

# *Center, We Have A Problem. Emergency and Abnormal Situations in Aviation*

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# *EAS Project Team – Past and Present*

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# The Challenge

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## Emergency and abnormal situations:

- are often time critical, complex, and/or ambiguous
- are high stress, high workload, and a great deal is at stake
- require exceptionally high levels of coordination inside and outside of the airplane

## Emergency and abnormal procedures:

- are generally focused on aircraft systems rather than on the situation as a whole
- are practiced seldom (twice a year or less) and used rarely
- are often highly dependent on fragile cognitive processes
- **when needed, are crucial and must be performed correctly**



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# *Emergency and Abnormal Situations Project Industry Consultants and Collaborators*

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Manufacturers: Boeing, Bombardier, Airbus Industries, BAe Systems,

Regulatory and Governmental Agencies: FAA, CAA (UK), JAA, ICAO, Eurocontrol, NavCanada

Unions and Trade Groups: ALPA, IFALPA, APA, SWAPA, ASPA, ATA, IATA, AFA, ASSA, ADF

Accident Investigation Bodies: NTSB, TSB of Canada, ISASI

Airlines: Airborne Express, Air Canada, Alaska, Aloha, American, Atlantic Southeast, Cathay Pacific, Continental, Delta, FedEx, Frontier, Hawaiian, Horizon, JetBlue, Southwest, United, UPS, US Airways, TWA (prior to merger)



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# *Emergency and Abnormal Situations Project*

## *Taxonomy of the Domain*

### Issues Related to Checklists and Procedures

- Design and Content, Use, Modality (paper, electronic, etc.)

### Issues Related to Humans

- Performance under Stress, Communication and Coordination, Roles of All

### Issues Related to the Aircraft

- Warning Systems, Flight Envelope Protection, Automation

### Issues Related to Training

- Content and Approach, Retention of Seldom Practiced Procedures

### Selected Emergency Equipment and Evacuation Issues

- Initiation and Coordination of Evacuation, Equipment used during Response

### Broad, Over-arching Issues

- Philosophies and Policies, Regulatory and Economic Concerns



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# *SAS 751 - MD-81 Dual Engine Failure – Gottrora, Sweden – December 27, 1991*

On takeoff, ice was ingested into the engines which damaged the fan stages and caused the engines to surge – all power was lost 77 seconds later.



During the event engine power was increased automatically by the Automatic Thrust Restoration (ATR) feature, which increased the intensity of the surging and contributed to the failure of the engines.

Neither the crew nor the company knew that the ATR feature existed on the airplane.

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*Airtran 356 - 717-200 – Flushing, New York – March 26, 2003*



While on final approach the forward flight attendant noticed a burning smell and discovered that the handset to call the cockpit was not working.

After landing she pounded on the cockpit door and yelled to get the flight crew's attention.

The flight crew never heard the flight attendant pounding or yelling.



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## *Alaska Airlines, Flight 261 – CVR Excerpt*

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Dispatch:...uh current San Francisco weather one eight zero at six, nine miles, few at fifteen hundred, broken twenty eight hundred, overcast thirty four hundred...uh, if uh you want to land at LA of course for safety reasons we will do that , uh, we'll uh tell you though that if we land in LA uh, we'll be looking at probably an hour to an hour and a half, we have a major flow program going right now...uh, that's for ATC back in San Francisco.

Captain: Well, uh, yu, you eh, huh...boy you put me in a spot here, um...I really didn't want to hear about the flow being the reason you're calling us 'cause I'm concerned about overflying suitable airports.



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# *Overall Goal of the EAS Project*

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Develop guidance for procedure development and certification, training, crew coordination, and situation management based on knowledge of the operational environment, human performance limitations, and cognitive vulnerabilities in real-world situations.



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