the fast-paced environment has made it difficult for some participants to collect and analyze data in ways that support meaningful changes. This is especially true for charter/on-demand air carriers, they said. Additionally, safety analyses and results can vary based on the company's data needs and its defined system boundaries. This variation in safety-assessment data selected by operators makes it difficult to consistently and accurately analyze safety data, according to participants. Proactive risk assessments also are seen as difficult to conduct due to the same basic reasons. Participants especially asked how others identify good risk-assessment practices related to new technologies and systems — without waiting for the risks to reveal themselves over time.

Accurately analyzing data trends was cited by many participants. A difference in terminology across the industry also makes it difficult to classify data properly and to show trends accurately, some said. Local absence of an industry-wide common taxonomy presents an issue for monitoring hazards effectively. This means that efforts to externally share safety data are complicated because data are often filtered (de-identified) to protect confidentiality to the extent that insights are severely limited.

Asia Pacific participants also expressed concerns that statistical information often is biased by the special interests of the person conducting the analysis. This was attributed to both a lack of standardized analysis techniques and to the perspectives and prerogatives of the analyst. Participants additionally reported challenges in identifying root causes of safety issues from the available data. They expressed the need for the source of the trends to be expanded beyond accident data. Participants recommended including incident data and normal operational data to provide a more complete picture of the safety level, risks and hazards impacting flight operations.

These participants described significant differences in the amount of safety data available for analysis in their countries. Some safety data programs and databases typically produce ample data. In some cases, large amounts of data have been overwhelming, complicating the tasks of processing or analysis. Other participants described the equally challenging prospects of having very limited quantities of safety data available for analysis. In addition to such individual organizational challenges, this variation makes standardizing methods and comparing results across organizations or databases difficult, they said.

Safety Mitigations. Many successful safety improvements from use of SDCPS were described by focus group participants. The industry is making clear progress on stabilized-approach performance due to risk mitigations. Improvements can also be seen with specific mechanical issues, airport markings, taxiway lights, ramp markings and many other risk-mitigation programs. Safety forums were viewed by participants as effective events for gaining information on risk mitigations and analysis strategies currently under way. Participants recommended that larger operators lead the way on developing risk mitigations in order to influence the entire industry.

The focus groups summarized their priority future needs as:

- Guidelines for safety data analysis methods;
- More data mining capabilities;
- Scalable data analysis methods to enable industry-wide results to be applied by individual operators;
- Industry-wide analyses to identify systemic hot spots and to improve aviation safety as a whole;
- More information and training on just culture and SDCPS for the industry and for frontline staff, in particular; and,
- A collaborative approach to developing risk mitigations.

Safety Data Sharing . Currently, some safety data are shared in the Asia Pacific through industry groups, airline alliances, state-sponsored data sharing programs and regulators. Safety data discussions are occurring at various levels; however, there is hesitance to share actual data, according to the GSIP focus groups. Although there are data sharing meetings, action and follow-up are limited, and greater participation in worldwide safety data sharing is needed. Of the data being shared, the analysis of aggregate data varies — from a fully assembled scorecard of safety performance indicators to audit data to hazard trending, participants said.

While exploring the challenges related to data sharing, participants identified four key issues:

- Lack of data sharing;
- Unavailability of data;
- Regulatory challenges; and,
- Management of pooled data.

Some operators have significantly greater challenges than others in sharing data. Certain operators lack a reporting culture because the cost of data maintenance outweighs the perceived benefits, participants said. Some lack of data sharing was attributed to regional cultures. Because the data formats vary from operator to operator and from state to state, data sharing and aggregate analysis have proven to be difficult. Additionally, stakeholders said that concerns about news media exposure can adversely impact the flow of safety data and risk-related information.

Data availability was also a question raised within the focus groups. Some of the states and operators do not make available basic operational data, much less safety data, some participants said. There is a vast difference between the types of safety data shared by states and those shared by operators. This inconsistency is due to concerns over the interpretation of the ownership of the safety data. Additionally, safety data may not be available due to varying aircraft equipage levels and requirements (e.g., automatic dependent surveillance–broadcast [ADS-B]); this also limits the sharing of certain data types.

Regulators were often described in focus groups as data collectors who struggle to aggregate and effectively analyze the disparate safety data from their diverse sources. The degree to which regulators support or conduct data sharing varies greatly across the regions, participants said. Some regulators support data sharing via audits and ICAO, while other regulators either cannot or do not promote data sharing, participants said. The level of each regulator's funding resources impacts the ability of its technical facilities to share data. Other regulators have a very strong punitive culture, or a poor safety culture, making it difficult for operators to fully share safety data, participants noted. Some expressed concerns about sharing data with their regulators because of fear that the regulator will utilize this information to rescind their air operator certificate. In summary, each regulator has an individual viewpoint and an individual response to risk, these focus groups concluded. This causes the regulators to limit data sharing within the country, and makes the data unavailable outside of the country.

When safety data are pooled (collected from multiple operators) to later be shared, source data typically first must be de-identified and aggregated. Focus groups expressed concern about who should manage any large database of aggregated data. At the point where the data are pooled, each operator should still be able to maintain access to its data in order to assess its own trends and compare them to the aggregate results. In the region's current safety databases, contributors typically are provided with traditional statistical information, but not with advanced analyses or insights, participants said. Due to a lack of standards and guidelines for reporting most safety statistics, it is difficult for an operator to accurately compare its safety data with data provided by others, or within the pooled database.

The focus groups summarized their priority future needs as:

- Guidelines on who should manage data sharing and aggregate data analysis;
- Guidelines on what data should be shared and in what format;
- Industry-wide education on the purpose of data sharing, what information is currently shared, and how these data are being analyzed;
- More advanced aggregate data analyses including setting industry baselines; and,
- Data sharing tools and processes extended across boundaries of states.

Safety Information Protection. Flight Safety Foundation raised the issue that SIP is not often seen as a problem until an accident occurs. Due to variations in national laws, it is not clear what data are protected and when. Some data are protected on a situation-by-situation basis. While exploring the challenges related to SIP, Asia Pacific focus group participants identified three key areas of concern:

- Legal/legislative issues;
- Regulator issues; and,
- Public and confidentiality issues.

Some regulators, operators and organizations do not have immunity from prosecution in these regions. This lack of immunity results in legal concerns for many of the stakeholders. The variations in SIP laws make it difficult for stakeholders to share data across states, some said. Participants expressed concern about the difficulty in starting any legislative process for SIP. Policing in some states is very strong and is dependent on the current political party in power, they said. This causes data protection to vary not only across states but also within a state. In some cases, police have high authority levels during an accident investigation, causing the investigation to focus on culpability.

Once data are shared with the regulator, the level of data protection is unclear, because it may be possible to request data from the regulator. GSIP focus group participants expressed concern about how the regulators may use the data against an operator. If an operator shares data with the regulator, the regulator may have the ability to use the information in the auditing process for punitive measures.

In some states, full safety data are made available to the public during the accident investigation process. The public, including journalists, may inaccurately interpret the sensitive safety data, making speculations or invalid conclusions. Finally, SIP issues are not limited to data sharing with outsiders, but can be of concern within an organization, according to focus group discussions. Sometimes, sensitive information is leaked during the investigation process, resulting in a lack of confidence in the process and its data protection. As noted, the fear of exposure to the public and news media of sensitive safety data can inhibit data collection and the flow of data. Data that are made publicly available also can be used in many less-tangible ways against those involved in its collection. The increasing potential of social media and vast reach of modern news outlets can add to this fear.

The focus groups summarized their priority future needs as:

- Guidelines on what types of data should be protected; and,
- Consistent and upgraded SIP laws and regulations.

Overall Theme Frequency. Figure 3.1 is a summary of predominant discussion topics from the Asia Pacific focus groups. The size of each box provides an indication of how frequently each theme was discussed by members of the focus group. For example, the largest box in Figure 3.1 "Culture and data sharing" indicates that across all Asia Pacific focus groups this theme was discussed by participants more than any other theme.

Pan America Region

Safety Data Collection. Participants in Flight Safety Foundation's GSIP focus groups in the Pan America region described the importance to them of having support at all levels within their respective organizations for successful SDCPS. Collection should not be limited to the frontline staff, but should include the whole organization, they said. To accomplish this and to achieve the best possible outcome, data collection must use all available tools.

