NTSB National Transportation Safety Board

Office of Aviation Safety

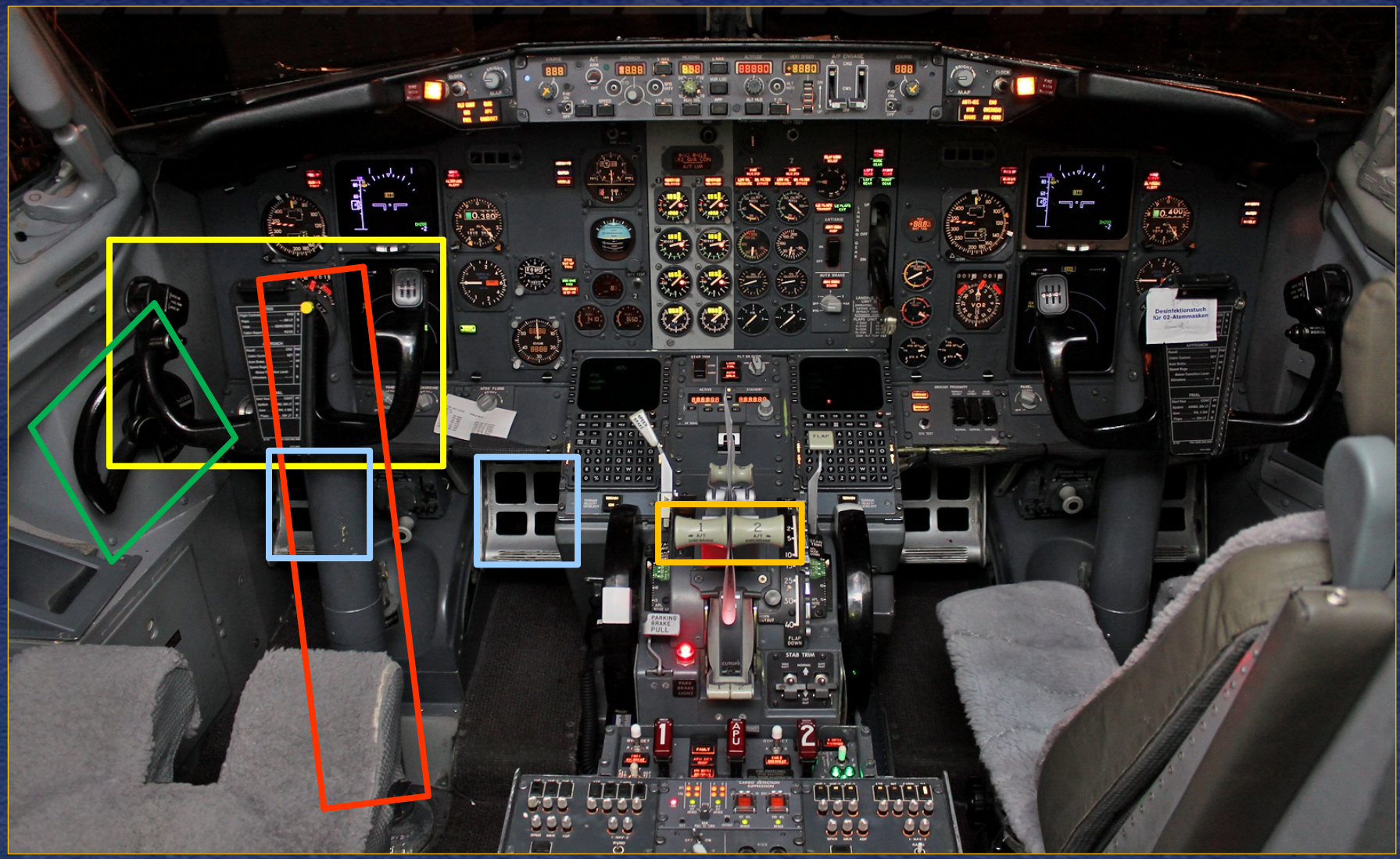
Continental Airlines Flight 1404

Airplane Performance
Timothy Burtch

