ITU-T Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments

Document AVC-673R
22 July 1994

Source: RAPPORTEUR (Sakae OKUBO)
Title: REPORT OF THE SIXTEENTH EXPERTS GROUP MEETING IN GRIMSTAD (13-22 July 1994) - Part I and Part II
Purpose: Report

Part I General
Part II Sole sessions
Part III Joint sessions (see AVC-674R)

Part I General

The sixteenth meeting of the Experts Group was held in Grimstad, Norway, as follows;

- ITU-T sole sessions during 13-15 july at the kind invitation of Norwegian Telecom Research,
- Joint sessions with ISO/IEC JTC1/SC29/WG11 (MPEG) during 18-22 July at the kind invitation of Norwegian Standards Association (NSF).

Part II Sole Sessions

Contents

1. Introduction

The ITU-T sole sessions were held at Sorlandet Hotel and Conference Center during 13-15 July 1994 at the kind invitation of Norwegian Telecom Research. At the opening session, Mr. Gisle Bjoentegaard made a welcoming address on behalf of the hosting organization.

At the end of the sessions, Chairman thanked the hosting organization for providing an opportunity to meet at a nice season of the year, excellent meeting facilities and secretarial support.

We had also a closing session on 22 July to review both sole and joint sessions.

It is noted that this time the discussion of H.222.1, H.32X, H.32Y and H.32Z was co-chaired by Rapporteur and each Editor; Mr. Stuart Dunstan, Mr. Chia-Chang Li, Mr. Hayder Radha

and Mr. Geoff Morrison. It is also noted that relevant parts of this meeting report were drafted by the Editors.

2. Documentation (TD-2)

For the sole sessions, 42 AVC-numbered documents and 11 temporary documents have been made available as listed in Annex 1.

3. Review of the previous meetings

Rapporteur presented the major outcome of the following meetings, drawing attention of the members to items of the Experts Group concern;

1) Experts Group March meetings in Geneva/Paris (AVC-631R, 632R, 633R)

- AAL1 and AAL2 discussion for video transport services
- network adaptation discussion and protocol reference model
- jitter consideration in the ATM environments

2) SG15 May meeting in Geneva (AVC-637, 638, 639)

- framework for audiovisual/multimedia Recommendations
- common text approach to H.222.0|ISO/IEC 13818-1
- response to the items on which we sought guidance of Working Party 1/15

It has been noted that the IVS Baseline Document contains "Service Requirements" as Annex 7 which lists a set of requirements for the audiovisual communication systems in ATM environments. Since it is as was produced in 1991, Rapporteur undertakes its updating to clarify the objectives of the Experts Group work.

3) JCG/AVMMS May meeting in Geneva (AVC-652)

- relationship between international standardization bodies (ISB) and consensus forming bodies (CFB)
- study of interactive multimedia services
- profiles of multimedia terminals

4) MPEG June meeting in Atlanta (AVC-643R)

- DIS and additional work for stipulating interface characteristics at the junction of MPEG decoder and network/DSM adaptation
- jitter tolerance
- VBR aspects

4. Video matters

4.1 Picture format parameters for Main Level (AVC-646)

AVC-646 proposes to extend the frame rate upper bound of the Main Level from 30 to 60 for pro-scan sources within the same upper bounds for luminance sample rate. This proposal does not include extension of field rate of interlaced source such as 120 fields per second

Considering that

- the pro-scan will be widely used by audiovisual/multimedia applications in the future, and
- required resource of the decoder does not change due to this extension of the frame rate upper bound,

but recognizing that the standardization is now in the very last stage, the Experts Group supports this proposal on the proviso that implementers of the decoder do not have difficulty to accommodate this change of the specifications.

As to the implementers reaction, we heard one explicit voice of difficulty during the meeting. Since many more implementers will come next week, we will await their reactions before making our firm position.

It was noted that the frame rate is currently defined in discrete values and that an indication will be required to distinguish between 60 fields per second interlaced source and 60 frames per second pro-scan source at the decoder.

Simulation result pictures related to the description of AVC-646 were demonstrated by NTR; comparison of coding and displaying interlaced pictures and pro-scan pictures.

4.2 Video frame synchronous signals (AVC-656, 665, 668)

AVC-665 proposed to standardize a method to send the closed caption signals while AVC-656 and 658 pointed out the need to specify a method to send C&I signals; both type of signals are tightly coupled with corresponding video frames. The channel and encoding methods of such video synchronous signals are to be decided.

We recognize that there will be more applications for video frame synchronous auxiliary or control signals other than closed caption and C&I. Furthermore, a control channel is in any case required (see §5.3 of this report). We seek a separate systems stream solution rather than a video stream solution since it provides necessary synchronization and is more flexible. After considering the need to cover both PS and TS as the H.32X multiplex scheme, the meeting agreed to find a PES solution which is common to PS and TS and allows to identify different applications.

Mr. Paul Haskell undertook to draft a solution with cooperation of other volunteers. The outcome is in Annex 2 which was approved by the meeting. This will be submitted to the joint sessions for consideration and seeking advice toward the November meeting.

Contributions on the descriptor syntax to be included in H.222.1 are solicited toward the next meeting.

During the discussion, it was clarified that the degree of synchronization between video and closed caption is not more strict than that of the lip-sync.

5. H.222.1 and H.222.0

5.1 Priority (AVC-636, 658)

Documents AVC-636 and 658 proposed to define primitive parameters for priority and error indication at the boundary of H.222.1 and AAL layers. The meeting agreed to do so and send SG13 a request for action in AAL. It was also agreed that the linkage between the higher layer priority request and the primitive parameter setting at the AAL-SAP should not be tight; it should be left to the choice of applications.

5.2 Bit error /cell loss handling (AVC-635, 657, 672)

Document AVC-635 gave the ATM network performance assumptions to make our progress in the study of network adaptation solutions. AVC-672 provided a backing material regarding the cell delay variation. It should be noted that these assumptions are our own yardstick in the lack of definitive performance figures and do not represent official views from any national or international standardization bodies. The meeting agreed to send this to SG13 for comments and to SA&A of The ATM Forum for information.

Some questions were raised on the end-to-end delay figures in AVC-635, particularly if we consider B-ISDN support of ordinary telephone services. This point needs advice of SG13.

Mr. Radha drew attention of the members to that definition of SECB (Severely Errored Cell Block) may need our consideration from the point of audiovisual communication services support and noted that cell losses are treated as part of Severely Errored Second, thus not counted in BER.

Document AVC-657 presented analysis of bit error impacts on the audiovisual communication in terms of mean error free time and concluded that bit error correction is indispensable even in the best case scenario which is given in AVC-635. The meeting shared this conclusion. Mr. Tanaka suggested Case 1 (AAL1 short interleaver) or Case 2-1 (FEC in the H.222.1 specific layer) for the generic AAL solution, and Case 3-2 (FEC in AAL SSCS) or Case 4 (interleaver in AAL for 47 TS packets) for the TS specific AAL solution. It was clarified that the double correlated errors in a cell due to payload scrambling can be recovered in each of these solutions. The meeting agreed to the preference of seeking generic AAL solution(s).

The document also raised a question of matching between AAL5 and bit error correction; the meeting reached a view that the AAL5 is only appropriate in the low bit error environments. The issue of more general bit error correction in VBR supporting AAL2 awaits contributions.

Mr. Dunstan made a comment that the mean error free time in AVC-657 does not take into account the effect of error concealment; there are cases where bit errors are not visible because of inherent or intentional error resilience.

5.3 Multiplexing of ITU-T specific channels (AVC-656)

Document AVC-656 pointed out the need to provide a mechanism in H.222.0 for accommodating ITU-T application specific audio, video, data and control channels. The meeting discussed the proposal in the document and reached a conclusion as in Annex 2 to this report (see §4.2 above).

As to the method for synchronous mode switching, the issue should be raised in the joint sessions with MPEG for seeking advice.

5.4 Multiple VC solution (AVC-640, 664; TD-6)

Documents AVC-640 and AVC-664 discussed use of multiple VCs being more appropriate for some cases; the former addresses T.120-series telematic and conference control information, the latter audiovisual communication information. TD-6 is an input from SG8 during our meeting which contains recent SG8 meeting outcome.

The meeting took note of the discussions in these documents and solicits contributions regarding pros and cons for use of single VC vs multiple VCs toward the next meeting. It is also suggested the contributions address whether single VC and multiple VCs solutions coexist or migrate from one to the other and their interworking. Motivations for multiple VCs are summarized in AVC-664 as:

- Different Quality of Service in ATM may be defined for different signal components (elementary streams), being conveyed in different VCs, e.g. for layered coding.
- Routing of programs and elementary streams of programs by ATM switches without need of H.222 equipment as network elements.
- Multipoint control unit operating at ATM layer instead of H.222 layer.

Representation of the multiple VC consideration in the protocol reference model also needs further work.

As to the "transparency" for the COTS in a single VC configuration, which has been raised by SG8, Mr. Dunstan commented that one way is to provide transparent Class C service by reducing video rate to cope with bursty nature of the COTS data traffic.

5.5 Communication control procedures H.24X (AVC-641, 655)

The channel for this purpose was discussed in the context of video frame synchronous C&I, ITU-T application specific channel allocations (see §4.2, §5.3 and Annex 2 of this report). In case of asymmetrical channel configuration, the return channel may use AAL5.

The meeting agreed to the following guideline for developing communication control procedures:

- to consider both the "capabilities and command" approach and the "ACK-NACK" approach, at least at the initial stage of study; the latter is thought to be more robust and allow easier transition of state machines ,

- to cover both interactive and broadcasting type of communications; communication channels may be symmetrical, asymmetrical or completely unidirectional.

As to the selection of PS or TS at the start of a call, the meeting reached a common understanding that conveying it through the signalling channel by e.g. LLC/HLC is appropriate. There was some discussion on the underlying question whether H.32X should support PS or TS or both. Several indications were given to the market support of TS, but it was also expressed that use of PS is attractive for single programs in the ATM environments, particularly in computer applications. Rapporteur desired to narrow down the alternatives; contributions with strong position may be needed to achieve it.

5.6 Protocol reference model (Annex 3 to AVC-632R)

The model in Annex 3 to AVC-632R is still valid as far as the contributions for this meeting have been considered. Only wording improvements have been identified; "timebase recovery" in "Possible AAL2/5 functions" should be removed, that in "AAL type 1 functionalities" should be replaced with "transmission clock recovery".

Rapporteur requested members to make progress in definite allocation of functionalities to each constituent element in the protocol reference model.

5.7 Draft Recommendation (AVC-660)

Document AVC-660 is the draft of Recommendation H.222.1 which was input to the SG15 meeting in May 1994.

The meeting agreed to adopt the proposed protocol description approach in Sections 8 and 9, recognizing that it helps designing the implementation.

The following suggestions were also given to the current draft:

- Jitter removal is not purely an implementation matter, but a protocol issue.

- Naming of HPS and HTS will be misleading that H.222.1 defines another set of PS and TS different from those in H.222.0.

- Draft Recommendation H.222.1 will prepare a placeholder for the multiple VCs, but with indication of "for further study". It could be handled as multiple instances of H.222.1.

- Inclusion of the protocol reference model (as in Figure 1/AVC-639) was suggested, but this is more appropriately to be part of H.32X.

- Security functions provided by H.222.0/ISO/IEC 13818-1 are more than encryption; entitlement control and management are also included. Support of H.233 and H.234 or their extensions should be considered as well.

Mr. Dunstan agreed to update the draft reflecting the above discussion with indication of action points in form of Editor's comments and distribute it before 9 September 1994.

5.8 VBR issues (AVC-647; TD-3,4)

After short discussion due to time availability, the meeting recognized that VBR operation in PS or single program TS has less problems but that in multi-program TS needs elaborate techniques.

5.9 Report on detailed discussion

Mr. Dunstan's report containing the details of discussion on H.222.1 related topics is found in Annex 3 to this report.

6. H.32X

6.1 Framework (AVC-666, §3/AVC-659)

Document AVC-666 provided discussion materials addressing communication mode, terminal type and interworking scenarios. Specifications for the hardware trials presented in §3/AVC-659 were also used for this discussion since they should reflect essential part of the H.32X specifications.

The meeting generally supported the direction proposed in AVC-666, giving the following suggestions:

- Since characterization of H.32X terminals are multi-dimensional, use of the attribute method such as employed for the definition of ISDN services may help us.
- Characteristics of control channel may be part of the attributes.
- Symmetrical configuration may be defined as both end terminals having the same set of capabilities. Asymmetrical cases including receive only should be considered from the outset if we take into account potential services and B-ISDN capabilities.
- Definition of Type A in H.32X is not supported. Interworking modes of operation should instead be specified (see §7.2 of this report).
- Since the transfer rate is flexible in B-ISDN, the operating bit rates of the H.262 encoder should be at any bit rates below the declared maximum value as is the case of H.262 decoders.
- Indication of a preferred receiving mode from the receiving side should be considered.
- Specification for the video encoder should be to produce a bitstream compliant to a certain Profile @ Level. It needs not to support whole tools of the defined Profile @ Level.
- The protocol reference model should be included in Recommendation H.32X.

As to the hardware trial specifications, the meeting suggested the following:

- Interconnection of 525/625 video: Some codecs are expected to send only one format, but receive either format.
- Audio: MPEG-1 mandatory, MPEG-2 optional (note that MPEG-2 audio is backward compatible with MPEG-1 audio).

- Multimedia multiplex: decoder supports PS and TS, but encoder can use either of them.
- AAL: four combinations of (CBR, VBR) and (AAL1, AAL5) are possible, leaving open the choice of one or more of the combinations at this moment.
- Communication procedures: testing a minimum set is desirable.
- User network signalling: PVC at the initial stage to avoid additional verification for signalling.

6.2 Draft Recommendation (AVC-661)

Document AVC-661 is the draft of Recommendation H.32X which was input to the SG15 meeting in May 1994.

Mr. Li agreed to update the draft reflecting the above discussion with indication of action points in form of Editor's comments and distribute it before 9 September 1994.

6.3 Report on detailed discussion

Mr. Li's report containing the details of discussion on H.32X related topics is found in Annex 4 to this report.

7. H.32Y

7.1 Framework (AVC-634, 653)

Document AVC-634 gave Mr. Yamazaki's clarification on the circuit emulation. The meeting appreciated this informative input.

The following comments were given to the analysis for bit error handling in AVC-653 which is based on the network scenarios in AVC-635:

- BCH decoding in the H.261 decoder is optional, hence it can not always be counted as a measure to cope with bit errors, though it is mostly supported by the equipment in the market.
- Delay sensitive audio applications may not accept the short interleaver solution, hence if the bit error performance of a 64 kbit/s channel is not sufficient for the ATM portion, a general bit error correction solution is required.

Related to the use of cell loss correction in the ATM part of connection for the B-N interworking, a question was raised how the Interworking Function can recognize the audiovisual call, particularly when the N-ISDN side originates a call. It might be possible for the IW activate the short interleaver AAL1 by interpreting LLC/HLC or AAL negotiation, but it is against the principle that the network is service independent.

These should be communicated with SG13 seeking their advice.

7.2 Terminal type (AVC-667)

The meeting agreed that definition of the H.32Y terminal type should be the same as that of H.320.

There was some discussion on the relationship between H.32X terminal, H.32Y terminal and modes of operation which each of them should support. Since the H.32X terminal is required to interwork with H.320 terminals connected to the N-ISDN, it should support some interworking modes of operation in addition to the broadband specific modes of operation (e.g.

using H.262 video, MPEG audio, H.222.0 multiplex). Terminal configuration of H.32X and H.32Y terminals is illustrated in Figure 1.

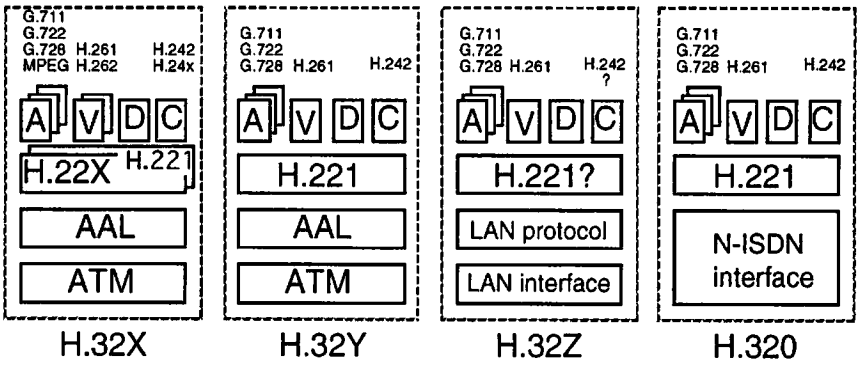

Figure 1 H-series audiovisual communication terminals

A minimum set of interworking modes of operation which H.32X terminals should support has been agreed to include the following transfer rates;

- 2B (including 1B by definition),
- H0,
- H11, and
- H12.

This is based on the consideration that the specification should reflect the typical type of H.320 terminals which are currently installed and with which the H.32X terminal talks, and that the regional restriction can be overcome by utilizing the B-ISDN characteristics. This and other specifications are contained in Annex 5 to this report together with H.32Y discussion summaries.

7.3 Draft Recommendation (AVC-662)

Mr. Radha agreed to update the draft reflecting the above discussion with indication of action points in form of Editor's comments and distribute it before 9 September 1994.

7.4 Editor

Mr. Hayder Radha agreed to take the editorship of H.32Y from this meeting which had provisionally been undertaken by Rapporteur due to the absence of volunteer.

8. H.32Z

8.1 Framework (AVC-648, 649, 650, 671; TD-9)

The major discussion centred on the scope of H.32Z. A provisional agreement from the Paris meeting was that H.32Z be for "bandwidth guaranteed LANs" (§7.2/AVC-632R). Document AVC-648 proposed that "best effort" networks should also be supported, primarily through the use of RTP (Internet Real Time Protocol) in place of H.221. Accompanying documents AVC-649 and 650 gave further technical information on RTP and other major issues including ISDN-LAN gateways, ISDN-LAN address conversion, mapping of H.320 on RTP, mapping RTP on LAN, respectively.

It was clarified that RTP uses a separate "virtual circuit" for each media component such as audio, video, etc. Timing recovery and media synchronisation are accomplished through time stamps which are functionally similar to SRTS and require a common network clock at both ends.

Several participants expressed concerns about the Quality of Service issues which arise from the absence of resource reservation. The general theme was whether ITU-T should have its

name associated with the variable and sometimes low quality they feared would arise and become even more prevalent as usage increases. It was reported that some experiments had been prematurely ended by LAN management functions terminating the transmissions. The rebuttal of QoS arguments was that it is the user's choice and the strategy for H.320 terminal standardization has been to guarantee interworking but to leave the cost/performance trade-off to the choice of designers.

Document AVC-671 was also supportive of extending the scope of H.32Z to include "non-guaranteed bandwidth" LANs and suggested splitting the Recommendation into two parts.

In counter to the above contributions, Mr. Morrison introduced an extract (see TD-9) from the draft of IEEE802.9a due to be submitted for letter ballot in August 1994. This draft standard is a specific example of a "guaranteed bandwidth" LAN and can provide isochronous services instead of, or in addition to, those of ISO/IEC 8802-3 (=IEEE 802.3). Many advantages for the use of such an approach were claimed:

- current H.320 performance is maintained from end to end. No QoS problems.
- gateway devices for the LAN-ISDN gateway will be general purpose, not H.32Z specific. This has benefits in terms of availability (larger market is more attractive for manufacturers to enter), lower unit price (larger manufacturing volume) and lower per user cost (same device serves many users, not just H.32Z terminals).
- extension of the ISDN including the D channel to the H.32Z terminal rather than terminating it at the ISDN-LAN gateway avoids or simplifies some issues concerning any necessary connection approval of the gateway device to the ISDN.
- much superior support for higher rate real time signals such as MPEG-1 and MPEG-2.
- an evolutionary approach suitable for upgrading the majority of existing LAN installations without needing rewiring. Attractive to many LAN users already running out of capacity irrespective of H.32Z.

The meeting agreed to confirm the provisional agreement at the previous meeting that only "bandwidth guaranteed" LANs would be explicitly covered by H.32Z. It was recognised that for "best effort" networks, equipment may be offered which achieve performance levels acceptable for some users and achieve interworking with ISDN based H.320 terminals by means of a dedicated custom gateway. However, these would be "at the user's risk" and not recommended by ITU-T.

Further clarification of "bandwidth guaranteed" and improved terminology is requested for the next meeting. Such bandwidth guaranteed networks can be either circuit based or packet based.

Proposals should also include information on call set up matters such as terminal numbering. We need a network configuration model to make progress on this matter.

8.2 Draft Recommendation H.32Z (AVC-663)

Document AVC-663 was presented as the draft H.32Z skeleton given to SG15 WP1/15 at their May 1994 meeting. There was a suggestion that because H.32Z may be very similar to H.320 a delta Recommendation may be the most appropriate form. A major difference is likely to be the network interface. In the event of several alternatives it may be sufficient that H.32Z includes only a single logical interface and leaves the physical interfaces to the respective LAN specification documents.

Mr. Morrison agreed to update the draft reflecting the above discussions with indication of action points in form of Editor's comments and distribute it before 9 September 1994.

9. AAL

9.1 AAL1 (AVC-651)

Document AVC-651 reported preliminary experiment results on ATM transport of H.320 signals through AAL1 in UK. Mr. Beaumont advised the meeting of interconnection tests being planned between UK and France in the near future. Comparison of the current adaptive clock method and an SRTS method is also intended. Further reports of the experiment are welcome.

9.2 TS delivery AAL (AVC-658)

See §5.1 of this report for defining primitive parameters at the AAL SAP.

9.3 AAL2 (TD-4)

This type of AAL is a placeholder at the present. It is deemed that its progress owes largely to the work of this Experts Group as a potential user. Contributions are solicited for defining requirements to AAL2.

10. Timebase recovery

10.1 Dejittering for ATM cell delay variation (AVC-642)

Document AVC-642 presents general solutions for timebase recovery in the jitter prone environments such as ATM. The meeting reviewed this outcome of the Atlanta meeting and agreed to send it to the meeting of SA&A in The ATM Forum.

Mr. ter Horst pointed out that implementation related description comparing PS and TS should have been more carefully worded. Rapporteur will bear this comment in his mind for future opportunities to make such statements.

10.2 Speeding up timebase recovery (AVC-647)

Document AVC-647 provided information on a method of speeding up the timebase recovery by estimating the cell arrival time. This technique may be implemented in the decoder without affecting the specifications in the standard. Its implication is, however, jitter removal is not required in the network adaptation portion.

Mr. Li suggested that transmission rate which is necessary for VBR timebase recovery in this method can be made known by external means if the call set up includes such information.

11. Work plan and work method

11.1 Approval process for H.262, H.222.0 (AVC-669, 670)

Rapporteur clarified the process of obtaining approval of ITU-T for the common text Recommendations H.262|ISO/IEC 13818-2 (Video) and H.222.0|ISO/IEC 13818-1 (Systems) in AVC-669. Members are requested to send their comments on the current drafts to Rapporteur by 10 October 1994 so that he can integrate them into a single SG15 contribution for consideration of the Singapore meeting.

Since one of the necessary conditions for the approval is to clear the intellectual property handling, members are requested to follow the ITU-T code of practice as described in Annex to AVC-670. As to Table 1/AVC-670, Mr. Bjoentegaard confirmed that NTR's "patent information" cell should read "*".

11.2 Hardware trials (AVC-659; AVC-651)

Document AVC-659 provided information on the hardware trial plan in Japan, addressing date, testing items, experimental system configuration and specifications. The meeting reviewed this plan and gave some suggestions on the specifications as in §6.1 of this report. For the remaining topics, the meeting felt the plan gave a good starting point.

Participation in the hardware trials and contributions to materialize the trial plans are requested.

11.3 Document and information distribution

The meeting requested Rapporteur to issue lists of distributed documents so that the distribution points in respective countries can take necessary actions for distribution inside the country.

After having reviewed the e-mail distribution of the documents, the meeting confirmed the agreement at the Daejeon and Paris meetings (see §9.2.3/AVC-498R, §9.2/AVC-632R); namely interchange formats should be

- uuencoded Word for Windows 2.0 file (not compressed),
- not more than 80 characters in a line,
- plain text version as well as formatted version.

11.4 Correspondence work between this meeting and the next meeting

Since the November meeting is crucial for proposing frozen draft Recommendations at the February 1995 meeting of SG15, progress should be made through correspondence. Editors are requested to lead this correspondence work regarding respective Recommendations in charge.

12. Joint sessions with MPEG

12.1 Documents

The following documents are input to the joint sessions:

- From the Experts Group TD-7 revised
- From individual sources AVC-646, 647, 654, 655, 656, 664, 665, 669, 670.

As to the proposal from the Experts Group, this meeting is understood as an opportunity for consensus forming toward the November meeting.

12.2 Representatives

ITU-T EG	S. Okubo
Requirements	S. Okubo
Video	G. Bjoentegaard
Systems	S. Dunstan

13. Others

13.1 Communication with SA&A of The ATM Forum

The meeting agreed to send AVC-635 and AVC-642 for information to SA&A of The ATM forum which meets in the week of July 18. Rapporteur will get contact with Mr. Jeffrey Lynch.

13.2 Correspondence with SG8 and SG13

Rapporteur will draft correspondence letters with help of Mr. Dunstan on the following items:

Destination	Request for	Contents
SG8	consideration	Response to SG8's comments contained in TD-6 regarding multiplexing telematic information in audiovisual communication call
SG13	action	priority and error indication primitive parameters at ALL-SAP
SG13	comments	network performance assumptions contained in AVC-635
SG13	advice	end-to-end delay, particularly for support of telephone as part of audiovisual services
SG13	advice	identification of audiovisual services at the interworking function and terminal adaptor to activate error correction
SG13	consideration	general bit error correction as discussed in §7.1
SG13	clarification	short interleaver, circuit emulation and support of SDT

11.3 Future meetings till February 1995

Meeting	Date	Place	Sole sessions	Joint sessions with MPEG
17th	Nov. 1994	Singapore	Nov. 1, 3, 4	Nov. 7-11
18th	Jan. 1995	Japan	later January (note)	-

Note - The week of January 16 or 23 is intended considering that SG15 will meet from February 6, 1995.

END

Annexes

Annex 1 Documents for the Grimstad meeting
Annex 2 Support for ITU-T Control and Indication Signals
Annex 3 Summary of discussions on H.222.0 and H.222.1
Annex 4 Summary of H.32X Discussions
Annex 5 Summary of H.32Y Discussions and H.320/H.32X Interoperability Issues

Participants of the sixteenth meeting of the Experts Group for Video Coding and Systems in ATM and Other Network Environments held in Grimstad, Norway

Sole sessions 13-15 July
Joints sessions with MPEG 18-22 July

Country	*Name*	*Organization*	*Sole*	*Joint*
Germany	Mr. Bernard Hammer	Siemens	X	X
Australia	Mr. Stuart Dunstan	Siemens	X	X
Belgium	Mr. Olivier Poncin	BELGACOM	X	X
USA	Mr. Bahman Amin-Salehi	Bell Atlantic	X	X
	Mr. Richard Grinnell	PictureTel	X	X
	Mr. Barry Haskell	AT&T	X	X
	Mr. Paul Haskell	CLI	X	X
	Mr. Chia-Chang Li	AT&T	X	X
	Mr. Hayder Radha	AT&T	X	X
	Mr. Gary Rekstad	NCS	X	X
	Mr. Tony Wasilewski	Scientific Atlanta	X	X
	Ms. Andria Wong	Bellcore	X	X
Finland	Mr. Roy Mickos	Tampere University	X	X
	Mr. Juha Pihlaja	Nokia	X	
France	Mr. Philippe Boucheron	CNET	X	
	Mr. Stephane Lemaire	CNET	X	
	Mr. Bruno Loret	CNET		X
Japan	Mr. Kazuhiro Matsuzaki	Mitsubishi	X	X
	Mr. Sakae Okubo	GCL	X	X
	Mr. Tomoaki Tanaka	NTT	X	
	Mr. Hideyuki Ueno	Toshiba	X	X
Norway	Mr. Gisle Bjoentegaard	NTR	X	X
	Mr. Robert Danielsen	NTR	X	X
	Mr. Karl Olav Lillevild	NTR	X	X
Nethrelands	Mr. Roel ter Horst	KPN-PTT	X	X
UK	Mr. David Beaumont	BT	X	
	Mr. Geoff Morrison	BT	X	
	Mr. Mike Nilsson	BT		X
Sweden	Mr. Per Tholin	Telia Research	X	
	Ms. Christel Verreth	Telia Research		X

Documents for the Grimstad meeting (13-22 March 1994)

Normal Documents

AVC number	MPEG number	Pur-pose	Title (Source)
AVC-631R	-	R	Report of the joint meeting with SG13 AAL 1&2 Group in Geneva (14 March 1994) and liaison statement from SG13 (Rapporteur)
AVC-632R	-	R	Report of the fifteenth Experts Group meeting in Paris (16-25 March 1994) - Part I and Part II (Rapporteur)
AVC-633R	-	R	Report of the fifteenth Experts Group meeting in Paris (16-25 March 1994) - Part III (Rapporteur)
AVC-634	-	R	AAL1 circuit emulation (Rapporteur for Q.6/13, K. Yamazzaki)
AVC-635	-	R	ATM performance assumptions (Experts Group)
AVC-636	-	P	Consideration of loss priority between H.22X (Multimedia multiplex including MPEG-2 Systems) and AAL type 1/2 (Korea)
AVC-637	-	I	IVS Baseline Document - March 1994 (SG13)
AVC-638	-	R	Meeting report of WP1/15 (Chairman of WP1/15, M. Yamashita)
AVC-639	-	R	Sixth progress report of The Experts Group for Video Coding And Systems in Atm and Other Network Environments (Rapporteur, S. Okubo)
AVC-640	-	D	Correspondence between Rapporteurs for Q.8/10 (B. DeGrasse) and Q.2/15 (S. Okubo)
AVC-641	-	D	Considerations for H.24X - Communication Procedures for Multimedia on ATM (Rapporteur for Q.3/15; N.D. Kenyon)
AVC-642	94/166	I	Position paper on MPEG Systems and ATM (A. MacInnis, S. Okubo)
AVC-643R	-	R	Report of the Systems Adhoc and WG11 meetings held in Atlanta (ITU-T EG Representatives; G. Franceschini, S. Okubo)
AVC-644	N0721	R	Darft ITU-T Rec. H.222.0IISO/IEC 13818-1 Systems (Editor)
AVC-645	N0702	R	Darft ITU-T Rec. H.262IISO/IEC 13818-2 Video (Editor)
AVC-646	94/183	P	Increase of frame rate from 30 to 60 Hz in Main Level (ML) (NTR)
AVC-647	94/253	P	Fast timing recovery in the presence of cell delay jitter (AT&T)
AVC-648	-	P	Expanding the current scope of H.32Z (Tampere University of Technology, Bitfield)
AVC-649	-	D	Real-Time Transport Protocol in H.32Z Systems in ATM and Other Packet-Switched Computer Networks (Tampere University of Technology)
AVC-650	-	D	Technical Issues concerning Real-Time Protocol in H.32Z Systems n ATM and Other Packet-Switched Computer Networks (Tampere University of Technology, Bitfield)
AVC-651	-	I	Report on preliminary experiments using H.320 codecs over ATM networks (BT)
AVC-652	-	R	Report of the first meeting of the JCG on AVMMS (Chairman of JCG/AVMMS, M. Yamashita)
AVC-653	-	P	Comments for Editor's notes in H.32Y draft recommendation (Japan)
AVC-654	94/230	P	Editorial comments for Draft Rec. H.222.0 I ISO/IEC 13818-1 (Japan)
AVC-655	94/225	P/D	Communication procedure for H.222.1 (Japan)
AVC-656	94/214	P/D	Necessary provision for applying H.222.0 to the H.32X terminals (Japan)
AVC-657	-	D	Consideration on error correction functionality in H.222/AAL (Japan)
AVC-658	-	I	A study of the H.22X interaction with the AAL for the ATM transmission of TS packets (Japan)
AVC-659	-	I	A plan of H.32X hardware interconnection experiment in Japan (Japan)
AVC-660	-	P	Darft H.22X (Editor, Stuart Dunstan)
AVC-661	-	P	Draft H.32X (Editor, Chia-Chang Li)
AVC-662	-	P	Draft H.32Y (Editor, Sakae Okubo)
AVC-663	-	P	Draft H.32Z (Editro, Geoff Morrison)
AVC-664	94/254	I/D	Multiplex at ATM layer with H.222 (KPN-PTT)

AVC number	MPEG number	Pur-pose	Title (Source)
AVC-665	94/220	P	Closed caption in ITU-T H.262|ISO 13818-2 (Bellcore)
AVC-666	-	D/P	H.32X Communication Modes, Terminal Types, and Interwroking Scenarios between H.32X Terminals (AT&T)
AVC-667	-	D/P	Inter-operability between B-ISDN H.32X and N-ISDN H.320 Terminals (AT&T)
AVC-668	-	D/P	Video Conferencing Control and Indication Signals for H.262 (AT&T)
AVC-669	94/228	I	ITU-T Approval of Common Text Recommendations I International Standards (Rapporteur)
AVC-670	94/227	I	Patent Statements and Information for Draft ITU-T Rec. H.262 I ISO/IEC 13818-2 (Rapporteur)
AVC-671	-	P	Considerations for H.32Z Endpoints (AT&T)
AVC-672	-	I	Cell Delay Variation (CDV) in ATM Networks (AT&T)

Abstract

[nnn] indicates MPEG Document Number.

AVC-631R [-] Report of the joint meeting with SG13 AAL 1&2 Group in Geneva (14 March 1994) and liaison statement from SG13 (Rapporteur)

This document contains a report of the joint discussion by the experts of SG13 AAL1&2 and SG15 ATM video coding and systems which took place on March 14, 1994. It also contains SG13 liaison statements to SG15, SG9 and MPEG on video signal transport in ATM networks.

AVC-632R [-] Report of the fifteenth Experts Group meeting in Paris (16-25 March 1994) - Part I and Part II (Rapporteur)

This document records the outcome of the Paris sole sessions held in March 1994, summarizing the discussion and identifying action items.

AVC-633R [-] Report of the fifteenth Experts Group meeting in Paris (16-25 March 1994) - Part III (Rapporteur)

This document records the outcome of the Paris joint sessions held in March 1994, covering Requirements, Video and Systems sub-groups.

AVC-634 [-] AAL1 circuit emulation (Rapporteur for Q.6/13, K. Yamazzaki)

Clarification is given to "circuit emulation" which was raised at the Paris meeting (§6.4/AVC-632R) in terms of circuit transport Vs video signal transport. Services provided by N-UNI, B-UNI, Interworking Function and TA are also clarified.

AVC-635 [-] ATM performance assumptions (Experts Group)

Best available information on ATM performance assumptions are tabulated for the worst, average case and worst case of CLR, BER, end-to-end delay, CDV etc. This information is intended to assist the network adaptation study as decided at the Paris meeting (§8.2.2/AVC-632R).

AVC-636 [-] Consideration of loss priority between H.22X (Multimedia multiplex including MPEG-2 Systems) and AAL type 1/2 (Korea)

This document proposes to define a priority primitive between H.22X and AAL Type1/2 for the MPEG-2 Transport Streams with transport_priority. This priority primitive is mapped onto CLP bit in the ATM layer.

AVC-637 [-] IVS Baseline Document - March 1994 (SG13)

This is the final version of the IVS Baseline document which has served to provide a common basis for the ongoing study of IVS by SG13 and other groups. It describes objectives, responsibility of each group, range of services to be covered and staged approach for evolution of service integration. It also includes several annexes to overview the current status of the study on both of network and service aspects.

AVC-638 [-] Meeting report of WP1/15 (Chairman of WP1/15, M. Yamashita)

This is the Chairman's report of the Working Party 1/15 meeting held in May 1994. Materials related to broadband audiovisual matters are either attached to this document or issued as separate AVC-numbered documents (AVC-636,639,640).

AVC-639 [-] Sixth progress report of The Experts Group for Video Coding And Systems in Atm and Other Network Environments (Rapporteur, S. Okubo)

This document provides a progress report to Working Party 1/15, which covers the two meetings of the Experts Group (October-November 1993 and March 1994) and summarizes major achievements toward defining H.262, H.22X, H.32X/Y/Z. It also lists particular items which need consideration of WP1/15; 1) intellectual property processing for H.262, 2) commitment in hardware trials, 3) advice on open issued for Draft Recommendations, 4) Common Text approach to MPEG-2 Systems, 5) DSM-CC activities in MPEG, 6) editorial corrections to H.262, 7) guideline for the interaction with The ATM Forum, 8) initiation of H.24X work.

AVC-640 [-] Correspondence between Rapporteurs for Q.8/10 (B. DeGrasse) and Q.2/15 (S. Okubo)

SG8 comments on the H.32X protocol model that use of different AAL thus different VC is more appropriate for exchange of telematic information and high-level audio-video control. Views of SG15 are also provided which was generated during its May 1994 meeting.

AVC-641 [-] Considerations for H.24X - Communication Procedures for Multimedia on ATM (Rapporteur for Q.3/15; N.D. Kenyon)

Rapporteur for Q.3/15 provides some hints on the communication procedures for the broadband audiovisual/multimedia terminal, reflecting the lessons obtained through the development of H.242 for the N-ISDN terminal. Possible extensions to the H.242 procedures are; 1) capabilities to encode, 2) no need for indication of multiplex structure this time, 3) expression of mode preference from the receiving end, 4) integration of outband and inband procedures, 5) handling of ATM fault conditions, 6) unified handling of data, 7) consideration of multipoint from the outset, 8) interworking with ISDN and PSTN multimedia terminals as a mandatory requirement, 9) physical channel for control, 10) choice of control protocol harmonized with other applications.

AVC-642 [94/166] Position paper on MPEG Systems and ATM (A. MacInnis, S. Okubo)

This document intends to clarify the relationship between the MPEG Systems and ATM with their overviews and techniques to cope with particular characteristics of ATM - cell delay variation. It is shown that cell delay variation of the network can be reduced by either of the network specific solution or the integrated decoder solution.

AVC-643R [-] Report of the Systems Adhoc and WG11 meetings held in Atlanta (ITU-T EG Representatives; G. Franceschini, S. Okubo)

The outcome of the Atlanta meetings of the Adhoc Group and WG11 is reported with focus on the ATM related organizational and technical matters.

AVC-644 [N0721] Darft ITU-T Rec. H.222.0|ISO/IEC 13818-1 Systems (Editor)

This draft was produced at the MPEG meeting in Atlanta for DIS balloting.

AVC-645 [N0702] Darft ITU-T Rec. H.262|ISO/IEC 13818-2 Video (Editor)

This draft was produced at the joint meeting in Paris for DIS balloting.

AVC-646 [94/183] Increase of frame rate from 30 to 60 Hz in Main Level (ML) (NTR)

To allow low bitrate and high temporal resolution applications and low delay applications requiring high temporal resolutions within the resource for the current Main Level decoder, increase of frame rate bound from 30 to 60 is proposed. Newly covered formats include (720x288x50), (360x288x50), (480x240x60), (544x288x50), etc.

AVC-647 [94/253] Fast timing recovery in the presence of cell delay jitter (AT&T)

This document presents a method of speeding up the timebase recovery where arrival time of each cell is monitored and compared with estimated arrival time which is computed from the values of *program_mux_rate* (in case of PS) or *piecewise_rate* (in case of TS) and the encoder clock reference (SCR or PCR) and adjusted for the effect of packing the clock reference information into cell, then the arrival jitter is fed back to the timebase recovery PLO.

AVC-648 [-] Expanding the current scope of H.32Z (Tampere University of Technology, Bitfield)

This document proposes a framework of H.32Z which consists of; 1) use of the word "Packet Switched Computer Network (PSCN)" instead of "LAN", 2) use of Real Time Protocol (RTP) in PSCN, 3) support of the best effort computer networks in addition to the guaranteed bandwidth networks, 4) non-use of H.221/H.22X in PSCN connections, they are removed/regenerated at the PSCN-ISDN gateway, 5) adoption of RTP as ITU-T Recommendation H.22Z.

AVC-649 [-] Real-Time Transport Protocol in H.32Z Systems in ATM and Other Packet-Switched Computer Networks (Tampere University of Technology)

This document provides supporting material to the proposal in AVC-648; 1) overview and status of RTP, 2) timing model without bandwidth reservation, 3) packet routing in PSCN, 4) multicast addresses for data transportation. As a conclusion, it is argued that installed base of computers be used for audiovisual service even if its quality may be slightly worse than the one obtained through the guaranteed bandwidth network.

AVC-650 [-] Technical Issues concerning Real-Time Protocol in H.32Z Systems n ATM and Other Packet-Switched Computer Networks (Tampere University of Technology, Bitfield)

This document addresses several aspects of the RTP use in PSCN environments as support of the proposed framework in AVC-648; 1) ISDN-PSCN interworking, 2) ISDN and PSCN address conversion, 3) mapping of H.320 on RTP, 4) mapping of RTP on PSCN.

AVC-651 [-] Report on preliminary experiments using H.320 codecs over ATM networks (BT)

This document reports on connecting existing H.320 terminals between Ipswich and London through an ATM Virtual Path where AAL1 adaptation is carried out between G.703/704 2 Mbit/s connection and the ATM switch. Adaptive clock method is employed and 3 Mbit/s ATM channels are used not to invoke policing. It is concluded that the quality of link and coded pictures is very good.

AVC-652 [-] Report of the first meeting of the JCG on AVMMS (Chairman of JCG/AVMMS, M. Yamashita)

This meeting was represented by SGs 1,3,7,8,9,11,12 and 15. Among other things, Questions and work plans of relevant SGs, relationship with organizations outside of ITU-T, study of Interactive Multimedia Services, profiling multimedia services were discussed.

AVC-653 [-] Comments for Editor's notes in H.32Y draft recommendation (Japan)

This document provides replies to some of the editor's questions, particularly to the questions of AAL1 parameters, error handling and call control.

AVC-654 [94/230] Editorial comments for Draft Rec. H.222.0 | ISO/IEC 13818-1 (Japan)

Comments of editorial nature are given to the DIS version of "Systems" specifications. (AVC-644).

AVC-655 [94/225] Communication procedure for H.222.1 (Japan)

This document discusses communication control procedures which handle negotiation at the beginning of communication and mode switching during communication. It also lists items to be negotiated and C&I signals for audiovisual communications. Since a dedicated control channel is required, assignment of PID (for TS) and *stream_id* in the PES header is proposed. Furthermore, an outline of communication procedure is illustrated for further discussion. For distinction of PS and TS as a multiplex method, us of LLC/HLC in the outband and sending a liaison statement to SG11/13 is suggested. Finally, necessary study for setting up a bi-directional control channel for asymmetric communication is raised.

AVC-656 [94/214] Necessary provision for applying H.222.0 to the H.32X terminals (Japan)

This document proposes new entries to the definition of elementary streams, *stream_id* in the PES header, *stream_type* in Program Stream Map and Program Map Table, *descriptor_tag* in the stream descriptors in H.222.0 to accommodate ITU-T audio/video/data/control channels. It also discusses dynamic mode changes during transmission whose indication should be synchronous with the mode change. Use of *data_alignment_indicator* together with the PSM/PMT descriptors is proposed; this is also applicable to video frame synchronous C&I. For this purpose, a new entry to the *audio_data_stream_alignment* is proposed. Finally, this document points out a packetizing delay management problem involved in the low bit rate ITU-T audio coding.

AVC-657 [-] Consideration on error correction functionality in H.222/AAL (Japan)

This document discusses necessity of bit error/cell loss correction against the network performance assumptions given in AVC-635. For a 6 Mbit/s user information bit rate, it is concluded from the calculation of mean error free time that bit error correction is necessary for all the scenarios while cell loss correction becomes necessary only for the worst case scenario. Several error correction alternatives are illustrated; 1) use of the short interleaver in AAL1, 2) FEC in the H.222.1 specific layer with/without its own framing header, 3) FEC for the TS packet in H.222.1 specific layer/AAL2 with/without alignment with cell boundaries, 4) interleaver for 47 TS packets in AAL2. It is also argued that error detection in AAL5 and bit error correction in a higher layer do not match well.

AVC-658 [-] A study of the H.22X interaction with the AAL for the ATM transmission of TS packets (Japan)

This documents provides two examples of primitive parameters to be defined between the H.22X and AAL when TS packets are delivered through the ATM network; one for modified AAL1 where every TS packet is mapped onto 4 ATM cells, the other for AAL5 where 2 TS

packets are mapped onto 8 ATM cells. Support of packet priority and error indication are considered.

AVC-659 [-] A plan of H.32X hardware interconnection experiment in Japan (Japan)

This document provides for information on a Japan plan of H.32X hardware verification testing which is going to be carried out mid 1995. It describes objectives, time schedule, testing environments, test items as well as several points which should be decided to specify the experimental hardware.

AVC-660 [-] Darft H.22X (Editor, Stuart Dunstan)
AVC-661 [-] Draft H.32X (Editor, Chia-Chang Li)
AVC-662 [-] Draft H.32Y (Editor, Sakae Okubo)
AVC-663 [-] Draft H.32Z (Editro, Geoff Morrison)

These documents contain drafts which reflect discussion at the Paris meeting and subsequent correspondence. Many open issues are indicated in form of editor's comments.

AVC-664 [94/254] Multiplex at ATM layer with H.222 (KPN-PTT)

This document discusses use of multiple VCs for different elementary streams in a program or different programs in a TS. Specific requirements for H.222.1 to support this are; 1) combining the data from different VC's into a logical valid TS or PS for the target H.222.0 decoder, 2) compensation of the transmission delay differences between the VC's, 3) reduction of cell delay variations between the VC's to a jitter that is acceptable for the target H.222.0 decoder. As a conclusion, it is suggested to define a conformance point at the H.222.1/AAL service boundary for this multiple VC configuration.

AVC-665 [94/220] Closed caption in ITU-T H.262|ISO 13818-2 (Bellcore)

This document proposes to standardize a mechanism to carry closed caption information which is tightly synchronized with the picture data. The specifications should include location, (de)cipher and other necessary elements. As to the location, use of the *user_data* in the picture header of ITU-T Rec. H.262|ISO/IEC 13818-2 is proposed as is done in the Grand Alliance HDTV approach.

AVC-666 [-] H.32X Communication Modes, Terminal Types, and Interwroking Scenarios between H.32X Terminals (AT&T)

This document provides a framework for the work on H.32X communication modes which consist of Video Codec Capability (VCC), Audio Codec Capability (ACC), and Network Adaptation Capability (NAC) with distinction between the transmit end (TE) and receive end (RE) characteristics. It also provides a strawman proposal for H.32X communication modes, terminal types and interworking scenarios which are based on the discussion in AVC-608,610,612; Types A,B,C are defined according to the picture format class (CIF, 601, HDTV).

AVC-667 [-] Inter-operability between B-ISDN H.32X and N-ISDN H.320 Terminals (AT&T)

H.32X support of H.320 capabilities are discussed and the following is proposed among other things; 1) at minimum two Service Channels, namely transfer rate up to 2x64 kbit/s, 2x384 kbit/s, 1920 kbit/s and their restricted network versions, 2) audio coding of G.711, G.722 and G.728, 3) H.261 with CIF and QCIF formats and 1/29.97 minimum Picture Interval, 4) LSD channel. The conclusion is tabulated with indication of "Mandatory" or "Optional' for all the H.320 capabilities.

AVC-668 [-] Video Conferencing Control and Indication Signals for H.262 (AT&T)

This document proposes that we pay a special attention to the transmission of C&I signals which are tightly coupled with the video pictures. Four alternative transmission methods are provided for urgent consideration; 1) a separate (logical) channel, 2) *user_data* or *extension_data* within the H.262 video sequence header, 3) *PES_extension* field within the PES packet header, 4) *extra_information_picture* field of the H.262 picture header.

AVC-669 [94/228] ITU-T Approval of Common Text Recommendations | International Standards (Rapporteur,

The ITU-T approval process till the publication of the common text MPEG-2 standards (ITU-T Rec. H.222.0|ISO/IEC 13818-1 and ITU-T Rec. H.262|ISO/IEC 13818-2) is tabulated. Requests for cooperation are also described; handling of comments to the DIS version, facilitating to make delta documents for the February 1995 meeting of SG15 and collection of patent statements and information.

AVC-670 [94/227] Patent Statements and Information for Draft ITU-T Rec. H.262 | ISO/IEC 13818-2 (Rapporteur)

This document summarizes the submission of patent licensing policy statements and information on relevant patens by the patent holders. As a conclusion, cooperation of the ITU-T and ISO/IEC JTC1 members are appreciated and further cooperation

AVC-671 [-] Considerations for H.32Z Endpoints (AT&T)

Noting that non-guaranteed bandwidth LANs are critical to the success of H.32Z, the following is suggested; 1) splitting H.32Z into two parts - one for guaranteed bandwidth LANs, the other for non-guaranteed bandwidth LANs, 2) use of RTP from the IETF for the latter part of H.32Z.

AVC-672 [-] Cell Delay Variation (CDV) in ATM Networks (AT&T)

This document (1) emphasizes the standardized CDV parameter in ITU-T Recommendation I.356, (2) summarizes work for CDV characteristics to date, (3) comments on the independence of delay between successive links in an end-to-end connection, and (4) presents some preliminary simulation results on the delay characterization in ATM networks. It is concluded that a value of equal to 350 service times (service time = cell transmission time) as the 10^{-10} th quantile point of the delay distribution is anticipated for a maximum of 20 switches, muxes and cross connects, giving a CDV of 0.96 milliseconds for 156 Mbit/s trunks.

Temporary Documents

TD-1	Rapporteur	Agenda for the sole sessions
TD-2	Rapporteur	Available documents for the Grimstad meeting
TD-3	G. Franceschini	E-mail regarding VBR
TD-4	G. Franceschini	Support of VBR Real Tome services in the AAL
TD-5	Rapporteur	Draft summary of discussion on Wednesday
TD-6	SG8	Liaison statement to Study Group 15 (Q.2/15) on B-ISDN audiographic and audiovisual conferencing on ATM
TD-7	AVC Experts Group	Support of ITU-T Control and Indication Signals
TD-8	H. Radha	Summary of H.32Y discussion and H.320/H.32X interoperability issues
TD-9	G. Morrison	Excerpt from IEEE 802.9a Draft Standard
TD-10	S. Dunstan	Summary of discussion on "H.22X and H.222.0", item 5 of TD1
TD-11	Rapporteur	Draft report of the sole sessions in Grimstad

END

ITU-T SG15 Experts Group **ISO/IEC JTC1/SC29/WG11**
TD No.7 rev (Grimstad) **MPEG94/262**
July 18, 1994 **July 18 1994**

Source: ITU-T SG15 Experts Group for Video Coding and Systems in ATM and Other Network Environments
Title: Support for ITU-T Control and Indication Signals
Purpose: Discussion/Proposal
Relevant sub-group: Systems

1. Background

To accommodate the requirements of audiovisual communications systems in ATM environments (ITU-T Rec. H.32X), ITU-T Rec. H.222.0 | ISO/IEC 13818-1 and ITU-T Rec. H.222.1 should provide the following in addition to the generic functionalities already covered by ITU-T Rec. H.222.0 | ISO/IEC 13818-1:

- provision of a control channel for audiovisual communication control,
- use of audio and video coding algorithms other than ISO/IEC 13818 and ISO/IEC 11172,
- inclusion of control and indication signals synchronized with the presentation of audiovisual frames,
- change of audio coding and other communication modes during communication.

This document discusses and proposes necessary provisions in ITU-T H.222.0 | ISO/IEC 13818-1 to allow the above functions.

2. Introduction

At the June 1994 Atlanta MPEG Systems meeting, a "stream type" was reserved in ISO/IEC 13838-1 table 2-35 (p. 56) for "ITU-T auxiliary data." Stream type value 0x09 identifies streams that carry control-type information such as ITU-T control and indication messages, closed-caption data, etc. Stream_type values are used in the TS_program_map_section() and program_stream_map() to identify elementary stream types within Transport Stream and Program Stream PSI tables.

The execution or use of some ITU-T auxiliary information must be synchronized with the presentation of audiovisual data [1, 2, 3]. This contribution suggests that the ITU-T define syntax for ITU-T auxiliary information that uses the MPEG-2 PES Packet structure to achieve this synchronization. A benefit of this approach is that it supports the transmission of ITU-T auxiliary information in Program Streams as well as in Transport Steams.

We propose that ISO/IEC and ITU-T allocate one stream_id in ITU-T H.222.0 | ISO/IEC 13818-1 table 2-18 (p. 30) for ITU-T auxiliary information: the suggested codeword is the currently-reserved value "1111 0100". (This proposal is an alternate to that suggested in document AVC-656|MPEG94/214, which proposes the allocation of multiple stream_id's to indicate the type of ITU-T channel: control and indication, data, etc.). This table entry should include a note that refers to ITU H.222.1, will define the syntax of elementary streams with this stream_id value. Suggested text for the note is, "This stream_id only is allowed in streams with stream_type = 0x09 (table 2-35)."

It would be possible to carry ITU-T auxiliary information in elementary streams that use stream_id values of 1011 1101 or 1011 1111 (private_stream_1 or private_stream_2), but the use of a separate stream_id value helps ensure that decoders recognize the type of such elementary streams. Further, the availability of a unique stream_id value for ITU-T auxiliary data allows decoders to distinguish between elementary streams that carry true control/indication information from ITU-T auxiliary streams that carry ITU-T audiovisual data such as H.261 video or G.711 audio. To enable the transmission of ITU-T encoded audio and video data in elementary streams with stream_type = 0x09, we recommend that:

- the description of stream_id 110x xxxx be changed to read, "ISO/IEC 13818-3 or ISO/IEC 11172-3 or ITU-T audio stream number x xxxx"
- the description of stream_id 1110 xxxx be changed to read, "ITU-T H.262 | ISO/IEC 13818-2 or ISO/IEC 11172-2 or ITU-T video stream number xxxx"

3. ITU-T Auxiliary Data Syntax

We propose that H.222.1 define ITU-T auxiliary elementary streams to follow the same PES packet format as private_stream_1. This syntax allows the execution of ITU-T control and indication messages to be synchronized with the presentation of audiovisual data, by use of the PTS and DTS fields. We recommend that in ITU-T auxiliary elementary streams, the following fields in the PES packet header be set to fixed values:

- data_alignment = 0
- copyright = 0
- original_or_copy = 1
- DSM_trick_mode = 0
- additional_copyright_info = 0

The syntax and semantics for the PES packet payloads in an ITU-T auxiliary elementary stream will be determined by the elementary stream descriptors used to describe the elementary stream. (Section 2.6 of ISO/IEC 13818-1 explains elementary stream descriptors.) ITU-T H.222.1 should define descriptors for ITU-T auxiliary elementary streams. H.222.1-defined descriptors will use "user private" descriptor tag values (ISO/IEC 13818-1 table 2-39). These descriptors will not be used in the ISO/IEC 13818-1 program_stream_map() or TS_program_map_section() to describe entire programs, but only will be used to describe elementary streams.

Benefits of this proposed syntax include:

- minimal modifications are needed to the ITU-T H.222.0 | ISO/IEC 13818-1 DIS,
- the existing PTS/DTS mechanism is used for synchronization of ITU-T auxiliary information with audiovisual data,
- the format of auxiliary data as its own stream allows ITU-T auxiliary streams to be added and dropped from ITU-T H.222.0 | ISO/IEC 13818-1 programs easily, solely via entries in the TS_program_map_section() or program_stream_map(),
- much of this syntax can be parsed in the same way as other components of ITU-T H.222.0 | ISO/IEC 13818-1 streams.

Drawbacks of this method include:

- Possible inefficient use of bits to transmit auxiliary information. However, H.222.1 could define "packed" formats that combine several control and indication messages within a single PES packet.

Although it is beyond the scope of this proposal to define the ITU-T auxiliary elementary stream descriptors and the syntax of ITU-T auxiliary elementary stream data, we feel that the adoption of the syntax presented above would allow decoders to know where within the ITU-T H.222.0 | ISO/IEC 13818-1 syntax to look for auxiliary information.

4. Example of ITU-T Auxiliary Information

H.222.1 could define a video_control_descriptor, following the syntax of ITU-T H.222.0 | ISO/IEC 13818-1 section 2.6. This descriptor, applied to an elementary stream, indicates that the elementary stream carries video display control signals. An elementary stream referenced by this descriptor could carry directives such as "freeze_frame_release" in its PES packet payloads. The time at which a directive should be implemented is carried in the PTS field of the header of the PES packet that carries the directive.

5. Summary of Suggested Changes to DIS 13818-1

- In table 2-35, the description corresponding to value 0x09 should read: "ITU-T auxiliary".
- In table 2-18, stream_id value 1111 0100 should be allocated for ITU-T auxiliary data. A note attached to this table entry should read, "This stream_id only is allowed in streams with stream_type = 0x09 (table 2-35)."
- In table 2-18, the description of stream_id 110x xxxx be changed to read, "ISO/IEC 13818-3 or ISO/IEC 11172-3 or ITU-T audio stream number x xxxx"
- In table 2-18, the description of stream_id 1110 xxxx be changed to read, "ITU-T H.262 | ISO/IEC 13818-2 or ISO/IEC 11172-2 or ITU-T video stream number xxxx"

6. References

[1] AVC-656 | MPEG94/214 Necessary provision for applying H.222.0 to the H.32X terminals (Japan)
[2] AVC-668 Video conferencing Control and Indication signals for H.262 (AT&T)
[3] AVC-665 | MPEG94/220 Closed caption in ITU-T H.262||ISO/IEC 13818-2 (Bellcore)

Source: Stuart Dunstan
Title: Summary of discussions on H.222.0 and H.222.1
Purpose: Report

1) As proposed in AVC-636 and AVC-658, parameters relating to primitives at the ATM Adaptation Layer Service Access Point (AAL-SAP) were defined. Table 1 shows the required primitives and parameters for use with H.222.1.

side	primitive	direction	parameters
send	AAL_request AAL_response	user to AAL AAL to user	DATA, PRIORITY STATUS
receive	AAL_indication AAL_command	user to AAL AAL to user	DATA, STATUS STATUS

Table 1. Proposed definition of primitives for use with H.222.1 at AAL-SAP

In the case of the Transport Stream, the PRIORITY parameter will not be tightly coupled to the transport_priority bit in the Transport Stream packet header. In the case of an integrated H.32X terminal, the entity which might set the transport_priority bit has access to the AAL-SAP, and can set the PRIORITY parameter as required. In the case of a Transport Stream being accessed remotely, it remains the users option as to how priority should be implemented, and as to whether it should or should not be used. Such choices depend on cost, and network Quality Of Service offerings. Priority may as well be implemented using multiple virtual channels.

The primitive names and the exact meaning of the parameters in Table 1 require further study. There may be a STRUCTURE parameter associated with the AAL_request and AAL_indication primitives.

It is not clear whether the primitives definitions should reside in Rec. I.363 or Draft Rec. H.222.1. For the moment they will be placed in Draft Rec. H.222.1, to indicate what is expected from the AAL.

2) The ATM performance assumptions, in AVC-635, were reviewed. The quoted figures represent the feeling of a group of experts. The meeting expressed some concern at the rather high end-to-end delay figure, and its consequences. The figure was not changed. The document is to be forwarded to the ATM Forum, and to ITU-T SG13 for information.

3) AVC-657 considered the Mean Error Free Time, and concluded that bit error correction was required, even for bit error rates of 10^{-9}. As a result the performance of AAL type 5 for audio and video is sensible only for low error environments. Of the error correction proposals shown in AVC-657, generic proposals are preferable. The meeting did not recommend a particular solution.

[Note: While the MEFT is a reasonable measure of channel performance, the effect of bit error may not be significant due to concealment].

4) AVC-656 discussed the need for a H.222.1 control channel for terminal-to-terminal and terminal-to-MCU signalling. Discussion based on the proposal in AVC-656 led to the following solution:

- request ISO/IEC MPEG to allocate a specific stream_id value for ITU-T purposes. An ITU-T stream_type value already exists.

- in H.222.1 define descriptors, for use in the Transport Stream PSI or the Program Stream PSM tables, which identify the nature of the ITU-T stream. Only descriptor values greater than or equal to 64 shall be used. These ITU-T defined descriptors apply only to individual streams and not to whole programs.

AVC-665 considered closed captions. It is believed that closed captions can be handled within the above method of C&I signalling.

The method of mode switching presented in AVC-656 was reviewed. Further thought is required as to how mode switching is best achieved in the Program Stream and the Transport Stream.

5) It is believed that H.222.1 should support the following modes of communication:

acknowledged- this method is only appropriate in bi-directional point to point communications. It may offer the most robust performance.

unacknowledged - this method is the only alternative in unidirectional communications. Information is transmitted repeatedly. The required bandwidth to do so may not be great.

In contrast to H.320, H.32X should allow the receive terminal to set a preferred mode of operation. Higher level error conditions in Rec. H.32X need to be identified.

6) The means to set the H.222.1 mode should be provided by out of band signalling i.e. by the user data fields in Q.2931. This includes selection of the Program Stream or Transport Stream.

7) Liaison with ITU-T SG8 was reviewed. SG8 deal with the T.120 series of audiographic conferencing recommendations. They are concerned that multiplexing in H.222.1, and the use of real time AALs, may not be appropriate for their purposes. Their preferred option is for use of a separate VC for T.120 purposes.

8) AVC-664 illustrated the use of H.222.1, with multiple VCs. The contribution illustrated the fact that while H.222.0 provides support for hierarchical coding, it says nothing about how to carry hierarchical coded signals in multiple channels. H.222.1 should define how this is to be done.

9) A contribution on how to speed up the locking of the phase locked loop, for removal of jittered clock references in H.222.0, was reviewed. The method was based upon knowledge of the rate of the incoming stream.

10) The text in the current version of H.222.0 relating to multiple program, variable bit rate Transport Streams, was questioned. The meeting agreed that a variable bit rate Program Stream, or a single program Transport Stream was not difficult to construct. However the issue, stated in H.222.0, that a variable bit rate Transport Stream, was "generally not possible", was disputed. While it may or may not be easy to do, there appears to be nothing that prohibits such a Transport Stream.

11) The draft text for H.222.1 was reviewed. It was agreed that ISO protocol layering principles, are a convenient means of specifying the H.222.1 protocol. Some text changes were incorporated.

12) The protocol model used to identify network adaptation functions in H.32X was reviewed. The model is still relevant, though some minor changes were made.

- end -

Source: Chia-Chang Li
Title: Summary of H.32X Discussions
Purpose: Report

1. Introduction

This document summaries the discussion of H.32X terminals and systems and the hardware specification of H.32X hardware verification test during the 16th meeting of ITU-T SG15 Experts Group on Video Coding and Systems in ATM and Other Network Environments.

2. Summary

1) The communication modes of H.32X terminals will be specified separately for the Receive End and Transmit End for the following attributes
   - Video Codec Capabilities
   - Audio Codec Capabilities
   - Network Adaptation Capabilities
2) Network Adaptation Capabilities Attribute is further divided into three sub-attributes
   - Multiplex and Synchronization
   - AAL
   - Transfer Rate
3) The H.32X terminal types will be defined in such a way that there exists a hierarchical structure of the sub-types within a type of terminals, i.e., a terminal of "higher" sub-type will have all the mandatory capabilities of the terminals of "lower" sub-types.
   The hierarchy between H.32X terminal types will be defined in such a way that a "higher" type terminal will have a minimum set of capabilities to allow maximum interworking with the "lower" type terminals.
4) If different "profiles" are defined for Control & Indication Capabilities, C&I Capabilities will also be a distinguishing attribute of the communication modes.
5) It is recognized the benefits of several preferred approaches of attribute value specification. These include using on-off switch for some attributes and using maximum rate for the transfer rate specification.
6) H.331 broadcast-type terminal lacks the communication capability for mode-switching. It is desirable for H.32X to improve over this deficiency.
7) The system configuration diagram in H.32X Draft will be improved to reflect better the relationship and information flow between the building blocks.
8) AVC-659 discussed the work plan and hardware specification for an H.32X hardware interconnection trial in Japan. While discussion carried out in the meeting focused on the initial hardware specification for the experiment, which will use a subset of the H.32X, it also touched on inevitably several issues of H.32X specification.
   - Audio: There is a general agreement that MPEG-1 Audio should be used for the experiment and be included as an Audio Codec Capabilities attribute value in H.32X communication mode specification.
   - Video: The video codec capabilities of B2-type terminals, as was discussed in AVC-666, will be used for the experiment.
   - Data, Communication Procedure, Control and Indication Protocol: It was agreed upon that it is too aggressive for this experiment initially.
   - Program Stream/Transport Stream: Decoders will be required to do both TS and PS.
   - AAL: A maximum combination of AAL1, 5 and VBR, CBR or a subset of them will be considered for the experiment.
   - It is recognized that other standards setting and consensus forming bodies currently focus more on AAL1 and AAL5. It is this group that understands better the characteristics of the video applications and thus should lead the development of AAL2. Experts Group members are encouraged to bring in contributions to speed up the definition of AAL2.

END

Source: Hayder Radha
Title: Summary of H.32Y Discussions and H.320/H.32X Interoperability Issues
Purpose: Report

1. Introduction

This report summarizes the AVC Experts Group discussions regarding Recommendation H.32Y. In addition, discussions regarding the interoperability and interworking between existing H.320 terminals and H.32X terminals are also outlined.

2. Summary of H.32Y Discussions

1) H.32Y terminals will support AAL Type 1 for the adaptation of H.320 over ATM.

2) There are two possible implementations of H.32Y terminals: (1) an integrated solution including both H.320 and AAL-1 capabilities in one terminal equipment (B-TE), and (2) a two-component solution which consists of an H.320 terminal and an AAL-1 broadband adaptor (B-TA).

3) H.32Y terminal types will follow the same terminal types specified by Recommendation H.320. In addition, AAL-1 tools and capabilities will be defined for H.32Y.

4) By the next AVC meeting, the group should decide the level of support of the SDT pointer capability by H.32Y terminals. The level of support may be optional, mandatory, or none.

5) AVC-653 provided AAL-1 and Q.2931 parameters for circuit emulation mode of H.32Y terminals. Based on the parameters shown, it was noted that multiple B and H0 connections supported by H.320 terminals will be mapped onto the corresponding number of ATM virtual connections.

6) The number of virtual channels supported by an H.32Y terminal will be the same as the number of B or H0 channels supported by the corresponding H.320 terminal type.

7) By the next meeting the group should decide the level of support of the short interleaver FEC capability by H.32Y terminals.

8) Currently, the support of both the short interleaver FEC and SDT pointer is not possible. This issue is under consideration by Study Group 13 as noted by Mr. Yamazaki contribution on circuit emulation (AVC-634).

9) As noted in AVC-653, N-ISDN circuit emulation includes the SDT pointer. This excludes the usage of the short interleaver FEC approach. This issue should be clarified with SG13.

10) It is not clear if the signaling of AAL-1 tools (e.g., FEC) can be achieved among H.32Y terminals, AAL-1 terminal adaptors, and interworking units. If such AAL capabilities are not communicated, it is not clear how terminals and adaptors will decide when to use these capabilities. This issue should be addressed with SG13.

11) It was noted that the short interleaver FEC method, which protects against one cell loss in a 16-cell block, may not be required under several transmission conditions. However, a simpler FEC approach which only protects the data against BER conditions (i.e., no cell loss protection) might be desired. Currently, AAL-1 does not support such a mechanism (i.e., error correction capability only). This issue will be addressed with SG13.

12) A preliminary experiment for the deployment of H.320 codecs over ATM networks was conducted by BT (AVC-651) between Ipswich and London. The experiment was based on

AAL-1 with adaptive clock recovery. No visual degradation was observed based on this experiment. However, it was emphasized that the results were very preliminary. Future experiments and their results will be shared with the AVC Experts Group.

3. H.32X Support of H.320/Y capabilities

1) It was agreed that a minimum set of H.320/Y capabilities should be defined for their support by H.32X terminals. This minimum set will reflect, as much as possible, the common features and capabilities found in existing H.320 terminals.

2) AVC-667 provided a proposed set of H.320 capabilities to be supported by H.32X terminals. The following summarizes some of the major capability modes to be supported:

- Transfer modes B, 2B, H0, H11, and H12. Other modes are optional.
- G.711, G.722, and G.728 audio coding modes.
- H.261 video mode.
- MLP and H-MLP data modes.
- H.221 multiframe structure and a minimum of two service channels. The support of a higher number of service channels (i.e., 3-6 service channels) is optional.
- H.261 BCH, H.221 CRC4, and BAS double-error correction codes.

3) The definition of the above set of capabilities will be extended to include AAL-1 tools that H.32Y terminals will support. This will provide a comprehensive frame-work for the inter-working between H.32X and H.32Y terminals.

4) It was agreed that identifying a Class 1 (or Type A) H.32X terminal which only supports H.320/Y capabilities will not be required. Therefore, all H.32X terminal types will support some level of high-end capabilities (e.g., H.262 video) and a minimum set of H.320/Y features as explained above.

END