



ICAO Annex 10 and Doc 8071: current status and planned developments

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Presentation overview

- Introduction to ICAO
- ICAO SARPs and guidance material
 - Definitions
 - Development process
- Navigation systems SARPs and GM
- The ICAO Navigation Systems Panel (NSP)
- Current SARPs developments in NSP
- Doc 8071 evolution



Introduction - ICAO

- Convention (Chicago, 1944) and Annexes
- UN Specialized Agency
- 190 Contracting States
- Assembly (ordinarily every 3 years)
- Council – 36 States
- Air Navigation Commission – 19 members
- Secretariat (Secretary General)
- Standards and Recommended Practices (SARPs)



Standards and Recommended Practices (SARPs)

- Contained in the Annexes to the ICAO Convention
- Standard: Any specification [...] the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory
- Recommended Practice: Similar to Standard, but application is “desirable” rather than “necessary” and notification of non-compliance is not compulsory



Guidance material (GM)

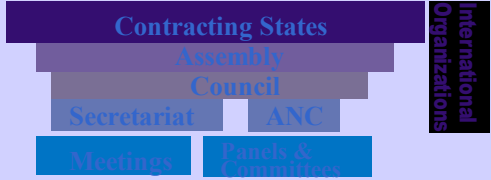
- Additional material supplementary to SARPs
- Provides guidance on technical aspects and application of SARPs
- Placed in Attachments to Annexes or in separate documents
- Does not have the legal status of SARPs
- Examples: “green pages” in Annexes; Doc 8071; GNSS Manual (Doc 9849)



SARPs development process

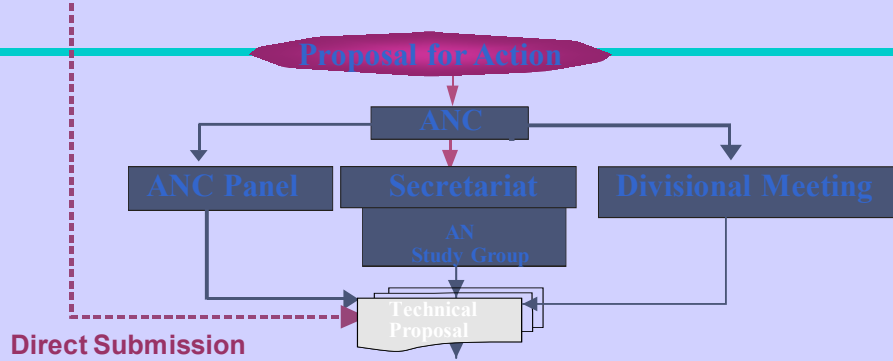
- Proposed draft developed by ICAO Secretariat and/or groups of experts
- Preliminary review by the Air Navigation Commission (ANC)
- Consultation with States and International Organizations (“State letter”)
- Final review by ANC and report to Council
- Adoption by Council
- Approval/disapproval by States
- SARPs become applicable

