

Aviation Safety Reporting System

Safety Management Seminar

ATEC

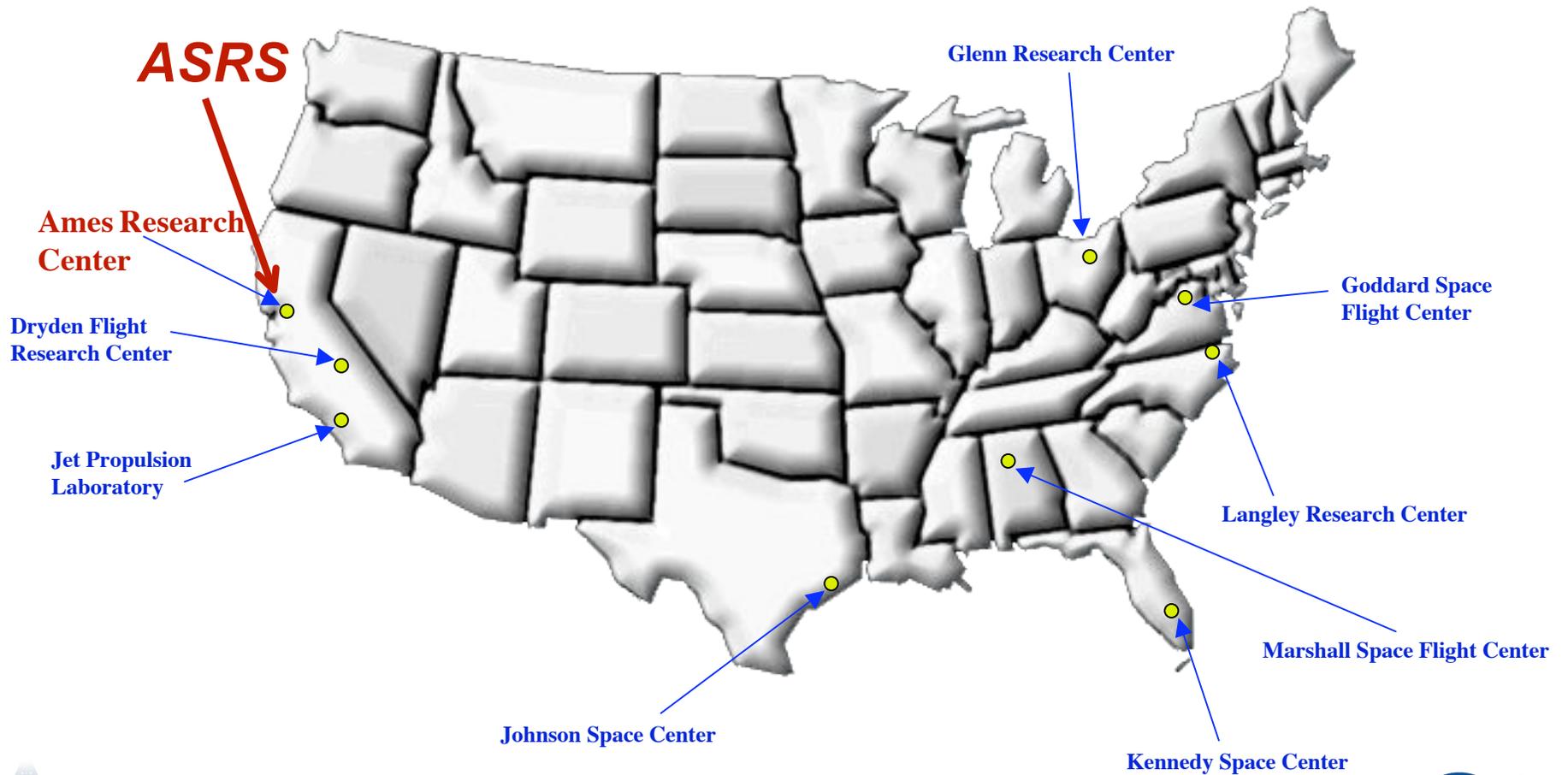
January 2011 • Tokyo Japan

Overview

**Linda Connell,
NASA ASRS Director**



Home of ASRS



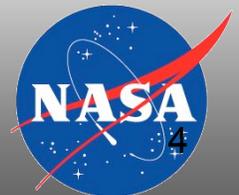
May 2008



Moffett Field - Hangar One
1932

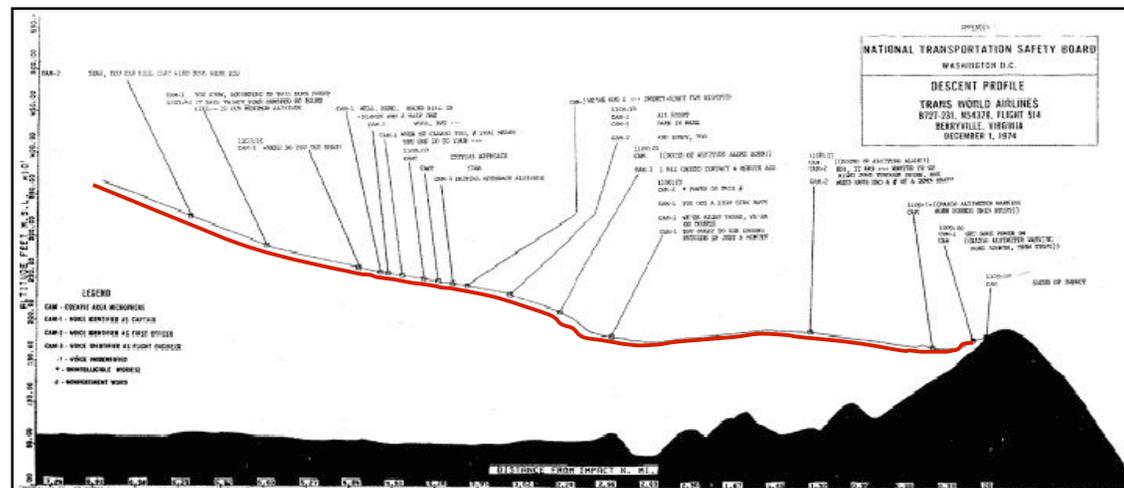


ASRS Background



ASRS History

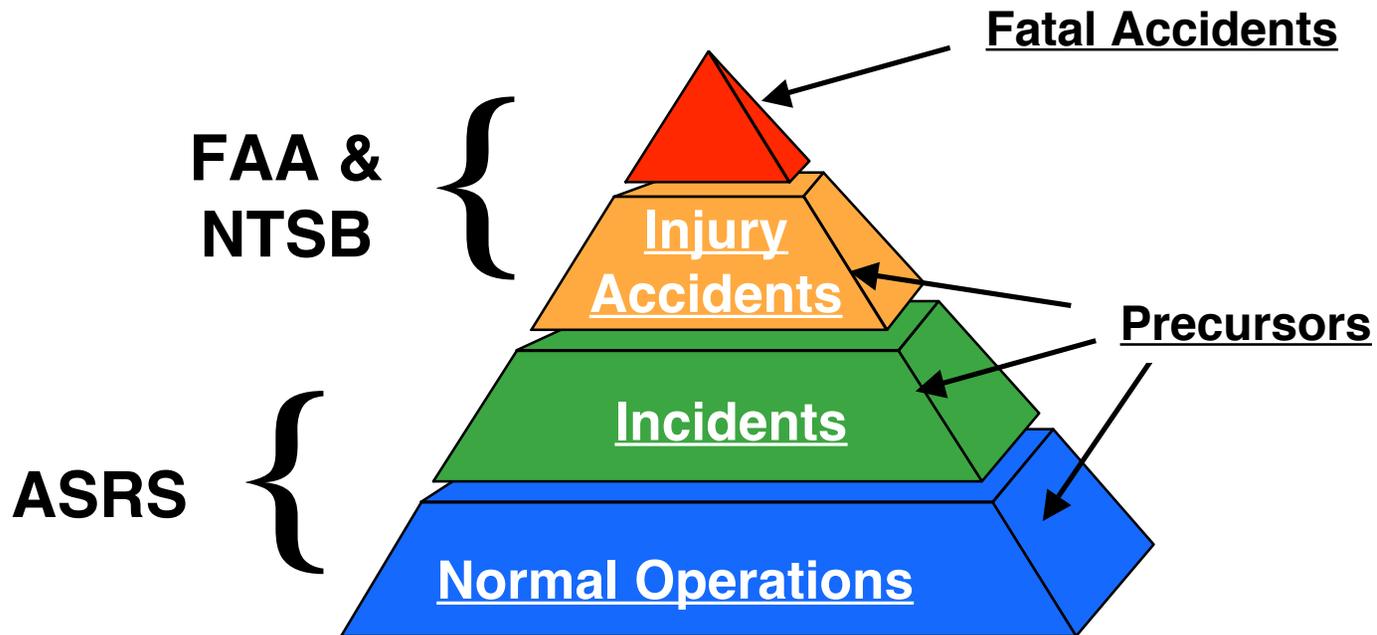
- The ensuing investigation revealed that six weeks prior, a United Airlines crew had experienced an identical ATC misunderstanding and narrowly missed the same mountain.
- At the time there was no method of sharing the United pilot's experience with TWA and other airline operators.
- This gave birth to the idea of a national aviation reporting program that would enable information sharing.
- In April 1976, NASA and FAA implemented the Aviation Safety Reporting System (ASRS)



NTSB Identification: DCA75AZ005



Event Occurrences



ASRS is Complementary to Other Systems of Reporting



FAA and NASA Partnership

MOA signed by Administrators for FAA
and NASA

. . . . To provide information to the FAA
and the aviation community to assist
them in reaching the goal of
identifying and eliminating unsafe
conditions to prevent accidents.



