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INTERWORKING WITH SATELLITE MOBILE SYSTEMS

INTERFACES FOR INTERWORKING BETWEEN THE INMARSAT AERONAUTICAL MOBILE-SATELLITE SYSTEM AND THE INTERNATIONAL PUBLIC SWITCHED TELEPHONE NETWORK/ISDN

ITU-T Recommendation Q.1151

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation Q.1151 was revised by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation Q.1151

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(Melbourne 1988, modified at Helsinki, 1993)

1 General

1.1 This Recommendation provides information on the services offered in the INMARSAT aeronautical mobile-satellite system and describes the requirements for connection to and interworking with the public networks. Special terminology for this Recommendation is defined in Recommendation Q.1100. Detailed interworking procedures are set out in Recommendation Q.1152.

1.2 As well as connection to public networks, the aeronautical system is required to be able to interwork with existing specialized private networks. In implementing all interworking cases, regard should be paid to the open systems interconnection referenced model (X.200-Series Recommendations) and to ISDN services and signalling methods (I-Series Recommendations), with a view to achieving uniformity in user procedures and formats and to achieving generally applicable facilities.

1.3 Within the constraint of the need to operate as economically as possible, the preferred interworking cases are with the ISDN and with those parts of the international telephone network employing common channel signalling. If one of these is not available or accessible at the ISC to which an aeronautical ground earth station (GES) is connected then another signalling system from the Q-Series Recommendations should be used.

1.4 The use of the ISDN will offer both improvement in quality and more flexibility in service. It will be possible to supply either voice or data over the same network with the ability to change from one to the other under control of the aircraft earth station (AES) terminal.

2 Service capabilities

A general description of the INMARSAT aeronautical system is contained in Appendix I.

2.1 Channel capabilities

2.1.1 The system provides circuit-mode single channel per carrier (SCPC) channels at a range of information bit rates, including at least the following:

9600 bit/s; 4800 bit/s; 2400 bit/s

Channels for other information bit rates, such as 64 000 bit/s, may be defined in the future.

2.1.2 The system provides demand assigned forward (ground to air) TDM channels and return (air to ground) random access and (reservation) TDMA channels, at a range of bit rates. Although the following bit rates include housekeeping overheads, they are indicative of the information bit rates provided:

300 bit/s; 600 bit/s; 1200 bit/s; 2400 bit/s; 5250 bit/s.

Channels for other bit rates may be defined in the future.

2.2 Bearer capabilities

2.2.1 The following bearer services on SCPC channels, with the following information transfer attributes as defined in Recommendation I.211, may be supported:

- a) speech (initially at 9.6 kbit/s); transcoding to 64 kbit/s PCM should take place at the GES;
- b) circuit mode audio service (initially at 9.6 kbit/s), suitable for voice and other signals occupying the same bandwidth; transcoding to 64 kbit/s PCM should take place at the GES;
- c) virtual call bearer service at any of the bit rates defined in 2.1.1, with rate adaptation in the GES to 64 kbit/s using, for example, flow control and flag stuffing;
- d) digital data, circuit mode interworking with the ISDN should take place as defined in Recommendation X.30 for data terminals designed to Recommendation X.21, and Recommendation X.32 for data terminals designed to Recommendation X.25.

2.2.2 The following bearer services on TDM, TDMA and RA channels may be supported:

- a) virtual call bearer service – interworking with the ISDN should take place as defined for interworking between PSPDNs and the ISDN.

2.3 Teleservices

Teleservices, when supported, should be in accordance with Recommendation I.212. It is to be observed that not all teleservices of ISDN may be supported with bearer services that can be provided on SCPC or TDM/TDMA channels operating at the available information bit rates.

3 Interworking scenarios

Three interworking scenarios can be envisaged for the interface between the MSSC and the fixed networks.

3.1 The first scenario is shown in Figure 1. The MSSC public network interface is to the PSTN only, with all data services, and some voice services, handled via private networks.

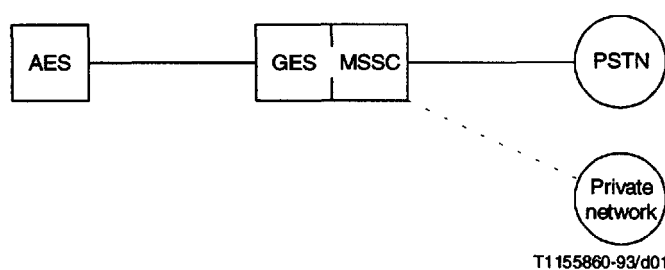


FIGURE 1/Q.1151
Interworking scenario with PSTN interface

3.2 Figure 2 shows the situation where an ISDN exists and the MSSC has an interface to it. Interworking with the PSTN is achieved via the ISDN. Interworking with PDNs may be by direct interface with the PDN or via the ISDN, as in the case of the PSTN.

