

Data *centric* Aeronautical Information !

Top40 Words added in Annex 15

Accuracy Aeronautical Air
Appendix application arrangements associated concerning
contained **Data** Digital Doc ensure
format including **Information**
Integrity intended Navigation needed **Note** order
origination PANS-AIM performance procedures
Product provided provision
requirements scope **Services** sets
Specifications standards States surveillance
System traceability used

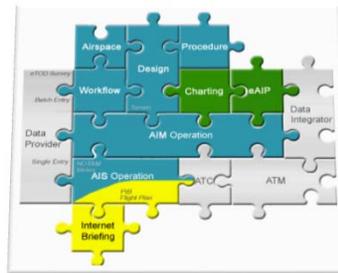
Top40 Words transferred to PANS-AIM

Aerodrome Aeronautical AIP
amendment Appendix application area changes
contained **Data** date
distribution Doc effective electronic establishment
guidance include **Information**
integrity material NOTAM **Note**
Obstacle operation originated process Product provided
Quality requirements Services specifications
specified Standard state supplement System Terrain
used

Facilitate Digital Transition

Key words

- Accuracy
- Digital
- Origination
- Product
- Surveillance
- Electronic
- AIP
- NOTAM
- Obstacle
- Terrain



Goal requested to Industry's Product

- Enables transition from AIS to AIM means enabling transition from product centric to data centric

Means proposed by industries

- Build an **Aeronautical Digital Data Chain** improving

- Quality and Safety with Origination, Traceability, Accuracy
- Data quality with error detection
- NOTAM distribution
- AIP generation
- Procedures design from AIP data Terrain and obstacles
- Chart design from AIP data, Procedures, obstacles and Terrain
- Terrain and obstacle surveillance toward AIM storage

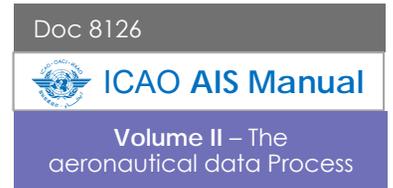
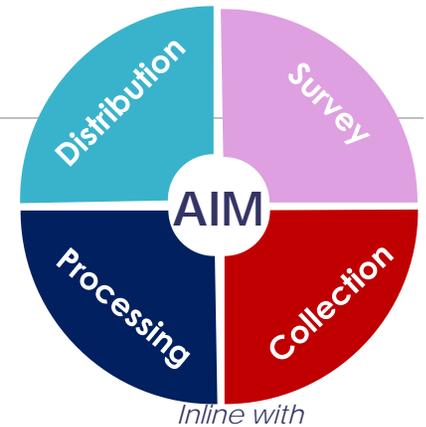
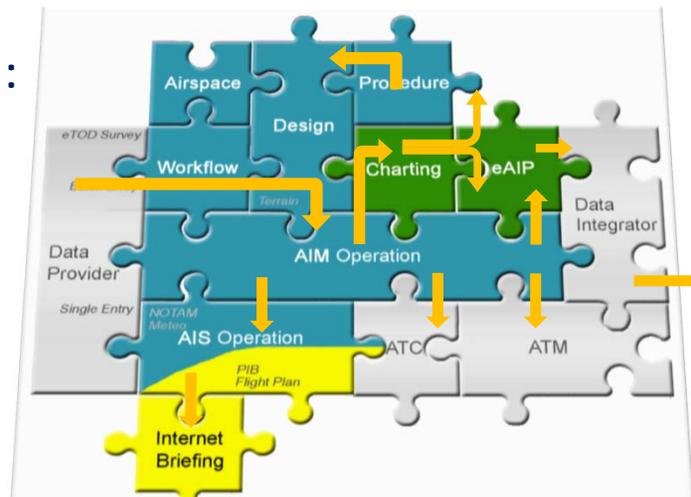
Note that such digital transformation impact also ANSP Organization

a Digital Data Chain embedding eTOD

AIM is a digital data chain
eTOD collection is the initial and most important link.

