



Aviation Safety Reporting System SAFETY INFORMATION

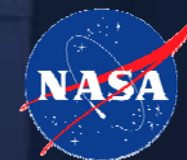
Safety Intelligence & Management Through Safety Reporting



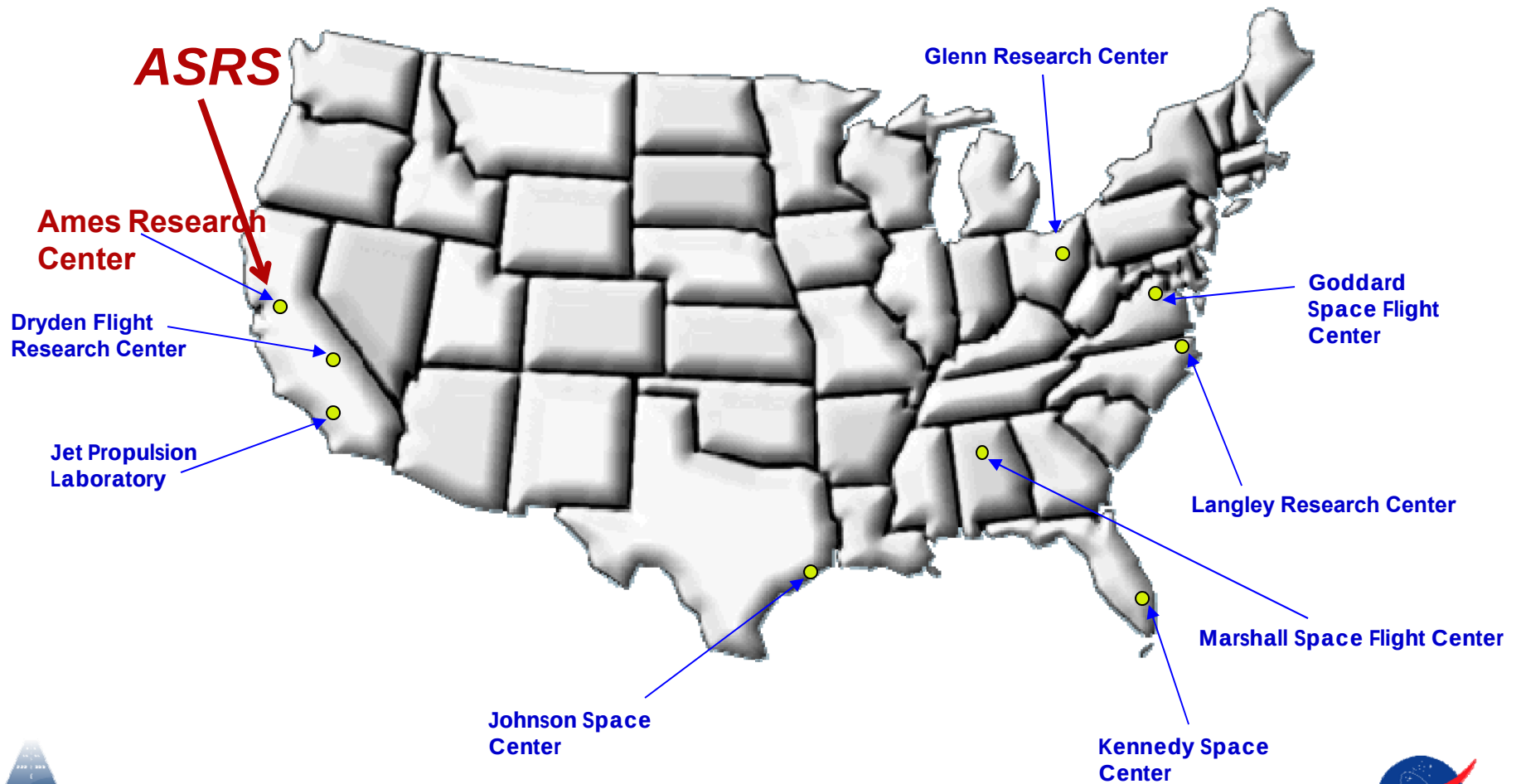
Presentation from:
Linda Connell, NASA ASRS Director
Human Systems Integration Division
NASA Ames Research Center



AVIATION SAFETY REPORTING SYSTEM



NASA Aviation Safety Reporting System



Aviation Safety Reporting System





What is ASRS Safety Reporting?



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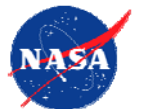


System-Wide Event Occurrences

- ASRS is complementary to other systems of reporting and focuses on precursors to the most severe events

