



International Civil Aviation Organization

ICAO

The Third Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/3)

Bangkok, Thailand, 16 – 19 April 2024

Agenda Item 9: Any Other Business

REVALIDATION OF COORDINATE DATA IN INDONESIA

(Presented by Indonesia)

SUMMARY

This paper presents the revalidation of coordinate data in Indonesia and shares information about the mechanism of coordinate data revalidation that has already been arranged in Indonesia's national regulation.

1. INTRODUCTION

1.1 Referring to the conclusion ATM/SG/10-9: Revalidation of Coordinate Data, some factors cause WGS-84 coordinate data to change over time. Due to that reasons, States are urged to ensure that all surveyed and calculated coordinate data published in AIP or used in Instrument Flight Procedure design is revalidated:

- a. each five years; or
- b. after a major natural event such as an earthquake or volcanic eruption; or
- c. following the construction of critical airport elements,

whichever is the sooner, by ground survey, or Light Detection and Ranging (LIDAR) survey, or imagery collection.

1.2 Revalidation of coordinate data is to ensure the coordinates of surveyed and calculated points (calculation based on a surveyed point or points) are updated as necessary to ensure their accuracy and integrity are maintained when changes occur due to geophysical effects.

2. DISCUSSION

Revalidation of Coordinate Data Regulation in Indonesia

2.1 Minister of Transportation Decree No. 11 Year of 2022 - Civil Aviation Safety Regulations Part 173 Regarding Flight Procedure Design Provider is a regulation that obliges stakeholders concerned to conduct periodic reviews of flight procedures published no later than 5 years from the effective date of publication. This review evaluates significant obstacles, aerodromes, aeronautical data, and air navigation facilities. Significant criteria and design specifications affecting the flight procedures are assessed to determine necessary actions before periodic review.

2.2 The Director General of Civil Aviation Decree No. SKEP/29/II/2010 Year of 2010 concerning Guidelines for the Measurement and Supervision of the Quality of Air Navigation

Coordinates in the World Geodetic System (WGS) 1984 Part 173-4 (Advisory Circular 173-4) states the detailed guidance of revalidation mechanisms.

2.3 There are key points and positions of air navigation aids that must be measured using the World Geodetic System (WGS) 1984 such as threshold runway, parking stand, NDB, DVOR, DME, ILS-GP, ILS-LLZ, ILS-MM, ILS-OM, ILS-LOC, radar head (PSR & SSR), tower, Aerodrome Reference Point (ARP).

2.4 The measurement of coordinates for key points and air navigation aids can be conducted by:

- 2.4.1 Directorates or units under the Directorate General of Civil Aviation;
- 2.4.2 Airport Operators;
- 2.4.3 Air Navigation Service Providers;
- 2.4.4 Aircraft operators;
- 2.4.5 Other parties with the capability to conduct measurements.

2.5 Indonesia has CORS station and Geoid Undulation Model (INAGEOID2020 version 2) under the responsibility of the Geospatial Information Agency (BIG).

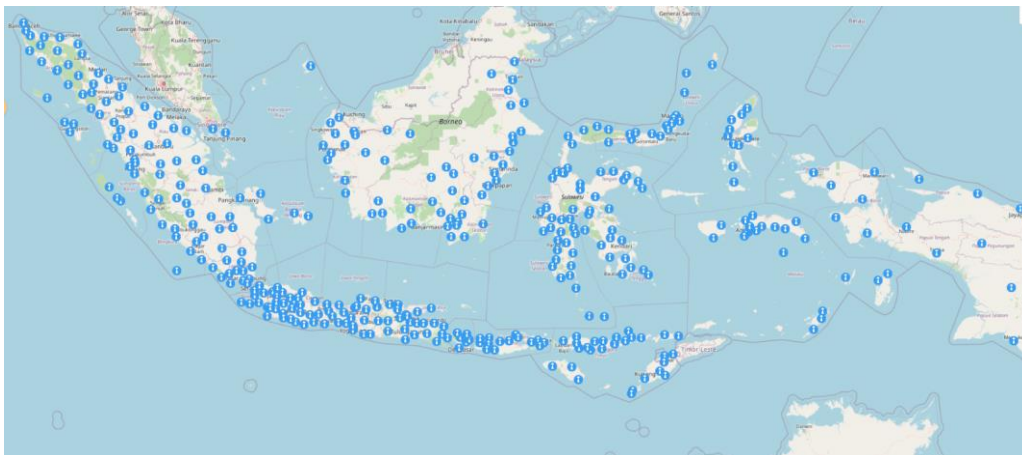


Figure 1: CORS Station in Indonesia at <https://srgi.big.go.id/map/jkg-active>

2.6 The horizontal position (Latitude and Longitude) use CORS station will support for high accuracy measurement with the Real-Time Kinematic (RTK) method or static method (online post processing).

