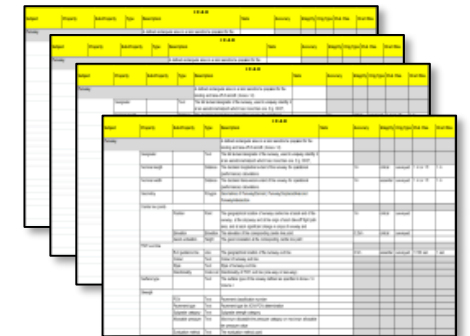


The Aeronautical Data Catalogue

- PANS-AIM (Doc 10066), Appendix 1 -

Practical usage has started



ICAO Asia/Pacific AAITF/15 - AIM Seminar
Virtual Meeting, 1st June 2020

Current AIM Trends

GASP, GANP, ASBU, AIM, IM

// Based on Annex 15, Ed 16 & PANS-AIM

// AIS to AIM

// Product to Data Centric

// IMP AIM WG (selection)

// AIM Global Implementation Support (JC06)

(Quality Manual, Training Manual)

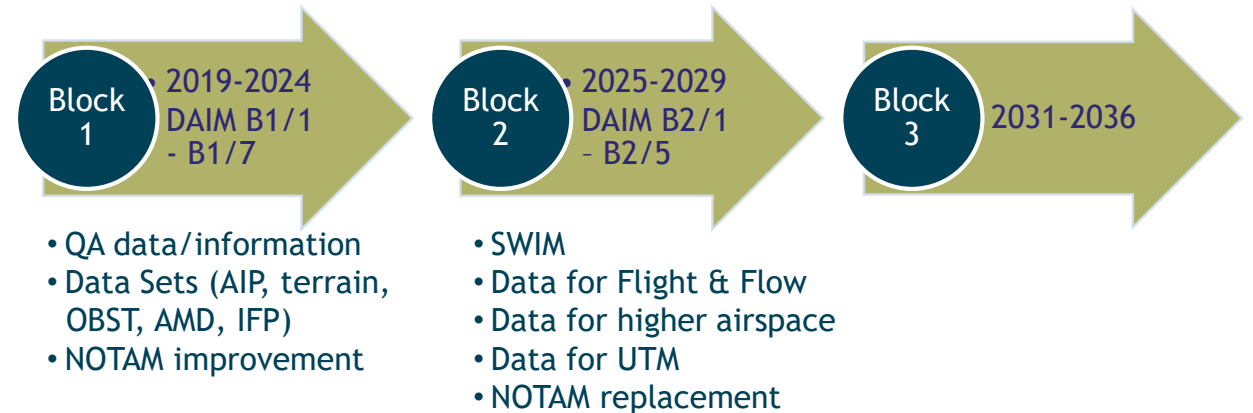
// NOTAM modernisation (JC07)

// Aeronautical Charts modernisation (JC08)

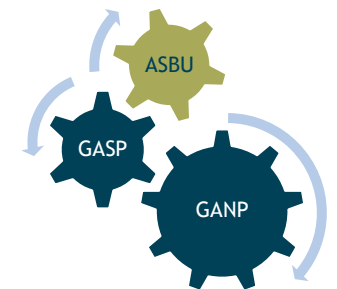
// Digital Data Sets (JC09)

// OLS review (ADOP03)

Aviation System Block Upgrads (ASBU)



- GANP - Global Air Navigation Plan
- GASP - Global Aviation Safety Plan
- ASBU Document



Content / Discussion

// 01 To remind us

// 02 Why this catalogue?

// 03 What do organisations do?

// 04 What can you do?

// 05 Questions & Answers



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Courtesy of www.aim-tracking.org



