INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

REPORT OF THE FOURTH MEETING OF ICAO SOUTH-EAST ASIA REQUIRED NAVIGATION PERFORMANCE IMPLEMENTATION TASK FORCE (RNP-SEA/TF/4)

SINGAPORE

5 – 7 November 2008

The views expressed in this report should be taken as those of the Task Force and not of the Organization

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1.1 Introduction

1.1.1 The fourth meeting of ICAO South-East Asia Required Navigation Performance Implementation Task Force (RNP-SEA/TF/4) was held at the Singapore Aviation Academy, Singapore from 5 to 7 November 2008.

1.2 Attendance

1.2.1 RNP-SEA/TF/4 was attended by 35 participants from China, Hong Kong China, Malaysia, Singapore, Thailand, Viet Nam, IATA and IFALPA. A complete list of participants is at **Appendix A** to this Report.

1.3 Officers and Secretariat

1.3.1 Mr. Peter Rabot, Head (School of ATS), Singapore Aviation Academy, Civil Aviation Authority of Singapore (CAAS) continued as the Chairperson of the Task Force. Mr. Kyotaro Harano, Regional Officer, Air Traffic Management (ATM), ICAO Asia and Pacific Office served as the Secretary for the meeting.

1.4 Opening of RNP-SEA/TF/4

1.4.1 Mr. Peter Rabot extended a warm welcome to all of the participants. He recalled that this was the third time they were meeting this year and the first time since the implementation of 50 NM/50 NM separation was introduced on RNAV routes L642 and M771 in July 2008. The meeting would focus on post-implementation issues and also, on the future direction of the Task Force. He was sure they had much to discuss and report.

1.4.2 Mr. Rabot had always maintained that the experience and expertise of the members of the Task Force, working in unison, was vital to the common goal, which is to achieve a safe and more efficient movement of traffic and enhancing airspace capacity in the region. It was his hope that they, at that meeting, could achieve further positive steps towards their goal of enhancing and improving efficiency of the air routes in the region as they discuss the future work of the Task Force.

1.4.3 On behalf of the Task Force, Mr. Rabot thanked Singapore for hosting the fourth meeting here at Singapore Aviation Academy. With much to do within the time they had allocated, he concluded by wishing all, a fruitful meeting and a pleasant stay in Singapore.

1.4.4 On behalf of Mr. Mokhtar A. Awan, Regional Director, ICAO Asia and Pacific Office, Mr. Kyotaro Harano welcomed all the participants to the meeting. He expressed sincere appreciation to the warm welcome and the generous assistance provided by Singapore in hosting the meeting at the excellent facility of Singapore Aviation Academy. Horizontal separation had been successfully reduced since 3 July 2008 on L642 and M771 thanks to the teamwork effort of the Task Force. Mr. Harano expressed congratulations to all of them. The second meeting as well as the third meeting had achieved some concrete steps to implement RNP 10 operations on L642 and M771. Subsequently, the third meeting took a “Go” decision to implement RNP 10 based 50 NM/50 NM separation on the South China Sea routes L642 and M771. Mr. Harano congratulated the Task Force for achieving the work in timely manner.

1.4.5 Mr. Harano requested the meeting to discuss the next plan of the Task Force. Traffic volume was continuing to increase across the region. To cope with the traffic increase, he hoped that now the Task Force had completed RNP 10 based 50 NM/50 NM separation on L642 and M771, the Task Force could move on to other initiatives aiming for increasing efficiency.

1.4.6 Mr. Harano informed the meeting that Mr. Brian Colamosca had received the Laurel award from ICAO Air Navigation Commission (ANC). Mr. Colamosca had long been working for the United States Federal Aviation Administration (FAA) and for the RVSM implementation in Asia and Pacific Region, and was now working for reduced separations in the horizontal plane in this region. The meeting applauded Mr. Colamosca.

1.4.7 Mr. Rosly Bin Md Saad, Head (Air Traffic Control Operations), Singapore Air Traffic Control Centre extended a warm welcome to the participants to the meeting and to Singapore. He acknowledged the ICAO Regional Office and the Task Force members for their achievement during the past three meetings. On behalf of Civil Aviation Authority of Singapore, he wished the meeting participants a fruitful meeting and a pleasant stay in Singapore.

1.5 Documentation and Working Language

1.5.1 The working language of the meeting as well as all documentation was in English.

1.5.2 Eleven Working Papers and five Information Papers were presented to RNP-SEA/TF/4. A list of papers is included at **Appendix B** to this Report.

Agenda Item 1: Adoption of Agenda

Adoption of Agenda

1.1 The meeting adopted the following agenda:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Review Outcomes of Related Meetings

Agenda Item 3: Operational Issues

Agenda Item 4: Safety Analysis and Airspace Monitoring Issues

Agenda Item 5: Post-Implementation Management Considerations

Agenda Item 6: Future Direction and Arrangements

Agenda Item 7: Update RNP-SEA/TF Task List

Agenda Item 8: Any Other Business

Agenda Item 9: Date and Venue for the RNP-SEA/TF/5

Agenda Item 2: Review Outcomes of Related Meetings

Outcomes of APANPIRG/19

2.1 The meeting reviewed the outcomes of the 19th meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/19, September 2008).

Amendments to ICAO Flight Plan

2.2 APANPIRG/19 noted that on 28 May 2008, Amendment 1 to the Fifteenth Edition of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) was approved, calling for substantial changes to ICAO flight plan format to take effect from 15 November 2012. During the discussions on this topic, APANPIRG/19 raised the concern that the implementation of the new flight plan format in a non-integrated manner could result in flight plans being rejected or processed improperly by States that have not yet transitioned. The changes would have widespread implications on automated systems.

2.3 In order to assist States for an orderly transition from the current flight plan to the new one, a basic checklist, using an ICAO performance framework form (PFF), had been developed by the ICAO headquarters and is available in **Appendix C** to this report. Additional guidance on transition to the new flight plan was being developed by the ICAO headquarters and was scheduled to be made available to States by February 2009. Interim guidance is included as **Appendix D** to this report. In order to ensure that the implementation would be appropriately addressed on a regional basis, APANPIRG/19 agreed to Decision 19/6 – Establishment of an ICAO Flight Plan & ATS Message Implementation Task Force and drafted preliminary terms of reference (TOR) accordingly.

Ocean ATM Enhancements and Environmental Benefits

2.4 APANPIRG/19 noted that Japan Civil Aviation Bureau (JCAB) was planning to develop tracks where 30 NM lateral separation would be applied, taking into account the readiness of operators and the growth of the number of RNP 4 approved aircraft. Noting that APANPIRG/19 had adopted an interim regional PBN implementation plan which set the target for RNP 4 implementation in oceanic airspace as short term (2008-2012), Japan urged operators to equip their aircraft with RNP 4 avionics and obtain approval from the States of Registry/Operators as early as possible. In this context, APANPIRG/19 noted that suitable ground equipment to support RNP 4 operations was already being used by both Japan and the United States for the Pacific operations, so aircraft equipping with RNP 4 avionics would gain immediate benefits. Accordingly, APANPIRG/19 formulated Conclusion 19/7 – RNP 4 Capability for Operators.

Indonesia - ADS/CPDLC Trial in the Ujung Pandang FIR

2.5 APANPIRG/19 considered information from Indonesia which described how Indonesia had installed ADS/CPDLC in Ujung Pandang Area Control Centre (ACC). Indonesia informed APANPIRG/19 that the trial operations of ADS/CPDLC in the Ujung Pandang flight information region (FIR) would be effected from 3 July to 3 October 2008 for the ATS routes A461, B462, B472, B473, B583, B584 and R340/R590. APANPIRG/19 noted that international flights involved in the trial and operating on these routes would use CPDLC for main communication and VHF voice communication for back up.

Data Link Implementation in the Manila FIR

2.6 Philippines updated APANPIRG/19 in respect to their CNS/ATM Implementation Programme. APANPIRG/19 noted that the project included provision for ADS-C and CPDLC but that commissioning of this equipment was not scheduled until late 2012, some four years hence.

2.7 APANPIRG/19 recognised that the Manila FIR was the last integral part for seamless data link operations in the entire South China Sea area, including a large component of the high capacity parallel route structure between Southeast Asia and Japan/North America. APANPIRG/19 recognized that reduced separations as a result of seamless data link operations between adjacent airspaces were becoming more and more important in the situation of increasing fuel prices and environmental pressures. APANPIRG/19 urged the Philippines to consider appropriate steps for ADS/CPDLC data link services to be provided in the Manila FIR as soon as possible and developed Conclusion 19/12 – Accelerated Data Link Implementation in the Manila Flight Information.

Summary of the Third Meeting of Asia/Pacific Performance Based Navigation Task Force

2.8 The meeting reviewed the outcomes of the third meeting of the PBN Task Force (PBN/TF/3, July 2008) which was held in Bangkok, Thailand at the Regional Office.

