RTCA

THE GOLD STANDARD FOR AVIATION SINCE 1935

RTCA Special Committee 206

FPAW Presentation:

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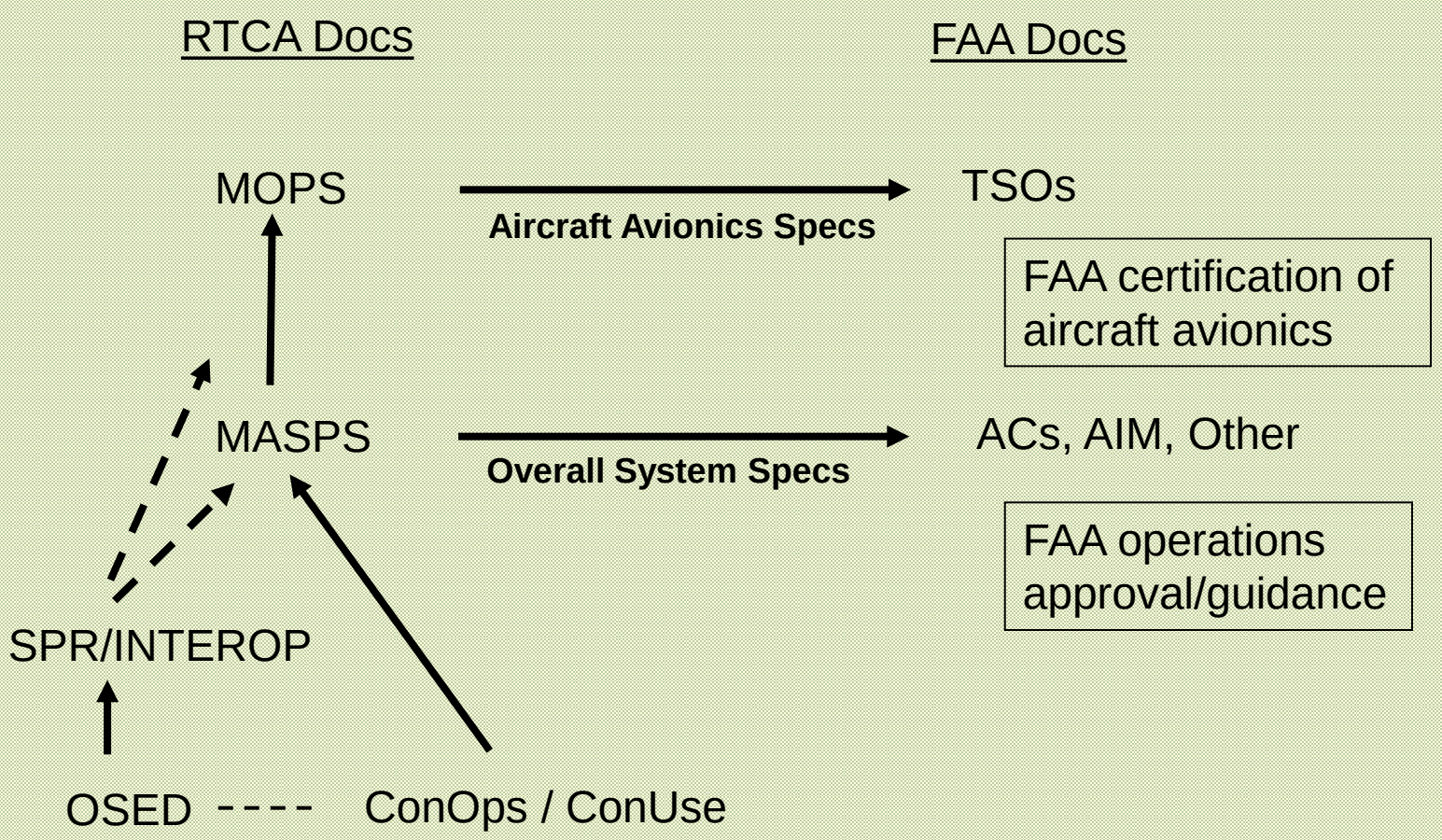
What You Will Hear