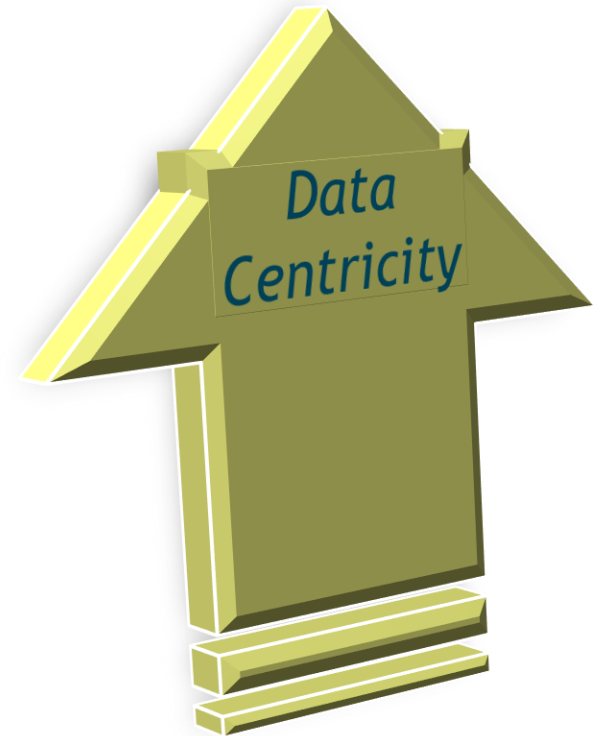
// 01 To remind us

To remind us - the intent

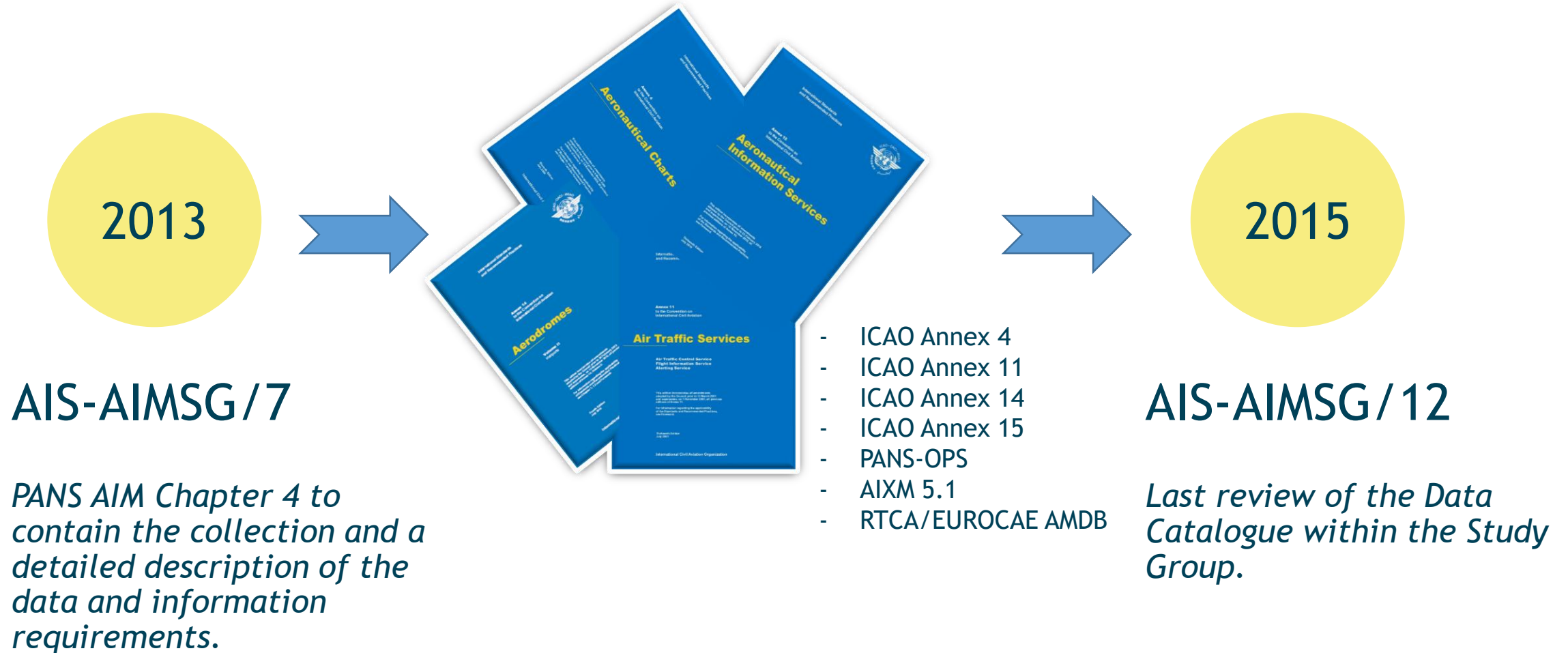


Aeronautical
Information Services to
Aeronautical
Information
Management Study
Group

