

# Digital Documents and Safety-Critical Data

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# The Issues

## ■ Digital data update effortlessly

- ◆ No “work” by crew
- ◆ No need to handle individual changes

## ■ Correspondence of digital data to on-board displays—vastly different update rates

## ■ Transfer from analog to digital and back (transfer tasks add workload that wouldn't be there if laptop was coupled with the aircraft avionics)

- ◆ Transfer tasks go up
  - Laptop to FMS
  - ACARS to/from laptop
  - Crew to/from laptop
- ◆ Input approaches are error prone

# The Issues 2

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- **Information can't be easily extracted, e.g., to place on clipboard**
  - ◆ Abnormals/emergencies
  - ◆ Advance preparation and study
- **Access time to unbooted laptop**
- **Use of laptop under unusual attitudes**

# The Benefits

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## ■ Configuration management

- ◆ Manuals always up to date
- ◆ Safety critical updates always immediately integrated

## ■ Effectivity

- ◆ Aircraft specific information

## ■ Ability to “filter” by safety relevance

- ◆ Critical
- ◆ Explanatory
- ◆ Background

# Benefits 2

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## ■ Multiple access schemes

- ◆ Serial
- ◆ Random
- ◆ Keyword

## ■ Context-sensitive alerting

- ◆ Bulletins and updates
- ◆ Critical safety points
- ◆ Non-standard operating procedures

# Focal Areas

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## ■ Transition to digital

- ◆ Crews, managements and authorities must understand the different metaphor
- ◆ Limitations of non-integrated system must be overcome
  - 1-way data
  - Transfers
- ◆ Alerting for bulletins and updates must be accomplished – *Stealth* updates must be avoided
- ◆ Laptop use procedures must be developed

# Focal Areas 2

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## ■ Design of integrated, end-to-end system

- ◆ What, where, when and how
- ◆ How is safety-related data
  - Categorized?
  - Communicated?
  - Updated?
- ◆ How is disconnect between on-board systems and documentation handled?
  - Faster block changes?
  - Same database?

# Next Steps

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## ■ Establish standards for future integrated systems

- ◆ Displays (what, when, where and how)
- ◆ Levels of safety criticality
- ◆ Updating frequency and approach
- ◆ Certification
- ◆ Training approach and requirements
- ◆ Personal copies for off-aircraft review

# Next Steps 2

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- **Focus on transition and present use of laptops**
  - ◆ Displays (what, when, where and how)
  - ◆ Levels of safety criticality
  - ◆ Updating frequency and approach
  - ◆ Accuracy of transfer tasks
  - ◆ Smoothing interfaces with the analog world
    - ACARS
    - FMS
    - Flight plans
  - ◆ Training and procedures