



National  
Transportation  
Safety Board

## The Virtues, Strengths, and Mission of the NTSB

Robert L. Sumwalt, III



ERAU ISASI





Our greatest virtues:  
Independence  
Credibility

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## The Board



Mark Rosekind



Chris Hart



Debbie Hersman



Robert Sumwalt



Earl Weener

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Our biggest strength:  
Our experienced staff

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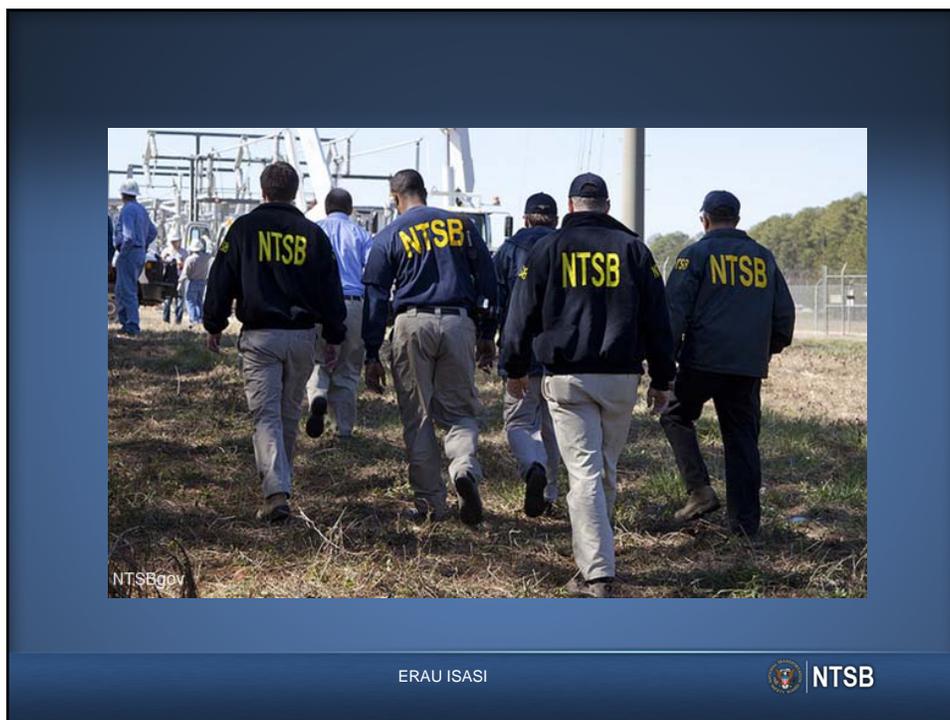
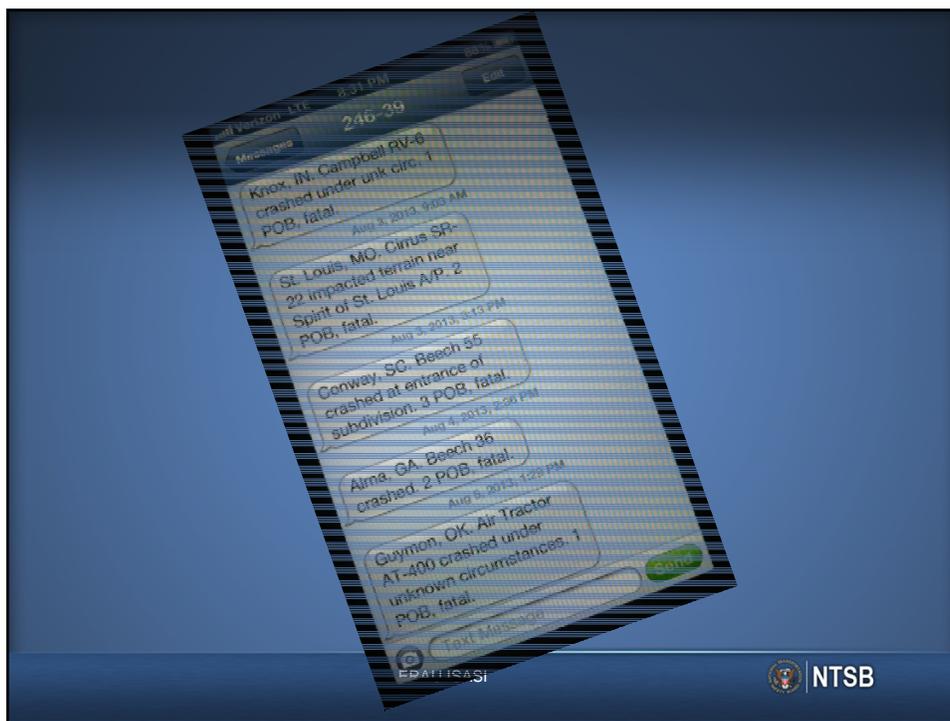
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Our mission:  
Prevent Accidents  
Reduce Injuries  
Save Lives

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## Why investigate accidents and incidents?

