



**INTERNATIONAL CIVIL AVIATION ORGANIZATION  
ASIA AND PACIFIC OFFICE**

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

*Web-conferencing*  
09 June – 10 June 2020

The views expressed in this Report should be taken as those of  
SRWG/4 Meeting and not of the Organization.

Approved by the Meeting  
And published by the ICAO Asia and Pacific Office, Bangkok

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**1. Introduction**

1.1 The Fourth Meeting of the Spectrum Review Working Group (SRWG/4) of APANPIRG was held via video conferencing from 09 to 10 June 2020.

**2. Attendance**

2.1 The meeting was attended by 43 participants from 12 States/Administration including: Australia, Cambodia, China, Hong Kong China, Indonesia, Japan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand and USA. The List of Participants is provided in **Attachment 1** to this Report.

**3. Opening of the Meeting**

3.1 The meeting was opened by Mr. LUO, Yi, Regional Officer CNS who also extended warm welcome to all participants and expressed deep appreciation and gratitude to the efforts of all parties to make great achievements. He thanked Mr. Robert Witzten for his continuous support to SRWG and spectrum related activities particularly in supporting this meeting remotely from Canada.

**4. Officers and Secretariat**

4.1 Mr. LUO, Yi, Regional Officer CNS, ICAO Asia and Pacific Regional Office acted as secretary for the meeting with the support of Ms. Bhabhinan Sirapongkosit, the Programme Assistant of the same office, in operating the WebEx platform during the meeting. The meeting was also assisted by Mr. Robert Witzten in voluntary way from Montreal, who's a former ICAO Officer, expert in frequency management and main developer of Frequency Finder software tool.

**5. Organization, working arrangement, language and documentation**

5.1 The SRWG/4 met as a single body. The working language for the meeting was English inclusive of all documentation and this Report. A total of Four (4) Working Papers, Ten (10) Information Papers and One (1) Flimsy were considered by the meeting. The List of Working and Information Papers is provided in **Attachment 2** to this Report.

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### **Agenda Item 1: Adoption of agenda**

- 1.1 The provisional agenda presented in **WP/1** was adopted as agenda for the meeting.

### **Agenda Item 2: 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 Chair role after the third meeting, there is a need to elect a new chair 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 Chair of the SRWG.

### **Agenda item 3: Frequency coordination process and improvement for the Asia/Pacific Region**

#### **Review of Regional Process (WP/2)**

3.1 Through this paper, the secretariat presented an overview of the frequency coordination process that is being used in the APAC Region. It presents some 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 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 in the meeting is provided in **Appendix A** to this Report for reference by States in improving the coordination process.

3.2 The paper also addressed the need to explore the spectrum capacity to implement future requirements for VHF-COM systems as well as for NAV systems are in the light of determining the need to reduce in particular the channel spacing in the VHF band 108 – 117.975 MHz for ILS Localizer and VOR to 50 kHz.

3.3 Finally, the paper proposed to develop a frequency assignment plan that would include all requirements for VHF-COM and for NAV systems, including GBAS/VDB, for the period up to around 2030.

3.4 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 in supporting CTAF service, and ICAO is urged to explore the solution with Frequency Finder's function to meet the requirements for CTAF. **ACTION ITEM 4-1.**

3.5 The meeting formulated the following draft Decision:

<b>Draft Decision SRWG/4/1 - Frequency requirements for VHF-COM systems and ILS, VOR, DME and GBAS/VDB facilities</b>	
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.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
Why: To secure adequate spectrum for these facilities for the near future.	Follow-up: <input checked="" type="checkbox"/> Required from States
When: 13-Nov-20	Status: Draft to be adopted by PIRG
Who: <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: XXXX	

### Report of Frequency Finder Implementation in Indonesia (IP/9)

3.6 This paper presented the meeting about the experiences and findings on using Frequency Finder tool in years. The implementation of Frequency Finder in Indonesia started right after the Frequency Finder Workshop for Asia Pacific region which was held on 18-21 October 2016 in Bangkok, Thailand. By far, Indonesia has been regularly updating FF 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 are also experienced.

3.7 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 FF took all day long in the late of 2019. Frequencies from other States were discovered in the exported file in MS excel format, and some errors in display of frequency range happened in April and May 2020. All of the abovementioned issues have been resolved with the joint effort between Indonesia, ICAO APAC Office and Mr. Robert Witzten.

3.8 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. Initially, Indonesia acknowledges this will most likely change the frequency assignment for Manado, Sulawesi. **ACTION ITEM 4-2.**

3.9 Indonesia proposes a refreshment tutorial by ICAO on the use of Polygon function and mechanism to assign VHF-Extended Range (ER) in FF 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.

3.10 The meeting noted the needs in organizing 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) (IP/2)**

3.11 The Secretariat presented the latest updates on the revision of the Handbook on Radio Frequency Spectrum Requirement for Civil Aviation (DOC9718), Volume II, *Frequency assignment planning criteria for aeronautical radio communication and navigation systems*. The 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 - DME and Chapter 6 - GBAS/VDB. It also moves the guidance material on frequency assignment planning for NAV systems currently in Annex 10, Volume I, Attachments C (ILS, VOR, DME) and 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 in this paper would update and replace the criteria currently in use in the APAC Region, which was specified by **Recommendation 12/2 - Amended ASIA/PAC plan of radio navigation aids** from the third Asia/Pacific Regional Air Navigation Meeting held in 1993. The material in this paper is being used for updating the ICAO program Frequency Finder to include the module for NAV systems frequency assignment planning, which including ILS Localizer and Glide Path, VOR, DME and GBAS/VDB. The 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 (IP/6)**

3.12 This paper introduced the signal monitoring for ILSs which using 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.

3.13 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 (IP/7)**

3.14 This paper introduced the considerations of GBAS VDB frequency assignment criteria changes, and studies on the VDB signal compatibility in China. An example of GBAS VDB operation at Shanghai Pudong international airport is given, introducing the information of frequency assignment (frequency spacing and geographical separation), operation status and signal compatibility analysis. Furthermore, when assigning GBAS frequencies, it is suggested that compatibility studies, operation effects of various states and the performance of airborne receivers should be taken into consideration. When amending DOC9718 and relevant documents, GBAS frequency assignment criteria should be classified and formulated to meet the development needs of GBAS in different regions.

**Need for a Harmonized Approach for Coordination of Frequency  
for GBAS Implementation (IP/10)**

3.15 As implementation of GBAS needs to install VHF radio station to broadcast correction signals to aircraft, via the same radio frequency spectrum that is already occupied by the VHF Omni-directional Range (VOR) and Localizer (LOC) of Instrument Landing System (ILS). With reference

to the newly proposed chapters for ICAO Doc 9718, the channel spacing for a VDB shall have minimum of 1 MHz channel spacing from any existing VOR, ILS 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.

3.16 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 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 in the future.

3.17 The SRWG is requested to deliberate a harmonized approach in ensuring frequency planning for VDB, and the ICAO APAC Office is expected to provide assistance in coordination 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 the ICAO initiatives in GANP/ASBU.

3.18 The meeting noted the research and outcomes in IP/7 and IP/10, and encouraged States/Administration to continue the exploration on the spectrum capacity to accommodate GBAS/VDB and report the recommendations back to the SRWG for further review by the NSP, as necessary. **ACTION ITEM 4-3.**

#### **Agenda Item 4: Review of global COM Lists**

##### **Review of Global COM List for the APAC Region (WP/3)**

4.1 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.

4.2 The maintenance and promulgation of Frequency List Nos. 1 and 2 are 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.

4.3 Demonstration was made on the current status of database (Frequency List No. 3) in Frequency Finder, highlighted the Export and Import functions to be used to improve coordination efficiency. The meeting also noted the new functional modules of Frequency Finder for navigation systems and Mode S SSR II code. The *Minimum requirements for computer operating Frequency Finder* discussed in the meeting is provided in **Appendix B** to this Report for reference by States in implementation the Frequency Finder tool.

4.4 After review of the regional Frequency List No. 3, through further discussion in the meeting, a decision was made as following:

SRWG/4  
Report on Agenda Items

<b>Draft Decision SRWG/4/2 – Simulation of VHF COM Frequency requirements for next 10 years</b>	
<b>What:</b> 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.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<b>Why:</b> To support regional strategy on the use of 8.33KHz channel spacing.	<b>Follow-up:</b> <input checked="" type="checkbox"/> Required from States
<b>When:</b> 13-Nov-20	<b>Status:</b> Draft to be adopted by SG
<b>Who:</b> <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: XXXX	

4.5 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 make the benefits in using Frequency Finder for spectrum coordination while effectively manage the relevant risks, the meeting urged ICAO to continue the robustness of the tool, and adopted the following draft Conclusion aiming at improving the process in administrative aspect accordingly:

<b>Draft Conclusion SRWG/4/3 – Establishment a list of focal point responsible for the operation of Frequency Finder in States</b>	
<b>What:</b> 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.	<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Ops/Technical
<b>Why:</b> To reduce operational error in accessing the tool of Frequency Finder and improve the spectrum management quality by enhancing the administrative process.	<b>Follow-up:</b> <input checked="" type="checkbox"/> Required from States
<b>When:</b> 13-Nov-20	<b>Status:</b> Draft to be adopted by PIRG
<b>Who:</b> <input checked="" type="checkbox"/> Sub groups <input checked="" type="checkbox"/> APAC States <input checked="" type="checkbox"/> ICAO APAC RO <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Other: XXXX	

4.6 The meeting encouraged States/Administrations to share experience in using VHF COM function of Frequency Finder in various regional CNS events. **ACTION ITEM 4-4.** The meeting also urged States to provide ICAO Regional Office with information of all facilities that are in operation to improve the currency of Frequency lists. **ACTION ITEM 4-5.** ICAO is requested to organize Frequency Finder workshop on COM module, Mode S SSR II code module and new NAV Module. **ACTION ITEM 4-6.**

**Agenda Item 5: Next meeting and any other business****Review of TOR and Action List (WP/4)**

5.1 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.

5.2 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 by 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. The meeting discussed the aforementioned information and experiences from States, and agreed the following draft Decision for consideration by CNS SG:

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

5.3 The keynote for this revision is to conduct simulation on VHF COM frequency assignment and expand its scope of work to cover Navigation systems with highlight on GBAS implementation. The revised TOR by this meeting is provided in **Appendix C** to this Report.

5.4 There was also a discussion on the integration of WRC activities in the SRWG. It was agreed that this work should be kept separate and WRC activities should occur in the RPG. It was noted though that ICAO should coordinate to have the SRWG and RPG meet at the same time where possible.

5.5 The meeting expressed strongly 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 and secure the continuity and availability in the use of Frequency Finder in a near time.**

5.6 The proposed action items by parties in this meeting were incorporated into the action list of this group, and is provided in **Appendix D** to this Report.

### **Update on Space-based VHF Voice Communications Service (IP/8)**

5.7 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. There is also no change to existing terrestrial VHF voice communications, hence it is expected that there will be no major amendments for ICAO Standards and Recommended Practices (SARPs).

5.8 Amendments to the ITU Radio Regulations (“RR”) is necessary as the space-based VHF project will require the ITU to harmonise and allocate the 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 (AI 10) on allocating VHF frequency band for space-based VHF services at WRC-19. With the support from ICAO and the different Regional Groups of the ITU, the above space-based VHF frequency allocation AI 10 was formally accepted as an agenda item for WRC-23, where the approval of such frequency allocation will be discussed and sought.

5.9 The space-based VHF 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.

5.10 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 through joining 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 agenda item.

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

### **Annex 10 Volume V and VI on RPAS C2 Link (IP/3)**

5.12 This IP presented the proposals to amend Annex 10, Volume V and to add a new Volume VI to Annex 10 to include a dedicated to the SARPs on the “C2 Link Procedures” and the “C2 Link Systems”. On 23 August 2019, a State Letter with Ref.: AN 7/67.1.1-19/52 and **Subject:** *Proposals for the amendment of Annex 10, Volume V, new first edition of Volume VI and consequential amendments to Annexes 1 and 2 arising from the thirteenth meeting of the Remotely Piloted Aircraft Systems Panel (RPASP/13)* was issued for a 6-month consultation.

5.13 The proposed Volume VI, “Communication Systems and Procedures relating to Remotely Piloted Aircraft Systems C2 Link”, is constituted in two parts: Part I, dealing with procedural SARPs, organized similarly to Annex 10 Volume 2; and part II on Systems organized similarly to Annex 10 Volume 3. The State Letter, appended the IP/30 introduces generic and technology-neutral C2 Link SARPs, the

first of the two planned C2 Link deliverables. It provides stakeholders, including regulators, manufacturers and operators, with a framework enabling them to plan for the introduction of the C2 Link.

#### **1090 MHz Spectrum and 24-bit Aircraft Address Issues with UAS (IP/4)**

5.14 The secretariat presents a brief summary 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 in SEA/BOB ADS-B WG/14 through Working Paper 07 *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.

5.15 It is noted that on 8 November 2019, ICAO issued a State Letter on the 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 are urged to note the ongoing ICAO initiatives to ensure the continued safe and reliable operation of aeronautical surveillance systems, and encouraging State to make use of the guidance material enclosed in the letter.

#### **Report on the results of the International Telecommunication Union (ITU) World Radiocommunication Conference (2019) (WRC-19) (IP/5)**

5.16 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.

5.17 The International Telecommunication Union (ITU) World Radiocommunication Conference (WRC) serves as the preeminent event for negotiating long-term frequency spectrum rights. This paper summarizes the discussions and results from ITU WRC-19 (held 28 October to 22 November 2019 in Sharm el Sheikh, Egypt). In general, the conference results conformed to the ICAO Position. It is now essential to form an expeditious start of the 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 the ICAO Position is supported by the conference.

#### **Date and Venue for the Next Meeting**

5.18 The meeting recognized the need to organize another face to face meeting to review the outcome of simulations for States and progress the tasks listed in the revised Terms of Reference.

5.19 Next meetings were tentatively scheduled as follows:

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

#### **Note of appreciation**

5.20 The meeting thanked Mr. Robert Witzen for his contribution to the success of the meeting.

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### Preferred format of the characteristics of submissions

Reference of submission:

Date:

Subject: Application for **xxxx**, at **xxxx** (location name)

Contact information of the Civil aviation authority of States.

### Suggested basic information of a submission:

Function of the proposed assignments,

Details of the facility: Manufacturer & Model (if possible),

Frequency Range (if request RO for proposal) or proposed frequency,

Transmit Power or DOC

Latitude/Longitude:

### Minimum information required with reference to the following screenshot:

Country, Location, Latitude/Longitude, Service.

The screenshot shows a web-based form for entering station information. The form is titled "Station" and includes the following fields and controls:

- Region:** APAC
- Key:** D 420458
- Cat:** (empty)
- Channel spacing:** 25 kHz, 8.33 kHz
- Country:** (empty)
- Location:** (empty)
- Latitude:** D ' " N S
- Longitude:** D ' " E W
- Frequency:** 0.000
- Service:** (empty)
- Stat:** (empty)
- DOC:** Drop down disabled, MOD Range (NM), MOD Height (feet)
- ER family:** Example: ER-BOT-1
- PolyID:** (empty)
- Required fields:** FIR SECTORNAME
- Remarks:** (empty)
- Upload Status:** DN
- TEST button:** (bottom left)

**The Minimum System Requirements for Operating Frequency Finder (FF)**

- MS Windows 7 or higher
- CPU: Intel Core i5 or better, or equivalent AMD recommended
- RAM: 2GB or higher
- Video display with resolution of 1440 x 900 (or better) recommended
- Google Earth installed on the computer
- The user should have right to install a programme on the computer
- The runtime version does not require FileMaker Pro to be installed on the computer.

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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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SRWG/4  
Appendix D to the Report

Reference	Who	What	Due date	Status	Completed on	Result	Comment
A 2-4	Robert Witzten	to propose a DOC for AOC	14-Oct-16	Closed		Implemented in FF	
A 2-7	All	to check consistency between global database and frequency list 3	on going			Information in original Frequency List3 now kept and updated in FF	
A 3-1	Robert Witzten	to run new simulations in 2017 or 2018 if the captured operational needs have significantly increased.	20-May-18	Cancelled			
A 3-2	All	consider if options for coordination of classified VHF assignments are practicable	14-Oct-16	Closed			Not practical in the region.
A 3-3	All	States/Administrations to consider which backup frequencies currently assigned they can release	14-Oct-16	Closed			Not practical in the region.
A 3-4	All	States/Administrations to try and use the backup frequencies template and propose improvements	14-Oct-16	Closed			Not practical in the region.
A 4-1	Robert Witzten, Australia, ICAO	Validate solution of Common Traffic Advisor Frequency (CTAF) with Frequency Finder	14-Aug-20	Open			
A 4-2	Robert Witzten, Indonesia, Philippines, ICAO	Issues identified in using Frequency Finder and the interference of Frequency 124.9 MHz.	30-Jun-20	Open			
A 4-3	Robert Witzten, China, Hong Kong China	Explore spectrum capacity to accommodate GBAS VDB in busy airport	30-Mar-21	Open			
A 4-4	All	Experience sharing on Frequency Finder use	30-Mar-21	Open			
A 4-5	All	States to provide ICAO Regional Office with information of all facilities that are in operation to improve the currency of Frequency lists	30-Mar-21	Open			
A 4-6	ICAO	Frequency Finder workshop on COM module, and new NAV Module (Mode S SSR II Code module as necessary).	30-Mar-21	Open			
A 4-7	All, Robert Witzten	Create ad hoc group to draft Table of Content first, then develop the regional guidance material on aeronautical frequency spectrum management in a shared way by States.	30-Mar-22	Open			
A4-8	Robert Witzten, All	to run new VHF COM simulations	20-May-21	Open			

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**LIST OF WORKING/INFORMATION PAPERS**

<b>WP/IP No.</b>	<b>Agenda Item</b>	<b>Subject</b>	<b>Presented by</b>
<b>LIST OF WORKING PAPERS</b>			
WP/1	1	Provisional Agenda	Secretariat
WP/2	3	Review of Regional Process	Secretariat
WP/3	4	Review of Global COM List for the APAC Region	Secretariat
WP/4	5	Review of ToR and Action List	Secretariat
<b>LIST OF INFORMATION PAPERS</b>			
IP/1	-	Meeting Information	Secretariat
IP/2	5	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718, Volume II)	Secretariat
IP/3	5	Annex 10 Volume V and VI on RPAS C2 Link	Secretariat
IP/4	5	1090 MHz Spectrum and 24-bit Aircraft Address Issues with UAS	Secretariat
IP/5	5	Report on the results of the International Telecommunication Union (ITU) World Radiocommunication Conference (2019) (WRC-19)	Secretariat
IP/6	3	Introduction of Signal Monitoring for ILSs Using Same Frequency But Different Identifiers at Both Ends of the Same Runway	China
IP/7	3	Introduction of Studies on the GBAS VDB Frequency Assignment	China
IP/8	5	Update on Space-based VHF Voice Communications Service	Singapore
IP/9	3	Report of Frequency Finder Implementation in Indonesia	Indonesia
IP/10	3	Need for a Harmonized Approach for Coordination of Frequency for GBAS Implementation	Hong Kong China

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