Guiding Principles

VOLUNTARY PARTICIPATION

Aviation personnel voluntarily submit reports concerning events related to safety for the purpose of system alerting, understanding and learning

CONFIDENTIALITY PROTECTION

Protection of identity is provided by NASA through de-identification of persons, companies, and any other information

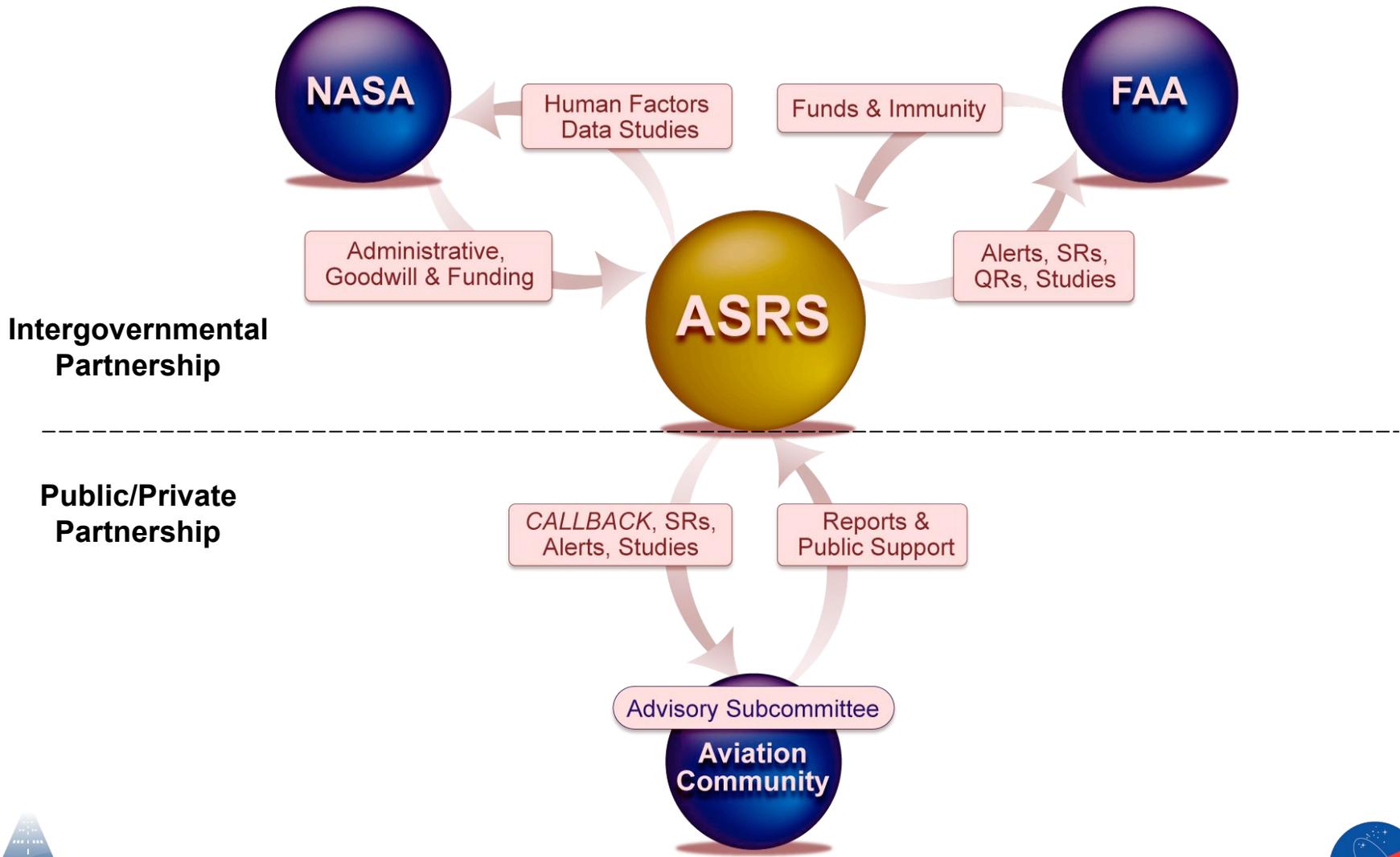
NON-PUNITIVE

FAA will not use, nor will NASA provide, any report submitted for inclusion under ASRS guidelines or information derived therein for use in any disciplinary or other adverse action.

(14CFR91.25 & Advisory Circular 00-46D)



ASRS Beneficiaries & Providers



Governing Documents

- **Federal Register Notices 1975 & 1976**
- **Federal Aviation Regulation - 14 CFR 91.25**
- **FAA Advisory Circular (00-46A, B, C, & D)**
 - **Defines immunity provisions for pilots and others**
- **FAA Facility Operation and Administration Handbook, 7210.3T (Air Traffic Controllers) and new ATSAP MOU**
 - **Defines immunity provision for Air Traffic Controllers**
- **FAA Order 8020.10: Aviation Safety Reporting Program**
 - **Establishes program responsibilities & ASRP Study Group**
- **Interagency Agreement (signed in 1999 and renewed in 2004 for an additional 5 years)**
 - **IA details such factors as duration, products, expected funding level, termination clause, points of contact, etc.**



U.S. Aviation Statistics *

▶ FAA Certificated Professionals

- Pilots 613,746
 - Air Carrier (124,746)
- Air Traffic Controllers 14,305
- Mechanics 116,310
 - Air Carrier (27,020)

▶ Airline

- Flight Attendants 98,700

▶ Potential Aviation Reporters

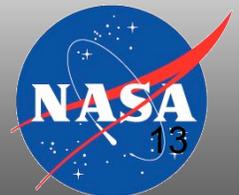
- TOTAL(Est.) 850,000

▶ Flight Volume

- 60,000 Flights/Day (Air Carrier, Cargo, Military)
- 27,178 Flights/Day (General Aviation)



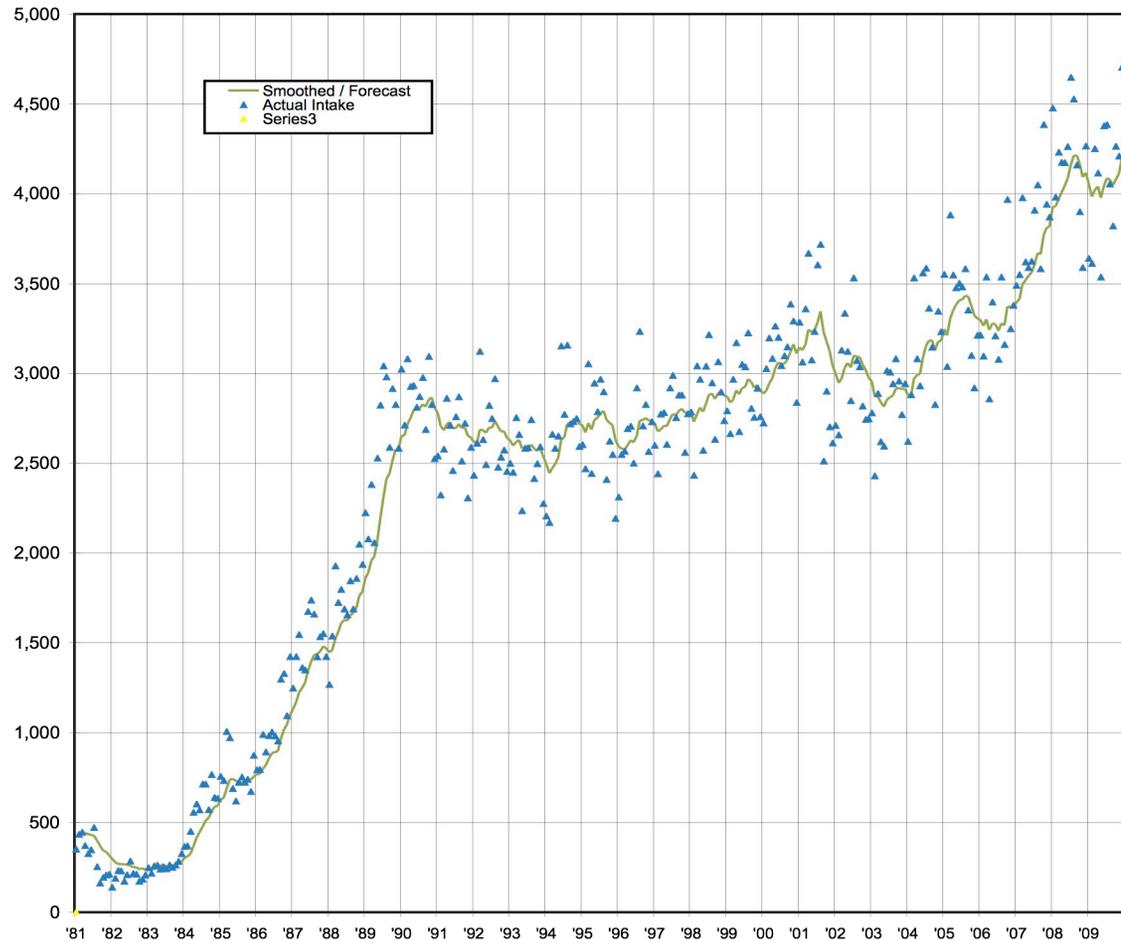
ASRS Program Overview and Use of Voluntary Reports



Monthly Report Intake

- Averaging 4,082 reports per month, 189 per working day
- Total Report intake for 2009 was **48,986**
- **60,000 to 62,000** Reports in 2010

