Some Lessons Learned About Flight Deck Automated Systems

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Lesson 1: Automated systems have contributed significantly to improvements in safety, operational efficiency and precise flight path management. However, vulnerabilities exist.

• Pilots sometimes rely too much on automated systems and may be reluctant to intervene.
• Autoflight mode confusion errors
• FMS programming and usage errors
Lesson 2: Automated systems, not “automation”

• Many systems, not a single system

• Not all the same type of automated system – from Billings 1997
  – Control
  – Information
  – Management

• Greatest growth is in automation of information-related tasks
Lesson 3: Lack of practice can result in degradation of basic knowledge and skills

• Degradation of motor and cognitive skills and knowledge for manual flight operations
Lesson 4: “Levels of automation” is a useful concept for communicating ideas about automated systems but can be hard to operationalize

- Combinations of automated system features
- Not a simple linear hierarchy
Lesson 5: Operational policy for flight path management, not automation policy

- Focus on managing the flight path of the airplane, not the automated systems
- Identify opportunities for manual flight operations
- Automated systems are tools for the pilot to use
Lesson 6: Use of automated systems can reduce workload during normal operations but may add complexity and workload during demanding situations
Corollary to Lesson 6: Adding automated systems can add new tasks

New tasks and errors exist
Flight Path Monitoring

- Monitor aircraft systems and flight path
- Note that both Pilot Flying and Pilot Monitoring have to monitor!
- Monitoring requires intervention skills
Both pilots monitor and manage flight path

Technical

PF

Non Technical

- CRM / NTS
- Intent / Challenge
- Aircraft Systems
- Flight Path
- a/c + ATC
- Modes
- Rules of thumb
- Manual
- Recovery
- Malfunction
Flight Path Monitoring - Intervention

• Assumes that a flight path issue has been detected and requires actions
• Implications for pilot training
• Implications for operational policies
Lesson 7: Sometimes the issue is complexity, not automation

- Vulnerabilities are sometimes related to complexity. Examples:
  - Large amounts of information
  - “Change fatigue”
Lesson 8: Be cautious referring to automated systems as another crewmember

- Potential for false expectations about system behavior
Lesson 9: Pilots and controllers mitigate risk on a regular and ongoing basis

Safety Snapshot: Split-second Decision Saved the Day (and more) in Perth
by John Craft in Things With Wings
Mar 15, 2016

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Note: This Emergency Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) No 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

This AD is issued in accordance with EU 748/2012, Part 21.A.3B. In accordance with EC 2042/2003 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [EC 2042/2003 Annex I, Part M.A.301].
Operational Use of Flight Path Management Systems

Final Report of the Performance-Based Operations-Aviation Rulemaking Committee/
Commercial Aviation Safety Team
Flight Deck Automation Working Group
September 5, 2013


http://flightsafety.org/files/flightpath/EPMG.pdf
Thank you!