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The following contribution has been submitted for discussion of 'system aspects' of visual telephony in the coming Study Group XV meeting (March 13-22).

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STUDY GROUP XV - CONTRIBUTION

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1. Introduction

This contribution describes a framework for the communication procedure to be included in AV312 "Videoconference systems/terminals" and AV320 "Videophone systems/terminals". Since there are no clear definitions to distinguish between videoconferencing and videophone, "visual telephone" is used to represent both of them as in the title of the Question 3/XV. Here are discussed visual telephone systems connected through the basic interface or the primary rate interface in the narrowband ISDN.

2. Communication phases and applied Recommendations

Communication phases for audiovisual services are divided as follows in Draft AV240 "Principles for communication between audiovisual terminals" (see § 5.2 of Annex 3 to Q.4/XV).

Phase A: Call establishment
Phase B: Pre-message transmission
Phase C: Audiovisual message transmission
Phase D: Post-message procedure
Phase E: Call release

Phases A and E are stipulated in Rec. I.450 series, while Phase C are defined in AV250 series for audio, AV260 series for video, etc.

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Phase B is sub-divided into Phase B1 which is common to all the audiovisual terminals and Phase B2 which is specific to detailed parts of visual telephone. The former is defined in AV240 series, while the latter is defined in AV300 series. This contribution discusses the Phase B2.

3. **Communication modes for the visual telephone**

Visual telephone systems are characterized by the communication speed if they are configured using switched circuit networks. Since the communication speeds provided by the narrowband ISDN are at primary rates or lower, one of the communication modes in Table 1 is determined through Phase B1 procedure.

4. **Phase B2 for visual telephone**

4.1 Items to be negotiated

Phase B2 gives a procedure which determines detailed operational parameters, usage/non-usage of optional functions, etc. once a video telephone communication mode is chosen through Phase B1. Following the same principle for Phase B1 (see Draft AV242 in Annex 5 to Q.4/XV), capabilities are first indicated by the receiving side and then the sending side decides common maximum operational parameters and controls the receiving side.

The following items, for example, may be decided through Phase B2.

1) Picture format: CIF/Quarter CIF
2) Minimum coded picture interval: t x 1/29.97 sec where t=1 to 4
3) TYPE4 (8x8 block type) attribute: usage/non-usage
4) Video encryption: usage/non-usage
5) Audio encryption: usage/non-usage
6) Forward error correction: usage/non-usage
7) Video scrambling to cope with one's density: usage/non-usage
8) Demand refresh: usage/non-usage
9) Equipment connected to the data port and and their types:
   Facsimile, telewriter, still picture transmission equipment, etc.

4.2 Transmission channels

Phase B1 negotiations are carried out using BAS codes. BAS, however, can not deal with Phase B2 negotiations due to its capacity limitation since there are variety of items to be negotiated according to specific services. ISDN D-channels may be used for the Phase B2 negotiation purpose, but for the time being, in-channel signalling would help easier service expansion.

Consequently, use of the data port is proposed for the Phase B2 negotiation. According to H.221, a data port at 6400 bit/s, for example, is set up by sending a BAS code;

"011(Data Command) + 00100(6400 bit/s in AC assigned to data"

When the negotiation is over, the data port is closed by sending a BAS code:

"011(Data Command) + 0000(No data; data switched off"

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4.3 Protocol

A protocol for Phase B2 negotiation should be defined. We can consider the following candidates which are described in Appendix 1 to Rec. H.221;

- Simple bit protocol indicating one bit flag for each item to be negotiated
- Message channel protocol: such as the one suggested in Rec. H.140

If any data communication protocol is appropriate for the current purpose, it can be another candidate.

In case of a simple bit protocol, protection against transmission errors are required. Majority decision logic or the same error correction code as used for BAS can be applied.

5. C&I signals required during communication

Table 2 lists up control and indication signals which are required during visual telephone communication with their attributes and transmission channels. If any C&I should be synchronized with the video signal, only way to transmit it is to embed it in the coded video signal, eg in the picture header.

Remaining C&I signals are transmitted through Application Channel (AC). By use of Data Command BAS, AC can be opened only when necessary and closed when C&I transmission is finished. Since a data port set up by the Data Command BAS is used both for C&I transmission and data transmission for such visual aids as telewriter, a protocol should be defined to distinguish between these two purposes.

If the number of visual telephone C&I signals is limited, there may be a possibility to use BAS for their transmission (as indicated in COM XV-183, January 1988).

6. Conclusion

Visual telephone communication procedure has been discussed in respect of items to be negotiated in Phase B2, C&I signals required during communication, and transmission channels for these purposes. The contents are summarized as follows;

1) Detailed communication procedures specific to visual telephone are stipulated as Phase B2 procedures in AV312/320.
2) They are defined as Application Channel protocol. The receiving side indicates capabilities and the sending side decides the operational parameters.
3) C&I signals during communication are transmitted through AC.
4) A protocol is required to share the data port between C&I and visual aids.

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Table 1 Communications modes of visual telephone

Visual Telephone Mode	Channel Rate (kbit/s)	ISDN Channel	Coding			Sync. of Multiple Channels	ISDN Interface	
			Audio	Video	Data/AC		Basic	Prima. Rate
a	64	B	AV254	AV261*	AV312 AV320	not req.	not applicable	applicable
b	128	2B/64+64	G.722			not req.		
c	128	2B/ 128	AV254/3?			required		
d	384	H0	G.722			not req.		
e	768	2H0				required		
f	1152	3H0				required		
g	1536	4H0				required		
h	1536	H11				not req.		
i	1920	5H0				required		
j	1920	H12				not req.		

* AV261(H.261) is assumed to cover px64 kbit/s where p is 1 to 30.

Table 2 C&I signals for visual telephone

C&I signal	Source	Sink	Sync. with Picture	Transmis. Channel
Freeze Picture Request Control	coder or MCU	decoder	no	BAS or AC
Fast Update Request Control	decoder or MCU	coder	no	BAS or AC
Freeze Picture Release Control	coder	decoder	yes	embedded in coded video
MCU Related Message	terminal or MCU	terminal or MCU	no	AC
Video Loop Request Control *	terminal	terminal	no	BAS or AC
Digital Loop Request Control *	terminal	terminal	no	BAS or AC
Split-screen Indication	sending terminal	receiving terminal	yes	embedded in coded video
Document Camera Indication	sending terminal	receiving terminal	yes	embedded in coded video
AIA Indication ** (audio active)	sending terminal	receiving terminal	no	AC
VIA indication ** (video active)	sending terminal	receiving terminal	no	AC
VRA indication ** (ready to activate video)	sending terminal	receiving terminal	no	AC

* See Annex 4 to COM XV-R16 (Nov. 1986).

** See Draft AV320 in Annex 2 to Q.3/XV.

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