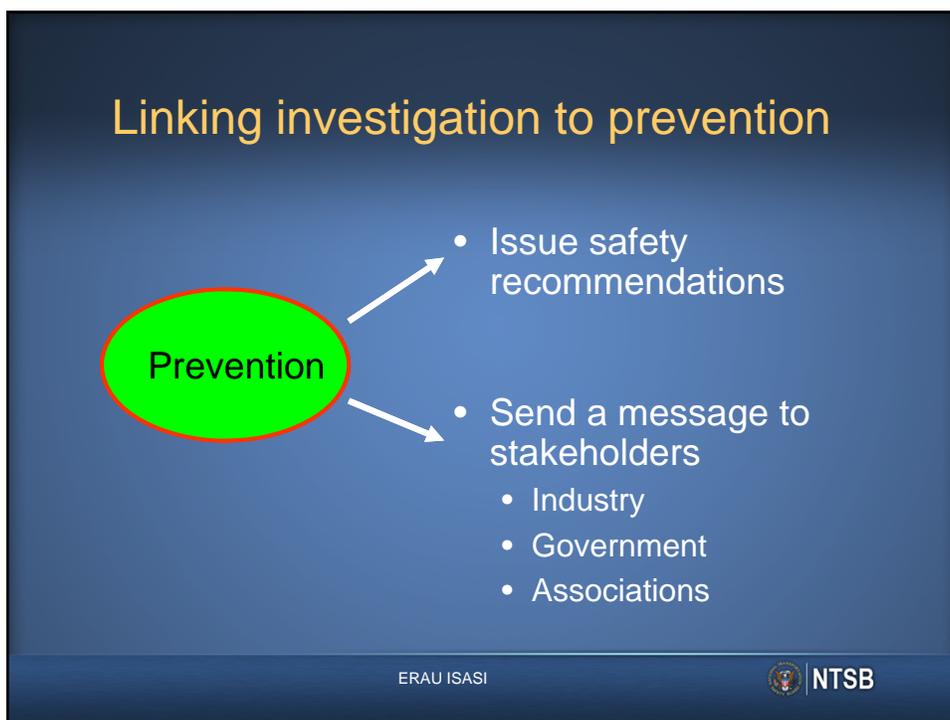
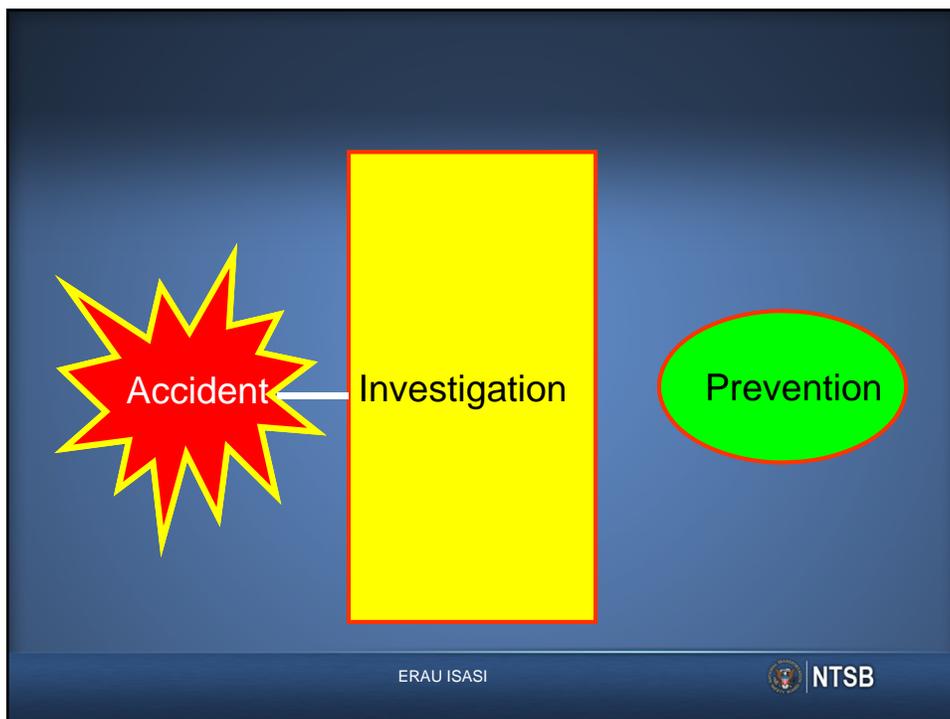
“The sole purpose of the investigation of an accident or incident shall be the prevention of accidents and incidents.”