SMSs currently support data collection within the region. These states have increased their use of SDCPS through raising awareness of SMS principles, participants noted. SMS has not only increased data collection but also has affected the data after collection. States have made progress toward data analysis, risk mitigation and the practice of continuous data monitoring. Additionally, voluntary safety reporting programs are being developed in conjunction with the implementation of SMS, according to focus group discussions. These programs have incorporated mobile-device technology into data collection to improve the usability and availability of related systems.

Five challenges with SDCPS have been experienced by participants:

- Organizational culture;
- Constrained resources;
- Collecting the correct types of data;
- Insufficiency or lack of voluntary safety reports; and,
- Inadequate regulation.

Data collection to identify aviation risks — such as voluntary safety reporting — relies on a nonpunitive approach that is an element of a just culture. The culture of nonpunitive information collection and sharing currently is limited in the Pan America region, according to focus group discussions. Often, privacy and secrecy are perceived today as signs of corruption. If a data collection process is veiled in secrecy, the program may be viewed as corrupt rather than beneficial to the society's aviation risk mitigation. Success stories involving data collection have not been broadly shared; therefore, the benefits of data collection are still questioned amid the longstanding cultural beliefs, participants noted.

Limitations on funding and human resources also impact data collection efforts. Relatively small aviation operators with limited resources typically are unable to implement complex data collection methods, according to focus group discussions. These smaller operations also have limited access to SDCPS subject matter experts and advanced technologies. However, the existing educational programs and materials on data collection (e.g., ICAO guidance materials) are underutilized despite being valuable resources.

The Foundation raised the issue of data collection involving identifying the appropriate type of data to be collected.

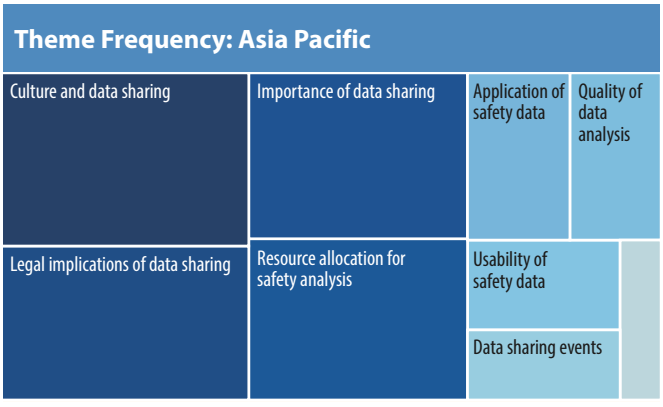

Figure 3.1

The data now being collected in Pan America vary significantly from state to state, however, participants said. Data can also be limited depending on the culture of the state. Data collection should not be limited to generic data types, but should allow for local customization, as not all data types are important to all operators, regulators, manufacturers, air navigation service providers (ANSPs) and other organizations, some added.

Voluntary safety reports rely on truthfulness and openness from the reporters. Without this, bias impacts the successful implementation of a voluntary safety reporting program, according to the discussions. Also affecting these programs has been high employee turnover. Employees must be trained in the program, and high turnover makes this challenging. In addition, some voluntary safety reporting programs are not user-friendly and make it difficult for reporters to submit information.

The civil aviation regulators tend to have limited access to the data being collected by operators because SMS is not fully implemented throughout Pan America, according to the focus group discussions. The regulators collecting data must validate the data, which can be a difficult process. Feedback from regulators on data being collected and analyzed, therefore, has been limited. If a regulator identifies important information that may help to prevent future accidents, then this information should be shared with the appropriate parties, participants agreed.

The focus groups summarized their priority future needs as:

- Guidelines on data collection types that allow for local customization;
- A neutral third party to collect safety data;
- Tools and technologies to aid in collecting safety data at all levels of an organization;
- A feedback process that incorporates all organizations (operators, ANSPs, regulators, manufacturers, etc.); and,
- Training and outreach materials aimed at unique cultural challenges impacting voluntary safety reporting and SDCPS in some of these states.

Safety Data Analysis. Current data analysis focuses on FDM, which is conducted with commercial software, according to these focus groups. The software can monitor and analyze selected parameters in relation to specified flight standards and emergent issues. This type of analysis requires buy-in from management and can produce successful results; however, the data can be complex, and effective analysis can be challenging. Three challenges were presented by Pan America participants regarding collecting safety data:

- Large amounts of data;
- Constrained resources; and,
- Lack of tools/methods.

Some SDCPS methods result in a large volume of data, which makes it difficult to comprehend and to analyze. It is unclear to participants how to prioritize the disparate data types and to know which data types add the most value. The organization and analysis of a large volume of data can heavily consume both time and resources. This can make reaching accurate conclusions difficult.

Financial and human resource limitations also impact data analysis. There are a limited number of SDCPS specialists with adequate educational qualifications and applicable work experience in the Pan America region, some participants said. As noted, some states and operators have limited funding to conduct thorough and accurate ongoing data analyses.

The current data analysis tools and methods are limited, based on focus group discussions. Large amounts of data theoretically could be collected with the technology at hand, but without the appropriate tools and methods, the data are useless, some participants said. The current tools and methods do not take into account data quality. In their experience, when data of questionable quality are assessed, the process can result in flawed conclusions, the focus groups emphasized.

The focus groups summarized their priority future needs as:

- Improved analysis tools and methods that account for varying data quantities and qualities; and,
- Guidelines for standardization in analysis techniques to promote data comparison.

Safety Data Sharing. In the Pan America region, data are being shared within organizations, operator-to-operator, ANSP-to-ANSP and operator-to-regulator. Data sharing is being conducted through meetings, forums, exchange programs, airline alliances and regulators. Standards exist for data sharing that outline the data types, trends and statistics for some of these groups. Some regulators are collecting and analyzing shared data and holding conferences in which their expert feedback is provided regarding the results of analyses. Feedback is also provided to organizations about current legislation, associated benefits and recommendations for risk mitigation.

While data sharing is being conducted in the Pan American states, improvements clearly can be made, the focus groups stressed. Three challenges were presented by stakeholders regarding safety data sharing:

- Organizational culture;
- Generic feedback; and,
- Punitive nature of interactions.

Some states and organizations struggle with data sharing due to cultural issues. As noted, fear of contradicting anti-corruption measures and punitive actions has affected organizations' willingness to share safety data, participants said. The current culture does not encourage sharing of safety data or other risk information, so a more progressive safety culture is needed, they added.

Although the regulators provide feedback on data being collected, this feedback sometimes has been in the form of generic reports with generic recommendations, according to focus group discussions. In some cases, compliance with these generic recommendations is mandatory. Some situations require an entity-customized solution rather than a generic approach.

Other Pan America focus group participants described a fear among some operators that their regulator will issue sanctions based on the results of sharing voluntary safety reporting information. This fear affects the operator's willingness to support or share voluntary safety reports. Moreover, flight operations and maintenance inspectors often approach their jobs and inspections from a perspective of policing, a strictly enforcement interest. Focus groups raised the issue that such inspectors are often excessively focused on finding errors, failures or regulatory/procedural noncompliance rather than working with the operator to improve safety. Some states and organizations develop improvement programs with the goal of identifying hazards and mitigations. Participants expressed that in some of these cases, the regulator took punitive action rather than assisting in the mitigation of an identified risk or hazard.

The focus groups summarized their priority future needs as:

- Education and awareness aimed at enhancing the safety culture and improving trust between regulators and operators;
- Data sharing mechanisms that incorporate all parties and encourage a community of open information sharing; and,
- Data sharing mechanisms that permit stakeholders to assess their safety data against other organizations' safety data.

Safety Information Protection. FSF GSIP focus group participants in Pan America noted the primacy of the legislative and judicial branches of government in ensuring SIP. However, in this region, a conceptual line is almost non-existent to distinguish between the effectiveness of punishing individual aviation professionals and organizations versus taking long-term preventive actions already proven to be more effective in reducing the risk of fatal accidents. The focus groups said educational and cultural changes are needed for people to adopt the latter approach. SIP varies from state to state, and changes based on whether a given group is from the private sector or government/military. Some states' data protection laws are well established, while others' are newly implemented and have yet to be fully tested. Therefore, the effectiveness of the laws is unclear.

