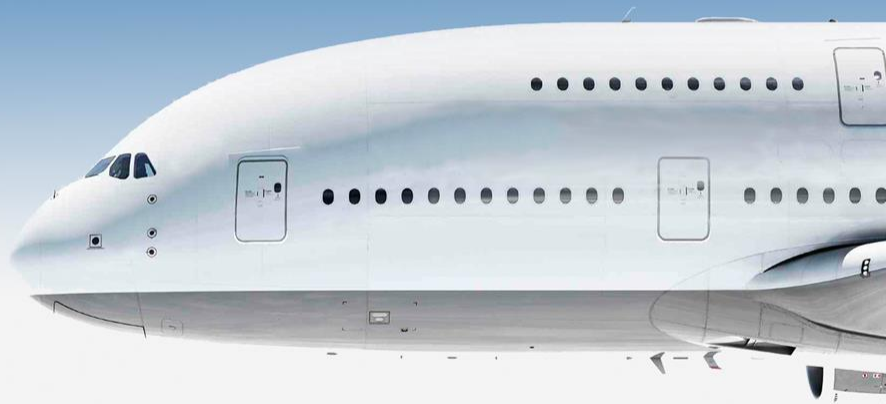
ICAO APAC Webinars – Fundamentals of ANS

CNS



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Agenda

- Basics of CNS
- Regional requirements and implementation
- Q&A session

BASICS OF CNS

What is CNS?

- Cool New System
  - Yes / No ?
    - Leading technology
    - Long lasting old technology
    - Safety Critical functions

CNS

- **C**ommunication**s**:
  - Transferring information / for stakeholders
- **N**avigation
  - Knowing the position / reference for pilot
- **S**urveillance
  - Detect the target / tool of controller

Communications

- Voice/data
- Ground to ground
- Air/ground
- Air to air

Navigation

- Support the airspace user knowing its position in a known coordinates system
  - Where from, where is, where to

Surveillance

- Detect the desired target
  - Position, speed, heading, identifier, etc.
- Active/passive
- Cooperative /non-cooperative
- Independent/dependent

Infrastructure & Service

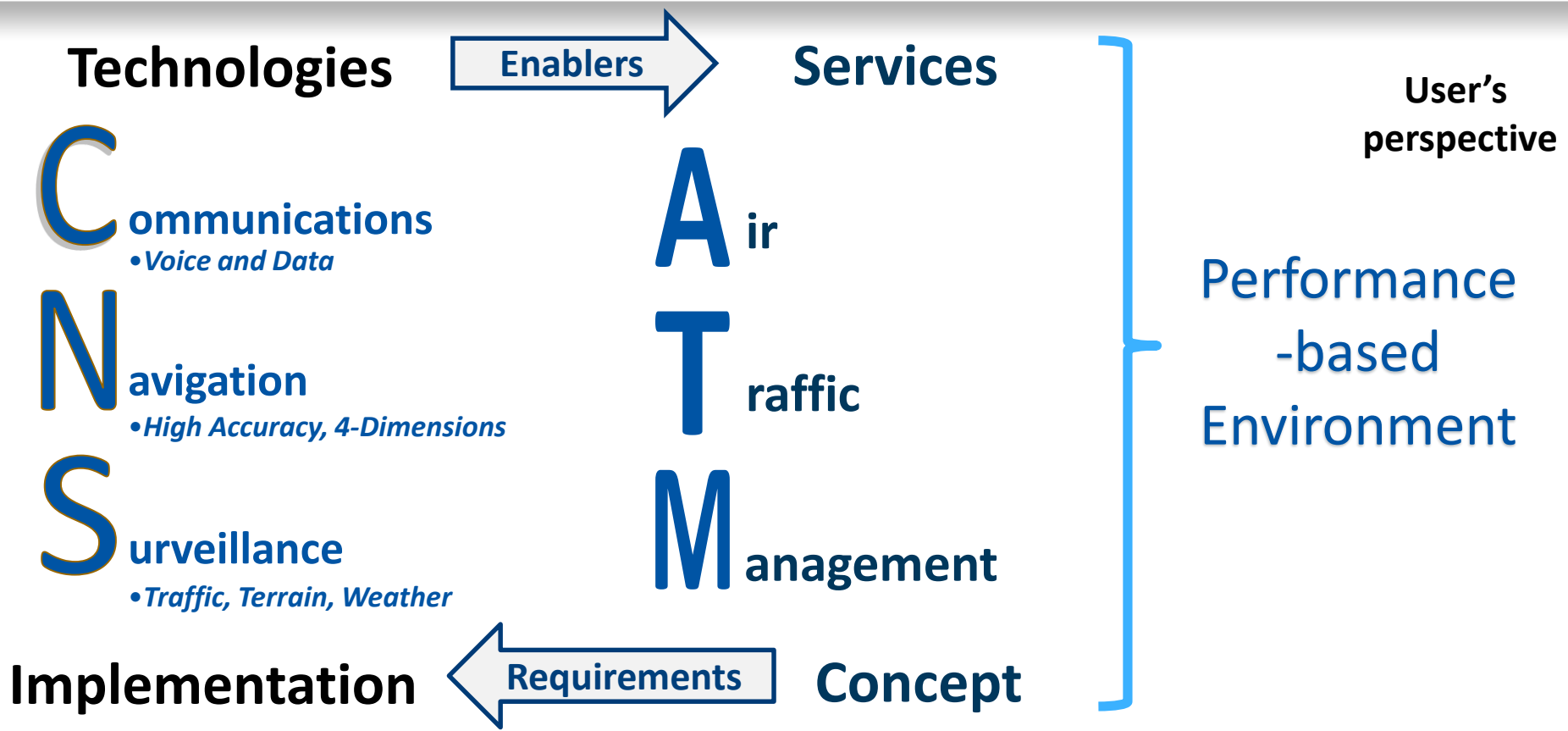
ATM, AIM, MET, etc.

CNS Infrastructure and Services

CNS/ATM

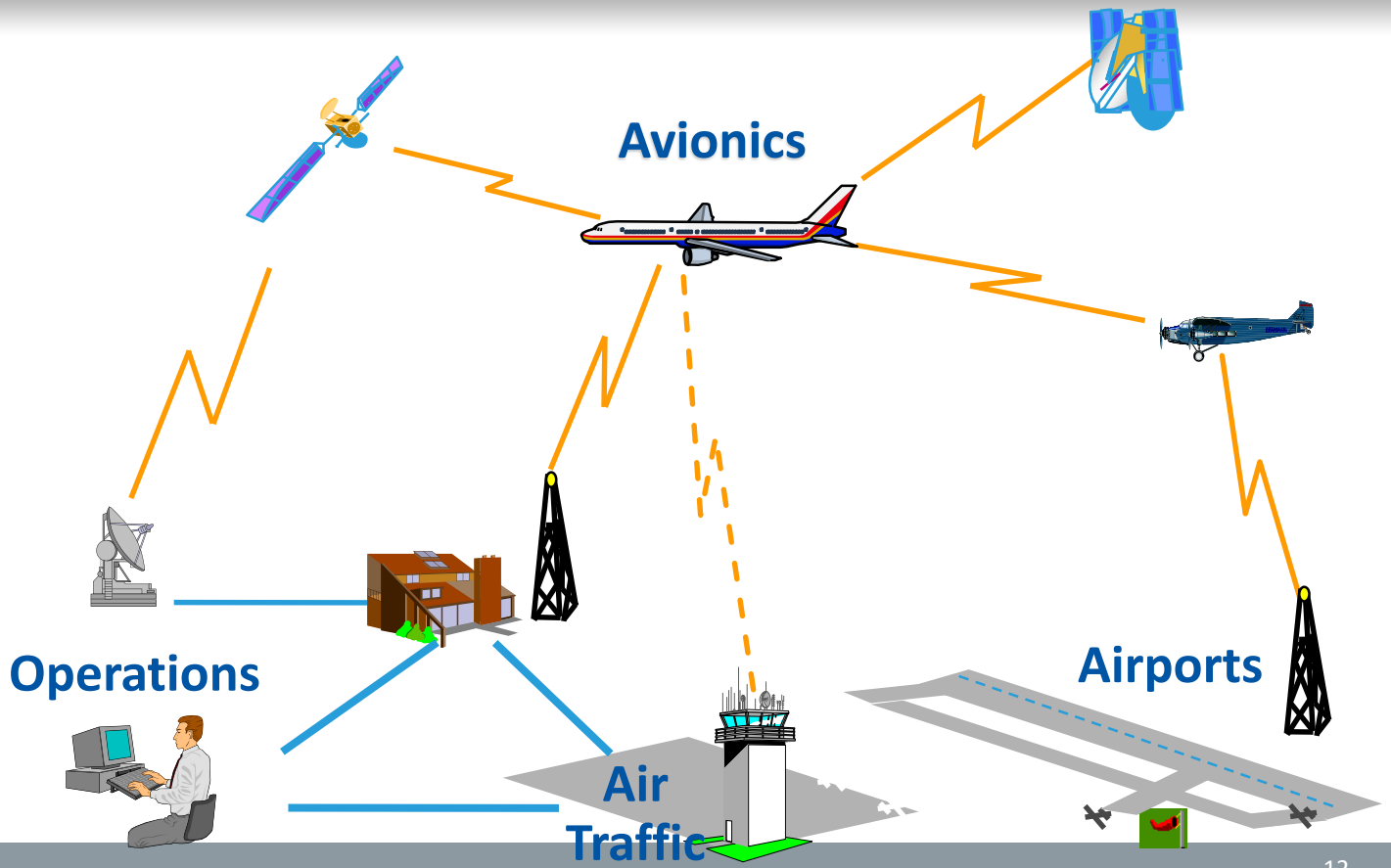
- Cool New Systems Always Take Money
  - Technology ⟺ Requirements
  - **Integrated CNS/ATM Environment** for Airspace user