From eTOD collection derives :

- reliable Terrain and Obstacles data
- secured procedures design
- secured optimized airspace design
- secured optimized traffic flow
- secured optimized traffic control



eTOD integration requirements within an AIM Solution should be considered **Upfront** for the integrity of the overall digital AIM data chain.

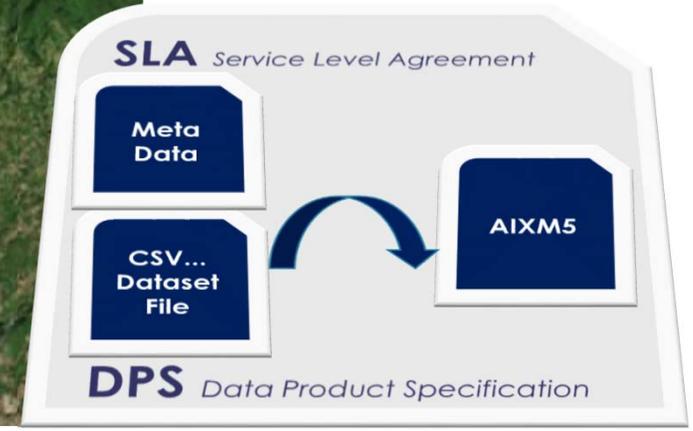
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CGX THALES

Survey



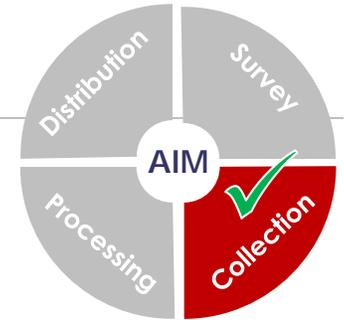
Extract of eTOD LIDAR acquisition
filtered by altitude and sector
110 000 points



San Jose airport (Costa Rica)

During Obstacles collection, focus on Safer Procedures.
Tailor missions with **IFPD** expert on site with Qualified geometer team
and agreed on **SLA defining DPS format** inline with AIXM5 conversion.

Collection



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Traceability on the origin of the data

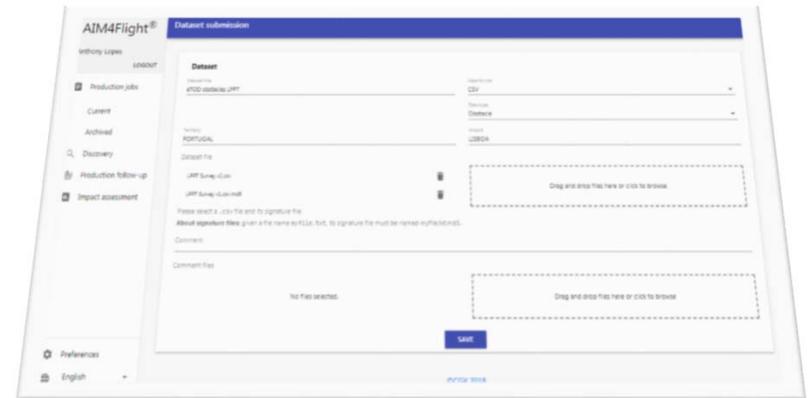
is central to accredit the safety of the computed data such as Procedures ... (Metadata ISO 19139)

Authorized delivered format

Data Product Specification (DPS) and associated mapping or conversion to AIXM data should be agreed, validated and defined through SLA.

Avoid corruption of data

from the data source with CRC.



Such collection traceability, in line with ADQ and QMS is being deploy in Croatia, **operation mid 2019**

Processing



Inline with



- Validation against ICAO regulation such as PANS-OPS rules of any tool transforming data within the data chain is a must
 - Ex. : protection areas not computed correctly by a procedure design tool, could lead to miss obstacles penetrating protection areas.
- Obstacles assessment according to areas definition should also be assisted by a tool.

