

**INTERNATIONAL ORGANISATION FOR STANDARDISATION**  
**ORGANISATION INTERNATIONALE DE NORMALISATION**  
**ISO/IEC JTC1/SC29/WG11**  
**CODING OF MOVING PICTURES AND AUDIO**

ISO/IEC JTC1/SC29/WG11 **N2401**  
October 1998

**Source:**       **Convenor**  
**Title:**        **Atlantic City meeting report**

## **1 Opening**

The 45<sup>th</sup> WG11 meeting was held at Atlantic City, NJ, US at the kind invitation of ANSI, The US National Standards Body. Opening speeches were made by Peter Schirling, representing the hosting country and Glenn Reitmeier representing Sarnoff Corporation, the hosting organisation.

## **2 Roll call of participants**

The attendance list is given as annex 1

## **3 Approval of agenda**

The agenda given in annex 2 was approved

## **4 Allocation of contributions**

The list can be found in annex 3.

## **5 Communications from Convenor**

There were no communications

## **6 Report of previous meetings**

The report of the Dublin meeting was approved

## **7 Processing of NB Position Papers**

These were discussed and a response produced

## **8 MPEG Phase 2**

### **8.1 MPEG-2 parts**

ISO/IEC 13818-10/FDIS was approved

## 8.2 Verification of MPEG-2

No results were reported

## 8.3 Amendments

The following amendments were approved

ISO/IEC 13818-1/FPDAM 5.2

ISO/IEC 13818-1/FPDAM 6

ISO/IEC 13818-4/FPDAM 2

## 8.4 Corrigenda

No corrigenda were considered

## 8.5 Workplan

This was approved

# 9 MPEG Phase 4

## 9.1 Version 1

### 9.1.1 *Patent statements*

The last patent statements were collected

### 9.1.2 *Final Committee Draft*

#### 9.1.2.1 System

This was approved

#### 9.1.2.2 Video

This was approved

#### 9.1.2.3 Audio

This was approved

#### 9.1.2.4 Reference software

Approval was deferred to the March 1999 meeting

#### 9.1.2.5 DMIF

This was approved

### 9.1.3 *Verification Tests*

MPEG-4 Audio verification test results were reported on speech codecs and audio on Internet

### 9.1.4 *Quality of service*

No activity took place

### 9.1.5 *Conformance Testing*

A new version of the WD was produced

## 9.2 Version 2

### 9.2.1 *Requirements*

A new requirements document was produced

### 9.2.2 *Tools*

Version 2 tools were tested and where appropriate introduced

### **9.2.3 Verification Models**

New versions of the VMs were produced

### **9.2.4 Working draft**

New versions of the WDs were produced

## **9.3 Workplan**

This was approved

## **10 MPEG Phase 7**

### **10.1 Requirements**

A new version of the requirements document was produced

### **10.2 Call for proposals**

The call for proposal was approved and released

### **10.3 Tools**

No real activity could take place yet on this subject

### **10.4 Workplan**

This was approved

## **11 Overall WG11 workplan**

This was approved

## **12 Explorations**

Discussions on MPEG-4 and the Web and on Requirement study for High Quality Applications continued.

## **13 Liaison matters**

Letters were considered and responses drafted where appropriate.

## **14 Administrative matters**

### **14.1 Schedule of future MPEG meetings**

This was approved

### **14.2 Promotion of MPEG**

A press release was drafted and approved

## 15 Organisation of this meeting

### 15.1 Tasks for subgroups

The following tasks were assigned

#### Requirements

- MPEG-4 Applications
- MPEG-4 Requirements
- MPEG-4 Overview
- MPEG-7 Applications
- MPEG-7 Requirements
- MPEG-7 Context and Objectives
- MPEG-7 CfP & PPD
- MPEG-7 Tests and Evaluations
- MPEG-7 test material w/ conditions of use
- Press Release

#### Delivery

- 13818-10 DoC & FDIS
- 14496-6 DoC & FDIS
- Status of reference software
- Contribution to 14496-4 WD
- MPEG-4 part 6 ver. 2 WD
- MPEG-4 part 6 ver. 2 ref. software
- Proposal of joint work w/ IETF

#### Systems

- 13818-1 rev WD
- 13818-4 PDAM 6 DoC & FDAM
- 14496-1 DoC & FDIS
- Self-assessment of ver. 1 software
- Contribution to 14496-4 WD
- MPEG-4 part 1 ver. 2 WD
- MPEG-4 part 1 ver. 2 ref. software

#### Video

- 13818-2 rev WD
- 14496-2 DoC & FDIS
- Self-assessment of ver. 1 software
- Contribution to 14496-4 WD
- MPEG-4 part 2 ver. 2 WD
- MPEG-4 part 2 ver. 2 ref. software

#### Audio

- 14496-2 DoC & FDIS
- Self-assessment of ver. 1 software
- Contribution to 14496-4 WD
- MPEG-4 part 3 ver. 2 WD
- MPEG-4 part 3 ver. 2 ref. software

**SNHC**

- 14496-2 DoC & FDIS
- Self-assessment of ver. 1 software
- Contribution to 14496-4 WD
- MPEG-4 part 2 ver. 2 WD
- MPEG-4 part 2 ver. 2 ref. software

**Test**

- Audio Verification Tests
- Video Verification Tests

**ISG**

- Complexity assessment

**Liaison**

- Liaison documents

**HoD**

- NB position papers
- Patents
- MPEG trademark
- ACY meeting fees
- Approval of MPEG-4 FDIS
- Publication of MPEG-4 on the web
- ISO awards
- Meeting schedule
- Support to Friday plenary

**15.2 Room allocation**

This was done

**15.3 Joint meetings**

The following joint meetings were held

ISG	Audio	SA	16:30-17:30	Mon	ISG
Requirements	ISG	Level Complexity	17:30-18:00	Mon	Requirem
Audio	Requirements	MPEG-7	09:00-10:00	Tue	Audio
Video	Test	Ver. Test	09:00-10:00	Tue	Video
Delivery	Systems, Requirements	Miscellanea	10:00-11:30	Tue	Systems
Video	Requirements	Profiles	11:00-12:00	Tue	Video
Audio	Test	Ver. Test	11:30-13:00	Tue	Audio
Audio	Requirements, ISG	Profiles	14:00-15:00	Tue	Audio
Audio	Systems	Miscellanea	15:00-16:00	Tue	Audio
ISG	SNHC	CGD	16:00-17:00	Tue	SNHC
Requirements	Systems, SNHC	Profiles	16:00-18:00	Tue	Systems

Requirements	Test	MPEG-7	12:00-13:00	Wed	MPEG-7
Systems	Requirements	Profiles	13:00-14:00	Wed	Systems
Audio	Test	Verif. Test	14:00-15:00	Wed	Audio
Systems	SNHC	Multilayer	16:00-17:00	Wed	SNHC
Requirements	Video	Profiles	16:00-18:00	Wed	Video
Systems	Requirements	MPEG-J	18:00-19:00	Wed	Systems
Systems	ISG	IPMP compl	09:00-10:00	Thu	ISG
Requirements	Video	MPEG-7	09:00-10:00	Thu	Video
Delivery	ISG	QoS	10:00-11:00	Thu	Delivery
Systems	Requirements	Adv. BIFS	11:00-12:00	Thu	Systems
Systems	Delivery	MPEG-4 on IP	11:00-13:00	Thu	PB2
Systems	Audio	Adv. Aud. BIFS	12:00-13:00	Thu	Audio
Requirements	ISG	Level compl.	12:00-13:00	Thu	Requirem
Systems	Requirements	MPEG-7	14:00-15:00	Thu	Systems
ISG	SNHC	CGD	14:00-15:00	Thu	SNHC
Requirements	Audio	NB on Profiles	15:00-16:00	Thu	Audio
Delivery	Video	UEP	15:00-15:30	Thu	Delivery

## 16 Planning of future activities

The following ad hoc groups were established

2440	AHG on 3D Model Coding
2530	AHG on Advanced BIFS
2486	AHG on Computational Graceful Degradation
2475	AHG on core experiments in MPEG-4 video
2492	AHG on Editing ISO/IEC FDIS 14496-6
2477	AHG on editing the documents of the MPEG-4 video verification model and the MPEG-4 visual working draft
2441	AHG on Face Body Animation
2534	AHG on IM 1 Software Platform
2479	AHG on Integration of Still Texture and 2D/3D Mesh Coding
2533	AHG on Intellectual Property Management & Protection within MPEG-4
2434	AHG on MPEG-4 Audio Conformance
2436	AHG on MPEG-4 Audio environmental spatialisation
2433	AHG on MPEG-4 Audio FDIS and Reference Software FDIS editing
2437	AHG on MPEG-4 Audio Version 2 error resilience
2535	AHG on MPEG-4 Content on MPEG-2 Systems
2536	AHG on MPEG-4 Content on the Internet
2532	AHG on MPEG-4 File Format
2435	AHG on MPEG-4 Structured Audio
2537	AHG on MPEG-4 Systems Profiles and Levels
2478	AHG on MPEG-4 video encoder optimization
2491	AHG on MPEG-4 Video Verification tests
2447	AHG on MPEG-4 Visual Conformance
2438	AHG on MPEG-7 audio matters

2453	AHG on MPEG-7 Evaluation Logistics
2452	AHG on MPEG-7 Requirements and Applications
2454	AHG on MPEG-7 XM Development
2531	AHG on MPEG-J Specification and Implementation
2455	AHG on Requirement study for High Quality Applications
2442	AHG on SNHC VM Editing
2476	AHG on software integration and verification in MPEG-4 video
2529	AHG on Systems Conformance
2528	AHG on Systems Specifications Editing
2487	AHG on video Decoder Quality of Service

## **17 Resolutions of this meeting**

These were approved

## **18 A.O.B**

There was no other business

## **19 Closing**

The meeting closed at 98/10/16T23:00

Annex 1  
Attendance list

Abdel-Mottaleb	Mohamed	Philips Research	US
Abrantes	Gabriel	AT&T Labs Research	PT
Addington	Tim	Scientific-Atlanta	US
Ahn	Chieteuk	ETRI	KR
Akansu	Ali	NJIT/NJCMR	US
Alatan	A. Aydin	NJIT/NJCMR	US
Ando	Ichiro	JVC	JP
Armati	Douglas	InterTrust Technologies Intl.	US
Asai	Kohtaro	Mitsubishi Electric Corporation	JP
Auffret	Gwendal	INA	FR
Aust	Andreas	Deutsche Thomson-Brandt GmbH	DE
Avaro	Olivier	France Telecom - CNET	FR
Bajaj	Chandrajit	Lucent **	US
Balabanian	Vahe	Nortel	CA
Barron	Kevin	KPN Research	NL
Basso	Andrea	AT&T Labs Research	US
Battista	Stefano	ST Microelectronics	IT
Bauer	Sven	Bosch	DE
Bayarakeri	Sadik	Sony	US
Belknap	William	IBM	US
Bell	Bob	Mitsubishi	US
Benzler	Ulrich	University of Hannover	DE
Berekovic	Mladen	University of Hannover	DE
Bhat	Dinkar	LGERCA	US
Birkmaier	Craig	P-Cube	US
Bober	Miraslaw	Mitsubishi	UK
Boon	C.S.	Matsushita Elec.	JP
Bormans	Jan	IMEC	BE
Bossen	Frank	EPFL	CH
Brandenburg	Karlheinz	Fraunhofer Institut IIS-A	DE
Bray	Alvar	PACT	UK
Burman	Bo	Ericsson	SE
Burns	Ron	Hughes Research Laboratories	US
Buxton	Mark	Intel Corp.	US
Capin	Tolga	Swiss Federal Institute of Technology	CH
Carvalho	Antonio	Queen Mary & Westfield College	UK
Casner	Stephen	Cisco Systems	US
Cazoulat	Renaud	France Telecom - CNET	FR
Chau	Lap Pui	Center for Signal Processing	SG
Chau	Kwok	NJR Corporation	US
Chen	Homer H	Rockwell	US
Chen	Tihao	Sarnoff Corporation	US
Chen	Xuemin	General Instrument Corp.	US
Chen	Yingwei	Philips Research	US
Chiariglione	Leonardo	CSELT	IT



Choi	Jin Soo	ETRI	KR
Choi	Yanglim	Samsung Electric Company	KR
Chung	Jae-Won	Hyundai Electronics	KR
Civanlar	Reha	AT&T Labs Research **	US
Cognell	Anna	Telia Research	SE
Cohen	Robert	Philips Research	US
Cohen	Noam	VSOFT	IL
Coleman	Mike	Five Bats Research	US
Collins	Andrew	Sony Broadcast & Professional Europe	UK
Corhog	Katie	AVID Technology, Inc.	US
Crinon	Regis	Sharp Labs	US
Curet	Dominique	France Telecom - CNET	FR
Day	Neil	Ricoh Co. Ltd.	JP
De Petris	Gianluca	CSELT	IT
Demos	Gary	DemoGraFX	US
Di Cagno	Gianluca	CSELT	IT
Dietz	Martin	Fraunhofer Institut IIS-A	DE
Divakaran	Ajay	Mitsubishi Electric ITA	US
Doenges	Peter	Evans + Sutherland Computer	US
Dufaux	Frederic	Compaq Computer Corp.	US
Dufourd	Jean-Claude	ENST	FR
Dumitras	Adriana	University of British Columbia	CA
Ebrahimi	Touradj	EPFL	CH
Ecklund	Roberta	Nokia Research Center	FI
Edler	Bernd	University of Hannover	DE
Erne	Markus	Swiss Federal Institute of Technology ETH	CH
Fehn	Christoph	Heinrich Hertz Institute	DE
Fellers	Matt	Dolby Laboratories	US
Fernando	Gerard	Sun Microsystems	US
Flaiani	Roberto	Aethra	IT
Fogg	Chad	Pixonics	US
Franceschi	Olle	Ericsson Radio Systems AB	SE
Franceschini	Guido	CSELT	IT
Francois	Edouard	Thomson Multimedia R&D France	FR
Frater	Michael	University of New South Wales	AU
Fujita	Noriaki	Sony Corporation	JP
Fukunaga	Shigeru	Oki Electric Industry Co., Ltd.	JP
Funken	Ralf	Philips Consumer Electronics	NL
Gandini	Marco	CSELT	IT
Gao	Wen	Motorola	CN
Gentric	Philippe	Lab.d. Electronique Philipa	FR
Gelissen	Jean	Philips Research	NL
Gerken	Peter	Q-Team	DE
Gill	Aharon	Zoran Microelectronics Ltd.	IL
Glidden	Rob	Quadramix	US liaison
Gray	Patricia	Intel Corporation	US
Grill	Bernhard	University of Erlangen	DE

Guillaume	Allys	CNET	FR
Guillotel	Philippe	Thomson Multimedia R&D France	FR
Hahn	Minsoo	ICU	KR
Hakulinen	Harri	Nokia Research Center	FI
Hammer	Bernard	Siemens AG	DE
Han	Mahn-Jin	Samsung AIT	KR
Han	Seokwon	Daewoo Electronics	KR
Haque	Munsi	Philips Electronics	US
Hartley	Edward	Lancaster University	UK
Haskell	Barry	AT&T Labs Research	US
Heising	Guido	Heindrich Hertz Institute	DE
Hernandez-Gil	Felix	Telefonica	ES
Herpel	Carsten	Deutsch Thomson-Brandt	DE
Herre	Jürgen	Fraunhofer Institut IIS-A	DE
Hill	Keith	MCPS LTD	UK
Hirose	Narumi	IPSJ/ITSCJ	JP
Hoddie	Peter	Apple Computer	US
Honko	Harri	Nokia Research Center	FI
Hori	Osamu	Toshiba Corporation	JP
Horne	Caspar	Mediamatics, Inc.	US
Hotani	Sanae	NTT DoCoMo	JP
Hsu	Wei-Lien	Compaq Computer Inc.	US
Huang	Chien-Min	Sorenson Vision	US
Ido	Daiji	Matsushita	JP
Imaizumi	Hiryuki	NHK	JP
Inoue	Akira	Sony Corporation	JP
Inoue	Hiroshi	Canon Inc.	JP
Ito	Norio	Sharp Corporation	JP
Iwadare	Masahiro	NEC	JP
Jang	Euee S.	Samsung AIT	KR
Jeannin	Sylvie	Philips LEP	FR
Judice	Charlie	Eastman Kodak	US liaison
June	Tye Bee	Institute of Microelectronics	SG
Kai	Sung-Jin	LGE Research Center of America	US
Kalva	Hari	Columbia University	US
Kaneko	Itaru	ASCII Corporation	JP
Kar	Mukta	Cable Television Laboratories	US
Kaup	Andre	Siemens AG	DE
Kawahara	Toshiro	NTT DoCoMo	JP
Kawamura	Yoshihisa	Digital Equipment Corporation	JP
Kiderud	Jörgen	Teracom	SE
Kikuchi	Yoshihiro	Toshiba	JP
Kim	Hae Kwang	Hyndai Electronics	KR
Kim	Hyeon June	LG Corp. Inst. of Tech.	KR
Kim	Jin Hun	Daewoo Electronics	KR
Kim	Munchurl	ETRI	KR
Kim	Sang-Wook	Samsung AIT	KR

Kim	Sung-Jin	Samsung AIT	KR
Kim	Whoi-yul Yura	Hangyang University	KR
Kim	Yeon Bae	Samsung AIT	KR
Kim	Michelle	IBM	US
Kim	Yuongmoo	MIT Media Lab	US
Kimata	Hideaki	NTT	JP
Klemets	Anders	Microsoft	US
Klungsoyr	Gunn K.	Telenor R & D	NO
Kneib	Kristine	KEA	US
Kogure	Takuyo	Matsushita Electric Industrial Co., Ltd.	JP
Koyama	Hitoshi	NEC Corporation	JP
Krisanamacharj	Santhana	Philips Research	US
Kudamakis	Panos	CRL	UK
Lacy	Jack	AT&T Labs-Research	US
Lafruit	Gauthier	IMEC	BE
Law	Chee Yong		
Le Guyader	Alain	France Telecom - CNET	FR
Lee	Jin Soo	LGCIT	KR
Lee	Sang-Mi	ETRI	KR
Lee	Youngjik	ETRI	KR
Lee	Hung-ju	Sarnoff Corporation	US
Leonardi	Riccardo	University of Brescia	IT
Li	Jiankun	USC	US
Li	Weiping	Optivision, Inc.	US
Li	Xiaoming	Zoran Corporation	US
Liang	Jie	Texas Instruments	US
Lifshitz	Zvi	VDOnet Corporation	IL
Lindquist	Morgan	Ericsson	SE
Lindsay	Adam	Riverland Research	BE
Liu	Yi	AMD	US
Long	Stephen	DOD	US
Luthra	Ajay	General Instument	US
Ma	Kai-Kuang	Nanyang Technological University	SG
Maeda	Mitsuru	Canon, Inc.	JP
Manjunath	B.S.	University of California	US
Masuda	Shunichi	Zapex Tech. Inc.	US
Matsubara	Hiroshi	Sony	JP
Matsui	Yoshinori	Matsushita	JP
Mattavelli	Marco	EPFL	CH
Meares	David	BBC R&D	UK
Mech	Roland	University of Hannover	DE
Miki	Toshio	NTT DoCoMo	JP
Miyamoto	Yoshihiro	NEC Corporation	JP
Mlasko	Torsten	Bosch	DE
Moccagatta	Iole	Rockwell	US
Moon	Joo-Hee	Hyundai Electronics	KR
Mooy	Win	Mindport	NL

Moran	Francisco	University Politecnica	ES
Mori	Takeshi	NTT	JP
Morimatsu	Eishi	Fujitsu Laboratories	JP
Moriya	Takehiro	NTT	JP
Murakami	Tokumichi	Mitsubishi	JP
Murao	Kohei	Fujitsu Ltd.	JP
Nack	Frank	GMD-IPSI	DE
Nagumo	Takefumi	Sony	JP
Nakamura	Takeshi	Pioneer Electronic Corporation	JP
Nakassis	Tassos	NIST	US
Nakaya	Yuichiro	Hitachi Ltd	JP
Nandhakumar	Ragaraj	LG Electronics Research Center	US
Narasimhan	Sam	General Instruments	US
Naveen	T.	Tektronix	US
Negishi	Shinji	Sony	JP
Nezot	Beatrice	LEP	FR
Nishiguchi	Masayuki	Sony Corporation	JP
Noam	Cohen	VSoft	IL
Nomura	Toshiyuki	NEC	JP
Norimatsu	Takeshi	Matsushita Electric Industrial Co., Ltd.	JP
O'Connell	Kevin	Motorola	US
O'Conner	Noel Edward	Teltec Inc.	IE
Ohm	Jens-Rainer	Heinrich Hertz Institute	DE
Ojala	Pasi	Nokia Research Center	FI
Ostermann	Joern	AT&T	US
Paek	Seungyup	Columbia University	US
Pandzic	Igor	University of Geneva	CH
Panusopone	Krit	General Instrument Corp.	US
Passarelli	Eugene	RIAA	US
Pawson	Dave	Oracle Corporation	US
Peach	Allan	DemoGraFX	US
Penney	Bruce	SMPTE/Tektronix	US liaison
Pereira	Fernando	IST	PT
Perkins	Colin	UCL	UK
Petajan	Eric	Lucent	US
Pierrick	Phillippe	France Telecom - CNET	FR
Pockaj	Roberto	DIST- University of Genova	IT
Powell	Bill	Microsoft	US
Preteux	Francoise	Institute National des Electronique	FR
Puri	Atul	AT&T	US
Purnhagen	Heiko	University of Hannover	DE
Qingmig	Huang	Kent Ridge Digital Labs	SG
Quackenbush	Schuyler	AT&T	US
Rafey	Rick	Sony Electronics, Inc.	US liaison
Rajan	Ganesh	General Instrument Corp.	US
Ramaswamy	Arun	Vela Research	US
Rault	JB	France Telecom - CNET	FR

Reader	Cliff	Reader LLC	KR
Renaud	Earl	Naval Research Lab **	
Ronfard	Reni	INA	FR
Rump	Niels	Fraunhofer Institut IIS-A	DE
Russo	Giuseppe	Fondazione Ugo Bordoni	IT
Sadeh	Ilan	Visnet	IL
Salembier	Philippe	UPC	ES
Satija	Surendra	Intelsat	US liaison
Saw	YS	LG Info and Crown	KR
Schaphorst	Richard	Delta Information Systems	US
Scheirer	Eric	MIT Media Lab	US
Schirling	Peter	IBM	US
Schmidt	Robert	AT&T Labs Research	US
Schreiner	Peter	Scientific-Atlanta	US
Schultens	David	Digital Broadcasting OVS **	
Schuster	Brigitte	Alcatel Telecom Corporate Research Center	FR
Schultz	Stefan	Q-Team	DE
Sekiguchi	Shun-ichi	Mitsubishi Electric Corporation	JP
Senoh	Takanori	Matsushita Electric Industrial Co., Ltd.	JP
Sethuraman	Sriram	Sarnoff Corp.	US
Sezan	Ibrahim	Sharp Labs of America	US
Shamoon	Talal	InterTrust Technologies Intl.	US
Shibata	Masahiro	NHK	JP
Shin	Hyundoo	Samsung Electronics	KR
Shin	Jae-Seob	Samsung Ait	KR
Signes	Julien	France Telecom R&D	US
Silva	Claudio	IBM Research	US
Singer	David	Apple Computer	US
Sodagar	Iraj	Sarnoff Corp.	US
Son	Sehoon	Samsung AIT	KR
Sperschneider	Ralph	Fraunhofer Institut IIS-A	DE
Stepping	Michael	Fern Universitat-Hagen/FTK	DE
Stone	John	Sony Broadcast	UK
Subramanyan	Mahesh	Oracle Corporation	US
Sugiyama	Akihiko	NEC Corporation	JP
Sull	Sanghoon	Korea University	KR
Sullivan	Gary	PictureTel	US
Sun	Huifang	Mitsubishi	US
Suzuki	Teruhiko	Sony	JP
Suzuki	Yoshinori	Hitachi, Ltd.	JP
Swaminathan	Viswanathan	Sun Microsystems	US
Syeda-Mahmood	Tanveer	IBM	US
Takahashi	Kuniaki	Sony Corp.	JP
Takamura	Seishi	NTT	JP
Tan	Thiow-Keng	Panasonic Singapore Laboratories	SG
Takeuchi	Seiichi	Matsushita Electrical Industrial Co., Ltd.	JP
Tanaka	Naoya	Matsushita Communication Ind.	JP

