



Sharing Aviation Safety Information

Paper written for the Flight Safety Foundation Icarus Committee

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January 2009



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AQD – the software supporting Safety Information Sharing schemes

The airline industry is taking a more proactive approach to safety and risk management (driven by ICAO and others). Effective risk management relies on access to data in a single repository. Organizations who adopt a software solution that enables the collection and classification of information in a single repository are ideally positioned to participate in global information sharing programs and take their business to another level of safety and performance.

AQD, integrated Safety and Risk Management software provides the means to capture all safety and risk related information across the organization in one data repository. This not only presents a single view of data for trend analysis and measuring business performance; but a single source for extracting the required information to interface with external information sharing programs.

AQD enables you to collect the information, classify the data based on standard classification systems and, using the AQD Data Export module, extract the information required for each of the schemes that your organization participates in.

The AQD Data Export module can be configured to extract any customized data set that an AQD Customer chooses. This includes not only de-identified safety information but MORs to the Aviation Authority, Technical Reports to manufacturers, Occurrence Reports to partner airlines etc.

An example of the Safety Information Sharing programs that AQD customers use the AQD Data Export module to provide data for are:

- IATA Safety Trend Evaluation Analysis and Data Exchange System (**STEADES**)
- FAA Aviation Safety Information Analysis and Sharing (**ASIAS**) Distributed National ASAP Archive (**DNAA**)
- NASA Aviation Safety Reporting System (**ASRS**)
- Australian Transport Safety Bureau (**ATSB**)
- National Aviation Authority Mandatory Occurrence Reports (**MORs**)

AQD is positioned to be the software of choice for providing the source data for global information sharing programs.

The following paper was prepared by Eddie Rogan, Aviation Solutions Director for Superstructure Group and demonstrates the commitment that Superstructure Group is making to support the sharing of aviation safety data in pursuit of a safer world.

Sharing Aviation Safety Information Introduction

Background The Icarus committee was tasked by the Flight Safety Foundation (FSF) Board to identify the top 5 safety related issues in the aviation industry. One of these was the sharing of safety information.

Objective To examine ways to reduce barriers to safety information sharing and make a number of recommendations to the FSF in areas where they can assist.

Scope

- Only sharing of safety information within the aviation industry.
- Only operational safety information; not occupational safety.
- More than just Aircraft Accident information.
- Technological solutions not covered.

Discussion Sharing of aviation safety information has been a long sought after ambition for the industry and many working groups, committees and organizations for a number of decades. There has been some notable progress and some set backs during that time but generally it is accepted that our industry is not sharing to the extent that we could and should.

This paper researches the subject by answering a number of important questions which are often held up as barriers or hurdles to overcome for the industry to truly achieve what it unanimously wants to achieve; i.e. the sharing of safety information.

There are a number of regional and global examples of safety information sharing and we should look at the strengths and weaknesses of these before looking at ways to improve how we share in the industry.

Existing Safety Information Sharing Schemes

IATA STEADES

Some 90 Airlines and several helicopter operators are involved in the global safety information exchange and analysis scheme operated by IATA. The information is derived from air safety reports which are de-identified to protect flight crew and operator although IATA is aware of which airline sent the information at the time of submission. Once the data is collated into the global database, IATA can no longer determine which airline is associated with a particular record. STEADES members can directly query 12 months of global data via an interactive STEADES Web Query Tool. Additionally, regular high level analysis and periodic in-depth analysis is shared with the members of the scheme.

Advantages:

- Global and includes helicopters
- Information is generally good quality and has been cleansed and classified by operator and then reviewed by IATA.
- IATA seen as ideal “honest brokers”.
- Has been operating for about 15 years (was with BA before IATA)
- The basic STEADES Service e.g. periodic in-depth analysis and on-going high level analysis is free of charge to airlines that regularly contribute data.
- Query tool is free to IATA members and \$500 to non-members
- Members have access to website and generic analysis
- Specific Analysis can be funded by anyone
- Multiple classification system accepted (converted centrally)

Disadvantages:

- Industry lack of advanced analytical software tools - analysis of narratives is time consuming since they must be read and coded individually. This is a high burden on resources when performing in-depth analysis.
 - Data submission is quarterly.
 - An incomplete set of data may lead to biased results.
 - Findings and actions not sent or shared beyond STEADES Members, except in certain circumstances.
 - Some potential members do not have technology to collect and export information.
 - Some potential members collect very few reports – lack of safety reporting culture.
 - Amount of data needs data/text mining tool.
-

ASIAS

This is a US based safety information exchange and analysis scheme operated by MITRE on behalf of the FAA and overseen by a board made up the information contributors. The ASIAS system enables users to perform integrated queries across multiple databases, search an extensive warehouse of safety data, and display pertinent elements in an array of formats. As well as Air Safety Reports, information from ATC and Weather is also used in the analysis which is shared with all of the stakeholders.