- Process – Standards Development
  - RTCA Approach – FAA Use
- Industry Motivation
- Relevant Data Link Architecture
- RTCA SC-206 Examples
  - ConUse for MET and AIS Data Link Services
  - OSED for Wake Vortex, Air Traffic Management and Weather Applications
  - RTCA SC-206 Workplan - Recruiting

Process

RTCA Approach – FAA Use

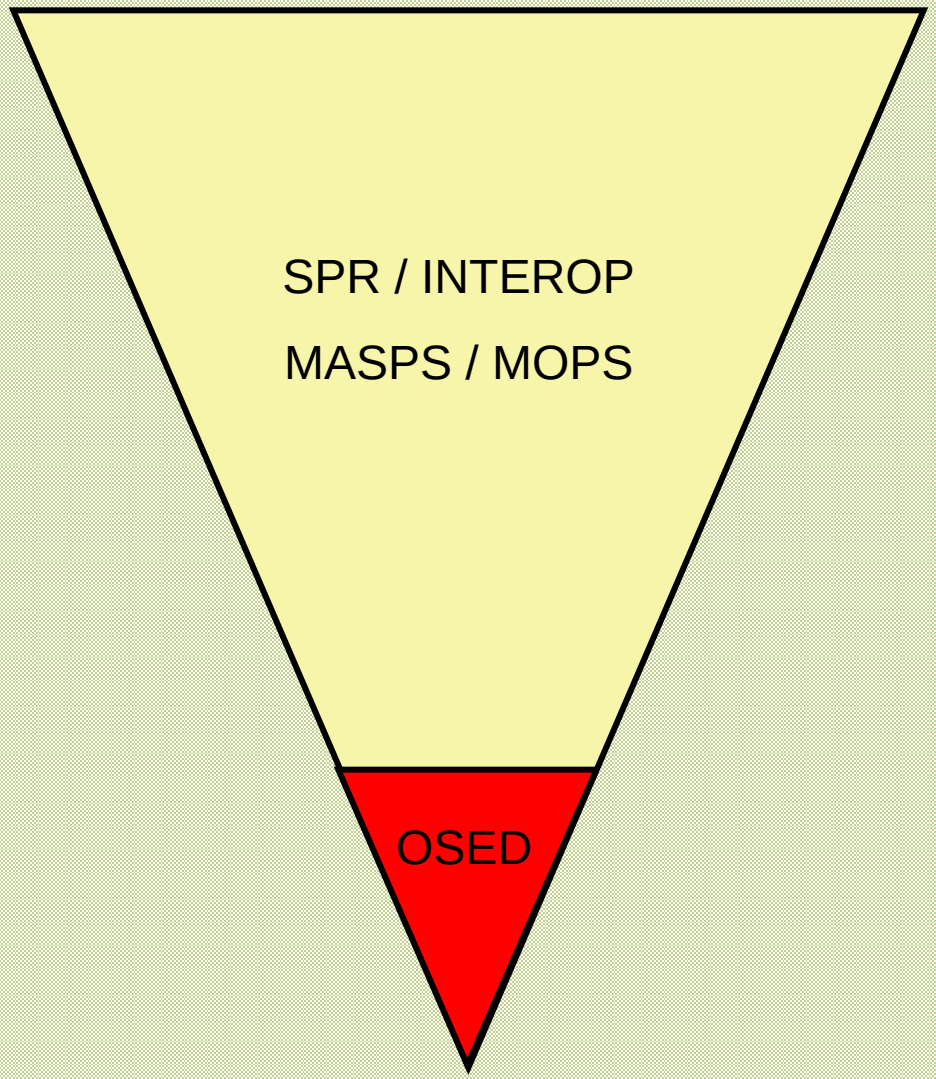


Bottomline: An OSED or ConOps/ConUse are the basis for developing System(s) Performance Specifications

