



International Civil Aviation Organization

CAR/SAM REGIONAL PLANNING IMPLEMENTATION GROUP (GREPECAS)

**Fifth Meeting of the CNS Committee of the GREPECAS ATM/CNS Subgroup
(CNS/COMM/5)**

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CNS/COMM/5-WP/08

20/10/06

Agenda Item 2: Navigation systems developments

PROGRESSIVE DEACTIVATION OF NDB STATIONS

(Presented by the Secretariat)

SUMMARY

Based on the ICAO SARPs and guidelines, on the current VOR, DME and ILS stations, as well as on the increasing use of GNSS, this working paper proposes the preparation of a Plan for the progressive deactivation of NDB stations in the CAR/SAM Regions.

References:

- Annex 10, Vol. I
- ANP CAR/SAM (Doc 8733)
- Report of the AN-Conf/11
- Report of the GREPECAS/12
- Amendment 2 to the Global Air Navigation Plan (Doc 9750)

1. Introduction

1.1 It has been considered necessary to develop a plan for the progressive deactivation of NDB stations considering the CNS3/3-3.2 Task assigned to the CNS Committee and that the NDB is not included in the SARPs as a mandatory regulation for approach, landing and departure; that the mandatory aid in the terminal and en-route areas is the VOR complemented by DME; likewise, taking into account the evolution of the airborne fleet equipment that operates in the CAR/SAM Regions; and, considering that the use of GNSS satellite navigation dependency is increasing and, in order to meet the airspace required navigation performance, either maintaining or improving safety, thus allowing the economisation of resources.

2. Discussion

2.1 Annex 10, Vol. I, paragraph 2.1 – *Aids to approach, landing and departure* and specifically paragraph 2.1.1, which establishes that “*The standard non-visual aids to precision approach and landing shall be:*

- a) *the instrument landing system (ILS) conforming to the Standards contained in Chapter 3, 3.1;*
- b) *the microwave landing system (MLS) conforming to the Standards contained in Chapter 3, 3.11; and*
- c) *the global navigation satellite system (GNSS) conforming to the Standards contained in Chapter 3, 3.7.”*

2.2 Paragraph 2.2.1 related to *Short-distance aids* establishes that “*In localities and along routes where conditions of traffic density and low visibility necessitate a ground-based short-distance radio aid to navigation for the efficient exercise of air traffic control, or where such short-distance aid is required for the safe and efficient conduct of aircraft operations, the standard aid shall be the VHF omnidirectional radio range (VOR) of the continuous wave phase comparison type conforming to the Standards contained in Chapter 3, 3.3*”. Therefore, it is important to keep in mind that the VOR is the mandatory aid.

2.3 Additionally, paragraph 2.2.2 of the mentioned Annex establishes that “*At localities where for operational reasons, or because of air traffic control reasons such as air traffic density or proximity of routes, there is a need for a more precise navigation service than that provided by VOR, distance measuring equipment (DME) (conforming to the Standards in Chapter 3, 3.5) shall be installed and maintained in operation as a complement to VOR.*”

2.4 Paragraph 68, Part I – *Basic Operational Requirements and Planning Criteria (BORPC)* contained in the Basic ANP, Volume I (Doc 8733) establishes that “[...] *Whenever possible, VORs should be located and operated so that they can serve both the requirements for en-route and terminal navigation guidance, including holding. Where the provision of VORs for the holding is not practicable, NDBs can be used for this purpose. [...]*”.

2.5 The Eleventh Air Navigation Conference (AN-Conf/11), held in Montreal from 22 September to 3 October 2003, under its Agenda Item 6 – *Aeronautical navigation issues*, among other aspects, analysed the GNSS function in the provision of air navigation services and the considerations related to the transition strategy, under which some States presented plans for the progressive elimination of NDB stations services while the airborne equipment of the operating fleet in a determined region develops and the satellite navigation dependency evolves.

2.6 Regarding the transition to satellite-based navigation and the GNSS vulnerability, the AN-Conf/11 formulated Recommendation 6/1 – *Transition to satellite-based air navigation*, which, among other aspects, urges ICAO to continue to develop as necessary provisions which would support seamless GNSS guidance for all phases of flight and facilitate transition to satellite-based sole navigation service; as well as Recommendation 6/2 – *Guidelines on mitigation of GNSS vulnerabilities*.

