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

ISO/IEC JTC 1/SC 29/WG 11 N10876

Xi'an, CN – October 2009

Source: **Leonardo Chiariglione**

Title: **Report of 90th meeting**

Status

Report of 90th meeting

1. Opening

The 90th MPEG Meeting took place from 26th to 30 October 2009 at Sheraton Hotel in Xi'an, China.

2. Roll call of participants

Annex 1 provides the list of participants

3. Approval of agenda

The agenda adopted is provided by Annex 2

4. Allocation of contributions

Annex 3 provides the list of input documents

5. Communications from Convenor

There was no specific communication

6. Report of previous meeting

This was approved

7. Processing of NB Position Papers

Papers were presented and, where appropriate, responses provided.

8. Work plan management

8.1. Media coding

8.1.1. ALS simple profile

The following documents were approved

11031	**DoC on ISO/IEC 14496-3:2009/PDAM 2, ALS Simple Profile and Transport of SAOC**
11032	**ISO/IEC 14496-3:2009/FPDAM 2, ALS Simple Profile and Transport of SAOC**

8.1.2. Scalable-complexity 3D mesh compression

The following document was approved

10888	**Text of ISO/IEC 14496-25:2008/PDAM 1 Scalable Complexity 3D Mesh Coding for 3DG Compression Model**

8.1.3. Efficient representation of 3D meshes with multiple attributes

The following documents were approved

10886	**Request for ISO/IEC 14496-16:2009/AMD2 Efficient representation of 3D meshes with multiple attributes**
10887	**WD 1.0 of ISO/IEC 14496-16:2009 AMD2 Efficient representation of 3D meshes with multiple attributes**
10885	**Description of 3DG Core Experiments**

8.1.4. Open Font Format

The following documents were approved

10956	**Text of ISO/EC 14496-22:2009/FPDAM 1 Support for many-to-one range mappings**
10957	**Summary and description of Composite Font Format**
10958	**Draft request for the Fonts as top level MIME type**

8.1.5. Video Tool Library

The following documents were approved

10921	**Study of ISO/IEC 23002-4/FPDAM 1 Video Tool Library Conformance and Reference Software**
10922	**WD 6 of ISO/IEC 23002-4/Amd.2 (Tools for AVC HP)**
10923	**Description of Core Experiments in RVC**
10924	**RVC Work Plan**

8.1.6. Spatial Audio Object Coding

The following documents were approved

11037	**Study on ISO/IEC FCD 23003-2:200x, Spatial Audio Object Coding**
11038	**Workplan on SAOC**
11039	**Report on Performance of MPEG SAOC Technology**

8.1.7. Unified Speech and Audio Coding

The following documents were approved

11040	**WD5 of USAC**
11041	**Workplan for USAC CEs**
11042	**Workplan on MPEG USAC Reference Encoder**

8.1.8. Media Context and Control – Control Information

The following documents were approved

10983	**DoC on ISO/IEC CD 23005-2 Control Information**

10984	**Text of ISO/IEC FCD 23005-2 Control Information**
10985	**WD for additional technologies for ISO/IEC 23005-2 Control Information**

8.1.9. Media Context and Control – Sensory Information

The following documents were approved

10986	**DoC on ISO/IEC CD 23005-3 Sensory Information**
10987	**Text of ISO/IEC FCD 23005-3 Sensory Information**

8.1.10. Media Context and Control – Virtual World Object Characteristics

The following documents were approved

10988	**DoC on ISO/IEC CD 23005-4 Virtual World Object Characteristics**
10989	**Text of ISO/IEC FCD 23005-4 Virtual World Object Characteristics**

8.1.11. Data Formats for Interaction Devices

The following documents were approved

10990	**Request for subdivision of ISO/IEC FCD 23005-5 Data Formats for Interaction Devices**
10991	**Text of ISO/IEC FCD 23005-5 Data Formats for Interaction Devices**

8.1.12. 3D Video Coding

The following documents were approved

11061	**Applications and Requirements of 3D Video Coding**
10925	**Description of Exploration Experiments in 3D Video Coding**

8.1.13. High-Performance Video Coding

The following document was approved

10926	**Draft Call for Proposals on High Performance Video Coding**

8.2. Composition coding

8.2.1. BIFS ExtendedCore2D Profile

The following documents were approved

10948	**DoC on ISO/IEC 14496-11:2005/PDAM 7 ExtendedCore2D Profile**
10949	**Text of ISO/IEC 14496-11:2005/FPDAM 7 ExtendedCore2D Profile**
10950	**Items under Consideration for further improvements of BIFS**

8.2.2. Presentation and Modification of Structured Information

The following documents were approved

10953	**DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI**
10954	**Text of ISO/IEC 14496-20:2008/FDAM 3 PMSI**
10955	**Updated Workplan for service examples of LASeR Adaptation & PMSI**

8.3. Description coding

8.3.1. Video Signature Descriptors

The following documents were approved

10899	**Disposition of Comments on ISO/IEC 15938-3/PDAM 4**
10912	**Text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools**
10913	**MPEG-7 Visual XM 37**
10914	**Description of Core Experiments in Video Signature Description development**

8.3.2. Extraction and Matching of Image Signature Tools

The following documents were approved

10919	**Disposition of Comments on ISO/IEC 15938-8/DAM 5**
10920	**Text of ISO/IEC 15938-8/AMD 5 Extraction and Matching of Image Signature Tools**

8.3.3. MPQF semantic enhancemen

The following documents were approved

10962	**Request for ISO/IEC15938-12:2008 AMD 2 MPQF semantic enhancement**
10963	**Text of ISO/IEC15938-12:2008 PDAM 2 MPQF semantic enhancement**

8.3.4. Metadata driven post processing of audio signals

The following document was approved

11043	**Report on the Performance of MPEG-2 AAC Dynamic Range Control**

8.4. Systems support

8.4.1. MPEG-4 Systems 4th edition

The following document was approved

10943	**Text of ISO/IEC 14496-1 4th Edition**

8.4.2. Registration Authority and Systems support

The following document was approved

10944	**Text of ISO/IEC 14496-1:200X/FPDAM 1 Usage of LASeR in MPEG-4 systems and Registration Authority for MPEG-4 descriptors**

8.5. Digital Item

8.5.1. Presentation of Digital Item

The following documents were approved

11013	**DoC on ISO/IEC 21000-2:2005/PDAM 1 Presentation of digital item**
11020	**Possible alternative solutions to support presentation in digital item**

8.6. Transport and File formats

8.6.1. Carriage of JPEG 2000 in MPEG-2 Systems

The following documents were approved

10939	**Request for ISO/IEC 13818-1:2007/AMD 5 Carriage of JPEG2000 over MPEG-2 TS**
10940	**Text of ISO/IEC 13818-1:2007/PDAM 5 Carriage of JPEG2000 over MPEG-2 TS**

8.6.2. MVC operation point descriptor

The following documents were approved

10941	**Request for ISO/IEC 13818-1:2007/AMD 6 MVC operation point descriptor**
10942	**Text of ISO/IEC 13818-1:2007/PDAM 6 MVC operation point descriptor**

8.6.3. AVC File Format

The following document was approved

10952	**WD of ISO/IEC 14496-15 2nd edition**

8.6.4. Sub-track selection & switching

The following document was approved

10951	**WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection & switching**

8.6.5. MPEG Media Transport

The following documents were approved

11056	**Draft Requirements for MMT (Modern Media Transport)**
11057	**Draft Call for Proposals on MMT**
11058	**Draft Modern Media Transport (MMT) Context and Objectives**
11060	**Workshop on MMT (MPEG Modern Transport) – Call for Contributions**
11062	**Draft Use Cases for MMT**

8.7. Multimedia architecture

8.7.1. MXM Architecture and Technologies

The following document was approved

10972	**Study Text of ISO/IEC FCD 23006-1 MXM Architecture and Technologies**

8.7.2. MXM API

The following document was approved

10973	**Study Text of ISO/IEC FCD 23006-2 MXM APIs**

8.7.3. MXM Protocols

The following document was approved

10975	**Study Text of ISO/IEC FCD 23006-4 MXM Protocols**

8.7.4. MPEG Rich Media UI

The following documents were approved

11055	**Rich Media UI Framework Requirements**
10976	**DoC on ISO/IEC CD 23007-1 Widgets**
10977	**Text of ISO/IEC FCD 23007-1 Widgets**
10978	**White paper on MPEG Rich Media Widgets**
10979	**Ideas on Advanced User Interaction Interface in MPEG-U**

8.7.5. Media Context and Control - Architecture

The following documents were approved

10981	**DoC on ISO/IEC CD 23005-1 Architecture**
10982	**Text of ISO/IEC FCD 23005-1 Architecture**

8.7.6. Advanced IPTV Terminal

The following documents were approved

11063	**Advanced IPTV Terminal (AIT): Requirements and candidate technologies**
11064	**Draft Call for Proposals on Advanced IPTV Terminal (AIT)**
11070	**Context and Objectives for Advanced IPTV Terminal (AIT)**
11072	**Use case based testing of AIT basic services**
11071	**Ideas on protocols supporting AIT services**

8.8. Application formats

8.8.1. Interactive Music Application Format

The following documents were approved

10970	**Study of ISO/IEC FCD 23000-12 Interactive Music AF**
10971	**Workplan for the Interactive Music AF Conformance & Reference SW**

8.9. Reference implementation

8.9.1. MVC Reference Software

The following documents were approved

10896	**Disposition of Comments on ISO/IEC 14496-5 :2001/FPDAM 15**
10897	**Text of ISO/IEC 14496-5 :2001/FDAM 15 MVC Reference Software**

8.9.2. SC3DMC Reference Software

The following documents were approved

10881	**DoC on ISO/IEC 14496-5:2001/PDAM 27 Reference Software for Scalable Complexity 3D Mesh Coding**
10882	**Text of ISO/IEC 14496-5:2001/FPDAM 27 Reference Software for Scalable Complexity 3D Mesh Coding**

8.9.3. Scalable Complexity 3D Mesh Coding in 3DG Compression Model Reference Software

The following documents were approved

10883	**Request for ISO/IEC 14496-5:2001 AMD 26 Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**
10884	**Text of ISO/IEC 14496-5:2001/PDAM 26 Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**

8.9.4. Synthesized Texture Reference Software

The following document was approved

10947	**Text of ISO/IEC 14496-5:2001/FDAM 23 Synthesized Texture Reference Software**

8.9.5. Image Signature Tools Reference Software

The following documents were approved

10915	**Disposition of Comments on ISO/IEC 15938-6/FPDAM 3**

10916	**Text of ISO/IEC 15938-6/FDAM 3 Reference Software for Image Signature Tools**

8.9.6. MPQF Reference Software

The following documents were approved

10960	**DoC on ISO/IEC 15938-12:2008/PDAM 1 MPQF Conf. and Ref. SW**
10961	**Text of ISO/IEC 15938-12:2008/FPDAM 1 MPQF Conf. and Ref. SW**

8.9.7. Professional Archival AF Reference Software

The following documents were approved

10964	**DoC on ISO/IEC 23000-6:2009/FPDAM 1 Conformance and Reference Software for Professional Archival AF**
10965	**Text of ISO/IEC 23000-6:2009/FDAM 1 Conformance and Reference Software for Professional Archival AF**

8.9.8. DMB AF Reference Software

The following document was approved

10966	**Workplan for DMB AF conformance & reference software**

8.9.9. Stereoscopic video AF Reference Software

The following documents were approved

10967	**DoC on ISO/IEC 23000-11/PDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**
10968	**Text of ISO/IEC 23000-11/FPDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**
10969	**Updated workplan for Stereoscopic Video AF Ref. Soft. and Conf.**

8.9.10. MXM Reference Software

The following document was approved

10974	**Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW**

8.9.11. MPEG Rich Media UI Reference Software

The following document was approved

10980	**WD of ISO/IEC 23007-3 Conformance and Reference Software**

8.9.12. Media Context and Control – Reference Software

The following document was approved

10992	**Workplan of Reference Software regarding ISO/IEC 23005-2 and 23005-4**

8.10. Conformance

8.10.1. BSAC Conformance for Broadcasting

The following documents were approved

11034	**DoC ISO/IEC 14496-26:2009/PDAM 2, BSAC Conformance for Broadcasting**
11035	**ISO/IEC 14496-26:2009/FPDAM 2, BSAC Conformance for Broadcasting**

8.10.2. MVC Conformance

The following documents were approved

10894	**Disposition of Comments on ISO/IEC 14496-4 :2004/FPDAM 38**
10895	**Text of ISO/IEC 14496-4 :2004/FDAM 38 MVC Conformance**

8.10.3. Scalable Complexity 3DMC Conformance

The following document was approved

10889	**Text of ISO/IEC 14496-27:2009/FPDAM 2 Conformance for Scalable Complexity 3D Mesh Coding**

8.10.4. 3D Graphics Compression Model Conformance

The following documents were approved

10890	**Request for ISO/IEC 14496-27:2009 AMD3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**
10891	**Text of ISO/IEC 14496-27:2009/PDAM3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**

8.10.5. Image Signature Tools Conformance

The following documents were approved

10917	**Draft Disposition of Comments on ISO/IEC 15938-7/FPDAM 5**
10918	**Study Text of ISO/IEC 15938-7/FPDAM 5 Conformance Testing for Image Signature Tools**

8.10.6. MPQF Conformance

The following documents were approved

10960	**DoC on ISO/IEC 15938-12:2008/PDAM 1 MPQF Conf. and Ref. SW**
10961	**Text of ISO/IEC 15938-12:2008/FPDAM 1 MPQF Conf. and Ref. SW**

8.10.7. Professional Archival AF Conformance

The following documents were approved

10964	**DoC on ISO/IEC 23000-6:2009/FPDAM 1 Conformance and Reference Software for Professional Archival AF**
10965	**Text of ISO/IEC 23000-6:2009/FDAM 1 Conformance and Reference Software for Professional Archival AF**

8.10.8. DMB AF Conformance

The following document was approved

10966	**Workplan for DMB AF conformance & reference software**

8.10.9. Stereoscopic video AF Conformance

The following documents were approved

10967	**DoC on ISO/IEC 23000-11/PDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**
10968	**Text of ISO/IEC 23000-11/FPDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**
10969	**Updated workplan for Stereoscopic Video AF Ref. Soft. and Conf.**

8.10.10.MXM Conformance

The following document was approved

10974	**Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW**

8.10.11.MPEG Rich Media UI Conformance

The following document was approved

10980	**WD of ISO/IEC 23007-3 Conformance and Reference Software**

8.11. Maintenance

8.11.1. Systems coding standards

The following documents were approved

10936	**DoC on ISO/IEC 13818-1:2007/DCOR 3**
10937	**Text of ISO/IEC 13818-1:2007/COR 3**
10938	**Text of ISO/IEC 13818-1:2007/AMD 3:2009/COR 1**
10945	**DoC on ISO/IEC 14496-5:2001/Amd.14:2009/DCOR 1**
10946	**Text of ISO/IEC 14496-5:2001/Amd.14:2009/COR 1 Open Font Format Reference Software Technical Corrigendum**

8.11.2. Video coding standards

The following documents were approved

10893	**Text of ISO/IEC 14496-2:2004/DCOR 4**
10898	**Study of ISO/IEC 14496-10:2009/DCOR 1**

