International Civil Aviation Organization

Twenty-fourth Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/24) of APANPIRG

Web-conference, 30 November - 4 December 2020

Agenda Item 4: Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

4.4 Review Report of the Fourth Meeting of Spectrum Review Working Group (SRWG/4)

REVIEW REPORT OF THE FOURTH MEETING OF THE SPECTRUM REVIEW WORKING GROUP (SRWG/4)

(Presented by Secretariat)

SUMMARY

This paper presents the outcomes of the fourth meeting of the Spectrum Review Working Group which was held via video conferencing, from 9 to 10 June 2020.

1. INTRODUCTION

1.1 The fourth meeting of the Spectrum Review Working Group (SRWG/4) of APANPIRG was held via video conferencing from 9 to 10 June 2020.

1.2 The meeting was attended by 43 participants from 12 States. The States that attended the meeting were Australia, Cambodia, China, Hong Kong China, Indonesia, Japan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand and United States of America.

1.3 A total of 4 working papers, 10 information papers and 1 flimsy were considered. A Draft Conclusion and 3 Draft Decisions was formulated by the meeting. The papers and report of SRWG/4 meeting are available at: https://www.icao.int/APAC/Meetings/Pages/2020-SRWG4.aspx

2. DISCUSSION

Election of Chairperson

2.1 The Secretariat re-capped the achievements made by this group and highlighted the leadership of Mr. Paul Dowsett from Airservices, Australia since the establishment of SRWG. Due to resignation of Mr. Paul Dowsett from the role of Chairman after the third meeting, there was a need to elect a new chairman to lead the group. Nominated by Hong Kong, China and seconded by Singapore, Mr. Chainan Chaisompong, Air Traffic Engineering Manager from Aeronautical Radio of Thailand Ltd. (AEROTHAI) was elected as the new Chairman of the SRWG.

Review of Regional Process

2.2 The Secretariat presented an overview of the frequency coordination process that was used in the Asia/Pacific (APAC) Region. The presentation included measures that could be implemented to improve the efficiency of the current process, with highlight on a more streamlined process based on the implementation of Frequency Finder (FF), for the coordination of frequency assignments within the APAC Region with the goal to improve the efficiency in frequency coordination. The *Preferred format of the characteristics of submissions* discussed at the meeting was provided in Appendix A to the Report of SRWG/4 for reference by States in improving the coordination process.

2.3 The meeting also noted the need to explore the spectrum capacity to support future requirements for VHF-COM systems as well as for navigation (NAV) systems, in light of the need to reduce the channel spacing in the VHF band 108 – 117.975 MHz for Instrument Landing System (ILS) Localizer (LOC) and Very High Frequency (VHF) Omni-directional Range (VOR) to 50 kHz.

2.4 The proposal to develop a frequency assignment plan, that would include all requirements for VHF-COM and for NAV systems, including Ground Based Augmentation System (GBAS)/VHF Data Broadcast (VDB), for the period up to around 2030 was also noted by the meeting. The following Draft Decision was endorsed by the meeting.

<table>
<tr><td colspan="3">Draft Decision SRWG/4/1 - Frequency requirements for VHF-COM systems and ILS, VOR, DME and GBAS/VDB facilities</td></tr>
<tr><td colspan="2">What: That, the SRWG is tasked to develop a rolling frequency assignment plan for VHF-COM and ILS, VOR, DME and GBAS/VDB facilities to meet the operational requirements until [2030], subject to a regular review and updating by the SRWG.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To secure adequate spectrum for these facilities for the near future.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 13-Nov-20</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XX</td></tr>
</table>

2.5 Australia informed the meeting about its use of Common Traffic Advisor Frequency (CTAF). A CTAF is a frequency designated for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. The meeting noted the need of Australia to implement Frequency Finder to support CTAF service, and ICAO is urged to explore the solution with Frequency Finder's function to meet the requirements for CTAF.