RTCA Approach – Documents Scope

- OSED = Operational Services and Environment Definition
  - Provides description of a proposed Service
  - Describes
    - How it will work
    - Where it will work
    - Under What Conditions it will work
    - What are the potential Benefits
- ConOps / ConUse – follow basic FAA outline
  - Contents and purpose similar to an OSED
- SPR = Safety and Performance Requirements (3 Main Components)
  - OSD – Operational Service Description
    - Based on an OSED
  - OSA – Operational Safety Assessment
    - Establishes Integrity Requirements
      - Integrity = Service Quality/Corruption Risk
  - OPA – Operational Performance Assessment
    - Establishes Timing, Availability and Continuity Requirements
      - Timing = Time to complete action (latency)
      - Availability = Service available risk to one/all users
      - Continuity = Service interruption risk
- INTEROP = Interoperability Requirements
  - Identifies requirements (technical, interface and functional) for a specific technology (or mix) needed to operate successfully per the SPR/OSED

Level of Effort



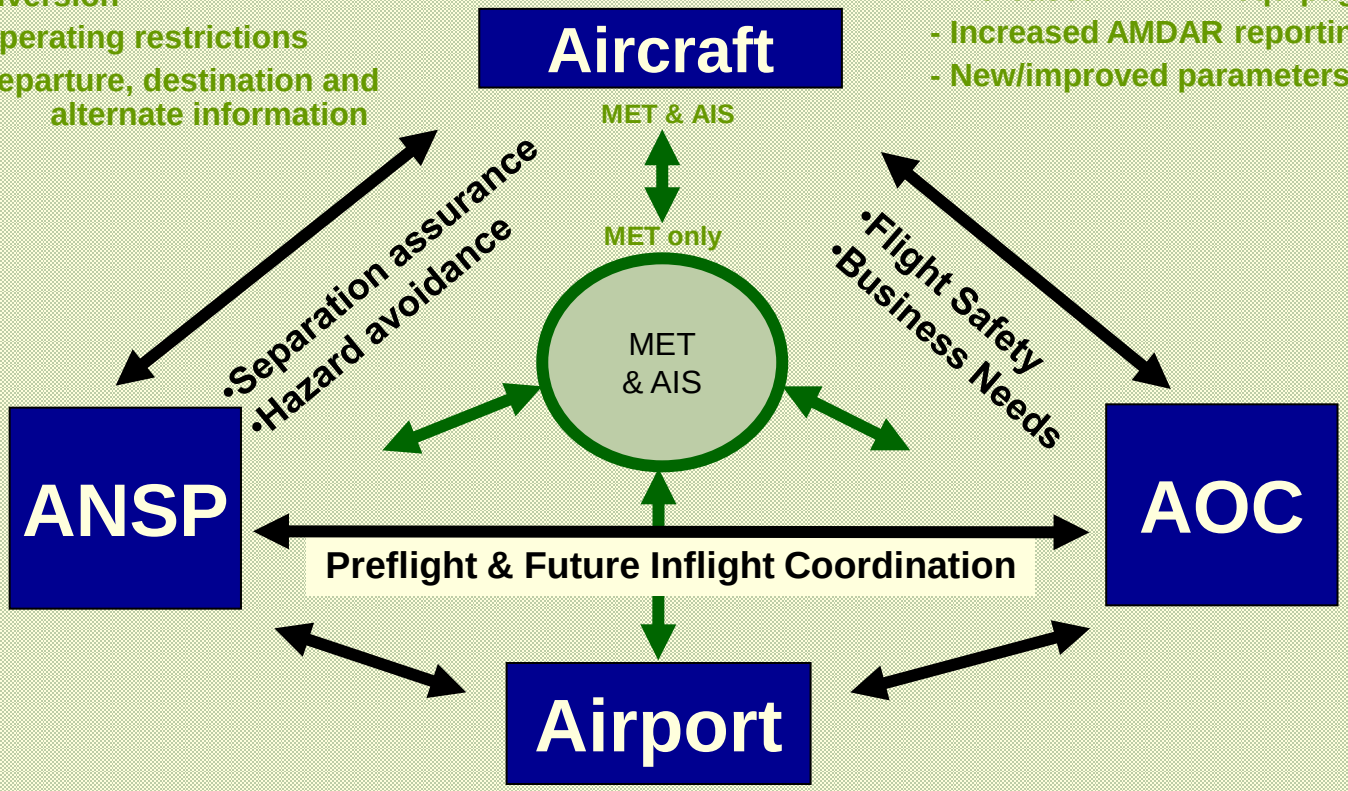
If OSED is not done well – SPR / INTEROP / MASPS / MOPS are at risk - !!

