

FREQUENTIS
FOR A SAFER WORLD

ICAO APAC / EUR / MID Workshop

on Service Improvement through integration of
AIM, MET and ATM Information Services

Session 12: AI5 – Integrated Information Services

SWIM best practices providing integrated
service delivery

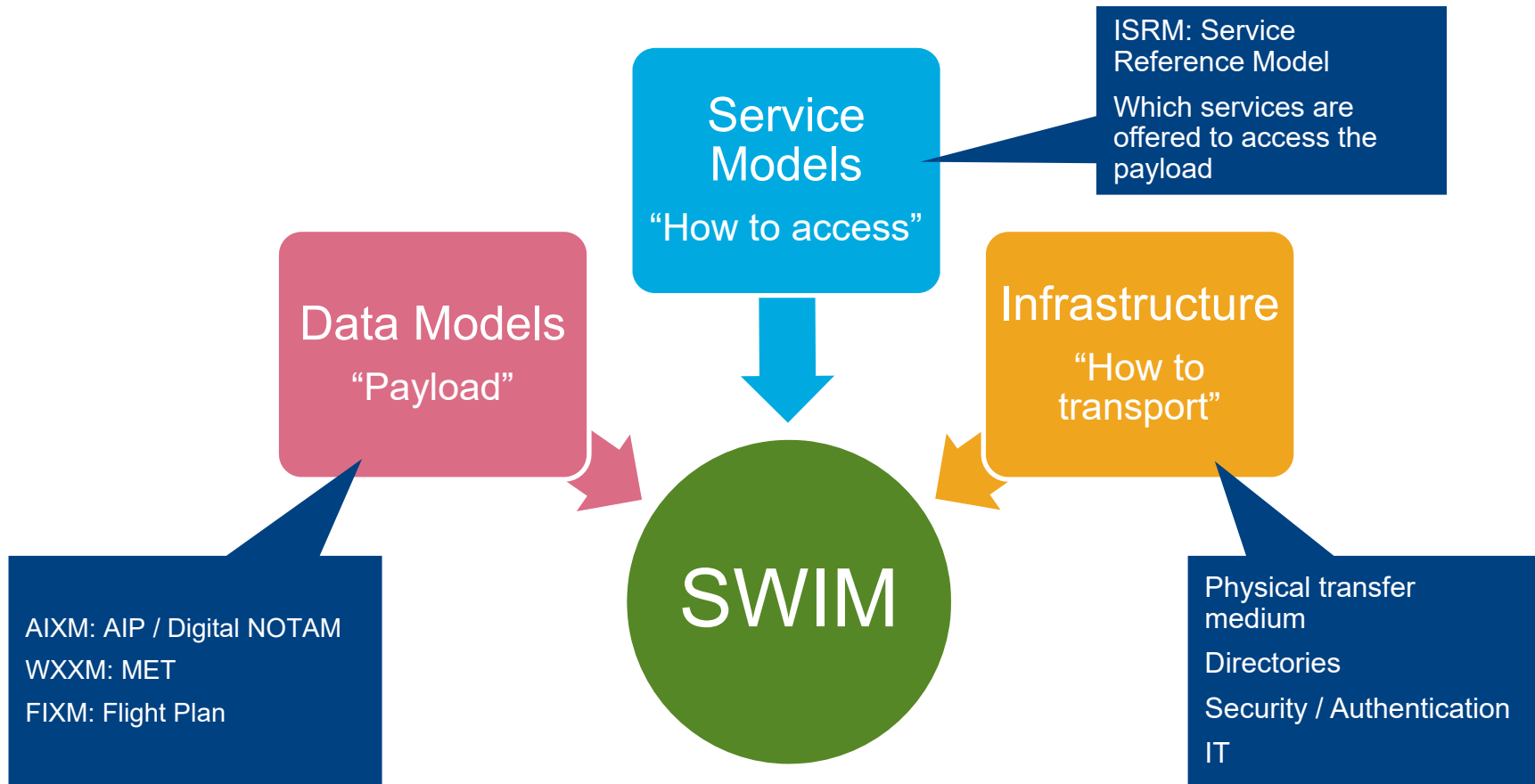
SWIM Building Blocks



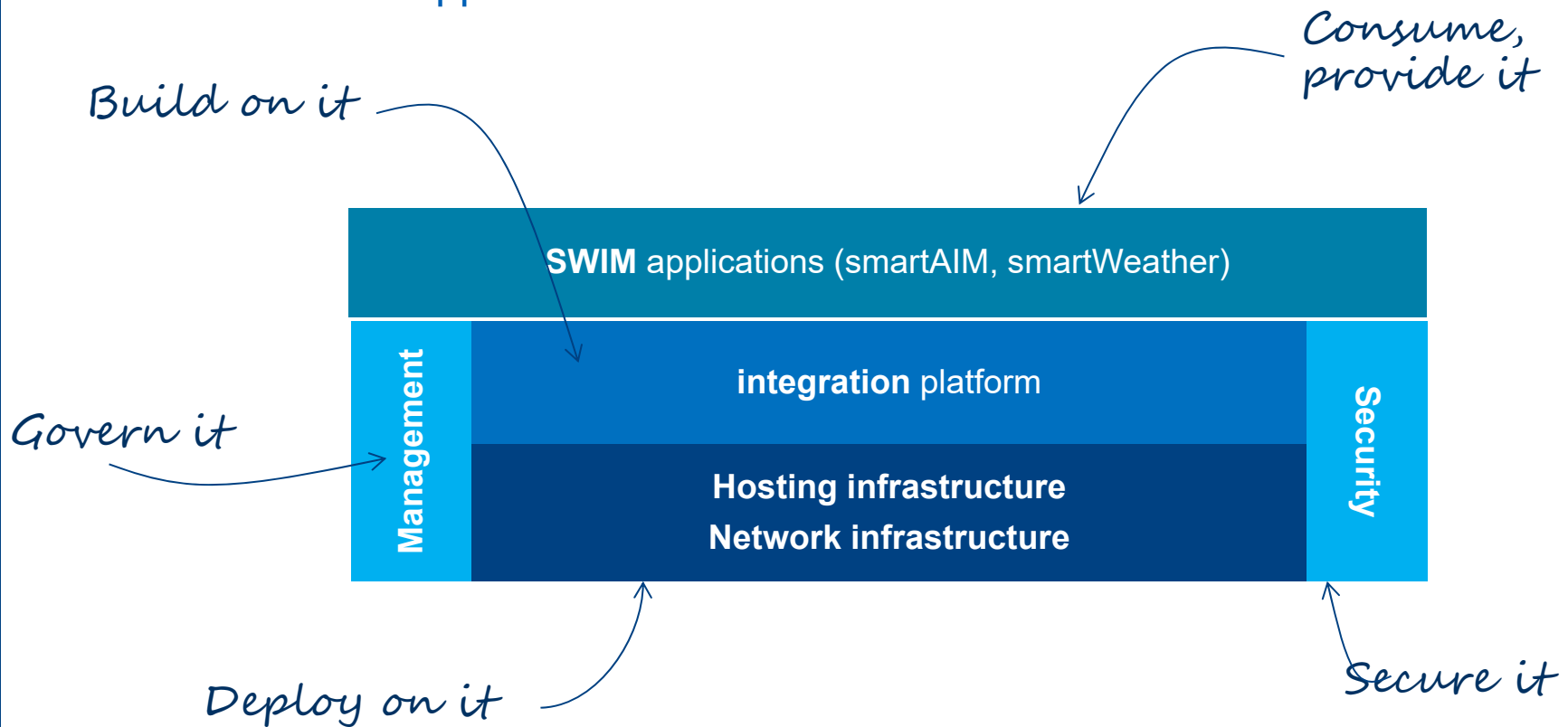
Getting the right information versus Information Overload

- As already indicated by Alexander Schwassmann, IFATCA on day 1:
 - Overload of information for pilots and controllers
 - Information is too unfocused
 - Risk to miss important information
 - Sometimes hard to interpret (e.g. Field 10)
- SWIM can help to
 - Make the right information available through interoperability between systems
 - Allow automated and semantic filtering
 - Harmonise the information

