



ICAO

International Civil Aviation Organization

The Ninth Meeting of the APANPIRG ATM Sub-Group  
(ATM/SG/9)

Video Teleconference, 01 – 05 November 2021

### Agenda Item 3: Performance Frameworks and Metrics

#### APPLICATION OF ATC SEPARATION MINIMUMS

(Presented by the Secretariat)

##### SUMMARY

This paper presents information on the Seamless ATM survey conducted to determine which Air Traffic Control (ATC) separation minimums were being applied within the Asia/Pacific Region.

### 1. INTRODUCTION

1.1 In an endeavour to track the effectiveness of the Seamless Air Navigation Services (ANS) element implementation related to the use of tactical (ATC surveillance-based and datalink-supported) ATC separation minimums, the ICAO Regional Office issued State Letter T 3/10.1 – AP252/20 (ATM) dated 18 December 2020, with a response date of 01 March 2021 (**Attachment A**).

1.2 The survey requested respondents to advise the minimum horizontal separation minimums authorized for use by controllers within Category R (remote), Category T (terminal operations serviced by direct ATS communications and surveillance) and Category S (surveilled by radar, Automatic Dependent Surveillance-Broadcast [ADS-B] or Multilateration [MLAT]). The survey is at **Attachment B**.

1.3 The specific parts from the *Asia/Pacific Seamless ANS Plan* being referred to in the survey were:

7.34 All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, taking into account such factors as:

- a) the automation of the ATM system, including automated hand-off between sectors;
- b) the capability of the ATC communications system;
- c) the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; and
- d) ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.

*Note 1: the delivery of ATC services should be based primarily on the CNS/ATM capability. When using Annex 10 compliant ATS surveillance, 5NM (enroute) or 3NM (terminal) surveillance-based separations should be authorised within ATC sectors. At the TOC points in such environments, 5-10NM should be authorised with auto hand-off and surveillance data-sharing or overlapping coverage at the TOC point, and 5-20NM without auto hand-off, as determined by an appropriate safety assessment.*

*Note 2: the efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems (regarding ATM contingency operations, refer to the Regional ATM Contingency Plan).*

7.35 *Priority for FLAS level allocations should be given to higher density ATS routes over lower density ATS routes. FLAS should comply with Annex 2, Appendix 3a unless part of an OTS. FLAS other than OTS should only be utilised for safety and efficiency reasons within:*

a) *Category R airspace with the agreement of all ANSPs that provide services:*

- *within the airspace concerned; and*
- *within adjacent airspace which is affected by the FLAS; or*

b) *Category S airspace with the agreement of all ANSPs that provide services:*

- *where crossing track conflicts occur within 50NM of the FIRB; and*
- *ATS surveillance coverage does not overlap the FIRB concerned, or ATS surveillance data is not exchanged between the ATC units concerned.*

## 2. DISCUSSION

### Survey

2.1 The response from Asia/Pacific States and administrations to the latest survey was poor, with only 12 replies (28% of administrations). The responses are provided in **Attachment C**. The data in Attachment C has been coloured so that red text indicates non-compliance with the *Asia/Pacific Seamless ANS Plan's* expectations, while green text means compliance.

2.2 Given the survey response after re-circulation, there still remained many States and Administrations that have not responded. This survey requires few resources, and yet it is important to understand how efficient the region is when matching the service delivery with both the capability of the aircraft, and the existing or planned ground systems.

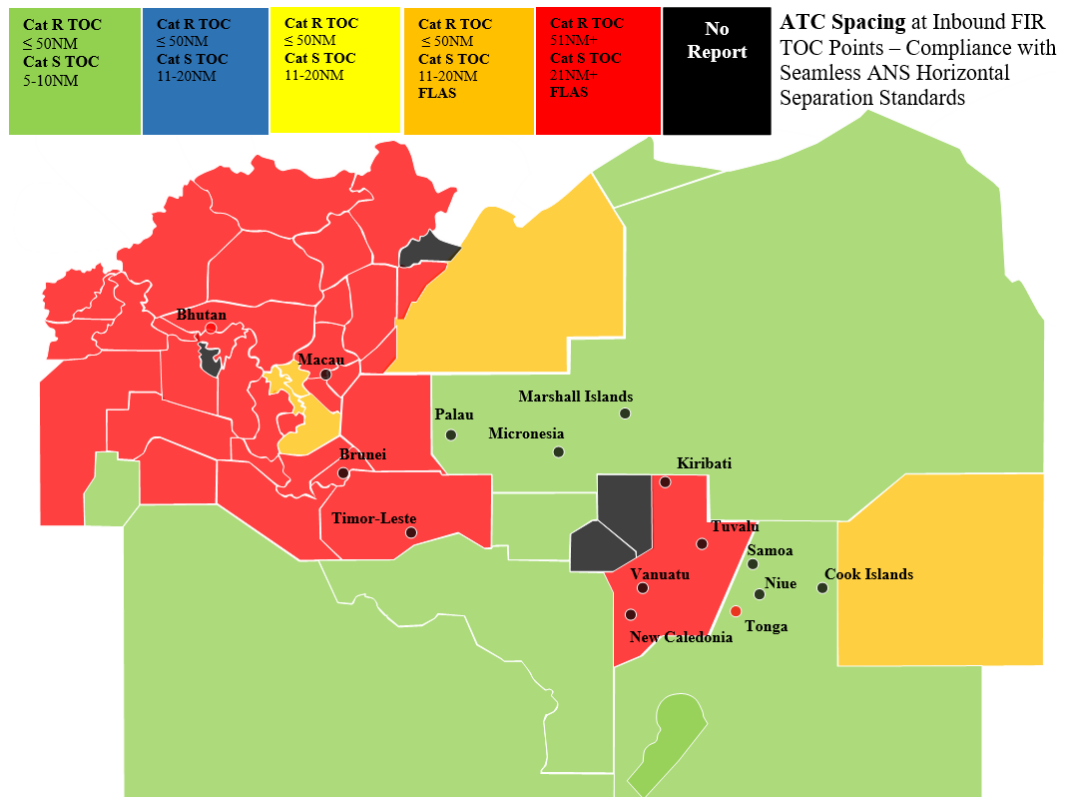
2.3 States and Administrations that did not respond were as follows:

Bangladesh, Brunei Darussalam, Cook Islands, DPR Korea, Kiribati, Marshall Islands, Micronesia (Federated State of), Nauru, New Caledonia, Palau, Samoa, Solomon Islands, Timor-Leste, Tuvalu and Vanuatu.

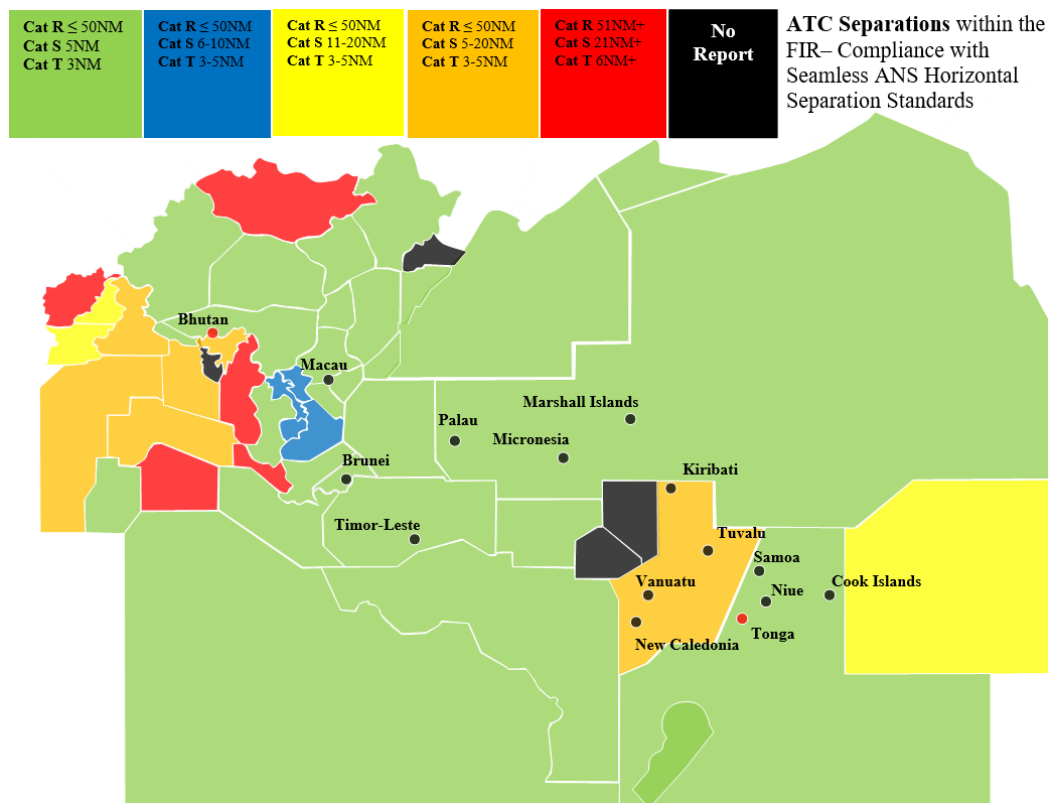
2.4 During the Eighth Meeting of the ATM Sub-group of APANPIRG (ATM/SG/8) (23-27 November 2020), some States and Administrations opined that the previous illustration was unable to show the application of minimum surveillance within Flight Information Regions (FIRs) and at Transfer of Control (TOC) Points. To better reflect the status, the Regional Office agreed to develop the chart as two separate figures, one for the separations within the FIR and the other for the Flight Level Allocation Scheme (FLAS)/TOC status.

2.5 The survey questions circulated were expected to provide greater clarity on the separation minimums used in the region. Remote, Surveillance and Terminal airspace separations were surveyed and tracked. States are reminded to respond on separation minimums for only inbound flights at FIR TOC points.

2.6 **Figure 1** and **Figure 2** provide an indication as at March 2021 of the efficiency of ATC spacing between aircraft at the same level as it is theoretically being applied inbound at FIR TOC Points and within FIRs respectfully.