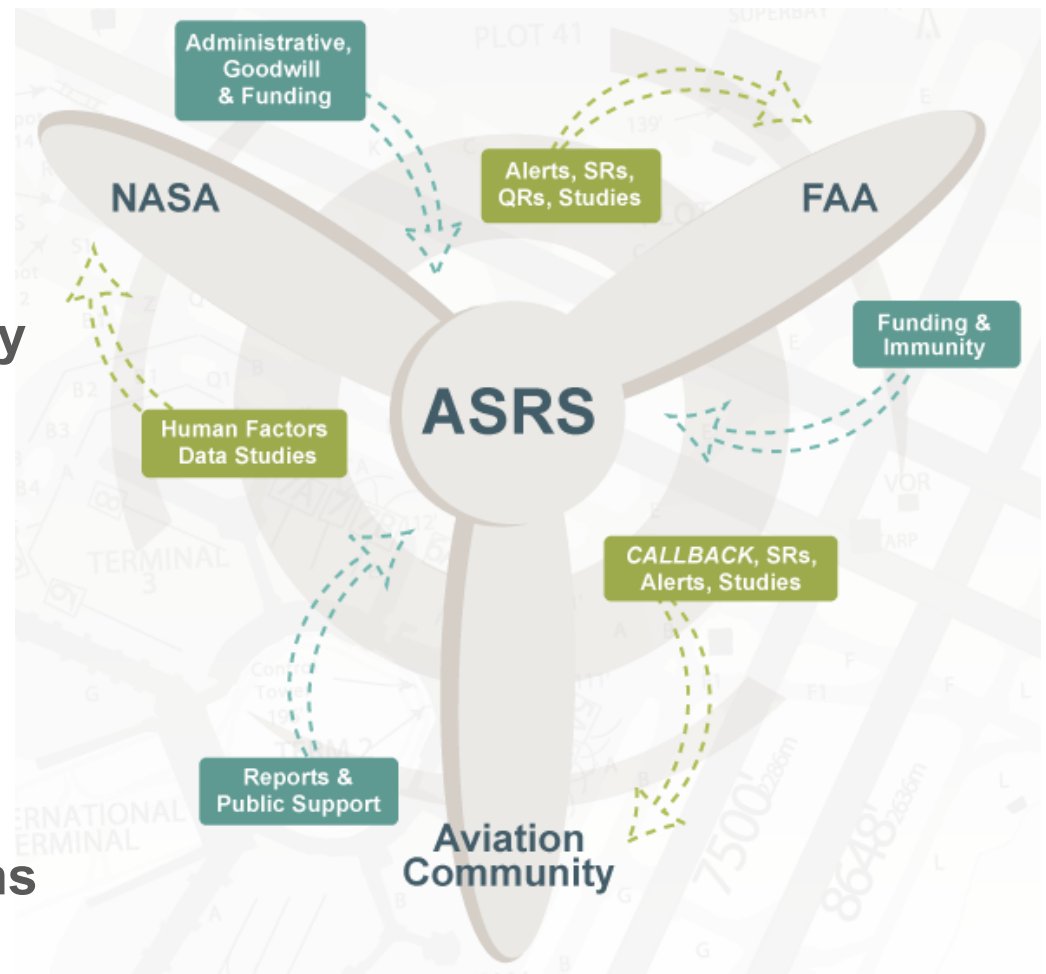


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ASRS Gov't/Industry Stakeholders

- **FAA provides reimbursable funding to NASA for ASRS Management & Expertise**
- **NASA provides Aviation Safety Program funding for direction & management of ASRS**
- **The Aviation Community provides support through advocacy for reporting, feedback, and communications**



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ASRS 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 & AC 00-46E)

INDEPENDENT

Necessary for trust building and unbiased dissemination of safety information



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Linking Risk Assessment with Risk Management Leading to Safety Intelligence



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NASA Procedures and Guidelines

Nine Steps of Risk Assessment

*Confidential
Reporting
Model Has
Specific
Contributions
to:

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

NASA NPG 2810.1



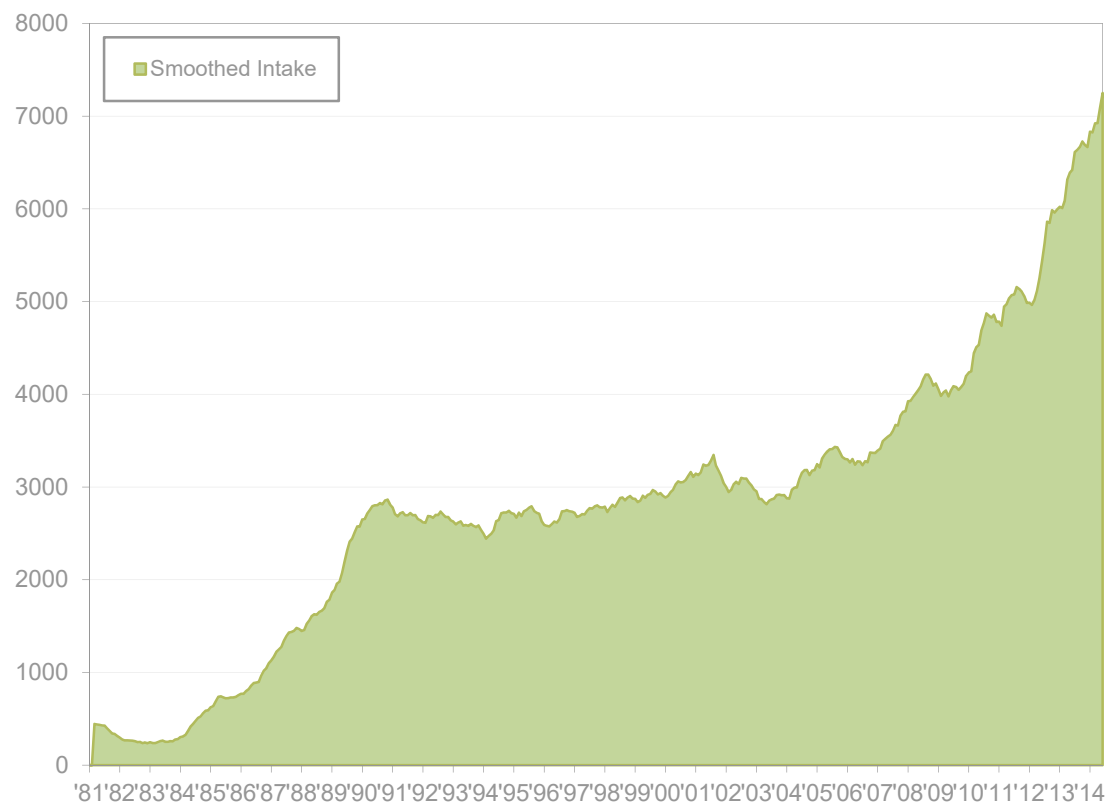
Data Characteristics of Voluntary and Confidential Reporting



ASRS Report Volume Profile

- 38 years of confidential safety reporting
- Over 1,200,000 reports received
- Over 5,900 alert messages issued
- Over 7,542 reports per month, or 359 per working day
- Total report intake for 2013 was 80,840
- Current rate estimate for 2014 is over 90,500

