Service improvement through integration of AIM, MET and ATM Information Services
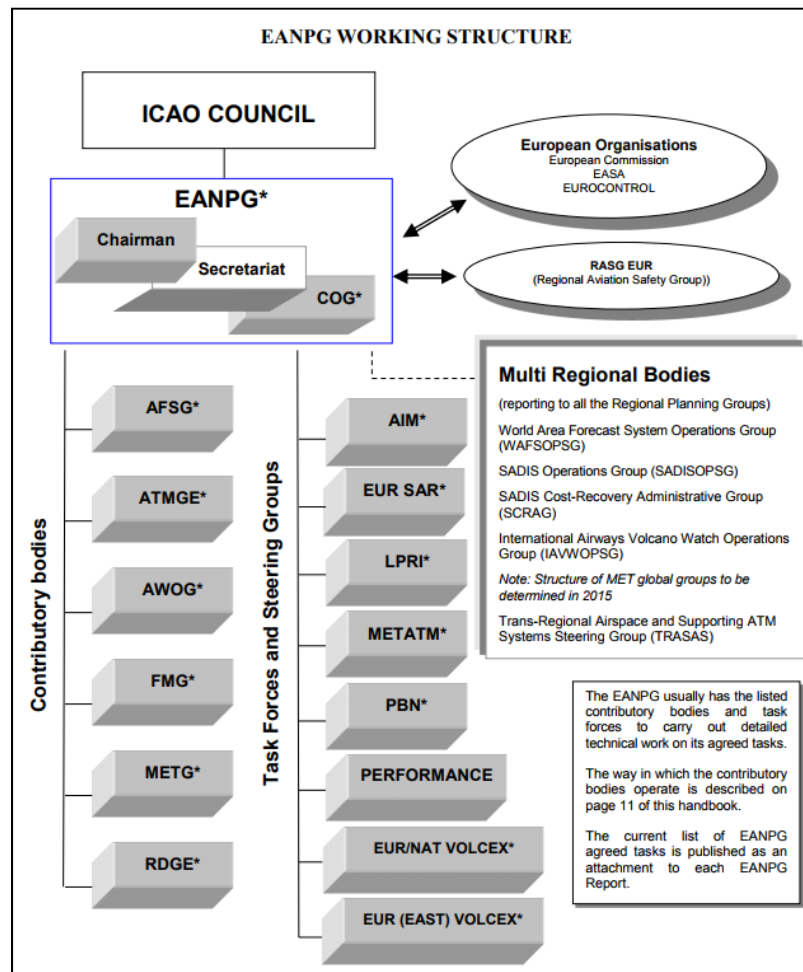
B0-DATM EANPG COG AIM Task Force implementation practice

Dr. Vadims Tumarkins

Chairman of the EANPG COG AIM Task Force

Head of Latvian AIS

Latvijas Gaisa Satiksme

Purpose of the presentation

- Provide a glance on the information related to EANPG COG AIM Task Force and its activities to support B0-DATM implementation;

- Demonstrate regional initiatives for Data centric environment established to enable Digital AIS products and services;

- Present AIM solutions for ATM needs;

- Provide AIM TF preliminary study results in preparation for digital AIS, MET and ATM services harmonisation.

COG AIM Task Force

EANPG WORKING STRUCTURE

ICAO COUNCIL

EANPG*
- Chairman
- Secretariat
- COG*

European Organisations
European Commission
EASA
EUROCONTROL

RASG EUR
(Regional Aviation Safety Group))

Contributory bodies
- AFSG*
- ATMGE*
- AWOG*
- FMG*
- METG*
- RDGE*

Task Forces and Steering Groups
- AIM*
- EUR SAR*
- LPRI*
- METATM*
- PBN*
- PERFORMANCE
- EUR/NAT VOLCEX*
- EUR (EAST) VOLCEX*

Multi Regional Bodies

(reporting to all the Regional Planning Groups)

World Area Forecast System Operations Group (WAFSOPSG)

SADIS Operations Group (SADISOPSG)

SADIS Cost-Recovery Administrative Group (SCRAG)

International Airways Volcano Watch Operations Group (IAVWOPSG)

Note: Structure of MET global groups to be determined in 2015

Trans-Regional Airspace and Supporting ATM Systems Steering Group (TRASAS)

The EANPG usually has the listed contributory bodies and task forces to carry out detailed technical work on its agreed tasks.

The way in which the contributory bodies operate is described on page 11 of this handbook.

The current list of EANPG agreed tasks is published as an attachment to each EANPG Report.

European and North Atlantic Office

AERONAUTICAL INFORMATION MANAGEMENT GROUP COG/AIM TASK FORCE

THIRTY-THIRD MEETING
(Baku, Azerbaijan, May 30 - June 1, 2017)

MEETING REPORT

Members: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan and EUROCONTROL.

Terms of Reference

a) ensure that the planning and implementation of AIM in the Eastern Part of the European Region are coherent and compatible with developments in adjacent regions and are in line with the Global Air Navigation Plan and the Aviation System Block Upgrades (ASBU) methodology;

b) seek to achieve common understanding and support from all stakeholders involved in or affected by the AIM developments/activities in the Eastern Part of the ICAO European Region;

c) provide a platform for harmonization of developments and deployments in the AIM domain;

d) monitor the status of implementation of the required AIM facilities and services and the transition from AIS to AIM in the Eastern Part of the European Region, and provide necessary assistance and guidance to States in this respect;

e) develop proposals for the updating of relevant parts of the EUR ANP, as deemed necessary;

f) identify and review specific deficiencies and difficulties that constitute major obstacles to the provision of efficient AIM services in the States of the Eastern Part of the European Region, and recommend necessary remedial actions;

g) monitor and review technical and operating developments in the area of AIM and procedure design issues associated with AIM; and foster their implementation in the Eastern Part of the European Region in a harmonized manner;

Automation is needed to be interoperable

- Automation shall be introduced with the objective of improving the timeliness, quality, efficiency and costeffectiveness of aeronautical information services.

