International Civil Aviation Organization

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

2 – 6 October 2023

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

NORTH PACIFIC (NOPAC) ROUTE SYSTEM REDESIGN

(Presented by United States of America and Japan)

SUMMARY

This paper discusses a joint effort by JCAB, FAA and IATA to improve the efficiency of operations in the NOPAC Route System in the Fukuoka and Anchorage Oceanic FIRs. Through a phased implementation, the new NOPAC Routes will utilize the PANS-ATM, 23 NM lateral separation minima; they will be compressed into a smaller airspace volume and more airspace is opened up for User Preferred Routes (UPRs) and other more efficient flexible routing alternatives.

1. INTRODUCTION

1.1 The NOPAC route system was originally created in 1974 when standard oceanic separation was 100 NM lateral, 20 minutes longitudinal and 2000 feet vertical. The NOPAC route system was designed as 5 parallel routes with a minimum of 50 NM in lateral spacing. Composite separation (½ lateral and ½ vertical) was applied between the aircraft. This allowed for the efficient movement of the NOPAC aircraft through a compressed amount of airspace. Subsequent improvements in aircraft capabilities (RNP10/RNAV10 and RVSM) allowed standard oceanic separation to be reduced to 50 NM laterally and 1,000 feet vertically, resulting in significant increases in the capacity of the NOPAC Route System, but the NOPAC route structure has remained basically the same as originally published for almost 50 years—a series of 5 parallel routes that cross the Fukuoka/Anchorage Oceanic common FIR boundary.

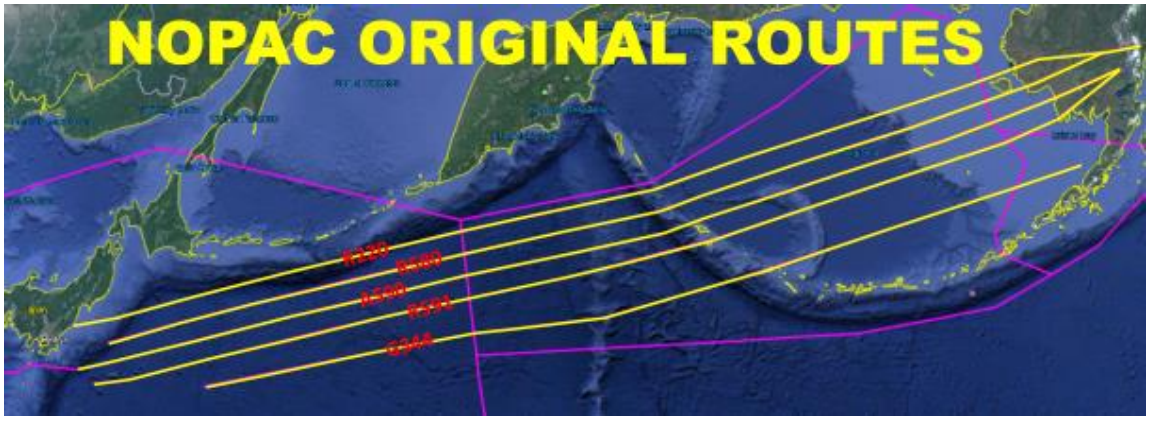

Figure 1, Original NOPAC Routes

1.2 In 2016, at the Informal Pacific Air Traffic Control Coordinating Group Forty Second Meeting (IPACG42) Anchorage Air Route Traffic Control Center (ARTCC) proposed to leverage enhancements in navigation and communication that had led to a new PANS-ATM 23 NM lateral separation minimum to optimize the NOPAC Route System. IATA endorsed the proposal and agreed to work with its recommendations. After consolidation of airline inputs, IATA provided the following recommendations for optimization/reorganization of the NOPAC Route Structure to the IPACG 43 meeting:

1.2.1 The NOPAC airspace be declared as RNP4 exclusive airspace.

1.2.2 The current NOPAC fixed route structure be replaced with a series of closely spaced (RNP4 23 or 30 NM) bidirectional routes, accompanied with additional connector routes between the tracks.