Advantages:

- Use information from multiple sources
- Well resourced analysis team

Disadvantages:

- Mainly US airlines currently
 - New program, still evolving
 - ASAP is de-identified information
 - Findings and actions not sent and shared
 - Airlines withdrawing from the program due to disagreement over immunity levels with the FAA
-

Mandatory Occurrence Reports

In many parts of the world, flight crew, air traffic controllers and technicians are required to submit safety reports as part of their license approval requirements. These are generally referred to as MORs and are sent to the national aviation authorities who can collate them and share with all of the national aviation service providers. The extent of the sharing will vary but in the UK, a list of de-identified summaries for every MOR is circulated in paper form on a monthly basis; they have recently decided to de-identify this information.

Advantages:

- Works well where there is trust between the aviation service providers and aviation authority.
- Good quality information; i.e. mandatory reports

Disadvantages:

- MORs only
 - Paper based
 - Aviation Authority are the guardians of the information
 - Analysis not shared routinely outside authority
 - No findings or action sent or shared.
-

CHIRP (UK)

Confidential reports from flight crew and technicians sent to CHIRP which is an independent charity based in the UK. Anonymous reports are not normally acted upon as they cannot be validated.

ECCAIRS

A number of European Aviation Authorities are sending their MORs to a central database called ECCAIRS which is operated by the JRC.

**Regional
Committees**

A number of regions have established safety committees which share safety information on a regular basis. The UKFSC (UK Flight Safety Committee), GFSC (Gulf Flight Safety Committee) are well known examples of this type of forum.

Flight Data

There are a number of examples of Flight Data sharing between airlines operating the same aircraft types; e.g. B777 POD meeting includes BA, Emirates, Air France, Virgin Atlantic, Air New Zealand, South African Airways, Cathay Pacific and Lufthansa.

Audit:

IOSA and ISAGO audit findings by IOSA accredited auditors are held centrally by IATA.

Sharing Safety Information

Why share safety information?

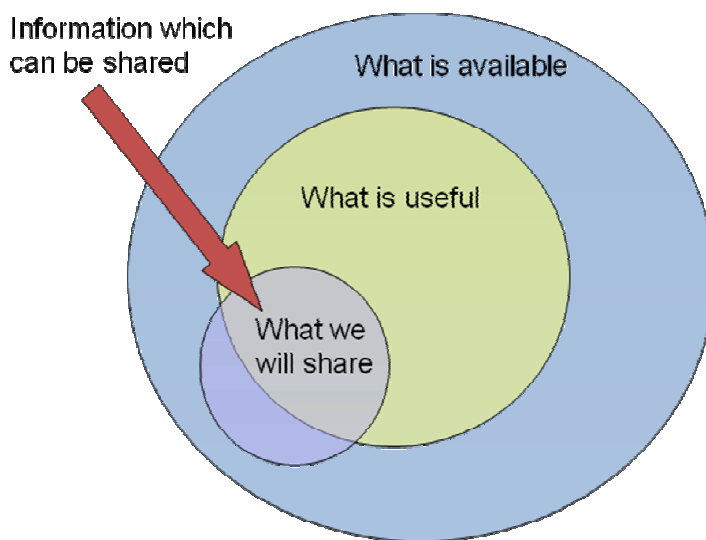
One thing that both experienced aviation safety experts and lay people agree on is that many accidents and serious incidents are preventable if lessons had been learned from past incidents and accidents. There are numerous examples of this every year and every time we repeat the mantra “we have to share more in order to learn from others”.

However, experienced aviation experts will know that it isn't as simple as that; past Accident Reports are well publicized, in the public domain and accessible to everyone who has the time and inclination to read them. So why don't they read them, who should be reviewing this information and how often, and what happens when they leave?

