5i’

SECTION 5

DATA TRANSMISSION SERVICES

Recommendation F.600

SERVICE AND OPERATIONAL PRINCIPLES FOR PUBLIC DATA TRANSMISSION SERVICES

1 Introduction

1.1 *Scope*

These provisions fix the rules to be followed for International Public Data Transmission Services.

1.2 *Definition*

The definition of <<public data transmission service>> is a data transmission service established and operated by administration and provided by means of a public network. Circuit switched, packet switched, and leased circuit data transmission services are specified.

Note 1 — A public data transmission service may be subdivided into derived services.

Note 2 — A public data transmission service or a derived service consists of service elements forming a basic service and of other service elements which are called optional user facilities.

Note 3 — There is an implicit definition of data transmission services in Recommendations X.1 and X.2.

1.3 Issues of an essentially technical nature concerning International Public Data Transmission Services are dealt with in other CCITT Recommendations.

1.4 Issues of an essentially technical nature concerning compatibility of terminals and connected equipment are dealt with in Recommendations A.20 and A.21.

2 Terms

2.1 **data transmission relations**

A data transmission relation between two terminal countries exists when there is between them an exchange of data traffic (and normally a settlement of accounts).

2.2 **primary route**

The route normally used in a given relation.

2.3 **alternative route**

The route normally used when the primary route is not available for any reason.

2.4 **data service calls**

Those data calls that relate to the operation of the international telecommunications services.

2.5 *Other terms*

These are given in the appropriate CCITT Recommendations and publications.

3 Access to the service

3.1 *Types of access*

Two types of terminal can access the public data transmission service.

3.1.1 Terminals defined by ISO operating at OSI levels 1 to 3 (Recommendation A.20).

3.1.2 Other terminals (e.g., teletex terminals as defined by Study Group VIII) providing telematic services (Recommendation A.21) or other new as yet undefined CCITT services operating at OSI levels 1 to 7.

3.1.3 Access may be either packet mode (Recommendations X.25 or X.32) or start-stop mode (Recommendation X.28) terminals. Details of services offered are contained in Table 1/X.1, parts (c) and (d).

4 International data circuits/routes

4.1 An international route established and operated between Administrations for the specific purpose of providing public data transmission services. Circuit switched and/or packet switched data transmission techniques are feasible.

4.2 For each data transmission relation the Administrations concerned shall by mutual agreement decide upon the necessity and possibility of alternative data routes. In this respect Administrations should conform with the principles in the appropriate CCITT Recommendations.

4.3 The networks of the Administrations operating data services shall, as far as possible be directly connected using appropriate conversion facilities as necessary. If international transmit points are used, they should be restricted in principle to the definitions given in CCITT Recommendation X.92 and others.

4.4 In the event of interruption to the data transmission service every effort must be made to restore the service with minimum delay.

5 Duration of service

5.1 International data transmission services are in principle continuously available.

5.2 Services that are not available continuously are required to extend beyond the normal closing hours until calls in progress are terminated.

5.3 Each Administration shall designate universal time in all telecommunication activities. Recommendation B.11 refers.

6 Type of call

6.1 Data calls may originate on one data network (e.g. packet) and terminate on the same type of network. In addition it is possible that data calls may originate on one network e.g. telephone and terminate on another network e.g. packet. Possible routines may include:

— Telephone to/from packet;

— Packet to/from telex (Recommendation F.73);

— Circuit to/from packet;

— Telephone to/from telex.

Implementation to be subject to bilateral agreement between Administrations.

6.2 *Service calls*

6.2.1 In principle the use of data transmission services for service calls between Administrations concerned with the international data services should be excluded from international accounts.

6.2.2 Data service calls may only be originated as authorized by the respective Administrations.

6.2.3 Data service calls should as far as possible be made outside the busiest hours.

6.2.4 The identification of service calls is for futher study.

7 Modes of operation

7.1 *General provisions*

7.1.1 The data transmission service should be operated in the automatic mode. It is noted that semi-automatic or manual operation may be necessary.

7.1.2 Administrations shall reach mutual agreement on the most appropriate method of operation to be applied in the case of the data transmission service concerned.

7.2 *Automatic operation*

7.2.1 In principle the data network of each Administration should be interconnected on an automatic basis permitting all subscribers to reach one another either directly or by automatic means.

7.2.2 To establish an international data call by automatic means the subscriber shall normally follow the appropriate CCITT Recommendation (e.g. X.121).

7.2.3 The duration of normal calls in the automatic service should not be limited.

7.3 *Semi-automatic and manual operation*

7.3.1 Semi-automatic and manual operation may be offered on an exceptional basis, subject to bilateral agreement.

8 Directories — compilation and supply

Note — This is for further study in conjunction with Question 14/I.

8.1 As far as possible each Administration shall make available a directory of its dedicated data subscribers which is updated at least once a year. Customers may elect to be excluded from the directory.

8.2 Printed directories for international use should not be larger than 216 × 297mm (A4).

8.3 The directories for international use shall be set up in Roman letters. The call number published shall be that which the calling subscriber has to transmit in order to obtain the called subscriber after he has followed the procedure prescribed in his own country to gain access to the destination country.

8.4 When directories are written in a language other than a language used in that country, they shall be accompanied by an explanatory note to facilitate the use of such directories. This note shall be drawn up in whatever official language of the Union has been agreed upon by the Administration concerned.

8.5 Each Administration will supply to the Administration with which data service exists, a number of copies of its subscribers directories. The number of such copies shall be fixed in advance by mutual agreement and shall be regarded as applying until a request to change it is received.

9 Call progress signals on public data networks

These are defined in Recommendation X.96. (The interpretation of these codes needs further consideration.)

10 Quality of service

The quality of service criteria for the various public data transmission services are to be defined separately in the F.600 series recommendations taking due account of existing CCITT Recommendations. The following are examples of service criteria which need to be covered in individual Recommendations:

— service availability;

— percentage of effective calls;

— data throughput;

— bit error rate;

— transmission delay;

— blocking aspects.

11 Provision of customer support

Administrations should provide customers with the following information:

— access and log-on procedures;

— explanation of call progress and error messages;

— fault reporting arrangements;

— disputed calls arrangements;

— directory facilities.