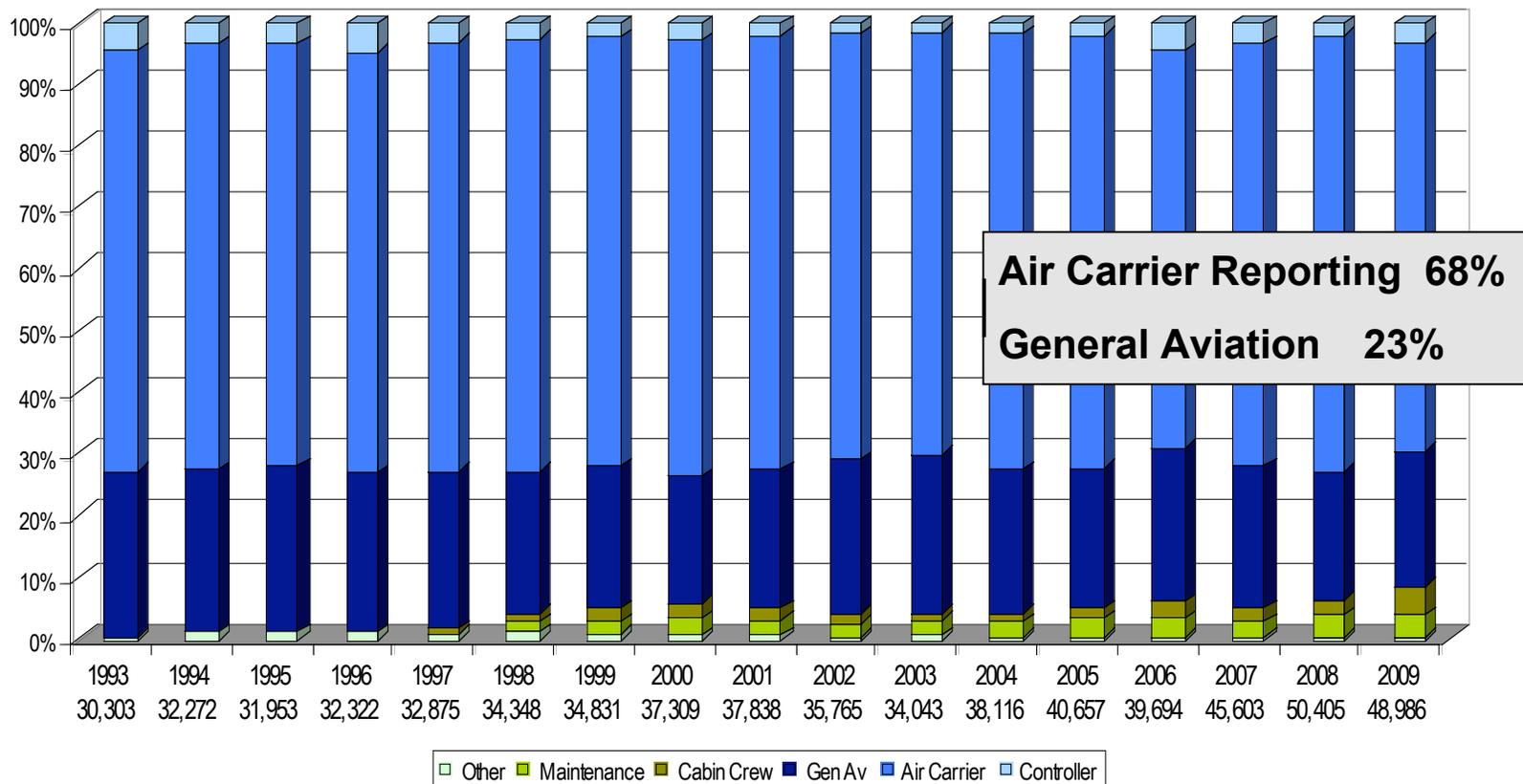
January 1981 – December 2009



INCIDENT REPORTER DISTRIBUTION

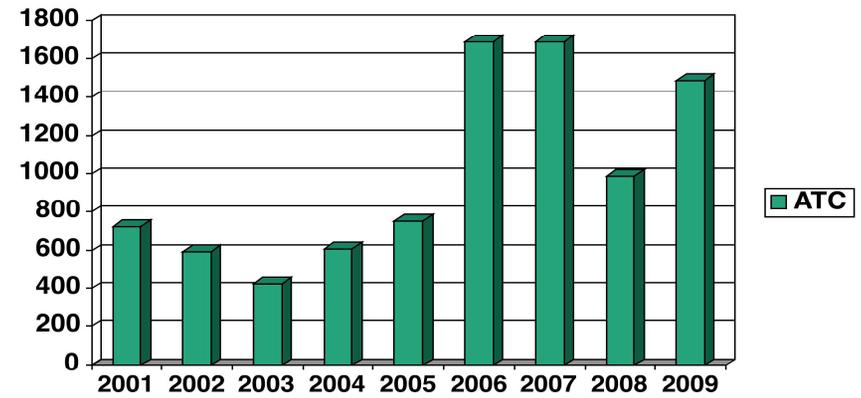
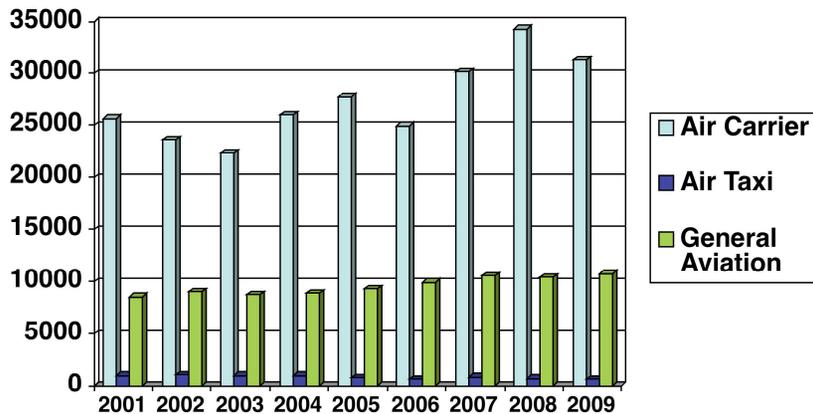
Percentage of Total Intake

January 1993 – December 2009

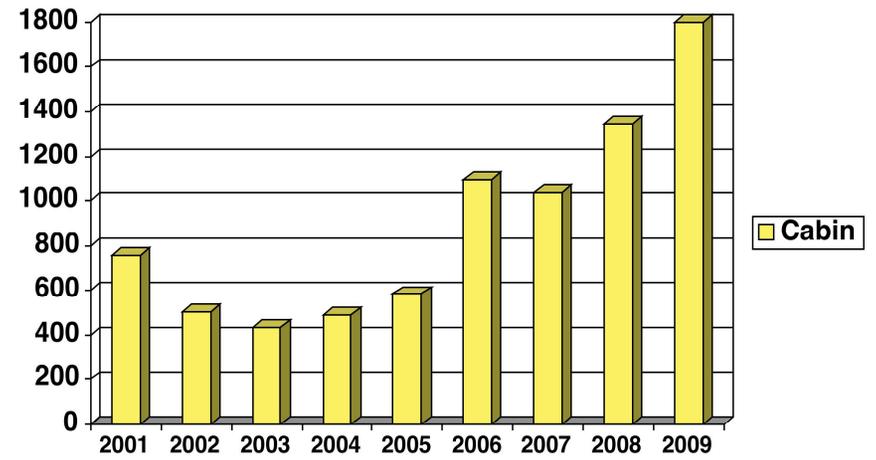
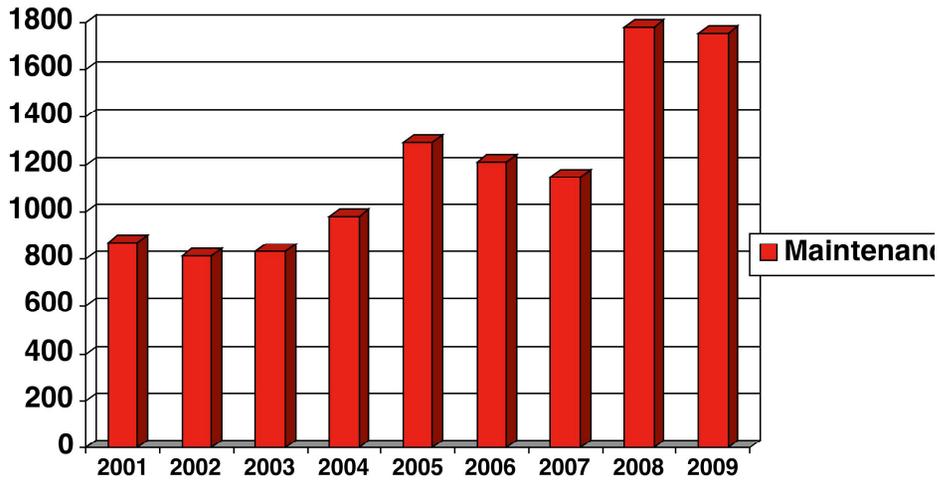


Report Intake 2001 - 2009

Reporter Groups



20% of all reports are matched to unique events



Decreases evident following September 11, 2001 are showing return to pre-9/11 levels



ASRS Forms and Reporting

Program Information

Report to ASRS

Search ASRS Database

Safety Publications

International

Online Resources

SEND REPORT ELECTRONICALLY

The Aviation Safety Reporting System (ASRS) has developed a new feature which enables you to securely send an Aviation Safety report via the internet. All ASRS Reporting Forms (General, Air Traffic Control, Maintenance, and Cabin) can be sent electronically. If electronic report submission is unavailable and there is a time issue you may want to download and the print the reporting form.

Adobe® Reader® is required for submission and must be configured to open within the browser window. Configuration settings are listed [here](#).

If you experience a certificate warning message, refer to our [FAQ](#) for further instructions.

If you want to keep a copy of your report for your own records, be sure to print it **BEFORE** clicking submit. For your security, the form is designed to clear after submission.

After you submit a report to ASRS online you will be taken to a web page with a verification code concerning your submission. Please retain this verification code for future reference. If you submit a report but do not receive a verification code, [contact us](#) immediately.

Quick Links

- ▶ [Send Report Electronically](#)
- ▶ [Download & Print for US Mail](#)

ERS Resources

- ▶ [Frequently Asked Questions](#)
- ▶ [Certificate](#)
- ▶ [Online Security Tips](#)
- ▶ [Contact ERS](#)



Download below to fill out & securely submit a form electronically:



General

Pilots, Dispatchers, & Airport Personnel



Air Traffic Control

Air Traffic Controllers



Maintenance

Mechanics



Cabin

Cabin Crew

Reporting Methods

Direct-to-ASRS

- ▶ Electronic Submission (ERS) from website
- ▶ From website
 - Fill out on computer, print, mail
 - Print, fill out by hand, mail
- ▶ Paper Forms
 - Remains a continuing source of reporting
 - Diminishing volume of paper

ASAP*-to-ASRS

- ▶ Electronic (*secure electronic transfer protocols*)
 - Direct from Airline Program
 - WBAT System or other software
- ▶ Paper Forms
 - Continue to be used but being replaced by electronic transfer

***Aviation Safety Action Program at airlines**



ASAP Reporting to ASRS (September 10, 2010)