2.7 Furthermore, GREPECAS through its Conclusion 12/45 amended the “*Regional Guidelines for the Transition to the Global Navigation Satellite Systems (GNSS)*” and the “*Regional Strategy for the introduction and application of non visual aids to approach, landing and departure*”, which are included as Appendices S and T to the Report of the GREPECAS/12 Meeting. Essentially, the strategy is to maintain the ILS and implement the GNSS. Therefore, the NDB is not contemplated in the strategy.

2.8 Amendment 2 to the Global Air Navigation Plan (Doc 9750), under GEI 21 – *Navigation Systems* oriented the progressive introduction of performance-based navigation, which must be supported by an appropriate navigation infrastructure consisting of an appropriate combination of global navigation satellite systems (GNSS), self-contained navigation systems (inertial navigation system) and conventional ground-based navigation aids. Thus, the ultimate goal is a transition to GNSS that would eliminate the requirement for ground-based aids, although the vulnerability of GNSS to interference may require the retention of some ground aids in specific areas. Near-term applications of GNSS are intended to enable the early introduction of satellite-based area navigation without any infrastructure investment.

2.9 The conventional navigation systems, i.e. NDB and VOR, are not part of the new strategy in the Global Air Navigation Plan, therefore, a progressive deactivation in the transition process to the global navigation satellite systems (GNSS). However, this deactivation has to be coordinated and orderly in order to avoid affecting the air operations safety in flight phases.

2.10 In short, regarding the deactivation of NDB stations, it is precise to analyse together with air navigation services provider entities and airspace users, the service provided by each NDB station, its function, the procedural existence with other aids such as VOR/DME, GNSS-RNAV, as well as the aircraft capacity/development that operate in the area. Also, it must be taken into account that some States have chosen the position to deactivate those NDB stations that are considered unnecessary and to maintain the NDB stations that support air navigation until the end of their useful lives.

3. Conclusion

3.1 As a result of the analysis made in the above paragraphs, this paper recommends the development of a plan for the progressive deactivation of NDB stations, using the format presented in the **Appendix** to this working paper. Therefore, the Meeting is asked to consider the following Draft Conclusion:

DRAFT

CONCLUSION CNS 5/X PROGRESSIVE DEACTIVATION OF NDB STATIONS

That in order to develop a progressive deactivation of NDB Stations without affecting safety, States, Territories, International Organizations and airspace users:

- a) analyse the service provided by each NDB station, its function, procedural existence with other aids such as VOR/DME, GNSS-RNAV, as well as the aircraft capacity/development that operate in serviced airspace;
- b) based on the analysis described in item a) above and in the table format included in the Appendix to this paper, develop a plan for the progressive deactivation of NDB stations; and
- c) inform the ICAO NACC or SAM Regional Office regarding their respective plan for the progressive deactivation of NDB stations, before **1 August 2007**.

3.2 Likewise, the CNS Committee has to follow-up on the development of a regional plan for the progressive deactivation of NDB stations, taking into account the responses from States/Territories and air navigation Service Providers to Draft Conclusion CNS 5/X. This Plan would impact Table CNS 3 – *Table of Radio Navigation Aids* of the FASID. Therefore, the Meeting is asked to consider the following Draft Decision:

**DRAFT
DECISION CNS 5/Y DEVELOPMENT OF A REGIONAL PLAN FOR THE
PROGRESSIVE DEACTIVATION OF NDB STATIONS**

That the CNS Committee:

- a) prepares a regional plan for the progressive deactivation of NDB stations, taking into account the responses from States/Territories and air navigation Service Providers to Draft Conclusion CNS 5/X and the Table presented in the Appendix to this paper; and
- b) based on the results of item a) above, propose the corresponding amendments to Table CNS 3 of the FASID.

4. Suggested action

4.1 The Meeting is invited to:

- a) take note of the information contained in this working paper;
- b) review and recommend actions for the development of the plan for the progressive deactivation of NDB stations, taking into account the proposed text in the Draft Conclusion presented under paragraph 3.1 and the Table shown in the Appendix to this paper;
- c) consider the possibility to recommend that based on the Administrations' responses, the Committee centralises the development of the plan for the progressive deactivation of NDB stations through a Draft Decision such as the one proposed under paragraph 3.2 of this working paper; and
- d) analyse other considerations deemed appropriate by the Meeting regarding this issue.