8.11.3. Audio coding standards

The following documents were approved

11029	**DoC on ISO/IEC 14496-3:2009/DCOR 1 Byte Alignment**
11030	**ISO/IEC 14496-3:2009/Cor.1 Byte Alignment**
11033	**ISO/IEC 14496-5:2001/AMD 10:2007/DCOR 4 SLS**
11036	**Defect Report on the MPEG Surround conformance and reference software.**

8.11.4. Systems description coding standards

The following document was approved

10959	**Text of ISO/IEC 15938-12:2008/COR 2 MPQF (missing semantics)**

9. Organisation of this meeting

9.1. Tasks for subgroups

The following tasks were assigned

Requirements	Std	Pt	Amd	
	V			Haptics
				Advanced IPTV Terminal
				HVC – CfP
				3DV
				MMT
				Royalty free codec
				ToR of collaboration with ITU-T on HVC
				New standard areas • Audio for HVC
Systems	Std	Pt	Amd	
	2	1	4	Carriage of MVC
			Cor. 3	Miscellaneous
			5	Carriage of JPEG2000
	4	1	4	LASeR in MPEG-4 System and RA
		1		4th edition
			23	Synthesised texture RS
			?	SVC FF RS
		11	7	New BIFS Profile for Digital Radio
		14	1	MPEG-4 Audio Enhancement Layers (FF)
		20	3	Presentation and Modification of Structured Information
		22	1	Open Font Format
	7	12	Amd1	C and RS
			Amd2	Semantic enhancement
			Cor. 2	missing semantics
	21	2	Amd1	PDI

		4	Amd4	Protection of presentation element
		19		MVCO
	A	5	2nd Ed	Media Streaming AF
		6	2	Professional Archival AF RS & C
		9	1	DMB AF RS & C
		9	2	DMB MPEG-2 TS storage
		10	1	Video Surveillance AF RS & C
		11	1	Stereoscopic video AF RS & C
			2	Additional composition type
		12		Interactive music AF
	B	6		Data representation for multimedia devices
	M	1		MXM Architecture
		2		MXM API
		3		MXM RS & C
		4		MXM Protocols
	V	1		Architecture
		2		Control Information
		3		Sensory information
		4		Avatar information
	U	1		Rich Media Widgets
		2		Advanced input device interface
		3		Reference Software and Conformance
	X			Advanced IPTV Terminal
Video				
	4	4	38	MVC Conformance
		5	15	MVC RS
		10	Cor 1	Miscellanea
	7	3	4	Video Signature Tools
		6		Image Signature Tools RS
		7		Image Signature Tools C
	A	3	2	Photo Player Conformance

	C	4	1	Video Tool Library Conformance & RS
			2	Video Tool Library extensions
				3DV/FTV
				HVC
Audio	4	3	2	ALS profile
		3		960/1024
		26	2	BSAC for broadcasting
	D	2		Spatial Audio Object Coding
		3		USAC
				New audio issues (HVC)
3DG	4	16	1	Scalable complexity 3DMC
			2	Mesh representation supporting multiple attributes
		27	1	3D Graphics Compression model Conformance
		5	22	3D Graphics Compression model Reference Software
			27	Scalability complexity 3DMC RS
	V			Information exchange with virtual worlds
				Reconfigurable Graphics coding
				Scalable 3DMC

9.2. Joint meetings

The following joint meetings were held

Groups	**What**	**Day**	**Time**	**Where**
S, R	AIT	Mon	16:00-18:00	R
S, R	MMT	Tue	11:00-12:00	R
S, R, V	MMT	Tue	12:00-13:00	R
S, R	MPEG-U	Tue	14:00-15:00	R
V, 3	RVC	Tue	16:00-18:00	3
R, S	MMT	Tue	16:00-17:00	R
V, R	HVC ToR	Wed	13:00-14:00	R
3, S, R	Haptics	Wed	11:00-12:00	S
S, R	Font	Wed	12:00-13:00	S

3, S	MPEG-V	Wed	14:00-18:00	3
V, R	HVC	Wed	14:00-15:00	V
V, R	3DV	Wed	15:00-16:00	V
S, R	AIT	Wed	16:00-18:00	R
V, R	Subjectively lossless video	Wed	18:00-18:30	R
S, A	MXM	Thu	09:00-09:30	S BO2
S, R	MMT	Thu	09:00-11:00	R

10. WG management

10.1. Terms of reference

The following document was approved

10900	**Terms of reference**

10.2. Editors

The following document was approved

10904	**Editors of MPEG standards**

10.3. Liaisons

10.3.1. Liaisons sent

The following documents were approved

11014	**Liaison statement to SC 29/WG 1 on ColorInformationBox**	**No**	**09/10/30**
11015	**Liaison statement to SC 29/WG 1 on JPEG2000 over MPEG-2 TS**	**No**	**09/10/30**
11016	**Liaison statement to SCTE on signaling of MVC operation points**	**No**	**09/10/30**
11017	**Liaison statement to SC 34/WG 2 on Open Font Format Reference Software**	**No**	**09/10/30**
11018	**Liaison statement to SC 27/WG 4 on WD 27037 – Digital Evidence**	**No**	**09/10/30**
11019	**Liaison statement to ISO/TC 223/AH 3 on WD 22311 – Videosurveillance Format**	**No**	**09/10/30**
11021	**Liaison statement to SGDCMP**	**No**	**09/10/30**
11022	**Liaison statement to IEC TC 100 on DLNA link protection**	**No**	**09/10/30**

11023	**Liaison statement to ISO/TC 46/SC 9 on Digital Object Identifier**	**No**	**09/10/30**
11024	**Liaison statement to DVB TM AVC on signaling of AVC video with 3D**	**No**	**09/10/30**
11025	**Liaison statement template on AIT**	**No**	**09/10/30**
11026	**Liaison statement template on MMT**	**No**	**09/10/30**
11027	**Liaison statement to ISO TC 20/SC 13 on PA-AF**	**No**	**09/10/30**
11028	**Liaison statement to IEC TC 100 and ITU-T SG 16 on REL profile**	**No**	**09/10/30**
10927	**Liaison statement to ITU-T SG16 Q6 on HVC Collaboration**	**N**	**09/10/30**
10928	**Liaison statement to SC 37 on ISO/IEC JTC 1/SC 37's CDs and FCDs**	**N**	**09/10/30**
10929	**Liaison statement to SCTE on 3D Video**	**N**	**09/10/30**
11044	**Liaison to IETF on MPEG Audio Codecs**		**09/10/30**

10.3.2. Statements of benefits

The following documents were approved

10930	**Statement of benefits from establishing a category C liaison with the SCTE**
11073	**Statement of benefits from establishing a category C liaison with the VSF**

10.3.3. Lists of organisations in liaison

The following document was approved

10911	**List of Organisations with which MPEG entertains liaisons**

10.4. Responses to National Bodies

The following documents were approved

11047	**Responses to National Bodies on video issues**
11065	**Responses to CNNB position statement on more friendly IPR policy**
11066	**Call for Comments on Possible Future activities on “Royalty-free” Standardization by MPEG**
11067	**Summary of Issues and question from the 90th MPEG Meeting In connection with CNNB input document (M16903)**

10.5. Work item assignment

10.6. Ad hoc groups

The following documents were approved

11059	Adhoc on MPEG Modern Transport (MMT)
11063	Advanced IPTV Terminal (AIT): Requirements and candidate technologies
10934	AHG on 3D Video Coding
10892	AHG on 3DGC documents, software maintenance and core experiments
11052	AHG on Advanced IPTV Terminal
11050	AHG on Application Format
11045	AHG on Audio Standards Maintenance
11051	AHG on Font Format Representation
10935	AHG on High-Performance Video Coding
10931	AHG on Maintenance of MPEG-4 Visual related Documents, Reference Software and Conformance
11049	AHG on MPEG File Formats
11068	AHG on MPEG Media Transport (MMT)
10933	AHG on MPEG-7 Visual
11054	AHG on MPEG-V
11053	AHG on MXM
10932	AHG on Reconfigurable Video Coding
11046	AHG on SAOC, USAC and MetaData
11048	AHG on Scene Representation

10.7. Asset management

The following documents were approved

10905	**Schema assets**
10906	**Software assets**
10907	**Conformance assets**
10908	**Content assets**
10909	**URI assets**

10.8. IPR management

The following document was approved

10910	**Standards under development for which a call for patent statements is issued**

10.9. Work plan and time line

The following documents were approved

10901	**MPEG Standards**
10902	**Table of unpublished FDISs**
10903	**Work plan and time line**

11. Administrative matters

11.1. Schedule of future MPEG meetings

The following meeting schedule was approved

#	City	Country	yy	mm	dd-dd
90	**Xian**	**CN**	**09**	**10**	**26-30**
91	**Kyoto**	**JP**	**10**	**01**	**18-22**
92	**Dresden**	**DE**	**10**	**04**	**19-23**
93	**Geneva**	**CH**	**10**	**07**	**26-30**
94	**Guangzhou**	**CN**	**10**	**10**	**11-15**
95	**?**	**KR**	**11**	**01**	**24-28**
96	**Geneva**	**CH**	**11**	**03**	**21-25**
97	**Torino**	**IT**	**11**	**07**	**18-22**
98	**?**	**?**	**11**	**10**	**17-21**
99	**?**	**?**	**12**	**01**	**??-??**

11.2. Promotional activities

11.3. Technical

The following documents were approved

10994	**Short descriptions**

10995	**Overview of MPEG-V part 3**
10996	**Overview of MPEG-V part 4**
10997	**Overview of BIFS (Digital Radio Profile)**
10998	**Overview of Digital Item Presentation**
10999	**Overview of SVC File Format**
11002	**Overview of MVC File Format**
11003	**Overview of MPEG-U**
11004	**Overview of MXM part 1**
11005	**Overview of MXM part 2**
11006	**Overview of MXM part 3**
11007	**Overview of MXM part 4**
11008	**Overview of PA AF**
11009	**Overview of DMB AF**
11010	**Overview of VS AF**
11011	**Overview of Stereoscopic AF**
11012	**Overview of IM AF**
11069	**White paper on ISO Base Media File Format**

11.4. Press release

The following document was approved

10878	**Xi'an press release**

12. Resolutions of this meeting

These were approved

13. A.O.B.

There was no other business

14. Closing

The meeting closed at 2009/10/30T20:00

A. – Attendance list

Name	Affiliation	Country
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B. – Agenda

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8.11.12Photo Player AF Conformance
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14 Closing

C. – Input contributions

No.	Source	Title
16770	Webmaster	Xian document register
16771	Yi-Shin Tung	Ad Hoc Group on Maintenance of MPEG-4 Visual related Documents, Reference Software and Conformance
16772	Euee S. Jang, Marco Mattavelli, Kazuo Sugimoto	Ad Hoc Group on Reconfigurable Video Coding
16773	Miroslaw Bober, Paul Brasnett, Ryoma Oami	Ad Hoc Group on MPEG-7 Visual
16774	Karsten Müller, Anthony Vetro	Ad Hoc Group on 3D Video Coding
16775	Jens-Rainer Ohm, Vittorio Baroncini, T.K. Tan	Ad Hoc Group on High-Performance Video Coding
16776	Francisco Morán Burgos	Ad Hoc Group on 3DGC documents, software maintenance and core experiments
16777	S. Quackenbush	Ad Hoc Group on Audio Standards Maintenance
16778	S. Quackenbush, Pierrick Philippe	Ad Hoc Group on SAOC, USAC and MetaData
16779	Young-Kwon Lim, Jaeyeon Song, Cyril Concolato	Ad Hoc Group on Scene Representation
16780	David Singer	Ad Hoc Group on MPEG File Formats
16781	Kyuheon Kim, Hui Yong Kim, Noboru Harada	Ad Hoc Group on Application Format
16782	Vladimir Levantovsky	Ad Hoc Group on Font Format Representation
16783	Xin Wan, Young Kwon Lim	AHG on Advanced IPTV Terminal
16784	Filippo Chiariglione, Christian Timmerer, Victor Rodriguez, Marius Preda	Ad Hoc Group on MXM
16785	Marius Preda	Ad Hoc Group on MPEG-V
16786	Jörn Ostermann, Young-Kwon Lim, Doug Suh, Jaeyeon Song	Ad Hoc Group on MPEG Media Transport (MMT)

16787	ITU-T SG 16 via SC 29 Secretariat	Liaison Statement from ITU-T SG 16 [SC 29 N 10553]
16788	SC 29/WG 1 via SC 29 Secretariat	Liaison Statement from SC 29/WG 1 [SC 29 N 10576]
16789	SC 34/WG 2 via SC 29 Secretariat	Liaison Statement from SC 34/WG 2 [SC 29 N 10579]
16790	Christian Timmerer (editor)	Draft Advanced IPTV Terminal (AIT) Requirements
16791	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-3:200X/ DCOR 1 [SC 29 N 10584]
16792	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-5:2001/Amd. 14:2009/DCOR 1 [SC 29 N 10585]
16793	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-22:200X/ PDAM 1 [SC 29 N 10586]
16794	SC 29 Secretariat	Summary of Voting on /IEC 23000-11:200X/PDAM 1 [SC 29 N 10587]
16795	Pierrick Philippe	Quality assessment of the Bass Filter post processing correction
16796	IEC TC 100 via SC 29 Secretariat	IEC CD 61937-10 [SC 29 N 10592]
16797	SC 27/WG 4 via SC 29 Secretariat	Liaison Statement from JTC 1/SC 27/WG 4 [SC 29 N 10593]
16798	AFNOR via SC 29 Secretariat	Proposed Sequence of Events regarding the ISO/TC 223/ AH 3 "Videosurveillance format"
16799	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-26:200X/ PDAM 2 [SC 29 N 10594]
16800	SC 29 Secretariat	Summary of Voting on ISO/IEC 21000-2:2005/ PDAM 1 [SC 29 N 10595]
16801	SC 29 Secretariat	Summary of Voting on ISO/IEC 21000-4:2006/ PDAM 2 [SC 29 N 10596]
16802	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC 23000-4:2009/FDAM 2
16803	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-20:2008/ FPDAM 3
16804	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23000-5 [2nd Edition]
16805	JTC 1 Secretariat via SC 29 Secretariat	Summary of Voting on ISO/IEC TR 15938-8:2002/ DAM 5

16806	SC 29 Secretariat	Summary of Voting on ISO/IEC 15938-6:2003/ FPDAM 3
16807	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC 14496-5:2001/FDAM 22
16808	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC 14496-5:2001/FDAM 24
16809	SC 29 Secretariat	Summary of Voting on ISO/IEC 13818-1:2007/DCOR 3
16810	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-3:200X/ PDAM 2
16811	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-11:2005/ PDAM 7
16812	SC 29 Secretariat	Summary of Voting on ISO/IEC 15938-12:2008/ DCOR 2
16813	SC 29 Secretariat	Summary of Voting on ISO/IEC 15938-3:2002/ PDAM 4
16814	SC 29 Secretariat	Summary of Voting on ISO/IEC 14496-5:2001/ FPDAM 23
16815	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23005-1
16816	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23005-3
16817	SC 29 Secretariat	Summary of Voting on Proposal for a New Work Item, Information technology -- Rich media user interfaces
16818	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23007-1
16819	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23005-4
16820	SC 29 Secretariat	Summary of Voting on ISO/IEC 15938-7:2003/ FPDAM 5
16821	SC 29 Secretariat	Summary of Voting on ISO/IEC CD 23005-2
16822	SC 29 Secretariat	Summary of Voting on ISO/IEC 15938-12:2008/ PDAM 1
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17059	Hao Chen Ruimin Hu Zhongyuan Wang Dan Mao Jinhui Hu	Inter Prediction Based on Backward Motion Estimation
17060	Hyungyu Kim Hwa Seon Shin Yong-Hwan Kim Byeongho Choi Euee S. Jang	On the media identification in the MXM media framework engine
17061	Khaled MAMOU Titus Zaharia Marius Preda Françoise Prêteux	SC3DMC Reference Software Update

