

**INTERNATIONAL ORGANIZATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE NORMALISATION
ISO/IEC JTC 1/SC 29/WG 11
CODING OF MOVING PICTURES AND AUDIO**

ISO/IEC JTC 1/SC 29/WG 11 **N1835**

October 1997

Source: Leonardo Chiariglione - Convenor
Title: Report of Fribourg meeting
Status: Draft

1. Opening

The 41st WG11 meeting was held in Fribourg, CH, on 97/10/27-31 at the kind invitation of SNV, the Swiss National Body.

2. Roll call of participants

This was not performed because of constraints of time.

3. Approval of agenda

Annex 1 gives the approved agenda

4. Allocation of contributions

Annex 2 gives the documents submitted

5. Communications from Convenor

There was no specific communication to be made.

6. Report of previous meeting

The Convenor apologised with the meeting on his inability to provide the Bristol meeting report. Because of the recurrence of these episodes he promised this to be the last. If needed he would ake recourse to *very* strong actions.

7. Processing of NB Position Papers

These were considered and appropriate responses drafted and approved.

8. MPEG Phase 2

8.1 Verification of MPEG-2

Work on AAC verification was continued.

8.2 *Amendments*

8.2.1 AAC Conformance Testing (part 4 #1)

This was promoted to FPDAM

8.2.2 Simulation Software (Part 5 #1)

This was promoted to FPDAM

8.3 *Corrigenda*

A corrigendum of part 7 was initiated

8.4 *Workplan*

This was approved

9. MPEG Phase 4

9.1 Requirements

Work on applications and requirements continued. Profile information was introduced in parts 1, 2 and 3 of the MPEG-4 CD.

9.2 Tools

9.2.1 DMIF

Tools were introduced in final form in the DMIF CD

9.2.2 Systems

Tools were introduced in final form in the Systems CD

9.2.3 Natural Video

Tools were introduced in final form in the Visual CD

9.2.4 Synthetic Video

Tools were introduced in final form in the Visual CD

9.2.5 Natural Audio

Tools were introduced in final form in the Audio CD

9.2.6 Synthetic Audio

Tools were introduced in final form in the Audio CD

9.3 Verification Models

9.3.1 System

Version 2 Verification Model was approved as a continuation of Version 1.

9.3.2 Video

Version 2 Verification Model was approved as a continuation of Version 1.

9.3.3 Audio

Version 2 Verification Model was approved as a continuation of Version 1.

9.3.4 SNHC

Version 2 Verification Model was approved as a continuation of Version 1.

9.4 Reference software

The reference software was updated

9.5 Working Draft

9.5.1 System

The version 1 CD and the version 2 WD were approved

9.5.2 Video

The version 1 CD and the version 2 WD were approved

9.5.3 Audio

The version 1 CD and the version 2 WD were approved

9.5.4 DMIF

The version 1 CD and the version 2 WD were approved

9.5.5 Software

The version 1 CD and the version 2 WD were approved

9.6 Verification Tests

9.6.1 Video

The Video Verification Test plan was approved

9.6.2 Audio

The Audio Verification Test plan was approved

9.7 Conformance Testing

9.7.1 System

A first working draft was approved

9.7.2 Video

A first working draft was approved

9.7.3 Audio

A first working draft was approved

9.7.4 DMIF

A first working draft was approved

9.8 Workplan

This was approved

10. MPEG Phase 7

10.1 Applications

An application document was approved

10.2 Requirements

A requirements document was approved

10.3 Workplan

This was approved

11. Overall WG11 workplan

This was approved

12. Liaison matters

Input documents were considered and responses provided

13. Administrative matters

13.1 Schedule of future MPEG meetings

This was approved

13.2 Promotion of MPEG

Several updates to the MPEG home page and a press release were produced. In addition the MPEG-4 Overview, covering also version 2 was produced. Several documents to be made public were identified. A press release was approved

14. Organisation of this meeting

14.1 Tasks for subgroups

14.1.1 Requirements

- MPEG-4 Applications
- MPEG-4 Requirements
 - File format
 - IPR support
 - ver. 2 requirements
- MPEG-4 Profiles into parts 1-2-3
- MPEG-4 ver. 1 overview
- MPEG-4 ver. 2 overview
- MPEG-7 Applications
- MPEG-7 Requirements
- Press Release

14.1.2 Tasks for subgroups - DMIF

- DSM-CC Conformance Testing CD
- DMIF ver. 1.0 CD
- DMIF software
- Review of MPEG-4 ver. 1.0 overview
- Amendment to MPEG-4 part 6
- DMIF ver. 2.0 WD
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.3 Tasks for subgroups - Systems

- MPEG-4 Systems ver. 1.0 CD
- Contribution to MPEG-4 Verification Tests Plan
- Review of MPEG-4 ver. 1.0 overview
- Amendment to MPEG-4 part 1
- MPEG-4 Systems ver. 2.0 WD
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.4 Tasks for subgroups - Video

- MPEG-4 Video ver. 1.0 CD
- Contribution to MPEG-4 Verification Tests Plan
- Review of MPEG-4 ver. 1.0 overview
- Amendment to MPEG-4 part 2
- MPEG-4 Video VM
- MPEG-4 Video ver. 2.0 WD
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.5 Tasks for subgroups - Audio

- AAC Conformance Testing (part 4 amd#1)
DoC & FCD Final text
- Simulation Software (Part 5 amd#1)
DoC & FCD Final text
- MPEG-4 Audio ver 1.0 CD
- Contribution to MPEG-4 Verification Tests Plan
- Review of MPEG-4 ver. 1 overview

14.1.5 Tasks for subgroups - Audio (2)

- Amendment to MPEG-4 part 3
- MPEG-4 Audio VM (ver. 2.0)
- MPEG-4 Audio ver. 2.0 WD
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.6 Tasks for subgroups - SNHC

- Contributions to MPEG-4 ver. 1.0 parts 1-2-3
- Contribution to MPEG-4 Verification Tests plan
- Review of MPEG-4 ver. 1.0 Overview
- Contributions to Amendments to MPEG-4 parts 1-2-3
- SNHC ver. 2.0 VM
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.7 Tasks for subgroups - Tests

- AAC Verification Tests
- MPEG-4 ver. 1.0 Verification Test Plan
- Review of MPEG-4 ver. 1.0 Overview
- Contributions to Press Release

14.1.8 Tasks for subgroups - Implementation Studies

- CGD into Video CD
- Report on “Decoder quality of service levels” & Recommendations
- Contribution to Press Release

14.1.9 Tasks for subgroups - Liaisons

- Review liaisons from
 - SC24/VRML
 - TC46/SC9/WG1
 - ITU-T SG 16
 - MMA
 - FIAPF
 - IETF AVT WG
 - et al.

14.1.10 Tasks for subgroups - Reference Software

- MPEG-4 reference software ver. 1.0 CD
 - all groups to provide software to Mike Coleman
- Review of MPEG-4 ver. 1.0 Overview
- Amendment to MPEG-4 part 5
- MPEG-4 reference software ver. 1.0
- Contribution to MPEG-4 ver. 2 overview
- Contributions to Press Release

14.1.11 Tasks for subgroups - Conformance Testing

- MPEG-4 ver. 1.0 Conformance Testing WD

14.2 Finalisation of meeting allocation

The following joint meetings were held:

Group 1	Group 2	What for	Day	Time	Where
Audio	Requirem	Audio prof	Tue	9-10	Audio
Audio	Test	Verif. Tst	Mon	4-5	Audio
Audio	Systems	Synchronis	Tue	10-11	Systems
Systems	Requirem	File format	Mon	5-6	Requir
Systems	SNHC	BIFS	Tue	2-5	Systems
Systems	Requirem	OCI/IPR	Wed	11-12	Systems
Systems	DMIF	Walkthru	Tue	11-13	Systems
Requirem	ISG	Compl. Metr	Tue	1-2	Requir.
Requirem	DMIF	DMIF Req	Tue	2-3	Requir
Audio	Test	Audio Tests	Wed	4-5	Audio
Audio	Req	Audio Prof	Thu	9:30-10	Audio
Video	Req	Video Prof.	Wed	2-4	Video
Systems	Req	Syst. Misc.	Wed	11-13	Systems
Video	ISG, Req	Video Misc.	Thu	9-10	Video
System	DMIF	Back chann	Wed	4-6	Systems
Req.	SNHC	SNHC prof	Wed	5-6	Req
Syst	Video	Timing	Thu	10-11	Video

Syst	ISG	QoS	Thu	11-12	Syst
Video	Test	Verif. Test	Thu	2-3	Test

15. Planning of future activities

The following ad hoc groups were established

1888	AHG on 3D model coding
1927	AHG on AAVS Specification
1862	AHG on audio/systems issues
1926	AHG on BIFS Scene Description
1893	AHG on CD 14496-6 editing
1963	AHG on Computational Graceful Degradation (CGD)
1897	AHG on content-related IPR
1964	AHG on Core experiment on Binary Shape complexity in Simple profile.
1880	AHG on core experiments on coding efficiency in MPEG-4 video
1877	AHG on core experiments on coding of arbitrarily shaped objects in MPEG-4 video
1878	AHG on core experiments on error resilience in MPEG-4 video
1879	AHG on core experiments on multifunctional coding in MPEG-4 video
1965	AHG on Decoder QoS.
1881	AHG on editing the documents of the MPEG-4 video verification model and the MPEG-4 visual working draft
1887	AHG on FBA
1856	AHG on MPEG-2 AAC conformance and technical report
1857	AHG on MPEG-2 AAC stereo verification tests
1841	AHG on MPEG-2 Advanced Layer Coding for High Resolution Video
1858	AHG on MPEG-4 audio CD and reference software CD progression
1863	AHG on MPEG-4 audio error resilience
1860	AHG on MPEG-4 audio verification tests
1861	AHG on MPEG-4 audio website
1896	AHG on MPEG-4 Composition Profiles and Levels
1864	AHG on MPEG-4 conformance
1865	AHG on MPEG-4 core experiments for version 2
1884	AHG on MPEG-4 Random Access Coding
1859	AHG on MPEG-4 structured audio developments
1883	AHG on MPEG-4 texture coding
1885	AHG on MPEG-4 tools complexity
1882	AHG on MPEG-4 video encoder optimization
1962	AHG on MPEG-4 video verification tests
1894	AHG on MPEG-7 Requirements
1895	AHG on other MM Metadata schemes
1931	AHG on Representation of Time and Decoder Configuration
1937	AHG on SNHC VM editing
1930	AHG on Systems Conformance and Bitstreams Exchange
1925	AHG on Systems Elementary Streams Management
1924	AHG on Systems Specifications Editing
1932	AHG on Systems User to User interaction
1928	AHG on Systems Version 1.0 Software Implementation
1929	AHG on Systems Version 2.0 Software Implementation

16. Resolutions of this meeting

These were approved

17. A.O.B

No other business

18. Closing

The meeting was closed 97/10/31 at 21:00 with thanks to the hosting organisation.

Annex 1
Agenda

1. Opening
2. Roll call of participants
3. Approval of agenda
4. Allocation of contributions
5. Communications from Convenor
6. Reports of previous meetings
7. Processing of NB Position Papers
8. MPEG Phase 2
 - 8.1 Verification of MPEG-2
 - 8.2 Amendments
 - 8.2.1 AAC Conformance Testing (part 4 #1)
 - 8.2.2 Simulation Software (Part 5 #1)
 - 8.4 Corrigenda
- 8.3 Workplan
9. MPEG Phase 4
 - 9.1 Requirements
 - 9.2 Tools
 - 9.2.1 DMIF
 - 9.2.2 Systems
 - 9.2.3 Natural Video
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 - 9.2.5 Natural Audio
 - 9.2.6 Synthetic Audio
 - 9.3 Verification Models
 - 9.3.1 System
 - 9.3.2 Video
 - 9.3.3 Audio
 - 9.3.4 SNHC
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 - 9.5 Working Draft
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 - 9.5.4 DMIF
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 - 9.6 Verification Tests
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 - 9.7 Conformance Testing
 - 9.7.1 System
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 - 9.7.4 DMIF
 - 9.8 Workplan
10. MPEG Phase 7
 - 10.1 Applications

- 10.2 Requirements
- 10.3 Workplan
- 11. Overall WG11 workplan
- 12. Liaison matters
- 13. Administrative matters
- 13.1 Schedule of future MPEG meetings
- 13.2 Promotion of MPEG
- 14. Organisation of this meeting
- 14.1 Tasks for subgroups
- 14.2 Finalisation of meeting allocation
- 15. Planning of future activities
- 16. Resolutions of this meeting
- 17. A.O.B
- 18. Closing

Annex 2

List of submissions

Number	Source	Title
2594	Pete Schirling	Document Register for 41st Meeting in Fribourg, CH
2924	SC 24 and VRML	2nd joint statement from SC 24 and VRML ÖSC 29 N 2281å
2862	Peter Kuhn, Georg Diebel	Complexity Analysis of the MPEG-4 Video Verification Model Version 8.0
2595	Joern Ostermann	Activities related to coding of arbitrarily-shaped objects in MPEG-4 video during the Stockholm meeting
2596	Vahe Balabanian	DMIF July 1997 (Stockholm) Meeting Report
2597	SC 29 Secretariat	Summary of Voting on ISO/IEC 13818-4/PDAM 1 (SC 29 N 2194)
2598	SC 29 Secretariat	Summary of Voting on ISO/IEC TR 13818-5/PDAM 1 (SC 29 N 2195)
2599	Hai Tao, Homer Chen	FAP Interpolation Table (FIT)
2600	MIDI	Liaison Statement from MIDI Manufacturers Association to SC 29/WG 11 (SC 29 N 2229)
2601	Brent Wilson, C.S. Boon	Market Driven Levels with CGD
2602	Vahe Balabanian	SG16 liaison in response to liaison N1777 from ISO/IEC MPEG
2603	Roberto Pockaj, Fabio Lavagetto	Proposal for FAP1 and FAP2 syntax modification
2604	Fernando Pereira & Adam Lindsay as chairmen of the AHG	Report of the Ad Hoc Group on MPEG-7 Requirements
2605	Fernando Pereira & Ibrahim Sezan as chairmen of the AHG	Report of the Ad Hoc Group on Object Content Information in MPEG-4
2606	Fernando Pereira (Editor)	Third Draft of MPEG-7 Requirements
2607	UK National Body, (D. J. Meares)	MPEG-4 coding issues
2608	UK National Body, (D. J. Meares)	MPEG-7 developments
2609	Casalino F, Bergallo P, Cellario L	G.723.1 software improvements in IM-1 player
2610	Zvi Lifshitz	APIs for Systems Software Implementation
2611	Zvi Lifshitz	DMIF Implementation on Local Area Networks which Provide a Non-Guaranteed Quality of Service
2612	Mike Coleman, Chuck Lueck, David Thom	Report of the Ad Hoc Group on AAC Conformance and Technical Report
2613	Jiro Katto	Some Remarks on Timing Issues in MPEG-4 Systems
2614	Minhua Zhou	Temporally adaptive binary shape coding algorithm for B-VOPs
2615	David Thom	Ad-hoc report on audio web page

2616	MIDI and WG 11 Convener	Liaison Statements between MIDI and SC 29/WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2241)
2617	Minhua Zhou	Update of vector predictors in the B-VOP vector coding
2618	Julien Sign?s,, adhoc group on BIFS	Report of the adhoc group pre meeting in Rennes
2619	Niels Rump	Protection of payload and related IPR information within the MPEG-4 IPR standard
2620	Niels Rump	Report on ad-hoc group on content related IPR issues
2621	Pascal Faudemay	Syntax proposal for OCI descriptors
2622	Pascal Faudemay	Benchmarking issues in the MPEG-7 process
2623	Pascal Faudemay	Some issues about logic representation of video scripts
2624	Wei-ge Chen, Eric Fleischman, Phil Chou, Ming-Chieh Lee	Requirements for MPEG4 file format
2625	Ulrich Benzler	Results of core experiment P8 (Motion and Aliasing compensating Prediction)
2626	MIDI Manufacturers Association	Liaison Statement from MIDI to WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2264)
2627	IEC/TC 100C	IEC FDIS 61833-1: Consumer audio/video equipment - Digital interface - Part 1: General (SC 29 N 2265)
2628	IEC/TC 100C	IEC FDIS 61833-4: Consumer audio/video equipment - Digital interface - Part 4: MPEG2-TS data transmission (SC 29 N 2266)
2629	J?rgen Ahlberg, Haibo Li	Results of FAP Coding using DCT
2630	Sang-Wook Kim, Laura Contin	Report of the ad-hoc group on MPEG-2 AAC stereo verification tests
2631	S. R. Quackenbush, J. D. Johnston	Results of Core Experiment on Perceptual Noise Substitution
2632	Haibo Li and Robert Forchheimer	Image analysis tools for distance learning applications
2633	Philip A. Chou, Eric Fleischman, Wei-ge Chen, Ming-Chieh Lee, Mark van Antwerp, Steven Levi	The MPEG-4 Stored File Format as an Extension of ASF
2634	E. Hartley, F Nack, A.P. Parkes	A review of MPEG-7 terminology
2635	Jian Zhang, Constance Belz, Norbert Gerfelder, Luc Neumann	Update of MPEG-4 Application Document regarding Mobile Multimedia Application
2636	Jian Zhang, Norbert Gerfelder, Luc Neumann	Upate of MPEG-4 Application Document regarding Collaborative Scene Visualization Applications
2637	Minhua Zhou	Experimental results on testing the skip rule in B-VOPs
2638	Minhua Zhou	Vector Padding Technique
2639	Jens-Rainer Ohm, Karsten M?ller, Silko Kruse	Incomplete 3D Representation of Video Objects

2640	Krit Panusopone, Xuemin Chen	Efficiency of alternative vertical scan for VLC of interlaced video
2641	Jae Gark Choi, Munchurl Kim, Myoung Ho Lee, Chieteuk Ahn	New ETRI results on core experiment N2 on automatic segmentation techniques
2642	Toshiaki Watanabe, Yoshihiro Kikuchi	Error Resiliency for Shape Coding (Core Experiment E14)
2643	Tadashi Araki, Tatsuya Okada and Itaru Kaneko	A source code for a psychoacoustic model of AAC encoder
2644	Wolfgang Niehsen	Results of Core Experiment P8 (Motion and Aliasing Compensating Prediction)
2645	Karlheinz Brandenburg	Report of the Adhoc Group on MPEG-4 Audio Core Experiments
2646	Klaus Diepold	Application Document Revision
2647	Shigeru Fukunaga, Yasuko Matsumura, Toshihisa Nakai	Results of Core Experiment E4 (Backward Channel Signaling)
2648	Eric Petajan, FBA adhoc group	Face Animation Profiles
2649	Eric Petajan, FBA adhoc group	Report of the adhoc group on Face and Body Animation
2650	David Meares	Availability of audio material for the MPEG web site
2651	Constance Belz, Norbert Gerfelder, Luc Neumann, Jian Zhang	Definition of a System Profile Level for 3D Graphics in Low Bitrate Environments
2652	C. S. Boon, S. Kadono, T.K Tan	Results of Bitstreams Exchange
2653	Eishi Morimatsu, Akira Nakagawa	Results of Core Experiment P13(Dynamic Resolution Conversion)
2654	Gauthier Lafruit, Jan Bormans	Complexity comparison between scalable wavelet codec and scalable DCT codec
2655	Gauthier Lafruit, Jan Bormans	Graceful degradation parameters for a scalable wavelet codec
2656	Marc Escher, Igor Pandzic, Pierre Beylot, Tolga Capin	Results of core experiments FBA3
2657	DAVIC	Liaison Statement from DAVIC to SC 29 on the Tenth Call for Proposal ÖDAVIC 450å (SC 29 N 2270)
2658	IEC/TC 100C	IEC CD 61937: Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 (SC 29 N 2273)
2659	Niels Rump,, Frank Hartung,, David Meares	Tasks for watermarking core experiments
2660	Jyri Huopaniemi	Virtual Acoustic Parameters in MPEG-4 version 2 Audio Rendering
2661	Michael Zeug	Report of Ad Hoc Group on MPEG-4 Low Delay Evaluations
2662	Michael Zeug	MPEG-4 Profile Requirements version 4.1
2663	French National Body	MPEG-4 OCI and MPEG-7 developments
2664	G.Russo, S.Colonnese, U.Mascia	Automatic Segmentation Techniques: Updated FUB Results on Core Experiment N2

2665	R. Sch?fer (Heinrich-Hertz-Institut, Germany), S. Bauer (Robert-Bosch GmbH, Germa)	Hierarchical structure of Profiles in MPEG-4
2666	Adam Lindsay	Second Draft of MPEG-7 Applications
2667	Noel Brady	Results of E14 (Error Resilient Arbitrary Shaped Objects)
2668	Anthony Vetro, Huifang Sun	Results of a mini-experiment on bit-plane coding
2669	USNB	USNB Contribution Requesting AMD to 11172-2
2670	James Van Loo	Adaptive Terminal Conformance
2671	T. Nishi, C. S. Boon, S. Kadono	Alternative-Vertical Scan Mode for Interlaced Video
2672	Yoshinori Matsui	Modifications of the Syntax and Semantics of Access Unit Layer
2673	Yoshinori Matsui	Modification of MPEG-4 Encapsulation Method by MPEG-2 Transport Stream
2674	Shinya Kadono, C. S. Boon	Comments and Proposals for the Error Resilient Coding of Arbitrarily Shaped Objects (E14)
2675	John Arnold, Wee Sun Lee, Mark Pickering, Michael Frater	Results for Core Experiment E14
2676	Dean S Messing, Ibrahim Sezan	Bitstream Exchange for 2D Dynamic Mesh Compression (Z4)
2677	Hiroyuki Katata	Result of core experiment P13(Dynamic resolution conversion)
2678	Hiroyuki Katata	Profiles requirements for temporal scalability
2679	Hiroyuki Katata, Tomoko Aono, Norio Ito, Shu-ichi Watanabe, Ryuji Kitaura	Result of bistream exchange for temporal scalability
2680	Takeshi Norimatsu, Mineo Tsushima, Tomohisa Ishikawa	Results of core experiment on Matra scalable coder
2681	Laurent Herrmann	Encapsulation of MPEG-4 Multiplexed Data into MPEG-2 TS
2682	G. Richard,, A. Le Dor?	Results of Core Experiment on an extension of the narrow-band CELP VM coder to a bandwidth scalable CELP (m2486)
2683	German National Body	Comments on the Relation between MPEG-4 and VRML
2684	German National Body	Comments on Version Management in MPEG-4
2685	Minoru Etoh, Takao Yamaguchi	Proposal for Access Unit Priority
2686	Toshio Miki, Toshiro Kawahara, Sanae Hotani	Error Pattern Generation Programs for Core Experiments on MPEG-4 Audio Error Resilience
2687	Rob Koenen for AHG on MPEG-7 Reqs	Draft v. 5 of MPEG-7 Context and Objectives
2688	Rob Koenen for MPEG-4 Requirements AHG	draft v.5 of MPEG-4 Requirements Doc

2689	Rob Koenen (KPN Research), Fernando Pereira (IST), Karlheinz Brandenburg (FHG)	Discussion on Audio Profiles
2690	Rob Koenen	Report of AHG on MPEG-4 Requirements
2691	Weiping Li, F. Ling, H. Sun	Bitplane Coding of DCT Coefficients
2692	Juergen Herre	Updated Description for Perceptual Noise Substitution Tool
2693	Torsten Mlasko, Robert Bosch GmbH, Bernd Edler, University of Hanover, Robert Boesnecker, Siemens AG, Holger Hesse, Sican	Proposal for MPEG-4 Audio Object Profiles
2694	Fernando Pereira, Olivier Avaro, et al.	Proposal for Object Content Information (OCI) in MPEG-4
2695	Fernando Pereira	Portuguese National Body Position Regarding MPEG-4 Versioning
2696	Gabriel Abrantes, Fernando Pereira	Donation to ISO of MOMUSYS Facial Animation Software
2697	Gabriel Abrantes, Fernando Pereira	Results for MPEG-4 Facial Animation System
2698	Gael RICHARD	Results of Core Experiment on Lossless Coding in the CELP core of the MPEG-4 Audio VM (m2495)
2699	G. Richard., C. Murgia., J-L Bonifas., A. Le Dor?, P. Lockwood	Results of Core Experiment on Matra's low to medium bit rates scaleable audio/speech coder (m2346)
2700	Graham Thomas	Description of virtual studio coding application
2701	Frederic Bouilhaguet, Jean-Claude Dufourd	Contribution to the Systems WD on 2D nodes
2702	Michael Wollborn, Roland Mech (University Hannover), Giuseppe Russo, Stefania Colonnese, Umberto Mascia, P. Talone (FUB), Jae Gark Choi, Munchurl Kim, Myoung Ho Lee, Cheituk Ahn (ETRI)	Description of automatic segmentation techniques developed and tested for MPEG-4 version 1
2703	Michael Wollborn, Roland Mech (University Hannover)	Results for core experiment N2 (automatic segmentation of moving objects)
2704	Michael Wollborn, Roland Mech (University Hannover)	Procedure for objective evaluation of VOP generation algorithms
2705	Rob Koenen (editor)	draft revision of MPEG-4 Overview
2706	Guido Franceschini	Review of the DAI, after the IM1 experience
2707	Guido Franceschini	AssociationTags or generic handles at the DAI
2708	Caspar Horne	Report of the AdHoc Group on SNHC VM Editing
2709	Guido Franceschini	Reserved FMC Number to bypass FlexMux Layer
2710	Caspar Horne	SNHC Verification Model V5.1