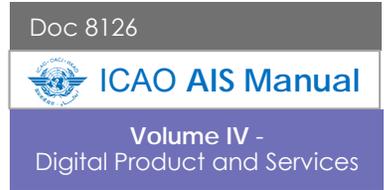
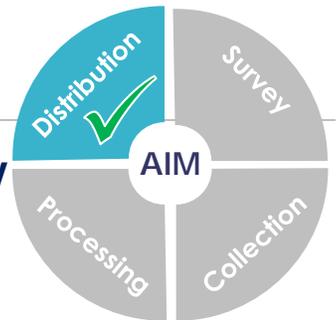
- Use validated computed geometry for charting and publication. Indeed, geometry is part of the AIXM5 data model and not an artifice of design supporting to be recomputed by each tool.
- Use a Business rules engine to check the respect of regulation at each steps :
 - Collect / Design / Publish.

Any deviation of these rules during data processing could lead to a breach of the digital AIM Data Chain. Such Processing on AIXM5 data is **in operation in COCESNA since 2016.**

Open



Distribution



AIM Internal interoperability

- **Distribution of original data** from the data chain, like procedures, to consumers such as **ATC** or data integrator.
 - since 2016, operational process of conversion of AIXM5 data for ATC are deployed and being evaluated.
- **Distribution of AMXM** (Airport mapping data sets) for tower and other airport tool.
 - beginning 2019, such AIM function is being deployed.
- **SWIM Yellow profile**, means of distributing AIM data.
 - beginning 2019, being deployed to build operational use case for distribution of iWXXM, FPL and dynamic AIM data.

AIM external interoperability

- **AIM-SL web service** from Eurocontrol start to be proposed in Europe, but still technical & operational topics to solve.
- **WFS2.0 is available for AIM** but performance on operational use case need to be proven, bi-party testing is needed.
- **Cyber security** is critical and the key to ensure internal and external interoperability, industry is investing lot in this area.

Few AIM **internal interoperability** means are **available and deployed** while AIM external interoperability is starting and not yet in place.

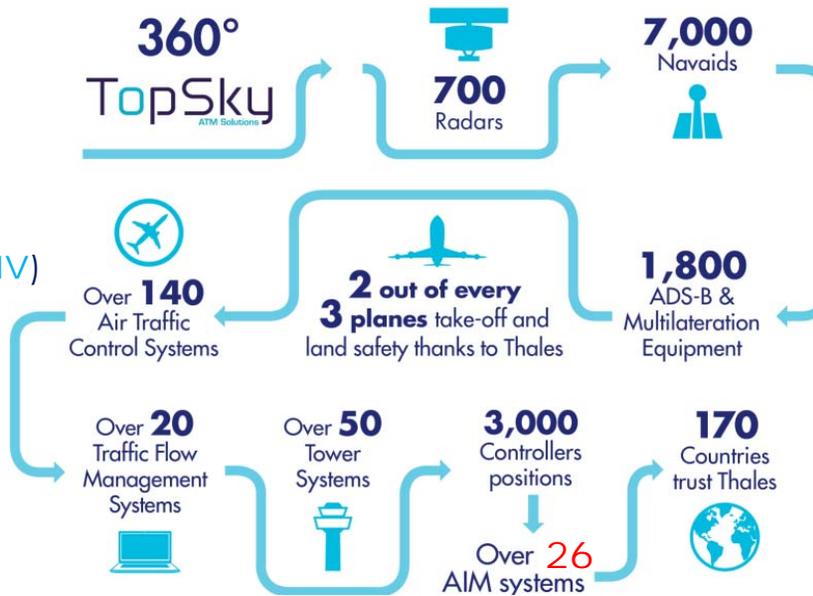
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THALES ATM references

170 states trust Thales ATM solutions

EUROCONTROL trust Cegeka & Thales for Airspace Environment system (ENV) part of Network Manager (May 2018)