AIS-AIMSG

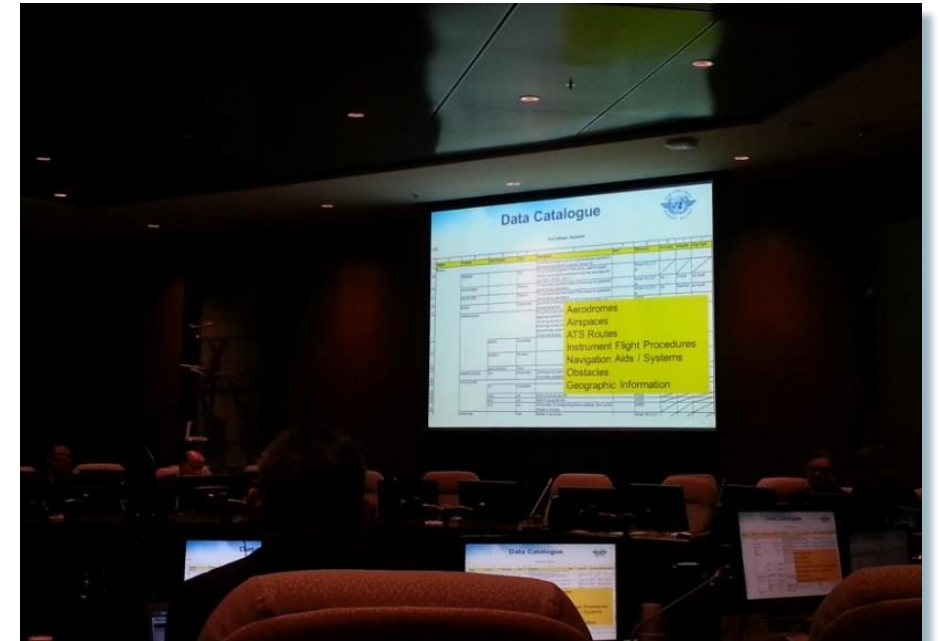


To remind us - the development process



The result in different words

The Data Catalogue is not just an ICAO PANS, but a tool to ease your working process.



DC first time shown to ANC on 10.11.2014

ICAO Data Catalogue











- Around 65 subjects, 350 properties, ca. 500 subproperties
- Basis for Data Sets!

Table A1-6 Obstacle data

| Subject | Property | Sub-Property | Type | Description |
|----------|---------------------|--------------|--------------------------|---|
| Obstacle | | | | All fixed (whether temporary or permanent) and mobile obstacles or parts thereof. |
| | Obstacle identifier | | Text | Unique identifier of obstacle |
| | Operator / Owner | | Text | Name and Contact information of obstacle operator or owner |
| | Geometry type | | Code list | An indication whether the obstacle is a point, line or polygon. |
| | Horizontal position | | Point Line Polygon | Horizontal position of obstacle |
| | Horizontal extent | | Distance | Horizontal extent of the obstacle |
| | Elevation | | Elevation | Elevation of the highest point of the obstacle. |
| | Height | | Height | Height of the obstacle above ground |
| | Type | | Text | Type of obstacle |
| | Date and time stamp | | Date | Date and time the obstacle was created |
| | Operations | | Text | Feature operations of mobile obstacles |
| | Effectivity | | Text | Effectivity of temporary types of obstacles |
| | Lighting | Type | Text | Type of lighting |

The result

| ICAO | | | | | | | | | | |
|---------|------------|--------------|------|---|------|----------|-----------|-----------|-----------|------------|
| Subject | Property | Sub-Property | Type | Description | Note | Accuracy | Integrity | Orig Type | Pub. Res. | Chart Res. |
| Runway | | | | A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft. (Annex 14) | | | | | | |
| | Designator | | Text | The full textual designator of the runway, used to uniquely identify it at an aerodrome/heliport which has more than one. E.g. 09/27, | | | | | | |

-  PANS-AIM -- Appendix 1 -- Table A1.1 Aerodrome.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.2 Airspace.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.3 ATS_Routes.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.4 IFP.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.5 Navaid.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.6 Obstacles.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.7 GeographicInformation.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.8 Terrain.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.9 Data type.xlsx
-  PANS-AIM -- Appendix 1 -- Table A1.10 Other information.xlsx



// 02 Why this data catalogue?