1.2.3 There be increased use of UPRs in the NOPAC Airspace.

1.3 Based on these IATA recommendations, JCAB, IATA and the FAA developed a proposal for a phased plan to compress the 5 NOPAC Routes into a series of four 25 NM spaced ATS Routes against the northern oceanic FIR boundary with Russia. The new NOPAC Route System will occupy less airspace than 3 routes previously occupied. This opens significantly more airspace south of the NOPAC ATS Routes for UPRs and flexible tracks. The NOPAC Redesign project when completed is depicted in **Figure 4** below.

1.4 NOPAC Redesign Phases 1a and 1b have been implemented (see **Figure 2**). The 2 southern NOPAC routes R591 and G344 have been removed but the waypoints that defined the routes were retained for improved UPR flight planning capability. Operators are able to flight plan more efficient routes saving fuel and greenhouse gas emissions. In preparation for Phase 2 and 3 of the NOPAC Redesign project, the northernmost NOPAC Route requires RCP240, RSP180 and RNP4 approvals for aircraft operating on R220 from FL340 through FL400. Aircraft without the PBCS/RNP4 approvals may operate on R220 at or below FL330 or at or above FL410. Non-approved aircraft also may flight plan via R580, 50 NM to the south or a UPR 50 NM south of A590. Flight Levels 340 through 400 were chosen to be the altitude stratum where the PBCS/RNP4 23 NM separation will be applied between the NOPAC routes in Phase 2 and 3. Older cargo aircraft without PBCS approvals frequently operate at FL330 and below. By starting the PBCS/RNP4 requirements at FL340, these older cargo aircraft have a much lesser impact. Business Aviation aircraft frequently operate at FL410 and above, so the PBCS/RNP4 requirements were topped at FL400. It is understood that not all older cargo aircraft and business aviation operate in NOPAC outside of the FL340-FL400 altitude stratum but the FL340-FL400 PBCS/RNP4 requirements mitigate some of the impacts on these aircraft. Since beginning NOPAC Redesign Phase 1a, data has been collected each month on NOPAC flights. Non-PBCS/RNP4 approved operators are identified and these operators with more than one flight a month are provided information on the NOPAC Redesign Project so that they are informed and can prepare for the changes.