It is clear that providing information is only one of the “directions” involved in sharing information. Another more important one is “viewing and learning” from that information. It is important that we do not overwhelm recipients with too much information. So it is vital that we ensure that the signal to noise levels is such that the “wood can be seen from the trees”. It is important to consider what information and what detail to share.

What safety information should we share?

Let's not worry at this stage about the technical side of sharing as this is a technological issue which can be covered later. Let's first try to answer a fundamental question which is “what data or information should we be sharing”. To help identify this we should consider what information is available, what would be useful and what is sharable. In an ideal world, all three would overlap 100% but we are not in such a world and we can best represent this in a Venn Diagram.



What safety information should we share?, continued

The information that we are able to share is a subset of all of the available information to us in the industry and the size of this subset will depend on the intersection of the three sets of information. So what determines the individual sets in the above diagram?

What is available: Every bit of data/information available in the industry. This includes:

- Accident investigation findings
- Openly reported Safety Occurrences from Flight Crew, Maintenance, Flight Attendants, Ground Personnel, Air Traffic Controllers etc.
- Safety Investigation findings
- Audit findings (IOSA, ISAGO, JARs, etc.)
- Flight Data Analysis (OFDM/FOQA etc)
- Risk Assessments
- Maintenance Reliability Programme (MRP)
- Confidential/Anonymous Safety Reports
- Mandatory Occurrence Reports

What is useful: It is vital that we only share information that will enable learning and not merely share information for sharing's sake. It is also important to realize that what is useful to one party is not necessarily useful to another. For example, what would be more valuable to an airline safety department; a trend chart showing 5,000 incidents plotted by event type or the 100 recommendations which came from the 17 safety investigations which were related to their aircraft types and airports locations from those 5,000 incidents.

What we will share: We have not yet looked at the stakeholders involved in sharing information but by far the most important ones are those who supply the information. Without them, sharing doesn't happen and it is they who determine what information they are willing to give. Some of the barriers for not giving everything requested might be:

Legal: fear of information being used against them in court or by the authorities.

Internal political: information is power and sharing might expose weaknesses.

Economic: cost of collecting and distributing information.

Unions: staff fears of sharing information involving them

Media: fear of information splashed on front pages

Competition: giving operational secrets which give a competitive advantage

Warranty: giving information which manufacturers may use against a warranty claim; i.e. examples where a/c has been operated outside of normal envelope.

Workload: perception that it is too much hassle to share

Incentive: What's in it for me? Getting direct feedback / benefit to sharing

These barriers are real and vary by country, culture, organization type and even by department within that organization. If we are looking to establish a truly global safety information sharing scheme then without tackling these barriers, we would be forced to accept the lowest common denominator approach which would mean a very small intersection on the Venn diagram above and ultimately this would mean a less effective safety information scheme.

Who are the main stakeholders?

As mentioned before the most important stakeholders are the *Information Suppliers* but there are two others who can contribute to and benefit from information sharing.

Information Suppliers: These are the most important Stakeholder's with the most barriers with which to contend. These are organizations which receive day to day safety information from their operational departments through various channels such as occurrence reports, safety investigations, audit findings, flight data monitoring, risk assessments and surveys. These could be airlines, maintenance organizations, ATMs, helicopter operators, cargo operators, ground handlers, accident investigation organizations, manufacturers, airport operators and aviation authorities. The main barriers and hurdles to sharing information are faced by these stakeholders.

Information Administrator: This stakeholder is the probably the second most important of the three as this party should be trusted by all the suppliers of information and seen as the honest broker. They need to collect, store and collate all of the inputs of information and provide useful outputs to the *Information Customers*.

Information Customers: Some of these stakeholders will also be Information Suppliers but many will not. Typically those not supplying information but wishing to access it will be Regulators, Manufacturers, Researchers and Academics.

Who should see the information?

Anyone in the industry in a role which can learn from the safety lessons of others. At the sharp end this would include Pilots, technicians, flight attendants, air traffic controllers, ramp workers etc. However, generally the safety office has a responsibility in the company of distilling information and making it available to the appropriate staff at the sharp end; this improves the signal to noise ratio of the information being shared.

Who should provide the data/information?

Again, those at the sharp end are ultimately those with the responsibility of submitting occurrence reports, either openly or confidentially to their organization. The safety office is well positioned to collect and share this information along with investigation findings and actions to everyone in the organization and a global or externally run information sharing program.