2711	Vitor Teixeira, Hugo Ribeiro, Teresa Andrade, Luis Teixeira	VIDION as a genuine MPEG-7 application
2712	Peter Westerink, Lurng-Kuo Liu, Wai-Man Lam	Additional AAVS API's for set-top box DTV applications
2713	Dan Tamir	Report of the AHG on Decoder QoS
2714	Frederic Dufaux	Results of N3 (dynamic sprites and GMC) using VM8.0
2715	Bob Eifrig, Xuemin Chen, Ajay Luthra	Results of Bitstream Exchange of Interlaced Video Coding
2716	Juergen Ruf	Updated DSM-CC Conformance ISO/IEC 13818-10 WD 2.0
2717	Andreas Hutter	Proposals for Composition Profiles and Conformance Testing
2718	Regis J. Crinon, Ibrahim Sezan	Results of Automatic Object Segmentation N3 Core Experiment.
2719	Ajay Luthra, Cheung Auyeung (Motorola), C.S. Boon (Matsushita), Gerard Fernando (Sun), Mukta Kar (CableLabs), Ajay Luthra (Next Level Systems), Richard Prodan (CableLabs), Raj Talluri (Texas Instrument), Yoichi Yagasaki (Sony), Ya-Qin Zhang (David Sarnoff Research Center)	Interlaced Video for Consumer Electronics Applications
2720	James Van Loo	Adaptive Terminal Charter
2721	Brian Link, Dave Rossum	Proposed Refinements to Structured Audio Sample Bank Format
2722	Wei-ge Chen, Ming-Chieh Lee	Improved Macroblock Syntax Overhead
2723	Yung-Lyul Lee, Yoon-Soo Kim, Hyun-Wook Park	Results of Core Experiment N1 (Deblocking and Deringing filter)
2724	Michael Frater, John Arnold	Status of 12-Bit Video Work
2725	Michael Frater, Homer Chen	Variable Pixel Depth Functionality in MPEG 4
2726	Yoichi Yamada, Zhixiong Wu	Bitplane Coding of DCT Coefficients
2727	Toshiyuki Nomura, Masahiro Iwadare, Kazunori Ozawa	Error protection and concealment schemes for the MPEG-4 Narrow-band CELP VM coder
2728	Cliff Reader	Proposal for Decoder QoS
2729	Touradj Ebrahimi, Atul Puri	Report of ad hoc group on video VM/WD editing
2730	Touradj Ebrahimi, Homer Chen	Report of ad hoc group on bitstream exchange for visual texture/mesh coding
2731	Touradj Ebrahimi (editor)	Video Verification Model 8.1

2732	Sung Deuk Kim, Jaeyoun Yi, Jong Beom Ra, Hyun Mun Kim, Young Su Lee	Results of core experiment N1
2733	Eric Scheirer	Draft CD 14496-3 Subpart 5 (Structured Audio)
2734	Eric Scheirer	Audio nodes and normative audio composition text for Systems CD
2735	Eric Scheirer, Georgio Zoia, EPFL	Proposed changes to SAOL
2736	Eric Scheirer (chair)	Report of AHG on Structured Audio WD/VM
2737	Eric Scheirer	Complexity analyses of some Structured Audio orchestras
2738	Luis Ducla Soares, Fernando Pereira	Results for MPEG-4 Core Experiment on Error Resilient Shape Coding (E14)
2739	Tim Addington tim.addington@sciatl.com	Input to corrigendum of ISO/IEC 13818-6
2740	Dominique CURET	Semantics of some timestamping related fields
2741	Dominique CURET	Towards a more accurate System Decoder Model
2742	Dominique CURET	Access Unit & FlexMux syntaxes
2743	Dominique CURET	Clock References present at the FlexMux level
2744	Martin Dietz, Toshio Miki	Report of the ad-hoc group on MPEG-4 Audio Error Resilience
2745	Martin Dietz, Eric Allamanche, Joachim Gnauk, Juergen Herre	Test Results of the Matra Scaleable Coder Core Experiment
2746	Martin Dietz, Ralph Sperschneider	Refined Core Experiment on Error Resilience of AAC spectral data
2747	Shun-ichi Sekiguchi, Kohtaro Asai	The insertion of VOP rate information
2748	Kohtaro Asai, Shun-ichi Sekiguchi	The insertion of extra information field
2749	Toshio Miki	Proposal of MPEG-4 Audio core experiment test conditions on error resilience
2750	Hideaki Kimata, Yasuhiro Tomita, Tadashi Ichikawa	Results of Core Experiment on Back Channel Signaling (E4)
2751	Sanae Hotani, Toshio Miki	Core experiment results on Huffman-Codeword Reordering
2752	Sanae Hotani, Takashi Suzuki, Toshiro Kawahara, Toshio Miki	Proposal of Universal UEP tool for MPEG-4 Audio error resilience
2753	KNB	Proposal on MPEG-4 Version Management
2754	Brent Wilson	Alternative Method to Determine VOP CGD Parameters
2755	Koji Imura, Yutaka Machida	The Results of core experiment on E4
2756	John Muller	Report of the Adhoc group on core experiments on coding efficiency in MPEG-4 video
2757	Yasuo Katayama	The comparison of IDCT mismatch controls
2758	Hirohisa Jozawa, Kazuto Kamikura	Results of core experiment N3

2759	Young-Kwon Lim, Sanggyu Park, Jinwoong Kim	On the decoder QoS conformance levels and CGD
2760	Joon-Hyeon Jeon, Hwang-Seok Oh	Block-Matching with search window adjustment
2761	Young-Joon Song, Joon-Hyeon Jeon	A Modification of DC and AC Prediction of Intra VOP
2762	Itaru Kaneko	A proposal for MPEG-4 Identification and Protection of contents includes CORBA interface and realtime specification
2763	Itaru Kaneko	About revisions of content related IPR field.
2764	Y. Lee, H.S. Lee, J.C. Lee, M. Hahn	Implementation of English MPEG-4 Audio TTS and Korean MPEG-4 Audio TTS Improvement
2765	M. Hahn, J.C. Lee, Y.K. Lim, Y. Lee	Report on the progresses of MPEG-4 Audio TTS
2766	Masayuki Nishiguchi, Kazuyuki Iijima, Jun Matsumoto	Listening test results of Hannover's proposal "Harmonic and Individual Lines plus Noise Tools"
2767	Masayuki Nishiguchi, Kazuyuki Iijima, Jun Matsumoto	Listening test results of NEC bandwidth scalable CELP, and wideband CELP VM with LSP-VQ
2768	Yuji Maeda, Masayuki Nishiguchi	Error correction and concealment tools for parametric speech coder core of the VM
2769	Kazyuki iijima, Masayuki Nishiguchi, Jun Matsumoto	Variable rate coding tools for the parametric speech coder core of the VM
2770	Yoichi Yagasaki	Scalable Coding Tools for Network Applications
2771	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment on an Extension of the narrow-band CELP VM coder to a bandwidth Scalable CELP coder proposed by NEC
2772	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment for extended `Harmonic and Individual Lines plus Noise` Tools for the Parametric Audio Coder Core
2773	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment on Low Delay Filterbanks proposed by Uni. Hannover
2774	R.Taori, A. Gerrits, W. Oomen, L. v.d. Kerkhof	Unified CELP Core for MPEG-4 Audio VM
2775	Julien Sign?s	report of the Adhoc Group on BIFS
2776	Sung-Moon Chun,, Dongkyoo Shin,, Joo-Hee Moon	Adaptive Frame/Field CAE Method(S12:Interlaced Binary shape coding)
2777	Jong-Deuk Kim,, Dongkyoo Shin,, Joo-Hee Moon,, Hae-Kwang Kim	Lossy Binary Shape Coding Method using CAE Probability Table
2778	Guido Franceschini	ES hierarchies in ODs
2779	Julien Sign?s	Proposed evolution of some BIFS nodes
2780	Keiichi HIBI, Tadashi UCHIUMI	Proposal of the enhancement to data partitioning scheme for error resilience
2781	Julien Sign?s	Analysis of VRML 2.0 nodes in the MPEG-4 context
2782	ACTS-MoMuSys	Donation of MoMuSys Video VM C Source Code

2783	Julien Sign?s	Clarification of timing issues for BIFS scenes
2784	Julien Sign?s	On BIFS and VRML relationships and content interchange
2785	Akio Jin, Takehiro Moriya, Naoki Iwakami, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki, Takeshi Norimatsu, Mineo Tsushima, Tomokazu Ishikawa	Proposal of the core experiment on improvement of t/f scaleable coder
2786	Jae-Gon Kim, Taehwan Shin, Hankyu Lee, Jinwoong Kim	A Description Model for Video
2787	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Proposal of refinement of VM software
2788	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Results of core experiment of Matra's scaleable coder
2789	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Report on the bitstream exchange of t/f coder
2790	Mattavelli Marco	Report of the ad-hoc group on Computational Graceful Degradation.
2791	R?mi Ronfard	MPEG 7 Applications in Radio, TV and Film Archives
2792	R?mi Ronfard	MPEG7 Requirements for Radio, Television and Film Applications
2793	R?mi Ronfard	A logical framework for shot-level description of video content.
2794	Sven Bauer, Henning Heiber	Results of CE P8 on Motion and Aliasing Compensating Prediction
2795	Heiko Purnhagen, Bernd Edler	Check Phase Results of Core Experiment on extended "Harmonic and Individual Lines plus Noise" Tools
2796	Marco Mattavelli, Sylvain Brunetton	Control of video decoding time by means of CGD techniques
2797	Franco Casalino, Antonio Arena, Matthew Leditscke	Implementing the subset of the BIFS 2D nodes: a cross-check of semantic & syntax
2798	Kenzo Akagiri, Yoshiaki Oikawa	Contributions for MPEG-2 AAC
2799	Naoya Tanaka	Results of the core experiment on wideband CELP
2800	Ji-heon Kweon, Hae-Kwang Kim, Dongkyoo Shin and Joo-hee Moon	Results on BBM with AC/DC Prediction
2801	Munchurl Kim, Jae Gark Choi, Myoung Ho Lee, Chieteuk Ahn	Report on the combination of temporal and spatial segmentations

2802	Ji-heon Kweon, Dongkyoo Shin, Hae-kwang Kim and Joo-hee Moon	Suggestions for Editorial Change: vop size coding in 16-pixel unit, vop left-top position coding in 2-pixel unit
2803	Munchurl Kim, Jae Gark Choi, Myoung Ho Lee, Cheituek Ahn	User-assisted segmentation for moving objects of interest
2804	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Report on 3D mesh coding
2805	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Draft proposal for new core experiment on generic 3D mesh coding
2806	Gauthier Lafruit, Eddy De Greef, Jan Bormans	Implications of Expiration Time Stamp / Object Lifetime on Memory Management
2807	Jisang Yoo, Jusang Lee	Implementation of TTS assisted Facial Animation
2808	E.Hartley, F. Nack, AP Parkes	Proposed Revision of w1734 Terminology
2809	Teruhiko Suzuki, Yoichi Yagasaki	The report of bitstream exchange : spatial scalability
2810	Teruhiko Suzuki, Yoichi Yagasaki	The proposal of CE for scalable shape and texture coding
2811	Teruhiko Suzuki, Yoichi Yagasaki	The system to support scalable coding
2812	Hiroyuki Aga, Yasuhiro Honda, Teruhiko Suzuki, Yoichi Yagasaki	The necessity of further refinement/improvement of the BIFS regarding the relation to VRML
2813	Jean Gobert (LEP), Serge Gourrier (LEP), Françoise Caillaud (LEP), Beatrice Nezot (LEP), Christophe Etienne (LEP), Lionel Bouchard (LEP), Benno Stabernack (HHI), Andrea Barbieri (PACT), Pascal Fleury (EPFL)	Generically optimized VM7 compatible MPEG-4 video decoder
2814	Jin Hun Kim, Sang Hoon Lee, Seong Ryul Cho, Seok Won Han, Han Ho Choi	Interlaced Coding Method for Binary Shape Image
2815	Patrick Prache, Serge Gourrier, Lionel Bouchard, Raoul Mallart, Laurent Herrmann, Philippe Gentric, Jean Gobert, Françoise Caillaud, Beatrice Nezot, Christophe Etienne, Jean-Luc Tobelaim, Sylvain Rousseau, Eric Barrau	Interactive multi-standard terminal based on TriMedia
2816	Rainer Buchta, Martin Dietz	Proposal for Evaluation of MPEG-4 Audio Technology for the NADIB Application

2817	Karen Hsing, Chilsung Seo	Comments on the PICS proforma of DSMCC Conformance Testing Specification (ISO/IEC WD 2.0 13818-10)
2818	Karen Hsing, Chilsung Seo	Conformance Abstract Test Cases for DSMCC UU Core Interfaces
2819	Jean-Claude Dufourd,, Frederic Bouilhaguet	Necessary changes of BIFS for authoring
2820	Masayuki Nishiguchi, Jun Matsumoto, Naoya Tanaka	Bitstream exchange
2821	Sushil K. Bhattacharjee	Structured vs. Unstructured Approaches to Indexing Information
2822	Sushil K. Bhattacharjee	Structured vs. Unstructured Approaches to Indexing Information
2823	Bernd Edler, Laura Contin	Report of AHG on MPEG-4 Audio Verificaton Test Preparations
2824	Yoshinori Suzuki, Yuichiro Nakaya, Satoshi Misaka	Results of Core Experiment N3 (Dynamic Sprite and Global Motion Compensation)
2825	James Brailean	Error resilience ad hoc group report
2826	Yuichiro Nakaya, Yoshinori Suzuki, Satoshi Misaka	Preliminary results on rounding control for spatially scalable coding
2827	Klaus Diepold, Jiang Zhang	Overview of the available MPEG-4 Tools and Profiles
2828	T. Einarsson	Results from Spatial Scalability Bitstream Exchange
2829	Jack Lacy, James H. Snyder, Amy R. Reibman	Watermarking as a Protection Mechanism for IPR in MPEG-4
2830	Heiko Purnhagen, Bernd Edler	Hannover Check Phase Results of Core Experiment on "Lossless Coding in CELP core of MPEG-4 Audio VM"
2831	Bernd Edler, Werner Oomen	Report of AHG on MPEG-4 Audio Conformance
2832	Mauri Vaananen, Mikko Suonio, Juha Ojanpera	Nokia check site results for the core experiment on the t/f scalable coder proposed in m2328 and m2463
2833	Mauri Vaananen, Mikko Suonio, Kalervo Kontola, Di Li	Nokia check site results for the core experiment on bandwidth scaleable coder proposed in m2486
2834	Mauri Vaananen, Mikko Suonio, Juha Ojanpera	Report on Long Term Prediction in the t/f part of MPEG-4 Audio
2835	Ulrike Pestel, Michael Wollborn, Ulrich Benzler	MPEG-4 simulcast vs. spatial scalability (SSP): are "real" B-VOPS missing in SSP?
2836	Jorgen Ahlberg, Haibo Li, Robert Forchheimer	FAP-coding using Facial Action Basis Functions
2837	Michael Zeug	Harmonization of Definitions in MPEG-4 Requirements and Profiles Documents
2838	Claudio Lande	Results of a simulation for the animation of downloaded models
2839	Vahe Balabanian	Definition of DMIF Addresses for Service Attach and ChannelAdd/Setup
2840	Vahe Balabanian	Report of the DMIF Reference Source Code AHG
2841	Vahe Balabanian	Walkthrough for the DMIF Reference Source Code in the Interactive Remote Case

2842	Vahe Balabanian -- Nortel, Koon-Seng Lim -- Columbia University, Aurel Lazar -- Columbia University	DMIF FlexMux Interface (DFI) for ISO/IEC 14496-6 WD 1.0
2843	Bernhard Grill, Heiko Purnhagen	Report of the Ad-hoc Group on MPEG-4 Audio Working Draft editing and Verification Model software implementation
2844	Vahe Balabanian -- Nortel, Eric Fleischman -- Microsoft, Philip A. Chou -- Microsoft	DMIF Operation with ASF
2845	Vahe Balabanian	Operation of DMIF with ITU-T H.310 and H.323 Recommendations
2846	P.J.L. van Beek, A.M. Tekalp	Bitstream verification of 2D dynamic mesh
2847	Vahe Balabanian	DMIF SRM and V1 Mode to V2 Transition U-N Messages
2848	Vahe Balabanian	Transition from DMIF V1 to V2
2849	Christian Koechling (Christian.Koechling@fr.bos ch.de)	AudioRenderer for IM1
2850	Vahe Balabanian	Proposal of DMIF Profiles
2851	Vahe Balabanian	Proposal of DMIF Requirements
2852	Bernhard Grill, Bodo Teichmann	Proposed refinements for the scalable T/F coder of the MPEG-4 Audio WD/VM
2853	Vahe Balabanian	DMIF Tool Requirements in MPEG-4 Applications
2854	P.J.L. van Beek, A.M. Tekalp	IM1-player integration of 2D dynamic mesh decoder
2855	Vahe Balabanian	Comments Input to DSM-CC Conformance WD 2.0
2856	Bernhard Grill, Bodo Teichmann	Proposal for a joint stereo add-on to the scalable T/F coder
2857	Vahe Balabanian	DSM-CC ISO/IEC 13818-6 IS Editorial Errata
2858	Gerald Schuller, Bernd Edler	Revised Technical Description for Core Experiment on Low Delay Filter Banks
2859	Gerald Schuller, Bernd Edler	Uni-Hannover Check Pase Results of the Core Experiment on Low Delay Filter Banks
2860	Michel Bonnet (LEP), Sylvie Jeannin (LEP), Ralph Neff (Berkeley)	Bitstream syntax with Matching Pursuit
2861	Thomas Stingl, Olaf Barheine, Rico Dreier, Yankin Tanurhan	Description of a prototypical MPEG-4 Infotainment Application
2863	Peter Kuhn	A Complexity Analysis Tool: iprof (Version 0.3)
2864	M2VTS	Applications description from the M2VTS project

2865	Touradj Ebrahimi, Fred Jordan, Joern Ostermann, Jim Bralean, Fernando Ferreira, Homer Chen, Shigeru Fukunaga, Marco Mattiavelli, Marco Gandini, Eric Petajan, Ganesh Rajan, Barry Haskell, Chieteuk Ahn	We Need a Back Channel !
2866	Ganesh Rajan	2D Dynamic Meshes: Results of Bitstream Exchange
2867	Jordi Ribas, Shawmin Lei	Verification of macroblock layer rate control
2868	Rico Dreier, Olaf Barheine, Thomas Stingl, Yankin Tanurhan	Experiences with Java/C-based MPEG-4 Prototype
2869	Carsten Herpel	Report of ad hoc group on Systems Decoder Model and Multiplex
2870	ITU-T Q.15/16	Liaison statement regarding 1) MPEG-4 Visual Working Draft testing, 2) MPEG-4 compatibility with H.263v1, and 3) MPEG-2 ³ H.262 Draft Amendments 3 and 4
2871	A. Puri	Report of ad hoc group on Multi-functional coding in MPEG-4 video
2872	A. Basso, R. L. Schmidt, A. Puri	Requirements for the File Format for MPEG-4
2873	H. Kalva, A. Eleftheriadis, A. Basso, R. L. Schmidt, A. Puri	File Format for MPEG-4
2874	Carsten Herpel	How to model the Composition Buffer resources
2875	Carsten Herpel	The Expiration Time Stamp is redundant
2876	Carsten Herpel	WD text for semantics of scene time vs. media time
2877	Ralph Neff, Toshio Nomura, Osama Alshaykh, and Avideh Zakhor	Experiment T3: Matching Pursuit Prediction Error Coding
2878	Anil M. Murching, Radu S. Jasinschi, T. Naveen, Ali J. Tabatabai, Paul T. Babic-Vovk	Indexing Object Content Information (OCI) for MPEG-4/MPEG-7
2879	Jennifer Webb, Raj Talluri	Interlace bit exchange results
2880	I. Pitas, C. Kotropoulos, A. Nikolaidis, S. Tsekeridou	Algorithms for face localisation, facial feature extraction and tracking
2881	Joern Ostermann	Report of the Adhoc Group on Coding of Arbitrarily Shaped Objects in MPEG-4 Video
2882	Andrea Basso, Joern Ostermann, Barry Haskell	Requirements for a Back Channel: Messages from the Decoder to the Encoder
2883	Joern Ostermann	Face Animation Tables: More Models
2884	Yen-Kuang Chen, Anthony Vetro, Huifang Sun, S. Y. Kung	Optimizing INTRA/INTER Coding Mode Decisions
2885	Jeff McVeigh	Editorial Changes to Visual WD to Support Truncated Quantization Matrices

2886	Hari Kalva, Alexandros Eleftheriadis	Requirements for MPEG-4 File Format
2887	Yuval Fisher, Homer Chen, Hai Tao	BIFS description for FAP and Mesh interpolation tables
2888	Hari Kalva, Alexandros Eleftheriadis	MPEG-4 Interaction Model and Required Normative Support
2889	Zvi Lifshitz	Systems Software Implementation AHG report
2890	Zvi Lifshitz	Systems Software Implementation source code (Core)
2891	Zvi Lifshitz	Systems Software Implementation source code (Mux)
2892	Euee S. Jang, Se-Hoon Son, Shi-Hwa Lee	Binary Shape Coding for Interlace Video(S12)
2893	Zvi Lifshitz	Systems Software Implementation source code (BIFSEncoder)
2894	Jae-Seob Shin, Dae-Sung Cho, and Euee S. Jang	Editorial updates of shape coding in WD 4.0 rev. 4
2895	Sung-Jin Kim, Dae-Sung Cho, Jae-Seob Shin	Improvement of inter No Update mode in Binary Shape Coding
2896	Gerard Fernando	Workplan for AAVS
2897	Yuval Fisher, Homer Chen	BIFS Scene Tree Parser
2898	Yuval Fisher, Homer Chen	MPEG4/HTML Interaction
2899	Raj Talluri, Jennifer Webb, Bob Eifrig, Xuemin Chen, Krit Pansopone	MoMuSys derived source code for Interlaced Video coding
2900	Tom White	Liaison Contribution from the MIDI Manufacturers Association on Structured Audio Downloadable Sounds
2901	T. Chiang and H. Sun	Report of ad hoc group on encoder optimization
2902	Alexandros Eleftheriadis, Yihan Fang	Proposed revision for the MPEG-4 Syntactic Description Language (Rev. 2.1)
2903	Y.B. Thomas Kim, S.W. Kim, S.H. Park	Result of tests for integrating BSAC with other AAC Tools
2904	Hung-Ju Lee and Tihao Chiang	Complexity Analysis of MPEG-4 Video VM Software
2905	Jonathan Courtney	Report of AHG on Adaptive Audio-Visual Session (AAVS)
2906	Iraj Sodagar, Hung Ju Lee, Jie Liang, Zhixiong Wu, Mengxiang Li, Weping Li, Rongxiang Yi, Charles Chui, Hiroyuki Katata	Report on the Visual Texture Bitstream Exchange
2907	Jie Liang	Results of Validation and Bitstream Exchange for the Texture Object Layer Coding
2908	Sang-Wook Kim, Yeon-Bae Thomas Kim	Report on core-experiment on NTT/Matsushita scalable codec
2909	Jonathan Courtney	An Approach to Adaptation in AAVS
2910	Sang-Wook Kim, Yeon-Bae Thomas Kim, Sung-Hee Park	Report on core-experiment on Univ. Hannover Low Delay Filter Banks (m2528)

2911	Yuval Fisher, Homer Chen	BIFS User Interface Nodes
2912	Ronald Jacoby	Variants on Profile Definitions for MPEG-4 Systems
2913	Jonathan Courtney	Conformance and AAVS
2914	Young-Kwon Lim, Sanggyu Park, Jinwoong Kim	On the system support for CGD
2915	ACTS-MoMuSys WP2.4	MoMuSys Implementation of VM (VM8-971021)
2916	Minhua Zhou	Comparison between MPEG-2 and MPEG-4 video coding at 1 Mbit/s
2917	G. Richard,, C. Murgia,, JL Bonifas,, A. Ledore,, P. Lockwood	Revised technical description of Matra's scalable speech/audio codec
2918	Si Jun Huang	Report of Adhoc Group on Advanced Layered Coding for High Resolution Video
2919	Regis J. Crinon	Use of DSM-CC Data Carousel as FlexMux in MPEG-2 Transport Streams
2920	Bodo Teichmann	Report of the Ad-hoc group on Audio/Systems related transport issues
2921	Giovanni Caire	The ATMAN content description specification
2922	Keith Hill	Revised Proposal for Managing IPR Identification Information within an IPR Data Set
2923	Y. Lee	test

Report of Requirements Meeting

Source: Rob Koenen, chair Requirements
Niels Rump for IPR part
Ibrahim Sezan for MPEG-7

Introduction

The Requirements Group met during the entire week of the MPEG Stockholm meeting. The discussion addressed MPEG-4 as well as MPEG-7. The most important topics were:

MPEG-2

- Advanced Layered Coding

MPEG-4

- Profiles
- General Requirements
- IPR issues
- Overviews: MPEG-4 Version 1 and Version 2

MPEG-7

- Requirements Document version 3
- MPEG-7 Context & Objectives
- MPEG-7 Applications Document
- First draft of MPEG-7 Call for Proposals

These issues will be discussed in detail below.

