RECOMMENDATION ITU-R M.1089*

TECHNICAL CONSIDERATIONS FOR THE COORDINATION OF MOBILE-SATELLITE SYSTEMS SUPPORTING THE AERONAUTICAL MOBILE-SATELLITE (R) SERVICE (AMS(R)S)

(Question ITU-R 111/8)

(1994)

The ITU Radiocommunication Assembly,

considering

a) that, in accordance with Article 50 of the Radio Regulations (RR), the aeronautical mobile-satellite (R) service (AMS(R)S) is reserved for communications relating to safety and regularity of flight;

b) that there is concern over the availability of adequate spectrum for mobile-satellite services, e.g., AMS(R)S use in certain service areas served by different satellite networks;

c) that there is concern regarding the availability of adequate power and spectrum for AMS(R)S messages on individual satellites designed to provide mobile-satellite services;

d) that coordination of mobile-satellite networks is complex, e.g., because radiation patterns for some mobile station antennas do not provide much discrimination towards other mobile-satellite networks;

e) that the spectrum allocated to the AMS(R)S will be used by multiple AMS(R)S systems;

f) that the need for coordination between geostationary-satellite networks is determined using the methods set forth in RR Appendix 29;

g) that the Standards and Recommended Practices (SARPs) in the International Civil Aviation Organization (ICAO) Annex 10 define the technical parameters for AMS(R)S;

h) that AMS(R)S requires special measures to ensure freedom from harmful interference to provide protection for safety and distress communications (see RR No. 953);

j) that the bands 1 545 to 1 555 MHz, and 1 646.5 to 1 656.5 MHz are allocated to the AMS(R)S for safety-related traffic (see also RR Article 51);

k) that AMS(R)S communications must have priority and pre-emption capability over all other mobile-satellite communications in bands allocated to the AMS(R)S (see RR No. 729A),

recommends

1. that the following guidelines be used during the detailed coordination of satellite networks and for frequency assignments in bands used by AMS(R)S to ensure appropriate spectrum availability for AMS(R)S use:

- the satisfying of AMS(R)S requirements by each system should be taken account of in the coordination process. The coordination process should provide the flexibility to accommodate future requirements including peak AMS(R)S traffic within each system;
- administrations responsible for mobile-satellite system coordination should consider ICAO global and regional transition plans, as they become available, (e.g., North Atlantic Systems Planning Group Implementation Plan/Strategy) to ensure AMS(R)S communication requirements are accommodated;
- for systems with global and spot beams, operational measures should be taken to minimize the amount of global bandwidth used and maximize the use of spot beams to the extent that it is operationally, technically, and economically feasible;

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* The Director, Radiocommunication Bureau, should bring this Recommendation to the attention of the International Civil Aviation Organization (ICAO).

– the three-phase process in Annex 1 should be used during detailed coordination wherever possible;

– AMS(R)S system providers should explore technical and operational means to share the AMS(R)S spectrum efficiently with other AMS(R)S system providers including the considerations listed in Annex 2.

Note 1 – The use of techniques and technology that improve spectrum efficiency is the basis for these guidelines. It is recognized that not all of these guidelines will be relevant to all parties of a coordination process since their respective systems may be in different stages of development or implementation. Continual assessment and, where possible, the application of improved techniques and new technology may be required if the available spectrum is to be capable of meeting the growth of the AMS(R)S. However, any resulting applications will need to be compatible with ICAO Standards and Recommended Practices (SARPs).

ANNEX 1

Phases of detailed coordination

Phase 1 – Assessment of the interactions of the transmissions of the involved systems against predetermined interference criteria. If unacceptable levels of interference are anticipated, it will be necessary to move to Phase 2; otherwise, the administrations can agree that no adjustments to the system design parameters are needed.

Phase 2 – Adjustment of technical and operational system parameters which could facilitate a completion or partial resolution of the interference problems identified in Phase 1. However, any adjustments made during this phase should not require either system to constrain its current or planned mode of operation, nor its type, distribution, or quality of services.

Phase 3 – Consideration and negotiation of further adjustments and constraints of system parameters to either or both systems if interference problems have not been resolved during Phase 2, to the extent that this does not unacceptably degrade AMS(R)S performance standards as established by ICAO. Such changes could affect the operating flexibility and future growth options of either or both systems.

ANNEX 2

Coordination considerations between AMS(R)S system providers

AMS(R)S system providers, in coordination with service providers, should explore all means to utilize the spectrum efficiently, to the extent that the performance standards for AMS(R)S as established by ICAO are not degraded, including but not limited to consideration of the following:

– using other system providers' satellite transponder guardbands;

– using frequency assignment by aircraft location;

– taking advantage of improvements in aircraft earth station antenna side-lobe discrimination;

– using offset and interleaved carriers;

– using satellite spot/shaped beams;

– reducing spacecraft antenna side-lobe levels;

– increasing the resistance of systems to interference;

– using earth station power control;

– using satellite transponder adjustable gain setting;

– using knowledge of operational schedules to take advantage of the difference in time zones;

– carrier frequency planning, including appropriately grouped carriers;

– using adjustable satellite filter techniques;

– implementing agreed procedures for mobile earth station certification;

– re-positioning of satellites;

– using polarization isolation techniques, and

– taking advantage of high gain aircraft earth station antennas and the resulting ability to use lower carrier powers, which would assist frequency coordination.