CNS/ATM Systems

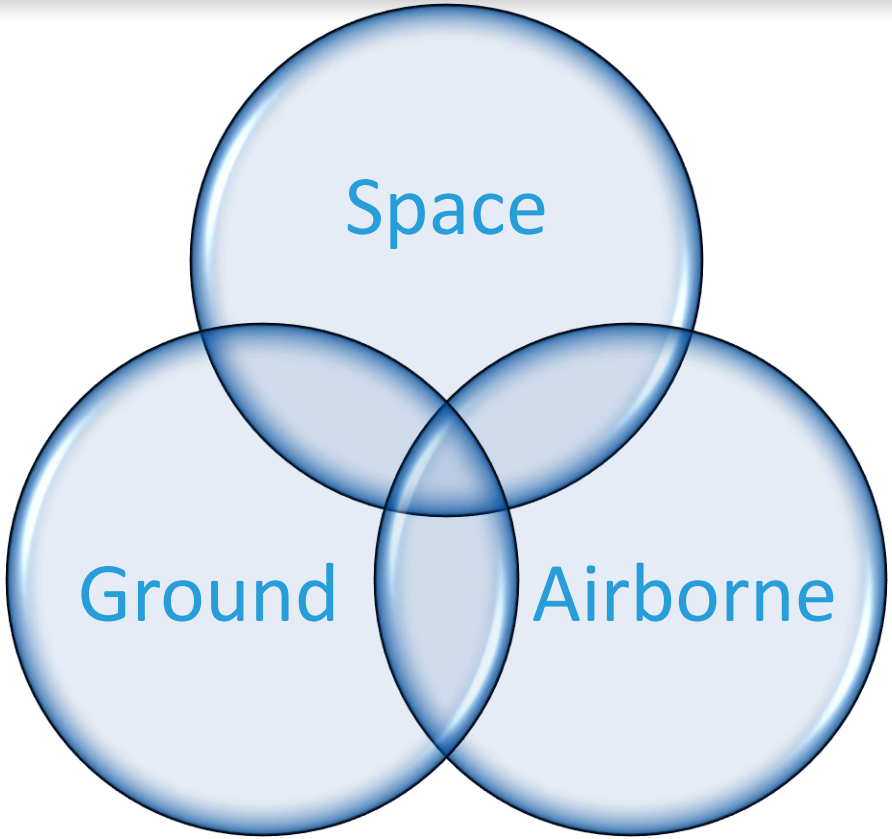


Avionics in CNS/ATM Systems

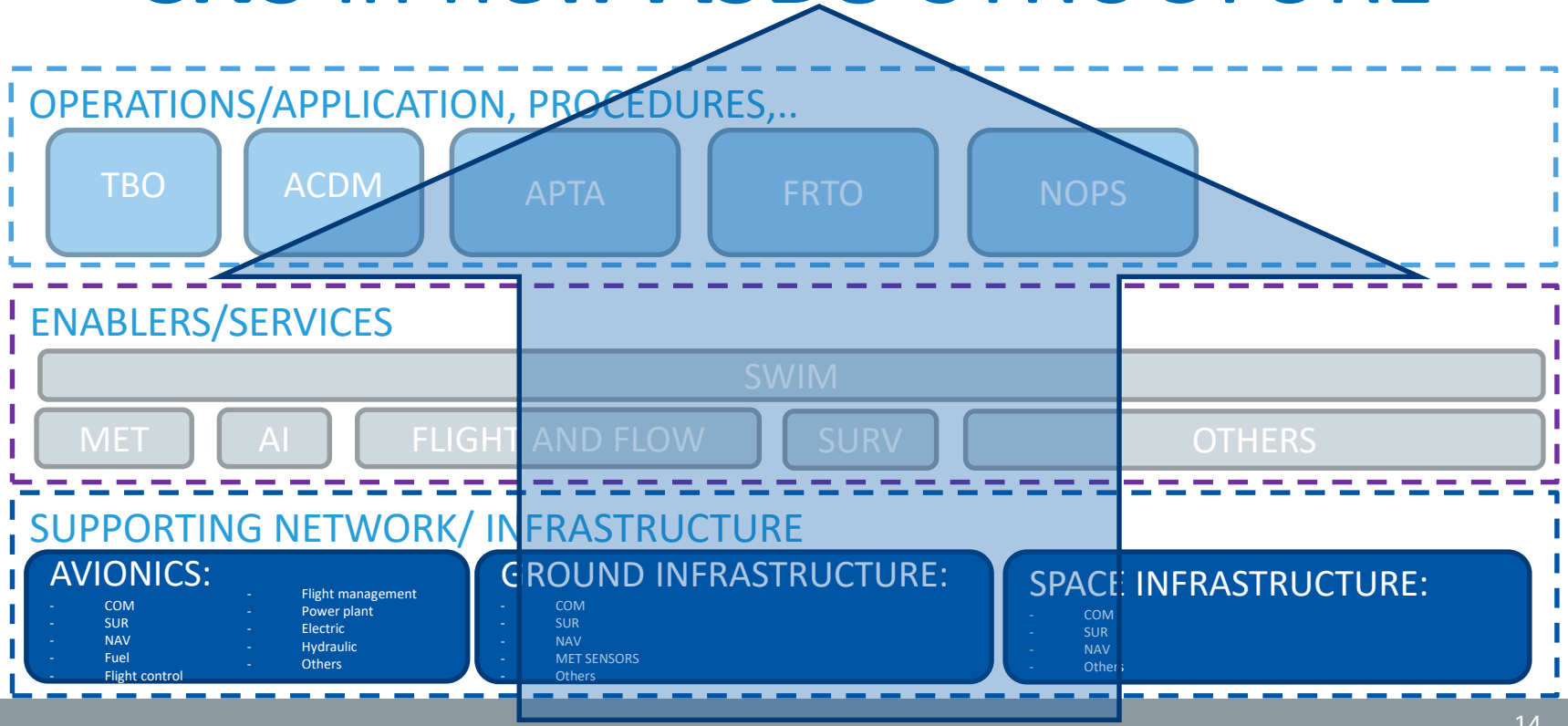
Avionics is a Key role of CNS/ATM Systems



