Managing Automation or Managing Aircraft Flight Path: How does Operational Policy Need to Evolve?

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Federal Aviation
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Overview

- **Operator automation policies**
- **Flight path management – what is it?**
- **Content of operational policy – potential topics**

Operator Automation Policies

- **Most airlines have a policy for operational use of automated systems**

- **Content varies**

- **Maximize use of automation**

But

- *Flying is more than use of automated systems*

Flight Path Management

"Flight Path Management" is the planning, execution, and assurance of the guidance and control of aircraft trajectory and energy, in flight or on the ground.*

*Flight Path Management Working Group, Air Carrier Training Aviation Rulemaking Committee

Flight Path Management

- **Manual flight operations**
- **Managing automated systems**
- **Flight path monitoring and intervention**
- **Managing energy state**
- **Operating in the airspace**
- **Stabilized approach**
- **Go-around decision and implementation**

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Manual Flight Operations

- **When and how to fly "manually"**

- **Manual flight operations include more than "stick and rudder" motor skills**

- **There are many cognitive skills needed for manual flight operations**

Examples Requiring Motor and Cognitive Knowledge and Skills

- **Spatial reasoning needed for visual or non-precision approaches**

- **Go-arounds/missed approaches, especially all-engine and at altitudes higher than DA/DH**

- **Returning to nominal flight path after a flight path deviation**

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Managing Automated Systems – Example Topics

- **When to turn on or off**

- **Mode awareness**

- **"Levels" of automation?**

- **Dealing with anomalies or confusion**

- **Guidance versus control**

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Monitoring and Intervention

- **Define <u>roles</u> of Pilot Flying/Pilot Monitoring**
- **Define <u>activities</u> of monitoring – tasks done by both pilots**

Skills?
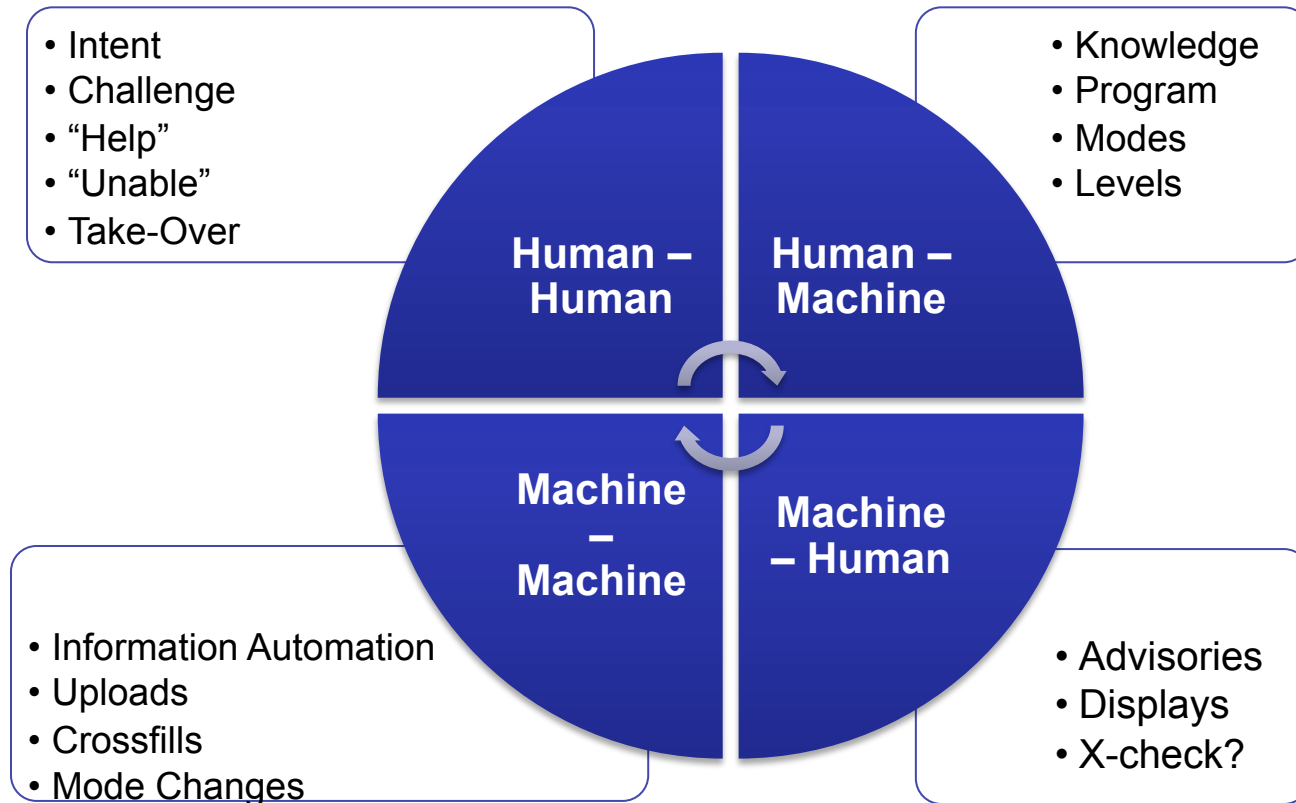
Non Technical

- CRM / NTS
- Intent / Challenge

- Aircraft Systems
- Flight Path
- a/c + ATC
- Modes
- Rules of thumb
- Manual
- Recovery

PF

PM

PNF

Technical

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Communication and Intervention

- Intent
- Challenge
- "Help"
- "Unable"
- Take-Over

- Knowledge
- Program
- Modes
- Levels

Human – Human

Human – Machine

Machine – Machine

Machine – Human

- Information Automation
- Uploads
- Crossfills
- Mode Changes

- Advisories
- Displays
- X-check?

