



NCAR



Weather Delivery and Display in the Cockpit

Tenny Lindholm

FPAW, NBAA Atlanta

21 Oct 10



National Center for Atmospheric Research



The Concepts

INFORMATION MANAGEMENT FOR ATM

Need for timely, relevant, quality-assured information directly into the cockpit

AIS (Annex 15)

- *Aeronautical Information Package (AIP, AIC, etc.)*
- *AIRAC system*
- *Permanent changes and NOTAM*

MET (Annex 3)

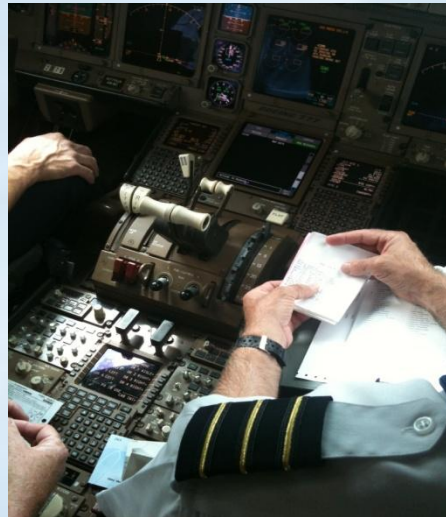
- *Various products and services (Reports, forecasts, etc.)*
- *Pre-flight planning / radio contact*
- *Dynamic and time-sensitive*

The Vision

Paper PIB
(Dated info)



Today's ACARS
(DL Text-Based)



Future Data Link
(DL Data Depicted Graphically)



ASHTAM

Eyjafjallajokull (e-ja-fal-la-yokel)
(a.k.a. "That Volcano in Iceland")