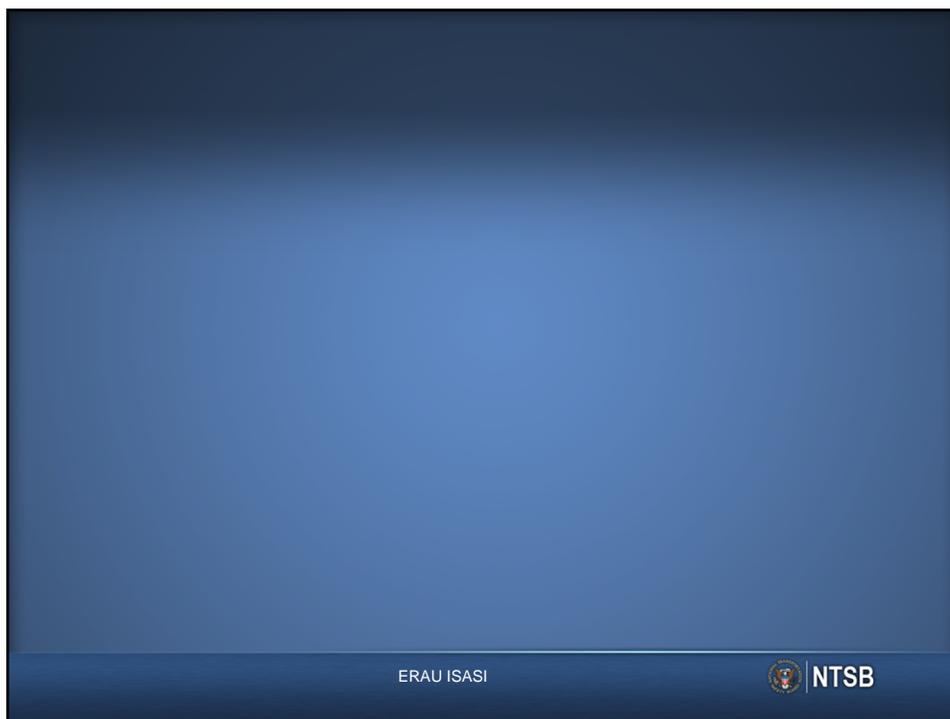
- ICAO Annex 13 Paragraph 3.1

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The cover of the "ISASI FORUM" journal is centered. The title "ISASI FORUM" is in large, blue, serif font. Below it, in smaller text, is "APRIL-JUNE 1992" and "AIR SAFETY THROUGH INVESTIGATION". A small photograph of an aircraft is visible on the cover. Overlaid on the bottom half of the cover is a yellow rectangular box containing the following text in bold black font: "The discovery of human error should be considered the starting point of the investigation, and not the ending point." At the bottom of the slide, the text "ERAU ISASI" and the NTSB logo are visible, identical to the slide above.

## Two Icing Accidents

- Allegheny Airlines      February 1979  
    (changed name to USAir in 1979)
- USAir                      March 1992

2 similar accidents, same airline

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## Allegheny Airlines      1979



## Allegheny Airlines 1979

No Safety Recommendations

**Prevention**

“... the probable cause of the accident was the captain’s decision to take off with snow on the aircraft’s wing and empennage surfaces...”

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## Icing Accidents

- February 1979 - Allegheny Airlines  
Nord 262 Clarksburg, WV
- February 1980 - Redcoat Air Cargo  
Britannia 253F Boston, MA
- January 1982 - Air Florida  
B737 Washington, DC

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## Icing Accidents

- February 1985 - DC-9-10      Airborne Express  
Philadelphia, PA
- December 1985 - DC-8      Arrow Air  
Gander, Newfoundland
- November 1987 - DC-9-10      Continental  
Denver, CO

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## Icing Accidents

- March 1989 F28      Air Ontario  
Dryden, Ontario
- November 1989 F28      Korean Air  
Kimpo, Korea
- February 1991 DC-9-15      Ryan International  
Cleveland, OH