**Figure 1:** ANS Horizontal Spacing at Inbound FIR TOC points, March 2021



**Figure 2:** Horizontal Separation Minimums within the FIR, March 2021

2.7 Except for the Male FIR (Maldives), **Figure 1** indicates that no Asian States were adhering to the TOC spacing expected inbound to their FIRs in accordance with the *Asia/Pacific Seamless ANS Plan*, despite the largely modernised ATC surveillance and communication systems available. Only two Pacific FIRs were failing to provide the correct TOC aircraft spacing.

2.8 This is a disappointing result, as ICAO has been emphasizing the need for improvements in line with agreed regional policy since the *Asia/Pacific Seamless ATM Plan Version 1.0*. It appears that Asian States were also passing on TOC restrictions from FIR to FIR, meaning that unnecessarily conservative and inefficient spacing was often being imposed on aircraft hours before the source of the restrictions.

2.9 As presented in **Figure 2** and in contrast to the TOC results, many more Asian States and Administrations had been applying the recommended separation minimums within their FIR(s), including China, Japan, the Republic of Korea, Malaysia and Thailand. However, the following States were still not meeting the expectations of the *Asia/Pacific Seamless ANS Plan*:

- poor application of regional policy within Category S (ATC surveillance) airspace were noted in the FIRs served by Afghanistan, Malaysia (Kuala Lumpur FIR), Mongolia, Myanmar and Sri Lanka;
- less than satisfactory application of regional policy within Category S airspace were observed in the FIRs served by Cambodia, India, Lao PDR, Pakistan and Viet Nam; and
- in the Pacific, two FIRs had less than satisfactory application of regional policy within largely Category R (Remote) airspace – Nadi FIR (Fiji) and Tahiti FIR (French Polynesia). However, these FIRs had significant portions that were able to be monitored by ground-based surveillance (Category S airspace).

2.10 These States are invited to review their ANS service delivery standards as part of their next National Air Navigation Plan (NANP) review, in coordination with affected Air Navigation Service Providers (ANSPs) and airspace users.

2.11 In particular, ICAO has determined that there are significant weaknesses in many Asian State's application of terminal separations, so this area had been included in the survey. Few States appear to be using the standard 3NM terminal airspace separation minimum consistently in all surveillance-based ATC sectors. This, and the failure to implement proper Air Traffic Flow Management (ATFM) where necessary, sequencing mechanisms such as Arrival Manager (AMAN) and efficient Standard Terminal Arrival Routes (STARs) and use of runways for both arrivals and departures, means that many terminal airspace operations are operating below their actual capability.

2.12 This has resulted in many gains made in en-route operations through Performance-based Navigation (PBN) being lost in the terminal airspace with adverse effects on ATC workload, and significant losses in terms of economics and environmental outcomes. An example is where aircraft are manoeuvred in a 'trombone' pattern when the controller is not confident of the sequence, which is inefficient and workload-intensive for both pilots and ATC.

2.13 Instead, systems such as the more organised STAR-based approach in **Figure 3** is recommended so Continuous Descent Operations (CDO) might be possible, subject to vectoring to adjust the distance between aircraft.



- lack of confidence in the neighbouring FIR's inbound flight data estimates (*this human factors issue can be overcome through closer coordination between involved Area Control Centres (ACCs) and their safety teams, and data sharing – particularly ADS-B and ATS Inter-facility Datalink Communications (AIDC)*);
- TOC restrictions imposed by the next or 'downstream' FIR (*this issue should be discussed at sub-regional level in informal groups and via bilateral discussions to ensure that the separations and TOC spacing is evaluated on the basis of the whole route, not be individual FIR and is a matter that will continue to be highlighted by the Regional Sub-Office (RSO) in ATS route development sessions*);
- perceived need for spacing to climb and descend aircraft crossing en-route traffic (*this issue should be addressed by the proper use of ATC simulators and other tools to ensure that controllers are competent and comfortable to apply tactical measures available in PANS-ATM and in accordance with the Asia/Pacific Seamless ANS Plan*);
- perception that larger separations were necessary due to reliance on one surveillance system or occasional communication issues (*this issue should be addressed by ensuring controllers are competent and confident in applying procedures for degradation and contingency circumstances*); and
- improper perception that ICAO standard separations required a buffer because they weren't 'safe' enough or to avoid aircraft conflicts and subsequent safety incidents (*this issue should be addressed by educating senior managers that there is no requirement to build extra buffers into ICAO standards that already have buffers and thus systematically penalise every aircraft – PANS ATM 5.4.1 applies, and that the use of larger, arbitrary separations than necessary like 10NM en-route has been empirically shown<sup>1</sup> to result in higher workload and more conflicts, and were thus less safe*).

#### 5.4.1 Lateral separation

##### 5.4.1.1 LATERAL SEPARATION APPLICATION

5.4.1.1.1 Lateral separation shall be applied so that the distance between those portions of the intended routes for which the aircraft are to be laterally separated is never less than an established distance to account for navigational inaccuracies plus a specified buffer. This buffer shall be determined by the appropriate authority and included in the lateral separation minima as an integral part thereof.

*Note. – In the minima specified in 5.4.1.2 an appropriate buffer has already been included.*

#### New Survey

2.18 To better analyse the separation standards used in the APAC Region, the Regional Office, with valuable inputs from Thailand, has developed a new survey (**Attachment D**). Surveying the TOC points' spacing parameter is a step forward in helping to identify the 'bottleneck' FIR Boundary TOC points in the region.