Motivations For Our Industry

CDM and Exchange of MET/AIS Data

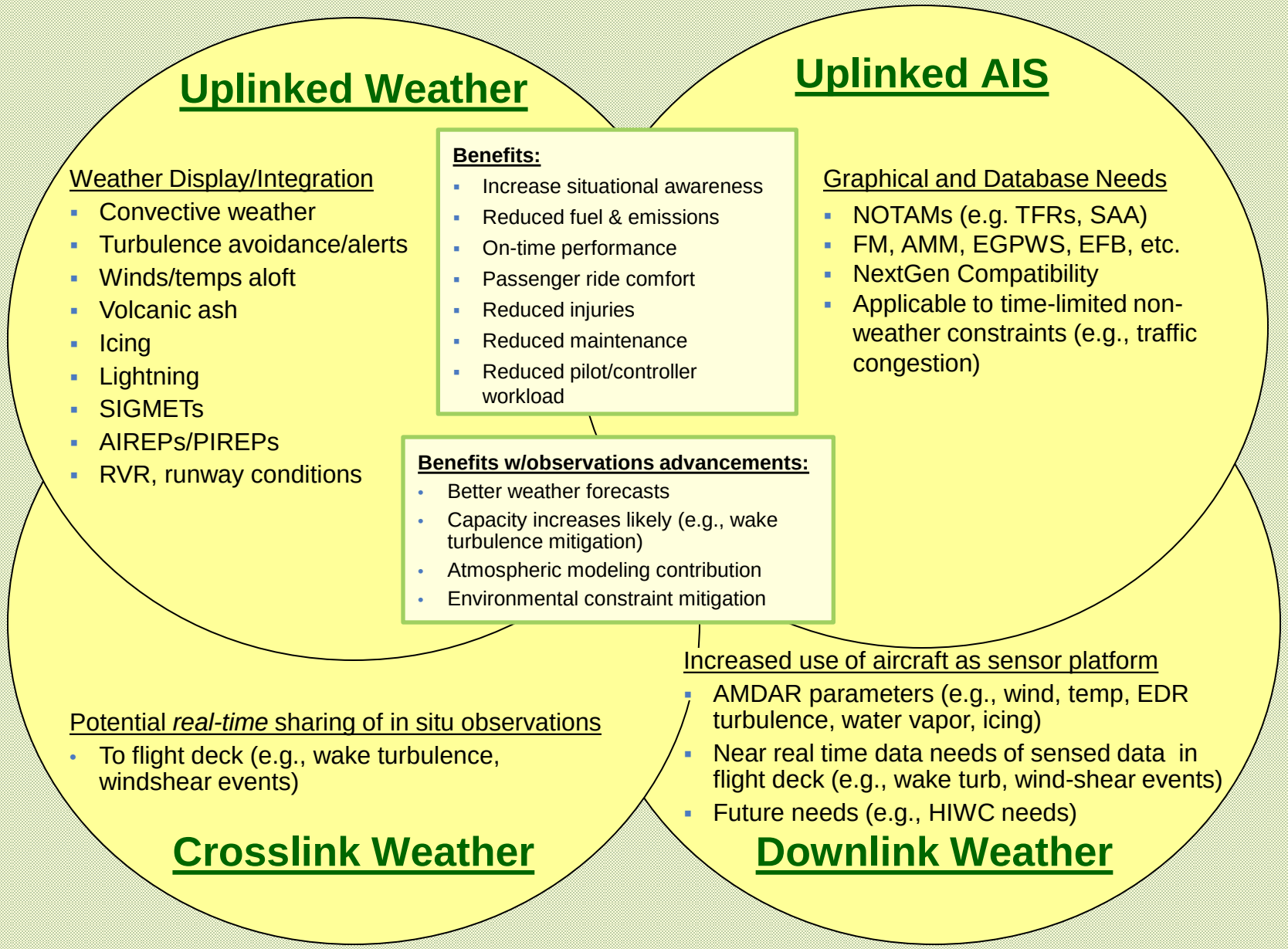
Flight Crew Needs
- Hazard avoidance
- Flight optimization
- Diversion
- Operating restrictions
- Departure, destination and alternate information