2.9 The RASMAG text for the PBN Regional Implementation Plan was presented by the Secretariat. PBN/TF/3 noted that the Regional Airspace Safety Monitoring Advisory Group (RASMAG) was established in 2004 by APANPIRG to achieve a regional approach for coordination and harmonization of airspace safety monitoring activities, and to provide assistance to States in this respect. The ninth meting of RASMAG (RASMAG/9, May 2008) studied the outcomes of PBN/TF/1 (January 2008) and PBN/TF/2 (April 2008), noting the excellent progress that was being made toward the drafting of regional and State PBN implementation plans.

2.10 New Zealand provided the results of a review of the PBN Manual Structure. New Zealand stated that the review of the PBN Manual had identified a number of shortcomings, however, the basic structure of the manual was correct. The most significant issue was that the Manual did not define an end state goal to enable long term planning. Definition of the end state was essential for long term State and regional air navigation system and financial planning. The RNP/RNAV MASPS, with some relatively small changes, had the potential to be the defined end state.

2.11 Reports of the Regional PBN Implementation Planning Sub-group and the State PBN Implementation Sub-group were presented to the Plenary Session of PBN/TF/3. The regional PBN implementation plan was presented to the meeting under Agenda Item 6.

Agenda Item 3: Operational Issues

Benefits from the Implementation of 50 NM Lateral and Longitudinal Separations Based on RNP 10 Operations on RNAV Routes L642 and M771 in the Singapore FIR

3.1 Singapore presented the meeting with the benefits gained with the implementation of 50 NM horizontal separations based on RNP 10 operations on RNAV routes L642 and M771 in the Singapore FIR. The meeting noted the following:

a) Route Capacity and Utilisation

i) Traffic sample data (TSD) was collected over two months on RNAV routes L642 and M771. The period of collection commenced two weeks after the implementation and the data collected were compared with the TSD collected for a similar period in 2007, i.e. TSD collected for the periods between 15 July – 15 September 2008 and 15 July – 15 September 2007. The two weeks' time lag was to allow the application of the RNP 10 50 NM/50 NM procedures to reach a steady state so as to remove any inconsistency in the statistics as much as possible.

ii) Based on the longitudinal separation of 80 NM (10 min), the route capacity on a single flight level would be calculated as six movements per hour, or 36 movements per hour for six flight levels. The reduction to 50 NM (~6.25 min) longitudinal separation would hypothetically increase the route capacity to 9.6 movements per hour, or 57.6 movements per hour for six levels, a 60% increase. It should be noted, however, that it would be unrealistic to expect aircraft movements at this rate for a sustained period of time due to the varying speed of aircraft. Nonetheless, comparison of air traffic movement rate was valuable in determining route utilisation after implementation.

iii) The maximum movement rate on M771 before implementation of 50 NM longitudinal separation was 14 movements per hour. After implementation, the maximum movement rate on M771 stands at 15 movements per hour, a 7% increase, whereas on L642 the maximum movement rate had gone up from 11 to 13 movements per hour, an 18% increase. Increase in route utilisation contributed to other benefits such as reduction in departure delays, better flight level optimisation and flexibility for ATC to assign more optimum flight levels.

b) Departure Delays on M771

i) Besides route capacity and utilisation, a comparison was made on the departure delays on M771 before and after the implementation. A two-month TSD was taken to measure delays for flights departing from Changi Airport and operating on RNAV route M771. The data collected showed that average delay per flight had reduced from 1.28 minutes down to 1.09 minutes, a 15% reduction.

c) Flight Safety

i) The implementation of 50NM lateral separation had also brought about enhanced flight safety. Seasonal weather build-ups over the South China Sea area constantly affected flights en-route. RNAV routes M771 and L642 were currently spaced approximately 60 NM apart. With the implementation of 50 NM lateral separation for flights operating on M771 and L642, weather deviations of up to 10 NM could be permitted as long as lateral separation of 50 NM could be maintained between flights on adjacent routes occupying the same flight level without a breakdown in lateral separation. Controller-pilot response time had also improved such that flights had a better chance of avoiding thunderstorms with ATC clearances instead of having to carry out weather deviation contingencies on their own.

ii) The onset of typhoon season over the north-eastern part of the South China Sea had reduced the opportunity for controllers to apply the reduction of separation especially when Large Scale Weather Deviation (LSWD) procedures were activated.

3.2 China informed the meeting that they did not face any operational issues regarding flight safety and navigation errors since the implementation of RNP 10 operations on L642 and M771. Hong Kong, China advised the meeting that there was improvement to traffic flow on L642 during their departure peak hours. However, RNAV distance-based procedures on succeeding traffic cruising at a faster speed than the preceding traffic was not clearly defined in ICAO documents and was causing a concern to operational controllers. Also, the typhoon season had not allowed the full benefits of RNP 10 operations to be achieved and the LSWD procedures were activated approximately 29 times. Hong Kong, China informed the meeting that the LSWD procedures would be reviewed at the next Western Pacific/South China Sea RSVM Scrutiny Group meeting. Malaysia and Viet Nam informed the meeting that they did not encounter any difficulties since the implementation of RNP 10 operations on L642 and M771.

IFALPA's Requesting Letter Regarding the Improvement of HF Communication in the Manila FIR

3.3 IFALPA presented the meeting its letter to the Philippines requesting the improvement of HF communication in the Manila FIR. Further improvement of communication system utilizing the data link in the Manila FIR would allow for reduced separation minima on the trunk routes N884, N892, L625 and M767. The improvement of communication in the Manila FIR is important not only for the reduction of the separation minima on these trunk routes but also to keep the flight safety. According to the report of APANPIRG/19, the Philippine was going to implement the New CNS/ATM Systems Development Project funded under the 25th Yen Loan Package of Japan Bank for International Cooperation (JBIC), which project is in accordance with the ICAO Global Air Navigation Plan (Doc 9750) to cope with the projected increased in air traffic demand.

3.4 This project had not been started yet, and even if the project is carried out according to its schedule, the implementation should be waited until February to May of 2013 for the completion. Thousands of flights had to wait under the inconvenient and unsafe condition in the Manila FIR until then. The improvement of the current HF communication system in Manila FIR without delay was very important to keep the flight safety that is facing in front of daily flights. IFALPA had requested the Philippines to improve the communication performance in the Manila FIR as in **Appendix E** to this report.

Agenda Item 4: Safety Analysis and Airspace Monitoring Issues

Post-implementation Assessment of the Safety of 50 NM Lateral and Longitudinal Separation Standards on RNAV Routes L642 and M771

4.1 Singapore presented the meeting with the post-implementation safety assessment of implementing 50 NM lateral and 50 NM longitudinal separation on RNAV routes L642 and M771. Tables 1 and 2 below show, respectively, flight level use on L642 and M771, as observed in the Singapore FIR, for the four month period after the introduction of the separation changes on L642 and M771 (and contemporaneous change in the South China Sea flight level orientation scheme (FLOS)) and the same calendar period from 2007. As noted, the flight levels preferred for operations had changed as the result of the change in the FLAS. Prior to the FLAS change, FL 380 appeared to be the preferred flight level on both L642 and M771. The first preference now differs by route. In general, the difference in flight level use before and after the 3 July separation change may had lead to a different value of occupancy, or exposure to risk.

	3/7/2007 – 3/10/2007		3/7/2008 – 3/10/2008	
FL	Count of Flights	Proportion of Flights	Count of Flights	Proportion of Flights
290	6	0.000921	0	0
300	47	0.007211	3	0.000481
310	0	0	73	0.011708
320	413	0.063363	332	0.053248
330	83	0.012734	5	0.000802
340	943	0.144676	29	0.004651
350	13	0.001994	901	0.144507
360	1677	0.257288	1859	0.298156
370	28	0.004296	12	0.001925
380	1768	0.271249	63	0.010104
390	20	0.003068	1555	0.249399
400	1449	0.222307	1307	0.209623
410	71	0.010893	96	0.015397
Grand Total	6518	1	6235	1

Table 1: Comparison of Flight Level Use on L642, for Same Calendar Period Pre- and Post-Separation-Change and FLAS Change

	3/7/2007 – 3/10/2007		3/7/2008 – 3/10/2008	
FL	Count of Flights	Proportion of Flights	Count of Flights	Proportion of Flights
290	5	0.000766	25	0.0037
300	141	0.021603	3	0.000444
310	1	0.000153	281	0.041593
320	590	0.090394	535	0.079189
330	2	0.000306	1	0.000148
340	1482	0.227057	20	0.00296
350	11	0.001685	1689	0.25
360	1743	0.267045	1875	0.277531
370	17	0.002605	25	0.0037
380	1699	0.260303	14	0.002072
390	21	0.003217	1575	0.233126
400	793	0.121495	670	0.099171
410	22	0.003371	43	0.006365
Grand Total	6527	1	6756	1

Table 2: Comparison of Flight Level Use on M771, for Same Calendar Period Pre- and Post-Separation-Change and FLAS Change

Review of Operational Concept Underlying Planned Application of 50 NM Lateral and Longitudinal Separation Standards in South China Sea Airspace

4.2 The November 2001 introduction of the six RNAV routes into the South China Sea provided for a 60 NM lateral separation standard between the three pairs of RNAV routes. From 3 July 2008, the lateral separation standard between L642 and M771 is 50 NM, although the locations of the two routes have not changed. Rather, the concept of operation for application of the 50 NM lateral separation standard is that air traffic control will have the flexibility to clear an aircraft to deviate up to 10 NM from route centerline – to accommodate a pilot request for a weather-related deviation, for example – without the need for action to ensure maintenance of safe lateral separation from aircraft on the adjacent route.

