



International Aviation Safety Program

National Transportation Safety Board
Washington, D.C., U.S.A.

February 8, 2000

National Transportation Safety Board

International Aviation Safety Program

- ✈ **Aircraft Accident Investigations**
- ✈ **Research and Engineering Assistance**
- ✈ **Safety Training, Advocacy and Outreach**
- ✈ **Family Affairs Assistance**

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Why Does NTSB Conduct International Activities ?

- ✈ **Fulfill international obligations-ICAO**
 - Annex 13 and Annex 8
- ✈ **Attain national purpose and agency goals**
- ✈ **Provide technical support to the safety efforts of developing states - on site**



Why Does NTSB Conduct International Activities (Continued)

- ✈️ **Maintain preeminence among colleagues**
- ✈️ **Maintain currency with newest advances**
- ✈️ **Build rapport and confidence with other states before a major event occurs**



WHO IS AFFECTED ?

U.S. Carriers -1998 International Passengers
20 year traffic growth average 5%

- ✈ **53.1 million international passengers**
- ✈ **50,000 international departures**
- ✈ **163.3 billion international passenger miles**
 - triple the 1979 figure
 - forecast to double again by 2010

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International Passenger Traffic Growth (U.S. portal cities)

✈ 126.1 million in CY 1998

✈ 230.2 million in CY 2010

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Worldwide Passenger Traffic 1997-1998

- ✈ Currently 1.5 billion passengers worldwide
- ✈ About 70% are flying on Boeing airplanes

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How Does the NTSB Participate in Foreign Investigations ?

- ➔ Role of NTSB U.S. Accredited Representative and NTSB staff members
- ➔ Role of the FAA Advisors
- ➔ Role of the Operator Advisors
- ➔ Role of the Manufacturer's Advisors



Most Recent Foreign Investigations

Major Investigations Division

- ✈ Korean Airlines B747F London
- ✈ Cubana DC-10 Guatemala City
- ✈ FedEx MD-11 Manila
- ✈ LAPA B737 Buenos Aires



Most Recent Foreign Investigations

Regional Operations Division

- ✈ Civil C-130 Bolivia
- ✈ TAESA DC-9 Mexico
- ✈ Saudi Bell 212 Aramco
- ✈ Tanzania CE 404
- ✈ Costa Rica LET 410

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Significant Accomplishments as a Result of Foreign Investigations

- ✈ Lauda B767 - thrust reversers
- ✈ Birgenair B757 - instrument disagreement
- ✈ El Al B747 - engine pylon improvements
- ✈ American/Cali B757- EGPWS
- ✈ TAM Brazil F100- thrust reversers
- ✈ JAL MD-11 - autopilot improvements
- ✈ Swissair MD-11 - electrical/insulation
- ✈ many more to disprove mechanical failure



NTSB Research and Engineering Assistance to Foreign States

- ✈ Materials Laboratory Examinations
- ✈ CVR transcriptions
- ✈ FDR readouts
- ✈ Flight path video animations
- ✈ Vehicle Performance studies

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MATERIALS LAB



- ➔ Supports Failure Analysis Investigations Worldwide
- ➔ Fractographic Analysis, Component Examination, Aircraft Reconstruction



