



NTSB National Transportation Safety Board

Office of Aviation Safety

**US Airways
Flight 1549
Ditching on
the Hudson River
January 15, 2009**



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Human Performance
Capt. David Helson
Operational Factors

Flight Crew Performance

- Captain started the auxiliary power unit and commanded control of airplane
- Engine Dual Failure checklist performed
- Captain assessed options for landing
 - Hudson River highest probability of survival
- Decision-making and excellent crew resource management



Flight Crew Performance

- Airspeed slow due to high workload, stress, and task distraction
- Alpha-protection activated
- Captain's sidestick inputs attenuated
- Alpha-protection cues to pilots
 - Airspeed scale indicator
 - Low-speed awareness warning
 - Inhibited during accident sequence

Certification vs. Accident Flight

	Certification
Pitch attitude	11°
Descent rate (in fps*)	3.5
Flightpath	-1°

*fps = feet per second

Certification vs. Accident Flight

	Certification	Accident Flight
Pitch attitude	11°	9.5°
Descent rate (in fps*)	3.5	12.5
Flightpath	-1°	-3.4°

*fps = feet per second

Operational Feasibility

- FAA and EASA certification
 - No evaluation of a pilot's ability to achieve ditching parameters
- Postaccident simulator testing
 - Possible but difficult without practice

ENG DUAL FAILURE Checklist

- Amended by Airbus in 2005
- 3 parts:
 - Fuel remaining or no fuel remaining
 - Engine restart or no restart
 - Forced landing or ditching
- NASA research on checklist design
 - Cover all relevant phases of flight
 - Include all appropriate information
 - Reduce memory load



US Airways Training

- Dual-engine failure
 - Scenario begins at 25,000 feet
 - One engine restart by 8,000 feet
 - No low-altitude training
- Ditching
 - Review of Ditching checklist
 - Minimal guidance on ditching without engine power
 - No training for visual illusions



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