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WORKING PAPER

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

EXPANDING AIRSPACE CAPACITY BY INTRODUCING NEW SEPARATION STANDARDS IN OCEANIC CONTROL AREAS

(Presented by Japan)

EXECUTIVE SUMMARY

This paper provides an update on the status of the NOPAC Redesign Project, which is being jointly undertaken by Japan Civil Aviation Bureau (JCAB), Federal Aviation Administration (FAA) and International Air Transport Association (IATA) highlighting the expansion of airspace capacity and improvements in operational efficiency through the introduction of new separation standards, and also calls for the sharing of best practices regarding emergency response procedures in the event of a data link failure, which remains a key challenge for this operation.

The NOPAC route redesign, which began on 2 December 2021, is expected to expand the available airspace for UPR through route compression, and ultimately, to shorten flight paths for many aircraft by bringing the routes closer to the great circle route. However, in the Anchorage flight information region (FIR) connectivity issues have arisen during the transition between very high frequency (VHF) data link and satellite data link, affecting the reliability of the 23NM lateral separation standard. Due to these data link connectivity issues, the transition to Phase 3 has been postponed. Going forward, it will be necessary to consider the progress of the NOPAC route Redesign Project and long-term options for mitigating the impact of data link failures.

Action: The Assembly is invited to:

a) note the challenges faced by States to date in relation to the NOPAC Redesign Project;
b) encourage States, international organizations, and industry stakeholders to promote the expansion of airspace capacity through the introduction of new separation standards, while enhancing the reliability of data-link services, given their critical role in the safe application of reduced separation standards; and
c) encourage ICAO to develop and finalize a streamlined framework for emergency response procedures in the event of data link failures.

Strategic Objectives:	This working paper relates to *Every Flight is Safe and Secure* and *Aviation Delivers Seamless, Accessible, and Reliable Mobility for All*.
Financial implications:	No additional resources are required.

References:	Annex 11 — *Air Traffic Services* Doc 4444, *Procedures for Air Navigation Services - Air Traffic Management* Doc 9869, *Performance-based Communication and Surveillance (PBCS) Manual*

1. INTRODUCTION

1.1 The North Pacific Air Route (hereinafter referred to as "NOPAC routes") originally consisted of five parallel air routes spanning the Fukuoka flight information region (FIR) and Anchorage FIR and constitute the busiest airspace in the Pacific region due to their proximity to the great circle route between North America and Asia.

1.2 When the NOPAC routes were created, a combination of a minimum lateral separation of 100 NM and the minimum vertical separation of 2,000 ft, - referred to as "composite separation" - was applied. With subsequent improvements in aircraft performance, the lateral separation between the NOPAC routes was reduced to 50 NM and the vertical separation to 1,000 ft. Furthermore, in November 2016, a revision to international standards for air traffic management (ATM) procedures enabled a further reduction in lateral separation from 30 NM to 23 NM using conventional surveillance systems and data link communication.

1.3 In response, the Informal Pacific ATC Coordinating Group (IPACG), a forum between the U.S. Federal Aviation Administration (FAA) and the Japan Civil Aviation Bureau (JCAB), began discussions on the redesign of the NOPAC routes to enable more effective use of airspace through the application of 23 NM separation, and has developed a phased implementation plan. In accordance with this plan, the redesign of the NOPAC routes began in December 2021 and is currently ongoing.

1.4 The redesign of the NOPAC routes has been conducted in four phases, ultimately resulting in four air routes with 25 NM separation between them.

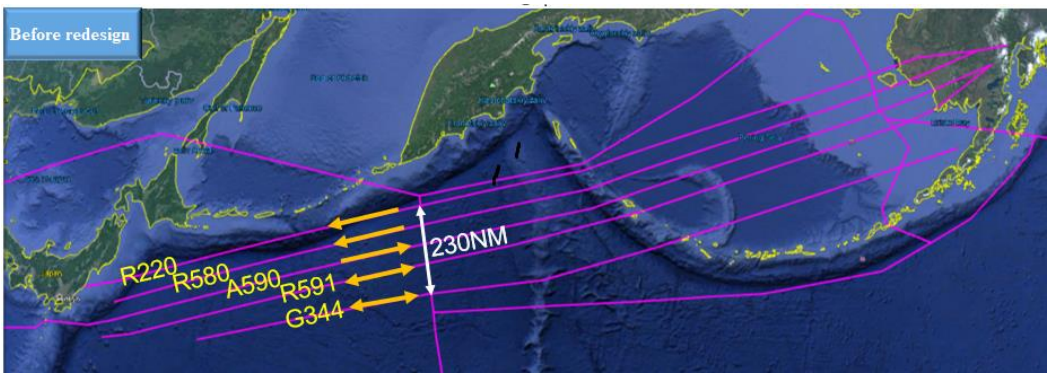

Figure 1: NOPAC routes before redesign[1]

[1] Figures were submitted in EN only.