SWIM BUILDING BLOCKS



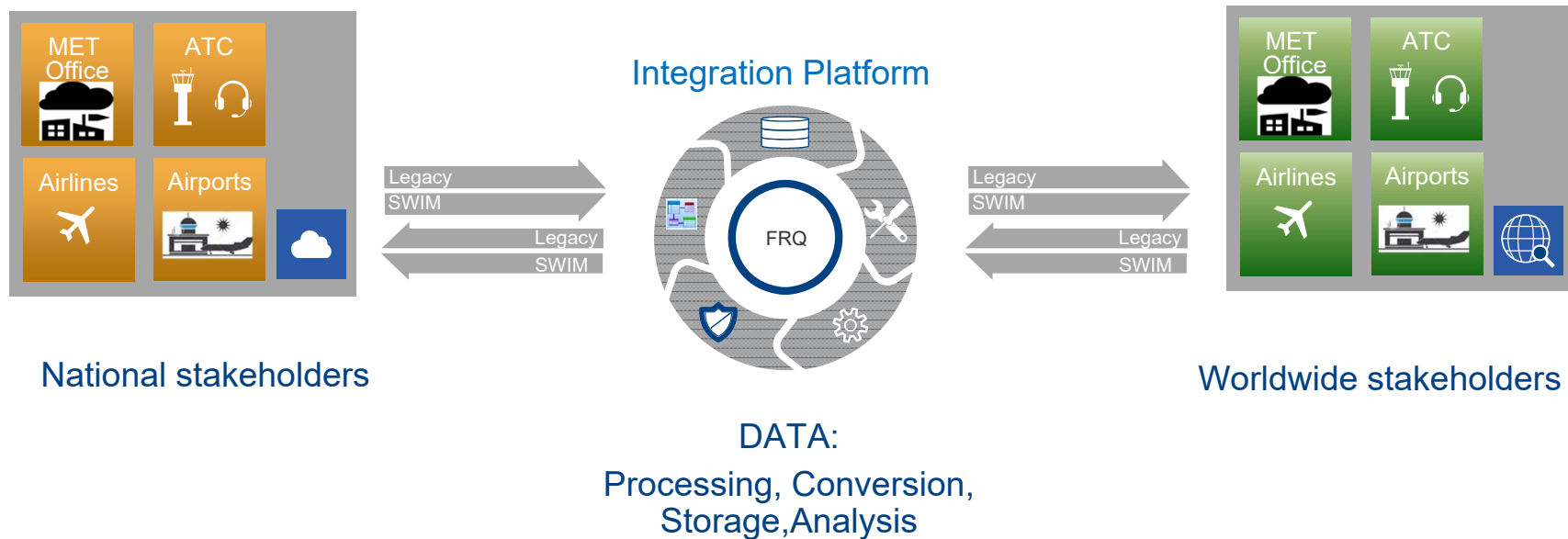
SWIM from ATM Supplier Point of View



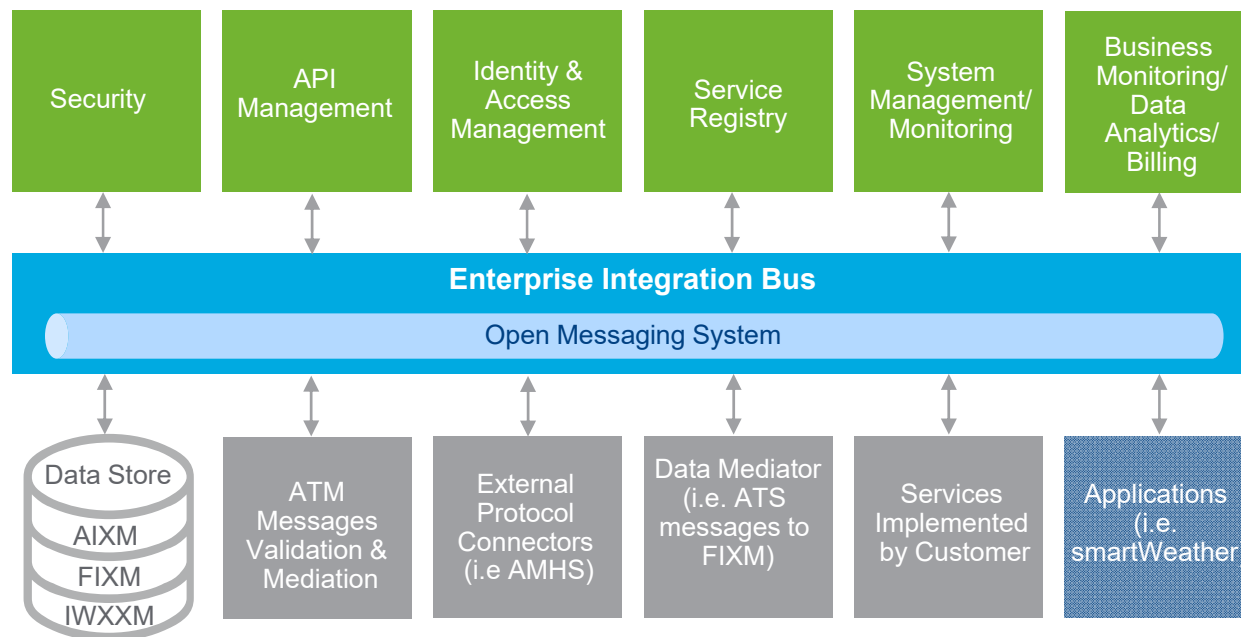
FRQ Integration Platform - Main Functions

- Supports all available SWIM Service Definitions as well as legacy services
- Acts as a information backbone connecting ANSPs with main aviation stakeholders (Airports, Airlines, MET Office)
- Route, convert, transform messages between consumers and providers
- Data Conversion
 - Bridge applications talking different protocols and formats around a common information exchange format
 - Support of SWIM data formats but also legacy protocols and data formats to facilitate transition
- Provides service inventory / registry

FRQ Integration Platform - Main Functions



FRQ Integration Platform - Main Building Blocks



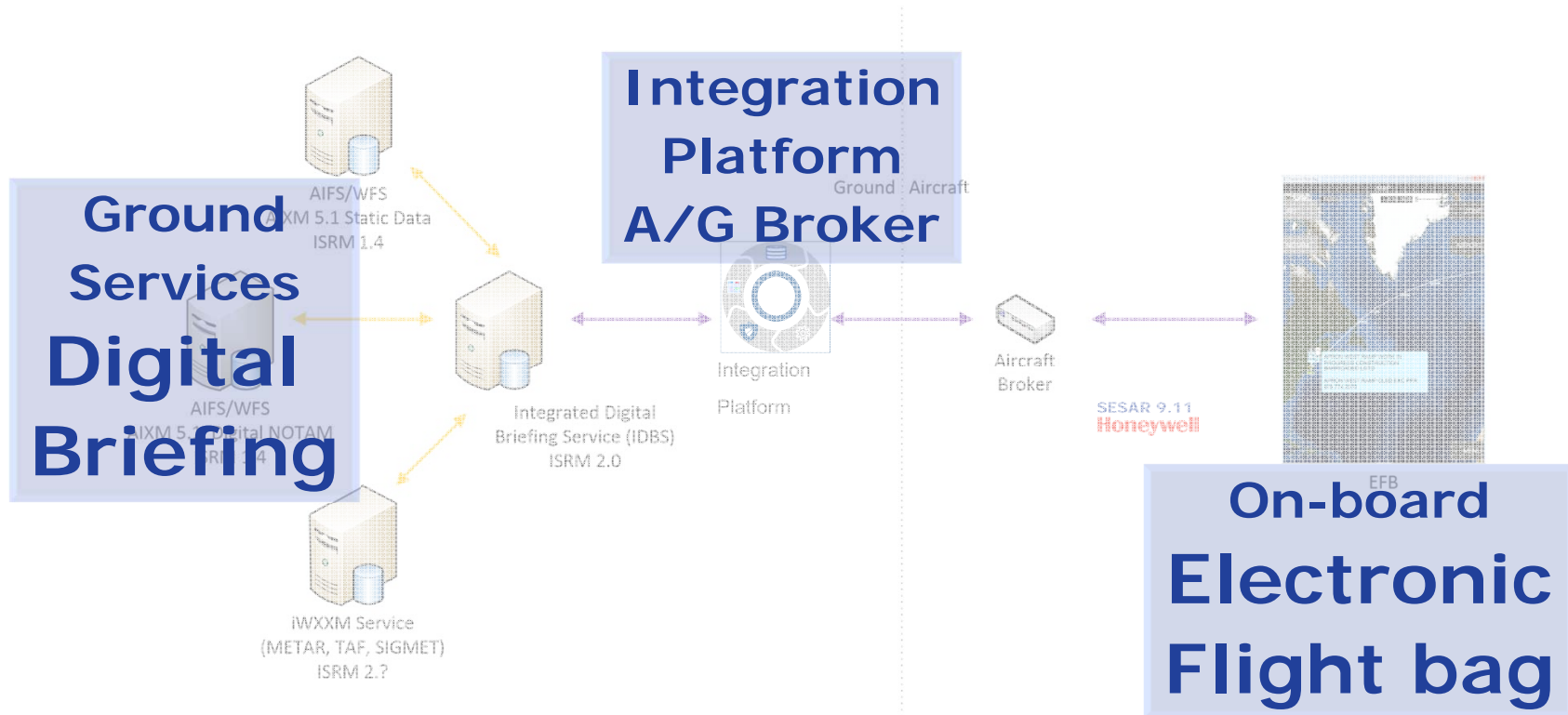
Example Usecase: Digital Integrated Briefing