26 Thales AIM solutions trusted by **46** states
TopSky AIM

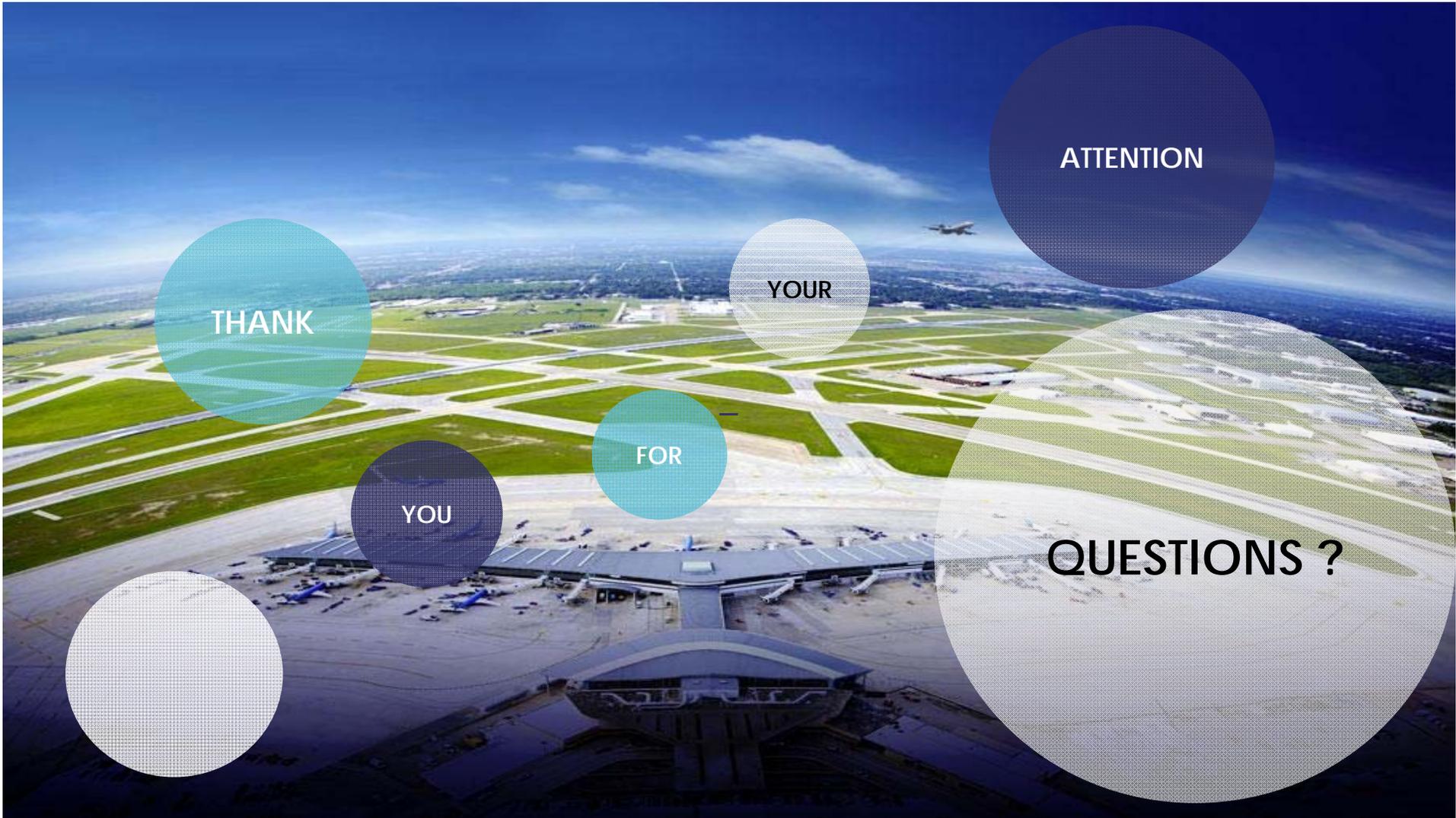


COCESNA, full AIM (AIXM5.1) put in operation in only 12 months

Portugal Air Force, full AIM (AIXM5.1.1) accepted on site in only 5 months

ATM solutions are connected by a **digital AIM data chain**
12 states are using Thales **AIXM5** solution
4 new states select Thales AIXM5 solution last year !

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