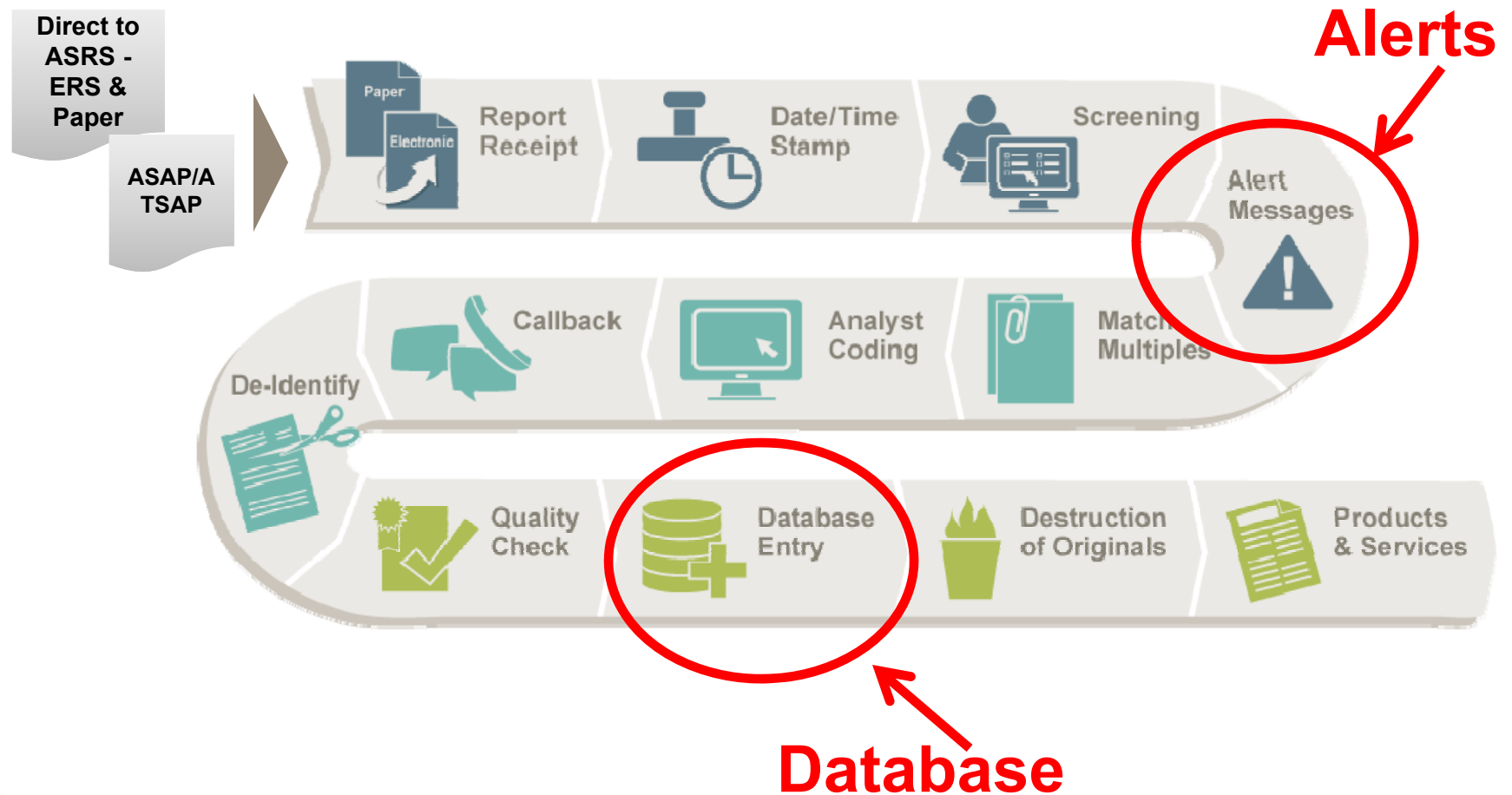
Monthly Intake
January 1981 – June 2014



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Report Processing Flow



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Collecting Data is not the Final Goal

Data => Analysis => Information => Intelligent Decisions



ASRS Aviation Expert Analysts provide initial review of 100% of reports and produce insights and categorization of data using mature taxonomy

Not all data are created equal. The nature of the data characteristics determines analyses:

Quantitative (e.g., Flight Recorder Data, Aircraft Systems)

Qualitative (e.g., Voluntary, Subjective Reporting)



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Data Typology

Qualitative

Describes the “why” of events
Takes advantage of diverse responses
Uses narratives and storytelling
Categorizes patterns, observations, environmental context, etc.
Holistic and contextual
Exploratory (i.e., hypothesis generation)

Quantitative

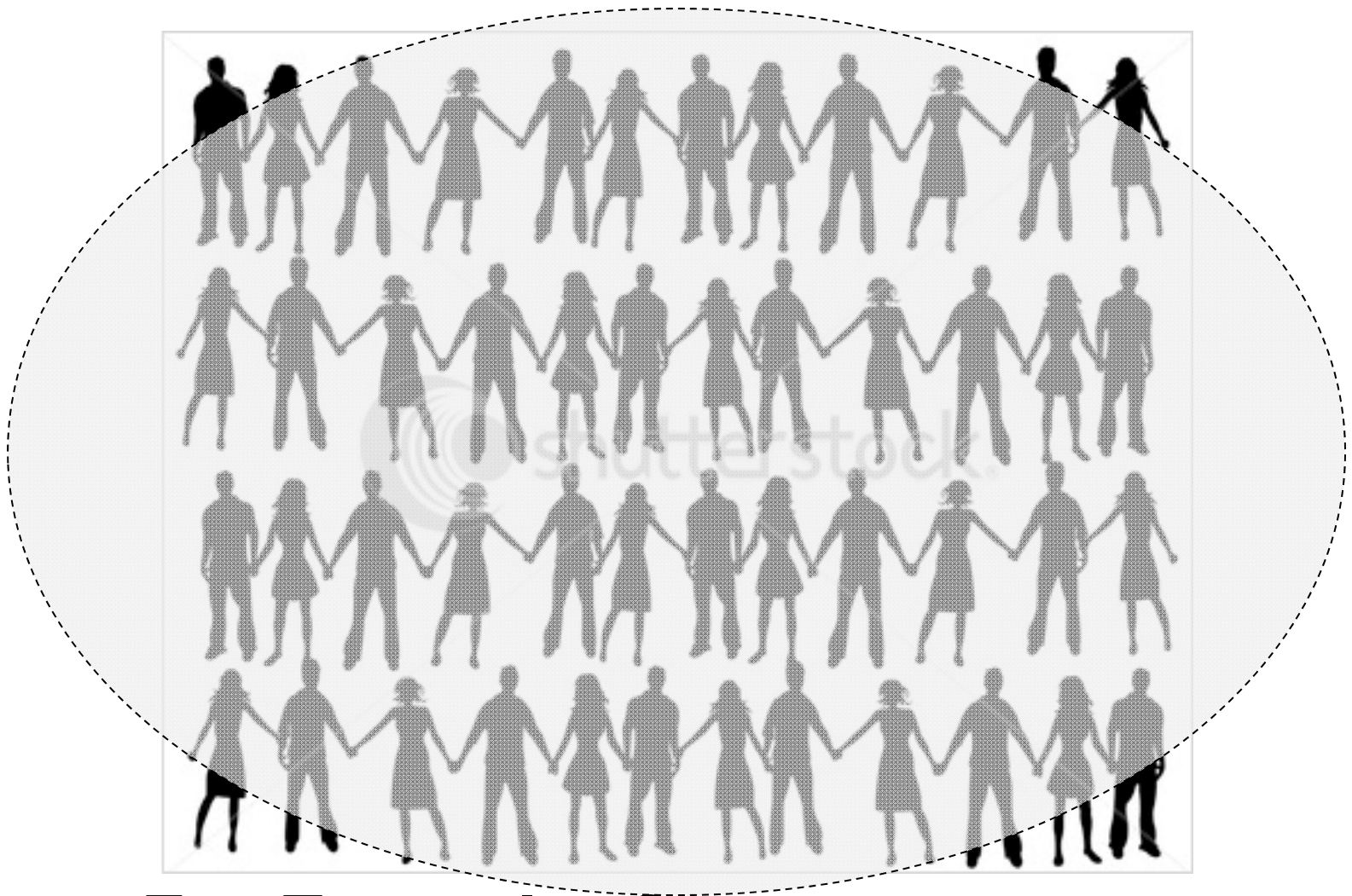
Describes the “what” of events
Rigid categorization for measurement
Reductionist and isolationist
Hypotheses driven
Focused measurement tools and applied inferential mathematics