Recommendation F.601

SERVICE AND OPERATIONAL PRINCIPLES FOR PACKET-SWITCHED PUBLIC DATA NETWORKS

The CCITT

considering

(a) that Recommendation X.1 specifies the user classes of service applicable to networks offering packet-switched services;

(b) that Recommendation X.2 specifies the virtual call service as an essential service to be provided by all networks offering packet-switched services.

(c) that Recommendation X.25 specifies the DTE/DCE interface for packet mode terminals in networks providing packet-switched services.

(d) that Recommendation X.75 specifies signalling procedures between packet-switched networks.

(e) that Recommendation X.92 specifies hypothetical reference connections packet-switched services;

(f) that Recommendation X.96 specifies the call progress signals in public data networks;

(g) that Recommendation X.110 specifies the routing plan to be applied in the international portion of networks providing packet-switched services;

(h) that Recommendation X.121 specifies the international numbering plan for public data networks;

(i) that Recommendation X.134 specifies boundaries and packet level reference events;

(j) that Recommendation X.135 specifies the delay aspects of the grade of service in networks providing packet-switched services;

(k) that Recommendation X.136 specifies the blocking aspects of the grade of service of networks providing packet-switched services;

(l) that Recommendation X.137 specifies availability performance values for public data networks;

(m) that Recommendation X.140 specifies the user-oriented quality of service parameters applicable to all services;

(n) that Recommendation X.213 specifies the OSI network layer service;

(o) that Recommendation F.600 specifies the general service and operational principles for public data transmission services.

unanimously declares

That the provisions specified in this Recommendation fix the rules to be followed for international data transmission services via packet-switched public data networks, PSPDN. The Recommendation covers service definitions, quality of service and provision of customer support aspects.

1 Introduction

1.1 *Definition*

1.1.1 The definition of packet-switched public data network (PSPDN) is found in Recommendation X.1.

1.1.2 Issues of an essentially technical nature concerning compatibility of terminals and connected equipment are dealt with in Recommendations A.20 and A.21.

1.2 *Class of service (Recommendation X.2)*

The definition of PSPDNs is found in Table 1/X.2.

1.3 *Types of traffic*

The packet-switched data transmission service accepts different types of traffic originated by the users either Permanent Virtual Circuits (PVC) or Virtual Calls (VC). The following table lists the most frequent of these types. Also indicated is a technical solution which could provide a definition of the corresponding type of traffic.

The following list is not exhaustive, but indicative only. New services may spawn different classifications, and possibly create the need to define new facilities in Recommendations X.25 and X.75.

Traffic types	*Possible technical solution*
Short transactions	Fast select with restriction process
Interactive (average duration	No specific technical frame

and volume) transactions

Batch mode transactions   No specific technical frame

Also possible on other services

The need to associate specific, or a group of specific, quality of service parameters to each of the perceived or identified traffic types is for further study.

2 Terms

2.1 **data transmission relations**

A data transmission relation between two terminal countries exists when there is between them an exchange of data traffic (and normally a settlement of accounts).

2.2 **data service calls**

Those data calls that relate to the operation of the international services via PSPDNs.

2.3 *Other terms*

These are given in the appropriate CCITT Recommendations in particular Annex A of Recommendation X.110.

3 Access to the service

Access can be either in a packet mode (Recommendations X.25 or X.32) or in a start-stop mode (Recommendation X.28). Details of services offered are contained in Table 1/X.1, parts (c) and (d).

3.1 *Packet mode access*

3.1.1 *Access via X.25 DTEs*

The access to a packet-switched public data network by means of equipment capable of handling X.25 is automatic. In general, there is no human intervention required.

3.1.2 *Access via X.32 DTEs*

The access to a packet-switched public data network by means of equipment capable of handling and interfacing to the network using Recommendation X.32 in general does need manual intervention. Where manual intervention is required the operational procedures should be standardized (according to Recommendation A.20), user friendly, and automatable.

3.2 *Start-stop mode access*

The access to a packet-switched public data network by means of equipment capable of handling and interfacing to the network via Packet Assembler/Disassembler equipment is referred to in Recommendations X.3, X.28 and X.29. This access method in general requires manual intervention. Where manual intervention is required the operational procedures should be standardized (according to Recommendation A.20) and user-friendly. For further study.

3.3 *Access methods*

Log-on procedures should be user-friendly and provide security of access. The access methods as specified in §§ 3.1.2 and 3.2 require manual intervention and hence standardized log-on procedures are desirable. The international log-on procedure standardization is for further study.

4 International data route

4.1 An international data route is established and operated between Administrations for the specific purpose of providing an international packet-switched public data service.

4.2 The networks of the Administrations operating PSPDNs should be directly connected when justified. If international transit points are used, they should be restricted to the definitions given in Recommendation X.92.

4.3 For each PSPDN relation, the Administrations concerned should provide alternative data routes where practical, in accordance with Recommendation X.110.

4.4 In the event of interruption to the international data route every effort must be made to restore the service with minimum delay, taking into account Recommendation X.137.

5 Duration of service

International PSPDNs are in principle continuously available.

6 Type of call

Types of call correspond to calls based on PVCs or on VCs. Calls based on VCs may be service calls or subscriber calls, the latter being included in international accounting.

6.1 *Service calls*

Service calls should be kept to a minimum and not hamper subscriber calls.

7 Modes of operation

7.1 *General provisions*

Administrations should provide PSPDN services in accordance with Recommendations X.25, X.28 and, if possible, Recommendation X.32 protocols.

7.2 *Automatic operation*

All call operations in the network are automatic (see Recommendations X.25, X.28, X.29, X.75, etc.). Call operations may be manual or automatic when initiated by the user from his DTE.

7.3 *Semi-automatic and manual operation*

Semi-automatic and manual operation are not available.

8 Directories — compilation and supply

See Recommendation F.600, § 8.

9 Call progress signals on PDNs

Call progress signals are defined in Recommendation X.96. The interpretation of these codes shall be user friendly and details are for further study.

10 Quality of service

The quality of service criteria for the PSPDNs to be defined under the following headings taking due account of existing CCITT Recommendations.

10.1 *Service availability*

Service availability is the ratio of aggregate time during which satisfactory or tolerable service is or could be provided to the total observation period, Recommendation X.137 refers. This is for futher study.

10.2 *Percentage of effective calls*

Technical aspects are examined in Recommendation X.136. For further study.

10.3 *Data throughput*

Technical aspects are examined in Recommendation X.135. For further study.