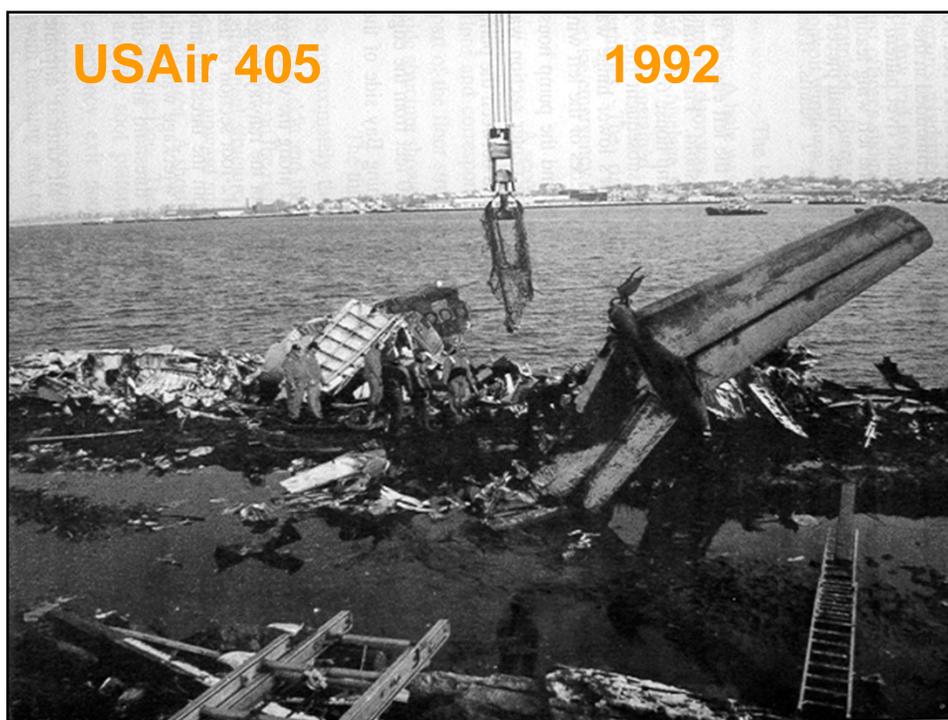
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## Icing Accidents

- December 1991                      SAS  
    MD80                                Stockholm, Sweden
- March 1992                         USAir  
    F28                                  New York, New York

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**USAir 405** **1992**

16 Safety Recommendations

**Prevention**

“...the probable causes of this accident were the failure of the airline industry and the FAA to provide flightcrews with procedures, requirements, and criteria compatible with departure delays in known icing conditions, and the decision of the flightcrew to take off ...”

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**As a result of this accident**

- More effective de-icing/ anti-icing fluids
- Better guidance – “Hold-over charts”
- New Federal Aviation Regulations regarding ground de-icing
- Better training
  - Flight crews
  - Ground crews
- ATC procedures for minimizing ground delays after de-icing

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## An effective investigation

- 13 years between the Allegheny and USAir 405 crashes, 10 similar accidents
- 21 years after USAir 405, \_\_\_\_ air carrier accidents due to ground icing

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## The Investigation Revealed...

- Elevator trim cables were rigged improperly, resulting in the trim cables being reversed.
  - When pilot applied nose-up trim, the elevator trim system actually applied nose-down trim.
- Inspector's block on maintenance work cards were not signed off by the Required Inspection Item (RII) inspector.

59. Elevator System Rigging  
a. Connect elevator cables and rig in accordance with Allison Convair M/M, section 8, figure 8.2.107.

Inspection: \_\_\_\_\_

**AIR TAHOMA**  
**CV 580 Overhaul**

Card No.: 55-04      A/C: 11587  
Date: 10/03/96      Date: 8-21-08  
Rev: Original      T.A.T.: 719654  
Area: Horizontal Stabilizer and Elevator      STA: LCP

	MECH	
	L/H	R/H
b. Connect elevator servo trim tab cables and rig in accordance with Allison Convair M/M, section 8, figure 8.2.108 and 8.2.108A. Inspection: _____	N/A	(Signature)
c. Connect elevator gust lock and rig in accordance with Allison Convair M/M, section 8, figure 8.2.114. Inspection: _____	(Signature)	N/A
d. Connect autopilot cables to elevator bell cranks. Rig I.A.W. with AIR TAHOMA INC. CV580 Maintenance Supplement 22-10-01. Inspection: _____	(Signature)	(Signature)
<b>NOTE: A COMPLETE INSPECTION OF ALL ELEVATOR CONTROLS MUST BE ACCOMPLISHED AND SIGNED OFF BY AN RII QUALIFIED INSPECTOR AND A LOG BOOK ENTRY MADE TO THIS EFFECT.</b> RII Inspector: _____		

