xSNOWTAM – TEC

Mapping Document
From AIXM 5.0 To Snowtam Messages

TECHNICAL ANALYSIS

Version 0.1

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1 Introduction

In the specification document, the conversion from AIXM 5.0 to SNOWTAM appears lots of time:

25. The mapping shall be provided in the form of a document detailing how the AIXM 5.0 SurfaceContamination records can be converted:

- ⇨ *into ICAO SNOWTAM messages;*
- ⇨ *into clear text, optimised for reading by the crew as part of a pre-flight or in-flight briefing.*

33. The conversion code shall be provided as a set of Java classes, which:

- ⇨ *Read a number of AIXM 5.0 TEMPDELTA TimeSlices that contain SurfaceContamination data for the features (RunwayDirection, Taxiway,etc.) related to one Airport/Heliport (input data);*
- ⇨ *Access the same AIXM 5.0 source in order to get all necessary support data, such as AirportHeliport, RunwayDirection, Taxiway, Apron, etc. (support data);*
- ⇨ *Write one or more equivalent SNOWTAM message(s) corresponding to the data of all input TimeSlices; if all input TimeSlices have the same validity period, then it is likely that only one SNOWTAM message is needed;*
- ⇨ *Write readable text, formatted in HTML and optimised as considered necessary in order make it easy readable by the crew in the pre-flight phase;*
- ⇨ *Write readable text, using the limited formatting supported by the .txt encoding, in order to make it suitable for in-flight update on simple character displays.*

47. The database shall also be able to store the free text translations (HTML and TXT format) that are generated by the AIXM 5 to free text conversion algorithm.

96. For all TimeSlices containing SurfaceContamination data, which have the source "Application", the user shall have the possibility to automatically generate a classical SNOWTAM formatted message, which shall be stored in the database. The AIXM 5 to SNOWTAM conversion code (deliverable D1.4) shall be used for this purpose.

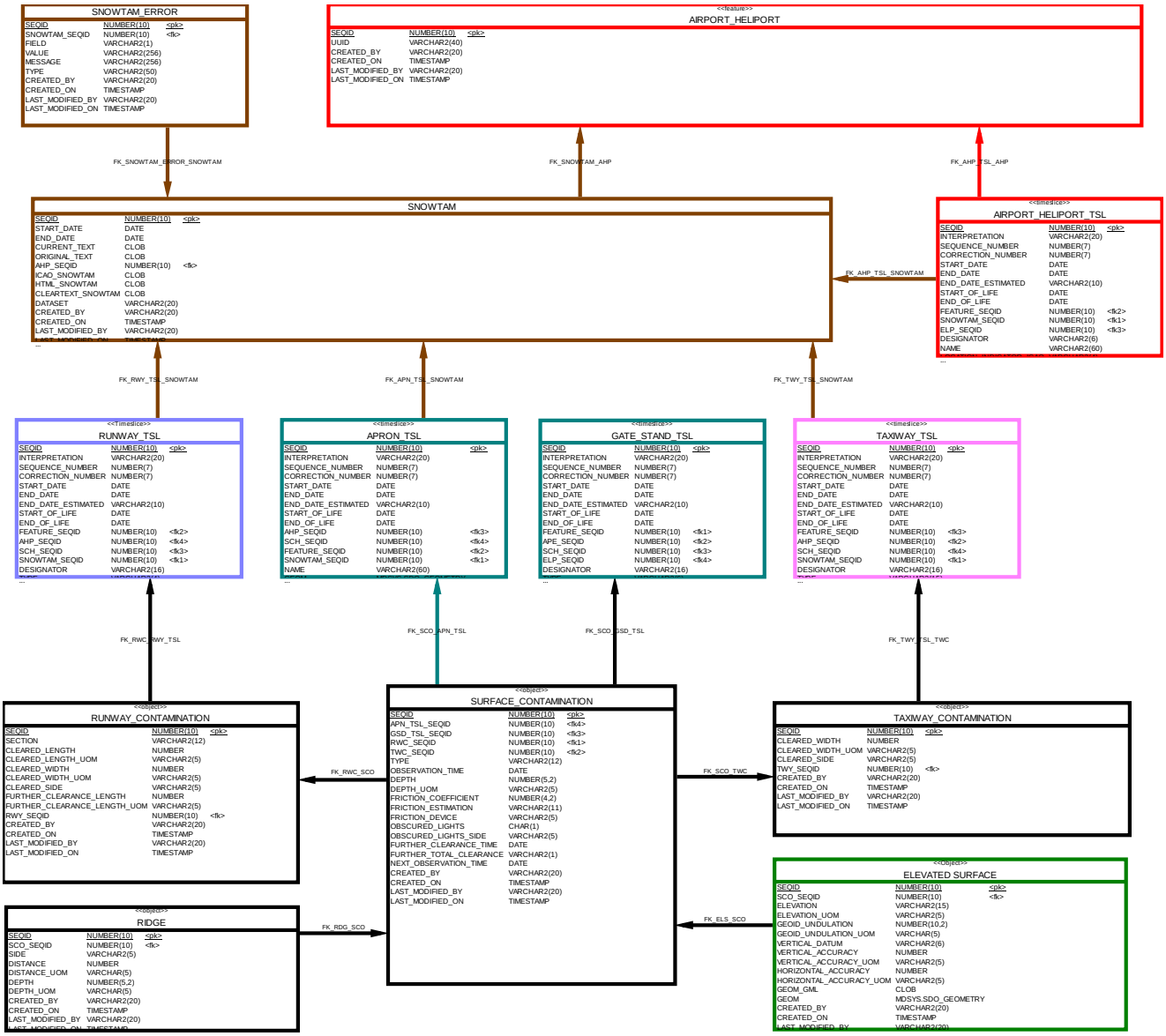
97. For all TimeSlices containing SurfaceContamination data, whatever the source, the user shall have the possibility to automatically generate a free text description of the surface contamination, optimised for pre-flight and in-flight briefing, which shall be stored in the database. The AIXM 5 to SNOWTAM conversion code (deliverable D1.4) shall be used for this purpose.
Digital SNOWTAM Concept Technical Specification