10.4 *Bit error rate*

A bit error rate (BER) of at least 1 in 10^6 is required. (For further study with particular respect to the effect of access networks.)

10.5 *Transmission delay*

This should be expressed in milliseconds. See Recommendation X.135. For further study.

10.6 *Blocking aspects*

Recommendation X.136 sets forth values of unavailability of the packet-switched service due to network congestion.

The end to end user service blocking aspects with particular respect to the network used is for further study.

11 Provisions of customer support

11.1 *Procedures for updating customer information*

The provision of service information should be available to the user on request. This is for further study.

11.2 *Procedures for updating inter-administration information*

For further study.

11.3 *Procedures for handling customer international difficulties*

Administrations should provide customer support facilities, which may include a ‘‘Help Desk’’, to provide:

— accurate information from the operator at the time of problem;

— explanation of corrective action subsequent to failure;

— further assistance in the event of unresolved problems.

For further study.

BLANC

SECTION 6

TELECONFERENCE SERVICE

Recommendation F.710

TELECONFERENCE SERVICE

1 Introduction

1.1 *Scope*

1.1.1 This Recommendation fixes the general rules to be followed in the international Teleconference Service (TCS), preferably to be provided on digital network.

1.1.2 Teleconference (TC) is an international telecommunication service, offered by Administrations, enabling conference conducted in real time between users placed in different locations, connected by terminals and telecommunication networks.

1.1.3 The TCS can be a multimedia service, i.e., several media could use the same transmission channel.

1.1.4 This Recommendation is a general Recommendation for teleconferencing services. Annex A is a table of present and future Recommendations on audiovisual services. AVxxx numbers are references for classification in this table and not actual Recommendations' numbers. This classification will be updated as the work progresses.

The services are described in Recommendations AV 100-series. The infrastructural needs are described in Recommendations AV 200-series. The facilities are described in Recommendations AV 300-series.

1.1.5 Computer conferencing and MHS do not constitute part of real-time teleconference service. However, the facilities of computer conferencing an MHS may additionally be used in a teleconference.

These services are not covered by this Recommendation.

1.2 *Service definitions*

1.2.1 *General*

1.2.1.1 The **teleconference service** provides the necessary arrangements for a real-time conferencing among single individuals or groups of individuals at two or more locations, by means of telecommunication networks.

The concept of conferencing implies that the exchange of speech signals is always provided for as a basic facility. The use of supplementary facilities, for the exchange of signals other than speech, is to be determined by the conference participants.

For the interconnection of terminal equipment at three or more locations, a specific interconnection facility is required, namely the Multipoint Control Unit (MCU), to which all locations are connected individually.

The MCU provides proper distribution of the various signals among the connected locations and takes part in maintaining the proper procedures among the connected terminals.

1.2.1.2 TCS is a real-time service which can be divided according to the following categories:

a) **audiographic conference service**

A type of TCS in which audiosignals are exchanged together with non-voice information (data, text, graphic, etc.), except video and signalling.

The transmission of documents during a Teleconference will be supported by the use of the Recommendations such as in the T.400, T.500, T.600 series and the telewriting Recommendations.

Interworking and intercommunication between different types of audiographic conference is for further study.

b) **video conference service**

A type of TCS in which both voice and moving picture video information can be exchanged together with optional non-moving visual information, telematic information and signalling (speaker identification, floor request, etc.).

1.2.1.3 The terms used in this Recommendation have the meaning given in Annex B.

1.2.2 *Basic requirements*

The basic requirements of TCS are as follows:

a) It is intended that the service should require no changes to the Recommendations for existing services or networks.

b) With respect to the interworking/intercommunication of teleconference terminals, a basic level of capabilities is defined; this basic level corresponds to the default conditions.

High levels of intercommunication capabilities have to be negotiated via the teleconference protocol.

c) It should be possible to extend TCS to any number of Administrations.

d) It is for each Administration to decide on the network(s) on which TCS will be provided.

e) It is essential at least to provide the intercommunication on Audio basis (Recommendation G.711).

f) TCS indicated in § 1.2.1.2 as a) and b) in particular will provide the following basic functions:

f1) Conference management functions:

— call set-up, call establishment and call clearing at network level;

— handling of multipoint functions;

A Telephone Multipoint conference may be considered as a simple form of Audiographic conference. Other forms of Audiographic conference may imply loudspeaking terminals working in full duplex or half duplex mode, providing a considerably better sound quality than normal telephone (they may even contain wideband speech coding). Supporting signalling like request for floor, grant request for floor and speaker identification may also be present.

— switching of proper channels to the various terminal and equipments during the call control phases of TCS (§ 3.2).

f2) Terminal management functions:

— handling and management of terminal functions like audio and video;

— handling and management of all telematic terminal-functions that can be used during the service, depending on the type of Teleconference service, e.g. communication function for:

— using a telewriter

— using a marker

— using a facsimile

— using a still picture

— using a teletex

— conference set-up and clearing

— identification of speaker

— floor request, grant floor request signalling

— control of speakers microphone

— line breakdown signalling

— etc.

f3) Coordination and conference management and Terminal protocols in order to make available, during the various TCS phases, the service required (audio is presumed to be always available), e.g.:

— Telewriting

— Facsimile

— Teletex

— Still picture

All the above functions have to be accomplished in such a way that can be easily controlled by an actual participant in the conference, without special training

f4) Local conductor functions:

— chairing the local meeting

— enabling/disabling local functions.

1.2.3 *Functional options*

1.2.3.1 Functional options like encryption may be provided in the terminal or by the network. The use may be made only by bilateral or multilateral agreement.

Personnel by Administrations should not be required.

1.2.4 *Standardized options*

1.2.4.1 It shall be possible for more sophisticated terminals to provide particular facilities different from the basic ones (e.g. editing, autocall, set-up, etc.).

These optional facilities should be normalized. Some optional facilities have to be provided by network (supplementary services), e.g. Closed User Group (CUG). In general the supplementary services are the same as for telephony.

1.2.4.2 Since in the near future TCS will be increased by special services such as those given in the list of examples below, Administrations should give attention to their early introduction:

— Abbreviated Address Calling.

— Multiaddress Calling.

— Indication of Charge.

1.2.4.3 They may also be provided from TCS terminal instead of, or as well as, from the network.

1.2.4.4 By means of a negotiation procedure between terminals and, in multipoint connections, the MCU, terminals are aware of the facilities of the other terminal(s).