Who should be the honest brokers?

The best honest brokers to collect the safety information for the aviation industry should have ticks in the following boxes:

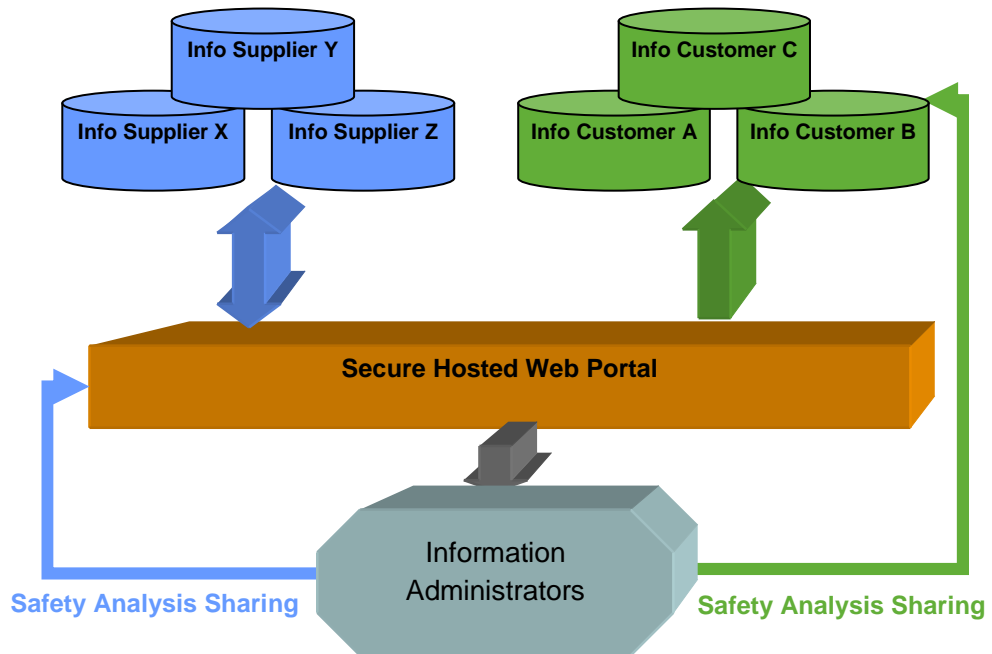
- Are trusted and respected by both the Information Suppliers and Customers
 - Have sufficient competent staff able to perform meaningful analysis
 - Have the technology and support infrastructure to manage the sharing process
 - Have a good business model to make the process sustainable and self funding
-

Outputs and Analysis – can we benchmark?

So what output/analysis would be useful? Given that we have already identified that there are a number of potential recipients who can benefit from sharing safety information and analysis, many believe that the only way to do this is to have an output which is capable of being easily configured and compiled for whoever requires it and that reports and analysis is easily obtainable by the various recipients of the information customers.

The most effective and secure way of sharing data is via the internet. It is not in this paper's scope to delve into the technology aspect of how this can be achieved, however, it is clearly a technology that is with us now and everyone from banks to intelligence agencies use it so there should be no reason why our industry cannot.

A recognized best practice method of doing this would be for the Information Suppliers to periodically upload to a centrally held global database supported by the Information Administrator via a secure web portal; i.e. a one stop shop for information sharing. Software tools could then be used by Information Suppliers and Customers to interrogate the database and produce reports and analysis depending upon their needs. Those Information Suppliers who do not have a software tool for capturing and exporting could directly enter information to the central system and effectively "rent" a web hosted system. The Information Administrator would also be able to create reports and analysis which can be supplied as a generic output for perhaps benchmarking purposes among the Information Suppliers or specific outputs which could be funded by the Information Customers.



Outputs and Analysis – can we benchmark?, continued

However, we need to be clear that it isn't all about just sharing the "data" here; the word used throughout this paper is "information". So what is the difference?

One way of looking at it is that safety information is something that can give knowledge for the benefit of the global aviation community and consequently we must all be able to understand it. Therefore the raw safety data (e.g. pilot reports, flight data events etc) needs to be put into a standardized, recognizable format so that everyone can interrogate and analyze it otherwise we would be comparing bananas and apples with carrots and broccoli! In order to achieve this, we could ask the information providers to use a standard format or the information administrators could convert all of the different formats into the one standard.