4.3 The concept of operation for application of 50 NM longitudinal separation took advantage of the nearly complete radar and VHF voice radio coverage of the two routes, calling for use of the 50 NM standard between any two same-altitude aircraft on either route. The concept of operation does not rely on CPDLC and ADS being fitted to an aircraft; rather, advantage is taken of the highly developed ground communications and surveillance infrastructure in the Hong Kong, Ho Chi Minh and Sanya FIRs. In the Singapore FIR, 50 NM longitudinal separation is applied between aircraft equipped with CPDLC.

Monitoring of Navigational Performance in South China Sea Airspace

4.4 A programme to monitor the lateral and longitudinal deviations of aircraft assigned to the RNAV routes was implemented when the routes became operational in November 2001. Through the Letter of Agreement (LOA) signed by the air navigation service providers of the six South China Sea FIRs, there had been uninterrupted radar monitoring of both individual-aircraft lateral and longitudinal errors, and also no unexpected changes in longitudinal separation between aircraft pairs,

at fixes near the end of flight on routes M771, L625, N884 and N892 since introduction of the RNAV routes. A revised LOA added formally Singapore's surveillance of L642 and M767 to the monitoring program. In fact, Singapore has been monitoring these routes since November 2001.

4.5 Under the LOA, all instances of 15 NM or greater magnitude lateral errors observed on any of the RNAV routes are reported to Singapore, which has acted as the monitoring program coordinator since introduction of the RNAV routes. To date, two instances of such larger lateral errors have been reported. Neither error occurred on either L642 or M771.

4.6 If time-based separation is being applied to a pair of co-altitude aircraft, monitoring of longitudinal errors under the LOA requires that a report be sent to Singapore if: (a) the 10 minute minimum is infringed, (b) the expected time between the pair varies by 3 minutes or more, even if the separation standard is not infringed, or (3) a pilot estimate varies by 3 minutes or more from that advised in a routine position report. If distance-based separation pertains, a report is to be sent if: (a) the separation standard is infringed, or (b) the expected separation between a pair of aircraft varies by 10 NM or more, even if the separation standard is not infringed.

4.7 From 3 July through the end of October 2008, there was no report of lateral errors of 15 NM or greater magnitude for operations on L642 and M771. Also, there had been no reports of large individual-aircraft longitudinal errors or loss of longitudinal separation between pairs of aircraft.

4.8 The pre-implementation safety assessment presented at RNP-SEA/TF/3 had used the internationally applied collision risk methodology which has supported airspace separation changes in several ICAO regions. The methodology consisted of estimating the risk of midair collision for the proposed standard and comparing the risk estimate to a safety goal, the Target Level of Safety (TLS). APANPIRG had adopted the value of 5×10^{-9} fatal accidents per flight hour as the TLS for each separation dimension – lateral, longitudinal and vertical – in the Asia and Pacific Region. It was noted that if the estimated risk is less than the TLS, the outcome of applying the methodology is to support the proposed change.

4.9 The results of applying the collision risk methodology to the separation changes proposed for L642 and M771 showed that both the 50 NM lateral and longitudinal separation standards met the applicable regional TLS values. As a result, the outcome of the safety assessment supported introduction of the separation changes.

4.10 The purpose of a 90-day follow-up safety assessment was to confirm that the risk remained within the TLS value for each separation change. This confirmation would be found if the factors affecting risk are within the bounds forecast by the pre-implementation safety assessment.

4.11 Singapore had assembled traffic movement data for operations on L642 and M771 to support examination of factors affecting post-implementation risk. Table 1 above summarized flight-level use determined from this information. As noted previously, the results of the South China Sea monitoring program, as reported to Singapore since 3 July 2008, are that there have been no large lateral or longitudinal errors on either L642 or M771.

4.12 The pre-implementation safety assessment presented a description of the collision risk model applied in the pre-implementation safety assessment. After review of the assumptions and mathematical derivation, the forms of the lateral and longitudinal collision risk models were shown to be:

$$N_{ay} = P_y(S_y)P_z(0)\frac{\lambda_x}{S_x}\left\{E_y(same)\left[\frac{\overline{|\dot{x}|}}{2\lambda_x}+\frac{\overline{|\dot{y}|}}{2\lambda_y}+\frac{\overline{|\dot{z}|}}{2\lambda_z}\right]+E_y(opp)\left[\frac{\overline{V}}{2\lambda_x}+\frac{\overline{|\dot{y}|}}{2\lambda_y}+\frac{\overline{|\dot{z}|}}{2\lambda_z}\right]\right\} \quad (1)$$

and:

$$N_{ax} = P_y(0)P_z(0)\frac{2\lambda_x}{\overline{|\dot{x}|}}\left[\frac{\overline{|\dot{x}|}}{2\lambda_x}+\frac{\overline{|\dot{y}|}}{2\lambda_y}+\frac{\overline{|\dot{z}|}}{2\lambda_z}\right]\times\int_m^M\left(\int_s^M f(s,l)dl\right)ds \quad (2)$$

Review of Post-Implementation Lateral Risk

4.14 A table of the pre-implementation safety assessment (Table 3 below) provided descriptions and estimated values for the parameters of the lateral risk model, equation (1), above. As can be seen from inspection of the table, most parameter values – aircraft dimensions and relative speeds, for example - would not be expected to change as the lateral separation standard changed from 60 NM to 50 NM, especially since there was no actual relocation of the routes on 3 July 2008.

Model Parameter	**Description**	**Value Used in Preliminary Safety Assessment**	**Source for Value**
N_{ay}	Risk of collision between two aircraft with planned 50-NM lateral separation	5.0×10^{-9} fatal accidents per flight hour	TLS adopted by APANPIRG as safety goal for changes in separation minima
S_y	Lateral separation minimum	50 NM	Goal of RNP-SEA Task Force
$P_y(50)$	Probability that two aircraft assigned to parallel routes with 50-NM lateral separation will lose all planned lateral separation	2.69×10^{-9}	Value required to meet exactly the TLS value of 5×10^{-9} fatal accidents per flight hour, given other parameters used in the preliminary safety assessment.
λ_x	Aircraft length	0.0399 NM	Merged December 2007 TSDs
λ_y	Aircraft wingspan	0.0329 NM	
λ_z	Aircraft height	0.0099 NM	
$P_z(0)$	Probability that two aircraft assigned to the same flight level will be at the same geometric height	0.538	Commonly used in safety assessments
S_x	Length of the interval, in NM, used to count proximate aircraft at adjacent fix for occupancy estimates	+120 NM to -120 NM, equivalent to the +15-minute to -15-minute pairing criterion used in the safety assessment, for aircraft operating at 480kts.	Arbitrary criterion which does not affect the value of risk

Model Parameter	Description	Value Used in Preliminary Safety Assessment	Source for Value
E_y(same)	Same-direction lateral occupancy	0.0	Result of direction of traffic flows on L642 and M771
E_y(opp)	Opposite-direction lateral occupancy	0.78	MAAR estimate based on December 2006 TSD (reference 8)
$\overline{V}$	Aircraft along-track speed	483.9 kts.	Combined December 2007 TSDs
$\overline{\lvert\dot{y}\rvert}$	Average relative speed of a pair of aircraft as they lose all planned 50-NM lateral separation	75 kts.	Reference 8
$\overline{\lvert\dot{z}\rvert}$	Average relative vertical speed of a co altitude aircraft pair assigned to the same route	1.5 kts.	Conservative value commonly used in safety assessments

Table 3: Summary of Risk Model Parameters Used in Lateral Safety Assessment

4.13 The pre-implementation safety assessment noted that the importance of lateral occupancy, a measure of exposure to risk due to the relative density of aircraft at the same flight level on adjacent routes. The lateral risk model contains two occupancy parameters, one reflecting the relative density of aircraft on laterally adjacent routes with traffic on both routes operating in the same direction (E_y(same)) and the other (E_y(opp)) if traffic on the two routes is operating in opposite directions. Because L642 and M771 are unidirectional routes, E_y(same)=0.0, as is shown in Table 3.

4.14 One factor in Table 3, which may change, was the opposite-direction lateral occupancy, E_y(opp), due to the new FLOS rather than to the separation change. As noted in the pre-implementation safety assessment, the value for E_y(opp) in Table 3, 0.78, was originally developed by the Monitoring Agency for the Asia Region (MAAR) as part of a safety assessment of the 60 NM lateral standard. The value was considered to be conservative, in the sense that 0.78 is likely to represent an upper bound on the true value of the present E_y(opp).

