

A320 Strasbourg 1992 Accident Analysis

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Accident Synopsis

- January 20, 1992
- Airbus A320 Air Inter **F-GGED**
- Lyon -> Strasbourg
- The flight crew was prepared for an landing runway 23



Why ?

- Selected mode for automatic pilot
- Major cause: selection of the descent rate of **3300** ft/min instead of descent rate of 800 ft/min (enabling a approach plan of **3.3** deg)...
transcripts indicates that the crew is more worried about *heading* than *altitude & speed*

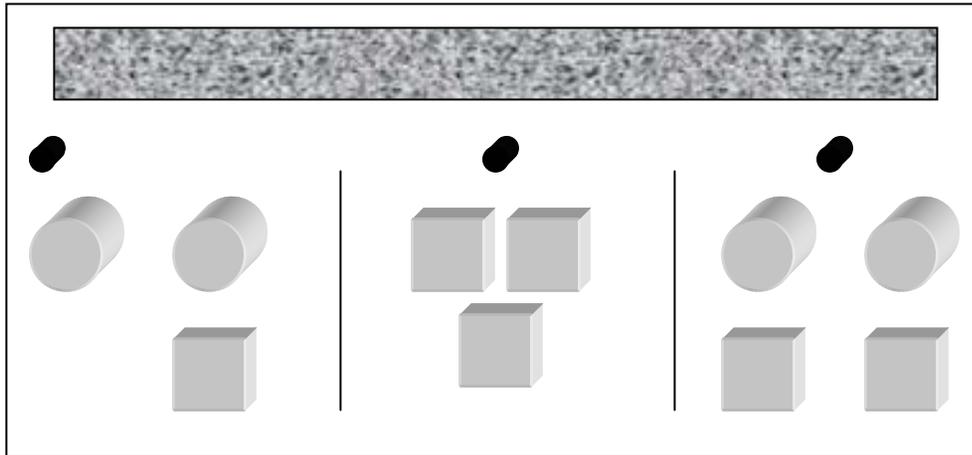


3 Main Hypotheses

- The captain forgets to change the mode Vertical Speed (VS) in the Flight Control unit (FCU), and then dials 3.3
- The captain wants to stay in VS mode, but dials 3.3 automatically, as he had determined in his approach briefing
- The captain changes the VS mode, but because of a problem in the FCU, this change is not taken into account



FCU



- VS mode: 3,3 = 3300 feet per minute
- FPA mode: 3,3 = 3.3 degrees
- Bi-modal dials decide which mode

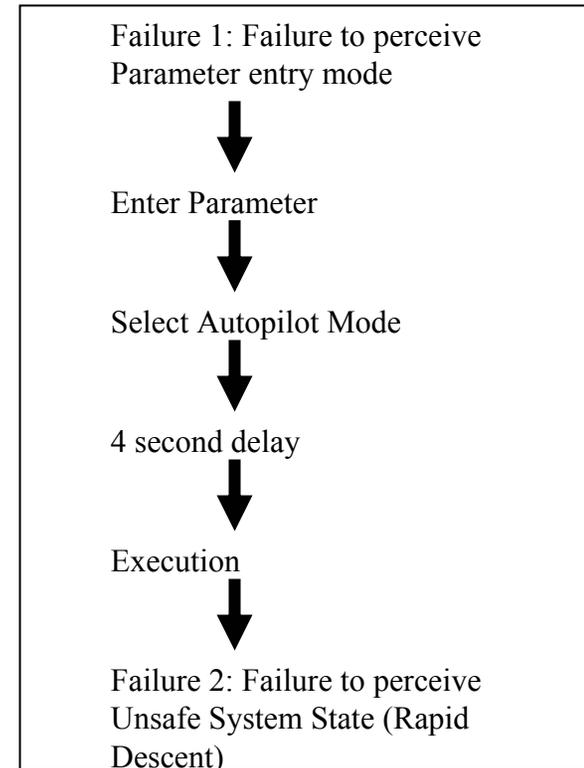
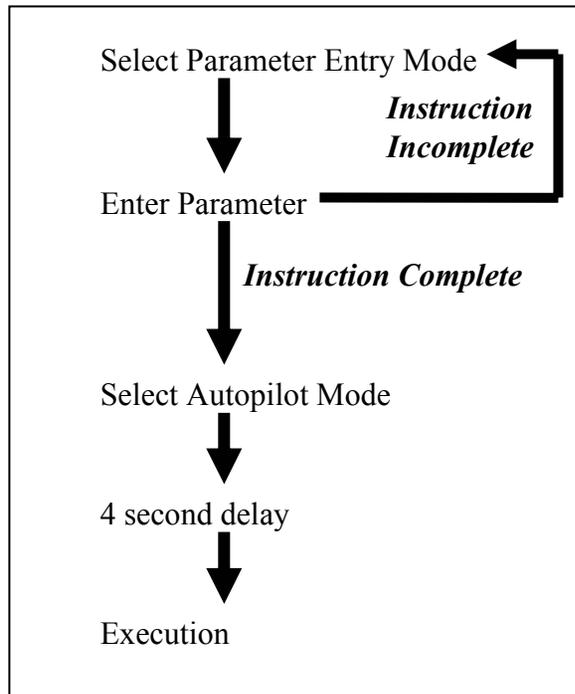


Accident Analysis

- No mechanical failure
- No sense of panic
- No significant malpractice
- Automation surprise
- Entry to autopilot was central to events leading to disaster



Task Procedural Structure



Modal Errors

- Modal errors (failure 1) involve failure to perceive current system mode
- Modal errors falls under category of perceptual slips
- Solutions involve prevention of such slips