One of the major barriers to a truly global sharing program are the multi-various event classifications, human factors taxonomies, flight data event limits etc. that are in everyday current use by the potential Information Suppliers. The best "blue sky" approach would be that all Information Suppliers send their information in a standard format. There are, however, a number of technical hurdles to overcome first:

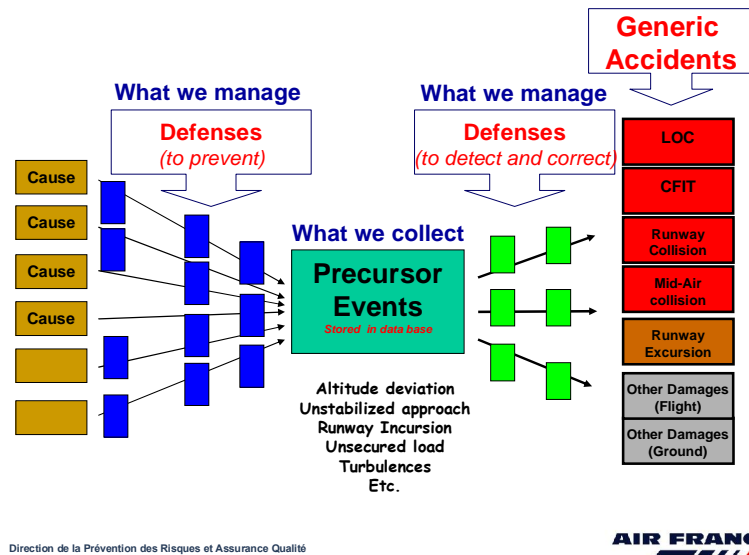
- *Standard Occurrence Classification:* There is not currently one recognized industry standard for classifying occurrence events, let alone classifying the root causes discovered during investigations.
- *Flight Data:* Many operators monitor similar events, however, the limits are configurable and differ.
- *Occurrence reporting:* Not all potential Information Providers have a software tool which can export data/information.
- *Funding:* Who pays and how much is such a service worth?

A big advantage of using standardized information at source is that Information Providers are then able to benchmark their safety performance. However, benchmarking safety information needs to be done cautiously and thoughtfully; for example if you have a Information Provider with a very good "open reporting culture" then this could mistakenly be seen as a negative performance comparison which would undermine the ultimate reason for sharing information.

Flight Data event comparisons do not suffer from this "open reporting culture" effect but sectors flow versus sectors monitored is, however, an important effect to take into account.

Outputs and Analysis – can we benchmark?, continued

Example of a potential framework for a standard classification system:



This classification framework has the advantage of linking actual events to potential worse case outcomes; i.e. accidents. This type of classification has a number of advantages:

1. Global Accident and Incident data analysis can be performed in a more meaningful and consistent manner.
2. Safety specialist have a more compelling case when trying to influence others in their organizations to take an incident trend seriously; i.e. potential outcome is clearly identified as an accident.

Obviously the lists of events, causes and defenses would have to be agreed but there are a number of well established classification systems that could be reviewed and a decision made; e.g. IATA STEADES, ASIAs TEM etc.

Barriers or hurdles to negotiate

Many of the barriers and hurdles have already been identified in various sections of this paper but are listed below as a comprehensive list:

- Fear of collecting the information in the first place; e.g. information being used against Information Suppliers in court or by the authorities/regulators.
 - Information is power and sharing might expose weaknesses.
 - Cost of collecting and distributing information borne by Information Suppliers.
 - Information Suppliers' front end staff fears of sharing information involving them
 - Fear of some information being leaked and splashed over the front pages of newspapers
 - Information Suppliers' concern about giving operational secrets away which give a competitive advantage
 - Giving information which manufacturers may use against in a warranty claim; i.e. examples where a/c has been operated outside of normal envelope.
 - Reporting cultures vary across the globe as well as among organizations and departments.
 - Cost of running a global safety information sharing program by the Information Administrators; sufficient competent staff, technology and support infrastructure
 - Big organization's attitude of "what is in it for us". Also big organizations believe it is easier to identify them among de-identified information.
 - Not all potential Information Providers have software tools which can export.
 - Non industry standard classification of information used by organizations
 - Reporting rates of Information Providers will vary and benchmarking against a global database may make those with a healthy open reporting culture look worse.
 - Is the global analysis of safety information useful or relevant to others?
-

Risk Mitigation Strategies

It was clear from the brainstorming sessions conducted by the working group and the one to one discussions that there is no easy fix for all of the barriers and, indeed, some of the barriers vary by culture, organization, regulatory authority etc. However, awareness of such barriers is key when developing a global information sharing program and in some cases might be sufficient to alleviate them. Other barriers will require more tangible initiatives to be put in place. All of the barriers identified in the paper are listed below along with existing/potential enablers.

