

# THALES



## e-AIP Developments within TopSky-AIM product

SEMINAR ON DATABASE MANAGEMENT FOR EAIP  
(LIMA, PERU, 1-4 NOVEMBER 2016)

*Arnaud BELLOC*  
*TopSky-AIM Project Manager & System Engineering Manager*



## e-AIP Developments within **TopSky-AIM** product

- 1 – AIM IN THE HEART OF THALES
- 2 – WHY THALES FOR AN AIXM5.1 SYSTEM ?
- 3 – AIXM5.1 VERSUS AIXM4.5
- 4 – TOPSKY-EAIP SMART & MODERN DESIGN
- 5 – TOPSKY-AIM BENEFITS FOR SAM
- 6 – ASBU ROADMAP, WHATS NEXT ?



# 1- **Aeronautical Data** (AIM) in the **Heart of THALES**

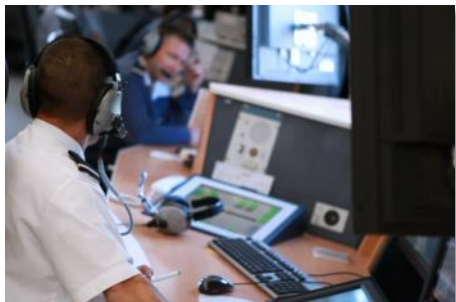
Airport & Air **Traffic**  
Management



**Flight**  
Avionics



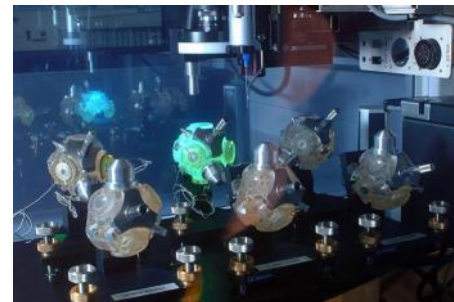
Unmanned Aerial  
**Vehicles** systems



Command & **Control**  
Centres - Air Operations



Critical Information  
and **Cybersecurity**



**Navigation**  
Solutions

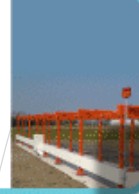
# 1 - AIM part of ATM, THALES ATM solutions are trusted by 180 countries

**TopSky**  
ATM Solutions  
Shaping Tomorrow's Sky

Over  
**680**  
Radars in  
operation



**7,000**  
Nav aids



**TopSky**  
AIM

**130**

Air Traffic Control  
Systems



**2 out of every 3 planes**

take-off and land safely than  
to Thales

Over  
**3,000**

Controller Positions  
More than



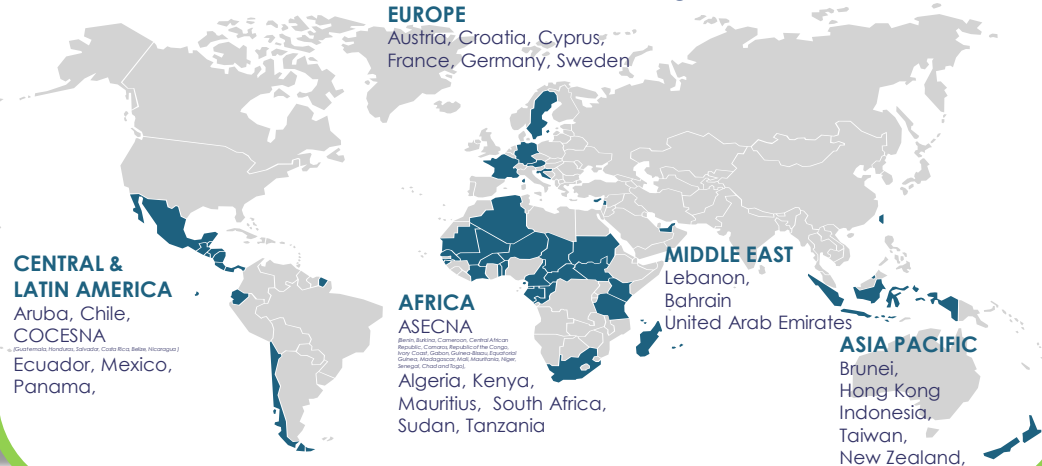
Over  
**25**  
Tower  
Systems  
in  
operation



**27** Aeronautical  
Information  
Mgt. Systems

**1,800**  
ADS-B &  
Multilateration Equip.

**27** AIM References worldwide in **45** countries  
including **8** in AIXM5.1



## 2 - Why THALES for an AIXM5.1 system ?

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### Thales experienced in AIXM 5.1

- ✓ **AIXM5.1 in operation**  
*production of digital eAIP from AIXM5.1 database*

### Thales deploy also regional AIXM 5.1

- ✓ **Centralized** regional AIXM 5.1 Database

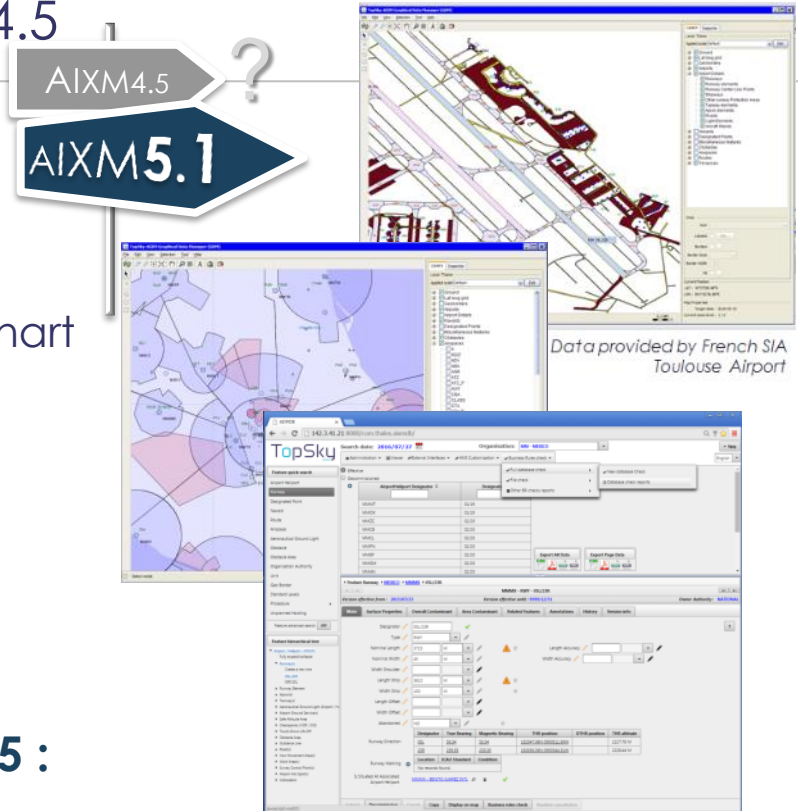
### 3 - Why AIXM 5.1 in AIM ? / versus AIXM 4.5

#### It is a MUST to achieve ICAO AIS to AIM transition, requiring to :

- be eTOD Obstacle ready
- draw SID/STAR/IAP Procedures Geometry in Chart
- enable AMDB airport mapping production
- enable Business rules quality improvement
- manage the temporality
- enable SWIM for digital data exchange
- be Digital NOTAM ready

#### AIXM 5.1 remains compatible with AIXM 4.5 :

- when AIXM4.5 is the reference, Thales is able to do a mapping in AIXM5.1, then a validation by ATM SMS and the Regulator of AIXM5.1 converted data will remain mandatory until AIXM5.1 be the reference.