- In order to meet the data quality requirements, automation shall:

  a) enable digital aeronautical data exchange between the parties involved in the data processing chain; and

  b) use aeronautical information exchange models and data exchange models designed to be globally interoperable.

Annex 15 to the Convention on International Civil Aviation

Aeronautical Information Services

Fifteenth Edition, July 2016

Trajectory based digital AIM/ATM Environment
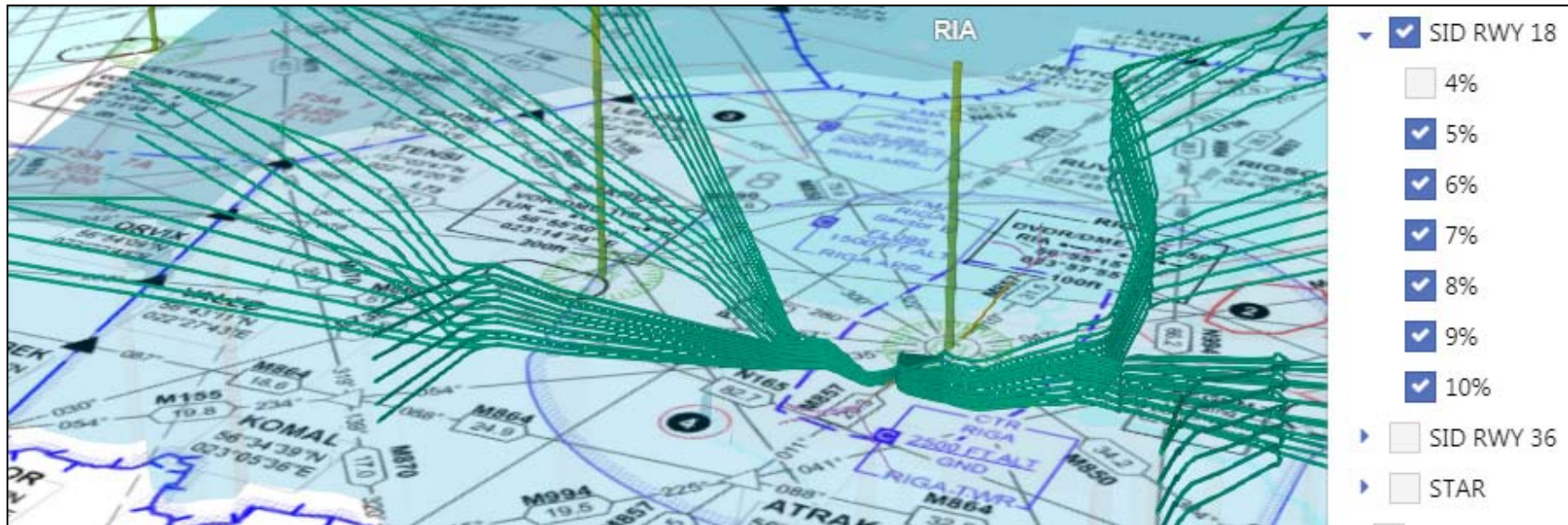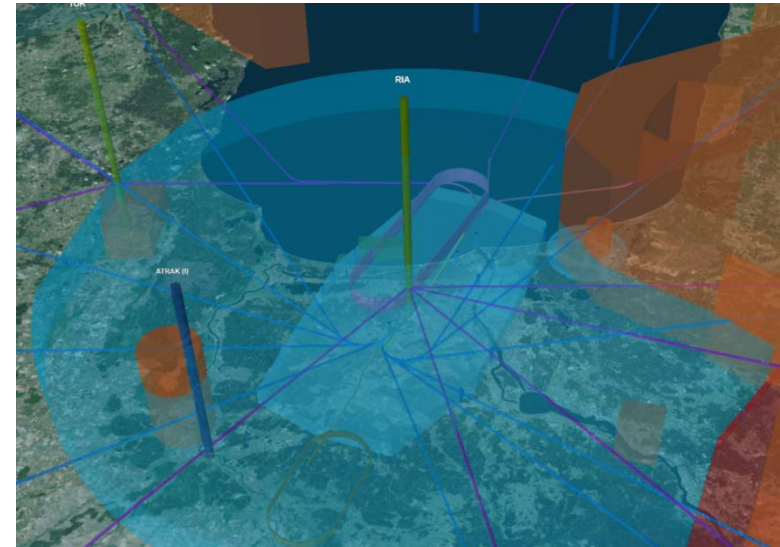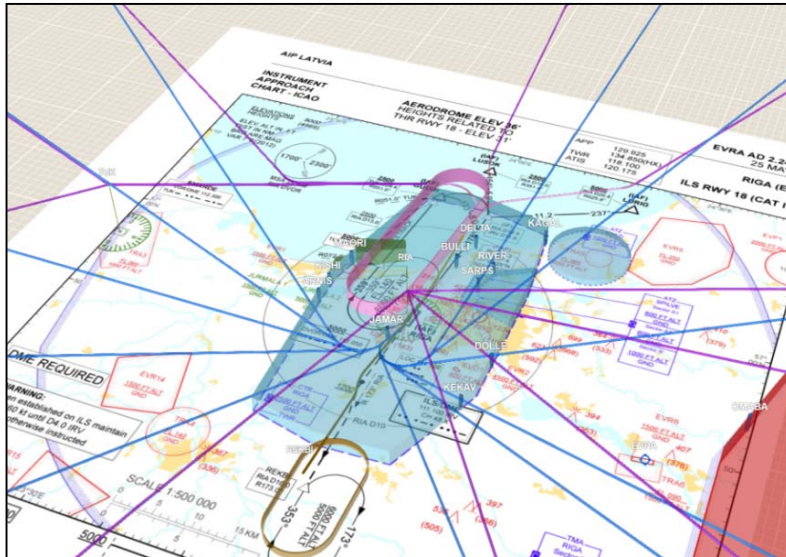
AIM solutions for ATM needs