One-Stop-Shop for all Aeronautical Data



- Aerodrome data
- Airspace data
- ATS and routes data
- Instrument flight procedure data
- Radio navigation aids data
- Obstacle data
- ..and more

One-Stop-Shop for DQR



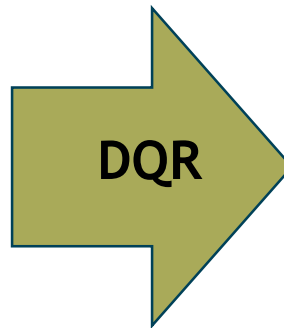
- Aerodrome data
- Airspace data
- ATS and routes data
- Instrument flight procedure data
- Radio navigation aids data
- Obstacle data
- ..and more

Institutional significance and potential benefits

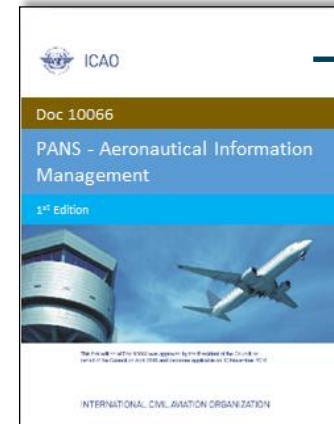
One-Stop-Shop for DQR



Annex 4, 11, 14, 15, & PANS-OPS



PANS-AIM



Appendix 1

A screenshot of a data table with multiple columns and rows, representing Appendix 1 of the PANS-AIM document. The table has a header row with yellow background and contains various data entries.

Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution, integrity (or equivalent assurance level), traceability, timeliness, completeness and format.

DQR in the Catalogue

| | Accuracy | Integrity | Orig Type | Pub. Res. | Chart Res. |
|---------|----------|-----------|-----------|-------------|------------|
| | | | | | |
| | | | | | |
| | 1 m | critical | surveyed | 1 m or 1 ft | 1 m |
| | 1 m | essential | surveyed | 1 m or 1 ft | 1 m |
| | | | | | |
| | | | | | |
| Annex 4 | 1 m | critical | surveyed | | |
| | 0.25 m | critical | surveyed | | |
| | | | | | |
| | | | | | |
| | 0.5 m | essential | surveyed | 1/100 sec | 1 sec |
| | | | | | |
| | | | | | |
| | | | | | |

DQR Components

- **Data accuracy**

- A degree of conformance between the estimated or measured value and the true value.

- **Data integrity**

- (assurance level). A degree of assurance that an aeronautical data and its value has not been lost or altered since the origination or authorized amendment.

- **Data resolution**

- A number of units or digits to which a measured or calculated value is expressed and used.

- **Data timeliness**

- The degree of confidence that the data is applicable to the period of its intended use.

- **Data traceability**

- The degree that a system or a data product can provide a record of the changes made to that product and thereby enable an audit trail to be followed from the end-user to the originator.

- **Data Completeness**

- The degree of confidence that all of the data needed to support the intended use is provided.

Origination Type

- calculated
- declared
- surveyed

Meta Data

- Collected for process & exchange points
- Provided with each data set
- ISO 19115

Format

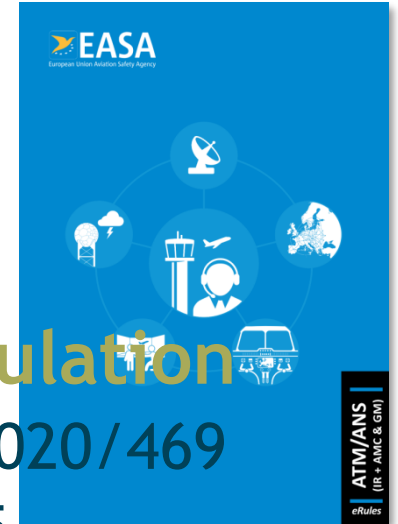
- Discretion of State
- *Note: Commonly used data encoding formats*
- *Note: XML, GML, JSON*



// 03 What do organisations do?

EASA, RTCA/EUROCAE, EUROCONTROL

EASA = EU Regulator



- EASA regulates 30 states
 - 27 EU member states
 - 3 states in the EEA
 - 1 additional states

- Implementing Regulation

- (EU) 2017/373 & 2020/469
- ATM/ANS.OR.A.085
Aeronautical data quality management

- Data Catalogue is built into the AIM regulation

- ICAO wording
- Applicable 27.01.2022



EU Reg ATM/ANS.OR.A.085

- Catalogue copied from ICAO
- When originating, processing or transmitting data to the AIS provider, the service provider shall
 - (a) ensure that aeronautical data referred to in Appendix 1 conform to the specifications of the aeronautical data catalogue; ...
- Applicable 27.01.2022

| 1. Aerodrome data | | | | | | | | | | |
|-------------------|-------------|-------------------------|------|--|--------|----------|-----------|------------|-----------|------------|
| Subject | Property | Sub-property | Type | Description | Note | Accuracy | Integrity | Orig. Type | Pub. Res. | Chart Res. |
| Aerodrome | | | | A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft. | | | | | | |
| | Designator | | | Designator of the aerodrome/heliport | | | | | | |
| | | ICAO location indicator | Text | The four-letter ICAO location indicator of the aerodrome/heliport, as listed in ICAO Doc 7910 'Location Indicators' | If any | | | | | |
| | | IATA designator | Text | The identifier that is assigned to a location in accordance with IATA rules (Resolution 767) | If any | | | | | |
| | | Other | Text | A locally defined airport identifier, if other than an ICAO Location indicator | | | | | | |
| | Name | | Text | The primary official name of an aerodrome as designated by the competent authority | | | | | | |
| | Served city | | Text | The full name (free text) of the city or town the aerodrome/heliport is serving | | | | | | |
| | Type of | | | | | | | | | |

