

GUIDELINES FOR THE OPTIMIZATION OF THE RADAR SERVICES IN THE CAR/SAM REGIONS

1. Optimization of facilities

1.1 Radar service can be improved by optimizing the coverage of radar facilities in FIR sectors or in specific TMAs located near boundaries with other States.

1.2 In this sense, it is necessary for States to consider sharing the radar data signal for its display, in keeping with the requirements and priorities established by the States concerned themselves.

2. Surveillance improvements

2.1 Similarly, States should consider increasing the benefit of surveillance systems foreseen in the various regional CNS/ATM transition plans, by replacing:

- SSR monopulse for PSR; and
- ADS for SSR monopulse.

2.2 SSR Mode S may be used as an independent complementary element in the transition to ADS.

3. Human resources

3.1 The availability of sufficient and well-trained human resources is essential to ensure the effectiveness and proper use of the radar system, without neglecting operational planning, since a radar system involves automated functions that require timely preparation of human resources.

The human being is the centre of this air traffic control process and, thus, requires proper training before operating an advanced system or new procedures. In a constantly changing ATM environment, personnel capabilities need to be preserved.

Constant personnel training, including emergencies and evaluation programmes, must be established to make sure that human capabilities are maintained at a proper level.

4. Planning

4.1 Air navigation plans should contemplate the continuous operation of radar systems during the transition period towards the CNS/ATM Global Plan, as a supplementary backup for future surveillance systems, based on regional agreements among States.

PLANNING NEW RADAR FACILITIES IN THE CAR/SAM REGIONS

1.1 In view of the above, new radar facilities planned for the CAR/SAM Regions should take into account the following aspects:

- a) before deciding on radar installation, all aspects which might be affecting the efficient supply of ATC based on conventional procedures would need to be reviewed, *inter alia*:
 - 1) status of communication systems (AMS and AFS) and radio navigation and approach aids in use;
 - 2) status of technical and operational facilities of the ATC units concerned;
 - 3) organization of the airspace concerned, including SID, STAR and ATS routes and sectorization of TMAs and FIRs;
 - 4) aerodrome infrastructure (runways, taxiways, rapid exit taxiways, etc.). It should be borne in mind that traffic delays in the TMA may be the result of aerodrome problems (apron, taxiway, runway layout, etc.);
 - 5) training, rating and staffing of ATC personnel required for operational posts; and
 - 6) working conditions of ATC personnel in all aspects, including social satisfaction, possibilities of attending higher-level courses and functional promotions within the Administration;
- b) radar facility planning should be based on sound operational requirements. The opinion of airspace users concerned should be taken into account;
- c) a careful cost/benefit analysis should be carried out, taking into account budget planning, initial implementation costs and maintenance costs (supply of spare parts and cost of specialized personnel), as well as the need for new communication systems, new units, etc.;
- d) prior training of the ATC and technical personnel required for the new facilities;
- e) radar facilities should be planned for gradual implementation. Experience shows that large-scale implementation involving several radar stations (APP and ACC) demands huge financial investments and causes great difficulties in terms of planning, implementation, operation, maintenance and management, resulting in implementation delays, partial use of facilities and affecting the Administration and operators in all possible ways. Initial planning should include:

- 1) TMA (APP) as first priority; and
 - 2) FIR (ACC), giving priority to sectors already providing radar service to TMAs, gradually expanding to other sectors without losing continuity of coverage. At the level of ACCs, coverage priority for upper airspace should be considered;
- f) plans of neighbouring States, taking into account the possibility of sharing radar data from stations located close to international borders, in order to expand the coverage of adjacent control areas, avoiding duplication of facilities in said areas; and
- g) transition to CNS/ATM systems, in keeping with the CAR/SAM Transition Plan. In this sense, the following should be considered:
- 1) TMA (APP): Implementation of PSR associated to SSR monopulse expandable to Mode S. The PSR will be phased out with the use of SSR alone;
 - 2) FIR (ACC): Implementation of SSR monopulse expandable to Mode S should be considered for high density continental airspace. In remote continental and/or oceanic areas, en route surveillance should consider the use of ADS;
 - 3) whatever the circumstances, when planning the implementation of surveillance systems, especially en route, Administrations should make a thorough analysis of surveillance options (SSR, ADS or ADS/SSR), taking into account the CNS/ATM Regional Transition Plan.

- END-