AIP to digital data set transition challenges

Interregional EUR/MID PANS AIM Workshop
ICAO EUR/NAT, Paris, 10-12 July 2018

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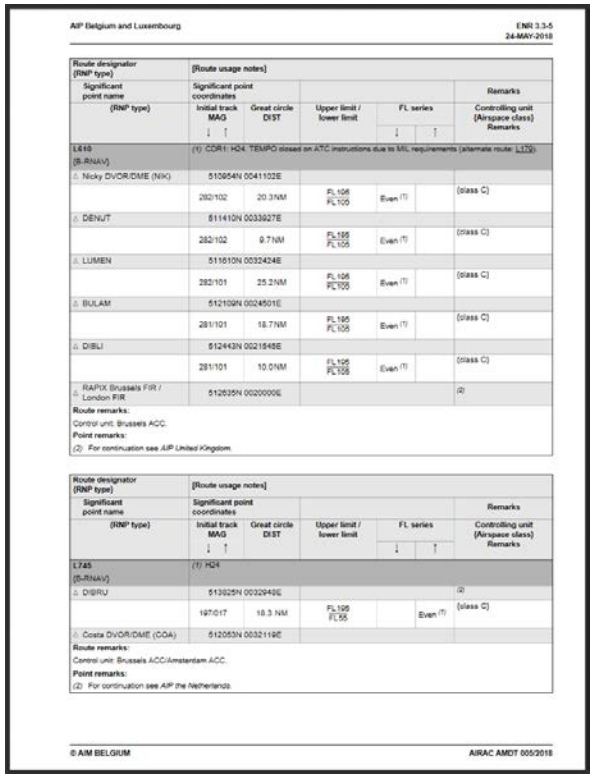
DECMA/STR/SWM
July 2018

From AIS to Digital AIM



AIP Belgium and Luxembourg — ENR 3.3-5 — 24-MAY-2018

Route designator (RNP type)	Route usage notes					
Significant point name (RNP type)	Significant point coordinates: Initial track MAG	Great circle DIST	Upper limit / lower limit	FL series ↓	FL series ↑	Remarks: Controlling unit (Airspace class) Remarks
L610 (B-RNAV)	(1) CDR1: H24. TEMPO closed on ATC instructions due to MIL requirements (alternate route: L170)					
Nicky DVOR/DME (NIK)	510954N 0041102E					
	282/102	20.3NM	FL105 / FL700	Even (1)		(class C)
DENUT	511410N 0033927E					
	282/102	9.7NM	FL195 / FL105	Even (1)		(class C)
LUMEN	511610N 0032424E					
	282/101	25.2NM	FL105 / FL700	Even (1)		(class C)
BULAM	512109N 0024501E					
	281/101	18.7NM	FL195 / FL105	Even (1)		(class C)
DIBLI	512443N 0021548E					
	281/101	10.0NM	FL105 / FL700	Even (1)		(class C)
RAPIX Brussels FIR / London FIR	512635N 0020000E					(2)

Route remarks:
Control unit: Brussels ACC.
Point remarks:
(2) For continuation see AIP United Kingdom.

Route designator (RNP type)	Route usage notes					
Significant point name (RNP type)	Significant point coordinates: Initial track MAG	Great circle DIST	Upper limit / lower limit	FL series ↓	FL series ↑	Remarks: Controlling unit (Airspace class) Remarks
L745 (B-RNAV)	(1) H24					
DIBRU	513925N 0032949E					(2)
	197/017	18.3 NM	FL195 / FL55		Even (1)	(class G)
Costa DVOR/DME (COA)	512053N 0032119E					

Route remarks:
Control unit: Brussels ACC/Amsterdam ACC.
Point remarks:
(2) For continuation see AIP the Netherlands.