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## 4 - TopSky-eAIP / TopSky-AIM components

### TopSky-eAIP Publication

# TopSky

eAIP

Smart Design allowing **Automation, Customization & Several products** management.

Designed to be **ADQ Compliant**, do not open Doors when data should be protected.

Modern design handling **XML** as internal data structure.

Reliable Design including a CMS suitable for **Large AIP**.



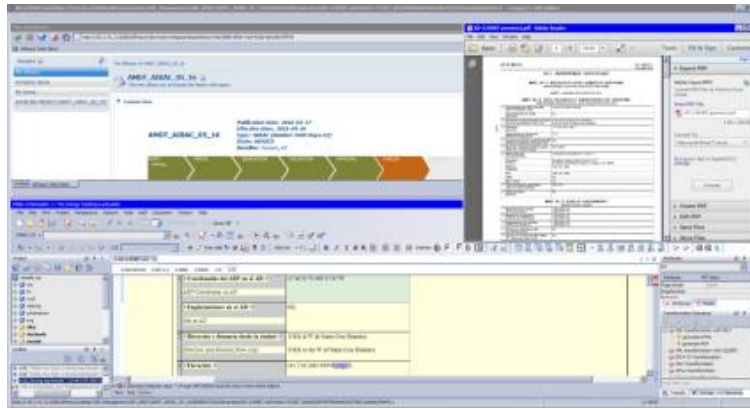
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# 4 - TopSky-eAIP / Smart & Modern DESIGN



## Integrated Solution with Open interface

- TopSky-eAIP, AGC Charting and GéoTITAN (Procedure Design including PBN) are fully integrated with TopSky-AIXM (AIXM5 database)
- TopSky-eAIP is able to manage Several output (PDF & HTML) & products (AIP single/multi-country, IAC, VAC Aerodromes ...)



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# 4 - TopSky-eAIP / Standard Production Workflow

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Work-package identification by **Coordinator**.  
**Editors** performing modification in documents



TopSky-eAIP merges in a consistent set of files source documents modified by the different Editors.

TopSky-eAIP generates all automatically generated sections from the contents of the AIXM database such ENR, AD sections tables.

TopSky-eAIP generates a validation report in order to verify the completeness and consistency of the generated documents (no broken links, compliancy with configured DTD etc....).

TopSky-eAIP generates the output documents in PDF and HTML format from the source files.



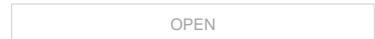
Generated documents are approved by a quality **Controller** and can be published by the **Publisher**.



Generated output documents are diffused on CD, to EAD/PAMS system, on paper format, on ANSP web site.



**CD-ROM**

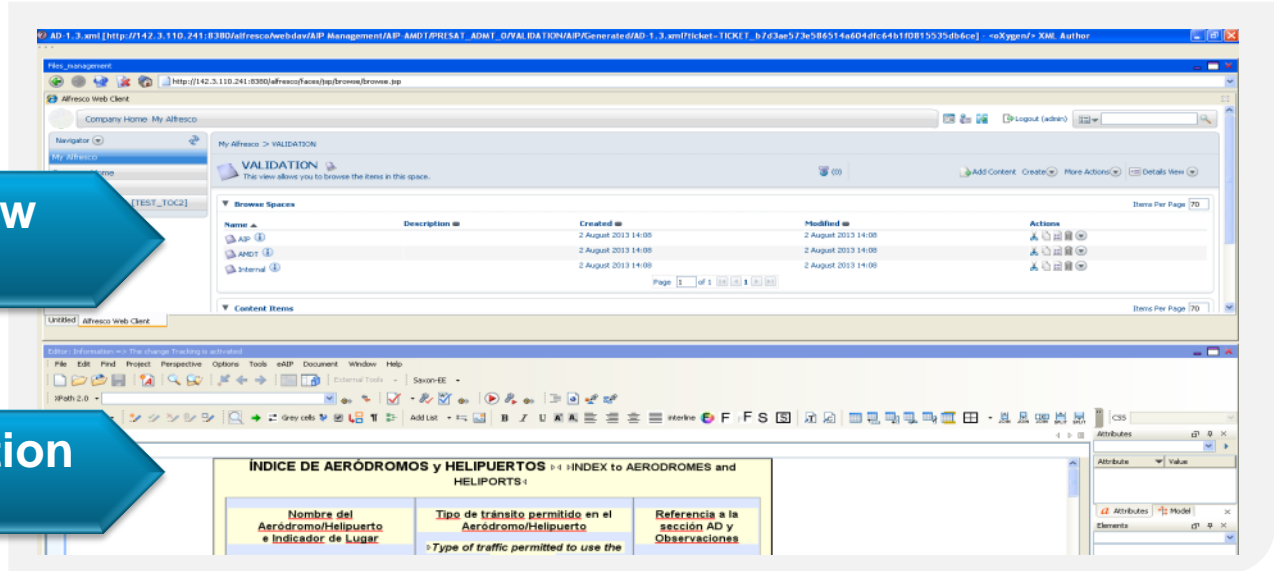


# 4 - TopSky-eAIP / Functionalities

## 2 modules accessible through single Web interface

**Production Workflow**  
module

**XML document Edition**  
module



➤ Functionalities granted according to User Rights



Coordinator



Editors



Controller

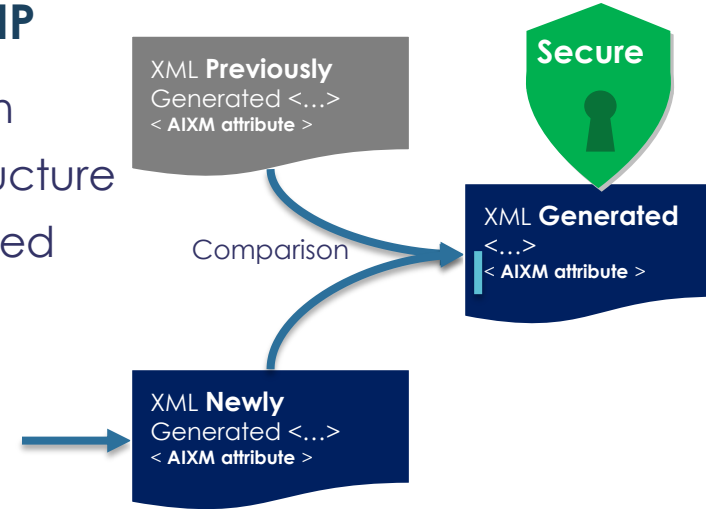


Publisher

OPEN

## Secured Automatic Generation of TopSky-eAIP

- Smart Design allowing Automation, Customization
- Modern design handling XML as internal data structure
- Do not open Doors when data should be protected
  - **Indeed, AIP changes are identified at the latest stage during comparison between 2 XML files.**



## 5 - TopSky-AIM / Benefits for SAM area

### Multi-Country *(within a region)*

- AIS (multi-NOF, multi ARO)
- Internet Briefing (large capacity)
- AIM (multi-AIP)
- Centralized AIXM database
- Remote country access capability for AIS/AIM functions
- Solution for limited bandwidth network
- Contingent AIS/AIM database in remote country



### Multi-Country

- Ready to exchange/share AIXM
- Country remain responsible of its own UUID (AIXM5 ) until guideline from ICAO

### Improve AIP Quality & consistency

- TopSky-eAIP generates AIP using data extracted from a centralized AIXM database avoiding errors issued from AIP constructed from several legacy database.



