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Agenda Item 6: Other Business

CAPACITY BUILDING AND TRAINING REQUIREMENTS FOR THE VERIFICATION AND VALIDATION OF AERONAUTICAL CHARTS AND ELECTRONIC TERRAIN AND OBSTACLE DATA

(Presented by Trinidad and Tobago)

EXECUTIVE SUMMARY

This information paper outlines the need for capacity building and specialised training in the area of aeronautical charting and the management of electronic Terrain and Obstacle Data (eTOD) in support of ICAO Annex 4 and Annex 15 requirements. It emphasises regional capacity gaps, the technical nature of geospatial data verification and validation, and proposes a structured framework for developing skills, knowledge, and tools needed to support accurate and compliant aeronautical data products.

Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• ICAO Annex 14 Volume I — Aerodromes • ICAO Annex 15 — Aeronautical Information Services • ICAO Doc 9881 — Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information • ICAO Doc 9674 — World Geodetic System — 1984

1. Introduction

1.1 In compliance with ICAO Annex 4, Annex 15, and Doc 9881, the provision of accurate, timely, and quality-assured aeronautical charting and electronic obstacle/terrain data is vital for the safe and efficient operation of aircraft within the region.

1.2 Geospatial data validation and verification is a specialised function that requires both foundational and advanced knowledge in Geomatics Engineering, Geospatial analysis, and the application of aeronautical data standards.

2. Background and Current Challenges

2.1 Many States in the Eastern Caribbean (ECAR) Region face a shortage of personnel adequately trained in Geographical Information Systems (GIS), Global Navigation Satellite System (GNSS) surveys, Light Detection and Ranging (LiDAR) interpretation, and the application of ICAO aeronautical data quality requirements.

2.2 Aeronautical charting deficiencies persist due to the absence of qualified personnel in Aeronautical Information Management (AIM) departments. This affects the States 'ability to effectively review and amend aeronautical charts, or to produce and maintain terrain and obstacle data databases.

2.3 Furthermore, the integration of modern technologies such as Unmanned Aerial Vehicles (UAVs), satellite imagery, and electronic terrain databases into AIM operations requires new competencies which are currently underdeveloped in the region.

3. Capacity Building and Training Requirements.

3.1 The TTCAA AIM Geomatics Unit currently focuses on the core areas for capacity building:

a. Functional Training
   i. Principles of Geomatics and Cartography.
   ii. ICAO Annex 4 and 15 Data Standards and Specifications.

b. Specialised Training
   i. GNSS Data Acquisition and Post-Processing.
   ii. LiDAR Data Processing and Validation.
   iii. Use of satellite imagery for obstacle verification.
   iv. Electronic Terrain and Obstacle Data (eTOD) standards and practices.
   v. Application of spatial data tools utilising relevant software.

c. Quality Management and Data Assurance
   i. Formalisation of data verification and validation processes for aeronautical data.
   ii. Integration of the Unit's processes and functions into the AIM Quality Management Systems to ensure alignment with statutory and regulatory requirements, ICAO standards.
   iii. Implementation of metadata standards and data lineage practices.

4. Suggestions and Way Forward

4.1 The development of a regional eTOD and Charting Training Roadmap, possibly through collaboration with the ICAO NACC Regional Office, COCESNA, or State training institutes.

4.2 Encouraging partnerships with academic institutions and international organisations for certification programmes in eTOD and aeronautical cartography.

5. Conclusion

5.1 The AIM transition to a data-centric environment demands specialised geospatial expertise, robust verification and validation procedures, and a systematic approach to training and capacity building. As aviation becomes increasingly reliant on accurate eTOD for safe and efficient operations, States must invest in equipping AIM personnel with the necessary skills and tools to develop capacity, to effectively carry out relevant responsibilities and meet international aeronautical information standards.

5.2 By addressing current human resource and technical gaps, and through regional cooperation, the E/CAR Region can ensure compliance with ICAO standards, improve aeronautical data quality, and support the development of modern, interoperable air navigation services. The proposed training initiatives and partnerships present a strategic opportunity to elevate charting accuracy, obstacle management, and overall aviation safety across the region.

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