A/C Observations
- Increased AMDAR equipage
- Increased AMDAR reporting
- New/improved parameters



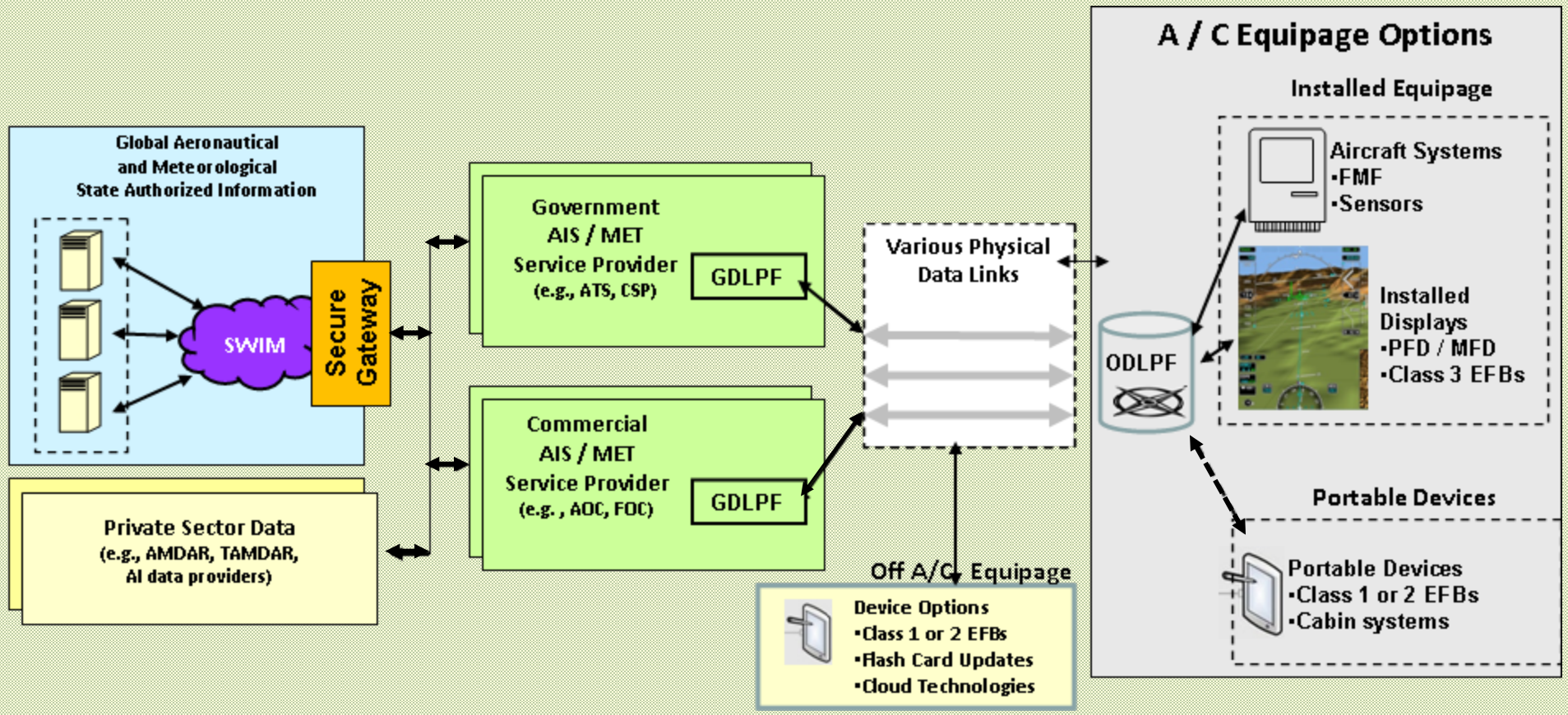
Improved connectivity will provide better data collection and dissemination