Taubin	Gabriel	IBM Corp.	US
Teichmann	Bodo	Fraunhofer Gesellschaft	DE
Tescher	Andrew	Lockheed-Martin	US
Thebault	Betrand	France Telecom - CNET	FR
Thom	David	Mitsubishi Electronic America Inc.	US
Thomas	Graham	BBC R&D Dept.	UK
Toguri	Yasuhiro	Sony Corporation	JP
Torres	Jose	INESC-Porto	PT
Tsushima	Mineo	Matsushita Electric Industrial Co., Ltd.	JP
Tsutsumi	Masahito	Victor Company of Japan	JP
Vaananen	Mauri	Nokia Research Center	FI
Vaananen	Riitta	Helsinki University of Technology	FI
van Beek	Peter	Sharp Labs of America	US
Van der meer	Jan	Philips Electronics	NL
VanLoo	James	Sun Microsystems	US
Varsa	Viktor	Nokia Research Center	FI
Vasudevan	Vinod	Kent Ridge Digital Labs	SG
Vercoe	Barry	MIT Media Lab	US
Vetro	Anthony	Mitsubishi Electric	US
Vetter	Michael	TASC Inc.	US liaison
Vollmer	Jens	Bosch	DE
Vucher	Guez	SCPP	FR
Wang	Lance	Sony	US
Watanabe	Toshiaki	Toshiba	JP
Ward	Liam	Teltec Inc.	IE
Watanabe	Hiroshi	NTT	JP
Westerink	Peter	IBM	US
White	Tom	M101 Mfrs. Assoc.	US liaison
Wikman	Birgitte	Teracom	SE
Winder	Simon	Microsoft	US
Wollborn	Michael	University of Hannover	DE
Yagasaki	Yoichi	Sony	JP
Yang	Chao-Kung	Hughes Electronics	US
Yon	Dominique	CISAC	FR
Yoo	Seong-Joon	ETRI	KR
Yoshida	Masaru	Pioneer	JP
Zamora	Javier	XBIND, Inc.	US
Zeug	Michael	Iterated Systems	US
Zhang	Ya-Qin	Sarnoff Corporation	US
Zhou	Minhua	Texas Instruments	US

## Annex 2 Agenda

1. Opening
2. Roll call of participants
3. Approval of agenda
4. Allocation of contributions
5. Communications from Convenor
6. Report of previous meetings
7. Processing of NB Position Papers
8. MPEG Phase 2
  - 8.1 MPEG-2 parts
    - 8.1.1 Revision of MPEG-2 Systems
    - 8.1.2 Revision of MPEG-2 Video
  - 8.2 Verification of MPEG-2
  - 8.3 Amendments
    - 8.3.1 Systems
    - 8.3.2 Video
    - 8.3.3 Audio
    - 8.3.4 Conformance
    - 8.3.5 Technical Report
    - 8.3.6 DSM-CC
  - 8.4 Corrigenda
    - 8.4.1 Conformance
  - 8.5 Workplan
9. MPEG Phase 4
  - 9.1 Version 1
    - 9.1.1 Patent statements
    - 9.1.2 Final Committee Draft
      - 9.1.2.1 System
      - 9.1.2.2 Video
      - 9.1.2.3 Audio
      - 9.1.2.4 Reference software
      - 9.1.2.5 DMIF
    - 9.1.3 Verification Tests
      - 9.1.3.1 Systems
      - 9.1.3.2 Video
      - 9.1.3.3 Audio
    - 9.1.4 Quality of service
    - 9.1.5 Conformance Testing
      - 9.1.5.1 System
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- 10. MPEG Phase 7
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- 11. Overall WG11 workplan
- 12. Explorations
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- 14. Administrative matters
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  - 14.2 Promotion of MPEG
- 15. Organisation of this meeting
  - 15.1 Tasks for subgroups
  - 15.2 Room allocation
  - 15.3 Joint meetings
- 16. Planning of future activities
- 17. Resolutions of this meeting
- 18. A.O.B
- 19. Closing



Annex 3  
Documents submitted

No.	Source	Title
3856	Pete Schirling	Document Register for 45th Meeting in Atlantic City, NJ(US)
3857	Vahe Balabanian	DMIF July 1998 (Dublin) Meeting Report
3858	Peter Hoddie	Comments on M4F Intermedia Format VM
3859	Alvar Bray, Paul Garrett, Andrea Barbieri	Current Status of PACT 3D player
3860	Zvi Lifshitz	IPMP Development Kit Guide
3861	Touradj Ebrahimi, Charis Christopoulos	Can MPEG-7 be used beyond data-base applications?
3862	ZviLifshitz	IM1 DMIF Development Kit Version 1.2
3863	ITU-R (via the SC 29 Secretariat)	Liaison Statement from ITU-R (SC 29 N 2720)
3864	visual CD editors	Study on the visual FCD incorporating NB comments received in Dublin
3865	Visual CD editors	List of edits incorporated in study on visual CD doc 3864
3866	Pasi Ojala, Henri Toukoma	Report on the MPEG-4 speech codec verification tests
3867	F.Pereira (editor)	Revised MPEG-4 Applications
3868	Olivier Avaro, Carsten Herpel, Julien Sign's	MPEG-4 Systems Profiles/Levels Specification
3869	Minhua Zhou., Raj Talluri	Simplified extended padding
3870	Eric Scheirer, Sang-Wook Kim, Martin Dietz	Results of the MPEG-4 Audio verification test - Audio on Internet
3871	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 13818-10 (SC 29 N 2734)
3872	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-1
3873	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-2
3874	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-3
3875	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-5
3876	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-6
3877	SC 29 Secretariat	Summary of Voting on ISO/IEC 13818-1/PDAM6
3878	SC 29 Secretariat	Summary of Voting on ISO/IEC 13818-4/PDAM2
3879	Martin Dietz, Ralph Sperschneider	Core Experiment Proposal on Huffman Codeword Reordering Refinement for MPEG2-AAC
3880	Martin Dietz, Ali Nowbakht-Irani	Core Experiment Proposal on Error Resilient Scalefactor Coding for MPEG2-AAC
3881	Yingwei Chen, Robert Cohen, Hayder Radha, Cecile Dufour, Weiping Li, Avideh Zakhor, Samson Cheung, Brigitte Schuster, Jie Liang	Description of Experiment on Fine Granular Video Scalability
3882	Vahe Balabanian (Nortel), IETF Transport Area	MPEG-4 Operation with IETF Transport Area Standards
3883	Vahe Balabanian (Nortel), IETF-AVT Working Group	MPEG-4 Transport using RTP: input to the 14496-1 and 14496-6 FCD Ballots
3884	Guido Franceschini	Revised introduction for DMIF
3885	Guido Franceschini	DMIF instance for IP multicast
3886	Jean-Claude Dufourd	Comments on the Systems FCD
3887	Alvar Bray, Andrea Barbieri	Pact 3D Player System
3888	Andrea Barbieri, Alvar Bray	Preliminary Profiling of Pact 3D Player System
3889	Yoo-Sok Saw, Chul-Heum Yon, Jung-Rhyul Lee, Yong-II Choi	CONTRAXPAND(TM) Video buffering
3890	Yoo-Sok Saw, Chul-Heum Yon, Jung-Rhyul Lee, Yong-II Choi	Pin-point re-transmission for improved video error resilience using CONTRAXPAND(TM) Video buffering
3891	Shipeng Li, Hung-Ju Lee, Iraj Sodagar, Ya-Qin Zhang	Description of Mini Core Experiment on Scalable Shape Coding for Visual Texture Coding
3892	Fernando Pereira	Some useful data about Portuguese MPEG-7 content
3893	Fernando Pereira	Portuguese Votes to MPEG-4 FCD
3894	Fernando Pereira	Portuguese National Body Positions

No.	Source	Title
3895	A. Eleftheriadis	Proposal for Reorganization of MPEG-4 Systems FCD Object Descriptor Structures
3896	Martin Dietz	Report from the audio error resilience ad-hoc meeting in Erlangen, September 7, 1998
3897	Ralf Funken	Error protection for the MPEG-4 Wideband CELP VM coder
3898	D.Curet, C.Islas	A graphical representation of MPEG4 SL as an informative annex.
3899	D.Curet,C.Islas	MPEG4 ESI enhancements for SL management
3900	D.Curet, C.Islas	MPEG4 SL and FlexMux management, amendments to the DAI
3901	D.Curet, C.Islas	MPEG4 SL and FlexMux management: fixed length SL_PDU
3902	C.Guillemot(INRIA),P.Christ (RUS),D.Curet (F.T.)	Proposed amendments to the DAI for QOS monitoring support
3903	Cecile Dufour, Isabelle Corset	Request for a delay of the Main Video Object Profile to Version 2
3904	Liam Ward (Teltec), Julien Signes (France Telecom)	Proposed editorial and clarification improvements to BIFS Specification
3905	Mark Buxton	MPEG-7 Software Experimentation Model Architecture
3906	Vahe Balabanian	DSM-CC ISO/IEC 113818-6 IS Corrigenda for DMIF dsmccType
3907	Joern Ostermann, Yao Wang, Gabriel Abrantes	Comments on Visual FCD (Phonem/Bookmark to FAP Converter)
3908	Renaud Cazoulat	french national body comments on BIFS specs.
3909	Jean-Bernard RAULT	Request for a specific profile or level to address Digital AM Broadcasting applications
3910	Takehiro Moriya, Oliver Kunz	Result of the MPEG-4 Audio Verification tests -speech part at NTT and FhG
3911	Takehiro Moriya, Akio Jin, Takeshi Norimatsu, Mineo Tsushima, Tomokazu Ishikawa	Reprts on the AAC-TwinVQ convergence work after the Dublin meeting
3912	USNB	USNB Contribution - Communication with AICI
3913	USNB	USNB Contribution - MPEG-2 Video Maximum Line Count
3914	USNB	USNB Contribution - IPMP in MPEG-4 version 1
3915	USNB	USNB Contribution - MPEG-2 Compliance bitstreams
3916	USNB	USNB Contribution - Timing of FDIS ballot for 14496-5
3917	USNB	USNB Contribution - Upstream Server Message Control
3918	USNB	USNB Contribution - MPEG-7 Proposal Evaluations
3919	USNB	USNB Contribution - Revision of 13818-1 and 13818-2
3920	Beatrice Nezot, Philippe Gentric	Accurate GOV for random access
3921	Steve Demko, Michael Zeug	Testing Methodologies for Image Indexing and Content Based Retrieval
3922	Gary Demos	Results of ALC Tape Experiments
3923	Gary Demos	ALC Syntax: Semantics
3924	KNB	A Study on the FCD 14496-1 Systems
3925	KNB	Comments on MPEG-4 FCD 14496-2 and 14496-5
3926	KNB	Comments on ISO/IEC FCD 14496-3 (Audio)
3927	The National Body of Japan	JNB Comment on New Profile for MPEG-4 Visual Version 2
3928	Shigeru Fukunaga (Oki), Hideaki Kimata (NTT), Eishi Morimatsu (Fujitsu)	New Profile for MPEG-4 Visual Version 2
3929	Jean-Claude Dufourd	Report of AHG on Systems Conformance
3930	Jean-Claude Dufourd, Souhila Boughoufalah, Frederic Bouilhaguet	Update of 2D BIFS editor
3931	Jean-Claude Dufourd	Systems conformance WD 1.1
3932	Jean-Claude Dufourd	Review of MP4 VM and suggestions
3933	ITTF via the SC 29 Secretariat	Table of Replies on ISO/IEC 13818-1:1996/FDAM 5
3934	Munchurl Kim,, Hyung Lee,, Myoung Ho Lee, and Chieteuk Ahn	Grand experimental results for the combined automatic segmetation algorithm

No.	Source	Title
3935	Munchurl Kim,, Jinsuk Kwak,, Jun Geun Jeon,, Myoung Ho Lee,, and Chieteuk Ahn	User's guide for a user-assisted video object segmentation tool
3936	Jinsuk Kwak,, Jun Geun Jeon, Munchurl Kim,, Myoung Ho Lee,, Chieteuk Ahn, and Jae Gark Choi	Partial experimental results for user-assisted video object segmentation with a Graphical User Interface
3937	Rob Koenen, Ralf Funken	Votes and Comments to FCD of 14496-1, -2, -3, -5, -6 (MPEG-4)
3938	Sang-Wook Kim, Martin Dietz	Report of the Ad-hoc Group on MPEG-4 Audio Verification tests
3939	Marc Escher, Igor Pandzic	Results of Core Experiment on mesh calibration
3940	Giorgio Zoia, Maurizio Maneri, Ulrich Horbach	Proposed enhancements to Structured Audio
3941	Han-kyu Lee,, Munchurl Kim, and Jinwoong Kim	A pose descriptor for Human poses and content based retrieval by pose description
3942	Auffret Gwendal	ACTS DICEMAN: a european project for the creation of MPEG-7 descriptions
3943	Zvi Lifshitz	Status of Im1 Software
3944	Zvi Lifshitz	Implementation status of the workplan of AHG on Im1 Software Platform
3945	P. G. Schreiner III, D. J. Meares	Audio Subgroup--Task Group Mandates for Atlantic City meeting
3946	Torsten Mlasko, Christian Mittendorf	Report on the MPEG-4 HVXC speech coder listening tests with half size codebooks and half size quantized codebooks
3947	Vahe Balabanian, Uhlrich Mayer	Update Proposal for the DMIF Conformance Specification
3948	Jack Lacy, Talal Shamoon, For the IPMP AHG	MPEG-4 IPMP Test Results
3949	H.Imaizumi, Y.Kaneko, S.Sakaida, Y.Shishikui, Y.Kanatsugu	Description of Metadata by using OCI_Descriptor for MPEG4 Ver.2
3950	German National Body (DIN)	German National Body Positions
3951	Mladen Berekovic, Kilian Jacob, Peter Pirsch	Architecture of a dedicated hardware module for shape decoding
3952	Jorgen Kiderud	Normative DAI Syntax
3953	Jorgen Kiderud	Normative DAI Syntax Software
3954	Michael Frater	Australian National Body Comments on FCD 14496
3955	Whoi-Yul Kim, MunChurl Kim, YoungSum Kim	Mpeg-7 Applications
3956	Sanae Hotani, Toshiro Kawahara, Toshio Miki	The test results of check phase on Huffman Codeword Reordering Refinement for AAC
3957	Sanae Hotani, Toshiro Kawahara, Toshio Miki	The test results of check phase on error resilient scalefactor coding for AAC
3958	SC 29 Secretariat	Late Vote on ISO/IEC FCD 14496-5 (SC 29 N 2752)
3959	Masayuki Nishiguchi, Yuji Maeda, Akira Inoue	Proposed modifications of HVXC codebooks and listening test results
3960	Shinichi Sakaida, Hiroyuki Imaizumi, Yoshiaki Shishikui, Eisuke Nakasu, Yasuaki Kanatugu	Additional explanation for the default values of colorimetry in JNB's MPEG-4 Visual FCD ballot
3961	Hiroyuki Imaizumi, Shinichi Sakaida, Wentao Zheng, Osamu Mizumo, Yoshiaki Shishikui, Yasuaki Kanatugu	Experimental results of 4:2:2 chrominance format video encoding for MPEG-4 studio profile
3962	Hiroyuki Imaizumi, Shinichi Sakaida, Wentao Zheng, Yoshiaki Shishikui, Yasuaki Kanatugu	Experimental results of 10-bit video encoding for MPEG-4 studio profile
3963	Youngjik Lee, Jung-Chul Lee, Jae-Woo Yang	Comments on the MPEG-4 Audio Markup TTS WD
3964	Jung-Chul Lee, Youngjik Lee, Jae-Woo Yang	Conformance of the MPEG-4 Audio TTS

No.	Source	Title
3965	Michael Frater	Report of the AHG on error resilience verification in MPEG-4 Video
3966	Martin Dietz, Ali Nowbakht-Irani	Core Experiment Results on Error Resilient Scalefactor coding for AAC
3967	Martin Dietz, Ralph Sperschneider	Core Experiment Results on Huffman Codeword Reordering Refinement for AAC
3968	T.K. Tan	Report of the Adhoc group on Software Integration and Verification in MPEG-4 video (N2346)
3969	C.Y. Law	Simplified Proposal for the Valuator Node
3970	Jens-Rainer Ohm, Michael Frater, Jörn Ostermann, Iraj Sodagar, T.K. Tan	Report of AHG on Core Experiments in MPEG-4 Video
3971	Jens-Rainer Ohm, Ralf Buschmann, Sila Ekmekci	Proposal for Multiple Alpha Channel Syntax in MPEG-4 Version 2
3972	Jens-Rainer Ohm, Sila Ekmekci	Report on Multifunctional Core Experiment M1
3973	Jens-Rainer Ohm, Wolfram Liebsch, Bela Makai, Karsten Müller, Behnam Saberdest, Detlef Zier	Concepts for Database Linking Mechanisms in MPEG-7
3974	Ralf Buschmann	"Results on Multifunctional CE M1"
3975	Jose Maria MARTINEZ, Jesus BESCOS, Jose Manuel MENENDEZ, Julian CABRERA, Guillermo CISNEROS	A Video Information System for the Audio-Visual Market. The HYPERMEDIA trial
3976	Eric Scheirer	Three Informative Annexes for MPEG-4 Structured Audio
3977	Eric Scheirer, Lee Ray	Report of the AHG on MPEG-4 Structured Audio
3978	Ralf Funken	Results of an informal test assessing the quality and complexity of MPEG-4 Narrowband CELP modes
3979	Swedish National Body	SNB Contribution, MPEG-2 Video Maximum Line Count
3980	Swedish National Body	SNB Contribution, Comment on the use of a complexity formula for video
3981	Swedish National Body	SNB Contribution, Comment on the inclusion of new BIFS
3982	Swedish National Body	SNB Contribution, Comment on the inclusion of IPMP
3983	Swedish National Body	SNB Contribution, Comment on flexibility and interoperability
3984	Swedish National Body	SNB Contribution, Comments on the Visual profiles
3985	Swedish National Body	SNB Contribution, Comment on the problem of getting lost in MPEG
3986	David Thom, Heiko Purnhagen	Audio web page activity
3987	Yingwei Chen	Summary of mini experiment on fine granular video scalability
3988	Yingwei Chen, Hayder Radha, Robert A. Cohen	Philips Research, U.S.A. results of ME on fine granular video scalability
3989	Weiping Li	Bit-Plane Coding of DCT Coefficients for Fine Granularity Scalability
3990	Weiping Li	Bit-Plane Coding of DCT Coefficients for Studio Production Profile
3991	Sen-ching Samson Cheung, Avideh Zakhor	Matching Pursuit Coding for Fine Granular Video Scalability
3992	Minhua Zhou, Weiping Li	Summary of Visual Conformance Discussions
3993	Takefumi Nagumo, Yoichi Yagasaki	Results of the verification test for temporal scalability in simple scalable profile
3994	Takefumi Nagumo, Yoichi Yagasaki	Results of Object based spatial scalability :CE B1.2
3995	Eishi Morimatsu	Performance Confirmation of Dynamic Resolution Conversion
3996	V.V.Vinod	MPEG-7 Draft Proposal Package Description
3997	Yo-Sung Ho, Jeong-Hwan Ahn	Geometry Compression of 3D Meshes using Adaptive Quantization for Prediction Errors
3998	Jeong-Hwan Ahn, Yo-Sung Ho	Results of Core Experiment M2 on 3D Model Coding
3999	Aamir Saeed Malik, Yo-Sung Ho	Addition to MPEG-7 Applications Document
4000	Joon Ho Song, Cheol Soo Park, Jae-won Chung, Joo-hee Moon	A new method for enhancing the SA-DCT coding efficiency
4001	Jong Deuk Kim, Jae-won Chung, Hae	Results of Mini CE on Scalable Shape Coding for Visual

No.	Source	Title
	Kwang Kim, Joo-hee Moon	Texture Coding
4002	Norio Ito, Hiroyuki Katata	A Result of Core Experiment F1: Wavelet Tiling
4003	Tomoko Aono, Hiroyuki Katata, Norio Ito	Result of The Verification Test for Temporal Scalability
4004	Anne-Claude de Chauveron, Jean Gobert, Andrea Barbieri	Parameters for shape: alpha_threshold and conversion ratio
4005	Ed Hartley	UML: A preliminary DDL for the MPEG-7 PPD
4006	Ed Hartley Lancaster University,, Jens-Rainer Ohm Heinrich-Hertz-Institut	Introduction of MPEG-7 Systems Requirements Document
4007	Jens Spille	Report of Ad Hoc Group on MPEG-4 Audio Conformance
4008	Marion Benetiere, Cecile Dufour	Matching Pursuit Residual Coding for Video Fine Granular Scalability
4009	Frank Nack	MPEG-7 Requirements Document V.7
4010	Frank Nack	MPEG-7 Context and Objectives V.10
4011	Frank Nack, Ed Hartley	Report of the Ad-hoc Group on MPEG-7 Requirements
4012	Giorgio Zoia	A possible SA subset for the AudioFX node
4013	Adam Lindsay	MPEG-7 Applications Document v. 7
4014	Adam Lindsay	Audio Issues for MPEG-7 AHG Report
4015	Adam Lindsay	Descriptor and Description Scheme Classes
4016	Adam Lindsay	MPEG-7 Audio FAQ contributions
4017	Alvar Bray, Paul Garrett, Andrea Barbieri, Ron Laborde	Release Notes for PactPlayer - Release 03
4018	Alvar Bray, Paul Garrett, Andrea Barbieri, Ron Laborde	PactPlayer release 03 source code
4019	Alvar Bray, Paul Garrett, Andrea Barbieri, Ron Laborde	PactPlayer release 03 test code
4020	Alvar Bray, Paul Garrett, Andrea Barbieri, Ron Laborde	Technical Introduction to the PactPlayer
4021	Brigitte Schuster	Fine Granular Scalability with Wavelets Coding
4022	Niels Rump	Ad-hoc report on MPEG-4 IPMP
4023	UK National Body	Access to AAC IPR and Licence Information
4024	S. Jeannin, V. V. Vinod, S. Paek	Report of the Ad Hoc Group on MPEG-7 Evaluation and Development
4025	Jie Liang, Jun Yu, Yong Wang, Mandyam Srinath, Minhua Zhou	Fine Granularity Scalable Video Coding using Combination of MPEG4 Video Objects and Still Texture Objects
4026	I. Moccagatta, S.L. Regunathan, O. Al-Shaykh, H. Chen	Preliminary results of the core experiment on error resilience for
4027	Dave Pawson	Report of the AHG on the mp4 file format
4028	Dave Pawson	Preliminary software for mp4 implementation in IM1
4029	Dave Pawson	Preliminary software for an mp4 parser
4030	v. Balabanian, A.Basso, M.R. Civanlar	Experimental MPEG-4 Profile for IETF
4031	Xuemin Chen,, Krit Panusopone,, Ajay Luthra	Results of bitstream verification for MPEG-4 interlace mode
4032	Teruhiko Suzuki	Revised test conditions of video verification test on scalability
4033	Teruhiko Suzuki, Michael Wollborn	Report of ad-hoc group on video verification test
4034	David Singer	Contact points between systems and elementary streams (the ?matrix?)
4035	David Singer	Revised RTP Hint Track Format
4036	Kevin O'Connell	Report of MPEG-4 Version 1 Level Definition AHG
4037	Xuemin Chen	Some test results on simplified extended padding
4038	Alexis M. Tourapis, Oscar C. Au, Ming-Lei Liou	Fast Motion Estimation using Circular Zonal Search
4039	Viswanathan Swaminathan, Gerard Fernando, James Vanloo	Requirements for MPEG-J
4040	Se-Hoon Son, Jae-Seob Shin (Samsung AIT), Jae-Won Chung (Hyundai)	Description of Mini CE on Scalable Shape Coding for Visual Texture Coding using version 2 WD tool
4041	Se-Hoon Son, Dae-Sung Cho, Jae-Seob	Experimental Results on Scalable Shape Coding for Visual