MATERIALS LAB



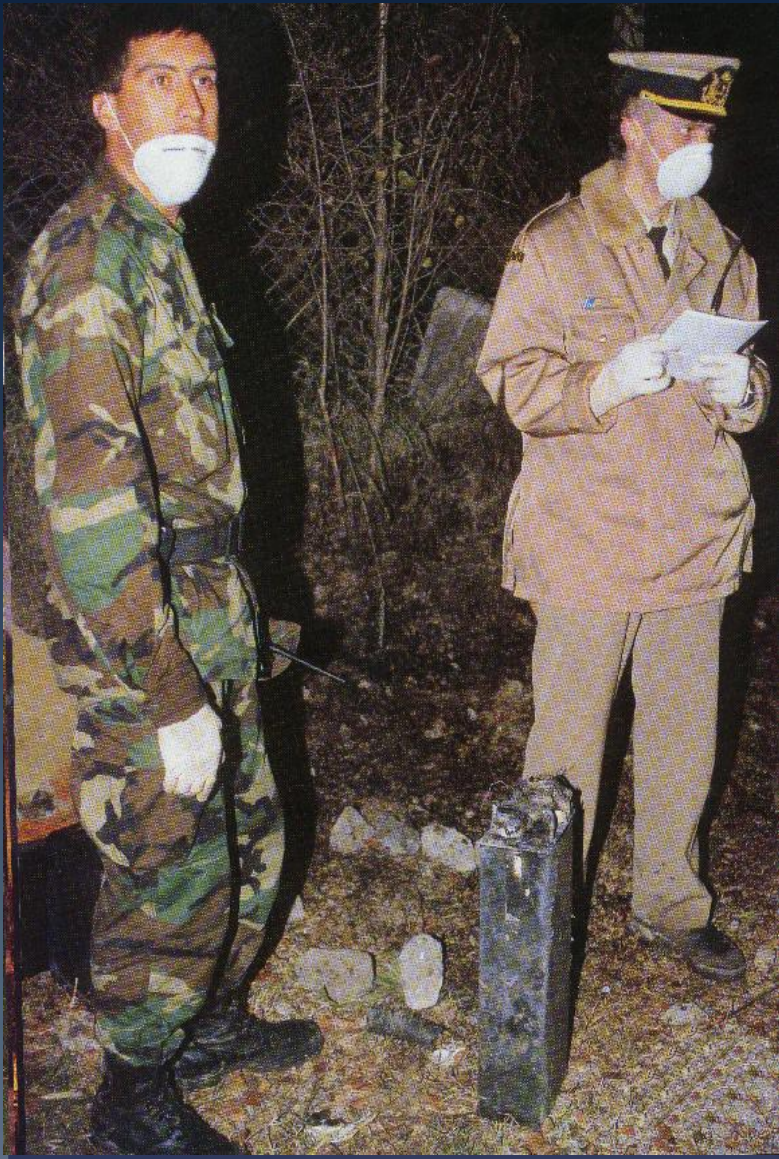
- ✈ Foreign Accidents in 1999 were from Africa, Europe, Asia, South America, and the Caribbean



Flight Recorder Readouts for Foreign States

- ✈ 30 Flight Recorder Readout in CY 1999
- ✈ Flight Data Recorders (FDR) 18
- ✈ Cockpit Voice Recorders (CVR) 12

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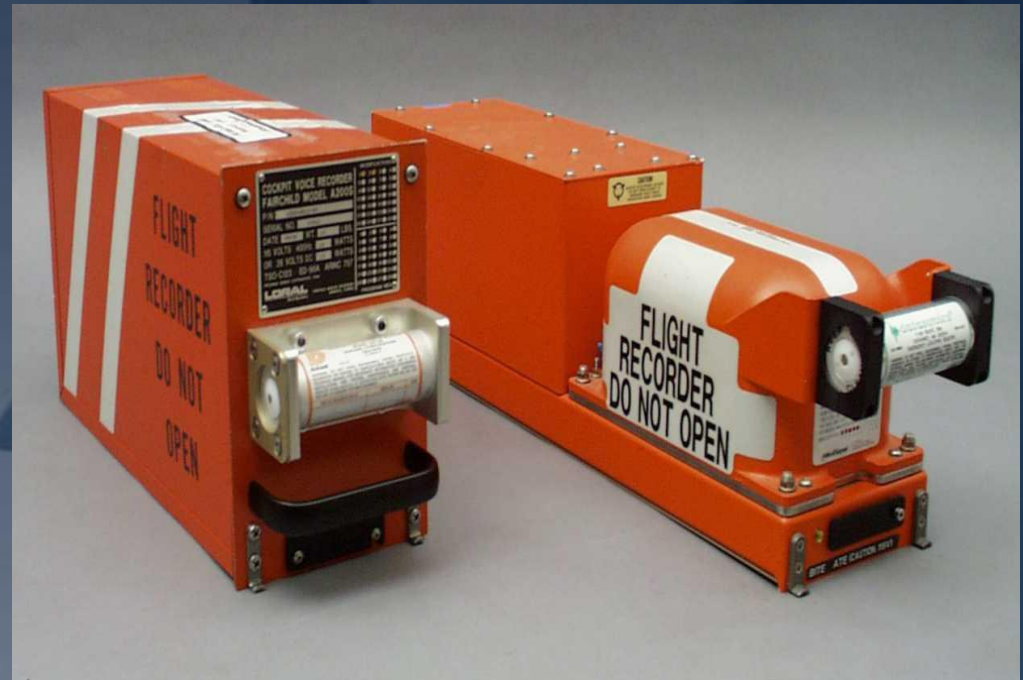
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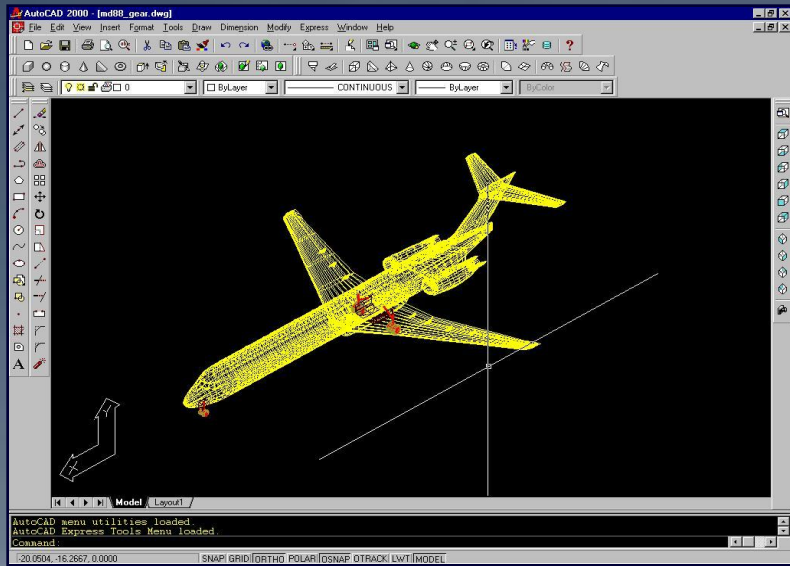