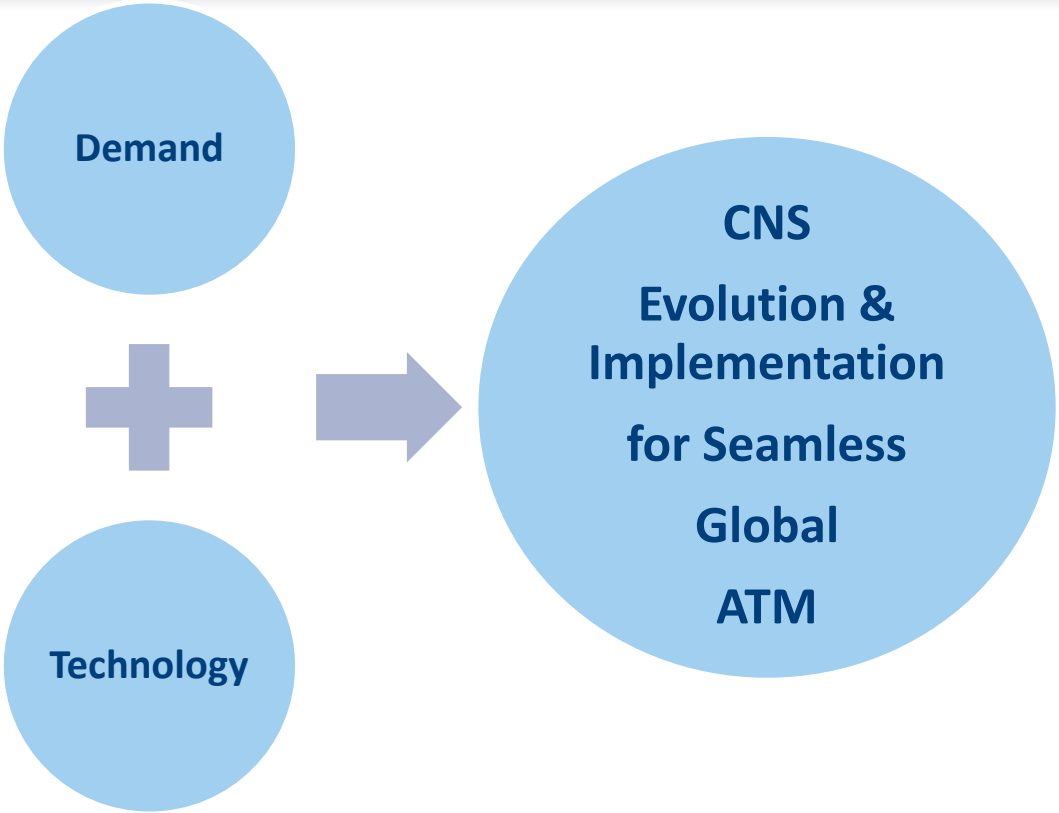
CNS DOMAIN



CNS in new ASBU STRUCTURE



Dual Drivers



REGIONAL IMPLEMENTATION

Objectives

- Air Navigation Objectives in CNS area:
  - providing States assistance in the effective **planning** and **implementation** of CNS **facilities, services and ICAO SARPs** related to CNS, aiming at increasing **capacity** and improving **efficiency** of the aviation system, helping achieve the **harmonization** and **interoperability** at regional and global level.

Activities

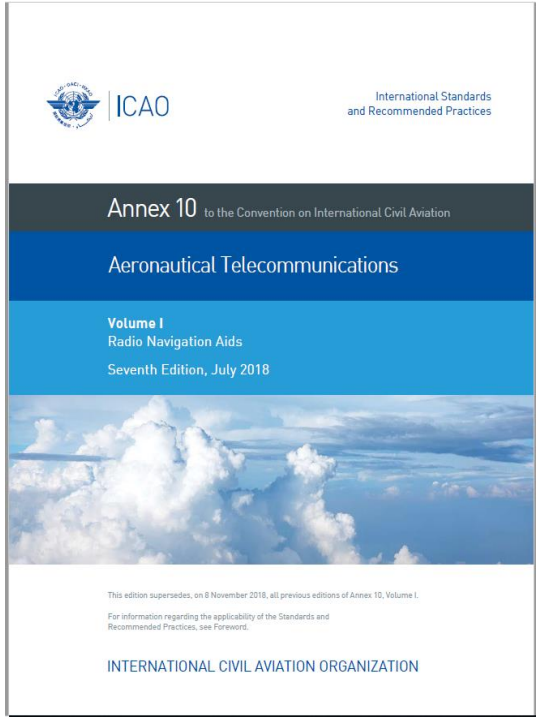
- to maintain the Annex 10 SARPs and related ICAO guidance, update the CNS part of the GANP and the ANP, coordinate and facilitate the transitions from conventional facilities and services to new CNS technology, work on addressed CNS issues and assist Member States to develop remedy actions on outstanding regional deficiencies.

Role of Regional Office

- interregional coordination, harmonized implementation of the CNS aspects included in ICAO Strategic Objectives, SARPs, PANS, SUPPs and ANPs, identification of deficiencies of regional ANS capabilities, and assistance to Member States to resolve the related issues. Provides technical guidance and assists States in their implementation activities as well as monitors and reports the implementation of CNS facilities and services. Helps to establish regional and sub-regional priorities and targets through coordination with the PIRG, develops and/or coordinates CNS related proposals for amendments to the SUPPs and the ANPs, submits proposals of amendments for SARPs, PANS, ANPs from accredited States to ICAO headquarters, and provides CNS technical input to ICAO HQ.

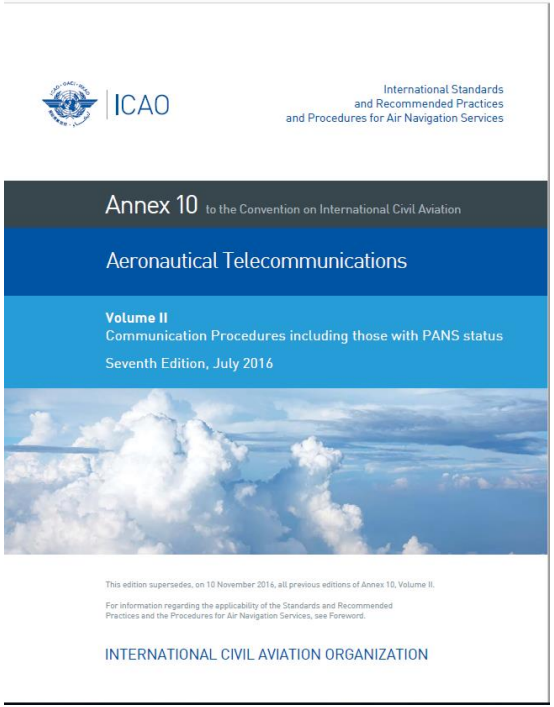
Aeronautical Telecommunications (Volumes I)

- Volume I, ***Radio Navigation Aids***, 658 pages
  - A technical document which defines for international aircraft operations the systems necessary to provide radio navigation aids used by aircraft in all phases of flight , to ensure that suitably equipped aircraft will be able to receive navigation signals in all parts of the world with the requisite degree of reliability.
- It covers radio navigation aids such as
  - ILS, PAR, VOR, NDB, DME, GNSS and MLS.



Aeronautical Telecommunications (Volumes II)

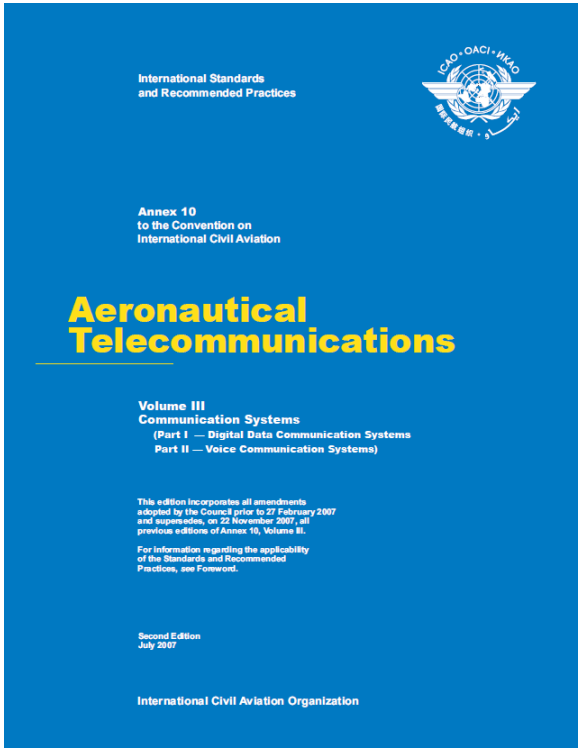
- Volumes II, ***Communications Procedures including those with PANS status***, 136 pages
  - general, administrative and operational procedures pertaining to aeronautical fixed and mobile communications are presented.