17062	Weizhong Chen Leonardo Chiariglione Riccardo Chiariglione Tiejun Huang Sergio Matone Andrea Pignatiello Martin Springer	Open Media Marketplace basics
17063	Weizhong Chen Leonardo Chiariglione Jinwoo Hong Tiejun Huang Stefano Quintarelli Martin Springer Christian Timmerer	Use case based testing of OMM Basic Services
17064	JeongHoon Park Woo-Jin Han Jason Suh Ken McCann	Samsung Comments on HVC Development
17065	Woo-Jin Han JeongHoon Park Ken McCann	Hierarchical P results for CfP and comments about type-2 scenario
17066	Mohamad Raad	Comment on ISO/IEC 21000-2 PDAM
17067	Miran Choi	Late KNB ballot comment on ISOIEC 15938-12 PDAM
17068	Eunmi Oh	Comments on Unified Stereo
17069	Gary J. Sullivan Jens-Rainer Ohm Thomas Wiegand Ajay Luthra	Meeting Report of the 31st JVT Meeting (28 June - 2 July 2009, London, UK)
17070	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC FDIS 23000-11
17071	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC 14496-12:2008/FDAM 1
17072	KNB	Late KNB ballot comment on Text of ISO/IEC CD 23005-3 Sensory Information
17073	KNB	Late KNB ballot comment on Text of ISO/IEC CD 23005-2 Control Information
17074	Henney Oh	Thoughts on lossless parameter coding for SAOC

17075	Jean Le Feuvre	Late FNB Comment on ISO/IEC 14496-11
17076	Karsten Grüneberg Thomas Schierl	One-Pager on SVC File Format
17077	Bojan JOVESKI Iain-James MARSHALL Mihai MITREA Françoise PRETEUX Pieter SIMOENS Abdeslam TAGUENGAYTE Bart DHOEDT	New mandate related to the activity of "A study of the MPEG potential for active and reactive components in participative, distributed and collaborative BiFS scenes"
17078	Jaejoon Han	Late KNB ballot comment on Text of ISO/IEC CD 23005-2 Control Information
17079	Jaejoon Han	Late KNB ballot comment on Text of ISO/IEC CD 23005-4 Avatar Information
17080	Teruhiko Suzuki	JNB comments on Class A testing in HVC CfP

D. – Output documents

No.	Source	Title
10873	Convener	List of Documents from the 90th Meeting in Xian, China
10874	Convener	Resolutions of the 90th Meeting in Xian, China
10875	Convener	List of AHGs Established at the 90th Meeting in Xian, China
10876	Convener	Report of the 90th Meeting in Xian, China
10877	Convener	Guidelines for Electronic Distribution of MPEG M and N Documents
10878	Convener	Press Release of the 90th Meeting in Xian, China
10879	Convener	Meeting Notice of the 91st Meeting in Kyoto, Japan
10880	Convener	Guide for WG 11 Meeting Hosts
10881	3DGC	DoC on ISO/IEC 14496-5:2001/PDAM 27 Scalable Complexity 3D Mesh Coding reference Software
10882	3DGC	Text of ISO/IEC 14496-5:2001/FPDAM 27 Scalable Complexity 3D Mesh Coding reference Software
10883	3DGC	Request for ISO/IEC 14496-5:2001 AMD 26 (Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model)
10884	3DGC	Text of ISO/IEC 14496-5:2001/PDAM 26 (Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model)
10885	3DGC	Description of 3DG CE
10886	3DGC	Request for ISO/IEC 14496-16:2009/AMD2 Efficient representation of 3D meshes with multiple attributes
10887	3DGC	WD 1.0 of ISO/IEC 14496-16:2009 AMD2 Efficient representation of 3D meshes with multiple attributes
10888	3DGC	Text of ISO/IEC 14496-25:2008/PDAM 1 Scalable Complexity 3D Mesh Coding for 3DG Compression Model
10889	3DGC	ISO/IEC 14496-27:200x/FPDAM 2 Conformance for Scalable Complexity 3D Mesh Coding Conformance
10890	3DGC	Request for ISO/IEC 14496-27:2009 AMD3 Conformance for Scalable Complexity 3D Mesh Coding Conformance

10891	3DGC	Text of ISO/IEC 14496-27:2009/PDAM3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model
10892	Convener	AHG on 3DGC documents, software maintenance and core experiments
10893	Video	Text of ISO/IEC 14496-2:2004/DCOR 4
10894	Video	Disposition of Comments on ISO/IEC 14496-4 :2004/FPDAM 38
10895	Video	Text of ISO/IEC 14496-4 :2004/FDAM 38 MVC Conformance
10896	Video	Disposition of Comments on ISO/IEC 14496-5 :2001/FPDAM 15
10897	Video	Text of ISO/IEC 14496-5 :2001/FDAM 15 MVC Reference Software
10898	Video	Study of ISO/IEC 14496-10:2009/DCOR 1
10899	Video	Disposition of Comments on ISO/IEC 15938-3/PDAM 4
10900	Convener	Terms of Reference
10901	Convener	MPEG Standards
10902	Convener	Unpublished standards at FDIS level
10903	Convener	MPEG work plan and time line
10904	Convener	MPEG Standard Editors
10905	Convener	Schema assets updates
10906	Convener	Software assets
10907	Convener	Conformance assets
10908	Convener	Content assets
10909	Convener	MPEG URIs and MIME Types

10910	Convener	Standards under development for which a call for patent statements is issued
10911	Convener	List of Organisations with which MPEG entertains liaisons
10912	Video	Text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools
10913	Video	MPEG-7 Visual XM 37
10914	Video	Description of Core Experiments in Video Signature Description development
10915	Video	Disposition of Comments on ISO/IEC 15938-6/FPDAM 3
10916	Video	Text of ISO/IEC 15938-6/FDAM 3 Reference Software for Image Signature Tools
10917	Video	Disposition of Comments on ISO/IEC 15938-7/FPDAM 5
10918	Video	Text of ISO/IEC 15938-7/FDAM 5 Conformance Testing for Image Signature Tools
10919	Video	Disposition of Comments on ISO/IEC TR 15938-8/DAM 5
10920	Video	Text of ISO/IEC TR 15938-8/Amd.5 Extraction and matching of image signature tools
10921	Video	Study of ISO/IEC 23002-4/FPDAM 1 Video Tool Library Conformance and Reference Software
10922	Video	WD 6 of ISO/IEC 23002-4/Amd.2 (Tools for AVC HP)
10923	Video	Description of Core Experiments in RVC
10924	Video	RVC Work Plan
10925	Video	Description of Exploration Experiments in 3D Video Coding
10926	Video	Draft Call for Proposals on High Performance Video Coding
10927	Convener	Liaison statement to ITU-T SG16 Q6 on HVC Collaboration
10928	Convener	Liaison statement to SC 37 on ISO/IEC JTC 1/SC 37's CDs and FCDs

10929	Convener	Liaison statement to SCTE on 3D Video
10930	Convener	Statement of benefits from establishing a category C liaison with the SCTE
10931	Convener	AHG on Maintenance of MPEG-4 Visual related Documents, Reference Software and Conformance
10932	Convener	AHG on Reconfigurable Video Coding
10933	Convener	AHG on MPEG-7 Visual
10934	Convener	AHG on 3D Video Coding
10935	Convener	AHG on High-Performance Video Coding
10936	Systems	DoC on ISO/IEC 13818-1:2007/DCOR 3
10937	Systems	Text of ISO/IEC 13818-1:2007/COR 3
10938	Systems	Text of ISO/IEC 13818-1:2007/AMD 3:2009/COR 1
10939	Systems	Request for ISO/IEC 13818-1:2007/AMD 5 Carriage of JPEG2000 over MPEG-2 TS
10940	Systems	Text of ISO/IEC 13818-1:2007/PDAM 5 Carriage of JPEG2000 over MPEG-2 TS
10941	Systems	Request for ISO/IEC 13818-1:2007/AMD 6 MVC operation point descriptor
10942	Systems	Text of ISO/IEC 13818-1:2007/PDAM 6 MVC operation point descriptor
10943	Systems	Text of ISO/IEC 14496-1 4th Edition
10944	Systems	Text of ISO/IEC 14496-1:200X/FPDAM 1 Usage of LASeR in MPEG-4 systems and Registration Authority for MPEG-4 descriptors
10945	Systems	DoC on ISO/IEC 14496-5:2001/Amd.14:2009/DCOR 1
10946	Systems	Text of ISO/IEC 14496-5:2001/Amd.14:2009/COR 1 Open Font Format Reference Software Technical Corrigendum
10947	Systems	Text of ISO/IEC 14496-5:2001/FDAM 23 Synthesized Texture Reference Software

10948	Systems	DoC on ISO/IEC 14496-11:2005/PDAM 7 ExtendedCore2D Profile
10949	Systems	Text of ISO/IEC 14496-11:2005/FPDAM 7 ExtendedCore2D Profile
10950	Systems	Items under Consideration for further improvements of BIFS
10951	Systems	WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection & switching
10952	Systems	WD of ISO/IEC 14496-15 2nd edition
10953	Systems	DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI
10954	Systems	Text of ISO/IEC 14496-20:2008/FDAM 3 PMSI
10955	Systems	Updated Workplan for service examples of LASeR Adaptation & PMSI
10956	Systems	Text of ISO/EC 14496-22:2009/FPDAM 1 Support for many-to-one range mappings
10957	Systems	Summary and description of Composite Font Format
10958	Systems	Draft request for the Fonts as top level MIME type
10959	Systems	Text of ISO/IEC 15938-12:2008/COR 2 MPQF (missing semantics)
10960	Systems	DoC on ISO/IEC 15938-12:2008/PDAM 1 MPQF Conf. and Ref. SW
10961	Systems	Text of ISO/IEC 15938-12:2008/FPDAM 1 MPQF Conf. and Ref. SW
10962	Systems	Request for ISO/IEC15938-12:2008 AMD 2 MPQF semantic enhnacement
10963	Systems	Text of ISO/IEC15938-12:2008 PDAM 2 MPQF semantic enhnacement
10964	Systems	DoC on ISO/IEC 23000-6:2009/FPDAM 1 Conformance and Reference Software for Professional Archival AF
10965	Systems	Text of ISO/IEC 23000-6:2009/FDAM 1 Conformance and Reference Software for Professional Archival AF
10966	Systems	Workplan for DMB AF conformance & reference software

10967	Systems	DoC on ISO/IEC 23000-11/PDAM 1 Stereoscopic Video AF Ref. Soft and Conf.
10968	Systems	Text of ISO/IEC 23000-11/FPDAM 1 Stereoscopic Video AF Ref. Soft and Conf.
10969	Systems	Updated workplan for Stereoscopic Video AF Ref. Soft. and Conf.
10970	Systems	Study of ISO/IEC FCD 23000-12 Interactive Music AF
10971	Systems	Workplan for the Interactive Music AF Conformance & Reference Software
10972	Systems	Study Text ISO/IEC FCD 23006-1 MXM Architecture and Technologies
10973	Systems	Study Text of ISO/IEC FCD 23006-2 MXM APIs
10974	Systems	Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW
10975	Systems	Study Text of ISO/IEC FCD 23006-4 MXM Protocols
10976	Systems	DoC on ISO/IEC CD 23007-1 Widgets
10977	Systems	Text of ISO/IEC FCD 23007-1 Widgets
10978	Systems	White paper on MPEG Rich Media Widgets
10979	Systems	Ideas on Advanced User Interaction Interface in MPEG-U
10980	Systems	WD of ISO/IEC 23007-3 Conformance and Reference Software
10981	Systems	DoC on ISO/IEC CD 23005-1 Architecture
10982	Systems	Text of ISO/IEC FCD 23005-1 Architecture
10983	Systems	DoC on ISO/IEC CD 23005-2 Control Information
10984	Systems	Text of ISO/IEC FCD 23005-2 Control Information
10985	Systems	WD for additional technologies for ISO/IEC 23005-2 Control Information

10986	Systems	DoC on ISO/IEC CD 23005-3 Sensory Information
10987	Systems	Text of ISO/IEC FCD 23005-3 Sensory Information
10988	Systems	DoC on ISO/IEC CD 23005-4 Virtual World Object Characteristics
10989	Systems	Text of ISO/IEC FCD 23005-4 Virtual World Object Characteristics
10990	Systems	Request for subdivision of ISO/IEC FCD 23005-5 Data Formats for Interaction Device
10991	Systems	Text of ISO/IEC FCD 23005-5 Data Formats for Interaction Device
10992	Systems	Workplan of Reference Software regarding ISO/IEC 23005-2
10993	Systems	Guide to the MPEG Subversion Repository
10994	Systems	Short descriptions
10995	Systems	Overview of MPEG-V part 3
10996	Systems	Overview of MPEG-V part 4
10997	Systems	Overview of BIFS (Digital Radio Profile)
10998	Systems	Overview of Digital Item Presentation
10999	Systems	Overview of SVC File Format
11002	Systems	Overview of MVC File Format
11003	Systems	Overview of MPEG-U
11004	Systems	Overview of MXM part 1
11005	Systems	Overview of MXM part 2
11006	Systems	Overview of MXM part 3

11007	Systems	Overview of MXM part 4
11008	Systems	Overview of PA AF
11009	Systems	Overview of DMB AF
11010	Systems	Overview of VS AF
11011	Systems	Overview of Stereoscopic AF
11012	Systems	Overview of IM AF
11013	Systems	DoC on ISO/IEC 21000-2:2005/PDAM 1 Presentation of digital item
11014	Convener	Liaison statement to SC 29/WG 1 on ColorInformationBox
11015	Convener	Liaison statement to SC 29/WG 1 on JPEG2000 over MPEG-2 TS
11016	Convener	Liaison statement to SCTE on signaling of MVC operation points
11017	Convener	Liaison statement to SC 34/WG 2 on Open Font Format Reference Software
11018	Convener	Liaison statement to SC 27/WG 4 on WD 27037 - Digital Evidence
11019	Convener	Liaison statement to ISO/TC 223/AH 3 on WD 22311 - Videosurveillance Format
11020	Systems	Possible alternative solutions to support presentation in digital item
11021	Convener	Liaison statement to SGDCMP
11022	Convener	Liaison statement to IEC TC 100 on DLNA link protection
11023	Convener	Liaison statement to ISO/TC 46/SC 9 on Digital Object Identifier
11024	Convener	Liaison statement to DVB TM AVC on signalling of AVC video with 3D
11025	Convener	Liaison statement template on AIT