98. Both the SNOWTAM text and the free text generation shall work "by airport", meaning that all valid TEMPDELTA TimeSlices of features that belong to the same airport shall be processed together.

From this specification, we infer that a SNOWTAM message has two output formats:

- The ICAO SNOWTAM format;
- The HTML format (readable by the crew in pre-flight phase).

Each message (doesn't matter the format) will contain information about the whole airport, and will be saved in the SNOWTAM Table (ICAO_SNOWTAM and HTML_SNOWTAM fields). In the diagram below, all the tables used to create SNOWTAMs are displayed:



Next chapters will talk about the different formats, and how to convert the above tables in the desired format.

2 ICAO SNOWTAM Messages

Concerning the ICAO SNOWTAM messages mapping, the main thing to do is to read the document "TEC-EC-xSNOWTAM-AIMX5 to Snowtam Mapping". It explains what is a SNOWTAM message, and the mapping between a SNOWTAM message and the AIXM 5 database.

Only things which are specifics to the mapping *"AIXM 5 database => xSNOWTAM message"* are described here.

2.1 Generals

2.1.1 SNOWTAM Serial Number

It is not in the scope of the application to generate SNOWTAM numbers. "*knowing that the correct numbering of SNOWTAM remains the full responsibility of the local Airport Authority*". The client will copy/paste the SNOWTAM text from the application into his SNOWTAM publication software. Only at that moment it will get a serial number.

2.1.2 T Field

As AIXM 5 allows storing more precise information than SNOWTAM messages, information that cannot be put an ICAO SNOWTAM should be put in the T field (plain text remarks). Notes are a good example of such information.

2.1.3 Distances

Distance values must be specified in (mili/centi)meters, so conversions should be applied where necessary. Moreover, decimal values which can appear after conversion must be dropped (the accuracy of the information is anyhow low, not worth putting decimals).

2.1.4 Empty value for friction coefficient or mean depth

If frictions coefficient or mean depth were not filled in by the user, they should be left empty in the generated ICAO SNOWTAM. Example: `10//30` => the second runway has not mean depth (this is different from `10/0/30` which shall be used only if the user has put himself the value "`0`" through the application).

2.2 Runway contaminations

While AIXM allows for maximum flexibility when specifying contaminations on runways and runway thirds, the application doesn't allow encoding much more than ICAO SNOWTAM needs so this should not be too difficult to map.