Within various Pan American organizations, data protection policies and confidentiality protections already are in place and supported through SMS, some focus group participants noted. However, some said their regulator needs to enhance or develop SIP to ensure a framework of immunity for specific types of industry safety information in the best interest of the flying public.

While exploring the challenges related to SIP, Pan American participants identified three key issues:

- Legal protections;
- News media access; and,
- Cultural issues.

The extent of SIP implementation and strength of stakeholder adherence to SIP varies across the region, according to the GSIP focus groups. Participants expressed concern regarding judiciary involvement with safety data, as the release of data cannot be refused if it is ordered by a court. This potential for future legal liabilities can lead operators to limit their safety information sharing. Participants were not aware of any organization that has taken a lead to further the legal protection of safety data or to address issues surrounding information confidentiality. These varying data protection laws have impacts on the way data are collected, analyzed and shared. Additionally, the willingness of operators to collect voluntary safety reports has been adversely affected as a result of the lack of legal protections, they said.

To improve participation in data sharing and enhance the usefulness of safety data, it is important to prevent sensitive safety data — including information that would publicly identify those participating in voluntary reporting and/or those affected by events — from entering the hands of the news media, some said. Some information must be shared with the public; however, guidance is lacking as to exactly what information should be disclosed and what information should be protected for the common good.

A theme throughout the Pan America focus groups was the impact of culture on safety data, and this was apparent in SIP discussions. Confidentiality, which, as noted, often has been misconstrued as corruption, is not widely accepted in some states. Without education and outreach, this culture will continue and will limit the progress of SIP laws and policies. Improved policies are needed to protect all employees at all levels of an organization, according to some participants.

The focus groups summarized their priority future needs as:

- Data protection guidance to identify and prioritize what type of data should be protected;
- Education and outreach materials on SIP for officials in legislative and judicial branches, voluntary safety data reporting and data analysis;
- Education and a communication forum for aviation stakeholders and legal authorities on the key concepts driving safety and SMS; and,
- Education and guidance for regulators on sensitive data collected through audit and safety mitigation programs.

Overall Theme Frequency. Figure 3.2 is a summary of key discussion topics from the Pan America focus groups. The size of each box provides an indication of how frequently each theme was discussed by members of the focus group. For example, the largest box in Figure 3.2 "Legal implications of data sharing" indicates that across all Pan America focus groups this theme was discussed by participants more than any other theme.

Comparing Discussion Themes of Regions

Flight Safety Foundation made the following comparisons based on content-analysis coding of each participant's statements during the focus group sessions according to our meeting notes. Many factors can influence the amount of discussion time spent on each topic in a given region. These comparisons should therefore be treated as a high-level view of the focus group discussion themes in each region.

Figure 3.3 provides the themes for each regional grouping , based on the frequency of discussion of each theme. The size of the mark for each theme indicates how frequently that theme was discussed in each region. This shows that the Pan America focus group discussions were weighted more heavily toward a few themes, while the Asia Pacific focus group discussions were more evenly distributed among the themes.

Figure 3.4 (p. 17) shows the distribution of theme discussion frequency between the two regional groupings. For example, the majority of discussion around the legal implications of SIP occurred in the Pan America focus groups. Similarly, most of the discussion around concerns about publicly available data occurred in the Asia Pacific focus groups.

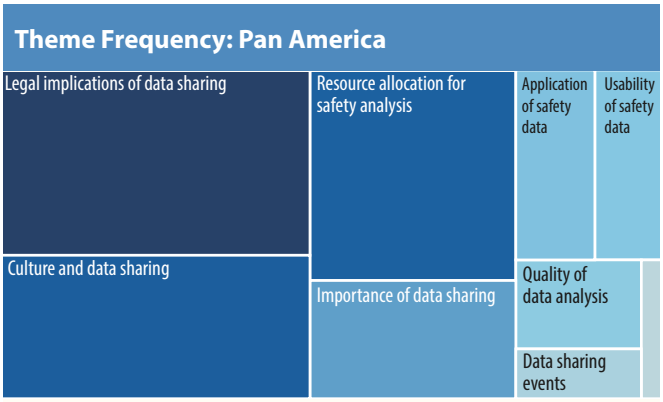

Figure 3.2

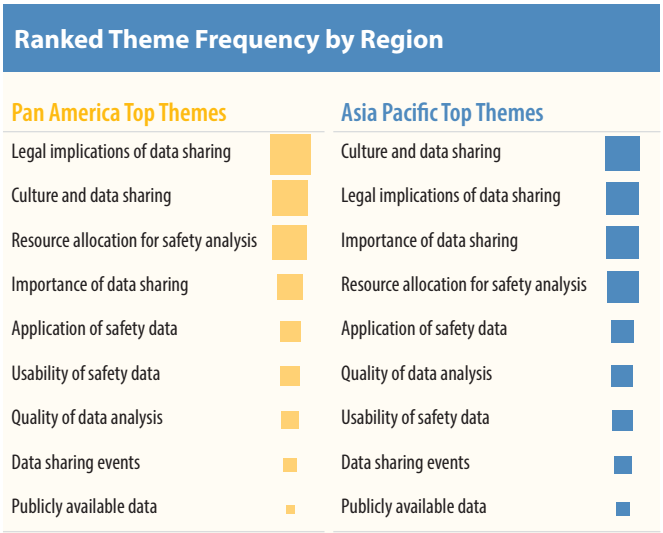

Figure 3.3

3.3.3. Stakeholder Inventories of Safety Data Collection and Processing Systems

GSIP focus group participants were asked to complete a survey specifically prepared for their stakeholder category (Table 3.2, p. 17). Survey responses from individuals representing air carriers,[1] ANSPs, airports and civil aviation authorities were collected and analyzed. If multiple focus group participants were present from the same organization, one representative was asked to complete a survey on behalf of that organization. Due to the limited size and demographic characteristics of the survey samples, Flight Safety Foundation regards the responses as of preliminary informational value and does not consider the responses representative of any entire population of stakeholders; nevertheless, the survey results display some noteworthy similarities and differences among respondents.

All of the survey respondents said that their organization has a safety reporting system in place for frontline staff, including flight crews, maintenance crews, air traffic controllers and dispatchers. Among the air carrier respondents, 78 percent had programs for flight attendants. Respondents overall said that safety reporting systems exist for air carrier ground personnel, third-party vendors, the manufacturer's factory

1 Includes commuter air carrier and on-demand operations in the selected regions similar to those conducted in accordance with U.S. Federal Aviation Regulations Part 135.

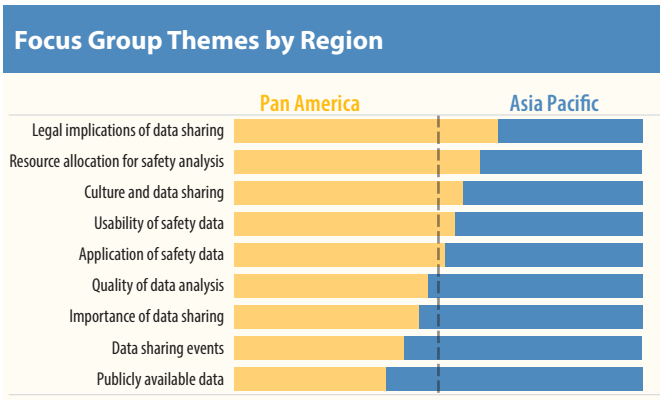

Figure 3.4

Stakeholder Type	Number of Survey Responses Collected[1]
Air carrier	11
ANSP	2
Regulator	3
Airport	1
Aircraft manufacturer	1

Note

1. Not all collected surveys were 100-percent completed.

Table 3.2

workers and office employees. Among the frontline-staff safety reporting systems, 80 percent perform safety-event rate calculation and trending by issue and/or finding, with 58 percent using a custom-defined database. Of the survey respondents, 47 percent share safety information outside their organization in safety forums, and 56 percent share safety information with selected partners on such topics as rates of events/problems, investigative findings and risk mitigations. In terms of safety information sharing with regulators, 36 percent of the air carrier, ANSP, airport and manufacturer respondents said that their data are shared during event review committee discussions, and 47 percent said that this sharing takes place during quarterly and/or annual reviews. Moreover, 20 percent of the non-regulator respondents said that they share safety information with regulators using a pooled, de-identified database.