11026	Convener	Liaison statement template on MMT
11027	Convener	Liaison statement to ISO TC 20 and SC 13 on PA- AF
11028	Convener	Liaison statement to IEC TC 100 and ITU-T SG 16 on REL profile
11029	Audio	DoC on ISO/IEC 14496-3:2009/DCOR 1 Byte Alignment
11030	Audio	ISO/IEC 14496-3:2009/Cor.1 Byte Alignment
11031	Audio	DoC on ISO/IEC 14496-3:2009/PDAM 2, ALS Simple Profile and Transport of SAOC
11032	Audio	ISO/IEC 14496-3:2009/FPDAM 2, ALS Simple Profile and Transport of SAOC
11033	Audio	ISO/IEC 14496-5:2001/AMD 10:2007/DCOR 4 SLS
11034	Audio	DoC ISO/IEC 14496-26:2009/PDAM 2, BSAC Conformance for Broadcasting
11035	Audio	ISO/IEC 14496-26:2009/FPDAM 2, BSAC Conformance for Broadcasting
11036	Audio	Defect Report on the MPEG Surround conformance and reference software.
11037	Audio	Study on ISO/IEC FCD 23003-2:200x, Spatial Audio Object Coding
11038	Audio	Workplan on SAOC
11039	Audio	Report on Performance of MPEG SAOC Technology
11040	Audio	WD5 of USAC
11041	Audio	Workplan for USAC CEs
11042	Audio	Workplan on MPEG USAC Reference Encoder
11043	Audio	Report on the Performance of MPEG-2 AAC Dynamic Range Control
11044	Convener	Liaison to IETF on MPEG Audio Codecs

11045	Convener	AHG on Audio Standards Maintenance
11046	Convener	AHG on SAOC, USAC and MetaData
11047	Convener	Responses to National Bodies on video issues
11048	Convener	AHG on Scene Representation
11049	Convener	AHG on MPEG File Formats
11050	Convener	AHG on Application Format
11051	Convener	AHG on Font Format Representation
11052	Convener	AHG on Advanced IPTV Terminal
11053	Convener	AHG on MXM
11054	Convener	AHG on MPEG-V
11055	Requirements	Rich Media UI Framework Requirements
11056	Requirements	Draft Use Cases and Requirements for MMT (Modern Media Transport)
11057	Requirements	Draft Call for Proposals on MMT
11058	Requirements	Modern Media Transport (MMT) Context and Objectives
11059	Convener	Adhoc on MPEG Modern Transport (MMT)
11060	Requirements	Workshop on MMT (MPEG Modern Transport) - Call for Contributions
11061	Requirements	Applications and Requirements for 3D Video Coding
11062	Convener	Draft Use Cases for MMT
11063	Requirements	Advanced IPTV Terminal (AIT): Requirements and candidate technologies

11064	Requirements	Draft Call for Proposals on Advanced IPTV Terminal (AIT)
11065	Requirements	Responses to CNNB position statement on more friendly IPR policy
11066	Requirements	Call for Comments on Possible Future activities on 'Royalty-free' Standardization by MPEG
11067	Requirements	Summary of Issues and question from the 90th MPEG Meeting In connection with CNNB input document (M16903)
11068	Convener	AHG on MPEG Media Transport (MMT)
11069	Systems	White paper on ISO Base Media File Format
11070	Requirements	Context and Objectives for Advanced IPTV Terminal (AIT)
11071	Requirements	Ideas on protocols supporting AIT services
11072	Requirements	Use case based testing of AIT basic services
11073	Convener	Statement of benefits from establishing a category C liaison with the VSF

E. – Requirements report

Source: Jörn Ostermann (Leibniz Universität Hannover)

15. Requirements documents approved at this meeting

No.	Title
11055	Requirements for MPEG-U
11056	Requirements for MMT (Modern Media Transport)
11057	Draft Call for Proposals on MMT
11058	Modern Media Transport (MMT) Context and Objectives
11059	Adhoc on MPEG Modern Transport (MMT)
11060	Workshop on MMT(MPEG Modern Transport) – Call for Contributions
11061	Applications and Requirements for 3DV
11062	Draft Use Cases for MMT
11063	Advanced IPTV Terminal (AIT): Requirements and candidate technologies
11064	Draft Call for Proposals on Advanced IPTV Terminal (AIT)
11065	Responses to CNNB position statement on more friendly IPR policy
11066	Call for Comments on Possible Future activities on “Royalty-free” Standardization by MPEG
11067	Summary of Issues and question from the 90th MPEG Meeting in connection with CNNB input document (M16903)
11070	Context and Objectives for Advanced IPTV Terminal (AIT)
11071	Ideas on protocols supporting AIT services
11072	Use case based testing of AIT basic services

16. MPEG-4 Audio

The profiles proposed for SAOC were extend by a third level for the low delay profile. The minimum number of output channels for all profiles and levels but the third level of the low delay profile were set to 2. The third level of the low delay profile requires a minimum of 5 channels. Significant industry support for all SAOC profiles and levels was demonstrated such that the profile definition can move forward in the standardization process.

17. MPEG Font Formats

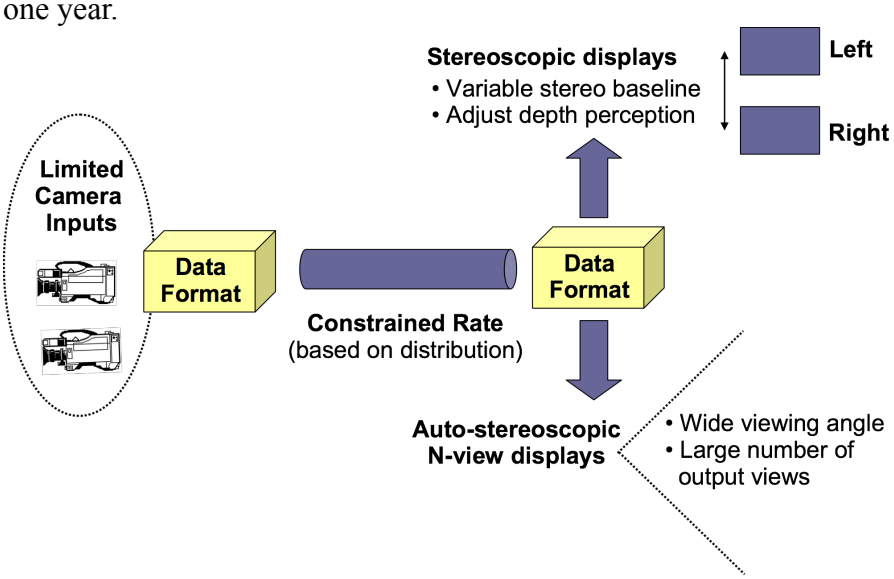
From a requirements perspective, the current MPEG Font Formats activity is not well defined. The active people did not attend a scheduled requirements meeting in order to explain requirements, work plan or time table.

18. Explorations

18.1. 3D Video Coding

In the Applications and Requirements document N11061 *Applications and Requirements for 3DV,* the definition of backward and forward compatibility was clarified. Backward compatibility to MVC is important for the future 3DV market.

The 3DV experts offered a time table for developing the standard. A call for proposals is foreseen in one year.



18.2. High Performance Video Coding (HVC)

HVC targets mobile services, IPTV, and Ultra High Definition (UHD) displays with a focus on coding efficiency considering codec complexity as well. The current target is to increase coding efficiency by 25% at low complexity and 50% at full complexity.
In order to facilitate collaboration with ITU-T, MPEG updated its N10722 *Draft Call for Proposals on High-Performance Video Coding (HVC)* providing further detail on the test sequences and rate points as well as a delayed schedule. Currently, an evaluation of proposals is envisioned for April 2010.

18.3. Advanced IPTV Terminal (AIT)

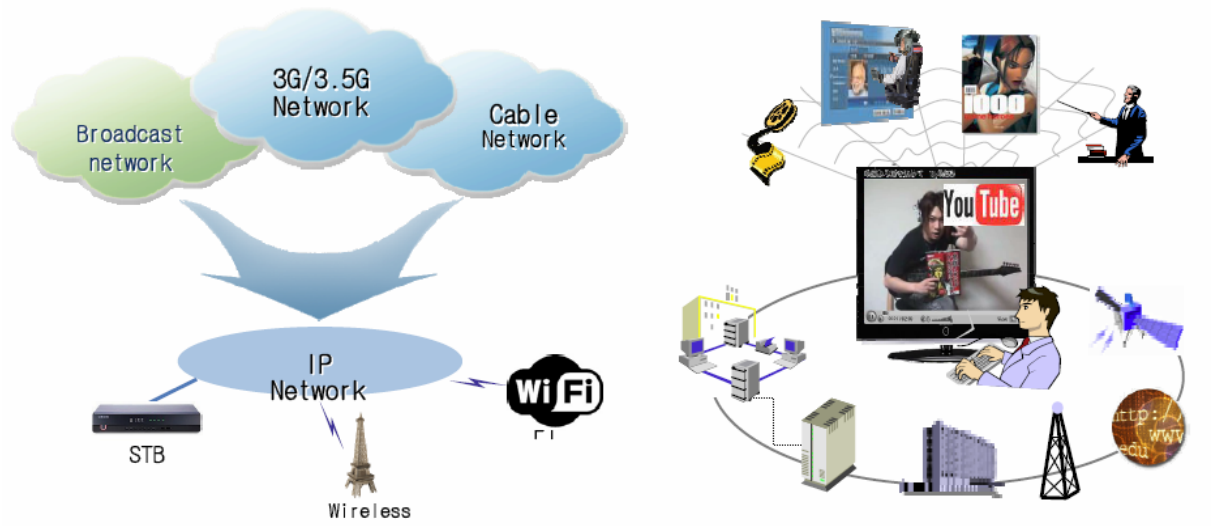
More than 15 input documents on AIT were received showing strong support for this activity. MPEG updated its time table for the standardization of AIT. A Draft Call for Proposals is now envisioned for April 2010. This will have no major impact on the time line for finalizing the standard. N11064 *Draft Call for Proposals on Advanced IPTV Terminal (AIT)* was prepared in order to focus the work.

Updated requirements as well as context and objectives are reported in N11063 *Advanced IPTV Terminal (AIT): Requirements and candidate technologies* and N11070 *Context and Objectives for Advanced IPTV Terminal (AIT)*, respectively. The main purpose of the upcoming standard is to

define the exchange of information as well as command and control between the different services involved in AIT. Therefore protocols will be at the core of the standard. N11071 *Ideas on protocols supporting AIT services* and N11072 *Use case based testing of AIT basic services* collect thoughts into this direction. All documents related to AIT still need major refinement in order to be ready for the April Call for Proposals.

18.4. MPEG Media Transport (MMT)

According to N10496 issued at the 87th meeting, there is a need for a transport and file format friendly stream format. Error resilience of current MPEG streams might not be optimal. The potential gains of joint optimization of coding and transport are not known. Conversions between different transport mechanisms like from MPEG-2 Transport Stream to MPEG Program Stream are not straight forward or defined. Furthermore, MPEG does not provide any hint on how to adapt content to different networks. Information provided in NAL unit headers is not used optimally in real world implementations.



The area of work for MMT might include adaptive progressive transport (download/stream), cross layer optimization, hybrid delivery and conversational services. Following a workshop on MPEG Media Transport at the 89th meeting, 3GPP and OIPF showed interest in the work area. New services in the area of MMT are expected towards the end of 2010. Hence, MPEG expects to issue a Call for Proposals in April of 2010 with a due date in July of 2010. A draft call N11057 *Draft Call for Proposals on MMT* was prepared at this meeting. N11056 *Requirements for MMT (Modern Media Transport)*, N11062 *Draft Use Cases for MMT* and N11058 *Modern Media Transport (MMT) Context and Objectives* are related documents. They need further work prior to issuing the call.

A second workshop on MMT is planed for the 91st meeting in January. It will be focused on adaptive progressive download and cross layer design: N11060 *Workshop on MMT(MPEG Modern Transport) – Call for Contributions*. The workshop program will be available by January 10, 2010. An adhoc group manages MMT: N11059 *Adhoc on MPEG Modern Transport (MMT)*.

MPEG is considering to combine the upcoming standards for HVC, Audio and MMT into one package.

18.5. MPEG-User Interface Framework (MPEG-U)

MPEG-U will enable user interface (UI) exchange between devices and UI aggregation. This requires exchange of information and transport of widgets. In order to protect MPEG-U devices from malicious attacks, security requirements on the communication and the widgets are identified: N11055 *Requirements for MPEG-U.*

18.6. Royalty-free Codecs

The Chinese National Body encouraged MPEG to discuss the option of royalty-free codecs developed within MPEG (N11065 *Responses to CNNB position statement on more friendly IPR policy).* Especially small companies perceive licensing as cumbersome. Some royalty free standards have become successful in the market place.
MPEG might consider royalty-free codecs only as a supplement to its current standards development process. The preliminary results of the discussion are summarized in N11067 *Summary of Issues and question from the 90th MPEG Meeting in connection with CNNB input document (M16903)*. In order to help with this discussion, MPEG requests National Bodies to provide input according to N11066 *Call for Comments on Possible Future activities on "Royalty-free" Standardization by MPEG.*

F. – Systems report

Source Young-Kwon LIM, Dave Singer, Christian Timmerer, Marius Preda, Kyuheon Kim, Sam Narasimhan, Cyril Concolato,

1. List of Output Documents

No.	Title	TBP	Available
	13818-1 MPEG-2 Systems		
10936	DoC on ISO/IEC 13818-1:2007/DCOR 3	No	09/10/30
10937	Text of ISO/IEC 13818-1:2007/COR 3	No	09/10/30
10938	Text of ISO/IEC 13818-1:2007/AMD 3:2009/COR 1	No	09/10/30
10939	Request for ISO/IEC 13818-1:2007/AMD 5 Carriage of JPEG2000 over MPEG-2 TS	No	09/10/30
10940	Text of ISO/IEC 13818-1:2007/PDAM 5 Carriage of JPEG2000 over MPEG-2 TS	No	09/11/20
10941	Request for ISO/IEC 13818-1:2007/AMD 6 MVC operation point descriptor	No	09/10/30
10942	Text of ISO/IEC 13818-1:2007/PDAM 6 MVC operation point descriptor	No	09/11/20
	14496-1 MPEG-4 Systems		
10943	Text of ISO/IEC 14496-1 4th Edition	No	09/10/30
10944	Text of ISO/IEC 14496-1:200X/FPDAM 1 Usage of LASeR in MPEG-4 systems and Registration Authority for MPEG-4 descriptors	No	09/10/30
	14496-5 Reference software		
10945	DoC on ISO/IEC 14496-5:2001/Amd.14:2009/DCOR 1	No	09/10/30
10946	Text of ISO/IEC 14496-5:2001/Amd.14:2009/COR 1 Open Font Format Reference Software Technical Corrigendum	No	09/10/30
10947	Text of ISO/IEC 14496-5:2001/FDAM 23 Synthesized Texture Reference Software	No	09/10/30
	14496-11 Scene description and application engine		
10948	DoC on ISO/IEC 14496-11:2005/PDAM 7 ExtendedCore2D Profile	No	09/10/30
10949	Text of ISO/IEC 14496-11:2005/FPDAM 7 ExtendedCore2D Profile	No	09/12/11