Date de publication : 10-04-21 07:21

Nof : LFFA Type : R Identifiant : A 2345 / 10 A03

A/R : A 2344/ 10

Q) LFXX/QXXXX/IV/NBO/E/ 000/ 205/4558N-00520E 999

A) LFBB LFEE LFFF LFMM LFRR

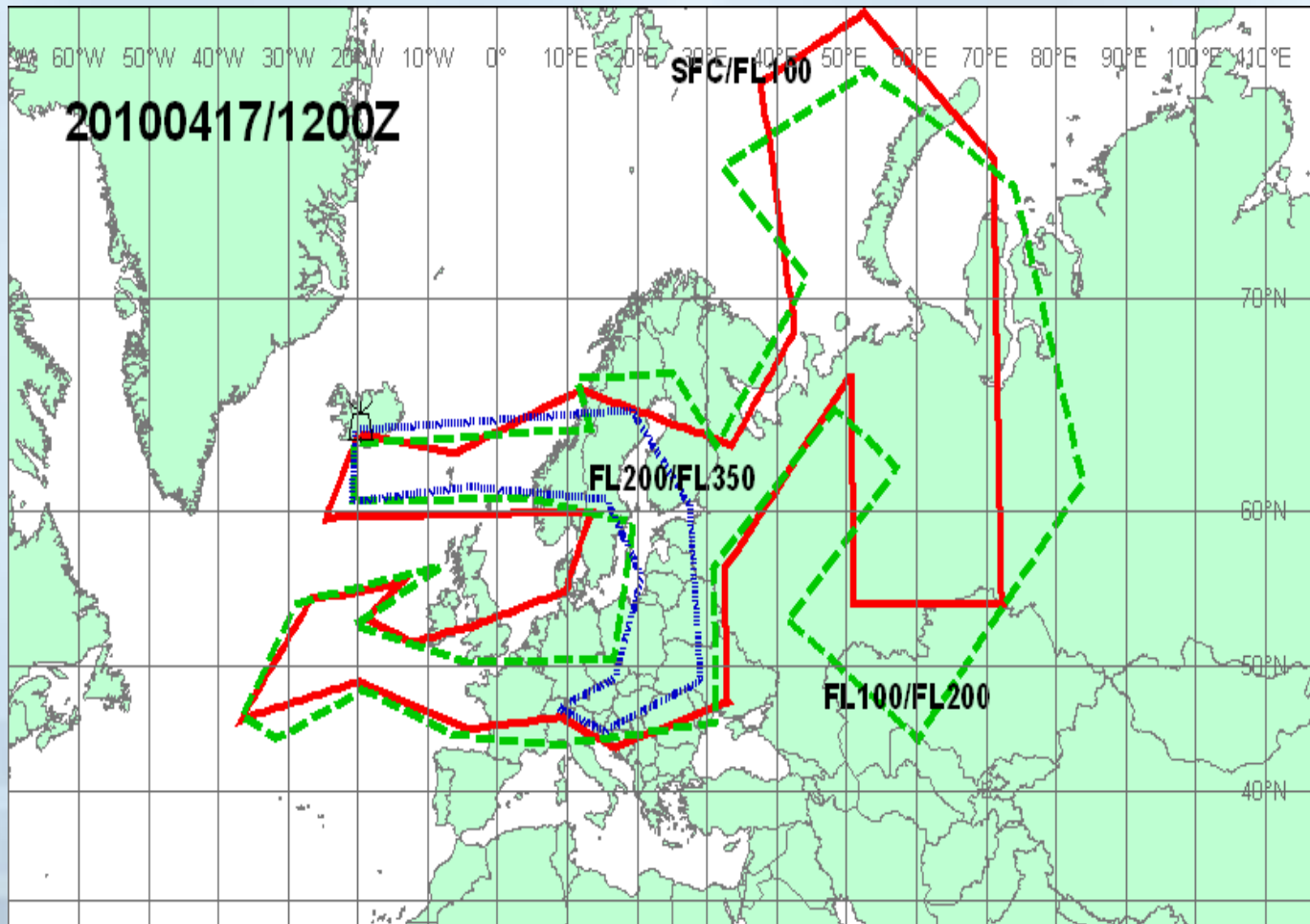
B) 10-04-21 07:21 C) 10-04-22 04:00

D)

E) DUE TO ICELANDIC VOLCANO EYJAFJALLAJOKULL ACTIVITY, VFR PUBLIC AIR TRANSPORT FLIGHTS AND ALSO ALL IFR FLIGHTS ARE PROHIBITED WITHIN FRENCH AIRSPACE, FROM SURFACE TO FL205, LOCATED ON NORTH OF A LINE LAPEX (4700N, 00800W) / NANTES-ATLANTIQUE LFRS (4709N, 00136W) / LGL (4847N, 00032E) / DPE (4956N, 00110E) EXCEPT FOR FLIGHTS CONDUCTING HUMAN SAFETY OPERATIONS. - HOWEVER, IFR DEP OR ARR FERRY AND CARGO FLIGHTS FROM OR TO AD LOCATED WITHIN THIS AREA ARE AUTHORIZED AFTER INFO FROM AIRSPACE MANAGEMENT CELL, AT THE FLW ADDRESS : AMC.FRANCE'AT'AVIATION-CIVILE.GOUV.FR