Concerning FDM programs, 56 percent of air carrier respondents said that such programs have been implemented at their company. Of the 44 percent without FDM programs, 50 percent indicated that they have implementation plans with a time frame of two years or less. Regarding sharing of FDM data, 33 percent of these air carriers said they share the data outside their company in safety forums, while 44 percent share analytical results with partners on such topics as rates of specific problems, investigative findings and safety events. FDM data are shared with a regulator during event review committee discussions by 20 percent of respondents, while 10 percent said that a pooled FDM database is accessible to both air carriers and regulators in their state.

The Foundation asked the air carrier respondents about their continuous monitoring capability for a range of risk-related issues, including unstabilized-approach rates, loss of control–in flight events, runway excursion precursors and aircraft energy management anomalies. Depending on the issue in question, between 56 percent and 67 percent of these respondents said their company possesses this type of monitoring capability.

Regarding review processes, 79 percent of air carrier, ANSP and airport respondents said that they have some form of an internal department review and/or audit process, and 67 percent also have an external review process. Of the air carrier respondents, 70 percent described some level of involvement with the International Air Transport Association (IATA) Operational Safety Audit (IOSA) program.

The Foundation also requested information regarding any collection and analysis of data on the performance of personnel during initial and continuing qualification training. Of the air carrier respondents, 57 percent said they use training performance data for flight crews, 50 percent do this for flight attendants, and 67 percent do this for aviation maintenance technicians/mechanics. Fifty percent of respondents said that their data are stored in a custom database. Based on the survey data, the Foundation found that training performance data appeared to be used largely for internal air carrier purposes. No air carrier respondents said that they share training performance data outside their organization, such as during industry safety forums. Among these respondents, 12 percent reported sharing such data with a regulator during event review committee discussions.

3.3.4 Focus Group Responses to Post-Meeting Survey Questionnaires

Following the GSIP focus group sessions, participants were asked to complete a second questionnaire, this time soliciting responses to the same questions after meeting with others. Flight Safety Foundation collected 19 of these questionnaire responses. If multiple participants were present from a single organization, instructions were provided to complete a single questionnaire. The questions and responses are presented below:

What safety risk information do you think your organization needs the most to improve safety?

- Voluntary safety reports;
- Fatigue data;

- FDM data; and,
- Safety data shared by airports and ANSPs with aircraft operators.

What safety risk data do you feel are most valuable today?

- FDM data;
- Voluntary safety report data; and,
- Safety data shared by other service providers.

What safety risk data do you feel are the least valuable?

Respondents collectively indicated all safety data are valuable.

What safety risk information do we most need to collaborate better within the industry?

- Safety benchmarks and data standardization among service providers;
- Standardized event-detection logic to enable valid comparisons; and,
- Sharing of data among stakeholders.

What ICAO–related safety initiatives are the most important to you for effective safety improvements in your country/region?

Respondents specifically cited the RASG-PA and Brazilian Commercial Aviation Safety Team (BCAST) as important initiatives to improve regional safety. References also were made to ongoing ICAO efforts related to Annex 19, *Safety Management*, and the implementation of safety management systems.

What safety risk information most requires legal protections?

- Voluntarily reported data;
- Personally identifiable information;
- Confidential safety reports;
- FOQA data; and,
- Data indicating latent accident risk within an organization.

What safety risk information must be kept public?

- Incident and accident investigation reports; and,
- General industry safety data, statistics produced from the data and trends from data analysis.

Do you have existing regulations for legal protection of safety information in your country/region? What do they protect? What additional protection is needed? What efforts have been made to keep safety information protected from uses contrary to safety?

Both affirmative and negative responses were received to this question. Respondents cited Brazil's "Law 12.970," as well as individual company efforts to protect information. Surveys indicated some efforts are under way to change existing laws to follow ICAO guidelines regarding data protection. A further analysis of existing legal protection systems and focus group discussions regarding legal protection are available in sections 5.1–5.2 of this report.

3.4 Survey Responses From Focus Groups

Flight Safety Foundation's review of written responses to survey questionnaires collected before and after GSIP focus group sessions found, in general, a desire by individuals and/or the organizations they represented to enhance FDM analysis, implement LOSA programs and expand the number of dedicated safety staff. Respondents told us that protected data sharing between stakeholders would yield beneficial results for all involved parties, but they emphasized the importance of data standardization to permit accurate comparisons. Additionally, the development and maturation of just culture policies to encourage voluntary safety reporting were frequently cited as an organizational objective. The expectation that a mature just culture increases the quantity and quality of voluntary safety reports recurred as a survey-response theme.

These responses suggest that, internally, voluntary safety reporting systems, auditing programs and other forms of data collection are relatively commonplace in the organizations represented by the survey respondents; however, sharing of data-driven findings with interested parties outside the organization is less prevalent. Our observation correlates with experiences described and views expressed during the focus group discussions. Organizations often possess an extremely high volume of data but lack the ability to interpret it, focus group participants said. They attributed this to a wide variety of causes, but commonly cited a lack of adequate human resources and/or suitable technology. Cultural issues and legal concerns also were cited as impediments to data sharing outside the source organization.

The Foundation expects to continue distributing these surveys to other stakeholders in Pan America and Asia Pacific. Our analysis of all survey responses will continue, and findings will be used as a reference during GSIP tool kit development.

FSF Interpretation of Response Significance

We have summarized our findings and conclusions so far across six categories. What we learned has helped to shape

planning for the next phase of GSIP. Each of these findings or conclusions is described below, with specific examples or explanation of the source responses:

1. As noted, FSF researchers replaced the original, heavily quantitative method (lengthy survey) for gathering information with a predominantly qualitative method (interviews/group discussion supplemented by short surveys). The knowledge gained for our assessment of the status of SDCPS efforts showed that the latter was the superior strategy. In addition, the resulting direct interactions with stakeholders were viewed as a marked improvement toward project success.

2. We found a consensus among these focus group participants that safety data are viewed as a means to solve tomorrow's problems, but not everyone knows how to work with safety data effectively enough to accomplish their goals. Furthermore, while there is general agreement that critically important information should be a derivative of data collection and analysis, the process of refining data into such safety information has been not as consistent or predictable as needed. Too often, individuals and organizations have come to different conclusions based on information derived from equivalent data processed in significantly different ways. There is clearly a need to standardize some approaches to collecting and processing safety data.

   The Foundation often has heard companies and leaders worldwide say that their risk-management decisions are "data driven," but in our observation, low-value or high-value data can be generated by almost any flight-related activity; valuable data can be collected in some activities of the operation but not completely captured for others. For example, government and industry safety researchers have captured vast amounts of data on unstable approaches, but much remains to be studied on why certain unstable approaches are significantly more hazardous than others. The unstable-approach metric itself typically is tied to conditions at a specific point on the approach, usually 1,500 ft, 1,000 ft or 500 ft above ground level. Sometimes, researchers encounter examples of a hazardous approach that technically is stable at one of these gates where flight crews assess the status.

   Regarding use of the terms hazard and risk, GSIP survey responses made it evident that even these safety professionals did not use these terms with consistency. Often, we heard discussions during the focus group sessions about "risks" when, in context, the speakers meant "hazards" or they said "hazards" when they meant "risks." As noted, some participants told FSF researchers that this was a result of a lack of adherence to a common taxonomy in risk assessment.

   To be fair, there is a level of evolution in the practices described by many aviation safety professionals as they learn new and more precise ways to describe their operations. This was akin to the evolution of terminology, descriptive practices and statistics in the game of baseball. It took decades for those who study that sport to come up with statistics that adequately describe a team's performance. That analogy raises the question, "Do we really think the far more complex world of aviation safety will be able to be broken down easily into key statistics that reliably reveal where the highest risks will be found?"

3. Aviation leaders in government and industry need to promote more data sharing initiatives and build on the progress already under way with the data sharing practices in place. Respondents said that an airline or other aircraft operator sees any given set of raw data from flight operations in a far different context than a regulator or an ANSP. When an accident takes place, the investigative authority and the investigation team have the ability to collect and analyze relevant data in ways that no other type of organization or individual safety professional can. The level of data collection after an accident arguably is far more intensive and comprehensive than the typical SDCPS in an airline SMS.