▶ Overall ASAP Intake

- 149 Total Programs
- 59 Air Carriers

▶ Reporting Groups

- 58 Pilot
- 37 Mechanic
- 33 Dispatch
- 17 Flight Attendant
- 4 Ground Crew

▶ Secure Electronic Data connection protocols between airline and ASRS

- 142 Programs
- 57 Airlines

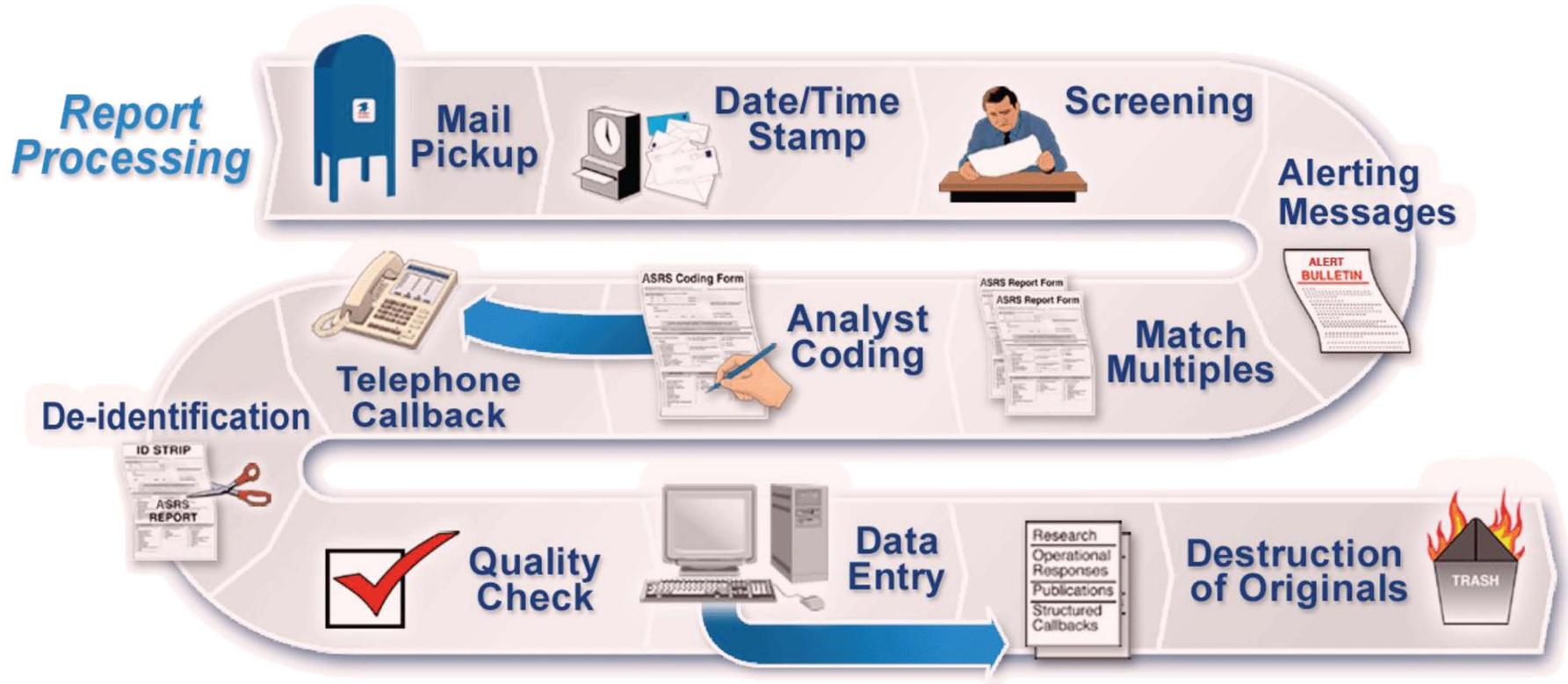
ASRS Electronic Transmission Methodology compatible with numerous software platforms

More airline programs being added continuously

20% of all reports are matched to unique events



Report Processing Flow



ASRS Staff

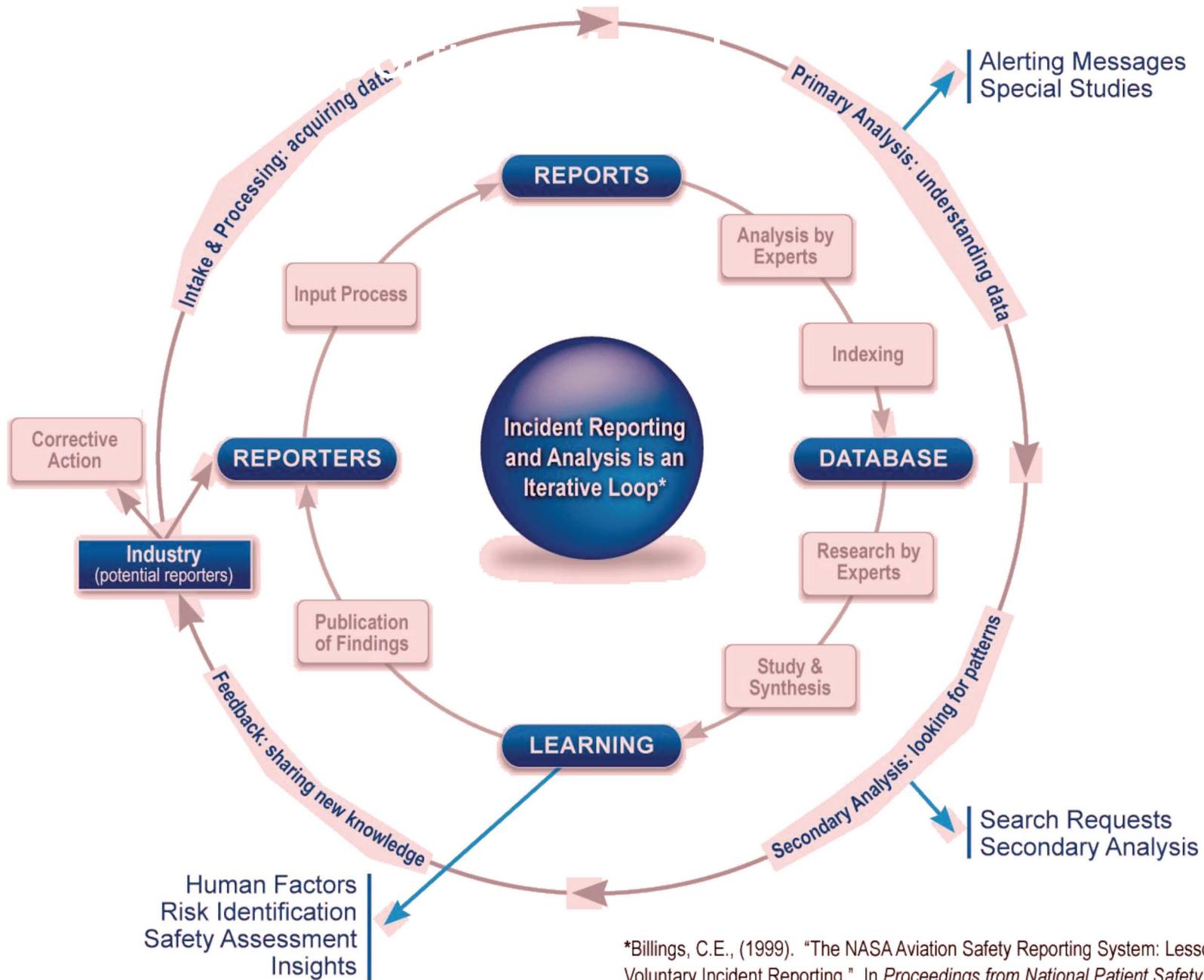
The ASRS Staff is composed of highly experienced pilots, air traffic controllers and mechanics, as well as a management team that possess aviation and human factors experience.

ASRS Analysts' average 35 years of aviation experience is comprised of

- ATC experience: Towers, TRACONs, Centers, and Military Facilities; or
- Over 200 cumulative years of pilot expertise covering the full spectrum of aviation activity: air carrier, corporate, military, and general aviation
 - Analyst cumulative flight time exceeds 100,000 hours in over 50 different aircraft
 - B727, B737, B747, B757, B767, B777, MD-80 series, A320 series, A330 series, L-88, Gulfstream II, III, IV, DH/HS/BAe 125-3A, 600, 700, 800, and other civilian and military aircraft

In addition, the ASRS Staff has human factors and psychology research experience in areas such as crew resource management, training, fatigue, user interface design, usability evaluations, and research methodology.





*Billings, C.E., (1999). "The NASA Aviation Safety Reporting System: Lessons Learned from Voluntary Incident Reporting." In *Proceedings from National Patient Safety Foundation Conference Enhancing Patient Safety and Reducing Errors in Health Care*.

WHY CONFIDENTIAL REPORTING WORKS

- When organizations want to learn more about the occurrence of events, the best approach is simply to ask those involved
- People are generally willing to share their knowledge if they are assured:
 - ✓ Their identities will remain protected
 - ✓ There is no disciplinary or legal consequences
- A properly constructed ***confidential, voluntary, non-punitive*** reporting system can be used by any person to safely share information



ASRS Metrics

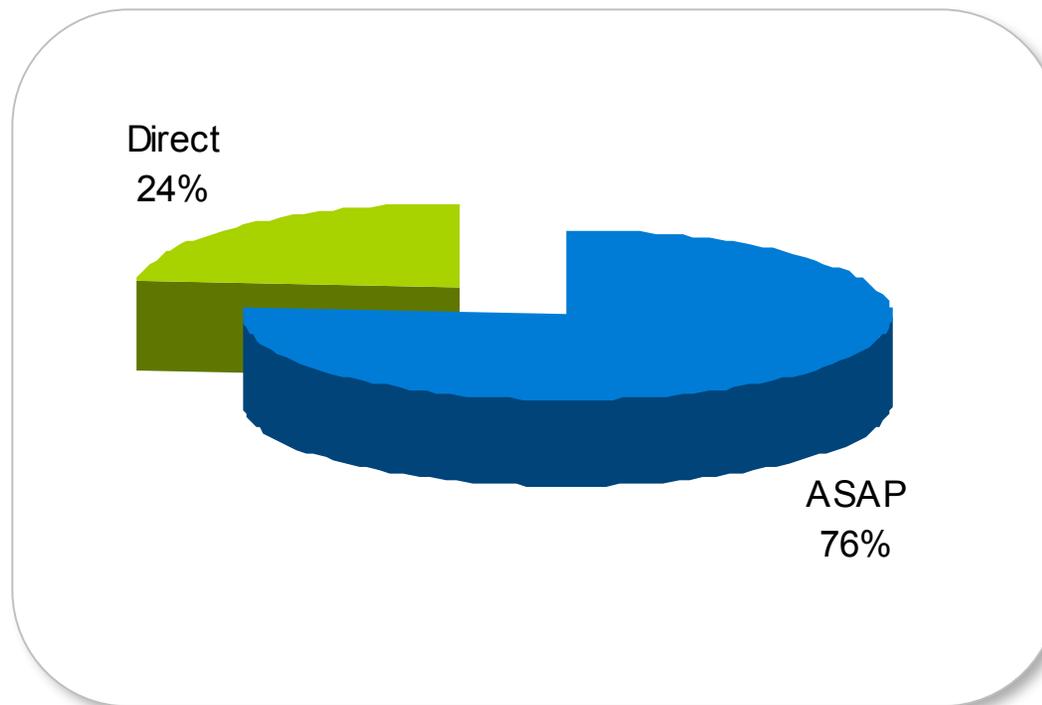
April 1976 – December 2009

Significant Items	Quantity
Incident Reports Received	Over 868,421
Safety Alert Messages Issued	5,024
Search Requests	7,317
<i>CALLBACK</i> Safety Bulletins	360
<i>ASRS Directline</i> Issues	10
Major Research Studies	63