Aeronautical Telecommunications (Volumes III)

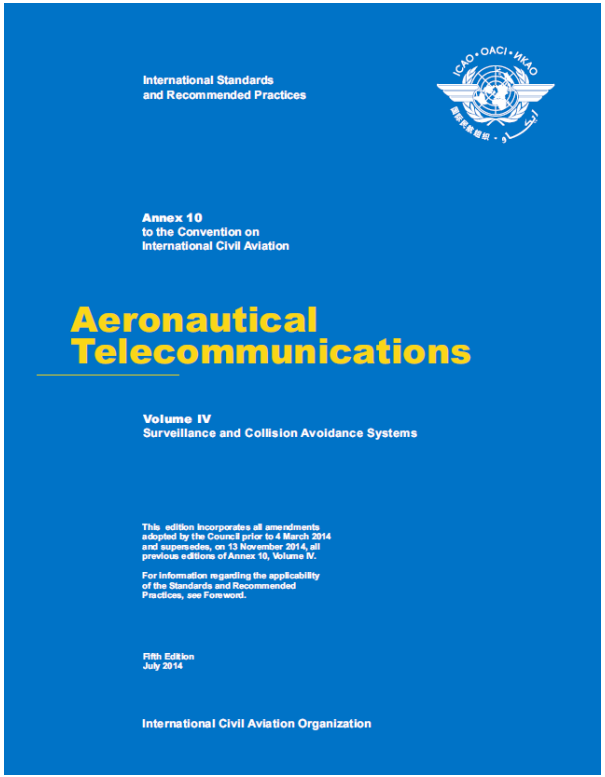
- Volume III, ***Communication Systems***, 268 pages
  - contains SARPs and guidance material for various air-ground and ground-ground voice and data communication systems, including
    - ATN, aeronautical mobile-satellite service (AMSS), SSR Mode S air-ground data link, very high frequency (VHF) air-ground digital link (VDL), Aeronautical Mobile Airport Communications System (AeroMACS), aeronautical fixed telecommunication network (AFTN), **aircraft addressing system***, high frequency data link (HFDL), Universal Access Transceiver (UAT), aeronautical mobile service, selective calling system (SELCAL), aeronautical speech circuits and emergency locator transmitter (ELT).

      *A WORLDWIDE SCHEME FOR THE ALLOCATION, ASSIGNMENT AND APPLICATION OF AIRCRAFT ADDRESSES, *Table 9-1. Allocation of aircraft addresses to States*



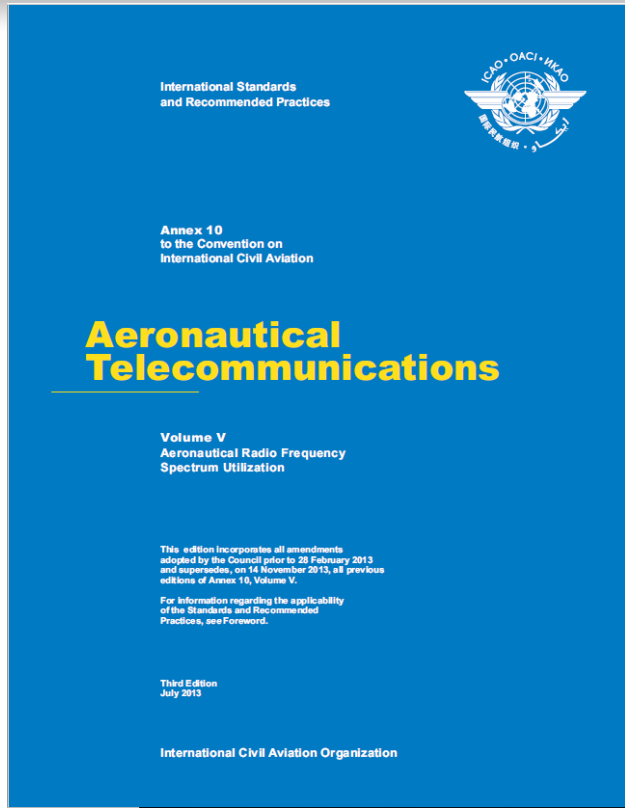
Aeronautical Telecommunications (Volumes IV)

- Volume IV, ***Surveillance Radar and Collision Avoidance Systems***, 216 pages
  - contains SARPs and guidance material for secondary surveillance radar (SSR) and airborne collision avoidance systems (ACAS), including SARPs for SSR Mode A, Mode C and Mode S, ADS-B OUT/IN, MLAT and the technical characteristics of ACAS.



Aeronautical Telecommunications (Volumes V)

- Volume V, ***Aeronautical Radio Frequency Spectrum Utilization***, 42 pages,
- It defines SARPs and guidance material on the utilization of aeronautical frequencies.
  - Under ITU framework, in which the demands for radio spectrum from individual States are balanced with the interests of different radio service users to produce a planned radio environment incorporating interference-free, effective and efficient radio spectrum use.
- Volume V contains information on the assignment planning of individual aeronautical radio stations operating or planned to operate in different frequency bands.



Annex 10 Volume V and VI on RPAS C2 link

- ICAO provisions related to RPAS is to be integrated in current Annexes in the same way as for manned aviation.
- RPAS Panel proposed to amend Annex 10, Volume V and to add a **new Volume VI** to Annex 10, dedicated to the SARPs on the "C2 Link Procedures" and the "C2 Link Systems".

- The proposed Volume 6, "***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 organized similarly to Annex 10 Volume 3. This approach provides consistency with the overall structure of Annex 10.
- The following structure is therefore proposed:
  - Annex 10 Volume VI Part I (Procedures)
  - Annex 10 Volume VI Part II (Systems)

Annex 10 Volume V and VI on RPAS C2 link

On 23 August 2019, ICAO Secretary General signed 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),* for a 6-month consultation.

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-8219 ext. 6190

Ref.: AN 7/67.1.1-19/52 23 August 2019

Subject: Proposals for the amendment of Annex 10, Volume V, 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)

Action required: Comments to reach Montréal by 21 February 2020

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, at the eleventh meeting of its 211th Session held on 12 June 2019, considered proposals developed by the thirteenth meeting of the Remotely Piloted Aircraft Systems Panel (RPASP/13) for the amendment of Standards and Recommended Practices (SARPs) in Annex 10 — *Aeronautical Telecommunications*, Volume V — *Aeronautical Radio Frequency Spectrum Utilization*, first edition of Annex 10 — *Aeronautical Telecommunications*, the first edition of Annex 10, Volume VI — *Communication Systems and Procedures Relating to Remotely Piloted Aircraft Systems C2 Link* and consequential amendments to Annex 1 — *Personnel Licensing* and Annex 2 — *Rules of the Air*. The Commission authorized their transmission to Member States and appropriate international organizations for comments.

2. The background of the aforementioned proposals is explained in Attachment A. The proposals for amendment to Annex 10 (Volume V and new Volume VI) and Annexes 1 and 2 are contained in Attachments B, C, D and E, respectively. A rationale box providing more information has been included immediately following each proposal.

3. May I request that any comments you wish to make on the amendment proposals be dispatched to reach me not later than 21 February 2020. To facilitate the processing of replies with substantive comments, I invite you to submit an electronic version in Word format to icaohq@icao.int. The Air Navigation Commission has asked me to specifically indicate that comments received after the due date may not be considered by the Commission and the Council. In this connection, should you anticipate a delay in the receipt of your reply, please let me know in advance of the due date.

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Considering implementation

- implement SARPs **appropriately** to the level and scope of the aviation activity in a member State, with the necessary human and financial resources.

APAC Air Navigation Plan

- https://www.icao.int/APAC/Pages/APAC-eANP.aspx
- On 18 June 2014, the ICAO Council decided that the regional air navigation plans (ANPs) should be published in three volumes.

ANP Vol 1. Part III CNS

- This part of the APAC ANP constitutes the agreed regional requirements considered to be the **minimum necessary** for effective planning and implementation of Communications, Navigation and Surveillance (CNS) facilities and services in the Asia and Pacific Regions and complements the provisions of ICAO SARPs related to CNS.
- In planning for these elements, **economy and efficiency** should be taken into account in order to ensure that the requirements for the provision of CNS facilities and services can be kept to a **minimum**. CNS facilities and services should fulfil multiple functions whenever this is feasible.