Failure 2 explanation

- Mode error however does not explain failure 2
- Could have noticed rapid descent from
 - Instrument panel
 - Raw physical sensation of rapid descent
- De Keyser [KJ] describes this as fixation error (confirmation bias)
- Confirmation bias: a tendency to confirm an existing world view in the face of contradictory evidence

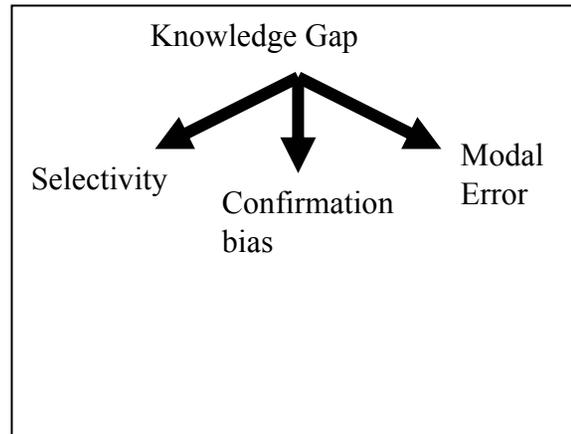


Knowledge-Based Errors

- More fundamental element exists that links the two failures
- Better explanation of surprise than mode error alone
- Modal errors better associated with knowledge-based errors than perceptual slips.



New Model



Appendix A

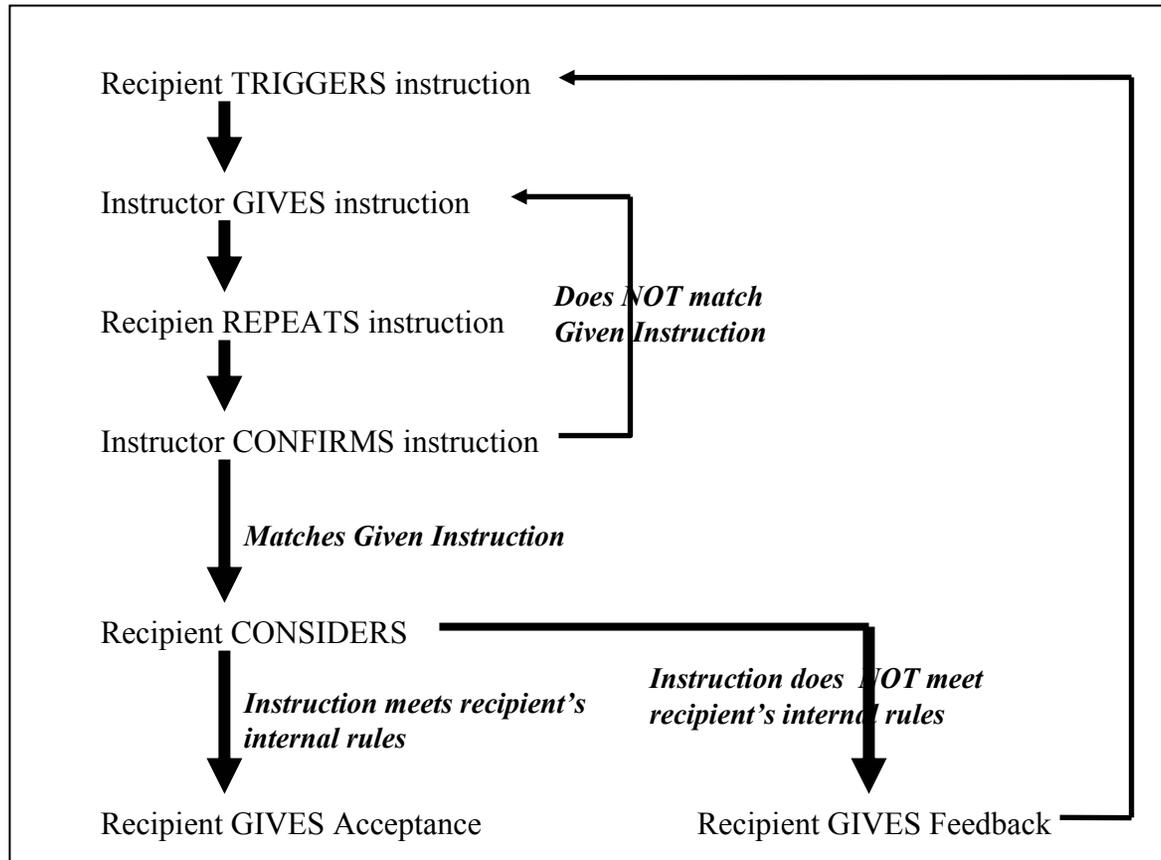


Experiment

- Hourizi and Johnson (Univ. of Bath) conducted an experiment
- Looked at examples of coordination between pilot and co-pilot which has benefited from decades of research



Pilot/Autopilot Task Model



Comparison of the two task models shows:

- No full repetition of the desired instruction is provided
- No confirmation is required from the pilot (instruction automatically executed after 4 second delay)
- No internal rule check is performed by the recipient (autopilot)
- Feedback given back is both distributed and passive



References

- [HJ] Hourizi, R & Johnson, P Human Computer Interaction Laboratory, Computing Science Group, University of Bath
- [KJ] De Keyser, V, Javaux, D, 1996. Human factors in aeronautics, design, specification & verification of interactive systems 1996
- French accident analysis:
<http://www.bea-fr.org/docspa/1992/f-ed920120/htm/f-ed920120.html>