10950	**Items under Consideration for further improvements of BIFS**	**No**	**09/11/13**
	14496-12 ISO File Format		
10951	**WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection & switching**	**No**	**09/11/20**
	14496-15 AVC File Format		
10952	**WD of ISO/IEC 14496-15 2nd edition**	**No**	**09/10/30**
	14496-20 LASeR& SAF		
10953	**DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI**	**No**	**09/10/30**
10954	**Text of ISO/IEC 14496-20:2008/FDAM 3 PMSI**	**No**	**09/10/30**
10955	**Updated Workplan for service example of LASeR Adaptation & PMSI**	**No**	**09/10/30**
	14496-22 Open Font Format		
10956	**Text of ISO/EC 14496-22:2009/FPDAM 1 Support for many-to-one range mappings**	**No**	**09/10/30**
10957	**Summary and description of Composite Font Format**	**No**	**09/10/30**
10958	**Draft request for the Fonts as top level MIME type**	**No**	**09/11/13**
	15938-12 MPEG Query Format		
10959	**Text of ISO/IEC 15938-12:2008/COR 2 MPQF (missing semantics)**	**No**	**09/10/30**
10960	**DoC on ISO/IEC 15938-12:2008/PDAM 1 MPQF Conf. and Ref. SW**	**No**	**09/10/30**
10961	**Text of ISO/IEC 15938-12:2008/FPDAM 1 MPQF Conf. and Ref. SW**	**No**	**09/11/27**
10962	**Request for ISO/IEC15938-12:2008 AMD 2 MPQF semantic enhnacement**	**No**	**09/10/30**
10963	**Text of ISO/IEC15938-12:2008 PDAM 2 MPQF semantic enhnacement**	**No**	**09/10/30**
	21000-2 Digital Item Declaration		
11013	**DoC on ISO/IEC 21000-2:2005/PDAM 1 Presentation of digital item**	**No**	**09/10/30**
11020	**Possible alternative solutions to support presentation in digital item**	**No**	**09/10/30**
	23000-6 Professional Archival MAF		

10964	**DoC on ISO/IEC 23000-6:2009/FPDAM 1 Conformance and Reference Software for Professional Archival AF**	**No**	**09/10/30**
10965	**Text of ISO/IEC 23000-6:2009/FDAM 1 Conformance and Reference Software for Professional Archival AF**	**No**	**09/11/27**
	23000-9 Digital Multimedia Broadcasting Application Format		
10966	**Workplan for DMB AF conformance & reference software**	**No**	**09/10/30**
	23000-11 Stereoscopic Video Application Format		
10967	**DoC on ISO/IEC 23000-11/PDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**	**No**	**09/10/30**
10968	**Text of ISO/IEC 23000-11/FPDAM 1 Stereoscopic Video AF Ref. Soft and Conf.**	**No**	**09/10/30**
10969	**Updated workplan for Stereoscopic Video AF Ref. Soft. and Conf.**	**No**	**09/10/30**
	23000-12 Interactive Music AF		
10970	**Study of ISO/IEC FCD 23000-12 Interactive Music AF**	**No**	**09/10/30**
10971	**Workplan for the Interactive Music AF Conformance & Reference SW**	**No**	**09/10/30**
	23006-1 – MXM Architecture and Technologies		
10972	**Study Text ISO/IEC FCD 23006-1 MxM Architecture and Technologies**	**Yes**	**09/11/27**
	23006-2 – MXM APIs		
10973	**Study Text of ISO/IEC FCD 23006-2 MXM APIs**	**Yes**	**09/11/27**
	23006-3 – MXM Conf. & Ref. SW		
10974	**Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW**	**Yes**	**09/11/27**
	23006-4 – MPEG eXtensible Middleware Protocols		
10975	**Study Text of ISO/IEC FCD 23006-4 MXM Protocols**	**Yes**	**09/11/27**
	23007-1– MPEG-U Widgets		
10976	**DoC on ISO/IEC CD 23007-1 Widgets**	**No**	**09/10/30**
10977	**Text of ISO/IEC FCD 23007-1 Widgets**	**Yes**	**09/10/30**
10978	**White paper on MPEG Richmedia Widgets**	**Yes**	**09/10/30**
	23007-2–Advanced User Interaction Interface		
10979	**Ideas on Advanced User Interaction Interface in MPEG-U**	**No**	**09/12/11**
	23007-3– MPEG-U Conformance and Reference Software		

10980	**WD of ISO/IEC 23007-3 Conformance and Reference Software**	**No**	**09/10/30**
	23005-1 Media context and control - Architecture		
10981	**DoC on ISO/IEC CD 23005-1 Architecture**	**No**	**09/10/30**
10982	**Text of ISO/IEC FCD 23005-1 Architecture**	**No**	**09/10/30**
	23005-2 Media context and control – Control Information		
10983	**DoC on ISO/IEC CD 23005-2 Control Information**	**No**	**09/10/30**
10984	**Text of ISO/IEC FCD 23005-2 Control Information**	**Yes**	**09/12/11**
10985	**WD of ISO/IEC 23005-2 Control Information**	**No**	**09/10/30**
	23005-3 Media context and control – Sensory Information		
10986	**DoC on ISO/IEC CD 23005-3 Sensory Information**	**No**	**09/10/30**
10987	**Text of ISO/IEC FCD 23005-3 Sensory Information**	**Yes**	**09/12/11**
	23005-4 Media context and control – Virtual World Object Characteristics		
10988	**DoC on ISO/IEC CD 23005-4 Virtual World Object Characteristics**	**No**	**09/10/30**
10989	**Text of ISO/IEC FCD 23005-4 Virtual World Object Characteristics**	**Yes**	**09/12/11**
	23005-5 Data Formats for Interaction Devices		
10990	**Request for subdivision of ISO/IEC FCD 23005-5 Data Formats for Interaction Device**	**No**	**09/10/30**
10991	**Text of ISO/IEC FCD 23005-5 Data Formats for Interaction Device**	**Yes**	**09/12/11**
	23005-6 Media context and control – Reference Software		
10992	**Workplan of Reference Software regarding ISO/IEC 23005-2**	**No**	**09/10/30**
	Assets and Standing Documents		
10905	**Schema assets updates**	**No**	**09/10/30**
10909	**MPEG URIs and MIME Types**	**No**	**09/10/30**
	SVN support		
10993	**Guide to the MPEG Subversion Repository**	**No**	**09/10/30**
	Liaison		
11014	**Liaison statement to SC 29/WG 1 on ColorInformationBox**	**No**	**09/10/30**

11015	**Liaison statement to SC 29/WG 1 on JPEG2000 over MPEG-2 TS**	**No**	**09/10/30**
11016	**Liaison statement to SCTE on signaling of MVC operation points**	**No**	**09/10/30**
11017	**Liaison statement to SC 34/WG 2 on Open Font Format Reference Software**	**No**	**09/10/30**
11018	**Liaison statement to SC 27/WG 4 on WD 27037 – Digital Evidence**	**No**	**09/10/30**
11019	**Liaison statement to ISO/TC 223/AH 3 on WD 22311 – Videosurveillance Format**	**No**	**09/10/30**
11021	**Liaison statement to SGDCMP**	**No**	**09/10/30**
11022	**Liaison statement to IEC TC 100 on DLNA link protection**	**No**	**09/10/30**
11023	**Liaison statement to ISO/TC 46/SC 9 on Digital Object Identifier**	**No**	**09/10/30**
11024	**Liaison statement to DVB TM AVC on signaling of AVC video with 3D**	**No**	**09/10/30**
11025	**Liaison statement template on AIT**	**No**	**09/10/30**
11026	**Liaison statement template on MMT**	**No**	**09/10/30**
11027	**Liaison statement to ISO TC 20 and SC 13 on PA- AF**	**No**	**09/10/30**
11028	**Liaison statement to IEC TC 100 and ITU-T SG 16 on REL profile**	**No**	**09/10/30**
	Promotion		
10994	**Short descriptions**	**Yes**	**09/10/30**
10995	**Overview of MPEG-V part 3**	**Yes**	**09/10/30**
10996	**Overview of MPEG-V part 4**	**Yes**	**09/11/06**
10997	**Overview of BIFS (Digital Radio Profile)**	**Yes**	**09/10/30**
10998	**Overview of Digital Item Presentation**	**Yes**	**09/10/30**
10999	**Overview of SVC File Format**	**Yes**	**09/10/30**
11002	**Overview of MVC File Format**	**Yes**	**09/10/30**
11003	**Overview of MPEG-U**	**Yes**	**09/10/30**
11004	**Overview of MXM part 1**	**Yes**	**09/10/30**
11005	**Overview of MXM part 2**	**Yes**	**09/10/30**
11006	**Overview of MXM part 3**	**Yes**	**09/10/30**
11007	**Overview of MXM part 4**	**Yes**	**09/10/30**

11008	**Overview of PA AF**	**Yes**	**09/10/30**
11009	**Overview of DMB AF**	**Yes**	**09/10/30**
11010	**Overview of VS AF**	**Yes**	**09/10/30**
11011	**Overview of Stereoscopic AF**	**Yes**	**09/10/30**
11012	**Overview of IM AF**	**Yes**	**09/10/30**
11069	**White paper on ISO Base Media File Format**	**Yes**	**09/10/30**

19. General Input Documents

19.1. AHG reports

Session	Number	Title	Source	Disposition
General	**m16779**	Ad Hoc Group on Scene Representation	Young-Kwon Lim, Jaeyeon Song, Cyril Concolato	
General	**m16780**	Ad Hoc Group on MPEG File Formats	David Singer	
General	**m16781**	Ad Hoc Group on Application Format	Kyuheon Kim, Hui Yong Kim, Noboru Harada	
General	**m16782**	Ad Hoc Group on Font Format Representation	Vladimir Levantovsky	
General	**m16783**	AHG on Advanced IPTV Terminal	Xin Wan, Young Kwon Lim	
General	**m16784**	Ad Hoc Group on MXM	Filippo Chiariglione, Christian Timmerer, Victor Rodriguez, Marius Preda	
General	**m16785**	Ad Hoc Group on MPEG-V	Marius Preda	
General	**m16786**	Ad Hoc Group on MPEG Media Transport (MMT)	Jörn Ostermann, Young-Kwon Lim, Doug Suh, Jaeyeon Song	

All AHG reports are accepted.

19.2. General technical contributions

None.

19.3. Demo

1. PA-AF reference software
2. MPQF reference software

19.4. FAQ

The FAQ were updated as needed.

19.5. AOB

None.

20. MPEG-2 Systems (13818-1)

20.1. Topics

20.1.1. ISO/IEC 13818-1:2007 COR 3 Minor Corrections

(short description)

20.1.2. ISO/IEC 13818-1:2007 AMD 5 Carriage of JPEG2000 over MPEG-2

20.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-2	m16809	Summary of Voting on ISO/IEC 13818-1:2007/DCOR 3	SC 29 Secretariat	
MPEG-2	m16853	USNB Contribution: Carriage of MVC over MPEG-2 Systems	Andy Tescher	
MPEG-2	m17025	Comments on the carriage of MVC over MPEG-2 Systems	Ying Chen Peisong Chen Marta Karczewicz	
MPEG-2	m17042	Belgian NB Comment on Working Draft 1.0 of ISO/IEC 13818-1:2007/Amd.5	Kenneth Vermeirsch on behalf of Belgian NB	

20.3. Summary of discussions

m16809 Approved with comments from Germany and Japan. All comments are disposed appropriately.
m16853, m17025 USNB comments on the carriage of MVC over MPEG-2. All comments are disposed appropriately together with ballot comments.
m17042 BENB comments on the carriage of JPEG2000 in MPEG-2 suggesting alignment with SVC over MPEG-2. Accepted.

20.4. Action Points

- ISO/IEC 13818-1:2007/FDAM 4 ballot until 2009-11-15

21. MPEG-4 System (14496-1)

21.1. Topics

21.1.1. ISO/IEC 14496-1:200X 4th edition

21.1.2. ISO/IEC 14496-1:200X AMD 4 LASeR in MPEG-4 System and RA

21.2. Contributions

Session	Number	Title	Source	Disposition
General	m16823	Summary of Voting on ISO/IEC 14496-1:2004/PDAM 4	SC 29 Secretariat	
Scene	m16964	Proposed text of 14496-20 AMD4	Jean Le Feuvre	

21.3. Summary of discussions

m16823 Passed the ballot without comments
m16964 Accepted as a base text for the output document

21.4. Action Points

22. MPEG-4 Conformance (14496-4)

22.1. Topics

22.2. Contributions

None

22.3. Summary of discussions

22.4. Action Points

- **ISO/IEC 14496-4:2004/FDAM 37 ballot until 2009-11-11**

23. MPEG-4 Reference Software (14496-5)

23.1. Topics

23.1.1. ISO/IEC 14496-5:2001 AMD 14:20009/COR 1 Open Font Format Reference Software Technical Corrigendum

23.1.2. ISO/IEC 14496-5:2007 AMD 23 Synthesized Texture Reference Software

23.2. Contributions

Session	Number	Title	Source	Disposition
Font Format	m16792	Summary of Voting on ISO/IEC 14496-5:2001/Amd. 14:2009/DCOR 1 [SC 29 N 10585]	SC 29 Secretariat	
Scene	m16814	Summary of Voting on ISO/IEC 14496-5:2001/FPDAM 23	SC 29 Secretariat	

23.3. Summary of discussions

m16729 Passed the ballot without comments
m16814 Passed the ballot without comments

23.4. Action Points

24. MPEG-4 BIFS (14496-11)

24.1. Topics

24.1.1. ISO/IEC 14496-11:2005/AMD 7 ExtendedCore2D Profile

24.1.2. Exploration

1. Remote and Collaborative work
2. Haptic interaction

24.2. Contributions

Session	Number	Title	Source	Disposition
Scene	m16811	Summary of Voting on ISO/IEC 14496-11:2005/PDAM 7	SC 29 Secretariat	
Scene	m16963	Input on ISO/IEC 14496-11 PDAM7	Jean Le Feuvre	
Scene	m16882	BiFS vs. LASeR remote display solutions for mobile thin clients	Bojan JOVESKI Mihai MITREA Françoise PRETEUX Iain-James MARSHALL Pieter SIMOENS Bart DHOEDT	
Scene	m16883	A study of the MPEG potential for active and reactive components in participative, distributed and collaborative BiFS scenes	Bojan JOVESKI Iain-James MARSHALL Mihai MITREA Françoise PRETEUX Pieter SIMOENS Abdeslam TAGUENGAYTE Bart DHOEDT	

24.3. Summary of discussions

Contribution m16882:
Report on the activities of the European FP7 Mobithin project. Development of an adaptive image transmission protocol. New LASeR component compared to the London contribution. Conversion of X11 commands into BIFS and into LASeR. Comparison between BIFS and LASeR compression

for 3 types of graphics content (Hello World, Icon and static XClock and dynamic). Conclusion of the contribution: Both LASeR and BIFS met the visual reqs, but results show that BIFS outperforms LASeR in terms of compression rates.

The data sets will be exchanged on the scene reflector and the Scene AhG recommends evaluating/ reproducing these results as part of the mandate of the AhG.