2.19 The new survey will be circulated to States towards the end of 2021 and all States/Administrations are urged to respond to the survey.

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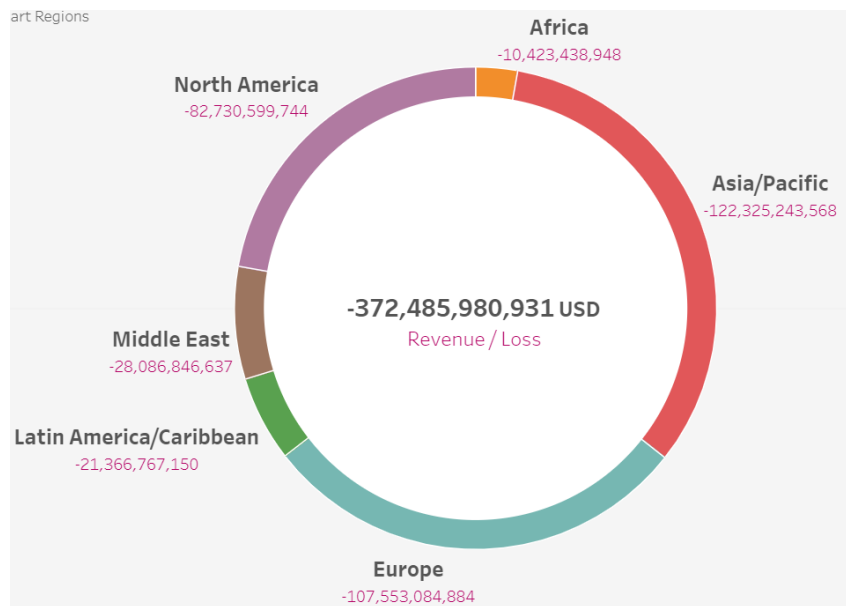
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Conclusions

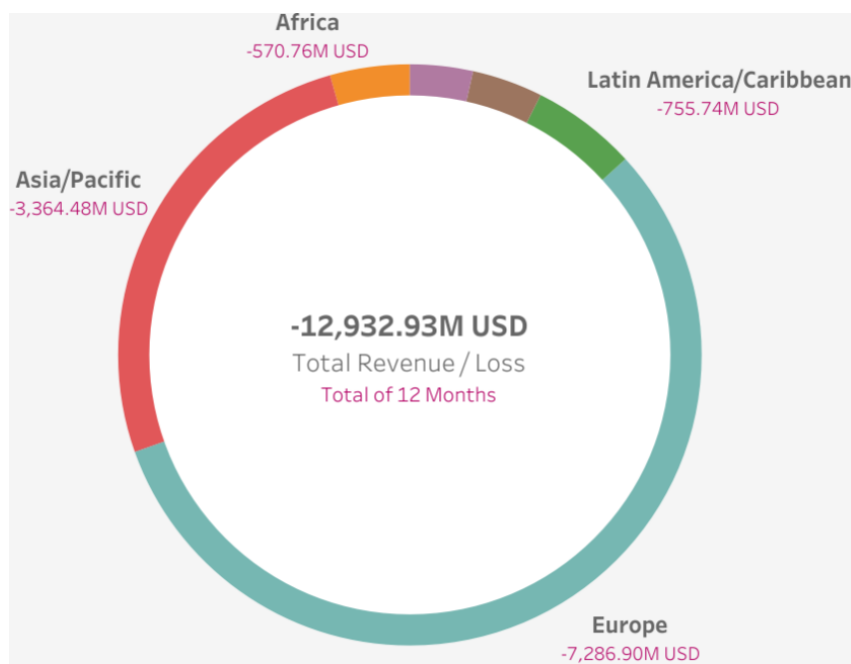
2.20 As the cost of new CNS/ATM systems were generally not providing a commensurate increase of efficiency in service, States should consider the ramifications of this in terms of safety (especially with regards to ATC workload), efficiency for airlines and environmental consequences, which ultimately had a political dimension when the public becomes aware of the comparatively poor performance in Asia. Given the increasing air traffic in Asia in particular, Asian States should recognise the problem and establish policies, rules and procedures for ANSPs as part of their review of the State’s NANP to greatly improve the benefits from modern CNS/ATM systems, including training for senior managers so they might recognise the gap between current practice and best practice.

2.21 States/Administrations are urged to review Letters of Agreement (LOAs) with adjacent FIRs whenever there is an improvement in CNS/ATM systems. Periodic revision of separation minimums minima with adjacent FIRs are highly encouraged, and should be based on technical and operational aspects.

2.22 Given the urgent need to ensure the most efficient ATM systems to support the fragile recovery of the aviation industry after severe financial losses compared to ANSPs during the COVID-19 pandemic (**Figure 5** and **Figure 6**), ICAO urges all APAC States and Administrations to address this key aspect of capacity and efficiency within their National Air Navigation Plans. ICAO will be bringing this matter to the attention of States through the DGCA Conference and Ministerial forums.