No.	Source	Title
	Shin	Texture Coding using version 2 WD tool
4042	Jae-Seob Shin, Se-Hoon Son, Dae-Sung Cho, Yang-Seock Seo	Preliminary Results on Fine Granular Video Scalability for Arbitrary Shaped Object
4043	Yong Han Kim, Ho-Jang Lee, In-Sung Park	Crosscheck and Bitstream Exchange Results of Core Experiment M2: Geometry Coding Using PRVQ
4044	The National Body of Japan	Request for a Technical Corrigendum to ISO/IEC 13818-4
4045	Tom Geary (Rapporteur Q.11/16)	Liaison to ISO/IEC regarding status of inclusion of code points in H.245v5 for signalling MPEG-4 Visual Standard capability
4046	Giuseppe Russo	Core Experiment N2: Automatic Segmentation Techniques Comparisons
4047	Giuseppe Russo	Results of FUB user assisted segmentation environment
4048	Giuseppe Russo, Stefania Colonnese	Core Experiment N2: Complexity evaluation of FUB automatic segmentation method
4049	Giuseppe Russo, Caterina Ciotti	Core Experiment N2: Evolution of FUB Automatic Segmentation Technique
4050	E. S. Jang, S. J. Kim, M. J. Han, S. Y. Jung, Y. S. Seo	Results of CE M5
4051	S. Y. Jung, M. J. Han, S. J. Kim, E. S. Jang, Y. S. Seo	Results of CE M2
4052	Viswanathan Swaminathan , Gerard Fernando	Description of PersonalJava and EmbeddedJava Platforms
4053	Gerard Fernando	Report of MPEG-J AHG
4054	Jin Soo Choi, Jinyoung Yang, Myoung Ho Lee, Chieteuk Ahn	Geometry coding using PRVQ
4055	Jin Soo Choi, Jinyoung Yang, Myoung Ho Lee, Chieteuk Ahn	Results of Core Experiment M2: Geometry coding using PRVQ
4056	The National Body of Japan/Itaru Kaneko	A Comment on IPMP Verification Model
4057	Itaru Kaneko	Possible enhancement of CMP(IPMP)
4058	Francoise Preteux, Titus Zaharia, Mircea Curila, Sorin Curila, Gerard Mozelle	Geometry Compression of 3D Meshes: Results on Core Experiment M2
4059	Francoise Preteux	Liaison CEN/ISSS/MMI - MPEG-7
4060	Toshiro Kawahara, Sanae Hotani, Toshio Miki	Revision of MPEG-4 Audio Version 2 WD (EP Tool)
4061	Frank Bossen	Description of Core Experiments for 3DMC
4062	T.K.Tan, Roger G.R. Hu	Proposal for Complexity Cost Function Verification in Video Conformance
4063	Jiankun Li, C.-C. Jay Kuo	Coding of Mesh Geometry by Successive Quantization
4064	Takeshi Mori, Kazunaga Ikeda, Takehiro Moriya, Akio Jin, Naoki Iwakami	Designs of error protection and concealment schemes for MPEG-4 TwinVQ coder
4065	Kuniaki Takahashi, Yoichi Yagasaki	ALC experiment results
4066	Osamu Sunohara, Yoichi Yagasaki	Simulation results of 4:2:2/4:4:4 interlaced video
4067	Yoichi Yagasaki(Sony), Ajay Luthra(General Instrument)	Adhoc Group Report of Requirement Study for High Quality Application
4068	Yoichi Yagasaki(Sony)	Additional Requirements for High Quality Application (Video)
4069	Kai-Kuang Ma and Prabhudev I. Hosur	The Third Status Report of Core Experiment on Fast Block-Matching Motion Estimation (Q4a)
4070	Tolga K. Capin, Joaquim Esmerado, Srikanth Bandi	Results of Core Experiments Body Animation
4071	Osamu Sunohara, Yoichi Yagasaki	Request for the study of multiple alpha channels coding
4072	Toshiyuki Nomura, Masahiro Iwadare	Listening test results for MPEG-4 HVXC coder modification
4073	Toshiyuki Nomura, Masahiro Iwadare	Listening test results to evaluate the fixed-point codebooks and operation in the MPEG-4 CELP coder
4074	Bo Burman	Report of AHG on Mobile Network Connections
4075	Bo Burman	Mobile Network Mappings Walkthrough
4076	Gauthier Lafruit, Toon Gijbels, Andy Scherpenberg, Tom Huybrechts, Jan	Complexity analysis of OpenGL 3D rendering for Computational Graceful Degradation

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	Bormans	
4077	Naoya Tanaka	Listening test results of MPEG-4 speech coders with fixed-point codebooks
4078	Naoya Tanaka	Proposed changes to the FCD text with regard to the PICOLA speed change
4079	Jens Vollmer	Bi-directional communication based on H.324 and MPEG-4
4080	The National Body of Japan	JNB Comment on Main Visual Object Type and Main Visual Profile
4081	Masayuki Nishiguchi, Heiko Purnhagen	Listening test results of HILN and TwinVQ at 6.0kbps
4082	Bernhard Grill, Heiko Purnhagen	Report of the AhG on MPEG-4 Audio CD and Reference Software Progression
4083	Roland Mech, Michael Wollborn	Automatic Segmentation of Moving Objects (Final Results of Core Experiment N2)
4084	M. Mattavelli	Report on the ad-hoc group on decoder QoS
4085	Yoshinori Suzuki (Hitachi,Ltd.), Seishi Takamura (NTT), Yuichiro Nakaya (Hitachi,Ltd.)	Results of experiments and bitstream verification on the combination of Global Motion Compensation with various tools
4086	Heiko Purnhagen	Uni Hannover listening test results for HVXC codebook modifications
4087	Heiko Purnhagen, Bernd Edler	On HILN and TwinVQ performance in the AudioOnInternet Verification Test
4088	VRML/C via the SC 29 Secretariat	Liaison Statement from VRML/C to SC 29/WG 11 (SC 29 N 2761)
4089	S. Jeannin, Requirements group	MPEG-7 Evaluation Process Document
4090	Andreas Hutter (TU Munich), Michael Wollborn (Uni Hannover)	Improved AC/DC Prediction tool without division operations
4091	Frank Bossen	Putting the pieces of the 3DMC puzzle together
4092	Javier Zamora, Lai-Tee Cheok, Alexandros Eleftheriadis , Hari Kalva, Li Tang	MPEG-4 Remote Interactive Application through IP Networks: Demonstration Outline
4093	Liam Ward	Dublin Meeting Debrief
4094	Javier Zamora, Jean Francois Huard	DMIF Multicast Proposal
4095	NEMESIS 2nd Phase, J. Figue, P. Kauff, B. Maujean, H. Nicolas, J.-M. Vezien	On the Use of a MPEG-4 Studio Profile for Professional Post-Production
4096	Anthony Vetro, Huifang Sun	Results of object-based video verification tests
4097	Anthony Vetro, Huifang Sun	Core experiment Q5: Intelligent pre-quantization for reduced encoder complexity
4098	Anthony Vetro, Huifang Sun	Experiments with lossy shape coding
4099	Rémi Ronfard	A presentation of INA's response to the MPEG7 Call for Test Material
4100	Vahe Balabanian	The Role of DMIF in Support of RTP MPEG-4 Payloads
4101	Vahe Balabanian	The Use of MPEG-4/DMIF and RSVP with Integrated Services
4102	Vahe Balabanian	The Role of DMIF with RTSP and MPEG-4
4103	Dr. Norm Badler, Deepak Tolani, Liwei Zhao	Body Animation at UPENN (MPEG4 contributions)
4104	Deepak Tolani, Liwei Zhao, Norm Badler	Body Animation at UPENN (MPEG4 contributions)
4105	Torsten Mlasko, Torsten Prange, Christian Mittendorf	Report on quantization of speechcoder tables
4106	Sylvie Jeannin	Visual descriptors evaluation: precisions and suggestions
4107	Jens-Rainer Ohm, Sven Bauer, Andreas Engelsberg, Alexander Erk, Bjorn Klock, Aasmund Sandvand	Broadcast Application and Requirements for MPEG-7
4108	Deepak Tolani, Liwei Zhao, Norm Badler	Results of Core Experiments
4109	Yuval Fisher,, Homer Chen,, Wei Wu	The MPEG4 Script Node
4110	Giorgio Zoia	Level definition examples for SA main profile

No.	Source	Title
4111	Giorgio Zoia, Laurent LeBourhis	About AudioBIFS level definitions
4112	Antonio Carvalho	DMIF instance with network independence
4113	Martin Dietz	Request for modification or extension of the MPEG-4 Audio scaleable profile according to the needs of Digital Narrowband Broadcasting
4114	Gabriel Taubin, Andre Gueziec, Claudio Silva	Compression of Non-Manifold meshes with Topological Surgery
4115	Martin Dietz, Toshio Miki	Report of the Ad-hoc group on MPEG-4 audio error resilience for version 2
4116	Gabriel Taubin (Editor)	SNHC Verification Model version 9.0
4117	Gabriel Taubin, Andre Gueziec, Claudio Silva	SNHC 3D Mesh Coding Software
4118	Gabriel Taubin, Andre Gueziec, Claudio Silva	Results of Core Experiments on 3D Mesh Coding
4119	Mauri Vaananen, Juha Ojanpera	Additional information on the LTP tool in MPEG-4 Audio T/F part
4120	Gianluca De Petris (CSELT), Roberto Becchini (SIA)	Comments to MPEG-J VM 3.1
4121	Roberto Becchini (SIA)	MPEG-J Network API - Integration model and status of implementation
4122	Roberto Becchini (SIA), Barbara Silano (SIA)	Review and re-addressing of the proposed Network APIs for MPEG-J
4123	BIFS AhG	Report of the BIFS AHG
4124	Julien Signes	Using BIFS and MPEG-4 in a telecommerce application
4125	Julien Signes, Olivier Ondet	Results of BIFS compression
4126	Julien Signes	Editorial Help for US NB resolutions
4127	Iole Moccagatta, Osama Alshaykh, Homer Chen	Technical evidences in support of USNB comment 13198-70, clauses
4128	Viswanathan Swaminathan, Shivakumar Govindarajapuram, Gerard Fernando	Timing APIs for MPEG-J
4129	Viswanathan Swaminathan, Shivakumar Govindarajapuram, Gerard Fernando	Exception Hierarchy for MPEG-J APIs
4130	Viswanathan Swaminathan, Yihan Fang, Gerard Fernando	Implementation Status of Sun/Columbia and Outstanding Issues In MPEG-J
4131	Iole Moccagatta, Osama Alshaykh, Homer Chen	MPEG-4 verification test for low bit rate - Coastguard pre-screening results
4132	Dinkar Bhat	On Representing Video Structure using RDF
4133	D. Lyons	Status of Body Animation Quantization Core Experiments
4134	R. L. Schmidt, A. Puri, B. G. Haskell	Implementation of advanced BIFS node for keying
4135	Wendi Rabiner, Madhukar Budagavi, Raj Talluri	Proposed extensions to DMIF for supporting unequal error protection of MPEG-4 video over H.324 mobile networks
4136	Weiping Li	Results on Scalable Shape Coding for Visual Texture Coding
4137	Touradj Ebrahimi, Pete Doenges	Report of ad hoc group on 3D model coding
4138	T. Ebrahimi, C. Horne, E. Jang, Y. Nakaya	Report of ad hoc group on visual standard editing
4139	J. Herre, E. Allamanche, R. Geiger, T. Sporer	Proposal For A Low Delay MPEG-4 Audio Codec based on AAC
4140	Eric Petajan, Tolga Capin	FBA adhoc Report
4141	Eric Petajan, Chandrajit Bajaj	Proposal for Object Mirroring in 3D Model Coding
4142	Chuck Lueck, David Thom, Martin Dietz	Report of the Ad-Hoc Group on AAC Conformance and Technical Report
4143	Jan Bormans	Report on the Ad-hoc Group on Computational Graceful Degradation
4144	Zvi Lifshitz	BIFS/OD Encoder Software Release 1.4
4145	Zvi Lifshitz	MPEG-4 Player Core Code Release 1.4
4146	Zvi Lifshitz	IM1 Software Platform AHG Report
4147	Francoise Preteux, Marius Preda, Gerard	Body Animation, BAPs Coding and Bitstream Exchanges



No.	Source	Title
	Mozelle	
4148	Zvi Lifshitz	MPEG-4 Off-line Multiplex Software Release 1.4
4149	P. van Beek, I. Sezan, M. Tekalp	Proposed changes to MPEG-4 Visual FCD and Systems FCD
4150	P. van Beek, I. Sezan, M. Tekalp	Preliminary results for SNHC CE M6
4151	Iraj Sodagar, Hung-Ju Lee, Paul Hatrack, Shipeng Li, Bing-Bing Chai	Bitstream exchange result for visual texture coding
4152	Shipeng Li, Iraj Sodagar, Hung-Ju Lee	Results of mini core experiment on scalable shaping coding for visual texture coding
4153	Bing-Bing Chai, Iraj Sodagar	Report of results on CE-E16: Error Resilient Still Texture using a Packet Approach
4154	Hung-Ju Lee, Iraj Sodagar	Verification of result on CE-F1: Tiling function for visual texture
4155	Peter Westerink	Comments and suggestions for the mpeg-4 file format
4156	Tihao Chiang, Huifang Sun	Report of Ad Hoc Group on Encoder Optimization
4157	Hung-Ju Lee, Tihao Chiang	Results for MPEG-4 video verification test using rate control
4158	Hung-Ju Lee, Tihao Chiang	Verification of result on CE-Q4a: Core Experiment on Fast Block-Matching Motion Estimation
4159	Hung-Ju Lee, Tihao Chiang	Verification of result on CE-Q5: Core Experiment on Encoder Complexity based on Intelligent Pre-Quantization
4160	Joern Ostermann	Proposal for an Informative Annex on binary shape coding
4161	Joern Ostermann, Gabriel Abrantes	Implementation of TTS and Face Animation in the IM1 3D player
4162	Norio Ito	A Result of Core Experiment E16: Error Resilience for Still Texture
4163	SC 29 Secretariat	Late Vote and Comments on ISO/IEC FCD 14496-6 (SC 29 N 2763)
4164	Panos Kudumakis	MPEG-4 IPMP comments
4165	Akihiko Sugiyama, Masahiro Serizawa	Request to support MPEG-4 Audio in H.324 terminals
4166	Panos Kudumakis	Comments on MPEG-4 IPMP
4167	Olivier Avaro, Rob Koenen	AhG Report on MPEG-4 and the Web
4168	Mr. Takayuki Kunieda, Ms. Yuki Wakita	Movie Indexing System
4169	SC 29 Secretariat	Late vote on ISO/IEC 13818-1/PDAM 6 (SC 29 N 2783)
4170	Hiroshi Inoue	Synchronization for IPMPS
4171	Hiroshi Inoue	Expanded Verification Model for IPMPS
4172	Eric Petajan, Chandrajit Bajaj, Euee Jang, Cliff Reader	Integration of Error Resilient M5 Layering Scheme with M1

## Annex 4 Requirements Group Report

Source: Rob Koenen, Chair

### **MPEG-2**

#### **Video Maximum Line Count**

Two NB position papers were received in response to the request from the Dublin meeting to consider the desirability to go from 1152 lines to 1088 lines for all high levels. Both NB positions supported this change. There was no one present who had any knowledge of any implementation of any 1152 line system. It was agreed to begin the amendment process to change from 1152 lines to 1088 lines for all high levels (see N2406 and N2407). It was agreed that this amendment should be included in the roll up of release 2 of 13818-2.

### **MPEG-2/MPEG-4**

#### **High Quality Requirements**

The requirements for high quality applications were reviewed. The output of the ad hoc group on high quality Applications and several input contributions formed the basis for the discussion. The conclusions reached were:

1. that for very high level applications more study is required before the exact requirements can be determined.
2. If camera position data is needed it can be conveyed in the OCI field. SMPTE 315M format is suggested for camera data. Camera data should have no normative effect on the scene.
3. Audio experts are needed to examine the requirements for high quality audio applications.
4. A number of auxillary channels are required for post production applications.
5. There is a need to discuss the use of BIFS in post production with the Systems Group in Eilat.
6. Metadata is important in studio applications. OCI may not be the best method of transporting metadata needed in studio applications as the metadata may need to be synched with images on a VOP by VOP basis.

One contribution (M4068) provided a list of “problems” that may limit the ability of MPEG-4 visual to accommodate high quality applications. There was discussion on these problems and disagreement arose over what the exact application was where these problems manifested themselves. More work is needed here to identify exactly which applications are effected by these problems. In Eilat it may be necessary to have joint meetings with Visual and ISG to discuss these problem areas if a specific application can be identified.

It was agreed to update the MPEG-4 requirements document to reflect the agreements of the group with respect to auxillary data and camera position data. The ad hoc group on high quality applications will be continued until the Eilat meeting.

### **MPEG-4**

#### **Experimental Profile**

The requirements group met jointly with the Systems group and the DMIF group to discuss transport issues, specifically working with the IETF. The issues was raised of developing a IETF specific MPEG-4 profiles so that the IETF could experiment with the transport of MPEG-4 over the

internet. It was agreed NOT to develop such a profile since MPEG-4 profiles should only be developed for mature applications with well known requirements. Instead, it was agreed that the IETF could experiment with MPEG-4 using existing objects and profiles and then convey to MPEG the specific requirements which the internet may place upon MPEG. After reviewing these requirements, MPEG may develop a IETF Profile if none of the existing profiles meet the requirements.

### **Disposition of Comments – Visual**

The Australian NB commented on the lack of the 12 bit object in the 12 bit profile. This was obviously an oversight and it was agreed to add the 12 bit object to the 12 bit profile.

Numerous minor changes were made to the profiles and levels section of 14496-2 based on NB comments. The DoC for visual (N2417) contains all of the agreed upon changes. Some of the more interesting (and perhaps controversial) changes include:

1. The terminology for object types and profiles was clarified and made consistent between documents.
2. The number of objects allowed in visual profiles was increased.
3. OBMC was removed from the Main object type. This was done since OBMC does not improve the performance at higher bitrates (but it does at low bitrates) and the Main object type is intended to operate at bitrates high enough so that OBMC does not improve the performance.
4. It was agreed not to use the combination of Error Resilience and Interlaced and Gray Scale Shape coding. This was done since these combinations had not been thoroughly tested.
5. It was agreed to accept the level 4 @ Main Profile definition included in the study of the FCD from the Dublin meeting. The rationale for this was that there had been no level defined which was suitable for HDTV resolution applications.

### *Comments on Cost Function (Complexity Formula)*

Several detailed comments addressing the Cost Function (also known as the Complexity Formula) were reviewed in a joint session with ISG. It was agreed that the cost function would not be applied to the Simple and Simple Scalable Profiles. The reason for doing this was that the cost function values for the Simple Profile Levels and the Simple Scalable Profile Levels have no effect on limiting the number of I-MBs/second and do limit the number of P-MBs/second to only 97% of the Max. number of MB/second value. However, this limitation on the number of P-MBs provides very little savings to the decoder complexity, while adding complexity to the encoder, reducing the coding efficiency potential, and unnecessarily restricting the way in which the Profiles are used. By increasing the cost function values for the Simple Profile Levels and the Simple Scalable Profile Levels from 97% to 100% of the Max. number of MB/second value, the cost function constraint can be removed without significantly increasing the decoder complexity.

An error in the cost function equivalent I-MB/sec entry in the Core Profile @ Level 1, Core Profile @ Level 2, and N-Bit Profile @ Level 2 was discovered. It was agreed that this was an error and the correct values were inserted.

The cost function associated with the Main Profile generated considerable discussion. Many comments were received indicating that the cost function definition of MB/sec was incomplete. In a joint meeting with ISG it was agreed that the existing definition of MB/sec was insufficient. ISG was tasked with developing a new definition and applying it to the cost function. Unfortunately this work was not completed. It was agreed in a joint meeting between ISG and Requirements that the fundamental premise for the new definition was good, but that further work would be required between ISG and Video experts in order to complete the definition using the exact terminology used

in 14496-2. It was agreed that this further work would be completed within two weeks of the completion of the Atlantic City meeting.

#### *Delay of the Main Object Type and the Main Profile*

There were many comments related to delaying the definition of the Main Object type and the Main Profile. The arguments presented can be divided up into four major classes:

1. The Cost Function is not well defined.
2. There are tools that are not included in the Main Object type
3. The Main Profile doesn't satisfy the Requirements.
4. Combinations of tools within the Main Object type have not been fully tested.

The question of the cost function was addressed above.

The question of tools not being included was reviewed in a joint session with the Visual group. It was agreed that the tools which were not included were tools that the visual group had previously agreed not to include in version 1 of the standard. The group agreed that this decision should be honored and therefore the tools were not added to the Main Object type.

The question of whether the Main Profile satisfied the Requirements was first reviewed in the requirements group. It was agreed that all of the requirements for the Main Profile were fulfilled except the requirements for error resilience, improved coding efficiency, and the combination of alpha channel coding and interlaced coding. These questions could not be answered by the Requirements group and it was agreed that the requirements group should ask the video group for their input.

In a joint session with the video group these questions were examined one by one. The video experts stated that requirement for error resilience could be met by the error resilience tools and that the standard did indeed provide for improved coding efficiency (although further improvements were possible). The question of the combination of tools could not be so easily answered. The video group agreed to initiate the task of verifying this combination in the shortest possible time immediately following the 45<sup>th</sup> MPEG meeting.

Given the answers provided by the video group, there were no objections to keeping the Main Object type and the Main Profile in version 1 (one delegate did indicate that he would need to check with his delegation prior to agreeing).

#### **Disposition of Comments – Audio**

In response to NB comments, the Audio Scalable Profile was simplified by removing some of the tools from the profile. The tools removed from this profile were moved to version 2 of MPEG. This agreement was based on the requirements of the Digital AM Broadcasting application and Internet applications.

#### **Disposition of Comments – Systems**

A new profile type, the Object Descriptor (OD) profile, was added to Systems. This profile type contains tools that cannot be attributed to the scene description, but can be separated into functional blocks. It provides the shell for all descriptive information. Only one OD Profile was defined, called Core. It contains the following tools:

1. Object Descriptor (OD) tool
2. Sync Layer tool
3. Object Content Information (OCI) tool
4. Intellectual Property Management Protection (IPMP) tool

Although the main reason for creating the profile is the definition of Levels, no levels were defined yet.

The scene description profiles were updated to reflect the inclusion/removal of tools in response to NB comments. Four scene description profiles were agreed upon, they are: Simple 2D, Complete 2D, Audio, and Complete. The only level defined at this point is the level 1 of the Simple 2D profile. The other profiles have no level restrictions.

The graphics profiles were updated to reflect NB comments. Three graphics profiles remain, the Simple 2D, the Complete 2D, and the Complete profiles. There are no level restrictions associated with the Graphics profiles.

A template for the future definition of profiles@levels was agreed upon in the joint Requirements and Systems meeting. This template can be found in N2519.

### **MPEG-4 Version 2 Issues**

Several contributions addressing MPEG-4 version 2 issues were discussed. Two of the contributions discussed new profiles for version 2 of MPEG-4. The other contribution addressed requirements for multi-user interactions. It was agreed that these contributions should be re-submitted to the Eilat meeting so that a more full discussion could take place there.

In a joint meeting with the Systems group requirements for MPEG-J were discussed. It was agreed that these requirements should be added to the MPEG-4 Requirements document.

### **MPEG-4 Applications Document**

A new version of the MPEG-4 Applications document was not produced at this meeting. It was agreed that the editor should be charged with updating the document between the 45<sup>th</sup> and 46<sup>th</sup> meetings based on input received by email.

## **MPEG-7**

### **National Body Comments**

1. USNB: Comment: Use electronic submission of proposals for easy circulation to evaluators. Reply: The present process supports this request.
2. Portuguese NB: Comment: Requests a clear policy on software to be provided for XM. Reply: The proposers are required to provide software in a form which can be easily integrated into a tested in the XM framework.

### **Test Material**

1. The group has drafted a set of conditions under which the test material is available for individuals and organizations taking part in the development of the MPEG-7 standards. These conditions have been summarized from the individual statements of the various content providers. These conditions are available in document numbered ISO IEC/JTC1/SC29/WG11/N2466
2. The group has decided on a list of material which it thinks are available under the conditions referred to above. This list is also available in document numbered ISO IEC/JTC1/SC29/WG11/N2467
3. A resolution was drafted: WG11 thanks all the organizations that answered to the Call for MPEG-7 Content.
4. A second resolution was adopted: *MPEG has prepared a unified version of the conditions in individual statements and they are listed in document ISO IEC/JTC1/SC29/WG11 N2466. All*

*organizations which have content items in the MPEG-7 content set and cannot accept those licensing conditions should state this position by 1st November 1998 to Mr. Rob Koenen, chairman of MPEG Requirements, and to Dr. Leonardo Chiariglione, convenor of MPEG.*

5. The test material will be approximately 25 CDs and will be available for a price through a duplicating company. The intention to obtain test material must be stated by 1st November 1998 and payments made by 8th November 1998. The material will be shipped by 25th November 1998. The procedure is detailed in the documents.

### **Requirements**

1. The group accepted recommendations from several contributions and included a section on Systems Requirements.
2. Certain open issues were identified and are listed in the Requirements document. This concerns mainly Systems issues; in particular its scope and the need for a distributed architecture.

### **Applications**

1. A new application personalised television has been added to the applications document and the corresponding requirements accommodated in requirements document.
2. A second new application on search for trademarks added and requirements accommodated.

### **Evaluation Procedures**

1. The evaluation procedures have been decided upon for all categories of proposals. Detailed forms have been drafted for the use of the evaluators.
2. The selected list of test material and the detailed procedure for obtaining the material are listed in the document ISO/IEC JTC1/SC29/WG11/N2467 and ISO/IEC JTC1/SC29/WG11/N2468.
3. What will be done with non-normative components called for has been clarified. It is listed in document ISO IEC/JTC1/SC29/WG11/N2463, section 1.4, following para B which lists the non-normative items called for.
4. No evaluation of Systems technologies in February. Because the requirements have not been drawn up to a level of maturity desired for determining evaluation criteria and methods. This is specified in call for proposals ISO IEC/JTC1/SC29/WG11/N2469

### **Call for Proposals**

1. A CFP which includes a list of important dates, contacts and references has been produced. The document is numbered ISO IEC/JTC1/SC29/WG11/N2469

### **Proposal Package Description**

1. A PPD which lists what is called for and a brief overview of the MPEG process along with the list of important dates, contacts and references has been produced.
2. The call will be extended to include systems technologies, but they will not be evaluated in February. See point 4 under Evaluation Procedures, above.

### **Ad-Hoc Groups**

The following Ad-Hoc Groups were set up (see N2400):

1. MPEG-7 Evaluation
2. MPEG-7 XM Development.
3. MPEG-7 Requirements
4. MPEG-7 Audio matters

Annex 5  
Delivery Meeting Report

Source: Vahe Balabanian, Chair

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

## **DMIF**

- 1) Disposition of National Body Comments for DMIF V1 FCD N2420 and

### **DMIF FDIS N2506**

All major and minor technical comments were addressed and resolved. Comments related to stream QoS performance were redirected to DMIF V2 CD for consideration in December/98 in Eilat. The work in the Delivery WG from now on will be devoted to DMIF V2 except for the DMIF V1 conformance, see below.

- 2) Review and update DMIF V1 Conformance N2471 The existing document now contains the PICS proforma for the DAI, the DMIF signaling Protocol, the test environment for remote interactive scenarios and 4 test cases. There are now at least 3 and may be 4 independent implementations of DMIF. This should provide a good base of information for conformance testing. We urgently require the addition of the following:

- More test cases for interactive scenarios
- Test environments for the broadcast and file scenarios
- Test cases for the broadcast and file scenarios

Since this document is slated to become a CD on December/98 in Eilat, I urge all participants to contribute to it.

- 3) DMIF V2 WD 4.0 N2480

- Good progress was made on MPEG-4 over mobile networks. Mappings to H.245 have been completed. The results are documented in the WD 4.0. Liaison N2508 was forwarded to ITU-T SG16/Q.11 on support for complete MPEG-4 content. Mr. Yoshihiro Kikuchi will take the liaison to the next ITU-T/SG11 meeting in November/98. Work remaining in this area include:
  - Resolution whether UEP should be added in DMIF (see UEP) below.
  - Definition of a DMIF URL for mobile networks
  - Message Flow scenario for Mobile networks
  - Conformance points PICS proforma and test cases
  - Reference Source Code and Interoperability between at least 2 implementations before the FCD approval 99/07
  - Proposal for the support of UEP in DMIF M4135 was discussed. The Delivery WG consulted with the Video WG on the benefits of adding UEP in DMIF. It was decided that core experiments will be set up and final resolution reached in Eilat to include UEP in the DMIF V2 CD. Concerns were expressed on where the information re-the partitioning and the QoS will be extracted from and how will it be passed to DMIF.
- The DNI primitives were extended to accommodate the DMIF Multicast Proposal, M4094. The scaling issue was discussed related to the  $N < 100$ . A solution which does not put a limit on N would be preferable. The issue of the apparent replacement of the globally unique networkSessionId with sourceId needs to be resolved for logging the resources. Work remaining in this area include:
  - Definition of a DMIF URL for multicast

- Message Flow scenario for DMIF multicast
- Conformance points PICS proforma and test cases
- Reference Source Code and Interoperability between at least 2 implementations before the FCD approval 99/07
- QoS Management and feedback of monitoring is a critical piece of DMIF V2, a meeting was held with MPEG-4 End-to-End QoS Management M3462 was reviewed with ISG. It was decided to add IPMP delay in the budget in Figure 1. After the demux at the ES level. Also add video mode/resiliency selection. Decoder does not affect the LOSS\_PROB i.e., concealment is done during composition in Sync Layer. Reviewed the proposed amendments to the DAI for QoS monitoring support, M3902. Dr. Javier Zamora stated that it is better for the application to be polling the delivered QoS as opposed to it being notified by DMIF if the QoS gets below the expected QoS. More input is required on the QoS metrics, the measurement of the delivered performance and its comparison to the expected QoS.
- The DAI API M3952 was discussed and it was agreed that DMIF would not standardize on a DAI API. In its place an informative Annex in DMIF V2 will cover DAI APIs in Java, ANSI C++ and IDL.
- The operation of DMIF with the DSM-CC Session and Resource Managers (SRM) has been moved out of DMIF V2 WD 4.0 to a “Text for a possible DMIF V3” N2481.
- In terms of heterogeneous network operation, DMIF V2 uses the DMIF IWU. Two aspects need to be expanded DMIF to non-DMIF operation as well as DMIF to DMIF operation over concatenated dissimilar networks.

## DSM-CC

### 1) **The DSM-CC Conformance FCD passed the ballot and is an FDIS, N2410.**

The disposition of comments is documented in N2409.

### 2) **Text of ISO/IEC 13818-6/FPDAM1 will be augmented by Corrigenda for DMIF dsmcc Type, M3906.**

#### Documents Reviewed:

Doc # Title

M3857 DMIF July 1998 (Dublin) Meeting Report

M3862 IM1 DMIF Development Kit Version 1.2

M3871 Summary of Voting on ISO/IEC FCD 13818-10 (DSM-CC Conformance)

M3882 MPEG-4 Operation with IETF Transport Area Standards

M3884 Revised introduction for DMIF

M3885 DMIF instance for IP multicast

M3900 MPEG4 SL and FlexMux management, amendments to the DAI

M3902 Proposed amendments to the DAI for QOS monitoring support

M3906 DSM-CC ISO/IEC 113818-6 IS Corrigenda for DMIF dsmccType

M3947 Update Proposal for the DMIF Conformance Specification

M3952 Normative DAI Syntax

M3953 Normative DAI Syntax Software

M4030 Experimental MPEG-4 Profile for IETF

M4074 Report of AHG on Mobile Network Connections

M4075 Mobile Network Mappings Walkthrough

M4079 Bi-directional communication based on H.324 and MPEG-4

M4094 DMIF Multicast Proposal

M4100 The Role of DMIF in Support of RTP MPEG-4 Payloads



M4101 The Use of MPEG-4/DMIF and RSVP with Integrated Services

M4102 The Role of DMIF with RTSP and MPEG-4

M4112 DMIF instance with network independence

M4135 Proposed extensions to DMIF for supporting unequal error protection of MPEG-4 video over H.324 mobile networks

Next Meeting:

MPEG 46 Dec 6-10/98 Atlantic City NJ

Next Target Dates to meet:

DMIF V1 conformance CD-December 1998

DMIF V2 CD—December 1998

## Annex 6 Systems meeting report

Source: Olivier Avaro, Chair

### Overview

The main results of the MPEG meeting from a Systems perspective are :

1. Delivery of the Final Draft International Standard of Version 1 Systems (FDIS of 14496-1). This document is the result of the processing of comments from the national bodies. It can be considered as the final text of the standard since no technical modification will be allowed after its approval.
2. Delivery of Systems Version 2 VM and WD. These documents represent the work in progress for the Version 2 specification.

### Detailed Report

#### MPEG

*FDIS of 14496-1 (MPEG-4 Systems Version 1)*

#### Scene Description BIFS (Liam Ward - Teltec)

All VRML nodes including the Script node are included in MPEG-4 Systems Version 1. Proto and ExternProto nodes are postponed to version 2 (Not specified and not implemented). Application signaling (stream control, message from client to servers, ...) is postponed to version 2 (Not specified, not implemented and controversial). Additional information on this activity can be found in an attached presentation (esm-bifs.ppt).

#### Streaming Framework (Carsten Herpel – Thomson Multimedia)

The 'IPMP' (Intellectual Property Management and Protection) interface enables rights owners to use advanced systems to manage and protect their intellectual property in MPEG-4 Multimedia Content. The IPMP interface is now being integrated into MPEG-4 Version 1. Besides the introduction of IPMP, the possibility to signal JPEG images in an MPEG-4 bitstream has been included. Additional information on this activity can be found in an attached presentation (esm-bifs.ppt).

#### Profiles

The framework to profile the MPEG-4 specification has been improved. The different dimensions of MPEG profiles are now : OD profiles, Scene Graph profiles, Visual Profiles, Audio Profiles and Graphics Profiles. Only basics levels are defined for these profiles for Systems. A template for the definition of Systems Profiles and Levels has been produced in order to help the industry to customize the MPEG-4 Systems toolbox to their own needs. Contributions from the industry are expected.

#### Implementation framework (Zvi Lifshitz – Triton Software)

A work plan has been constructed in order to align FDIS part 5 (the MPEG reference software) to FDIS part 1 including IPMP. Audio Bifs part 5 is not likely to be completely implemented in Im1 but will be validated in a separate and complete piece of software. There were new software donation to MPEG, in particular, a 3D Player from Pact and a 2D MPEG-4 authoring tool from ENST. Additional information on this activity can be found in an attached presentation (gen.ppt).

During the Atlantic City meeting, several real time software applications based on the Im1 framework have been demonstrated. This demonstration activity of Im1 should continue in the coming meetings.

### When will the FDIS specification be delivered ?

The Systems specification has received many comments. Not all of these comments have proposed text and solutions to document the FDIS. During the meeting, all the comments were analyzed, answered and decisions were taken on what changes should be made in the FDIS. Still, it was not possible during the meeting to document in the very last details these decisions. Therefore, the following schedule for editing the document has been proposed and adopted :

By 98/11/15	editors upload w250xa (x=1, 2) to the MPEG FTP site and send notification to WG11 reflector
By 98/12/04	membership identifies in writing by the deadline incorrect transposition of DoC and delta document items into w250xa
By 98/12/18	editors send w250x to SC29 (clean copy) and upload copy with revision marks to MPEG FTP

The approval of part 5 has been postponed to the Seoul meeting in order to give the time to the Im1 implementers to catch up with the paper specification.

### Conformance (Jean-Claude Dufourd – ENST)

The work on conformance has not made significant progress between the last two meetings. The lack of participation to this activity is really becoming problematic since the conformance document is supposed to be promoted to Committee Draft at the next meeting. During Atlantic City, however, promising results have been achieved :

- Definition of a methodology to define conformance on specific points,
- Identification of companies that are willing to participate to bitstream exchange on the complete specification or on part of it : MPEG Im1 (Complete), France Telecom (BIFS), ENST (BIFS 2d, OD, MP4), Panasonic (BIFS 2d), Five Bats Research (Complete), IBM (BIFS 2d, OD, MP4), GI (BIFS 2d, OD, MP4), Philips (BIFS, MP4), AT&T (TTS/FAP),
- Construction of a mock-up application to validate IPMP.

An intense activity in this area is expected between Atlantic City and Eilat, which will serve also to complete the validation of the standard.

### *MPEG-4 Systems Version 2 Activities*

#### Evolution of Version 2 from VM/WD to CD

The methodology for evolution of the VM and WD is described on the MPEG home page and follows the Core experiment process. Syntax and semantic specified in the VM will go in the CD in Eilat only if validated (implemented, tested and exercised).

#### MPEG-4 on MPEG-2 Systems and on the Internet (Jan Van Der Meer – Philips)

Responding to the needs from the industry to grow from existing MPEG-2 Systems or Internet applications to further include MPEG-4 functionality, preliminary works on the mapping of MPEG-4 content on MPEG-2 Systems and on the internet have been produced. This activity is conducted jointly with DMIF. Additional information on this activity can be found in an attached presentation (4on2.ppt).

#### Advanced BIFS

The specification and implementation of advanced BIFS made progress. Advanced BIFS nodes that enable the description of spatialization properties are now stable and in pretty good shape. The specification of Proto and ExternProto, Viewport, Mediatime sensor, inherited from version 1 need to be validated (implemented, tested and exercised in Im1). Requirements to include HTML kind of content in BIFS scene have been accepted and will lead to development of the specification. Contributions are solicited in this area. Application signaling, a feature also inherited from version 1 is in bad shape (It needs harmonization with the Systems architecture, complete specification and validation in Im1). It is not yet clear as well how 3D meshes will be included in the V1 architecture. These two last points specifically need contributions. The transparency node, proposed in V2

extends/overlap video functionality. The added value (complexity, functionality, ...) of this new feature needs to be evaluated.

#### MPEG-J (Gerard Fernando – Sun)

The MPEG-J activity addresses programmatic control of an MPEG-4 terminal to adapt to the varying operating conditions or enable enhanced multimedia functionality. At the Atlantic City meeting, the specification of Application Programming Interfaces (API) and architecture was refined via integration of a number of input contributions. A demonstration of partial MPEG-J functionality was also held and a work-plan for implementation of the MPEG-J technology was decided.

#### MP4 File Format(Dave Pawson – Oracle)

Work continued on the development of the mp4 file format, the stored content format for MPEG-4. With increasing contribution from new companies, the specification for mp4 was refined and clarified, and development of reference software is well under way. Great gains were made with the help of new contributors. Several implementations are expected in Eilat.

#### *MPEG-7*

Some preliminary work has been done on the MPEG-7 project. MPEG-7 Requirements related to Systems expertise (synchronization of information, association of data streams, scene description, APIs, ...) have been reviewed. The need of a well-defined architecture was raised and further input are needed to make progress and to clarify the structure of an MPEG-7 Systems at a detailed level. The list of open issues on MPEG-7 has been reviewed. The more important ones are listed below :

1. What is the link between MPEG-4 OCI and MPEG-7 ? OCI is a short term, limited and dedicated to MPEG-4 solution to solve MPEG-7 related problems.
2. Is there an MPEG-7 stream type in MPEG-4 ? Yes. And this stream type can be used when MPEG-7 will be used within the MPEG-4 context.

Finally, Systems aspects of MPEG-7 have been introduced in the call for proposal.

#### *List of Systems Proposed Resolutions and Document*

Here follows the list of resolutions that have been produced during the Atlantic City meeting by the Systems sub-group:

- 3.3.1 Given the status of specification, the results of Im1 and the National Bodies comments, that the following technology is included in the Version 1 FDIS:
- IPMP,
  - All missing VRML nodes except Proto/ExternProto.
  - JPEG, as an Object Type
- And that the following technology is not included in the Version 1 FDIS:
- Application signaling in BIFS.

- 3.3.2 the approval of the following documents:

Title	No.
Systems Disposition of Comments on FCD Ballot	N2416
Systems Version 1 Final Draft International Standard	N2501
Template for Systems Profiles and Levels Definition	N2519
IPMP Implementation Studies	N2520
Status of the Systems Version 1 Software Implementation	N2521
Systems Software Implementation Workplan	N2522
Im1 Tools	N2523
MPEG-4 Systems Version 2 WD 4.0	N2524
MPEG-4 Systems Version 2 VM 4.0	N2525
Carriage of MPEG-4 Content on MPEG-2 Systems	N2526

<b>19.1.1 Systems FAQ V 7.0.</b>	N2527
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- 3.3.3 To solicit contributions on OD Profiles, Scene Description Profiles, and Graphics profiles. A template for the definition of such profiles is provided in the "Template for Systems Profiles and Levels Definition" document.
- 3.3.4 To approve the Systems part of Version 1 WD Conformance (WG11 N2).
- 3.3.5 That part 5 of Systems will be submitted to approval to WG11 in the Seoul meeting following suggestions from the USNB to delay the approval of part 5. The Systems AHG on Im1 will regularly publish the status of the Im1 software and make this information available to National Bodies.
- 3.3.6 MPEG utilises technology components to define its standards. These technology components are called tools. MPEG-J will need certain combinations of Java packages and these will be referred normatively by MPEG-4 version 2. MPEG as such requires a position statement from the owner of the IP on Java that these specific configurations of Java packages with respect to MPEG-J profiles to be defined will be possible. Any other supplementary information concerning licensing will be welcome. A clear position on this matter is required before or at the MPEG Eilat meeting of December 1998.
- 3.3.7 in Atlantic City on the transport on MPEG-4 Content over MPEG-2 Systems and Internet networks (WG11 N2) are made available to the AIC Initiative.
- 3.3.8 Given that the Systems sub-group published a set of APIs for the MPEG Player platform (Im1) within which Version 1 and Version 2 tools developed by other MPEG sub-groups can be integrated (plug-in interfaces), the Systems sub-group expects to receive from other MPEG-4 sub-groups more plug-ins with better efficiency (decoders, DMIF, IPMP) in order to achieve a full implementation of an MPEG-4 browser and to progress in making demonstrations of MPEG-4 capabilities.
- 3.3.9 That the different parts of the MPEG-4 Version 2 WD, VM, conformance testing the "Im1 tools" and the "Systems FAQ" documents will be released within 20 days after the Atlantic City meeting to accommodate final text editing.
- 3.3.10 The Systems sub-group has considered the possibility of year 2000 bugs in the Systems specifications and did not find any.
- 3.3.11 to establish the following AdHoc Groups:

Title	Chair(s)	No.	Mtg
AHG on Systems Specifications Editing	Eleftheriadis & al.	N2528	Y
AHG on Systems Conformance	Dufourd & al.	N2529	Y
AHG on Advanced BIFS	Signes & al.	N2530	
AHG on MPEG-J Specification and Implementation	Fernando & al.	N2531	Y
AHG on MPEG-4 File Format	Pawson	N2532	Y
AHG on Intellectual Property Management & Protection within MPEG	Rump & al.	N2533	
AHG on IM 1 Software Platform	Lifshitz & al.	N2534	Y
AHG on MPEG-4 Content on MPEG-2 Systems	Jan Van Der Meer	N2535	Y
AHG on MPEG-4 Content on the Internet	S. Casner & al.	N2536	Y
AHG on MPEG-4 Systems Profiles and Levels	Rob Glidden	N2537	

- 3.3.12 to make publicly available the following documents:

Title	No.
<i>Carriage of MPEG-4 Content on MPEG-2 Systems</i>	N2526
Systems FAQ	N2527

Annex 7  
Report of the Video meeting

Source: T.K. Tan, Acting Chairman

The video group addressed in its meeting issues related to MPEG-4 (Version 1 and Version 2), MPEG-7 and MPEG-2. The major effort in the group was dedicated towards progression to Final Draft International Standard (FDIS) of the Visual part of the MPEG-4 standard.

## **MPEG-2**

### MPEG-2 revision 1

In response to the US NB comment to produce a second edition of the MPEG-2 Video Standard, the video group has initiated this work and appointed Chad Fogg as the editor. A working draft of ISO/IEC 13818-2.1 was approved at this meeting.

### Maximum Line Count

In response to the US and Swedish NB comments on changing the maximum lines from 1152 to 1088, the video group agrees and a PDAM 6 to ISO/IEC 13818-2 was approved at this meeting.

### Output Documents

ISO/IEC 13818-2/PDAM6  
Proposal of ISO/IEC 13818-2/PDAM6  
First Draft for the text of ISO/IEC 13818-2.1

## **MPEG-4 (Version 1)**

### *FDIS*

The video group evaluated the NB comments issued on the FCD of MPEG-4 and discussed possible reactions to NB's. A total of 265 editorial and 136 technical comments were received. Out of these, 238 editorial comments were accepted as presented and the remaining 27 editorial comments were accepted with modifications. 111 technical comments were accepted as presented, 13 accepted with modification and 12 not accepted. Based on the outcome of the discussions and taking into account of the number of remaining software verification to be completed a Delta FDIS document was compiled. At the same time the FDIS document is approved.

### *Software Integration and Verification*

A schedule for continuing software integration and verification was developed. A detailed plan for testing combination of tools was issued. The schedule targets to complete the software fixes within 3 weeks after the meeting and the bitstream verification before the Eilat meeting.

### *Delay of Main Profile Version 1*

Several National bodies requested that the main object type and the main profile be delayed until the next meeting on the following basis.

- 1) that some tools were not mature
- 2) that some combinations of tools were not possible in version 1
- 3) that if Main Profile were delayed there would be more time to include the three tools.
- 4) that the complexity of the sprite tool were not studied.

The video group replied with the following response

Video thanks the national bodies for their investigation and comments on the tools related to the Main Object Type.

On the issue of the maturity of some of the individual tools in Version 1 the video group agrees with the assessment of the national bodies and will initiate the task of verifying these tools in the shortest possible time immediately after the 45<sup>th</sup> WG11 meeting.

On the issue of the missing combination of tools, video agrees with the assessment of the national bodies that some of the combination of tools may be useful in MPEG-4 Version 2. The video group shall investigate these combination of tools under the existing framework for the development of tools within the group as and when the requirements of the tools become clear.

The requirements group will endeavour to investigate the inclusion of the Quarter Pel Motion Compensation, Global Motion Compensation and Boundary Block Merging tools in a Version 2 Profile.

WG11 regrets that the timetable did not allow all tools to be included in the Video part of MPEG-4 version 1.

### *Verification Tests*

The results of the "Error Resilience" verification tests were reviewed. In general the results showed an excellent performance of the new tools developed under experimental testing conditions. For a bitrate of 128 kbit/s one test sequence was redone with new coding parameters containing more intra updates. This showed promising results at the expense of more overheads. This will be added to the test sequences for Eilat. The non-error case is eliminated from the test, as it was not shown to provide any additional statistical information.

Temporal Scalability using Simple Scalable Profile is also completed. New test material and conditions (including anchors) were defined. Temporal Scalability will now be compared to Simulcast and Single Layer. This test will be ready for Eilat. Temporal Scalability using Core Profile is delayed to the Seoul meeting.

Further verification tests are under preparation for MPEG-1 vs MPEG-4, content-based coding and scalable coding (core profile) of video. These tests are targeted for Seoul meeting. More prescreening will be conducted at the Eilat meeting.

### *Conformance*

Good progress was made for the specification of conformance of MPEG-4 video coding systems.

Issues brought up between meetings were discussed. It was decided that the non-real time and real time conformance testing should be renamed to functional and performance testing since these names reflected the actual test better. Since the two reference software are in perfect match the constraints for the conformance were also change to reflect this. A new version of the MPEG-4 conformance working draft was released and incorporated into the conformance WD.

A list of tools and volunteers were identified to study and develop the conformance of these tools. This work will be done between meetings in an ad hoc created for this purpose at this meeting.

### *Output Documents*

ISO/IEC 14496-2 FDIS

Description of changes in natural video tools ISO/IEC 14496-2 FCD to FDIS

Disposition of National Body Comments to FCD ballot on ISO/IEC 14496-2

ISO/IEC 14496-2 Video Conformance WD

### **MPEG-4 (Version 2)**

#### Tools to be supported

The following tools were accepted into version 2 at the last meeting.

- GMC
- ¼ pel MC
- BBM
- SADCT
- Newpred (Error Resilience)
- Object Spatial Scalability (Scalability)

Some results were brought as further information for GMC and Object Based Scalability.

The mini and remaining core experiment for the following tools were studied.

- Multiple Auxiliary Components (completed)
- Error Resilience for Still Texture Coding (One single syntax was achieved, completed)
- Scalable Arbitrary Shape for Texture Coding (completed)
- Wavelet Tiling (Non-overlap WT was chosen, completed)



One additional tool, Dynamic Resolution Conversion, was added to the list of tools for Version 2. New tape were brought to the meeting to supplement the tape that was shown at the last meeting which showed sequences that were not standard MPEG test sequences. This tool was added as it has now satisfied all the necessary conditions for inclusion.

A timetable and list of volunteers for the integration of these tools into the version 2 reference software was created. The work on the integration and bitstream exchange will start as soon as the version 1 software has been updated with the necessary changes.

### Output documents

Text of ISO/IEC 14496-2 visual working draft Version 2 Rev.5.0

## **MPEG-4 (Further)**

### Advanced Layered Coding

At this meeting a clear core experiment to compare the ALC method to the MPEG-4 Spatial Scalability was defined. The core experiment will compare the performance of the simple upsampling filter currently available in the definition of the MPEG-4 mid processor with that of the upsampling filter proposed by the ALC. Since the time between this and the Eilat meeting was considered too short, the final decision will be made at Seoul. A final decision will be made regarding the need for the normative tools if any.

### Fine Granularity Scalability

Some results on fine granularity scalability methods were brought to this meeting. The base layer in all cases was MPEG 4 version 1 compatible. There were three methods proposed. These are the methods where enhancement layer comprises of the Wavelet, Matching Pursuits and DCT coding. Bitplane coding was also proposed in combination with these tools. More results are expected at the next meeting to show evidence that fine granularity scalability is possible. Only one method will eventually be selected.

### Studio Applications

This investigation is continued to the next meeting. The requirements of these applications are yet to be finalized in the Requirements subgroup. Experiments will be continued according to the new requirement of 4:4:4 format.

### Unequal Error Protection in DMIF

The Video group was requested by the DMIF group to give an evaluation of the usefulness of Unequal Error Protection for Video. One document was presented, but the video group felt that the information provided is insufficient to make any comment. A simple performance evaluation will be conducted between meetings and the result presented at the next meeting.

### Encoder Optimisation/Segmentation

For encoder optimisation, the core experiment on Optimizing Coding Mode Decision was discontinued due to lack of contributions. The Fast Motion Estimation was not conclusive and continued until the next meeting. The last core experiment on Encoder Optimisation Complexity based on Intelligent Pre Quantization was fully verified and the text added to the VM. The experiment on automatic segmentation method showed marked improvements at this meeting and was recommended for inclusion as an informative annex in Version 2 WD.

### Output documents

Text of ISO/IEC 14496-2 video verification model V.11.1  
Core Experiment Description for MPEG-4 Video

### **MPEG-7**

The activities of the MPEG-7 group were reviewed and discussed in the video group. Two input documents related to MPEG-7 image database query systems were presented and discussed. The Video/Image Evaluation process and Video/Image Test Material were also presented to the video group in a joint meeting between the Requirements and Video subgroups.

Annex 8  
Report of the 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 45th meeting of WG11 in Atlantic City, USA on 12 to 16 October 1998. The list of participants is given in Annex A-1. The Chairman welcomed the delegates to the meeting and outlined the work for the five days

### Administrative matters

#### *Approval of agenda*

The agenda as presented in Annex AII was discussed and approved.

#### *Dublin meeting report*

The Audio Subgroup portion of the Dublin meeting report, July 1998, had been previously distributed by email and was approved.

#### *Allocation of contributions*

All contributions were listed (see Annex A-VI) and allocated to the agenda and were discussed in either the Task Groups or in Audio plenary. Several relevant documents from Test, Systems, and Requirements were brought to the attention of the group by the secretary.

#### *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.

- The state of the Systems part of MPEG-4 was discussed. Reference software may be delayed to allow bitstream exchange and verification testing to take place. The Systems normative text inconsistencies will need to be resolved as does its alignment to the software and/or the demonstrators.
- MPEG-4 back-channel delayed to version 2.
- Final text for FDIS needs to be prepared by end of week. But there may be a period for editing which will consequentially delay the FDIS ballot.
- A number of joint meetings were agreed

#### *Received National Body Comments*

The NB comment from Japan on the harmonisation of Twin VQ and AAC was presented by Mr. Moriya. This was discussed at length by the Subgroup as it was feared that some aspects of the changes proposed could have required syntax changes that might have affects on other parts of the standard. Those comments relating to changes that had been implemented, independently tested and had given acceptable results were accepted by the Group for the FDIS. The additional proposed changes that had not been independently verified could not be accepted. A response to the Japanese NB was prepared accordingly.

Other National Body comments were reviewed in the context of specific agenda items as reported below. Responses to the specific comments by UK and USA were drafted and passed to Liaison.

*Liaison matters*

Mr. Sugiyama presented document m4165 on the provision of a new H.245 codepoint in H.324 terminals by ITU-T SG16 in support of MPEG-4 audio. This proposal was endorsed by the Audio Subgroup and Mr. Sugiyama was asked to prepare a liaison statement.

Mr. Brandenburg kindly took care of the other Liaison matters. He reported the issues to the Audio Subgroup and worked the Subgroup's wishes into the responses. It was agreed that the latest Audio Test results be sent to AES, ITU-R, and ITU-T.

*Temporary task group formation*

To accomplish the large number of tasks to be performed by the Audio Subgroup, 15 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.

**Task group activities***MPEG-2 AAC Conformance and Technical Report***IS 13818-7 AAC Final review of Conformance, Tech Report and Corrigendum**

Mr. Schreiner thanked the editors for their completion of the work since Dublin on DRC in the corrigendum to AAC. This had been finished on target.

Mr. Quackenbush reviewed in his task group the status and whereabouts of the conformance bitstreams for AAC. It was determined that 5 additional conformance bitstreams are needed for AAC and 2 are needed for ADTS, a transport mechanism for AAC. There is however a problem of making access available beyond MPEG members as ISO are no longer going to publish the Audio conformance bitstreams on a CD. Audio would like them to be available on an FTP site, but the copyright may not allow this. The Convenor undertook to discuss this with ISO and the matter was raised in one of the Resolutions from this meeting. Copyright release for the source material and the encoded bitstreams in being requested.

**13818-4 BC MC\_CRC conformance bitstream**

The MC\_CRC bitstream will be made available by Philips by end of this meeting. A response to the US NB comment on this matter was prepared.

**Other MPEG-2 matters**

To accommodate the addition of these bitstreams an amendment of the Conformance part of IS13818 needs to be launched. This is covered by documents WG11/N2414 and 2423, prepared by Mr. Quackenbush.

Philips provided a UserID and a password (refer to document WG11/N2414) in order to be able to access the MPEG Empowered web site containing MPEG1 and MPEG2 Conformance bitstreams. For convenience of the MPEG members, a link will be added to the MPEG Audio web site.

Mr. Meares introduced the UK NB paper on the problems UK members were experiencing in obtaining access to the AAC licensing information. He noted that as soon as the UK NB paper appeared on the MPEG server, the licensing authority finally started to progress the requests. By Wednesday Plenary, the initial requirements of the UK members appeared to have been satisfied.

Mr. Meares drafted a response to the UK NB paper which was approved by Audio.

*MPEG-4 Audio FDIS (Oct 98)*

The problems of handling very large documents as single files was discussed: the editors stressed the lack of alternatives to Microsoft Word. Together with input from SC29, it was accepted that the editors could either work with the existing word processing packages and have the subparts of 14496-3 existing as multiple files, or could switch to Framemaker if they wished.

Mr. Grill queried whether the reduction of complexity in the toolset, reported below, could be matched by a compaction of the FDIS into fewer sections. In principle 'yes' but in practice this would generate a lot of work. It will therefore be handled by adjusting titles.

Mr. Funken introduced the proposal from the Netherlands NB on new modes within narrowband CELP. The fundamental element is that this is a new proposal at FDIS conversion stage with no independent check site. The decision was that the proposal is too late with no independent check. The editors identified the possibility of simplifying one part of the standard by removing a combination of tools which was not felt to be of advantage: specifically removal of NEC's data pulse from the t/f scalable profile. No tool was to be removed entirely but just an unfortunately complicated combination. With no further time for additional subjective or objective evaluation, the consensus of the group was in favour of simplification.

The results of other task groups, reported below, generated 'simplifications' for the FDIS and were taken account of in the work of the FDIS task group. All of the NB comments were considered by the task group and incorporated, as necessary, in the FDIS. The disposition of comments is given in document WG11/N2418.

The task group, reviewed and rewrote the introduction to the standard. This was presented by Mr. Scheirer to the subgroup and was approved. The finished document will be presented in document WG11/N2503, which has a deadline of 15<sup>th</sup> November. Processing communications on error of transposition has a further 10 days after that and the final version is to be delivered to SC29 by 30 Nov 98.

#### *MPEG-4 Reference Software FDIS (Mar99)*

Mr. Coleman reported that there is a formal delay of the reference software. There will therefore be no DoC or FDIS from this meeting. The requirement is that the components of the software have to be delivered to Mr. Coleman by the 30<sup>th</sup> November so that they can be worked on in Eilat.

#### *MPEG-4 Conformance WD (CD Dec. 98)*

Mr. Brandenburg's task group reviewed the input documents and the consequences of changes due to the verification test results. Commitment and a schedule for delivery of the conformance bitstreams for many of the tools in MPEG-4 was obtained. The conformance information is given in document WG11/N2471. An ad hoc group activity until the Eilat meeting is required.

#### *MPEG-4 Profiles and levels*

In a joint session with Requirements, the issues relating to profiles and levels were discussed. Mr. Rault presented the work of his Task Group, in which the topic and the input documents had been discussed. The starting point was the output document from the Dublin meeting. There were 15 audio tools and 14 audio object types.

The French NB paper requests a simpler profile for Digital AM broadcasting. The German NB go further for the same application and propose a specific combination of audio object types. There was some debate over whether or not one could add error resilience to a profile in V2. The advice of Requirements would be to delay the profile to V2 so that error resilience could be included from the start. The Swiss NB tabled two papers, m4012 and m4110, on SA and an audio FX profile. The US NB has tabled a paper requesting a profile that enables the use of MPEG-2 AAC audio within MPEG-4. Sweden in contrast request that there be no more profiles.

The specific request for a Digital Radio Mondiale (DRM) profile was discussed. A slim scalable profile, incorporating the tools AAC LC, PNS, LTP, LSS, CELP, and HVXC, was suggested. But what about Twin VQ? The advice from Requirements is not to add tools willy nilly just to load a particular profile: only include tools where they are essential to an application, unless an extra tool expands the take-up of a profile. Further discussion gave rise to the decision that the DRM project requirements are not 100% defined at this stage, and so a specific profile for this was not requested at this stage.

The task group reviewed these proposals and drafted changes and responses to the NB comments. Also, the reduction in the approved toolsets required additional changes to the profiles and levels which were also accommodated. The task group additionally identified that the term t/f coding was

not going to be meaningful outside MPEG, and so it was decided to rename it GA coding, for General Audio coding, to compliment Structured Audio coding, Speech coding etc.

All of the above items from the task group were summarised in document WG11/N2439 and were communicated through to the Requirements Group.

Concern was expressed that there were very few specific applications being discussed in the context of profiles and levels. It has seemed to the Audio Group for several meetings that this is the only sensible way of specifying profiles that will not be weighed down by mandatory but unwanted and unused elements.

#### *MPEG-4 Verification Tests*

##### Speech codec tests

A task group reviewed the reports on the speech codec test results, m3866 and m3910, and converted them to an output document, document WG11/N2424.

In Audio Plenary, it was noted that there were many modes for the CELP coder, and it was not obvious that all modes were necessary for the performance/functionality of MPEG-4. Mr. Grill noted the following groupings:-

Mode 1	RPE + LAR/SQ
Mode 2	RPE + LSP/VQ
Mode 3	MPE + LAR/SQ
Mode 4	MPE + LSP/VQ

In wideband CELP embodiments, mode 3 has not been evaluated at all yet and mode 4 outperforms modes 1 and 2. In narrowband CELP, only mode 4 is used. This would make a radical improvement to the simplification of the FDIS. It was acknowledged that the complexity issue was also important. Mode 4 requires 3k5 ROM words, mode 2 requires 2k5 words and mode 1 requires 150 words. But mode 1 performs more poorly, by a half grade. However, ROM size may not be an issue as much as computation complexity: estimated at 2 to 1 for MPE versus RPE. It was additionally noted that the processor also requires to do other things as well, thus diluting the 2 to 1 ratio.

The group had little support for the SQ tool, and this was dropped. Mr. Funken asked that his dissension on this consensus decision should be formally noted. The complexity of both RPE and MPE was analysed in Task Group so that valid comparisons could be drawn. The outcome was a decision in support of retention of both options in V1

##### Audio on Internet tests

A task group reviewed the report on the speech codec test results m3870, and converted it to an output document, document WG11/N2425.

The justification of retaining HILN and BSAC in V1 in view of their poor results was discussed. These tools could be re-examined for V2, subject to there being further support. It was eventually decided that in the face of the Twin VQ results, the poorer results of HILN justify its removal from V1. Mr. Kim observed that mistakes had been made in the coding of BSAC at 40 kb/s, but when will the technique be proven? The Audio Subgroup believe that BSAC is a worthy option and offers a worthwhile functionality of small step scalability. The decision was made to move BSAC to V2 to allow more time for it to be optimised and debugged, and to remove any doubt of a fundamental problem with this approach at certain bitrates..

##### Audio Test Source Material Archive

Mr. Kim prepared a report showing the source of test material for audio tests together with access information. This is reported in document WG11/N2426.

##### *MPEG-4 SA issues & MMA alignment*

Mr. Scheirer reported that the alignment which was discussed at length in previous meetings had been resolved along the lines decided in Dublin. A liaison statement to the MMA prepared by Mr. Scheirer was approved by the Audio Subgroup.

### *MPEG-4 Audio/Systems Issues and SA*

Mr. Scheirer raised the issue of IM1 versus Systems Software. IM1 started as a demonstrator, but it seems to be becoming Systems Reference software which currently does not include many of the BIFS nodes (audio and video) that are included in the Systems part of MPEG-4. The stated intention is that Systems will be frozen at this meeting and then the software can catch up. The lack of audio framework in IM1 means that audio lip sync issues can not even be addressed and assertions about the adequacy of A/V synchronisation in Systems in general and in support of IPMP specifically are without substantiation.

NB comments. Request to move scene description part of the TTSI/FBA text from the Audio part to the Systems part of the specification. Lip synch in FBA will be handled via a pointer in the SNHC part to the audio part. The Swiss NB expressed concern over lack of accuracy in sample rate conversion – this had been handled in the Dublin meeting in document WG11/N2280. Switzerland also raised the issue of use of a quality measure to assist in graceful degradation.

VRML audio clip functionality does not seem to map comfortably into the streaming situation of MPEG-4 audio. Mr. Scheirer recommended a more rigorous control regime as had already been prepared in Audio BIFS some months ago.

The Swiss NB also expressed concern over the potential for problems of lip synchronisation. The fundamental question relates to the real performance of the normative parts of the standard. Demonstrations have all been of various versions or implementations of IM1, not the normative part of the standard.

Documents m4012 and m4111 were discussed in the task group about levelling within SA. Mr. Scheirer handled these points. The SA task group prepared responses to the NB papers on SA. These responses were added to the DoC and the FDIS.

Mr. Quackenbush and Mr. Teichmann raised the problem of the transport and signalling of MPEG-2 audio bitstreams through the MPEG-4 Systems layer. The mechanism is to use the Systems object profile but this is not indicated in the Audio part of the standard. The concept of cross-referencing this information between Audio and Systems was agreed.

In a joint meeting with Systems, Mr. Schreiner noted that there was a continuing problem in getting functional support for fine-grain-scalability. Even though this function had been moved at this meeting to V2, the Systems part should be capable of supporting it without breaking when BSAC is added in V2.

The Chair of Systems reported into Audio that part 5, the reference software, would not be approved at this meeting. Approval will wait until IM1 is updated to reflect all that is in the normative text of part 1. Support for helping Systems proof test their part of the standard was volunteered.

In a joint meeting with ISG it was agreed that issues relating to levels and complexity should be moved to the Conformance part of the standard. This was raised with the Convenor and accepted.

Information relating to Audio/Systems issues are recorded in document WG11/N2427.

### *Review of MPEG-4 Overview*

Mr. Edler's task group reviewed the Overview documents and drafted necessary revisions.

### *MPEG-4 version 2 - Error resilience*

Mr. Dietz's task group reviewed the input documents and revised the V2 WD accordingly. The workplan for error resilience is given in document WG11/N2429.

### *MPEG-4 version 2 - Markup TTSI*

Mr. Ostermann ran a demonstration of TTSI and FBA using bookmarks within the TTSI stream. Facial expression control within the TTS allows synchronisation and interactive services to be considered. The demonstration follows one from Dublin to show the trick-mode functionality. Mr. Ostermann noted that it is timely now to introduce this combined element as the market is exploring such possibilities elsewhere. <FAP...> is a specific type of bookmark for Facial animation. The way of handling trick mode, a version 2 functionality, by repetition of FAPs, was discussed. The demo was based on MPEG-4 TTSI encoder and decoder and integration into IM1 3D.

Mr. Lee pointed out that what is required is the correct handling of random start and stop points, rather than playing pre-edited files. It was also noted that there are a lot of undefined elements in the standard that cause concern over whether or not all possibilities have been proven to work. Streaming mode requires a backchannel to function: stored mode is not so hampered but is more vulnerable to break-in problems. However, is it essential to have instant response under these conditions?

In the case of speed change, for instance, there is a need to ensure continuing synchronisation between Audio and Video. This could be solved by feeding the speed change parameter to the FBA compositor but this has not been dealt with. Mr. Grill asked whether informative notes could be used to advise of limitations in the trick mode.

Each of the points raised was discussed in the group, and it was decided that where irregular compositor behaviour may be generated, it was as a result of irregular operation by the user. In the case of break-in, a short delay before correct performance would occur. In the case of speed change, too slow or fast changes of FBA expression may result. In neither case was anything in MPEG-4 broken. On that basis the TTSI/FBA bookmarks were approved for V1.

Mr. Lee reported on the progress of defining a Markup language. The inclusion of bookmarks in V1 to provide facial expression markup now fulfils the requirements. Mr. Lee therefore recommended that the task be considered adequately complete and that there is no longer a requirement for any additional V2 elements.

*MPEG-4 version 2 – other matters*

#### Audio 14496-3 /Amd 1 WD (Oct 98)

Mr. Grill has accepted the task of being editor of the WD. Mr. Sperschneider reviewed for the Audio group the current state of the WD as given in document WG11/N2428.

Mr. Brandenburg presented document WG11/N2430 describing the core experiment work for version 2. This was approved.

#### Reference Software 14496-5 /Amd 1 WD (Oct 98)

Mr. Purnhagen has accepted the task of being editor of the WD.

#### IPR and Watermarking

FhG and CRL input was tabled in the IPMP group. The framework of IPMP can carry the signalling for watermarking and incorporation of a watermarking system into V2 would require a great deal of work. But should a single proprietary system be incorporated? The observation was made that there are no specific proposals on the table at this meeting, so the matter was set aside.

There were two items (44.1kHz stereo) uploaded as original and watermarked by CRL in August and announced on the Subgroup reflector. During August and September versions of these signals that had been encoded and coded were uploaded by CCETT, NTT, and Philips (AAC, MP1, TwinVQ, WB-CELP). There has been no report from CRL on the effects of the processing. Low delay

Mr. Herre introduced document m4139 which explained the compromises between quality and delay in audio coding. The causes of delay were identified as frame length, filterbank, look ahead for block switching and use of bit reservoir. The parameters of a low delay coder proposed by FhG were described as were the results of pre-screening tests. The low delay coder working at 32 kb/s was compared with AAC at 24 kb/s: its performance was not as good as AAC on several items. However, this is a useful first proposal, and it was agreed that this would be incorporated into the working draft. The source code will be provided by FhG within three weeks, to allow further developments to take place.

#### Environmental spatialisation

Mr. Rault gave the group an update on 3D audio and spatialisation based on the input document into Dublin by Mr. Horbach. The reproduction of artificial sound in artificial rooms is being studied by IRCAM and France Telecom in France. Presence, envelopment, position, heaviness, vivacity, and reverberance are manipulated by the rendering engine. CCETT's proposal shows the use of



Ambisonic format as a way of transforming from one format to another. Only the perceptual parameters are currently being considered as BIFS elements and perhaps the spatialiser. Mr. Meares expressed concern over the restrictions introduced by the Ambisonic format as a transcode route: in his experience too many spatial cues were lost in 3-channel Ambisonic format. Mr. Rault emphasised, however, that Ambisonics format was just used as an example: HRTFs could have been used instead.

The main point of Mr. Rault's proposal is to share the perceptual rendering between part 1 (BIFS nodes handling the perceptual parameters) and part 3 (a "spatialisateur" using the perceptual parameters). A spatialisateur (SPAT) is a processing engine that receives an audio source url, its position in the virtual scene and perceptual parameters allowing for the rendering of the source in a virtual room. From these inputs, a SPAT produces seven channels : one for direct path, two for the early reflections and four for the late reverberation. Mr. Schreiner expressed concern over the lack of formal assessment in Audio of what was being proposed. Mr. Rault reported that he is working on implementation into IM1 for Eilat.

In a joint meeting with Systems, Ms Vaananen presented the audio group with an update on advanced audio BIFS, documents m3559, m3440, and m3501. These add more advanced source modelling, such as sound propagation, sound reflections, sound transmission and reverberation. The new BIFS in 3D sound rendering are AcousticScene, AcousticMaterial, and DirectiveSound. Considerable discussion ensued on whether this technology was yet sufficiently developed and proven. It was known that there were other people working in this area and that some of them may join the ad-hoc group before Eilat. There was also potential conflict with the IM1 structure that may not allow advanced BIFS to be added. It was agreed that to allow flexibility in this important area, proposals would be allowed up to the start of the next meeting in Eilat. Mr. Scheirer expressed concern that very little of this functionality had been demonstrated so far and thus even V1 aspects may cause problems even before the V2 aspects are added.

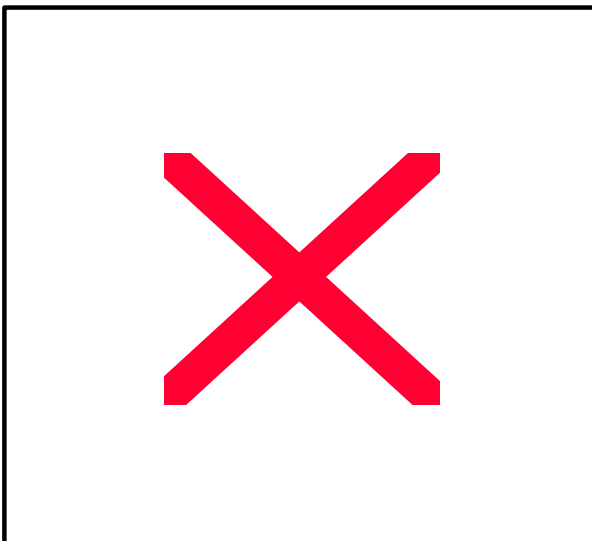
#### Back channel

No matters were raised at this meeting.

#### *MPEG Audio FAQ/Web Page*

*Mr. Thom worked in his task group and prepared additional FAQs. These incorporated FAQs for MPEG-7. The revisions are given in document WG11/N2431. Mr. Thom also reviewed the web page content and identified volunteers to add additional content. This is documented in WG11/N2432. FhG volunteered to assist in converting the web site information to HTML format. Both Hannover University and NEC volunteered to see if they could handle the EBU SQAM material server requirements. A request was placed for a Japanese company to provide administrative support for the web site. Mr. Purnhagen needs to be relieved of this task in light of his commitments to 14496-5 and 14496-5/amd1.*

#### **MPEG-7 Audio (15938 CfP Oct 98)**



In a joint meeting with Requirements, Mr. Herre and Mr. Lindsay introduced the topic of MPEG-7 and gave the Group a presentation on where the topic had got to and how the Group can pick up the task and contribute to this new task. MPEG-7 is Multimedia Content Description Interface and essentially defines the content rather than compressing it. Careful balance is needed between immediate use and future-proof proposals. The CfP is to be prepared at this meeting and test material is needed now for near instant distribution to those developing systems. MPEG-7 needs more content, particularly sound effects. 1 Dec 98 is the deadline

for responses to the CfP with close for submissions of 1 Feb 99. The target is XM 1.0 by 1 March. MPEG-7 is supposed to be independent of format. Descriptions need to be exchanged to facilitate filtering, selection, deselection of material.

There are a lot of ways of describing content, which complement one-another as shown in the figure.

The Requirements, CfP and Evaluation process were reviewed. In evaluation, the parameters to be reviewed were noted to be feature relevance, effectiveness, application, expression efficiency, processing efficiency and scalability. Document m4089 gives the evaluation procedure information whilst m3996 gives the Proposal Package Description. It was noted that new material can be offered for a period of two weeks beyond this meeting.

The Task group collected further undertakings to provide additional test material to be delivered shortly after this meeting. There will, however, be a continuing need for additional material for the later stages of the study. The Requirements document and the evaluation document were reviewed and a generic evaluation procedure was proposed.

The group also considered how it could expand the awareness of MPEG-7 in the outside world. This is to be based on an analysis of which relevant groups could be interested/active in this area.

What is specific to audio?

Mr. Herre presented to the Audio Group for review the following output documents from Requirements on MPEG-7

- Requirements
- Call for proposals
- PPD
- Evaluation document
- Context and objectives
- MPEG-7 test material

### **Discussion of unallocated Contributions**

All contributions had been assigned to specific agenda items.

### **Meeting deliverables**

*Press statement*

*Mr. Meares prepared the Audio part of the press statement, which was approved.*

*Dispositions of Comments*

*The DoC matters are referred to above.*

*Responses to NB comments*

*Responses to the National Body comments were prepared and were approved.*

*Liaison statements*

*As reported above, these were prepared and approved.*

*Recommendations for final plenary*

*A list of recommendations was prepared for approval at the final MPEG plenary meeting. Four Audio and the main MPEG-7 documents from this meeting were approved for public release, see Annex A-VI.*

*Establishment of new Ad-hoc Groups*

The following ad-hoc groups were established:

	Mandate	Meeting
AHG on MPEG-4 Audio FDIS and Reference Software FDIS editing (Grill/Purnhagen)	2433	Weekend, Eilat
AHG on MPEG-4 Audio Conformance (Spille)	2434	No
AHG on MPEG-4 Structured Audio(Scheirer/Ray)	2435	No

	Mandate	Meeting
AHG on MPEG-4 Audio environmental spatialisation (Ray)	2436	Sunday, Eilat
AHG on MPEG-4 Audio Version 2 error resilience (Dietz/Miki)	2437	Sunday p.m., Eilat
AHG on MPEG-7 audio matters (Herre/Lindsay)	2438	No

*Approval of output documents*

All output documents were presented to Audio plenary and were approved.

**Future activities**

*Schedule of future meetings*

The dates of the next MPEG meeting in Eilat were confirmed. Dates for the ad-hoc group meetings had been previously discussed. All of the ad-hoc group meetings will occur on the Saturday or Sunday immediately preceding the MPEG meeting.

*Agenda for next meeting*

The agenda for the MPEG Audio Subgroup meeting in December 1998 in Eilat, Israel was presented to the meeting. This was briefly discussed and approved (Annex III).

**A.O.B.**

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 the secretary, Mr. Meares, for his support during the meeting. Mr. Schreiner also announced that this was to be his last meeting as Audio Chairman and introduced Mr. Quackenbush, who had accepted the proposal to take over the Audio Subgroup Chair. Mr. Meares, on behalf of the whole Subgroup, thanked Mr. Schreiner warmly for his hard work and careful guidance of the Subgroup over his years in office. With that, the Audio Subgroup meeting was declared closed.



## Annex A-I: Meeting Participants List

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## Annex A-II: Agenda for the Atlantic City Audio Subgroup Meeting

1. Opening of the meeting
2. Administrative matters
  - 2.1. Approval of agenda
  - 2.2. Dublin meeting report
  - 2.3. Allocation of contributions
  - 2.4. Communications from the Chair
  - 2.5. Joint meetings
  - 2.6. Received National Body Comments and Liaison matters 3894, 3981, 3985, 4023, 4165,
3. Task group activities 3945,
  - 3.1. MPEG-2 AAC Conformance and Technical Report
    - 3.1.1. IS 13818-7 AAC Final review of Conformance, Tech Report and Corrigendum 3878, 4023, 4044, 4142,
    - 3.1.2. 13818-4 BC MC\_CRC conformance bitstream 3915,
  - 3.2. MPEG-4 Audio FDIS (Oct 98) 3874, 3893, 3911, 3926, 3937, 3976, 3978, 4078, 4105,
  - 3.3. MPEG-4 Reference Software FDIS (Oct 98) 3875, 3911, 3916,
  - 3.4. MPEG-4 Conformance WD (CD Dec. 98) 4007,
  - 3.5. MPEG-4 Profiles and levels 3849, (3867), (3868), 3909, 4110, 4111, 4113,
  - 3.6. MPEG-4 Verification Tests 3911, 3946, 3959, 4072, 4073, 4077, 4081, 4086, 3866, 3910, 4105, 3870, 4087,
  - 3.6.1. Speech codec tests
  - 3.6.2. Audio on Internet tests
  - 3.6.3. Audio Test Source Material Archive
  - 3.7. MPEG-4 SA issues & MMA alignment (3894), (3891), 3976, 3977, 4078, 4110, 4012, 4111, 4123,
  - 3.8. MPEG-4 Audio/Systems Issues
  - 3.9. Review of MPEG-4 Overview
  - 3.10. MPEG-4 version 2 - Error resilience 3879, 3880, 3896, 3897, 3956, 3957, 3966, 3967, 4060, 4064,
  - 3.11. MPEG-4 version 2 - Markup TTSI 3874pt6, 3893, 3926, 3963, 3964, 4115, 4161,
  - 3.12. MPEG-4 version 2 – other matters
    - 3.12.1. Audio 14496-3 /Amd 1 WD (Oct 98) 3940,
    - 3.12.2. Reference Software 14496-5 /Amd 1 WD (Oct 98)
    - 3.12.3. IPR and Watermarking
    - 3.12.4. Low delay 4139,
    - 3.12.5. Environmental spatialisation
    - 3.12.6. Back channel
  - 3.13. MPEG Audio FAQ/Web Page 3986, 4016,
  - 3.14. MPEG Audio - Preparation of press statement
4. MPEG-7 Audio (15938 CfP Oct 98)) (3892), 3894, 3918, (3942), (3955), (3996), (4006), 4014, 4016, 4089, 4107,

5. Discussion of unallocated Contributions
6. Meeting deliverables
  - 6.1. Press statement
  - 6.2. Dispositions of Comments
  - 6.3. Responses to NB comments
  - 6.4. Liaison statements
  - 6.5. Recommendations for final plenary
  - 6.6. Establishment of new Ad-hoc Groups
  - 6.7. Approval of output documents
7. Future activities
  - 7.1. Schedule of future meetings
  - 7.2. Agenda for next meeting
8. A.O.B.
9. Closing of the meeting

### **Annex A-III: Agenda for the Eilat Audio Subgroup Meeting**

1. Opening of the meeting
2. Administrative matters
  - 2.1. Approval of agenda
  - 2.2. Atlantic City meeting report
  - 2.3. Allocation of contributions
  - 2.4. Communications from the Chair
  - 2.5. Joint meetings
  - 2.6. Received National Body Comments and Liaison matters
3. Task group activities
  - 3.1. Amendment to MPEG-2 Conformance, 13818-4 AMD3
  - 3.2. MPEG-4 Reference Software FDIS (Mar 99)
  - 3.3. MPEG-4 Conformance WD (CD Dec. 98)
  - 3.4. MPEG-4 Profiles and levels
  - 3.5. MPEG-4 Audio/Systems Issues
    - 3.5.1. IM1 Audio plug-in
  - 3.6. Review of MPEG-4 Overview
  - 3.7. MPEG-4 version 2 – other matters
    - 3.7.1. Audio 14496-3 /Amd 1 CD (Dec 98)  
(including BSAC and HILN)
    - 3.7.2. Reference Software 14496-5 /Amd 1 CD (Dec 98)
    - 3.7.3. MPEG-4 version 2 - Error resilience
    - 3.7.4. IPR and Watermarking
    - 3.7.5. Low delay
    - 3.7.6. Environmental spatialisation
    - 3.7.7. Back channel
  - 3.8. MPEG Audio FAQ/Web Page
  - 3.9. MPEG Audio - Preparation of press statement
  - 3.10. MPEG-7 Audio (15938 CfP Oct 98)
4. Discussion of unallocated Contributions
5. Meeting deliverables
  - 5.1. Press statement
  - 5.2. Dispositions of Comments
  - 5.3. Responses to NB comments
  - 5.4. Liaison statements
  - 5.5. Recommendations for final plenary
  - 5.6. Establishment of new Ad-hoc Groups
  - 5.7. Approval of output documents
6. Future activities
  - 6.1. Schedule of future meetings
  - 6.2. Agenda for next meeting
7. A.O.B.
8. Closing of the meeting

## **Annex A-V: Audio Task Groups and Mandates**

In order to make the necessary progress during the Atlantic City meeting, the following task groups are proposed together with the mandates as listed. The intention is that the Task Groups are charged with working on the topics listed with the aim and delegated authority of making decisions and recommendations.

### **MPEG-2 BC & AAC Conformance and Technical Report (Quackenbush)**

- To review the final stages of work on 13818-4/Amd 1 since the Dublin meeting and report status
- To review the progress to providing a test bitstream for checking MC\_CRC and, if necessary, schedule tasks and responsibilities to provide the bitstream and complete the conformance tests
- To establish publicly accessible server for all Audio Conformance bitstreams.
- To review the current information on ADTS for AAC and complete as necessary
- To prepare a corrigendum to add MC\_CRC bitstream and ADTS description to 13818-4

### **MPEG-4 Audio FDIS (Grill)**

- To study all input comments on the MPEG-4 Audio FCD
- To review thoroughly all late changes, such as the verified HVXC modifications
- To take input from the MPEG-4 Audio Verification Test Task Group in relation to any changes in toolsets
- To prepare editorial changes to the FCD in preparation for its progression to FDIS
- To prepare a DoC on the FCD
- To resolve the outstanding issues as far as is possible, e.g. random access for both 'clean' and 'dirty' break-in

### **MPEG-4 Reference Software FDIS(Purnhagen)**

- To study all input comments on the MPEG-4 Reference Software FCD
- To review thoroughly all late changes, such as verified HVXC
- To take input from the MPEG-4 Audio Verification Test Task Group in relation to any changes in toolsets
- To prepare editorial changes to the FCD in preparation for its progression to FDIS
- To prepare a DoC on the FCD

### **MPEG-4 Conformance (Brandenburg)**

- To continue development of a conformance model for MPEG-4 Audio
- To consider and propose appropriate test procedures and performance criteria as may be required by the various tools in MPEG-4 Audio
- To work with members of the other subgroups, as required, in order to develop a unified approach to Conformance testing
- To work by consensus towards decisions on Conformance matters and to bring those decisions to plenary

### **MPEG-4 Profiles and levels (Rault)**

- To consider the audio profiles and levels as specified at the Dublin meeting
- To consider relevant input documents on the subject
- To consider the needs of the industry in relation to workable allocations of toolsets to profiles/applications
- To define audio profiles/objects



- To propose changes and additions as necessary in order to complete the allocation of audio toolsets to profiles and levels

#### **MPEG-4 Verification Tests (Kim)**

- To review the test results on speech codecs and to draw conclusions on the validity of the evaluated toolsets
- To review the Internet Audio test results and to draw conclusions on the validity of the evaluated toolsets
- To make positive recommendations about which toolsets have proven their value in the context of the current stage of the MPEG-4 software
- In line with NB requests to simplify the MPEG-4 software wherever possible, to make recommendations on which tools can be omitted from the MPEG-4 software
- To study the issue of audio test source material and to make the necessary arrangements for establishing and archive of such material

#### **MPEG-4 SA issues (Scheirer)**

- To consider the continuing alignment of SASBF and MIDI DLS2 in light of the ad-hoc group activity since Dublin
- To review the allocation of SA tools in the MPEG-4 Profiles and Levels and to contribute to the Task Group on Profiles and Levels
- To complete any outstanding issues relating to BIFS for audio
- To consider and propose to the Conformance Task Group ways in which the conformance of the SA tools can be tested
- To discuss with the ISG subgroup, and propose methods by which the complexity of SA tools can be assessed

#### **Review of MPEG-4 Overview (Edler)**

- To review the current content of the MPEG-4 Overviews for version 1 and version 2
- To recommend changes where necessary

#### **MPEG-4 version 2: Error resilience (Dietz)**

- To consider any test results as may be reported to this meeting
- To continue integration work of the proven error resilience tools into the MPEG-4 version 2 VM
- To propose a continued workplan to the completion of this activity

#### **MPEG-4 : Markup TTSI with FBA (Lee)**

- To consider the state of development and testing of the TTS/FBA tools being included in MPEG-4 version 1 and advise the other task groups, if necessary, of any essential changes
- To continue work on the full TTS/FBA toolset for version 2
- To recommend which tools should be included at this stage
- To propose a single Markup language for TTSI for version 2
- To propose methods by which the various tools can be tested and approved for inclusion in version 2

#### **MPEG-4 version 2: other matters (Vaananen)**

- To consider input documents relating to IPR/watermarking, Low delay profiles, Environmental spatialisation, Back channel and other matters as may be submitted.
- To receive input from the specific task groups on Error resilience and Markup TTSI

- To prepare Working Drafts for parts 3 and 5 of MPEG-4 version 2

**MPEG-7 (Herre)**

- To discuss the input documents on MPEG-7 as they affect Audio
- To identify missing and additional sources and types of audio material needed for the evaluation of MPEG-7 proposals
- To propose evaluation methods for the testing of MPEG-7 proposals
- To assist in the formulation of the MPEG-7 Call for Proposals
- To consider Audio FAQs and their answers

**MPEG Audio FAQ/Web Page (Thom)**

- To consider new FAQs and propose answers to them
- To add MPEG-7 FAQs
- To review the web pages and propose updated pages
- To review the progress of uploading the audio test files (EBU SQAM etc) and to set dates for completion of this work.
- To list tasks which will remain unfinished at the end of this meeting and to obtain undertakings to complete them.

**MPEG Audio - Preparation of press statement (Meares)**

- To consider the state of development of the work delegated to the Audio Subgroup
- To prepare a press statement describing the highlights as of this meeting

## Annex A-VI: Input/Output Documentation

### Contributed documents

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

Number	Source	Title
3866	Pasi Ojala, Henri Toukoma	Report on the MPEG-4 speech codec verification tests
3870	Eric Scheirer, Sang-Wook Kim, Martin Dietz	Results of the MPEG-4 Audio verification test - Audio on Internet
3874	SC 29 Secretariat	Summary of Voting on ISO/IEC FCD 14496-3
3879	Martin Dietz, Ralph Sperschneider	Core Experiment Proposal on Huffman Codeword Reordering Refinement for MPEG2-AAC
3880	Martin Dietz, Ali Nowbakht-Irani	Core Experiment Proposal on Error Resilient Scalefactor Coding for MPEG2-AAC
3896	Martin Dietz	Report from the audio error resilience ad-hoc meeting in Erlangen, September 7, 1998
3897	Ralf Funken	Error protection for the MPEG-4 Wideband CELP VM coder
3909	Jean-Bernard RAULT	Request for a specific profile or level to address Digital AM Broadcasting applications
3910	Takehiro Moriya, Oliver Kunz	Result of the MPEG-4 Audio Verification tests -speech part at NTT and FhG
3911	Takehiro Moriya, Akio Jin, Takeshi Norimatsu, Mineo Tsushima, Tomokazu Ishikawa	Reprts on the AAC-TwinVQ convergence work after the Dublin meeting
3915	USNB	USNB Contribution - MPEG-2 Compliance bitstreams
3926	KNB(ksc29@kisi.or.kr, ahnc@etri.re.kr)	Comments on ISO/IEC FCD 14496-3 (Audio)
3940	Giorgio Zoia, Maurizio Maneri, Ulrich Horbach	Proposed enhancements to Structured Audio
3945	P. G. Schreiner III, D. J. Meares	Audio Subgroup--Task Group Mandates for Atlantic City meeting
3946	Torsten Mlasko,, Christian Mittendorf	Report on the MPEG-4 HVXC speech coder listening tests with half size codebooks and half size quantized codebooks
3956	Sanae Hotani, Toshiro Kawahara, Toshio Miki	The test results of check phase on Huffman Codeword Reordering Refinement for AAC
3957	Sanae Hotani, Toshiro Kawahara, Toshio Miki	The test results of check phase on error resilient scalefactor coding for AAC
3959	Masayuki Nishiguchi, Yuji Maeda, Akira Inoue	Proposed modifications of HVXC codebooks and listening test results
3963	Youngjik Lee, Jung-Chul Lee, Jae-Woo Yang	Comments on the MPEG-4 Audio Markup TTS WD
3964	Jung-Chul Lee, Youngjik Lee, Jae-Woo Yang	Conformance of the MPEG-4 Audio TTS
3966	Martin Dietz, Ali Nowbakht-Irani	Core Experiment Results on Error Resilient Scalefactor coding for AAC
3967	Martin Dietz, Ralph Sperschneider	Core Experiment Results on Huffman Codeword Reordering Refinement for AAC
3976	Eric Scheirer	Three Informative Annexes for MPEG-4 Structured Audio
3978	Ralf Funken	Results of an informal test assessing the quality and complexity of MPEG-4 Narrowband CELP modes
3986	David Thom, Heiko Purnhagen	Audio web page activity
4007	Jens Spille	Report of Ad Hoc Group on MPEG-4 Audio Conformance
4012	Giorgio Zoia	A possible SA subset for the AudioFX node
4014	Adam Lindsay	Audio Issues for MPEG-7 AHG Report
4016	Adam Lindsay	MPEG-7 Audio FAQ contributions
4044	The National Body of Japan	Request for a Technical Corrigendum to ISO/IEC 13818-4
4060	Toshiro Kawahara, Sanae Hotani, Toshio Miki	Revision of MPEG-4 Audio Version 2 WD (EP Tool)
4064	Takeshi Mori, Kazunaga Ikeda, Takehiro Moriya, Akio Jin, Naoki Iwakami	Designs of error protection and concealment schemes for MPEG-4 TwinVQ coder
4072	Toshiyuki Nomura, Masahiro Iwadare	Listening test results for MPEG-4 HVXC coder modification
4073	Toshiyuki Nomura, Masahiro Iwadare	Listening test results to evaluate the fixed-point codebooks and operation in the MPEG-4 CELP coder
4077	Naoya Tanaka	Listening test results of MPEG-4 speech coders with fixed-point codebooks
4078	Naoya Tanaka	Proposed changes to the FCD text with regard to the PICOLA speed change
4081	Masayuki Nishiguchi, Heiko Purnhagen	Listening test results of HILN and TwinVQ at 6.0kbps
4082	Bernhard Grill, Heiko Purnhagen	Report of the AhG on MPEG-4 Audio CD and Reference Software Progression
4086	Heiko Purnhagen	Uni Hannover listening test results for HVXC codebook modifications

Number	Source	Title
4087	Heiko Purnhagen, Bernd Edler	On HILN and TwinVQ performance in the AudioOnInternet Verification Test
4105	Torsten Mlasko, Torsten Prange, Christian Mittendorf	Report on quantization of speechcoder tables
4110	Giorgio Zoia	Level definition examples for SA main profile
4113	Martin Dietz	Request for modification or extension of the MPEG-4 Audio scalable profile according to the needs of Digital Narrowband Broadcasting
4115	Martin Dietz, Toshio Miki	Report of the Ad-hoc group on MPEG-4 audio error resilience for version 2
4119	Mauri Vaananen, Juha Ojanpera	Additional information on the LTP tool in MPEG-4 Audio T/F part
4139	J. Herre, E. Allamanche, R. Geiger, T. Sporer	Proposal For A Low Delay MPEG-4 Audio Codec based on AAC
4142	Chuck Lueck, David Thom, Martin Dietz	Report of the Ad-Hoc Group on AAC Conformance and Technical Report

## 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
2414	Rationale for ISO/IEC 13818-4/AMD3
2423	Text of ISO/IEC 13818-4/PDAM3
2418	DoC on MPEG-4 Audio Final Committee Draft 14496-3
2503	ISO/IEC 14496-3 FDIS
2471	ISO/IEC 14496-4 WD 4 Conformance Testing of the MPEG-4
2424	<i>MPEG-4 Audio verification test results: speech codecs</i>
2425	<i>MPEG-4 Audio verification test results: audio on Internet</i>
2426	Details of MPEG audio test material
2439	Concise report on MPEG-4 Audio profiles and levels task group activity
2427	Information on MPEG-4 Audio systems issues
2280	Contribution to MPEG-4 Systems FDIS on audio sample rate conversion
2428	MPEG-4 Audio Version 2 WD
2429	MPEG-4 Audio error resilience workplan
2430	Status of MPEG-4 Audio Version 2 core experiments
2459	MPEG-4 Overview Update
2431	<i>MPEG Audio FAQs version 9</i>
2432	MPEG Audio web page work plan

Annex 9  
Report of SNHC meeting

**Source: Peter Doenges, Chair**

## 1. SNHC Meeting Objectives

SNHC main objectives for Atlantic City were review and disposition of comments from NBs on Version 1 FCD to prepare the text of FDIS, and further development of conformance contributions for Part 4 based on profile/level work and the expected availability of key SNHC people. Objectives for Version 2 included moving technologies forward in preparation for CD in Eilat (especially the WD completeness of 3D Model Coding and its interlocking technology parts), with special emphasis on 3D model vertex prediction, error resilience/incremental rendering, and coding of properties (color). Version 2 work included the development with ISG of CGD metrics for 3D model complexity into syntax changes for 3D Model Coding so the decoder/terminal can estimate rendering load and scale content complexity to reduce overload. This work may offer a later possibility for extension to 3D BIFS scene compositions.

From the agenda, some detail Atlantic City objectives are listed below:

### Version 1

1. DoC & FDIS text on NB vote/comments for FCD
  - Review & DoC response on NB comments on FCD
  - Text to amend Visual spec, advise on Systems spec for FDIS
2. Conformance
  - Development of conformance input to Visual Conformance WD
  - Plan & post-meeting work on test bitstreams generation/exchange
3. Profiling
  - Changes with Requirements/Systems driven by NB comments
4. Review & update SNHC software plan
  - Version 1 & 2 deliverables of encoder, decoder, test data, tools
5. Part 5 reference software
  - Reference software brought up to date (with Mike Colman)
6. IM1 software status
  - Any revision to work plan & contributions to ensure completion
7. Cross-check Systems BIFS
  - Nodes for FBA, 2D mesh, scene composition, still texture
8. Still Texture Coding
  - End-to-end test, BIFS support for wavelet progressive/MIP texture

### Version 2

1. Closure on technology promotion to Visual WD for CD in Eilat
  - a. 3D Model Coding
    - i. Decision - drop 3D regular gridded mesh
    - ii. M1: 3D mesh connectivity - WD, interleave syntax, M5 interaction
    - iii. M2: 3D geometry - WD promotion if final review supports SQ
    - iv. M3: Hierarchical connectivity - WD, dependence on M1

- v. M4: Property coding - invoke M2 core plus extensions to WD
- vi. M5: Error resilience, incremental rendering - 3 proposals!
- vii. M6: General topology for 2DM animation - partial experiment
- b. Face Animation
  - i. FA1: Face Model Mesh Calibration - FDP/VRML, texture
- c. Body Animation
  - i. BA2: BAP Compression
  - ii. BA6: BAP Quantization Step Sizes
  - iii. BA8: BAT Table Interpolation
- 2. Review pre-Atlantic City CEs beyond results of 3DMC AHG in Korea
- 3. WD promotion with bitstream exchanges and integration considered
- 4. ISG CGD contribution on SNHC-related experiments (OpenGL, Projected Surface Sphere)
  - a. Recommend model complexity metrics for 3D Model Coding to support adaptive decoding
- 5. Quality and effectiveness of documentation and software for Version 2 implementers
- 6. VM 9.1 with recommended changes from AHGs and what to continue

Most of these objectives were achieved. For Version 1, profile and level work retains simplicity as driven by NB comment (most suited to broadcast applications without CGD and with few constraints on 2D or 3D model or scene complexity). More complex profiles/levels within Visual or Systems BIFS to quantify scene complexity or fidelity of models (FBA, 2D animated mesh, 3D model coding), to ensure quality of the media experience, were again allocated to Version 2. Good progress was made on conformance.

Qualification of 3D Model Coding technology for promotion to Version 2 CD still needs important work for Eilat, both in the areas of core tools (vertex prediction, color/property coding) and the more advanced tools (error resilience/incremental rendering). Promotion of most core tools to WD for 3D Model Coding was achieved, and an extraordinary 2-day AHG meeting for 3D Model Coding is planned for Eilat including live error resilience tests to achieve Version 2 CD. There is still no feature in Version 2 BIFS or 3D Model Coding for mirroring of symmetric models, a potential burden for terminals decoding and storing such models as faces, although proposals late in the process have been made. A further update of SNHC FAQs fell short with resource priorities placed on other pressing technical work.