Report of Frequency Finder Implementation

2.6 The meeting was informed of the experience and findings with the use of Frequency Finder tool by Indonesia. The implementation of Frequency Finder started right after the Frequency Finder Workshop for APAC Region which was held between 18-21 October 2016 in Bangkok, Thailand. Indonesia has been regularly updating Frequency Finder version from the FF2016.5R to FF2016.9R, FF2017.23R, FF2017.26R and now the latest version FF2020.03R installed on its platform, and gained many benefits from the use of Frequency Finder, particularly in testing the compatibility of new or modified frequency and improvement on coordination with ICAO APAC Regional Office, while some difficulties and errors were also experienced.

2.7 Errors in 'Key' column was identified in 2018. Instead of displaying six-digit number, it appeared as '?' question mark. Difficult automatic downloading process of global database on starting the Frequency Finder took all day long in the late of 2019. Frequencies from other States were discovered in the exported file in Microsoft Excel format, and some errors in display of frequency range happened in April and May 2020. All of the above-mentioned issues have been resolved with the joint effort between Indonesia, ICAO APAC Office and Mr. Robert Witzen.

2.8 An interference report was received from air navigation service provider on frequency 124.900 MHz implemented at Manado, Sulawesi. The frequency experienced interference with Manila, Philippines. The meeting noted that the reported interference was predicted by Frequency Finder and the use of the graphical display that Frequency Finder generated was further explained.

2.9 Indonesia proposed that a refreshment tutorial by ICAO on the use of Polygon function and mechanism to assign VHF-Extended Range (ER) in Frequency Finder tool on the SRWG/4 meeting or in an another specific event, and is willing to support the Frequency Finder system working on Frequency List No. 1 and 2 as well as Frequency List No.3.

2.10 The meeting noted the needs to organize another workshop on the use of Frequency Finder for States in the region, and urged ICAO to plan the event aiming to improve the understanding of the built-in functionality and the skill in operating the tool.

Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718, Volume II)

2.11 The Secretariat presented the latest updates on the revision of the Handbook on Radio Frequency Spectrum Requirement for Civil Aviation (Doc.9718), Volume II, *Frequency assignment planning criteria for aeronautical radio communication and navigation systems*. ICAO secretariat initiated the revision and drafting of the Handbook in 2018, to incorporate the application of the Recommendation ITU-R P-528.4 (2019) on Aeronautical Propagation Curves and to cover the planning criteria for aeronautical navigation systems. The overall achievements included the revision of Chapter 1, drafting of Chapter 3 - ILS, Chapter 4 - VOR, Chapter 5 – Distance Measuring Equipment (DME) and Chapter 6 - GBAS/VDB. It also moved the guidance material on frequency assignment planning for NAV systems currently in Annex 10, Volume I, Attachment C (ILS, VOR, DME) and Attachment D (GBAS/VDB) into the Handbook. The outcome was reviewed by the Navigation Systems Panel (NSP) and circulated to CNS experts in the regions. The updated frequency assignment planning criteria presented would update and replace the criteria currently in use in the APAC Region, which was specified in **Recommendation 12/2 - Amended APAC plan of radio navigation aids** from the third Asia/Pacific Regional Air Navigation Meeting held in 1993. The material is also being used to update the Frequency Finder to include the module for NAV systems frequency assignment planning, which includes ILS LOC and Glide Path, VOR, DME and GBAS/VDB. Member States at the meeting were invited to provide offline comments and inform ICAO APAC Office in case of any findings.

Introduction of Signal Monitoring for ILSs Using Same Frequency but Different Identifiers at Both Ends of the Same Runway

2.12 The meeting noted the signal monitoring for ILSs, which uses the same frequency but different identifiers at both ends of the same runway, in China. In order to solve the problem of ILSs frequency strain in airports dense area, it is a common practice to assign the same frequency but different identifiers at both ends of the same runway. Such practice was implemented at Shanghai Pudong International Airport and Beijing Daxing International Airport. Since human factor or failure of interlock could lead navigation indication error and aircraft flight path loss, a monitoring method is necessary for protection of ILSs signal quality. In response an enquiry, China clarified the implementation of same frequency set has been applied to LOC, GP and associated DME on both ends of the same runway.