Prior to taking over an operating position, a controller should:

a) ensure that he has a full understanding of the air traffic situation including an awareness of clearances issued but not yet acted upon and any developing situation requiring early attention;

b) familiarize himself with the serviceability of all equipment under his charge and liable to be used during his tour of duty (e.g. radar, radio, approach aids, telephone lines and aerodrome lighting);

c) obtain all relevant information and familiarize himself with the meteorological situation and trends for his tour of duty and where practicable get a personal briefing from a meteorological office;

d) ensure he is fully conversant with the latest promulgated orders, instructions, notices and information, particularly with reference to the serviceability of aerodromes and other air navigation facilities.

AIXM 5.1 NOTAM
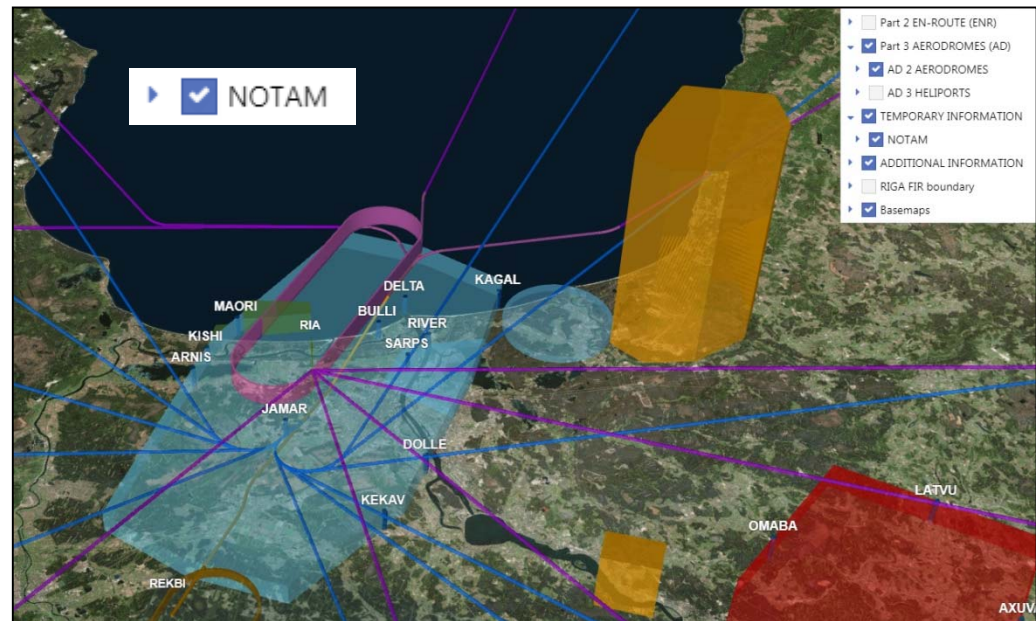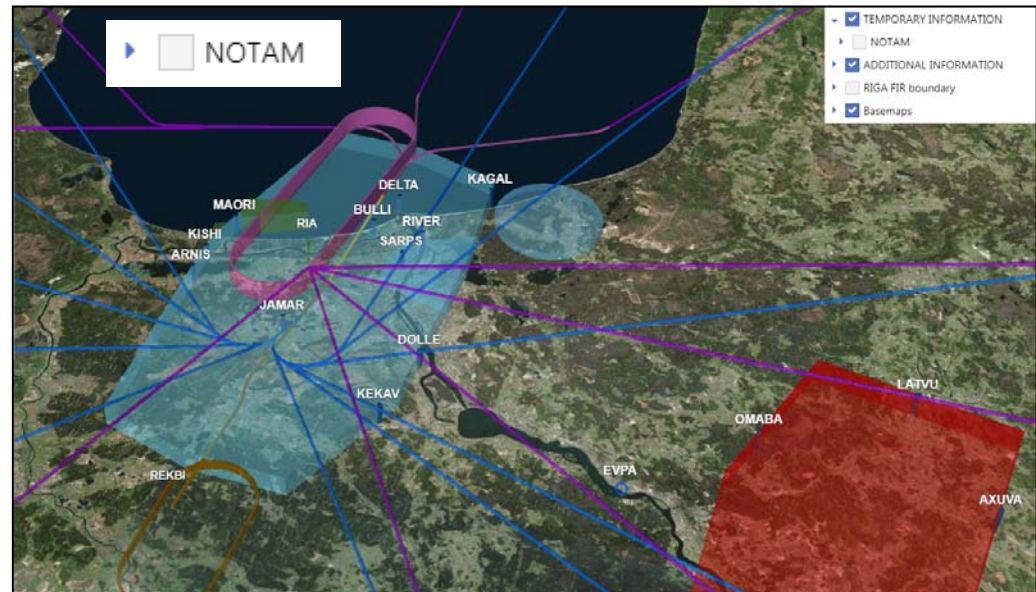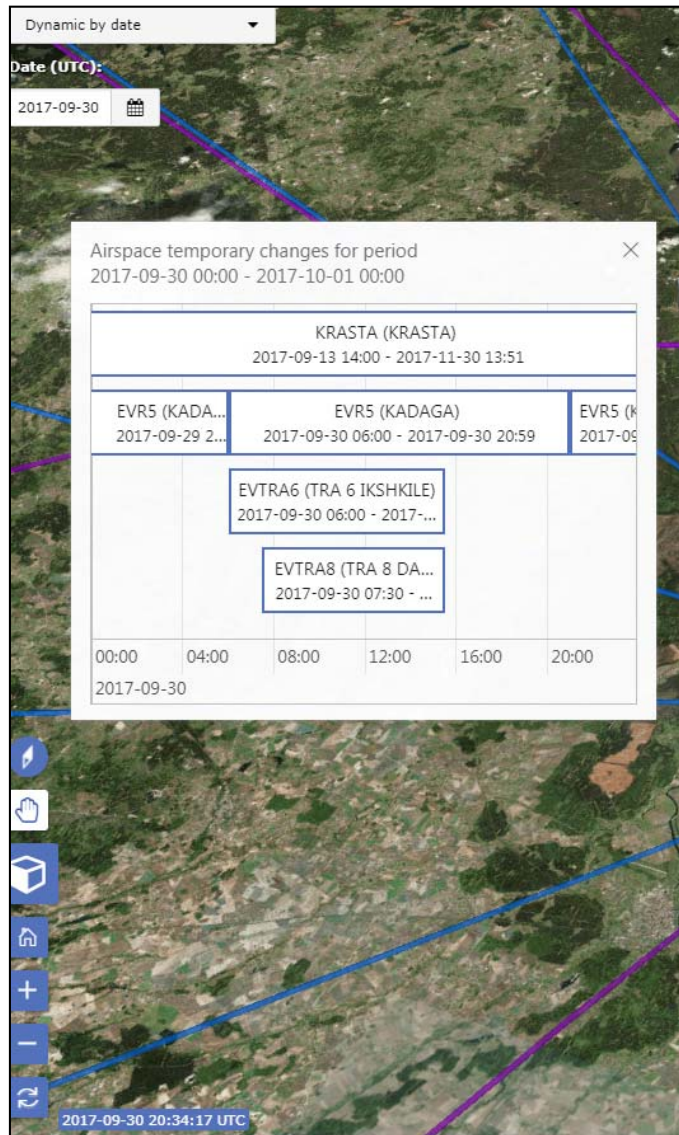
Current approach for AIS-MET harmonisation

