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COMMITTEE A

Agenda Item 1: Air navigation global strategy

1.2: Air navigation performance improvement and measurement through the aviation system block upgrades (ASBUs) and basic building blocks (BBBs) framework

ENVIRONMENTAL KEY PERFORMANCE INDICATORS (KPIS) IN THE GLOBAL AIR NAVIGATION PLAN (GANP) KEY PERFORMANCE AREA (KPA) “ENVIRONMENT”

(Presented by the Secretariat)

SUMMARY

This paper describes the work undertaken by ICAO in order to facilitate the identification of Key Performance Indicators (KPIs) that would inform the definition of a new Key Performance Area (KPA) on Environment, in the context of the Global Air Navigation Plan (GANP). In particular, the paper highlights some limitations pertaining to this task and lays down a proposed path for cooperation in strengthening environmental performance measurement in a GANP context.

REFERENCES

AN-Conf/13-WP/19

Doc 10075, *Assembly Resolutions in Force (as of 6 October 2016)* Doc 9750, *Global Air Navigation Plan*

1. INTRODUCTION

1.1 The 39th Session of the ICAO Assembly endorsed the Fifth Edition of the Global Air Navigation Plan (GANP, Doc 9750)(Assembly Resolution A39-12: ICAO global planning for safety and air navigation refers). One of the improvements included in the fifth edition was the development of an ICAO Potential Key Performance Indicators (KPIs) Catalogue. KPIs serve to track the performance of the air navigation system. This first version of the catalogue contains indicators in three (capacity, efficiency and predictability) of the eleven key performance areas (KPAs) where expectations from the air traffic management (ATM) community are defined.

1.2 In this context, the Committee on Aviation Environmental Protection (CAEP), a technical advisory Committee of the Council of ICAO, was tasked to reflect on the possible definition of specific environmental KPIs in an ATM context.

2. OBJECTIVES OF ENVIRONMENTAL KPIs IN A GANP CONTEXT

2.1 As part of the monitoring activities on the implementation of the GANP, ICAO collects data from States, through ICAO Regional Offices, on the implementation of aviation system block upgrade (ASBU) modules. These data provide a global picture of the improvements brought about by operational changes. During the CAEP/11 cycle (2016 to 2019), the ICAO CAEP considered that environmental KPIs could be developed to assess potential global environmental changes resulting from the implementation of ASBU modules.

2.2 Environmental KPIs, which would not be performance-based, would assess the global environmental impact of the implementation of GANP concepts. Therefore, it is suggested that they be referred to as environmental indicators.

2.3 CAEP was invited to consider how emissions or other environmental areas could benefit from the implementation of ASBU modules and how environmental benefits could be reflected over time at a global level through the development of specially designed indicators.

2.4 Any additional data needed to apply the indicators would be requested from States as part of the regular data collection process carried out by ICAO on the GANP implementation.

3. DISCUSSION RELATED TO AVIATION ENVIRONMENTAL IMPACTS: NOISE AND EMISSIONS

3.1 Concerning possible noise-related indicators, which could be used in the context of GANP, it was observed by CAEP that only the indicator “number of people exposed” would be relevant in an operational context. However, there are several concerns with this metric, starting with the uncertainty of the modelling efforts required to capture the impact of operational changes on the number of people exposed to aircraft noise. Therefore, a full scoping exercise should be undertaken to understand the resources needed to use an indicator of “Number of people exposed” in an ATM context.

3.2 Applying existing emissions indicator metrics would be acceptable in determining an emissions mass delta between an optimal mission and an actual mission, however using these emissions indicator metrics would not sufficiently explain the result. That is, the emissions metric(s) would need to be coupled with payload information (in terms of tonnes of passengers and cargo) moved over a unit distance to properly explain the changes in aviation system efficiency. For instance, an appropriate metric may be [kg of CO₂/payload tonnes kilometre].

3.3 In addition to the inadequacy of the mass emissions metric, the quantification of landing and take-off (LTO) NO_x and particulate matter (PM) mass emissions would not properly represent local air quality impacts. The static LTO certification data (e.g., emissions indices, times-in-mode, etc.) would not be able to capture the actual emissions associated with improvements to the air navigation system.

3.4 Specific, environmentally focused emissions indicators with metrics that combine mass of emissions and appropriate activities need to be given further consideration and developed at a later stage so that environmental performance can be adequately assessed.

3.5 There are also limitations with the use of minimum route lengths (great circle) as an indicator for fuel efficiency and CO₂ emissions. Indeed, they are not necessarily the most fuel efficient, as aircraft operate in an atmosphere that is constantly moving and which varies in temperature and hence

density. Consequently, with strong winds, particularly where jet streams exist, the most fuel-efficient route may be longer than the great circle distance. This is also reflected in the document *Operational Opportunities to Reduce Fuel Burn and Emissions* (Doc 10013).

4. CONCLUSION

4.1 At this stage, CAEP has not identified any indicator primarily focused on environment that could assess environmental performance in an ATM context. The existing 16 KPIs in the Fifth Edition of the *Global Air Navigation Plan* (Doc 9750) that assess efficiency improvements can only be correlated with decreases in fuel burn and associated emissions.

4.2 CAEP will examine if further explanation or definition is required in some of the operational efficiency indicators to explicitly refine CO₂ reduction indicators as part of its preparation for the decision on its future work programme at the CAEP/11 meeting from 4 to 15 February 2019.

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