RTCA / EUROCAE

- RTCA SC-217/EUROCAE WG-44 „Aeronautical Databases“

RTCA



- Consistency check between „Data Catalogue“ (PANS-AIM) and:
 - Standards for Aeronautical Information (Do201B/ED77A),
 - User Requirements for Aerodrome Mapping Information (Do272D/ED99B),
 - ARINC424.

RTCA / EUROCAE

- Status SC-217 / WG-44:
 - Work is ongoing,
 - First results are presented to IMP WG-A/3 in February 2020.

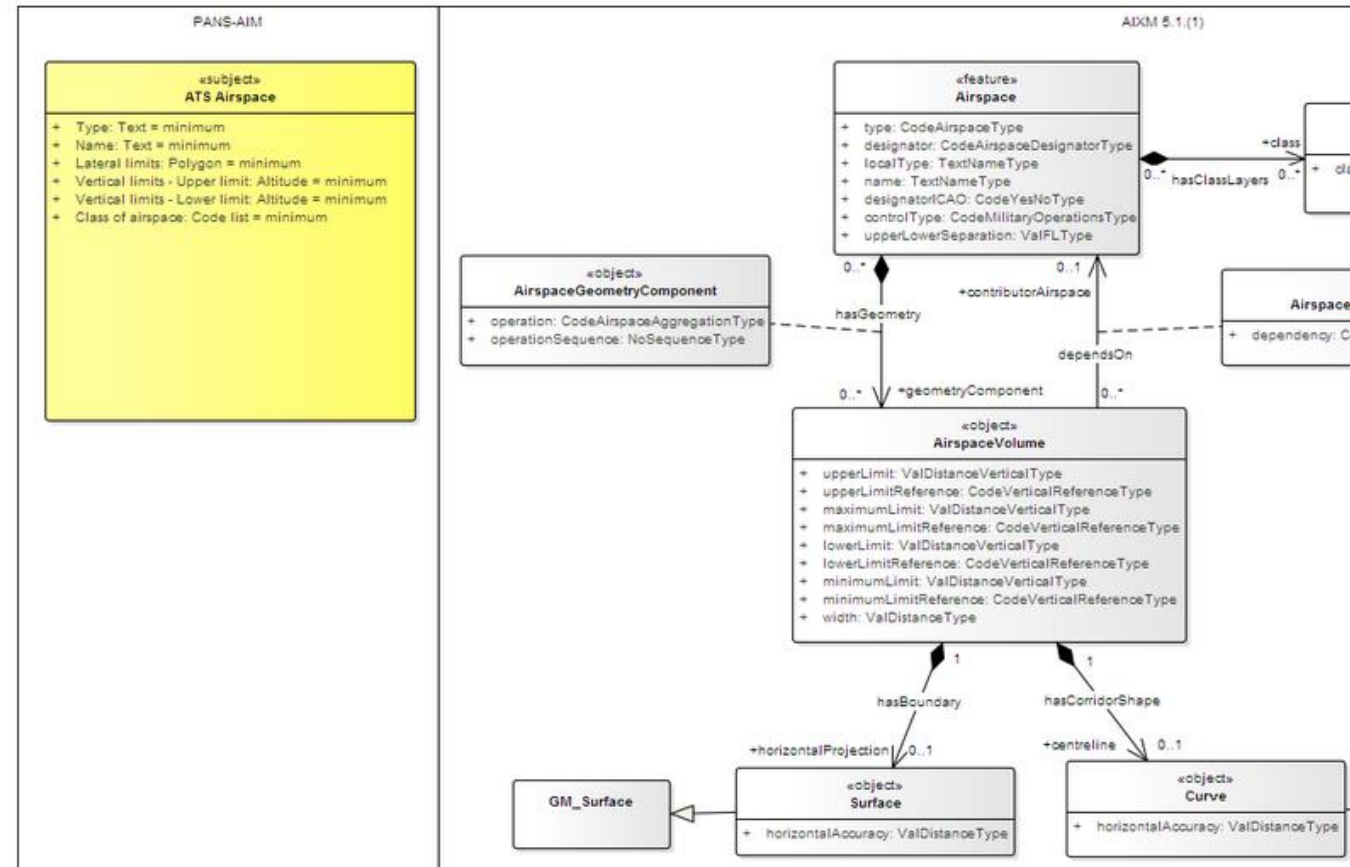
| Property | Sub-Property | Type | Description | BG: Covered by DO-272 | LH: In ARINC 424 | BG: Recommend covering in DO-201 | Core | DDC | Note |
|----------------------|--------------------|----------|---|-----------------------|------------------|----------------------------------|------|-----|------|
| | | | A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance. | | | | | | |
| Designator | | Text | The full textual name or designator used to identify an apron at an aerodrome/heliport. | Yes | No | No | NO | NO | |
| Geometry | | Polygon | Geographical location of the apron element | Yes | No | No | NO | NO | |
| Type | | Text | Classification of the primary use for the apron | Yes | No | No | NO | NO | |
| Aircraft restriction | | Text | Usage restriction (prohibition) for specified aircraft type | Yes | No | No | NO | NO | |