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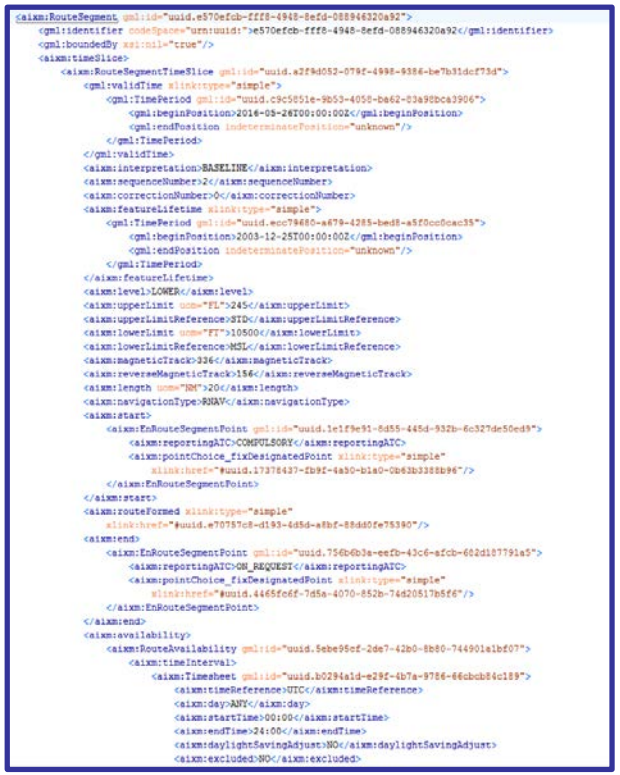
Pre-formatted documents



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Digital data sets

Transition

Challenges ahead…

Digital

- "*recording or storing information as series of the numbers 1 and 0, to show that a signal is present or absent*"

Be digitally - friendly !

Friendly

- "*behaving in a pleasant, kind way towards someone*"

(*Cambridge Dictionary, https://dictionary.cambridge.org*)

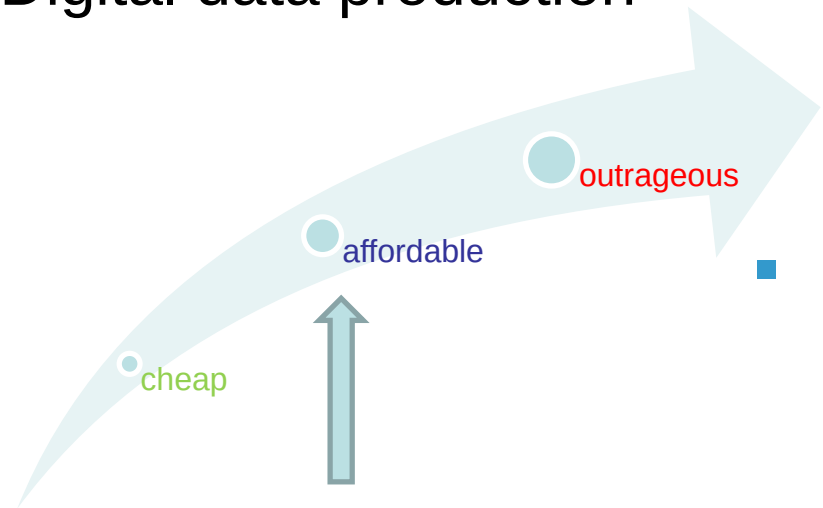
Be friends, digitally !

In this presentation

1. *AIS provisions and practices that are not digitally-friendly*
2. *Digital data impact on the AIS friends*

Why digitally - friendly ?

- Digital data production



…cost challenge!