4.15 The traffic movement data collected by Singapore was from the Singapore FIR. In order to obtain a more reliable estimate of the new value of E_y(opp) resulting from the change in FLAS, it is necessary to use traffic movement data from all FIRs in which flights operate on the two routes. This is so, since flight schedules and other factors may cause aircraft on the two routes at the same flight level to pass each other in any of the FIRs.

4.16 The annual regional collection of TSD is the optimum source for data to estimate an updated value for E_y(opp). It is, thus, recommended that a new value of E_y(opp) be determined from the 2008 TSD.

4.17 The pre-implementation safety assessment presented a simplified means of determining whether the lateral-risk TLS is satisfied at any time, based on the results of the South China Sea monitoring program. Instead of computing risk directly using equation (1) for comparison with the TLS, a sequential sampling chart, similar to those used in industrial quality control processes, is used to determine, at any time, whether the lateral TLS. Figure 1 below re-presents the control chart from the pre-implementation safety assessment.

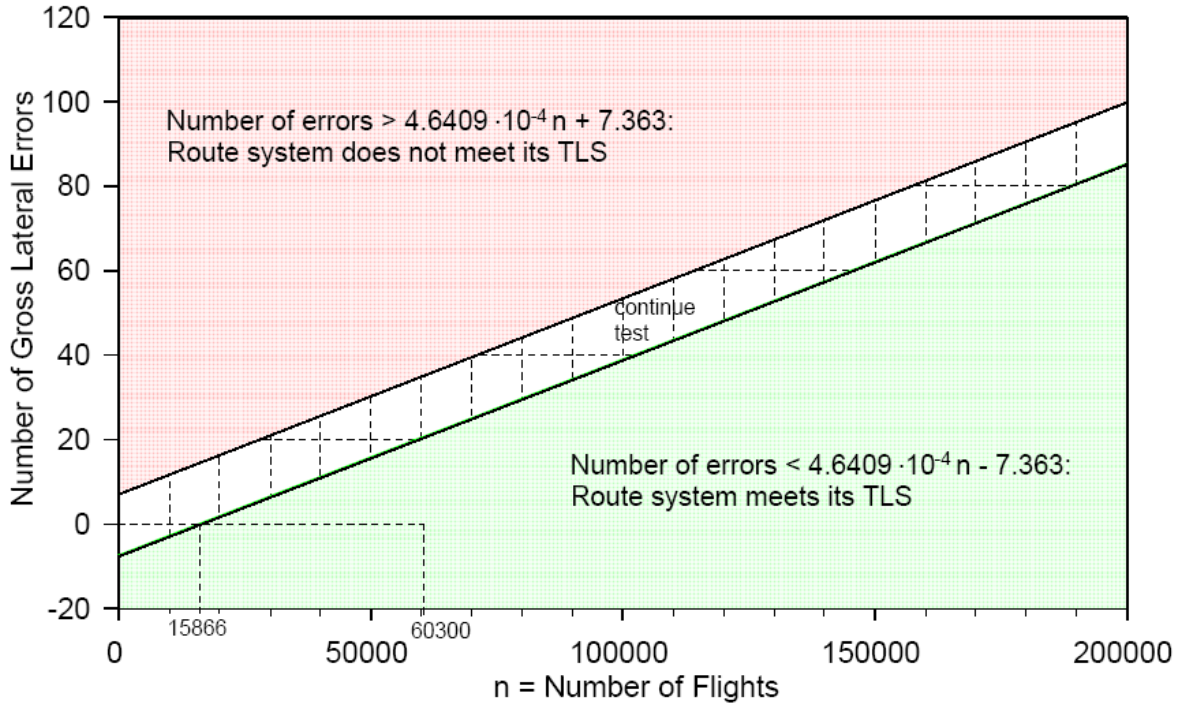

Figure 1: Sequential Sampling Approach to Demonstrating That Lateral Collision Risk for 50-NM Lateral Separation Standard Applied to L642/M771 Complies With TLS

4.18 As the pre-implementation safety assessment explained, use of the chart was straightforward. At any time, it is simply necessary to plot the cumulative number of L642 and M771 15 NM or greater magnitude errors observed in the monitoring program together with the corresponding cumulative number of monitored flights on a monthly basis as a point on the two-dimensional chart of Figure 1. If plotting is done monthly, the point will be an x-y doublet where x is the cumulative number of flights monitored starting from the beginning of the monitoring program up to that month, and y is the corresponding cumulative number of 15 NM magnitude or greater errors observed for operations on L642 and M771. At any month, the (x,y) point plotted will be in one of the three regions of the chart:

(1) The area below the two parallel lines, indicating that the TLS is being met – although the monitoring program should continue.

(2) The area between the two parallel lines, indicating uncertainty about whether the TLS is either being met or being exceeded - monitoring should continue until the plotted (x,y) occurs above or below the parallel-line region.

(3) The area above the two parallel lines, meaning that the TLS is likely being exceeded and authorities should consider taking remedial action after determining the causes of the underlying problems.

4.19 The pre-implementation safety assessment noted that, for the lateral risk model parameter values shown in Table 3, it would be necessary that the monitoring program find no instances of 15 NM magnitude or greater lateral errors in 15866 consecutive flights in order to conclude with 95 percent confidence that the lateral TLS is met. The point (x = 15866 flights, y = 0 = cumulative number of large lateral errors) is plotted on Figure 1, and can be seen to be on the border of the area below the two parallel lines. Also shown on Figure 1 is the point (x = 60300 flights, y = 0

large lateral errors), representing the results of the monitoring program when the pre-implementation safety assessment was conducted. It is clear from that plotted point that the sequential trail of (cumulative number of monitored flights, cumulative number of 15 NM or greater magnitude lateral errors) is well within the "meets the lateral TLS with 95 percent confidence" region of the chart.

4.20 As can be seen from the "grand total" entries of Tables 1 and 2, the sum of flights using L642 and M771 between 3 July and 10 October 2008 is 6235 + 6756, or 12991. Hence, since there had been no 15 NM magnitude or greater errors reported since 4 July 2008, the latest doublet to be plotted on Figure 1 is (73291 (= 60300+12991) cumulative number of monitored flights, 0 = cumulative number of 15 NM or greater magnitude lateral errors), or (73291,0). If plotted on the chart, it is clear that this point further reinforces the conclusion that the lateral TLS is being met.

4.21 Therefore, based on system performance during the first 90 days after the introduction of the 50 NM lateral separation standard between L642 and M771, it was concluded that the APANPIRG-agreed lateral TLS was met.

Review of Post-Implementation Longitudinal Risk

4.22 The pre-implementation safety assessment noted that some parameters are used only in the estimation of longitudinal risk as shown in Table 4 below. The parameter, P_x, is the probability that two aircraft lose all planned along-track separation between updates of their positions. As was noted in the pre-implementation safety assessment, given the virtually complete radar and VHF coverage of L642 and M771 (with the exception of roughly 20 minutes flying time in the Singapore FIR), it is very difficult to see circumstances in which an aircraft pair would lose 50 NM of initial longitudinal separation. Since P_x is the probability that two aircraft will lose 50 NM of initial separation and all initial separations larger than 50 NM, the pre-implementation safety assessment built a very conservative scenario in order to produce a longitudinal risk estimate. Using the results of the monitoring program available at that time, the risk under even this very conservative scenario was shown to meet the TLS.

Model Parameter	**Description**	**Value Used in Preliminary Safety Assessment**	**Source for Value**
$P_y(0)$	Probability That Two Aircraft Assigned to the Same Route and Flight Level Are in Lateral Overlap	0.20	RVSM/TF/3
$\lvert\dot{\bar{y}}\rvert$	Relative Across-Track Speed of Two Aircraft Assigned to the Same Route and Flight Level	1 knot	RVSM/TF/3
P_x	Probability of Longitudinal Overlap	Various	Very conservative approach to estimating probability that two aircraft lose all planned longitudinal separation

Table 4: Summary of Risk Model Parameters Used Only in Longitudinal Safety Assessment

4.23 The results of the monitoring program provided since the 3 July 2008 separation changes have continued to show no instance of substantial loss of longitudinal separation between pairs of aircraft close together along track. As a result, employing the conservative approach taken in the pre-implementation safety assessment, it can be concluded with high confidence that the

longitudinal risk during the first 90 days of operation on L642 and M771 with the 50 NM longitudinal separation standard meets the Regional longitudinal TLS value.

4.24 The data available from the Singapore FIR used to produce Tables 1 and 2 were not in themselves sufficient to provide estimates of two key parameters used in the estimate of longitudinal risk: (1) the distribution of initial distance separations between co-altitude aircraft pairs on L642 and M771, and (2) the distribution of loss or gain of separation distance between co-altitude aircraft pairs during operations on the routes. In order to produce estimates of these parameters, it is necessary to use traffic movement or radar-based position measurements of aircraft from all FIRs with control responsibilities for L642 and M771.