Concepts for NextGen Industry Standards Activities (e.g., RTCA SC-206)



Relevant Architectures

ConUse Recommended Architecture



AIS and MET Services Physical Architecture (Notional)

RTCA SC-206 Examples

AIS, MET, & ATM Information Categories (AIS/MET ConUse)

Information Categories	Flight Scenario														Services				
	Situational Awareness							Hazard Avoidance			Diversion		Optimize Flight		MET			AIS	
	Pre Flt	Sfc Ops	Term Ops	En Route	OCN	Polar	RMT	Term Ops	En Route		Destination	Emergency e.g., medical	Surface/ Terminal	En Route	WPDS	WNDS	WIDS	BSS	AUS
									Route Dev	Alt Chng									
MET Examples																			
Airport/ Aerodrome Wx	X	X	X	X	X	X	X				X	X	X	X	X	X	X		
Hazardous Weather																			
Convective Activity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Turbulence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Icing/Freezing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
Microburst	X	X	X					X			X	X	X			X	X		
Wind shear	X	X	X					X			X	X	X			X	X		
Wake Turbulence	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X		
Volcanic Ash	X			X	X	X	X		X	X				X	X	X	X		
Winds/Temps																			
Flight Path	X			X	X	X	X		X	X				X	X	X			
Arrival/Departure	X	X	X								X	X	X		X	X			
BSS Examples																			
Aerodrome Map	X	X	X								X	X	X					X	
Aerodrome Info	X	X	X								X	X	X					X	
Airspace and Comm	X	X	X	X	X	X	X				X	X	X	X				X	
Electronic Charts	X	X	X	X	X	X	X				X	X	X	X				X	
Geopolitical	X			X	X	X	X				X			X				X	
Magnetic Field/Flux																		X	
Navigation	X	X	X	X	X	X	X				X	X	X	X				X	
Obstacle	X	X	X	X	X	X	X				X	X	X	X				X	
Terrain	X	X	X	X	X	X	X				X	X	X	X				X	
Miscellaneous																		X	
AUS Examples																			
Aerodrome	X	X	X	X	X			X			X	X	X						X
Airspace	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X
Services	X	X	X	X	X	X	X	X	X		X	X	X	X					X
Points & NAVAIDs	X		X	X	X	X													X
Communications	X	X	X	X	X	X					X	X							X
Surveillance	X	X	X	X	X	X					X	X	X	X					X
Procedures	X	X						X			X	X		X					X
Routes	X			X	X	X	X		X	X	X	X	X	X					X
Obstacles	X	X	X	X	X	X		X			X	X	X						X
Miscellaneous																			X
Air Traffic Mgmt Examples																			
Traffic Flow Info	X	X	X	X	X	X	X				X		X	X					X
ATC Procedures	X	X	X	X	X	X	X				X		X	X					X