   FSF researchers observed the assembly of ICAO RASG-PA and RASG-APAC safety reports and the high degree of interaction within and among these safety groups. Each group's representatives said, however, that they continue to struggle with the best ways to collect optimum risk data. No stakeholder claimed to have an ideal overall view of risk data and the risk assessments that could be performed.

   We were briefed about many airlines involved in IATA's Flight Data Exchange (FDX) and Safety Trend Evaluation, Analysis and Data Exchange System (STEADES) and how this involvement leads to reviews and comparisons on key metrics that are exchanged with the FAA's Aviation Safety Information Analysis and Sharing (ASIAS) program. Respondents said that these exchanges in the two regions give a good risk picture on unstable approaches; traffic-alert and collision avoidance system (TCAS) resolution advisory (RA) alert rates for key routes and airports; enhanced ground-proximity warning system (EGPWS) warning rates for certain routes and across specific terrain; and runway incursion and excursion data for several airports. These all are valuable sources of data, but they are not comprehensive, and analytical

results reportedly are still not directly available to all stakeholders in the RASG-APAC and RASG-PA states. Others reported that airline associations and airline alliances are conducting a basic level of safety data/information exchange for specific types of events, and that they sometimes share the broad event-per-exposure rates they are tracking and the responses they have initiated within their SMS processes. These exchanges have benefits for sharing program-management approaches to certain problems, but they may not help much in getting a full understanding of key risk issues that would stimulate industry specialists and regulators to begin highly collaborative work.

4. Our assessment of survey responses and notes from GSIP focus group discussions also revealed the need for a globally appropriate structure that more completely defines the methods for performing aviation safety data analysis from the very basic levels up through the most complex analysis. We found that, generally, every participant and every organization represented reported looking for ways to improve what they are doing. Organizations reported they are fully implementing SMS programs for which annual objectives are set for improving the organization's risk level and for strengthening the organization's related processes.

   Participants generally recognized that "every organization needs to start somewhere with their risk-analysis process" and then to improve steadily over time. It would be difficult to expect every organization to become expert immediately, and doing too much too fast could have negative outcomes, some said. For this reason, the increasing use of a maturity curve approach appears not only likely but also welcome to the general industry in these regions. Other participants noted that for companies just getting started in an SMS, it is probably best not to get completely overwhelmed with its most sophisticated tools.

   There was considerable interest in "measuring ourselves against the rest." We interpreted this statement as an indication of interest in being able to use data to determine where an entity's performance stands and how robust the capabilities of its risk-management processes are, as well as its general level of exposure to operational risk. Therefore, the Foundation will be exploring a means to capture such ongoing assessments via risk assessment and the maturity curve.

   As with so many advances in the history of aviation safety, what was good enough yesterday may not be good enough tomorrow. There are plenty of creative minds at work considering the next "best analysis method" and the next "best data metrics" to understand risk — and a few organizations will test them even if no one else has adopted them yet. We believe the maturity curves in the tool kit we create similarly could inspire methods that are not widely practiced but conceivably would improve on today's methods.

5. Participants in GSIP focus groups typically said that they are always anxious to see clear examples of how risk analysis is performed and what special considerations must be involved to create indisputably effective approaches. A manual or course on SMS by itself introduces them to the process of following a structure that defines how to perform the work, and examples of what can be done to both spur creativity and implement successful programs.

   However, they said, one of the most helpful ways of imparting this knowledge may be specific data analysis illustrations. The use of data analysis illustrations is expanding broadly, and route networks, topography and airport design lend themselves to this tool. Google Earth has features for mapping three-dimensional points in space and translating them into two-dimensional static or two-dimensional interactive displays that could warn flight crews of the known risk hot spots.

   Regional specialists were aware of a heavily used tool in today's analysis: showing relationships in bow tie diagrams. These diagrams have been desirable in these regions because they improve understanding of hazards, the planned protection systems and the recovery methods for undesired aircraft states, for example.

   One growing area of analysis noted by participants is the simultaneous understanding of multiple data streams. Some of these systems can provide a much-enhanced understanding of risk or correlations of events that represent the greatest risks.

6. SIP so far is embedded in layers across the industry, some respondents noted. They recommended that each stakeholder learn about the specific processes that can help them protect and safeguard the long-term availability of their streams of hazard and risk information. Protections also depend on how an organization runs its voluntary safety reporting programs and its commitment to supporting work groups responsible for the hazard-identification process, respondents said. Specifically, the potential pitfalls cited regarding data protection — particularly pitfalls that might interfere with the cultivation of a level of trust between employees and employers — were:

   - **Protection within organizations** — When a given voluntary safety report is initiated there is policy that must be built and continually reinforced about the organization's commitment to that policy. Even after the policy and practices

are set up, organizations have a tendency to sometimes fall short of the commitment, and there are good reasons to revisit this on some regular basis with key participants. Sometimes this involves labor and company leadership review, even if neither thinks there is an issue.

- **Protection across organizations** — Some stakeholders have met to share what is happening with safety reports and safety data and have helped each other to look for a means to plan mitigations. There are many ways this information could spread beyond the agreed parties, but even while the process of sharing and collaborating is under way, there could be certain parties that believe they have the responsibility to act before a consensus is reached. Enforcement actions by a regulator, employer or court are still quite possible in some of these situations.

- **Protection from harmful news media reports and exposure to punitive judicial actions in these regions.** — We certainly know how much an accident can generate speculation from all corners of the globe, and that there can be a strong push in the face of tragedy for accountability for criminal actions. But even before that, there are government-transparency laws that can run counter to keeping safety data protected for purposes of advancing safety. Allegations, based on erroneous data interpretations, that aviation safety intentionally has been compromised make sensational headlines, but they don't help advance safety.

4.0 Workshop-Related Development

4.1 Stakeholder Identification

Flight Safety Foundation used a variety of methods to identify key stakeholders for GSIP, and continues to identify other individuals and organizations whose participation would be valuable. While promoting GSIP throughout the aviation industry is beneficial, we determined that certain stakeholders in the selected regions were particularly important to identify, communicate with and involve in the project.

The Foundation acquired lists of potential contacts from a variety of industry sources, including online aviation databases, periodical subscription/membership lists, and FSF proprietary sources. Original, manually performed contact research was completed to identify high-value contacts within organizations. Approximately 9,600 individuals were identified as a result of this methodology. The potential contacts were then analyzed for relevancy using a combination of automated and manual processes. Names, positions and organizations were analyzed and assigned a weighted relevancy score, based on the following criteria (Table 4.1) to help develop mailing lists for focus group invitations.

We used communication analysis tools to track and analyze the level of stakeholder engagement in related issues by collecting information about focus group attendance, email responses and other indicators of interest. The resulting comprehensive data set is, and will continue to be, used to assist in the categorization of stakeholders according to their involvement in the GSIP work, as well as their influence within the aviation industry. The data set will allow the Foundation to identify influential decision makers in selected geographic regions who have high levels of interest in the project and have engaged in constructive relationships regarding the subject. This data set also will be invaluable in 2016 GSIP stakeholder-engagement efforts, and will continue to grow in value as more data become available.

Advancing Safety Information Protection: Potential Target States

In the early stages of GSIP tool kit discussions, and to assist the Foundation in identifying several states to engage in the project, Foundation legal advisors conducted a preliminary assessment of states' involvement in, familiarity with, exposure to, and participation in SIP development efforts.

Using their knowledge, public information and ICAO materials, including state letter comments to proposed changes to

Category	Ranking	Criteria
Organization	0	Known to be outside the targeted group or unknown relevancy for the organization
	1	Generally targeted stakeholder
	2	Specific major air carrier, civil aviation authority, airframe manufacturer or airport
	3	Specific organization conducting studies on safety, or accident investigation organization
Position	0	Known to be outside the targeted positions or unknown relevancy of the position within the organization
	1	In the area of operations for the organization
	2	Quality/safety role in the organization
	3	Known leader within quality/safety for the organization or region
Contact	0	Invalid/unknown email address
	1	Response received from unsolicited email
	2	Confirmed contact — known interest or plans to participate

Table 4.1

ICAO SARPs for SIP and SMS, the advisors developed three tiers of potential target states for tool kit promotion and development in each GSIP region, based upon states demonstrated willingness to implement SIP, its history with SIP, safety and regulatory culture, political environment supporting SIP development, sophistication in aviation laws and regulation, and demonstrated capability to implement safety programs, The Foundation's legal advisors and the Foundation identified contacts in states with whom the Foundation should explore interest in GSIP, and particularly in SIP. The Foundation's legal advisors recommended that primary states for consideration in Pan America include Chile, Panama and Peru, and that lead countries in the Asia Pacific region include New Zealand, Singapore and Malaysia.