4.25 It was, thus, recommended that the 2008 TSD from the South China Sea FIRs be used to estimate the distribution of initial separations between co-altitude aircraft pairs on L642 and M771 and also be used to determine the distribution of loss or gain in distance for such pairs.

4.26 The meeting accepted that the safety assessment had supported the continued use of RNP 10 (50 NM/50 NM) horizontal separation on L642 and M771, and agreed that the application of RNP 10 (50 NM/50 NM) horizontal separation shall continue on L642 and M771.

4.27 The meeting also agreed that the 2008 TSD from the Hong Kong, Ho Chi Minh, Sanya and Singapore FIRs should be used to estimate the opposite-direction lateral occupancy parameter of the lateral collision risk model and the aircraft-pair distributions of initial separation and separation loss or gain used in the longitudinal collision risk model when the TSDs are available in early 2009. The safety assessment would be presented by South-East Asia Safety Monitoring Agency (SEASMA) at the RASMAG meeting in June 2009 using the 2008 TSDs.

Agenda Item 5: Post-Implementation Management Considerations

Data Link Implementation Table for Capacity Planning

5.1.1 The meeting noted that the aircraft data traffic that the aircraft using the SITA satellite service were generating had recently reached the full capacity of the channel units in the Ground Earth Station (GES) used by SITA and caused the average message delivery time to increase. Ongoing global capacity planning by all stakeholders was necessary to draw up a plan for maintaining the availability of the classic aeronautical service at an acceptable level of performance as the traffic levels evolve.

5.2 If the actual traffic generated is more than predicted, customers would face severe degradation. SITA wished to obtain from customer airlines and air navigation service providers their planned FANS activities and to feed traffic forecast model to decide infrastructure enhancements to provide the required level of performance for their customers.

Agenda Item 6: Future Direction and Arrangements

Review of the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444)

6.1 The meeting reviewed PANS-ATM which contains procedures and RNAV procedural separation minima for use in the separation of aircraft in the en-route phase under Chapter 5 Separation Methods and Minima, 5.4 Horizontal Separation.

6.2 The meeting noted that the separation minima shown in the above required specific RNP values and were based on collision risk modelling which determines communications and surveillance requirements. However, this modelling does not include all operational and technical aspects and is dependent upon parameter values that may vary depending on the particular airspace where the minimum will be applied. Therefore, prior to implementation, a system verification of sufficient duration and integrity must be performed to assess such parameters and conditions including weather deviations or other contingency events for the airspace concerned and to demonstrate that operational and technical requirements are met.

Review of the Terms of Reference (TOR) for RNP-SEA/TF

6.3 The meeting reviewed the TOR of the Task Force as follows:

Terms of Reference of the South-East Asia RNP Implementation Task Force

The objective of the Task Force is to:

Develop strategic, benefits-driven implementation plans in collaboration with stakeholders, to improve en-route airspace efficiency by means of reduced horizontal separation based on RNP operations within the Southeast Asia area, ensuring inter-regional harmonization.

To meet this objective the Task Force shall:

a) Review the current South China Sea route structure and examine its suitability for application of reduced horizontal separation based on RNP operations.

b) Identify routes where the application of reduced horizontal separation would bring immediate operational efficiency

c) Determine the reduced horizontal separation required, taking into account the aircraft approval status of the traffic operating on the relevant routes, capacity increase desired, and communication and surveillance capability of ATS providers.

d) Examine the possibility of a phased implementation of reduced horizontal separation based on RNP operations and to detail the phases required and the areas/routes concerned.

e) Develop the necessary strategic plans to implement the agreed horizontal separation taking into account airspace user requirements, the need for inter-regional harmonization, and ICAO Standard and Recommended Practices.

f) Explore the possibility of further harnessing operational efficiency of the routes through re-reconfiguration and enhanced surveillance.

g) Ensure the conduct of Annex 11 compliant pre-implementation safety assessments and make arrangements for States to conduct ongoing post-implementation safety monitoring in accordance with ICAO provisions.

h) Consider setting up appropriate teams/groups which might but not necessarily, include the entire Task Force, to address and implement specific agreed measures within their airspace; and

i) Cooperate with other Task Forces and groups which are involved with similar work in the adjacent airspace in order to achieve harmonized inter-regional solutions.

Scope of Initial Work

The Task Force shall adopt a phase-by-phase approach, beginning with the 50 lateral/50 longitudinal separations based on RNP 10 operations on RNAV routes L642 and M771 as Phase 1.

The Task Force reports to the South East Asia ATS Coordination Group (SEACG).

(Adopted by the 13th meeting of SEACG, 2006; amended by the 15th meeting, 2008)

Regional Performance Based Navigation (PBN) Implementation Plan

6.4 The meeting noted that APANPIRG/19 had reviewed the results of the work accomplished by its Performance Based Navigation Task Force (PBN/TF).

6.5 The primary task of PBN/TF was to develop a PBN Implementation Plan for the Asia/Pacific Regions. The work of PBN/TF that had been accomplished by the two meetings prior to the ninth meeting of RASMAG (RASMAG/9, May 2008) and the 18th meeting of the ATM/AIS/SAR Sub-group (ATM/AIS/SAR/SG/18, June 2008) was coordinated with those bodies and input was received from the RASMAG for the regional PBN Implementation Plan. That task for the regional PBN Implementation Plan was completed at the third meeting of PBN/TF (PBN/TF/3, July 2008).

6.6 Recognizing that the final version of the regional PBN Implementation Plan had not been coordinated with the ATM/AIS/SAR Sub-group and the RASMAG, APANPIRG/19 considered it more appropriate to adopt the plan as an interim edition. Accordingly, APANPIRG/19 adopted the following Conclusion and urged the States to review the plan and provide feedback to the Regional Office and use it as a basis for developing their national PBN Implementation Plans.

Conclusion 19/25 – ASIA/PAC PBN Implementation Plan

That, the Asia/Pacific PBN Implementation Plan as provided in Appendix G to the Report on Agenda Item 3.4 be adopted and published as the interim edition based on which, States be urged to develop their national PBN implementation plan and provide feedback to the ICAO Regional Office.

6.7 The meeting was invited to review the plan and provide feedback to the Regional Office. Also, the meeting noted in the regional plan that RNP 4 is preferred (RNAV 10 is acceptable) in oceanic airspace in the short term (2008-2012) and RNP 2 is preferred (RNP 4 and RNAV 10 are acceptable) in the medium term (2013-2016). However, the meeting recognized that there was no need to wait for these dates to conduct implementations and, where States were agreeable, implementations could take place earlier than the guidelines given in the PBN regional plan.

Alignment with the Regional PBN Implementation Plan for Future Initiatives in Reduction of Horizontal Separation

6.8 The meeting reviewed the need to rename the RNP 10 operations on L642 and M771 to RNAV 10 to align with the ICAO PBN Manual. Currently, any existing or new operational approvals could still continue to be designated RNP 10, as RNP 10 is referred to as RNAV 10 in the PBN concept.

6.9 IATA raised the concern that renaming from RNP 10 to RNAV 10 could affect the whole Asia and Pacific Region and that ICAO should take a holistic view on this subject.

6.10 The meeting agreed that the ICAO PBN Task Force could include this item as one of the discussion item at the coming PBN Task Force meeting to chart the direction for Asia and Pacific Region.

Review of the *Regional Supplementary Procedures* (Doc 7030)

6.11 The meeting reviewed the Middle East/Asia (MID/ASIA) *Regional Supplementary Procedures*, which are supplementary to the provisions contained in Annex 2 – *Rules of the Air*, Annex 6 – *Aircraft Operations*, Annex 11 – *Air Traffic Services*, the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444) and the *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS, Doc 8168).

Future Direction for the RNP-SEA Task Force Proposed by Singapore

6.12 Singapore presented the meeting with the possible future direction of the Task Force as the first phase has been completed. Looking at the Terms of Reference (TOR) of the Task Force, the next phase would be to identify other routes in the South East Asia region where the application of reduced horizontal separation would bring about immediate operational efficiency, or explore the possibilities of further harnessing operational efficiency of routes using enhanced surveillance capability. The two options presented were the implementation of RNP 10 (50 NM/50 NM) horizontal separation on the remaining four parallel unidirectional routes or the implementation of RNP 4 (30 NM/30 NM) operations on L642 and M771.

Proposed Future Direction for the RNP-SEA/TF Proposed by IATA

6.13 IATA presented the meeting the need for a complete review of the route structure, with a view to extracting significant savings in reduction of track miles on each route, and improving efficiency and capacity further as it was within the TOR of the Task Force. The recent contraction in the traffic numbers provided a window to do a comprehensive review to prepare for the time when the traffic will build up again. The South China Sea route structure was designed as RNAV routes with 60 NM lateral separation, and to take into account the surveillance capabilities of the ANSPs of the period. As such many of the routes had to be kinked to accommodate these requirements. Many of the routes were therefore, not the most efficient in terms of track miles. Given the advances made in CNS/ATM, the opportunity exists to optimize the airspace capacity through a redesign. More and more the expectation is to move, at least in the initial stages, to an RNP 4 environment.