Contribution m16883:
The contribution presents ideas for active and reactive components in participative, distributed and collaborative BIFS scenes. It describes scene and encoding requirements for the development of the MobiThin project as an update of the London contribution and gives a description of the architecture for a distributed and collaborative scene management. The contributor analyzed the previous Multi-User tools and recommends to re-open the Multi-User Tools, to launch a Core Experiment on this issue and to evaluate if other technologies can be used.
Why AJAX does not fit the needs? Because it requires 2 channels (BIFS download, AJAX upload) and the contributors would like to use only one channel instead of 2 for efficiency, compactness.
Reopening the Multi User technologies should probably go through requirements and would require strong industrial support.
This work should probably be made generic enough, without losing performance and efficiency, to work for both LASeR and BIFS.
The contributors wish to attract more people and inputs on the topic. One option could be to add it as a mandate of the AhG. Another option could also be to create an Exploration Experiment. A third option would be to created a "context and objective" or "Ideas under Consideration" document to help attract people. The mandate of the AhG would be to propose requirements in this area.

M16811:
15 approvals and 6 absentions. No comments but a late FNB comment (m17075) with 1 editorial command and 4 technical ones pointing to M16963.

M16963:
We need an editing period for this document to provide text for XMT syntax but it should not be too long to leave enough time for the PDAM ballot. Editorial comments accepted, technical comments accepted but part of a comment is refused (step in Keynavigator is kept).

24.4. Action Points

25. MPEG-4 ISO Base File Format (14496-12)

25.1. Topics

25.1.1. Exploration

1. Subtrack selection and switching
2. Adaptive progressive download

25.2. Contributions

Session	Number	Title	Source	Disposition
File Format	m16995	On Adaptive Progressive Download	Stefan Doehla	
File Format	m17007	Updated ISO base media file format white paper	David Singer	
File Format	m16863	Semantics of the ChannelCount field in the Sample Description Box	Teruhiko Suzuki	

25.3. Summary of discussions

m16995 On Adaptive Progressive Download
Thank you. This should be presented to MMT, we feel. Perhaps the file format group should be more assertive about wanting to work on progressive download in the context of MMT?
m17007 Updated ISO base media file format white paper
Seems OK. Please review, and we'll discuss in systems plenary. Accepted as a white paper.

m16863 Semantics of the ChannelCount field in the Sample Description Box
Agreed. But make it the maximum, and add a note saying that other configs than the maximum may also be present (e.g. a stereo mix), and that the geometry should be discovered from the audio codec itself. Into the WD of amendment.

25.4. Action Points

1. ISO/IEC 14496-12 :2008 FDAM 1 ballot until 2009-10-25

26. MPEG-4 File Format (14496-14)

26.1. Topics

26.1.1. ISO/IEC 14496-14:2003 AMD 1 Handling of MPEG-4 Audio enhancement layers

26.2. Contributions

Session	Number	Title	Source	Disposition
File Format	m17006	Proposed MP4 Registration Authority Updates	David Singer	

26.3. Summary of discussions

m17006 Proposed MP4 Registration Authority Updates
Specifically, should Track Selection types (Part 12 8.10.3.5) or Item Reference types (Part 12) be registered? Yes, to both questions. Editors to catch.

26.4. Action Points

2. ISO/IEC 14496-14 :2003 FPDAM 1 ballot until 2009-11-05

27. MPEG-4 AVC File Format (14496-15)

27.1. Topics

27.1.1.

27.2. Contributions

Session	Number	Title	Source	Disposition
File Format	m16979	File format video requirements	Per Fröjdh Clinton Priddle Zhuangfei Wu	

27.3. Summary of discussions

m16979 File format video requirements
This seems like a good idea. We'd like to do this 'just like' DRM i.e. have a box with a code-point that tells you the form of the restriction/transformation information (e.g. AVC SEI in your example). Is 'restriction' the right word? Transformed? Post-processed? Ideas welcome. Do we need to put the SEI itself into the setup info, or (as here) a pointer (code-point, type)? We need to make sure the design works with protected, restricted, video (e.g. how many original format boxes)? We say de-protect before dealing with the restriction. Into the WD of amendment.

27.4. Action Points

3. ISO/IEC 14496-15 :2004 FDAM 3 ballot until 2009-12-26

28. LASeR & SAF (14496-20)

28.1. Topics

28.1.1. ISO/IEC 14496-20:2008 AMD 3 Presentation and Modification of Structured Information (PMSI)

28.1.2. Exploration

1. Advanced User Interaction Interface

28.2. Contributions

Session	Number	Title	Source	Disposition
Scene	m16876	Proposed text for WD of 14496-20 LASeR AMD2 Reference SW	Seo-Young Hwang	
Scene	m16803	Summary of Voting on ISO/IEC 14496-20:2008/FPDAM 3	SC 29 Secretariat	
Scene	m16931	Proposed text of ISO/IEC 14496-20:2008 FDAM3 (PMSI)	Jihun Cha Injae Lee Young-Kwon Lim	
Scene	m16878	Updated service example and workplan of LASeR Adaptation & PMSI	Seo-Young Hwang	
Scene	m16932	An Idea on MPEG Advanced User Interaction	Jihun Cha Injae Lee Young-Kwon Lim Hankyu Lee Jinwoo Hong	

28.3. Summary of discussions

- Contribution m16803: Voting on LASER PDAM3
13 accepted, 2 disapprove with comments and 6 abstentions.
Japan: editorial comments, all accepted.
France: editorial comments (accepted), 2 technical comments (externalUpdate (accepted) and SDL(accepted with modifications))

- Contribution m16876: Proposed text for WD of 14496-20 LASeR AMD2 Reference SW
Amendment should be on 14496 Part 4 (Reference Software). Contribution is noted and we expect next meeting to receive the reference software and we will create the WD at the next meeting taking the description of the software as the basis for the WD. Conformance streams should be provided with the reference soft.

- Contribution m16878: Updated service example and workplan of LASeR Adaptation & PMSI Changes in the workplan: new date is Jan 2010.

m16931
accepted as a base text for the output document

m16932
This contribution provides an analysis on the MPEG-V to be used for the data format for user interaction device interface. Accepted in principal as a base document for the output document. Further study will be carried out during the AHG meeting planned.

28.4. Action Points

29. Open Font Format (14496-22)

29.1. Topics

29.1.1. ISO/IEC 14496-22:200X AMD 1 Support for many-to-one range mappings

29.2. Contributions

Session	Number	Title	Source	Disposition
General	m16793	Summary of Voting on ISO/IEC 14496-22:200X/PDAM 1 [SC 29 N 10586]	SC 29 Secretariat	

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29.3. Summary of discussions

m16793 Passed the ballot without comments

29.4. Action Points

1.

30. MPEG Query Format (15938-12)

30.1. Topics

30.1.1. ISO/IEC 15938-12:2008 COR 2 missing semantics

30.1.2. ISO/IEC 15938-12:2008 AMD 1 MPQF Conf. and Ref. SW.

30.1.3. ISO/IEC 15938-12:2008 AMD 2 Semantic Enhancement

30.2. Contributions

Session	Number	Title	Source	Disposition
MPQF	m16812	Summary of Voting on ISO/IEC 15938-12:2008/DCOR 2	SC 29 Secretariat	
MPQF	m16822	Summary of Voting on ISO/IEC 15938-12:2008/PDAM 1	SC 29 Secretariat	
MPQF	m17067	Late KNB ballot comment on ISOIEC 15938-12 PDAM	Miran Choi	
MPQF	m16958	A demonstration of the use of the MPEG Query Format Reference Software	Rubén Tous Jaime Delgado	
MPQF	m17027	Basic Interpreter Module to MPEG QF Reference Software	Miran Choi Yeochan Yoon Myeong Gil Jang	

30.3. Summary of discussions

m16812 Passed ballot without comments
m16822 Approval with comments from Germany, Japan, and Korea. All disposed appropriately.
m17067 Additional comments from Korea. All disposed appropriately.
m16958 Demonstration of Reference Software
m17027 Accepted to be included in the reference software

30.4. Action Points

1.

31. MPEG-21 DID (21000-2)

31.1. Topics

31.1.1. ISO/IEC 21000-2:2005 AMD 1 Presentation of Digital Item

31.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-21	m16800	Summary of Voting on ISO/IEC 21000-2:2005/PDAM 1 [SC 29 N 10595]	SC 29 Secretariat	

MPEG-21	m17066	Comment on ISO/IEC 21000-2 PDAM	Mohamad Raad

31.3. Summary of discussions

m16800 Disapproval with comments from Australia and UK. Both comments are saying there is a requirement to make Digital Item agnostic to presentation. However, requirements are amended to include presentation information. Therefore, the comments are rejected. However promotion of the standard will be delayed until the next meeting to further investigate alternative choices.

m17066 companion document to AUNB comment

31.4. Action Points

32. MPEG-21 IPMP Components (21000-4)

32.1. Topics

32.1.1. ISO/IEC 21000-4:2006 AMD 2 Protection of Presentation element

32.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-21	m16801	Summary of Voting on ISO/IEC 21000-4:2006/PDAM 2 [SC 29 N 10596]	SC 29 Secretariat	

32.3. Summary of discussions

m16801 Passed the ballot without comments. However, promotion is delayed until ISO/IEC 21000-2 PDAM is promoted.

32.4. Action Points

33. Media Value Chain Ontology (21000-19)

33.1. Topics

33.1.1. ISO/IEC 21000-19 Media Value Chain Ontology

33.2. Contributions

Session	Number	Title	Source	Disposition

33.3. Summary of discussions

33.4. Action Points

2. FCD ballot until 2009-11-18

34. Musical Slide Show AF (23000-4)

34.1. Topics

34.1.1. ISO/IEC 23000-4:2009 AMD 2 Conf. and Ref. SW for Protected MSSAF

34.2. Contributions

Session	Number	Title	Source	Disposition
MAF	m16802	Table of Replies on ISO/IEC 23000-4:2009/FDAM 2	ITTF via SC 29 Secretariat	

34.3. Summary of discussions

m16802 Approved

34.4. Action Points

35. Media Streaming AF (23000-5)

35.1. Topics

35.1.1. ISO/IEC 23000-5 2nd edition

35.2. Contributions

Session	Number	Title	Source	Disposition

MAF	m16804	Summary of Voting on ISO/IEC CD 23000-5 [2nd Edition]	SC 29 Secretariat

35.3. Summary of discussions

m16804 Approved without comments. However, promotion is delayed until the requirement from AIT work is further clarified.

35.4. Action Points

36. Professional Archival AF (23000-6)

36.1. Topics

36.1.1. ISO/IEC 23000-6:2009 AMD1 PA-AF Conf. and Ref. SW

36.2. Contributions

Session	Number	Title	Source	Disposition
MAF	m16920	Editor's update to ISO/IEC 23000-6/FDAM 1 (PA-AF)	Noboru Harada Houari Hendry Takehiro Moriya Yutaka Kamamoto Munchuri Kim	

36.3. Summary of discussions

m16920 Accepted

36.4. Action Points

37. DMB AF (23000-9)

37.1. Topics

37.1.1. ISO/IEC 23000-9:2008 AMD1 DMB AF Conf. and Ref. SW

37.1.2. ISO/IEC 23000-9:2008 AMD2 DMB AF Harmonization on MPEG-2 TS Storage

37.2. Contributions

Session	Number	Title	Source	Disposition
MAF	m16944	DMB-AF (ISO/IEC 23000-9) conformance file contribution for T-DMB Profile 2, DAB+, and Midlet	Hui Yong Kim Kwang-Yong Kim Kyutae Yang Yong Han Kim Houari Sabirin Munchrl Kim Do-Hyung Kim Benoit Pellan Mathias Coinchon	
MAF	m16945	Updated text and software for ISO/IEC 23000-9:2008/ FDAM1 DMB-AF Conf. & Ref. Soft.	Hui Yong Kim Myung Seok Ki Han Kyu Lee Yong Han Kim Houari Sabirin Munchurl Kim	

37.3. Summary of discussions

M16944: All the functionalities of the Ref. SW have been done apart from S-DMB stream, which has mismatches between the TS stream available in the service and the TS specification of S-DMB TS. Due to this it is recommended that the current version without S-DMB is promoted for FDAM.

M16945: Accepted and produced as the ouput doc.

37.4. Action Points

3. ISO/IEC 23000-9:2008/FPDAM2 ballot until 2009-11-05

38. Video Surveillance AF (23000-10)

38.1. Topics

38.1.1. ISO/IEC 23000-10:2009 AMD1 VS AF Conf. and Ref. SW

38.1.2. Exploration

4. Advanced visual surveillance AF

38.2. Contributions

None.

38.3. Summary of discussions

38.4. Action Points

5. ISO/IEC 23000-10/FPDAM 1 ballot until 2009-11-02

39. Stereoscopic Video AF (23000-11)

39.1. Topics

39.1.1. ISO/IEC 23000-11 AMD1 SV AF Conf. and Ref. SW

39.1.2. ISO/IEC 23000-11 AMD2 Additional composition type

39.2. Contributions

Session	Number	Title	Source	Disposition
MAF	m16794	Summary of Voting on /IEC 23000-11:200X/PDAM 1 [SC 29 N 10587]	SC 29 Secretariat	
MAF	m17032	Proposed Text of ISO/IEC 23000-11/FPDAM1 Stereoscopic Video AF Conformance and Reference Software	Next Generation Broadcasting Forum (Korea)	
MAF	m17056	composition types of 23000-11	Seo-Young Hwang	

39.3. Summary of discussions

M16794: reviewed the NB comments. Provide the DoC for this ballot.

M17032: Accepted for approval. The workplan for the Ref.SW has been updated and been reviewed. A new workplan is proposed due to the EVRC implementation and accepted.

M17056: Reviewed. It is not clear to see the enough evidence for accepting top-bottom composition type, which was previously proposed by JNB and not accepted due to the memory problem for mobile devices. Also, it is needed to investigate how to deal with a future coming composition types. Thus, it is suggested that the Systems group will take care of this issue.

39.4. Action Points

1. FDIS ballot until 2009-10-24

40. Interactive Music AF (23000-12)

40.1. Topics

40.1.1. ISO/IEC 23000-12 Interactive Music AF

40.2. Contributions

Session	Number	Title	Source	Disposition
MAF	m16936	Editor's study on ISO/IEC 23000-12 FCD Interactive music application format	Inseon Jang Hui Yong Kim Jeongil Seo Laurent Primaux Owen Lagadec	
MAF	m16935	Brands for Interactive Music AF	Inseon Jang Jeongil Seo Hui Yong Kim Kyeongok Kang	
MAF	m16937	Consideration on Backward Compatibility for IM AF	Inseon Jang Jeongil Seo Taejin Lee Kyeongok Kang	
MAF	m16960	IM AF Brands Proposal from iKlax Media	Emmanuel Bouix Laurent Primaux Owen Lagadec	

40.3. Summary of discussions

M16935 & m16960: Proposal of brands.Two contributions are combined together because of the same purpose for the definition of brands. Two contributions are merged and provide a new brand table, which is accepted as a new brand table for IM AF.

M16937: it has been found that a new box for playing a non-interactive stream is needed. For a legacy player it is suggested that the text of FCD have a recommendation of putting a AR into the first track in the IM AF file.

On the basis of the new brand table, it is recommended that the AMD1 for Ref. SW and Workplan should be re-visited and submitted to the Systems plenary.

40.4. Action Points

2. FCD ballot until 2009-11-05

41. MPEG-V Architecture (23005-1)

41.1. Topics

41.1.1. ISO/IEC 23005-1 MPEG-V Architecture

41.1.2. Exploration on Haptics

41.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-V	m16815	Summary of Voting on ISO/IEC CD 23005-1	SC 29 Secretariat	
MPEG-V	m17013	Austrian NB comments on ISO/IEC CD 23005-1	Christian Timmerer Markus Waltl (on behalf of Austrian NB)	

41.3. Summary of discussions

m16815 Approved without comments.
m17013 All comments are disposed appropriately.

41.4. Action Points

42. Control Information (23005-2)

42.1. Topics

42.1.1. ISO/IEC 23005-2 Control Information

42.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-V	m16821	Summary of Voting on ISO/IEC CD 23005-2	SC 29 Secretariat	
MPEG-V	m17014	Austrian NB comments on ISO/IEC CD 23005-2	Christian Timmerer Markus Waltl (on behalf of Austrian NB)	
MPEG-V	m16872	Proposal on Control information for real world sensors and motion sensing	Jae-Joon Han Seungju Han Hyunjeong Lee	
MPEG-V	m16873	Proposal for the improved Working Draft of ISO/IEC 23005 Part 2: Control Information	Kyounro Yoon	
MPEG-V	m16875	Device Capability for Motion Effect	E. S. Lee B. S. Choi	
MPEG-V	m16877	User Preference for Motion Effect	E. S. Lee B. S. Choi	

42.3. Summary of discussions

m16821
Passed ballot with comments from Korea. All comments are disposed appropriately.

m17014
AUNB comments on the CD. Comments are disposed appropriately with other ballot comments.

m16875
This contribution presents the capabilities for the motion chair device. It presents them for basic motion but also for the abstract motions.

Resolutions
There is no need for connecting the device capabilities to the abstract motions. Define the device capability type with respect to the position and orientation capabilities and not with respect to high level motion types.
Update the types as following:
- add a type indicating the kind of chair (orientable, movable or both).
- change the MoveType to consider capabilities with respect to the three axes.
- include the speed and the speed levels for Move and Incline capabilities.

m16877

The proposal introduces user preferences for all the motion effects (basic and combinational). They contain maximum speed, maximum count…
Resolution: it is not obvious that the user preferences should be defined with respect to each motion type. This contribution need to be reviewed again during the week.

m16872

The contribution deals with several aspects:
- it proposes base types for device capabilities, user preferences and sensor commands.
- it proposes data type for motion sensor, and intelligent camera for tracking face and/or body motion.
Resolutions: include the device capabilities base type (excluding the position attribute), user preferences and commands in the current version of Part 2.
- include the basic motion sensor in Part 2
- add in the intelligent camera the bodyBones as well (use the same mechanism of low-level and high-level feature tracking as for face, that is the high level feature tracking for body is are the bones)

Note: Investigate on the better name for the information captured from the sensors. Now in Figure 1 this data travel in the module called "Device Commands". (one idea is to use SensedInformation). In a new name is found Figure 1 from the architecture should be updated.

m16873

The paper provides several improvements on the document with respect to the definitions. In addition KynetheticType should be updated with the latest version and MotionSensor and HapticSensor should be aligned.

42.4. Action Points

43. Sensory Information (23005-3)

43.1. Topics

43.1.1. ISO/IEC 23005-3 Sensory Information

43.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-V	m16816	Summary of Voting on ISO/IEC CD 23005-3	SC 29 Secretariat	

MPEG-V	**m17015**	Austrian NB comments on ISO/IEC CD 23005-3	Christian Timmerer Markus Waltl (on behalf of Austrian NB)
MPEG-V	**m17016**	Editor's Input on ISO/IEC CD 23005-3	Christian Timmerer Sang Kyun Kim Jeha Ryu Yeongmi Kim
MPEG-V	**m16874**	Sensory Effect for Motion	B. S. Choi E. S. Lee

43.3. Summary of discussions

m16816
Passed the ballot with one comment from Korea. Comment is disposed appropriately.

m17015
AUNB comment on CD ballot. Comment is disposed appropriately together with other ballot comment.

m17016
Accepted as a base document for FCD.

m16874
This contribution introduces the motion chairs (actuator). Several king of motion are may be created: change of position and orientation but also vibrations.
The paper introduces two levels for motion affects: physical and conceptual motion effects. It depends on the capability of each chair to render specific sensory effect. It proposes the 6Dof control (position and orientation) and derives two categories of motion patters: basic motion patters (corresponding to the one of each DoF) and combinational motion patters. In the basic class there are Move (wrt position) and Incline (wrt orientation). In the combinational there are Shake, Wave, Spin, Turn, Collide. The parameters describing each motion pattern are specified.
Open issues:
- not only uniform speed should be supported but also acceleration.
- the spin can be performed with respect to the three orientations.
- align the syntax and semantic of the effects (use the same names as for other sensors).

Resolution:
- Include the use case of motion actuators in Part 1.
- propose the new types and review them during the week.

43.4. Action Points

44. Avatar Information (23005-4)

44.1. Topics

44.1.1. ISO/IEC 23005-4 Avatar Information

44.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-V	m16819	Summary of Voting on ISO/IEC CD 23005-4	SC 29 Secretariat	
MPEG-V	m17038	Proposal on Avatar information for Motion control	Jae-Joon Han Seungju Han Hyunjeong Lee Wonchul Bang Dokyun Kim	
MPEG-V	m17039	Proposal on Virtual object information	Hyunjeong Lee	

44.3. Summary of discussions

m16819
Passed ballot with comments from France and Korea. All comments are disposed appropriately.

m17038

The proposal introduces the calibration parameters for face animation and a set of additional feature points for face animation.
Resolution: Classify the calibration parameters in a new type. Consider two resolution for the OutlineType (4 and 8 feature points). Keep in miscellaneous points only for feature points that are not used currently for face animation.

m17039

The contribution introduces several types for virtual object:
- attributes specific to the object such as creator, family,
- new elements grouping the virtual object with other medias (sound, scent, …),
- elements for controlling the object by using physical sensors.

Resolution: no resolution yet for this contribution

44.4. Action Points

45. MXM Architecture (23006-1)

45.1. Topics

45.1.1. ISO/IEC 23006-1 MXM Architecture and technologies

45.2. Contributions

Session	Number	Title	Source	Disposition
MXM	m16836	Use of MXM in a web browser environment	Angelo Difino	
MXM	m17011	Proposed study on ISO/IEC 23006-1 FCD MXM Architecture and Technologies	Filippo Chiariglione	
MXM	m17060	On the media identification in the MXM media framework engine	Hyungyu Kim Hwa Seon Shin Yong-Hwan Kim Byeongho Choi Euee S. Jang	
MXM	m16848	Handling exceptions in MXM C++ Engines and Applications	Dumitrita Munteanu Emiliano Leporati Angelo Difino	

45.3. Summary of discussions

m16836
Presenting an relationship between browser and MxM engine.

m17011
Accepted as a base text for study of FCD.

m17060
New input on format identification engine. Accepted.
Open issue: missing use cases for certain functionalities

m16848
Basic structure for C++ exception handling. Accepted.

45.4. Action Points

1. Harmonization with MPEG-E
2. FCD ballot until 2010-01-09

46. MXM APIs (23006-2)

46.1. Topics

46.1.1. ISO/IEC 23006-2 MXM APIs

46.2. Contributions

Session	Number	Title	Source	Disposition
MXM	m17010	Proposed study on ISO/IEC FCD 23006-2 MXM APIs	Filippo Chiariglione	
MXM	m16974	Proposal on MPEG-7 Visual API for MXM	Paul Brasnett Ryoma Oami Stavros Paschalakis Kota Iwamoto	
MXM	m16857	MPEG-4 Audio API for MXM	S. Quackenbush	
MXM	m16880	Proposal for revised generic metadata APIs on MXM	Wonsuk Lee Seungyun Lee	

46.3. Summary of discussions

m16974

MPEG-7 Visual API
VisualMetadataManager covering both video and image
Accepted.

m16857
MPEG-4 Audio API
Basic API for encoding & decoding – needs no support from MXM side
Accepted.

m16880
Revised generic metadata APIs

Add'l interfaces for additional core properties
Revised input parameters and return types
Read access only; write access later; Java

46.4. Action Points

3. FCD ballot until 2010-01-09

47. MXM Conf. & Ref. SW (23006-3)

47.1. Topics

47.1.1. ISO/IEC 23006-3 MXM Conformance and Reference Software

47.2. Contributions

Session	Number	Title	Source	Disposition
MXM	m16997	Proposal for study on ISO/IEC FCD 23006-3 MXM conformance and reference software	Filippo Chiariglione Sergio Matone Edoardo Radica	

47.3. Summary of discussions

m16997
Accepted as a base text for study of FCD.

47.4. Action Points

4. FCD ballot until 2010-01-09

48. MXM Protocol (23006-4)

48.1. Topics

48.1.1. ISO/IEC 23006-4 MXM Protocols

48.2. Contributions

Session	Number	Title	Source	Disposition
MXM	m16961	Proposal of Study of ISO/IEC FCD 23006-4 MXM Protocols	Víctor Rodríguez-Doncel Jaime Delgado Filippo Chiariglione	

48.3. Summary of discussions

m16961
Accepted as a base text for study of FCD
MXM protocols improvements and extensions
Improvement of a base protocol message
Improvement of the IPMP Tool Protocols
Addition of an Event Report Collecting Device and the corresponding protocols

48.4. Action Points

5. FCD ballot until 2010-01-09

49. MPEG-U Widgets (23007-1)

49.1. Topics

49.1.1. Package, Delivery and Presentation of Widgets

49.1.2. Communication

49.2. Contributions

Session	Number	Title	Source	Disposition

MPEG-U	**m16817**	Summary of Voting on Proposal for a New Work Item, Information technology -- Rich media user interfaces	SC 29 Secretariat
MPEG-U	**m16818**	Summary of Voting on ISO/ IEC CD 23007-1	SC 29 Secretariat
MPEG-U	**m16847**	Editor's Text of 23007-1 MPEG-U Widget	Cyril Concolato
MPEG-U	**m16856**	Comments on CD 23007-1 (MPEG-U)	Kyungmo Park
MPEG-U	**m16866**	Security requirements for MPEG-U	Nhut Nguyen Jaeyeon Song Kyungmo Park Cyril Concolato Jean-Claude Dufourd Jean Le Feuvre
MPEG-U	**m16867**	Text for security aspects of MPEG-U	Nhut Nguyen Jaeyeon Song Kyungmo Park Cyril Concolato Jean-Claude Dufour Jean Le Feuvre

49.3. Summary of discussions

m16847 reviewed at the Paris AHG
m16817 This proposal has met the required criteria for approval.

Contribution m16818: Voting on CD
12 accepted, 1 accepted with comments (KNB) and 1 disapprove with comments (FNB)
- FNB comments (as discussed in Seoul, mostly accepted, see disposition of comments)
- KNB comment: general comment asking to improve some aspects: disposition follows the answer to contributions m16856

Contribution m16856: (not formally mentioned by the KNB, but dealt with anyway)
- Widget Adaptation
  - agreement to add an attribute "required" or "waitForActivation" to the interface element
  - agreement that adaptation of the scene to the communication capabilites (and consequently of the functionalities of the widget) is needed. But some participants think that this kind of adaptation is already possible using the bind/unbind events. The group welcomes inputs on further investigation of this matter.

- Widget Mobility:
  Pushing the context from A to B, leads to two options:

- B already has the associated widget: there is no need for a request and download of the widget, but this requires a unique identification of the widget

- B does not have the widget: the download is needed and therefore an accessible URL needs to be provided

We agree on adding a UUID, a version, release date and URL attributes to the contextInformation document and a UUID in the widget manifest. We need also the processing of the context information for mobility.

- Widget grouping
  - accepted, will add an example of "template-widget" for grouping of components

- **Contribution m16866**: requirements for widget security

Agreement on the rewriting of the requirements to indicate that widget shall be able to carry information for security in general. The technical solution from **m16867** does not reflect the revised requirements and need to be updated for the next meeting. The recommendation is not to delay the FCD and to start an amendment on security.

- White paper and 1 pager and presentation material: no review needed, editorial work, documents are being circulated.

49.4. Action Points

As a general rule, the group recommends to use "[MPEG-U]" for posting on scene representation mailing list.

50. MPEG-U Conformance and Reference Software (23007-2)

50.1. Topics

50.1.1. Conformance and Reference Software

50.2. Contributions

Session	Number	Title	Source	Disposition
MPEG-U	m17055	Ideas on MPEG-U Reference Software	Cyril Concolato Jean Le Feuvre Jean-Claude Dufourd	

50.3. Summary of discussions

- Contribution m17055: Reference Software & Conformance v2
Accepted, including the conformance part for ISOFF package which proposes to transpose the W3C processing of widgets to for ISOFF package conformance.

50.4. Action Points

51. Exploration – Advanced IPTV Terminal

51.1. Topics

51.1.1. Context and Objectives

51.1.2. Requirement and candidate technologies

51.1.3. Terminologies

51.2. Contributions

Session	Number	Title	Source	Disposition
AIT	m16790	Draft Advanced IPTV Terminal (AIT) Requirements	Christian Timmerer (editor)	
AIT	m16824	Mash-up use case for AIT	Stefano Quintarelli	
AIT	m16828	Advanced IPTV Terminal (AIT): Requirements and candidate technologies	Leonardo Chiariglione	
AIT	m16829	Revised version of 'Context and Objectives for Advanced IPTV Terminal' (N10858)	Leonardo Chiariglione	
AIT	m16833	Announcement of meeting of ?Ad hoc group on Advanced IPTV Terminal(AIT)?	Leonardo Chiariglione	
AIT	m16835	Advanced IPTV Terminal (AIT) Terminology	Leonardo Chiariglione	
AIT	m16837	Actors in AIT payment/ cashing protocols	AHG on AIT	

AIT	**m16838**	Context and Objectives for Advanced IPTV Terminal	AHG on AIT
AIT	**m16839**	Advanced IPTV Terminal (AIT): Requirements and candidate technologies	AHG on AIT
AIT	**m16840**	Advanced IPTV Terminal (AIT) Terminology	AHG on AIT
AIT	**m16915**	Comments on Advanced IPTV Terminal (AIT): Requirements and candidate technologies	Jin Young Lee
AIT	**m16917**	Comments on Advanced IPTV Terminal (AIT) Terminology	Jin Young Lee
AIT	**m16966**	Proposed Updates to MPEG AIT Requirements	Truong Cong Thang Jung Won Kang Jeong-Ju Yoo
AIT	**m16980**	Proposed AIT requirements and candidate technologies	Leonardo Chiariglione
AIT	**m17017**	Comments on Advanced IPTV Terminal (AIT) Terminology	Christian Timmerer Lars-Erik Eriksson (on behalf of P2P-Next)
AIT	**m17018**	Comments on Advanced IPTV Terminal (AIT) Requirements and candidate technologies	Christian Timmerer (on behalf of P2P-Next)
AIT	**m17023**	Some Comments on the AIT Requirements and Terminology	Xin Wang
AIT	**m17062**	Open Media Marketplace basics	Weizhong Chen Leonardo Chiariglione Riccardo Chiariglione Tiejun Huang Sergio Matone Andrea Pignatiello Martin Springer

AIT	m17063	Use case based testing of OMM Basic Services	Weizhong Chen Leonardo Chiariglione Jinwoo Hong Tiejun Huang Stefano Quintarelli Martin Springer Christian Timmerer