| Surface type | | Text | The surface type of the apron | Yes | No | No | NO | NO | |
| | | | Strength | | | | | | |
| | PCN | Text | Pavement classification number of apron | Yes | No | No | NO | NO | |
| | Pavement type | Text | Pavement type for aircraft classification number — pavement classification number (ACN -PCN) determination | Yes | No | No | NO | NO | |
| | Subgrade category | Text | Subgrade strength category of apron | Yes | No | No | NO | NO | |
| | Allowable pressure | Text | Maximum allowable tire pressure category or maximum allowable tire pressure value | Yes | No | No | NO | NO | |
| | Evaluation method | Text | The evaluation method used to determine the apron strength | Yes | No | No | NO | NO | |
| | | | Elevation | | | | | | |
| | | | The elevation of the apron | No | No | No | NO | NO | |
| | | | A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another. | | | | | | |
| Designator | | Text | The full textual designator of the taxiway. | Yes | No | No | NO | NO | |
| Width | | Distance | The transversal extent of the taxiway. | No | No | No | NO | NO | |
| Geometry | | Polygon | Geographical location of the taxiway element | Yes | No | No | NO | NO | |
| Bridge | | Text | Type of bridge (none, overpass, underpass) | Yes | No | No | NO | NO | |
| Surface type | | Text | Surface type of taxiway | | | | | | |