**Voluntary data are most appropriate
for qualitative analyses.**

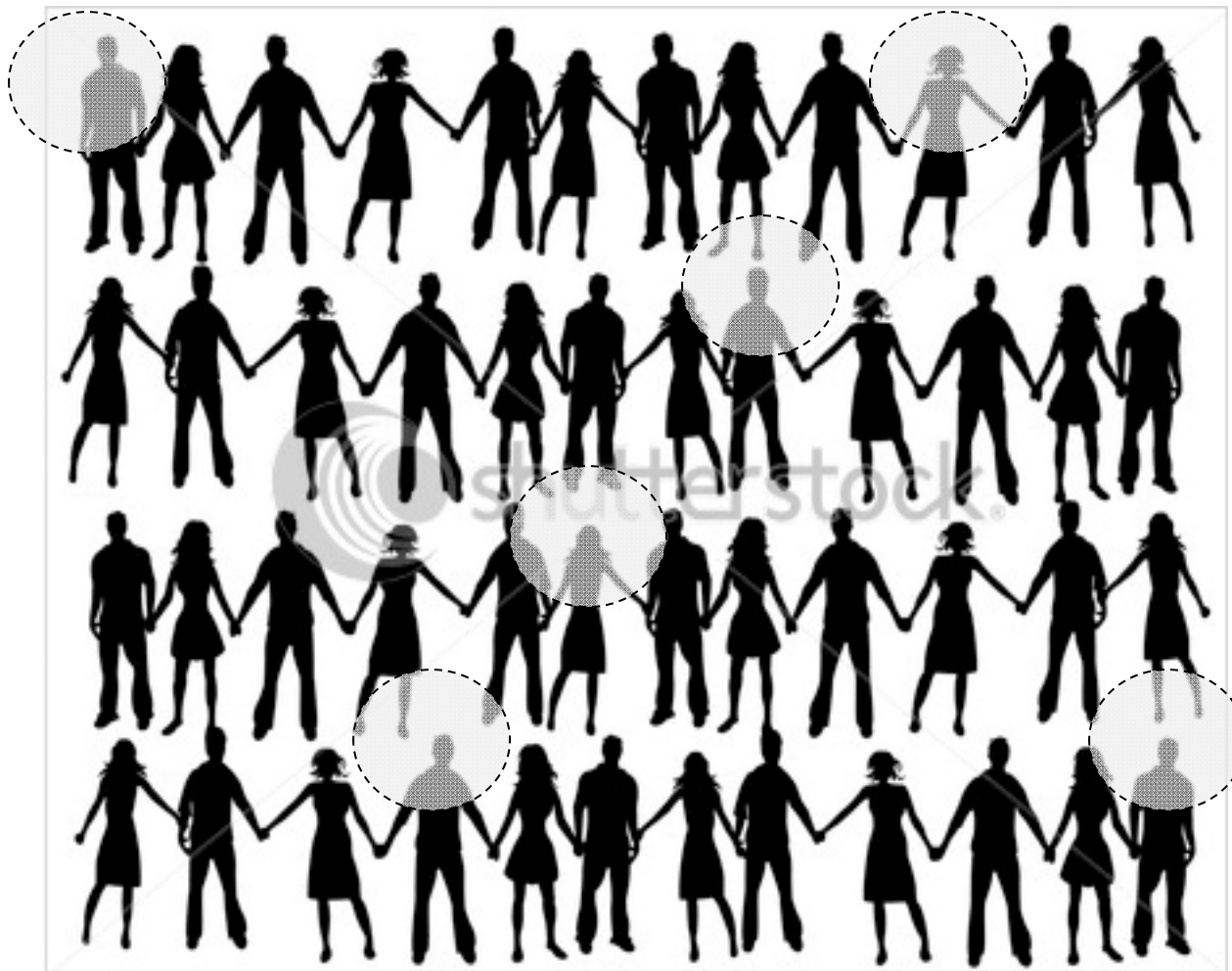


Population



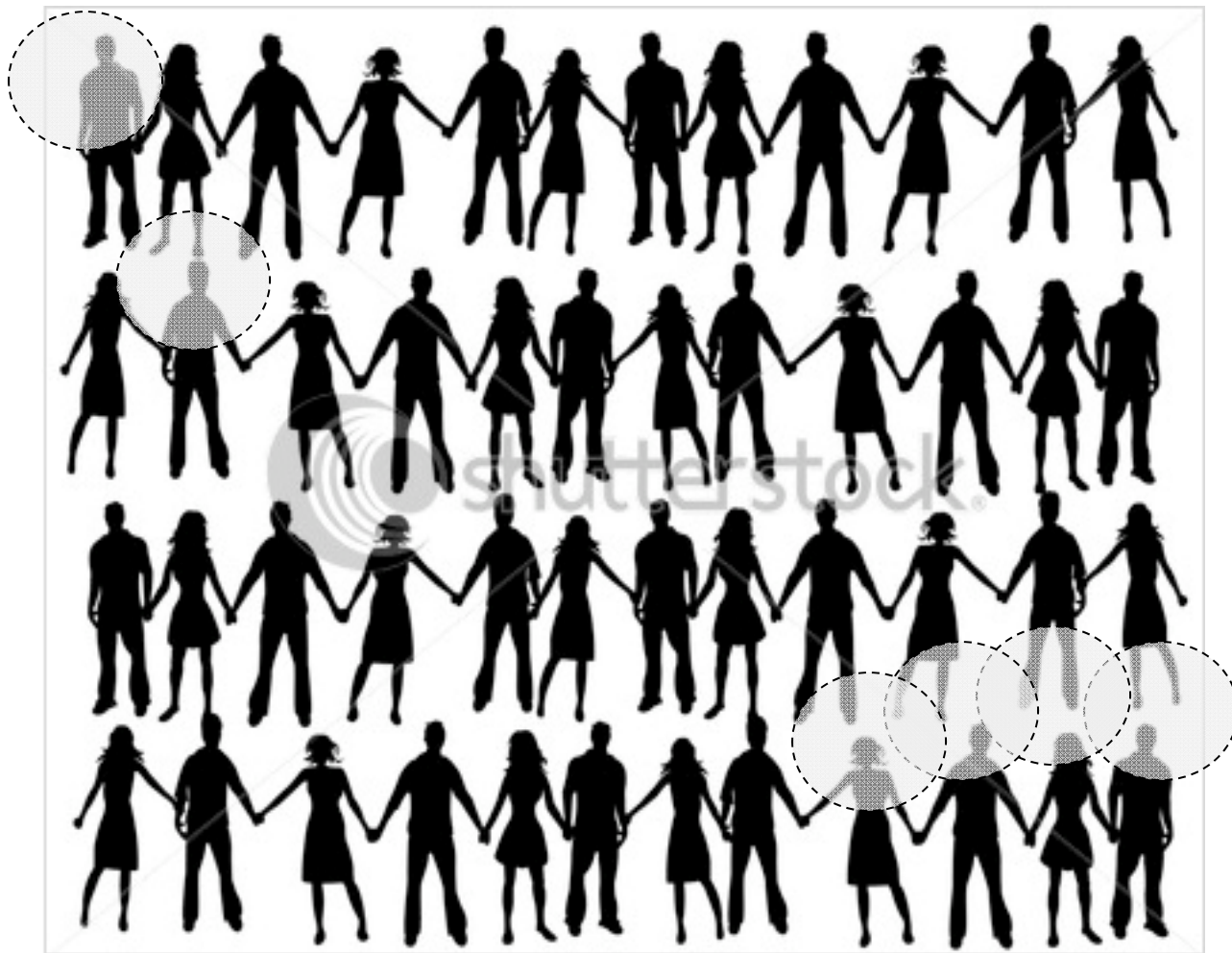
For Example: Census

Random Sampling of Population



For Example: Survey

Implicit Biases of Subjective Reporting

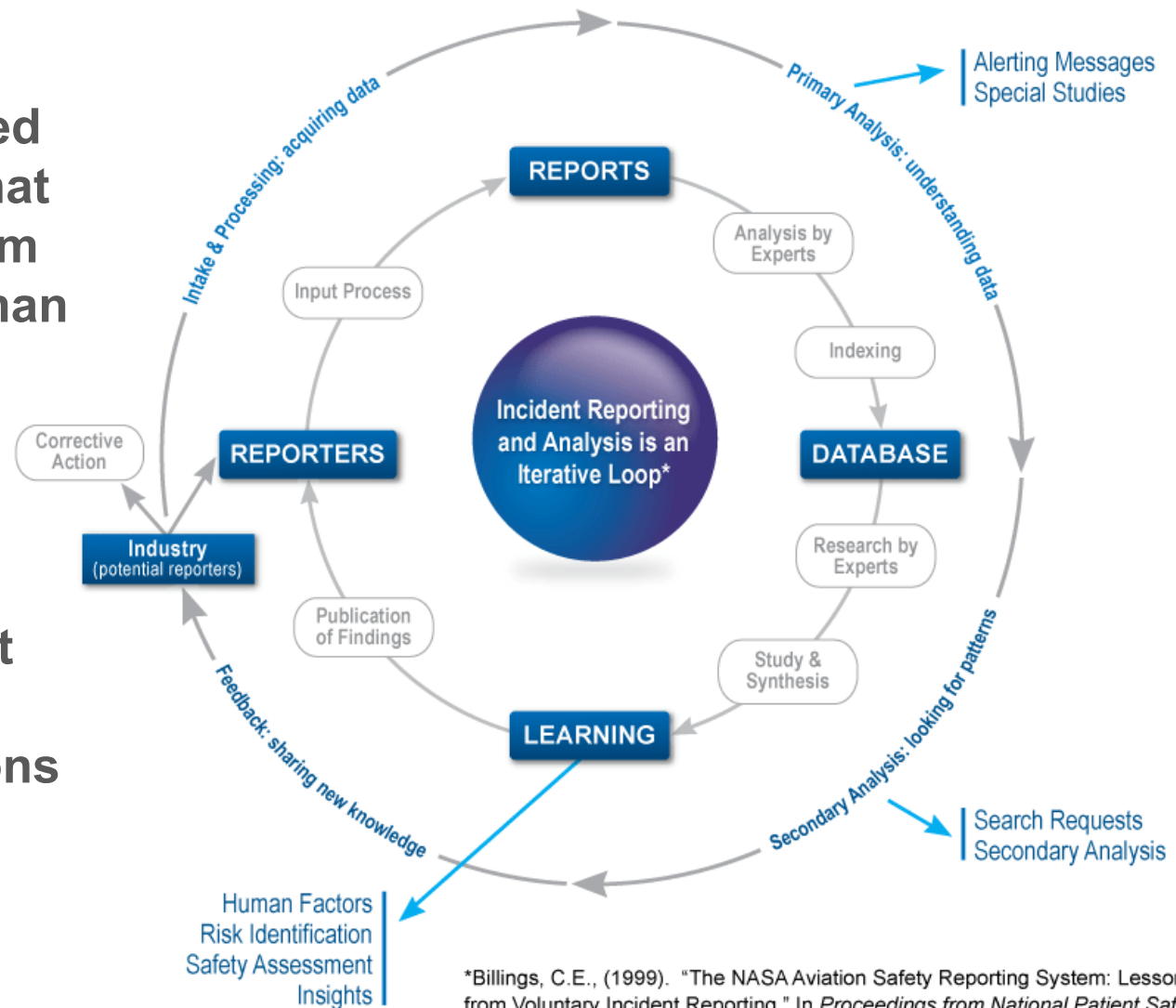


For Example: Safety Reporting



Incident Reporting Model

- ASRS is a closed loop process that supports System Safety and Human Factors
- Government / Industry are provided information that may result in corrective actions



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*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*.