### Improve SAM ANSP missing FPL concern

- TopSky-AIS compute and fill-up automatically the AFTN/AMHS distribution address.

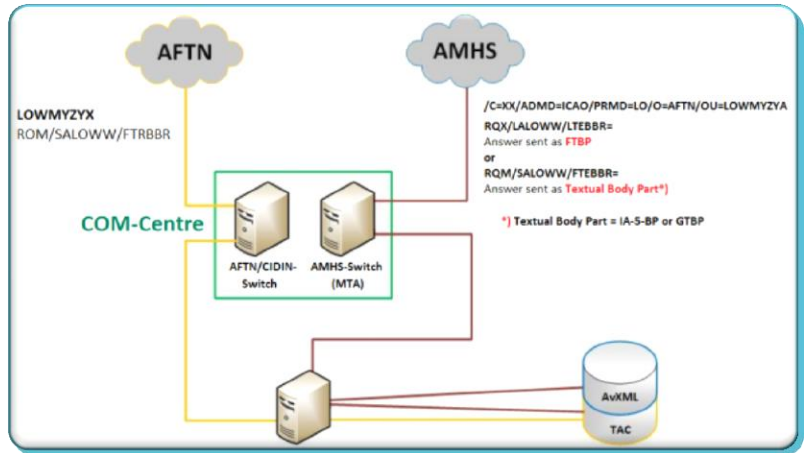
### Procedure design including PBN fully integrated in AIXM5

# 6 - ASBU Roadmap / What's next ?

## B1-AMET

Digital Meteo (IWXXM) under AMHS  
**ICAO Amendment 77 to Annex 3**

Effective on	Applicable (should)	Mandatory (Shall)
11 July 2016	<b>10 November 2016</b>	November 2018 (or 2019)



ICAO (EUR Doc 033) First Edition – 2016  
 Concept of Operations for the Transition of OPMET Data Exchange using IWXXM

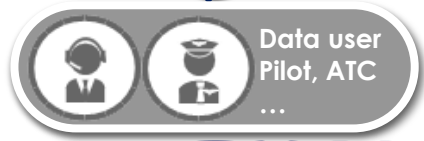
## B1-DAIM

> Digital NOTAM

## B1-SWIM



- AIFS** - WFS2.0
- AINS** - WS-N 1.3
- AMQP 1.0
- email**
- AMHS**



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The **TOPLINK** demonstration project, bringing together **14 European partners**, test a panel of new Aeronautical Information Services, in order to **optimize pertinence, accuracy and readability of aeronautical data** during flight, and after specific training for pilots, airlines, ground flight dispatchers and air traffic controllers.



Contribution

Consolidated & extended **AIM data** available via **SWIM** to Airlines Operation Centre and other consumer systems enabling capacity increase

[http://www.sesar/...TOPLINK\\_AIM\\_GATE.pdf](http://www.sesar/...TOPLINK_AIM_GATE.pdf)



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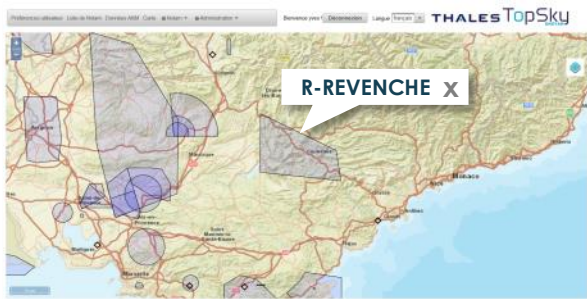


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# 6 - TOPLINK/AIM Gate, AIP SUP & DNOTAM / Special Practical use case

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## Creating an AIP SUP from Digital NOTAM



The associated graphical view

```

R007016 NOTAMN
Q) LFMMLQRCRCA/BLOW/00001964352N00628E/015
A) LFMMLQ (E) 1609120530 (I) 150022130
D) SEP 12 0630-0930 SEP 12 1130-1330 SEP 12 1815-2130 SEP 13
0630-0930 SEP 13 1300-2030 SEP 14 0630-0930 SEP 14 1815-2130 SEP 15
0630-1230 SEP 15 1815-2130 SEP 16 0700-1030 SEP 16 1300-1600 SEP 16
1815-2130 SEP 17 0630-0930 SEP 17 1815-2130 SEP 18 0630-0930 SEP 18
1815-2130 SEP 19 0630-0930 SEP 20 1200-1500 SEP 20 1815-2130 SEP 21
0630-0930 SEP 21 1815-2130 SEP 22 0630-0930 SEP 22 1130-1500 SEP 22
1815-2130
E) RESTRICTED AREA (REVENGE) ESTABLISHED FOR MILITARY EXERCISE AS
FOLLOWS:
440130N 005133E - 435137N 004411E - 434329N 0044328E - 434547N
0061324E - 440130N 006133E
RAMBERT INFO: 143 500 MHz / 317 500 MHz
MARSEILLE INFO: 124 500 MHz / 120 500 MHz
MARSEILLE CTL: 127 800 MHz
NICE INFO: 120 800 MHz
FANNY CTL: 127 975 MHz / 378 675 MHz

AUTHORITIES TO CONTACT
- BEFORE THE EXERCISE:
SHIFT MANAGER OF THE CHARLES DE GAULLE AIRCRAFT CARRIER
PHONE: +33(0)4 84 02 11 80
OPERATIONS MANAGER OF THE EMBARKED AIR GROUP
PHONE: +33(0)2 22 06 96 52 OR +33(0)4 84 02 10
-DURING THE EXERCISE:
CONTROL AND REPORTING CENTRE
(CRC) OF LYON MONT-VERDUN
PHONE: +33(0)4 78 14 68 21
SHIFT MANAGER OF THE CHARLES DE GAULLE AIRCRAFT CARRIER
PHONE: +33(0)4 84 02 11 80
OPERATIONS MANAGER OF THE EMBARKED AIR GROUP
PHONE: +33(0)4 84 02 10 83
TEMPORARY RESTRICTED AREA (ZRT) COEXISTING WITH THE CONTROLLED
AIRSPACE AND REPLACING THE RESTRICTED AREAS WITH WHICH IT OVERLAPS
GAT / MIL AIR TRAFFIC
COMPULSORY AVOIDANCE EXCEPT FOR:
- AIRCRAFT INVOLVED IN THE EXERCISE
- AIRCRAFT CONDUCTING ASSISTANCE, RESCUE OR PUBLIC SAFETY MISSIONS
WHEN THE AVOIDANCE IS NOT COMPATIBLE WITH THESE OPERATIONS, AFTER
PRIOR COORDINATION
WITH THE CRC OF LYON MONT-VERDUN (OR THE REPLACING CRC IN CASE OF
REPLACEMENT PLAN) AFTER NOTIFICATION WITH 10-MINUTE PRIOR NOTICE
MIL AIR TRAFFIC FLIGHT INFORMATION, ALERTING AND ASSISTANCE ARE
PROVIDED IN THE ZRT BY THE MANAGING AUTHORITY.
GAT: IN THE PORTIONS OF THE ZRT COEXISTING WITH CONTROLLED
AIRSPACES, THE USUAL ATC UNITS PROVIDE, TO USERS CLEARED INTO THE Z
RT, THE AIRS IN ACCORDANCE
WITH THE CLASS OF THESE CONTROLLED AIRSPACES.
F) FL1000 (G) FL195
    
```