SARPs & GM reference

- The SARPs and related guidance material applicable to the provision of CNS are mainly contained in:
  - a) Annex 10 – Aeronautical Telecommunications, Volumes I, II, III, IV and V;
  - b) Annex 2 – Rules of the Air;
  - c) Annex 3 – Meteorological Service for international air navigation;
  - d) Annex 6 – Operation of Aircraft, Parts I (Chapter 7), II (Chapter 7) and III (Chapter 5);
  - e) Annex 11 – Air Traffic Services;
  - f) Annex 12 – Search and Rescue;
  - g) Annex 15 – Aeronautical Information Services;
  - h) Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444);
  - i) Regional Supplementary Procedures (Doc 7030);
  - j) GNSS Manual (Doc 9849);

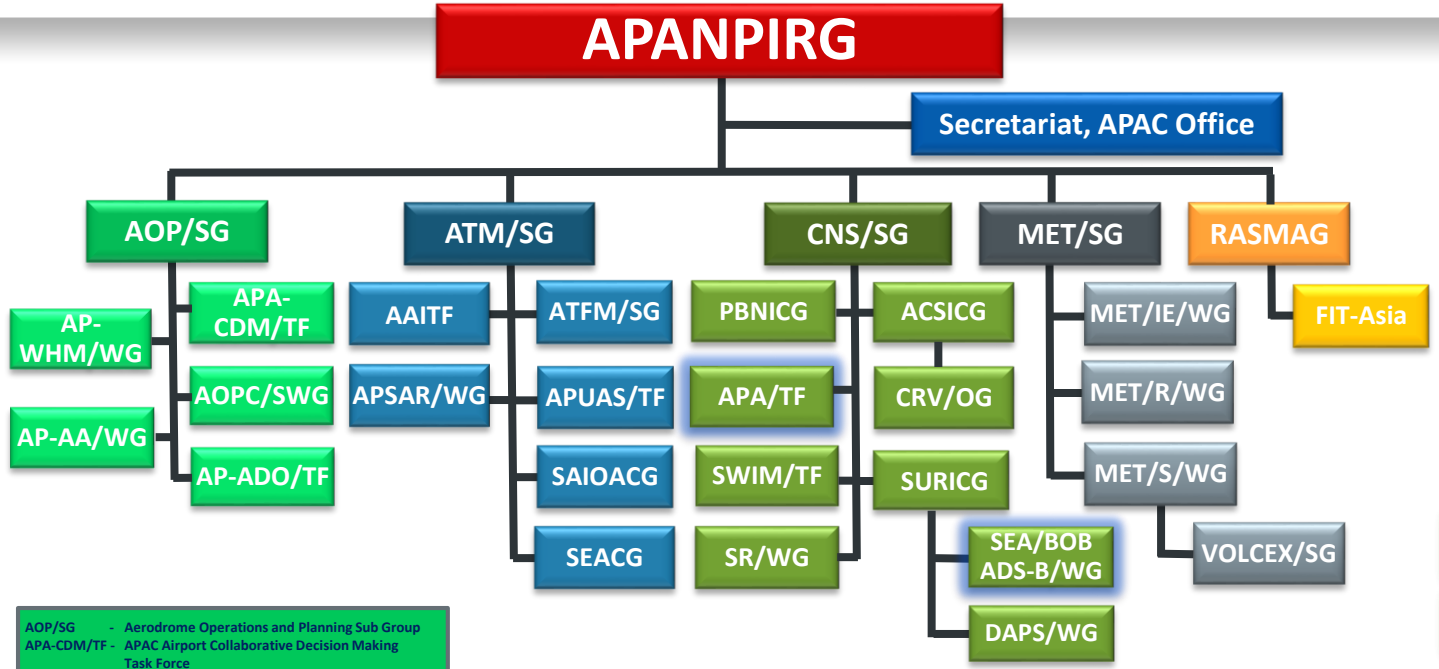
SARPs & GM reference

- k) Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols (Doc 9880);
- l) ICAO Aeronautical Telecommunication Network (ATN) Manual for the ATN using IPS Standards and Protocols (Doc 9896);
- m) Manual of Testing of Radio Navigation Aids (Doc 8071);
- n) Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunications Network (Doc 8259);
- o) Manual on Required Communication Performance (RCP) (Doc 9869);
- p) Training Manual (Doc 7192);
- q) Performance-based Navigation Manual (Doc 9613);
- r) Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718);
- s) Manual on Airborne Surveillance Applications (Doc 9994); and
- t) Manual of Air Traffic Services Data Link Applications (Doc 9694).

APANPIRG

- Asia/Pacific Air Navigation Planning and Implementation Regional Group
  - to ensure continuous and coherent development of the Asia/Pacific Regional Air Navigation Plan and other relevant regional documentation in a manner that is harmonized with adjacent regions, consistent with ICAO SARPs and Global Air Navigation Plan (DOC 9750) and reflecting global requirements;
  - to facilitate the implementation of air navigation systems and services as identified in the Asia/Pacific Regional Air Navigation Plan with due observance to the primacy of air safety, regularity and efficiency; and
  - to identify and address specific deficiencies in the air navigation field.

Contributory bodies



AOP/SG - Aerodrome Operations and Planning Sub Group
APA-CDM/TF - APAC Airport Collaborative Decision Making Task Force
AOPC/SWG - Aerodrome Operations Personnel Competency Small Working Group
AP-ADO/TF - APAC Aerodrome Design and Operations Task Force
AP-WHM/WG - APAC Wildlife Hazard Management Working Group
AP-AA/WG - APAC Aerodrome Assistance Working Group

ATM/SG - ATM Sub Group
AAITF - AIS - AIM Implementation Task Force
APSAR/WG - APAC Search and Rescue Working Group
ATFM/SG - ATFM Steering Group
APUAS/TF - APAC Unmanned Aircraft System Task Force
SAIOACG - South Asia Indian Ocean ATM Coordination Group
SEACG - South East Asia ATS Coordination Group

CNS/SG - CNS Sub Group
PBNICG - PBN Implementation Coordination Group
APA/TF - ATS Inter-facility Data Communication Implementation Task Force
SWIM/TF - System-Wide Information Management Task Force
SR/WG - Spectrum Review Working Group
ACSICG - Aeronautical Communication Services Implementation Coordination Group
CRV/OG - Common Regional Virtual Private Network (VPN) Operations Group
SURICG - Surveillance Implementation Coordination Group
• SEA/BOB ADS-B/ WG - South East Asia & Bay of Bengal ADS-B Working Group
• DAPS/WG - Mode S Downlinked Aircraft Parameters Working Group

MET/SG - Meteorology Sub Group
MET/IE/WG - Meteorological Information Exchange Working Group
MET/R/WG - Meteorological Requirements Working Group
MET/S/WG - Meteorological Services Working Group
• VOLCEX/SG - (APAC) Volcanic Ash Exercises Steering Group

RASMAG - Regional Airspace Safety Monitoring Advisory Group
• FIT-ASIA - FANS Implementation Team - Asia

CNS Subgroup

- **Primary objectives**
  - Planning and monitoring the implementation of facilities and services plus improvements
    - e-ANP
    - Seamless plan
  - Solving the regional issues
  - Identifying Deficiencies
  - Inter subgroup coordination

CNS Subgroup

- CNS SG
  - ACSICG - annex 10 Vol II, Vol III
    - CRV OG
  - APA TF - annex 10 Vol II, Vol III
  - PBNICG - annex 10 Vol I
  - SRWG - annex 10 Vol V
  - SURICG - annex 10 Vol III, Vol IV
    - DAPs WG
    - SEA/BOB ADS-B WG
  - SWIMTF - Information Management solution
  - **ATM AS TF - annex 10 Vol III, Vol IV**
  - **GBAS/SBAS ITF -annex 10 Vol I, Vol V**

Main Activities

- Regional strategies
  - Promote AMS digital application & Datalink
    - Efficient spectrum use, reduce workload, increase COM accuracy between Pilot and ATCO;
  - Transition to IP;
  - Encourage GNSS based application;
  - ADS-B Implementation and data sharing
  - SSR Mode S implementation;
  - Explore space based ADS-B and VHF Voice COM
- Guidance Materials
- Project promotion and coordination
  - AMHS transition, CRV, SWIM demo
- AFTN Routine table
- Aeronautical frequency spectrum
  - ICAO Position, Coordination and selection
  - Resolve interference
  - Frequency Lists (part of ANP), II code management, SIC/SAC

Main Activities

- Flight Inspection and Procedure Validation
  - Catalogue of Service Provider
  - Guidance Material for FI
- ASBU implementation
- Human Factors and Air Traffic Safety Electronics Personnel (ATSEPs)
- Contingency planning and disaster recovery
- Cybersecurity & Trust framework
- Innovation in aviation (relevant to CNS)
  - big data analysis, blockchain, artificial intelligence, Digital Tower, counter UAS detection and identification system, UTM etc.