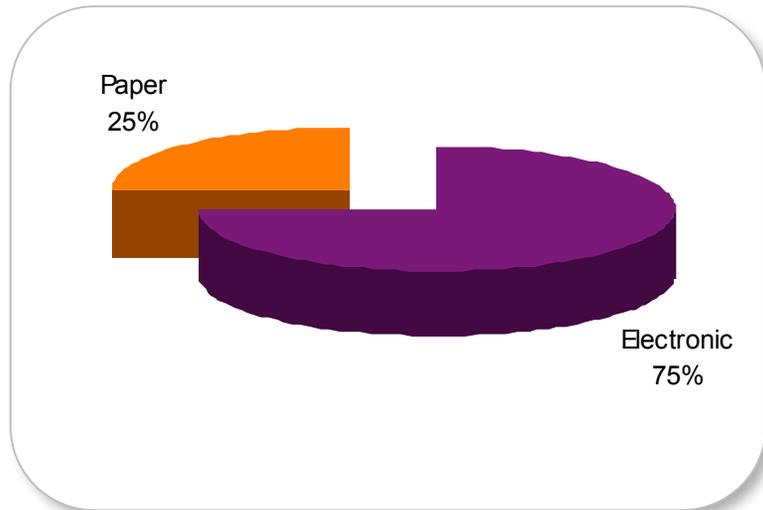
ASRS Intake – Jan 2010 through Aug 2010

Total ASRS Intake

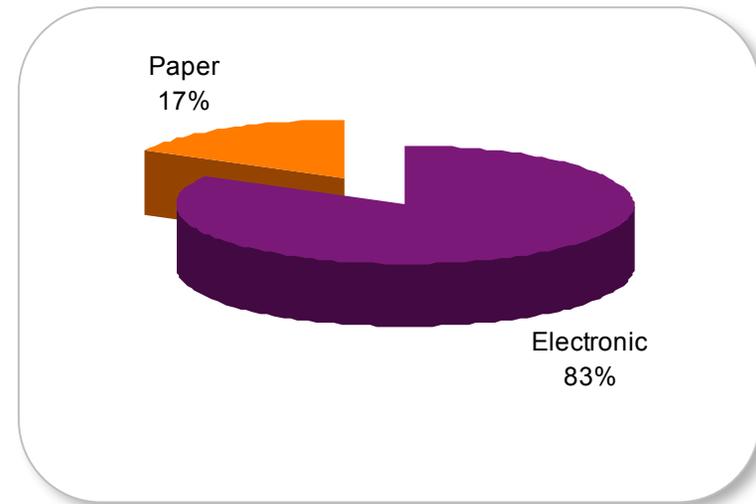


ASRS Intake – Jan 2010 through Aug 2010

ASRS Direct Intake



ASRS/ASAP Intake



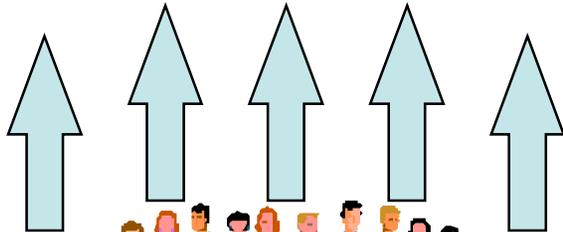
Currently 86% of reports are received electronically



ASRS Purpose

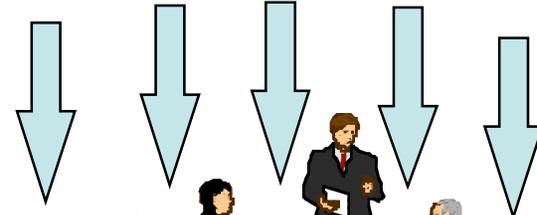
ALERTS

Identify
Deficiencies and
Discrepancies



PRODUCTS

Provide Data for
Planning and
Improvements



ASRS Products & Services



ASRS Web Site

The screenshot shows the ASRS website interface. At the top, it says 'Aviation Safety Reporting System' with 'Home' and 'Contact Us' links. Below that is a 'GENERAL FORM' header. The main content area features a large 'CALLBACK' banner with the ASRS logo. The article title is 'A Delicate Balance: "Minimum Fuel" vs. "Emergency Fuel" Declarations'. The article number is 'Number 367' and the date is 'July 2010'. The article text discusses pilot reports of fuel emergencies and the importance of declaring them. A fuel gauge image is also present.

- ▶ Completed Fall 2006
 - Over 7 million hits in 2009
- ▶ File an ASRS Report
 - Electronic
 - Print and Mail
- ▶ Database Online
- ▶ ASRS Publications
- ▶ Program Information
- ▶ Immunity Policies

<http://asrs.arc.nasa.gov>





Alert Messages and Monthly Telecons



Safety Alerts

- **Types of Safety Alerts**
 - Alert Bulletin (AB)
 - For Your Information Notice (FYI)
- **Identifying Safety Alert Candidates**
 - Expert Analyst review during screening
 - SME knowledge base
 - Downstream identification
 - Occurs after initial screening during regular report processing
 - May result from information obtained in a callback to reporter



Safety Alerts

- **Expert Analysis**

- Analysts assigned to sets of reports on basis of expertise
- Analyst contact reporter for more information (attempt 100% contact)
- Analyst reviews pertinent sources of information
 - Aircraft and other manuals, publications, cooperative review with other analysts, etc.



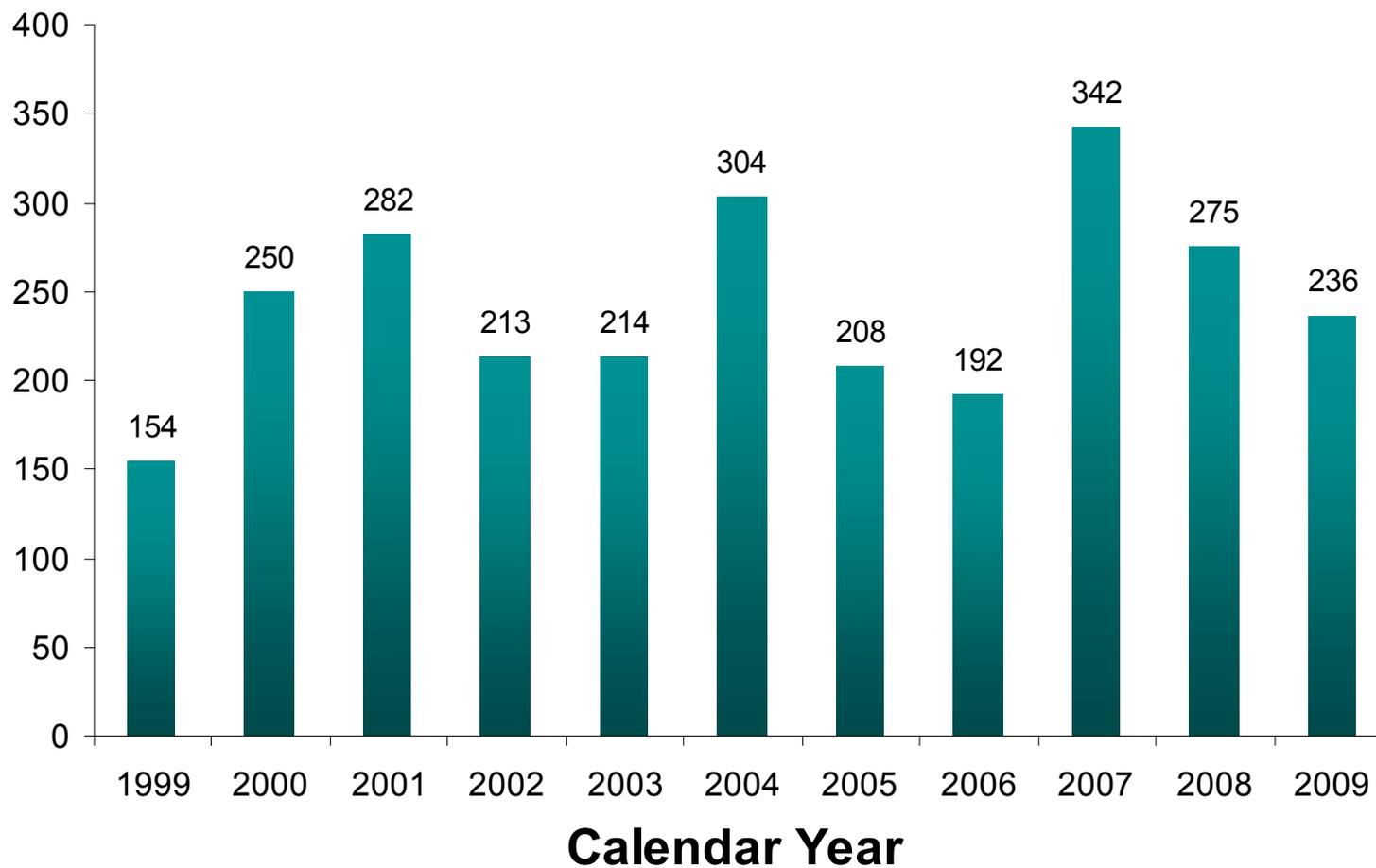
Safety Alerts

- **Timeliness of Safety Alerts**
 - Relevant reports may be grouped to provide more comprehensive picture
 - Issue may be identified subsequent to screening process by:
 - An emerging industry issue or concern
 - Downstream recognition of pertinent information
 - Information obtained during normal processing of a report
 - Can be accomplished quickly following NASA assessment of confidentiality concerns
 - Recent MD80 flight control issued in 24 hours