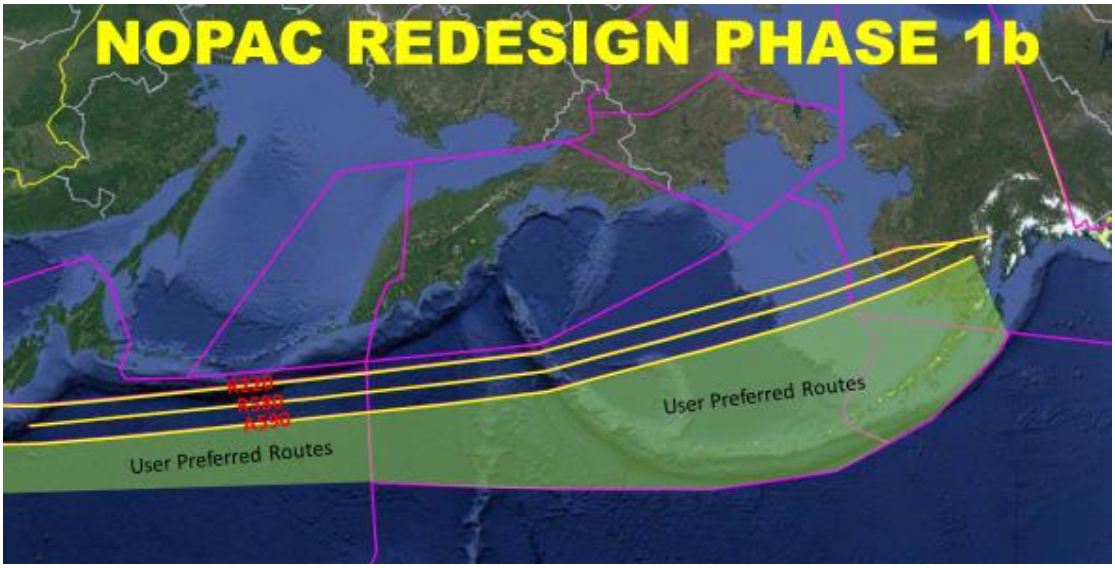

Figure 2, NOPAC Redesign Current State

1.5 NOPAC Redesign Phase 2 is projected to begin around January 2024. In Phase 2 a new westbound ATS Route M523 (depicted in green in **Figure 3** below) will be established between R220 and R580. M523 is open to westbound aircraft operating from FL340 through FL400 and closed to aircraft outside those altitudes. ATS Route R580 will change from a westbound route to an eastbound route in Phase 2. At the start of Phase 2, aircraft operating on R220, M523 and R580 from FL340 through FL400 must have RCP 240, RSP 180 and RNP4 approvals to ensure lateral separation between aircraft on the routes. Aircraft without these approvals may operate on R220 and R580 at or below FL330, at or above FL410, or at least 50 NM south of ATS Route A590. ATS Route A590 remains an eastbound route with no PBCS requirements in Phase 2.

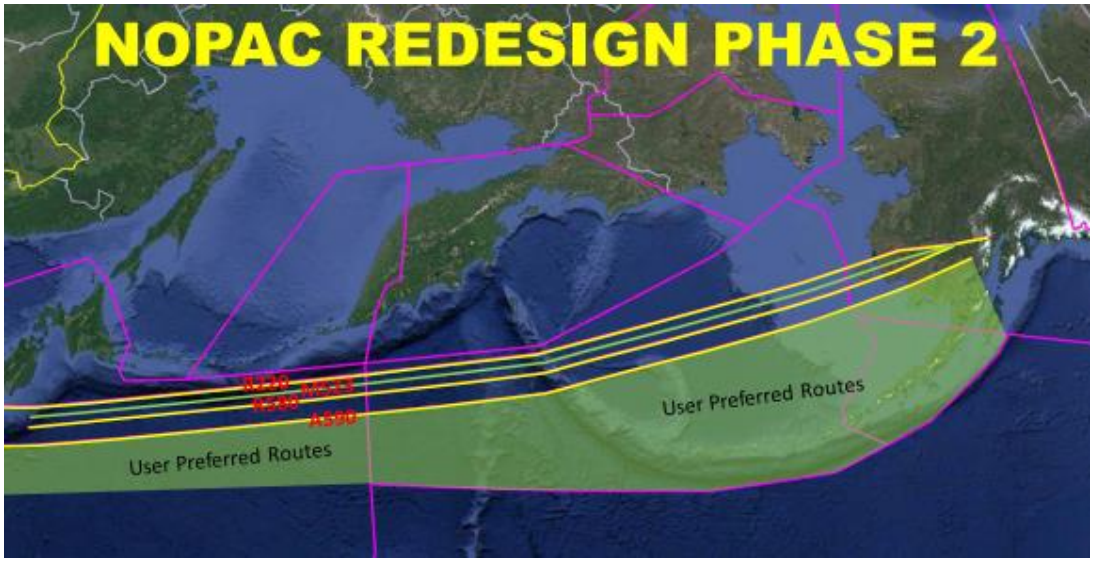

Figure 3, NOPAC Redesign Phase 2

1.6 Phase 3 of the NOPAC Redesign project is projected to begin around Mid-2024. In Phase 3, the new eastbound ATS Route N507 (depicted in green in **Figure 4**) will be established 25 NM south of R580. M523 is open to eastbound aircraft operating from FL340 through FL400 and closed to aircraft outside those altitudes. Most of ATS Route A590 will be removed in Phase 3, but the waypoints that define the route will be retained to assist with flight planning. In Phase 3, aircraft operating on R220, M523, R580, N507 and via the waypoints of the deleted A590 from FL340 through FL400 must have RCP 240, RSP 180 and RNP4 approvals to ensure lateral separation between the routes. Aircraft without

these approvals may operate on R220 and R580 at or below FL330, at or above FL410, or at least 75 NM south of ATS Route N507. The airspace 75 NM or more south of N507 has no PBCS requirements.