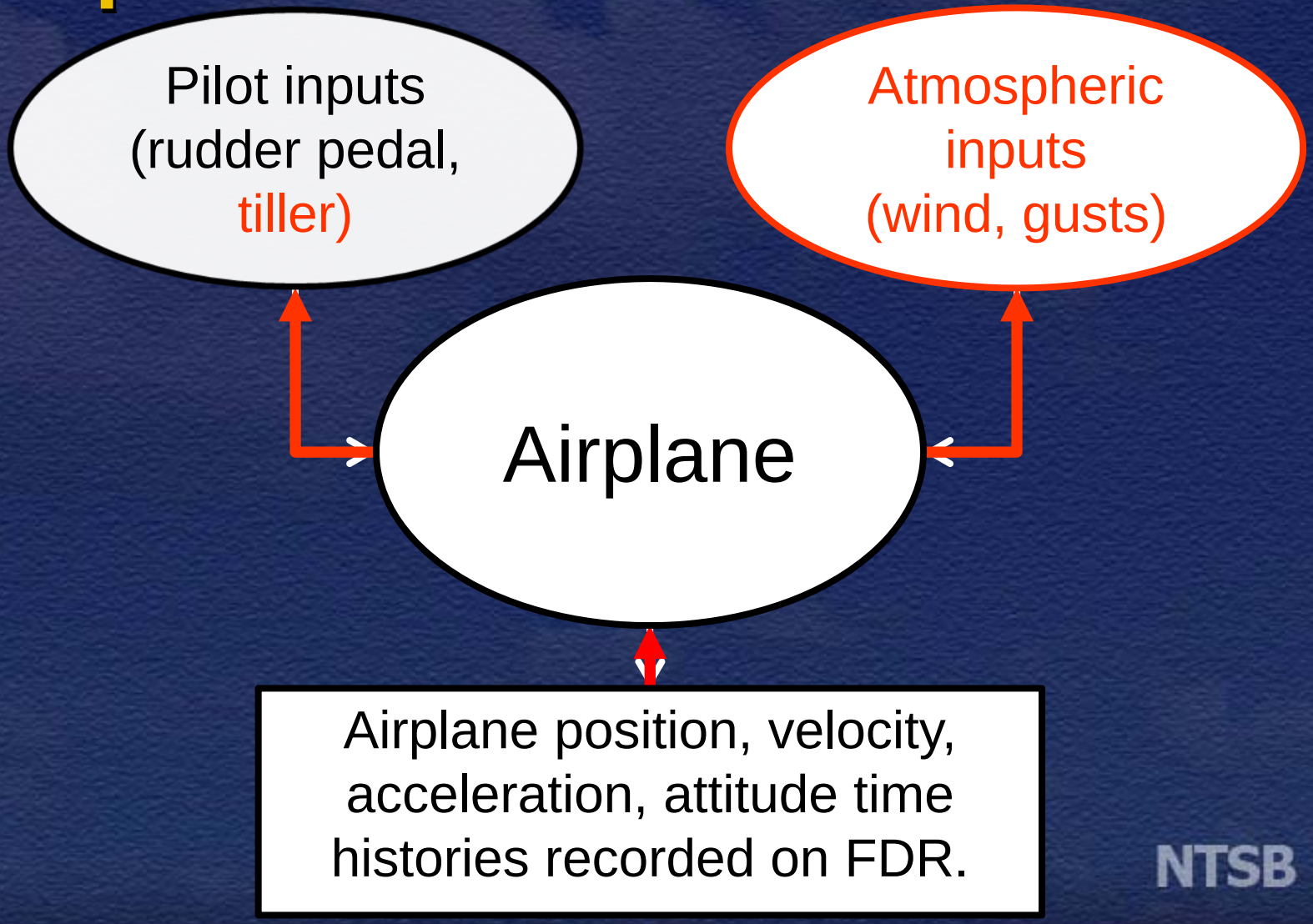
Available Data Sources

- Flight data recorder (FDR)
- Cockpit voice recorder (CVR)
- AMASS (ground radar)
- Meteorological reports
- On scene information