Note 1 — Administrations are encouraged to ensure that standardized and nationally defined options are used in such a way as to minimize the need for the introduction of private use option.

Note 2 — There is a need for further study as the service develops.

1.2.5 *Private use options*

1.2.5.1 These optional requirements should not be CCITT defined.

1.3 *Definition of terms used in TCS*

1.3.1 The terms listed in Annex B have the definitions given there when used in these provisions.

2 Network requirements

2.1 Ultimately the TCS is intended for ISDN. As long as ISDN is not universally available, it is the responsibility of Administrations to decide on which network(s) national TCS is to be provided.

2.2 TCS can be accessed via:

a) Multiple of 64 kbit/s switched, semi-permanent and permanent connections in an ISDN.

b) Multiple of 64 kbit/s switched, semi-permanent and permanent connections in a CSPDN.

c) Multiple of 64 kbit/s connections in any other network if available.

d) Switched semi-permanent and permanent connections at bit rates being multiples of 64 kbit/s.

e) PSTN from some Administrations.

Note — The Packet Switched Public Data Network (PSPDN) and the Public Switched Telephone Network (PSTN) could be used in some cases to carry certain telematic services used in teleconferencing. The PSPDN is not capable of carrying audio and moving video. The use of different networks adopted for one terminal connection must however be considered as an unwanted temporary solution to serve as a bridge from the existing situation to ISDN.

2.3 Interworking between different types of networks should be assured on international connections.

2.4 The international connections shall use international digital transmission facilities. Only by bilateral agreement the use of other means may be made where necessary.

2.5 For interworking between networks of different types, the same network(s) should be used for both traffic directions.

2.6 In the case of international interworking between TC terminals connected to dissimilar networks, Recommendation X.300 shall be applied where appropriate.

2.7 The network should not impose any limitation on optional and private use applications.

2.8 If satellite connections are used, then more than two hops are to be avoided.

3 Operation of TCS

3.1 *General*

3.1.1 TCS in the international connections shall use any of the following:

- reserved or semi-permanent connections (e.g. manual set-up);
- on demand connections (automatic switching);
- permanent connections (leased circuits).

See also Recommendations AV 111, 112, 113.

3.1.2 The communication ways should be:

— two ways alternate (TWA), (but always TWS for audio and moving video, if applicable);

— two ways simultaneous (TWS).

See also Recommendations AV 111, 112, 113.

3.1.3 Interworking and intercommunication will be assured between:

a) different types of network;

b) different terminals (e.g. with different transmission rates);

c) different kinds of service.

The extent and functionality for interworking are for further study.

In Recommendations AV 111, 112, 113, 240, 241 and 242 the detailed interworking possibilities are pointed out.

3.2 *Call operations*

3.2.1 The operations for each call may be divided in the following two phases:

— call control phase;

— communication phase.

3.2.1.1 *Call control phase*

It comprises:

a) *Call set-up*

The network connections are established among the meeting locations either directly or through a connection between any meeting location and an MCU. Each meeting location and MCU is normally connected to a single network, ultimately this will be ISDN.

For the time being, however, connections to multiple networks may occur. They can be requested according to the telematic services used during TCS (e.g., PSTN for Audio plus CSDN for Teletex transmission).

In this phase any supplementary services to be used should be requested. For example:

— closed User Group (CUG);

— call Identification;

— charge Advise;

— reverse Charging.

The management of a teleconference is handled by the ‘‘conference conductor’’. The control functions to manage the conference may be operated by the ‘‘conference conductor’’, by the TCS operator, or by an automatic method offered through the MCU. The control functions offered to a teleconference may consist of any combination of the following, depending on the teleconference type, i.e., audio, audiographic or video. The control functions are the ability to:

— connect participants to a conference;

— re-connect a dropped teleconference participant;

— contact an operator for assistance;

— disconnect selected conference participants;

— identify participants on the teleconference or screen participants before connection to the teleconference;

— terminate the conference;

— perform other control functions required by the supplementary facilities if used.

b) *Intercommunication set-up*

Once the network connections have been established, the communication among the respective meeting locations takes place under the control of teleconferencing protocols (see Question 23, COM VIII).

c) *Communication termination*

A teleconference will terminate by one of the following methods:

1) The conference conductor determines the conference is over and proceeds to terminate it.

2) All of the conference participants hang up.

3) The MCU disconnects the participants (e.g., expiration of reservation time).

Individual locations may disconnect without terminating the conference.

d) *Clearing of connection*

The network clearing of connection is a matter of signalling procedures in the relevant networks and/or of Administrative procedures (e.g., in case of leased lines).

3.2.1.2 *Communication phase*

a) At each meeting location the functions of ‘‘Conference conductor’’ and ‘‘Local conductor’’ can at the wish of the participants, be fulfilled (see Annex 2 for clarification of the terms ‘‘Conference conductor’’ and ‘‘Local conductor’’). In this case the conference is termed ‘‘conducted’’. Only one of the local conductors can have the additional ‘‘role’’ of conference conductor.

b) The main task of the conference conductor is to chair the meeting in the classical sense. The ‘‘button-pushing’’ for the conductor must be kept to a minimum. Opening and closing of channels (for telewriter, facsimile, etc.) is done automatically. Only the microphones and/or the cameras of participants may be controlled by the conference conductor but like in normal meetings this should only be performed in large or very formal meeting. If the microphones and the cameras are not controlled by the conference conductor the conference is termed ‘‘non-conducted’’.

c) The initial mode in the set-up phase and the fall back mode after change configuration is non-conducted.

d) Also in this phase some supplementary services should be provided (left for further study).

3.3 *Basic call identification*

3.3.1 In Audiographic conferences and Videoconferences protocols are involved in sending and receiving of all audio modes, messages, documents, etc.

Exchange of addresses of transmitting and receiving terminals and/or MCU(s) is for further study.

3.4 *Communication related security*

3.4.1 It is essential to have TCS users‘ confidence that their teleconference will be secure. During both the call set-up phase and the communication phase, it will be the responsibility of the individual administrations to *offer* security mechanism based on bilateral or multilateral agreements. There are two levels of security which need to be addressed for teleconferencing:

— To safeguard privacy.

— To prevent unauthorized network access.

Basic requirements for both levels are for further study.

4 **Quality of the service**

4.1 *General*

4.1.1 The quality of the individual services should be the same as that for the individual services (in general this is prescribed in the appropriate Recommendations) comprised in the teleconference (e.g. Audio, Facsimile, Teletex, Videotex, Moving Picture Video, etc.).

4.2 *Maintenance*

4.2.1 Every Administration should provide for each TCS network a maintenance centre for assisting the operators, if necessary.

4.3 *Duration of service*

4.3.1 The international TCS, where it is possible, should be open continuously for 24 h/day.

5 Terminal

5.1 *General*

5.1.1 The terminal station (see Figure 1/F.710) is composed by:

— TC Common Box (TCCB).

— Associated equipments (AE).

Figure 1/F.710, p.

5.1.2 TCCB matches at one side (network side) the interface of the network, while at the other (user side) the interface of each AE.

5.1.3 AE are the application terminals.

5.1.4 The terminals will be described in Recommendations AV 310, 311, 312, 313 and 330.

5.2 *Control functions*

5.2.1 The control functions to provide are:

a) General control functions (on/off switch, call set-up, volume control, floor request, grant floor request, etc.). Some of these functions are optional; this is a matter for further study.

b) Control functions joined to AE.

5.2.1.1 The general control functions are joined to the handling of a command console.

There are two kinds of control functions to consider:

— The control functions of a local conductor (to be described).

— The control functions of the conference conductor (to be described).

5.2.1.2 The control functions joined to AE are those defined in the corresponding CCITT Recommendations.

5.2.1.3 The necessity for the conductor to handle controls should be kept to a minimum.

5.3 *TCCB identification*

5.3.1 Each TCCB shall have a unique identification (§ 3.3.1).

5.3.2 It is the responsibility of the conference conductor to verify the identification of connected TCCBs during the control phase of the call.

For this purpose the identification of connected terminals could be visualized to the conference conductor.

6 Multipoint operation

6.1 The international multipoint teleconference service is provided by means of one or more MCUs. Each MCU may serve one or more terminals and be interconnected with other MCUs.

6.2 *Multipoint audiographic teleconferencing*

The MCU provides the capability to interactively exchange audiovisual information among many connected terminals and/or other MCUs.

It can be located in a network or it can be considered as a part of terminal giving the possibility of multiple connections to the network.

Although particular attention must be paid to network topology in the case of satellite transmission, the basic functions of the MCU for a terrestrial or a satellite network are similar.

In order to provide the basic features in an international audiographic conference service the tasks to be performed by an MCU are:

— network access and interface;

— management of framing structure; multiplexing and demultiplexing;

— mixing of audio signals;

— processing of the subchannels;

— analysis of control messages;

— routing of signals to audiographic teleconference terminals and other MCUs;

— handling of encrypted signals;

— terminal interconnection;

— office automation facility;

— operator's console;

— notification to the ‘‘conference conductor’’ of a disconnected participant;

— reconnection of a disconnected participant to a conference;

— providing announcements to the conference participants whenever necessary.

A reservation system could be integrated into the MCU or it may be offered through a separate system connected to an MCU.

Reservations for a teleconference will be provided through a Reservation Centre.

6.3 *Multipoint videoconferencing*

The operating modes and consequently the switching decision criterion depend on the conception of the multipoint videoconference service of each Administration. Any solution, automatic or manual, can be implemented without altering the basic philosophy of multipoint videoconferencing. In each solution, the MCU provides each output port with the mixed audio signals from all other ports.

The minimum MCU working mode is as follows: the MCU, by comparing the incoming sound channels, selects the loudest speaker (called New Speaker or NS). A second channel is selected by the MCU being the previous loudest speaker (called Previous Speaker or PS). The NS is sent the PS channel and the other rooms are sent the NS channel. This mode is normally used when the multiconference is established.

The minimum MCU mode is automatic and doesn't require any extra facility. The basic functions of the MCU for terrestrial or satellite networks are identical. In order to provide the basic features in an international videoconference service, the MCU shall have the capability:

— to synchronize the incoming streams to a single pilot clock;

— to extract frame alignment in order to synchronize the different streams to the frame clock;

— to extract frame parity, multiframe and supermultiframe alignment from the signalling channel in order to access the codec-to-codec signalling channel in each incoming stream;

— to process this signalling channel;

— to process the sound channels in order to create an open sound system, in the case of unencrypted service;

— to decide image switching and dispatching according to a selection criterion (automatic or on request);

— to signal the decision of switching to the codecs in order to prepare them and to avoid any degradation during and after the switching;

— to multiplex the selected video channels with the open sound channel and the effective channel;

— to distribute the reconstructed streams to the corresponding access ports.

Procedures for multipoint operation (call set-up, protocols, etc.) and a description of the MCU are given in Recommendations AV 231, 232, 233 and 4xx (the matter should be extended for further study).

7 Intercommunication

Intercommunication of various kinds of TCS and between TCSs and other services (e.g. telephony or videophone) is described in Recommendations AV 240, 241, 242 (the matter should be extended for further study).

8 Reservation of international teleconference

8.1 *Audiographic teleconference*

In order to ensure the performance of an audiographic teleconference service for an appointed time, a reservation will be required at least for the MCU. Normally, reservation will be handled by the customer as the service will be an automatic one. Administrations may also provide a manual version of a reservation system. This process is normally left to each Administration; however, general guidelines for an harmonized operation of the international audiographic teleconference service follow below. The reservation is made through the operator service. The following information must be given by the convenor:

— list of participating terminals;

— starting time of the session;

— closing time of the session;

— symbolic name of the session;

— symbolic names of the terminals.

It will be possible for a convenor to access the Reservation Centre (RC) through an ordinary telephone connection to register a reservation for a conference. A data terminal can be used in an automatic system, alternatively, a reservation can be made by voice in a manually operating system. The RC determines which MCUs and which connections are required for the meeting and subsequently reserves these facilities. Each terminal will be notified of the MCU it has to connect to.

During a conference session the chairman may be able to access the reservation diary. In this way it will be possible during a conference to agree on a subsequent conference.

8.2 *Videoconference*

Due to the higher bit rates used for videoconference, a reservation will be required not only for the MCU but also at least for the international links in multipoint as well as in point-to-point conferences. Normally, the reservation of international videoconferences will be made manually. Administrations may also provide an automatic version of a reservation system for national videoconference or for the national part of international videoconferences.

The process of manual reservation of international point-to-point and multipoint videoconferences needs general guidelines to ensure a harmonized operation of the international videoconference service.

All reservation arrangements for international videoconferences are to be made by the National Reservation Office (NRO) of the participating Administrations. Negotiations are preferably carried out by telephone, but agreed reservations must be confirmed before the call.

The information needed for a reservation of a videoconference is similar to that needed for the reservation of an audiographic teleconference (details for further study).

The participating Administration in an international videoconference service must agree on the following items:

— minimum notice time for reservation;

— maximum notice time for reservation;

— minimum reservation time (duration of the session);

— acceptable increments for reservation;

— procedure for establishing a reservation between the NROs:

a) occasional use of booking

b) regular booking;

— procedure of last minute extensions;

— billing procedure.

(List not exhaustive, details for further study.)

9 Operational and commercial aspects

Matters of maintenance, tariff principles, etc. are for further study.

10 Results of questionnaire on TCS

The results are reported in Contribution COM I-98, 1985-1988 Study Period. (Responses to the questionnaire on Teleconference Service).

ANNEX A

(to Recommendation F.710)

Recommendations list for audiovisual service

A.1 *Service definition*

AV 100	General Recommendation for AV services	SG I
AV 110	Teleconference services	SG I
AV 111	Audiographic conference service	SG I
AV 112	Videoconference service	SG I
AV 120	Videophone service	SG I
AV 130	. | | (Other AV services)	SG I

A.2 *Infrastructure*

AV 200 General Recommendation for AV services Infrastructure SG XV/VIII

AV 210 Reference network configuration SG XV

AV 220 General Recommendation for Frame Structure SG XV/VIII

AV 221 Frame structure for a 64 kbit/s channel
in audiovisual teleservices SG XV/VIII

AV 222 Frame structure for 384-2048 kbit/s channels
in audiovisual teleservices SG XV

AV 223 . | | (Frame structure for higher bit/rates
in audiovisual teleservices) SG XV

AV 230 General Recommendation for AV system controls
and indications SG XV/VIII

AV 231 Multipoint Control Unit for 64 kbit/s SG XV/VIII

AV 232 Multipoint Control Unit for 384-2048 kbit/s SG XV

AV 233 . | | (Multipoint Control Unit for higher bit rates) SG XV

AV 240 Intercommunication principle

AV 241 Intercommunication between 64 kbit/s AV services
using the Frame Structure of Recommendation AV 220 SG XV/VIII

AV 242 Intercommunication between 64 kbit/s AV services
to Recommendation AV 220 and 64 kbit/s audio-only and
data-only terminals SG XV/VIII

AV 243 Interworking between higher bit rate AV
and data-only terminals SG XV/VIII

A.3 *Systems and terminal equipment*

AV 300 General Recommendation for AV systems and terminals

AV 301 General Recommendation on AV terminal equipment

AV 310 Requirements for teleconferencing

AV 311 Audiographic system and terminal requirements SG XII/XV/VIII

AV 312 Videoconference system and terminal requirements SG XV

AV 320 Requirements for videophone service

AV 321	Audio	SG XII/XV
AV 323	Video	SG XV
AV 330	Facility coding	

A.4 *Protocols*

AV 400	Protocol structure for Audiovisual services	SG I/XVIII/XV/VIII
AV 410	Audio protocol for Audiovisual services	SG XVIII
AV 420	Video protocol for Audiovisual services	SG XV
AV 430	Graphics protocol for Audiovisual services	SG VIII
AV 431	Graphics terminal protocol	SG VIII
AV 451	Audiographic conference protocol	SG VIII

A.5 *Other requirements*

ANNEX B
(to Recommendation F.710)

Definition of terms used in TCS

B.1 **basic requirement**

A service feature defined by CCITT as essential for the basic operational mode, available in terminal or network on an international basis.

B.2 **communication**

An exchange of information between two or more subscribers of a telecommunication network by agreed conventions.

B.3 **conference**

A meeting of a number of people in more than one location for discussion or consultation on subjects of common interest.

B.4 **conference conductor**

One who sets up, chairs and clears the conference. If necessary he coordinates and manages Network and Terminal functions such as giving the floor. All functions have to be accomplished in such a way that can be easily controlled by an actual participant in the conference, without special training (e.g. Administration's personnel should not be required).

B.5 **marker**

It is a conference tool used to draw attention to a particular part of a displayed image.

B.6 **meeting**

Coming together of a number of people at a certain time in a place to participate at a conference.

B.7 **local conductor**

Who has the main function in TCS to direct locally the conference. A meeting conductor may be provided for each meeting location. Every meeting conductor is identified by a number.

B.8 **meeting location**

A place in which a meeting is set up.

B.9 **multipoint control unit (MCU)**

A device which enables more than two teleconference terminals to be interconnected. It can be located in a network or it can be considered as a part of terminal giving the possibility of multiple connections to the network.

B.10 **private use option**

A service feature not defined by CCITT as an addition to the basic requirements, that may optionally be used by subscribers in the international TCS, but requiring always a previous agreement between subscribers.

B.11 **standardized option**

A service feature defined by CCITT as an addition to the basic requirements, that may optionally be used by subscribers in the international TCS. These options may be provided from the networks as well from the terminals.

B.12 **telecommunications**

All the transmissions, emissions, receptions of signals, writings, images, sounds of every nature by wires, electricity, or other electromagnetical systems.

B.13 **telewriting**

It is a text communication service which enables the transmission of graphic information to be displayed at the receiving side in accordance with the writing movements at the sending side. This display is normally effected on a real-time basis; a delay in the transmission may be included.

B.14 **real-time conferencing**

The concept of real-time conferencing implies:

1) The time required for the transmission of the various signals between the connected terminals is short in comparison to the human reaction times in conference situations.

2) The conferees participate simultaneously to the conference.

B.15 **convenor**

A person who arranges and reserves the conference facilities.

B.16 **conducted conference**

A conference where the conductor handles the (electronic) signals such as grant floor request (as a reaction on a floor request) and where the conductor opens and closes microphones of participants.

B.17 **non-conducted conference**

In this kind of conference no (electronic) conductor action is taken. All microphones are open or automatically switched by means of a voice switch for acoustic stability reason.

B.18 **reservation office**

A national administrative centre where reservations for connections and if applicable MCU(s) and other equipment are made.

B.19 **maintenance centre**

A national administrative centre where notification is taken from irregularities and from where action is taken for resolving these irregularities.

B.20 **facsimile**

Reproduction of all forms of graphics, handwritten or printed material, in the sense of a distant reproduction of the original within the limits and characteristics specified by the relevant recommendation.

B.21 **intercommunication**

Intercommunication in the teleconference area implies to have the capability (this capability could be distributed between networks or terminals) to translate the presentation of information given for a service to information available to be presented in another service and, if necessary, interworking between networks.

This is valid between services used in the TC environment and between TC service and another service.

B.22 **interworking**

The relationship between systems, networks, terminals and their components, primarily refers to signalling, protocols (lower levels) and other technical means for provisioning services.

Recommendation F.721

BASIC NARROW BAND VIDEOPHONE SERVICE IN THE ISDN

The CCITT,

considering

(a) that considerable efforts have been undertaken worldwide in order to develop videophone equipment based on rapid improvements in the quality of video codec algorithms;

(b) that videophones of some companies are already available on the market;

(c) that first trials of videophone have been performed nationally as well as internationally;

(d) that a number of countries intend to introduce the videophone service as soon as possible;

(e) that the ISDN will be an appropriate network for providing the narrowband videophone service;

(f) that ISDN trials are going on in a number of countries,

recognizes

the need for a standardized international videophone service, which will guarantee the compatibility of videophones on a worldwide basis and it therefore,

recommends

that the narrowband videophone service, where implemented, respect the requirements stated in this Recommendation.

1 Introduction

1.1 *Scope*

The narrowband videophone service is to be defined for networks providing 64 kbit/s channels. This Recommendation only deals with ISDN which is recognized as a strong candidate for providing this service.

1.2 *Bearer capabilities*

Videophone services requiring one or two 64 kbit/s channels are under study. If two rates are eventually standardized, it will become necessary to provide for basic intercommunication at the audiovisual qualities of the lower rate. Such basic intercommunication should be provided in the terminals.

This Recommendation may require further consideration, alignment and completion in the next study period.

2 Description of videophone service supported in the ISDN

2.1 *Definition*

The **videophone service** is a symmetrical, bidirectional, real-time, audiovisual teleservice in which speech and moving pictures are communicated; the picture information transmitted is sufficient for the adequate representation of fluid movements of persons.

2.2 *Service description*

The videophone service is likely to be used in much the same way as the telephone service for personal communication, the enhancement being in the visibility of the communication partners which implies a number of possible new applications.

A redundancy and irrelevance reduction technique (codec) in the terminal allows moving pictures to be displayed continuously in colour, even if transmission takes place at the comparatively low bit rate of the narrowband ISDN.

The speech quality of this new service must be at least as good as that applicable to the telephone service in the 64 kbit/s ISDN using a bandwidth of 3.1 kHz up to 7 kHz.

The videophone service is a teleservice, i.e. a fully standardized service as defined in Recommendations I.210 and I.240.

The basic videophone service is characterized by the continuous transmission of moving pictures simultaneously with the speech of the persons involved in the call (generally two in the case of a point-to-point connection) via one or two 64 kbit/s channels.

An optional enhancement available in some terminals provides for transmission of images of documents or other objects alternate to face-to-face communication. Transfer of documents at higher resolution may be an optional feature. Further study is required.

Two different types of calls should be possible: point-to-point calls (basic requirement) and multipoint calls.

Note — For multipoint calls a central facility is required for mixing speech signals and switching and/or combining video signals. This facility is to be defined in another Recommendation.

Videophone terminals must also be capable of supporting the telephone service.

In some installations a videophone will be attached to a passive bus configuration (S interface) along with terminals for other services.

Note — Speech supported only by still picture transmission and/or telewriting is *not* considered as part of the videophone service.

2.3 *Applications of the videophone service*

The examples given below are not exhaustive. Other enhanced videophone applications may emerge.

Examples :

a) ‘‘Face-to-face’’ dialogues involving at least head-and-shoulder images.

b) Dialogues including interactive viewing of documents such as sketches, diagrams or charts.

c) Access of the user to a videoconference.

d) Participation in videophone conferences.

e) Audio-visual tele-education.

f) Remote health ‘‘visiting’’ (limitations for further study).

g) Deaf-and-dumb communication (limitations for further study).

2.4 *Necessary quality characteristics*

— Synchronism of speech and lip movement (lip synchronism)

(No subjectively discernible difference in the delay of the speech and video signal.)

— Sound quality

Speech quality as in the 64-kbit/s ISDN telephone service based on a 3.1 kHz or 7 kHz bandwidth.

— Optimization of the picture quality is under study, including the need for adequate representation of fluid movements.

The overall effect on quality by the delays introduced by video codecs and transmission facilities needs to be taken into account in the service. If satellite connections are used, then two or more hops are to be avoided, because increased delays may impair user acceptability. Further study is needed for establishing criteria for ‘‘acceptable’’ signal delays.

For the convenience of the user visual user guidance between the videophone system and the user should be preferably provided with the aid of alphanumeric display.

3 Intercommunication

— Intercommunication with the telephone service is essential.

— Intercommunication with the videoconference service and other audio and visual services is necessary (but for further study).

— Intercommunication between videophone services based on different bit rates is required.

3.1 *Intercommunication with telephony*

Considering the fact that at the beginning of the introduction of the videophone service the number of videophone subscribers compared to the number of telephone subscribers will be negligible, a fundamental requirement must be fulfilled in order to avoid that videophone subscribers could only communicate in a kind of a closed user group. It is *essential* that every videophone subscriber is able to reach from his videophone terminal every telephone subscriber. This condition must be met regardless of the technology (analogue, digital, ISDN) applied in the local exchange to which the other telephone subscriber is connected.

If in case of intercommunication a videophone connection cannot be provided, a telephone call should be immediately initiated. If then no connection results, an appropriate cause indication shall be given.

On the other hand, every telephone terminal must be able to reach every videophone terminal. (The videophone terminal will be a multiservice terminal, i.e. appropriate for videophone calls as well as for telephone calls.)

3.2 *Intercommunication between different videophone services*

Basic intercommunication between videophone services based on different bit rates will be provided at the audiovisual qualities of the lower bit order.

3.3 *Intercommunication with other audiovisual and audiographic services*

For further study.

4 Service operation

4.1 *Call set-up*

Two possibilities are required:

— Call set-up starting directly as videophone service.

— Call set-up by means of a service change, starting from the telephone service.

Several service changes between telephony and videophony must be possible during a single call.

4.1.1 *Point-to-point videophone call*

The call set-up procedure from the user’s point of view must be as simple as possible in order to achieve a good acceptability.

Call set-up procedure from the user's point of view:

Case 1 — Videophone service from the very beginning

e.g.: — going off-hook

— dialling tone

— initialization of videocommunication

— keying in the number of the called subscriber

— videophone call

Case 2 — Telephone service first

e.g.: — going off-hook

— dialling tone

— keying in the number of the called subscriber

— telephone call

— initialization of videocommunication

— videophone call

Note — Interruption of the audio connection recognizable for the users should be avoided when changing between the telephone call and the videophone call.

4.1.2 *Multipoint videophone call*

The multipoint videophone call is in other terms the supplementary service ‘‘Conference videophone call’’. Conference facilities (three-party service, conference call) within the videophone service should be optionally provided. Appropriate support (network or user premises equipment) is necessary.

The procedure for operation of those conference calls is for further study.

4.2 *Call release*

In general, the release of a videophone call should be similar to the release of a telephone call; picture and sound are released simultaneously.

4.3 *Change of service*

— A service change will be controlled via the D-channel; thus several service changes are possible during a call provided an end-to-end 64 kbit/s transparent channel is available.

— Service change to and from videophony must be possible to other services which need a single B-channel or two B-channels.

Note — Details are for further study.

4.4 *Addressing of terminals*

Additional call set-up functions such as terminal selection on a passive bus, using multiple subscriber number may be offered. This is under study.

5 Controls and indications

5.1 *User guidance*

User guidance plays a major role in the acceptance of the videophone service by the subscriber. User guidance may take place in the form of a dialogue between the system and the user.

Information concerning the status of the call will be displayed on the screens or on other displays of the calling and the called users. Some standardization of icons is required.

The audible call progress signals used in the videophone service should comply to those of the telephone service.

User guidance may be based on the display of alphanumeric characters, e.g. on the screen, or by other visual means, and/or on audible announcements.

It must be possible for the sending user (calling as well as called user) to switch on and off the facility ‘‘suppressing the outgoing picture’’.

In the case that one communication partner does not want to send his own picture to the other, a substitutional image or a suitable pictogram should be transmitted and displayed at the remote terminal.

Call set-up and user contact procedures may need harmonization with those used for voice services. This point is for further study.

5.2 *Additional items*

— The display of the called and calling subscribers' pictures on the screen should be possible, not necessarily simultaneously.

— The subscriber's own picture should be switchable on and off, as required.

— Hands-free communication and loudspeaking should be optionally possible.

6 Supplementary services

— Same as for telephony (including conference call). Further study required.

— Other supplementary services, e.g. ‘‘change of service including change of connection’’ have to be studied.

Recommendation F.730

SERVICE ORIENTED REQUIREMENTS FOR TELEWRITING APPLICATIONS

The CCITT,

considering

(a) that telewriting could offer graphic-oriented communication on real time or store-and-forward basis;

(b) that telewriting could serve as an optional facility to the general public telephone service, which could be of interest to several categories of users (e.g. deaf people, architects, advertising agencies, etc.);

(c) that telewriting could support applications like educational communication services (‘‘electronic blackboard’’);

(d) that telewriting could be a facility within a teleconference service;

(e) that telewriting could add a graphic-oriented facility to telematic services.

concludes

that telewriting can be applied as either a communication service or a communication technique within other services;

recommends

that the service oriented aspects of telewriting applications be in accordance with this Recommendation.

1 General

1.1 *Scope*

This Recommendation specifies the service-oriented requirements for the application of telewriting in combination with telephony.

Use of telewriting as an independent telecommunication service or in combination with other services than telephony is for further study.

The technical characteristics of telewriting are specified in Recommendation T.150.

1.2 *Definition*

Telewriting enables the transmission of graphic information to be displayed at the receiving side in accordance with the writing movements at the sending side. This display is normally effected on a real time basis; a delay in the transmission may be included.

1.3 *Applications*

1.3.1 Telewriting can support:

a) explanatory information exchange;

b) teleconferencing;

c) distant teaching or lecturing;

d) telecommunication between speech- and/or ear-handicapped people.

1.3.2 Applications in combination with services other than the telephone service and/or non-real time applications are for futher study.

2 General characteristics of telewriting

2.1 The main characteristics of telewriting in this context are real time display and interactive communication during one session, which requires availability of a terminal at each side. Consequently, both sides of the connection will be able to contribute to the same image.

2.2 The presentation functionalities along with their attributes are described in Recommendation T.150. They allow mainly for:

— the generation, transfer and representation of curves of arbitrary shapes; the effect of the movement of the writing instrument at the sending side is retained during reproduction;

— marking single positions in a telewriting image by means of a cursor;

— erasure of all or part of a telewriting image.

2.3 The image input is provided by appropriate writing tools, such as a writing tablet and a writing pencil.

2.4 At the originators' terminal, the input information is made visible either by a display unit or on the writing tablet itself.

2.5 The reproduction at the recipients' terminal will take place on a screen, on paper or on any other means, normally resulting in a real time copy. The writing speed at the transmitting and receiving end should generally be the same.

2.6 In principle, any type of network can be used as a carrier for telewriting signals.

3 Telewriting in combination with telephony

3.1 The general characteristics are as mentioned in § 2.1.

3.2 The subset of presentation functionalities available are the default capabilities of the basic terminal as defined in Recommendation T.150.

3.3 The following terminal operating modes are defined:

a) speech plus telewriting: speech signals and telewriting signals can be sent simultaneously;

b) telewriting only: in this mode sending of speech signals is blocked, reception of speech signals is still possible.

3.4 The public switched telephone network is used for carrying the telewriting information. In practice, a 300 bps sub-channel derived from the available speech channel bandwidth is used.

Note — Use of the ISDN for carrying telewriting information is for futher study.

3.5 The quality of service depends on the characteristics of the telephone network and of the telewriting equipment.

In case of simultaneous transmission of speech and telewriting signals, mutual interference should be relatively small. Faults caused by speech interference on the telewriting band are not tolerable. The influence of the telewriting signals on the quality of the speech conversation must be limited.