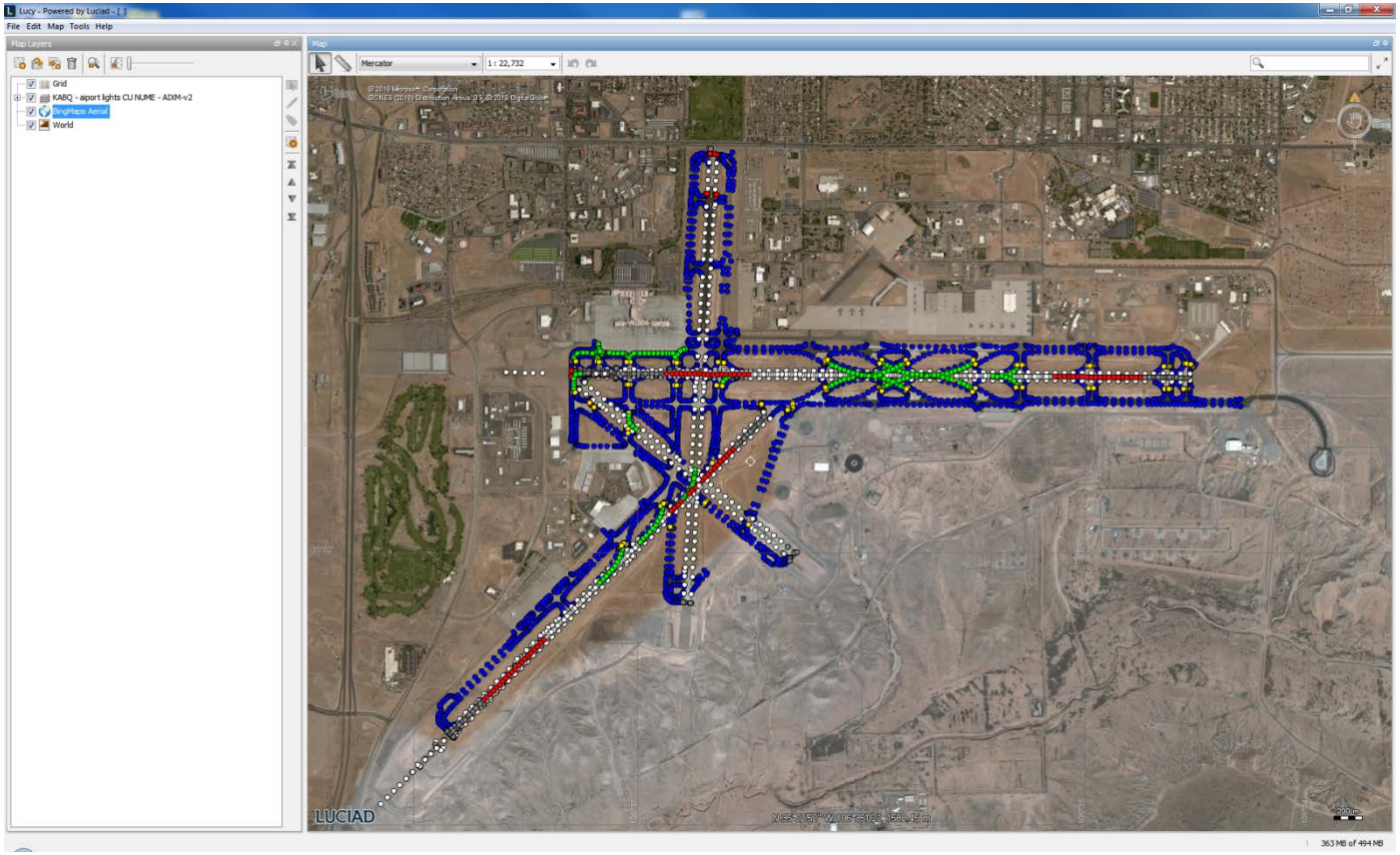
- Cost-effective solutions

  (*good value for the amount of money paid*)

  - *Join forces*
    - For example, bi-lateral, tri-lateral, … regional systems (such as EAD)
  - *Use COTS technologies*
    - (commercial off-the-shelf)

COTS technologies possible when…

- Applying standards and industry practices



… such as geographical data coding standards.

However,…

AIS practices .versus. geographical data standards

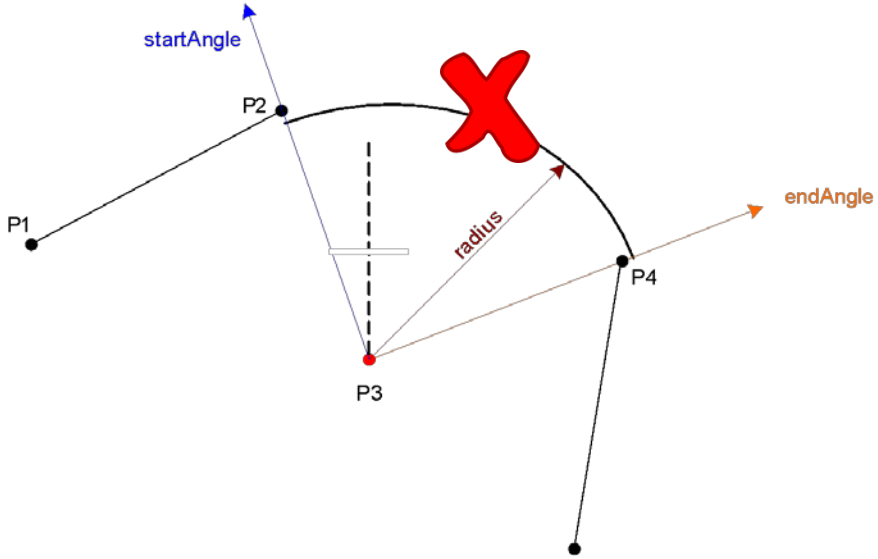
- ICAO Annex 14, Volume I
  - *"2.5.2 The geographical coordinates of each threshold shall be measured and reported to the aeronautical information services authority in degrees, minutes, seconds and hundredths of seconds"*