ASRS Model Described

- Dr Charles Billings quotes:

- “It has become [clear] that getting data is not the primary objective of this effort; using those data to synthesize new knowledge is the principal objective, and this requires human intelligence and expertise.”
- “These counts are too often used to infer the magnitude of system problems. But voluntary reporting of incidents involves the assumption that they are a representative sample of the population of such events, and this assumption is rarely tested and is usually not tenable.”
- “The population from which the sample of incidents comes is rarely known or quantified.”
- “The usefulness of incident reporting lies in the insights that can be gained from careful study of the narratives submitted, in all their contextual richness, not in quantitative knowledge one can gain from counting adverse events.”



THE HUMAN FACE OF BIG DATA



CREATED BY RICK SMOLAN AND JENNIFER ERWITT

ASRS Alert Messages and Feedback

ALERT BULLETIN

AB 2011:13/11-4

3/23/11

931477

TO: FAA (AFS-800)

INFO: FAA (AFS-230, AFS-200, FTW-AEG, ASA-100), AASC, HAI, ICASS, NTSB,

FROM: Linda J. Connell, Director
NASA Aviation Safety Reporting System

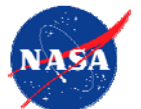
SUBJ: Green Helipad Perimeter Lights not Visible with Night Vision Goggles

We recently received an ASRS report describing a safety concern which may involve your area of operational responsibility. We do not have sufficient details to assess either the factual accuracy or possible gravity of the report. It is our policy to relay the reported information to the appropriate authority for evaluation and any necessary follow-up. We feel you should be aware of the following:

ASRS received a report from the Captain of an EMS helicopter expressing concerns regarding the utilization of Night Vision Goggles (NVGs) for night time operations. The reporter indicated that many hospital helipads use green perimeter lights which become invisible because of the NVG green visual environment. The Captain indicated that more and more EMS operations and aircraft are using NVG operations and that helipad perimeter lighting needs to be changed to another color. The reporter also suggested changes be made to the FAA Safety Alert for Operations that addresses these types of operations.



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ASRS Alert Messages and Feedback



Federal Aviation Administration

Memorandum

Date:

To: David Grizzle, Chief Operating Officer, Air Traffic Organization, AJO-0
Christa Fornarotto, Associate Administrator for Airports, ARP-1

From: Margaret Gilligan, Associate Administrator for Aviation Safety, AVS-1

Prepared by: John M. Allen, Director, Flight Standards Division, AFS-1

Subject: Light Emitting Diode (LED) Lighting and its Impact on Aviation Safety

Background: In response to the Aviation Administration (FAA) has incandescent lighting systems with. However, there continues to be some equivalency of LED lights to incandescent. This is particularly true in light of the rapid growth of LED lighting, which often rely on portions of the electromagnetic spectrum not emitted by LED.

Discussion: While the benefits of LED lighting (e.g., longer lifespan, etc.) it is critical to acknowledge the potential impact on aircraft guidance. In this regard, the wholesale replacement of incandescent lighting by LED (NAS).

LED light has different characteristics than incandescent light. The effects these characteristics have on human vision are inadequately understood and may result in certain color vision deficiencies leading to a safety risk. However, it is in the interest of the FAA to ensure that the disparities exist between incandescent and LED lighting (EFVS), which rely primarily on human vision to sense LED-based light. Similarly, the current filters are also currently unable to filter out the blue light and/or operational benefits to a substantial and growing segment of NAS users. It would be contrary to the stated mission of the FAA for these operational benefits to be lost or for safety to be compromised by a haphazard integration of these two technologies.

2
The most troubling aspect of LED lighting concerns is that they are often being discovered through voluntary disclosure programs such as the Aviation Safety Reporting System (ASRS). This strongly suggests that not all of the unintended consequences of LED lighting implementation have been discovered. This conclusion alone should encourage the FAA to take a more measured approach to LED lighting implementation.

Recommendation: Given the operational impacts outlined above, I intend to establish a task force with representation from all affected FAA lines of business. The task force will conduct a complete Operational Safety Assessment (OSA) of proposed LED lighting technology and address the impact of LED lighting on night and day low visibility operations, takeoffs, aircraft straight-in and circling instrument approaches, offset approaches, visual approaches, ground operations, EFVS and NVG/NVD use, as airport rescue and firefighting vehicle movements. This OSA should include a survey of the current implementation status of LED lighting at all airports, including non-federally funded airports and obstruction lighting. Further, the task force should use the data from the survey to determine the extent to which LED lighting has already impacted the NAS.

I am member to Les Smith at leslie.smith@faa.gov by the end of November.

“The most troubling aspect of LED lighting concerns is that they are often being discovered through voluntary disclosure programs such as the Aviation Safety Reporting System (ASRS). This strongly suggests that not all of the unintended consequences of LED lighting implementation have been discovered. This conclusion alone should encourage the FAA to take a more measured approach to LED lighting implementation.”