Flight Recorder Readouts for Foreign States

FDR Flight Path Video Animations 3

- LAPA B737
Buenos Aires
- Thai Airways,
A 310, Thailand
- China Airline
MD11 Hong Kong





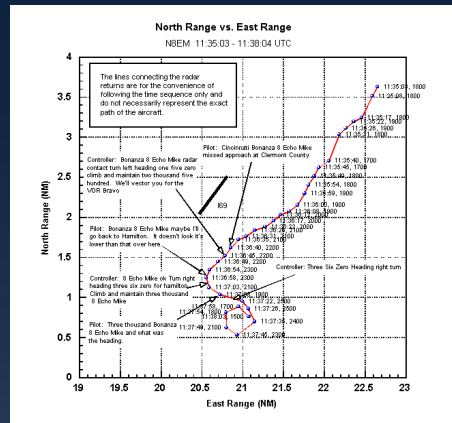
VEHICLE PERFORMANCE DIVISION

- ✈ Airplane Performance Experts
- ✈ Determine Motion

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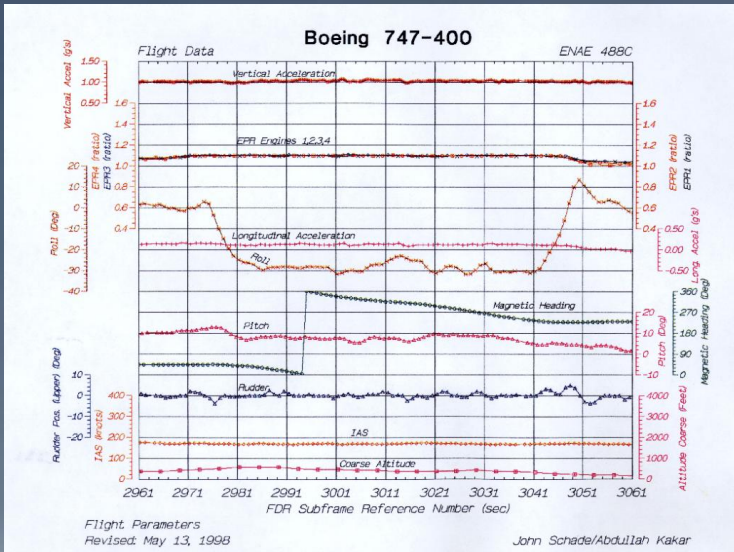


AIRPLANE PERFORMANCE STUDIES



✈ Analyze Evidence

✈ Evaluate Failure Scenarios



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AIRPLANE PERFORMANCE



- ✈ **Go - Team Launch**
- ✈ **Computer Analysis**



Flight Animation/Reconstruction



- ✈ Video Animation
- ✈ Address Safety Issues

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- ✈ 10 Foreign Performance Studies Annually
- ✈ Focus on Major Cases