Introduction of Studies on the GBAS VDB Frequency Assignment

2.13 China introduced the considerations of GBAS/VDB frequency assignment criteria changes, and studies on the GBAS/VDB signal compatibility. An example of GBAS/VDB operation at Shanghai Pudong International Airport was presented, introducing the information on frequency assignment (frequency spacing and geographical separation), operation status and signal compatibility analysis. Furthermore, when assigning GBAS/VDB frequencies, it was suggested that compatibility studies, operation effects of various States and the performance of airborne receivers should be taken into consideration. When amending ICAO Doc. 9718 and relevant documents, GBAS/VDB frequency assignment criteria should be classified and formulated to meet the development needs of GBAS/VDB in different regions.

Need for a Harmonized Approach for Coordination of Frequency for GBAS Implementation

2.14 As implementation of GBAS requires the installation of VHF radio station to broadcast correction signals to aircraft, via the same radio frequency spectrum that is already occupied by VOR and LOC. With reference to the newly proposed chapters for ICAO Doc. 9718, the channel spacing for a GBAS/VDB shall be a minimum of 1 MHz from any existing VOR, LOC or other VDB within a defined range of 33 nautical miles, which is the range where no interference is anticipated. Based on this range and the plus or minus 1 MHz channel spacing requirement, the number of frequency channels available for GBAS installation is quite constrained.

2.15 As an example, there are more than 20 sets of VOR and ILS within 33 nautical miles from the Hong Kong International Airport (HKIA). In view of the current situation due to lack of harmonized planning, it would not be feasible to assign a frequency for GBAS/VDB at HKIA in the band of 108.025 MHz to 117.950 MHz without re-assignment of existing occupied frequencies. Likewise, it is also noted that similar constraints might be imposed on other airports close to HKIA, in case they have any plans to implement GBAS/VDB in the future.

2.16 SRWG was requested to deliberate a harmonized approach in ensuring frequency planning for GBAS/VDB, and the ICAO APAC Office is expected to provide assistance in coordinating with States/Administrations on their plans for replacement/decommission/provision of VOR, ILS and GBAS, so that advance frequency planning can be done to facilitate GBAS implementation in the region to meet ICAO initiatives in Global Air Navigation Plan (GANP)/Aviation Systems Block Upgrades (ASBU).

2.17 The meeting noted the research and outcomes in IP/7 (Introduction of Studies on the GBAS VDB Frequency Assignment, Presented by China) and IP/10 (Need for a harmonized approach for coordination of frequency for GBAS implementation, Presented by Hong Kong, China), and encouraged States/Administration to continue to explore the spectrum capacity to accommodate GBAS/VDB and report the recommendations back to the SRWG for further review by the NSP, as necessary.

Review of Global COM List for the APAC Region

2.18 With the successful implementation of Frequency Finder, there was no more Frequency List No. 3 published by the ICAO Asia and Pacific Regional Office after the 29th Edition in January 2016, the up-to-date database in Frequency Finder (equivalent to Frequency List No. 3 in APAC region) is visible to all Frequency Finder users.

2.19 The maintenance and promulgation of Frequency List No.1 and Frequency List No.2 were still being conducted by the Regional Office in a timely and periodic manner. It proposes to request

States to update specific characteristics for NAV facilities in the Frequency List No.2 as well as to secure that the information in the Frequency Lists is up-to-date.