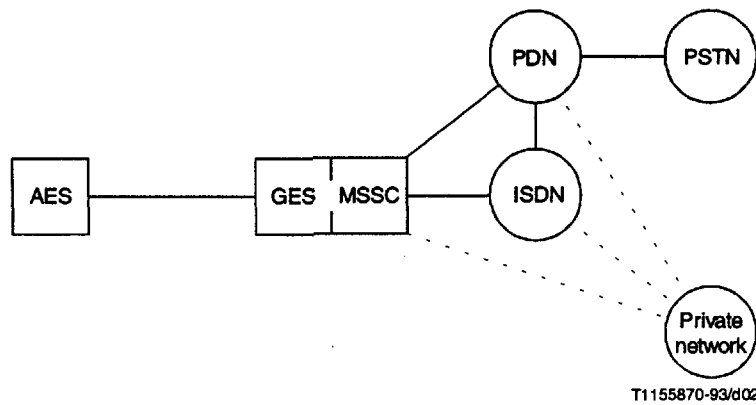


FIGURE 2/Q.1151

**Interim interworking scenario with interfaces
to ISDN and other fixed networks**

In this scenario interworking with the ISDN supports speech, 3.1 kHz audio and data services as indicated in 2.2.1. Other bearer services as indicated in 2.2.2 may require interworking with PDNs.

3.3 The third scenario is shown in Figure 3. The MSSC interfaces to the ISDN, which provide data services as well as voice, although some voice and data services may still use private networks.

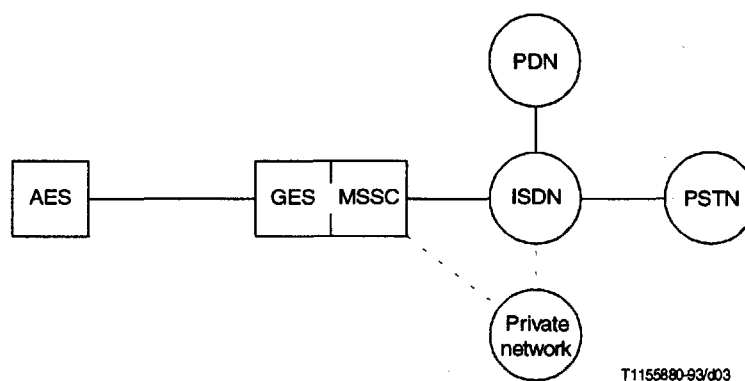


FIGURE 3/Q.1151

Interworking scenario with ISDN interface only

4 Connection interface requirements

4.1 General

This subclause identifies the information that must be available at the interfaces between the AES and the MSSC and between the MSSC and the fixed network, principally for the connection of services identified in 3.

4.2 MSSC-network interface

For ISDN connections ISUP should be used for message transfer. For non-ISDN or where ISUP is not available, TUP would be preferred.

If information transport between MSSCs over the fixed network is required, it is suggested that the procedures of the SCCP is used. Detailed interworking procedures are defined in Recommendation Q.1152.

4.3 AES-MSSC interface

Prior to and during call initiation the signalling channel functions may be provided by one or more common control channels.

A signalling capability should always be available during conversation in case it is needed for call clearing, call control, or for call management purposes. During a call the signalling channel may be multiplexed with the traffic channel at a lower bit rate so as to conserve radio channel capacity.

The multiplexed signalling channel or TDM/TDMA/RA channels may be used for bearer services such as connectionless data services, or connection oriented data services not requiring the establishment of a traffic channel.

The traffic channel should be used for bearer services such as:

- speech;
- circuit mode data services;
- packet mode data services;
- voice band data services.

4.4 Calling procedures air-to-ground

4.4.1 Passenger telephony operation

- a) The equipment for passenger telephony may consist of the following:

- the AES;
- cabin telephone equipment consisting of a fixed piece of equipment and a handset, which may be “cordless”.

The fixed cabin telephone equipment should be provided with a credit card reader.

- b) When a passenger wants to make a call, the typical sequence of events would be as follows:

- i) key-in seat number;
- ii) when this is accepted, insert credit card; and
- iii) when this is accepted, remove handset and return to seat.

- c) At the cabin telephone location, if a credit card which corresponds to the recognized card format is inserted into the equipment, the handset shall be released after validation of the check bits and expiry date. In the event that either of these checks fail, the card shall be returned and the handset not released. Upon obtaining the handset the customer returns to his seat and can commence making one or more telephone calls.

- d) Where telephones and associated credit card readers are located at the passengers' seats, a somewhat different procedure may apply. However, the procedure will still involve reading the credit card, validating the check bits and checking expiry date, before making calls.