



INFORMATION PAPER

FIFTH MEETING OF THE AFI REGION AIS/MAP TASK FORCE

Dakar, Senegal, 11th May to 12th May 2009

Agenda Item 3: eTOD

Implementation of e-TOD and draft development of a policy for the management of national e-TOD programmes – South Africa

(Submitted by South African CAA)

SUMMARY

This Information Paper provides updated information regarding the implementation of e_TOD in South Africa. Furthermore, it details draft developments of a policy for the management of national e-TOD programmes.

1. INTRODUCTION

This paper presents the plan for South Africa relating to the implementation of electronic Terrain and Obstacle Data (eTOD). Amendment 33 to ICAO Annex 15 (effective 12/07/2004) introduced requirements for States to ensure that electronic sets of Terrain and Obstacle Data (TOD) are available. The data shall be provided for four distinct areas, with each having specific data collection requirements.

Implementation of these requirements has caused significant concerns, mainly as a result of the high costs associated with data collection and processing, and the lack of a clear business case to support this expenditure.

2 THE DATA CHAIN

The data processes for terrain and obstacle need to be designed for electronic provision of the required data. Roles and responsibilities of all involved parties required for the implementation of AMDT 33 to Annex 15 (eTOD) need to be assigned. With the different players which are involved in the process from data origination to data publication (owners of obstacles, aerodromes, Civil Aviation Authority) questions on sharing liability have to be addressed with the parties involved(e.g. States, data integrators).

2.1 Terrain

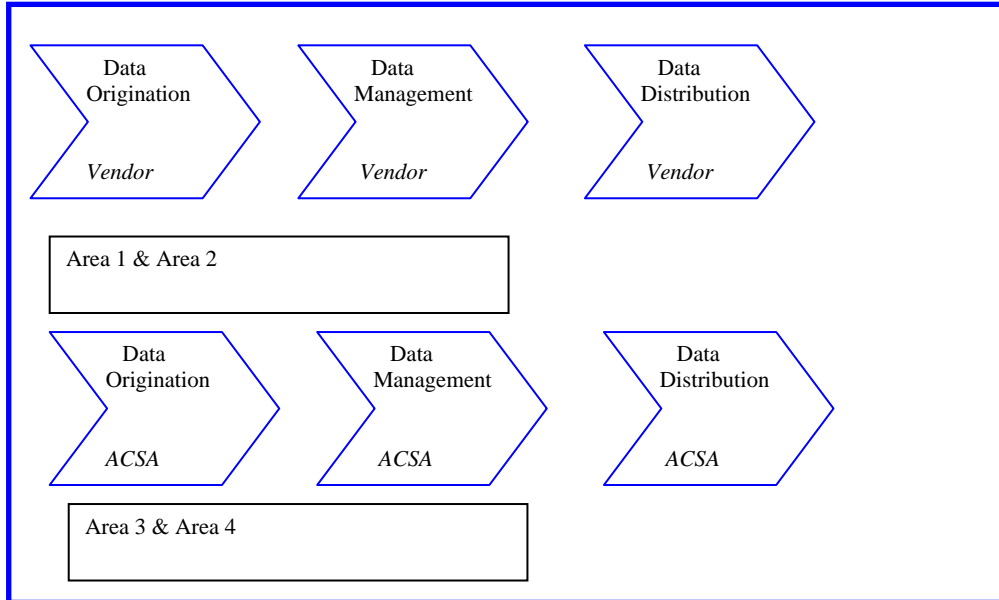


Figure 1 Terrain Data Chain.