Origin of Proposal



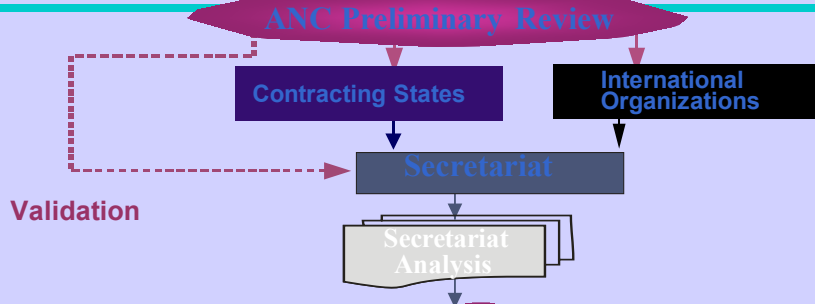
Development Phase

0 - 5 years



Review Phase

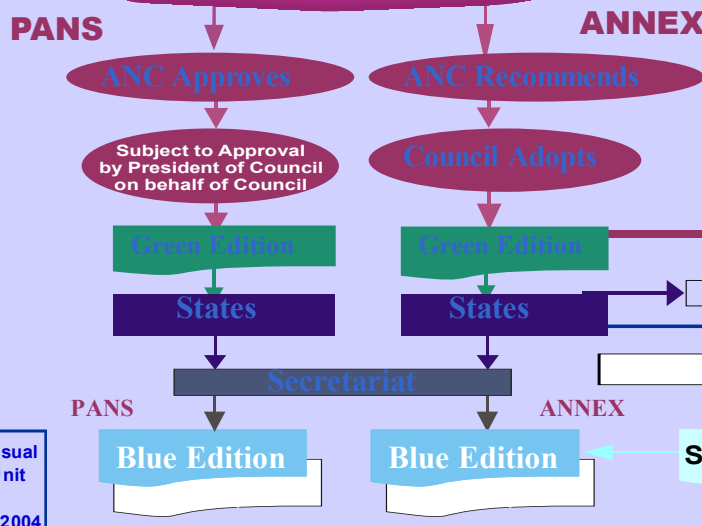
3 Months



Adoption/ Publication Phase

10 Months Approximately

Approximately 2 years



Adoption Date

(Usually March)

4 Months

Effective Date

(Amendment becomes effective if not disapproved by majority of States)

4 Months minimum

Applicability Date

(Usually November)



Annexes

- *Annex 1 — Personnel Licensing*
- *Annex 2 — Rules of the Air*
- *Annex 3 — Meteorological Service for International Air Navigation*
- *Annex 4 — Aeronautical Charts*
- *Annex 5 — Units of Measurement to be Used in Air and Ground Operations*
- *Annex 6 — Operation of Aircraft*
- *Annex 7 — Aircraft Nationality and Registration Marks*
- *Annex 8 — Airworthiness of Aircraft*
- *Annex 9 — Facilitation*
- ***Annex 10 — Aeronautical Telecommunications***
 - *Annex 11 — Air Traffic Services*
 - *Annex 12 — Search and Rescue*
 - *Annex 13 — Aircraft Accident and Incident Investigation*
 - *Annex 14 — Aerodromes*
 - *Annex 15 — Aeronautical Information Services*
 - *Annex 16 — Environmental Protection*
 - *Annex 17 — Security — Safeguarding International Civil Aviation Against Acts of Unlawful Interference*
 - *Annex 18 — The Safe Transport of Dangerous Goods by Air*



Annex 10

- Volume I: Radio Navigation Aids
- Volume II: Communication Procedures
- Volume III: Communication Systems
- Volume IV Surveillance and Collision Avoidance Systems
- Volume V: Aeronautical Radio Frequency Spectrum utilization



Volume I SARPs and GM

- SARPs (Annex 10 Volume I white pages):
 - Chapter 1: Definitions
 - Chapter 2: General provisions for radio navigation aids
 - Chapter 3: Specifications for radio navigation aids:
 - Conventional navaids: ILS, PAR, VOR, NDB, DME, marker beacons, MLS
 - GNSS: GPS, GLONASS, ABAS, SBAS, GBAS/GRAS
 - Appendix A: MLS characteristics:
 - Appendix B: Technical specifications for GNSS
- Guidance Material (Annex 10 Volume I green pages);
 - Attachments A-G
- Other guidance material:
 - ICAO Doc 8071 (Testing of radio navigation aids), Vol. I and II
 - ICAO Doc 9849 (GNSS Manual)



The ICAO Navigation Systems Panel (NSP)

- Technical group of qualified experts formed by the ANC
- 31 members (from 23 States and 8 International Organization), nominated at the ANC's request
- Members participate in their personal, expert capacity and not as representatives of their nominators
- Created in 2003 by merging the GNSS Panel (established in 1993) and the Testing of Radio Nav aids Study Group (TRNSG)
- Responsible for development of SARPs and GM for all radio navigation systems (GNSS and conventional nav aids)



Current developments

- Review of conventional nav aids provisions
- GPS/GLONASS evolution
- Introduction of Galileo
- GNSS Cat II/III landing operations
- SBAS evolution
- Other issues



Review of conventional navaids provisions (1)