Same ASHTAM Depicted Graphically

-- Source: UK MET Office, April 2010 --



Electronic Flight Bags

Used for AIS & MET Display in Both Legacy and New Aircraft

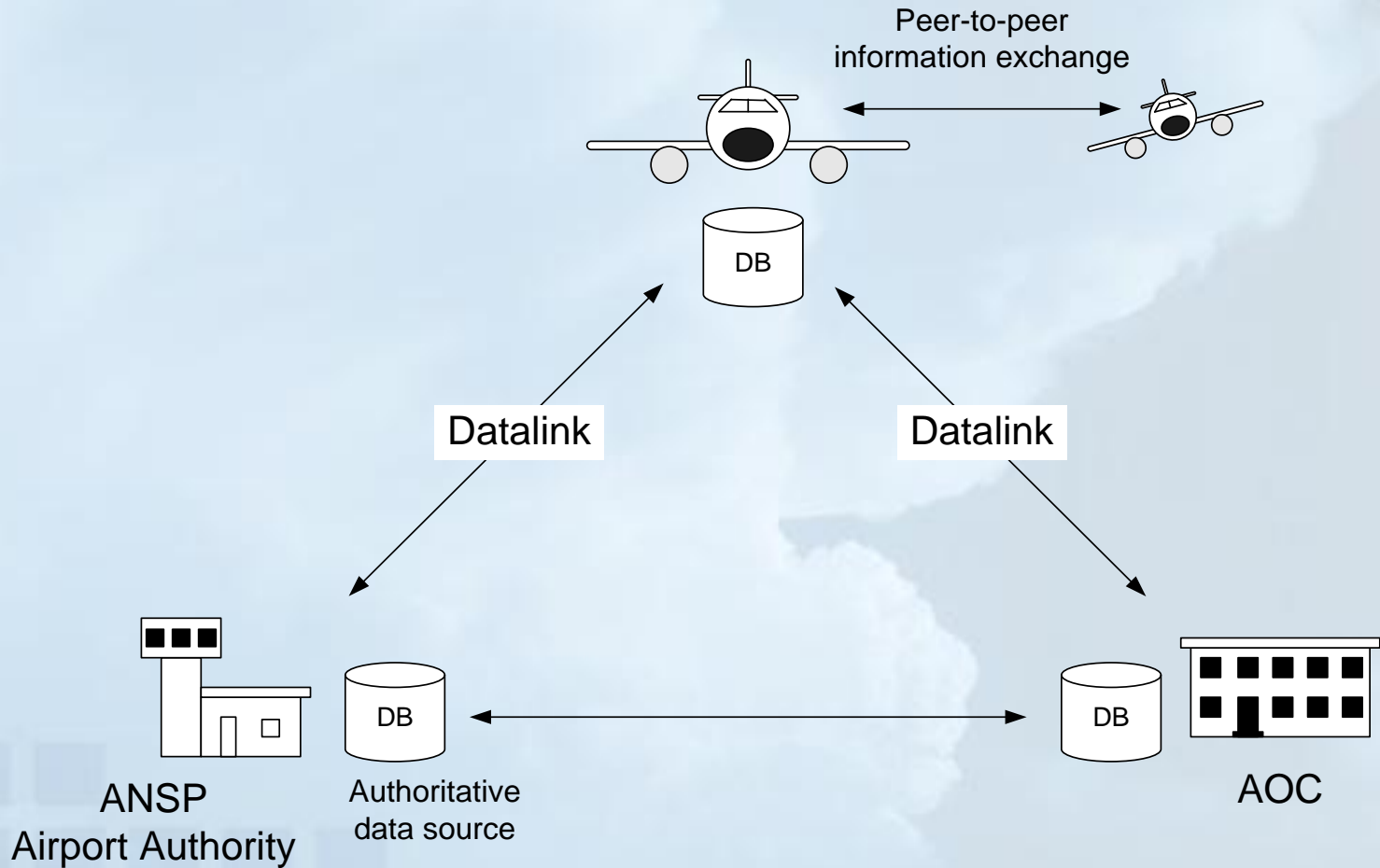




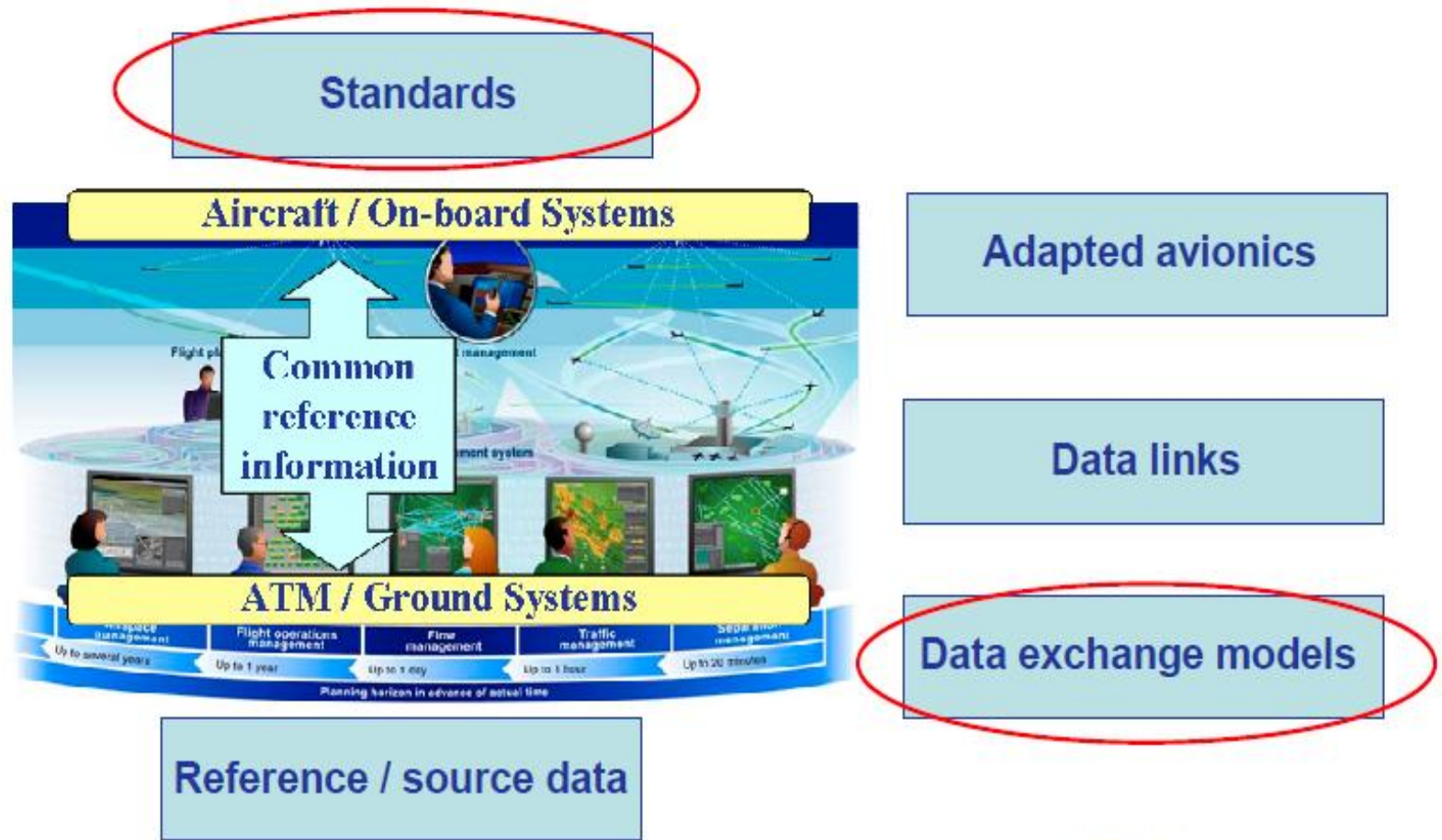
Fundamentally...

- WTIC is meant to promote CDM between dispatch, pilot, ATM/C
 - Strategic, not tactical (where is the transition?)
 - Does not (necessarily) promote autonomous pilot responses
 - Purpose, bottom line: to reduce the uncertainty of pilot response to a weather constraint or hazard
- WTIC also facilitates verification of applicability and temporal/spatial precision of weather R&D