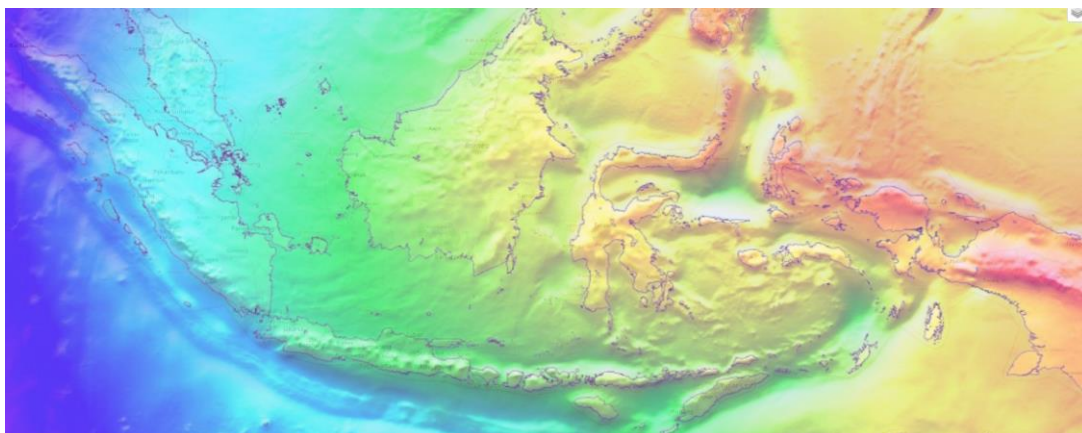


Figure 2 : Geoid Undulation in Indonesia at <https://srgi.big.go.id/map/jkg-active>

2.7 The vertical reference system in Indonesia is called Sistem Referensi Geospasial Indonesia (SRGI) Vertikal. SRGI Vertikal is an orthometric height that results from geoid undulation. Geoid undulation is fitted to the mean sea level at 90 tidal stations in Indonesia. Geoid undulation is obtained from gravity data related to the International Gravity Reference Frame (IGRF). Gravity data includes airborne gravity, terrestrial gravity, and other supporting data. For the orthometric height (vertical) we use INAGEOID2020 version 2.

2.8 As a national geoid model, INAGEOID2020 version 2 is developed based on EGM 2008. INAGEOID2020 is more precise than EGM-96 geoid model. INAGEOID2020 and EGM-96 are analyzed using the comparison between INAGEOID2020 and GNSS on benchmark leveling at several islands in Indonesia. Table 1 shows the results of the comparison. (refer to AIP Gen 2.1-4 Vertical Reference System AIRAC AIP AMDT 93 13 AUG 20).

Island	EGM96 (m)	INAGEOID2020 (m)
Jawa	2.9074 ± 0.2906	0.0079 ± 0.1181
Bali	2.9323 ± 0.5955	0.5195 ± 0.2167
East Kalimantan	1.7872 ± 0.0890	0.0200 ± 0.0588
West Kalimantan	2.6117 ± 0.2050	-0.2685 ± 0.0643
Sulawesi	2.4859 ± 1.1110	-0.0397 ± 0.2510
Sumatera	2.8324 ± 0.8187	-0.2194 ± 0.2858

Table 1 : Comparison between EGM96 and INAGEOID2020 Version 2

2.9 The precision of EGM96 to INAGEOID2020 version 2 increases by about 2 meters. Detailed explanation about INAGEOID2020 version 2 can be accessed at <https://srgi.big.go.id/page/geoid-model>

2.10 The measurement results as referred to in 2.4 are submitted to the Director of Air Navigation (DGCA) for the validation of coordinate data to ensure the quality of coordinate data in WGS 84. Then, the next process is publishing in AIP following applicable regulations.

2.11 In the event of a natural disaster such as an earthquake or volcano that affected changes to coordinate data, measurement of air navigation objects (position and points) can be surveyed to update the current coordinate data. This clause is currently being processed by the legal division of the Directorate General of Civil Aviation in the context of revision and update of the Director General of Civil Aviation Decree No. SKEP/29/II/2010 Year of 2010 - Guidelines for the Implementation of Measurement and Supervision of the Quality of Air Navigation Coordinates in the World Geodetic System (WGS) 1984 Part 173-4 (Advisory Circular 173-4).

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- note the information contained in this paper; and
- discuss any relevant matters as appropriate.

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