- General clean-up of obsolete or ambiguous material
- Restructuring of Chapter 2 (General provisions)
- Deletion of “protection dates”
- Complete revision of material on ILS critical and sensitive areas
- Review of VOR/DME service volumes and frequency planning material
- Alignment of DME accuracy Standard with actual avionics performance
- Deletion of NDB testing material
- MLS CAT III certification issues



Review of conventional navaids provisions (2)

- Impact of changes on existing systems carefully evaluated
- Backwards compatibility assessment completed
- Most of the changes should raise no cost / implementation issues
- Feedback from consultation with States will be used to confirm these findings
- State Letter sent in June
- Amendment 84, to become applicable end 2009



Review of conventional navaids provisions (3)

- Relaxations of ILS localizer coverage requirements are under review by NSP, in coordination with the OPSP
- Intent: to limit clearance signal reflection (multipath) from buildings
- Method: Raising the lower boundary of the coverage from 2000ft height above threshold at 17NM and +/- 15 degrees to a variable height (4500 ft max) at +/- 35 degrees
- Condition: “if operational requirements permit” (based on a specific operational impact evaluation)
- NSP recommendation expected at October 2008 meeting



GPS SARPs evolution

- Short-term (Amendment 83 to Annex 10):
 - Harmonization with GPS Interface Specification IS-GPS-200
- Longer-term:
 - SARPs for GPS L5 signal (1176.45 MHz), designed for safety-of-life uses



GLONASS SARP's evolution

- Short-term (Amendment 83 to Annex 10):
 - Harmonization of the formulation of GLONASS accuracy, availability and reliability provisions with that of the corresponding GPS provisions
 - Modifications to carrier frequency plans to protect radio astronomy bands
- Longer-term:
 - SARPs for GLONASS L3 signal in the 1164 – 1215 MHz band (GLONASS-K satellites)



Introduction of Galileo SARPs

- Longer term: Galileo SARPs to be developed
 - Open Service (OS)
 - Safety of Life (SoL)



SBAS SARP's evolution

- SBAS: Satellite-based augmentation system (WAAS, EGNOS, MSAS, GAGAN)
- Short-term (Amendment 83 to Annex 10):
 - Harmonization with airborne receiver standards (RTCA DO-229C/D)
- Mid term:
 - Investigate use of SBAS down to a 200 ft decision height (already planned for WAAS)
- Longer term:
 - SBAS L5 SARPs



GNSS Cat II/III operations

- Current GBAS SARPs support Cat I
- Development of GBAS SARPs for Cat II/III is ongoing
 - NSP Cat II/III Subgroup
- Several conceptual options still under assessment



Other SARP's issues

□ Evolving ICAO policy on formulation of SARPs:

➤ Assembly Resolution A36-13 (2007)

- *“ SARPs and PANS shall be drafted in clear, simple and concise language. SARPs shall consist of broad, mature and stable provisions specifying functional and performance requirements that provide for the requisite levels of safety, efficiency and interoperability. Supporting technical specifications, when developed by ICAO, shall be placed in separate documents to the extent possible;”*
- *“ In the development of SARPs, procedures and guidance material, ICAO should utilize, to the maximum extent appropriate and subject to the adequacy of a verification and validation process, the work of other recognized standards-making organizations. Material developed by these other standards-making organizations may be deemed appropriate by the Council as meeting ICAO requirements; in this case such material should be referenced in ICAO documentation;”*

□ Evolving relationship with other standards-making organizations



Doc 8071

Manual on testing of radio navigation aids

- Volume I — *Testing of Ground-based Radio Navigation Systems.*
- Volume II — *Testing of Satellite-based Radio Navigation Systems.*
- Volume III — *Testing of Surveillance Radar Systems.*



Doc 8071 evolution

- NSP CNTSG (Conventional Nav aids and Testing Subgroup) is responsible for the development of updates to Doc 8071
- New material on flight validation of instrument flight procedures introduced as Chapter 5 of Volume II in 2007
- Similar material to be introduced as Chapter 8 of Volume I
- Additional corrigendum to Volume II (GBAS chapter) to be published shortly
- Package of Volume I changes to be developed by NSP CNTSG (October 2008 meeting), to align with the proposed changes to SARPs.



END

Thank you for your attention!