Under Work Activity 2, the Foundation conducted a total of 12 focus group sessions in the Asia Pacific region (e.g., Australia, Hong Kong, India, Japan, Malaysia, New Zealand and Singapore) and Pan America (e.g., Peru, Brazil, Mexico, Panama and Jamaica). Based on the outcomes of those sessions and the feedback received from the participants, the Foundation and its researchers continue to assess potential target states for a more in-depth analysis of their SIP framework and possible improvements to be conducted under Work Activity 4.

4.2 Site Selection for Focus Groups and Follow-Up Workshops

Flight Safety Foundation followed several criteria to choose sites to host the GSIP focus groups and to plan for follow-up workshops in locations that have the desired mix of the following elements:

- Major hub for commercial air transport;
- Headquarters city or home to a large portion of stakeholders in a prospective host state;
- Within a city and state known for progressive collaboration in aviation safety data collection, analysis and sharing; and,
- Suitable for easy travel from neighboring states.

Recognizing that the Foundation did not want to hear only from the most mature regulators, air carriers and air navigation service providers, we also consciously chose some states that we know have interest regardless of their current capabilities. A good mix in the experience level of the participants was considered useful for healthy and robust discussions, recognizing that tool kits will need to be developed for all levels of experience.

Our focus group sessions were held in as many cities as our schedules would allow, and we kept ICAO informed of our progress and our ability to identify names, positions and email addresses of the target focus group participants.

4.3 Preliminary Tool Kit Concepts and Vetting Process

Flight Safety Foundation's overarching goal in building a feature-rich deliverable from the GSIP work is that the product becomes a vital, continuing reference on the Internet and not a one-time, stagnant publication. Leveraging the web as the medium for GSIP tool kit publication yields significant opportunities to include engaging and interactive content. Online tool kits can be searched, downloaded, printed and shared. References to related research can be linked to their sources, increasing the inherent value of the content. Presentations in many formats can be embedded for viewing within the tool kit context as opposed to requiring third-party computer software. Informational videos, tutorials or even expert interviews can be produced and embedded as well. Whether quantitative or qualitative, data-visualization models can adjust to additional information, serving as another level of engagement for tool kit users. GSIP tool kits will be positioned as technology-rich, coveted resources that reinforce the value of SDCPS and SIP within the aviation industry.

Two key points are mentioned in the current status of GSIP section of this report regarding the significance of what we learned from the focus group sessions. There already is a recognized maturity curve for users of SDCPS in the industry, and there are many elements of SDCPS and SIP that play into effective risk-management processes. As the Foundation moves forward in building tool kits, we foresee a matrix, yet to be defined, that outlines each maturity stage in a way that enables organizations to understand what they have currently and what may be the likely next steps in their own evolving risk management.

To illustrate these concepts, Table 4.2 (p. 24) offers a preliminary approach to defining the GSIP tool kit structure. Much more thought must be applied, and expert stakeholders must be consulted, to define a robust set of SDCPS maturity elements and levels. For each cell in this matrix, a more detailed set of guidance materials could be written describing the implementation with examples that would help an organization know best how to proceed. The implementation details could include videos, tutorials and visualization tools that explain and illustrate the proposed process. This concept could be applied to multiple stakeholders, and the data sources may be unique to each type of stakeholder. Thus, the total number of matrices may be multiplied by at least five (airline/operator, manufacturer, civil aviation authority [regulator], ANSP and investigative authority).

As we move toward the GSIP workshops and conduct them, the creation of these matrices will be a critical step in the successful launch of the tool kits. We expect to validate portions of these tool kits, as noted, with stakeholder experts who already have participated in GSIP focus group sessions, as well

Concept of Structure for Tool Kits With SDCPS-User Maturity Levels — Airline Example

	Initial Level	Practicing Level	Sophisticated Level	Industry-Leading Level	Best Conceivable Level
Safety Data Collection and Processing Systems					
Airline's reactive risk management process					
Objective setting	Commitment to zero accidents	Metrics that are partially aligned with pertinent risks	Metrics that fully capture top specific risk register issues	Metric tracking on both specific and general risks	
Public accident data	Recognizing high level trends across the world	Using the analysis from ICAO/IATA/local region	Conducting contributing-cause analysis from public data tailored to unique operations	Integrated process for updating new accident data in an ongoing analysis process	
Airline voluntary data sources	Employee reporting systems	Flight data monitoring systems	Internal monitoring and LOSA systems	Data pooling of employee reporting and FDM programs	
Voluntary sources – employees	Flight ops	Flight ops (plus 1 other department)	Flight ops (plus 3 other departments)	All employees	
Airline mandatory event reporting	Critical-system failure reports prepared	Recognition of the risk in relationship to underlying hazards	Rates of system failures in relation to ongoing risks	Sharing of data on hazards and risks between companies	
Airline internal auditing information	Findings and Recommendations for actions generated	Risk analysis on the findings to update the entire risk picture	Risk analysis that integrates and incorporates other data sources	Sharing of data on process weaknesses	
Airline external auditing information	Findings and recommendations for actions generated	Risk analysis on the findings to update the entire risk picture	Risk analysis that integrates other related source data	Sharing of data on process weaknesses	
Airline incident investigations	Reports generated with findings	Risk analysis on the findings to update the entire risk picture	Risk analysis that integrates other related-source data	Sharing the key contributing factors with regulator and investigative authority	
Data Protection					
Hazard Information	Deidentified methods or anonymous reporting to safety department	Protections built into the software/process for individuals	Agreements between company, employee group and regulator	Freedom of Information Act law protection and progressive regulator policy	Full protection from criminal prosecution

Table 4.2

as others who have become familiar with our project through the GSIP website. In essence, we plan to build some details and then validate them (or vet them in other ways) with these stakeholders through a collaborative, web-enabled process.

SIP in the GSIP Tool Kit

The SIP portion of the planned GSIP tool kit will be structured in a manner similar to the SDCPS portion of the tool kit, providing increasingly complex guidance and solutions to states and stakeholders that differ on a broad spectrum of maturity in the area of SIP. The structure and associated materials for this portion of the tool kit are under development. This SIP content will provide an interactive means of understanding and implementing SIP through training modules customized for various industry stakeholders, from the small organization having to implement an SMS to the training and education of judicial authorities. This will include case studies, example regulations, laws, and advance arrangements, and individual accounts of SIP experiences to demonstrate how SIP can work and its value. For guidance to states and organizations, the GSIP tool kit will provide model laws and advance arrangements prepared by Flight Safety Foundation's voluntary Legal Advisory Committee (LAC) members and legal counsel.

The tool kit will address all issues that a state should consider to implement a solid SIP framework and to meet the

expected ICAO standards on the protection of safety data and safety information.

4.4 Infrastructure Envisioned for Long-Term Management of Expert Advice and GSIP Tool Kit Content

To support a vetting process that follows up the GSIP focus groups and will continue throughout the GSIP tool kit workshops, Flight Safety Foundation will deploy online systems to connect subject matter experts and collaborate with them. These virtual communication media will reduce/eliminate the need for travel to generate and collect feedback on practical applications of the tool kit based on the project's findings and conclusions.

Virtual Meetings

The Foundation expects to rely on webinars, real-time meetings that include video conferencing, dial-in access, web-based calls, screen sharing and text-based chat. Recordings/media will be stored for documentation and future reference. Conducting online meetings will aid in retaining GSIP stakeholders' interest by providing progress reports and opportunities for active participation in content collaboration. Virtual meetings also open the door to expanding the project's reach within each region by targeting geographic areas that were not visited during the focus groups. These formats for communication also are suited for training and e-learning opportunities.