2.20 Demonstration was made on the current status of database (Frequency List No.3) in Frequency Finder, highlighting the export and import functions used to improve coordination efficiency. The meeting also noted the new functional modules of Frequency Finder for navigation systems and SSR Mode S Interrogator Identifier (II) code. The *Minimum Requirements for Computer Operating Frequency Finder* was discussed at the meeting and was provided in Appendix B of the Meeting Report for reference by States in implementing the Frequency Finder tool. After the review of the regional Frequency List No. 3, through further discussion, the meeting endorsed the following decision:

<table>
<tr><td colspan="3">Draft Decision SRWG/4/2 – Simulation of VHF COM Frequency requirements for next 10 years</td></tr>
<tr><td colspan="2">What: To conduct a new round of simulation for VHF COM frequency assignment based on new operational requirements of States to 2025 or to 2030 as necessary.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To support regional strategy on the use of 8.33KHz channel spacing.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 13-Nov-20</td><td colspan="2">Status: Draft to be adopted by SG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
</table>

2.21 Considering the important role of Frequency Finder played in the updating and maintenance of global database, relevant issues including user credential, software robustness, cyber security, etc. were addressed by the meeting. In order to fully benefit from the use of Frequency Finder for spectrum coordination, while effectively managing the relevant risks, the meeting urged ICAO to continue the robustness of the tool, endorsed the following Draft Conclusion aimed at improving the administrative process.

<table>
<tr><td colspan="3">Draft Conclusion SRWG/4/3 – Establishment a list of focal point responsible for the operation of Frequency Finder in States</td></tr>
<tr><td colspan="2">What: That, States in APAC Region are requested to nominate a focal point responsible for operation of the Frequency Finder and coordination for frequencies assignments with ICAO APAC Regional Office in order to reduce operational error and improve quality management for the coordination process.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: To reduce operational error in accessing the tool of Frequency Finder and improve the spectrum management quality by enhancing the administrative process.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 13-Nov-20</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
</table>

2.22 The meeting encouraged States/Administrations to share experience in using VHF COM function of Frequency Finder in various regional CNS events. The meeting also urged States to provide the Regional Office with information of all facilities that are in operation to improve the currency of Frequency lists. ICAO was also requested to organize Frequency Finder workshop on COM module, SSR Mode S II code module and new NAV module.

Review of TOR and Action List

2.23 The Secretariat presented the development and achievements made in APAC Region since SRWG/3, and the meeting reviewed the main outcomes from the previous meetings, with the experiences shared by States, discussed the possible future direction and tasks against the TOR and the Action List.

2.24 The most important function of this expert working group was to study *the issue of the requirement of 8.33 kHz channel spacing*, and it could be considered as completed in 2016 after SRWG/3. However, with the expected changes in air traffic, it has been agreed to conduct another round of simulation on VHF COM frequency assignment in APAC Region based on operational needs submitted by States. It has also been identified in spectrum capacity to accommodate GBAS/VDB and other emerging issues in optimizing the efficient and safe use of radio spectrum. After discussion, the meeting endorsed the following Draft Decision for consideration by CNS SG:

<table>
<tr><td colspan="3">Draft Decision SRWG/4/4 – Revision of the Term of Reference of the SRWG</td></tr>
<tr><td colspan="2">What: That, the revised Terms of Reference provided in Appendix C to the Report be adopted.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: Need to refine the scope of related tasks and include the new members.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 13-Nov-20</td><td colspan="2">Status: Draft to be adopted by PIRG</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: XXXX</td></tr>
</table>

2.25 The main points for this revision was to conduct simulation on VHF COM frequency assignment and expanded the scope of work to cover navigation systems with highlight on GBAS implementation. The revised TOR is provided in **Appendix A** of the working paper for action.

2.26 There was also a discussion on the integration of World Radiocommunication Conference (WRC) activities in the SRWG. It was agreed that this work should be kept separate and WRC activities should be conducted in the Regional Preparatory Group (RPG) Meeting for WRC. It was noted that ICAO should coordinate to have the SRWG and RPG meet at the same time where possible.

2.27 The meeting strongly expressed its concern on the ongoing technical support, maintenance and development of Frequency Finder, particularly in case of unexpected system failure which interrupts the normal process of the aeronautical spectrum coordination. **ICAO is requested to provide a practical solution to States/Administration to ensure the continuity and availability in the use of Frequency Finder as soon as possible**.

2.28 The proposed action items by States that participated at this meeting was incorporated into the list of action, and is provided in **Appendix D** of the meeting report.