6.14 IATA also highlighted to the meeting that the reduction in longitudinal and lateral separation on L642 and M771 was to enhance the capacity of the two routes and concurrently, the Flight Level Allocation Scheme (FLAS) for the six unidirectional routes in the South China Sea area was also changed, from FL 300, 320, 340, 360, 380 and 400 to FL 310, 320, 350, 360, 390 and 400, to reduce the transitions between different FLAS. IATA reported that the new FLAS has proven to be less efficient compared with the previous FLAS. For example, a flight with an optimal level of FL 380 can no longer opt to fly at that level as it is no longer available. It now has to operate at FL 360 instead, the next higher level being FL 390 which is operationally less suitable. Users of the airspace concerned have reported penalties ranging from 1 to 3 percent. One major user of the parallel route structure has estimated that they stand to burn an additional 1.3 million kg of fuel per year. Overall, IATA estimated that the increased fuel burn is around 8 million kg per year with a corresponding CO_2 emission estimated of around 25 million kg. IATA would continue to study the matter and provide comparative data to future meetings.

Discussion at the Meeting

6.15 The meeting discussed the three options as proposed by Singapore and IATA for the next phase of work for the Task Force as follows:

a) Implementation of RNP 4 (30 NM/30 NM) operations on L642 and M771;

b) Implementation of RNP 10 (50 NM/50 NM) operations on four parallel unidirectional routes; or

c) Review the route structure of the region.

6.16 During the discussion, Chairman requested that States keep an open mind in deciding the future work of the Task Force and emphasized that any options identified as the next phase of work for this Task Force was to initiate the planning, implementation process and determination of a target date for implementation.

6.17 The meeting noted that RNP 10 operations on the remaining four parallel unidirectional routes would need the active participation of the Philippines as the four routes transit through the Manila FIR. The meeting urged ICAO Secretariat to encourage the Philippines to participate in future Task Force activities.

6.18 Viet Nam informed the meeting that they had no objection to both implementation of RNP 4 on L642 and M771, and RNP 10 operations on N892 and L625 based on the current route structure as traffic would either be within radar coverage or ADS-CPDLC services could be provided.

6.19 Malaysia advised the meeting that they have no objection to either RNP 4 operations on L642 and M771 or RNP 10 operations on the other four parallel routes.

6.20 China informed the meeting that they had no objection to RNP 4 operations on L642 and M771 or RNP 10 operations on other parallel routes based on the existing route structure.

6.21 Hong Kong, China highlighted to the meeting that they would most likely adhere to the PBN Regional Plan which was adopted by APANPIRG/19 to implement RNP 4 in the region.

6.22 Singapore informed that meeting that they were agreeable to either the implementation of RNP 4 operations on L642 and M771 or RNP 10 operations on the remaining four parallel routes to be considered as the next phase of work by this Task Force.

6.23 IATA urged the meeting to maximize the capacity of the South China Sea area through implementation of RNP 4 (30 NM/30 NM), where possible, including a review of the route structure. IATA was of view that regional traffic simulation would be essential as part of a review.

6.24 The meeting agreed that a review of the route structure should be preceded by an identification of choke points and areas where potential efficiency gains may be obtained.

6.25 After considerable discussions, the meeting agreed as part of the next phase to the following:

a) States would conduct traffic simulation to determine their need to implement either RNP4 operations on L642 and M771 or RNP 10 operations on the other four parallel routes over the South China Sea, indicating their timeline for the implementations applicable within their FIR;

b) Task Force members, where applicable, would conduct cost-benefit analysis to determine the need for RNP 10 and RNP 4 operations; and

c) Provide the reports stated in a) and b) above, to the ICAO Regional Office by the end of January 2009.

6.26 Chairman and ICAO Regional Office would analyze the reports to determine the next phase of work for the Task Force and decide on the date and venue of the next meeting.

6.27 ICAO Regional Office would then inform Task Force members accordingly.

Agenda Item 7: Update RNP-SEA/TF Task List

7.1 The meeting reviewed and updated the RNP-SEA/TF Task List as in **Appendix F** to this report.

Agenda Item 8: Any Other Business

8.1 There was no other business to discuss at the meeting.

Agenda Item 9: Date and Venue for RNP-SEA/TF/5

9.1 Subject to the agreement by States on the necessity of continuing work by the Task Force, the meeting agreed the date and venue of RNP-SEA/TF/5 as follows:

RNP-SEA/TF/5 April 2009 Singapore

10. Closing of the Meeting

10.1 Mr. Peter Rabot thanked all for their valuable inputs, views and cooperation in discussing the agenda items in an open and friendly manner. He especially thanked the Regional Office for their secretariat support for the meeting. He wished all a safe journey home and looked forward to seeing everyone again.

10.2 On behalf of the RNP-SEA/TF, Mr. Harano thanked all delegates for their participation. He was grateful to the meeting for their excellent job contributed to the meeting.

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LIST OF WORKING PAPERS (WPs) AND INFORMATION PAPERS (IPs)

WORKING PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
WP/1	1	Provisional Agenda RNP-SEA/TF/4	Secretariat
WP/2	5	Review of the Task List for the Post-implementation of Required Navigation Performance (RNP)	Chairman
WP/3	6	Review of the *Procedures for Air Navigation Services – Air Traffic Management* (PANS-ATM, Doc 4444)	Secretariat
WP/4	6	Review of Terms of Reference of the Task Force	Secretariat
WP/5	6	Data Link Implementation Table for Capacity Planning	Secretariat
WP/6	8	Review of the *Regional Supplementary Procedures* (Doc 7030)	Secretariat
WP/7	3	Benefits from the Implementation of 50NM Lateral and Longitudinal Separations based on RNP10 Operations on ATS Routes L642 and M771 in Singapore FIR	Singapore
WP/8	5	Alignment with Regional PBN Implementation Plan for Future Initiatives in Reduction of Horizontal Separation	Singapore
WP/9	6	Proposed Future Direction for the RNP-SEA Task Force	Singapore

INFORMATION PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
IP/1	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP/2	2	APANPIRG Activities – Outcomes of APANPIRG/19	Secretariat
IP/3	2	Summary of the Third Meeting of Asia/Pacific Performance Based Navigation Task Force	Secretariat
IP/4	3	IFALPA's Requesting Letter Regarding the Improvement of HF Communication in the Manila FIR	IFALPA
IP/5	6	Regional Performance Based Navigation (PBN) Implementation Plan	Secretariat

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REGIONAL/NATIONAL PERFORMANCE OBJECTIVE — IMPLEMENTATION OF THE NEW ICAO FPL FORM				
Benefits				
Environment	• reductions in fuel consumption			
Efficiency	• ability of air navigation service providers t make maximum use of aircraft capabilities • ability of aircraft to conduct flights more closely to their preferred trajectories • facilitate utilization of advanced technologies thereby increasing efficiency • optimized demand and capacity balancing through the efficient exchange of information			
Safety	• enhance safety by use of modern capabilities onboard aircraft			
Strategy **Short term (2010)** ***Medium term (2011 - 2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
SDM	***En-route airspace***	2009-2012		
	• ensure that the automation and software requirements of local systems are fully adaptable to the changes envisaged in the new FPL form	2009		
	• ensure that issues related to the ability of FDPS's to pass information correctly and to correctly identify the order in which messages are received, to ensure that misinterpretation of data does not occur	2009-2012		
	• analyze each individual data item within the various fields of the new flight plan form, comparing the current values and the new values to verify any problems with regard to applicability of service provided by the facility itself or downstream units	2009		
	• ensure that there are no individual State peculiarities or deviations from the flight plan provisions	2009-2012		
	• ensure that the accepting ATS Reporting Office accepts and disseminates all aircraft capabilities and flight intent to all the downstream ACCs as prescribed by the PANS-ATM provisions	2012		

	• plan the transition arrangements to ensure that the changes from the current to the new ICAO FPL form occur in a timely and seamless manner and with no loss of service	2009-2012		
	• in order to reduce the change of double indications it is important that any State having published a specific requirement(s) which are now addressed by the amendment should withdraw those requirements in sufficient time to ensure that aircraft operators and flight plan service providers, after 15 November 2012, use only the new flight plan indications. • establish a central depository in order to track the implementation status and inform the ICAO regional offices on an ongoing basis	2009-2012 2009		
linkage to GPIs	GPI/18 Aeronautical Information			

GUIDANCE FOR IMPLEMENTATION OF FLIGHT PLAN INFORMATION TO SUPPORT AMENDMENT 1 TO PANS-ATM, DOC 4444, FIFTEENTH EDITION

1. INTRODUCTION

1.1. The guidance contained herein is provided to assist airspace users and Air Navigation Service Providers (ANSP) implement the flight planning changes incorporated by Amendment 1 to Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM ICAO Doc 4444).