Collaborative Content Creation for Tool Kit

As elements of GSIP tool kit content are determined, the platform to enable multiple contributors to discuss, suggest and refine conclusions and practical applications will be implemented. The platform will include the following features:

- **Intuitive User Interface** — To accommodate diverse end users who contribute tool kit content, straightforward interfaces will focus on optimal ways of writing, editing and rapidly providing feedback;
- **Editorial and Version Control** — To ensure the integrity of the overall document, proposed revisions over time will be vetted, moderated and approved to control tool kit versions and their release status;
- **User Roles and Permissions** — Administrators of the process will be able to control the level of user access as it relates to interacting with and revising content on a section-by-section basis, if necessary. Security of deliberations and draft work products is paramount;
- **Notifications** — Activity digests regarding working documents and related conversations will be emailed to collaborators to spur discussion and continued feedback; and,
- **Backups** — The entire content will be accessible for download to simplify the backup redundancy necessary for administrators to securely preserve tool kit content in the event of platform failure or other cause of data loss.

By deploying a platform with the capabilities described, participating stakeholders will be ready and able at any time to influence the overall outcomes of GSIP. This platform provides a means of scaling work without compromising integrity. It transforms a closed process of one-time report creation into an engaging effort, producing a living document that can continue to be published in new editions, with the latest best practices and resources.

5.0 Safety Information Protection

5.1 SIP Research on Status of States

Based on ICAO's anticipated SIP SARPS — to be included in the next version of ICAO Annex 19, *Safety Management* — the Foundation and its legal advisors are performing an in-depth SIP analysis of states in the Asia Pacific and Pan America regions. ICAO's proposed SARPs include important principles of protection and exception; the protection against public disclosure (i.e., protection from freedom of information laws); the necessity to a have a competent authority addressing SIP; the need to employ a balancing test, ensure advance arrangements and employ suitable safeguards in the event of disclosure; and the protection of ambient workplace recordings.

The Foundation's legal advisors began its analysis by researching and reviewing the national laws, regulations and policies on SIP. To offer an exhaustive analysis of the protection of information, the Foundation's legal advisors analyzed these states' protections for both voluntary and mandatory reporting systems. The materials analyzed included relevant civil aviation legislation and regulations, policies published by the national civil aviation authority or air accident investigation authority, and any existing advance arrangements, freedom of information laws and privacy laws. To complete the analysis, the Foundation's legal advisors has also compared the states' frameworks with those governing the protection of accident and incident records collected during an investigation under Annex 13, *Aircraft Accident and Incident Investigation*.

The SIP analysis addresses the following topics:

- **Background SIP information** — This topic includes definitions relevant to or impacting SIP; the applicability of laws to reporting systems; the framework of voluntary and mandatory reporting systems; the purpose for the use and disclosure of safety information; the designation of a competent authority to address SIP issues; the distinction with Annex 13 accident and incident records; and the past legal adjustments made by the state, whether by policy, legislation or judicial/administrative precedent.
- **Principles of protection** — This topic includes a necessary balancing test that takes into account the interests of safety and the need for the proper administration of justice; the protection of accident and incident records under Annex 13; the protection of safety data and information against disciplinary, civil, administrative and criminal proceedings; the applicability to individuals, organizations and employees and operational personnel; the different levels of protection between mandatory and voluntary reports of safety data and information; the procedures applied to protect reports; and the need for authoritative safeguards when information is used or disclosed under an applicable exception.
- **Principles of exception** — This topic includes a test to balance the proper administration of justice with the need to maintain and improve aviation safety; and the need to take into account the consent of the reporter of safety data or safety information.
- **Public disclosure** — This topic includes justifications for releasing safety data or information; freedom of information law exemption; compliance with the domestic privacy laws; the need to ensure that safety data or safety information is de-identified; the responsibilities of the custodian of safety data and safety information to apply SIP; and the protection of recorded data such as ambient workplace recordings.

The Foundation's legal advisors' gap analysis will help identify and assess the current implementation of SIP in the Asia Pacific and Pan America states, and identify the different levels of implementation.

6.0 Communication About GSIP Activities

6.1 Website Development

A mobile device–friendly website for the GSIP project with an easy-to-use content management system was designed, developed and launched by Flight Safety Foundation at <flightsafety.org/gsip>. The public side of the website includes a form that enables visitors to request to be added by project leaders as GSIP stakeholder-participants. Focus group activities are highlighted within an event calendar, and project progress is documented via posts published to the website's blog area.

The Foundation recognizes that new websites require a consistent content strategy to establish and enhance their domain authority. Domain authority is a critical metric in assessing over time the level of search engine optimization, the ability to effectively direct people to the GSIP website whenever they seek information about this domain of knowledge from Google and other search engine providers. To that end, plans call for the GSIP website to expand to include additional resources and related news. For its global audience, the website will serve as a current repository of references to SDCPS resources from states within the GSIP regions and from experts within the field.

The domain authority of the GSIP website has benefited from the domain authority of the Foundation's website <flightsafety.org>. As a well-established website with consistent visitor traffic, <flightsafety.org> links to press releases and pages on the GSIP website, increasing the likelihood that GSIP content will be returned in response to relevant inquiries to any commonly used search engine. The Foundation will drive additional visitor traffic to the GSIP website by leveraging the robust social media communities we own and moderate. This will provide continued exposure to an actively engaged audience of aviation safety professionals and other interested parties.

Digital marketing will be employed to promote upcoming working groups and workshops. Geo-specific keyword targeting will be leveraged to increase awareness within specific locales. Ultimately, the website presents an opportunity to anchor an international community interested in implementing best practices in SDCPS.

6.2 GSIP Communications Campaign

Flight Safety Foundation, working with TMP Government, a marketing communications, outreach and recruitment firm, has used a variety of methods to raise aviation industry awareness of GSIP objectives and methodology and to draw attention to the project's importance for continually improving the industry's safety record during a period of sector growth. An important objective of our communications campaign has been to generate interest in the project among stakeholders who participated in focus group sessions and potential participants in future GSIP tool kit workshops, helping to inform their decisions to participate.

Methods used to raise awareness of GSIP have included email, outreach to international aviation and general media, the development of collateral materials, advertising, video and presentations by FSF staff and members of the FSF Board of Governors. Details on several of the campaign elements are as follows:

AIN Custom HTML E-Blast

- We leveraged a relationship with *Aviation International News* (AIN) to secure an exclusive opportunity to reach its highly engaged e-newsletter audience with a

custom-designed e-blast created in hypertext markup language (HTML) format to promote the GSIP focus groups throughout the Pan America and Asia Pacific regions.

- The e-blast was sent to 4,802 people and garnered an open rate (the ratio of recipients who opened the email message or clicked on a tracked link within it to total recipients) of 34 percent.
- The e-blast generated 47 click-throughs (that is, email recipients' input took them either to the GSIP website or the GSIP email address), resulting in a 2.9 percent click-through rate (the ratio of click-throughs to total recipients) — more than 10 times greater than the industry-average click-through rate of 0.20 percent for e-newsletters.

Australian Media Outreach

- We conducted targeted media outreach in Australia in conjunction with a visit by FSF leaders.
- We developed a customized news media contact list and wrote a press release to promote the visit to attract media attention and media interest in conducting interviews about GSIP.
- The efforts resulted in interviews with five key publications, including *The Australian*, *Australian Financial Review*, *Australian Aviation*, *Pro Aviation* and *Asian Aviation*, as well as additional coverage in *FlightGlobal*.

Collateral Development

- Handouts and flyers were developed to promote both the focus groups and upcoming workshops.
- The collateral pieces matched a new branding look designed earlier in the year for general FSF activities.
- FSF staff used the handouts and flyers at trade shows as a way to make sure key stakeholders had takeaway information regarding upcoming GSIP events that would be pertinent to their interests.

Advertising and Media

- We developed an ad to match the look and feel of the new collateral pieces.
- The ad featured high-level GSIP messaging and sought to drive stakeholders to the GSIP website.
- We secured strategic placements in the *FlightGlobal* show dailies for the Latin American and Caribbean Air Transport Association (ALTA) Airline Leaders Forum, as well as in the *ALTA Yearbook*.

PowerPoint Customization

- We upgraded the design and functionality of the GSIP PowerPoint presentation to increase the amount of attention and interest garnered during each presentation.
- The look and feel of the new PowerPoint template match the branding developed in the new collateral pieces and print ad for a consistent design and identity.

Video Production

- We updated the Foundation's previously produced marketing video to include additional information about GSIP.