Not signed by RII Inspector

Air Tahoma

Prevention

No Safety Recommendations

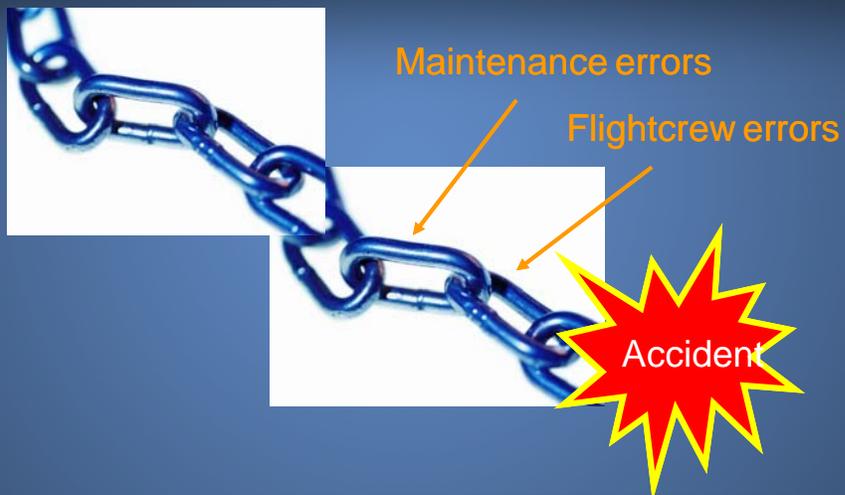
The improper (reverse) rigging of the elevator trim cables by company maintenance personnel, and their subsequent failure to discover the misrigging during required post-maintenance checks.

- Contributing to the accident was the captain's inadequate post-maintenance preflight check.

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## Links in Error Chain



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**“The discovery of human error should be considered the starting point of the investigation, and not the ending point.”**

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## PREVENTION is why we

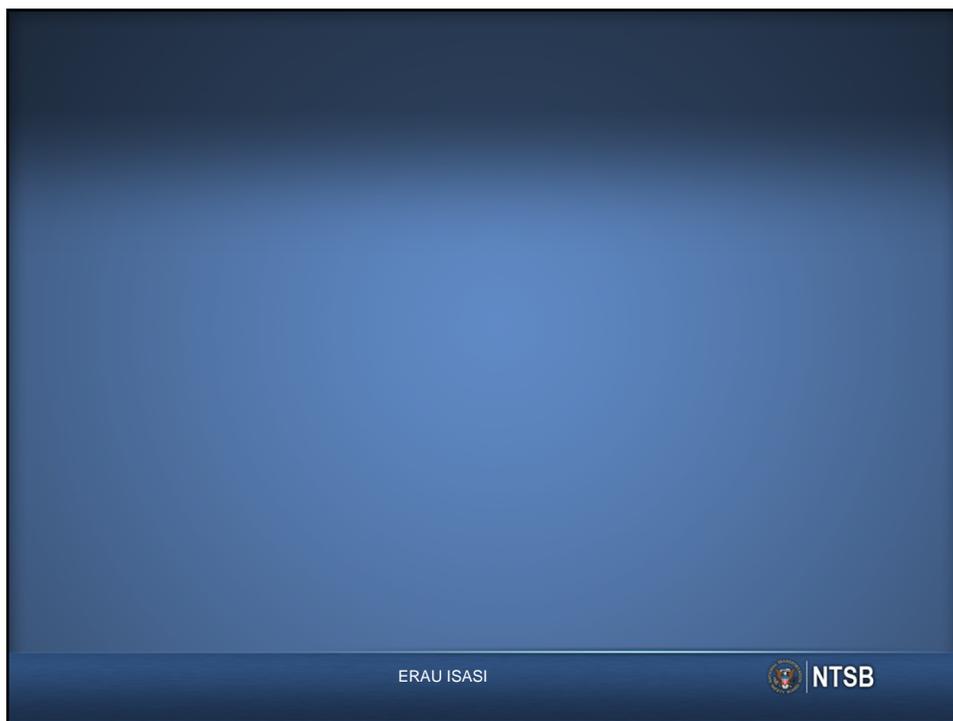


“From tragedy we draw knowledge to improve the safety of us all.”

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