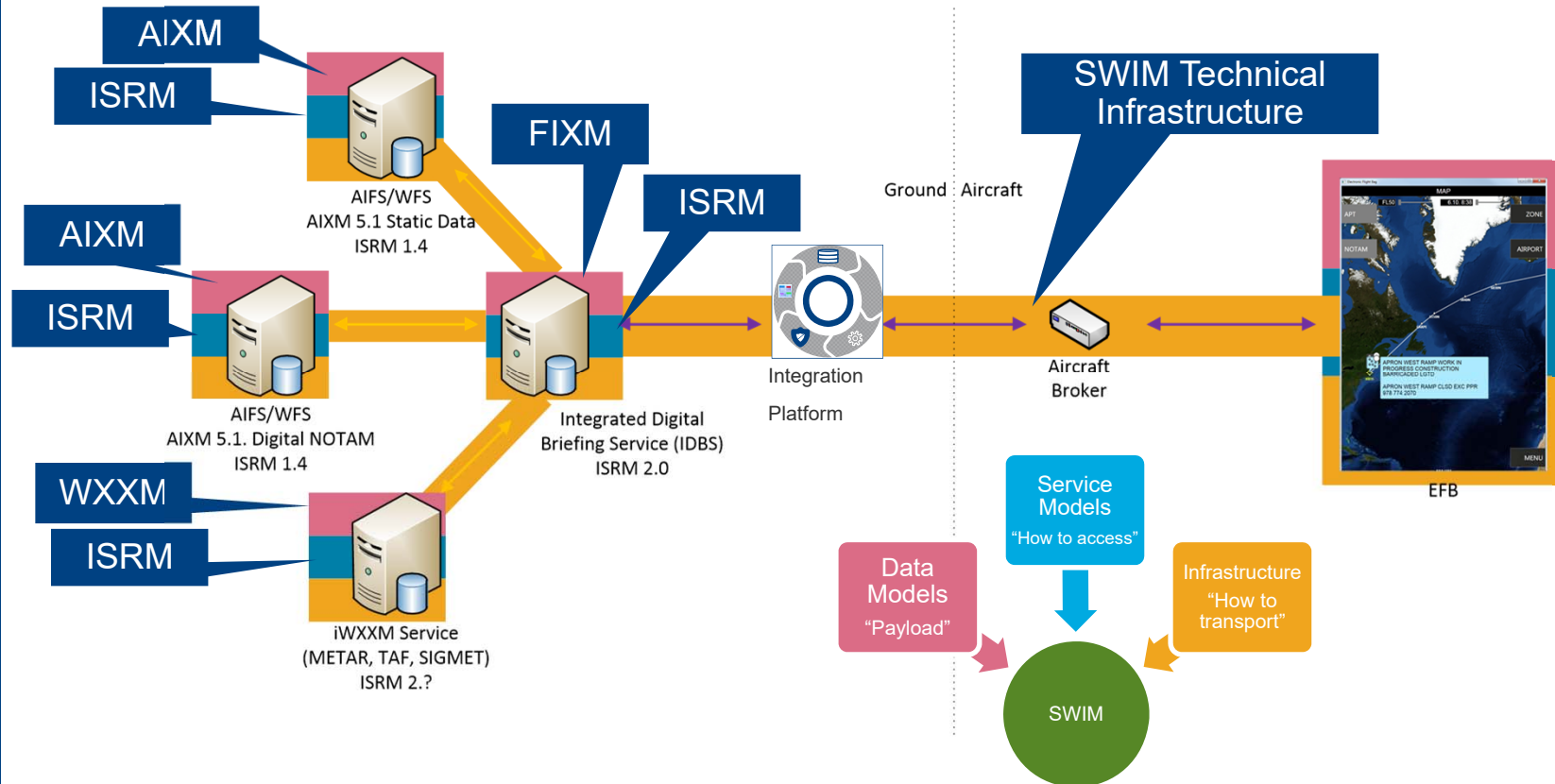
Integrated Digital Briefing

- Research Project of SESAR
- Showcase of SWIM
- Real application utilizing
 - SWIM Infrastructure
 - SWIM Data Model
 - SWIM Service Model
- Interdisciplinary (AIM + Airline related)
- Interoperable (multiple different vendors)