EUROCONTROL



• Mapping between PANS-AIM AIP Data-Set and AIXM 5.1

- Minimum Data Items
 - Those in PANS-AIM Chapter 5.3.3.1
- Conditional Data Items
 - Those in PANS-AIM Appendix 2 „Contents of AIP“, marked with #AIP-DS#
- Optional Data Items
 - All other in PANS-AIM Appendix 1 „Data Catalogue“



EUROCONTROL

- Mapping based on Data Catalogue:
 - Aerodrome/Heliport
 - Airspace Data
 - ATS Routs & others
 - Radio Navaids/Systems

Table A 1-1 Aerodrome/Heliport data

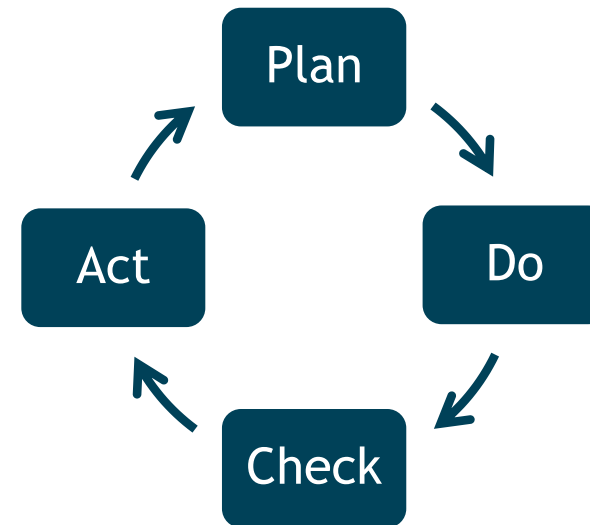
| Type | Description | Note | Integrity | Orig Type | Pub. Res. | Chart Res. | AIP data set | AIXM 5.1(1) |
|-----------|--|--------|-----------|-----------|-----------|------------|--------------|--|
| | A defined area on land or water (including any buildings, installations or equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft. | | | | | | minimum | //axm:AirportHeliport |
| | Designator of the aerodrome / heliport | | | | | | minimum | //axm:AirportHeliport/axm:designator |
| Text | The four letter ICAO location indicator of the aerodrome/heliport, as listed in ICAO DOC 7910 (Location Indicators). | if any | | | | | minimum | //axm:AirportHeliport/axm:locationInd //axm:AirportHeliport/axm:designator |
| Text | The identifier that is assigned to a location in accordance with rules (resolution 767) governed by the International Air Transport Association (IATA). | if any | | | | | minimum | //axm:AirportHeliport/axm:designator //axm:AirportHeliport/axm:designator |
| Text | A locally defined airport identifier, if other than an ICAO Location Indicator | | | | | | optional | //axm:AirportHeliport/axm:designator |
| Text | The primary official name of an aerodrome as designated by an appropriate authority. | | | | | | minimum | //axm:AirportHeliport/axm:name |
| Text | The full name of the city or town the aerodrome/heliport is serving | | | | | | minimum | //axm:AirportHeliport/axm:servedCity axm:name |
| | | | | | | | optional | |
| Code list | Indication if international and/or national flights are permitted at the aerodrome/heliport | | | | | | optional | |
| Code list | Indication if IFR and/or VFR flights are permitted at the aerodrome/heliport | | | | | | optional | //axm:AirportHeliport/axm:availability/ axm:AirportHeliportAvailability/axm:us axm:AirportHeliportUsage/axm:select axm:ConditionCombination/axm:flight axm:FlightCharacteristic/axm:rule |
| Code list | Indication if scheduled and/or nonscheduled flights are permitted at the aerodrome/heliport | | | | | | optional | |
| Code list | Indication if civil commercial aviation and/or general aviation and/or military flights are permitted at the aerodrome/heliport | | | | | | optional | |
| Text | Indication if an aerodrome or heliport is not open for the public (Only for the use of the owners). | | | | | | optional | |
| Text | The type of the heliport as mentioned in Annex 14 Volume II (Surface-level, elevated, shipboard or helideck) | | | | | | optional | |
| Text | Indication if an aerodrome is under civil control, military control or joint control | | | | | | minimum | //axm:AirportHeliport/axm:controlTyp |



// 04 What can you do?

Initial steps to use DC

- Get management on board
 - Identify internal key-players
 - Get regulator on board
 - Initiate a work shop
 - Plan the work, work the plan
- PANS-AIM & the paradigm shift AIS → AIM supports
 - GANP Ed. 6 (2019) DAIM



 = Data Catalogue - useful for discussion, clarification, specification, agreement

Keep the big picture in mind

Source

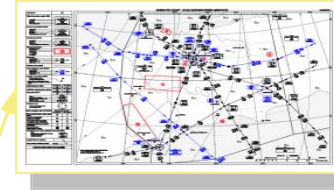
- Annex 2, 3, 4, 5, 7, 9, 10v1, 10v2, 10v3, 10v5, 11, 12, 13, 14v1, 14v2, 15, 16v1, 16v2, 17, 18, 19
- PANS-OPS

Products, Applications, Services

- Rules
- Properties
 - Parameters
 - Models
 - Features
 - ..

Products

Annex 4 (Amd 59)



Paper Chart



Electronic Chart

Data Sub-sets
Tables

Data Sub-sets

Books
Text
(electronic form)

Text

Thematic Data Sets (e.g. IFP)

Products

Next Intended User (SWIM)

Applicable
8. Nov 2018

$F(x:y)$

(y)



(x)

