



ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24 : Aviation Safety and Air Navigation Priority Initiatives

DEVELOPMENT OF SARPs AND GUIDANCE MATERIAL FOR PROTECTION OF COMMUNICATION, NAVIGATION AND SURVEILLANCE FACILITIES

(Presented by African Civil Aviation Commission on behalf of 54 African States²)

EXECUTIVE SUMMARY

This paper highlights the need to develop Standards and Recommended Practices (SARPs) as well as guidance material to harmonize building restricted areas (BRAs) and protect communication, navigation, and surveillance (CNS) facilities, ensuring a balance between land use in the vicinity of CNS facilities, aviation safety, economic growth and environmental protection.

Action: The Assembly is invited to:

- urge States and industry stakeholders to ensure aeronautical servitudes are kept free of obstacles to facilitate safe aircraft operations; and
- urge ICAO to develop Standards and Recommended Practices (SARPs) and guidance material to harmonize building restrictions for the protection of communication, navigation, and surveillance (CNS) facilities.

<i>Strategic Goals:</i>	This working paper relates to the Strategic Goals <i>Every Flight is Safe and Secure; Aviation Delivers Seamless, Accessible and Reliable Mobility for All; and Aviation is Environmentally Sustainable.</i>
<i>Financial implications:</i>	To be determined.
<i>References:</i>	Annex 10 — <i>Aeronautical Telecommunications</i> , Volume I — <i>Radio Navigation Aids</i> Annex 14 — <i>Aerodromes</i> , Volume I — <i>Aerodrome Design and Operations</i> Doc 8168, <i>Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS)</i> , Volume II — <i>Construction of Visual and Instrument Flight Procedures</i> ICAO EUR DOC 015 – <i>European Guidance Material on Managing Building Restricted Areas</i> CASA Guideline G: <i>Protecting Aviation Facilities - Communication, Navigation and Surveillance (CNS)</i>

¹ English and French versions provided by AFCAC.

² Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

1. INTRODUCTION

1.1 Aeronautical servitudes define the airspace that ideally should be kept free of obstacles around an aerodrome in order to carry out safe aircraft operations. These include: 1) aerodrome easements referring to those surfaces used to protect the runway; 2) radio electrical servitudes referring to those surfaces, which protect the signals emanating from aeronautical radio aids; and 3) operations easements, which protect the instrumental procedures established around an airport. Hence, municipalities in the vicinity of an aerodrome affected by aeronautical servitudes must take these limitations into account for urban planning purposes.

1.2 Communication, navigation, and surveillance (CNS) facilities are critical to aviation safety, yet their protection from obstructive structures remains inconsistently regulated. Current practices vary significantly across States and regions, leading to fragmented standards. Some States rely on the specifications of equipment manufacturers, hence the need for the building restricted areas (BRAs) defined by ICAO not to be less restrictive than those proposed by the manufacturers.

1.3 Stringent regulations in some States impose significant environmental and economic burdens by restricting land use unnecessarily in close proximity to CNS facilities, while insufficient safeguards in other States jeopardize the operational integrity of CNS facilities, increasing risks to aviation safety.

1.4 This working paper highlights the need for the development of Standards and Recommended Practices (SARPs) and guidance material to standardize BRAs around CNS facilities, ensuring a balanced approach to safety, economic and environmental considerations. It advocates for the establishment of uniform protection zones, such as cones and cylinders, tailored to specific facility parameters for both omni-directional (e.g., VHF omnidirectional radio range (VOR), non-directional radio beacon (NDB)) and directional systems (e.g., instrument landing system (ILS), microwave landing system (MLS)).

2. DISCUSSION

2.1 Current challenges

2.1.1 There are currently no SARPs and guidance material for BRA regarding the protection of CNS facilities, leaving Civil Aviation Authorities (CAAs), air navigation services providers (ANSPs), airport operators, municipal planning authorities, and other stakeholders at odds in adopting appropriate measures to safeguard CNS facilities in fast-developing urban areas near airports.