Digital Integrated Briefing



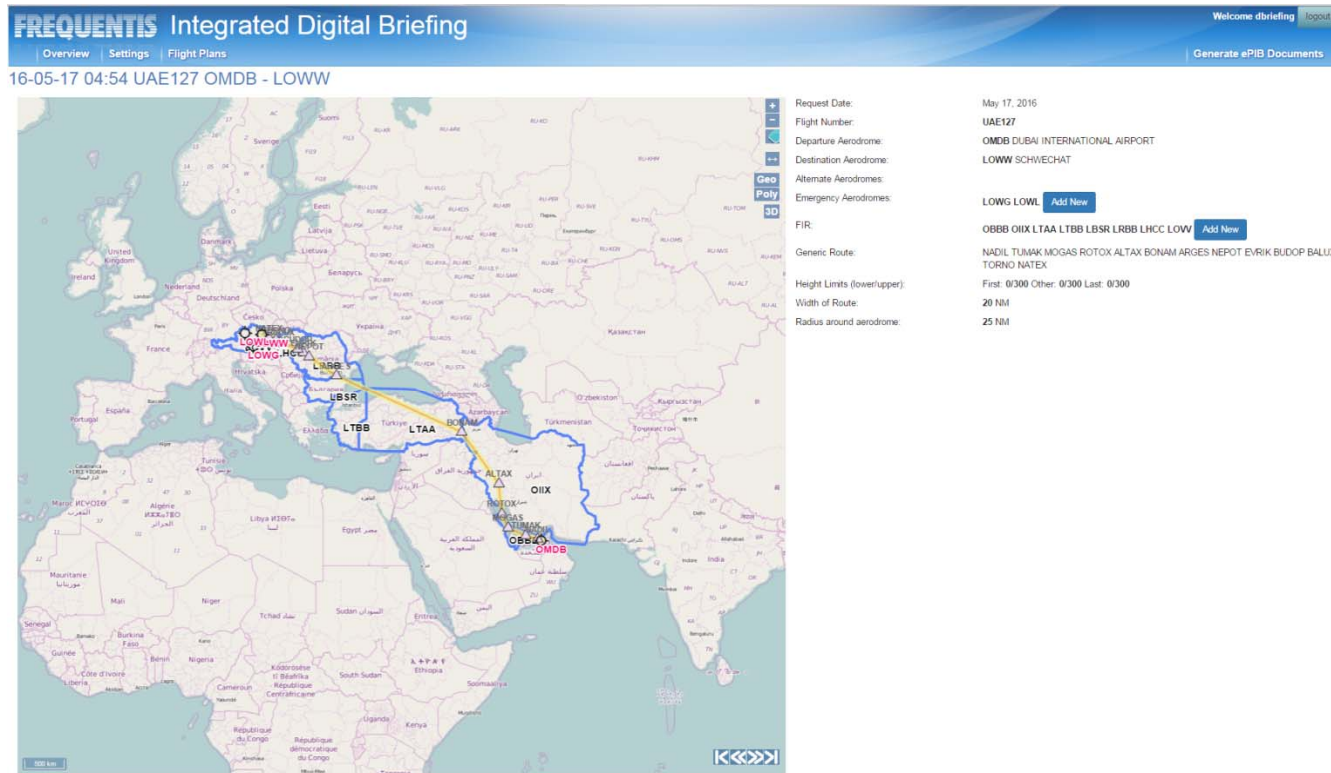
Digital Integrated Briefing

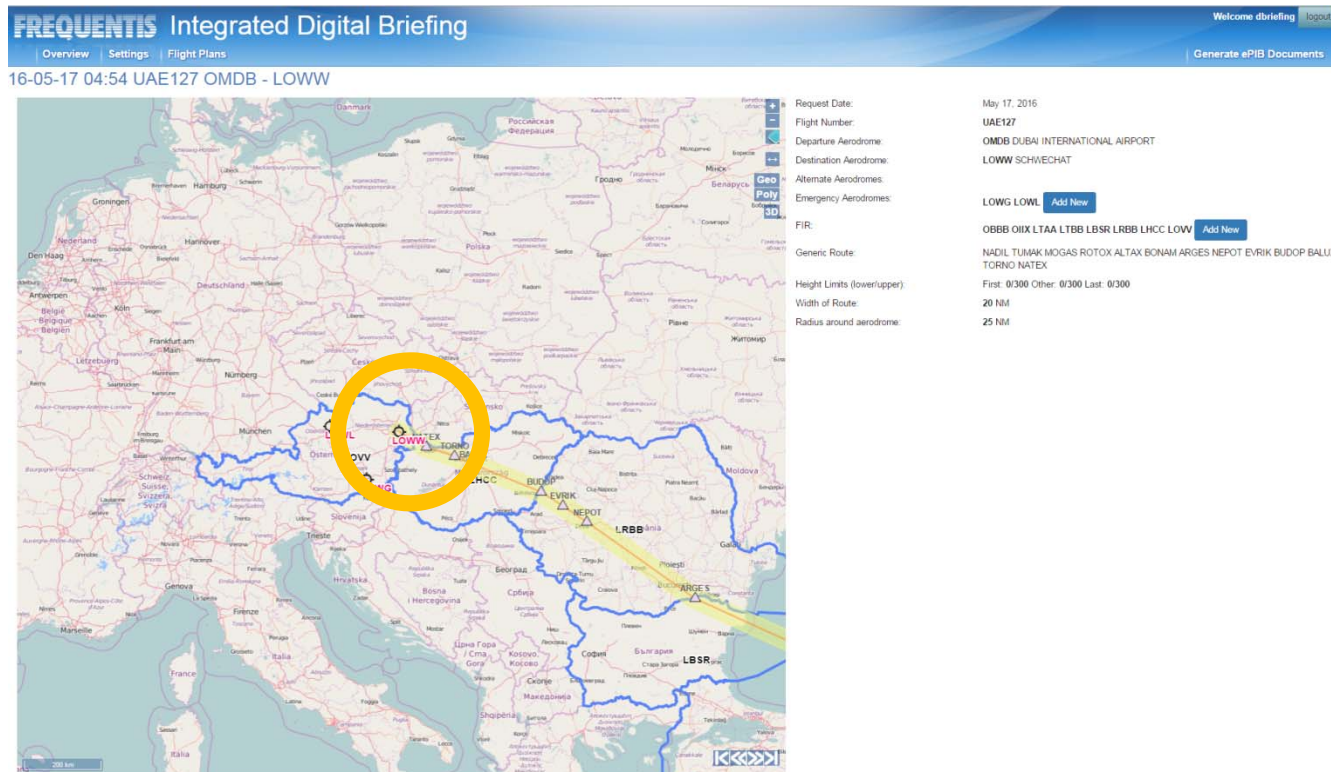


ePIB Load Flight Data

FREQUENTIS Integrated Digital Briefing				
Settings Flight Plans				
Departure	Arrival	EOBT Date	EOBT Time	Flight Identification
KJFK	LOWW	2016-05-17	15:00	TEST01
KBOS	LOWW	2016-05-17	15:00	TEST02
KIAD	LOWW	2016-05-17	15:00	TEST03
KATL	LOWW	2016-05-17	15:00	TEST04
LOWG	LOWW	2016-05-17	15:00	TEST05
YSSY	OMDB	2016-05-17	15:00	TEST06
OMDB	LOWW	2016-05-17	15:00	TEST07
YSSY	OMDB	2016-05-17	11:10	UAE413
OMDB	LOWW	2016-05-17	04:54	UAE127

ePIB Overview





FREQUENTIS Integrated Digital Briefing

Overview Settings Flight Plans

16-05-17 04:54 UAE127 OMDB - LOWW

Overview
APT
TMA
Meteo

Arrival Airport: LOWW

Time filter: 16-05-17 09:25 to 16-05-17 11:25 Edit Scenario Filtering

21 TWY Closure 16Apr19 14:00 to 16Jul02 14:00 A0294/18
TWY EX31 closed

24 Displaced Threshold 15Dec10 00:00 to 16Jun01 23:00 A1546/15
RWY 16 THR displaced 300 M. New THR location 480705N 0163446E.
WARNING: THR coordinates do not have the required resolution (1/100 seconds of arc)
WARNING: Displaced THR coordinates are not co-linear with Runway centreline

OTHER 15Dec29 08:37 to 16Jun01 23:00 A2651/14
Airport slot id's for general/business aviation flights to/from coordinated airports in Austria - see AIP sup 019/13

OTHER 15Nov17 17:04 to 16Jun01 23:00 A2381/16
Ref AIP Austria, LOWW ad 2.2.2, item 2.2.3. Current rush hour periods in UTC are: 0600-0800, 0930-1030, 1330-1430, 1600-1745 and 1830-2030.]

27 OTHER 16Jan22 15:00 to 16Jun01 23:00 A2554/14
Surface movement radar north out of service.

OTHER 15Oct14 13:55 to 16Jun01 23:00 A06291/14
Boeing 747-8 ops LOWW due to finalized compatibility project act a 5/09 not valid for b748. All published approach and departure procedures calculated for category D1. For PAPI, meht and glide slope - check AIP LOWW ad 2.14 B748 MAY use all RWYs, 1WYs and aircraft stand taxilanes which are useable unrestricted by icao code e aircraft. Pilots shall exercise caution when taxiing through TWYs a11, a12 and exit1 as main gear to pavement edge clearance MAY be limited.
Oversteering technique is required. TWY lima between exit 6 and exit 13 is an aircraft stand taxilane for b748. Rescue and fire fighting CAT 3 available - CAT 10 on request via atc 15 minutes in advance. Taxiing on TWYs and aircraft stand taxilanes during night and low visibility only permitted if center line lights are visible. Otherwise marshaller assistance mandatory. Ref AIP Austria LOWW ad 2.24-1-2. Max wingspans on parking stands not valid for b748 - mNM clearance to objects 7.5M