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noun

1. an act or instance of combining into an integral whole.

> 8.2.4 **Recommendation.**— *Automated pre-flight information systems providing a harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical information in accordance with 8.2.1 and meteorological information in accordance with 9.4.1 of Annex 3 should be established by an agreement between the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 2.1.1 c) and the relevant meteorological authority.*
>
> 8.2.5 Where automated pre-flight information systems are used to provide the harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical data, aeronautical information and meteorological information, the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 2.1.1 c) shall remain responsible for the quality and timeliness of the aeronautical data and aeronautical information provided by means of such a system.
>
> *Note.— The meteorological authority concerned remains responsible for the quality of the meteorological information provided by means of such a system in accordance with 9.4.3 of Annex 3.*

Recommendation. Automated pre-flight information systems has to provide harmonized, common point of access to aeronautical information and meteorological information

Digital cooperation perspectives

- Volcanic ash advisory information,
- Tropical cyclone advisory information
- METAR and SPECI
- TAF
- SIGMET
- AIRMET
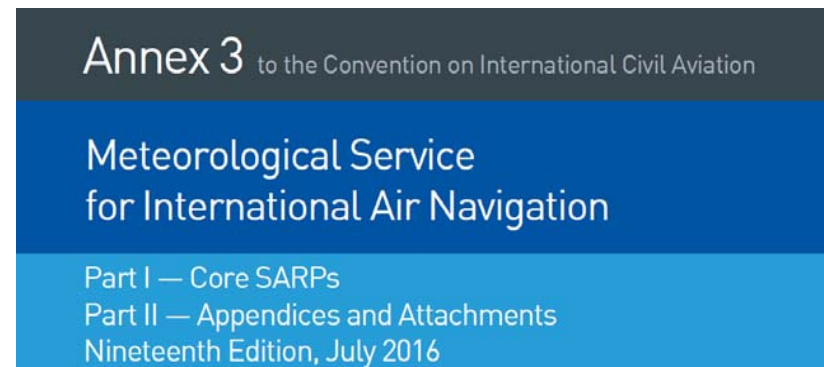
if disseminated in digital form, shall be formatted in accordance with a globally interoperable information exchange model and shall use extensible markup language (XML)/geography markup language (**GML**).

