



ICAO

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**Agenda Item 9: Any other business**

**DEVELOPMENT OF INDONESIA AIR NAVIGATION CARBON EMISSION  
CALCULATOR (INAVCEC)**

(Presented by INDONESIA)

**SUMMARY**

This paper presents an update of progress made by Indonesia to develop an application named Indonesia Air Navigation Carbon Emission Calculator (INAVCEC) to calculate emission carbon used by aircraft solely from air navigation aspect, including background process. It also presents how INAVCEC could be used to predict emission carbon produced from flight plans and provide an annual report to DGCA.

**1. INTRODUCTION**

1.1 The connectivity that the civil aviation sector in Indonesia provides to society is a key factor contributing to the national productivity and growth. According to Global Air Passenger Market data that released by IATA Economics, aircraft movement in Indonesia's airspace from period 2018 to 2038 will raise and will attain number 4 for the highest aircraft movement globally. In consequence, the emission carbon produced will be raised.

1.2 As member of Committee on Aviation Environmental Protection (CAEP), Indonesia has responsibilities to always concern about the effect of aviation sector to the environment. In 2013, Indonesia formulized national action plan and established Environment Team dedicated for implementing the actions to reduce emission from aviation sector in Indonesia.

1.3 Directorate of Air Navigation (DAN) DGCA Indonesia which also involve in this team realized that Indonesia has not yet had a tool to calculate emission solely from air navigation aspect, therefore DAN developed Indonesia Air Navigation Carbon Emission Calculator (INAVCEC) to calculate emission carbon used by aircraft from air navigation aspect.

**2. DISCUSSION**

Background Process

2.1 Every year DAN has to provide data for DGCA Environment Team and made target emission reduction from air navigation aspect. However, the data provided was calculated generally and less accurate. The identification of this problem led to the following findings in the national context:

- i. No mechanism to calculate emission carbon produced in air navigation aspect;
- ii. No quantitative data for emission carbon produced as an impact of air traffic services;

- iii. No tools to facilitate the calculation of emission carbon produced in air navigation aspect; and
- iv. No measurable strategic plan which targeting environmental protection in the air navigation aspect.

2.2 Furthermore, DAN formulated a calculation mechanism into the national regulation with the ICAO guidance in Doc. 9988 Guidance on the Development of States' Action Plans on CO<sub>2</sub> Emissions Reduction Activities. Then DAN in collaboration with Airnav Indonesia constructed an application to facilitate the calculation of emission carbon produced in air navigation aspect.

### Development of Indonesia Air Navigation Carbon Emission Calculator (INAVCEC)

2.3 Implementation of the application to calculate emission carbon gas produced in the air navigation aspect was merely accessed by Airnav Indonesia and DAN, which this condition means this application could not be utilized by aviation communities in Indonesia nor internationally.

2.4 As Indonesia has already developed Indonesia Web-Based Aeronautical Information System Handling (IWISH) and the system already supports the implementation of collaborative decision-making (CDM) by involving the regulator, air navigation services provider, airport operator, airline operator, and other stakeholders, Indonesia tried to integrate the application of emission calculator for air navigation into the IWISH system and created INAVCEC.

2.5 INAVCEC calculate emission carbon gas produced by aircraft since the aircraft block-off until block-on and calculate all air navigation configuration such as when the aircraft start engine, taxi-out, ground holding, take-off, climbing, enroute, descending, approach, holding, landing, taxi in, and cut engine. INAVCEC also can calculate emission carbon gas produced base on flight plan routes which can be customized by users. Users can use prediction tools in INAVCEC to find out the best route suggested by INAVCEC to produce less emission carbon gas and the system also can provide an annual report for users so they will get the total amount of emission carbon gas per year to make a better plan for next year.

2.6 INAVCEC can be accessed as one of the IWISH features on: <https://iwish.dephub.go.id/inavcec/dashboard>. The appearance of INAVCEC on the IWISH web will look as follows:



