International Civil Aviation Organization SAM/AIM/11-WP/03
South American Regional Office 05/04/18
Eleventh Multilateral Meeting of the SAM Region for the transition from AIS to AIM (SAM/AIM/11)
Lima, Peru, 23 to 27 April 2018

Agenda Item 1: Implementation of provision of Electronic Terrain and Obstacle Data (e-TOD)

Challenges in e-TOD implementation

(Presented by the Secretariat)

SUMMARY

This working paper presents a series of challenges to be faced by States in the e-TOD implementation.

REFERENCES:

- Annex 15 - *Aeronautical Information Services*
- Report of GREPECAS/18 meeting (draft)
- ICAO Roadmap for the transition of AIS to AIM
- Reports of SAM/AIM meetings
- Report of the Fourth Meeting of Air Navigation and Safety Directors (AN&FS/4)
- Conclusions of the e-TOD seminar
- *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information* (Doc. 9881)

ICAO Strategic Objectives	*A - Safety* *B - Air navigation capacity and efficiency* *E - Environmental protection*

1. Introduction

1.1 The roadmap for the transition of AIS to AIM expects the implementation of e-TOD in Phase 1.

1.2 SAM/AIM meetings analysed the progress obtained in the implementation of e-TOD in the SAM Region.

1.3 GREPECAS/18 meeting reviewed the implementation of e-TOD in the CAR/SAM Regions and formulated recommendations regarding the same.

1.4 ICAO Doc. 9881 provides guidelines for the implementation of e-TOD.

2. **Discussion**

2.1 Annex 15, Chapter 10, establishes that the provision of e-TOD is a standard since 12 November 2015.

2.2 After the analysis carried out by the PPRC/4 meeting, it was identified that the failure to provide terrain and obstacle data in electronic format had become a deficiency. The Secretariat requested, through State Letter, the corresponding Action Plans for the resolution of this deficiency.

2.3 SAM/AIM/10 meeting analyzed the progress of these Action Plans and observed that same had horizons from 2020 to 2023. However, with the exception of Argentina, Brazil and Chile, very conservative progress could be observed in the fulfillment of the activities proposed in same.

2.4 During e-TOD seminars for the CAR and SAM Regions, a series of recommendations were formulated. These recommendations highlight the lack of capacity of States to develop terms of reference for the hiring of a relevant company to provide e-TOD data, as well as technical capacity of AIS and other personnel that will be in charge of working with this data.

2.5 At the SAM/AIM meetings and the e-TOD seminar, note was taken that most States have a national mapping authority in charge of managing geodetic information.

2.6 On the other hand, consistent management of obstacle databases deployed within the territory of States can improve in their uniformity. This activity is carried out by entities beyond the scope of the aeronautical authority. In many cases, obstacle identification specifications differ from those required by ICAO. In general, only mobile or fixed obstacles built in the proximity of airports are submitted to civil aviation authorities for their authorization and registration.

2.7 GREPECAS/18 reviewed the information concerning difficulties encountered for the implementation of e-TOD and for a deeper analysis, decided to create an *ad-hoc* group. This group was composed by delegates from Brazil, Costa Rica, Dominican Republic, Panama, Trinidad and Tobago, Uruguay and the Secretariat (ROs AIM CAR and SAM). Delegates from Cuba and CANSO also expressed their intention to join the subsequent works.

2.8 The *ad-hoc* group focused its analysis on the following points:

i. Implement adequate regulations to support the collection and management of e-TOD data with respect to the responsible authority: State/government authorities, air navigation service providers (ANSP), aerodrome operators, military part, etc.

ii. Define the method in which data will be collected, either through topography (using WGS-84) or by other means (drones, satellite imagery/3D graphics processing/LIDAR).

iii. Define the format in which the data will be stored and distributed.

iv. Implement the required infrastructure (a GIS database) capable of managing/hosting the e-TOD data. (The database must be able to load the terrain data required in the digital surface model (DSM) or in the digital terrain model (DTM), with the associated metadata traceability).

v. Ensure that the State has the necessary resources to manage and maintain the e-TOD database in coordination with military representatives (national security issues).

vi. Ensure that the State resources are adequately trained in the management of terrain and obstacle data (i.e. understand the complexities of terrain data filing formats and the packing of these terrain data files).

vii. Ensure that the State has implemented a Quality Management System (QMS) with associated processes and procedures to ensure quality in data processing from source to publication (Controlled Harmonized Aeronautical Information Network - CHAIN) in the AIP AD 2.10 section (or other related IAIP documents).