2.2 Obstacles

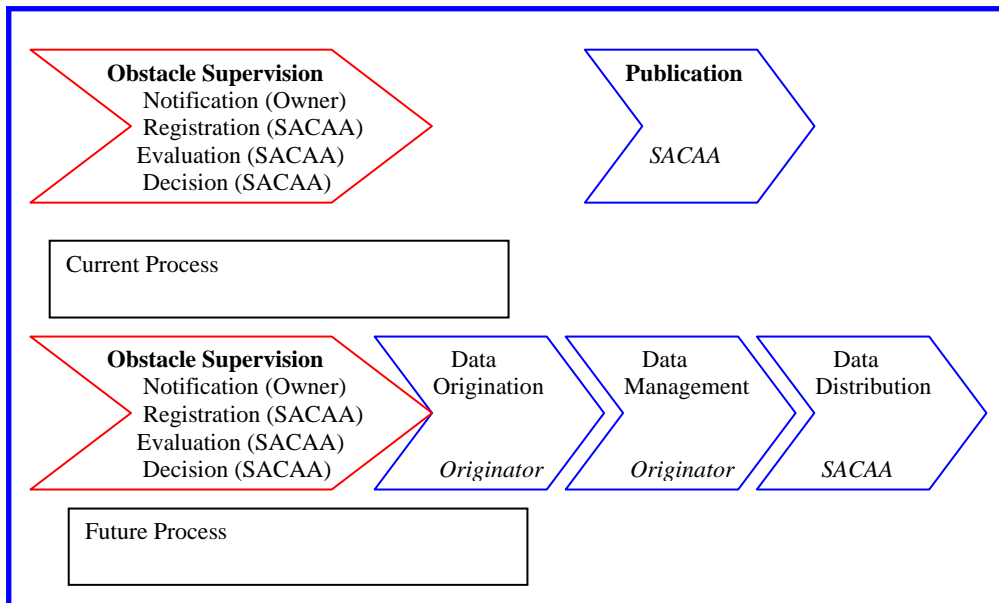


Figure 2 Obstacle Data Chain

3 ECONOMIC ISSUES

The costs of data origination will increase substantially and exceed the costs of data management, exchange and distribution by an order of magnitude. Terrain data in South Africa is a product of the national mapping organisation which is sold to the integrators and data users under the national mapping organisation’s license conditions.

3.1 Cost Recovery

This section documents how South Africa will finance, from whom the finance will be obtained and the cost recovery mechanisms associated with the initial and ongoing costs for eTOD, for each of the four Areas.

3.1.1 Cost Recovery for Area 1

	Who	How	Cost
Terrain	SACAA	50K map interpolation	Data user
Obstacles	SACAA	Obstacle database	Data user

3.1.2 Cost Recovery for Area 2

	Who	How	Cost
Terrain	ATNS	10K map interpolation	User charges
Obstacles	ATNS	Obstacle database	User charges

3.1.3 Cost Recovery for Area 3

	Who	How	Cost
Terrain	ACSA	Stereoscopic aerial photography	User chargers
Obstacles	ACSA	ATNS Surveys	User charges

3.1.4 Cost Recovery for Area 4

	Who	How	Cost
Terrain	ACSA	Stereoscopic aerial photography	User charges
Obstacles	ACSA	ATNS Surveys	User charges

3.2 Ongoing Costs

	Terrain	Obstacles
Area 1	Data user	Owner
Area 2	Data user	ATS Service Provider
Area 3	Data user	AD charges
Area 4	Data user	AD charges

4. DISCUSSION

The requirements for providing eTOD can be grouped as follows:

- Data collection requirements (geographical area): Areas 1,2,3 and 4;
- Data quality requirements (data accuracy, integrity and resolution);
- Database requirements (terrain database and obstacle database);
- Cross-border harmonisation;
- Availability requirements (when / how data to be made available by States).

4.1 Data collection requirements

As regards Area 1 Electronic Terrain Data, South Africa fully comply with Chapter 10, ICAO Annex 15, and therefore does not intend to file any difference with regards the technical content requirements. However not all of Electronic Obstacle Data complies with the data integrity requirements, therefore South Africa will not fully comply with Chapter 10, ICAO Annex 15, and has filed differences (alternative method of compliance differences have been filed on 10.2.5, 10.4.2 and 10.5.6). The issue is that we are dealing with legacy data whose integrity cannot be guaranteed at present. Circular Error of Probabilities (CEPs) will be provided with all data whose positional integrity does not fully comply with Chapter 10, ICAO Annex 15. The SACAA has taken responsibility for the provision of Area 1 data. For Area 2, IFR Aerodrome with ATS Service Provider, eTOD will be provided by the ATS Service Provider in conjunction with the SACAA, and for IFR Aerodrome without an ATS Service Provider, eTOD will be the responsibility of the Aerodrome License Holder in conjunction with the SACAA. Area 3 and Area 4 will be the responsibility of the Aerodrome License Holder.

4.2 Data quality requirements

Terrain and obstacle data shall comply with ISO 19100 series requirements in terms of data modelling. The eTOD implementation shall be in compliance with ICAO provisions contained in Annex 15, as amended, and Document 9881, and will be managed by the SACAA as a national programme supported by necessary resources, a high level framework and detailed planning, including priorities and timelines for the implementation of the programme.

Data validation and verification will be done to ensure that the data meets the ICAO numerical requirements, has the associated metadata and has full data source traceability. Updating of the database shall be done on a regular basis to account for errors, new or amendments to existing data sets. In that way, applications that use data continue to be trustworthy.

4.3 Database requirements

Two databases shall be provided: a terrain and an obstacle database. Neither of the databases shall contain data belonging to the other. ICAO Annex 15, 10.3.2: Terrain is, “*naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles*”. Ref. ICAO Annex 15, 10.4.1: Obstacles are “*all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight shall not be included in terrain databases.*”

All the eTOD data will reside with the SACAA in a Geodatabase that will be maintained by the Procedure Design & Cartography Department, and the data will be maintained by the respective data providers for each area.

