



Agenda Item 2: Report of activities of the GESEA and Subgroups

TRUE NORTH REFERENCE SYSTEM

(Presented by Secretariat)

SUMMARY

This paper analyses an ICAO initiative to eliminate using a magnetic north reference system for bearings, tracks and radials and instead publish and use the True North reference system only.

References:

- AN-Conf/13-WP/114 Working Paper
- ICAO State Letter SL22.87.EN dated 21/09/2022

1. Background

1.1 ICAO Annex 4 — Aeronautical Charts Eleventh Edition, section 9.81 requires bearings, tracks and radials to be published in degrees magnetic except under exceptional circumstances where bearings, tracks and radials may be aligned to True North or Grid.

1.2 At the Twelfth Air Navigation Conference (AN-Conf/12), Canada introduced a motion in AN-Conf/12-WP/147, paragraph 4.3.5 to move from a magnetic to True North reference system.

2. Analysis

2.1 With the switch from analogue to digital aircraft systems, magnetic variation discrepancies have and will continue to cause operational errors in performance-based navigation (PBN) procedures, CAT II/III auto-coupled approaches and landings and AIRAC 424 coding for all course and heading legs. Track legs will not suffer the same leg disconnect errors as course and heading legs but display errors may be present.

2.2 Eliminating the practice of using a magnetic north reference system for bearings, tracks and radials and instead publish and use the True North reference system only. Procedures are designed with reference to True North and converted to magnetic.

2.3 Most large aircraft use inertial reference units and flight management systems that complete calculations using True North and add magnetic variation values from tables to display information to pilots. Cost competitive gyros for mid-size and small aircraft are now available using fibre optic gyroscope (FOG) and micro-electromechanical system (MEMS) technology.

2.4 Small visual flight rules (VFR) aircraft calculate flight paths in true and convert tracks to magnetic prior to flight.

2.5 Air carriers, air navigation service providers (ANSPs) and avionics original equipment manufacturers (OEMs) spend millions annually managing magnetic variation.

2.6 Technology available today has rendered the use of a magnetic reference system obsolete, increases ANSP and air operator costs and introduces aircraft tracking instability where minor to moderate magnetic variation differences exist.

2.7 More information related to True North can be found on ICAO's websites:

<https://www.icao.int/safety/OPS/OPS-Section/Pages/Truenorth.aspx>.

<https://www.icao.tv/videos/moving-from-magnetic-to-true-north-in-aviation>

2.8 ICAO has prepared a survey (State Letter SL22.87.EN) to collect comments from States and their respective aviation sectors on the level of support needed for ICAO to begin work on the shift from a magnetic north reference system to a true north reference system for direction and defeat in air operations. The survey will also help identify any concerns or challenges that may need to be addressed during any implementation period.

3. **Suggested actions**

3.1 The Meeting is invited to Take note and analyze the information presented.