+

=

Directeur des Opérations Service de l'Information Aéronautique		AIP SUP <b>175/16</b> Publication date: 18 AUG
Subject: Creation of a Temporary Restricted Area (ZRT) for Exercise "REVENGE 2016" in Marseille FIR : LFMML		
Validity: From 12 to 22 September 2016		
		<b>ACTIVITY</b> Exercise including numerous Défense aircraft such as supersonic aircraft or French helicopters, day and night, in all flight conditions and at all altitudes.
<b>DATES AND TIMES OF ACTIVITY</b>		<b>USER'S INFORMATION</b> RAMBERT INFO: 143 500 MHz / 317 500 MHz MARSEILLE INFO: 124 500 MHz / 120 500 MHz MARSEILLE CTL: 127 800 MHz NICE INFO: 120 800 MHz FANNY CTL: 127 975 MHz / 378 675 MHz

Substitute the creation of an AIP SUP  
**Simple & Secure !**



Create the DNOTAM for a Temporary Restricted ZRT



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- Event organized by SESAR with the framework of ICAO and the FAA.
- 40 organizations demonstrating SWIM global interoperability capabilities in accordance with regional plans as well as ICAO provisions.
  - Simulate several kinds of information exchange related to different phases of the flight, such as: flight planning, departure, cruise and arrival.
  - During each phase, events demonstrates information publication in standard SWIM formats: AIXM for aeronautical information, iWXXM for meteorological information and FIXM for flight and network information.



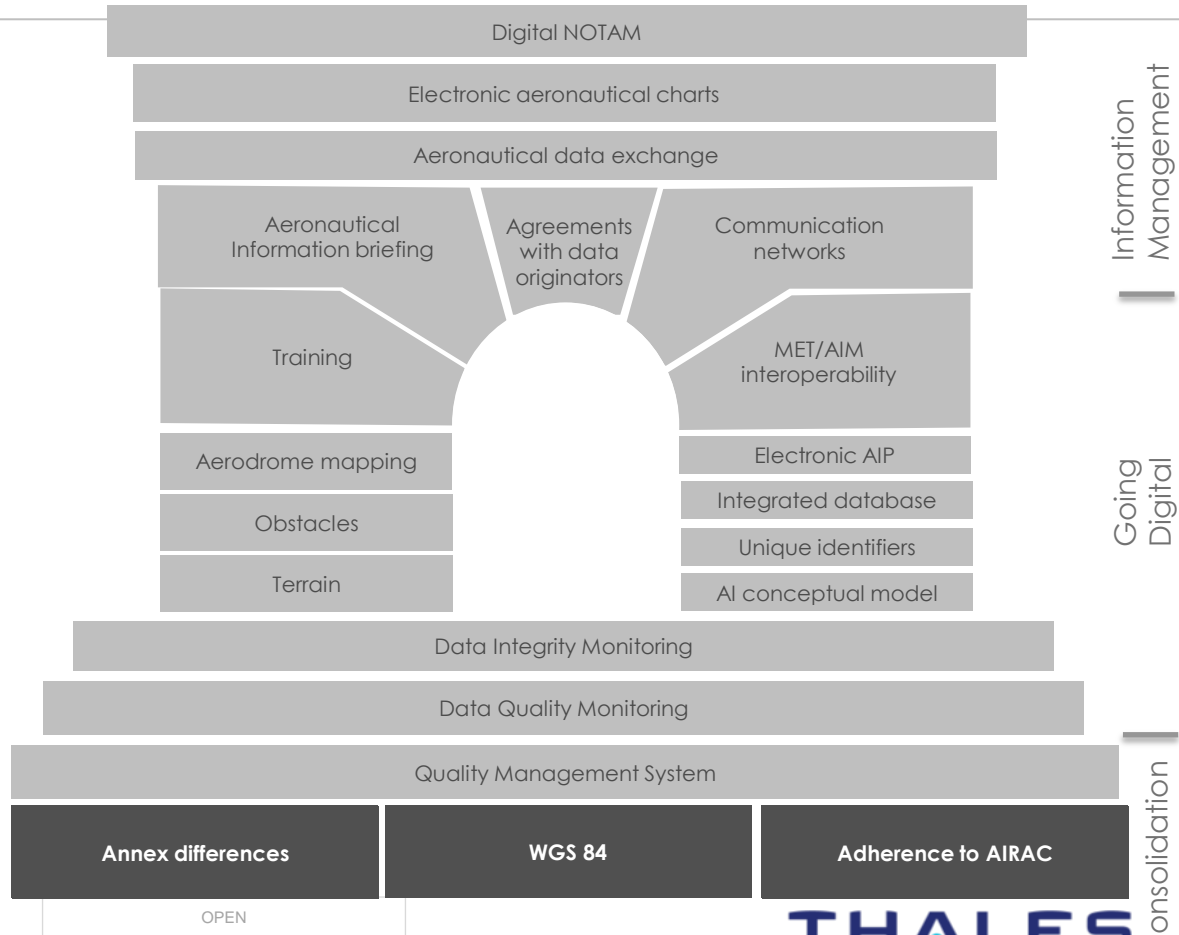
Demo 3

- **TOPLINK / AIM Gate** used as **DNOTAM Hub/Backbone** collecting DNOTAM from different providers and distributing them to subscribers (Eurocontrol, FAA, ...)

<b>Inter-operability</b>	Integration of many configurable communication interfaces
	Validation of interfaces with several tools from AIM industries
	Interoperability with external AIM databases