Possible Enhancement:

ICAO Annex 15, Appendix 2, § 18 specifies that the T field "*always report on length of uncleared runway (item D) and extent of runway contamination (item F) for each third of the runway (if appropriate) in accordance with the following scale:*

Runway contamination 10%	*(if less than 10% of runway contaminated)*
Runway contamination 25%	*(if 11-25% of runway contaminated)*
Runway contamination 50%	*(if 26-50% of runway contaminated)*
Runway contamination 100%	*(if 51-100% of runway contaminated)"*

This enhancement requires mainly geometric calculations to determine the percentage of the runway surface which is contaminated.

2.3 Taxiway contaminations

ICAO SNOWTAM messages allow to only specify the *type of deposits* in the N field (Taxiway deposits) and the *snowbanks* in the P field (Taxiway Snowbanks). Any other information provided by users will only be available in the plain text remark (field T).

Moreover, while in an ICAO SNOWTAM, taxiways are attached to a specific runway, AIXM provides no way to associate taxiways and runway. The mapping may lose precision in this case. If all taxiways share the same deposits, the N field can be safely duplicated for all runways of the SNOWTAM (same remark for the field P – taxiway snowbanks).

If all taxiways do not share the same deposits information, those deposits will only be available in the T field together with friction coefficient and so on (same remark for the field P – taxiway snowbanks)…
The format for the T field is (with two Taxiways and one Apron as example):

```
T) Taxiway UF => Deposits: 5, Friction Coefficient: 2, Further
Clearance Time: 11:26 / Taxiway M => Deposits: 11, Friction
Coefficient: 5, Further Clearance Time: 10:59
```

Note: in an ICAO SNOWTAM message, the field N may take the value "`NO`" if no appropriate taxiway is available. This information does not exist in AIXM 5, or can only be put in a note of a RunwayContamination. Therefore, this mapping will never set the field N to '`NO`'.

2.4 Apron contaminations

ICAO SNOWTAM messages only allow encoding contaminations for one apron in the R field (for the whole airport), but airports usually have more than one apron. SNOWTAMs have been seen which provide deposits and even friction coefficient for multiple aprons, but this not standard compliant.

Like for taxiways, if all aprons share the same deposits information, this can be summarized in the R field.

In either way, complete apron contaminations (including braking action, mean depth… if appropriate) may be specified in the T field. The format is the same as for Taxiways.

Note: in an ICAO SNOWTAM message, the field R may take the value "NO" if the airport aprons are unusable. This information does not exist in AIXM 5, or can only be put in a note of a RunwayContamination. Therefore, this mapping will never set the field R to 'NO'.

3 Plain Text Messages

Clear text messages are generated in HTML format.

As no standard is defined for this format, the mapping has more freedom as on how to generate the message. The main goal is to present has much information as possible in a human readable form.

The following structure will be used as a working base for the generation:

Location: ESSP - Norrköping flygplats SE-603 61 Norrköping
Date/Time (UTC): 23 juin 2009 at 18:59

Runway: 09

Cleared runway length: 1000 meters
Cleared runway width: 20 meters (left side of centre line)

	1st Third (Landing area)	2nd Third (Mid runway)	3rd Third (Opposite end)
Friction	1 (Estimated Poor)	1 (Estimated Poor)	3 (Estimated Medium)
Deposits (Mean Depth)	Frost Water (200 mm)	Frost Water (300 mm)	Dry Snow Water (100 mm)

Critical snowbanks: 50 cm high, 300 meters from runway edge on right side
Runway lights: Obscured on both sides
Further Clearance: 1200 meters
Further Clearance Time: 11:58

Runway: 11

Cleared runway length: 1500 meters
Cleared runway width: 30 meters (left side of centre line)

	1st Third (Landing area)	2nd Third (Mid runway)	3rd Third (Opposite end)
Friction (Measured By SFH = Surface Friction Tester)			
Deposits (Mean Depth)	Damp Dry Snow	Damp Dry Snow	Damp Dry Snow

Taxiway: C

Friction: 10 (Measured Poor) *(Measured By RFT = Surface Friction Tester)*
Deposits over taxiway (mean depth): Dry Snow, Slush (300 mm)
Remarks: Taxiway closed

Taxiway: B

Friction: XX
Deposits over taxiway (mean depth): Water, Frost (200 mm)
Critical snowbanks: 10 cm high, 20 meters from taxiway edge on left side
Taxiway lights: Obscured on both sides
Further Clearance: TOTAL

Each feature is included in a fieldset which contain all information related to the feature. The feature order is more or less the same as for an ICAO SNOWTAM: runways, taxiways, aprons and aircraft stands.