



## INTERNATIONAL CIVIL AVIATION ORGANIZATION

### WORKSHOP ON FREQUENCY FINDER

*(Bangkok, Thailand, 9-13 October 2023)*

### FINAL REPORT

#### 1. INTRODUCTION

1.1 The Workshop on Frequency Finder (FF) was held at the ICAO Asia and Pacific (APAC) Regional Office (Bangkok, Thailand, 9-13 October 2023). The objective of the Workshop was to share experience gained in using Frequency Finder since its implementation, introduce the new functionality modules to the APAC region, support the use of the Frequency Finder as the new ICAO aeronautical radio frequency management tool for NAV frequency assignments (COM list 2) and Mode S Radar Interrogator Code management, as well as provide a chance to review the established procedures and emerging issues.

1.2 The Workshop was attended by Thirty-two (32) participants from Ten (10) States/Administrations (Bhutan, Hong Kong China, India, Indonesia, Lao PDR, Malaysia, Nepal, Republic of Korea, Singapore, and Thailand). The list of participants is in **Attachment A** to this Report.

1.3 On behalf of ICAO Regional Director, Mr. MA Tao, Mr. LUO Yi, Regional Officer CNS extended a warm welcome to the participants, expressed appreciation for the close and effective cooperation among States and stakeholders to address the challenges in aeronautical spectrum utilization and protection, and wished a productive workshop. Mr. Loftur Jonasson, Chief, CNS & Spectrum Section at ICAO Headquarters thanked ICAO APAC Regional Office for the good arrangement of the workshop, recalled the achievement of the previous workshop held in 2016, and introduced the ongoing development of the Frequency Finder tool to include the functionality of NAV frequency assignments (COM list 2) and Mode S Radar Interrogator Code management, and expected a good interaction during the workshop. Mr. Chainan Chaisompong, Chairperson of the SRWG, expressed gratitude for unwavering support to the Asia/Pacific Region over the years from Loftur and Mie Utsunomiya, Technical Officer CNS and Spectrum Section at ICAO Headquarters, and the work contributed by Mr. Robert Witzen, former Technical Officer CNS. He emphasized the importance of the frequency finder tool, and encouraged all participants to fully utilize this great opportunity to ask as many questions as needed.

1.4 The workshop was moderated by Mr. Loftur Jonasson and Ms. Mie Utsunomiya, also supported by Mr. LUO Yi and Ms. ZHONG Wenhan, Regional Officers, CNS ICAO-APAC Office.

1.5 The workshop was conducted in English only, inclusive of all presentations and this Report. The list of presentations is provided in **Attachment B** to this Report.

#### 2. WORKSHOP AND DISCUSSIONS

2.1 The workshop alternated between presentations of the frequency assignment planning theory and provisions contained in Annex 10 Vol V, Doc 9718 Vol I and II; presentations of practical

examples based on that theory, using the FF tool; and exercises by the participants, using practical examples based on frequencies contained in the APAC Com list 3.

2.2 The participating States/Administrations were provided a detailed introduction to the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation Volume II Frequency assignment planning criteria for aeronautical radio communication and navigation systems (ICAO Doc 9718, Volume II) from the following aspects:

- ICAO Doc 9718, Radio Frequency (RF) Handbook: *Volume I - Spectrum Management* and *Volume II - Frequency Management* on ICAO Frequency Assignment Planning;
- Frequency assignment planning for VHF COM systems: Interference model (co-frequency separation), Interference model (adj frequency separation), and Frequency assignment planning for VHF air/ground communication systems;
- Use of Frequencies: Allotment of frequencies, Special frequencies, Regional Frequency Allotment Plans, Uniform values for DOC, Frequency coordination, Extended Range (ER) Facilities;
- Frequency assignment planning for ILS, VOR, DME and GBAS: Methodology and examples for calculation of separation distances for Instrument Landing System (ILS), VHF Omnidirectional Range (VOR), Distance Measuring Equipment (DME), Ground Based Augmentation System (GBAS);
- Radio Propagation, coverage areas vs. separation distances.

2.3 The lectures have been given on how to use the Frequency Finder tool with hands-on practice to cover the following functions:

- Installing the runtime version of Frequency Finder;
- Integrity check, COM list 3 and Query;
- Navigating through the COM List 3 - Test Frequency & Understand the result;
- Add, Modify, or Delete Frequency;
- Mapping, Export, Special Functions;
- Navigating through the COM List 2 – Test Frequency & Understand the result.

2.4 The workshop also introduced the aviation frequency spectrum management at the national, regional, and international levels, briefed the main outcomes from ITU World Radiocommunication Conferences in 2019 (WRC-19) and agenda items related to aviation to be discussed in the ITU WRC-23, and highlighted potential safety concerns due to interference from 5G to Aeronautical Radio Altimeters.

2.5 The workshop recognized the need to revisit the regional VHF COM Allotment Plan regularly, and the ICAO APAC Regional Office was reminded to inform CNSS of ANB once the regional VHF COM Allotment Plan is revised to ensure the Frequency Finder is incorporated with the latest revision.

2.6 Through the discussion, the participants of the workshop agreed that the regular publication (currently once a year at the end or beginning of the year) of the Frequency List 2 i.e. List of facilities in the band 108 - 117.975 MHz and 960 - 1215 MHz will no longer be required as the global database of frequencies included in the FF would provide an up-to-date status of frequencies assigned or used by States/Administrations. However, the access procedure by the designated contact points by States/Administrations to the FF should be provided to States accordingly.

### **3. ANY OTHER BUSINESS**

3.1 It is recommended that all the participants/ frequency managers take the following ICAO online web course “Aeronautical Spectrum Use with Special Focus on VHF” (<https://store.icao.int/en/aeronautical-spectrum-use-special-focus-training>) to gain the necessary frequency management basics.

3.2 Mr. Loftur Jonasson and Ms. Mie Utsunomiya were appreciated for their contributions and conduction of the workshop. Participants were also appreciated for their active participation and the actions taken on the integrity checks and updates to the data in the Frequency Finder.

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# ICAO WORKSHOP ON FREQUENCY FINDER

Attachment A to the Report

## List of Participants

	STATE/NAME	TITLE/ORGANIZATION	E-MAIL
<b>1.</b>	<b>BHUTAN (1)</b>		
	1. Mr. Karma Gayley	CNS Officer, Bhutan Civil Aviation Authority	kgayley@bcaa.gov.bt;
<b>2.</b>	<b>HONG KONG, CHINA (1)</b>		
	2. Ms. Chiu Nga Man	Electronic Engineer, Hong Kong Civil Aviation Department	dnmchiu@cad.gov.hk;
<b>3.</b>	<b>INDIA (2)</b>		
	3. Mr. Anil Kumar	Manager (CNS), Airport Authority of India	anilpaul@aai.aero;
	4. Mr. Rahul Chaudhary	Assistant General Manager (CNS), Airports Authority Of India (AAI)	crahul@aai.aero;
<b>4.</b>	<b>INDONESIA (3)</b>		
	5. Mr. Bimantoro .	Inspector of Air Navigation, DGCA	bimzink@gmail.com;
	6. Ms. Gyma Ramadhani	Analist Human Capital , DGCA Indonesia	Gyma.ramadhani@gmail.com;
	7. Mr. Abdul Aziz	Air Navigation Inspector, DGCA Indonesia, Directorate Of Air Navigation	azizsabdul@gmail.com;
<b>5.</b>	<b>LAO PEOPLE'S DEM. REP. (1)</b>		
	8. Mr. Soudalath Khamsitthisack	Officer, Department of Civil Aviation of Lao PDR	s.khamsouy@gmail.com;
<b>6.</b>	<b>MALAYSIA (2)</b>		
	9. Mr. Khairul Nazmi Bin Zainol Ariffin	Principal Assistant Director, Air Navigation Services and Aerodrome Division, Civil Aviation Authority of Malaysia	k.nazmi@caam.gov.my;

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Attachment A to the Report

	STATE/NAME		TITLE/ORGANIZATION	E-MAIL
	10.	Mr. Shairyzal Mohamad @ Azizan	Assistant Director, Civil Aviation Authority of Malaysia (CAAM)	shairyzal.azizan@caam.gov.my;
<b>7.</b>	<b>NEPAL (1)</b>			
	11.	Mr. Krishna Prasad Ghimire	Deputy Manager, Civil Aviation Authority of Nepal (CAAN)	krishnap.ghimire@caanepal.gov.np;
<b>8.</b>	<b>REPUBLIC OF KOREA (2)</b>			
	12.	Ms. Hyangjin Son	Assistant Director, Republic of Korea, Busan Regional Office Aviation	hjhj777@koera.kr;
	13.	Mr. Joo Hwan Bang	Assistant Director, Republic of Korea, Busan Regional Office Aviation	Joohwan.bang@korea.kr;
<b>9.</b>	<b>SINGAPORE (2)</b>			
	14.	Mr. Lim Wee Siang	Engineer (Communications), Civil Aviation Authority of Singapore	Lim_Wee_Siang@caas.gov.sg;
	15.	Mr. Mohamed Fazlee Bin Mohamed Shafie	Engineer (Navigation), Civil Aviation Authority of Singapore	Mohamed_FAZLEE@caas.gov.sg;
<b>10.</b>	<b>THAILAND (13)</b>			
	16.	Mr. Chainan Chaisompong	Air Traffic Engineering Manager, Aeronautical Radio of Thailand Co.,Ltd.	chainan.ch@aerorhai.co.th;
	17.	Mr. Mana Ladthawanidphan	Air Traffic System Engineering Manager, Aeronautical Radio of Thailand Co.,Ltd.	mana.la@aerorhai.co.th;
	18.	Mr. Narupon Montree	Air traffic system engineering, AEROTHAI, Aeronautical Radio of Thailand Ltd.	narupon.mo@aerorhai.co.th;

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	STATE/NAME		TITLE/ORGANIZATION	E-MAIL
	19.	Mr. Nattapong Siansawasdi	Air Traffic System Engineer, AEROTHAI, Aeronautical Radio of Thailand Ltd.	nattapong.si@aerorhai.co.th;
	20.	Mr. Panuwat Bucharattanakun	System Engineer, AEROTHAI, Aeronautical Radio of Thailand Ltd.	panuwat.bu@aerorhai.co.th;
	21.	Mr. Punyawee Phatthanakitworarak	Air Traffic Sysytem Engineer, AEROTHAI, Aeronautical Radio of Thailand Ltd.	punyawee.bu@aerorhai.co.th;
	22.	Mr. Sittipong Wiboonwipa	Air Traffic System Engineer, AEROTHAI, Aeronautical Radio of Thailand Ltd.	sittipong.wi@aerorhai.co.th;
	23.	Mr. Chavalit Ithiapa	CNS Senior Officer, The Civil Aviation Authority of Thailand	chavalit.i@caat.or.th;
	24.	Mr. Nattapol Witsuwat	CNS Officer, The Civil Aviation Authority of Thailand	nattapol.w@caat.or.th;
	25.	Mr. Nattaporn Pornsawat	CNS Officer, The Civil Aviation Authority of Thailand (CAAT)	nattaporn.p@caat.or.th;
	26.	Mr. Thamawoot Pocathikorn	Officer, The Civil Aviation Authority of Thailand (CAAT)	thamawoot.p@caat.or.th;
	27.	Mr. Phichpawis Plengsiriwat	Air Navigation Operations Planning Officer, The Civil Aviation Authority of Thailand (CAAT)	Phichpawis.p@caat.or.th;
	28.	Ms. Kamonpan Phasipol	Air Traffic System Engineer, AEROTHAI, Aeronautical Radio of Thailand Ltd.	kamonpanph@aerorhai.co.th;
<b>11.</b>	<b>ICAO (4)</b>			
	29.	Mr. Loftur Jonasson	Chief, CNS & Spectrum, ANB/ANS/CNSS	LJonasson@icao.int;

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	STATE/NAME		TITLE/ORGANIZATION	E-MAIL
	30.	Ms. Mie Utsunomiya	Technical Officer, CNS, ANB/ANS/CNSS	MUtsunomiya@icao.int;
	31.	Mr. Yi Luo	Regional Officer CNS International Civil Aviation Organization Asia and Pacific Office	yluo@icao.int;
	32.	Ms. Zhong Wenhan (Nancy)	Regional Officer CNS International Civil Aviation Organization Asia and Pacific Office	wzhong@icao.int;

# ICAO WORKSHOP ON FREQUENCY FINDER

Attachment B to the Report

## LIST OF PRESENTATIONS

SP No.	Title	Presented by
SP/01	Aeronautical Frequency Management in the APAC Region	Secretariat
SP/02	Potential Safety Concerns due to Interference from 5G to Aeronautical Radio Altimeters	Secretariat
SP/03	Future Work (Related to Frequency Finder)	Secretariat
SP/04	Frequency Finder 2 Integrity check, COM list 3 and Query	Secretariat
SP/05	Frequency Finder 3 Test Frequency	Secretariat
SP/06	Frequency Finder 4 Add, Modify or Delete Frequency	Secretariat
SP/07	Frequency Finder 5 Mapping, Export, Special Functions	Secretariat
SP/08	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation	Secretariat
SP/09	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (2A)	Secretariat
SP/10	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (3A)	Secretariat
SP/11	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (4A)	Secretariat
SP/12	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation -Side Track Coverage	Secretariat
SP/13	Aviation Frequency Spectrum and the ITU World Radiocommunication Conferences (WRC)	Secretariat
SP/14	Frequency Finder NAV Module	Secretariat
SP/15	ICAO Workshop on Frequency Finder- Introduction	Secretariat
SP/16	Frequency Finder 1 Installing, Start Page, Home Page	Secretariat
SP/17	ICAO Workshop on Frequency Finder- Easy Reference for Exercise	Secretariat
SP/18	Frequency Finder Easy Reference - NAV Module	Secretariat

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