A regional CNS picture

- Communications
  - Transition to AMHS, CRV, A-G data link
- Navigation
  - GNSS based operations are encouraged
  - Optimize the existing ground based navigation network to support PBN operations
- Surveillance
  - mixed application of different surveillance techniques for the best cost-effectiveness
  - improve air/ground common situational awareness
- Frequency
  - Implement a global frequency database

Regional Strategies and Guidances

- https://www.icao.int/APAC/Pages/eDocs.aspx

Example 1: Cyber issues

- **Cyber**- Involving, using, or relating to computers, or computer networks, especially the internet.
  - Cyber systems are critical for the safety and security of civil aviation operations.
- Industry High Level Group
  - ✓ Civil Aviation Cybersecurity Action plan and associated roadmap signed in December 2014.

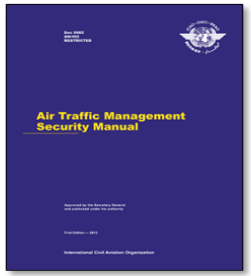
International Coordinating Council of Aerospace Industries Associations

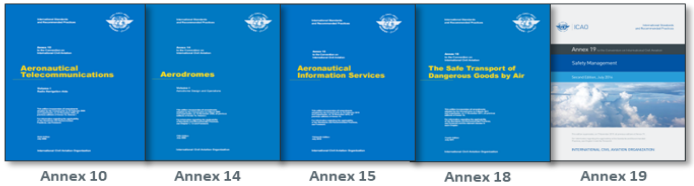
Strategy & Framework

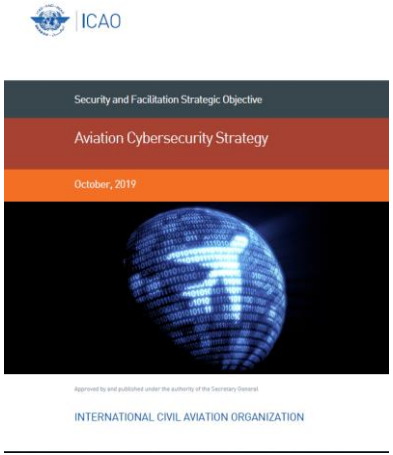
- **Resolution A39-19 adopted by ICAO 39th Assembly (2016)**
  - **Aimed at addressing cybersecurity in civil aviation through a horizontal, cross cutting and functional approach;**
- **The ICAO SSGC was launched in August 2017 in response to ICAO Assembly Res.39-19**
  - **Noted that ICAO should consider UN SCR 2341 (2017) - *protection of critical infrastructure***
  - **Endorsed roadmap to draft an ICAO cybersecurity strategy for the 40th Session of the ICAO Assembly (A40)**
- **A39-19 was amended as Resolution A40-12/1: *Addressing Cybersecurity in Civil Aviation***
  - **the governance of the cybersecurity subject in ICAO is to be expected to meet appropriate criteria discussed by Executive Committee to bring SSGC and TFSG under an overarching structure.**
    - **SSGC: Secretariat Study Group on Cybersecurity (focus on security)**
    - **TFSG: Trust Framework Study Group (focus on safety and resilience)**

Implementing ICAO cybersecurity Strategy

Cybersecurity is a cross-cutting issue that involves all domains of the aviation sector, **Synthesizes** relevant provisions spreading across the various Annexes into a single framework, focused on the management of cyber risk and improving cybersecurity as a whole, **Provides** States with a vision of the civil aviation sector as resilient to cyber-attacks, whilst continuing to innovate and grow.







Regional Joint Efforts

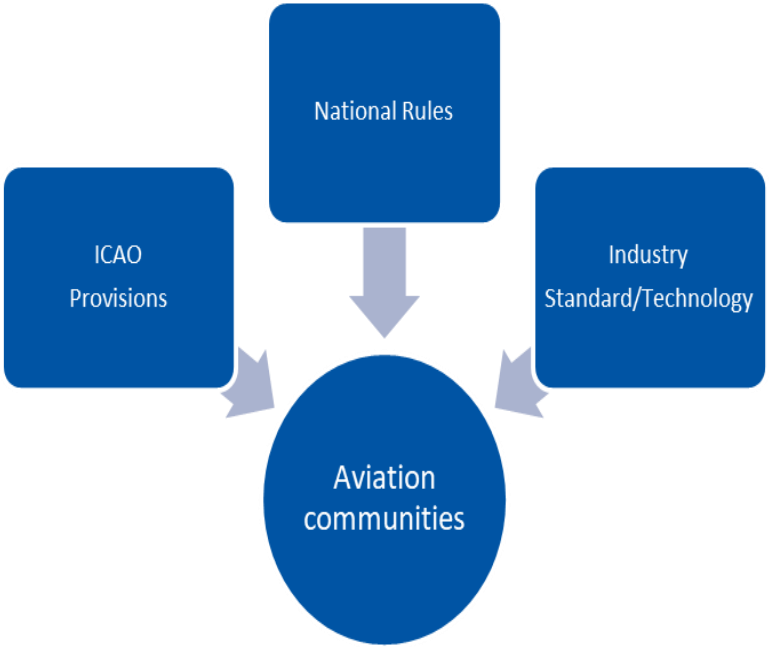
- ICAO APAC Regional Cybersecurity Symposium, Hong Kong China, May, 2018
- Cybersecurity Requirements WP briefing by AVSEC to Sub Groups, 2019
- Cyber Safety & Resilience Workshop with Tabletop Exercise (TTX), November, 2019,
- 2018-2019 AAPA Aviation Cyber Resilience Project 4 Workshops organized by Association of Asia Pacific Airlines
- APAC Aeronautical Fixed Service Safety and Protection Planning Working Group Meeting (AFSSP WG 2020)

CRV and Cybersecurity

- Relevant requirements on cyber security for tenderer contained in the TOR
- Cyber security was addressed in CRV meetings.
- PCCW Global implemented its Security Management Plan with clear defined process, intelligent tool and professional staffs to ensure the requirements from users.
- CRV Users can also add in data link encryption.
- Independent assessment on the safety and security.