**Figure 5: Revenue Losses by Region, 2019 and 2020 Comparison**



**Figure 6:** ANSP Navigation Charge Losses, 2019 and 2020 Comparison

2.23 The ICAO Regional Office (and from a global perspective, ICAO HQ) also has a role in educating States about the human performance aspects that act as barriers to implementation of more efficient horizontal separations and aircraft spacing at TOC points, particularly those contained within the *Asia/Pacific Seamless ANS Plan*, reproduced as follows for ease of reference:

5.22 *An optimal ‘aviation culture’ within regulators and service providers can only be implemented when top managers instil an understanding of a system-wide approach that creates an organic, learning and safe environment. When considering the key factors supporting an ‘aviation culture’, it is important to acknowledge that no ‘national culture’ is perfectly aligned with ‘aviation culture’, so there will always be a need for gap analysis and changes where development of an appropriate in culture is required. In focussing on management it is therefore important to train managers, and for managers to have a level of competency in the following areas (Figure 6):*

..... (truncated).....

- c) *the systematic application of human factors principles in –*
  - *air safety investigation;*
  - *system design (ergonomics, human-in-the-loop);*
  - *effective training (including the use of simulators);*
  - *fatigue management;*
  - *automated safety nets; and*
  - *contingency planning;*
- d) *the implementation of effective safety reporting systems that –*
  - *are non-punitive, supporting a ‘Just Culture’;*
  - *promote open reporting to management; and*
  - *focus on preventive (systemic), not corrective (individual) actions in response to safety concerns, incidents and accidents.*



**Figure 6: Optimal Aviation Culture Factors**

ANSP Human and Simulator Performance

7.43 The following systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should consider all the elements of the SHELL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material:

- a) human performance training for all managers of operational air navigation services (such as aerodrome operators, ATC organisations and aeronautical telecommunications), such training to include the importance of:
  - a proactive organisational culture where managers and operational staff are informed and safety is a first priority, using open communications and an effective team management approach;
  - assessment and management of risks by safety review and assessment teams comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM systems, particularly those related to human capabilities and limitations;
  - human factors in –
    - air safety investigation;
    - system design (ergonomics, human-in-the-loop);
    - effective training (including the improved application of simulators);
    - fatigue management;
    - automated safety nets; and
    - contingency planning;
  - effective safety reporting systems that –
    - are non-punitive, supporting a ‘Just Culture’;
    - promote open reporting to management; and
    - focus on preventive (systemic), not corrective (individual)

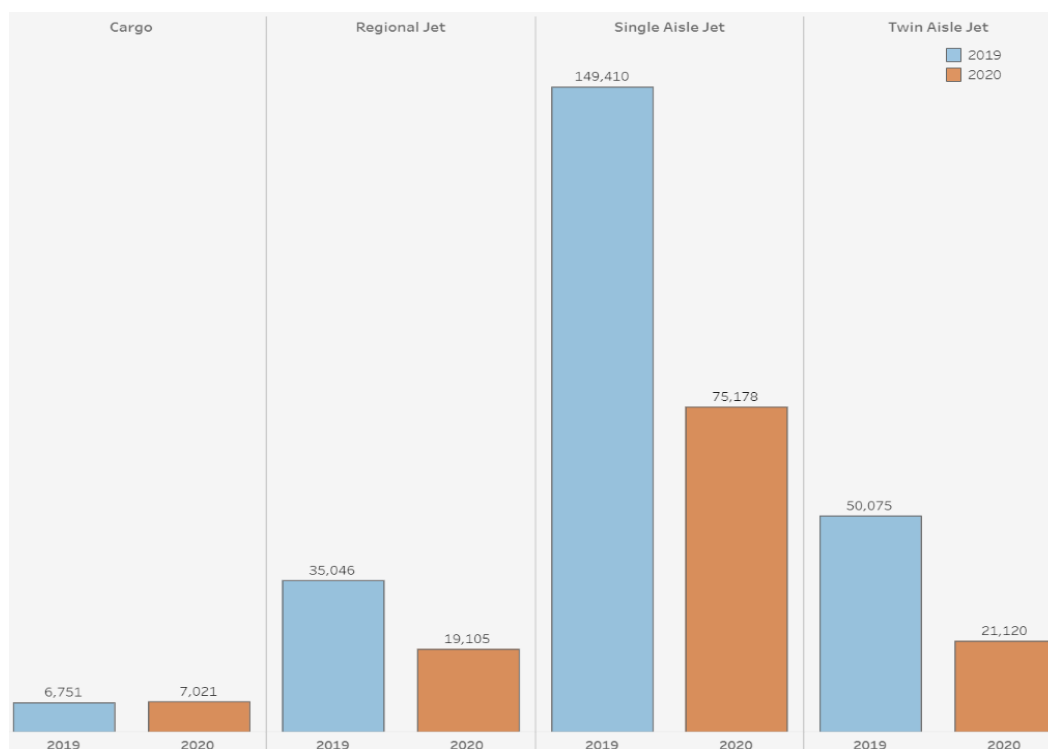
actions in response to safety concerns, incidents and accidents.

