



ISASI 2009

International Society of Air Safety Investigators

*40th Annual Seminar - September 14-18 - Orlando, Florida*

# **Sifting Lessons from the Ashes: Avoiding Lost Learning Opportunities**

**Ludwig Benner, Jr., &  
Ira J. Rimson**

# Key insights we learned from our study:

- Prevention results from changed behavior
- Need formal structure for investigation data
- Behavior sets analysis is essential
- Users need a lessons learning system
- We need a metric for prevention efforts

**ISASI's Motto:**

**“Safety Through Investigation”**

**ISASI 2009 Seminar Theme:**

**“Accident Prevention Beyond Investigation”**

# What do we mean by Lessons Learned?

- *Lessons* = Behavior patterns that produce undesired outcomes
- *Learned* = Applying lessons to change those behavior patterns to prevent recurrence of undesired outcomes

# How Effective Have We Been Learning and Applying Lessons to Prevent Accidents?

**NOT VERY!**

# Retrocursors

- Are incidents and accidents that repeat behavior patterns from earlier incidents or accidents
- Are a valid *METRIC* for measuring prevention effectiveness

# **Retrocursor Accidents in the Past Year :**

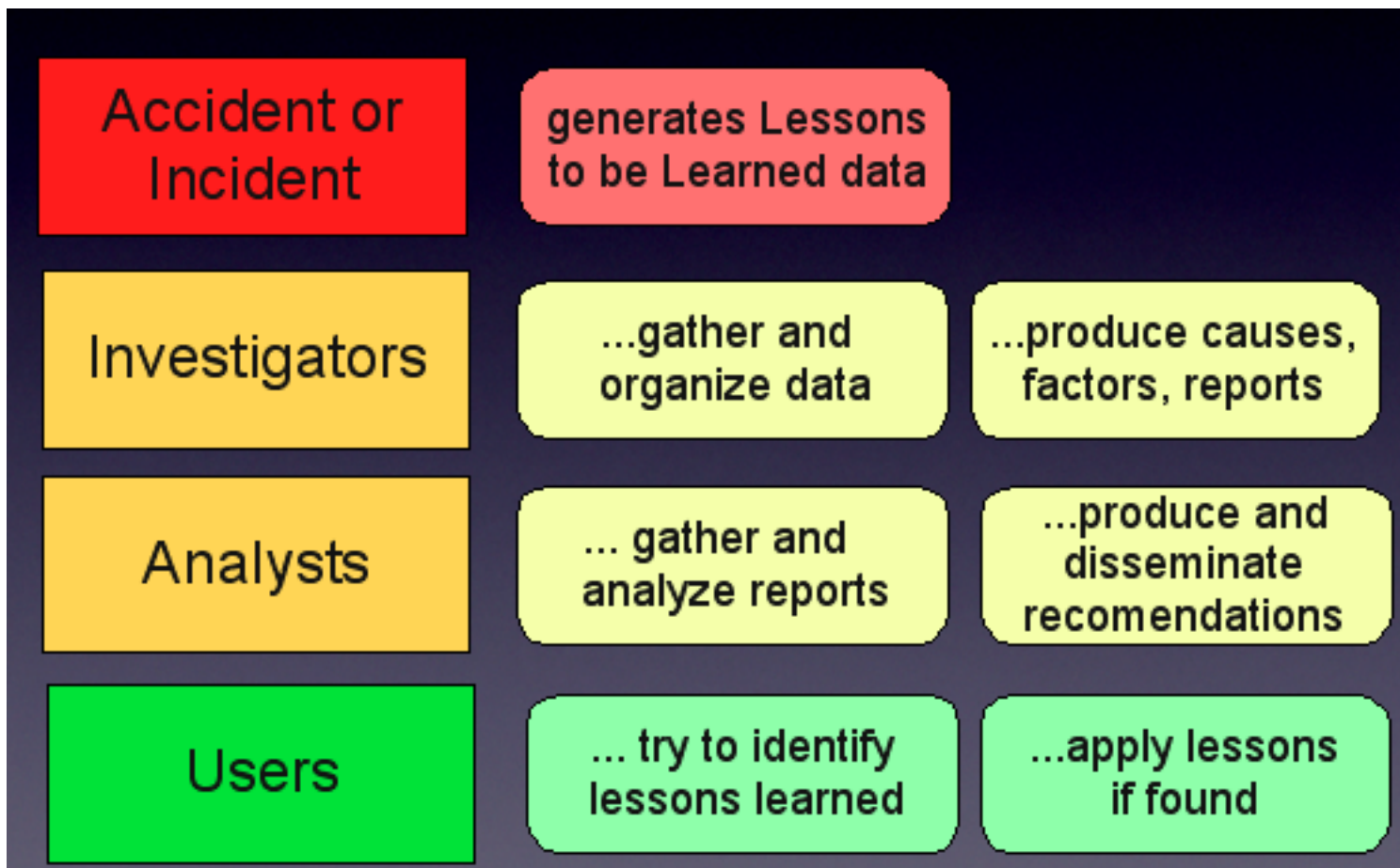
- **JK5022: MD-80 Madrid ES**
- **CO3407: DHC8-402 Buffalo NY**
- **TK1951: B-737 Amsterdam NL**
- **FedEx N526FE: MD-11 Narita JP**
- **AF447: AB-330-200 Atlantic Ocean**
- **NMSP: Ag-109A near Santa Fe NM**
- **Sayano-Shushenskaya Powerplant RU**