Implementation

States



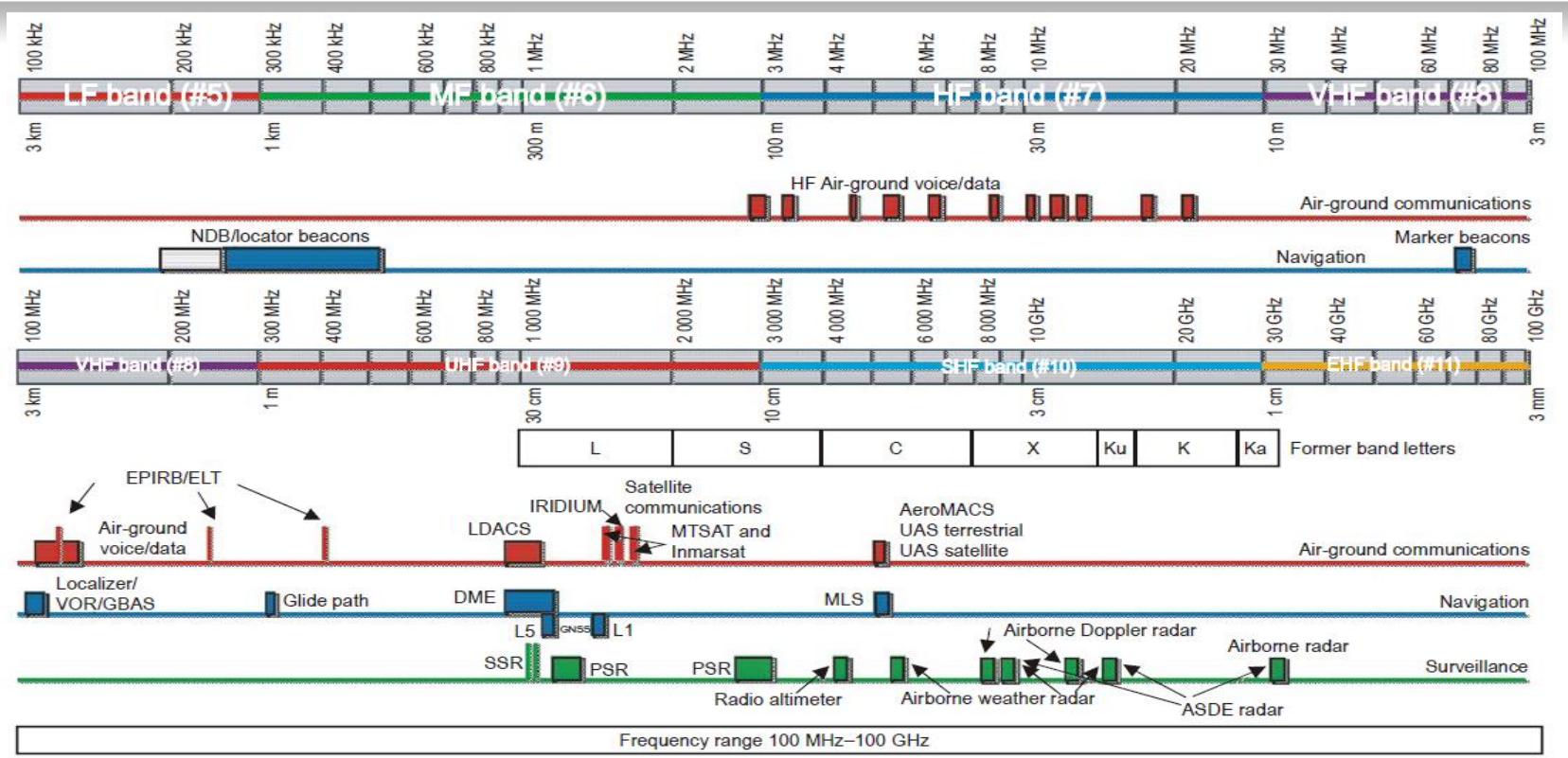
Regional

- Harmonized/Coordinated implementation
  - Global provision and National implementation
    - CERT
  - Cross-functional coordination (AVSEC, ANS, IT, Airports, Airlines, etc.)
  - Inter-region coordination (Inter-region IP network? Trust framework ?)
  - Inter-agency coordination
    - UNESCAP, ITU, APT

Example 2: Frequency spectrum

- A finite and limited **natural resource**, managed by the International Telecommunication Union(ITU) through its World Radiocommuication Conferences(WRCs) held every four years.
- Changes are made to the ITU Radio Regulations, including the Table of Frequency Allocations (Article 5 of the ITU Radio Regulations), on the basis of proposals made by **States**.

Spectrum Allocation to Aeronautical Services



Frequency Spectrum Matters

- For safe aircraft operations, CNS functions rely on a common resource — continued and interference-free access to **frequency spectrum**.
- **Regional Office**
  - Frequency coordination
    - Exclusive aeronautical bands, Frequency Lists, resolve interference
    - *II code*
  - Defend ICAO position
    - ICAO Position contains the agreed radio frequency allocation requirements for aeronautical radio services to support safety-critical aeronautical CNS systems.
    - ICAO position used by civil aviation authorities in their national discussions with the radio regulatory authorities when developing proposals for submission by their administrations to meetings of regional telecommunication organizations (**APT** in APAC) which prepare regional positions for ITU conferences.
    - ICAO position is submitted by ICAO to the regional ITU conferences as IP.

SUMMARY & EVOLUTION FOR FUTURE

Regional Footprints

- https://www.icao.int/APAC/Meetings/Pages/default.aspx
- ICAO is a forum
  - The views expressed in this report should be taken as those of *ABC XYZ* Meeting and not of the Organization.

QRGs

- ICAO has developed this COVID-19 Recovery Platform to collate the forecasts, guidance, tools, and resources which are needed by national regulators pursuing pandemic responses. https://www.icao.int/covid/Pages/default.aspx

- For CNS, ICAO published a Quick Reference Guidance (QRG) note on **“Periodicity of flight inspection of radio navigation aids”**,
  - https://www.icao.int/safety/COVID-19OPS/Pages/QRGs.aspx

- The notion of QRGs:
  - Developed by ICAO, with the support of relevant subject matter experts, to provide guidance of a particular subject area in addressing COVID-19 related risks to the continuity of business and operations that might be under consideration by a State for alleviations, while ensuring that the safety risks introduced by any changes from alleviations are also addressed. “

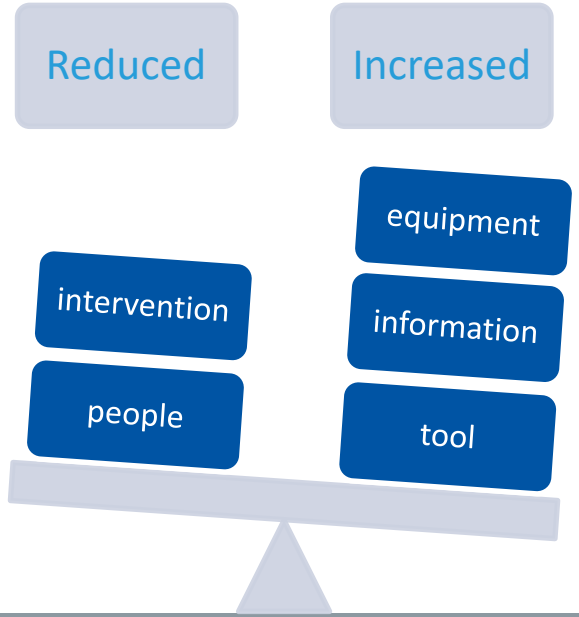
CNS Elements role changing

- CNS, **C**ommunications, **N**avigation and **S**urveillance are key technology elements to support today's ANS.
  - **C:** Transferring data, fundamental role in C,N,S elements, basis for all DEPENDENT application**.**
  - **N**:Dependency on conventional navigation infrastructure keeps going down, more and more new navigation means implemented with the use of GNSS, data communication and information processing**.**
  - **S**:Ground-based surveillance is being replaced by GNSS application, ADS-B, bi-directional data communication, and common situation between pilot and controller now is possible.

Blurred boundary

- Example: from *Communication* to *ICT*
  - AFTN
    - Communication means and message exchange
  - AMHS
    - Enhanced communication capability
  - SWIM
    - More than a communication issue