2.1.2 The SARPs in Annex 14 — *Aerodromes* establish procedures for defining aeronautical assessments related to runways, primarily focusing on obstacle limitation surfaces (OLS), but they do not systematically address radio frequency interference or the impact of off-airport developments on CNS signal integrity.

2.1.3 Two recognized and widely applied BRA frameworks are the requirements in the ICAO EUR Doc 015 document titled “European Guidance Material on Managing Building Restricted Areas” and that of Civil Aviation Safety Authority (CASA) of Australia’s Guideline G titled “Protecting Aviation Facilities - Communication, Navigation and Surveillance (CNS)”. However, there is a wide variation in the BRA requirements in these documents leading to fragmented implementation across ICAO Member States or regions, as well as a lack of global enforceability. For instance, Table 1 shows that EUR Doc 015 recommends significantly larger protection distances for CNS facilities than the guideline from CASA,

reflecting more conservative risk assumptions, particularly for VOR, Doppler VOR, distance measuring equipment (DME), and ILS systems used in high-precision operations.

Table 1 : BRA Protection Distance Comparison

CNS Facility	Australia Guideline G (Max Radius in metres)	ICAO EUR Doc 015 (Max Radius in metres)
VOR (CVOR)	1500	15000
DVOR	1500	10000
NDB	300	1000
DME	1500	3000
PSR	15000	15000
SSR	15000	15000
VHF Comm	2000	2000
ILS Localizer	N/A	6000
ILS Glide Path	N/A	6000

2.1.4 Also, equipment manufacturers' proprietary protection volumes are not standardized, which complicates compliance. Additionally, some manufacturers provide defined protection volumes, while others do not, further increasing the complexity.

2.1.5 Over-protection of CNS facilities unnecessarily restricts land use in the vicinity of aerodromes, while under-protection endangers signal integrity.

2.1.6 Annex 10 — *Aeronautical Telecommunications*, Volume I — *Radio Navigation Aids*, defines “critical” and “sensitive” areas mainly to prevent interference within airport boundaries, especially for ILS systems. However, it does not account for off-airport obstacles such as high-rise buildings or industrial structures that can degrade CNS signals, particularly the localizer and glide path. This creates a misleading perception of comprehensive protection. In the absence of global SARPs on radioelectric servitudes, airport authorities focus assessments on runway-related criteria, without a standardized approach to evaluating off-airport impacts on CNS signal integrity.

2.2 Proposed framework

2.2.1 Establish a technical subgroup under an appropriate panel comprising:

- a) experts from regional agencies, organizations and navigational aids (NAVAIDs) manufacturers to contribute technical expertise; and
- b) environmental and urban planning experts and other relevant stakeholders.

2.2.2 Develop SARPs and guidance material defining minimum/maximum protection volumes based on NAVAID type, signal range, and terrain.

2.3 Benefits of harmonization

2.3.1 Enhanced BRA requirements for CNS facilities ensuring consistent performance of facilities everywhere under the newly established SARPs and guidance material.

2.3.2 Additionally, the SARPs and guidance material will introduce a structured assessment process for evaluating building proposals and clearly define the responsibilities of authorities, ANSPs and

other stakeholders to streamline the approval process. By harmonizing BRA definitions and procedures, this initiative will reduce inconsistencies among Member States, safeguard radio signal integrity, and enhance safe all-weather aviation operations.

2.3.3 Reduced administrative burden for State CAAs, ANSPs, airport operators, and municipal planning authorities to ensure uniform application of requirements for appropriate control of developments of buildings and structures in airport vicinity as well as safeguarding CNS facilities to ensure civil aviation safety and ensure mitigated environmental impact through optimized land-use policies.

3. **CONCLUSIONS**

3.1 The development of SARPs and guidance material for BRAs will ensure that aeronautical servitudes are kept free of obstacles around an aerodrome, thereby facilitating safe aircraft operations. This is crucial to address existing inconsistencies and harmonize practices, thereby enhancing aviation safety while facilitating orderly development in the vicinity of aerodromes.

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