Phase No.	Start Date	Outline
1a	December 2, 2021	No route changes within the Fukuoka FIR; however, the route within the Anchorage FIR has been slightly shifted to the south. Two new routes have been established.
1b	February 23, 2023	Two routes located south of A590 (R591, G344) have been removed. The northernmost NOPAC route (R220) has been modified to operate based on specific navigation performance requirements.
2	January 25, 2024	A new route dedicated for westbound traffic (M523) has been established. One westbound route (R580) has been converted to an eastbound route.
3	TBD	A new eastbound-only route (N507) will be established. It will be available to aircraft that meet specific navigation performance requirements, subject to altitude restrictions. The southernmost eastbound-only route (A590) will be removed.

Figure 2: Phased implementation of the NOPAC route redesign

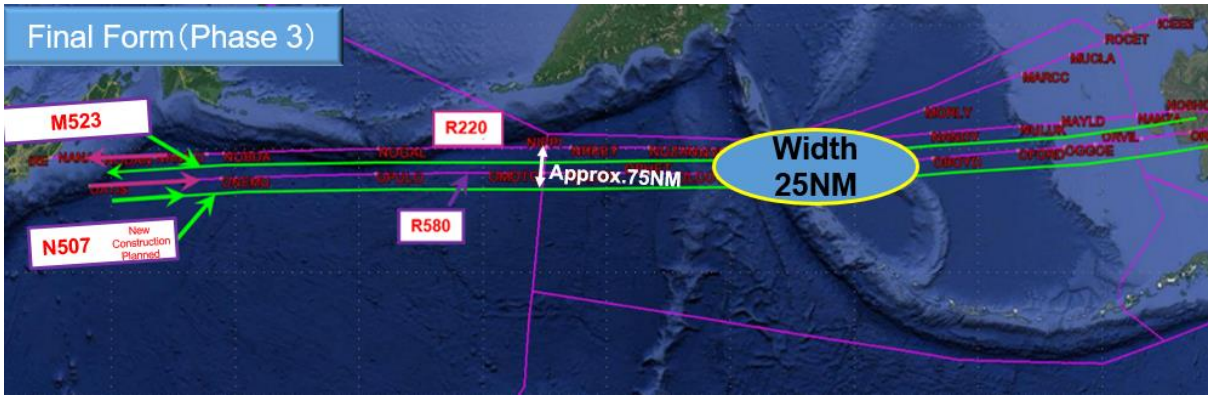

Figure 3: Final configuration of the NOPAC route redesign[1]

2. DISCUSSION

Benefits of the NOPAC route redesign

2.1 The main operational benefits of the NOPAC route redesign are as follows:

a) expansion of the airspace available for user-preferred route (UPR) by compressing the NOPAC routes—from a total width of approximately 230NM/5 routes to approximately 75NM/4 routes;

b) alignment of the NOPAC routes closer to the great circle route by compressing them northward, thereby shortening flight paths for many aircraft; and

c) optimization of the airspace through the establishment of a dedicated altitude zone within the NOPAC routes for aircraft approved for RNP4 and PBCS (*), thereby eliminating the mixed operation of PBCS-approved and non-PBCS-approved aircraft (*PBCS-approved aircraft refers to those approved for RCP240/RSP180).

Issues and Considerations

2.2 The redesigned NOPAC routes are based on RNP4, RSP180, and RCP240 standards. However, a major communication network failure in 2024 led to increased reliance on emergency procedures (procedural management of the traffic) coordinated between the Anchorage FIR and the Fukuoka FIR. In addition, in Anchorage's oceanic airspace, the transition from VHF data link to satellite data link has caused connectivity issues, affecting the reliability of the 23NM lateral distance standard. Although several VDL sites provide adequate coverage, performance degradation has been observed during the transition phase.

2.3 Due to traffic congestion along the NOPAC routes, it is crucial to ensure robust emergency procedures; however, the positional relationship between routes R220 and M523 makes it difficult to immediately establish a 50NM lateral separation in the event of a data link failure. Going forward, we will explore ways to improve the redesigned NOPAC routes with consideration for traffic congestion and emergency preparedness. Given the data link connectivity issues, we believe that proceeding to Phase 3 of the NOPAC redesign with the current design is not feasible, and the transition to Phase 3 has been postponed until these issues are resolved. Moving forward, it will be necessary to consider the progress of the NOPAC Redesign Project and long-term options for mitigating the impact of data link failures.

3. CONCLUSION

3.1 The NOPAC route redesign, based on the standards of RNP4, RSP180, and RCP240, will bring diverse benefits upon completion; however, to continue the project, it is necessary to mitigate the impact of data link failures. This issue is common not only for air routes that rely on data links in oceanic airspace but also for those over land.

3.2 States, international organizations, and industry stakeholders are encouraged to promote the expansion of airspace capacity through the introduction of new separation standards. ICAO may also develop a new streamlined framework for emergency response procedures in the event of data link failures, with the ultimate objective of proposing a set of recommendations for endorsement by the Assembly.

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