Pilot Control Inputs



Calculating Winds Acting on Airplane



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Winglet Effect

Negligible effect on crosswind capability

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Dorsal Effect

Significant effect on crosswind capability

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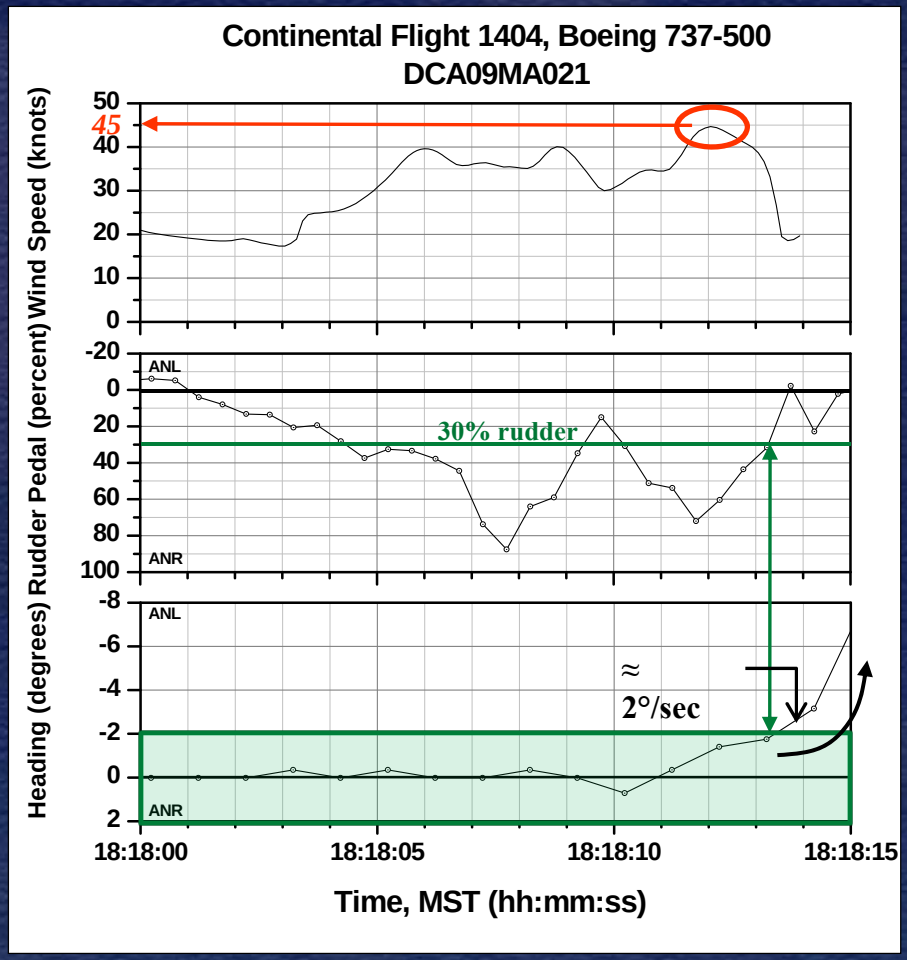
Wind Extraction Window

- No airspeed until 40 knots (18:18:00)
- Excessive skidding 14 seconds later
- Wind extraction 18:18:00 to 18:18:14
- First large rudder input peaked at 8 seconds
- Second large rudder input peaked at 12 seconds
- Departed runway at 17.5 seconds

Wind Extraction Results



- Peak gust about 45 knots
- Heading tracked until rudder pedal reduced to 30 percent
- No rudder above 30 percent after wheel started right-wing-down

Airplane had sufficient rudder to maintain desired track

FAA Certification Requirement

25.237 “Wind Velocities”

- Must be minimum of 20 knots
- Not necessarily more than 25 knots
- No gust requirements
- Boeing demonstrated 31 knots for 737-500
- Aviation Partners Boeing demonstrated 22 knots for 737-500 with winglets
- Boeing supplemental guideline: 40 knots (no gusts)

Supplemental Guideline Pitfalls

- Occurs at edge of the envelope
- How to model gusts?
- How to model pilot?
- Gusts matter

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