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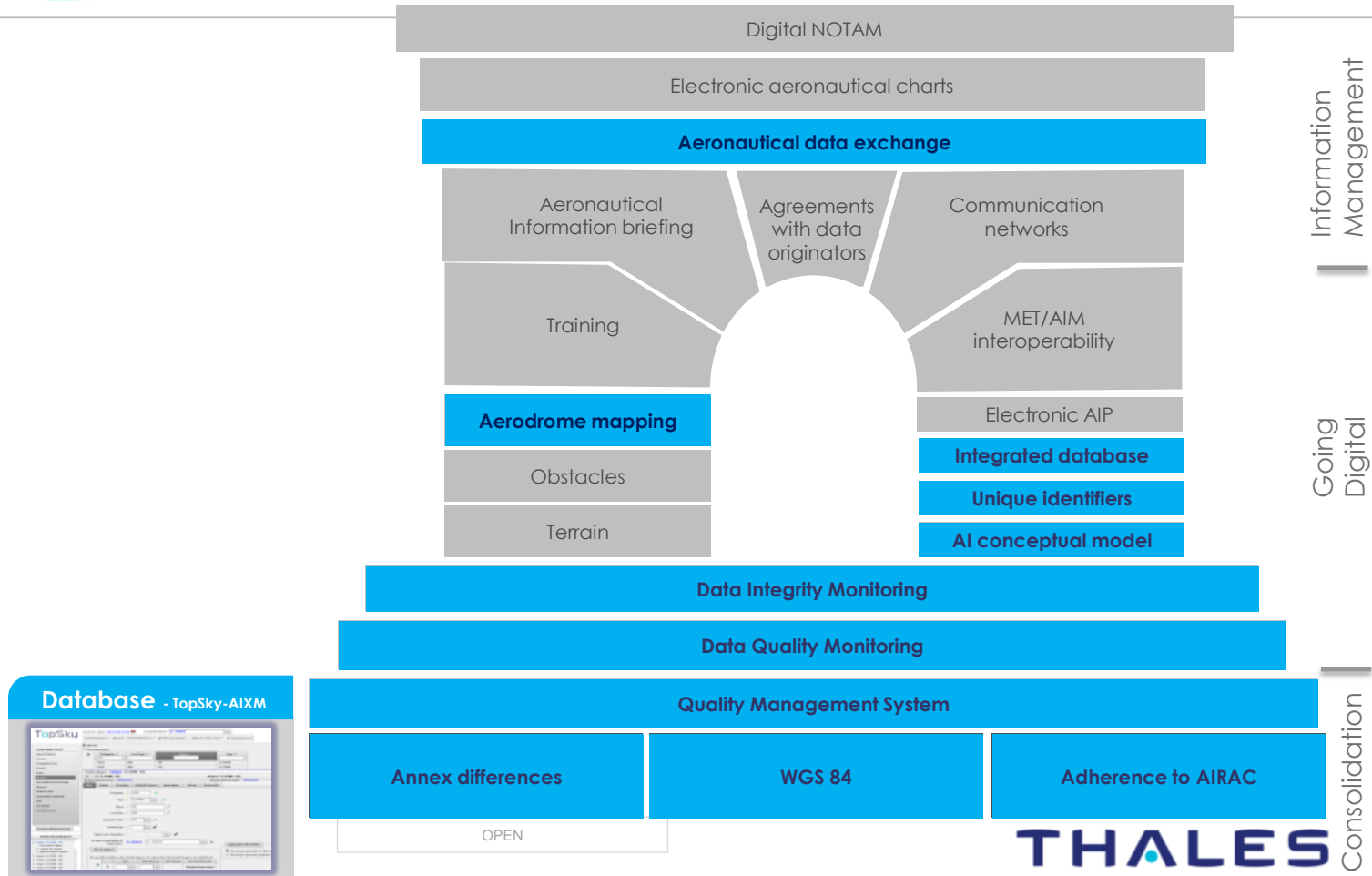
# 6 - TopSky<sup>AIM</sup> contribution for ICAO AIS to AIM Roadmap



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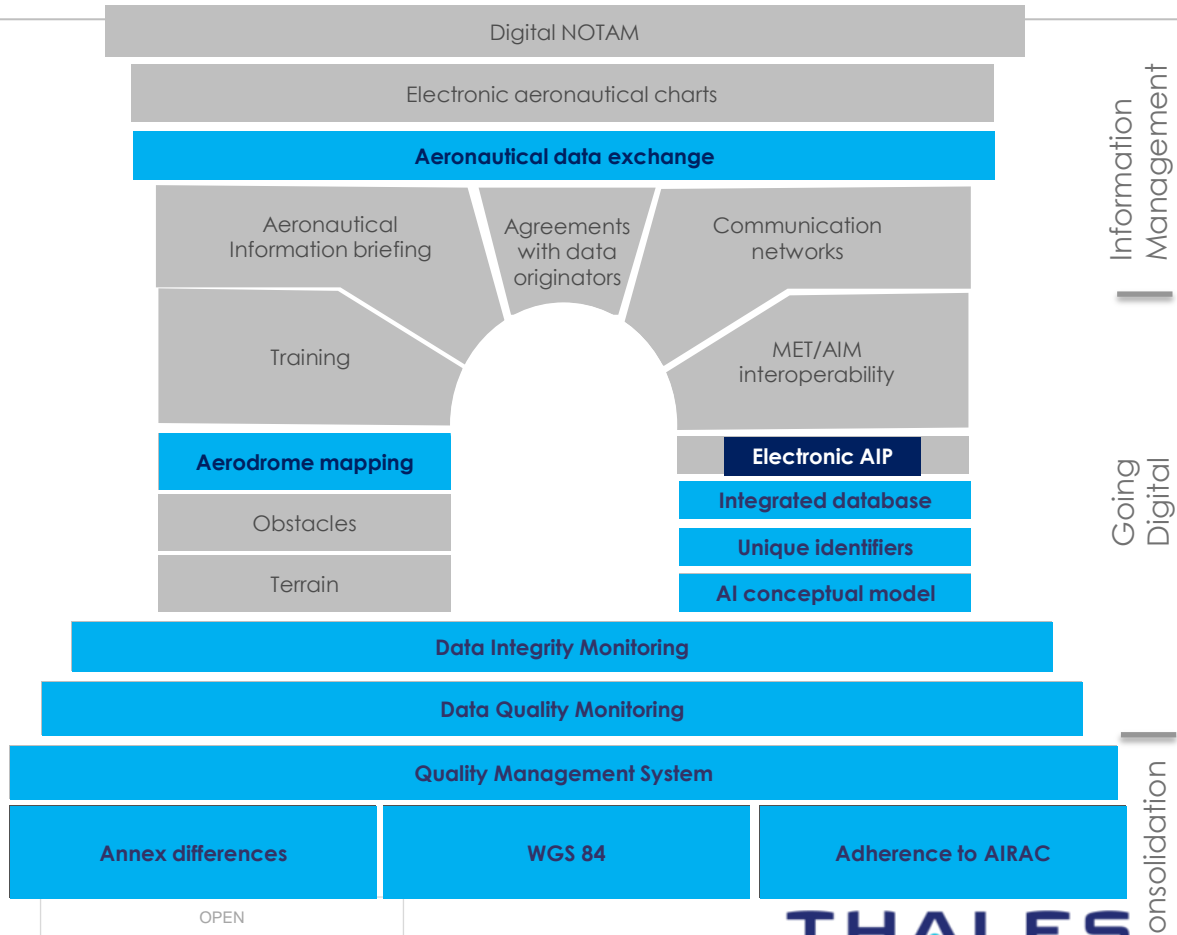
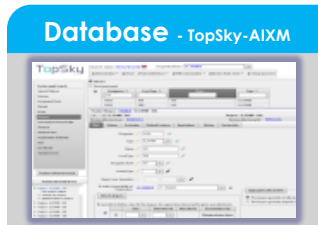