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✈ Foreign Launches in the Past 6 months



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Safety Training Initiatives

- ✈ **NTSB Investigator Training Courses**
 - Foreign representation, about 1/3 of each class
- ✈ **NTSB Training Academy**
 - Even greater opportunities for foreign representation in the future
- ✈ **On-site Training Courses**
 - Taiwan, Singapore, Indonesia, China



States Represented in NTSB Training Activity

- ➔ NTSB Investigators Course-France, U.K., Canada, Australia, Italy, Greece, Finland, Norway, Germany, Netherlands, Austria, Panama, Peru, Colombia, Spain, and Ghana
- ➔ Other NTSB Conducted Training
 - Representatives of 24 states have been present at other training opportunities



Advocacy and Outreach Efforts

✈ ICAO Assembly and AIG meetings

(Complete ICAO membership-185 states)

- Assembly-every 3 years, determine future direction of ICAO efforts
- AIG -every 5 years, revise investigation issues to future needs, Annex 13

✈ ICAO Regional Seminars

- 8-12 states with much local participation
- Centered on a particular accident prevention topic



Advocacy and Outreach Efforts

Vehicle Recorder Division



- EUROCAE -

THE EUROPEAN ORGANISATION FOR CIVIL AVIATION EQUIPMENT
ORGANISATION EUROPÉENNE POUR L'ÉQUIPEMENT DE L'AVIATION CIVILE



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Advocacy and Outreach Efforts

Vehicle Recorder Division

- ✈ ICAO Flight Recorder Panel (FLIREC)
- ✈ EUROCAE Flight Recorder Working Groups
- ✈ ISASI - Flight Recorder Working Group
- ✈ AIMS Symposium



Advocacy and Outreach Efforts

(Continued)

- ✈ **ICAO Committees** - manuals/oversight
- ✈ **ECAC conferences** (35 countries with a European regional perspective)*
- ✈ **ITSA** - Organization of independent, multimodal Safety Boards
- ✈ **Flight Safety Foundation** - Seminars
- ✈ **ISASI** - Annual International Conference
- ✈ **Individual states** or organizational safety efforts and workshops - by invitation