GSIP Presentations

- Foundation staff members, including President and CEO Jon Beatty; Vice President, Technical, Mark Millam; Vice President, Global Programs, Greg Marshall; and Vice President, Communications, Frank Jackman, have made GSIP presentations in a variety of forums, including the:
  - 6th Pan American Aviation Safety Summit (organized by ALTA in conjunction with RASG-PA), Medellín, Colombia;
  - Aviation Safety Conference (organized by the Aircraft Owners Association of Guyana), Georgetown, Guyana;
  - Singapore Aviation Academy Advisory Board meeting, Singapore; and,
  - FSF Newsmaker Breakfast (which featured a speech by FAA Administrator Michael Huerta), Washington.
- Staff also regularly briefs the U.S. Commercial Aviation Safety Team (CAST), and has briefed the RASG-PA Executive Steering Committee and RASG-APAC's APRAST.

SIP Promotion

To further promote the GSIP effort through focus group meetings and to promote the SIP portion of the future GSIP tool kit, presentations on GSIP, the LAC and the SIP-related tool kit developments were delivered to various conferences for aviation safety professionals around the world, including the Regional Aviation Association of Australia Convention 2015 on "Emerging Trends in Safety Enforcement and Information Protection" and at a European Air Law Association 27th Annual Conference session titled *Accidents and Incidents: Crimes?* The work of the LAC, the ongoing activities of GSIP and the development of the SIP portion of the GSIP tool kit were promoted and received positive feedback and interest from the audience.

As GSIP moves into its next stages, a well-executed communication campaign also will be critical to generating participation in the online GSIP tool kit–element verification processes planned for the first quarter of calendar year

2016. The Foundation will implement a media plan to cover this work during the first half of 2016 and feature earned-media articles in aviation publications, social media and websites in the Pan America and Asia Pacific regions. The purpose of the campaign will be to generate awareness for the upcoming workshops throughout the regions and to drive maximum attendance at each event, using targeted digital placements like website banner ads, HTML e-blasts and other digital media that will provide metrics for analysis of results. In addition, our analysis of the media metrics will allow us to optimize the campaign for maximum efficiency in cost and performance.

7.0 Current Status of GSIP

The information acquired from this first-year phase of GSIP has improved our understanding of RASG-APAC and RASG-PA participants' and other stakeholders' challenges, enabling Flight Safety Foundation to prepare for the tool kit development and workshops planned for the next phase of the project beginning in December 2015. After the first six months, we began to build momentum, and we now have a skilled team focused on improving analysis of our research, creating high-quality derivative materials and expanding our capability to collaborate with other key contributors. In hindsight, it would have been difficult to avoid this ramp-up period, but, as noted, our early shift to a principal methodology of focus group interviews/discussions gave us better insight and helped build an interested base of stakeholders.

There will be challenges in attracting a large number of workshop participants in the next phase of this project. We will need assistance from the FAA's international offices in the Pan America and Asia Pacific regions. We also will need continuing assistance from ICAO offices in Lima, Peru; Mexico City; and Bangkok to ensure adequate advance awareness of our workshops. We will need to conduct specific update briefings with these interested parties on how best to obtain their assistance.

The proposal to semi-permanently host the GSIP tool kit on an Internet platform does not obligate the FAA to own an asset or maintain the tool in mind. Rather, it would provide a flexible "open source" approach to completing the tool kit and facilitating ongoing content contributions. The Foundation foresees benefits from having periodic assessments by several stakeholder experts and other experts in SDCPS and SIP. We expect that the guidance materials we produce will enable others to improve their systems and processes in a methodical way to reach higher levels of collaboration between stakeholders. We do not intend for this guidance to become an auditable standard but rather"an aid to fulfill ICAO SMS risk management, SDCPS and SIP SARPs.

As we plan the 2016 workshops, we expect them to be targeted and specific based on advance dialogue with key participants. It will be helpful to focus on different parts of the tool kit for the areas of greatest benefit. For example, for a workshop in Indonesia, we would expect perhaps to spend more time on the initial stages of the maturity curve and to discuss portions of the tool kit that help to strengthen use of that state's existing public data; less time would be devoted to the most sophisticated sharing of FDA program data.

We intend to enlist the help of many interested experts on a contract basis, as volunteers or as members or affiliates of the Foundation. The work we now are accomplishing with our contractors has yielded good results for developing future tools and documents. To expand our work, we expect next year to grow the involvement from the base group to a slightly larger partnership.

A great portion of our effort to date has been conducting assessments of SDCPS and SIP through active listening in focus group sessions. As noted, we also completed research on existing safety data collection and analysis systems, regulatory policy and legislation. This research was carried out by Pillsbury and PAI Consulting, a Fairfax, Virginia-based consulting firm that specializes in aviation, regulatory affairs and training. As we proceed with our work and embark on building tool kits, we expect to further absorb the results of this research. We also expect to continue that research as we learn more details about specific stakeholders' actual experiences.

Flight Safety Foundation and our key contributors (see appendix 1, p. 32) have been honored to work with the FAA on this important project. The Foundation maintains respectful interpersonal connections and mutual trust with the right network to be exceptionally well informed about a multitude of hazards in the global risk environment. We are committed to improving international collaboration on SDCPS and SIP. Thank you for giving us this opportunity.

Appendix Privacy Policy

Flight Safety Foundation recognizes the value of keeping organization and individual privacy within this research project, therefore:

All participant names will be considered privileged information. No participants will ever be mentioned by name in any of the published material about the project. Likewise these sources will be protected from disclosure.

All organization names will be considered privileged information. No organization name will be used or associated with specific inputs during GSIP conversations or correspondence without their express consent for the materials and products developed in this project.

All discussions on issues during our focus groups will be considered valuable for building future frameworks for protecting safety information. In those discussions, there may be information shared about special circumstances that have actually taken place. However, no performance or nonconformance to any industry standards will be described by attributing a violation to a specific country or organization in any of the published materials or in the summary materials prepared for interested stakeholders.

This project is not collecting any safety data and therefore cannot release safety data to organizations that believe their regulations compel a duty to act on safety issues.

Acknowledgments

Flight Safety Foundation would like to thank a number of stakeholders who have helped us so far in this project. First on the list are the civil aviation authorities, airline operators, air navigation service providers, airports and manufacturers that contributed to our focus group discussions in the assessment phase of this project. Because we also committed a level of privacy to these stakeholders, we do not list them in our report. However, the following people and organizations are part of the ongoing working set of contributors to this project. We appreciate the tasks they are performing to directly support Flight Safety Foundation in its GSIP work activities.

Contributor	Organization
Nathan Scholz	Cole Lawson Communications Pty. Ltd.
Tony Fazio	Consultant
Steve Ramiah	Consultant
Jon Beatty	Flight Safety Foundation
Frank Jackman	Flight Safety Foundation
Greg Marshall	Flight Safety Foundation
Emily McGee	Flight Safety Foundation
Mark Millam	Flight Safety Foundation
Susan Reed	Flight Safety Foundation
Christopher Rochette	Flight Safety Foundation
Wayne Rosenkrans	Flight Safety Foundation
Linda Werfelman	Flight Safety Foundation

Contributor	Organization
Matt Miller	Flight Safety Foundation Ltd.
Katherine Berry, Ph.D.	Fort Hill Group
Michael Sawyer, Ph.D.	Fort Hill Group
Leah Werner	PAI Consulting
Tim Wilky	PAI Consulting
Philippine C. Dumoulin	Pillsbury Winthrop Shaw Pittman
Graham Keithley	Pillsbury Winthrop Shaw Pittman
Kenneth P. Quinn	Pillsbury Winthrop Shaw Pittman
Grame Campbell	Precision Framework
Phil Scarratt	Precision Framework
Brian Grossman	TMP Government
Adam Konowe	TMP Government
Vajaah Parker	Web Development Group

Editing and production by Flight Safety Foundation Publications Department:

Frank Jackman, vice-president, communications, Flight Safety Foundation

Susan Reed, graphic designer, Flight Safety Foundation

Wayne Rosenkrans, senior editor, Flight Safety Foundation

Linda Werfelman, senior editor, Flight Safety Foundation

701 N. Fairfax Street, Suite 250, Alexandria, VA 22314+2058 USA Tel. +1 703.739.6700 Fax +1 703.739.6708 flightsafety.org