Barrier	Enabler
<ul style="list-style-type: none"> • Fear of collecting the information • Information is power and sharing might expose weaknesses. • Information Suppliers' front end staff fears of sharing information involving them. • Reporting cultures vary across the globe as well as among organizations and departments. • Reporting rates of Information Providers will vary and benchmarking against a global database may make those with a healthy open reporting culture look worse 	<p>ICAO has amended Annex 6 to promote Just Culture in organizations and authorities. However the term Just Culture is still open to interpretation and time will tell how successful this will be. A good metric of how successful it is will be the increase in safety information reporting which will be a pre-requisite for safety information sharing.</p>
<ul style="list-style-type: none"> • Cost of collecting and distributing information borne by Information Suppliers. • Cost of running a global safety information sharing program by the Information Administrators; sufficient competent staff, technology and support infrastructure 	<p>The Information Administrators need to run the sharing service as a fully funded business where Information Customers are charged an annual access fee as well adhoc charges for specific research and analysis. Information suppliers may or may not be charged depending on the business model adopted. The service might also be sponsored by the interested parties such as ICAO, IATA, FSF etc.</p>
<ul style="list-style-type: none"> • Fear of some information being leaked and splashed over the front pages of newspapers • Giving information which manufacturers may use against in a warranty claim; i.e. examples where a/c has been operated outside of normal envelope. 	<p>All information will be confidential and securely stored and accessed via a secure web portal. This is more secure than old methods of sharing; paper and sending CDs in the post!</p>

Risk Mitigation Strategies, continued

Barrier	Enabler
<ul style="list-style-type: none"> Information Suppliers' concern about giving operational secrets away which give a competitive advantage 	<p>A clear statement of what is and what is not safety information will be in the service contract.</p>
<ul style="list-style-type: none"> Big organization's attitude of "what is in it for us". Also big organizations believe it is easier to identify them among de-identified information. 	<p>Large organizations will support a truly global sharing information program to which many other airlines and organizations contribute. The current attitude from the larger organizations is because current safety information exchange programs are relatively small and therefore large organizations do not get the same benefit as smaller organizations. Also we all share the same skies, apron and runways so it is in everyone's interest that everyone else is safe.</p>
<ul style="list-style-type: none"> Not all potential Information Providers have software tools which can export. 	<p>Those Information providers with software tools which cannot export could be supplied a collection software tool.</p>
<ul style="list-style-type: none"> Non industry standard classification of information used by organizations Will the global analysis of safety information useful or relevant to others? 	<p>A standard classification system needs to be selected, promoted and be a pre-requisite for joining the sharing program. A standard form of analysis and metrics will also result which will be more useful and relevant to participating organizations.</p>

Recommendations for a FSF Strategic Plan on Global Information Sharing

1. Endorse an industry standard classification system; ideally this should already exist and be currently used by many; do not want to re-invent the wheel. The FSF Classification working group should be approached.
 2. FSF to promote to its members the benefits of IATA STEADES and ASIAs safety information sharing programs and consider partnering/sponsoring with one or both of these.
 3. From the brainstorming session with the working group it was also felt that local knowledge of an airport operation was useful and that new technology such as a website or blog for pilots to share information on their local/base airports could be an import tool. It is recommended that research into this is conducted by the FSF with the cooperation and input from IALPA.
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January 2009

Bibliography:

Towards enhanced safety data bases - Capt. Bertrand de Courville (Air France)

Also many thanks to the ICARUS Global Safety Information Sharing working group for their input on this paper:

Danny Ho, EVA Air
Mike New, Bristow Helicopters
Peter Griffiths, UK DfT
Linda Or lady, United Airlines
Bertrand DeCourville, Air France
Kathy Abbott, FAA
Carlos Arroyo, Aeromexico