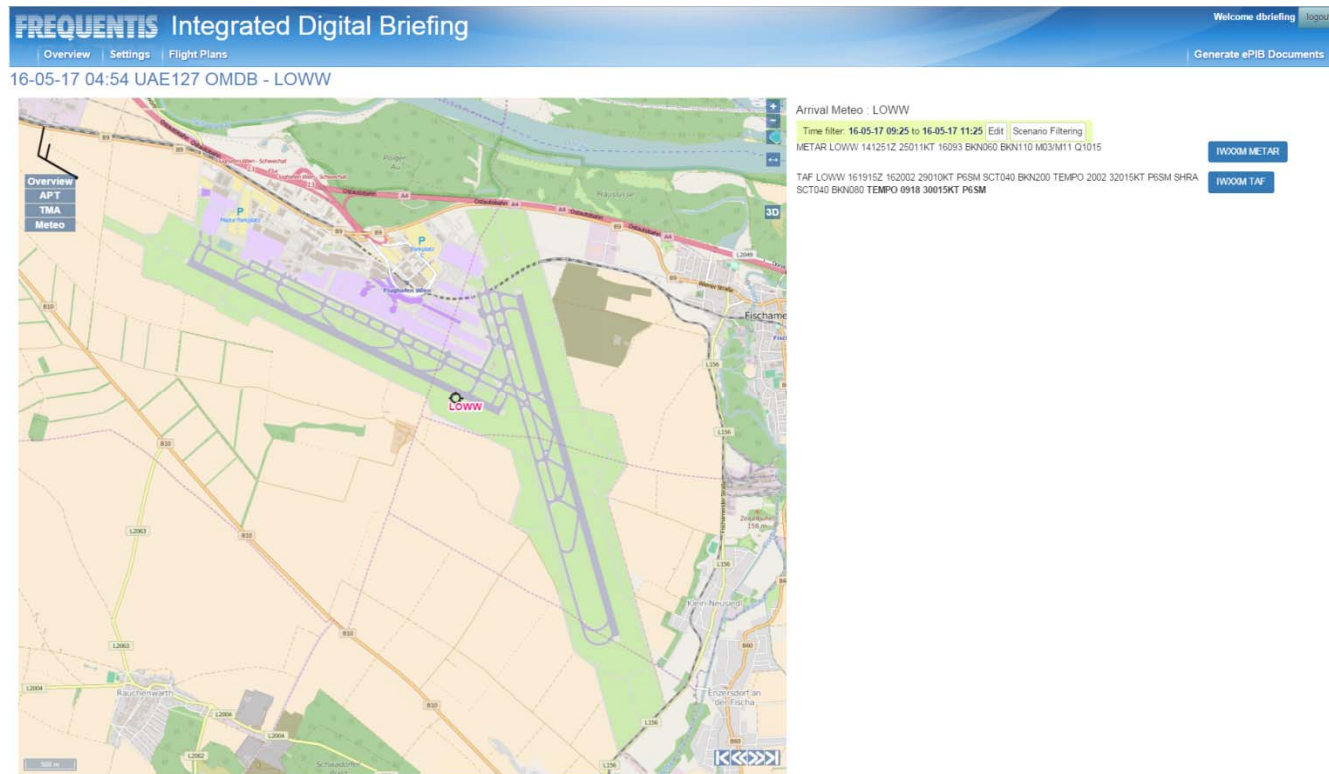
29 OTHER 15Sep09 14:56 to 99Dec31 00:00 A1882/14
Intermediate holding position lima 3 established on TWY lima between exit 6 and exit 7.

OTHER 15Oct14 13:24 to 16Jun01 23:00 A2126/14
Intermediate holding position lima 3 established on TWY lima between exit 6 and exit 7

OTHER 16Jan11 08:22 to 16Jun01 23:00 A0045/14
Deicing procedure for act on main-apron and gac-apron: p r o c e d u r e 1. Report the necessity for deicing agent either to your ramp-agent or contact directly your contracted deicing agent. ACFT without contracted deicing agent MAY contact Vienna Ice on 131,625 MHz or telephone +431700722050. 2. Report necessity for deicing to ATC when ACFT is completely ready (doors closed, ready for start-up/push-back). 3. Areas: de-icing standby area: prlg pns e48 to e99. De-icing south: prlg pns F43, I47, F51, F53, F55, F57, F59, F45, F55 for code F ACFT). De-icing north: prlg pns I42, I44, I46, I48, F50, I46 for code F ACFT). 4. ACFT cleared to the deicing standby area approach prlg pns e48 to e99 from the south - marshaller guidance on the area is mandatory. If instructed by marshaller car to stop on the deicing standby area, do not cut engines - intermediate stop only. Thereafter marshaller guidance to deicing south is provided and mandatory. 5. ACFT cleared to deicing north via blue or orange line expect marshaller on the area. ACFT cleared via TL40 expect marshaller at IHP W1, W2, or W3. 6. Marshaller instructions are issued via display on follow me car or by hand signals.

OTHER 15Oct14 13:55 to 99Dec31 00:00 A2127/14
Ref AIP Austria, LOWW ad 2.24-1-2, Remarks: the 4th remark shall read: pilots of long wheelbase ACFT such as B777-300 and A340-600 shall exercise caution when taxiing through TWYs A11, A12 and exit 1 as main gear to pavement edge clearance may be limited. For those ACFT oversteering technique is required.

ePIB Airport MET

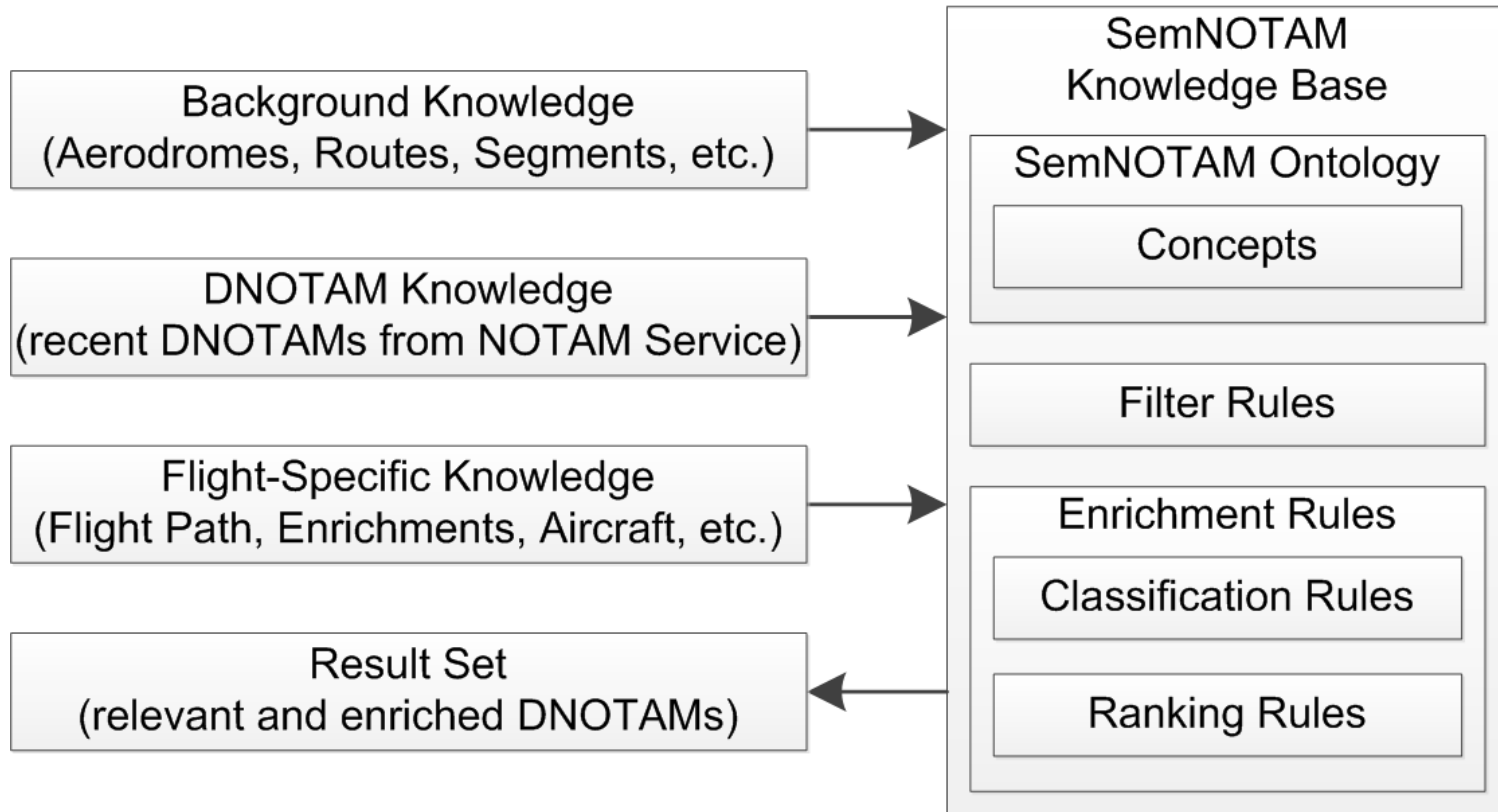


semNOTAM Key Aspects



- Ontology-based Representation and Semantic Querying of Digital Notices to Airman (NOTAM)
 - semNOTAM is a service not an application
 - Enable fine-grained intelligent semantic filtering and prioritization
 - Utilizing advantages of AIXM 5.1
- Knowledge-based system
 - Separating data and rules from reasoning
 - Incremental rule base
- Intelligent and fine-grained DNOTAM filtering is not enough
 - PIBs still contain substantial number of DNOTAMs that are relevant for a specific flight
 - Missing organization capabilities of relevant DNOTAMs