3. Conclusion

3.1 The Secretariat, after reviewing what had been done up to SAM/AIM/10 and GREPECAS/18 concerning monitoring the implementation of e-TOD, has observed that the challenges facing States in relation to it are:

a) availability or competencies for the conduction of a cost-benefit assessment in case digital terrain and obstacle data are available;

b) relevant State entities must be sensitised as to the usefulness of counting with digital terrain and obstacle data;

c) development of competencies or provision of assistance for the development of the technical terms of reference for hiring companies to provide terrain and obstacle data;

d) need to strengthen competencies in some States to work with terrain and obstacle data in a digital environment;

e) need to strengthen competencies for managing the obstacle database for the entire State; and

f) better coordination and communication with the national mapping institution.

3.2 States will observe that the progress of the Action Plans on the implementation of e-TOD could offer better results to comply with the requirements of Annex 15.

3.3 States, in accordance with the recommendations of GREPECAS/18, should:

a) maintain an exchange of information and agreements between institutions of Geodesy and Aeronautical Cartography;

b) prioritize e-TOD Area 3 for international airports;

c) evaluate the allocation of resources by the Aeronautical Authorities for a number of airports in each CAR and SAM State, after a previous study;

d) give enough time for the development of plans for each stage of the projects;

e) use of satellite images and LIDAR data for Areas 1 and 2, as well as the use of drones for Areas 3 and 4;

f) share e-TOD expenses among various state institutions that can obtain benefits after a cost-benefit analysis, maintaining the continuity of e-TOD projects with sufficient resources;

g) establish working agreements between all state institutions and the military, to carry out concerned tasks, prioritizing Areas 1 and 3;

h) consider software for 3D data management to obtain e-TOD products;

i) request States that have already started the e-TOD to share information and experts to advise other States that require it;

j) integrate Universities and Cartography/Geodetic Institutes into the e-TOD project;

k) identify Project risks and prepare e-TOD solution plans.

4. **Suggested action:**

4.1 The Meeting is invited to:

a) analyse the challenges encountered for the implementation of e-TOD and propose strategies to face them; and

b) mention any other action that may be deemed necessary.

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APPENDIX A

SAM REGION STATES	ACTION PLAN	FOLLOW-UP
Argentina	Estimated date: 27 November 2019.	Will review the Action Plan and corrections will be submitted with more detailed information.
Bolivia	Date to start the corrective actions: July 2017.	Corrective actions have started on the indicated date**.**
Brazil	2017 – 8 AD 2018 – 8 AD 2019 – 8 AD 2020 – 7 AD 2021 – 7 AD 2022 – 7 AD	Brazil modified its Action Plan according to referred terms.
Chile	Conclusion foreseen for 2022. Survey of Area 2a, 2b and 2c at Arturo Merino Benitez Airport in Santiago and Chacalluta Airport in Arica has been initiated	Survey work has also been completed at Diego Aracena Airport in Iquique.
Colombia	Plan has not been presented.	
Ecuador	Plan has not been presented.	
French Guiana	Plan has not been presented.	
Guyana	Estimated starting date: April 2017. So far the first seven points of the Action Plan presented should be completed	As informed by Guyana, works are carried out according to the plan presented.
Panama	Plan has not been presented.	
Paraguay	Data compilation for areas 2a, b, c, d completed. Other e-TOD related activities are foreseen for 2016 to 2019.	
Peru	Plan has not been presented.	Peru will hold a meeting between the civil aeronautical authority, the service provider-CORPAC and the aerodrome operators to prepare the Plan.
Suriname	Plan has not been presented.	
Uruguay	Plan has not been presented.	
Venezuela	During the second half of 2017 the corresponding terrain and obstacle data will begin.	