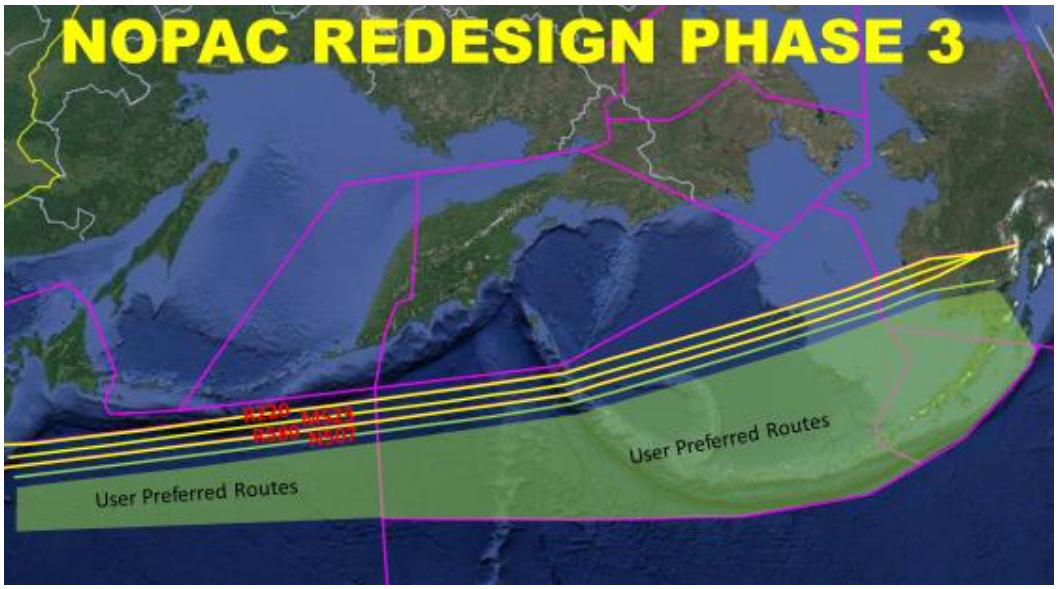

Figure 4, NOPAC Redesign Phase 3

2. DISCUSSION

2.1 In order to apply the PANS-ATM 5.4.1.2.1.6, 23 NM lateral separation minimum between the NOPAC Redesign Phase 2 and 3 routes, aircraft must be RCP240, RSP180 and RNP4 approved from FL340 through FL400. Fukuoka ATMC and Anchorage ARTCC determined that 90% or more of the aircraft operating in the NOPAC airspace would need to have these approvals before the NOPAC routes could be published with 25 NM between the routes. If less than 90% of the aircraft have the RCP240, RSP180 and RNP4 approvals, it was deemed that the controller workload would be too great to manage the airspace.

2.2 PBCS requirements were globally implemented in March 2018 and in July 2018, the percentage of aircraft with RCP240 and RSP180 approvals in the Anchorage Oceanic FIR was only around 48%. IATA conducted a survey of their member airlines without PBCS RCP240 and RSP180 approvals and they concluded that the majority of their members would obtain their PBCS approvals by the end of 2020. Based on this information, a tentative schedule to begin the phased implementation of the NOPAC Redesign project was set for the first quarter of 2022.

2.3 For several years, JCAB, IATA and the FAA took many efforts to ensure operators were aware of the future NOPAC Redesign Project requirements for RCP240, RSP180 and RNP4 on the routes. IATA Coordinated with their members and made them aware of the project requirements. Data was collected for the first 7 months of 2019 on NOPAC airway usage by Non-IATA members without PBCS and RNP4 approvals in their flight plans. Twelve non-IATA operators with 10 flights or more during the 7-month period were contacted and advised of the NOPAC Redesign Project.

