International Civil Aviation Organization

The Eighth Meeting of the APANPIRG ATM Sub-Group

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Agenda Item 6: ATM Coordination (Meetings, Route Development, Contingency Planning)

IMPLEMENTATION OF RNP 4 ON ATS ROUTES M767 AND N884

(Presented by Singapore and The Philippines)

SUMMARY

This paper presents the implementation of RNP 4 route specification for ATS routes M767 and N884 in addition to the current RNP 10. The implementation of RNP 4 enables the opportunity to reduce longitudinal and lateral separation between suitably equipped aircraft to enhance airspace capacity and increase air traffic management efficiency. The introduction of RNP 4 on the two routes is an interim enhancement, with plans to re-designate the two routes to RNP 2 in the future.

1. INTRODUCTION

1.1 The COVID-19 pandemic has significantly impacted the aviation industry. With the significant reduction of air traffic movement, States should take this opportunity to progress with Performance Based Navigation (PBN) implementation that can help to contribute towards enhancing Air Traffic Management capability and contributing towards increased efficiency for aircraft operators.

1.2 As recommended by the ICAO Global Air Navigation Plan (GANP) 2013-2028, PBN was accorded air navigation priority and regarded as a crucial element in the ICAO Aviation System Block Upgrades (ASBUs). The ICAO Asia Pacific Seamless ANS Plan also emphasized on implementing RNP 2 on ATS routes serving major aerodromes for oceanic and remote applications.

1.3 Based on flight plan data for aircraft utilizing ATS routes M767 and N884 for the period between July to August 2019, it was ascertained that a phased implementation from RNP 4 to RNP 2 would yield more benefits due to equipage of aircraft. Therefore, Singapore and the Philippines planned to embark on a phased implementation approach by implementing RNP 4 on these ATS routes, with the aim of progressing towards RNP 2.

2. DISCUSSION

Equipage

2.1 One crucial point of consideration is the availability of adequate Communications, Navigation and Surveillance (CNS). Adequate equipage on board aircraft operating on ATS routes M767 and N884 would enable the application of RNP 4 separation. Aircraft on-board navigational equipment will need to be RNP 4 equipped, coupled with Direct Controller Pilot Communication (DCPC) capability. DCPC option will either require Controller Pilot Data Link Communications (CPDLC) with ADS-C surveillance, or VHF services to ensure timely updates of aircraft position.

Specifications	Percentage of Aircraft Equipped
RNP 4	83%
CPDLC with RNP 4	41%
RNP 2	40%
CPDLC with RNP 2	40%

2.2 Based on the percentages shown in Figure 1, it can be seen that 83% of the aircraft operating on ATS routes M767 and N884 were RNP 4 equipped. In contrast, only 40% of the aircraft are RNP 2 equipped. Naturally, taking the aircraft equipage into consideration, a smoother transition from RNP 10 to RNP 4 is to be expected. As CPDLC becomes more widespread , there will be a higher percentage of aircraft that will be able to fulfil the DCPC requirements for reduced separation with RNP 4. Therefore, this reiterates Singapore's and the Philippines' recommendation for a phased approach implementation.

Reduced Environmental Impact

2.3 An increase in ATS route capacity due to reduction in minimum separation required will allow more aircraft to operate at their optimum levels and potentially reduce aircraft flight times due to more efficient cruising configurations resulting in lower fuel consumption, carbon emissions and noise pollution. This minimizes the adverse environmental effects due to civil aviation activities.

Easing Congestion During Large Scale Weather Deviation Procedures

2.4 Large scale weather deviation (LSWD) contingency procedures are activated on routes M767 and N884 when more than five aircraft requests to deviate more than 10NM off track within thirty minutes and such deviations could not be completed before the transfer of control point due to severe meteorological conditions such as typhoon. Upon activation of LSWD, the usable levels for ATS routes M767 and N884 under the Flight Level Allocations Scheme (FLAS) are reduced by half, thereby translating into a 50% reduction of usable airspace capacity. However, with the implementation of RNP 4, the required longitudinal separation could be reduced to 30NM between suitability equipped aircraft, thus help with easing traffic congestion even when LSWD is activated.

Optimization of Routes

2.5 Currently, the lateral spacing between ATS routes M767 and N884 is 60NM. Under RNP 10 procedures, aircraft that are suitably equipped at the same flight level, require 50NM separation longitudinally and laterally. Therefore, a maximum lateral deviation of not more than 10NM is allowed for 2 aircraft on adjacent airways at the same flight level. With the implementation of RNP 4, the minimum longitudinal and lateral separation required is reduced to 30NM and 23NM respectively. As a result, the maximum allowable lateral deviation for 2 aircraft on adjacent airways at the same flight level is increased to 30NM.

Future Development

2.6 As aforementioned, with the shift from RNP 10 to RNP 4 on M767 and N884, the minimum lateral separation for two aircraft that are suitably equipped on the parallel airways can be reduced. This would potentially allow for the establishment of an additional RNP 4 parallel route between the 2 airways, which can both serve as a tool to further optimize airspace capacity and level assignment or as a contingency airway for emergency purposes. Overall, the additional parallel route facilitates the ease of congestion and reduces the workload of air traffic controllers and pilots.

Implementation Timeline

2.7 The table below summarizes the key milestones towards the implementation of RNP4 on ATS routes M767 and N884.

Milestone	Timeline	Description
1	Q1 2021	Publish an Aeronautical Information Circular (AIC) on the reduction of separation between RNP 4 equipped aircraft on ATS routes M767 & N884
2	Jan 2022	RNP 4 implementation on ATS routes M767 and N884
3	Q2 2022	Submission of PfA and joint WP by Singapore and the Philippines at ATM/SG to amend ICAO Doc 7030, RNP 4 portion to include Singapore and the Philippines

Conclusion

2.8 With the uncertainty of the aviation industry due to the COVID-19 pandemic, States/Administrations should take this opportunity to progress with PBN implementation, leverage on advancements in CNS to continuously enhance safety and contribute towards further providing ATM efficiency for airspace users.

3. ACTION BY THE MEETING

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

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ANNEX A

IMPLEMENTATION OF RNP4 ON ATS ROUTES M767 AND N884