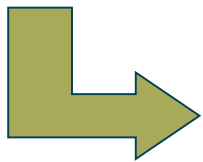
Data

Data Management

- Annex 15 (Amd 40)
PANS-AIM (new)
- Data catalogue

Data Sets

Origination

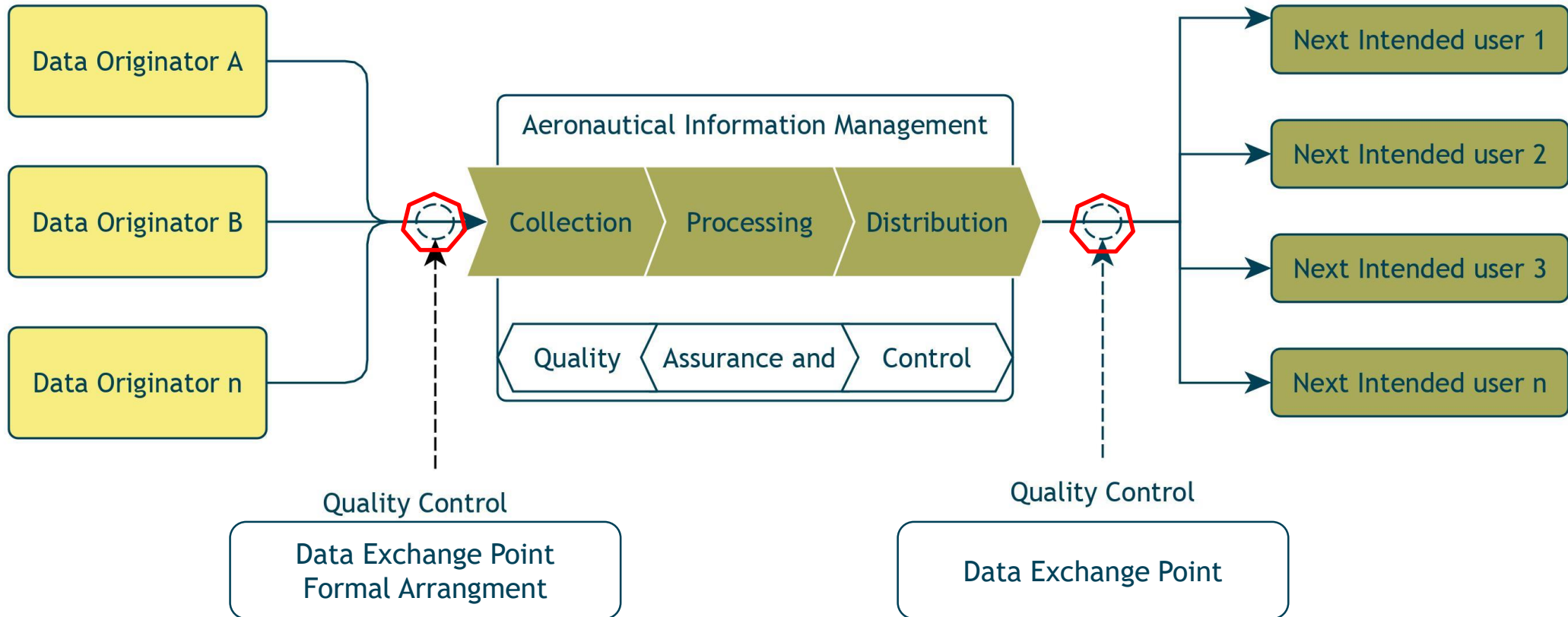


Super Set



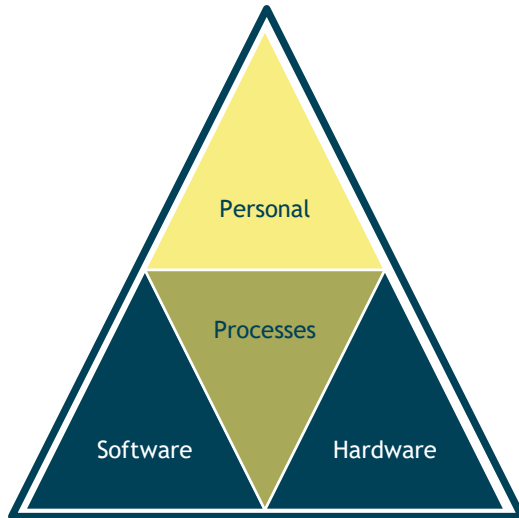
Data Metadata

Aeronautical Information Management Process



Other Options to Use DC

- Support to impact assessment



- Implementation plan for:

- Personal (training)
- Processes (modelling, if not yet available)
- Software (procurement)
 - Requirements
- [Hardware (procurement)]

Formal Arrangements

- **Between**

- Originators & State AIS
- *Also parties acting on behalf of states (recomendation) like e.g. ANSPs*

- **Minimum Content**

- Regulatory framework
- Data origination
- Quality assurance
- Metadata and quality reporting
- Data delivery
- Error handling



The Aeronautical
Data Catalogue
supports Formal
Arrangments.

Summary

// 01 To remind us

// 02 Why this catalogue?

// 03 What do organisations do?

// 04 What can you do?

// 05 Questions & Answers



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// 05 Question & Answers

ADDRESS

ASBU for Future GmbH
Römerstrasse 17 88690
Uhldingen-Mühlhofen, Germany

INFO

Phone: +49-7556-4521-78-0
E-mail: info@a4f.aero
Website: <http://asbu4future.aero>