Update on Space-based VHF Voice Communications Service

2.29 The proposed solution of space-based VHF voice communications that could fulfill the role of VHF direct controller-pilot communications (DCPC) in oceanic areas or remote regions where effective communications means is unavailable, when paired with appropriate surveillance, can potentially enable radar-like separation minima and enhancement of airspace safety and efficiency, without aircraft equipage being an issue. As there is no change to existing terrestrial VHF voice communications, it is expected that there will be no major amendments to ICAO Standards and Recommended Practices (SARPs).

2.30 Amendments to the International Telecommunication Union (ITU) Radio Regulations ("RR") was necessary as the space-based VHF project will require the ITU to harmonize and allocate VHF frequency spectrum for aeronautical mobile communications services between satellite and aircraft. The ICAO Frequency Spectrum Management Panel (FSMP) presented an ICAO position to support a future agenda item under Agenda Item 10 on allocating VHF frequency band for space-based VHF services at the World Radiocommunication Conference – 2019 (WRC-19). With the support from ICAO and the different Regional Groups of the ITU, the above space-based VHF frequency allocation was formally accepted as an agenda item for WRC-23, where the approval of such frequency allocation will be discussed and sought.

2.31 The space-based VHF voice communication concept was first endorsed in 2018 by ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) and supported by ICAO Communications and Frequency Spectrum Management Panels. Singapore has embarked on design studies with various communications vendors and satellites service providers since early 2019, and all of the technical studies are expected to conclude by end 2020. The Proof-of-Concept (POC) trials and verification tests may take place following the completion of all the technical studies. For such trials/tests, coordination will be made with the ICAO Asia Pacific Regional Office for the required frequencies.

2.32 The meeting noted the potential coverage of the proposed satellite constellation that will benefit a large number of States and the aviation community. The meeting encouraged States and Administrations to support the potential development of space-based VHF voice communication through joined technical studies and POC trials, supporting the ICAO positions, as well as active participating in the relevant ICAO and ITU WP5B meetings, in particular for the space-based VHF voice communication agenda item.

2.33 The meeting also noted the concerns from some States about this new project, and suggested Singapore to inform States/Administration of its plan for technical trials to facilitate the concerned States to be able to monitor the signal.

1090 MHz Spectrum and 24-bit Aircraft Address Issues with Unmanned Aircraft System (UAS)

2.34 The meeting noted the brief presentation by the Secretariat on regional activities on 1090 MHz spectrum and 24-bit aircraft address issues associated with unmanned aircraft. The meeting noted the topic was firstly presented to the region by Chairperson of the ICAO Surveillance Panel (SP) on APAC Aeronautical Surveillance Workshop in November 2018, further discussed at the Fourteenth Meeting of the South East Asia and Bay of Bengal Sub-regional Automatic Dependent Surveillance – Broadcast (ADS-B) Implementation Working Group (SEA/BOB ADS-B WG/14) through WP/7

Address and Spectrum Issues for small UAS and developed Draft Conclusion 14/02 – Small UAS Cooperative Surveillance Equipage, which was adopted by CNS SG/23 meeting through Conclusion CNS SG/23/11.

2.35 It was also noted by the meeting that on 8 November 2019, ICAO issued a State Letter, Subject: 1090 MHz spectrum issues and proper management of 24-bit aircraft addresses associated with unmanned aircraft operating exclusively at very low level, Ref.: SP 44/2 - 19/77. ICAO Member States was urged to note the ongoing ICAO initiatives to ensure the continued safe and reliable operation of aeronautical surveillance systems, and encouraged State to make use of the guidance material attached with the letter.

Report on the results of the International Telecommunication Union (ITU) World Radiocommunication Conference (2019) (WRC-19)

2.36 Radio frequency spectrum is a critical component of infrastructure that serves all aeronautical communications, navigation and surveillance/air traffic management (CNS/ATM) services and is protected as a safety-of-life function under the Radio Regulations. It is imperative that the global aviation community retains interference-free access to sufficient radio frequency spectrum in order to maintain safe implementation and operation of the CNS/ATM systems.