**“... never ...  
captured in 'lessons learned' reports.”**

-- from USAF Accident Report

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# Organizations with Specific Lessons Learned Procedures

- FAA - ASIAS - Aviation Safety Information, Analysis and Sharing Center
- NASA - ASRS - Aviation Safety Reporting System
- DoD - CELL Center for Engineering Lessons Learned
- Army - CALL - Center for Army Lessons Learned
- DoE - SELLS = Society for Effective Lessons Learned Sharing
- NASA LLIS - Lesson Learning Information system
- USGS – Earthquakes
- NIOSH – Medical Devices program
- OSHA -Safe Tank Alliance program
- Wildland Fire Lessons Learning Center
- DoT - RITA Research and Innovative Technologies Lessons Learned Reports For Programs

# Needed: A genuine Lessons Learning System

# Goals for Lessons Learning Systems:

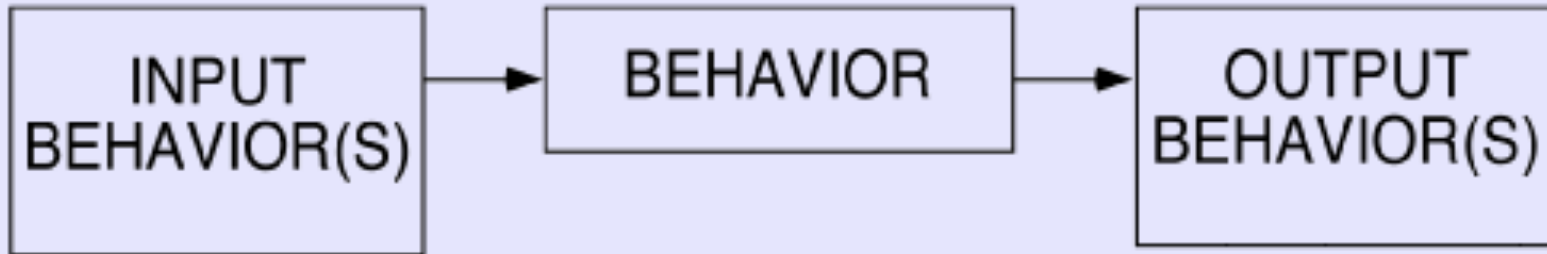
- Capture all lessons to be learned from accidents
- Structure lessons as “Behavior Sets”
- Produce lists of explicit “Lessons to be Learned” in investigation reports and repositories
- Make the Lessons-to-be-Learned easily accessible to all potential end users

# What is a Behavior Set?

- A description of an interactive behavior among people, things or energies during accident or incident processes

EACH BEHAVIOR IS A BEHAVIORAL EVENT BLOCK

## I/O BEHAVIOR SET



Behaviors or Actions necessary to produce the behavior or action of interest

The Behavior or Action by person, object or energy of interest

Behavior(s) that preceding behavior induced in other people, objects or energies

# Who are End Users?

- Equipment designers & manufacturers
- Aviation system operators
- Supervisors & managers
- Trainers & procedures writers
- Safety analysts



# What is needed?

**Lessons that are  
tailored to  
Users' Needs**

# What *DO* Users Need?

- Behavior set data from accidents or incidents, compatible with their dynamic operations
- Information that enables them to match accident behavior set data to behavior sets in their operations
- Timely and efficient access to accurate accident behavior set data

# Lessons Learning System Objective:

Changed behavior in  
dynamic operations to  
prevent known risks  
from recurring.

# Lessons Learning System Metric:

Number of occurrences of  
“Retrocursors”

	<b>OLD VIEW</b>	<b>NEW VIEW</b>
<b>Learning System Focus?</b>	<b>Causes</b>	<b>Behavioral interactions</b>
<b>Needs served?</b>	<b>Investigators</b>	<b>End users</b>
<b>Who defines lesson?</b>	<b>Analysts</b>	<b>Investigators</b>
<b>What is product?</b>	<b>Recommendations</b>	<b>Lessons list</b>
<b>Lesson accessibility?</b>	<b>Limited</b>	<b>Universal</b>

# Priorities for Change

As of 7/1/2009 Paper Submission

- Redefine investigation data products to require that lessons learned be an explicitly documented output of investigation processes.
- Redesign the form and substance of lessons-to-be-learned source data to improve their usefulness for end users.

# More insights recognized

*since 7/1/2009 paper submission*

- Structured input data criticality
- Social networking impact
- Digitized operating data potential
- and more...

# New Open Source (LGPL) Library:

<http://code.google.com/p/meslib/>

OPEN SOURCE = there for you to use free...

The Library needs contributions of updates.

Derivative applications are invited.

Add your ideas to this public library!

See handout for details