1.2. The changes were announced by ICAO on the 25 June 2008 in State Letter 50/2008 and become applicable on 15 November 2012.

1.3. The changes have considerable consequence on ANSP systems. Changes are required to ANSP systems that check and accept flight plans and related messages, use flight plan data in displays for controller reference, use data in ANSP automation and affect information that is communicated between ANSPs as the flight progresses. Preparation for the changes should therefore be made well in advance of 15 November 2012.

1.4. The changes also have consequences for airspace users. If a flight plan with new content is sent to an ANSP that has not yet changed to accept the new content then it is likely that some information will be lost, misinterpreted or cause a rejection of the flight plan.

1.5. No start date has been given for implementation of the changes to commence, however one reason for the ICAO State Letter on 25 June 2008 was to allow recipients “to begin updating your flight plan data processing systems”. The transition period for the changes is therefore from now until 15 November 2012.

1.6. It is recognized that changes will be implemented by airspace users and ANSPs on individual schedules due to individual needs, however that some coordination will occur.

1.7. It is essential to the success of this implementation that all airspace users and ANSPs be able to submit and process flight information in accordance with Amendment 1 by 15 November 2012, as processing via current methods is not assured after that date.

2. OBJECTIVE

2.1. The purpose of the guidance contained herein is to support a coordinated global effort during the transition period so that a successful transition is achieved by the applicable date of 15 November 2012.

3. APPLICABILITY

3.1. This guidance applies to airspace users, ANSPs, Planning and Implementation Regional Groups (PIRG). Please note that flight planning services and related organizations involved in the processing of flight plans are considered part of the airspace user community and, as such, are covered under this guidance.

3.2. This document presents guidelines which should be considered when developing implementation plans for this Amendment. Adherence to these guidelines will mitigate risks associated with the technical challenges inherent during the transition period and assure that users are able to meet flight planning requirements as individual ANSPs implement changes.

3.3. This document applies with immediate effect and continues until 15 November 2012.

4. SCOPE

4.1. This guidance is limited to transitioning to flight planning and Air Traffic Services (ATS) message changes defined in Amendment 1 to PANS-ATM (Doc 4444) Fifteenth Edition, including message content and submission instructions.

5. FLIGHT PLANNING ENVIRONMENT

5.1. In order to allow performance case considerations to drive individual airspace user and ANSP implementation schedules, the ATM system will need to simultaneously support both current and new flight plan information and content for a period of time (during the transition).

5.2. Amendment 1 to PANS-ATM (Doc 4444), except for explicitly stating an allowed filing time, contains only changes to content. The changes to content are:

- Change the way aircraft equipage and capabilities are communicated to provide more detail;
- Provide additional means of describing route way points (specifically bearing and distance from points other than navigation aids); and,
- Permit specification of the date of flight in a standardised manner.

5.3. The existing flight planning environment supports a variety of means of filing flight plans. For example flight plans can be filed directly by the airspace user to each ANSP individually or flight plans can be filed by the airspace user at one location and then the ATM system distributes the flight plan. Amendment 1 does not specifically change these options; however the means of transitioning to Amendment 1 may impose some requirements during the transition.

5.4. The existing ATM system supports a variety of means of ANSPs communicating flight plan data between ANSP systems, for example use of coordination messages where Amendment 1 implies changes of content.

6. IMPLEMENTATION GUIDELINES

6.1. CURRENT is defined as the present flight planning and ATS message formats as defined in the current version of PANS-ATM (Doc 4444) Fifteenth Edition.

6.2. NEW is defined as the flight planning and ATS message formats as specified in Amendment 1 to PANS-ATM (Doc 4444) Fifteenth Edition.

6.3. The transition period is from now until the applicability date of 15 November 2012.

6.4. Guidelines have been developed to allow for concurrent use of both CURRENT and NEW formats by airspace user and ANSP systems during the transition period.

6.5. Guide Line 1: As each ANSP transitions to NEW content, it is essential that they also support CURRENT content until the applicability date of 15 November 2012.

6.5.1. There is no requirement for ANSPs to accept and process CURRENT after the applicability date.

6.5.2. This guideline relates directly to the transition environment in which a segment of airspace users (and ANSPs) do not amend their flight planning systems until the end of the transition period.

6.6. Guide Line 2: PIRGs are encouraged to plan and publish regional implementations sufficiently in advance of the applicability date so that airspace users and ANSPs can respond to and resolve any unforeseen operational issues.

6.6.1. It is anticipated that implementation will occur progressively as each PIRG works with their member States and airspace users to coordinate a regional transition prior to 15 November 2012.

6.6.2. Transition plans should encourage all ANSPs transition to NEW a period of time before 15 November 2012 to allow airspace users a transition period to NEW before the applicability date.

6.6.3. Transition plans should take into account that the airspace user may not be able to make use of the new opportunities provided by NEW content until an ANSP has transitioned. Even then, use of NEW content may be restricted in its application if the flight still involves ANSPs who have not transitioned.

6.7. Guide Line 3: During the transition period and after an ANSP has advised that they can accept NEW flight plans, the determination to file NEW content or CURRENT content with that ANSP is the choice of the airspace user.

6.7.1. It is expected that airspace users will make the decision on what format to file based on performance gains which may be achieved through capability information in Items 10 and/or 18 of the NEW flight plan.

6.7.2. It is intended that all airspace users will file NEW from the applicability date forward, as using CURRENT is not assured after that date.

6.8. **Note: The following guidelines apply only to situations where ANSPs affected by a flight have not all transitioned to NEW.**

6.9. Guide Line 4 During the transition period when not all ANSPs affected by a flight have transition to NEW, the airspace user must ensure that CURRENT flight plan information is filed with ANSPs who have not transitioned.

6.9.1. This can be achieved by the airspace user filing only CURRENT information with all ANSPs (as ANSPs supporting NEW will also support CURRENT during transition).

6.9.2. ANSPs using CURRENT may misinterpret, and may reject, flight plan information that is filed more than 24 hours in advance of flight. Filing more than 24 hours in advance of flight cannot be used if one or more ANSPs affected by a flight

have not transitioned (unless those ANSPs already support filing more than 24 hours in advance of flight) for although ANSPs using NEW could accept the flight plan they may not be able to pass essential coordination to ANSPs using CURRENT.

6.9.3. The airspace user may choose to file NEW to ANSPs that have transitioned and CURRENT to ANSPs that have not transitioned. However without special transitional procedures, the NEW information would only be useable until the first ANSP along route of flight using CURRENT. This is because the ANSP using NEW will not be able to coordinate NEW information with ANSPs using CURRENT.

6.10. Guide Line 5: To facilitate user decisions on whether to file CURRENT, NEW or a combination of CURRENT/NEW, ICAO will maintain a repository of information on the ICAO website regarding the ability of each ANSP to accept CURRENT or NEW.

6.10.1. This information which will be publicly available is in addition to the normal methods of communication between an ANSP and its airspace users.

6.10.2. Each ANSP will communicate, via State and ICAO Regional Offices, their ability to accept NEW to ICAO as soon as possible so that ICAO can ensure that complete and updated information is posted. An ANSP advising NEW will mean that they can not only receive and process the new information but also coordinate with other ANSPs who have transitioned to NEW.

6.11. Guide Line 6: During the transition period, ANSPs who accept NEW will need to convert flight information to CURRENT format for coordination with adjacent ANSPs who have not transitioned.

6.11.1. It is strongly suggested for consistency that all ANSPs utilize the conversion table provided below so airspace users and ANSPs have a common understanding of how NEW will be converted to CURRENT.

6.11.2. PIRGSs, States and ANSPs should be aware that valuable planning information may be lost during the conversion process, as shown in the conversion table.

6.11.3. There is no intent for CURRENT to be converted to NEW during the transition period.

CONVERSION OF NEW ITEMS 10 AND 18 TO CURRENT

It is strongly suggested that all ANSPs utilize the table below to convert NEW flight information in Items 10 and 18 to the CURRENT format for coordination with adjacent ANSPs which only accept CURRENT.

- Completion of some Item 18 items will need to be worked between ANSPs, as noted below.
- CAUTION: Some capability information will be lost during conversion.