2.4 Operators recognize the benefits of the NOPAC Redesign Project and have been obtaining their PBCS and RNP4 approvals in anticipation of the changes. In January 2020, the percentage of aircraft operating in NOPAC had risen from 48% to 74% and the progression was looking good. Then the COVID-19 pandemic hit and by March 2020 the percentage of PBCS and RNP4 approved aircraft had fallen to 54%. During the pandemic, NOPAC passenger aircraft flights decreased and less equipped cargo flights increased leading to the PBCS and RNP4 approvals decline. JCAB, IATA and the FAA continued to work with NOPAC Airspace Users through the pandemic to advise them of the NOPAC Redesign Plan and the NOPAC route requirements. Through the COVID Pandemic, operators have

been very supportive of the NOPAC Redesign Project and the percentage of PBCS and RNP4 approved aircraft in NOPAC continued to climb and reached near 92% in June 2023.

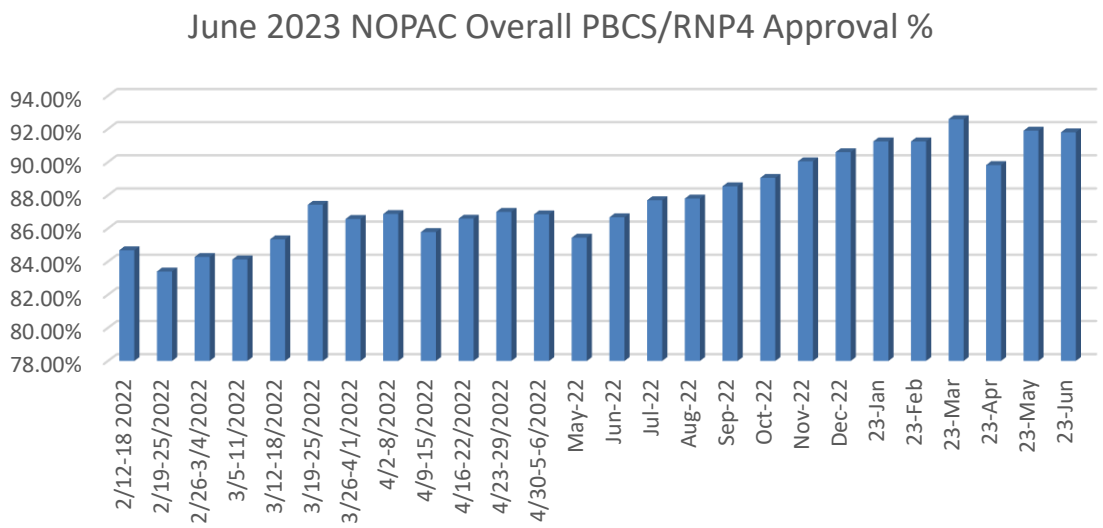

Figure 5, NOPAC PBCS and RNP4 Approvals level

2.5 Discussions with operators that plan to obtain their PBCS approvals before the end of 2023 indicate that the percentage of PBCS/RNP4 approved aircraft will rise to around 96% by the end of the year. When you consider that many of the aircraft without PBCS/RNP4 approvals operate outside of the FL340-FL400 altitude stratum, the percentage of approved aircraft is even higher than 96%.

2.6 The percentage of PBCS/RNP4 approved aircraft operating in NOPAC is extremely high. The NOPAC Redesign Project has been a collaborative effort to take advantage of the enhanced capabilities in the airspace to improve airspace efficiency. After almost 7 years of work on the project, operator coordination, airspace studies, COVID-19 setbacks and operator investment, the NOPAC Redesign Project is ready to proceed to its final phases in 2024. JCAB and the FAA appreciate all the support from IATA and the operators that was received to make this project the success it is. We are happy to see that NOPAC airspace users enjoy the benefits from this project for the years to come.

2.7 The NOPAC Redesign Project is a good example in the APAC that collaborative work with States/Administrations, operators and international organizations is essential to achieve an enhancement of airspace capacity. Implementation of reduced separation minima and beneficial ATS routes is needed. The reduced separation minima require aircraft performance and approval/authorizations. JCAB and the FAA continue to work on improving efficient operation in NOPAC and will continue to share our experience and progress to contribute to improving airspace capability and efficiency in the APAC region.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper, particularly the information in paragraphs 2.6 and 2.7, and

b) discuss any relevant matters as appropriate.

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