- b) *human performance-based training and procedures for operational staff providing ATS, including:*
- *the application of tactical, surveillance-based ATC separation;*
  - *control techniques near minimum ATC separation; and*
  - *responses to ATM contingency operations, irregular/abnormal operations and safety net alerts.*
- c) *human performance-based training and procedures for staff providing operational air navigation services (such as aerodrome staff operating ‘airside’, air traffic controllers and aeronautical telecommunications technicians) regarding the importance of:*
- *an effective safety reporting culture; and*
  - *‘Just Culture’ (Priority 1).*

*Note 1: prevention of fatigue systems should be established to support human performance in the delivery of a Seamless ANS service. The systems should be consistent with guidance within ICAO Doc 9966 FRMS – Fatigue Risk Management System.*

*Note 2: regarding ATM contingency operations, refer to the Regional ATM Contingency Plan.*

2.24 States should note that the current low traffic environment in most parts of the Asia/Pacific Region caused by COVID-19 – except for cargo aircraft operations – is an ideal lower risk opportunity to implement new ATC procedures, including efficient ATC separations (**Figure 7**).



**Figure 7:** Active Fleet Comparisons by Aircraft Types, 2019 and 2020

2.25 The meeting is invited to discuss and agree to the following Draft Conclusion from the Combined Tenth Meeting of the South Asia – Indian Ocean ATM Coordination Group and Twenty-Seventy Meeting of the Southeast Asia ATS Coordination Group (SAIOACG/10 and SEACG/27) meeting, held from 29 March to 02 April 2021:

<b>Draft Conclusion ATM/SG/9-X: Implementation of Efficient ATS Horizontal Separations and Transfer of Control Aircraft Spacing</b>	
<b>What:</b> That, given the global priority to support airlines' recovery from the unprecedented negative economic consequences of the COVID-19 pandemic and the suitable low traffic environment: a) States/Administrations are strongly urged to review and update their National Air Navigation Plans (NANPs) to ensure that Air Navigation Service Providers (ANSPs) fully implement the horizontal separation and aircraft spacing elements in the Asia/Pacific Seamless ANS Plan V3.0; and b) ICAO considers the need for seminars, workshops and other educational material to support this implementation.	<b>Expected impact:</b> <input checked="" type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<b>Why:</b> Due to the failure of the majority of APAC State/Administrations to implement the expectations of the Asia/Pacific Seamless ANS Plan regarding horizontal separation and spacing standards, and to support airline recovery.	<b>Follow-up:</b> <input checked="" type="checkbox"/> Required from States
<b>When:</b> 2-Dec-21	<b>Status:</b> Adopted by PIRG
<b>Who:</b> <input type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input checked="" type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Other: RSO	

### 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) urge all Administrations to complete the ATC separations survey;
- c) urge all Administrations to that have not done so to implement separation minimums to improve ATC service levels and update their ATS LOAs to meet the expectations of the *Asia/Pacific Seamless ANS Plan*;
- d) review and provide feedback to the new survey;
- e) discuss and agree to the Draft Conclusion; and
- f) discuss any relevant matters as appropriate.

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国际民用  
航空组织

Ref. T 3/10.1 – AP252/20 (ATM)

18 December 2020

**Subject:** ATC Separation Standards

**Action required:** To complete the survey and reply no later than **01 March 2021**

Sir/Madam,

I wish to draw your attention to the current ATC separation standards being applied in your airspace. All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, in accordance with the provisions of the *Asia/Pacific Seamless ANS Plan (7.34)*. It is necessary to determine how efficient the region is when matching the service delivery with both the capability of the aircraft, and the existing or planned ground systems.

The ICAO Asia/Pacific Regional Office had developed a new survey for circulation. The new survey questions were expected to provide greater clarity on the separation standards used in the region. Terminal airspace separations will now be surveyed and tracked. With regard to the spacing used at Transfer of Control (TOC) points, States are reminded to respond only for inbound flights at Flight Information Region (FIR) TOC points.

Guidance material to assist States in the interpretation of the survey is provided in **Attachment A**. Accordingly, States are urged to complete the ATC Separation Standards Survey (**Attachment B**) no later than **01 March 2021**, and submit the survey to the following email address [apac@icao.int](mailto:apac@icao.int), with a copy to [hchew@icao.int](mailto:hchew@icao.int).

Yours sincerely,

Arun Mishra  
Regional Director

**Enclosures:**

- A - Guidance Material
- B - ATC Separation Standards Survey

## Guidance Material

### Why is the survey necessary (including benefits if known)?

In general, several States were not applying ATC standards correctly, preferring to use larger, less efficient separations, which also affected safety due to the increased ATC workload managing larger spacing, and more conflicts. In this case, ATC had not optimised service levels that new systems were capable of under the *Asia/Pacific Seamless ANS Plan*.

The Eighth Meeting of the APANPIRG ATM Sub-Group (ATM/SG/8, Video Teleconference, 23-27 November 2020) had been concerned that only 30% of administrations had responded to the survey related to ATC separation standards.

### Who is affected by the survey?

The survey applies to all Asia/Pacific States that have an Air Traffic Control (ATC) unit providing area (en-route) or approach control services.

### What needs to be done?

State regulators need to determine what horizontal separation standards are approved through discussions with the Air Navigation Service Provider (ANSP), and in accordance with the survey attached to the State Letter. The horizontal separations include those within Category R (remote), Category S (surveilled by radar, Automatic Dependent Surveillance-Broadcast [ADS-B] or Multilateration [MLAT]) and Category T (terminal operations serviced by direct ATS communications and surveillance). Once the data is assembled to answer the survey, this should be transmitted to the ICAO Regional Office in accordance with the details in the State Letter.