	New Form value	Old Form value	
	Field 10	**Field 10**	**Field 18**
Com-Nav	N	N	
	S	S	
	A		NAV/GBAS
	B		NAV/LPV
	C	C	
	D	D	
	E1	J	DAT/V
	E2	J	DAT/V
	E3	J	DAT/V
	F	F	
	G	G	NAV/
	H	H	
	I	I	
	J1	J	DAT/V
	J2	J	DAT/H
	J3	J	DAT/V
	J4	J	DAT/V
	J5	J	DAT/S
	J6	J	DAT/S
	J7	J	DAT/S
	K	K	
	L	L	
	M1		COM/
	M2		COM/
	M3		COM/
	O	O	
	P1-P9	reserved	
	R	R or RP (Europe)	PBN/ -> NAV/
	T	T	
	U	U	
	V	V	
	W	When prescribed by ATS	

	New Form value	Old Form value	
	Field 10	**Field 10**	**Field 18**
	X	When prescribed by ATS	
	Y	When prescribed by ATS	
	Z	Z	COM/ NAV/ DAT/
Surveillance			
	N	N	
	A	A	
	C	C	
	E	D	
	H	S	
	I	I	
	L	SD	
	P	P	
	S	S	
	X	X	
	B1	D	
	B2	D	
	U1	D	
	U2	D	
	V1	D	
	V2	D	
	D1	D	DAT/S
	G1	D	DAT/S

For Field 18 the conversion table is the following:

	New Form value	Old Form value	
	Field 18	**Field 10**	**Field 18**
	STS/xxxx		STS/xxxx
	PBN/Bx	R or RP (in Europe)	
	PBN/Cx		
	PBN/Dx		
	PBN/Lx		
	PBN/Ox		
	PBN/Sx		
	PBN/Tx		
	NAV/		
	COM/		
	SURV*/*		
	DOF/	Europe	DOF/

-END-

The International Federation of Air Line Pilots' Associations

I·F·A·L·P·A

The Global Voice of Pilots

Reference: ASIA/PAC 15 September 2008

Mr. Ruben F. Ciron, PhD
Director General
Civil Aviation Authority of the Philippines (CAAP)
Department of Transportation and Communications
MIA Road corner Ninoy Aquino Avenue, Pasay City
1300 Metro Manila
Philippines

Dear Sir,

HF Communications Manila FIR

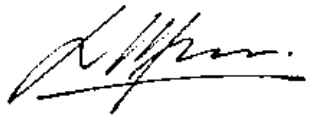
I am writing to you as the International Federation of Air Line Pilots' Associations (IFALPA) Regional Vice President for Asia/East. In the past few months we have been made aware by our members that establishing HF Communication through Manila FIR has been very difficult.

As you are probably aware reduced separation minimum was implemented on L642 and M771 from July 2nd 2008. It is also proposed that further reduced separation minima 30nm/30nm on those routes would be discussed in the future for the aircraft which have the capability of RNP4 and ADS-C/CPDLC on board. However, the other trunk routes N892, L625 and N884, M767 have less chance to be considered for improvements in the separation minima because of the current performance of ATC ground facilities in Manila FIR and the lack of adequate reporting for RNP 10 conformance.

The development of the infrastructure for the coverage of Ground Radar and VHF Communication, or to introduce ADS/CPDLC will be necessary in the future to improve the separation minima in Manila FIR. Such development would not only provide the infrastructure for reducing the separation minima, but also improve the flight safety in the FIR. This would be effective for weather avoidance clearances and in the event of an unusual or emergency situation pilots would be able to notify ATC without any delay.

We believe that you share our commitment to improving flight safety which is why we would encourage you to effect the improvements necessary to correct this deficiency. On behalf of the Federation I strongly urge you to implement the improvements required, regular reporting of data to ICAO's Regional Office in Bangkok and upgrading the status of the Manila FIR and in that regard, IFALPA is prepared and most willing to co-operate with your Administration in any way possible to ensure that a mutually acceptable solution is reached to address the problem.

Yours faithfully,



Captain Korn Mansumitchai
RVP Asia/East

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SN	Activity	Start	Complete	Present Status	Group Responsible
	Identify Operational Need				
~~1~~	~~Agree that an operational needs for a 50 NM horizontal separation in South China Sea area~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~RNP SEA TF~~
~~2~~	~~Seek agreement from Hong Kong China for the implementation of 50 NM horizontal separation on L642 and M771~~	~~25 Sep 07~~	~~25 Sep 07~~	Completed	~~SCM~~
	Safety Assessment				
~~3~~	~~Engage a qualified Horizontal Safety Assessment Expert~~	~~25 Sep 07~~	~~Dec 07~~	Completed	~~SINGAPORE~~
4	States to continue to collect and provide traffic data	25-Sep-07		On-going	STATES
5	States to provide additional data as required by the Horizontal Safety Assessment Expert	25-Sep-07		On-going	STATES
~~6~~	~~Examine history of navigational errors and assess possible impact on safety~~	~~Jan 08~~		~~N/A~~	~~RNP SEA TF~~
~~7~~	~~Confirm collision risk model assumptions/parameters are consistent with airspace where the 50 NM horizontal separation is to be applied~~	~~Jan 08~~	~~6 Mar 08~~	Completed	~~RNP SEA TF~~
~~8~~	~~Conduct simulations to predict occupancy after the 50 NM horizontal separation implementation~~	~~Jan 08~~	~~5 Mar 08~~	Completed	~~SINGAPORE~~
9	Collect weather and turbulence data for analysis	Jan-08		On-going	STATES
10	Report monthly navigational errors (including operational errors) to Monitoring Authority (Singapore)	13-Mar-06		On-going	STATES
11	Collect additional data if required by the Safety Assessment Expert for the safety assessment for the 50 NM horizontal separation implementation	Jan-08		On-going	STATES
	Feasibility Analysis				
12	~~Examine the operational factors and workload associated with the 50 NM horizontal separation implementation in South China Sea~~	~~13 Mar 06~~	~~6 Jun 08~~	~~On-going~~Completed	~~STATES~~
~~13~~	~~Complete feasibility analysis on the 50NM horizontal separation implementation on L642 and M771~~	~~13 Mar 06~~	~~25 Sep 07~~	Completed	~~N/A~~
	Determination of Requirements (airborne & ground systems)				
~~14~~	~~States assess the impact of the 50 NM horizontal separation implementation on controller automation systems and plan for upgrades/modifications~~	~~13 Mar 06~~	~~25 Sep 07~~	Completed	~~N/A~~
	Aircraft & Operator Approval Requirements				
~~15~~	~~Promulgate the operational approval process of RNP 10~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~N/A~~

SN	Activity	Start	Complete	Present Status	Group Responsible
	Perform Rulemaking (if required)				
~~16~~	~~Recommend State airspace regulatory documentation~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~N/A~~
	Perform Necessary Industry & International Co-ordination				
~~17~~	~~Establish target implementation date on the 50NM horizontal separation on L642 and M771~~	~~25 Sep 07~~	~~25 Sep 07~~	Completed (Target Date of Implementation is 2 July 2008)	~~RNP SEA TF~~
18	Report to South-East Asia ATS Coordination Group (SEACG)			On-going	SINGAPORE
~~19~~	~~Prepare draft amendment proposal to amend Doc 7030~~	~~25 Sep 07~~	~~26 Sep 07~~	Completed	~~SCM~~
~~20~~	~~Submit draft amendment proposal to amend Doc 7030 to ICAO~~	~~26 Sep 07~~		Completed	~~STATES~~
~~21~~	~~Assess need to publish AIP Amendment/Supplement, if necessary, containing the 50 NM horizontal separation policy/procedures~~	~~26 Sep 07~~	~~7 Mar 08~~	Completed	~~STATES~~
~~22~~	~~Assess need for NOTAM~~	~~13 Mar 06~~	~~Jun 08~~	Completed	~~STATES~~
~~23~~	~~Review inter-facility coordination procedures~~	~~26 Sep 07~~	~~Jun 08~~	Completed	~~STATES~~
~~24~~	~~Finalize changes to Letters of Agreement~~	~~26 Sep 07~~	~~Jun 08~~	Completed	~~STATES~~
	Approval of Aircraft & Operators				
~~25~~	~~Establish approved operations readiness targets~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~N/A~~
~~26~~	~~Assess operator readiness~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~N/A~~
	Develop ATC Procedures				
~~27~~	~~Develop procedures for handling non-compliant aircraft in ATS documentation~~	~~13 Mar 06~~	~~13 Mar 06~~	Completed	~~N/A~~
	ATC Training				
28	~~Complete training for air traffic controllers on the application of 50 NM horizontal separation~~	~~13 Mar 06~~	~~6 Jun 08~~	~~On-going~~Completed	~~STATES~~
	Complete Safety Assessment				
~~29~~	~~Review and accept safety assessment~~	~~13 Mar 06~~	~~Jun 08~~	Completed	~~RNP SEA TF~~
	Final Implementation Decision				
~~30~~	~~Go/No-Go Decision~~	~~Jun 08~~	~~Jun 08~~	Completed	~~RNP SEA TF~~
~~31~~	~~Implementation~~	~~Jul 08~~	~~3 Jul 08~~	~~On-going~~Completed	

SN	Activity	Start	Complete	Present Status	Group Responsible
	Post Implementation Review				RNP-SEA TF
~~32~~	~~RNP-SEA/TF/3~~	~~Jun 08~~		Completed	~~RNP-SEA TF~~
~~33~~	~~RNP-SEA/TF/4~~	~~Nov 08~~	~~7 Nov 08~~	~~On-going~~Completed	~~RNP-SEA TF~~