RECOMMENDATION ITU-R M.1180*

Availability of communication circuits in the aeronautical mobile-satellite (R) services (AMS(R)S)

(Question ITU-R 85/8)

(1995)

Scope

This Recommendation contains a definition and appropriate values for the availability of AMS(R)S circuits. The values of the cumulative interruption duration distribution and of the duration of a single service interruption are also specified.

The ITU Radiocommunication Assembly,

considering

a) that communications in the AMS(R)S provide communications relating to safety and regularity of flight by the provisions of the Radio Regulations (RR), Article 43;

b) that communications in the AMS(R)S are accorded special measures of protection against harmful interference and other degradations by RR No. 4.10;

c) that high levels of availability of communication services in the AMS(R)S are necessary to support the communications, navigation and surveillance functions of systems providing air traffic management, flight information and aeronautical operational control;

d) that, in addition to availability *per se*, the continuity of service, and hence frequency and duration of service interruptions, are of concern to aviation;

e) that levels of availability suitable for commercial communications are unlikely to be sufficient for the AMS(R)S;

f) that Annex 10 to the Convention on International Civil Aviation of the International Civil Aviation Organization (ICAO) defines availability in the context of aviation requirements;

g) that performance and integrity criteria for AMS(R)S are defined in ICAO AMSS Standards and Recommended Practices (SARPs);

h) that differing levels of AMS(R)S availability may be required for differing applications (e.g. in different airspace or phases of flight);

j) that availability of mobile-satellite services via a satellite network depends on the reliability of the network's elements, its architecture and operating and maintenance procedures, and propagation anomalies that can occur in feeder and service radio paths;

k) that the satellite network elements include satellite(s), aeronautical earth station(s), monitor/control subsystems, and the radio paths in which atmospheric and precipitation effects, interference, and ionospheric, tropospheric and multipath-fading effects should be considered,

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* Radiocommunication Study Group 8 made editorial amendments to this Recommendation in 2004 in accordance with Resolution ITU-R 44.

recommends

1 that availability, A, of communication circuits in the AMS(R)S be defined symbolically as follows, assuming a long observation period (see ICAO Annex 10):

$$A = \frac{\text{Actual operating time}}{\text{Specified operating time}}$$

2 that actual operating time be taken as the total time in which there is no loss of service in excess of 10 s, i.e.,

Actual operating time = Specified operating time – Total time of service interruptions

3 that, as the AMS(R)S is regarded as a full-time service, the specified operating time is the total calendar and clock time of a specified period of observation;

4 that a service interruption be defined as any period in excess of 10 s during which the performance and integrity requirements of any AMS(R)S services defined in the ICAO AMSS SARPs are not available to a qualified earth station nominally capable of participating in that service (see Note 1);

5 that the resultant availability of AMS(R)S services to aircraft earth stations within a defined coverage area should be not less that 0.9994 (see Note 2);

6 that the network(s) providing these services should have no single point of failure;

7 that the 95% value of the distribution of interruption durations should not exceed 90 s;

8 that a single interruption of service should not exceed 10 min;

9 that the availability characteristics of the aircraft earth station (AES) be excluded from the availability measurements and calculations (see Note 3).

NOTE 1 – The performance and integrity requirements are those of the ICAO AMSS SARPs and Recommendation ITU-R M.1037.

NOTE 2 – Conditions requiring greater or less availability, and related service interruption criteria are for further study. The availability specified is for the current architecture described in AMSS SARPs to meet an end-to-end availability of 0.999.

NOTE 3 – The possible inclusion of relevant AES characteristics in AMS(R)S availability requirements is for further study.