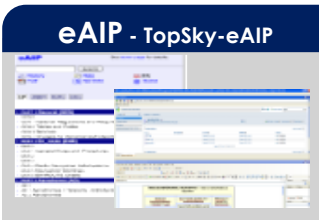
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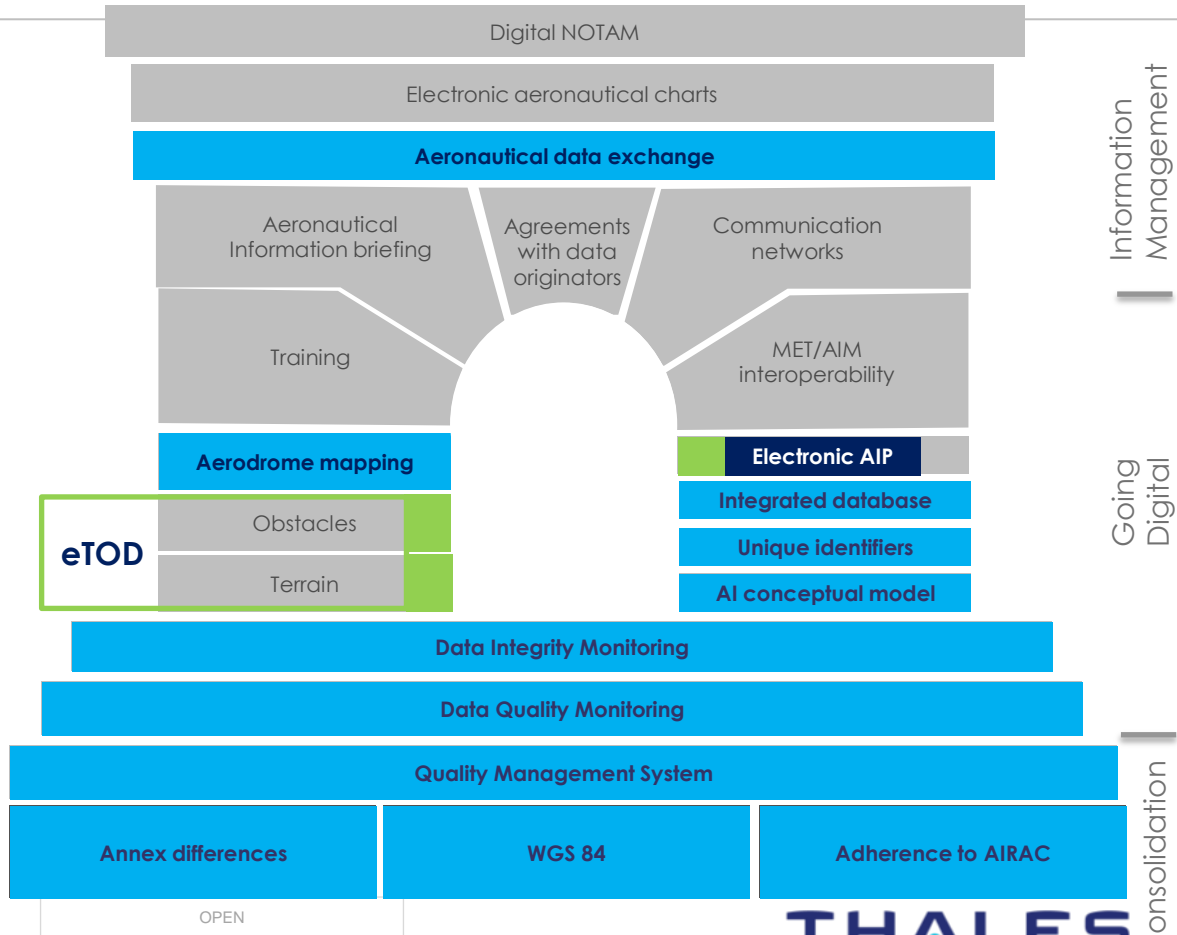
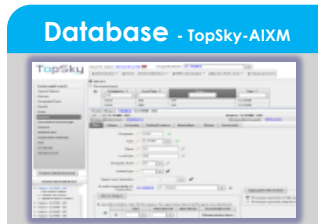
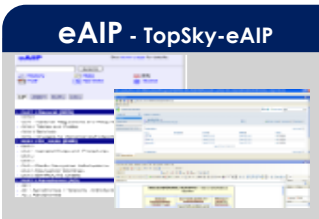
# 6 - TopSky AIM contribution for ICAO AIS to AIM Roadmap