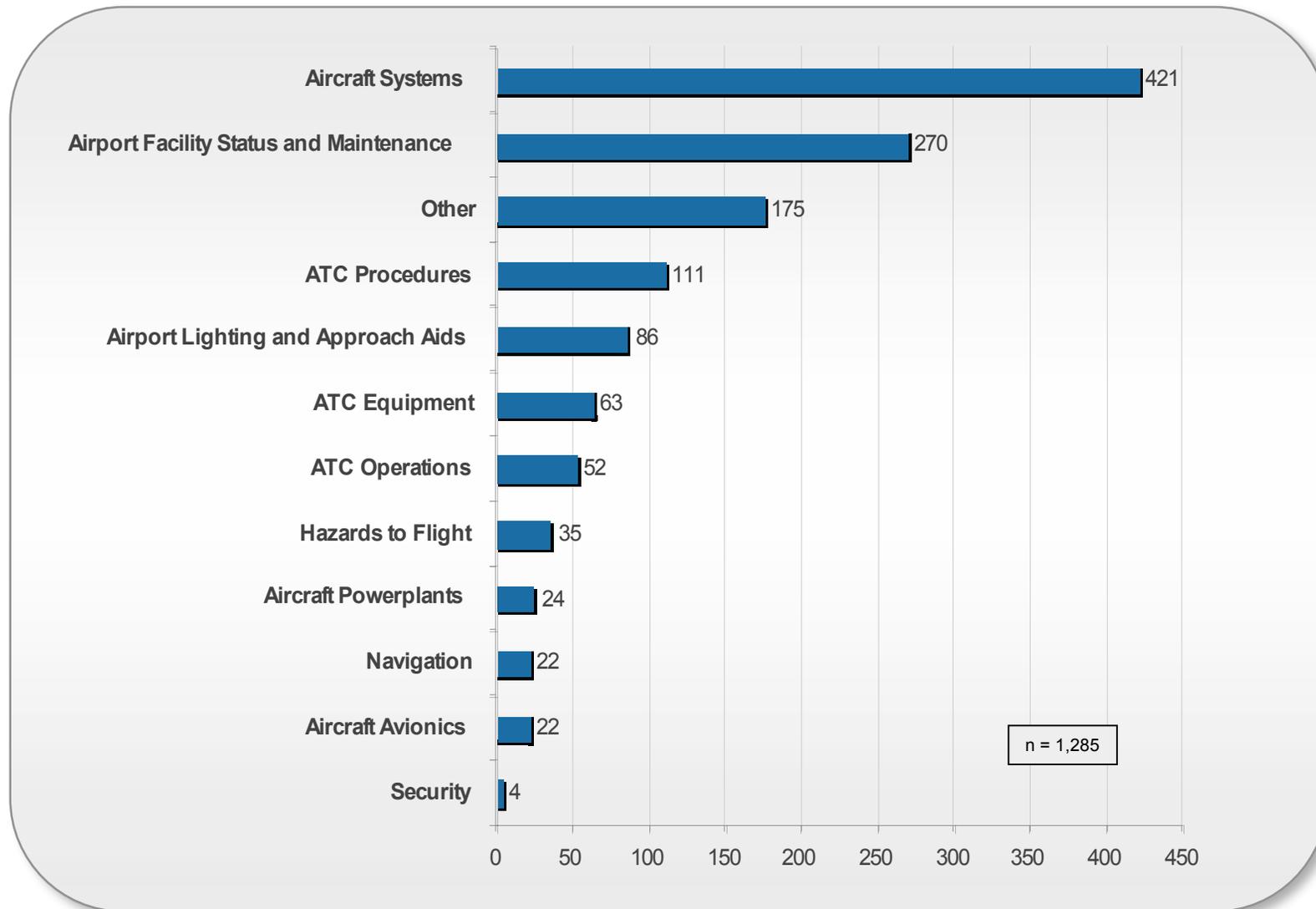
ASRS Alerting Messages

January 1999 – December 2009



Safety Alerts – Alerting Subjects

Messages Issued 2006 – Present

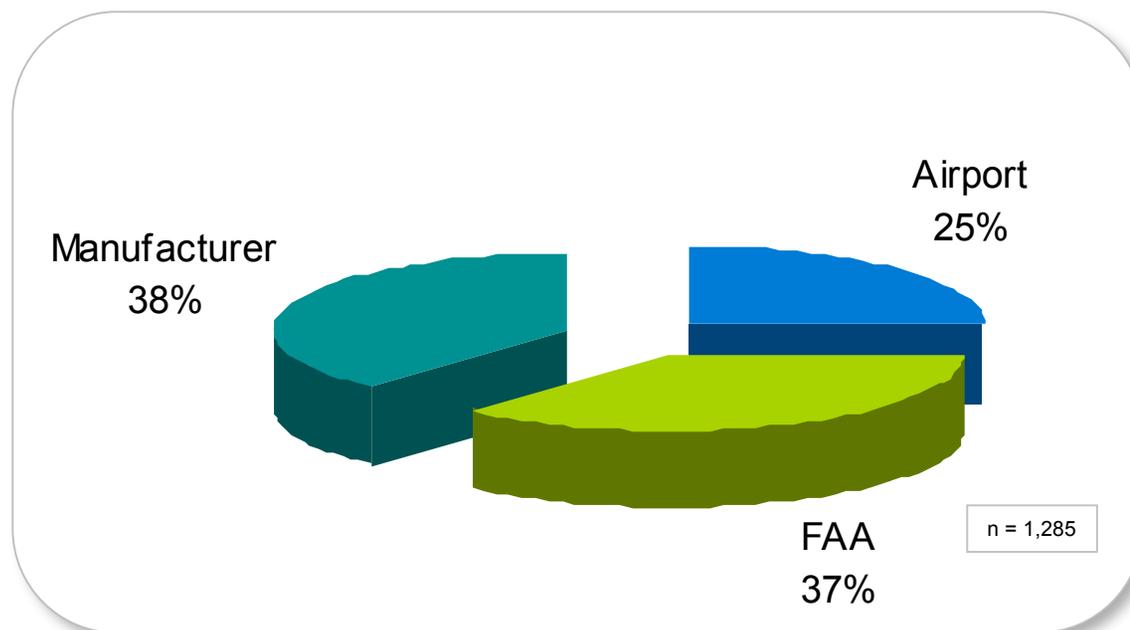


* 2010 data current through November 16.



Safety Alerts – Addressee Distribution

Messages Issued 2006 – Present



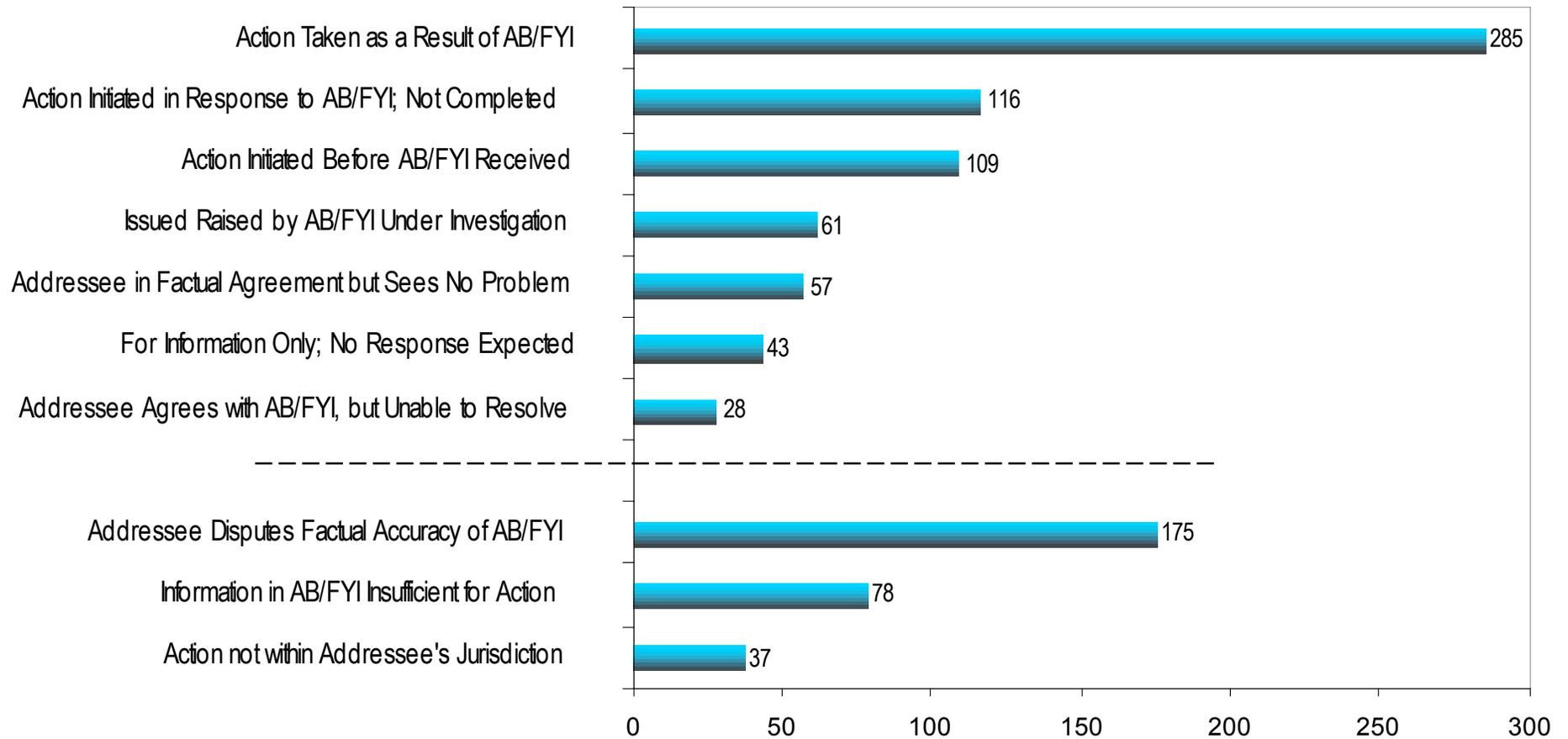
Alerting Metrics

January 1999 – December 2009

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alert Messages Issued	78	87	88	61	115	157	79	75	63	40	30
FYI Notices Issue	75	168	190	151	99	147	129	117	279	235	206
Response Rate to AB/FYI	35%	26%	24%	25%	28%	36%	32%	35%	49%	46%	38%
Response Rate Non-Manufacturer	75%	42%	32%	32%	38%	82%	45%	55%	64%	55%	26%



Alert Responses 1999 – Present





Database Search Requests



ASRS Database Search Requests

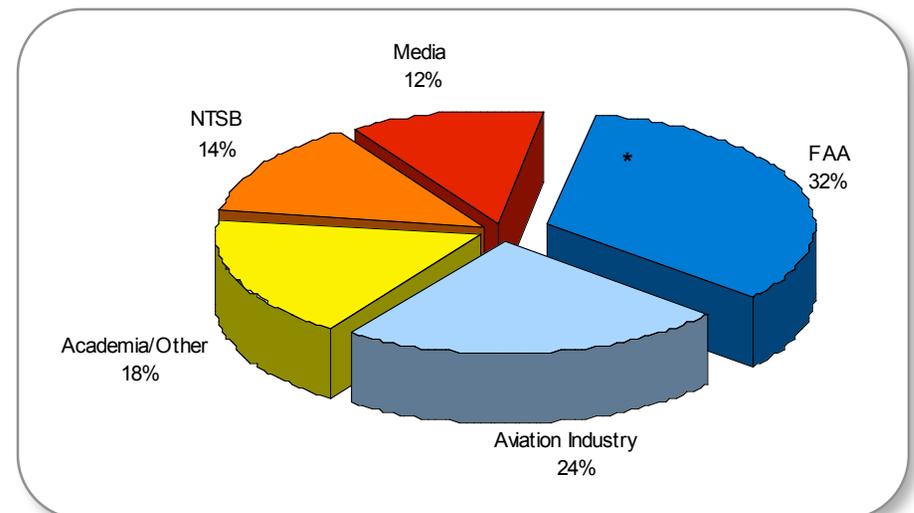
January 2009 – December 2009

▶ Database search requests from...