### Who do you contact if you have more questions, or if you would like to offer assistance to other States on this matter?

Contact (in order of precedence):

1. Mr. Han Chee Chew, Air Traffic Management Officer, [hchew@icao.int](mailto:hchew@icao.int); or
2. Mr. Len Wicks, Regional Officer ATM/SAR ([lwicks@icao.int](mailto:lwicks@icao.int)); or
3. ICAO Asia/Pacific Regional Office, attention ATM Section ([apac@icao.int](mailto:apac@icao.int)).

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Instructions: For each FIR administered by your State or Administration, complete the survey below:

Q1: Noting the categorization of airspace in the Asia/Pacific Seamless ANS Plan paragraph 1.4 and the performance expectation in paragraph 7.34, both copied below, what minimum horizontal separation standard has been authorized for controllers to use within your Category R, Category S and Category T airspace?

Category R (remote) airspace: NM

Category S (surveillance) airspace: NM

Category T (terminal) airspace (international airports): NM

Remarks:

Q2: What minimum horizontal spacing has been authorized by Air Traffic Services Letter of Agreement (ATS LOA) or other instrument on each of your Flight Information Region (FIR) inbound transfer of Control (TOC) points?

Category S airspace to Category S FIR TOC Points: NM

Category R airspace to Category S FIR TOC Points: NM

Category R OR Category S airspace to Category R FIR TOC Points: NM

*(Note: This question only applies to inbound flights entering the FIRs. If for example your State applies 10NM inbound at the TOC point and the neighbouring State applies 30NM, then respond '10NM').*

Remarks:

Q3: Noting the expectations of the Asia/Pacific Seamless ANS Plan paragraph 7.35 copied below, does your Administration apply a Flight Level Allocation Scheme within its FIR(s) [no closer than 50NM to the FIR boundary]?

If so, please provide details.

YES / NO

Details/Remarks:

### ***Excerpts from the Asia/Pacific Seamless ANS Plan***

1.4 *The Plan does not use ‘continental’, ‘remote’ and ‘oceanic’ areas to refer to an assumed geographical application area, as many Asia/Pacific States have islands or archipelagos that can support a higher density of Communications, Navigation, Surveillance (CNS) systems than in a purely ‘oceanic’ environment. In accordance with the CONOPS that air navigation services should be provided commensurate with the capability of the CNS equipment, it is important to categorise airspace in this manner, and simplify the numerous references to this capability throughout the Plan. Thus the Plan categorises airspace by reference to its CNS (Communications, Navigation and Surveillance) capability as:*

- a) ***Category R***: *remote en-route airspace with Air Traffic Services (ATS) HF or CPDLC communications and outside the coverage of ground-based surveillance coverage; or*
- b) ***Category S***: *serviced (or potentially serviced) en-route airspace – by direct (not dependent on a Communication Service Provider (CSP) ATS communications and surveillance; or*
- c) ***Category T***: *terminal operations serviced by direct ATS communications and surveillance.*

7.34 *All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, taking into account such factors as:*

- a) *the automation of the ATM system, including automated hand-off between sectors;*
- b) *the capability of the ATC communications system;*
- c) *the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; and*
- d) *ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.*

*Note 1: the delivery of ATC services should be based primarily on the CNS/ATM capability. When using Annex 10 compliant ATS surveillance, 5NM (enroute) or 3NM (terminal) surveillance-based separations should be authorised within ATC sectors. At the TOC points in such environments, 5-10NM should be authorised with auto hand-off and surveillance data-sharing or overlapping coverage at the TOC point, and 5-20NM without auto hand-off, as determined by an appropriate safety assessment.*

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- a) ***Category R*** *airspace with the agreement of all ANSPs that provide services:*
  - *within the airspace concerned; and*
  - *within adjacent airspace which is affected by the FLAS; or*
- a) ***Category S*** *airspace with the agreement of all ANSPs that provide services:*
  - *where crossing track conflicts occur within 50NM of the FIRB; and*
  - *ATS surveillance coverage does not overlap the FIRB concerned, or ATS surveillance data is not exchanged between the ATC units concerned.*