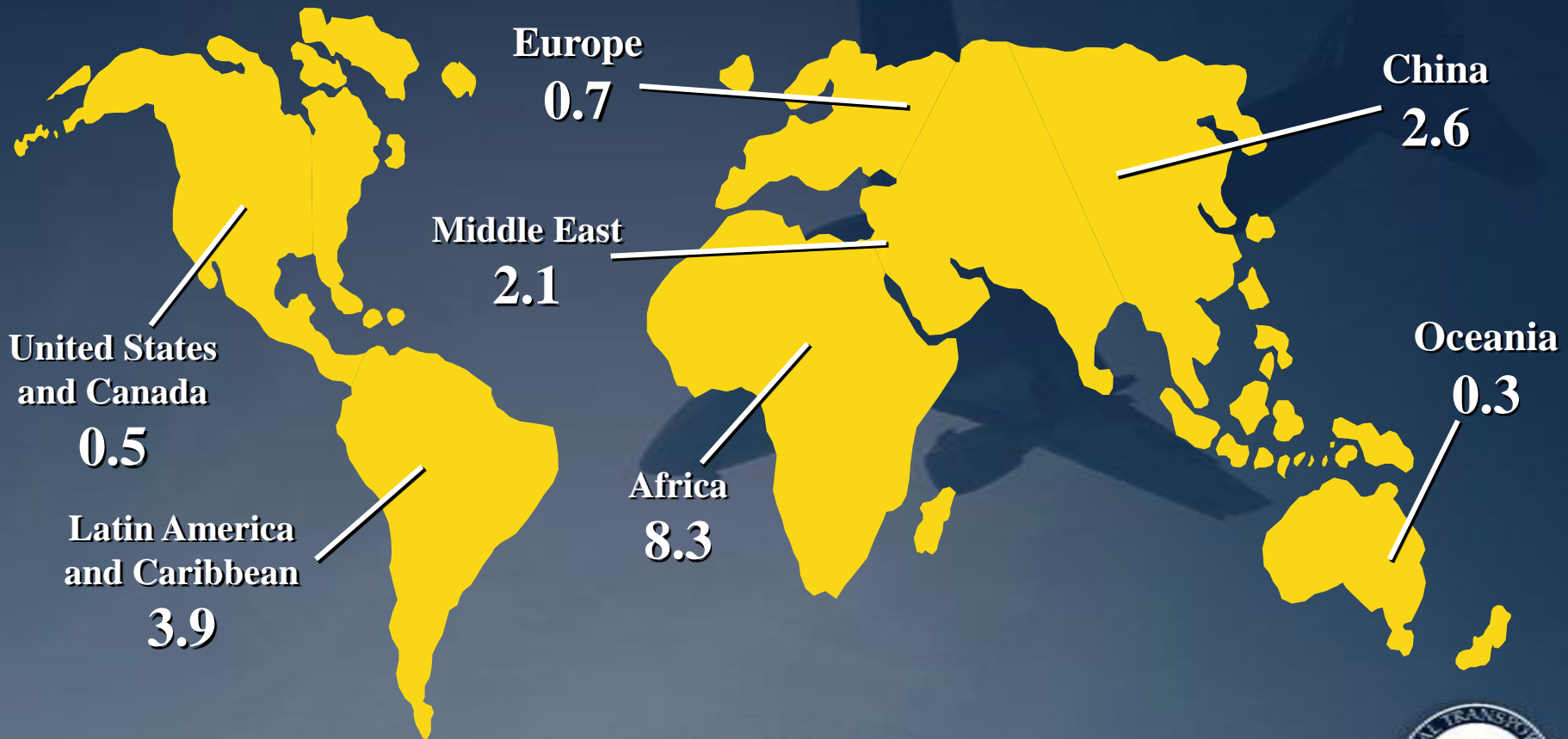
Results of Training and Outreach

- ✈ Improved bilateral cooperation when an accident occurs
 - Egypt, France, United Kingdom, Brazil, China, Taiwan, Singapore, Guatemala*, Mexico
- ✈ Quality accident investigations and reports from states former attendees
 - Colombia, AA and TAME
 - Japan, JAL



Regional Perspective of World Accident Experience

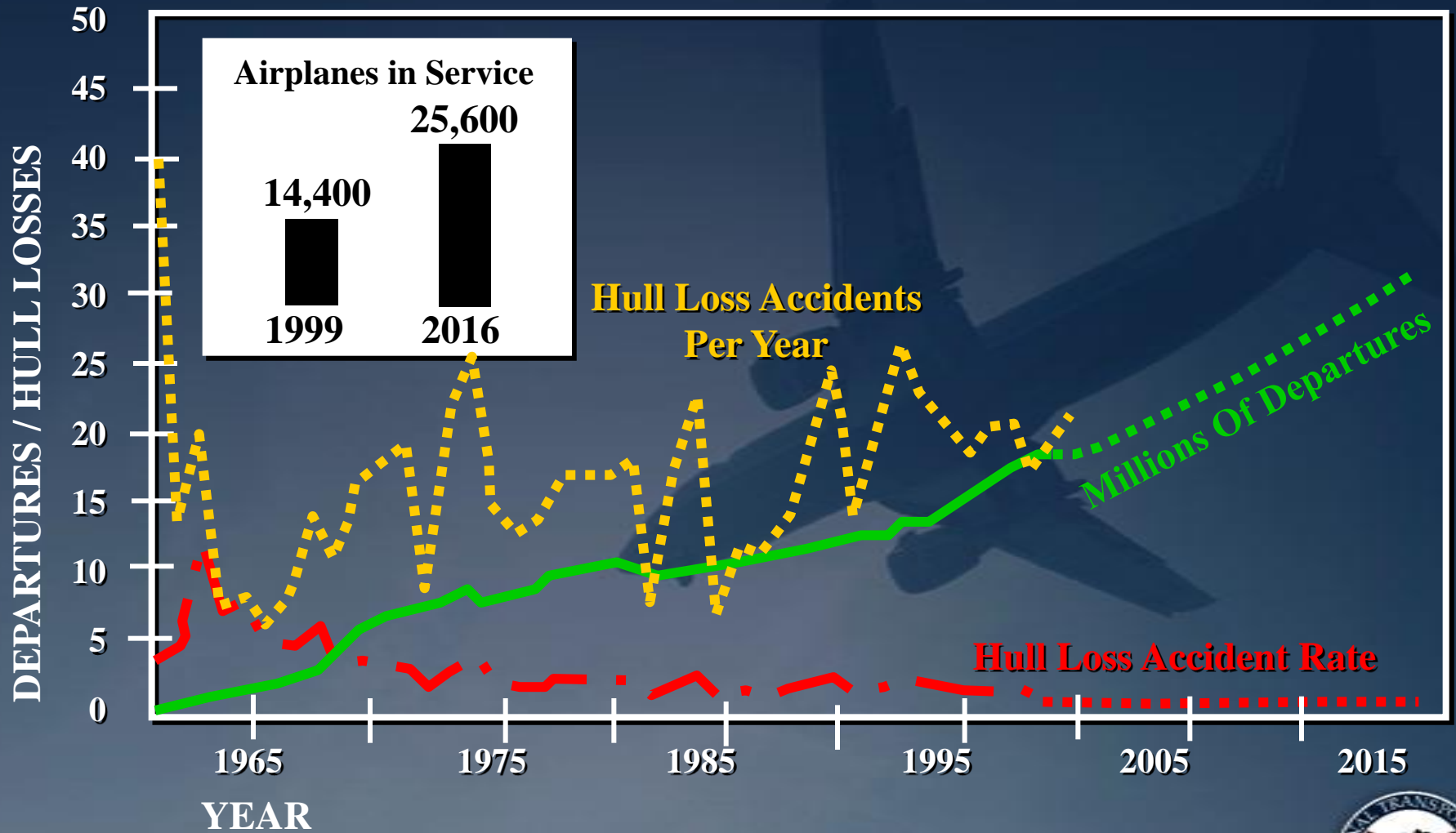
Accidents per million departures, 1989-1998



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Forecast of Future Accident Activity



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Investigator Staff Time and Travel Expenses

✈ Per event with foreign travel

- 20 staff days and \$20,000
- about **20 events per year**
- about \$400,000 annually

✈ Events without travel

- about **80 events per year**



Family Affairs Assistance

- ✈ Foreign Air Carrier Family Support Act-1997
- ✈ Coordination Role
- ✈ Support Department of State programs



Benefits Derived from Foreign Aircraft Accident Investigations

- ✈ Implications for U.S. Aviation Interests
 - Identify accident causal factors (Annex 13)
 - Airworthiness Responsibilities (Annex 8)
 - Flight Recorders Standards (Annex 6)
 - Commercial Impact-Operator/Manufacturer
- ✈ Safety Recommendations
 - NTSB initiated
 - Received from other states
- ✈ Implications for traveling public



CONCLUSIONS

NTSB should be prepared to:

- ➔ Maintain, and to - increase activity in international accident investigations
- ➔ Promote safety recommendations of an international scope
- ➔ Pursue international training academy goals
- ➔ Continue outreach efforts with ICAO, ITSA, EUROCAE, Flight Safety Foundation, and regional flight safety initiatives.





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SIGNIFICANCE OF U.S. GOVERNMENT INVOLVEMENT

Accident Investigation - The NTSB is responsible, consistent with U.S. Department of State requirements, to fulfill the obligations of the United States presented in Annex 13 to the Chicago Convention on International Civil Aviation

For an accident or incident in a foreign state involving civil aircraft of a U.S. operator, or of U.S. registry or manufacture, the state of occurrence is responsible for the investigation. The U.S. Government participates in these investigations through an NTSB appointed Accredited Representative and a team of advisors named by the NTSB

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FURTHER U.S. INVOLVEMENT

Airworthiness of Aircraft - The NTSB is responsible, consistent with U.S. Department of State requirements, to provide Accredited Representative leadership that enables the FAA to fulfill the obligations of the United States as presented in the Chicago Convention on International Civil Aviation, Annex 8, Airworthiness of Aircraft.

In accordance with Annex 8, Paragraph 4. Continuing Airworthiness of Aircraft, the State of Design of an aircraft must maintain a system to receive airworthiness information from user States, decide when action is needed to maintain continuing airworthiness and the safe operation of the aircraft, and transmit appropriate information to user states. The NTSB Accredited Representative, and advisors from FAA and industry participate in foreign accident investigations to fulfill this obligation and to gain air safety information to protect the traveling public.