2.37 The ITU WRC serves as the preeminent event for negotiating long-term frequency spectrum rights. The meeting noted the summary of discussion and results from WRC-19, held between 28 October to 22 November 2019 in Sharm el Sheikh, Egypt. In general, the outcome from the conference were in line with ICAO's position. It is now essential to form an expeditious start of ICAO preparatory activities for the next conference in 2023, as a very large effort will be required on the part of the Organization and its Member States to ensure that ICAO's position is supported by the conference.

Future Meetings

2.38 The tentative dates for meetings proposed by SRWG:

a) A 5-day workshop on Frequency Finder (Advanced training), 2021.
b) SRWG/5 –March 2021.

Note of Appreciation

2.39 The meeting thanked Mr. Robert Witzen for his contributions to the success of the meeting.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper

b) review and endorse or adopt, as appropriate, Draft Conclusion SRWG/4/3 (Establish list of focal point)

c) review and endorse or adopt, as appropriate, the following Draft Decisions:
- Draft Decision SRWG/4/1 (Frequency requirement for COM/NAV systems);
- Draft Decision SRWG/4/2 (Simulation of COM frequency requirement); and
- Draft Decision SRWG/4/4 (Revision of TOR provided in **Appendix A**)

d) request ICAO to provide a practical solution to States/Administration to ensure the continuity and availability in the use of Frequency Finder, and

e) discuss any relevant matter as appropriate.

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**REVISED TERMS OF REFERENCE OF
ASIA AND PACIFIC
SPECTRUM REVIEW WORKING GROUP (APAC SRWG)**

Consists of objectives and deliverables as follows:

The Objectives of the APAC SRWG are to:

(a) conduct regular spectrum capacity and requirements assessment for the APAC Region to accommodate current operational requirements and future implementation of aeronautical communication and navigation system as stipulated in the Global Air Navigation Plan (GANP);

(b) develops an approach, supported by new tools and criteria being introduced at ICAO global level, to enhanced possibilities of frequency assignments for communication (VHF air-ground communication) and navigation system (ILS, VOR, DME and GBAS/VDB);

(c) develop and review a high-level implementation plan and guidance material(s) for States/Administrations in the APAC region to implement the frequency assignments in a coordinated manner with ANSP, CAA and national frequency Authorities to satisfy future operational needs or the introduction of new technologies, with emphasis on communication and navigation systems, till 2030; and

(d) based on the above, develops recommendation(s) to address the future operational needs and current limitations.

Deliverables to meet the Objectives:

(a) Progress report to APANPIRG CNS Sub-Group addressing progress on the deliverables;
(b) Requirement/Capacity Assessments as necessary;
(c) High-level frequency assignment plan and Guidance Material(s) for communication (VHF air-ground communication) and navigation systems (ILS, VOR, DME and GBAS/VDB) until 2030; and
(d) Recommendation(s) on solutions to current limitation and future operational needs.

Timeframe for Deliverables:

The timeframe for the review of the deliverables by APANPIRG CNS Sub-Group are as follows:

Deliverable (a) – from 2020 onward;
Deliverable (b) – from 2020 onwards;
Deliverable (c) – first guidance material in 2022; and
Deliverable (d) – from 2020 onwards (recurring deliverable(s)/based on the outcome of (b) and (c))

Meeting:

The APAC SRWG shall convene annually with at least one face-to-face meeting per year, which is supplemented by teleconference meetings (e.g. WebEx) as appropriate.

Membership:

All APAC member States/Administrations providing ANS in the Asia and Pacific Regions. APAC members should nominate Subject Matter Experts from Civil Aviation Authorities, ANSPs, and other organizations preferably experts involved in aeronautical frequency and/or spectrum management to participate in the Working Group.

The Working Group would also invite representatives of International Organizations recognized by the ICAO Council as representing important civil aviation interests, to participate in its work in a consultative capacity.

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