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Managing Energy State

- **Energy management in normal operations**
- **Recognition/recovery from undesired energy state**
  - Autopilot/Autothrust mode interaction
  - Power Setting/Configuration/Drag Devices
  - Application of TEM/CRM
  - Upset recovery
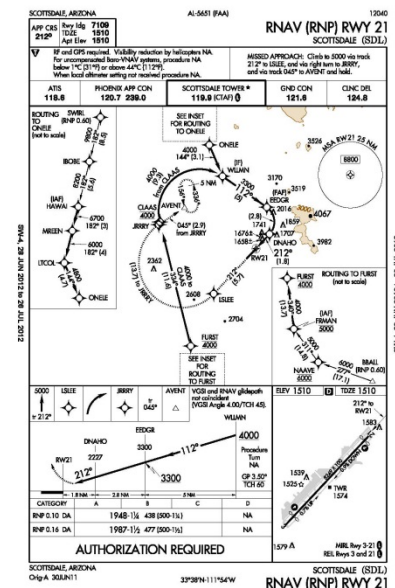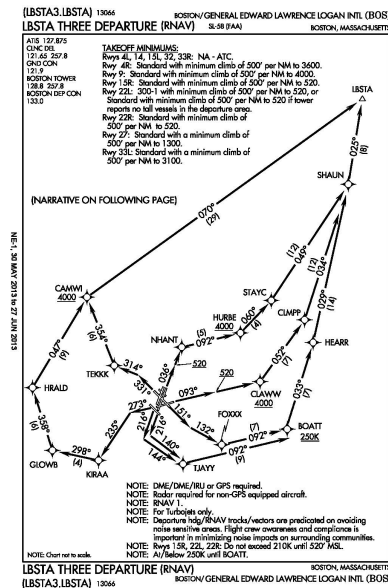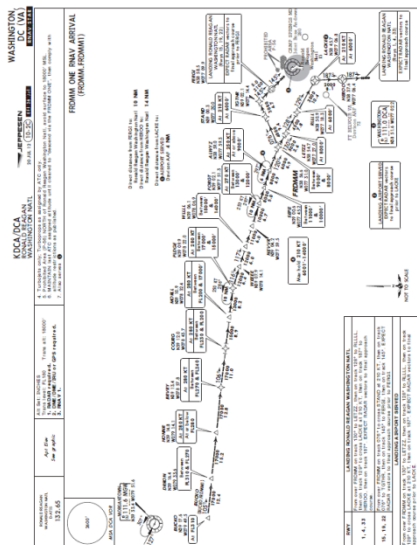- **Guidance for off-nominal energy states**

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Operating in the Airspace

- **Tell air traffic "unable" when appropriate**
- **Managing complexity**
  - Large amounts of information
  - "Change fatigue"

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Concluding remarks

- **Focus of operational policy needs to be on flight path management**

- **Improvements in operator policy/ procedures**
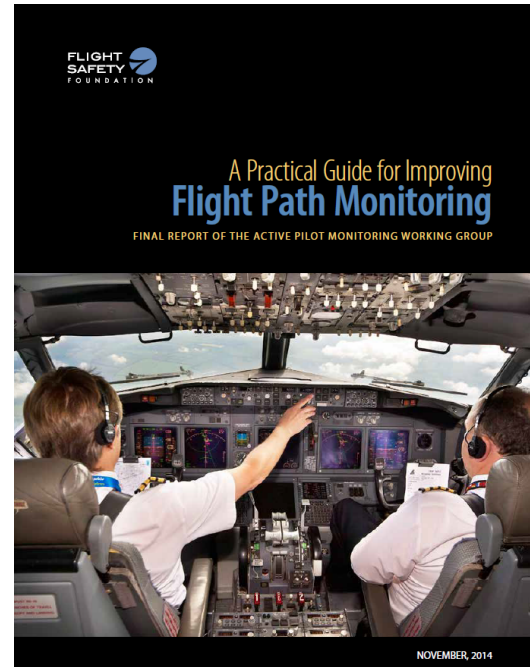
- **Basics! Reminders!**

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://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/parc/parc_reco/media/2013/130908_PARC_FltDAWG_Final_Report_Recommendations.pdf

A Practical Guide for Improving **Flight Path Monitoring**

FINAL REPORT OF THE ACTIVE PILOT MONITORING WORKING GROUP

NOVEMBER, 2014

UNSW AUSTRALIA

Volpe

http://flightsafety.org/files/flightpath/EPMG.pdf

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https://www.eurocontrol.int/publications/hindsight-20-winter-2014

https://www.caa.co.uk/docs/33/9323-CAA-Monitoring%20Matters%202nd%20Edition%20April%202013.pdf

Flight Path Management Working Group

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Thank you!

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