  - *DDMMSS.ss – not a native format for digital data coding in commonly available COTS tools…*
    - D.ddddddd – standard format for digital geographical coordinates
  - PANS-AIM specifies accuracy "1 m" –> far-North/far-South the format requirement could be in conflict with the accuracy requirement

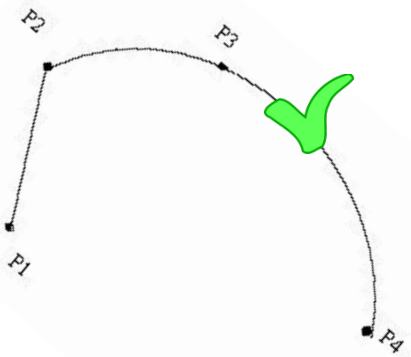
- Proposed reformulation
  - *"2.5.2 The geographical coordinates of each threshold shall be measured and reported to the aeronautical information services authority in compliance with the data quality requirements specified in PANS-AIM"*

AIS practices .versus. geographical data standards

Arc by centre point



Arc “by edge point”



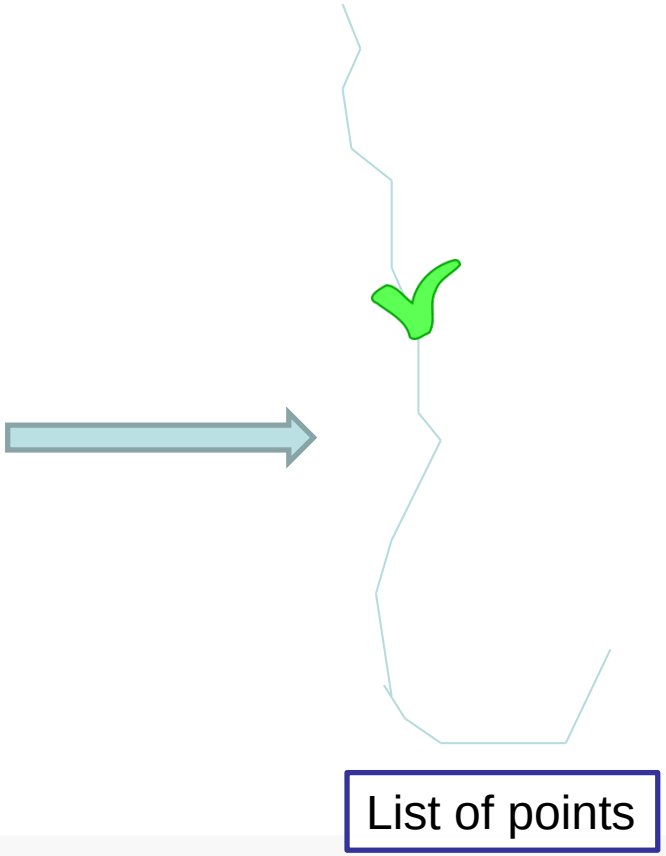
Even better – do not use arcs and circles when the same result can be achieved with 4, 8, 16, 32… straight segments

AIS practices .versus. geographical data standards

- Airspace boundaries based on State borders

BRUSSELS UIR

Lateral limits	510521N 0023244E - 510700N 0020000E - 513000N 0020000E - 512223N 0032147E - along the Belgian-Dutch border - 504515N 0060116E - along the Belgian-German border - 500748N 0060816E - along the German-Luxembourg border - 492810N 0062202E - along the French-Luxembourg border - 493247N 0054907E - along the Belgian-French border - 510521N 0023244E.
Vertical limits	UNL / FL195



Issues
- Missing data
- Inappropriate resolution
- Paper-drive solution
- Operational justification?

In this presentation

1. *AIS provisions and practices that are not digitally-friendly (not exhaustive…)*

2. *Digital data impact on the AIS friends*

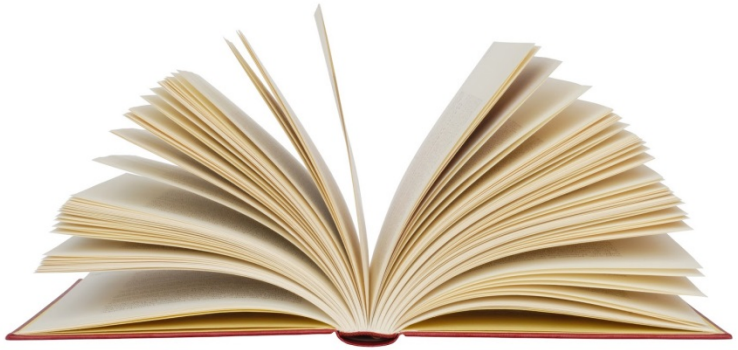
What could be left out of an AIP

"5.2.1.1.3 When the AIP Data Set (as specified in 5.3.3.1) is provided, the following sections of the AIP may be left blank and a reference to the data set availability shall be provided:

1. *ENR 2.1 FIR, UIR, TMA*
2. *ENR 3.1 Lower ATS Routes*
3. *ENR 3.2 Upper ATS Routes*
4. *ENR 3.3 Area Navigation (RNAV) Routes*
5. *ENR 3.4 Helicopter Routes*
6. *ENR 3.5 Other Routes*
7. *ENR 3.6 En-route Holding*
8. *ENR 4.1 Radio navigation aids — en-route*
9. *ENR 4.4 Name-code designators for significant points*
10. *ENR 4.5 Aeronautical Ground Lights — En-route*
11. *ENR 5.1 Prohibited, Restricted and Danger Areas*
12. *ENR 5.2 Military exercise and training areas and air defence identification zone (ADIZ)*
13. *ENR 5.3.1 Other activities of a dangerous nature*
14. *ENR 5.5 Aerial sporting and recreational activities*
15. ***** AD 2.19 Radio navigation and landing aids*
16. ***** AD 3.18 Radio navigation and landing aids "*

"5.2.1.1.4 When the Obstacle Data Set (as specified in 5.3.3.2.2) is provided, the following sections of the AIP may be left blank and a reference to the data set availability shall be provided:

17. *ENR 5.4 Air navigation obstacles*
18. ****AD 2.10 Aerodrome obstacles*
19. ****AD 3.10 Heliport obstacles "*



AIP user categories

Digital data sets

Data users
- Commercial data providers
- AOC
- NM, ATC
- ...

- Extract large amounts of data

Expected to gradually use the data sets as input!

However,…

AIP document users
- Briefing clients
- VFR/IFR pilots
- Regulators
- …

- Read information

- Extract small amounts of data

Might have difficulties to use data sets, especially on short term.

Might need affordable solutions, either directly from AIS or from 3rd party service providers.

If there is no coordination…

- some States start providing **parts of the AIP data set**
  - for the subjects that are “quick-wins” (points, navaids, etc.)
  - immediately after the entry into force of the proposed revision to the Annex 15 (November 2018)
- some States could provide sub-sets that **focus on a particular subject**
  - such as P, D, R airspace, or Routes/Points/navaids, etc.
- some States could decide to **remove from the AIP the “high cost“ tables**
  - such as the ENR 3.x and ENR 4.4, ENR 5.4, AD 2.10 sections;
- some States might **do nothing yet**
  - continue to provide the AIP and none of the recommended new data sets (except for the mandatory Obstacle and Terrain data sets).

Possible difficulties for all AIS clients
(includes other ECAC States!)

- unable to forecast what will be available as data sets
  - difficulty to plan the investment in tools and process adaptations
- risk of being un-prepared for empty AIP sections
  - A State might announce with 2-3 AIRAC cycles in advance that they will stop the publication of the AIP of certain data
- higher cost
  - needing capability to ingest all kind of data sub-sets, as from one State they could receive the sub-set with points, from other States the airspace, etc.
- difficulty to ingest islands of digital data
  - from the neighbouring States only AIP tables would still be provided

AIS working together with the clients

- Identify user communities and understand the impact of the transition from AIP tables to digital data sets
  - *Possible approach*
    - *regional inventory of 'AIP table users'*
      - *avoid annoying the users with repeated questionnaires from each State*
      - *avoid a multiplication of effort if each State does it individually*
      - *a truly regional issue*

- Identify transition and long term solutions for clients that are not ready for data sets
  - keep certain tables in the eAIP during the transition period?
  - use COTS (including common office tools) that can format data sets (AIXM) for consultation in tabular format?
  - provision/promotion of graphical/map viewers for AIXM data sets?
  - encourage 3rd party service providers (for the long term)?
  - other ideas?

Be friends, digitally !

In this presentation

1. *AIS provisions and practices that are not digitally-friendly*
2. *Digital data impact on the AIS friends*

- Other challenges…
  - A more stringent need for cross-border data coordination
  - Requests for the proper identification of the “official State data” when some information is published both as digital data set and paper products…
  - Anything else?

Be digitally - friendly !

Be friends, digitally !