MPEG-2

A draft Requirements document for ‘Advanced Layered Coding in MPEG-2’ was approved. Also, the following resolution was adopted: *The Requirements Group recommends that WG11 encourage MPEG members with interest and technology to provide a contribution document, preferably with demo, to the next WG11 meeting to show evidence of the advanced performance of the new layered coding technology. WG11 will review the contributions and demos of the advanced layered coding technology at the next MPEG meeting to justify whether an extension of MPEG-2 should be created*

MPEG-4

2690 *Rob Koenen - Report of AHG on MPEG-4 Requirements*

OCI (Object Content Information)

2605 *Fernando Pereira & Ibrahim Sezan - Report of the Ad Hoc Group on OCI in MPEG-4*
2663 *French National Body - MPEG-4 OCI and MPEG-7 developments*
2694 *Fernando Pereira et al. - Proposal for Object Content Information (OCI) in MPEG-4*
2621 *Pascal Faudemay - Syntax proposal for OCI descriptors*

It was agreed to include OCI in MPEG-4 Version 1. A discussion on the proposals m2605 and m2621 resulted in the conclusion that opening up OCI *too* much would potentially create confusion between OCI and MPEG-7, which is against the Requirements for OCI. The adopted solution is still quite flexible, and it fulfills all the requirements as listed in the MPEG-4 Requirements Document. A joint meeting with the Systems group revealed that including tables in OCI with pre-defined meaning could encounter resistance from American broadcasters. The adopted proposal is based on m2605, but has no default tables, neither for content classification, nor for content rating. An external body will have to take care of the registration of the tables.

The issue of protecting OCI data was raised. It is a very interesting thought, but not for Version 1, as *no* data will be protected at all in Version 1, not even the Intellectual Property Identification (IPI) dataset.

Initial thoughts on combining OCI and IPI revealed that we want to couple IPI data tighter to objects than OCI data, and hence different solutions have been adopted. The OCI included a field for IPI data, but this has been deleted.

Response to the French National Body's comment on MPEG-7 was drafted as follows:

WG11 thanks the French national Body for its support for OCI and its comments. WG11 has carefully considered and discussed your request. Following this discussion, WG11 has chosen to take an approach in which limited possibilities for extension exist. WG11 felt that opening OCI up to a still wider range of extensibility would induce a real risk of confusion in the market caused by the potential overlap between MPEG-4 OCI and MPEG-7. WG11 further wishes to note that the currently adopted solution conforms to the Requirements as defined in the MPEG-4 Requirements Document, ISO/IEC JTC1 SC29 WG11 N1886.

Profiles

Again, defining Profiles took the major part of the meeting.

Policy with respect to Profiles and Versions

The following guidelines apply when defining profiles:

- profiles are defined only once, and not again in Version 2 (so there will not be both Simple V.1 and Simple V.2)
- profiles can only include tools that are in the CD
- new profiles must be significantly different from existing ones
- hierarchy is nice to have, but not pursued 'at all cost'

Video

The following contributions were used in defining the Video Object Profiles:

2678	<i>Hiroyuki Katata - Profiles requirements for temporal scalability</i>
2770	<i>Yoichi Yagasaki - Scalable Coding Tools for Network Applications</i>
2719	<i>Ajay Luthra - Interlaced Video for Consumer Electronics Applications</i>
2665	<i>R. Schäfer, S. Bauer - Hierarchical structure of Profiles in MPEG-4</i>
2725	<i>Michael Frater, Homer Chen - Variable Pixel Depth Functionality in MPEG-4</i>

Scalability

Requests were made to include scalability into the two defined Video Object Profiles. It was agreed to include into 'Simple' arbitrary shaped P-VOP based scalability, in which the base layer is a rectangle. In the other Video Object profile (later named 'Core'), the following tools were provisionally included:

- arbitrary shaped P-VOP based scalability, but in this case the base layer can be an arbitrary shaped object itself;
- temporal and spatial scalability (only for progressive scan);

The inclusion was 'provisional', because the judgement of ISG was asked, and the policy was followed to 'include until people start voicing objections'. No one voiced any objections, however. The requirements group thought that, as far as its expertise went, these tools were valuable additions, without overly burdening applications that might want to use the profile but do not need scalability.

Main (Gray Scale Shape)

Concerns were voiced about the absence of gray scale (or 'alpha') shape in Version 1 of MPEG-4. As gray scale shape is in the requirements for 'Main', the Requirements Group felt it could not define a Main Profile now. This was expressed in the following resolution:

The Requirements Group recommends, considering the Requirements for the Main Video Object Profile, and having heard concerns from delegates wishing to build MPEG-4 compliant products, not to define a Main Video Object Profile for MPEG-4 Version 1 because Gray Scale Shape cannot be supported in this Object Profile.

Also other requirements for the Main Video Object Profile were discussed, but the Requirements Group thought that Gray Scale Shape was the most important one missing. The main concern here was the smooth blending of objects into the background. During the joint meeting with the Video Group, some people pointed out that this may perhaps also be accomplished if one uses uniform transparency together with the composition (feathering) possibilities available in Systems. During the meeting, time was too short to really assess whether this is an adequate solution, and the matter was left for National Bodies to judge, through the following:

The Requirements Group recommends, concluding that it is unclear whether some needs for gray scale (alpha) shape coding can also be met by the currently available tools in the Core Visual Object Profile (with

uniform transparency) and the Systems part of the MPEG-4 Standard (with composition tools), invites National Bodies to comment on this aspect of the Visual CD.

Some people very strongly felt that that no other Object Profile than Simple should be defined, because many tools that are useful will only be standardised in Version 2. After some discussion it was clear that there was considerable consensus that it was undesirable to have a (Visual) standard in which many tools were not in a profile, and that it was equally undesirable to wait for Version 2. It was also pointed out that if these new tools would indeed bring major improvements, it would not be a problem to define a new Video Object Profile

Interlace

'Interlace' was added to the Core Video Object Profile. There was much support for this, and no objections were raised, neither in the Requirements Group nor in the joint Requirements / Video meetings. The burden of having to convert from interlace to progressive in some applications (that have no Interlaced display) was not deemed excessive. The ISG remark that 'many existing terminals already support interlace' was not deemed a major factor in the decision, as no MPEG-4 terminals exist yet. The argument that much existing material is in interlaced format was considered important however.

Hierarchy

The Requirements Group agreed with the request put forward in m2665 for hierarchical Video Object Profiles. Although the intention of the Profiling effort was not necessarily obtaining a hierarchical definition of profiles, the Simple and Core Video Object Profiles are currently hierarchical, and it is very unlikely that this hierarchy would be broken in future revisions. The Requirements agreed that it would be desirable for decoders that understand the Core Video Object Profile to also be able to decoder Simple Video Objects, and hence decided to maintain this hierarchy in the future, if revisions were to be made.

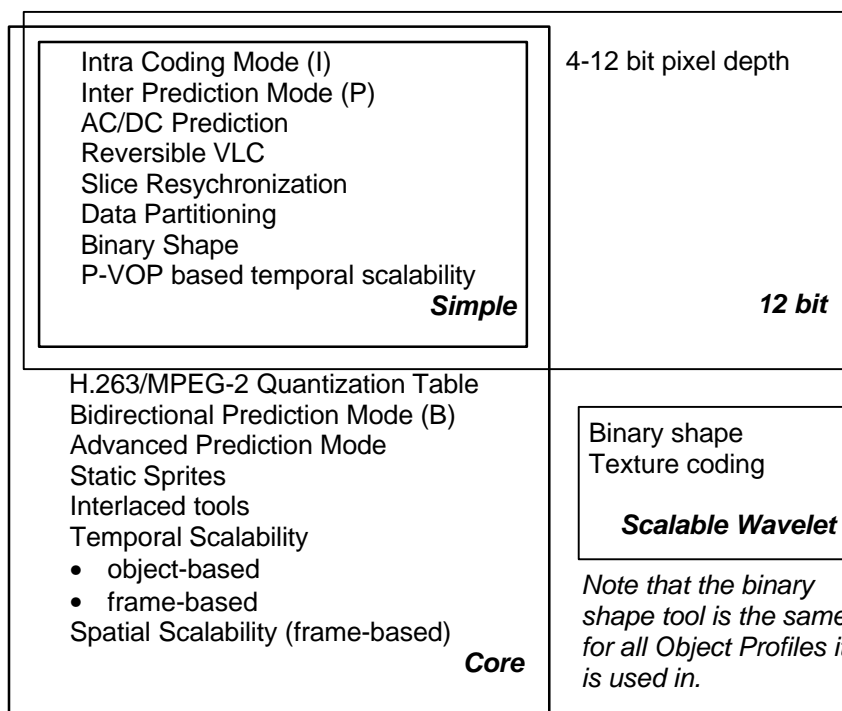
n-bit pixel depth coding

The need for an *n-bit Video Object Profile* was discussed again. It was decided to define such a Profile now that enough support - 7 parties, among which large manufacturers - has been shown. The Object Profile is called '4-12 bit Video Object Profile'.

Scalable Wavelet

A Video Object Profile was defined for the scalable wavelet texture coding tool, which includes binary shape.

Organization of Profiles



Ultra Simple Video Object Profile?

A request for an 'Ultra Simple' Video Object Profile was received at a very late stage. Notably, shape coding was considered unnecessary burdening for mobile and maybe simple Internet applications. The request was discussed in a joint Video/Requirements meeting on Friday morning, but this was too late to take it into account in the decisions on profiling. The proposers were asked to put forward their proposal through their respective National Bodies, and to look at *all* the tools in Simple, not just the shape coding.

Levels and Composition Profiles

Video Composition Profiles and Levels have not been defined yet. The Requirements Group still believes it does not hold enough expertise and tools for defining these for all cases.

Audio

- 2689 *Rob Koenen et. al. - Discussion on Audio Profiles*
 2693 *Torsten Mlasko et. al. - Proposal for MPEG-4 Audio Object Profiles*

Two joint meetings with Audio, together with the contributions mentioned above (which were based on work the Audio Group did at the last meeting) provided enough ideas to define both 8 Audio Object Profiles and three Audio Composition Profiles.

Audio Object Profile	Hierarchy information
Main Natural Audio Simple scalable Simple Parametric Audio	contains simple scalable contains natural speech - CELP& parameter based
Main Synthetic Audio Algorithmic synthesis Wavetable synthesis General MIDI	contains all other Synthetic Audio Object Profiles contains syntax of General MIDI contains syntax of General MIDI
TTS	

Audio Composition Profile	Hierarchy info	Object profiles contained
Main	contains Simple	<ul style="list-style-type: none"> main natural audio structured audio TTS interface composition (number and type dependent on level)
Simple	contains Speech	<ul style="list-style-type: none"> simple scalable audio algorithmic synthesis composition with level 1 scene description
Speech		<ul style="list-style-type: none"> Parameter-based speech coding CELP-based speech coding

There was a debate on the use of Object Profiles versus Composition Profiles. Object Profiles have the following uses:

- as building blocks, for defining composition profiles
- to allow different kinds of (Audio) Objects in the bitstream
- perhaps* - in the future - to allow the definition (negotiation) of 'flexible Composition Profiles'

Levels are for further discussion, but already some ideas exist on how to start addressing this issue. Parameters include: number of channels, sampling rates, number of audio objects which can be decoded in parallel, type of composition (equal of different sampling frequencies)

SNHC

- 2648 *Eric Petajan, FBA adhoc group - Face Animation Profiles*

For facial animation, the same two profiles exist that were defined at the previous meeting: Simple and Advanced. Ideas for levelling, and for a third (intermediate) Object Profile came too late to process.

Also ideas for Object Profiles for the other SNHC tools came too late to discuss in the Requirements Group (Friday morning). The Requirements Group felt it should apply the same rigour to defining SNHC Object Profiles as it had been applying to Natural Video Object Profiles. A document 'Initial Thoughts on SNHC Profiling and levelling'

(N1792) was created to have an output containing the defined Object Profiles, and resolution was adopted, asking the NBs for comments, as follows:

that National Bodies carefully review the 'Initial thoughts on SNHC profiling and levelling, and put forward requests for MPEG-4 SNHC Visual Object Profiles in their review of the Visual CD.

Systems

2912 Ronald Jacoby - *Variants on Profile Definitions for MPEG-4 Systems*

2651 Constance Belz et. al. *Definition of a System Profile Level for 3D Graphics in Low Bitrate Environments*

Discussions on Systems Profiling revealed that it is necessary to define subsets of the BIFS nodes. A 'Zero BIFS' option was discussed, for default cases in which only one Audio and one Video node would be present (say a mobile hand held terminal). In the absence of a BIFS stream, a default scene tree configuration would be assumed. This Profile was, however, not defined yet.

A discussion on 2D and 3D showed that while in theory it may be possible to see 2D as a special case of 3D, it is useful to keep them separate for implementation reasons.

Five Systems Profiles have been defined that give subset of the BIFS nodes. (Note that Systems does not have 'Object' and 'Composition' Profiles). The Profiles are:

- 2D (2-dimensional and common nodes)
- 3D (3-dimensional and common nodes)
- Complete (all nodes)
- Audio (only audio nodes)
- VRML (maximises interoperability with VRML)

M2651 deals with Levels, and this was not yet discussed. It will have to be revisited at the next meeting.

DMIF

2850 Vahe Balabanian - *Proposal of DMIF Profiles*

Three hierarchical Profiles were defined for DMIF, that each contain a (sub)set of the DMIF calls:

- 1) broadcast;
- 2) broadcast and storage;
- 3) broadcast and storage and interactivity

Profile Decisions (N1908) and Profile Requirements (N1899) documents

2662 Michael Zeug - *MPEG-4 Profile Requirements version 4.1*

2837 Michael Zeug - *Harmonisation of Definitions in MPEG-4 Reqs and Profiles Docs*

New versions of both the Profile Requirements and the Profile Decisions Documents were produced. The three different sets of requirements for Systems Profiles were merged into one. The changes in the input Profiles Requirements document were approved. Definitions were harmonised.

Requirements Document

2688 Rob Koenen for MPEG-4 Reqs AHG draft v.5 of MPEG-4 Reqs Document

Requirements for backward compatibility with MPEG-1 and MPEG-2 Systems were deleted. These have been in the Requirements Document for a long time, while the group has always believed that this compatibility should not hamper the design of MPEG-4 Systems. It was considered more important that MPEG-4 Systems should allow use of MPEG-1 and MPEG-2 coding technology. This is indeed the case.

Back Channel

2882 Andrea Basso, et. al. *Requirements for a Back Channel: Messages from the Decoder to the Encoder*

An output document on a back channel was created based on the basis of M2882. Also the Audio Group has gone through a similar activity, but unfortunately the results of this work have not reached the Requirements Group. It was decided to create a separate output document (N1917) because the requirements are not mature yet, and the MPEG-4 Requirements Document is publicly available. It is the intention of the Requirements Group to include the Requirements in the next version of the MPEG-4 Requirements Document.

DMIF

2851 *Vahe Balabanian - Proposal of DMIF Requirements*

A set of DMIF Requirements was included in the Requirements Document, based on M2851.

Composition Profiles, Levels, Conformance and Complexity

2670 *James Van Loo - Adaptive Terminal Conformance*

2717 *Andreas Hutter - Proposals for Composition Profiles and Conformance Testing*

2728 *Cliff Reader - Proposal for Decoder QoS*

The IS and Requirements Groups have the same ideas about conformance. This is the conclusions from the joint meeting. The ISG has listed a set of requirements for complexity measures. They should allow determining whether bitstreams and decoders are compliant. In particular, they should be:

- *small*
- *meaningful*
 - *to content provider*
 - *to decoder manufacturer*
- *accurate*
- *easy to calculate*
- *allows for trade off*

These metrics should also allow defining levels.

The ISG thought that supporting Interlace in the decoder itself would not be a real problem, but that the scan conversion could be computation-intensive

Applications Document (N1907) and Tools list (N1974)

2700 *Graham Thomas - Description of virtual studio coding application*

2646 *Klaus Diepold - Application Document Revision*

2827 *Klaus Diepold, Jiang Zhang - Overview of the available MPEG-4 Tools and Profiles*

2861 *Thomas Stingl, et. al. - Description of a prototypical MPEG-4 Infotainment Application*

2864 *M2VTS - Applications description from the M2VTS project*

2635 *Jian Zhang et. al. - Update of App Doc regarding Mobile Multimedia Application*

2636 *Jian Zhang et. al. - Update of App Doc regarding Collaborative Scene Visualization*

2853 *Vahe Balabanian - DMIF Tool Requirements in MPEG-4 Applications*

Many contributions were received on applications, and many of them also addressed tools. Moreover, Jian Zhang did an outstanding job in collecting all the available tools in MPEG-4, both before and during the meeting. Thomas Stingl and Jian Zhang edited the applications document and this list respectively. The tools (N1974) list must be added to the Applications Document (N1907), but this could not be done during the meeting yet, as not all the tools are completely correctly reflected (e.g. there is still mention of ITU codecs). The Requirements Group decided to be very careful in the wording that hints at the use of profiles. MPEG does not want to prescribe profiles; the most it can do is point out the suitability of certain profiles for an application.

IPR Issues

2619 *Niels Rump - Protection of payload and related IPR information within the MPEG-4 IPR standard*

2620 *Niels Rump - Report on ad-hoc group on content related IPR issues*

2659 *Niels Rump, Frank Hartung,, David Meaeres - Tasks for watermarking core experiments*

2762 *Itaru Kaneko - A proposal for MPEG-4 Identification and Protection of contents includes CORBA interface and real time specification*

2763 *Itaru Kaneko - About revisions of content related IPR field.*

2829 *Jack Lacy, James H. Snyder, Amy R. Reibman - Watermarking as a Protection Mechanism for IPR in MPEG-4*

2922 *Keith Hill - Revised Proposal for Managing IPR Identification Information within an IPR Data Set*

An IPR break out group was formed which met separately during the whole week, reporting back to the requirements group on Tuesday and Thursday afternoons. A joint meeting between the requirements and systems groups has been held on Wednesday.

Work for MPEG-4 Version 1

Before the Fribourg meeting it has become obvious that not all “creative industries” were satisfied with the definition of the “IPR Data Set” as formulated in N2922. A discussion, being chaired by Keith Hill, about this topic lasted all Tuesday.

It became clear that only the *identification of AVOs* is of interest to these industries and that including rights information is rather useless since this rights information can change on a daily basis. This discussion led to the definition of an “IP Identification Data Set” (IPI Data Set).

After finalising the content of the IPI Data Set, the *technical* discussion, chaired by Niels Rump, began. The group finalised the syntax and semantics of the IPI Data Set and decided against putting the IPI Data Set into the Object Content Information OCI because OCI is “meant to be left away” while the IPI Data Set needs to be persistent. The joint meeting with the systems group led to the conclusions that the IPI Data Set should be inserted into the Object Descriptor. The syntax and semantics of the IPI Data Set have been given to the editor of the Systems CD (Carsten Herpel) and the text was incorporated into the Systems CD.

A document *Managing Intellectual Property Identification and Protection within MPEG-4* (N1918) describing the IPI Data Set informally was created and was it was decided, by the WG11 plenary on Friday, to make it publicly available.

Work for MPEG-4 Version 2

Version 1 of the IPR part of the MPEG-4 standard offers rather limited functionality, since there are no means of technically *protecting* the IPI Data Sets. To achieve this, it seems appropriate *not* to standardise the methods of protection directly (i.e. cryptographic algorithms, watermarking techniques, etc.) but to provide “*hooks*” that can facilitate setting up external security systems. The future tasks in this area are primarily to identify the proper places for these security hooks.

An AHG was set up to further discuss IPR issues (N1897)

Intermedia Format

- 2624 *Wei-ge Chen, et. al. - Requirements for MPEG4 file format*
- 2873 *H. Kalva, et. al. - File Format for MPEG-4*
- 2872 *A. Basso, et. al. - Requirements for the File Format for MPEG-4*

Several discussions on what started off as a ‘file format’ resulted in requirements for what is now called an ‘Intermedia Format’, to be found in the MPEG-4 Requirements Document (N1886). The requirements bring together the different views of people who want to store and stream, and people who just want to have an interchange format. It was made very clear that the format in no way is mandatory for people who want to store MPEG-4 material. Also, it was clear that there are issues here which cannot be just dealt with outside of MPEG, such as how to organise elementary streams, where to put scene description information, how to deal with random access points, etc. The issue is different than for e.g. MPEG-2, because the number of ways in which material can be ‘played’ is potentially much larger. A Call for Proposals was issued, and the Intermediate Format will be developed using the best technology available in the proposals.

MPEG-4 Overview

- 2705 *Rob Koenen (editor) - draft revision of MPEG-4 Overview*

The revisions proposed by the AHG on MPEG-4 Requirements were accepted. More revisions were received on Thursday and Friday, but it was impossible to incorporate them, so the new Overviews (both for Version 1 and the delta document that described Version 2) will be completed and uploaded in the work of the new AHG on MPEG-4 Requirements.

MPEG-7

- 2604 *Fernando Pereira & Adam Lindsay as chairmen of the AHG - Report of the Ad Hoc Group on MPEG-7 Requirements*
- 2606 *Fernando Pereira (Editor) - Third Draft of MPEG-7 Requirements*
- 2666 *Adam Lindsay - Second Draft of MPEG-7 Applications*
- 2687 *Rob Koenen for AHG on MPEG-7 Reqs - Draft v. 5 of MPEG-7 Context and Objectives*
- 2822 *Sushil K. Bhattacharjee - Structured vs. Unstructured Approaches to Indexing Information*

A break-out Group on MPEG-7 met separately for the full week, reporting back to the Requirements group on Tuesday afternoon and afternoon.

The main accomplishments are:

- Definition of and agreement on a fundamental terminology that is important for more precisely defining the scope and objectives of MPEG-7
- A 'very first draft' of the MPEG-7 Call for Proposals.

A very intense discussion took place on the issue of what MPEG-7 will standardise. While some people believe that MPEG-7 should only standardise description schemes, and not the descriptions themselves, others believe that MPEG-7 should do both. People working with databases were afraid that standardising the description themselves would force them to use these in their own databases, and they indicated they did not want to do that. It was made clear that this is not required; the standardised descriptors would be meant for the interchange of information; an interface should take care of the translation to locally stored descriptions. Furthermore, it was pointed out that in the case of broadcast, it is very desirable to have standardised descriptions. Following this discussions, the wording in the MPEG-7 Requirements and Context & Objectives were decided upon as follows:

MPEG-7, formally called "Multimedia Content Description Interface", will standardize:

- *A set of description schemes and descriptors, and*
- *A way to specify description schemes and descriptors.*

The order was deemed important, and opinions differed. The final order was established after a 'straw vote'. No one objected to the decision.

Some concern was raised about the short time between the Call for Proposals and the Working Draft of MPEG-7. The issue is difficult to solve, because:

- postponing the WD would delay the schedule, which is not acceptable;
- issuing the CfP earlier would be a problem for companies that have made their plans based on the schedule, which has been available for over a year now.

It was decided that changes could only be made through National Body requests. The CfP was originally planned for November 1998, but there is no meeting then; the closest meetings are in October and December. During the closing plenary meeting, it was decided to issue the CfP in October.

The concerns of the UK National Body about the stability of the MPEG-7 Requirements before issuing the CfP were answered as follows (N1958):

WG11 agrees with the assessment that the development of the MPEG-7 standard will greatly benefit from having a stable set of requirements before evaluation of proposals commences. The requirements work for MPEG-7 is well underway. A full year before the Call for Proposals will be issued, there exists a draft Requirements Document that is already deemed suitable for public availability. Also, a rather complete view on the targeted application base is being developed. Considering this situation, WG11 is confident that the needed amount of stabilisation of the requirements can and will take place before evaluation starts.

Terminology

- 2634 *E. Hartley, F. Nack, A.P. Parkes - A review of MPEG-7 terminology*
- 2808 *E. Hartley, F. Nack, A.P. Parkes - Proposed Revision of w1734 Terminology*

We have started our meeting by approving the input documents 2604, 2606 and 2687. As we went over these documents we noted some outstanding issues that needed further discussion. We also realised that we still need a common terminology to understand each other (since most of us were coming from different application areas and backgrounds), and most importantly take one more step in defining what MPEG7 should or should not be. Hence, our

first item in the agenda was to agree on a common terminology and start our discussions on requirements and applications in particular and MPEG7 in general, although we expect that the terminology and the definition of the scope of MPEG7 will evolve in the future meetings en route to a stable framework that everyone can feel comfortable with.

With this spirit, we heard the presentations of documents 2634 and 2808. These two presentations led the way to lengthy discussions on determining the major concepts that will be used to establish the basic terminology of MPEG7, its scope, and to revise the requirements document accordingly. We first felt the need for defining the concept of *Data*, as audiovisual information that will be described using MPEG7. Data may refer to a video clip, an MPEG-2 video bitstream, or a video clip with its already existing associated Meta-Data.

Next, we discussed structures, or models, or features of the data content that MPEG7 descriptors will describe. On that basis, we agreed on the term *Description Scheme*. For example colour of a particular image object at a particular spatial position in a particular frame of the video data may specify a Description Scheme. A histogram of the colour distribution (in a colour space that may be specified by the Description Scheme). With the thought that it might not be possible (or necessary), in some cases, to clearly distinguish Description Scheme and the associated Descriptors, we also decided to refer to the combination of the two by *Description*. Finally, we defined the term *Coded Description*, referring to possible coded versions of the descriptions to facilitate easy indexing, efficient storage and transmission.

The above concepts are reflected in the output documents of the group, especially in the Annex A-Terminology part of the Requirements document. We also tried to make the wording of the existing requirements consistent with this terminology. These concepts are open for further discussions, as necessary, in the context of MPEG7 Ad-Hoc group work whose mandate includes further development of requirements, applications, context and objectives, and a proposal package description for MPEG7.

As noted above, there were lengthy discussions on what MPEG7 should standardise and a set of descriptions and a way to specify descriptions was the agreed upon answer.

Requirements

- 2786 *Jae-Gon Kim, Taehwan Shin, Hankyu Lee, Jinwoong Kim - A Description Model for Video*
2878 *Anil M. Murching, Radu S. Jasinschi, T. Naveen, Ali J. Tabatabai, Paul T. Babic-Vovk - Indexing Object Content Information (OCI) for MPEG-4/MPEG-7*

We have made several changes in the Requirements document for further clarification and maintaining consistency. We have also added a new requirement in the light of Documents 2786 and 2878 regarding support for hierarchical descriptions of multimedia material as well as relations between components of a description. We have also made some changes for maintaining consistency with newly introduced terminology.

Applications

- 2711 *Vitor Teixeira, Hugo Ribeiro, Teresa Andrade, Luis Teixeira - VIDION as a genuine MPEG-7 application*
2791 *Rémi Ronfard - MPEG 7 Applications in Radio, TV and Film Archives*
2792 *Rémi Ronfard - MPEG7 Requirements for Radio, Television and Film Applications*
2793 *Rémi Ronfard - A logical framework for shot-level description of video content.*
2623 *Pascal Faudemay - Some issues about logic representation of video scripts*

The MPEG-7 Applications document was edited by a small break-out group. The structure and Introduction were modified, as well as certain applications which reflected strong interests in the breakout group. The application domains in Section 3 were expanded, as were some examples to some of the items. The entire document was changed from having sections on "Video Applications," "Audio Applications," and "Advanced Applications," to sections on "Visual Retrieval," "Auditory Retrieval," and "Beyond Search," applications.

Following some intense discussions involving the focus of the Applications document and its relation to potential industrial partners who may read it, Section 4.1, "Storage and Retrieval of Video Databases," was heavily modified with contributions from Rémi Ronfard (INA), reflecting more accurately the interests of a large archive holder and an expert on these matters. Sections 4.2, "Delivery of pictures and video for professional media production," 4.4, "Bio-

medical applications," and 5.4, "Movie scene retrieval by memorable auditory events," were recognized to be relatively weak by the group, and are considered as top priorities for getting expert input in these areas. Eric Pauwels further refined section 4.3, "Teleshopping," and Françoise Prêteux contributed an excellent section 4.5, "Remote Sensing Applications." Section 6.4 was generalized from film music education to "Educational Applications," with examples from INA's interests added.

Proposal Package Description

2622 Pascal Faudemay - Benchmarking issues in the MPEG-7 process

Following presentation of 2622, which was mostly geared towards evaluating Information retrieval systems, we decided to have a brainstorming session on the contents of the Proposal Package Description for MPEG-7. We produced the very first version of the PPD at the end of the week.

We brainstormed on:

- Scope of MPEG7
- Functionalities
- What to call for
- How to evaluate

The results of our discussion is included in the output document containing the first PPD. This is a rather rough draft that will be improved and modified starting immediately after the meeting within the MPEG7 Ad-Hoc group and during the upcoming meetings. Defining an evaluation process seemed to be the most difficult subject. It seems that we will be spending a lot of time and effort to come up with evaluation criteria.

We also had lengthy discussions on what MPEG4 should standardize, as mentioned above. At least for a while, there was a strong suggestion that MPEG-7 should only standardize the means for specifying descriptions but not the descriptors themselves. This idea is similar to one of the ideas that was put forward at the early stages of MPEG4: "Let's standardize a syntax for object based coding (e.g., shape coding) rather than the coding method itself" The Requirements chairman reminded the group why this was not such a good idea for MPEG-4 and is not a good idea for MPEG-7 either. It was pointed out that a standard set of descriptors will enable immediate compatibility between MPEG-7 compliant databases and retrieval engines producing MPEG-7 compliant queries. Otherwise, a standard would not provide a stable solution, and will not provide a framework where different vendors have the means for establishing clear product advantage. The group agreed on the position stated at the beginning of this Section stating that MPEG7 will specify standard descriptions. In case, a database does not use MPEG-7 standard descriptors, it may respond to MPEG-7 queries on the basis of an appropriate translation.

Output Documents

The Committee produced the following output documents related to MPEG-7:

- Requirements (N1921)
- Applications (N1922)
- Context and Objectives (N1920)
- VERY FIRST DRAFT of Proposal Package Description (N1923)

WG11 Documents

The following documents were produced, with indication of public availability:

Preliminary Requirements for MPEG-2 Advanced Layered Coding for High Resolution Video	N1842
MPEG-4 Requirements Document v.5	N1886 public
MPEG-4 Profile Requirements Document v.5	N1899
MPEG-4 Applications Document v.2	N1907 public
Decisions on MPEG-4 Profiling	N1908 public
MPEG-4 Version 1 Overview (<i>to be finalised in MPEG-4 Requirements AHG</i>).....	N1909 public
MPEG-4 Version 2 Overview (<i>to be finalised in MPEG-4 Requirements AHG</i>).....	N1914 public
Initial Requirements for information to be carried on a back channel	N1917
Managing Intellectual Property Identification and Protection within MPEG-4	N1918 public
Call for Proposals for an MPEG-4 Intermedia Format.....	N1919 public

MPEG-7 Context and Objectives v.5.....	N1920	public
MPEG-7 Requirements Document v.3	N1921	public
MPEG-7 Applications Document v.2	N1922	public
MPEG-7 Preliminary Draft Call for Proposals	N1923	
Preliminary Requirements for AAVS format.....	N1933	
Response to French National Body Comment concerning OCI development	N1956	
Response to the UK National Body on MPEG-7.....	N1958	
Overview of the available MPEG-4 tools (<i>to be finalised in MPEG-4 Requirements AHG</i>).....	N1974	

Ad Hocs

The following Ad Hocs were recommended by the Requirements Group:

AHG on MPEG-2 Advanced Layer Coding for high resolution Video (SJ Huang).....	N1841
AHG on MPEG-7 Requirements (Ibrahim Sezan)	N1894
AHG on other MM Metadata schemes (Rémi Ronfard, Adam Lindsay, Frank Nack)	N1895
AHG on MPEG-4 Requirements (Rob Koenen).....	N1896
Ad Hoc Group on content-related IPR (Niels Rump).....	N1897
AHG on Version Management in MPEG-4 (Jae-Seob Shin).....	N1898

Annex 1: Agenda

When	What	Where
Monday		
9.00-13.30	<i>opening plenary</i>	
13.30-14.30	<i>lunch</i>	
14.30-17.00	<i>Meeting goals Requirements & OCI & IPR kick off & MPEG-7 kick off</i>	B30.04
2605	Fernando Pereira & Ibrahim Sezan Report of the Ad Hoc Group on OCI in MPEG-4	<i>done</i>
2663	French National Body - MPEG-4 OCI and MPEG-7 developments	<i>done</i>
2694	Fernando Pereira et al. - Proposal for Object Content Information (OCI) in MPEG-4	<i>done</i>
2621	Pascal Faudemay - Syntax proposal for OCI descriptors	<i>done</i>
2620	Niels Rump - Report on ad-hoc group on content related IPR issues	<i>done</i>
2604	Fernando Pereira & Adam Lindsay - Report of the AHG on MPEG-7 Requirements	<i>done</i>
17.00-20.00	<i>File Format Requirements</i>	B30.04
2624	Wei-ge Chen, et. al. - Requirements for MPEG4 file format	<i>done</i>
2873	H. Kalva, et. al. - File Format for MPEG-4	<i>done</i>
2872	A. Basso, et. al. - Requirements for the File Format for MPEG-4	<i>done</i>
Tuesday		
9.00-10.00	<i>Joint with Audio on Audio Profiles</i>	Audio
2689	Rob Koenen et. al. Discussion on Audio Profiles	<i>done</i>
2693	Torsten Mlasko et. al. Proposal for MPEG-4 Audio Object Profiles	<i>done</i>
10.00-12.00	<i>General requirements issues & Applications Document</i>	B30.04
2690	Rob Koenen - Report of AHG on MPEG-4 Requirements	<i>done</i>
2688	Rob Koenen for MPEG-4 Reqs AHG draft v.5 of MPEG-4 Reqs Document	<i>done</i>
2661	Michael Zeug - Report of Ad Hoc Group on MPEG-4 Low Delay Evaluations	<i>done</i>
2662	Michael Zeug - MPEG-4 Profile Requirements version 4.1	<i>done</i>
2837	Michael Zeug - Harmonization of Definitions in MPEG-4 Reqs and Profiles Docs	<i>done</i>
2700	Graham Thomas - Description of virtual studio coding application	<i>done</i>
2646	Klaus Diepold - Application Document Revision	<i>done</i>
2827	Klaus Diepold, Jiang Zhang - Overview of the available MPEG-4 Tools and Profiles	<i>done</i>
2861	Thomas Stingl, et. al. - Description of a prototypical MPEG-4 Infotainment Application	<i>done</i>
2864	M2VTS - Applications description from the M2VTS project	<i>done</i>
2635	Jian Zhang et. al. - Update of App Doc regarding Mobile Multimedia Application	<i>done</i>
2636	Jian Zhang et. al. - Update of App Doc regarding Collaborative Scene Visualization	<i>done</i>
12.00-13.00	<i>Lunch</i>	
13.00-14.00	<i>Joint with ISG - metrics for defining conformance</i>	
2670	James Van Loo - Adaptive Terminal Conformance	<i>done</i>
2717	Andreas Hutter - Proposals for Composition Profiles and Conformance Testing	<i>done</i>
2728	Cliff Reader - Proposal for Decoder QoS	<i>x</i>
14.00-15.00	<i>Joint with DMIF - DMIF Requirements issues</i>	
2850	Vahe Balabanian - Proposal of DMIF Profiles	<i>done</i>
2851	Vahe Balabanian - Proposal of DMIF Requirements	<i>done</i>

15.00-17.00	2853 Vahe Balabanian - DMIF Tool Requirements in MPEG-4 Applications	done
	<i>Profile Contributions (mainly Visual & Systems)</i>	
	2725 Michael Frater, Homer Chen - Variable Pixel Depth Functionality in MPEG 4	done
	2678 Hiroyuki Katata - Profiles requirements for temporal scalability	done
	2770 Yoichi Yagasaki - Scalable Coding Tools for Network Applications	done
17.30-18.00	<i>Progress report from MPEG-7 break out</i>	done
18.00-18.30	<i>progress report from IPR break out</i>	done
18.30-...	2719 Ajay Luthra - Interlaced Video for Consumer Electronics Applications	done
	2665 R. Schäfer, S. Bauer - Hierarchical structure of Profiles in MPEG-4	done

Wednesday

9.00-11.00	Plenary meeting	Video
11.00-13.00	Joint with Systems on where to put OCI and IPR information and System Profiles	B30.20
13.00-14.00	Lunch	
14.00-16.00	Joint with Video on Video Profiles	Video
16.00-17.00	Various Requirements Issues	B30.04
17.00-18.30	Joint with SNHC on SNHC Profiles	B30.04
	2648 Eric Petajan, FBA adhoc group - Face Animation Profiles	done
18:30 -	Social Event	

Thursday

8.00- 9.00	Discussion on Visual Profiles	B30.04
9.00- 9.30	Joint with ISG and Video on complexity issues in Video	Video
9.30-10.00	Joint with Audio on Audio Profiles	Audio
10.00-13.00	Various Requirements Issues	B30.04
	among others: processing NB positions on MPEG-4 and -7	done
	MPEG-4 Version 1 Overview; MPEG-4 Version 2 Overview	fi AHG
	2882 Andrea Basso, et. al. Requirements for a Back Channel: Messages from the Decoder to the Encoder (@ 12.00 h.)	done
13.00-14.00	Lunch	
14.00-15.00	Report back from IPR break out group	done
15.00-16.00	Report back from MPEG-7 break out group	B30.04
16.00-17.00	Joint with Systems on Systems Profiles	Systems
	2912 Ronald Jacoby - Variants on Profile Definitions for MPEG-4 Systems	done
	2651 Constance Belz et. al. Definition of a System Profile Level for 3D Graphics in Low Bitrate Environments	fi to be done
17.00-19.00	Remaining Requirements Issues	

Friday

9.00-13.00	Approving all requirements documents (including IPR, MPEG-7), final editing, resolutions	done
13.00-14.00	Lunch	
14.00-21.45	plenary meeting	

	Mon	Tue	Wed	Thu	Fri
8- 9				Video Profiling	joint w/V Versioning
9-10	opening plenary meeting	joint with Audio	Half way	Joint w/ISG+V - w/ A	approving all documents, AHGs resolutions etc.
10-11		general issues	Plenary meeting	Various	
11-12		requirements	Joint with Systems	Requirements	
12-13		lunch		Issues	
13-14		joint with ISG	lunch	lunch	lunch
14-15	lunch	joint with DMIF	joint with Video	IPR report back	closing plenary meeting
15-16	meeting goals, OCI	Profiling issues	On Profiles	MPEG-7 report back	
16-17	kick off MPEG-7& IPR		Various (MPEG-2)	Joint with Systems	
17-18		IPR & MPEG-7	Joint w/ SNHC (Prof)	NB positions, draft	
18-19	file format	Video Profiling	social event	resolutions & AHGs	
18-20	Requirements	issues			
20-21					
21-22					

Requirements work

no meeting possible

no meeting

Report of Delivery Meeting

Source: Vahe Balabanian, Chair

The list of attendees and the documents reviewed are attached at the end of this report.

The following are the results of the meeting grouped under the headings of DMIF and DSM-CC.

DMIF

1. Joint Systems-Mux/DMIF meeting

DAI (DMIF-Application Interface) Walkthrus for Downstream and Back Channels and URL Addresses were jointly agreed to.

2. Joint Requirements and DMIF meeting

DMIF Requirements and Profiles are now documented in the MPEG-4 requirements N1886 and the MPEG-4 profiles N1899 documents.

3. Release of DMIF V1 CD N1906

- Specifies DAI Normative functionality and parameters
- Maps DMIF Signaling primitives to H.310 and H.323 (Liaison is being sent to SG16 to request extensions for DMIF)
- Information flows provided transparent to operation with Remote Interactive peer terminals, Broadcast Carousels and local File systems
- Conditions for transition from MPEG V1 to V2

4. Decision on the DMIF Reference Source Code

- IM1 will implement DAI interface
 - AAVS will implement JAVA API to DMIF
- ⇒ Issue: Need volunteers who will implement underlying code. A joint effort between Darmstadt, Germany and Columbia, US universities is a clear possibility

1. Release of DMIF V2 WD 1.0 N1916

This document contains the DMIF operation over heterogeneous networks and the use of a network based Session and Resource Management function.

Amendments are:

- Inter-operation with ISO/IEC 13818-6
- Symmetric operation to cover peer conversational communication
- Networking of the SRM using SRM nodes
- Signaling between SRM and InterWorking Units

1. Prepared response to the SG16 liaison requesting for H.310 and H.323 extensions for DMIF N1946

2. Responded to IETF AVT request positively for making DMIF V1 CD an Internet-Draft for informational purposes and give a brief presentation on DMIF at the next AVT meeting in Washington, DC, during the week of December 8 N1942

DSM-CC

1. Release of the DSM-CC conformance test ISO/IEC 13818-10 CD N1764

- Contains conformance tables (complete)
- Contains test cases (Needs to expand to cover more tests)

2. DSM-CC IS Corrigenda

Minor editing items which will be added as errata sheet to the IS

Ad Hoc Group

One editorial AHG was formed with the mandate of completing and uploading the DMIF CD to the secretariat by 21 November 1997 N1893

Attendees:

Guide Franceschini, CSELT, Italy
 Vahe Balabanian, Nortel, Canada
 Tomas Uhlin Telia, Sweden
 Jurgen Diecke, Darmstadt University, Germany
 Ulrich Mayer, Darmstadt University, Germany
 Harri Honko, Nokia, Finland
 K Hsing NIST, USA (invited expert)
 Chilsung Seo, Korea Telecom, Korea (invited expert)
 Philip A. Chou, Microsoft, USA
 Eric Fleischman, Microsoft, USA
 Jeff Needham, Oracle, USA
 Ron Jacobi, Silicon Graphics, USA
 Tim Addington, Scientific Atlanta, USA
 David Anderson, David Anderson, USA
 Zvi Lifshitz, VDOnet Corp, Israel

Documents reviewed:

Doc #	Title	Contact	Relevance
M2716	Updated DSM-CC Conformance ISO/IEC 13818-10 WD 2.0	Jurgen Ruf	DSM-CC
M2739	Input to corrigendum of ISO/IEC 13818-6	Tim Addington	DSM-CC
M2855	Comments Input to DSM-CC Conformance WD 2.0	Vahe Balabanian	DSM-CC
M2857	DSM-CC ISO/IEC 13818-6 IS Editorial Errata	Vahe Balabanian	DSM-CC
M2817	Comments on the PICS proforma of DSMCC Conformance Testing Specification (ISO/IEC WD 2.0 13818-10)	Karen Hsing Chilsung Seo	DSM-CC
M2818	Conformance Abstract Test Cases for DSMCC UU Core Interfaces	Karen Hsing Chilsung Seo	DSM-CC
M2706	Review of the DAI, after the IM1 experience	Guido Franceschini	DMIF
M2707	AssociationTags or generic handles at the DAI	Guido Franceschini	DMIF
M2611	DMIF Implementation on Local Area Networks which Provide a Non-Guaranteed Quality of Service	Zvi Lifshitz	DMIF
M2596	DMIF July 1997 (Stockholm) Meeting Report	Vahe Balabanian	DMIF
M2602	Liaison Response from ITU-T SG16	ITU-T SG16	DMIF
M2839	Definition of DMIF Addresses for Service Attach and ChannelAdd/Setup	Vahe Balabanian	DMIF
M2840	Report of the DMIF Reference Source Code AHG	Vahe Balabanian	DMIF
M2841	Walkthrough for the DMIF Reference Source Code in the Interactive Remote Case	Vahe Balabanian	DMIF
M2842	DMIF-FlexMux Interface (DFI) for ISO/IEC 14496-6 WD 1.0	Vahe Balabanian Koon-Seng Lim Aurel Lazar	DMIF
M2844	DMIF Operation with ASF	Vahe Balabanian Eric Fleischman Philip Chou	DMIF
M2845	Operation of DMIF with ITU-T H.310 and H.323 Recommendations	Vahe Balabanian	DMIF
M2847	DMIF SRM and V1 Mode to V2 Transition U-N Messages	Vahe Balabanian	DMIF

M2848	Transition from DMIF V1 to V2	Vahe Balabanian	DMIF
M2928	Contribution to the DMIF Interfaces	Juergen Diecke Ulrich Mayer Manfred Glesner Angelika Knoll	DMIF

Annex 5
Report of Systems Meeting

Source: Olivier Avaro, Chair

1. Overview

The MPEG-4 Systems Sub-group has delivered the Systems CD for ISO/IEC 14496-1 (MPEG-4 Systems Version 1). This document specifies a first set of tools and profiles that are made available to the industry. In parallel of the editing effort for CD, activities for Systems Version 2 have been set up.

MPEG-4 Systems CD Version 1 contains the basic set of tools to reconstruct a synchronous interactive and streamed audiovisual scene : timing and buffer model (SDM), scene description (BIFS), association of scenes and streams (Object Descriptor), synchronization of streams (AccessUnit Layer) and efficient multiplexing of streams (FlexMux). In addition to these basic tools, Systems provides for the coding of object content information (OCI) and back channel functionality. A partition of the set of the BIFS nodes defines the five Systems profiles : 2D, 3D, VRML, Audio and Complete profile.

On-going Systems Version 2 activities will complete this first set of tools. These activities are : Advanced BIFS (new BIFS nodes under experiments), Adaptive Audio-visual Session (interfaces for interoperation of MPEG-4 media with Java), Content Return Channel (user to user interaction within the MPEG-4 framework) and MPEG-4 Intermedia Format. A call for proposal on this format has been issued in the Fribourg meeting. Contributions will be evaluated in San Jose and the collaborative work will begin after the Tokyo meeting.

2. Detailed Report

2.1 Version 1 Tools and Implementation

- ? Scene Description (BIFS) : the BIFS specification reached a good quality. Joint issues with audio/video and SNHC have been addressed in details. The definition of profiles has to be worked more according to industry needs, but a first set has been provided. URL have been introduced in the Scene Description. The collaborative framework with VRMLC/SC24 is making progress. Still the conformance issues have to be adressed.
- ? Management of Elementary Streams : this set of tools (Systems Decoder Model, Association of Scene and Streams, Synchronization of Elementary Streams, Multiplexing of Elementary Streams) is now quite stable. The specification of the Systems Decoder Model has been improved (in particular suppression of the ETS). Dominique Curet and a team of people have been working on it but the output of their work has not been reviewed for inclusion in the CD because of time constraints. These outputs will be examined on the AHG on Streams Management and further included in the Study of CD if suitable. The object descriptor structure has evolved to include IPI data set and URL fields. A scenario for the bootstrap of a Systems session is now described and harmonized with DMIF.
- ? Object Content Information : The object content information stream has been included in Fribourg in the Systems specification. This stream specifies a sequence of elements called events related to the content. The events can have a notion of time (e.g. start time and duration).
- ? Back Channel Specification : A new field has been added in the syntax of the object descriptor to allow for return channel set up. A walkthrough of the set up of such channels has been constructed jointly with the DMIF group. Currently, all the streams defined in Systems can be other forward or backward. But the more meaningful back channel up to now are the BIFS back channel and the View Dependent Coding back channel.
- ? Implementation framework : Zvi and the implementation team have set up a new workplan for Systems Version 1. This workplan is described in a Systems output document with the list of the committed partners.
- ? Test and Conformance : A test and conformance activity has been set up and will be chaired by Jean-Claude Dufourd. Systems conformance points and testing methodology will be defined. Tests streams to check MPEG-4 Systems conformance will be produced. The way to verify conformance to the Systems Decoder Model will be investigated.

2.2 Methodology for evolution of CD 0.1

We issue in Fribourg the CD 0.1 and an edit list to CD 0.1 editors. These edits have to be included in the document and send to the ISO Secretariat before the 21st of November. This document will be submitted to national bodies ballots.

Starting from this document, we are going to produce a study for CD 0.2. This document has no official value. It is an internal document. To make a modification to CD 0.1 :

1. If it is only editorial, send on the editorial AHG : the text you want to replace, the proposed text. Editors will comment and decide what action to take.
2. If you identify a bug that has to be fixed, send on the specific AHG (BIFS, or Mux AHG) : the description of the bug, the description of the solution to fix it, the text that should be replaced to fix it, the proposed text to fix it.

CD 0.2 will be produced in San Jose. We will continue to produce this kind of internal document (between San Jose and Tokyo, CD 0.2, between Tokyo and Dublin CD 0.3x, ...) until the DIS.

In Tokyo, we will produce the Final CD. The starting point is CD 0.1, with input from National Body comments. However, National Body can refer to CD 0.2x for their comments (indeed, this will be preferred, since lot of bugs and edits would have been fixed from now on to February). The same procedure will apply to go from FCD to DIS. CD 0.1, FCD and DIS are the only official documents.

2.3 Version 2 Tools and Implementation

- ? Advanced BIFS : An experiment on Advanced BIFS has been set up. It consists in the proposal of new nodes. Among these nodes, all the missing VRML nodes can be found (ex : Script node, Proto node, ExternProto, ...).
- ? AAVS Specification : AAVS will be part of Systems Version 2 has proposed by the AHG on AAVS. AAVS specifies different kind of Java API to serve MPEG-4 needs. Some of them relates to BIFS in the sense that they can be used to control the behavior of BIFS nodes, but there is no overlap between these two Systems tools. AAVS efforts will be first focussed to terminal model and user interaction.
- ? AAVS implementation : A set of committed companies agreed on an implementation workplan for AAVS. The implementation will be done on top of the current Systems software implementation. The details of the workplan can be find of the AAVS related experiments.
- ? MPEG-4 Intermedia Format : A call for proposal has been produced in Fribourg. According to the MPEG-4 Requirements Document, this format shall support exchange/distribution of MPEG-4 content on storage media. It must also allow access to and publishing (parts) of the content in a flexible way. A first evaluation of proposals will be done in San Jose. From the limited set of relevant proposals, we will set up Experiments (Implementation in Im1). Finally, in April, we will select the best technologies from each of the proposals to fit MPEG-4 needs and begin the collaborative work.

2.4 List of Systems Document

Here follows the list of document that have been produced during the Fribourg meeting :

- ? N1901 : Systems CD 0.1
- ? N1938 : Edit list to Systems CD Editors
- ? N1933 : Overview of AAVS Format
- ? N1911 : Systems WD 0.0.
- ? N1934 : Systems Experiments
- ? N1935 : Systems Version 1.0 Software Implementation Workplan
- ? N1936 : MPEG-2 and MPEG-4 Systems Frequently Asked Questions
- ? N1924 : AHG on Systems Specifications Editing
- ? N1925 : AHG on Systems Elementary Streams Management
- ? N1926 : AHG on BIFS Scene Description
- ? N1927 : AHG on AAVS Specification
- ? N1928 : AHG on Systems Version 1.0 Software Implementation
- ? N1929 : AHG on Systems Version 2.0 Software Implementation
- ? N1930 : AHG on Systems Conformance and Bitstreams Exchange
- ? N1931 : AHG on Representation of Time and Decoder Configuration
- ? N1932 : AHG on Systems User to User interaction

Annex 6
Report of Video Meeting

Source: Thomas Sikora, Chair

The work in the MPEG video group mainly concentrated on issues related to the release of the MPEG-4 Version 1 Committee Draft (CD). Further work items were the progression of the MPEG-4 Video Verification Model (VM), the Video Working Draft (WD), the establishment of general MPEG-4 video requirements and on issues related to bitstream exchange activities. Additionally, further Subjective Tests were planned in joint meetings with the MPEG Test group.

MPEG-4 Version 1 Committee Draft (CD):

The most important activity at the meeting was the preparation of the MPEG-4 Version 1 CD. To this end the bitstream exchange performed between the Stockholm and San Jose MPEG meetings was evaluated and a final decision on the techniques adopted for Version 1 was taken. The video tools that will be assisted by the MPEG-4 Version 1 Visual Standard will include:

- Support for 8-bit and 12-bit precision per YUV color component
- I,P and B frame coding and prediction
- Interlace prediction
- Binary shape coding (gray scale alpha plane coding is still being discussed)
- Error resilience techniques (slice synchronization, reversible VLC's and data partitioning)
- Scalability (object- and frame-based temporal scalability, frame-based spatial scalability)
- Sprite prediction (static Sprites and low-latency Sprites)
- Texture coding mode based on wavelet technology (frame- and object-based coding of textures also supporting SNR and spatial scalability)
- Computational graceful degradation

Subjective Tests of the MPEG-4 Standard Version 1:

In joint meetings with the Test Group a detailed plan was issued which outlines the first subjective evaluation of the MPEG-4 standard Version 1 in March 1998. This plan foresees an evaluation of the Error Resilience methods currently under development for Version 1. Possible MPEG-4 Video functionalities were identified for further tests. As an outcome of the meeting an AdHoc group was established which will organize experiments for Sprite Coding being performed before the San Jose meeting. At the San Jose meeting a decision will be required to whether the results encourage a future subjective test based on Sprite technology will be scheduled.

Software Implementation of CD:

A software implementation (technical report) of the MPEG-4 Version 1 Video part of the visual standard will be developed based on a C and C++ version (MOMUSYS and Microsoft). Since various decisions on new tools adopted for Version 1 were taken at the meeting the actual implementation of the CD tools will lag behind the text description. A detailed plan was developed which will result in a near-complete software implementation of the video part of the visual standard (with a limited amount of bitstream testing) at the San Jose meeting.

Verification Model (VM) and Working Draft (WD) for Version 2:

The existing list of Core Experiments (CEs) was revised. A significant amount of meeting time was allocated to the review of input documents related to results of existing CEs. Experimental conditions of the CEs were harmonized to allow a more efficient evaluation of the results at the next meetings. Documents with new or revised descriptions of CEs were issued related to "Coding Efficiency", "Shape and Alpha Channel Coding", "Object/Region Texture Coding", "Error Resilience" and "Multi-Functional Coding Aspects".

The following tools were adopted for VM Rev.1 for Version 2:

- Dynamic rate conversion
- $\frac{1}{4}$ pel prediction
- Combined motion/texture matching pursuits

In addition to the new version of the Video VM Rev.1 a 1st version of the WD for Version 2 was issued. The additional tools currently under discussion for the Amendment of the Version 1 MPEG-4 standard include:

- Global motion compensation
- Dynamic rate conversion
- $\frac{1}{4}$ pel prediction
- combined motion/texture matching pursuits
- Dynamic Sprite prediction
- Shape-adaptive DCT
- Gray-scale alpha plane coding
- Interlace shape prediction

Joint Meetings:

Joint meetings were held with the Test, Requirements, SNHC, Systems and Implementation groups to harmonize efforts. An extended list of video requirements in particular with respect to profiles was revised and used as a draft for the Requirements group. In a joint meeting between Video and Implementation groups coding methods for shape coding and motion prediction were evaluated in terms of software and hardware implementation complexity. In a meeting with the Systems group, the video requirements for the systems multiplex and composition were clarified.

At the next WG11 meeting in San Jose in February 1998 the Video group will mainly concentrate its efforts on reviewing the text and software implementation of the MPEG-4 Version 1 video standard. Further the review of Core Experiments for the tools for Version 2 of the MPEG-4 Video Standard will be an important aspect. Separate AdHoc group meetings are scheduled for "Coding Efficiency" (1 day), "Joint Meeting with Video/SNHC" (1 day), „Error Resilience“ (1 day) and "Shape Coding" (1 day) on the weekend prior to the San Jose MPEG meeting.



Annex 7 Report of Audio Meeting

Source: P. Schreiner, Chairman Audio Subgroup
D. Meares, Secretary Audio Subgroup

Opening of the meeting

The MPEG/Audio Subgroup meeting was held during the 41st meeting of WG11 Fribourg, Switzerland on October 27 to 31, 1997. The list of participants is given in **Error! Reference source not found.** The Chairman welcomed the delegates to the meeting and outlined the work for the five days

Approval of agenda

The agenda as presented in Annex A-II was discussed and approved.

Stockholm meeting report

The Audio Subgroup portion of the Stockholm meeting report, July 1997, had been previously distributed and was approved.

Allocation of contributions

All contributions were listed (see Annex A-VI) and allocated to the agenda. All contributions directly related to the Subgroup were presented in the MPEG-4 core experiments ad hoc group meeting, in task group discussions, or in Audio plenary. Several relevant documents from Test, SNHC, Systems and Requirements were brought to the attention of the group.

Communications from the Chair

The Chairman summarised the detailed allocations and questions raised at the Chairman's meeting held on the evening before the main meeting started. The majority of these, by design, were already in the agenda.

- Bitstream exchange activities not yet sufficiently visible.
- The Subgroup need to address the user friendliness of the Audio VM.
- MPEG-4 software copyright status needs to be sorted out by end of this week.
- Profiles - large number or very few? Joint meeting to discuss this.
- MPEG-4 Audio should use its own rather than an ITU codec where it is now good enough.
- Liaison with SNHC and MIDI to be included in this week's work. Need to identify overlap and what makes most sense for us to utilise.
- Verification tests of MPEG-2 Advanced Audio Coding (AAC) as a stereo/mono system are based on very high quality expectation. The issue is whether or not good quality very low bitrate options will be criticised unnecessarily. We need to reconsider the testing options.
- The ways of handling MPEG-4 versions was discussed. Particularly that version 2 will be handled as an amendment.
- Core experiments were discussed
- QoS issues are being raised and a meeting with Mr. Reader is required.

Joint meetings

Joint meetings were scheduled with Test, Systems and Requirements.

Report of ad-hoc group activities

All but one of the major ad-hoc group reports had been presented in the opening MPEG Plenary. The report on Audio/Systems Ad-hoc issues was presented to the Audio Subgroup. Further input from Systems is required. Additional details were taken into account in Audio plenary.

Resolution of National Body comments

Mr. Meares briefly introduced the NB papers that had been submitted to this meeting. Two were specifically related to Audio Subgroup, though three others addressed MPEG-4 versions. Responses to the NB papers were prepared for M2607 (UK) and M2683 (Germany).

Temporary task group formation

To accomplish the large number of tasks to be performed by the Audio Subgroup, 16 task groups were formed as indicated in Annex A-V. The results of each of the task groups were presented to and discussed by the entire Audio Subgroup, including iterations as necessary. The conclusions of the task groups are presented elsewhere in this report and are included in the output documents.

MPEG-2 BC coding

IS 13818-5 FPDAM 1

No NB comments had been received relating to the BC content of the FPDAM 1.

MPEG-2 audio quality update

No information

Bitstream tests

No information

MPEG-2 AAC

Technical Report 13818-4 FPDAM 1

FPDAM 1 comments from Japan NB were resolved in Stockholm, see document WG11/N1741. The provision of source code from Ricoh and GCL for AAC encoder psychoacoustic model in doc M2643 was noted and has been amalgamated. Contribution M2798 was also noted: the bug fixes for SSR profile have been amalgamated. Mr. Lueck's contribution of TNS codes in doc M2612 was also assimilated. The update of the Stockholm document is given in document WG11/N1867. A DoC was prepared, document WG11/N1968.

Conformance 13818-5 FPDAM 1

The Japan NB vote and comments in M2598 were noted and addressed during Stockholm, see document WG11/N1742. An update to this is given in document WG11/N1866. A DoC was prepared at this meeting, document WG11/N1969.

Workplan

The workplan for AAC Conformance and Technical Report is given in document WG11/N1844.

Systems 13818-1 /PDAM 5

The Systems PDAM was discussed and is reported in document WG11/N1868.

Verification Tests

The Subgroup debated the issue of BS-1116 testing versus MOS testing. BS-1116 allows some inter-test comparisons, but MOS only gives rank order with no absolute level. The real problem is identifying reference codecs that are of known quality within an application group **and** that we can obtain permission to use. Options of MPEG-1 LII at low bitrate and MPEG-1 LIII were raised: these are under our control. Various options already used on Internet were mentioned, but they are not under our control. Regardless of this it will be necessary to define a test methodology.

The Subgroup decided that the high quality AAC BS-1116-methodology tests should proceed as planned. Mr. Feige reported on the work of the ad-hoc group and in the task group. The selection panel have completed their work, selecting critical items and de-selecting one of the coder options. The reason for the deselection was that the codec in question had specific characteristics that made it easily detectable in the proposed form of tests but that are in no way relevant to its intended purpose. The audio quality of the coder, despite these audible spatial characteristics, were demonstrated to the Audio Subgroup and to the rest of WG11 in Plenary.

In discussion, the Audio Subgroup accepted the selection panels recommendations and decided to run 8 codec/bitrate combinations, 10 programme items, loudspeaker tests with three listeners at a time (line astern) using pre-recorded test sequences (no signal switching under listener control). NHK will run the tests and hope to have 20 listeners. Mr. Scheirer volunteered to carry out the statistical analysis, Mr. Meares and Mr. Watanabe volunteered to do the report, and Mr. Schreiner will act as test co-ordinator. The specification of the AAC stereo verification tests is given in document WG11/N1845.

Corrigendum to 13818-7 (AAC)

The corrections for 13818-7 were worked on during the week in a task group. The approved draft corrigendum is presented in document WG11/N1843.

MPEG-4

Audio Committee Draft

The Audio CD was worked on throughout the week in a task group taking into account all of the new information approved in the core experiment ad-hoc group meeting which preceded this meeting. Other relevant inputs were considered and incorporated. The CD is presented in document WG11/N1903. However, see the additional comments in Section 30112.

The need for a version 2 of MPEG-4 had been recognised at the Stockholm meeting and in order to set the appropriate actions in motion it was necessary at this meeting to initiate an amendment proposal. Mr. Meares collected contributions from all the MPEG Subgroups and prepared document WG11/N1910, the audio part of which was approved in Audio plenary.

Conformance Testing Working Draft

The Working Draft of 14496-4 was prepared during the meeting and was discussed by the Subgroup. The approved text is given in document WG11/N1847.

Reference Software Committee Draft

The software representing the approved state of the natural audio VM was edited as much as possible during the meeting. All elements were inspected by the editors with the intention of completing the editing by 16 November '97. The final software will be given in document WG11/N1905.

The Subgroup noted that all elements of the decoder were already copyright released. The situation for the encoder software was not yet so clearly defined. The requirement on this is that all elements of encoder software must be provided with the copyright release statement by the 16th November '97 in order to be incorporated. Any elements that are not available will be struck from the CD on the 21 November '97.

Preliminary work on the reference software for MPEG-4 version 2 WD was carried out and is presented in document WG11/N1915.

Structured Audio (SA)

Mr. Huopaniemi presented his ideas from M2660 with a demonstration of the virtual acoustic rendering. The idea is to model the properties of sound propagation using tools adapted to a BIFS format. New parameters relating to sound reflection, diffusion and transmission functions need to be added. The issue of including HRTF parameters in the specification was raised but was noted as needing further discussion. The demonstration showed a pre-rendered sound presentation where the sound/reverberation mix was position sensitive and computed based on the SA means being proposed.

Mr. Link presented M2721 on SA sample bank format providing dynamic filtering of the sort used in music synthesis. Accuracy of 0.01 semitones is needed on occasions. A demonstration showed how the various SA tools could convert a MIDI file into SAOL and then into rendered audio. The paper gives normative text to cover the issues of dynamic filtering and interpolation.

The need for specific test methodology for SA was recognised and a task group prepared an appropriate test specification. This was approved by Audio and is given in document WG11/N1852.

MIDI Liaison

A constructive meeting with MIDI Manufacturers' Association representatives was held and the input documents were reviewed. It was decided to prepare a cross-referencing table to show the inter-relationships, and MMA offered to help by contributing to the work on SA. A liaison statement to MMA was prepared to encourage future joint discussions and co-ordination of the work via an ad-hoc group. This was approved by the Audio Subgroup. The liaison letter was modified in closing MPEG plenary to remove the speculation on the course of action to be taken after the results of the comparison of the MMA DLS and corresponding MPEG-4 Audio CD functionalities are known.

TTS Interface

Mr. Lee demonstrated the use of the MPEG-4 Audio TTS interface using English, Japanese and Korean TTS packages. The quality of the synthesis was variable, but all of the language modules clearly functioned through the TTS Interface. Documents M2764 and 2765 cover this matter. The extensions to the TTS interface, to define the full set of international phonemes, proposed in M2765 were presented by Mr. Hahn. The extra descriptors, if used in full, would increase the overall data rate of a 'text' channel by 70%. However, its use is optional. This was accepted by the Audio Subgroup and was amalgamated in the CD during the week.

Systems issues

Error Resilience

Discussions with the Systems Subgroup addressed how the error protection within MPEG-4 will be split between the Systems and Audio layers. In practice Systems are leaving the question of error protection to the Link Layer, i.e. outside MPEG-4. However, the option for unequal error protection (UEP) is a detail that may be mapped into Audio. The difficulties of Flexmux and Transmux were debated.

Systems will be defining a Quality of Service which will be requested by the user and required of the link provider. Additionally the Audio task group decided that concealment mechanisms should be outside the standard, though an optional means may be provided in the informative part of the standard. Additionally, it was decided during the meeting that the tools currently being considered for error resilience were not yet sufficiently mature, and thus, will be delayed to version 2 of MPEG-4. A task group defined a workplan for future error resilience developments which is presented in document WG11/N1850.

Systems audio transport

The problem of data capacity within a systems frame was discussed. The options are a simple arrangement for low delay applications avoiding the full Systems layer of MPEG-4 or a more complex situation for normal audio with extra flexibility. Options for entropy compression of the header data were considered for the 2 kb/s applications, but this is really a Link Layer problem which is not within the remit of the Audio Subgroup.

Mr. Dietz chaired a task group to address the systems issues. It was noted that padding bits are needed within Systems, but it is not felt that this will affect what Audio needs to do. Additionally, Audio/video synchronisation will require a sequence bit: this is facilitated within the Systems layer. Extensive discussion took place with Systems and many matters were resolved. These are presented in document WG11/N1851.

Scene description

Composition

Mr. Scheirer presented doc M2734 relating to the various aspects of audio composition. It presents the normative parts of the MPEG-4 CD as it relates to SA.

The composition activity is proposed to take place in a structured way using the BIFS nodes, with the lower levels of composition mapping up to the higher levels. Nodes include AudioSource, AudioMix, AudioSwitch, AudioFX, and AudioClip. Also covered are the issues of sample-rate conversion (carried out node by node) and specific means of handling mixing. The difficulties of successive transcoding was noted: this may be handled by allowing headroom within the early stages of compositing or by specifying an output sampling-rate for use in the early stages. In either case, the relationships between the various sampling rates that hit a single compositor will have an impact on the complexity of the compositor.

IPR and content protection

Mr. Kaneko acted as a link between the Audio and IPR Subgroups during the week. He reported that the style of operation proposed was to add extra blocks of code for IPR and define an interface to the MPEG-4 Audio core code to operate the IPR control. By that means, the development of the IPR control mechanisms does not need to be a component in the normative part of MPEG-4, only the interface. Watermarking techniques were presented in IPR task group, and they have proposed a test methodology for the audio watermark. This methodology was not presented to the Audio Subgroup and will therefore have to be studied in the ad-hoc group.

Testing options

Core experiments

Ad-hoc group findings

Mr. Brandenburg summarised the findings of the ad-hoc group as follows

New Tool	Status proposed by ad-hoc group	Condition on acceptance imposed by ad-hoc	WD content editor	Status after main meeting
Twin VQ scaleable (NTT/Matsushita)	Accept	Software to be brought to site and inspected for integration	[NTT Iwakami]	Accept
Scaleable audio/speech codec (Matra)	Reject			Reject
Perceptual Noise substitution (joint proposal)	Accept	None	[Grill]	Accept
Harmonic and Individual Line plus Noise codec, HILN (Hannover)	Accept	Complexity increase, therefore option within profiles	[Massa]	Qualified accept
Lossless CELP (Philips)	Accept	None	[Rakesh and Nomoura]	Accept
Extension of CELP to bandwidth scaleable (NEC)	Accept	Option within profiles AND assuming CD drafting can be accommodated	[Rakesh and Nomoura]	Qualified accept
Vector quantisation tools (Philips)	Limited Accept	Optimised VQ is not yet ready so we can only set VQ flags in the syntax. Future applications will be limited to 'capability exchange' applications.	[Rakesh and Nomoura]	Qualified accept
Long Term Prediction in t/f (Nokia)	Accept	None	[Mauri]	Accept
BSAC (Samsung)	Accepted (Stockholm)	Software to be brought to site and inspected for integration	[Herre, S-W Kim]	Accept
Low delay filter bank (Hannover)	Accept	Option within profiles	[Edler]	Subject to further tests before next meeting
Variable rate coding for parametric core (Sony)	Accept	Software to be brought to site and inspected for integration	[Massa]	Accept
Refinement of VM software (NTT)	Accept	None	[Iwakami]	Accept

New Tool	Status proposed by ad-hoc group	Condition on acceptance imposed by ad-hoc	WD content editor	Status after main meeting
Refinements to t/f code (FhG) Frequency selective switch & Revised bitstream header:	Accept		[Grill]	Accept
TNS integration into AAC scaleable coder	Conditional accept	subject to demo by 12:00 Monday.		Subject to further tests before next meeting
Joint stereo add-on to t/f coder (FhG)	Accept	Subject to software integration being possible	[Grill]	Accept

Because of concern in the Monday MPEG Plenary, Mr. Meares prepared a summary document based on the email exchanges and input documents recording specifically the details of the bitstream exchanges that had taken place in the course of the core experiments. This is given in document WG11/N1853. Mr. Johnston asked that the record show a vote of thanks to Mr. Meares for his efforts in this matter.

The details of the core experiment status were discussed further and a summary report is given in document WG11/N1846.

Audio Subgroup discussions

The variety of MPEG-4 Tools and their components that are currently proposed to be in the CD were listed by Mr. Edler and discussed by the Audio Subgroup with a view to reducing their number and thereby, the complexity of MPEG-4 Audio.

T/F Coding	AAC	Twin VQ	Alternates
Dequantisation and Decoding			
Inverse Non-uniform Quantiser	MPEG-2		
Interleaved VQ		Twin VQ	
Huffman Decoding	MPEG-2		1
Bit Sliced Arithmetic Decoding	MPEG-4		1
Multi-Channel Coding			
MS	MPEG-2		
Intensity	MPEG-2		
Coupling Channel	MPEG-2		
Spectral Normalisation			
Scale Factors	MPEG-2		
LPC Normalisation + Periodic Component Handling		Twin VQ	
Long Term Prediction	MPEG-4	Twin VQ	
Backward Prediction			
Lattice Predictor	MPEG-2		2
Low Complexity Backward Predictor	MPEG-4		2
Perceptual Noise Substitution	MPEG-4		
Temporal Noise Shaping	MPEG-2		
Filter Bank			
MDCT Filter Bank	MPEG-2	Twin VQ	3
Hybrid Filter Bank	SSR		3
Low Delay Filter Bank	MPEG-4	Twin VQ	3
Gain Control	SSR		
Frequency Selective Switch	MPEG-4		
Upsampling / Filter Bank	MPEG-4		

CELP	Narrow band (8 kHz sampling)	Wide band (16 kHz sampling)	Alternates
LPC Decoder			

CELP	Narrow band (8 kHz sampling)	Wide band (16 kHz sampling)	Alternates
Lossless Decoder	Nb	Wb	
LAR Scalar	Nb	Wb	4
LSP VQ	Nb	Wb	4
enh. VQ		Wb	
LPC Interpolation	Nb	Wb	
Excitation Generation			
Multi-Pulse	Nb		
Regular Pulse		Wb	
enh multi-pulse		Wb	
LPC Synthesis Filter	Nb	Wb	
Post-Processing	Nb	Wb	

Parametric	HVXC	Harmonic Ind. Line Noise Mode
LSP Decoder (A, identical to CELP LSP Decoder)	HVXC	
Harmonic VQ Decoder	HVXC	
Time Domain Decoder	HVXC	
Background Noise Decoder	HVXC	
Individual Line Decoder		HILN
Harmonic Audio Decoder		HILN
Noise Decoder		HILN
Speed Control	HVXC	
Voiced Component Synthesiser	HVXC	
Unvoiced Component Synthesiser	HVXC	
Post Processing	HVXC	
Individual Line Synthesiser		HILN
Noise Synthesiser		HILN
Background Noise Decoder	HVXC	

Structured Audio
Score Decoder
MIDI
SASL (Structured Audio Score Language)
Synthesiser
Sample Based
Algorithmic - SAOL (Structured Audio Orchestra Language)
TTS
TTS Interface
General
PICOLA speed control
SR Conversion

Bitrate ranges were noted as follows:-

Bitrate (kb/s)	2	4	6	16	24	40	64
Speech coding							
parametric	—	—	—	—	—	—	—
CELP							
Music coding							
parametric		—	—	—	—	—	—
Twin VQ			—	—	—	—	—
AAC			—	—	—	—	—

Concern was expressed by Mr. Meares, reflecting what was already in the UK NB paper, m2607, that there seemed to be a lot of overlap between some of the tools for MPEG-4. The following differences between the music coding options were noted:-

Parametric is more complex than t/f at a given bitrate, but brings pitch/speed control.

Twin VQ is more complex than AAC-LC, but brings constant frame length (for random access requirements). Both have approximately the same delay. AAC has not yet been evaluated in the core experiments below 24 kb/s. Twin VQ has been evaluated between 6 and 40 kb/s. AAC supports joint stereo mode.

It was noted that the greatest area of overlap exists between Twin VQ and AAC and that a group of fast-track verifications tests need to be done before San Jose to resolve the relative performances of the two systems.

These tests will cover

1. quality performance at low bit rates
2. stereo performance at low bit rates
3. scalability

The additional tests from the core experiment analysis in section 3011700 which also have to be completed before the next meeting, if possible, are

1. Low delay filter bank (Hannover)
2. TNS integration into AAC scaleable coder

Additional tests on a more relaxed time scale should explore

1. MDTC vs low-delay filter banks for twin VQ and AAC
2. lattice prediction vs LC backwards prediction for AAC
3. long term prediction vs backwards prediction

The specification of the fast-track tests required by the next meeting was prepared in a task group and was subject to a great deal of debate. The approved specification for the direct comparisons between AAC and twin VQ tools is given in document WG11/N1966. Remaining details will have to be resolved during the gap before the start of the tests by the ad-hoc group. It was noted that these tests are of the utmost importance if MPEG-4 is to achieve its full potential.

Verification tests

Mr. Dietz presented M2816 on the proposal by Narrowband Digital Broadcast (NADIB) group to contribute to the MPEG-4 tests. They need to run tests during March to achieve their target dates which are in advance of the main MPEG-4 test sequence. They are requesting advice on how to test at the bit rates considered, i.e. from 6 up to 24/32 kb/s stereo. This relates to Stockholm output document N1749.

Ms. Contin showed her concept of the test options. The NADIB requirements for MPEG-4 Audio coders show a scaleable approach to Digital AM broadcasting - 6 kb/s (M), 6+10 kb/s (M/M), 6+10+16 kb/s (M/M/S), 6+18 kb/s (M/S). A valid query is who will provide the AM analogue signals for inclusion in these comparisons and, if so, should there be a European version and others from USA and Japan? The decision was that any tests should be 'baseband' first time and then real channels with fading etc. A comparison of AAC, Layer III, RealAudio, and LiquidAudio codecs for Internet applications at various bitrates was also noted to be of importance. The proposal went further that "Digital AM" tool tests should be March/April '98 and the "Internet Radio" tool tests by July '98. The issue of identifying commercial codecs in the comparisons would be sensitive, but it was felt that the whole process could be based on total anonymity of the commercial units with respect to the results. In discussion, it was seen that the chance of including these coders was very small so the matter was dropped.

The question of test methodology in the case of non-transparency but medium bitrate was raised. MOS testing is not appropriate for these conditions. Mr. Feige presented a paper which he had drafted on the possible method of running tests for medium bitrate tests. The problem being resolved is that neither BS-1116 nor MOS testing is appropriate at medium bitrates. His proposal is to ask subjects to judge the level of acceptance. The draft was amended in group discussion and is presented in document WG11/N1848 for further discussion in the ad-hoc group. In addition, the overview of MPEG-4 audio verification tests is given in document WG11/N1849.

Overview

Mr. Fielder chaired a task group to review the MPEG-4 Overview documents. The group made contributions to both the current Overview and to the Version 2 documents, documents WG11/N1909 and WG11/N1914.

Requirements

Profiles

Mr. Mlasko presented M2693 showing how the various MPEG-4 audio tools - compression type, compression feature and additional requirements - could be allocated to the possible profiles. Additionally, Mr. Brandenburg presented M2689, indicating that perhaps a concentration on the composition profiles would help identify what was really needed in the context of conformance. The number of profiles should be kept low and the concept of a hierarchy should be an option not a requirement. The proposal is made that speech specific tools be taken out of audio object profiles. Mr. Johnston noted that the input document did not yet reflect the existence of low complexity AAC - this will be reflected in the output document. Mr. Coleman queried how one could cope with multiple objects in any one scene - this was noted to be a matter of the levels of complexity within composition profiles. Mr. Koenen encouraged the practice of keeping the number of profiles as low as possible, both object profiles and composition profiles in order to ease the ultimate problems when it comes to application of MPEG-4. Mr. Gill also noted that the complexity of the composition profile will reflect on the task of combining multiple objects. Mr. Spille observed that main natural audio object profile currently needs to include AAC, twin VQ and CELP coding. The impact of this on complexity needs to be borne in mind when these options are rationalised.

The options for Profiles were discussed extensively within a task group and was reviewed again in a second joint meeting with Requirements. The content of the various profiles was discussed and amended real-time, with the following outcome.

	Composition Profiles	Main	Simple	Speech
Groupings	Object Profiles			
Natural Audio	Main	#		
	Simple Scaleable	#	#	
	Simple Parametric	#	#	
Synthetic Audio	Main	#		
	Algorithmic synthesis	#	#	
	Wavetable synthesis	#		
	General MIDI	#	#	
Natural speech	CELP based speech coding	#	#	#
	Parameter based speech coding	#	#	#
Text to Speech	TTS Interface	#		

The group developed the agreed profiles and allocated tools to them as presented in document WG11/N1908, for profiles, and in document WG11/N1899, for requirements overall.

Other developments

Mr. Ray prepared, in response to a request, an appraisal of the potential uses of an audio back-channel. This is covered in output document WG11/N1973.

MPEG-7 Audio

No time was available at this meeting to discuss this matter.

Promotion of MPEG Audio

FAQ

Additional FAQs were raised during the meeting and answers proposed. The sequence of the FAQs on the site will be reorganised to pull together appropriate groups, such as MPEG-2, MPEG-4 etc. The new FAQs are given in document WG11/N1854.

Audio Web site and content

The task group on web page development decided that the optimum way of handling donated decoder software was to provide links to 'non-commercial' web pages. Offers of donated software via such links should be made to the ad-hoc group for review and subsequent approval at the next meeting. Specific members undertook to provide mirror web page sites to be advised via the ad-hoc group. Mr. Meares reported that he had received from the EBU Technical Centre tentative permission to use some of the audio items from the EBU SQAM disc. The task group identified a subset of the disc contents, and Mr. Meares will now seek permission to place these specific items on the web page. The decisions of the meeting are given in document WG11/N1855.

Preparation of a press statement

A contribution to the press statement was prepared by Mr. Meares and approved by the Audio Subgroup. It is included in the overall press statement in document WG11/N1837.

Liaison matters

A liaison statement was prepared by the subgroup to encourage co-operation with EBU group B/CASE on the subject of audio coding at medium and high bitrates.

Discussion of unallocated contributions

All contributions were allocated to main agenda items.

Recommendations for final Plenary

A list of recommendations was prepared for approval at the final MPEG plenary meeting. Four documents were approved for public release, see Annex A-VI.

Establishment of new Ad-hoc groups

The following ad-hoc groups were established:

Ad-hoc Group on MPEG-2 AAC Conformance and Technical Report (Coleman/Thom/Lueck)	N1856
Ad-Hoc Group on MPEG-2 AAC stereo verification tests (S.W.Kim/Contin)	N1857
Ad-Hoc Group on MPEG-4 Audio CD and Reference Software CD progression (Grill/Purnhagen)	N1858
Ad-Hoc Group on MPEG-4 Structured Audio developments (Scheirer)	N1859
Ad-Hoc Group on MPEG-4 Audio Verification tests (Edler/Contin)	N1860
Ad-Hoc group on MPEG Audio web site (Thom/Purnhagen)	N1861
Ad-hoc group on Audio/Systems issues (Teichmann/Herpel)	N1862
Ad-hoc group on MPEG-4 Audio error resilience (Dietz/Miki)	N1863
Ad-hoc group on MPEG-4 Conformance (Vaananen/Rault)	N1864
AD-hoc group on MPEG-4 core experiments for Version 2 (Brandenburg/Moriya)	N1865
Ad-hoc group on MPEG-4 tool complexity (Spille)	N1885

Agenda for next meeting

The agenda for the MPEG Audio Subgroup meeting in February 1998 in San Jose, USA was discussed and approved (see Annex A-III). Following the meeting the secretary developed a better structure for the approved agenda contents.

Any other business

There was no other business.

Closing of the meeting

Mr. Schreiner thanked the participants for all their hard work in preparation for and during this meeting. He also thanked Mr. Meares for his outstanding performance in the role of Subgroup Secretary. With that, he declared the Audio Subgroup meeting closed and wished members a safe return journey.

Annex A-II
Agenda for the 41st MPEG/Audio Subgroup Meeting
in Fribourg, 27 to 31 October, 1997

I.	Opening of the meeting	
II.	Approval of agenda	
III.	Stockholm meeting report	
IV.	Allocation of contributions	
V.	Communications from the Chair	
	A. Joint meetings	
VI.	Report of ad hoc group activities	2604, 2605, 2612, 2615, 2620, 2630, 2640, 2645, 2690, 2736, 2744, 2775, 2823, 2831, 2843,
VII.	Resolution of National Body Comments	2607, 2608, 2663, 2683, 2684, 2695, 2753,
VIII.	Temporary task group formation	
IX.	MPEG-2 BC	
	A. IS 13818-5/FPDAM 1	2598,
	B. MPEG-2 audio quality update	
	C. Bitstream tests	
X.	MPEG-2 AAC	
	A. Conformance 13818-4 /FPDAM 1	2597, 2612, 2643, 2798,
	B. Technical report 13818-5 /FPDAM 1	2598, 2612, 2798,
	C. Systems 13818-1 /PDAM 5	
	D. Verification tests	
	1. Stereo	2630, 2798,
	2. Mono	
	E. Corrigendum to Pt 7	
XI.	MPEG-4	
	A. Audio Committee Draft	2607, 2684, 2733, 2736, 2843, 2852, 2789, 2820, 2831,
	B. Conformance Testing Working Draft	2787,
	C. Reference Software Committee Draft	2660, 2700, 2721, 2735, 2737, 2779, 2783, 2784,
	1. MIDI Liaison	2600, 2616, 2626, 2900,
	E. TTS Interface	2764, 2765,
	F. Systems issues	2658,
	1. Error resilience	2686, 2727, 2744, 2746, 2749, 2751, 2752, 2768,
	2. Systems audio transport	2613,
	3. Scene description	2683, 2775,
	a) Composition	2660, 2734,
	G. IPR and content protection	2619, 2620, 2659, 2763,
	H. Testing	
	1. Pre-screening results	2785,
	2. Core experiments	2631, 2645, 2680, 2682, 2698, 2699, 2745, 2766, 2767, 2769, 2771, 2772, 2773, 2785, 2787, 2788, 2795, 2799, 2830, 2832, 2833, 2859, 2903, 2908, 2910,
	a) Technical descriptions	2692, 2749, 2768, 2769, 2774, 2834, 2852, 2856, 2858, 2917,
	b) Task group findings	
	c) Audio subgroup discussions	
	3. Verification tests	2816, 2823, 2705,
I.	Overview	
J.	Requirements	2624, 2633, 2646, 2688, 2690, 2837, 2662, 2689, 2693, 2717, 2817,
	1. Profiles	
K.	Other developments	2753, 2695,

XII.	MPEG-7 Audio	2604, 2606, 2608, 2634, 2666, 2687, 2791, 2792,
XIII.	Promotion of MPEG Audio	
	A. FAQ	
	B. Audio Web site and content	2615, 2650,
XIV.	Preparation of a press statement	
XV.	Liaison matters	2600, 2616, 2626, 2657, 2658, 2900,
XVI.	Discussion of unallocated Contributions	
XVII.	Recommendations for final plenary	
XVIII.	Establishment of new Ad-hoc Groups	
XIX.	Agenda for next meeting	
XX.	A.O.B.	
XXI.	Closing of the meeting	

Annex A-III
Agenda for the 42nd MPEG/Audio Subgroup Meeting
in San Jose, 2 to 6 February 1998

- I. Opening of the meeting
- II. Administrative matters
 - A. Approval of agenda
 - B. Fribourg meeting report
 - C. Allocation of contributions
 - D. Communications from the Chair
 - 1. Joint meetings
 - E. Report of ad hoc group activities
 - F. Received National Body Comments and Liaison matters
 - G. Temporary task group formation
- III. MPEG-2
 - A. IS 13818-3 BC
 - 1. IS 13818-5/DAM 1 (Mar 98)
 - B. IS 13818-7 AAC
 - 1. Technical report 13818-4 /DAM 1(Mar 98)
 - 2. Conformance 13818-5 /DAM 1(Mar 98)
 - 3. Systems 13818-1 /DAM 5(Mar 98)
 - 4. Verification tests
 - a) Stereo
 - b) Mono
- IV. MPEG-4
 - A. Audio FCD (July 98)
 - B. Conformance Testing WD
 - C. Reference Software CD
 - D. Requirements
 - 1. Profiles
 - E. Overview
 - F. Testing
 - 1. Comparative tests AAC & twin VQ
 - 2. Core experiments
 - 3. Verification tests
 - G. Systems issues
 - 1. Simulation software
 - 2. Systems audio transport
 - 3. Scene description: composition
 - 4. IPR and content protection
 - H. Version 2 matters
 - 1. Error resilience
 - 2. Other developments
 - I. Other developments
- V. MPEG-7 Audio
- VI. Promotion of MPEG Audio
 - A. FAQ
 - B. Audio Web site and content
- VII. Discussion of unallocated Contributions
- VIII. Meeting deliverables
 - A. Press statement
 - B. Dispositions of Comments
 - C. Responses to NB comments
 - D. Liaison statements
 - E. Recommendations for final plenary
 - F. Establishment of new Ad-hoc Groups
 - G. Approval of output documents
- IX. Future activities

- A. Schedule of future meetings
- B. Agenda for next meeting
- X. A.O.B.
- XI. Closing of the meeting

Annex A-V

Audio Task Groups

1. MPEG Audio FAQ/Web Page - Thom
2. 13818-7 AAC Corrigendum - Johnston
3. MPEG Audio - Preparation of press statement - Meares
4. MPEG-4 Audio/Systems Issues - Spille/Teichmann
5. MPEG-2 AAC Conformance - Lueck
6. MPEG-2 AAC Technical Report - Coleman
7. MPEG-2 AAC stereo/mono verification tests - Feige, Watanabe
8. MPEG-4 Verification Tests - Moriya/Contin
9. MPEG-4 CD editing - Edler, Grill, Hahn, Kaneko, Nishiguchi, Scheirer, Vaananen
10. MPEG-4 Overview - Fielder/Brandenburg
11. MPEG-4 IPR (incl. watermarking) - Kaneko
12. 13818-1/amd5 Systems AAC tables - Coleman/Johnston
13. MPEG-4 Conformance WD - Edler
14. MPEG-4 Error resilience - M Dietz
15. Structured Audio MIDI Liaison for downloadable sounds - Eric Scheirer
16. MPEG-4 Profiles - Brandenburg

Annex A-VI

Input/Output Documentation

Contributed documents

The following documents were contributed to the Audio Subgroup and were considered during this meeting:

Number	Section	Source	Title
2597	Audio	SC 29 Secretariat	Summary of Voting on ISO/IEC 13818-4/PDAM 1 (SC 29 N 2194)
2598	Audio	SC 29 Secretariat	Summary of Voting on ISO/IEC TR 13818-5/PDAM 1 (SC 29 N 2195)
2600	Audio	MIDI	Liaison Statement from MIDI Manufacturers Association to SC 29/WG 11 (SC 29 N 2229)
2607	General	UK National Body, (D. J. Meares)	MPEG-4 coding issues
2608	General	UK National Body, (D. J. Meares)	MPEG-7 developments
2612	Audio	Mike Coleman, Chuck Lueck, David Thom	Report of the Ad Hoc Group on AAC Conformance and Technical Report
2615	Audio	David Thom	Ad-hoc report on audio web page
2616	Audio	MIDI and WG 11 Convener	Liaison Statements between MIDI and SC 29/WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2241)
2626	Audio	MIDI Manufacturers Association	Liaison Statement from MIDI to WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2264)
2631	Audio	S. R. Quackenbush, J. D. Johnston	Results of Core Experiment on Perceptual Noise Substitution
2643	Audio	Tadashi Araki, Tatsuya Okada and Itaru Kaneko	A source code for a psychoacoustic model of AAC encoder
2645	Audio	Karlheinz Brandenburg	Report of the Adhoc Group on MPEG-4 Audio Core Experiments
2650	Audio	David Meares	Availability of audio material for the MPEG web site
2660	Audio	Jyri Huopaniemi	Virtual Acoustic Parameters in MPEG-4 version 2 Audio Rendering
2680	Audio	Takeshi Norimatsu, Mineo Tsushima, Tomohisa Ishikawa	Results of core experiment on Matra scalable coder
2682	Audio	G. Richard,, A. Le Dor?	Results of Core Experiment on an extension of the narrow-band CELP VM coder to a bandwidth scalable CELP (m2486)
2686	Audio	Toshio Miki, Toshiro Kawahara, Sanae Hotani	Error Pattern Generation Programs for Core Experiments on MPEG-4 Audio Error Resilience
2692	Audio	Juergen Herre	Updated Description for Perceptual Noise Substitution Tool
2693	Audio	Torsten Mlasko, Robert Bosch GmbH, Bernd Edler, University of Hanover, Robert Boesnecker, Siemens AG, Holger Hesse, Sican	Proposal for MPEG-4 Audio Object Profiles
2698	Audio	Gael RICHARD	Results of Core Experiment on Lossless Coding in the CELP core of the MPEG-4 Audio VM (m2495)
2699	Audio	G. Richard,, C. Murgia,, J-L Bonifas,, A. Le Dor?,, P. Lockwood	Results of Core Experiment on Matra's low to medium bit rates scaleable audio/speech coder (m2346)
2721	Audio	Brian Link, Dave Rossum	Proposed Refinements to Structured Audio Sample Bank Format
2727	Audio	Toshiyuki Nomura, Masahiro Iwadare, Kazunori Ozawa	Error protection and concealment schemes for the MPEG-4 Narrow-band CELP VM coder
2733	Audio	Eric Scheirer	Draft CD 14496-3 Subpart 5 (Structured Audio)
2734	Audio	Eric Scheirer	Audio nodes and normative audio composition text for Systems CD
2735	Audio	Eric Scheirer, Georgio Zoia, EPFL	Proposed changes to SAOL
2736	General	Eric Scheirer (chair)	Report of AHG on Structured Audio WD/VM

2737	Audio	Eric Scheirer	Complexity analyses of some Structured Audio orchestras
2744	Audio	Martin Dietz, Toshio Miki	Report of the ad-hoc group on MPEG-4 Audio Error Resilience
2745	Audio	Martin Dietz, Eric Allamanche, Joachim Gnauk, Juergen Herre	Test Results of the Matra Scaleable Coder Core Experiment
2746	Audio	Martin Dietz, Ralph Sperschneider	Refined Core Experiment on Error Resilience of AAC spectral data
2749	Audio	Toshio Miki	Proposal of MPEG-4 Audio core experiment test conditions on error resilience
2751	Audio	Sanae Hotani, Toshio Miki	Core experiment results on Huffman-Codeword Reordering
2752	Audio	Sanae Hotani, Takashi Suzuki, Toshiro Kawahara, Toshio Miki	Proposal of Universal UEP tool for MPEG-4 Audio error resilience
2764	Audio	Y. Lee, H.S. Lee, J.C. Lee, M. Hahn	Implementation of English MPEG-4 Audio TTS and Korean MPEG-4 Audio TTS Improvement
2765	Audio	M. Hahn, J.C. Lee, Y.K. Lim, Y. Lee	Report on the progresses of MPEG-4 Audio TTS
2766	Audio	Masayuki Nishiguchi, Kazuyuki Iijima, Jun Matsumoto	Listening test results of Hannover's proposal "Harmonic and Individual Lines plus Noise Tools"
2767	Audio	Masayuki Nishiguchi, Kazuyuki Iijima, Jun Matsumoto	Listening test results of NEC bandwidth scalable CELP, and wideband CELP VM with LSP-VQ
2768	Audio	Yuji Maeda, Masayuki Nishiguchi	Error correction and concealment tools for parametric speech coder core of the VM
2769	Audio	Kazuyuki Iijima, Masayuki Nishiguchi, Jun Matsumoto	Variable rate coding tools for the parametric speech coder core of the VM
2771	Audio	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment on an Extension of the narrow-band CELP VM coder to a bandwidth Scalable CELP coder proposed by NEC
2772	Audio	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment for extended `Harmonic and Individual Lines plus Noise` Tools for the Parametric Audio Coder Core
2773	Audio	Werner Oomen, Rakesh Taori, Andy Gerrits	Philips Check Phase Results of the Core Experiment on Low Delay Filterbanks proposed by Uni. Hannover
2774	Audio	R.Taori, A. Gerrits, W. Oomen, L. v.d. Kerkhof	Unified CELP Core for MPEG-4 Audio VM
2785	Audio	Akio Jin, Takehiro Moriya, Naoki Iwakami, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki, Takeshi Norimatsu, Mineo Tsushima, Tomokazu Ishikawa	Proposal of the core experiment on improvement of t/f scaleable coder
2787	Audio	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Proposal of refinement of VM software
2788	Audio	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Results of core experiment of Matra's scaleable coder
2789	Audio	Takehiro Moriya, Naoki Iwakami, Akio Jin, Kazunaga Ikeda, Takeshi Mori, Satoshi Miki	Report on the bitstream exchange of t/f coder
2795	Audio	Heiko Purnhagen, Bernd Edler	Check Phase Results of Core Experiment on extended "Harmonic and Individual Lines plus Noise" Tools
2798	Audio	Kenzo Akagiri, Yoshiaki Oikawa	Contributions for MPEG-2 AAC
2799	Audio	Naoya Tanaka	Results of the core experiment on wideband CELP
2807	Audio	Jisang Yoo, Jusang Lee	Implementation of TTS assisted Facial Animation
2816	Audio	Rainer Buchta, Martin Dietz	Proposal for Evaluation of MPEG-4 Audio Technology for the NADIB Application

2820	Audio	Masayuki Nishiguchi, Jun Matsumoto, Naoya Tanaka	Bitstream exchange
2823	Audio	Bernd Edler, Laura Contin	Report of AHG on MPEG-4 Audio Verification Test Preparations
2830	Audio	Heiko Purnhagen, Bernd Edler	Hannover Check Phase Results of Core Experiment on "Lossless Coding in CELP core of MPEG-4 Audio VM"
2831	Audio	Bernd Edler, Werner Oomen	Report of AHG on MPEG-4 Audio Conformance
2832	Audio	Mauri Vaananen, Mikko Suonio, Juha Ojanpera	Nokia check site results for the core experiment on the t/f scalable coder proposed in m2328 and m2463
2833	Audio	Mauri Vaananen, Mikko Suonio, Kalervo Kontola, Di Li	Nokia check site results for the core experiment on bandwidth scaleable coder proposed in m2486
2834	Audio	Mauri Vaananen, Mikko Suonio, Juha Ojanpera	Report on Long Term Prediction in the t/f part of MPEG-4 Audio
2843	Audio	Bernhard Grill, Heiko Purnhagen	Report of the Ad-hoc Group on MPEG-4 Audio Working Draft editing and Verification Model software implementation
2852	Audio	Bernhard Grill, Bodo Teichmann	Proposed refinements for the scalable T/F coder of the MPEG-4 Audio WD/VM
2856	Audio	Bernhard Grill, Bodo Teichmann	Proposal for a joint stereo add-on to the scalable T/F coder
2858	Audio	Gerald Schuller, Bernd Edler	Revised Technical Description for Core Experiment on Low Delay Filter Banks
2859	Audio	Gerald Schuller, Bernd Edler	Uni-Hannover Check Phase Results of the Core Experiment on Low Delay Filter Banks
2900	Audio	Tom White	Liaison Contribution from the MIDI Manufacturers Association on Structured Audio Downloadable Sounds
2903	Audio	Y.B. Thomas Kim, S.W. Kim, S.H. Park	Result of tests for integrating BSAC with other AAC Tools
2908	Audio	Sang-Wook Kim, Yeon-Bae Thomas Kim	Report on core-experiment on NTT/Matsushita scalable codec
2910	Audio	Sang-Wook Kim, Yeon-Bae Thomas Kim, Sung-Hee Park	Report on core-experiment on Univ. Hannover Low Delay Filter Banks (m2528)

The following documents were also noted as relevant to the business of Audio Subgroup and discussed accordingly

Number	Section	Source	Title
2604	Requirements	Fernando Pereira & Adam Lindsay as chairmen of the AHG	Report of the Ad Hoc Group on MPEG-7 Requirements
2605	Requirements	Fernando Pereira & Ibrahim Sezan as chairmen of the AHG	Report of the Ad Hoc Group on Object Content Information in MPEG-4
2606	Requirements	Fernando Pereira (Editor)	Third Draft of MPEG-7 Requirements
2613	Systems	Jiro Katto	Some Remarks on Timing Issues in MPEG-4 Systems
2619	Requirements	Niels Rump	Protection of payload and related IPR information within the MPEG-4 IPR standard
2620	Requirements	Niels Rump	Report on ad-hoc group on content related IPR issues
2627	Liaison	IEC/TC 100C	IEC FDIS 61833-1: Consumer audio/video equipment - Digital interface - Part 1: General (SC 29 N 2265)
2628	Liaison	IEC/TC 100C	IEC FDIS 61833-4: Consumer audio/video equipment - Digital interface - Part 4: MPEG2-TS data transmission (SC 29 N 2266)
2630	Test	Sang-Wook Kim, Laura Contin	Report of the ad-hoc group on MPEG-2 AAC stereo verification tests
2634	Requirements	E. Hartley, F Nack, A.P. Parkes	A review of MPEG-7 terminology
2657	Liaison	DAVIC	Liaison Statement from DAVIC to SC 29 on the Tenth Call for Proposal ÖDAVIC 450å (SC 29 N 2270)
2658	Liaison	IEC/TC 100C	IEC CD 61937: Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 (SC 29 N 2273)
2659	Requirements	Niels Rump., Frank Hartung., David Meaeres	Tasks for watermarking core experiments
2662	Requirements	Michael Zeug	MPEG-4 Profile Requirements version 4.1
2663	Requirements	French National Body	MPEG-4 OCI and MPEG-7 developments
2666	Requirements	Adam Lindsay	Second Draft of MPEG-7 Applications
2683	General	German National Body	Comments on the Relation between MPEG-4 and VRML

2684	General	German National Body	Comments on Version Management in MPEG-4
2687	Requirements	Rob Koenen for AHG on MPEG-7 Reqs	Draft v. 5 of MPEG-7 Context and Objectives
2688	Requirements	Rob Koenen for MPEG-4 Requirements AHG	draft v.5 of MPEG-4 Requirements Doc
2689	Requirements	Rob Koenen (KPN Research), Fernando Pereira (IST), Karlheinz Brandenburg (FHG)	Discussion on Audio Profiles
2690	Requirements	Rob Koenen	Report of AHG on MPEG-4 Requirements
2695	General	Fernando Pereira	Portuguese National Body Position Regarding MPEG-4 Versioning
2705	General	Rob Koenen (editor)	draft revision of MPEG-4 Overview
2753	General	KNB	Proposal on MPEG-4 Version Management
2762	Requirements	Itaru Kaneko	A proposal for MPEG-4 Identification and Protection of contents includes CORBA interface and realtime specification
2763	Requirements	Itaru Kaneko	About revisions of content related IPR field.
2775	Systems	Julien Sign?s	report of the Adhoc Group on BIFS
2779	Systems	Julien Sign?s	Proposed evolution of some BIFS nodes
2781	Systems	Julien Sign?s	Analysis of VRML 2.0 nodes in the MPEG-4 context
2783	Systems	Julien Sign?s	Clarification of timing issues for BIFS scenes
2784	Systems	Julien Sign?s	On BIFS and VRML relationships and content interchange
2791	Requirements	R?mi Ronfard	MPEG 7 Applications in Radio, TV and Film Archives
2792	Requirements	R?mi Ronfard	MPEG7 Requirements for Radio, Television and Film Applications
2797	Systems	Franco Casalino, Antonio Arena, Matthew Leditscke	Implementing the subset of the BIFS 2D nodes: a cross-check of semantic & syntax
2812	Systems	Hiroyuki Aga, Yasuhiro Honda, Teruhiko Suzuki, Yoichi Yagasaki	The necessity of further refinement/improvement of the BIFS regarding the relation to VRML
2819	Systems	Jean-Claude Dufourd,, Frederic Bouilhaguet	Necessary changes of BIFS for authoring
2829	Requirements	Jack Lacy, James H. Snyder, Amy R. Reibman	Watermarking as a Protection Mechanism for IPR in MPEG-4
2849	Systems	Christian Koechling (Christian.Koechling@fr.bosch.de)	AudioRenderer for IM1
2893	Systems	Zvi Lifshitz	Systems Software Implementation source code (BIFSEncoder)
2905	Systems	Jonathan Courtney	Report of AHG on Adaptive Audio-Visual Session (AAVS)
2909	Systems	Jonathan Courtney	An Approach to Adaptation in AAVS
2911	Systems	Yuval Fisher, Homer Chen	BIFS User Interface Nodes

Output Documents

The following output documents were produced in whole or part by the Audio Subgroup. Those shown in *Italics* were approved for public release.

Number	Title
N1843	Text of MPEG-2 AAC 13818-7 Draft Technical Corrigendum 1
N1844	Workplan for AAC conformance and technical report
N1845	Revised specification of MPEG-2 AAC stereo verification tests
N1846	Report of status of MPEG-4 Audio core experiments
N1847	MPEG-4 Audio Conformance Testing Working Draft 14496-4
N1848	Proposed method to assess the audio quality of low bitrate audio coders
N1849	Proposal for MPEG-4 audio verification tests
N1850	MPEG-4 Audio error resilience workplan
N1851	Information on MPEG-4 Audio systems issues
N1852	Criteria for evaluation of MPEG-4 Structure Audio
N1853	MPEG-4 Audio bitstream exchange summary
N1854	<i>MPEG Audio FAQs version 5</i>
N1855	Proposals for the MPEG Audio web site content
N1866	Conformance 13818-4/FPDAM 1(covering 13818-7 AAC)
N1867	Technical Report 13818-5/FPDAM 1 (covering both 13818-3 Second Edition and 13818-7 AAC)
N1868	The study of the text of Systems 13818-1/PDAM 5

Number	Title
N1899	MPEG-4 Requirements
<i>N1903</i>	<i>Text for MPEG-4 Audio Committee Draft 14496-3</i>
<i>N1905</i>	<i>MPEG-4 Reference Software Committee Draft 14496-5</i>
N1908	Decisions on MPEG-4 Profiles
<i>N1909</i>	<i>MPEG-4 Overview for Version 1</i>
N1910	Text for MPEG-4 ISO/IEC14496 amendment proposal
N1914	MPEG-4 Overview for Version 2
N1915	Text for MPEG-4 Reference Software 14496-5 V2 WD
N1966	MPEG-4 Audio: comparison of AAC and twin VQ tools
N1968	DOC on 13818-4/FPDAM1
N1969	DOC on 13818-5/FPDAM1
N1973	Proposals for Audio Applications Using an MPEG4 Backchannel

Annex 8
Report of SNHC Meeting

Source: Peter Doenges, Chair

1. Meeting Objectives

The main objective for the Fribourg meeting was to achieve high quality in the Version 1 CD release of SNHC-related functionalities and to harmonize bitstreams, timing, parameterization, and AVO semantics and syntax with Systems and in particular with BIFS. The specification and refinement of profiles for SNHC tools was also essential to complete. Another important objective was development of the MPEG-4 Version 2 SNHC plan whose work items were defined after the Version 1 functionality for CD was certain. The Version 2 work plan and core experiments were discussed and documented in parallel with Version 1 work where possible by interested groups. Where resource conflicts arose, Version 2 work was given lower priority in loading of shared people to maximize attention on bitstream verification, final tool decisions, CD editing, and profiles development and review for Version 1 CD.

2. SNHC Reports & Working Groups

Ad Hoc Group reports were given as shown below:

Doc	Group	Section	Source	Title
2649	MPEG-4	SNHC	Eric Petajan, FBA ad hoc group	Report of the ad hoc group on Face and Body Animation
2708	MPEG-4	SNHC	Caspar Horne	Report of the Ad Hoc Group on SNHC VM Editing
2710	MPEG-4	SNHC	Caspar Horne	SNHC Verification Model V5.1
2730	MPEG-4	SNHC	Touradj Ebrahimi, Homer Chen	Report of ad hoc group on bitstream exchange for visual texture/mesh coding

Caspar Horne provided a review of the Version 1 WD editing preceding Fribourg and the plan for CD editing based on his new assignment described in Section 5.2. Based on his anticipated high loading with CD work, both core experiment coordination and VM editing were shifted to Peter van Beek.

Breakout discussions of SNHC working groups were held throughout the meeting to continue the work:

- Face animation (Eric Petajan)
- Body animation (Deepak Tolani)
- Scalable texture (Iraj Sodagar)
- Animated 2D mesh (Peter van Beek)
- 3D model coding (Chieteuk Ahn)
- View-Dependent Scalable texture (Pete Doenges)

Discussions and presentations occurred in the FBA breakout sessions on the DCT compression improvement for FAPs (contributions by Fernando Pereira, Gabriel Abrantes, Hai Tao, Homer Chen, Wei Wu, Jörgen Ahlberg, Haibo Li) that combines improved efficiency with increased delay suitable for broadcast applications of face animation. The FIT technique was also presented by Homer Chen and challenged extensively. Body animation work by Deepak Tolani, Joaquim Esmerado, and Tolga Capin was focused on CE development and the work plan to complete this activity in Version 2. Jörgen Ahlberg and Homer Chen supported facial animation enhancements for Version 2 based on facial action basis functions. 3D model coding was presented and discussed extensively by Chieteuk Ahn and Pete Doenges, and a Version 2 work plan and initial CEs based on an ETRI contribution were developed. Additional work was carried out during the two-week editing period after Fribourg to complete the 3D model coding CE descriptions. Essential enhancements to the VDS

texture narrative for CD were accomplished by Fred Jordan, Peter van Beek helped with final CD edits on animated 2D meshes, and Joern Ostermann and Pete Doenges contributed to some final CD editing gaps in face animation.

3. Output Document Editors

Output document editors to assist or be responsible for SNHC elements of output documents were:

Committee Draft - Visual	Caspar Horne
Committee Draft - Systems	Ganesh Rajan
Committee Draft - Audio	Eric Scheirer
SNHC Core Experiments	Peter van Beek
SNHC VM 6.0	Peter van Beek
MPEG-4 Overview	Pete Doenges
MPEG-4 Profiles	Eric Petajan
Press Release	Pete Doenges

4. SNHC Contributions

SNHC contributions and core experiments were allocated and presented during the meeting as follows, with early priority on contributions related to Version 1 CD:

Doc	Group	Section	Source	Title
2599	MPEG-4	SNHC	Hai Tao, Homer Chen	FAP Interpolation Table (FIT)
2603	MPEG-4	SNHC	Roberto Pockaj, Fabio Lavagetto	Proposal for FAP1 and FAP2 syntax modification
2629	MPEG-4	SNHC	Jorgen Ahlberg, Haibo Li	Results of FAP Coding using DCT
2656	MPEG-4	SNHC	Marc Escher, Igor Pandzic, Pierre Beylot, Tolga Capin	Results of core experiments FBA3
2696	MPEG-4	SNHC	Gabriel Abrantes, Fernando Pereira	Donation to ISO of MOMUSYS Facial Animation Software
2697	MPEG-4	SNHC	Gabriel Abrantes, Fernando Pereira	Results for MPEG-4 Facial Animation System
2836	MPEG-4	SNHC	Jorgen Ahlberg, Haibo Li, Robert Forchheimer	FAP-coding using Facial Action Basis Functions
2838	MPEG-4	SNHC	Claudio Lande	Results of a simulation for the animation of downloaded models
2883	MPEG-4	SNHC	Joern Ostermann	Face Animation Tables: More Models
2887	MPEG-4	SNHC	Yuval Fisher, Homer Chen, Hai Tao	BIFS description for FAP and Mesh interpolation tables
2676	MPEG-4	Video	Dean S Messing, Ibrahim Sezan	Bitstream Exchange for 2D Dynamic Mesh Compression (Z4)
2730	MPEG-4	SNHC	Touradj Ebrahimi, Homer Chen	Report of ad hoc group on bitstream exchange for visual texture/mesh coding
2804	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Report on 3D mesh coding
2805	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Draft proposal for new core experiment on generic 3D mesh coding
2846	MPEG-4	SNHC	P.J.L. van Beek, A.M. Tekalp	Bitstream verification of 2D dynamic mesh
2866	MPEG-4	SNHC	Ganesh Rajan	2D Dynamic Meshes: Results of Bitstream Exchange
2906	MPEG-4	Video	Iraj Sodagar, Hung Ju Lee, Jie Liang, Zhixiong Wu,	Report on the Visual Texture Bitstream Exchange

Doc	Group	Section	Source	Title
			Mengxiang Li, Weping Li, Rongxiang Yi, Charles Chui, Hiroyuki Katata	

5. Version 1 CD

5.1 Bitstream Verification

To meet CD requirements, the verification of bitstream exchanges was reviewed and confirmed in the following areas along with related input documents:

- Face animation (M2563, M2649, M2629, M2697)
- 2D animated mesh (M2676, M2730, M2846, M2866)
- SNR/resolution scalable texture (M2906)
 - Intensity/color coding
 - Shape coding
- View-Dependent Scalable texture (M2730)

Overviews of the bitstream exchanges were conducted by:

- Face animation (Eric Petajan)
- 2D animated mesh (Peter van Beek)
- SNR/resolution scalable texture (Iraj Sodagar)
- View-Dependent Scalable texture (Homer Chen)

More detailed discussions were supported by contributors in the associated work areas.

5.2 Visual CD Editing

The foregoing functionalities were subsequently recommended for CD inclusion. Extensive further CD editing was required to bring these elements together. Caspar Horne was assigned by the Convenor to share the Visual CD editing with Atul Puri. In some areas, narrative material in the Visual WD connected with SNHC going into the Fribourg meeting needed more work, or lagged in terms of incorporation into the WD by the WD editor after Stockholm, or was missing after its submission following Stockholm. Caspar accepted a daunting task and deserves the thanks of many people, particularly given the challenges and difficult discussions during the meeting about process and converging input from SNHC contributors.

Several people in the SNHC group gave editing support to Caspar Horne, during the meeting and in the three-week editing period after Fribourg before CD release. In joint sessions of SNHC working groups with the CD editor, repeated challenges arose about adhering to process vs. the readiness of contributors to finish CD work. These included adequate coverage of SNHC tools in the Visual WD prior to the meeting, and the justification for changing small elements of language in the CD relative to prior SNHC documents and to conformance with Systems BIFS semantics/syntax.

This effort, among dedicated people under considerable pressure to produce a quality result for the CD, tested the group greatly and resulted in impasses in some areas. The policy was generally adopted that if technology has been clearly specified, demonstrates distinct advantages, is mature, has been tested by proponents, and has been subjected to peer review, then the tools were incorporated in the CD.

5.3 Version 1 Software Implementations for Part 5

The completeness of encoder/decoder implementations of SNHC functionalities recently concluded before the Fribourg meeting was reviewed, including the selection of reference software where multiple implementations

exist. Mike Colman provided guidance and review of the submission of Part 5 software including the deletion of copyright-restricted software, marking of source headers with required legends, the occurrence of platform-specific implementations such as rendering, and the inclusion of encoder examples. In summary, while floppy disks were provided at the meeting in attempted coverage of Part 5 SNHC requirements, significant follow-up was planned after the Fribourg to clean up the distribution.

6. Joint Activities

Joint meetings or cross-reviews were conducted to assist Version 1 CD preparation.

6.1 QoS & Implementation Complexity

Joint sessions were held between ISG and SNHC representatives on the use of decoder/terminal resource metrics or content metrics to help match encoder and decoder capabilities. The sessions were useful in educating respective groups about how SNHC applications would vary bitstream and compositional complexity. The objective was to provide a basis for graceful computational degradation when the bitstream is scalable or when stream parameters could be used for graceful degradation as content complexity in scene composition beyond the stage of basic stream decoding exceeds terminal resources.

These discussions were productive and resulted in a better initial approach to encoder/decoder negotiations and CGD. Results concerning SNHC are discussed in Section 4 of output document **N1876** on "Decoder QoS Conformance Levels". An important result was that algorithmic tools can only go so far, when SNHC objects do not involve relatively fixed content complexity (e.g. a few triangles in a 2D or 3D scene could produce very high image area and rendering load even though decoding is well bound). Furthermore, very complex metrics (to characterize a stream or its impact on terminal resources beyond the decoder) can be difficult to use and determinism can be compromised due to interpretation.

A back channel could assist encoder-decoder negotiations where the decoder communicates its resources to the encoder (and the encoder acts accordingly). In this case metrics for terminal resources are needed. However, if no back channel exists such as in a broadcast application, discrete terminal types could be defined (e.g. PDA, PC) where resource metrics are effectively replaced by terminal types. Open issues must be addressed about correctly characterizing terminal resources and defining the terminal types with the inevitability of technology evolution.

Section 7 of that document also proposes core experiments for the next meeting including SNHC tasks. ISG proposes the core experiments to identify complexity measures that comply with the conformance requirements in Section 2. The core experiments are to be based on a methodology of statistical pattern recognition applied to the development of metrics using methods of feature selection to help define complexity measures. Solving this problem through pattern recognition requires a training set, a set of verification sequences, and their use in a process to identify a set of metrics including the selection of an "optimal subset" of features and decision functions. SNHC contributors should help identify the validity/efficiency of this approach and the source of training data to help with the selection process.

Jan Bormans also presented two contributions with the SNHC group:

Doc	Group	Section	Source	Title
2654	MPEG-4	ISG	Gauthier Lafruit, Jan Bormans	Complexity comparison between scalable wavelet codec and scalable DCT codec
2655	MPEG-4	ISG	Gauthier Lafruit, Jan Bormans	Graceful degradation parameters for a scalable wavelet codec

These analyses included the essential result that the wavelet codec shows lower arithmetic complexity than the scalable DCT-based codec with down- and up-sampling filters. A set of parameters (including only image

size, number of decomposition levels, and the bitranges) was described for the scalable wavelet codec to accompany bitstreams from encoder to decoder to provide hints on compensating for limited decoder memory and processing with graceful degradation using resolution or SNR scalability.

6.3 Conformance Testing

Conformance issues for SNHC tools were discussed mostly in the context of assisting in the QoS work by ISG reported in output document **N1876**. In that document, Section 2 on requirements for conformance and Section 8 on conformance level testing provide important related discussions. SNHC applications can involve a range of content complexities, several different tools that may be used in streaming or downloading modes, and the possibility of overloading terminal resources beyond the immediate demands on decoders. This could lead to significant over-design of decoders or terminals to be in strict conformance with decoding of specific streams, scene compositions, or the rendering of them. Some initial ideas on a concept for CGD are given in the QoS document to address the problem by decoding bitstreams with variable quality. This results in finer, more continuous conformance level testing units for operating points corresponding to capabilities of authoring systems, decoders, and bitstream content.

6.4 Systems and SNHC

SNHC by design remains highly dependent on Systems for spatial/temporal scene composition and synchronization of multiple AVOS. This includes support of MITG functionality developed via standalone tools over the last year, and then largely taken over by Jean-Claude Dufourd for Systems verification. Other SNHC capabilities rely on Systems to combine the output of SNHC tools, such as the integration of downloaded 3D meshes and texture with a face animation parameter stream, or the integration of 2D meshes with texture or video in 2D mesh animation. Several joint meetings were held.

6.4.1 BIFS Support for 3D Face, 2D Mesh Animation

Compatibility of BIFS semantics and syntax with specific SNHC objects was reviewed. Contributions on BIFS and SNHC-related topics were presented and discussed. After the Stockholm meeting, the inclusion of 3D as well as 2D support in BIFS had to be firmly resolved for Version 1 CD. There was much effort, during and after the Rennes meeting on BIFS and its relationship to VRML, in considering approaches to extending VRML (e.g. Proto, ExternProto) and achieving adequate synchronization for real-time deterministic applications such as SNHC FBA and 2D mesh animation. The results of this discussion were that 3D as well as 2D support in Systems BIFS is adequate for SNHC requirements.

6.4.2 VRML & Extensions for 2D/3D Scene Composition

SNHC representatives participated in discussions led by Julien Signes on BIFS scene description with VRML experts on the collaborative framework with SC24. This was an education for both groups. Important MITG-related issues were raised. Systems application walkthroughs were discussed using face and 2D animated mesh as examples. The potential relationship of the binary form of BIFS and the compressed binary format proposed for VRML were discussed. Extended discussion occurred on the BIFS nodes and related semantics/syntax for flexibly combining 2D and 3D in mixed media scene compositions. Many issues were resolved, while others were tabled pending further analysis. VRML experts expressed interest to study and absorb the 2D and mixed media thinking of MPEG-4 into VRML over time using the process of the VRML Consortium.

6.4.3 Availability of Back Channel (VDS, FBA)

The adoption of View-Dependent Scalable texture, and the emerging needs in other areas of MPEG-4 for communication between encoder and decoder during a session, called for a back channel. For Version 1 CD,

a specific form of back channel was agreed by Systems for the transmission of view parameters from decoder to encoder verified in VDS bitstream exchange. As yet, no more general back channel framework has been agreed for content-adaptive load management from encoder to decoder. The structure for the CD to address VDS texture was agreed to include back channel coverage in the Systems part and the DCT tool in the Visual part.

6.4.4 Software Interdependencies in Part 5

SNHC was interested to understand how Part 5 software from Systems would dovetail with SNHC software tools, so new developers could more rapidly experiment in building MPEG-4 applications that link SNHC downloads and streams with scene composition. The Systems plan to include BIFS text-to-binary and binary-to-text translators in Part 5 software was considered adequate for this purpose.

6.4.4 Node for Face Animation FIT

A joint meeting was held on the requirements from SNHC to Systems to provide a new node type in support of the FBA Interpolation Table (FIT) capability. The FIT technique includes the FAP interpolation graph (FIG) and a set of functions that interpolate FAP values from one set of FAPs to another set of FAPs. FIT is based on downloading parametric controls for generating more sophisticated spatial movements of face animations in frame after frame while baseline Face Animation Parameters are streamed into the terminal. The FIT transformations are based on rational polynomial functions whose complexity is specified when the FIT data is downloaded to initialize a session. The FIT node was subsequently incorporated into the Systems CD.

6.4.5 FBA, 2D Mesh Animation Stream Headers & BIFS Animation

The proposed BIFS Animation node generalizes the streaming of dynamic parameters (e.g. coordinate rotations, geometry streams). The BIFS Animation node and the specific objectives of face and 2D mesh animation suggested that SNHC and Systems consider the identical representation of stream headers for consistent timing control, the option to achieve minimum bitstream overhead, and to facilitate the interoperability of content. The headers would support the optional use of start-codes and timing information vs. the bitstream overhead incurred and relative error resilience objectives. An AHG under **N1931** was created to address "Representation of Time and Decoder Configuration" including this issue.

Lengthy discussions occurred in several SNHC sessions and with BIFS experts during and after the Fribourg meeting. Editors and contributors debated the issues in an effort to understand the problem and make necessary changes, but the final resolution of this topic remained open when CD was frozen. There remain substantive issues brought out by SNHC and BIFS experts for the unification of the header parts of the syntax in the Systems and Visual CD. However the issue touches broadly on Systems and Visual parts of the standard. The suggestion was made that the MPEG-4 groups consider the global impact and applicability of these changes. The topic was reserved for the San Jose meeting where a clear restatement of the problem, solutions, and the advantages of the header unification must be considered.

6.5 Requirements and SNHC

Extensive effort was applied during FBA sessions and related SNHC reviews to develop recommendations for face animation profiles and levels based on varied content complexity and terminal resources. Subsequent joint meetings were held with Requirements to review profiling contributions. Document **M2648** on "Face Animation Profiles" was presented to deal with simple (broadcast-style) and complex (downloading of customized face models) types of face animation. SNHC representatives led additional discussions on issues concerned with 2D mesh and texture profiling, although no concrete profiling language was available earlier in the Fribourg sessions with Requirements.

A high priority was assigned to complete profile descriptions for face animation, 2D animated mesh, scalable texture coding, and VDS texture. This was done and offered for detailed justification to the Requirements

group. By Thursday, insufficient time was available to follow the required process to achieve consensus on all of the remaining SNHC profiles. Requirements suggested an output document to deal with the issues. An output document **N1972** describing "Initial Thoughts on SNHC Visual Object Profiles & Levels" was submitted by SNHC. National Body reviews and comments on this document, further improvements, and contributions on SNHC profiling to the San Jose meeting are critical to achieve agreement on worthy proposals of SNHC profiling for inclusion in Final CD in Tokyo.

Modest corrections to the Overview document were supplied before the Fribourg meeting by SNHC. Press release recommendations were submitted by SNHC for consideration by Requirements.

6.6 Subjective Verification Testing

Definition and milestones for verification tests were an objective of the Fribourg meeting, but were not fulfilled due to CD priorities.

7. Version 2 VM Development & CEs

7.1 SNHC VM

The SNHC VM 6.0 was to carry forward the baseline Version 2 tools and techniques for SNHC. The functionalities addressed in SNHC VM 6.0 are body animation and 3D model coding. 3D model coding includes lossless and scalable coding of regular 3-D meshes using DCT and wavelet texture tools respectively, and generic 2D/3D static mesh coding of connectivity and geometry. "SNHC VM 6.0" was submitted as output document **N1891** with corresponding AHG on VM editing in document **N1937**.

7.2 3D Model Coding

To aid formulation of the work plan for SNHC Version 2, Chieteuk Ahn presented these documents:

Doc	Group	Section	Source	Title
2804	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Report on 3D mesh coding
2805	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Draft proposal for new core experiment on generic 3D mesh coding

Extensive discussion occurred on the approach to structuring core experiments for 3D model coding, and a preliminary working draft of the Version 2 work plan for 3D model coding was generated. Further work during and after Fribourg in the editing period produced the CEs on 3D model coding in output document **N1890** with corresponding AHG in document **N1888**. The CEs in 3D model coding include mesh topology/connectivity coding (M1), mesh geometry coding including progressive geometry (M2), progressive/scalable 3D mesh coding (M3), and attribute coding and tool integration (M4).

7.3 Body Animation & Face Animation Enhancements

The overall work plan for FBA in Version 2 includes a significant emphasis on body animation and possible enhancements to face animation. Joaquim Esmerado, Tolga Capin, and Deepak Tolani developed the work plan for Version 2 human body animation. A summary of this work plan includes:

- Completing bitstream exchange for BAPs
- BAP groups and global-based BAPs in encoder/decoder software
- BDP specification for redefining body kinematics & geometry
- BDP syntax based on VRML 2 Humanoid Animation Group
- BIFS conformance of Body Animation node in SNHC VM
- Possible scalability for bitstream & computation complexity

For San Jose, three CEs in body animation are planned. The first (FBA1) is to verify BAP syntax for the BAP interpreter that reads a stream of BAP frames and converts the BAPs into joint angles or inverse kinematics constraints that animate a human model. Files used in this CE will exhaustively test a variety of options permitted in BAP syntax including joint-based versus global-based parameters, grouped versus individual degrees of freedom, and detailed-versus-simple spine models.

The second core experiment is on BAP compression (FBA2) to verify the decoder and encoder implementations. Body animation is very sensitive to accumulated errors in joint angles or end-effector locations. This test also evaluates the effect of quantization on animation quality. The ASCII files from FBA1 will be used as input to the encoder program. Resulting bit streams will be decoded, and the BAP commands used to drive the body animation program. The animation produced by the encoded and decoded bit streams will be compared against that obtained with the ASCII BAP files to examine quantization errors and to determine the level quantization for visually acceptable animation quality.

A third core experiment is on body model independence (FBA3). BAPs are designed to be as model independent as possible. Given the same input BAP stream, two different body models should produce similar although not necessarily identical behavior. Previous results revealed minor discrepancies between the two model implementations, especially in the torso behavior. Future testing will place particular emphasis on generating torso motion. Body animation sequences in BAP file format will be provided to drive two different models, and the animations will be captured on video. The videos will be compared subjectively to determine if the two models achieve similar postures and behaviors.

The enhancement of face animation will be considered using low-delay FAP coding with Facial Action Basis Functions. Jörgen Ahlberg presented the contribution document:

Doc	Group	Section	Source	Title
2836	MPEG-4	SNHC	Jorgen Ahlberg, Haibo Li, Robert Forchheimer	FAP-coding using Facial Action Basis Functions

as the basis for face animation improvements in Version 2. The FAPs in the Version 1 Visual CD provide a rich set of parameters to support a wide range of facial motions, where FAPs are typically correlated and constrained in motion due to the nature of the human face.

The coding techniques for Facial Action Basis Functions (FBFs) are inspired by the Facial Action Coding System (FACS) of Ekman & Friesen, and utilize spatial correlation to achieve efficient compression. An FBF describes a possible motion in a human face. FBF coding offers the promise of compact representation for good compression, natural-looking interpolation of FAPs, support for simultaneous decoding and FAP-to-FAP interpolation, natural-looking extrapolation for high subjective quality, and orthogonality to predictive and temporal DCT coding for combining with those methods. The FBF technique does not introduce extensive delay, and should be suitable for interactive applications. A fourth CE on FAP coding (FBA4) is designed to examine the proposed coding method and compare the results with the compression methods in the CD and with the FIT interpolation in terms of complexity, PSNR, visual quality and offered functionality.

Finally the CEs in FBA were described in output document **N1889** with corresponding AHG in **N1887**.

7.4 SNHC Version 2 Work Plan

The "MPEG-4Version 2 SNHC Work Plan" was generated and submitted as output document **N1892**.

8. Meeting Participants

Many thanks to the quality of work, patience and determination of SNHC contributors in Fribourg:

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9. SNHC-related Contribution Documents

For reference, the following sections list SNHC-related contributions and recommended reading:

9.1 SNHC VM

Doc	Group	Section	Source	Title
2708	MPEG-4	SNHC	Caspar Horne	Report of the Ad Hoc Group on SNHC VM Editing
2710	MPEG-4	SNHC	Caspar Horne	SNHC Verification Model V5.1

9.2 SNHC FBA

Doc	Group	Section	Source	Title
2599	MPEG-4	SNHC	Hai Tao, Homer Chen	FAP Interpolation Table (FIT)
2603	MPEG-4	SNHC	Roberto Pockaj, Fabio Lavagetto	Proposal for FAP1 and FAP2 syntax modification
2629	MPEG-4	SNHC	Jorgen Ahlberg, Haibo Li	Results of FAP Coding using DCT
2649	MPEG-4	SNHC	Eric Petajan, FBA ad hoc group	Report of the ad hoc group on Face and

Doc	Group	Section	Source	Title
				Body Animation
2656	MPEG-4	SNHC	Marc Escher, Igor Pandzic, Pierre Beylot, Tolga Capin	Results of core experiments FBA3
2696	MPEG-4	SNHC	Gabriel Abrantes, Fernando Pereira	Donation to ISO of MOMUSYS Facial Animation Software
2697	MPEG-4	SNHC	Gabriel Abrantes, Fernando Pereira	Results for MPEG-4 Facial Animation System
2807	MPEG-4	Audio	Jisang Yoo, Jusang Lee	Implementation of TTS assisted Facial Animation
2836	MPEG-4	SNHC	Jorgen Ahlberg, Haibo Li, Robert Forchheimer	FAP-coding using Facial Action Basis Functions
2838	MPEG-4	SNHC	Claudio Lande	Results of a simulation for the animation of downloaded models
2880	MPEG-4	Systems	I. Pitas, C. Kotropoulos, A. Nikolaidis, S. Tsekeridou	Algorithms for face localization, facial feature extraction and tracking
2883	MPEG-4	SNHC	Joern Ostermann	Face Animation Tables: More Models
2887	MPEG-4	SNHC	Yuval Fisher, Homer Chen, Hai Tao	BIFS description for FAP and Mesh interpolation tables

9.3 SNHC 2D/3D Mesh & Texture

Doc	Group	Section	Source	Title
2676	MPEG-4	Video	Dean S Messing, Ibrahim Sezan	Bitstream Exchange for 2D Dynamic Mesh Compression (Z4)
2730	MPEG-4	SNHC	Touradj Ebrahimi, Homer Chen	Report of ad hoc group on bitstream exchange for visual texture/mesh coding
2756	MPEG-4	Video	John Muller	Report of the Ad hoc group on core experiments on coding efficiency in MPEG-4 video
2804	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Report on 3D mesh coding
2805	MPEG-4	SNHC	Jin Soo Choi, Myoung Ho Lee, Chieteuk Ahn	Draft proposal for new core experiment on generic 3D mesh coding
2846	MPEG-4	SNHC	P.J.L. van Beek, A.M. Tekalp	Bitstream verification of 2D dynamic mesh
2866	MPEG-4	SNHC	Ganesh Rajan	2D Dynamic Meshes: Results of Bitstream Exchange
2906	MPEG-4	Video	Iraj Sodagar, Hung Ju Lee, Jie Liang, Zhixiong Wu, Mengxiang Li, Weping Li, Rongxiang Yi, Charles Chui, Hiroyuki Katata	Report on the Visual Texture Bitstream Exchange

9.4 SNHC Audio

Doc	Group	Section	Source	Title
2600	MPEG-4	Audio	MIDI	Liaison Statement from MIDI Manufacturers Association to SC 29/WG 11 (SC 29 N 2229)
2616	MPEG-4	Audio	MIDI and WG 11 Convenor	Liaison Statements between MIDI and SC 29/WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2241)
2626	MPEG-4	Audio	MIDI Manufacturers Association	Liaison Statement from MIDI to WG 11 on WG 11's Audio Activities in MPEG-4 (SC 29 N 2264)

Doc	Group	Section	Source	Title
2645	MPEG-4	Audio	Karlheinz Brandenburg	Report of the Ad hoc Group on MPEG-4 Audio Core Experiments
2721	MPEG-4	Audio	Brian Link, Dave Rossum	Proposed Refinements to Structured Audio Sample Bank Format
2733	MPEG-4	Audio	Eric Scheirer	Draft CD 14496-3 Subpart 5 (Structured Audio)
2734	MPEG-4	Audio	Eric Scheirer	Audio nodes and normative audio composition text for Systems CD
2735	MPEG-4	Audio	Eric Scheirer, Georgio Zoia, EPFL	Proposed changes to SAOL
2736	MPEG-4	General	Eric Scheirer (chair)	Report of AHG on Structured Audio WD/VM
2737	MPEG-4	Audio	Eric Scheirer	Complexity analyses of some Structured Audio orchestras
2764	MPEG-4	Audio	Y. Lee, H.S. Lee, J.C. Lee, M. Hahn	Implementation of English MPEG-4 Audio TTS and Korean MPEG-4 Audio TTS Improvement
2765	MPEG-4	Audio	M. Hahn, J.C. Lee, Y.K. Lim, Y. Lee	Report on the progresses of MPEG-4 Audio TTS
2807	MPEG-4	Audio	Jisang Yoo, Jusang Lee	Implementation of TTS assisted Facial Animation
2900	MPEG-4	Audio	Tom White	Liaison Contribution from the MIDI Manufacturers Association on Structured Audio Downloadable Sounds

9.5 Backchannel

Doc	Group	Section	Source	Title
2865	MPEG-4	General	Touradj Ebrahimi, Fred Jordan, Joern Ostermann, Jim Bralean, Fernando Perreira, Homer Chen, Shigeru Fukunaga, Marco Mattiavelli, Marco Gandini, Eric Petajan, Ganesh Rajan, Barry Haskell, Chieteuk Ahn	We Need a Back Channel !
2882	MPEG-4	Systems	Andrea Basso, Joern Ostermann, Barry Haskell	Requirements for a Back Channel: Messages from the Decoder to the Encoder

9.6 BIFS & MITG/VRML-related

Doc	Group	Section	Source	Title
2610	MPEG-4	Systems	Zvi Lifshitz	APIs for Systems Software Implementation
2618	MPEG-4	Systems	Julien Signes, adhoc group on BIFS	Report of the adhoc group pre meeting in Rennes
2639	MPEG-4	Video	Jens-Rainer Ohm, Karsten Muller, Silko Kruse	Incomplete 3D Representation of Video Objects
2683	MPEG-4	General	German National Body	Comments on the Relation between MPEG-4 and VRML
2701	MPEG-4	Systems	Frederic Bouilhaguet, Jean-Claude Dufourd	Contribution to the Systems WD on 2D nodes
2775	MPEG-4	Systems	Julien Signes	report of the Adhoc Group on BIFS
2779	MPEG-4	Systems	Julien Signes	Proposed evolution of some BIFS nodes
2781	MPEG-4	Systems	Julien Signes	Analysis of VRML 2.0 nodes in the

Doc	Group	Section	Source	Title
				MPEG-4 context
2783	MPEG-4	Systems	Julien Signes	Clarification of timing issues for BIFS scenes
2784	MPEG-4	Systems	Julien Signes	On BIFS and VRML relationships and content interchange
2797	MPEG-4	Systems	Franco Casalino, Antonio Arena, Matthew Leditscke	Implementing the subset of the BIFS 2D nodes: a cross-check of semantic & syntax
2812	MPEG-4	Systems	Hiroyuki Aga, Yasuhiro Honda, Teruhiko Suzuki, Yoichi Yagasaki	The necessity of further refinement/improvement of the BIFS regarding the relation to VRML
2819	MPEG-4	Systems	Jean-Claude Dufourd., Frederic Bouilhaguet	Necessary changes of BIFS for authoring
2897	MPEG-4	Systems	Yuval Fisher, Homer Chen	BIFS Scene Tree Parser
2911	MPEG-4	Systems	Yuval Fisher, Homer Chen	BIFS User Interface Nodes

9.7 Timing & Caching

Doc	Group	Section	Source	Title
2613	MPEG-4	Systems	Jiro Katto	Some Remarks on Timing Issues in MPEG-4 Systems
2806	MPEG-4	Systems	Gauthier Lafruit, Eddy De Greef, Jan Bormans	Implications of Expiration Time Stamp / Object Lifetime on Memory Management
2874	MPEG-4	Systems	Carsten Herpel	How to model the Composition Buffer resources
2875	MPEG-4	Systems	Carsten Herpel	The Expiration Time Stamp is redundant
2876	MPEG-4	Systems	Carsten Herpel	WD text for semantics of scene time vs. media time

9.8 Profiling & Applications

Doc	Group	Section	Source	Title
2635	MPEG-4	Requirements	Jian Zhang, Constance Belz, Norbert Gerfelder, Luc Neumann	Update of MPEG-4 Application Document regarding Mobile Multimedia Application
2636	MPEG-4	Requirements	Jian Zhang, Norbert Gerfelder, Luc Neumann	Update of MPEG-4 Application Document regarding Collaborative Scene Visualization Applications
2646	MPEG-4	Requirements	Klaus Diepold	Application Document Revision
2648	MPEG-4	Requirements	Eric Petajan, FBA adhoc group	Face Animation Profiles
2651	MPEG-4	Requirements	Constance Belz, Norbert Gerfelder, Luc Neumann, Jian Zhang	Definition of a System Profile Level for 3D Graphics in Low Bitrate Environments
2662	MPEG-4	Requirements	Michael Zeug	MPEG-4 Profile Requirements version 4.1
2689	MPEG-4	Requirements	Rob Koenen (KPN Research), Fernando Pereira (IST), Karlheinz Brandenburg (FHG)	Discussion on Audio Profiles
2700	MPEG-4	Requirements	Graham Thomas	Description of virtual studio coding application
2717	MPEG-4	Requirements	Andreas Hutter	Proposals for Composition Profiles and Conformance Testing
2827	MPEG-4	Requirements	Klaus Diepold, Jian Zhang	Overview of the available MPEG-4

Doc	Group	Section	Source	Title
				Tools and Profiles
2912	MPEG-4	Systems	Ronald Jacoby	Variants on Profile Definitions for MPEG-4 Systems

9.9 Requirements & Overview

Doc	Group	Section	Source	Title
2688	MPEG-4	Requirements	Rob Koenen for MPEG-4 Requirements AHG	draft v.5 of MPEG-4 Requirements Doc
2690	MPEG-4	Requirements	Rob Koenen	Report of AHG on MPEG-4 Requirements
2705	MPEG-4	General	Rob Koenen (editor)	draft revision of MPEG-4 Overview
2725	MPEG-4	Requirements	Michael Frater, Homer Chen	Variable Pixel Depth Functionality in MPEG 4

9.10 Complexity, QoS, CGD

Doc	Group	Section	Source	Title
2601	MPEG-4	Implementation	Brent Wilson, C.S. Boon	Market Driven Levels with CGD
2654	MPEG-4	Implementation	Gauthier Lafruit, Jan Bormans	Complexity comparison between scalable wavelet codec and scalable DCT codec
2655	MPEG-4	Implementation	Gauthier Lafruit, Jan Bormans	Graceful degradation parameters for a scalable wavelet codec
2713	MPEG-4	Implementation	Dan Tamir	Report of the AHG on Decoder QoS
2728	MPEG-4	Implementation	Cliff Reader	Proposal for Decoder QoS
2759	MPEG-4	Implementation	Young-Kwon Lim, Sanggyu Park, Jinwoong Kim	On the decoder QoS conformance levels and CGD

9.11 File Format

Doc	Group	Section	Source	Title
2624	MPEG-4	Requirements	Wei-ge Chen, Eric Fleischman, Phil Chou, Ming-Chieh Lee	Requirements for MPEG4 file format
2872	MPEG-4	Requirements	A. Basso, R. L. Schmidt, A. Puri	Requirements for the File Format for MPEG-4
2873	MPEG-4	Systems	H. Kalva, A. Eleftheriadis, A. Basso, R. L. Schmidt, A. Puri	File Format for MPEG-4
2886	MPEG-4	Requirements	Hari Kalva, Alexandros Eleftheriadis	Requirements for MPEG-4 File Format

9.12 Versioning

Doc	Group	Section	Source	Title
2684	MPEG-4	General	German National Body	Comments on Version Management in MPEG-4
2695	MPEG-4	General	Fernando Pereira	Portuguese National Body Position Regarding MPEG-4 Versioning
2753	MPEG-4	General	KNB	Proposal on MPEG-4 Version Management

Annex 9
Report of Test Meeting

Source: **Laura Contin, Chair**

Introduction

At the 41st meeting of WG11, in Fribourg, the workplan for MPEG-4 verification tests to be carried out in 1998 was consolidated both for audio and for video and it is summarised in document WG11/1971.

During the meeting also the workplan for the MPEG-2 AAC verification test for high quality stereo applications was addressed.

Audio verification tests

Verification test of MPEG-2 AAC

This test is aimed at verifying how close to transparency is the quality achievable by AAC on stereo material. To this goal it was decided to apply the double-blind triple-stimulus with hidden reference method, that is particularly suited for evaluating coded excerpts that are hardly distinguishable from the corresponding sources. A preliminary test plan was specified at the previous WG11 meeting (Stockholm, July '97) and a pre-selection of the critical material to be used in the formal test was completed just before the Fribourg meeting.

The selection panel indicated that the excerpts coded at 64 kbit/s were in general easily distinguishable from the corresponding sources, when presented according to the triple-stimulus protocol. Thus, this condition was considered not suited for this test and it was removed from the list of the coding conditions.

The Test Subgroup endorsed the recommendations of the selection panel and revised in collaboration with the Audio Subgroup the experimental design, that includes 8 codec/bitrate combinations, 10 programme items, fixed presentation through loudspeakers with three subjects at a time. The revised test plan is specified in document WG11/N1845.

MPEG-4 verification tests

The preliminary proposal issued at the previous MPEG meeting was completely revised in collaboration with the Audio Subgroup and a new proposal for verification tests in the following application areas was approved (document WG11/N1849):

- narrow-band digital broadcasting
- music on Internet
- speech coding

Methodological issues were also discussed

Narrow-band digital broadcasting test

This test was proposed by the NADIB consortium (document M2816), that is interested in evaluating the performance of MPEG-4 scalable coding schemes in conditions suitable for digital audio broadcasting. The test results should be presented at the July '98 meeting.

Music on Internet test

This test is aimed at evaluating the quality achievable by AAC at medium bitrates (between 20 and 56 kbit/s). In this test only stereo excerpts will be used. AAC will be compared against MPEG-1 Layer 3. It was discussed the possibility of using products actually available on Internet as anchor conditions, but considering the problems related to this matter, it was decided to drop it. The results of this test should be available at the October '98 meeting.

Speech coding test

The test conditions for this test are based on the previous proposal and it includes bitrates from 2 to 56 kbit/s and sampling rates of 8 and 16 kHz. For logistic reasons it was agreed to include in this test only speech excerpts. Further tests will be hopefully carried out to check the performance of MPEG-4 coding schemes on music at low bitrates. The results of this first test should be available at the July '98 meeting.

Test methodology

The basic question of test methodology to be used in these tests was raised. In the past MPEG used two standard methods: the ACR method (known in MPEG as MOS method) and the triple-stimulus method. The former is suitable to evaluate excerpts with clearly audible impairments and, since no direct reference is given, suitable anchor conditions (e.g. MNRUs specified in ITU-T Rec. P.810) are needed. The latter is suitable to evaluate coded excerpts with hardly perceptible impairments.

In the application areas proposed for this first round of MPEG-4 verification tests, and in particular in the music on Internet test, the quality level of the excerpts is expected to be 'high', but 'quite far' from transparency. Thus, neither of the methods used in the previous test is suited: the ACR method because no adequate anchors are available, the triple-stimulus method because the quality level of the test conditions will not be close to transparency. A proposal for a new method aimed at evaluating this range of quality is given in document WG11/N1848 and it is based on the evaluation of the level of acceptance.

Video verification tests

At the previous MPEG meeting a preliminary specification of the conditions to be used for testing error robustness was issued.

In Fribourg, in collaboration with the Video Subgroup, this proposal was updated and a new proposal addressing content-based coding was developed. A pre-screening of the test material for either the tests will be carried out during the next MPEG meeting (San Josè, February '98)

Update of the error robustness test plan

It was agreed that only conditions that are representative of mobile communications will be included in this test. At each bitrate two error conditions will be taken into account: one pattern representative of typical conditions, the other representative of critical conditions.

Only one sequence, lasting three minutes, will be used in the test and it will be coded under all the combinations bitrate/error condition included in the test plan, so that the whole test material will last 18 minutes.

It was recognised the need for error patterns representative of the *physical* layer and a liaison was sent to the standardization bodies dealing with mobile communications to ask for new patterns.

Considering the time needed to obtain the error patterns, the delivery of the test results was postponed from March '98 to July '98.

Further details about the test plan are available in document WG11/N1960.

New proposal for a verification test on content-based coding

It was proposed to compare the performance of MPEG-4 content-based video coding against MPEG-4 frame-based and MPEG-1 coding. A range of bitrate between 384 kbit/s and 1.15 Mbit/s will be taken into account. The test plan is specified in document WG11/ N1961.

List of ad hoc groups

- Ad-Hoc Group on MPEG-2 AAC stereo verification tests, WG11/N1857 - S-W Kim/Contin
- Ad-Hoc Group on MPEG-4 audio verification tests, WG11/N1860 - Edler/Contin
- Ad-Hoc Group on MPEG-4 Video Verification tests, WG11/N1962 - Miki/Boon

Annex 10
ISG meeting report

Source: Paul Fellows, Chair

Overview

During the meeting, several key issues were discussed and input documents reviewed. The issues were :-

- Conformance
- Tool Analysis (Video: Interlace, iDCT/Wavelett comparison for scalability)
- Computational Graceful Degradation (CGD)

Mutually beneficial joint meetings took place between ISG and Video, Requirements and Systems.

Video Analysis

Interlaced Video

These issues were raised in the previous meeting. The group was of the opinion that the decoding cost delta above non-interlaced is not significant, however media conversion cost is significant. The technology to handle interlaced media is commercially deployed in existing MPEG-2 capable terminals.

Video VM complexity analysis

There had been considerable activity prior to the meeting in analysing the complexity of the Video VM.

- IDCT/Wavelett scalability complexity.

The contribution document m2654.doc was presented and reviewed. This document compared the arithmetic complexity of a still image scalable wavelet encoder/decoder with a still image scalable DCT encoder/decoder (quantization-inverse quantization and symbol coding/decoding were not considered in the analysis). The wavelet encoder/decoder used in the analysis was similar to the VM8.0, with the difference that it implemented a 9/7-tap bi-orthogonal wavelet filter, instead of the 9/3-tap bi-orthogonal filter of VM8.0. The scalable DCT codec used the approach described in N2437. Both the wavelet and DCT codec were seen to have no limitations on the number of scalability levels. It was shown that for the same degree of optimizations in the wavelet and DCT codec, the arithmetic complexity of the scalable wavelet codec is always smaller than the arithmetic complexity of the scalable DCT codec.

- VM Profiling

M2862.doc " Complexity Analysis of the MPEG-4 Video Verification Model Version 8.0", described the results of profiling VM 8.0. It highlighted a 150% increase in complexity, as a result of a significant change in the shape of the object under analysis.

The contribution M2813.doc described the first version of a generically optimized MPEG-4 video decoder. Preliminary performance measurements were encouraging. The padding, which used to be a very time consuming function (up to 40%) in previous decoder versions, was seen to be now between 5% and 30%. Motion compensation is now the most CPU intensive function. This finding lead to the conclusion that the impact of using the OBMC feature will be high.

Conformance

The discussions on conformance levels benefited from existing ISG members as well as additional representation from interested parties. Three main issues were identified as follows:-

1. Identification of a decoder's level.

This is intended to permit a decoder vendor to construct an implementation to a defined level of performance thus avoiding the costly prospect of having to considerably over-engineer the decoder. It also indicates to a service provider/application developer the level of performance available in an platform neutral manner.

2. Identification of a bit stream's complexity.

A method of characterizing the complexity of a bit stream such that the application can make an informed decision whether or not to begin decoding the bit stream.

3. Support in the process of content creation targeted at a certain level.

To provide guidance on how design tools may be constructed in order to limit the complexity of resultant bit streams such that the application can be successfully decoded in real time upon a decoder of level X.

To aid this work, a preliminary set of metrics was identified. Members of ISG consulted experts from Video, Audio, SNHC and Systems in order to ascertain the most useful metrics. The essential requirement for these metrics were that they should be accurate, easy to use, meaningful and implementation independent. The result of this activity is described in output document N1876.doc. This work will continue after the meeting in order to develop a "training set", select an efficient subset of the identified metrics and finally to verify the results.

CGD

The CGD ad-hoc group activity prior to the meeting was reviewed by ISG. During the meeting, the syntax proposed was approved by ISG and confirmed that there would be no start code emulation problems. The meeting achieved a major milestone in the progress of the techniques proposed for Computational Graceful Degradation. The benefits of this approach were clearly demonstrated by ISG to experts from the Video group. The Video group approved the concept. The syntax of CGD proposed by ISG was approved by WG11 in the MPEG-4 Visual CD.

The group requested the establishment of an ad-hoc group to assess how CGD could be applied to SNHC and Audio.

Annex 11
Report of Liaison Meeting

Source: Barry Haskell, Chair

The Liaison group considered the following input documents:

	SC29 number	source	Subject
0		ISO/TC 46	Copyright & IPR
1		FIAPF	Copyright & IPR
2		ITU-R	Stereoscopic Image Coding
3		ITU-T SG 9	Navigation Systems
4		ITU-T WP 1/9	New Terminology
5		ITU-T SG 9	Reply
6	N2185	IEC / TC 100	Organization
7	N2186	IEC / TC 100	Strategy
8	N2129	SC29 / N2129	Calling Notice Sydney meeting
9	N2199	SC24	Agreement between VRML & JTC1
10		letter	document registration
11	N2265	IEC SC 100C	Digital Interface for A/V Equipment
12	N2266	IEC SC 100C	Digital Interface for A/V Equipment
13		IEC SC 100C	Digital Interface for A/V Equipment
14		IEC SC 100C	Digital Interface for A/V Equipment
15	N2238	ITU-R WP 11A	Color quality optimization
16	N2237	ITU-R WP 11A	Future TV Quality Control
17		JTC 1	Organization & Operations
18		IETF AVT	liaison request
19	N2183	DAVIC	Call for proposals
20	N2270	DAVIC	Call for proposals
21	N2184	IEC TC100	B-Liaison
22	N2185	IEC TC100	Organization
23	N2186	IEC TC100	Strategy
24	N2187	IEC TC100	Agenda
25	N2188	IEC TC100	Program of Work
26	N2189	IEC SC100B	Program of Work
27	N2190	IEC SC100C	Program of Work
28	N2191	IEC SC100C	Organization of Work
29	N2273	IEC SC100C	Non-linear PCM Audio
30	N2237	ITU-R WP11A	Future TV Quality Control
31	N2238	ITU-R WP11A	Color TV Quality Control
32	N2241	MIDI	Audio Liaison
33	N2229	MIDI	Audio Liaison
34	N2264	MIDI	Audio Liaison
35		Chairman WG11	email response to MIDI
36	N2265	IEC SC 100C	same as #11
37		IEC SC 100C	same as #12
38	N2266	IEC SC 100C	same as #13
39		IEC SC 100C	same as #14
40	N2269	JTC1 SC24	Status of activities
41		JTC1 SC24 chair	email on MPEG-4 Systems issues
42		JTC1 SC24 chair	email on MPEG-4 Systems issues
43		JTC1 SC24 chair	email on MPEG-4 Systems issues
44		JTC1 SC24 chair	email on MPEG-4 Systems issues
45		JTC1 SC24 chair	email on MPEG-4 Systems issues

46		WG11 chair	email on MPEG-4 Systems issues
47		WG11 chair	email on MPEG-4 Systems issues
48		MELP	email on audio verification
49		J. Snyder	DVD Liaison
50		J. Snyder	MUSE/IFPI Liaison
51		R. Koenen	DIG
52		WG11 chair	email on CEN
53		R. Koenen	email on CEN activity on metadata
55		IPR ad hoc	draft liaison letter to CEN/ISSS
56	N1732	Requirements group	old note on IPR

The Liaisons Group Produced the following documents

No.	Date	Source	Title
1939	10/97	Liaison	Response to comments on MPEG-4 Copyright Information to FIAPF
1940	10/97	Liaison	Request for Liaison A to FIAPF
1941	10/97	Liaison	Liaison to ITU-T on OC
1942	10/97	Liaison	Letter to IETF on closer working relationship with IETF on DMIF
1943	10/97	Liaison	Letter from ISO/IEC JTC1/SC29/WG11 to the MIDI Manufacturers Association
1944	10/97	Liaison	Request for Liaison A to MMA
1945	10/97	Liaison	Liaison to EBU B/CASE
1946	10/97	Liaison	SG16 and ISO/IEC MPEG Cooperation on DMIF with H.310 and H.323
1947	10/97	Liaison	Liaison from SC29/WG11 to SC24 and the VRML Consortium
1948	10/97	Liaison	Liaison to ARIB on Verification tests of MPEG-4
1949	10/97	Liaison	Liaison to ETSI on Verification tests of MPEG-4
1950	10/97	Liaison	Liaison to TIA on Verification tests of MPEG-4
1951	10/97	Liaison	Answer to the Portuguese National Body regarding MPEG-4 versioning
1952	10/97	Liaison	Response to the position paper of the National Body of Korea on the version management of MPEG-4
1953	10/97	Liaison	Response to USNB Request for Amendment to 11172-2
1954	10/97	Liaison	Answer to the German National Body Position regarding MPEG-4 Profiles
1955	10/97	Liaison	Disposition of comments on MPEG-4 Audio to UK document M2607
1956	10/97	Liaison	Response to French National Body Comment concerning OCI development
1957	10/97	Liaison	Letter to CEN/ISSS on MPEG-4 IPR
1958	10/97	Liaison	Response to UK National Body Comment concerning MPEG-7 development
1959	10/97	Liaison	Liaison letter to ISO/TC 46/ SC 9/WG1 on MPEG-4 Copyright Information
1967	10/97	Liaison	Response the National body of UK comments on MPEG-4 video