- Government (FAA, NASA, NTSB, etc)
- Industry (ALPA, FSF, Manufacturers, etc)
- Academia

▶ Automatically conducted for accidents

- Disseminated to NTSB, FAA, etc.
- Recent examples
 - ✓ A330 Accident at Tripoli International Airport, Libya
 - ✓ DHC-8-400 Accident in BUF, NY
 - ✓ A320 Hudson River Ditching Accident
 - ✓ MD10 and MD11 Autothrottle Incidents – Shanghai, China Accident



ASRS Database Online (DBOL)

Begin Results View

New Search
Help
Contact Support

How to Search: ASRS Database Items (Taxonomy)

Step 1: Click + to add search items.
Step 2: In "Current Search Items" section, select "Click Here" in a statement and choose items from Lookup Window.

Date & Report Number

- + Report Number (ACN) was [number]
- + Date of Incident was between [date] and [date]

Environment

- + Flight Conditions were [conditions]
- + Lighting was [condition]
- + Weather was [element]

Aircraft

- + Federal Aviation Regs (FAR) Part was [regulation]
- + Flight Plan was [type]
- + Flight Phase was [phase]
- + Make / Model was [type]
- + Mission was [operation]

Place

- + Location was [identifier]
- + State was [abbreviation]

Person

- + Reporter Organization was [type]
- + Reporter Function was [position]

Event Assessment

- + Event Type was [anomaly]
- + Detector was [equipment / human]
- + Primary Problem was [most prominent factor]
- + Contributing Factors were [problem areas]
- + Human Factors (since 6/09) were [factor]
- + Result was [consequence]

Text: Narrative / Synopsis

- + Text contains [word(s)]

Current Search Items:

Back Run Search

- ▶ System launched August 23, 2006
 - Over 70,000 total online queries completed to date
 - Over 20,966 queries completed in 2009
- ▶ Fixed field and text search capability
- ▶ Data formats (export)
 - MS Word, Excel, CSV
HTML
- ▶ Experts version (DBOL II) being proposed

 <http://asrs.arc.nasa.gov>





ASRS Research and Special Projects

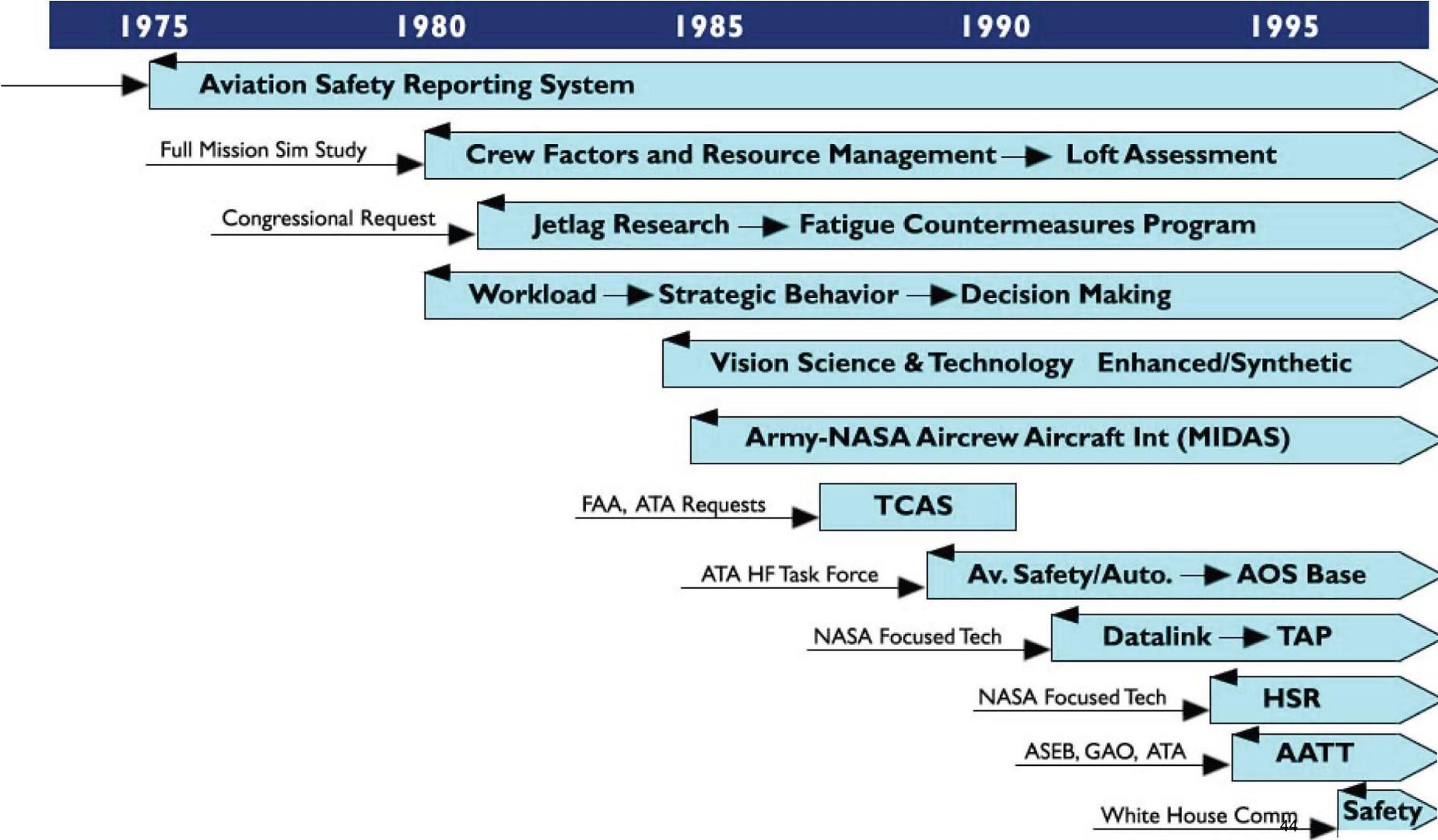


ASRS Research Focused on Operations and Human Factors

- ▶ 63 Research Studies and Special Papers Published
 - **Operations:** Deviations, De-Icing/Anti-Icing, Rejected Takeoffs, Clearances, Weather Encounters, Landing Incidents, Runway Transgressions, TCAS II, Crossing Restrictions, etc.
 - **Human Factors:** Communication, Memory, Confusion, Time Pressure, Judgment, Training, Crew Performance, Flight Crew Monitoring, etc.
 - **Confidential Reporting:** ASRS Reporting Model, Case for Confidential Reporting, Development of ASRS, Cross-Industry Applications, etc.
- ▶ Research agendas are developed in collaboration with government and industry safety organizations.
- ▶ There are over 30 ASRS research papers available for download on the ASRS website, dating from 1985 to date. Activity is ~ 3,300 downloads/month.



ASRS Genesis of Human Factors Research at NASA Ames

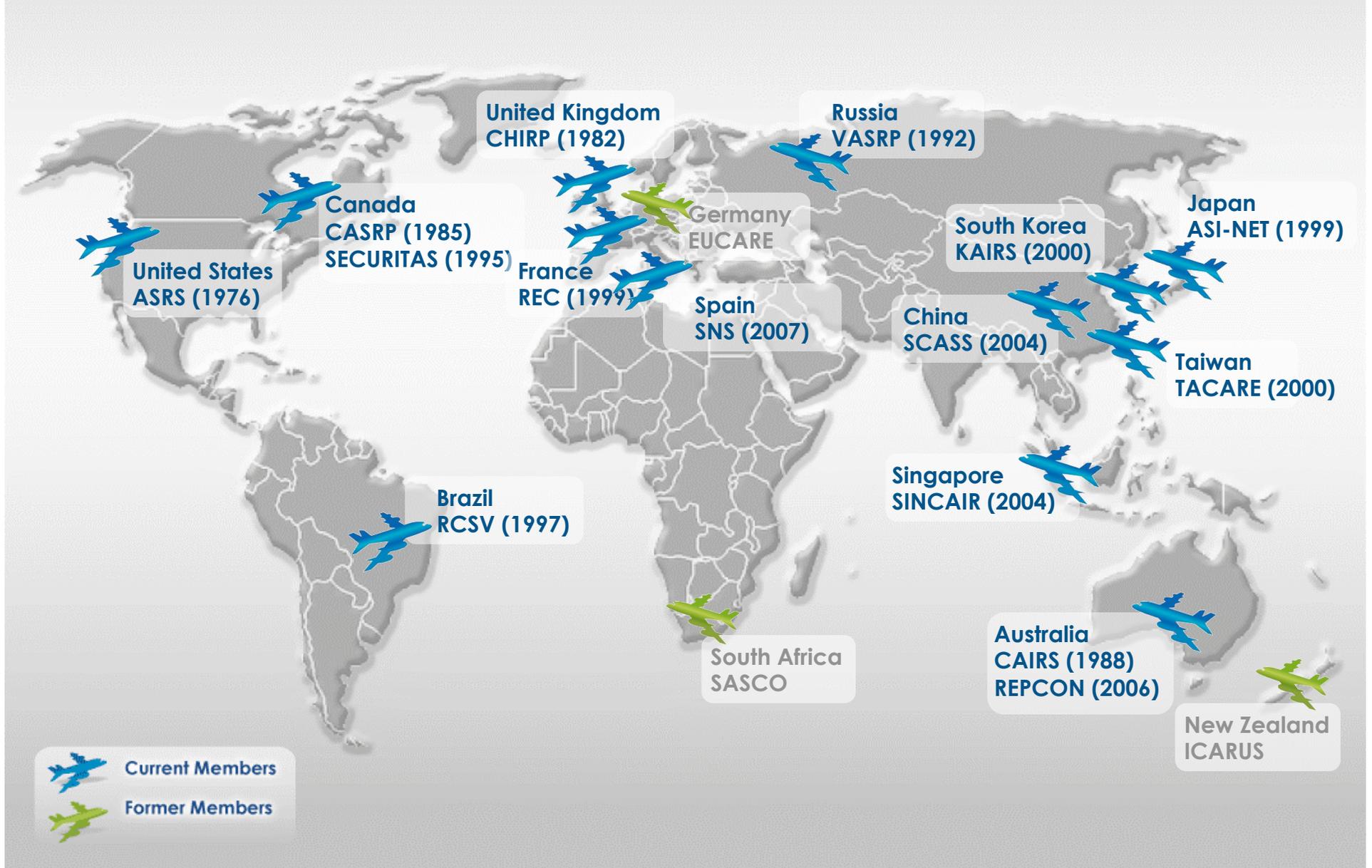




**Voluntary, Confidential, Non-
Punitive and Independent
Safety Reporting Model
is
Growing in International
Aviation**



International Confidential Aviation Safety Systems (ICASS)



Breaking News

International Civil Aviation Organization (ICAO) has revised Annex 13 - Accident Prevention to be implemented in November 2010. The previous Recommendation for member nations to establish a confidential safety reporting system has been elevated to a Standard.