Note.— Guidance on the information exchange model, XML/GML and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information *(Doc 10003).*

Possible mechanism for geo-referenced integration

- https://en.wikipedia.org/wiki/Geography_Markup_Language

- The **Geography Markup Language** (**GML**) is the XML grammar defined by the Open Geospatial Consortium (OGC) to express geographical features.

- GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet.

- Key to GML's utility is its ability to integrate all forms of geographic information, including not only conventional "vector" or discrete objects, but coverages (see also GMLJP2) and sensor data.

http://www.aixm.aero/page/aixm-51-specification

GML Profile

AIXM is a GML 3.2.1 compliant schema. This means both that AIXM applies the GML rules for application schemas (such as derivation from the gml:AbstractFeature, compliance with object/property model, etc.) and that the GML geospatial elements are available in AIXM for the encoding of positions, lines, surfaces, etc. However, only a small sub-set of the GML capabilities are necessary for the encoding of aeronautical data. In addition, there are some specialities of the aeronautical data (such as the reference to State borders, used of arcs and circles, etc.) that require special handling in GML. For this purpose, a GML profile and associated guidelines for use of GML for aviation data has been developed by the Aviation Domain Working Group of OGC and is made available on the OGC Web site.

📄 Guidance and Profile of GML for use with Aviation Data

Note: *a revised version of this document is now available in relation with the AIXM 5.1.1 version.*

GML for use with Aviation Data

Open Geospatial Consortium

Approval Date: 2012-03-23

Publication Date: 2012-05-15

External identifier of this OGC® document: http://www.opengis.net/doc/DP/gml-aviation-guidance

Reference number of this document: OGC 12-028

Editors: **OGC Aviation Domain Working Group**

Guidance and Profile of GML for use with Aviation Data

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GML 3.2.1 and GIS are friends

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📄 Is This Content Helpful?   ### How To: Access GML data without a Data Interoperability license

💬 Search on GeoNet   #### Summary

💡 Submit to ArcGIS Ideas   ArcGIS for Desktop 10.1 reads, imports and exports GML Simple Features or GMLSF format. GMLSF is based on the GML 3.2.1 specification. This functionality requires the Data Interoperability extension to be installed but does not require a license.

11.1 Aerodrome mapping data — requirements for provision

11.1.1 **Recommendation.**— *Aerodrome mapping data should be supported by electronic terrain and obstacle data for Area 3 in order to ensure consistency and quality of all geographical data related to the aerodrome.*

Note 1.— Accuracy and integrity requirements for aerodrome mapping data are contained in Annex 14, Volume I, Appendix 5.

Note 2.— Electronic terrain and obstacle data pertaining to Area 3 and aerodrome mapping data may be originated using common acquisition techniques and managed within a single geographic information system (GIS).

Note 3.— Supporting material with respect to the processing of electronic terrain and obstacle data and aerodrome mapping data is contained in Radio Technical Commission for Aeronautics (RTCA) Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76 — Standards for Processing Aeronautical Data.

GML competition

Annex 3 to the Convention on International Civil Aviation

Meteorological Service for International Air Navigation

Part I — Core SARPs
Part II — Appendices and Attachments
Nineteenth Edition, July 2016

Looking For:
  GML in the current docu
Results:
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New Search

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GML); simplification of runway visual range reporting including aligning the SPECI criteria with

GML). 3.1.4 Volcanic ash advisory information, if disseminated in digital form, shall be

XML/**GML** and the metadata profile is provided in the Manual on the Digital

XML/**GML**. 5.1.5 Tropical cyclone advisory information, if disseminated in digital form, shall be

XML/**GML** and the metadata profile is

GML). ANNEX 3 APP 3-

XML/**GML** and the metadata profile is provided in the Manual on the Digital

GML). 1.1.4 TAF if disseminated in digital form shall be accompanied by the

XML/**GML** and the metadata profile is provided in the Manual on the Digital

GML). 1.1.8 SIGMET if disseminated in digital form shall be accompanied by the

XML/**GML** and the metadata profile is provided in the Manual on the Digital

XML/**GML**. 2.1.8 AIRMET if disseminated in digital form shall be accompanied by the

XML/**GML** and the metadata profile is provided in Doc 10003. 2.2 Dissemination of

Annex 3 – 13; Annex 11 – 0; Annex 15 - 1

Annex 15 to the Convention on International Civil Aviation

Aeronautical Information Services

Fifteenth Edition, July 2016

Results:
  1 document(s) with 1 instance(s)

New Search

Results:

Microsoft Word - Anx.15.15th Edition.alltext.en.docx

GML), and JavaScript Object Notation (JSON). 3.7 Quality management system 3.7.1 Quality

Annex 11 to the Convention on International Civil Aviation

Air Traffic Services

Air Traffic Control Service
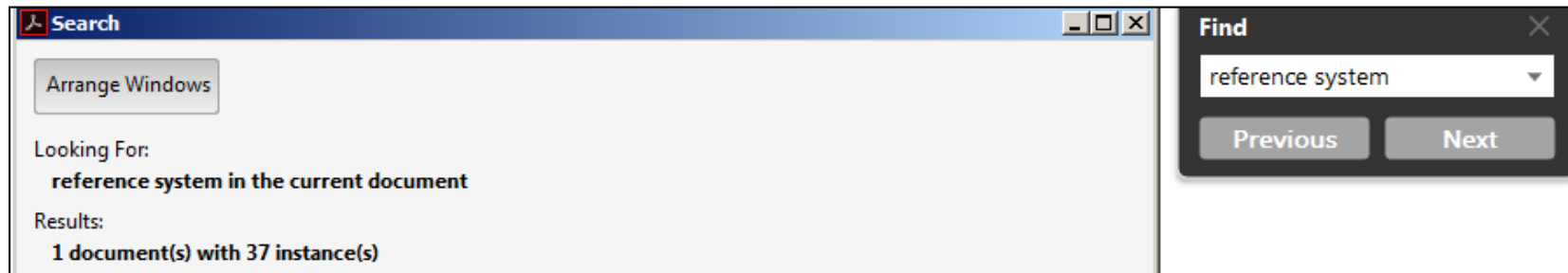Flight Information Service
Alerting Service

Fourteenth Edition, July 2016

Acrobat Reader

Adobe Acrobat Reader has finished searching the document. No matches were found.