REVISIT: A Detailed Example of a 2013 Alert

- This Alert highlighted a critical flight safety anomaly
- This anomaly had gone unnoticed during design, certification, manufacture, oversight, and operations in service
- No SDR was issued since no event had yet occurred
- An AD note was issued for a sister fleet but not for this, newer fleet type that had the same design configuration
- ASRS was able to detect this anomaly though a single report with no operational incident (weak signal)



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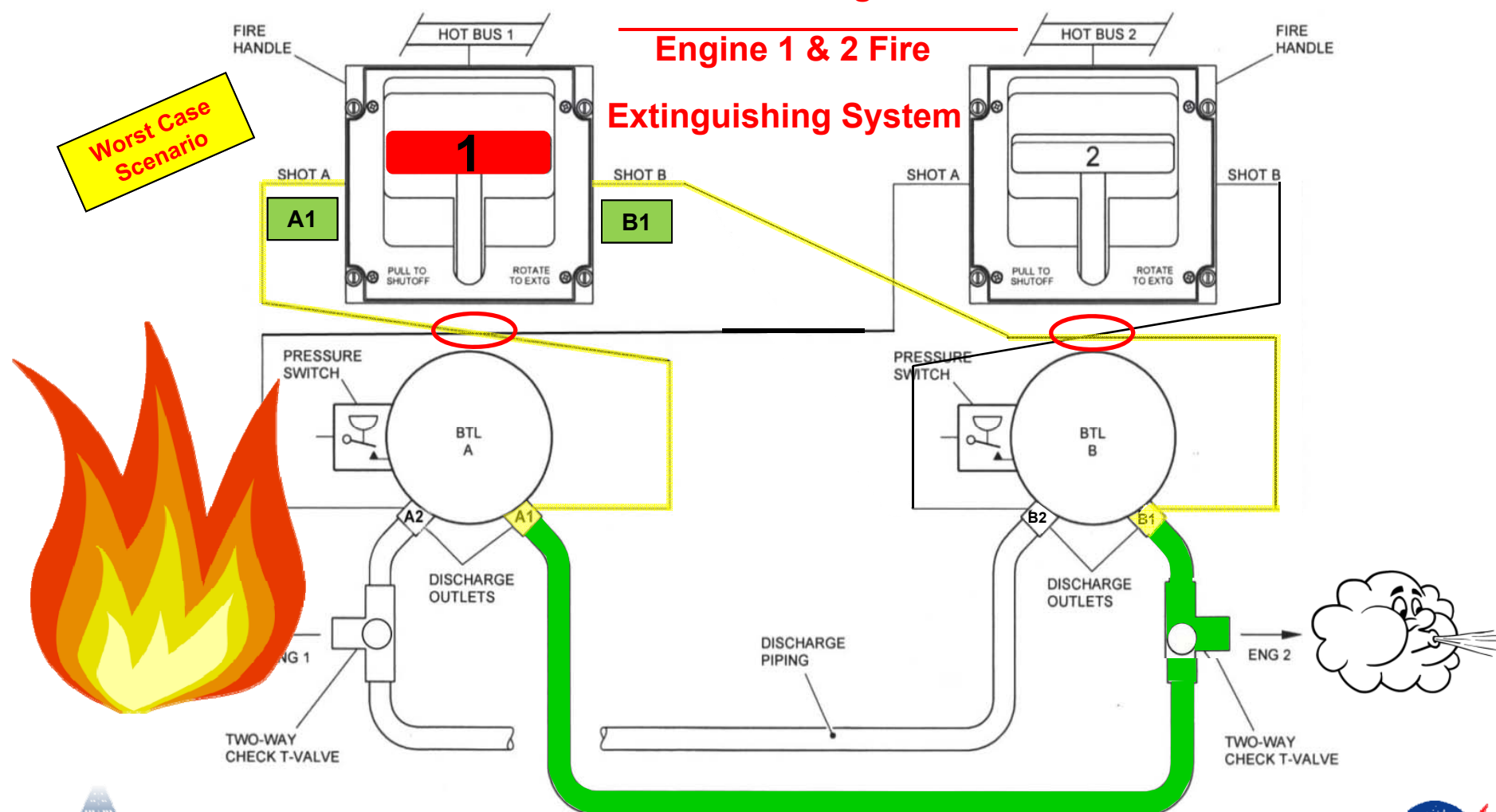
Embraer E170 Fire Bottle Installation

Report 1050457

Abnormal Configuration

Engine 1 & 2 Fire

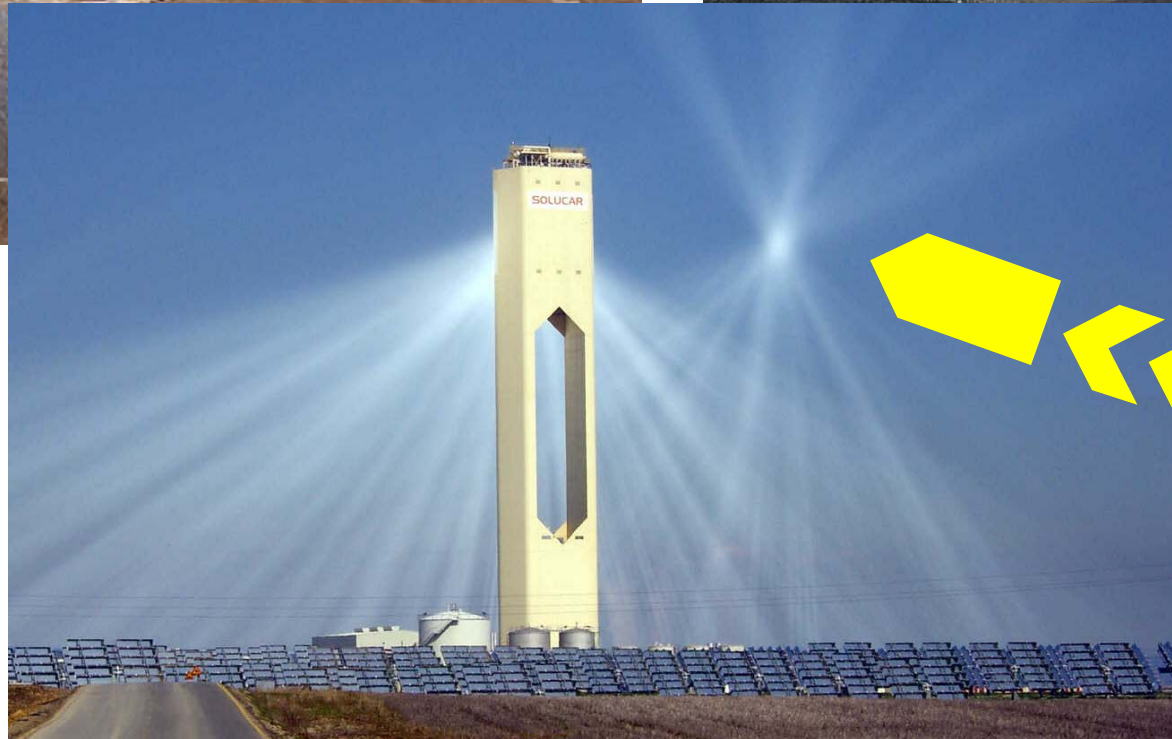
Extinguishing System



ENGINE FIRE EXTINGUISHING SYSTEM - SCHEMATIC

This graphic is for illustrative purposes only and not to be used for any other purpose