States/Administration	Q1: Minimum horizontal separation standard			Q2: Minimum horizontal separation standard authorized by ATS LOA on each TOC			Q3: FLAS
	Acceptable standard: ≤ 50 NM	Acceptable standard: 5 NM	Acceptable standard: 5 NM	Acceptable standard: ≤ 50 NM	Acceptable standard: ≤ 10 NM	Acceptable standard: ≤ 10 NM	Acceptable standard: No
	Category R Horizontal Separation	Category S Horizontal Separation	Category T Horizontal Separation	Category R/S ⇒ R TOC	Category R⇒S TOC	Category S⇒S TOC	FLAS
Afghanistan	N/A	50 NM		N/A	50 NM	50 NM	Yes
Australia	30 NM	5 NM	3 NM	30 - 50 NM	50 NM	N/A	No
Bangladesh							
Bhutan	N/A	50 NM		50 NM	50NM	50 NM	
Brunei Darussalam							
Cambodia	N/A	10 NM		N/A	N/A	10 NM or 10 mins	Yes
China	30NM	5 NM		30 NM	30 NM	10 NM	Yes
Cook Islands							
DPR Korea							
Fiji	30 NM RNP 4	10-20 NM		30 NM	20 NM	20 NM	No
French Polynesia	30 NM	10-20 NM		50/100 NM	50/100 NM	100 NM	No
Hong Kong, China	N/A	5 NM	2.5 - 5 NM	N/A	N/A	16 NM - 10 Mins MNT	No
India	50 NM	20 NM		50 NM	50 NM	20 NM	Yes
Indonesia	50NM	5NM	5NM	50-80NM	N/A	10-20NM	No
Japan	30NM	5NM	3NM	30NM	30NM	20NM	Yes
Kiribati							
Lao PDR	10 NM	10 NM		10 - 15 NM	10-15 NM	10-15 NM	Yes
Macao, China	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Malaysia (Kota Kinabalu)	N/A	5 NM	5 NM	10 Minutes	10 Minutes	10 Minutes	Yes
Malaysia (Kuala Lumpur)	Longitudinal 10 mins	5 NM	3 NM	10 Minutes	N/A	15-30NM	No
Maldives	50 NM	5 NM		50 NM	10 NM	10 NM	No
Marshall Islands							
Micronesia							
Mongolia	10 minutes	30KM/16NM		10 minutes	30KM/16NM	30KM/16NM	Yes
Myanmar	50 NM/10 mins	50 NM/10 mins		50 NM/10 mins	50 NM/10 mins	50 NM/10 mins	Yes
Nauru							
Nepal	N/A	5 NM	5-10 NM	N/A	10 Minutes	10 Minutes	Yes
New Caledonia							
New Zealand	30 NM RNP 4	5 NM		30 NM RNP 4; 50 NM RNP 10	5 NM	5 NM	No**
Pakistan	N/A	15 NM	5 NM	N/A	50 NM	50 NM	Yes
Palau							
Papua New Guinea	30NM	5NM	5NM	30NM	5NM	N/A	No
Philippines	50 NM	5 NM	5 NM	50 NM	50 NM	50 NM	Yes
Republic of Korea	N/A	5NM	3NM	N/A	N/A	15-30NM/10 mins MNT	Yes
Samoa							
Singapore	50 NM	5 NM	3 NM	10 NM - 10 Mins MNT	N/A	50 NM - 10 Mins MNT	Yes
Solomon Islands							
Sri Lanka	50 NM / 10 Mins MNT	8-10 NM	5 NM	50 NM / 10 Mins MNT	50 NM / 10 Mins MNT	30 NM / 10 Mins MNT	Yes
Thailand	N/A	5 NM	3-5 NM	N/A	7 Mins MNT	20 NM	No
Timor-Leste							
Tonga	N/A	25 NM		20 mins	N/A	N/A	No
Tuvalu							
United States (Anchorage Oceanic)	15 - 30 NM	5 NM	5 NM	30 NM	30 NM	5 NM	No*
United States (Oakland Oceanic)	15 - 30 NM	5 NM	3 NM	30 NM	30 NM	N/A	No*
Vanuatu							
Viet Nam	50 NM	5-10 NM	3-5 NM	20 NM	20 NM	10 NM	Yes

States that responded for 2021 survey

\*United States responded regarding uni-directional routes using all levels, not a FLAS blocking levels for procedural separation

\*\*NZ responded regarding the Flight Level Orientation Scheme (FLOS), not a FLAS

Updated 03 March 2021

Instructions: For each FIR administered by your State or Administration, complete the survey below:

Q1: Noting the categorization of airspace in the Asia/Pacific Seamless ANS Plan paragraph 1.4 and the performance expectation in paragraph 7.34, both copied below, what minimum horizontal separation standard has been authorized for controllers to use within your Category R, Category S and Category T airspace?

Category R (remote) airspace: NM  
 Category S (surveillance) airspace: NM  
 Category T (terminal) airspace (international airports): NM

Remarks:

Q2: What minimum horizontal spacing has been authorized by Air Traffic Services Letter of Agreement (ATS LOA) or other instrument on each of your Flight Information Region (FIR) inbound transfer of Control (TOC) points?

Please fill in the table in Sheet 2. Example as shown:

S/No.	TOC Points	ATS Routes	Category of Airspace to FIR TOC Point (Inbound only)	Minimum horizontal separation standard	Inbound Transferring FIR	Remarks/Route Restrictions
01	ARAMA	A464	Category S airspace to Category S FIR TOC Point	10nm	Kuala Lumpur	
02	AKMON	M768	Category R/S airspace to Category R FIR TOC Point	10 minutes MNT	Ho Chi Minh / Kota Kinabalu	
03	TEGID	M767	Category R/S airspace to Category R FIR TOC Point	50nm	Manila	Based on RNP10 operations

*(Note: This question only applies to inbound flights entering the FIRs. If for example your State applies 10NM inbound at the TOC point and the neighbouring State applies 30NM, then respond '10NM').*

Remarks:

Q3: Noting the expectations of the Asia/Pacific Seamless ANS Plan paragraph 7.35 copied below, does your Administration apply a Flight Level Allocation Scheme within its FIR(s) [no closer than 50NM to the FIR boundary]? If so, please provide details.

YES / NO

Details/Remarks: