



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

GLOBAL DEVELOPMENTS
RELATED TO CNS/GIS

RECONNECTING THE WORLD

GLOBAL DEVELOPMENTS RELATED TO CNSS & GIS

BY CNSS SECTION AND GIS SECTION

CNS SG/29

16-20 June 2025

Bangkok, Thailand

Presentation Overview

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02 NAVIGATION

03 SURVEILLANCE

04 SPECTRUM

05 INTEGRATED CNS &
SPECTRUM

06 OTHER CNSS ACTIVITIES

07 GLOBAL INTEROPERABLE SYSTEMS

GLOBAL DEVELOPMENTS RELATED TO CNS & Spectrum

COMMUNICATIONS

The 7th meeting of the Data Communication Infrastructure Specific Working Group of the Communications Panel (CP-DCIWG/7) was held 11-14 June 2024. Several deliverables, proposals for amendment to Annex 10 Volume III, were provided by CP-DCIWG/7.

- **Amendment to Annex 10-Aeronautical Telecommunications, Volume III – Communication Systems relating to Updates of the SATCOM SARP.**

(The PfA introduces in the AMS(R)S SARPS stringent performance provisions for new technical capabilities which will support new enhanced services, such as ATS B2 for data and one stage secure dialing for voice. These new provisions are based on published industry performance standards.)

- PfA preliminary review was conducted in Q1 2025
 - State letter was published AN 7/64.1.3- 25/51 23 May 2025

COMMUNICATIONS

Council Adopted amendment 93 to Annex 10, Volume III related to ATN/IPS and amendment 94 to Annex 10, Volume II Cont.



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Ref.: AN 7/63.1.3, AN 7/64.1.1- 23/59

31 July 2023

Subject: Proposed amendment to Annex 10, Volume III related to ATN/IPS and consequential amendment to Annex 10, Volume II, stemming from the sixth meeting of the Data Communications Infrastructure Working Group of the Communications Panel (CPDCIWG/6)

Action required: Comments to reach Montréal by 31 January 2024

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission (ANC), at the sixth meeting of its 223rd Session held on 13 June 2023, considered a proposal developed by the sixth meeting of the Data Communications Infrastructure Working Group of the Communications Panel (CPDCIWG/6) to amend Annex 10 — *Aeronautical Telecommunications*, Volume III — *Communication Systems*, Part I — *Digital Data Communication Systems* and Part II — *Voice Communication Systems*, and consequential amendment to Annex 10, Volume II — *Communication Procedures including those with PANS status*. The Commission authorized its transmission to Member States and appropriate international organizations for comments.

2. The proposal introduces provisions relating to updates to the aeronautical telecommunication network (ATN)/Internet Protocol Suite (IPS) requirements regarding IPS mobility across multiple media, naming and addressing, IPS security, quality of service (QoS), system management and overall transitional aspects.

State Letter (AN 7/64.1.3- 25/51) was published on 23 May 2025 and circulated to States and international organizations for their comments.

Due date for comments is set to 24 November 2025.

Proposals for the amendment of Annex 10, Volume III relating to satellite communication systems in support of ASBU Blocks 1 and 2, arising from the seventh meeting of the Data Communication Infrastructure Specific Working Group of the Communications Panel (CP-DCIWG/7)

COMMUNICATIONS

7

Council Adopted amendment 93 to Annex 10, Volume III related to ATN/IPS and amendment 94 to Annex 10, Volume II Cont.



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Ref.: AN 7/64.2.4-25/25

23 April 2025

Subject: Adoption of Amendment 93 to Annex 10,
Volume III

Action required: a) Notify any disapproval before
4 August 2025; b) Notify any differences and
compliance before 27 October 2025; c) Consider the use
of the Electronic Filing of Differences (EFOD) System
for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 93 to the *International Standards and Recommended Practices, Aeronautical Telecommunications— Communication Systems* (Annex 10, Volume III, to the Convention on International Civil Aviation) was adopted by the Council at the twelfth meeting of its 234th Session on 28 March 2025. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.

State Letter (AAN 7/64.2.4-25/25) was published on 23 April 2025 and circulated to States and international organizations.

Action: a) Notify any disapproval before 4 August 2025; b) Notify any differences and compliance before 27 October 2025; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance

The Council resolved that Amendment 93, to the extent it becomes effective, will become applicable on 27 November 2025

COMMUNICATIONS

- In support of the Provisions on the exchange of information using the aeronautical telecommunication network over the internet protocol suite that were adopted by the Council at the twelfth meeting of its 234th Session on 28 March 2025, three new manuals and new edition of Doc 9896 were endorsed:
 - Doc 10090 “Manual of Security Services for Aeronautical Communications”
 - Doc 10095 “Manual of Public Key Infrastructure (PKI) Policy for Aeronautical Communication
 - Doc 10145 “Manual of Security Risk Assessment for Aeronautical Communications”
 - Doc 9896 “Manual on the Aeronautical Telecommunication Network (ATN) using Internet Protocol Suite (IPS) Standards and Protocol, edition 3”

COMMUNICATIONS

- SARPS on L-Band Terrestrial Data Link System (LDACS)
 - Postpone the PfA submission until the resolution of the comments from NSP and SP on compatibility (inter-panel TF)
- Advanced cellular technology introduction for AeroMACS
 - New performance based PfA for Vol III for AeroMACS
- Air ground data link Documents maintenance and improvements
- The Space-Based VHF PfA is expected end of the year 2025
 - Both Vol III and Vol V in coordination with FSMP
- Introduction of VoIP Air-ground Networks job card submitted to ANC
 - Study to commence after the DCIWG/8 in Dec 2025

NAVIGATION

Amendment 94 to Annex 10 — Aeronautical Telecommunications, Volume I & V — Radio Navigation Aids, regarding:

- Advanced receiver autonomous integrity monitoring (ARAIM);
- update GPS Standards and Recommended Practices (SARPs);
- updates the existing provisions for ISD in the Galileo SARPs;
- DME coverage to support PBN implementation;
- Frequency assignment planning and utilization for ILS, VHF VOR, DME and GBAS

Applicability on 27 November 2025



NAVIGATION

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ICAO organized a Radio Navigation Symposium with the focus on GNSS RFI for ICAO EUR & MID Regions.

State letter dated 30 April 2024 circulated the outcome of the symposium and requested States to disseminate the guidance material and implement recommendations, as applicable.

Several Regional Navigation Workshops are planned during 2024-2025.



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30 April 2024

Ref.: E 3/5-24/54

Subject: Aviation safety concerns regarding interference to the Global Navigation Satellite System (GNSS)

Action required: a) disseminate guidance material; and
b) implement recommendations, as applicable

Sir/Madam,

1. I have the honour to bring to your attention the concerning escalation of jamming and spoofing activities targeting the global navigation satellite system (GNSS), which have been increasingly observed recently in various regions globally. GNSS, as one of the main enablers for performance-based navigation (PBN), provides navigation guidance for all phases of flight, from enroute through to precision approach. By providing accurate position and timing information, GNSS enables several systems critical to the safety of flight.

2. Since 2003, the International Civil Aviation Organization (ICAO) has been actively developing recommendations and guidance concerning GNSS Radio Frequency Interference (RFI). It is pertinent to recall ICAO Assembly Resolution A41-8, Appendix C: *Ensuring the resilience of ICAO CNS/ATM systems*, which serves as the latest ICAO policy on GNSS resilience.

3. To bring attention to the critical issue of GNSS interference, and to foster discussions on the management of GNSS vulnerabilities and potential mitigation measures against GNSS RFI, ICAO recently convened the ICAO EUR/MID Radio Navigation Symposium from 6 to 8 February 2024 in Antalya, Turkey. One important outcome of this symposium is the attached list of recommendations regarding Stakeholders' continued efforts towards ensuring safe, reliable, and resilient air navigation.

4. I would like to take this opportunity to refer to recent safety-related publications by the European Union Aviation Safety Agency (EASA), [Safety Information Bulletin No. 2022-02R2](#) and the Federal Aviation Administration (FAA), [Safety Alert for Operators \(SAFO 24002\)](#).

SURVEILLANCE

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Follow-up of SP/5 outcome

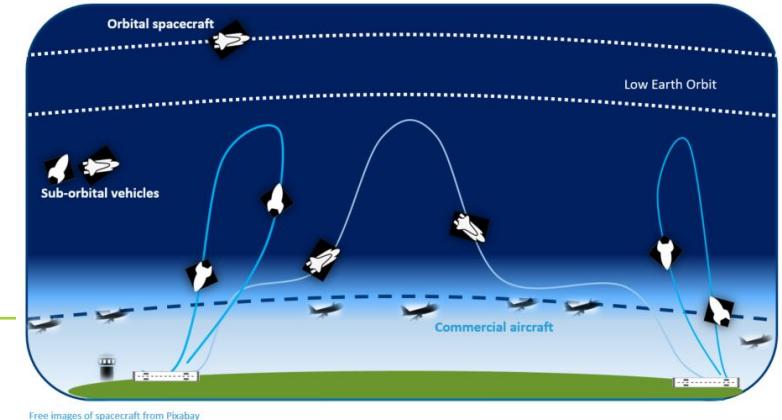
The PfA updates the SSR transponder requirements for compatibility with the new 1090 MHz extended squitter ADS-B version 3 Format.

ADS-B version 3 will provide new capabilities including :

- autonomous distress tracking support
- information to support future interval management operations;
- broadcast of aircraft-based derived weather data;
- Broadcast of lost C2 Link state for UAS/RPAS;
- broadcast of 1030/1090 MHz spectrum monitoring data; and
- functionality to support sub-orbital vehicle operations.

This is related to:

➤ **WRC-23 Agenda item 1.6 and 1.8**



A10V3 Part I *Chapter 5 SSR MODE S AIR-GROUND DATA LINK*, was proposed for deletion.

PfA preliminary review by ANC in Sep 2024, AN-WP/9778

- State letter AN 7/64.1.2, AN 7/65.1.2-24/94 was circulated in Nov 2024.

-Comment by 26 May 2025. Applicability on 26 2026.

SURVEILLANCE

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SP/5 (20-29 Sep 2023) also discussed and approved PfA to Annex 10, Volume IV:

- to provide technical provisions for **the efficient use of the 1090 MHz radio frequency (RF)**, providing means and measurements to reduce 1090 MHz RF congestion, ensuring better performance of surveillance systems and continued use of 1090 MHz systems;
- to introduce ACAS III technical provisions, based on **ACAS Xu** (Unmanned Aircraft System) avionics standards developed by RTCA/EUROCAE; and
- to provide a proposed revision to Chapter 7 of Annex 10 Volume IV, which specifies technical requirements for **airborne surveillance applications utilizing ADS-B IN.**



PfA (ACAS III) preliminary review by ANC in Q2 2026. Applicable in 2028.

SURVEILLANCE

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Ongoing activities

- Development of RSUR Manual
 - Required Surveillance Specification (RSUR) differentiate from PBCS RSP
- Updating ACAS Manual (Doc 9863) due to the introduction of ACAS III
- Updating Manual on Airborne Surveillance Applications (Doc 9994) to introduce SURF-A function.
- Progressing the provisions development for Interval Management (IM)
- transferring Flight Test Guidance from Doc 9924 to Doc 8071
- SP/5 Revised docs for publication:
 - 8071, 9871, 9924, 9994

SP/6 is planned for 4-13 March 2026.

FREQUENCY SPECTRUM MANAGEMENT

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ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference 2027 (WRC-27)

- The initial ICAO Position was presented at 227th ANC (Oct 2024). It was then circulated to States and international organizations for their comments.
- ANC reviewed comments and updated it in May 2025, then it will be processed for Council approval in June 2025



State Letter 24/93 (ICAO-NET)

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FREQUENCY SPECTRUM MANAGEMENT

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ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference 2027 (WRC-27) - Cont.

- States and Int Orgs are requested to take into account the ICAO Position, to the maximum extent possible,
 - in their prep activities for the WRC-27 at the national level,
 - in the activities of the regional telecommunication organizations and
 - in the relevant meetings of the ITU.
- In addition to the first workshop held in APAC RO, to promote ICAO position and increase awareness of WRC-27 agenda items related to aviation, Frequency Spectrum Management Panel (FSMP) will organize 3 more workshops in total in 2025/2026.

The next WRC27 Workshop for MID+EUR/NAT will be held at ICAO Paris office.

- WRC27 Workshop 06-07 Oct 2025
- FSMP-WG/21 08 -17 Oct 2025

**Many WRC agenda items
could affect
aeronautical safety
services!**

- ***Further collaboration
is needed!***

FREQUENCY SPECTRUM MANAGEMENT

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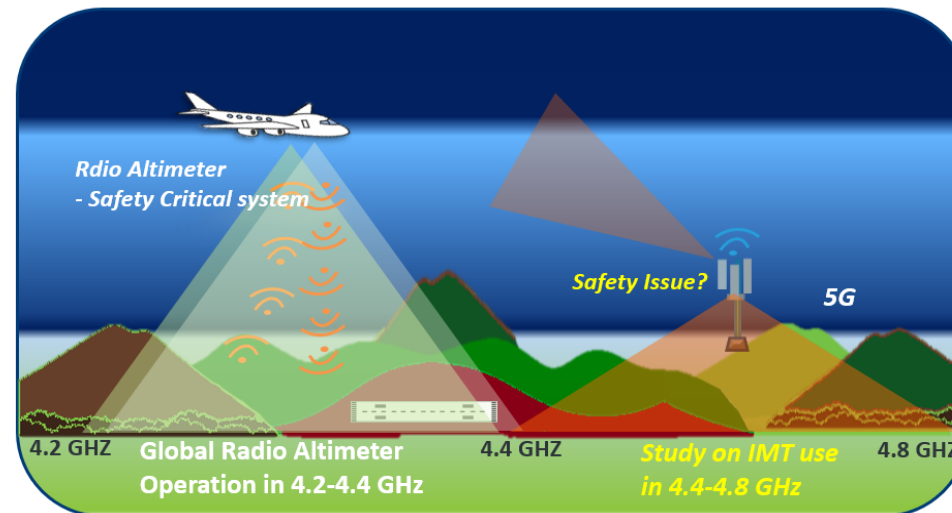
- ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference 2027 (WRC-27)

Active support from States is deemed to be the only means to ensure that the results of the WRC-27 reflect civil aviation's interest.

WRC-27

WRC-27 Agenda Item 1.7:

Study on IMT Use in the frequency bands 4400-4800 MHz



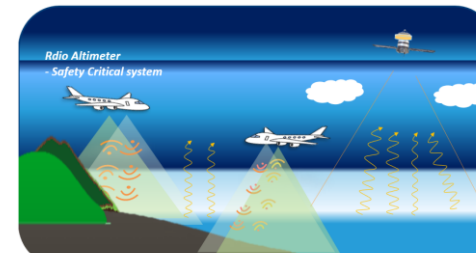
WRC-27

WRC-27 Agenda Item 1.17:
Space Weather Sensors



WRC-27

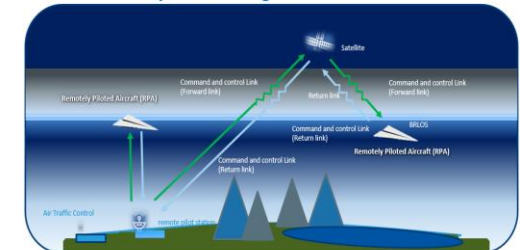
WRC-27 Agenda Item 1.19: Primary allocations to the EESS passive in the bands 4200-4400



WRC-27

WRC-27 Agenda Item 6:

Urgent action by Study groups in prep for the next WRC beyond-line-of-sight C2-link for RPAS



FREQUENCY SPECTRUM MANAGEMENT

42nd ICAO Assembly (23 Sep to 03 Oct 2025)

- Spectrum and CNS related issues might be discussed at the Technical commissions of the 42nd Assembly.

Such as...

- ❖ GNSS Interference,
- ❖ ITU WRC-27 agenda items, including potential interference concerns to radio altimeter/ WAIC, and
- ❖ Integrated Communications, Navigation and Surveillance & Spectrum (ICNSS)

INTEGRATED CNS AND SPECTRUM

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(Long Term Evolution of CNS and Spectrum matters)

ICAO CNS & Spectrum Long-Term Strategy

ICNSS-TF establishment:

in accordance with AN-Conf/13 Recommendation 2.2/1 c),
as further supported by 41st Assembly

to:

- launch a study, built on a multi-disciplinary view of the C N S elements and frequency spectrum
- evolve the required CNS and frequency spectrum access strategy and systems roadmap in the short, medium and long term, in a performance based and service-oriented manner
- ensure that CNS systems remain efficient users of the spectrum resource

Also, note AN-Conf/13 Recommendation 5.5/3:

- calls upon ICAO to review and enhance its Standards-making processes in order to meet the requirements of the rapid pace of technological development.

INTEGRATED CNS AND SPECTRUM – Cont.

(Long Term Evolution of CNS and Spectrum matters)

ICNSS Task Force – Global Concept & Deliverables

- ❑ Drafting the Global Concept for Integrated Communications, Navigation, Surveillance and Spectrum (ICNSS)
- ❑ Key Deliverables:
 - Roadmap for CNSS evolution, including CNS systems blueprint
 - Streamlined framework for CNSS standardization

INTEGRATED CNS AND SPECTRUM – Cont.

Current Status & Next Steps

- **First Draft Completed**

The initial completed draft of the ICNSS TF document has been finalized.

- **Planned Workshop for Panel Review**

A workshop is scheduled to present the draft to the relevant panels for their comments and feedback.

- **Next Step: Air Navigation Commission**

After the panel workshop, the document will be submitted to the Air Navigation Commission for an **informal briefing** and additional feedback.

OTHER CNSS ACTIVITIES

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Refinement of Frequency Finder (FF)

➤ In order to better support States and ICAO regional offices, ICAO continues to enhance the Frequency Finder tool. The following features have now been implemented:

- **New data protection mechanism brought to the NAV and the SSR modules of the Frequency Finder tool:** *With this objective being to continue securing in Frequency Finder sensitive data and maintaining the confidentiality, availability, and integrity of the database, a new functionality with password protection has been implemented. Every State's focal point will be assigned by the Regional Officer a password that will allow the user to manage his/her own data.*
- *Several additional enhancements have been implemented and are being tested such as: hiding the coordinates of radar location in the SSR module as well as importing bulk records for States into the VHF-COM module.*

Workshops to promote Frequency Finder (FF)

➤ Workshops will continue to be provided to assist States in use of FF

New web platform for the VHF-COM module of the Frequency Finder (FF) (refer to the next slide)

OTHER CNSS ACTIVITIES

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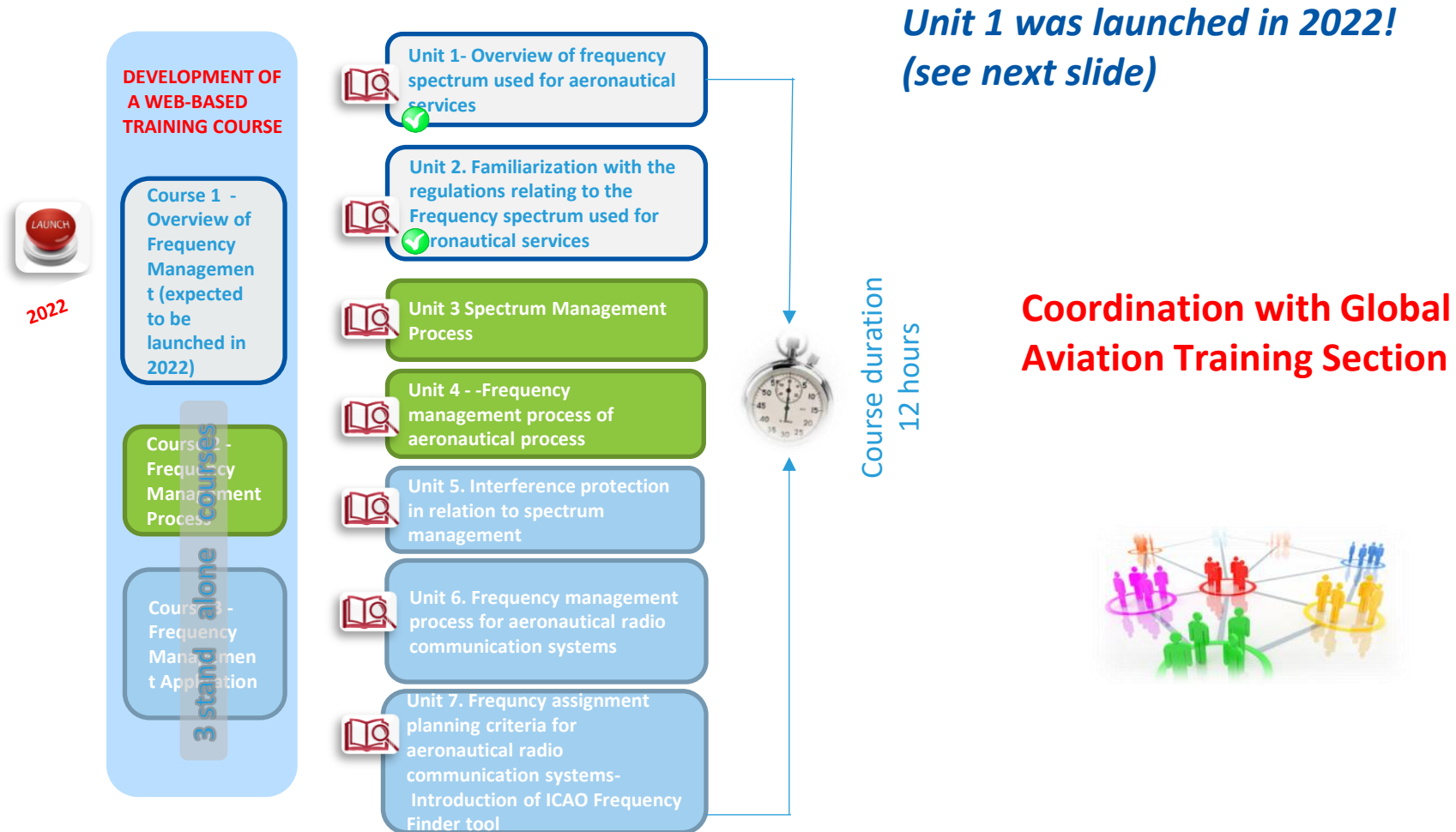
New web platform for the VHF-COM module of the Frequency Finder (FF)

In addition, ICAO will focus on modernizing the Aeronautical Communication Module, improving the frequency assignment processes for VHF air/ground communications by ensuring compatibility and minimizing interference. Major deliverables include:

- Real-Time Visualization: Enhance real-time visualization of communication spectrum usage for more accurate and efficient decision-making.
- Platform Transition: Migrate the Aeronautical Communication module away from FileMaker to a more robust, modular, scalable and secured platform, ensuring operational continuity.
- Optimized Spectrum Assignments: Improved tools for identifying optimal spectrum assignments at global and regional levels, reducing potential interference area and maximizing spectrum efficiency.
- Improved Cyber Resilience: Strengthened security features to protect critical data.
- Improve the effectiveness of CNS/ATM operations: A more efficient frequency assignment process to enhance safety and operational effectiveness in CNS/ATM systems.

Development of an online course, frequency management for civil aviation (refer to the next slide)

ONLINE COURSE DEVELOPMENT RELATED TO FREQUENCY MANAGEMENT FOR CIVIL AVIATION



GLOBAL DEVELOPMENTS RELATED TO GIS

GLOBAL INTEROPERABLE SYSTEMS

Focusing on global planning, information management and global interoperability for aviation information exchange

- Eighth edition of the Global Air Navigation Plan (GANP)
 - Major changes presented to 14TH AN Conference (see [Fourteenth air navigation conference \(icao.int\)](https://www.icao.int/NewsEvents/fourteenth-air-navigation-conference))
 - To be endorsed during the 42nd session of the Assembly
- Electronic system for management of Regional Air Navigation Plans
 - Publication of Vol I and II for the 14th AN Conference
- National Air Navigation Template
 - Under development

GLOBAL INTEROPERABLE SYSTEMS

Focusing on global planning, information management and global interoperability for aviation information exchange

- Provisions related to SWIM applicable by November 2024
 - Amendments to Annex 3, Annex 15 and PANS-ATM
 - New PANS-IM
 - Consequential amendments to Annex 10 and PANS-AIM
- Manual on the SWIM concept (Doc 10039) and Manual on SWIM Implementation (Doc 10203) published by Nov 2024
- Manual on aviation information security (Doc 10204) supporting PANS-IM and trusted information exchange published in December 2024

GLOBAL INTEROPERABLE SYSTEMS

Focusing on global planning, information management and global interoperability for aviation information exchange

- Amendments related to Aeronautical Information Management applicable by Nov 2024
 - Competency-based training and assessment (CBTA) methodology
 - Amendment to Annex 15 and PANS-AIM
 - Consistency of data that appears in multiple aeronautical information products
 - Amendment to PANS-AIM
 - NOTAM code for hang gliding and paragliding activities
 - Amendment to PANS-ABC
 - Consolidated minor amendments to Annex 15 and PANS-AIM
 - Amendment to Annex 15 and PANS-AIM

GLOBAL INTEROPERABLE SYSTEMS

Cyber safety, resilience and digital trust

- Guidance on information security available
 - Manual on aviation information security (Doc 10204)
- Digital identity and signature guidance in final coordination
 - Will be published in second half of 2025
- Trust framework implementation manual currently under development
 - Initial draft expected early 2026



Thank You