Solar Array Inflight Visibility Glare



This graphic is for illustrative purposes only and not to be used for any other purpose



Examples of Safety Alerting Success

- **Similar Sounding Fix Names DEWAY - DEJAY in close proximity (FYI 2013-32)**

The Southern California TRACON office reviewed the alert and stated they agreed "... the location and spelling of the two waypoints/fixes, DEWAY and DEJAY creates confusion and the possibility of aircraft entering the wrong fix into a FMS. Attached is a memo whereby we have requested to change the name of "DEJAY" waypoint, to eliminate this problem."

- **SAV Runway Lighting Procedures (FYI 2013-40)**

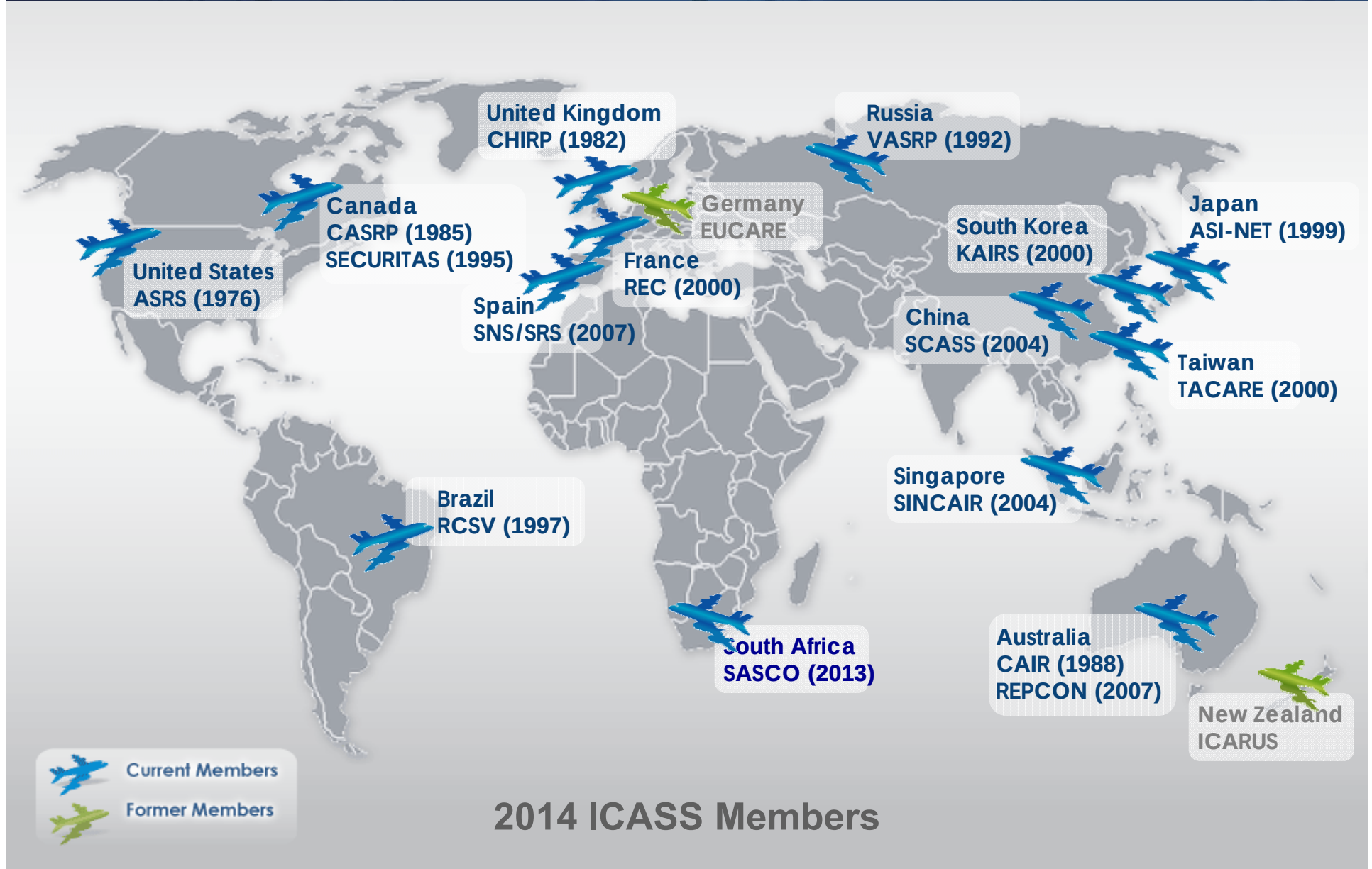
An FAA Southern Region, Lead Airport Certification Safety Inspector investigated the issue with SAV airport and stated "SAV airport reports that they are in the process acquiring cost estimates to reconfigure the airfield lighting circuit to operate both runway via radio controlled lighting when the Air Traffic Control Tower (ATCT) is not in operation. In the meantime, the ATCT is publishing a comment on ATIS regarding which runway is lighted at night, prior to their closure. I just completed the inspection and wrote a recommendation that they reconfigure the lighting system to operate that way. The pilot's complaint in this report was valid."

- **FWA RNAV 23 Chart Confusion (FYI 2013-94)**

A Jeppesen Sr. Manager of Aviation and Marine Safety responded stating "I have reviewed this and can see where the confusion may be coming into play. I have referred this to Jeppesen corporate technical standards for action."



International Confidential Aviation Safety Systems (ICASS)





Contact Information:

Linda Connell, NASA ASRS Director

Linda.J.Connell@nasa.gov

(408) 541-2827 ASRS Office

(650) 604-0795 NASA Office

ASRS Website:

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



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