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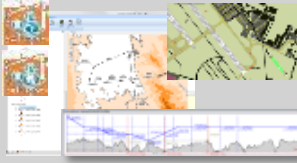
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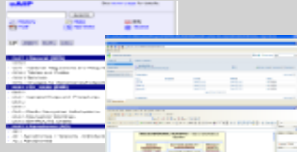
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**Charts - Chart4Flight®**




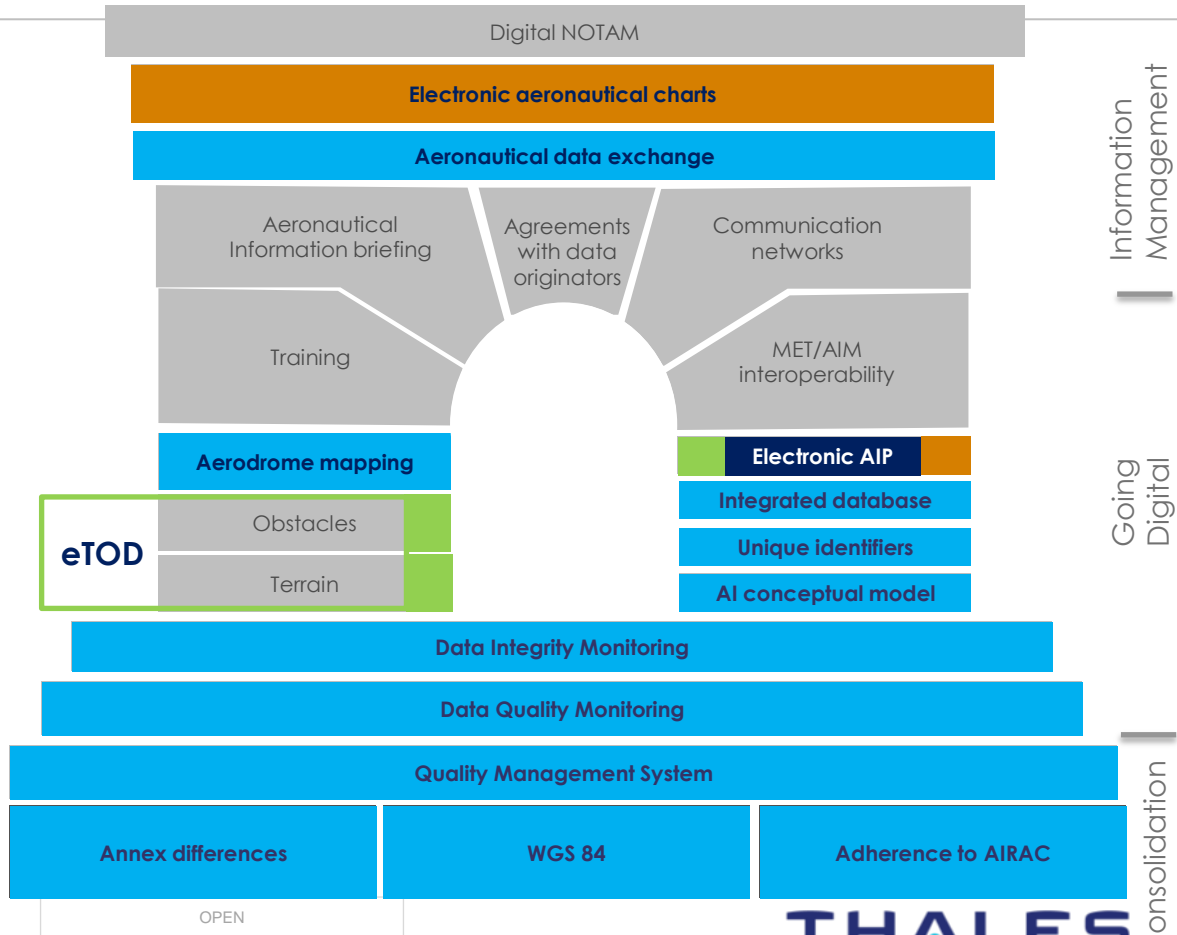
**eAIP - TopSky-eAIP**



**Procedures - GéoTITAN® Data4Flight®**



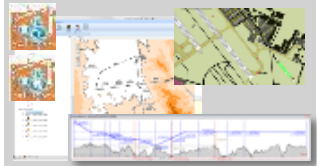
**Database - TopSky-AIXM**

# 6 - TopSky<sub>AIM</sub> contribution for ICAO AIS to AIM Roadmap

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## Charts - Chart4Flight®



## eAIP - TopSky-eAIP

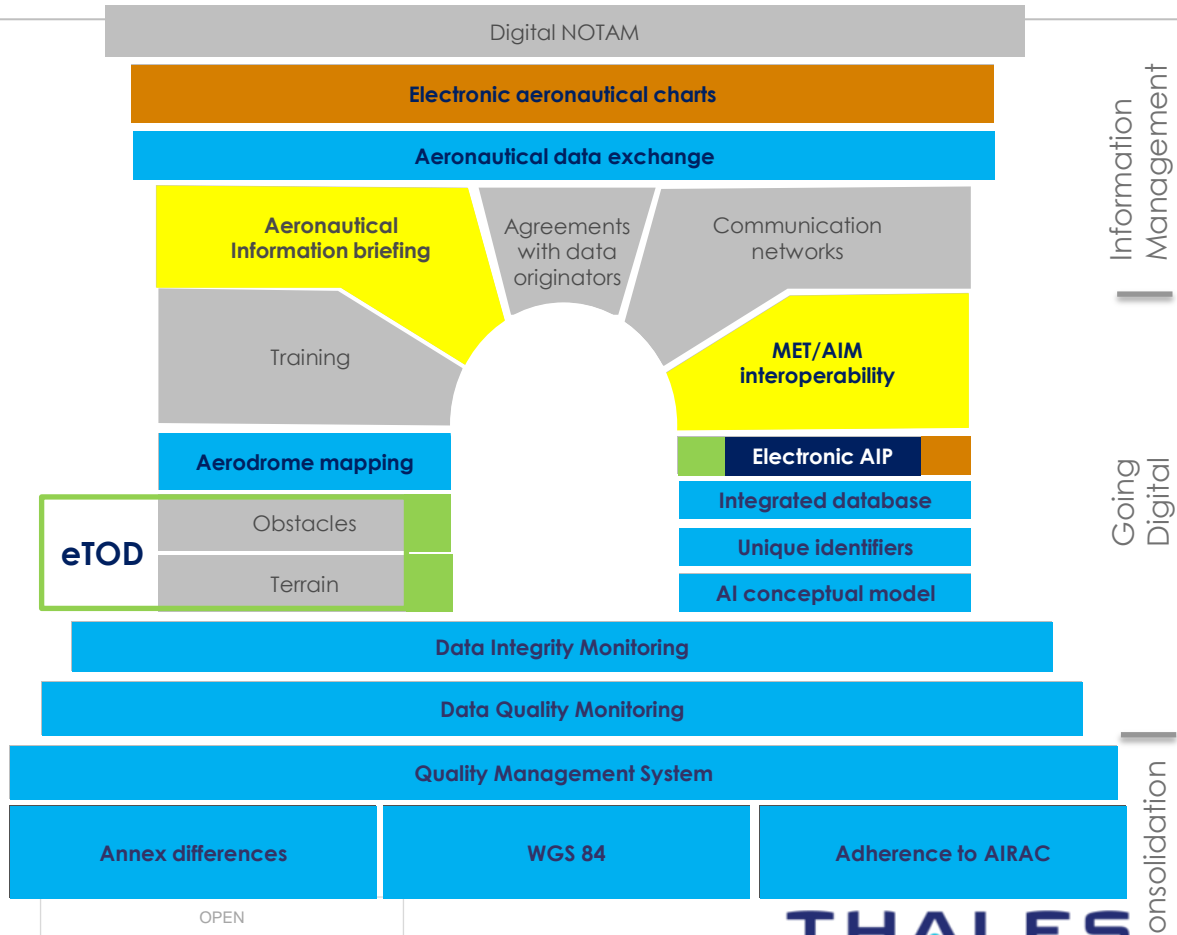


### AIS - TopSky-AIS

ARO, NOF, MET, Briefing

### Procedures - GéoTITAN® Data4Flight®

### Database - TopSky-AIXM



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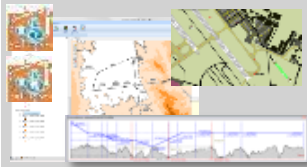
## Training Catalogue

39		TopSky - AIM - Maintenance Course	3d	A1001
40		TopSky - AIS - Maintenance Course	4d	A1002
41	Hands-on	TopSky - B - Administration Course	3d	A1003
42		TopSky - AIS - Operator Course	2d	SP1
43		TopSky - AIS - Operator Course	3d	SP2
44		TopSky - AIS - NOF & ARO Operator Course	3d	SP3
45		TopSky - AIS - NOF Operator Course	3d	SP4
46	Attn: services	TopSky - AIS - ARO Operator Course	4d	SP5
47	Hands-on	GeoTITAN - JetSet Training Course	10d	SP6
48	Attn: services	GeoTITAN - On the Job Training Course	4d	SP7
49		GeoTITAN - On the Job Training Course	10d	SP8
50	Hands-on	Chart4Flight® - Course	3d	SP9
51		Procedure Design/Tools - Course	3d	SP10
52		Chart4Flight® - Course	3d	SP11
53		Obstacle Clearance Software (OCS) - Course	2d	SP12
54	Attn: services	Electronic Terrain and Obstacle Data (E-TOD) - Course	2d	SP13
55		Attn: services - Course	2d	SP14