Meteorological Parameters to be Transmitted (DO-339 OSED)

Data Field	# of bits	Range	LSB/Comments	Desired Reception Period (seconds)
Wind Speed	8	0..255 knots	1 knot	3
Wind Direction	9	0…359 degrees	1 degree See Note 1	3
Static Air Temperature	9	-128..127.5 degrees C	0.5 degrees C	10
Static Air Pressure	11	0..2047 hPa	1 hPa See Note 2	10
Average Turbulence Metric (EDR1/3)	8	0..1.27 in EDR1/3 units	0.005 in EDR1/3 units. See Note 8	10
Humidity/water vapor	7	0..100%	100/127 percent, See Note 5	20
Peak Turbulence Metric ($EDR^{1/3}$)	8	0..1.27 in $EDR^{1/3}$ units	0.005 in $EDR^{1/3}$ units. See Note 8	20 nominal 10 on triggering event
Icing Hazard Metric	2	00=none, 01=light 10=moderate, 11=severe	See note 7	20 nominal 10 on triggering event
Windshear or Microburst Indication	2	00= none 01=windshear 10=microburst		20 nominal 10 on triggering event
Volcanic Ash Hazard Metric	2	00=none, 01=light 10=moderate, 11=severe	See note 8	20 nominal 10 on triggering event

Notes:
(1)The time and location of each observation is included with the transmitted parameters
(2)Vertical Wind Speed is a desired parameter for some potential applications. However, aircraft-derived vertical winds are often “noisy” and require specialized filtering. This may diminish usability.

SC-206 Summary

- Established Feb. 11, 2005 at the request of the FAA to address the future ATM concept of:
  - Establishing the aircraft as a primary participant in collaborative decision making (CDM).
  - Transitioning to a global Aeronautical Information Management (AIM) environment.
  - Using Broadcast, Demand, and Contract data link modes for accessing AIS/MET information.
  - Establishing the data link services as the primary means for cockpit receipt & decisions using time-critical information

    Note: For the first two Deliverables, SC-206 worked in conjunction with EUROCAE WG-76
- Leadership
  - Co-Chairs: Rocky Stone, United Airlines and Allan Hart, Honeywell
  - Secretary: Tom Evans, NASA
  - Designated Federal Official: Richard Heuwinkel, FAA - Weather Policy and Requirements
  - RTCA Program Director: Harold (Hal) Moses
- Sub-groups
  - #1 (Wake) Ed Johnson, NASA & Clark Lunsford, MITRE (Completed) #2 (ConUse) Tim Rahmes, Boeing & Ernie Dash AvMet (Submitted);
  - **#3 (Architecture) Matt De Ris, North Star & Bill Carson, MITRE** **#4 (DO-252) Tim Rahmes, Boeing & Tammy Farrar, FAA;**
  - **#5 (MOPS) TBD** **(Need Co-Chairs)** **#6 (MASPS) TBD**

Deliverable	Date	Status
Operational Service and Environment Description (OSED) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services	Dec 2007	D0-308/ED-151
Safety and Performance Requirements (SPR) for AIS and MET Data Link Services	Oct 2010	DO-324/ED-175
Wake Vortex, Air Traffic Management, and Weather Applications OSED	June 2012	DO-339
Concept of Use of AIS and MET Data Link Services (supports MASPS)	June 2012	Submitted
AIS and MET Services Delivery Architecture Recommendations	December 2013	In works
Revise DO-252 to include performance standards for determining EDR and meteorological sensor reports and status	December 2013	Just starting
Minimum Operational Performance Standards (MOPS) for Flight Information Services – Broadcast (FIS-B) with Universal Access Transceiver (UAT)	March 2014	Not started
Minimum Aviation System Performance Standards (MASPS) for AIS and MET Uplink Services	June 2014	Not started

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