



**Agenda Item 6: Assessment of operational requirements in order to determine the implementation of communications and surveillance (CNS) capabilities improvement for en-route and terminal area operations**

**STUDY OF THE LINE-OF-SIGHT COVERAGE FOR COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SYSTEMS**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This working paper presents a proposal to complete the study on the line-of-sight coverage for communications, navigation and surveillance systems, with the aim of supporting the implementation of PBN, ATFM and the exchange of radar data between adjacent FIRs at regional and SAM States level.	
<b>Reference:</b>	
<ul style="list-style-type: none"><li>• Fifth workshop/meeting of the SAM Implementation Group (SAM/IG/5) (Project RLA/06/901) Lima, Perú, 10-14 May 2010.</li></ul>	
<b>ICAO strategic objective:</b>	<i>D - Efficiency</i>

1. **Background**

1.1 SAM/IG/5 meeting took note of the study carried out on the calculated line-of-sight coverage of VOR/DME stations in the SAM Region. The study consisted in the elaboration of coverage maps and a database referring to coverage calculations of all VOR/DME installed in the SAM Region. In order to determine the coverage of VOR/DME stations, software tools such as Radio Mobile, SRTM3 and DTED digital databases were used. Furthermore, special coverage calculation programmes were mainly based on Windows Visual Basic Excel, Note Pad and Google Earth for coverage display.

1.2 The results of the task carried out include, for each of the stations analysed, the following information:

- a) Obstacle database;
- b) An Excel degree-by-degree coverage database up to FL250;
- c) A polar coverage map up to FL250, with a 5-degree filter; and
- a) Conversion of the Excel database to KML in order to permit the display of VOR/DME line of site coverage in Google Earth.

1.3 During the Meeting, a CD with information indicated in the above paragraph was handed over. To this effect, the Meeting considered that States should examine the information presented therein, with the aim that same is used as a contributory element for the PBN feasibility study (RNAV 5, RNAV 1 and RNAV 2). In this respect, the Meeting formulated Conclusion SAMIG/5-8 - *Review of the SAM VOR/DME stations line-of-sight coverage database.*

## 2. **Analysis**

2.1 As follow-up to Conclusion SAM/IG/5-8 and since the Office has received no comments on the VOR/DME stations line-of-sight database, it has been decided that, in accordance with the Conclusion, the database be used by the SAM States for studies regarding regional and national PBN implementation. The database has been uploaded in the SAM Office Web site.

2.2 SAM/G/5 meeting considered that the study on line-of-sight coverage should be extended to include coverage at levels above FL250. Likewise, it considered that a coverage diagramme for ground-air communications should be prepared, as well as for radar surveillance systems.

2.3 Since this study has not been considered in the approved 2010 RLA/06/901 project budget, the requirement would be submitted to the fourth committee coordination meeting of Project RLA/06/901, to be held in Lima, Peru, from 2 to 3 December 2010, for approval and implementation in 2011.

2.4 With the aim of facilitating the study on the extension of VOR/DME systems coverage at different altitude levels, as well as the line-of-site coverage for ground-air VHF communications and surveillance systems, the Meeting could analyze the possibility that the SAM/IG Group count with a software permitting to calculate the line-of-site coverage, as well as its presentation.

2.5 This tool could permit calculating the line-of-site coverage at any given moment, without requiring the services of an expert every time new different level coverage diagramme, a new coverage or a modification of an already existing coverage diagramme are required. The line-of-site diagrammes obtained would be added to the current VOR/DME coverage database.

2.6 With the aim of keeping the communications, navigation and surveillance line-of-site coverage database, SAM States should inform of the new equipment that would be installed or the changes in the currently installed equipment.

## 3. **Actions proposed**

3.1 The Meeting is invited to:

- a) Take note of the information presented;
- b) Analyze the proposals in paragraphs 2.4 and 2.5 of this working paper, for their possible approval and presentation at the fourth committee coordination meeting of Project RLA/06/901 (RCC/4); and
- c) Analyze any other aspects in this respect that might deem necessary.