## 2. SNHC Contributions & Related Review

The following contributions as applicable to SNHC were reviewed during the meeting:

### Vote/Comment on FCD for FDIS Version 1

Doc.	Group	Title	Authors
3874	Audio	Summary of Voting on ISO/IEC FCD 14496-3 (Audio)	SC 29 Secretariat
3926	Audio	Comments on ISO/IEC FCD 14496-3 (Audio)	KNB(ksc29@kisi.or.kr, ahnc@etri.re.kr)
4163	DMIF	Late Vote and Comments on ISO/IEC FCD 14496-6 (SC 29 N 2763)	SC 29 Secretariat
3875	General	Summary of Voting on ISO/IEC FCD 14496-5 (Reference Software)	SC 29 Secretariat
3876	General	Summary of Voting on ISO/IEC FCD 14496-6 (Delivery Multimedia Integration Framework)	SC 29 Secretariat
3893	General	Portuguese Votes to MPEG-4 FCD	Fernando Pereira
3937	General	Votes and Comments to FCD of 14496-1, -2, -3, -5, -6 (MPEG-4)	Rob Koenen, Ralf Funken
3954	General	Australian National Body Comments on FCD 14496	Michael Frater

Doc.	Group	Title	Authors
3958	General	Late Vote on ISO/IEC FCD 14496-5 (SC 29 N 2752) (Reference Software)	SC 29 Secretariat
3883	Liaison	MPEG-4 Transport using RTP: input to the 14496-1 and 14496-6 FCD Ballots	Vahe Balabanian (Nortel), IETF-AVT Working Group
3907	SNHC	Comments on Visual FCD (Phonem/Bookmark to FAP Converter)	Joern Ostermann, Yao Wang, Gabriel Abrantes
4149	SNHC WD?	Proposed changes to MPEG-4 Visual FCD and Systems FCD	P. van Beek, I. Sezan, M. Tekalp
3872	Systems	Summary of Voting on ISO/IEC FCD 14496-1 (Systems)	SC 29 Secretariat
3886	Systems	Comments on the Systems FCD	Jean-Claude Dufourd
3895	Systems	Proposal for Reorganization of MPEG-4 Systems FCD Object Descriptor Structures	A. Eleftheriadis
3924	Systems	A Study on the FCD 14496-1 Systems	KNB(ksc29@kisi.or.kr, ahnc@etri.re.kr)
3864	Video	Study on the visual FCD incorporating NB comments received in Dublin	visual CD editors
3873	Video	Summary of Voting on ISO/IEC FCD 14496-2 (Visual)	SC 29 Secretariat
3925	Video	Comments on MPEG-4 FCD 14496-2 and 14496-5	KNB(ksc29@kisi.or.kr, ahnc@etri.re.kr)
3960	Video	Additional explanation for the default values of colorimetry in JNB's MPEG-4 Visual FCD ballot	Shinichi Sakaida, Hiroyuki Imaizumi, Yoshiaki Shishikui, Eisuke Nakasu, Yasuaki Kanatugu

### Face Animation for Version 1

Doc.	Group	Title	Authors
3939	SNHC	Results of Core Experiment on mesh calibration	Marc Escher, Igor Pandzic
4140	SNHC	FBA Ad Hoc Group Report	Eric Petajan, Tolga Capin
4161	SNHC	Implementation of TTS and Face Animation in the IM1 3D player	Joern Ostermann, Gabriel Abrantes

### 2D Mesh Animation for Version 1

Doc.	Group	Title	Authors
4150	SNHC	Preliminary results for SNHC CE M6	P. van Beek, I. Sezan, M. Tekalp

### Body Animation for Version 2

Doc.	Group	Title	Authors
4070	SNHC	Results of Core Experiments Body Animation	Tolga K. Capin, Joaquim Esmerado, Srikanth Bandi
4103	SNHC WD	Body Animation at UPENN (MPEG4 contributions)	Dr. Norm Badler, Deepak Tolani, Liwei Zhao
4104	SNHC WD	Body Animation at UPENN (MPEG4 contributions)	Deepak Tolani, Liwei Zhao, Norm Badler
4108	SNHC	Results of Core Experiments	Deepak Tolani, Liwei Zhao, Norm Badler
4133	SNHC	Status of Body Animation Quantization Core Experiments	D. Lyons
4147	SNHC	Body Animation, BAPs Coding and Bitstream Exchanges	Francoise Preteux, Marius Preda, Gerard Mozelle

### 3D Model Coding for Version 2

Doc.	Group	Title	Authors
3997	SNHC	Geometry Compression of 3D Meshes using Adaptive Quantization for Prediction Errors	Yo-Sung Ho, Jeong-Hwan Ahn
3998	SNHC	Results of Core Experiment M2 on 3D Model Coding	Jeong-Hwan Ahn, Yo-Sung Ho
4043	SNHC	Crosscheck and Bitstream Exchange Results of Core Experiment M2: Geometry Coding Using PRVQ	Yong Han Kim, Ho-Jang Lee, In-Sung Park
4050	SNHC	Results of CE M5	E. S. Jang, S. J. Kim, M. J. Han, S. Y. Jung, Y. S. Seo
4051	SNHC	Results of CE M2	S. Y. Jung, M. J. Han, S. J. Kim, E. S. Jang, Y. S. Seo
4054	SNHC	Geometry coding using PRVQ	Jin Soo Choi, Jinyoung Yang, Myoung Ho Lee, Chieteuk Ahn
4055	SNHC	Results of Core Experiment M2: Geometry coding using PRVQ	Jin Soo Choi, Jinyoung Yang, Myoung Ho Lee, Chieteuk Ahn
4058	SNHC	Geometry Compression of 3D Meshes: Results on Core Experiment M2	Francoise Preteux, Titus Zaharia, Mircea Curila, Sorin Curila, Gerard Mozelle
4061	SNHC	Description of Core Experiments for 3DMC	Frank Bossen
4063	SNHC	Coding of Mesh Geometry by Successive Quantization	Jiankun Li, C.-C. Jay Kuo
4091	SNHC	Putting the pieces of the 3DMC puzzle together	Frank Bossen
4114	SNHC	Compression of Non-Manifold meshes with Topological Surgery	Gabriel Taubin, Andre Gueziec, Claudio Silva
4117	SNHC	SNHC 3D Mesh Coding Software	Gabriel Taubin, Andre Gueziec, Claudio Silva
4118	SNHC Missed	Results of Core Experiments on 3D Mesh Coding <b>Replaced at meeting by Gabriel with Pete S.</b>	Gabriel Taubin, Andre Gueziec, Claudio Silva
4137	SNHC	Report of Ad Hoc Group on 3D model coding	Touradj Ebrahimi, Pete Doenges
4141	SNHC	Proposal for Object Mirroring in 3D Model Coding	Eric Petajan, Chandrajit Bajaj

### SNHC VM for Version 2

Doc.	Group	Title	Authors
4116	SNHC	SNHC Verification Model version 9.0	Gabriel Taubin (Editor)

### Visual Texture Coding for Version 1 & 2

Doc.	Group	Title	Authors
3891	Video	Description of Mini Core Experiment on Scalable Shape Coding for Visual Texture Coding	Shipeng Li, Hung-Ju Lee, Iraj Sodagar, Ya-Qin Zhang
4001	Video	Results of Mini CE on Scalable Shape Coding for Visual Texture Coding	Jong Deuk Kim, Jae-won Chung, Hae Kwang Kim, Joo-hee Moon
4002	Video	A Result of Core Experiment F1: Wavelet Tiling	Norio Ito, Hiroyuki Katata
4021	Video	Fine Granular Scalability with Wavelets Coding	Brigitte Schuster
4025	Video	Fine Granularity Scalable Video Coding using Combination of MPEG4 Video Objects and Still Texture Objects	Jie Liang, Jun Yu, Yong Wang, Mandyam Srinath, Minhua Zhou
4040	Video	Description of Mini CE on Scalable Shape Coding for Visual Texture Coding using version 2 WD tool	Se-Hoon Son, Jae-Seob Shin (Samsung AIT), Jae-Won Chung (Hyundai)
4041	Video	Experimental Results on Scalable Shape Coding for	Se-Hoon Son, Dae-Sung Cho, Jae-Seob



Doc.	Group	Title	Authors
		Visual Texture Coding using version 2 WD tool	Shin
4136	Video	Results on Scalable Shape Coding for Visual Texture Coding	Weiping Li
4151	Video	Bitstream exchange result for visual texture coding	Iraj Sodagar, Hung-Ju Lee, Paul Hatrack, Shipeng Li, Bing-Bing Chai
4152	Video	Results of mini core experiment on scalable shaping coding for visual texture coding	Shipeng Li, Iraj Sodagar, Hung-Ju Lee
4153	Video	Report of results on CE-E16: Error Resilient Still Texture using a Packet Approach	Bing-Bing Chai, Iraj Sodagar
4154	Video	Verification of result on CE-F1: Tiling function for visual texture	Hung-Ju Lee, Iraj Sodagar
4162	Video	A Result of Core Experiment E16: Error Resilience for Still Texture	Norio Ito

### Computational Graceful Degradation & Quality of Service for Version 2

Doc.	Group	Title	Authors
4084	General	Report on the ad-hoc group on decoder QoS	M. Mattavelli
4076	ISG	Complexity analysis of OpenGL 3D rendering for Computational Graceful Degradation	Gauthier Lafruit, Toon Gijbels, Andy Scherpenberg, Tom Huybrechts, Jan Bormans
4143	ISG	Report on the Ad-hoc Group on Computational Graceful Degradation	Jan Bormans

### 3. Output Document Editors

Editors or coordinators responsible for SNHC elements of output documents were assigned:

Document	Editors
DoC on NB vote/comment FCD for V1	Igor Pandzic ... André Kaup, Mike Zeug
"Delta" text for FDIS modifying FCD for V1	Igor Pandzic ... Michael Wollborn, Yuchiro Nakaya, Mike Zeug
Face Animation	Eric Petajan
2D Animated Mesh	Peter van Beek
Cross Check of Systems BIFS	Igor Pandzic ... Julien Signes
Cross Check of Still Texture	Eric Petajan ... Iraj Sodagar
SNHC Conformance WD (via Video) for V1	Gabriel Abrantes, Eric Petajan, Peter van Beek ... Minhua Zhou
SNHC Profile/Level Contributions for V1	Eric Petajan, Peter van Beek (see Mike Zeug)
SNHC 3DMC, BA to Visual WD for V2	Gabriel Taubin, Tolga Capin ... Euee Jang
ISG/SNHC CGD Recommendation for V2	Gauthier Lafruit, Marco Mattavelli, Jan Bormans, Frank Bossen, Eric Petajan
SNHC Software Work Plan	Jiankun Li
SNHC Verification Model 10.0	Gabriel Taubin, Tolga Capin
SNHC Core Experiments	Frank Bossen, Tolga Capin
SNHC FAQs	Eric Petajan, Touradj Ebrahimi
Press Release	Eric Petajan, Touradj Ebrahimi

#### 4. Editing Schedule for Meeting

Documents	Monday	Tuesday	Wednesday	Thursday	Friday
DoC on NB vote/comment on FCD V1		1 <sup>st</sup> Draft	Final to Req Video, Sys		Approval
Text for FDIS modifying FCD V1		1 <sup>st</sup> Draft	Final to Req Video, Sys		Approval
Face Animation		See above			
2D Animated Mesh		See above			
Cross Check of Systems BIFS		Agreed			
Cross Check of Still Texture		Agreed			
SNHC Conformance WD (Visual) V1			1 <sup>st</sup> Draft	Preliminary	Approval
SNHC Profiles/Levels Contributions V1		Meet Requ., Systems		Meet Requ. Preliminary	Approval
SNHC 3DMC, BA to Visual WD V2			1 <sup>st</sup> Draft	Preliminary to Video	Approval
ISG/SNHC CGD Recommendation V2		Meet ISG	1 <sup>st</sup> Draft	Preliminary With ISG	Approval
SNHC Software Work Plan			1 <sup>st</sup> Draft	Preliminary	Approval
SNHC VM 10.0 (what WD shortfalls?)			1 <sup>st</sup> Draft	Preliminary	Approval
SNHC Core Experiments			1 <sup>st</sup> Draft	Preliminary	Approval
SNHC FAQs			1 <sup>st</sup> Draft	Preliminary	Approval
Press Release				to Mike Zeug 6pm	Approval

#### 5. AHG Meetings and Reports

The following AHG meetings were held on Sunday before the WG11 meeting and/or progress discussed:

Doc.	Group	Title	Authors
3755	SNHC	Report of ad hoc group on Face and Body Animation	<a href="#">Eric Petajan</a> , <a href="#">Tolga Capin</a>
3724	SNHC	Report of the ad hoc group on 3D model coding	Touradj Ebrahimi
3829	Video	Report of the Ad Hoc Group on Visual Texture Coding	<a href="#">Iraj Sodagar</a> , <a href="#">Iole Moccagatta</a>
3679	ISG	Report of the Ad-Hoc Group on Computational Graceful Degradation	<a href="#">Jan Bormans</a> , <a href="#">Marco Mattavelli</a>

The tremendous work by various proponents and partners as 2<sup>nd</sup> implementers, for the Korean AHG and for Atlantic City, brought the work in 3D Model Coding to the maturity of bitstream exchanges. However the exact methods of testing and reporting results were not quite sufficiently conclusive for the core tools (M1-M4) to promote all final technology components to WD. Thus provisional WD promotions were made pending some final core experiment work for Eilat.

#### 6. Joint Meetings

Joint with in	Monday	Tuesday	Wednesday	Thursday	Friday
Requirements		(see Systems)			
Video					
Audio					
ISG		4-5pm ISG CGD		2-3pm ISG CGD,	

<b>Joint with in</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
		for <u>SNHC</u>		<b>3DMC for <u>SNHC</u></b>	
Systems	Mon - Tue SNHC & <u>Systems BIFS</u> , as needed	4-6pm <u>Systems Profiles</u> - SNHC, Requirements	1-2pm <u>Systems Profiles</u> - SNHC, Requirements		
			4-5pm <b>Multi-Layer Texture &amp; BIFS</b> - <u>SNHC</u>		
Software	No meeting with Mike Colman, but V1 FDIS & V2 CD Reference Software sync critical				
<u>SNHC</u>	3-5pm SNHC <b>Plenary - meeting plan &amp; deadlines</b>	9-10am FA, 2DM <b>Conformance</b> for <u>SNHC</u>	11am =15 min! <b>Demo 3DMC</b> , after <u>Plenary</u>	3-6pm <u>SNHC</u> <b>Plenary doc review</b>	9-11:30am <u>SNHC</u> <b>Plenary V1/V2 doc approval, AHGs, V2 work plan &amp; software, software, resolutions</b> - <b>output doc submissions</b>
		10-11am 3DMC <b>M2 comparisons</b> in <u>SNHC</u>	3-4pm <u>SNHC</u> <b>Plenary doc, software review</b>		
		3-4pm <u>SNHC</u> <b>Plenary - status</b>	5-6:30pm <b>3DMC WD, M5 error resilience, incr. rendering, what, when?</b> <u>SNHC</u>		

## 7. Meeting Work and Results

### 7.1 DoC on FCD & Text for FDIS of Version 1

DoC for Systems and Visual parts of MPEG-4 Version 1 were contributed through N2416 and N2417. DoC in Systems relating to SNHC was mainly concerned with details of Face and FDP Nodes, TTS integration, and types of mapping. DoC in the Visual specification involved items for Face Animation and 2D Mesh.

Face Animation DoC included consistent treatment of phonemes and bookmarks for TTS with a complete text proposal for the FAP converter description, definition of default min/max values for the FAP arithmetic coder to minimize I-frame loading in broadcast applications, clarification that the def\_bit for building viseme/expression table is not required with the Simple Face visual profile at any level, addition of the gender bit as a hint to the desired appearance of a face model (subordinate to FDP information), and a minimum decoding requirement for face models with all defined feature points.

2D Mesh DoC included a number of editorial comments on missing mnemonics, unclear semantics and descriptions, figure clean-up, and assorted corrections plus technical edits including small syntax corrections, improved description of Delaunay triangulation and motion vector decoding, suppression of start code emulation, mapping of mesh data from Visual to Systems, and definition of level parameters.

SNHC-related FDIS edits for Systems appear in N2443, while the edits for Visual appear in N2444. The Systems edits include adding a texture type to the FDP node to signify whether a cylindrical or orthographic projection was used to apply texture to the face model, to allow for better decoder interpolation of texture coordinates for vertices that are not feature points, and the correction of the SkipFrame class definition within the AnimationFrameHeader.

The Visual edits include the large number of editorial improvements to 2D Mesh, the harmonization of Mesh and Face Object to support integration of animation-type streams, and the phoneme/bookmark FAP conversion. Visual edits also include the text for minor/major technical changes mentioned under the DoC areas above, an Annex on integration of facial animation with TTS, and the profile/level changes also as stated above.

## **7.2 Conformance Work for Version 1**

Useful discussion lead to decisions about how to apply functionality requirements and level points for 2D Mesh and Face Animation in Conformance functional vs. performance testing. Additional contributions were made to the Conformance document on basic definitions, descriptions of compliance including full-envelope functional testing, details of testing conditions for face animation and 2D animated mesh, definition of bitstream conformance and the procedure for testing for it, decoder conformance, content complexity of the model/stream, and differences in conformance testing at non-real-time and real-time rates driven by Visual Object Profile@Level points.

Yet more work is still needed on Conformance editing, bitstream generation including content summaries and organization, and mapping Profile@Level points into test conditions. An Ad Hoc Group was formed to continue the Conformance work in the video and SNHC areas.

## **7.3 Still Image Texture Coding in Version 1**

A joint meeting with Systems identified the need to verify the full integration of still image texture coding (as used for progressive transmission of texture scales or for MIP map texture downloads) in conjunction with Systems BIFS. VRML on which BIFS is built does not support explicit coding of a multi-resolution texture type (except very inefficiently as levels of detail distributed into the levels of a scene graph hierarchy). However BIFS is expected to integrate 3D meshes referencing multi-resolution texture as a surface property. Thus the semantics and syntax of how still the image texture object is linked as a surface property into polygon meshes under Systems BIFS should be clarified, and verification testing done. An Ad Hoc Group was formed to investigate this further, and develop content for testing.

As noted in the previous Dublin report, wavelet texture coding should also be subjected to an end-to-end (non-normative) verification test (not a CE) relative to the resolution scalability and quality of still texture when used in 3D rendering. The test could include conversion of a downloaded wavelet image pyramid from MPEG-4 Part 5 decoding into MIP map texture for varied viewing of textured 3D models on a PC graphics accelerator or workstation. OpenGL hardware with bilinear and trilinear filtering of MIP map texture could be used with dynamic viewing to verify that wavelet texture supports the intended MPEG-4 functionality. Texture maps could be extracted from 3D models, the textures processed through the wavelet encoder, the complete wavelet bitstream decoded while accumulating the supplied image resolution layers, results translated to MIP map texture, and the reintegrated multi-resolution texture models rendered in 3D. This AHG should evaluate the scope of verification testing that is possible here.

## **7.4 CGD for SNHC Functionalities in Version 2**

The ISG group gave an extensive report and held productive discussions with SNHC, as well as a mid-Plenary summary, of the important work described in meeting contribution M4076. This includes validation of the utility of certain complexity metrics for 3D models in estimated rendering complexity as a function of the performance prediction rules for a specific 3D rendering implementation. This work also involves the prediction of rendering load by tracking rendering load while circumnavigating 3D objects and recording a spherical mapping of render complexity vs. look angle on the 3D object.

While these rendering estimators do not account for complex occluded scene compositions or complex sequences of rendering state, they do provide a potentially useful CGD tool for SNHC, subject to verification. The metrics were developed with SNHC 3D Model Coding of objects or connected visual components in mind. However they may apply to BIFS-based rendering of scene compositions.

The ISG work involves extensive software-based profiling of OpenGL. Some specific models were profiled under varied viewing conditions while rendering in 2D/3D. More work on FBA, 3D models, and varied hardware platforms is desirable. Nevertheless, the initial work seems quite promising as a basis for certain kinds of rendering performance estimation. The Projected Surface Sphere provides a recording of simple measures of predicted rendering complexity as a table of data vs. object look angle downloaded with the models. Further fluctuations of predicted performance with changes in object range and perspective are thought to be secondary relative to the primary prediction of the Projected Surface Sphere.

The work of this meeting produced an output document N2482 recommending specific incorporation of changes to the SNHC Version 2 bitstream syntax for 3D Model Coding to support this CGD functionality. These normative bitstream changes would offer measures of model and scene complexity that are mainly independent of the rendering implementation. Thus it would be up to specific decoders/terminals to decide how to use the CHG parameters in the bitstream to predict rendering load for a specific terminal type and to adjust the model complexity within profile@level constraints if scalable 3D content is available in the bitstream.

There is also some chance that these CGD parameters could form a basis for specifying parameter-based level conformance within object profiles. This needs further discussion and operation verification to prove the worth of such a scheme if proponents are later willing to support needed testing. If this concept later proves feasible, then it could lead to tools at the encoder for content authors to limit 3D models for specific platform targets and for terminal manufacturers to ensure rendering power in terminals to match 3D content sent to conforming decoders.

## **7.5 BIFS for SNHC Functionalities in Version 2**

These issues remain areas of interest for harmonizing Version 2 Advanced BIFS with SNHC:

- Scripts & more sophisticated animation/interaction
- Customizing BAP streams by some extension mechanism
  - Adding feature control points, clothing, jewelry
- Dealing with progressive & incremental 3D models
- Harmonizing aural environment modeling
  - Material properties & room geometry
  - Consistency with 3D Model Coding

## **7.6 Face & Body Animation - Versions 1 & 2**

The following outline summarizes the progress and results in FBA work at this meeting:

### **Body Animation**

Core experiments on BAP coding and BAT interpolation were reviewed by EPFL and INT. EPFL and INT modified the BAP coding and animation programs to refer to the latest FBA bitstream syntax.

The reference to H-Anim specification was removed from the specification, and replaced by the H-Anim specification adapted to MPEG terminology:

- Body Definition Table interpolation technique was introduced.
  - Extendable BAPs were added to the FBA bitstream syntax for extra user-defined BAPs to be used for BAT table control.
- Language of body animation sections for visual and systems working draft was improved.  
DCT-based BAP coding semantic description was prepared for inclusion in Visual WD.

After discussions with the VRMLC H-Anim group (see special AHG meetings in Section 10), the following tasks were planned for completion before the next MPEG meeting:

- Some (especially spine) BAP names were changed to be compatible with H-Anim naming. These BAP names were referring to Segment names; changes are proposed to refer to H-Anim Joint Names.
- H-Anim uses three well-defined PROTOs for specification: JOINT, SEGMENT, HUMANOIDINFO. Therefore, the use of BDPs in version 2 requires PROTOs. The inclusion of PROTOs in Version 2 were discussed. It was decided to follow the Systems work on implementation of PROTOs, and if PROTOs will not be implemented, it would be proposed to have three more BIFS nodes related to Body node instead of PROTO implementations.
- The integration of the BDP node in IM1 requires parsing an H-Anim file. Lionheart within the H-Anim group will provide this parser for BDP IM1 implementation.
- Default joint centers could be useful for some applications, it was proposed to include a suggested set of default joint centers in an annex in the MPEG-4 Version 2 visual specification. University of Pennsylvania will provide this set.

Ongoing work for Body Animation includes:

- Core experiments on BAP coding continue with addition of DCT coding.
- First results on BAT core experiments were demonstrated, and bitstream exchanges will be done shortly.
- Determining BAP step sizes based on a binary search technique is in progress with Philips.
- Default min/max values for BAPs need to be determined.
- Profiles and levels need for body animation need to be defined and correlated to face animation.

## **Face Animation**

- The group decided on default min/max values for the Arithmetic Coder, and modified the specification and codecs to reflect this change.
- Gender bit was added in the FBA bitstream syntax to provide a hint of the gender of the person.
- The draft conformance document was prepared and reviewed for Version 1.
- The Rockwell codec was updated to reflect FDIS changes.
- Text-To-Speech and Face animation were defined and integrated in IM1.
- The EPF file format was modified: the first 3 values in the face min/max line were removed since they refer to viseme, expression FAPs.
- The IST codec in IM1 was updated for FDIS bitstream syntax, updating of the Rockwell codec and Miraface is in progress.

### **7.7 2D Animated Mesh Coding in Version 1**

2D Mesh efforts were applied in DoC/FDIS text development and conformance writing described above.

## 7.8 3D Model Coding in Version 2

As mentioned earlier, tremendous work was applied in preparation for the AHG meeting in Seoul, Korea, held on August 30-31, 1998, and for the AHG meeting prior to the main Atlantic City WG11 meeting. The result of this was extensive cross checks and bitstream exchanges, sometimes with bitstream exchanges paralleling basic comparative testing to identify the best technology for each required 3D model coding functionality to maintain schedule. Much of the comparative testing has involved plotting 3D model coding geometric distortion vs. number of vertices/triangles in connected components of modeled objects, as well as cumulative histograms of distortion vs. models tested (up to 300 considered). The assessment of M2 geometric distortion has included rate/distortion comparisons over a range of total bits allowed per compressed vertex.

