International Civil Aviation Organization

Eleventh Meeting of the Air Traffic Management Sub-Group (ATM/SG/11) of APANPIRG

Singapore, 2 – 6 October 2023

Agenda Item 5: ATM Systems (Modernization, Seamless ATM, CNS, ATFM)

GREEN ATM OPERATIONS

(Presented by Japan and Singapore)

SUMMARY

The Civil Aviation Authority of Singapore (CAAS) and the Japan Civil Aviation Bureau (JCAB) successfully conducted a one-month trial in June 2023 on air traffic management (ATM) operational measures aimed at achieving a sustainable and efficient aviation system, or green ATM operations. The trial was conducted for one daily passenger service between Tokyo and Singapore. ATM operational measures implemented include the facilitation of continuous climb and descent operations, and optimal cruising flight level assignment, which will save fuel, cut carbon emissions, and reduce flight times. Building on the success of the one-month trial, CAAS and JCAB will further extend the green ATM operations to all flights between Singapore and Tokyo. This paper provides information on the collaboration between CAAS, and JCAB in implementing green ATM operations, including the ATM measures undertaken and how they contribute to increased flight efficiency and reduction in carbon emissions.

1. INTRODUCTION

1.1 ICAO has forecasted that air passenger demand in 2023 will rapidly recover to pre-pandemic levels. The Asia-Pacific airlines have seen a continued robust momentum in air traffic growth with a 283% increase in March 2023 traffic compared to the previous year according to press information IATA in May 2023. However, the strong growth in air travel also calls for greater collaboration among aviation stakeholders, including governments, to address the environmental impact of their activities and ensure safe, efficient and sustainable long-term growth.

1.2 In December 2022, the Civil Aviation Authority of Singapore (CAAS) and the Japan Civil Aviation Bureau (JCAB) signed a high-level framework arrangement to collaborate on civil aviation as the two major air hubs of the Asia-Pacific region emerge from the COVID-19 pandemic. The collaboration covered six key areas of air transport, aviation sustainability, aviation safety, ATM, airport innovation and technology and unmanned aircraft systems and advanced air mobility. As part of the collaboration on ATM, the two authorities agreed to pursue green ATM operations between Singapore and Japan by conducting operational trials on ATM measures over a one-year period, aimed at achieving a sustainable and efficient aviation system.

1.3 CAAS and JCAB commenced the first phase of the trial on 23 May 2023 with one daily passenger service between Tokyo (Narita) and Singapore, for a one-month period. The scope of the first phase of the trial included the facilitation of continuous climb and descent operations, and optimal cruising flight level, as well as post-operations research and analysis to assess the benefits brought about

by the green ATM measures. Once successful, the trial could then be expanded to more flights in subsequent phases of the one-year period.

2. DISCUSSION

2.1 To operationalise the one-month trial on an identified daily passenger service between Singapore and Tokyo, CAAS and JCAB conducted the following initiatives below:

2.1.1 Green ATM measure #1: Facilitation of Continuous Climb/Descent Operations

- On a daily basis, ATC would endeavor to conduct Continuous Climb/Descent Operations, subject to air traffic situation to ensure safe operations within Singapore and Fukuoka Flight Information Region (FIR) respectively.
- For a flight that had successfully conducted Continuous Climb/Descent Operations, CAAS and JCAB would indicate accordingly in their respective monitoring and tracking sheet.
- Continuous Climb/Descent Operations provide fuel savings benefits to flights as they can climb/descend at optimum air speed with optimal engine thrust settings, thus reducing total fuel burn and emissions.

2.1.2 Green ATM measure #2: Facilitation of Optimal Cruising Flight Levels

- On a daily basis, Japan ATC would assign optimal cruising flight levels to the identified flight, subject to air traffic situation to ensure safe operations within Fukuoka FIR.
- For a flight that had successfully been assigned optimal cruising flight level, JCAB would indicate accordingly in their monitoring and tracking sheet.
- Assignment of optimum flight level before an aircraft leaves the FIR provides higher chance of the flight continuing at that altitude in the en-route phase.

2.2 In order to facilitate the post-operations research and analysis, CAAS and JCAB developed the following performance matrix:

Callsign	ORG	DES	CDO	CCO	Opt Cruise Level
SQ11	RJAA	WSSS		√	√

Table 1: Performance matrix for a specific flight

2.3 A similar matrix with the corresponding fuel burn (kg) and carbon emission (kg) was also developed to calculate the total fuel savings.

2.4 The one-month trial was successfully completed on 22 June 2023.

2.5 For the next step, CAAS and JCAB have agreed to extend the green ATM measures to all flights between Singapore and Tokyo (Haneda and Narita) until mid-2024. For post-operations research and analysis, the extended trial will use the performance matrix that was jointly developed by both authorities in the first phase of the trial.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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