semNOTAM Knowledge Base



ePIB Semantic Prioritization

semNOTAM
Intelligent NOTAM Prioritization

FREQUENTIS Integrated Digital Briefing

Overview Settings Flight Plans

16-05-10 15:00 TEST02 KBOS - LOWW

Welcome dtbriefing Logout

Generate ePIB Documents

Departure Airport: KBOS

Time filter: 16-05-10 14:00 to 16-05-10 16:00 Edit Scenario Filtering

Semantic Annotations Switch

1 RWY Closure 16-Jan01 00:01 to 16-Dec31 23:59 A0388 / 15
RWY 15L/3R closed except for TAXI

2 RWY Closure 16-Jan01 00:01 to 16-Dec31 23:59 A0386 / 15
RWY 14L/32 closed except for TAXI

3 TWY Closure 16-Jan01 00:01 to 16-Dec31 23:59 A0196 / 15
TWY Q closed except for crossing

4 TWY Closure 16-Jan01 00:01 to 16-Dec31 23:59 A0738 / 15
TWY M closed between TWY C and E proceed as instructed

5 OTHER 16-Jan01 00:01 to 16-Dec31 23:59 A0438 / 15
RWY 15R 9000FT dist remaining sign left side not LGTD

6 OTHER 16-Jan01 00:01 to 16-Dec31 23:59 A0439 / 15
RWY 33R 1000FT dist remaining sign left side not LGTD

Flight Brief Info

Map Controls

View Controls

Highlighted Feature

Flight Phase Browser

Interactive Map

Airport NOTAM with Semantical Annotations

semNOTAM
Intelligent NOTAM Prioritization

FREQUENTIS Integrated Digital Briefing

Overview Settings Flight Plans

16-05-10 15:00 TEST02 KBOS - LOWW

Welcome briefing logged

Generate ePIB Documents



Departure Airport - KBOS

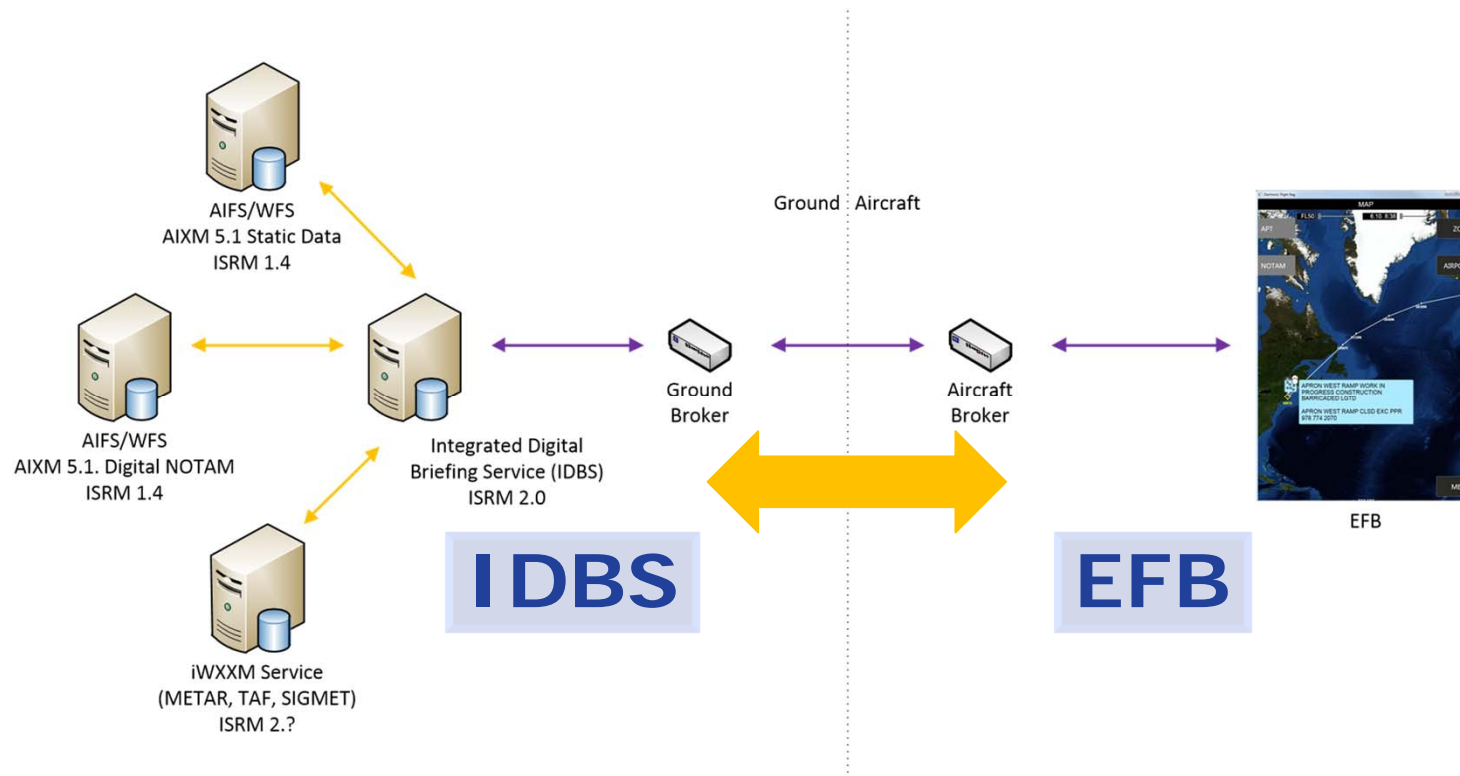
Time filter: 16-05-10 14:00 to 16-05-10 16:00 Edit Scenario Filtering Semantic Annotation

3	TWY Closure	16-Jan01 00:01 to 16-Dec31 23:59	A0196 / 15
4	TWY Q closed except for crossing	16-Jan01 00:01 to 16-Dec31 23:59	A0738 / 15
4	TWY Closure	16-Jan01 00:01 to 16-Dec31 23:59	A0738 / 15
	TWY M closed between TWY C and E, proceed as instructed		
2	RWY Closure	16-Jan01 00:01 to 16-Dec31 23:59	A0386 / 15
	RWY 14L/22 closed except for TAXI		
1	RWY Closure	16-Jan01 00:01 to 16-Dec31 23:59	A0388 / 15
	RWY 15L/33R closed except for TAXI		
5	OTHER	16-Jan01 00:01 to 16-Dec31 23:59	A0438 / 15
	RWY 15R 9000FT dist. remaining sign left side not LGTD		
6	OTHER	16-Jan01 00:01 to 16-Dec31 23:59	A0439 / 15
	RWY 33R 1000FT dist. remaining sign left side not LGTD		

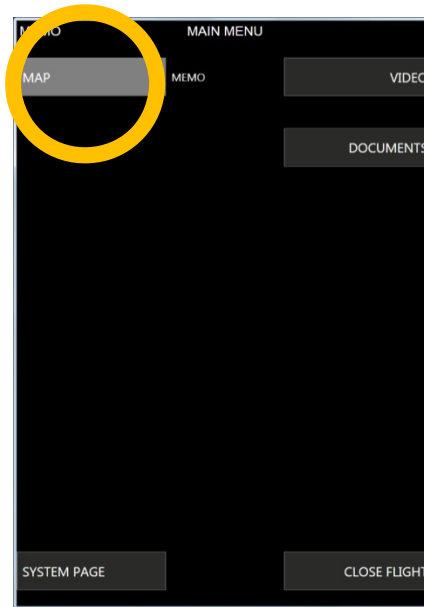
EFB – Select Flight



Request ePIB from Integrated Digital Briefing System

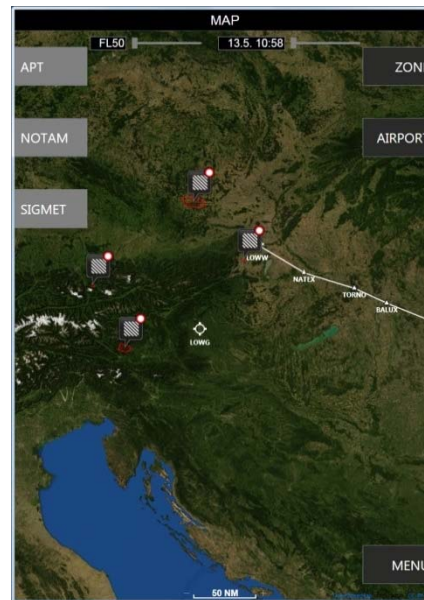
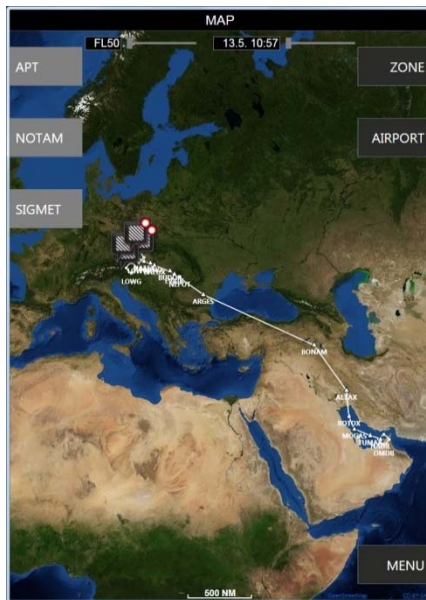


EFB – View Map



SESAR 9.11
Honeywell

EFB – Map View



SESAR 9.11
Honeywell



EFB – Airport

AIRPORT

LOWG: Graz Thalerhof

METAR

METAR LOWG 130850Z 02KT 10 FEW012 SCT066 BKN150 15/12

Runway 17C - Water_WetSnow(2mm)/Water_WetSnow(2mm)/Water_WetSnow(2mm) Medium/Medium/Medium.
Contamination RWY 17C 100%/100%/100% Dampness due to chemicals.
Taxiways: Water_WetSnow Aprons: Water_WetSnow

TWY S, S1 - S4 aerodrome operator may, if necessary, limited or extend operations for unpaved movement areas to specified ACFT types: details at aerodrome operations +43 (0) 316 2902 120.
ICAO marking may be not visible on grass TWY S, S1 - S4.

TWR must be notified during start-up request of any requirement to use cross-bleed start procedure.
Engine test runs have to be coordinated with the airport duty officer in advance.
TWR approval must be obtained during start-up request.
Minimum power is to be used when taxiing away from stand.

Apron west
aerodrome operator may, if necessary, limited or extend operations for unpaved movement areas to specified ACFT types: details at aerodrome operations +43 (0) 316 2902 120.
ICAO marking MAY be not visible on apron west

Grass RWY 17R/35L
aerodrome operator may, if necessary, limited or extend operations for unpaved movement areas to specified ACFT types: details at aerodrome operations +43 (0) 316 2902 120.
ICAO marking MAY be not visible on grass RWY 17R/35L

Apron west closed for fix-wing ACFT.

Ground handling will be stopped in case of lightning activity.
Information to the crew will be provided by the traffic ha agent. Follow me to the parking position is available.