The conclusions drawn from the Core Experiment work have resulted in the advancement to Version 2 WD of M1, M3, and M4 technologies, subject to an M2 core yet to be resolved. The current technologies in Visual WD (or nearly decided) include:

- M1: 3D mesh connectivity - lossless compression
  - Topological Surgery with enhanced arithmetic coding
- M2: Geometry coding including progressive shape
  - Successive Quantization (with embedded arithmetic coding)
- M3: Progressive connectivity coding (now called hierarchical coding)
  - Progressive forest split compression
- M4: Properties coding (normals, color, texture coordinates)
  - Compressed representation of properties attached to a model, with all bindings defined in VRML (per vertex, per face, per corner)

M2 technology performance depends on the M1 for the order of vertices and triangles encoded in the corresponding spanning trees. The spatial coherence of the connectivity produced by M1 affects the accuracy of vertex prediction under M2. By the middle of the Atlantic City meeting, competing techniques of parallelogram vs. polygonal vertex prediction in M2 had not been tested rigorously with the same M1 baseline technology to permit their objective comparison and the choice of the best technique for M2 in the visual WD.

The WD was structured to provide a dual-method M2 so that other schedule progress can be maintained. A down-select of the winning M2 technology could then be made with the rest of WD providing an interlocking approach to all basic 3D model coding functionality. A meeting was held with ISG later in the week to look at rough estimations of algorithm complexity for the two M2 vertex prediction techniques. It was finally decided to continue with a Core Experiment to resolve the M2 question after Atlantic City. This pushes decisions about the final promotions of WD technology into CD up against the critical schedule deadline of the Eilat meeting. For this and other pressing reasons concerned with meeting MPEG process requirements, another AHG is planned before Eilat.

The M5 work on error resilience and incremental (now called progressive) rendering received a lot of attention in the Seoul meeting, with much more work including bitstream exchanges provided by proponents going into the Atlantic City meeting. Even with the bitstream exchanges accomplished to date in support of M5, a totally consistent basis of error bitstreams generated on short notice with which to test and compare M5 candidates along with accurate VM language for each technique had not been completed to achieve WD promotion under N2073. Consequently intensive meetings were held at Atlantic City to define firm resource commitments and a conclusive Core Experiment for Eilat that will allow M5 results and a technology choice to be added to CD on the basis of making minor WD changes to the established M1 Topological Surgery. The Saturday meeting in Eilat is planned for dedicated, live error resilience testing of the three techniques

described in the Core Experiment document output from Atlantic City. Techniques and tools from the Video group are being used here for consistency with their prior work.

As an important indicator of the maturity and solid industry support behind these competing techniques, versions of the 3D Model Coding tools were demonstrated after the Wednesday Plenary in Atlantic City. In the most extensive integrated demonstration of 3D model coding, the functionalities addressed were:

- Connectivity (vertex/triangle structure)
- Geometry (3D vertex coordinates)
- Properties (color, shape, texture coordinates)
- Progressive transmission (compatible with error resilience) & rendering of complex 3D models

using a wide range of textured 3D models. These demonstrations of real-time software-based decoding and browser-style visualization of 3D models were given by EPFL (M1/M2/M4/M5) and Samsung (M5).

For all the progress and support of tough decisions that has been achieved in 2D and 3D model coding to date, SNHC extends gratitude and recognition to IBM, EPFL, USC, Rockwell, ETRI, INT, K-JIST, Samsung, UTA, Lucent, U. Seoul, U. Rochester, Sharp, and GI.

### 7.9 Tools in SNHC Version 2

The following tools are now expected in SNHC Version 2 based on current WD content, backward compatible with Version 1:

- 3D Model Coding
  - Topology compression
  - Geometry compression
  - Hierarchical compression
  - Attribute compression
  - Progressive compression (with error resilience)
- Body Animation
  - BAP
  - BDP
  - BAT
- CGD (3D model complexity metrics, Projected Surface Sphere)

## 8. Atlantic City Output Documents & Related Contributions

Doc. No.	Title
N2416	DoC for ISO/IEC FCD 14496-1 (specific embedded SNHC items)
N2417	DoC for ISO/IEC FCD 14496-2, Section 3, Disposition of SNHC-Related Comments on FCD 14496-2
N2443	SNHC-related edits on MPEG-4 FCD Systems 14496-1
N2444	SNHC-related edits on MPEG-4 FCD Visual 14496-2
N2445	SNHC Conformance Plan V2.0
N2446	SNHC Reference Software & Work Plan
N2450	SNHC FAQs
N2473	Text of ISO/IEC 14496-2 Visual Working Draft Version 2 Rev 5.0
N2482	Recommendation for the Definition of CGD Parameters in the Visual SNHC Syntax
	Text of SNHC Verification Model 10.0



## 9. Core Experiments for Eilat

The following sets of Core Experiments were formulated for Eilat:

Doc. No.	Title
N2448	Core Experiments in Face & Body Animation
N2449	Core Experiments in 3D Model Coding

### Face Body Animation

N2448

- FA1 Face Calibration
- BA2 BAP Coding
- BA6 BAP Quantization Step Sizes
- BAT BAT Table Interpolation

### 3D Model Coding

N2449

- M2 Prediction for Geometry Coding  
Parallelogram vs. polygon vertex prediction
- M5 Partitioning of Data for 3D Model Coding  
Error resilience/masking vs. efficiency loss  
WD/Topological Surgery with start codes  
Component-based Data Partitioning  
Unification of Looping with the TS Approach
- M6 2D/3D Mesh Unification  
Integrating connectivity/geometry of 3DMC into intra-plane coding of 2D mesh
- M7 Color Quantization  
Exploiting limits of human visual color differentiation to improve color coding efficiency

## 10. Ad Hoc Groups for Eilat

The following groups were established to coordinate core experiments and documents:

Doc. No.	Title
N2440	AHG on 3D Model Coding
N2441	AHG on Face Body Animation
N2442	AHG on SNHC VM Editing

plus these groups with related/intersecting objectives and need for assistance:

Doc. No.	Title
N2447	AHG on MPEG-4 Visual Conformance
N2479	AHG on Integration of Still Texture and 2D/3D Mesh Coding
N2486	AHG on Computational Graceful Degradation
N2530	AHG on Advanced BIFS

### AHG on 3D Model Coding

N2440

- Like Atlantic City, another big workload, priorities to verify WD changes
- Collect/update Core Experiment descriptions & administer Core Experiment work
- Special AHG meetings to evaluate technology maturity and promotion
  - 5 December 1998, Eilat (Rome) - Error resilience testing for M5
  - 6 December 1998, Eilat (Rome) - All other CE work & CD recommendations

**AHG on Face Body Animation****N2441**

- Continue body animation specification, synchronize with VRMLC H-Anim
- Produce additional data sets to verify FDIS, continue contributions to IM1
- Collect/update Core Experiment descriptions & administer Core Experiment work
- Special AHG meetings to evaluate technology maturity and promotion
  - 17 November 1998, Lucent, Murray Hill, New Jersey - with VRMLC H-Anim
  - 6 December 1998, Eilat (Rome) - All CE work and CD recommendations

**AHG on SNHC VM Editing****N2442**

- Collect editorial updates to SNHC VM/WD

**AHG on MPEG-4 Visual Conformance****N2447**

- Edit SNHC conformance plan elements into Visual Part 4
- Define & generate conformance decoders and bitstreams

**AHG on Integration of Still Texture and 2D/3D Mesh Coding****N2479**

- Verify integration of still texture and 2D/3D mesh coding within Systems
- Develop content that stresses system in support of verification
- Recommend guidelines for content developers

**AHG on Computational Graceful Degradation****N2486**

- Complete CGD experiments of N2317 in support of SNHC
- Verify consistency of SNHC syntax changes recommended in N2482
- Verify that N2482 parameters quantify intrinsic SNHC complexity for SNHC/BIFS levels

**AHG on Advanced BIFS****N2530**

- Specify the integration of 3D meshes into the current Systems architecture

## 11. Atlantic City Participants

Many thanks to the following individuals who participated in the working groups and SNHC meetings:

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## 12. Other Related Contributions

### Profiles

Doc.	Group	Title	Authors
3927	Requirements	JNB Comment on New Profile for MPEG-4 Visual Version 2	The National Body of Japan
3928	Requirements	New Profile for MPEG-4 Visual Version 2	Shigeru Fukunaga (Oki),, Hideaki Kimata (NTT),, Eishi Morimatsu (Fujitsu)
3984	Requirements	SNB Contribution, Comments on the Visual profiles	Swedish National Body
4030	Requirements	Experimental MPEG-4 Profile for IETF	v. Balabanian, A. Basso, M.R. Civanlar
4036	Requirements	Report of MPEG-4 Version 1 Level Definition AHG	Kevin O'Connell
3868	Systems	MPEG-4 Systems Profiles/Levels Specification	Olivier Avaro, Carsten Herpel, Julien Sign?s
3903	Video	Request for a delay of the Main Video Object Profile to Version 2	Cecile Dufour, Isabelle Corset
4080	Video	JNB Comment on Main Visual Object Type and Main Visual Profile	The National Body of Japan

P. K. Doenges  
23 November 1998

Annex 10  
Report of the test meeting

Source: Vittorio Baroncini, Acting Chair

## **Introduction**

At the 45th meeting of WG11, in Atlantic City, the results of two verification tests were presented and discussed. The work-plan for the other verification tests was updated.

## **MPEG-4 audio verification tests**

The MPEG-4 Audio coding tools cover a bit rate range from 2 kbit/s to 64 kbit/s with a corresponding subjective audio quality. Therefore, the MPEG-4 verification tests were carried out in several parts. The tests were related first of all Internet audio applications applying codecs with bit-rates ranging from 20 to 56 kbit/s, digital audio broadcasting on AM modulated bands with bit-rates of 16 to 24 kbit/s and speech applications. This document presents the MPEG-4 audio verification test results on speech coders. The performance of speech coders is evaluated in comparison with other standard coders. In this document the results of three independent test sites are presented.

## **Digital audio broadcasting**

The Digital Audio Broadcasting test was planned and carried out in collaboration with the European consortium NADIB (Narrow Band Digital Broadcasting).

The goal of this test was to evaluate the performance of digital systems (including MPEG-4, ITU-T G.723.1, MPEG-2 LayerIII) against Perfect AM, under conditions representative of audio broadcasting and focusing the attention on the comparison between scaleable and not scaleable mode. In particular scaleable codecs working at a global bit-rate of 24 kbit/s (6+18 kbit/s) were compared against non-scaleable codecs either at the same bit-rate or at 18 kbit/s, been this second condition representative of the simulcast mode.

Two separate tests were carried out, including narrow-band (used only for the core layers of the scalable codecs) and the wide-band signals respectively. In both of them only the monophonic mode was used.

The tests were carried out in two laboratories with non-expert listeners. Data analysis confirmed the reliability of the subjects and revealed a bias due to the test site, although rankings obtained at the two laboratories were generally in agreement.

Test results were discussed with the Audio Subgroup and the main conclusions about the performance of the codecs are:

- some codecs gave a very programme-dependent performance
- in the narrow-band test NB-CELP and G.723.1 performed equally well and better than Twin-VQ.
- in the wide-band test AAC-24 was the best.
- MPEG-4 at 24 kbit/s offers a worthwhile improvement to AM broadcasting,

- scalability at 6+18kbit/s is better than basic coding at 18 kb/s but not as good as basic coding at 24 kb/s, therefore scaleability is better than simulcast, but as expected scaleable codecs perform worse than non-scaleable ones.
- WB-CELP(mode3) did not perform well for speech+music.

The reasons for some of these observations were discussed during the meeting and they are explained in the final report (document N. 2276).

## **Speech**

The MPEG-4 verification tests were carried out in several parts. The tests were related first of all Internet audio applications applying codecs with bit-rates ranging from 20 to 56 kbit/s, digital audio broadcasting on AM modulated bands with bit-rates of 16 to 24 kbit/s and speech applications. The performance of speech coders was evaluated in comparison with other standard coders. In this document the results of three independent test sites are presented.

Due to the different technology and different band-width applied in the speech coders, the test had to be divided in three groups:

- Narrow band parametric speech coders with 2 and 4 kbit/s.
- Narrow band CELP (NB-CELP) coders bit-rates ranging from 6 to 12 kbit/s.
- Wide-band CELP (WB-CELP) coders with bit-rates ranging from 17.9 to 18.2 kbit/s and bandwidth scaleable CELP at 16 kbit/s.

## **Internet radio**

The test plan previously approved was completely revised and now it includes four sub-tests:

- Audio coding at a bit rate below 10kbit/s.
- Audio coding at bit rates around 16 Kbit/s
- Saleable coding of mono material at 24 kbit/s
- Scaleable coding of stereo material in a range of bitrate between 40 and 56 kbit/s

Details about the test plan are given in document N. 2278.

In addition during the meeting the source material collected for this test was pre-screened and 39 items out of 90 were selected (see document N.2279). The final selection of the test material will be done on the encoded material and it is one of the tasks of the ad hoc group for audio verification tests.

## **MPEG-4 video verification test**

### **Error robustness**

During the meeting it has been planned to carry out a new test to evaluate the performance of MPEG-4 error resilience tools.

This new test has been decided taking into account a new strategy for the error concealment.

The test will be carried out taking into account the experience gained with the first test run.

Test conditions will be produced by means of a simulation of the complete transmission chain, including transmission errors. The combination of three different bit rates with two error conditions

was considered. Furthermore two additional conditions (applied to the 32Kbps and 128kbps) will be added in order to evaluate the new concealment strategies.

This new test will be carried out in the same three laboratories that conducted the first test. Non-expert viewers will be used. Data analysis will include the reliability of the subjects and a check of the possible bias due to the test sites, although the trends of the results of the last test was very similar in the three laboratories.

Test results will be discussed with the Video Subgroup at the next meeting.

### **Content-based coding**

A fourth pre-screening of the material to be used in the lower bit rate test was conducted during the Dublin meeting. Sequences were coded by using MPEG-1 and 'MPEG-4 Frame-Based', both using rate control.

A number of problems related either to the implementation of MPEG-1 or to the particular rate control used were discussed and new coding parameter settings were agreed. In particular, in order to make fair comparisons between 'MPEG-4 Frame-Based' and MPEG-1, it was decided that the MPEG-4 rate control will be implemented in the MPEG-1 encoder and MPEG-1 (TM5) adaptive quantisation weighting factor will be used in MPEG-4.

Moreover, during the pre-screening a new sequence named 'Birthday' was presented. This sequence was produced by BBC, in reply to a call for critical segmented material issued at the previous MPEG meeting. Although the sequence meets most of the requirements indicated in the call, it was decided not to use it in the verification test because in that sequence the whole information of each object is always available, even when two objects overlap. This would result in a disadvantage for the object-based coding that in this kind of sequences wastes bandwidth to encode hidden parts.

Finally, the test methods to be used in the two tests (i.e. high and low bitrates) were agreed.

Details about coding parameter settings and test methods are given in document N.2334

### **Scalability**

In Dublin, a first pre-screening on the material to be used for the scalability verification test was conducted.

The suitability of the sequences to be used in this test was discussed and it was suggested that sequences are representative of potential applications. It was also realised that negative effects may be introduced when the frame rate of only one of two foreground objects is improved.

Moreover, it was recognised that the rate control is an important element and it should be used in the production of test conditions.

Therefore, in the ad hoc group for video verification tests the suitability of available MPEG sequences will be investigated and a suitable rate control strategy will be developed.

Finally, taking into account the considerable amount of work to be done, it was decided to remove the spatial scalability from the first round of this verification test.

The material for a second pre-screening will be prepared according to the considerations explained above and it will be presented in Atlantic City.

## List of output documents

Title	Number
MPEG-4 Audio verification test results: narrowband audio broadcasting	2276
Plan for MPEG-4 Audio verification tests: speech codecs	2277
Plan for MPEG-4 Audio verification tests: music on Internet	2278
Prescreening results on MPEG-4 Audio verification test excerpts - Music on Internet	2279
MPEG-4 Video verification test results: error robustness	2333
Revised test conditions for video verification test on content-based coding	2334
Revised test conditions for video verification test on scalability	2335
Test plan for the second verification test on error resilience	2368
Logistics for distribution of video and audio-visual test material on CD-ROMs	2336
MPEG Test FAQs	2337

## Ad hoc groups

Ad hoc group	Doc. #
vAd-hoc group on MPEG-4 Audio Verification tests (Edler/S-W Kim)	2296
Ad-hoc group on MPEG-4 Video Verification tests (Wollborn/Suzuki/Baroncini)	2338

Annex 11  
Report of the ISG meeting

Source: Marco Mattavelli, Chair.

### Generalities

The work of the Implementation Studies Group (ISG) during the Atlantic City meeting has addressed seven main topics:

- 1) The definition of video levels based on a complexity formula and the definition of a measure for limiting the allowed maximum number of macroblocks occurring in each decoding period,
- 2) The Computational Graceful Degradation for the rendering of SNHC video,
- 3) The complexity analysis for the definition of levels of Structured Audio Orchestra Language (SAOL),
- 4) The analysis of MPEG-4 components: IPMP interface synchronisation problems,
- 5) The complexity evaluation of two different CELP encoder configurations,
- 6) The evaluation of the complexity of two SNHC polygon prediction techniques.
- 7) The editing of ISG Frequently Asked Questions.

#### **1) Definition of video levels based on a complexity formula and definition of measures for limiting the allowed maximum number of macroblocks**

Several National Bodies commented the use of the complexity formula for the definition of levels in video. Although considered a good approach, there is still a lack of measurements of the complexity of some tools, and a lack of extensive statistical results of the occurrence of the various modes. The actual result is an incomplete definition for some coding modes. The analysis of the NB corresponds to the one of the ISG. Therefore, it was decided not to use the proposed complexity formula for the definition of profiles in MPEG-4 version 1, to encourage the measurements of the missing relative weight coefficients and the assessment of their correctness on different implementations for MPEG-4 version 2 level definition.

Another point raised by the NB comments was the ambiguous definition of the maximum allowed number of macroblocks per second. In MPEG-4 video a VOP can be placed at any time and appropriate measures have to be taken in order to prevent the congestion of several VOP occurring in a too short time interval. A new definition of what is meant by maximum number of macroblocks per second has been proposed by the ISG and can be found in document N2483.

#### **2) Computational Graceful Degradation for the rendering of SNHC video**

**Experimental results about the 3D rendering complexity of OpenGL functions for SNHC (document M4076) show that the conjecture come out in the previous meeting was correct. Indeed the complexity of the rendering can be predicted with an excellent degree of approximation using only the 4 parameters selected in Dublin:**

- number of triangles,
- number of vertices,



- number of edges,
- number of projected pixels.

While the first three can be easily made available in the visual SNHC bitstream the determination of the number of projected pixel required the development of an appropriate technique. The idea is to transmit with the 3-D model definition also the number of projected pixels in a limited number of point of views. It has been shown that simple interpolations are capable of proving a good approximation of such figure for any possible point of view, thus making possible complexity prediction at an extremely low cost. There is no need to transmit additional information for each frame but only include appropriate information in the model definition. A proposition for a change in the visual SNHC syntax that include the above mentioned information and thus make possible the implementation of CGD features in SNHC has been approved by the ISG and SNHC group (document N2482).

Further experiments to validate the obtained results will be carried out using different 3-D models a different support platform.

### **3) Complexity analysis for the definition of levels of Structured Audio Orchestra Language (SAOL).**

The results of the method for measuring complexity of SAOL (document M4110) presented in Dublin (M3602) have been reviewed. The proposed complexity vector has been shown to provide useful measures independent from the platform for bounding the complexity of SAOL. ISG and SA task group approved the decision of defining SAOL levels basing on the proposed complexity vector. The two groups discussed and defined actual values for a “low complexity”, “medium complexity” and “high complexity” levels for SAOL.

A contribution proposing limiting parameters for Audio BIFS nodes was discussed with the audio group. It was agreed that at least the proposed parameters are necessary to enable the implementation of Audio BIFS nodes. An output document (N2484) has been approved jointly by the ISG and the Audio group.

### **4) Complexity evaluation of MPEG-4 components: Analysis of IPMP interface synchronisation problems.**

In the framework of the assessment of the complexity of all MPEG-4 components the ISG group has discussed the timing and synchronisation problems introduced by the system IPMP interface. It was concluded that the “simple delay” model is not sufficient to characterise all possible effects on the system real-time and synchronisation implementation. A new case called “hold on” needs also to be studied considering the interaction between the non-normative application and the system. Moreover, limits and performance of the “simple delay” case need also to be determined. It was agreed to proceed with further experiments and tests of the IPMP interface in the IM1 framework (document N2520). The ISG agreed to become active part in these experiments. Some experiments will be carried out also studying the specific interactions with a multithread based OS implementation.

### **5) Complexity evaluation of two different CELP encoder configurations.**

Two different CELP encoder configurations have been submitted to the ISG for advice. One is based on a Multiple Pulse Excitation module while the second is based on Regular Pulse Excitation module. A preliminary complexity analysis shows that the RPE provides a lower complexity encoder. Further studies need to be done by the audio group to provide a performance analysis of the two modules.

#### **6) Evaluation of the complexity of two SNHC polygon prediction techniques.**

Two prediction techniques for the compression of 3-D model descriptions have been proposed in the SNHC group. A preliminary complexity analysis has been performed with the SNHC group. A more in depth analysis will be carried out to assess the complexity of the two competitive schemes and will be ready for the next meeting..

#### **7) Editing of ISG Frequently Asked Questions**

The document N2485 "ISG Frequently Asked Question" has been reviewed by the group, approved and is available for public distribution.

Annex 12  
Report of the Liaison meeting

Source: Barry Haskell, Chair

The Liaison group considered the following Atlantic City input documents

	Source	Title	Number (if any)
1		List of PAS Contacts	SC29 N2717
2	ITU-R WP11B	USE OF COMPUTER TECHNOLOGY IN TV BROADCASTING APPLICATIONS	M3863
3	ITU-R SGs 10 & 11 Joint Task Group	MULTIMEDIA BROADCAST EVOLUTION AND COMMON CONTENT FORMAT	
4	MEDSEC	MEDSEC Deliverables D13 - D19	SC29 N2731
5	IETF	MPEG-4 Operation with IETF Transport Area Standards	M3882
6	IETF	MPEG-4 Transport using RTP	M3883
7	ITU-T SG16	Liaison to ISO/IEC regarding code points in H.245v5	M4045
8		Email on MPEG4 and H.324	
9	Contrib to ITU-T SG1	MPEG-4 and H.324 - DMIF Interface	
10	Contrib to ITU-T SG1	MPEG-4 and H.324 - new Applications	
11	CEN	Liaison CEN/ISSS/MMI	M4059
12	VRML	Liaison - Review of BIFS Specification	M4088
13		Email on VRML	
14	DAVIC	Navigation tools for MPEG-2 Transport Streams and MPEG-4 streams	
15		Email on DAVIC	
16		Email on AES	
17		Email on Digital Broadcasting OVS	
18		Email on DAISY 2.0	
19		Email on UMID	
20		Email on AIC Initiative	
21		AIC Architecture	
22		Email on NEMESIS	
23		Email on DVB	
24		Email on Email on W3C and RDF for MPEG-7	
25		W3C - TV and the Web	
26		Email on LDC	
27		Email on AVT WG at IETF	

### List of current liaison representatives

IETF	Vahe Balabanian
ITU-T SG16 Q11	Yoshihiro Kikuchi
CEN	Francoise Preteux
VRML	Julien Signes
ITU-R WP10C	Karlheinz Brandenburg
AES	Karlheinz Brandenburg
ISO / TC 46 / SC 9	Albert Simmonds
AGICOA	

The following output liaison documents were produced:

N2493	Liaison to NEMESIS
N2494	Liaison to AIC
N2495	Liaison to MIDI Manufacturers Association
N2496	Liaison statement to ITU-T SG 12 on MPEG-4 audio verification tests
N2497	Liaison to ITU-R JWP 10-11Q on MPEG-4 audio verification tests
N2498	Liaison to ITU-T SG16 on MPEG-4 audio verification
N2499	Liaison to EBU B/CASE on MPEG-4 audio verification tests
N2507	Liaison to ITU-R WP 10C on MPEG-4 audio verification tests
N2508	Liaison to ITU-T SG16/Q.11 on support for complete MPEG-4 content
N2509	Liaison statement to ITU-T SG16 on the support of MPEG-4/Audio in H.324 termin
N2510	Liaison to VRML
N2511	Liaison to ITU-T SG16 Q12
N2512	Liaison to Transport Informatics and Control Systems (TICS)
N2513	Liaison to Advanced Interactive Content (AIC) Initiative
N2514	Liaison on closer working relationship with IETF on DMIF
N2515	Liaison to CEN
N2516	Liaison to SMPTE UMID Ad Hoc Group
N2517	Response to NB comments on non FDIS ballot subjects