4.4 Cross-border harmonisation

Currently there are arrangements to include as part of the South African eTOD implementation the terrain data for Lesotho and Swaziland, but there no arrangements for cross-border harmonization with Namibia, Botswana, Zimbabwe and Mozambique. It is recommended that some form of harmonisation activity is undertaken with neighbouring States, perhaps through the medium of a Memorandum of Understanding (MoU). Further, it is recommended that, where appropriate, States could make arrangements for data within its boundary to be provided to the other State, where it is needed for the other State's aerodrome. To assist with the exchange of data between States and other users, it is recommended that a common eTOD exchange format is adopted.

The SACAA, in its function as the manager of the South African eTOD implementation program, will endeavour to attempt to establish contact with neighbouring states in order to implement MoUs to enable data harmonisation.

4.5 Availability requirements

The SACAA will adopt/follow a collaborative approach involving all concerned parties in the implementation of eTOD and establish a multi-disciplinary team defining clearly the responsibilities and roles of the different Administrations within and outside the SACAA in the implementation process i.e. AIS Department, Aerodrome Operators, Military, National Mapping Agency, *et cetera*.

For eTOD implementation, commercial geospatial data vendors will be used in order to acquire Area 1 terrain data, and with regard to obstacle data the SACAA's obstacle dataset will be used, together with additional data from ATNS, ACSA, ESKOM, Local Municipalities Telecommunication companies, Petroleum & Gas companies, as well as the SA National Defence Force. A South African eTOD Implementation Workgroup has been established, consisting of stakeholders in the South African aviation community, to manage and oversee the eTOD implementation in South Africa.

In order to share eTOD data there is a need to establish a consistent basis for the interchange of data among originators, integrators, system designers and users. Furthermore, the exchange format must be compliant with ISO 19100 series of standards, provide unique DPS for terrain, obstacle, and aerodrome mapping data sets. The Aeronautical Information Exchange Model (AIXM) is a data exchange format originating from Eurocontrol and FAA that is now readable using ArcGIS, PLTS aeronautical extension. AICM and AIXM are emerging international standards for describing and exchanging aeronautical data. AIXM is being increasingly used in government aviation agencies and COTS vendors are beginning to adopt AIXM for representing aeronautical data.

The SACAA will ultimately deliver eTOD data to users in an AIXM database format which will allow interoperability with AIS packages

5 CONCLUSION

There is a need for a Collaborative approach on a global scale for roll-out involving ICAO support - e.g. ICAO eTODGuidance Material Doc 9881, update cycle, institutional issues such as cost recovery, sharing of liability, etc. need to be addressed. Furthermore, closer collaboration of States with data integrators (for agreeing and arranging the electronic data exchange, understanding the application requirements in the transition phase - allowing to determine planning priorities which influence the spread of initial implementation costs). Last but not least, coordination of eTOD tests in States already advancing on the implementation – South Africa, Namibia, etc.

— END —

Appendix 1: ACTION PLAN

Ref Number	Area	Feature	Description	Action By	Target Date	Implementation Date	Comments
AP/001	1	Terrain	Terrain dataset for South Africa, including Lesotho and Swaziland, available from commercial vendors. Not yet verified and validated to ensure compliance with ICAO requirements.	SACAA	28/02/2009	28/02/2009	Awaiting SACAA budget approval for procurement of terrain data for in-house use.
AP/002	1	Obstacle	Meeting held with owners of structures on the 14 th of October 2008 at SACAA offices. ICAO obstacle data requirements were discussed and their co-operation was requested.	SACAA	14/10/2008	14/10/2008	See AP/008
AP/003	2	Terrain	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 21 st May 2009.
AP/004	2	Obstacle	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 21 st May 2009.
AP/005	3	Terrain	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 21 st May 2009.
AP/006	3	Obstacle	To be addressed at the SA eTOD WG meetings.	SA eTOD WG	18/11/2010		Next meeting on the 21 st May 2009.
AP/007	4	Terrain	Terrain dataset available from and maintained by ACSA.	ACSA	20/11/2008	20/11/2008	
AP/008	1	Obstacle	SACAA to provide the ICAO Obstacle data requirements to the owners of the structures.	SACAA	20/10/2008	17/10/2008	See AP/009
AP/009	1	Obstacle	Structure owners to provide available obstacle data for verification by the SACAA.	SACAA	13/03/2009		See AP/010
AP/010	1	Obstacle	Guarantee that all CEPs for obstacle data are eliminated.	SACAA	18/11/2010		