Safety Management Systems (SMS)



FAA SMS Statements

- SMS is a management system for integrating safety activities into normal day-to-day business practices. SMS is assigned to help organizations integrate a systematic risk-based and process-oriented approach to managing safety.
 - SMS requires a proactive approach to discovering and correcting problems before they exhibit safety consequences.
 - SMS is not a substitute for compliance nor oversight.



ICAO Integrated SMS

Mandate

- The development and administration of safety management standards and recommended practices (SARPs)
- Development and administration of safety management training and facilitation activities
- Development and administration of safety management guidance materials
- **Development and administration of an integrated safety trend analysis and reporting system (iSTAR)**

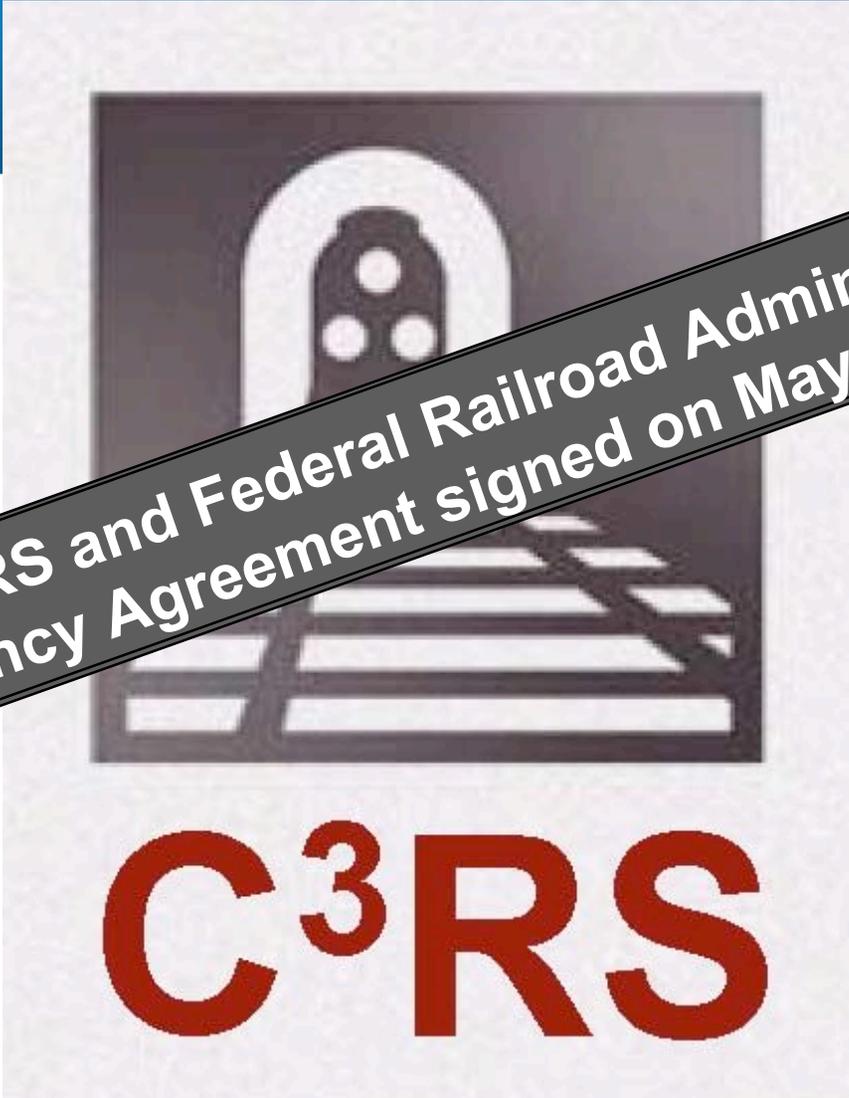




Other Domains Establishing Safety Improvement Programs Using Confidential Reporting

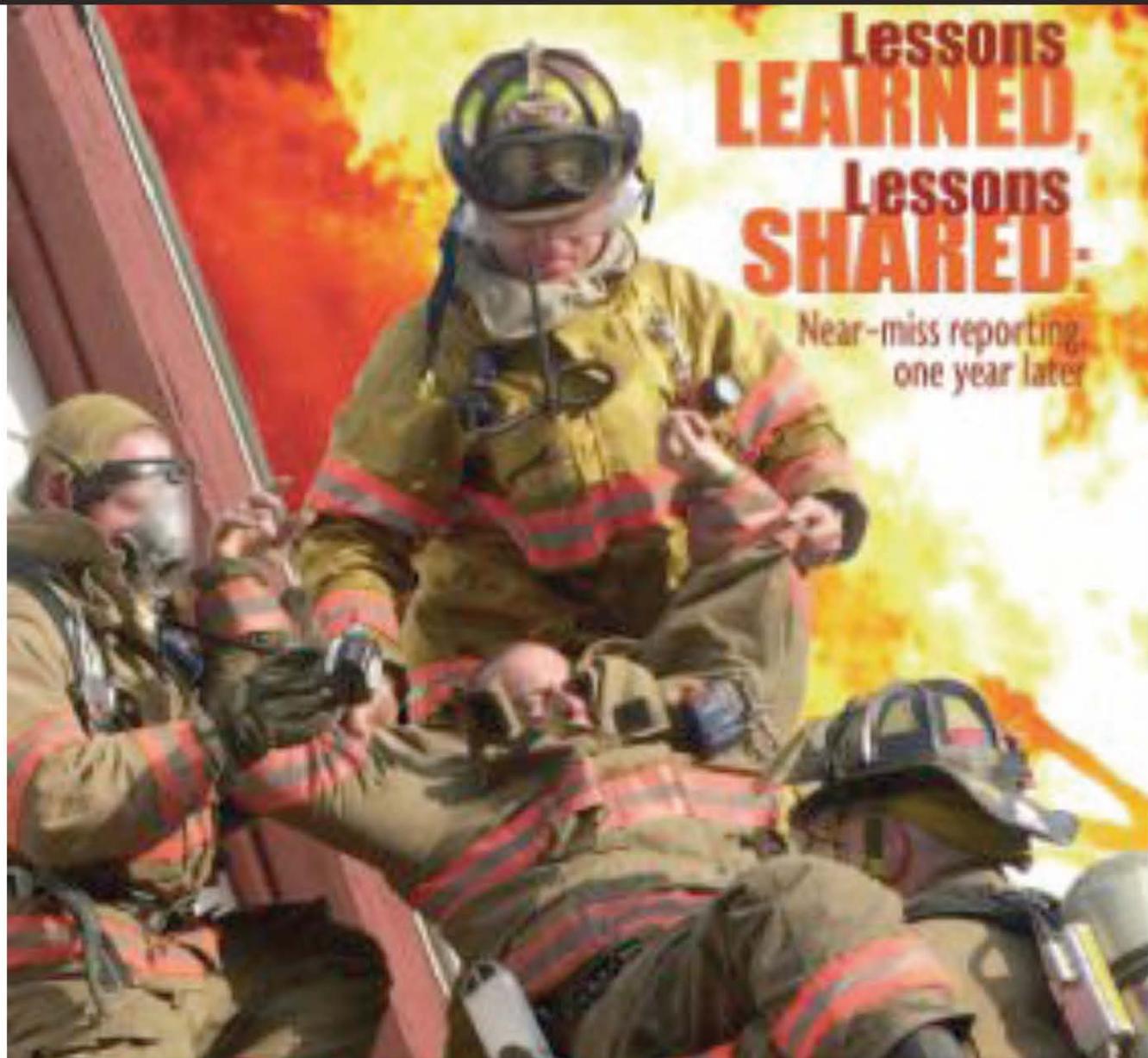


NASA ASRS and Federal Railroad Administration
Interagency Agreement signed on May 21, 2010



Confidential Reporting in the U.S Railroad Industry





Lessons LEARNED, Lessons SHARED:

Near-miss reporting
one year later

United States Fire Fighter Reporting



National Fire Fighter Near - Miss Reporting System

SUBMIT REPORT

PRINT BLANK REPORT

SEARCH REPORTS

RESOURCES



Welcome to the National Fire Fighter Near-Miss Reporting System

The National Fire Fighter Near-Miss Reporting System is a voluntary, confidential, non-punitive and secure reporting system with the goal of improving fire fighter safety.

Submitted reports will be reviewed by fire service professionals. Identifying descriptions are removed to protect your identity. The report is then posted on this web site for other fire fighters to use as a learning tool.

[Submit a Report](#)

[Questions?](#)
[Ask a Report
Reviewer](#)



Photos by Jason R. Henske/Fyrfoto.com

SUMMARY



NASA Procedures and Guidance

- Risk Management

▶ Encompasses:

- Risk Assessment
- Risk Mitigation
- Evaluation of Residual Risk
- Risk Acceptance

*Confidential Reporting Model Has
Specific Contributions to:*

Risk Assessment



Nine Steps of Risk Assessment

- 1) System Characteristics
- 2) Threat Identification
- 3) Vulnerability Identification
- 4) Control Analysis
- 5) Probability Determination
- 6) Impact Analysis
- 7) Risk Determination
- 8) Control Recommendations
- 9) Results Documentation



SUMMARY

Confidential reporting systems
have the means to answer the
question *why?* –
why a system failed
why a human erred



Unique Aspects of ASRS

System-Wide Perspective - capability to identify hazards identified by aviation personnel and match reports from all segments of aviation community

- ASRS was catalyst for recent FAA focus on Teterboro Departures

System-Wide Alerting - both national and international capability to provide ASRS Alert Messages to industry and government

- 2009 Alert Messages concerning 236 safety issues

Data Processing through Aviation Expert Analysts

- ASRS Office staff include Aviation Expert Analysts with a combined total of 200 years of experience in aviation (air carrier pilots, corporate pilots, general aviation pilots, air traffic control, and maintenance)
- Experts read and review 100% of reports and reliably code information to databases

Comprehensive and Time Tested Coding Taxonomy

- Fixed Field Codes combined with Narrative Text yields qualitative data for further secondary analysis techniques (Perilog, special studies, focused analytic techniques, etc)



Unique Aspects of ASRS

Strong Immunity and Legal Provisions

- Federal Law specifically addressing ASRS (14 CFR 91.25)
- FAA Advisory Circular 00-46D
- ASRS Mandated by Congress in 1980's

Information Sharing on Safety/Security

- Database Search Requests, Database Shared with FAA NASDAC, Topical Studies, Structured Telephone Callback Studies, Collaborations with Industry and Gov't (FAA, NTSB, NASA, TSA, etc.)
- Largest source of ASAP data collected in central location

National and International Reputation

- ASRS Recognized Model for Proactive Contribution to Safety Process
- Int'l Confidential Aviation Safety Systems (ICASS)
- ASRS Model Being Utilized by Other Domains for Safety Improvements



Contact Information

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