OK

Annex 15 - Common reference systems for air navigation

1.2.1 Horizontal reference system

1.2.2 Vertical reference system

1.2.3 Temporal reference system

Annex 3 - Supply, use, quality management and interpretation of meteorological information

- 2.2.4 **Recommendation.—** *The quality system should provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts.*

GML in industrial standards

Appendix G
G-4

G.3 Threshold Value T_F

For the definition of the threshold value, the use of the CityGML Level of Detail (LOD2)[3] approach and the different horizontal accuracy requirements (A_H) for Areas 1 to 4 is recommended. The value of the threshold T_F is set to $2*A_H$.

With the proposed threshold value, the minimum dimension of a polygonal obstacle would be:

- Area 1: 100 x 100m
  for helicopter requirements: 32 x 32m;
- Area 2: 10 x 10m;
- Area 3: 1.0 x 1.0m;
- Area 4: 5.0 x 5.0m.

- [3] The term Level of Detail (LOD) is used in 3D applications and virtual reality to describe how particularized an object is when it is presented to the user (e.g. CityGML specifications)
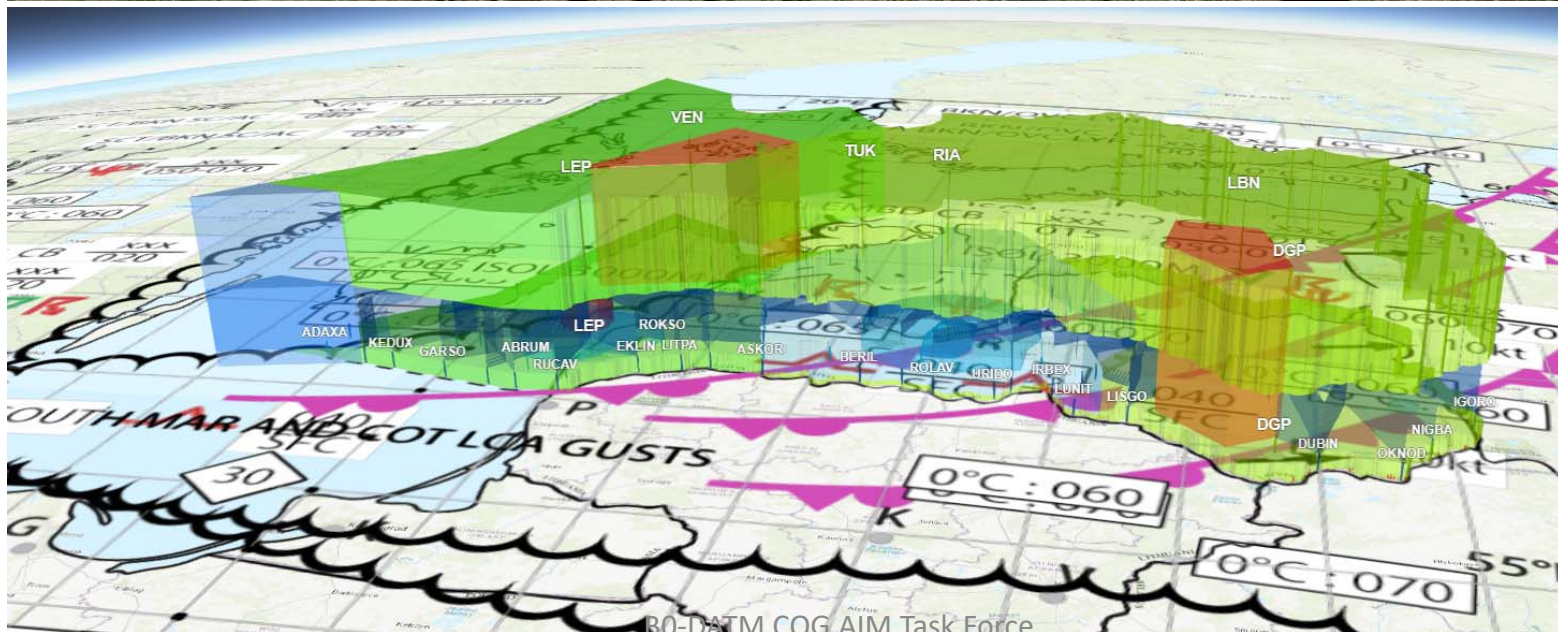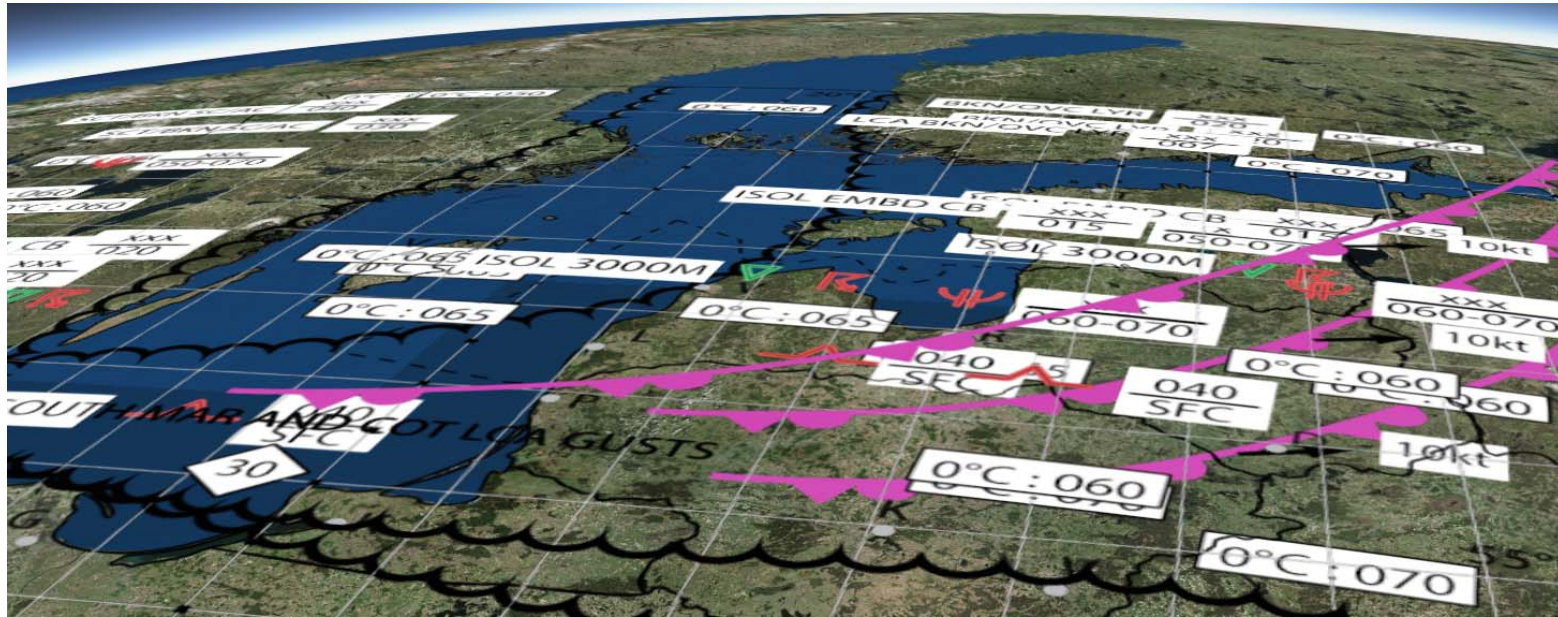
©2015 RTCA, Inc.