### AIS - TopSky-AIS

ARO, NOF, MET, Briefing

## Charts - Chart4Flight®

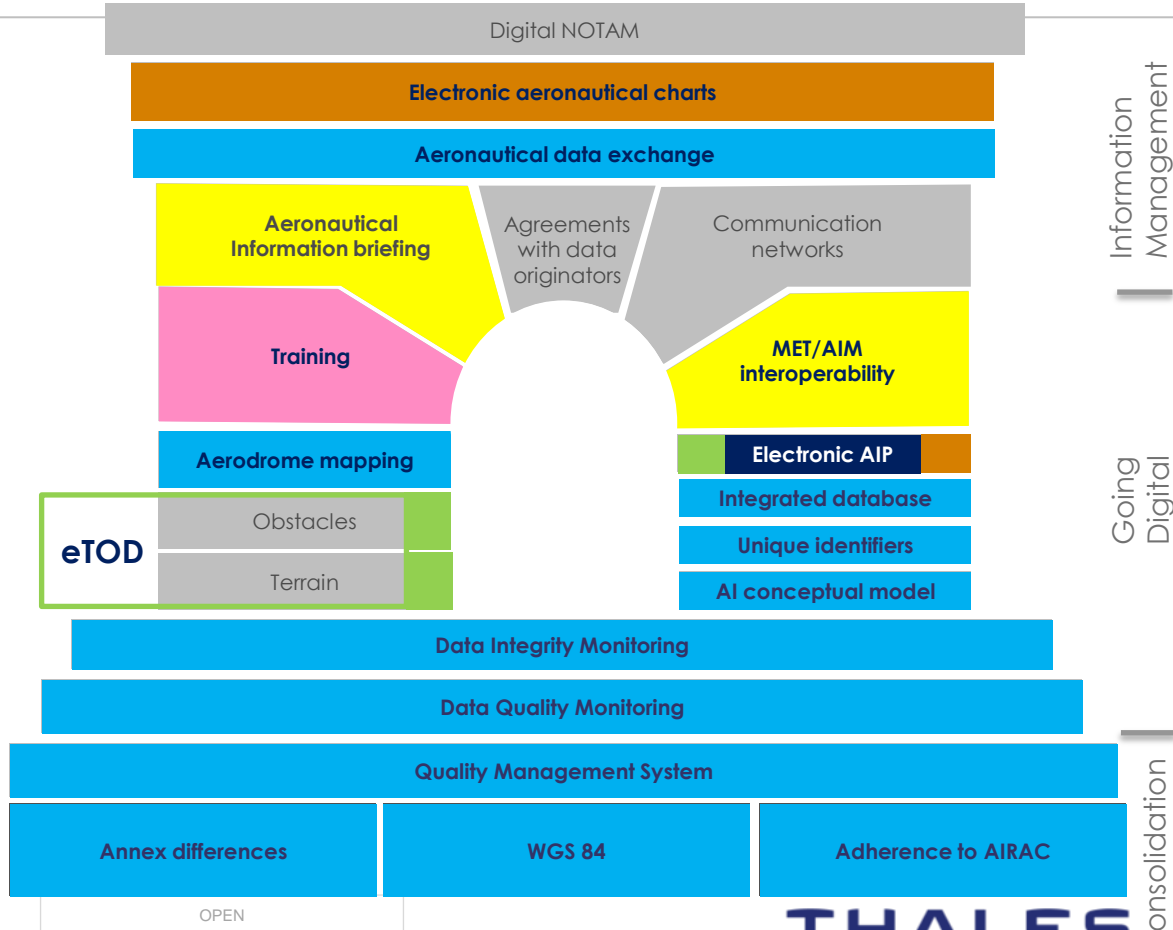


### Procedures - GéoTITAN® Data4Flight®

## eAIP - TopSky-eAIP



### Database - TopSky-AIXM



Information Management

Going Digital

Consolidation

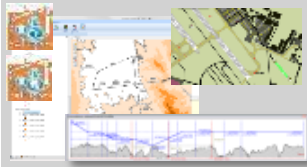
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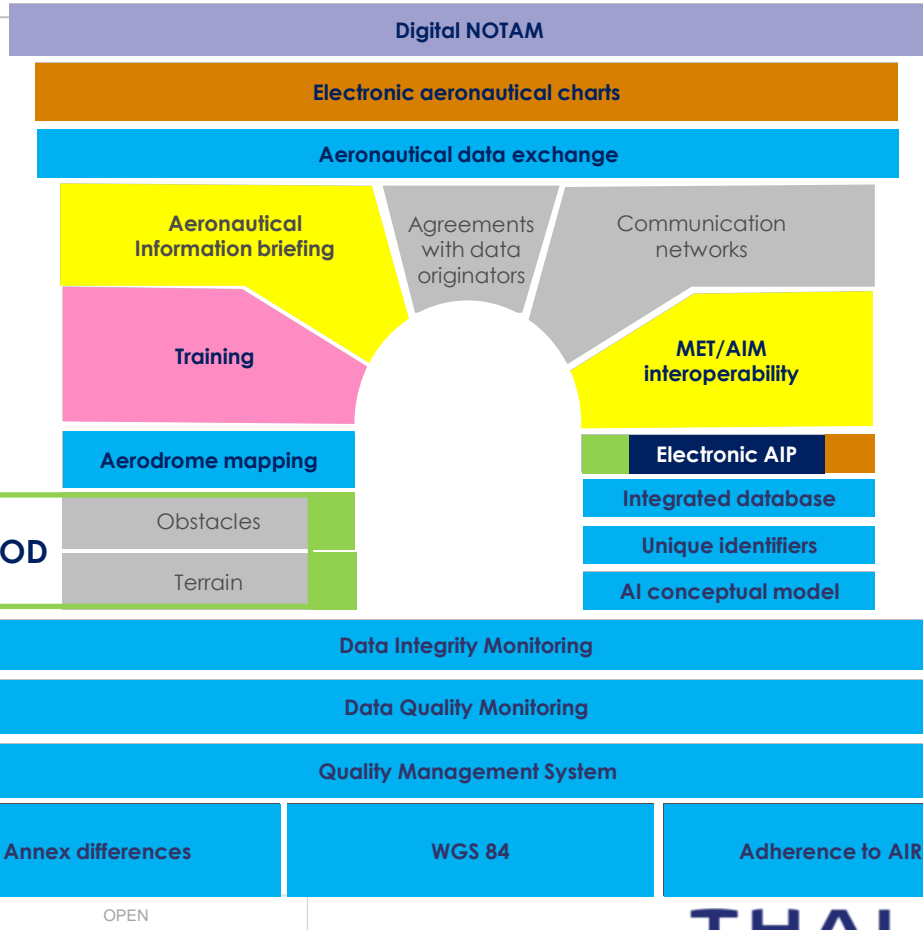
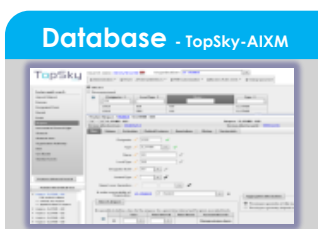
## Training Catalogue

39		TopSky - AIM - Maintenance Course	3d	AT004
40		TopSky - AIS - Maintenance Course	4d	AT004
41	Hors-d'air	TopSky - B - Administration Course	3d	AT007
42		TopSky - AIS - Operator Course	3d	SP1
43		TopSky - AIS - Operator Course	3d	SP1
44		TopSky - AIS - NOF & ARO Operator Course	3d	SP1
45		TopSky - AIS - NOF Operator Course	3d	SP1
46	Aérien - Aérien	TopSky - AIS - ARO Operator Course	4d	SP1
47	Hors-d'air	GéoTITAN - Jeune Training Course	10d	SP1
48	Aérien - Aérien	GéoTITAN - Op-Off Training Course	4d	SP1
49		GéoTITAN - On-Box Training Course	10d	SP1
50	Hors-d'air	Chart4Flight® - Course	3d	SP1
51		Procedure Manager/Tools - Course	3d	SP1
52		Chart4Flight® - Course	3d	SP1
53	Aérien - Aérien	Obstacles (eTOD) - Course	3d	SP1
54		Electronic Terrain and Obstacle Data (eTOD) - Course	3d	SP1
55		AirspaceFlight® - Course	3d	SP1

## Charts - Chart4Flight®



## eAIP - TopSky-eAIP



Information Management

Going Digital

Consolidation

# Conclusion

## Thales plays a Key role in AIM in America Latina

- Key References - Large AIM system with full AIM offer
- Long term roadmap with AIM/ATM integrated solution

## Thales is committed to play a Key Role in America Latina

- Possibility to propose services along with our ANSP partners
- Strong know-how in all key ATM and Cyber Security domains



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THALES



Thank you for your attention !