BACK

SESAR 9.11
Honeywell

MEMO

AIRPORT

OMDB: DUBAI INTL

METAR

METAR OMDB 130500Z 1704KT 10 CAVOK000 31/12

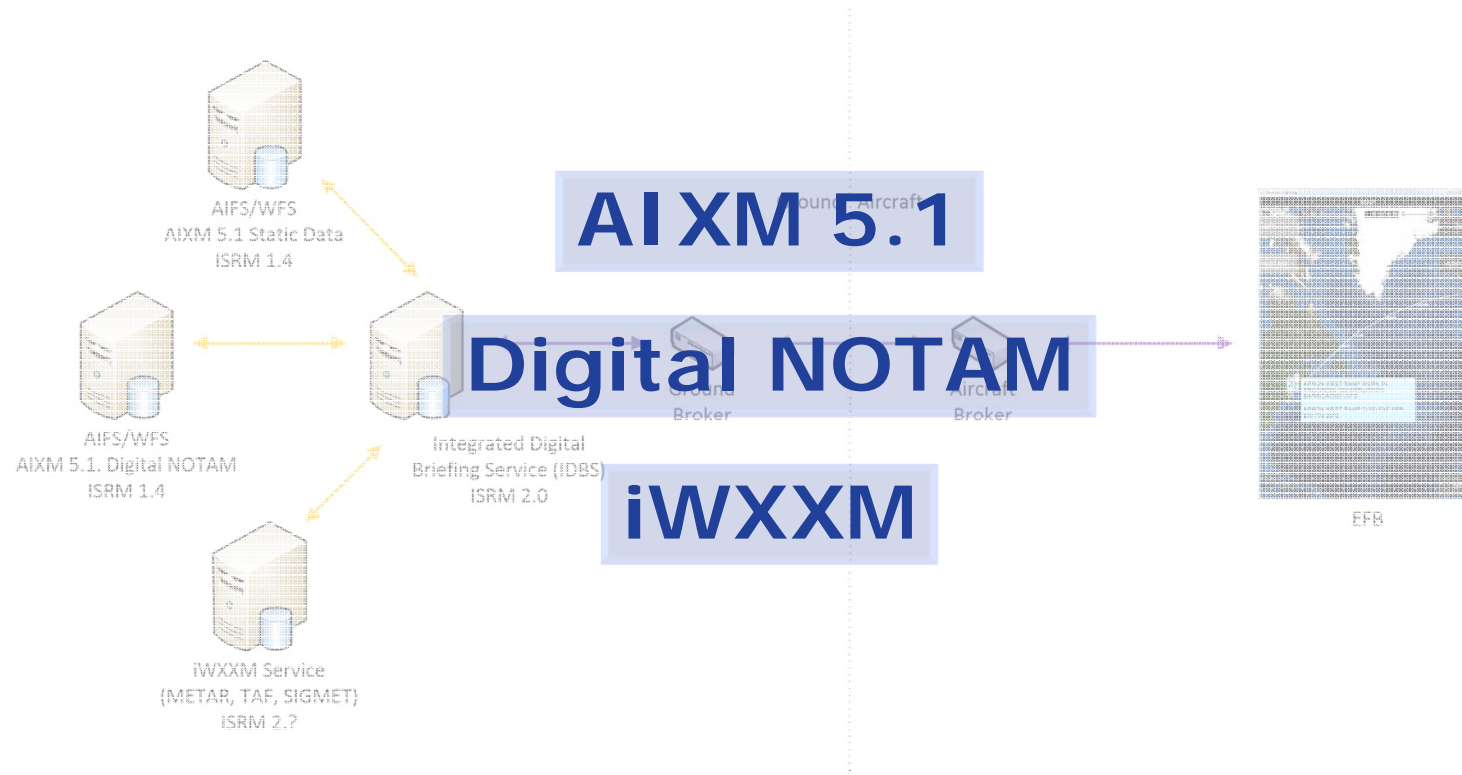
TAF

TAF OMDB 130055Z 130208
17005KT P6SM NSW NSC000
TEMPO 0818 31010KT P6SM NSW NSC000
TEMPO 1808 17005KT P6SM NSW NSC000

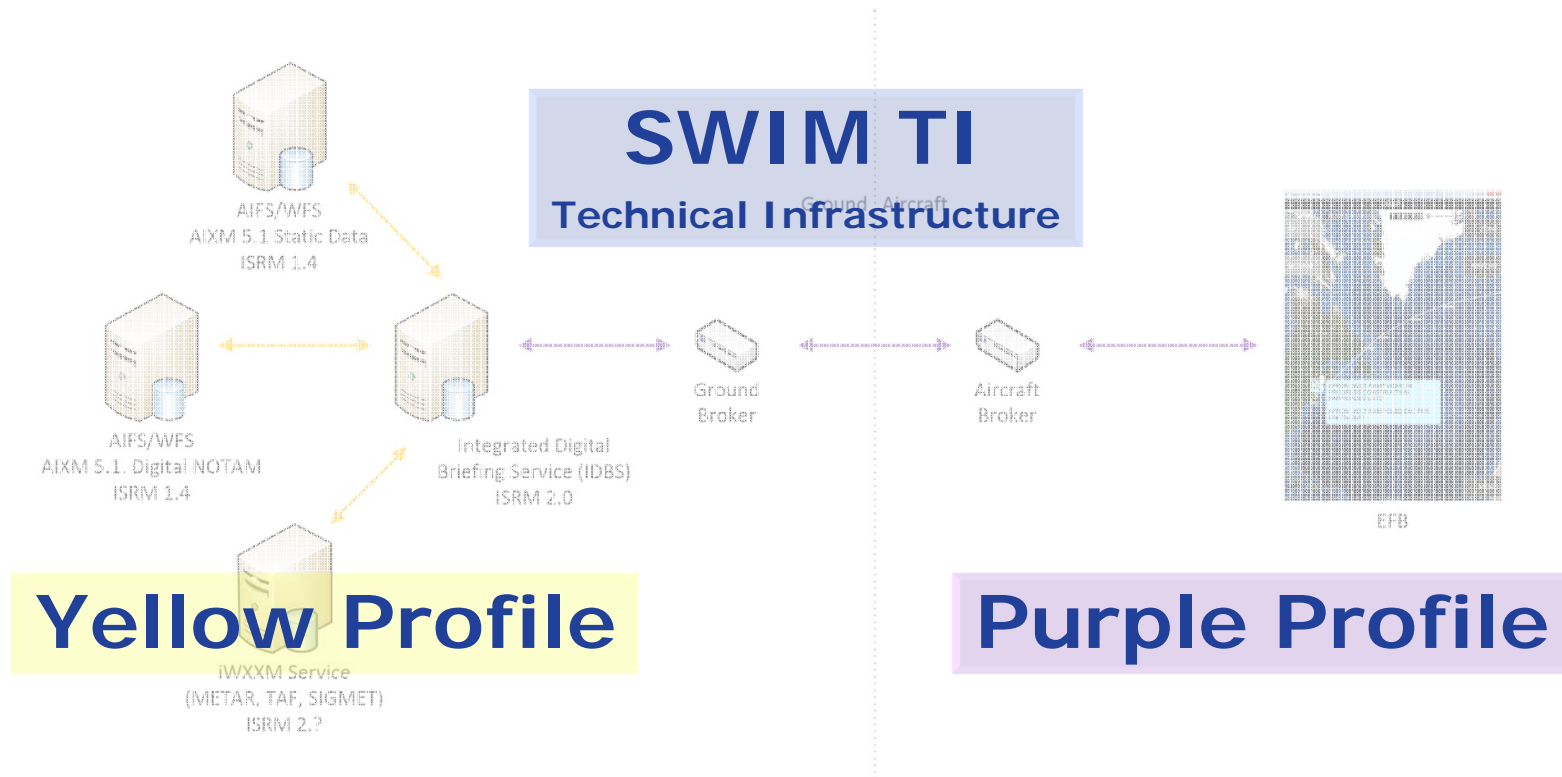
RUNWAY 12L/30R CLOSED on OMDB

BACK

True SWIM Integration



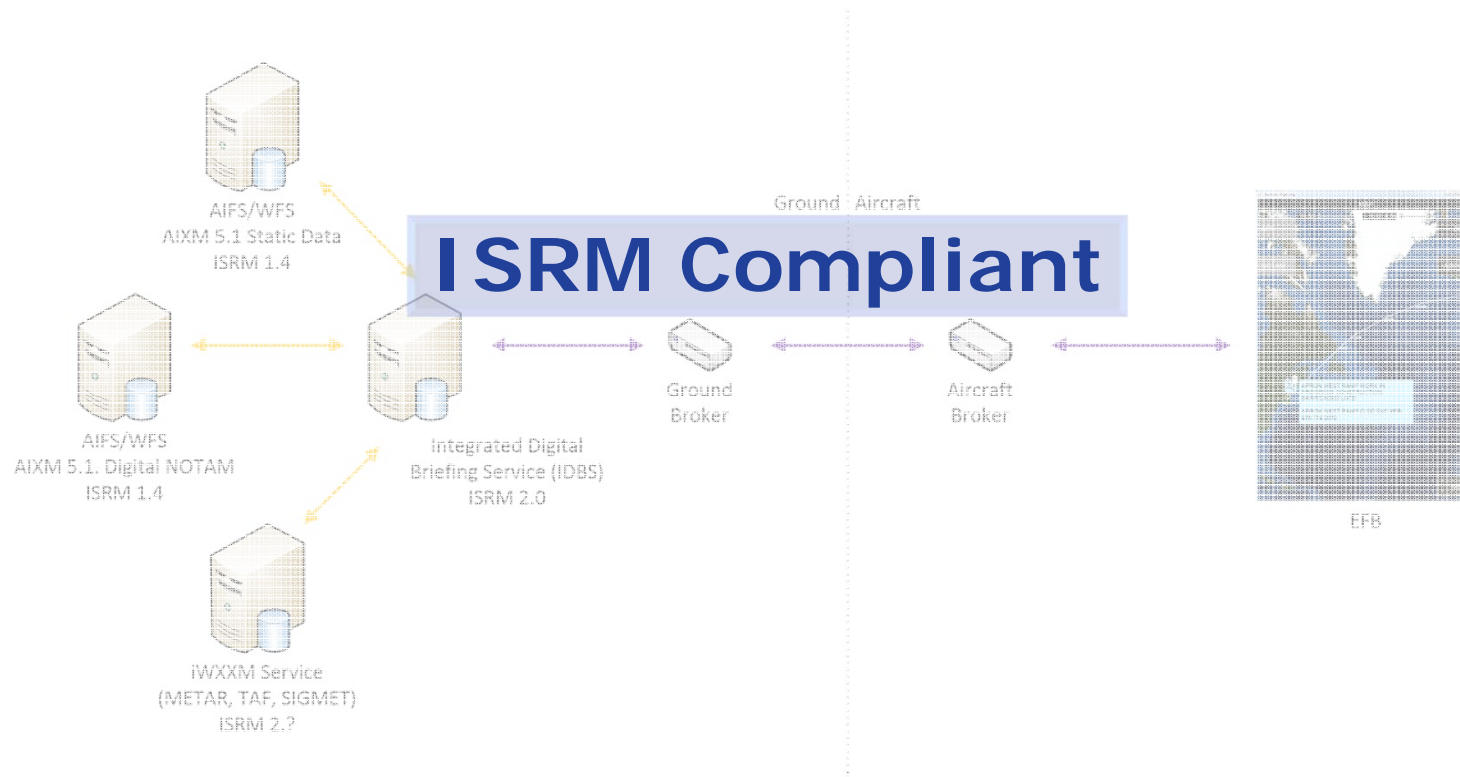
True SWIM Integration



Detailed Zoom in for Techies ;-) SESAR SWIM Profiles



True SWIM Integration



Semantic Data Containers to unleash the full Potential of SWIM

- Part of SWIM will be searching and selecting the appropriate data sources for a particular task, filtering for relevant data items, and composition of multiple data sources.


→ Linked Data


- Without dedicated support, the data logic will likely be hard-coded in applications and service implementations.
- An established principle in software engineering is the separation of data logic from business and presentation logic.

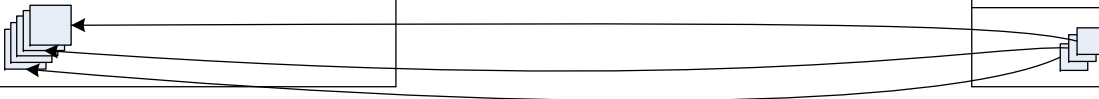
→ The SESAR2020 Exploratory Research BEST's semantic data container aims to introduce such a separation of concerns to SWIM




Electronic Flight Bag for Flight UAE415 (YSSY-OMDB) on 01/06/2017


<p>NOTAMs <YSSY-OMDB, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: NOTAM</p> <p>Location: Route YSSY-OMDB</p> <p>Valid time: 2017-06-01</p>



<p>NOTAM IMPORTANCE <UAE415, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: NOTAM IMPORTANCE</p> <p>Location: Route YSSY-OMDB</p> <p>Valid time: 2017-06-01</p> <p>Annotated-for-Aircraft:A380</p>






METARs <YSSY-OMDB, 01/06/2017>

<p>METARs <YSSY, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: METAR</p> <p>Location: YSSY airspace</p> <p>Valid time: 2017-06-01</p>


<p>METARs <YSSY-OMDB-1, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: METAR</p> <p>Location: YSSY-OMDB (Airspace 1)</p> <p>Valid time: 2017-06-01</p>


<p>METARs <YSSY-OMDB-2, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: METAR</p> <p>Location: YSSY-OMDB (Airspace 2)</p> <p>Valid time: 2017-06-01</p>


<p>METARs <YSSY-OMDB-3, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: METAR</p> <p>Location: YSSY-OMDB (Airspace 3)</p> <p>Valid time: 2017-06-01</p>


<p>METARs <OMDB, 01/06/2017></p> <p>--- Membership Condition ---</p> <p>Data item type: METAR</p> <p>Location: OMDB approach airspace</p> <p>Time: 2017-06-01</p>




Air Traffic
Management

Defence

Maritime

Public
Transport

Public
Safety