Technology is a **key** component

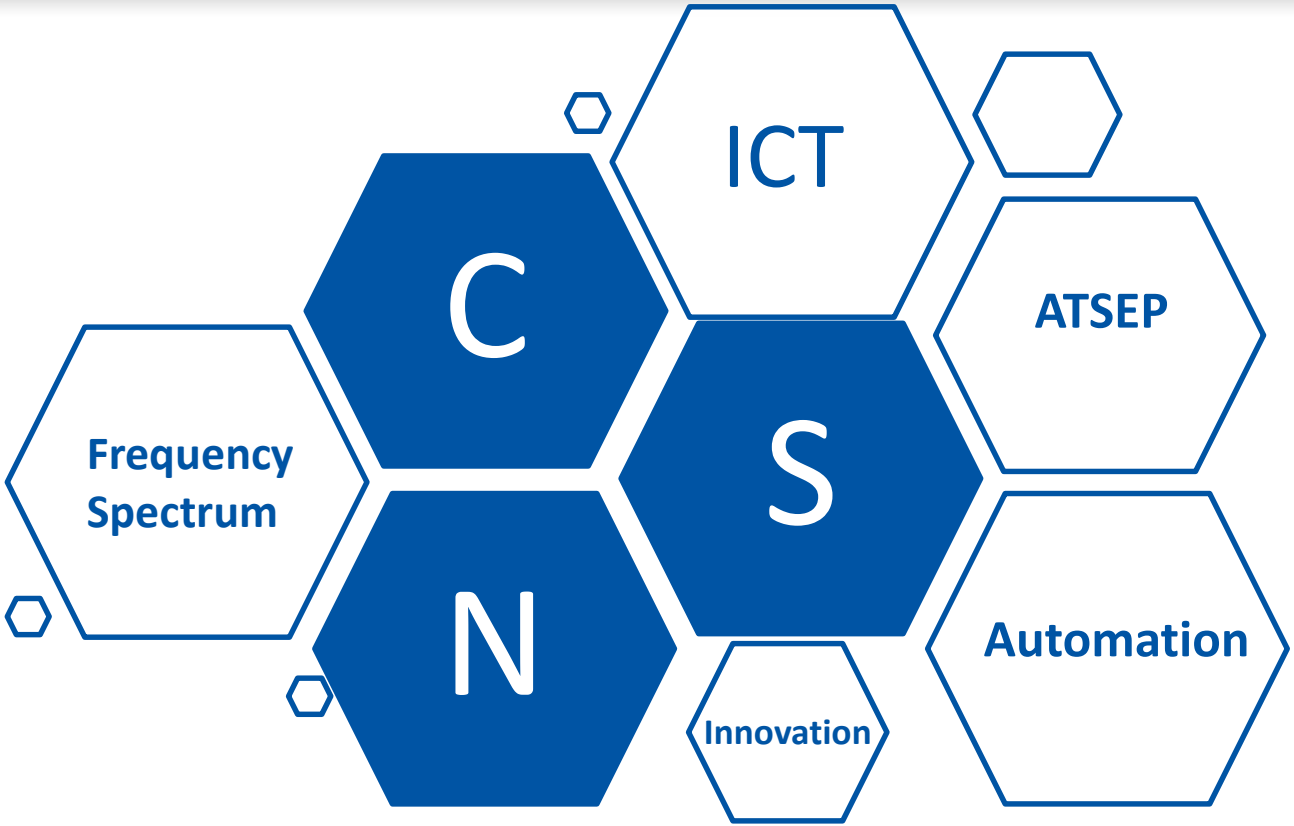


Technology will continue to increase its role in the future.

Evolution of CNS

- from the traditional technology-based segregated CNS infrastructure to a cross-domain integrated CNS architecture and performance-based framework which combines physical infrastructure and the delivery of CNS through services to enable key operational concepts such as trajectory-based operations (TBO), whilst maintaining and enhancing safety and security.
  - INTEGRATED CNS AND SPECTRUM STRATEGY,AN-Conf/13-WP/37, 20/8/2018
- Plus Frequency Spectrum:
  - Efficient use, Continuity, Interference free

Future Regional Puzzle



ICAO


North American Central American and Caribbean (NACC) Office Mexico City
South American (SAM) Office Lima
ICAO Headquarters Montréal
Western and Central African (WACAF) Office Dakar
European and North Atlantic (EUR/NAT) Office Paris
Middle East (MID) Office Cairo
Eastern and Southern African (ESAF) Office Nairobi
Asia and Pacific (APAC) Sub-office Beijing
Asia and Pacific (APAC) Office Bangkok
THANK YOU

Backup slides

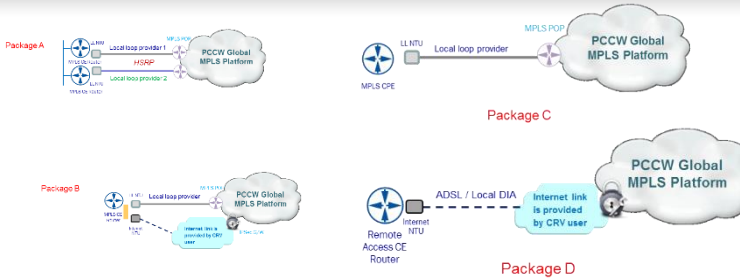
- **C**ommon Ae**R**onautical **V**irtual (CRV) Network
  - A **cross-border** cost-effective telecommunications **network** for States (Asia-Pacific and Middle East Members) , started in 2013.
  - Dedicated MPLS network provided by a common SP, PCCW Global limited (selected through ICAO TCB process), end to end service.
  - A wholly dependable and reliable communications infrastructure for aeronautical communications, enabling the global roadmap (ASBUs: B0-FICE, B0-NOPS, VoIP and B1-SWIM modules)
- Elsewhere
  - Pan-European Network Service (PENS),South America REDDIG and Caribbean MEVA

Why CRV

- **Harmonized and homogeneous level of network performance and services**
  - Solving current aeronautical communication deficiencies and current limitations (obsolescence, lack of standardization, poor escalation processes)
- **Cost efficient**
  - Reduced procurement time and effort, Value for money increases over years
- **Aeronautical Fixed Service (AFS) in the APAC region**
  - Sharing of surveillance data, AFTN/AMHS, Potential for additional connectivity beyond the initial AFTN-like routing network;
- **Prerequisite of the Global Air Navigation Plan**
  - Flight and Flow information, Network operations, AIM, VoIP, SWIM
- **Common helpdesk, common escalation process for network service issues**

Join CRV

- **Individual Contract** with PCCWG by selecting desired service from **common package**
- Participate in CRV Operations Group (oversight)
- A target of implementation for all: **2020**
  - Joining CRV is not technically complex
- Benefits to join CRV reduced or eliminated by the procrastination of the neighbor peers (cost of CRV + cost of legacy connections)



- ✓ Australia, Fiji, Hong Kong, Japan, ROK, New Zealand, Philippines, Singapore, USA
- Bhutan, Indonesia, PNG, Thailand, Bahrain, China, India, New Caledonia/ French Polynesia, Russia

SWIM

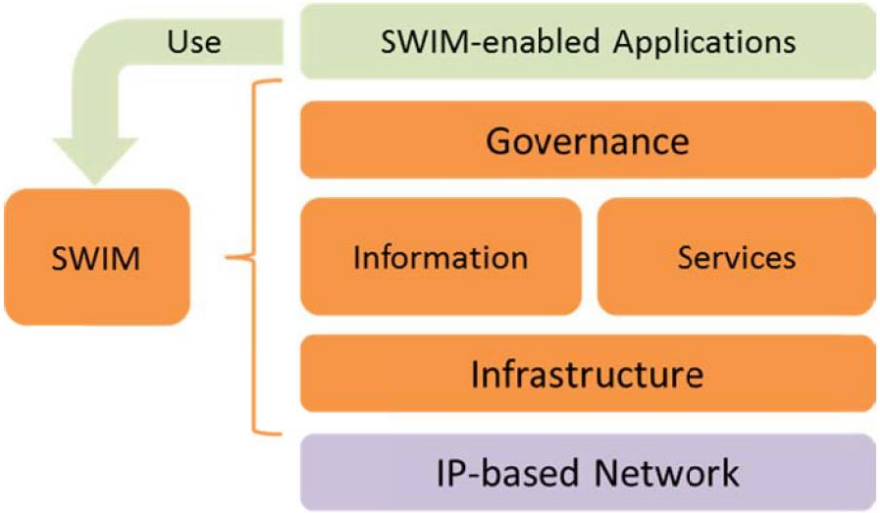
- **S**ystem **W**ide **I**nformation **M**anagement
- **Definition:**(A **set** of) **Standards**, **infrastructure** and **governance** enabling the management of the ATM-related information and its exchange between qualified parties via interoperable services.
  - It's a concept, approach, international language/solution in Information Management (IM) for International aviation industry with reference to the success in ICT.
- System-wide interoperability of ATM information architecture is achieved on a global scale through the use of common information exchange **models**, common **services**, and the use of appropriate **technology** and **standards**.

Need for SWIM

- Systems not designed and implemented to be globally interoperable
- Interfaces have limited flexibility to accommodate new users, additional systems, new content or changed formats
- Message-size limitations with the present infrastructure
- Current infrastructure make it difficult and costly for one stakeholder to access, on a timely basis, information originated by another stakeholder (Need for Right Information to the Right Person at Right Time and Right Place)
- Most organizations manage their ATM information in partial isolation leading to duplication and inconsistencies

Scope and Principles

Scope



Principles

- **interoperability**
  - Use industry open standards
  - Define interface/data exchange models
    - FIXM,AIXM,IWXXM
- **flexibility**
  - separation of information provision and information consumption
  - loose system coupling

Flexible infrastructure to meet today and future requirements

SWIM benefits

- Improved decision making by all stakeholders
  - improved shared situational awareness
  - improve availability of quality data and information
- More flexible and cost-effective communications using common standards for information exchange
- Loose coupling which minimizes the impact of changes between producers and consumers of information
- Support ATM-SDM (Service Delivery Management)
  - **Enabler** of the global ATM concept (Doc.9854)
  - Integral part of future Global ATM system

✓ APAC SWIM TF, since 2017 Education, survey, philosophy & Roadmap, Guidance Material, FIXM extension, Demonstrations, etc.