SWL example
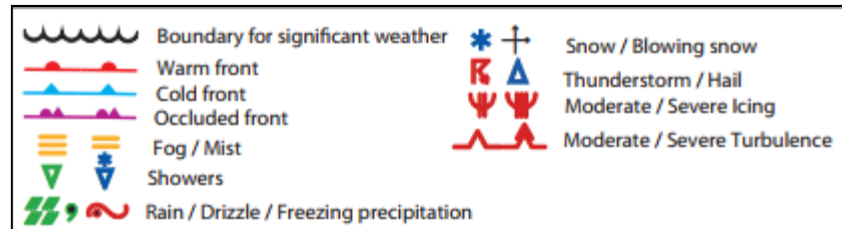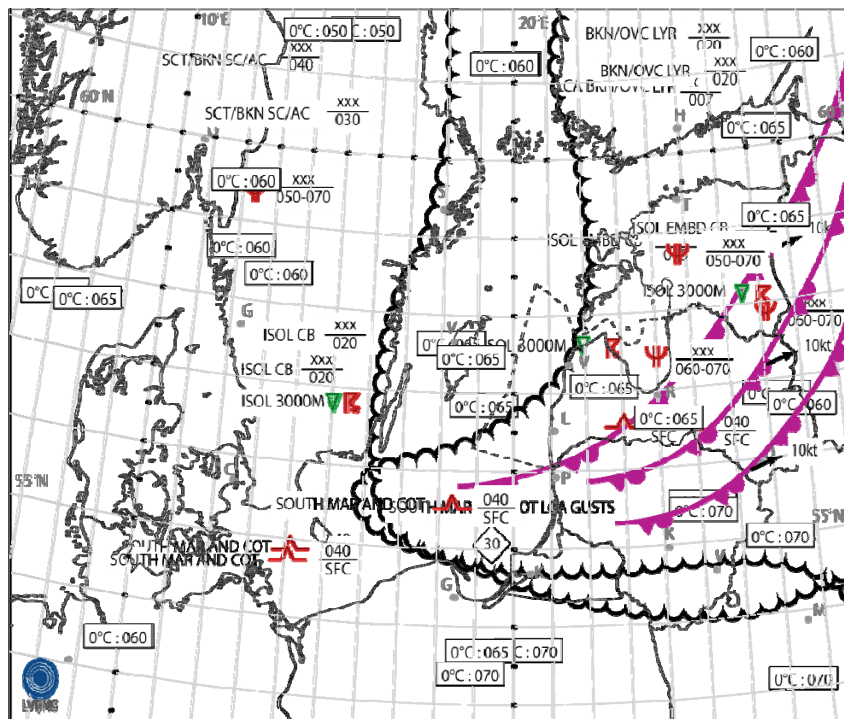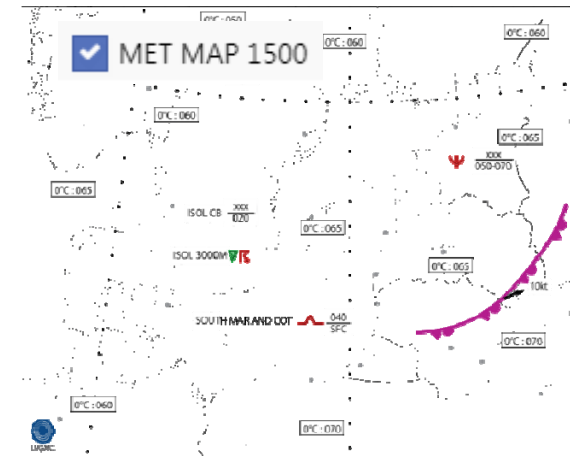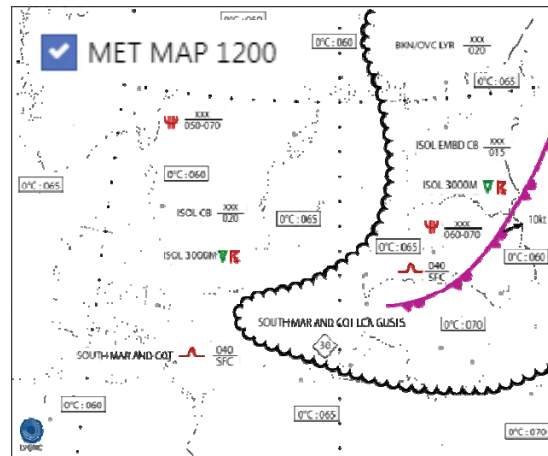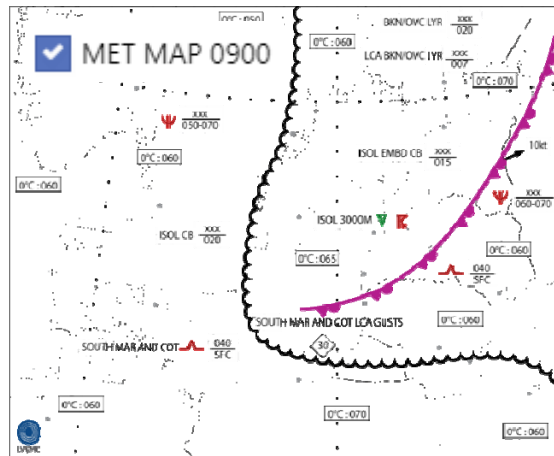
B0-DATM COG AIM Task Force
implementation practice