Shared Situational Awareness is Key

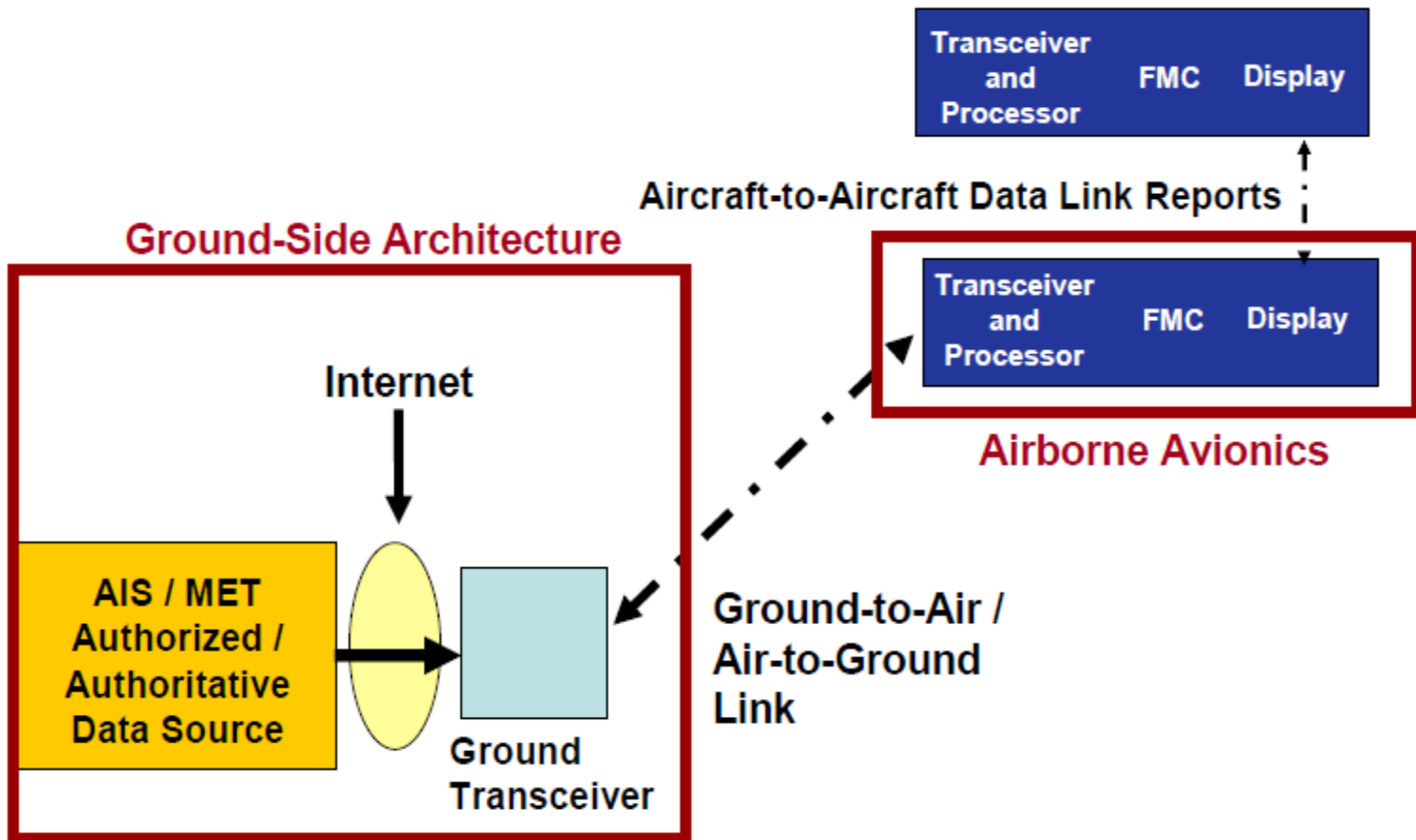


The Enablers





Notional AIS & MET Ground & Air Data Link Architecture



RTCA SC206/EUROCAE WG76



- Operational Service and Environmental Description (OSED) complete
 - Essentially, a concept of operations within defined environment(s)
- Safety and Performance Requirements (SPR)—final review and comment complete
- Approved TOR moving forward
 - DO 267 revision--Update requirements for advisory data link services
 - Concept of use, scope and plan for MASPS supporting AIS and MET data link services as the normal (or primary) means for cockpit receipt
 - Potential DO-252 revision for air-to ground data link
 - SC -186 WG1 potential applications of A-G data link OSEDs
 - Wake Vortex
 - Air Traffic Management
 - Weather Applications
 - AIS and MET Services Delivery Architecture Recommendations
 - Aeronautical Information Services/Meteorological (AIS/MET) MASPS

SAE G-10 Human Factors Support



- SAE G-10 has been asked by SC-206 to address HF issues associated with data link
 - ARP 5464—Human Factors Considerations in the Design of Multi-function Display Systems for Civil Aircraft (published)
 - ARP 5621—Electronic Display of Aeronautical Information – Charts (published)
 - ARP 5740—Cockpit Display of Data Link Weather Information (in progress)
 - ARP XXXX—Temporary Aeronautical Data (TBD)
- Relevant ARPs will be referenced in MASPS

Challenges

- Authoritative data source
 - Key enabler
- Adoption and maintenance of common data formats for both aeronautical information and weather exchange models (AIXM and WXXM)
- Development and harmonization of standards and initiatives
 - ICAO and WMO
 - RTCA and EUROCAE