MET/AIS/ATM information combine

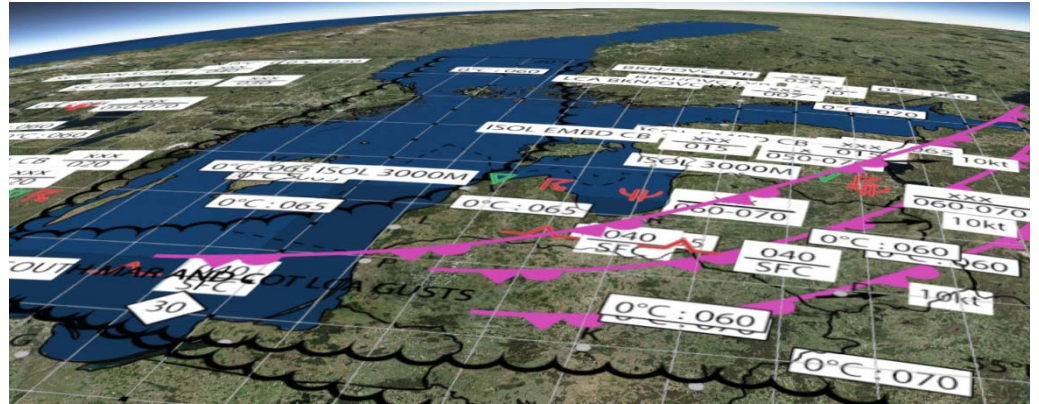B0-DATM COG AIM Task Force
implementation practice

AIM TF advanced AIM products and services

Trends for Digital AIS/AIM Transformation:

- Trajectory based information production with possible ATM system integration;

- Merging of the aeronautical information with the satellite imagery;

- Aeronautical chart production with embedded feature attributes;

- Environment provision for aeronautical prototyping, modeling and studies to support PBN implementation;

- Data originators involving into digital aeronautical data chain;

- Pre-flight and post-flight Integrated briefing using WEB services;

- Possible integration with digital information of other domains.

Conclusion

- In order to support the harmonization of the digital AIS, MET and ATM information services, their information exchange models have to be 'equipped' with GML;

- The common GML approach for each type of the information exchange model has to be added to the Global ANP;

- We need to establish the common interoperable environment to portray integrated digital AIS, MET and ATM information;

- AIM Task Fore is of the opinion that Geographical Information System (GIS) is one of the candidate that has necessary capacity to meet harmonization needs of digital AIS, MET and ATM information.

Thank you for your attention

Any questions?

Dr. Vadims Tumarkins

Chairman of the EANPG COG AIM Task Force

Head of Latvian AIS

Latvijas Gaisa Satiksme