51.3. Summary of discussions

m16833 About the logistics of Torino AHG meeting
m16790, m16824,m16829, m16833, m16835 These contributions are reviews during Torino AHG meeting. Revised version reflecting the results of discussions are produced as m16837,m16838, m16839 and m16840
M17062

- definitions of "entity" and "verb" to describe "basic services"
- systematic methodology to identify meaningful "basic services" and required protocols enabling communication between them

M17063

- testing of basic services against to the use cases
- three use cases: selfTV, professional mash-up and user mash-up

m16915, m16917 provides comments on requirements and definitions. harmonized with m16839 and 16849 to generate output documents
m16966 minor comments on requirements. harmonized with m16839 to produce output document
m16980 minor comments on requirements. harmonized with m16839 to produce output document

51.4. Action Points

6. Joint meeting with ITU-T Q.13/16

52. Exploration – MMT

52.1. Topics

- Transport- and file format friendly stream format
- Cross layer optimization between video and transport layer
- Error resilience for MPEG streams
- Conversion between transport mechanisms
- Content adaptation to different networks

52.2. Contributions

Session	Number	Title	Source	Disposition
MMT	m16879	Harmonization with the Existing QoS Protocols for MMT(use case)	Yonghun Lee Doug Young Suh	
MMT	m16881	On Cross Layer Solution for Multimedia Streaming in wireless channel(MMT)	YongIl Kown DougYoung Suh	
MMT	m16902	Additional use cases and requirements of MMT	Jaeyeon Song	**Agreed to update the requirement document with proposed requirements**

m16902
This contribution analyzes the use case and requirements for service convergence environment and raises open questions regarding the scope and the requirement of MMT. It is point out that cross layer design and adaptive progressive downloading are two most important issues from the view point of CE manufacturer. (Note: Unofficial liaison input regarding adaptive progressive download is also received from OIPF since we don't have liaison relationship formally established. OIPF OIPF is urging MPEG to work on this area as soon as possible.) It is pointed out during the discussion that progressive downloading or incremental streaming doesn't seem to require big changes of current transport format. However, "ADAPTIVE" progressive downloading might needs dramatic improvements by taking into account of cross layer design. And progressive downloading over HTTP is just a small part of cross layer design. General cross layer design covers wider scope.

m16879
This contribution presents experience of cross layer optimization between Video and MAC layer by using information of NAL header and proposes to work on design of cross layer optimization for HVC. It is pointed out during the discussion that the granularity of adaptation between progressive downloading over HTTP and this work are quite different. It is also noted that video group already designed video bitstream to provide information to be used for adaptation by assuming that the underlying transport layer will treat the data differently based on such information such as priority bits in NAL unit header. However it doesn't seem to be well used in a real situation. It is agreed that achieving meaningful optimization between layers requires knowledge about the other layers so it would be needed to provide more detailed information about the contents of the packet by assuming that underlying layer has some knowledge about the video layer.

m16881
This contribution presents experience of cross layer optimization including MAC/PHY layers.

52.3. Summary of discussions

52.4. Action Points

53. References

53.1. Program of work

1. Refer “Program of Work” section in SC29 Web Site : http://www.itscj.ipsj.or.jp/sc29/

53.2. Timeline of standards under development

Pr	Pt	Edit.	Project	Description	CfP	WD	CD	FCD	FDIS
2	1	2007	AMD4	Transport of MVC			08/10	09/02	09/07
2	1	2007	COR3	Miscellaneous			09/07		09/10
2	1	2007	AMD5	Carriage of JPEG2000		09/07	09/10	10/04	10/10
4	1	2004	AMD4	LASeR in MPEG-4 systems & RA			09/07	09/10	10/04
4	1	200x	4th ed.						???
4	5	2001	AMDxx	AVC File Format Ref. Soft		TBS			
4	5	2001	AMDxx	SVC File Format Ref. Soft		TBS			
4	5	2001	AMDxx	MVC File Format Ref. Soft		TBS			
4	5	2001	AMD14/ COR1	Open Font Format Ref. Soft. Technical Corrigendum			09/07		09/10
4	5	2001	AMD23	Synth. Texture Ref. Soft			08/04	09/04	09/10
4	11	2005	AMD7	Digital Radio BIFS Profile		09/02	09/07	09/10	10/04
4	14	2003	AMD1	Handling of MPEG-4 audio enhancement layers			09/02	09/07	10/01
4	20	200X	AMD3	PMSI		08/07	08/10	09/04	09/10
4	22	2008	AMD1.	Support for many-to-one range mappings			09/04	09/10	10/04
7	12	2008	COR2	Missing semantics			09/07		09/10
7	12	2008	AMD1.	MPQF reference software			09/07	09/10	10/04
7	12	2008	AMD2	Semantic enhancement		09/07	09/10	10/04	10/10
21	2	2002	AMD1.	Presentation element		08/10	09/04	09/10	10/04
21	4	2006	AMD2.	Protection of Presentation Information		08/10	09/04	09/10	10/04

21	19	200x	1st Ed.	Media Value Chain Ontology		08/07	08/10	09/07	10/01
A	5	200x	2nd Ed.	MS AF		08/01	09/02	09/10	10/04
A	6	2006	AMD2	PA-AF Conf. & Ref. SW			08/07	09/02	09/10
A	8	200x	AMD1	PVP AF Soft. And Conf.		TBS			
A	9	2009	AMD1	DMB AF Soft. And Conf.				09/02	09/10
A	9	2009	AMD2	DMB AF MPEG-2 Storage			09/02	09/07	10/01
A	10	200x	AMD1	VS Conf. & Ref. SW			08/07	09/07	10/01
A	11	200x	AMD1	SVAF Ref. Soft. And Conf.		09/02			
A	11	200x	AMD2	Additional composition type		09/07	09/10	10/04	10/10
A	12	200x	1st Ed.	Interactive Music AF			09/02	09/07	10/01
B	2	200x	AMD1	FRU Ref. Soft. And Conf.					
V	1	200x	200x	Architecture		09/02	09/07	09/10	10/04
V	2	200x	200x	Control Information		09/02	09/07	09/10	10/04
V	3	200x	200x	Sensory Information		09/02	09/07	09/10	10/04
V	4	200x	200x	Avatar Information		09/02	09/07	09/10	10/04
M	1	200x	1st ed.	MxM Architecture		08/07	09/02	09/07	10/01
M	2	200x	1st ed.	MxM APIs		08/07	09/02	09/07	10/01
M	3	200x	1st ed.	MxM Conf. & Ref. SW		08/07	09/02	09/07	10/01
M	4	200x	2nd Ed.	MxM Protocols			09/02	09/07	10/01

U	1	200x	1st ed.	Package, Delivery and Presentation of Widget	08/10	09/04	09/07	09/10	10/04
U	2	200x	1st ed.	Conf. & Ref. SW	08/10	09/04	09/10	10/04	10/10

53.3. Standing Documents

Pr	Pt	Documents	No.	Meeting
1	1	MPEG-1 White Paper – Multiplex Format	**N7675**	05/07 Nice
1	1	MPEG-1 White Paper – Terminal Architecture	**N7676**	05/07 Nice
1	1	MPEG-1 White Paper – Multiplexing and Synchronization	**N7677**	05/07 Nice
2	1	MPEG-2 White Paper – Multiplex Format	**N7678**	05/07 Nice
2	1	MPEG-2 White Paper – Terminal Architecture	**N7679**	05/07 Nice
2	1	MPEG-2 White Paper – Multiplexing and Synchronization	**N7680**	05/07 Nice
2	11	MPEG-2 White Paper – MPEG-2 IPMP	**N7503**	05/07 Poznan
4	1	MPEG-4 White Paper – MPEG-4 Systems	**N7504**	05/07 Poznan
4	1	MPEG-4 White Paper – Terminal Architecture	**N7610**	05/10 Nice
4	1	MPEG-4 White Paper – M4MuX	**N7921**	06/01 Bangkok
4	1	MPEG-4 White Paper – OCI	**N8148**	06/04 Montreux
4	6	MPEG-4 White Paper – DMIF	**N8149**	06/04 Montreux
4	11	MPEG-4 White Paper – BIFS	**N7608**	05/10 Nice
4	12	MPEG-4 White Paper – ISO File Format	**N8150**	06/04 Montreux
4	14	MPEG-4 White Paper – MP4 File Format	**N7923**	06/01 Bangkok
4	15	MPEG-4 White Paper – AVC FF	**N7924**	06/01 Bangkok
4	13	White Paper on MPEG-4 IPMP	**N7505**	05/07 Poznan
4	13	MPEG IPMP Extensions Overview	**N6338**	04/03 München
4	17	White Paper on Streaming Text	**N7515**	05/07 Poznan
4	18	White Paper on Font Compression and Streaming	**N7508**	05/07 Poznan
4	20	Presentation Material on LASER	**N6969**	05/01 Hong-Kong
4	20	White Paper on LASeR	**N7507**	05/07 Poznan
4	22	White Paper on Open Font Format	**N7519**	05/07 Poznan

7	1	MPEG-7 White Paper - MPEG-7 Systems	**N7509**	05/07 Poznan
7	1	MPEG-7 White Paper – Terminal Architecture	**N8151**	06/04 Montreux
21	9	MPEG-21 White Paper – MPEG-21 File Format	**N7925**	06/01 Bangkok
A	X	MPEG Application Format Overview	**N9421**	07/10 Shenzhen
A	X	MAF Overview Document	**N9840**	08/04 Archamps
A	X	MAF Overview Presentation	**N9841**	08/04 Archamps
B	X	MPEG-B White Paper – BinXML	**N7922**	06/01 Bangkok
E	X	MPEG Multimedia Middleware Context and Objectives	**N6335**	04/03 München
E	X	1rst M3W White paper	**N7510**	05/07 Poznan
E	X	2nd M3W White Paper : Architecture	**N8152**	06/04 Montreux
E	X	Tutorial on M3W	**N8153**	06/04 Monreux
E	X	M3W White Paper : Multimedia Middleware Architecture	**N8687**	06/10 Hanzhou
E	X	M3W White Paper : Multimedia API	**N8688**	06/10 Hanzhou
E	X	M3W White Paper : Component Model	**N8689**	06/10 Hanzhou
E	X	M3W White Paper : Resource and Quality Management	**N8690**	06/10 Hanzhou
E	X	M3W White Paper : Component Download	**N8691**	06/10 Hanzhou
E	X	M3W White Paper : Fault Management	**N8692**	06/10 Hanzhou
E	X	M3W White Paper : System Integrity Management	**N8693**	06/10 Hanzhou

53.4. Mailing Lists Reminder

Topic	Information	Kindly Hosted by
General Systems List	Reflector : gen-sys@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/gen-sys Archive: http://lists.uni-klu.ac.at/mailman/private/gen-sys/	**Klagenfurt University**
File Format	Reflector : mp4-sys@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/mp4-sys Archive: http://lists.uni-klu.ac.at/mailman/private/mp4-sys/	**Klagenfurt University**
LASeR	Reflector : mpeg-laser@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/mpeg-laser Archive: http://lists.uni-klu.ac.at/pipermail/mpeg-laser/	**Klagenfurt University**
MAF	Reflector : maf-sys@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/maf-sys Archive: http://lists.uni-klu.ac.at/mailman/private/maf-sys/	**Klagenfurt University**
ISO File Format Transport	Reflector: isoff-transport@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/isoff-transport Archive: http://lists.uni-klu.ac.at/mailman/private/isoff-transport/	**Klagenfurt University**
AIT	Reflector: jiptv@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/jiptv Archive: http://lists.uni-klu.ac.at/mailman/private/jiptv/	**Klagenfurt University**
Metaverse	Reflector: metaverse@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/metaverse Archive: http://lists.uni-klu.ac.at/mailman/private/metaverse/	**Klagenfurt University**

MXM	Reflector: mxm@lists.uni-klu.ac.at Subscribe: http://lists.uni-klu.ac.at/mailman/listinfo/mxm Archive: http://lists.uni-klu.ac.at/mailman/listinfo/mxm	**Klagenfurt University**

G. – Video report

Source: Jens Ohm and Gary Sullivan, Chairs

1. MPEG-4 part 2

A draft corrigendum was produced related to the MPEG-4 part 2 Studio profiles. The main issue is to clarify that various unused VLC codes, whenever they should appear in existing bitstreams, shall be skipped in parsing and shall never emulate a start code prefix. In addition, various editorial improvements related to the studio profile are included, and two clarifications related to vertical field MV conversion and scaling in quarter-pel MC, which had been documented in a previous Defect Report, are included in the corrigendum.

Document reviewed:

m16865	Defect report of MPEG-4 studio profile	Teruhiko Suzuki

Documents approved:

No.	Title	TBP	Available
10893	**Text of ISO/IEC 14496-2:2004/DCOR 4**	**N**	**09/11/30**

54.Development of AVC

The video subgroup held a session to review the input documents related to AVC (14496-10), in particular MVC. Some of the contributions were related to non-normative improvements (encoder optimization and pre-processing), some were related to inclusion of more coding tools at the MB level. None of these contributions led to taking immediate particular action (see below).

Since the London meeting, more work had been done related to the ongoing corrigendum (various AVC, SVC and MVC issues). A Study text was produced as an output from the Xi'an meeting.

The MVC reference software and conformance testing specifications now include the Stereo High profile, and have been stable since the issuing of the respective Study text documents in London. Therefore, both were progressed into FDAM status in Xi'an.

A report of the previous (31st) JVT meeting was submitted as m17069. The status of work on AVC related topics was expected to be further reviewed and progressed at the upcoming 32nd JVT meeting to be held in Geneva under ITU-T SG 16 auspices during 2-4 November 2009.

A liaison letter m16844 had been received from SCTE relating to 3D video content for cable networks. The output document N10929 was sent in reply to SCTE on the status of work on 3D video, focusing primarily on the MVC and frame packing arrangement SEI technology found in AVC.

Documents reviewed:

m16844	**Liaison Statement from SCTE - DVS**	SCTE - DVS via SC 29 Secretariat
m16859	**Selective disparity estimation for MVC** *This contribution set up rules for skipping disparity estimation, resulting in a reported reduction in computation by 25%.* *The contribution was non-normative in nature – describing an encoder speed-up technique for determining when to consider using inter-view prediction with disparity search, which can be summarized as follows:* *1) determine whether motion is homogeneous or not* *2) when motion is homogeneous, don't bother performing disparity estimation.* *The information provided in this contribution may be useful for improving the speed of encoding in the JMVC context (although the document refers to the JMVM rather than JMVC). A 26% speed-up appears to be claimed in document; verbally there was described to potentially be more. It was asserted that there is approximately no loss in coding efficiency due to inclusion of the technique.* *The group discussed whether to include the technique in our reference software. It was planned to have code for the technique made available toward considering this, and to study it for potential adoption into software at the next meeting*	Liquan Shen Ping An Ran Ma Zhaoyang Zhang Tao Yan
m16860	**Early Skip Mode decision for MVC Using Inter-view Correlation** *This contribution involved making a decision to use skip mode if the corresponding MB from neighbor views are also in skip mode.* *The described technique is non-normative – an encoder speed-up to recognize when the use of the skip mode is highly likely.* *It was asked whether this had been tried in combination with the m16859 technique, and the proponent indicated that yes, this had been done, and the two methods both help when used in combination.* *It was asked whether we have an early skip decision in the software already. Further study appeared to be desirable.* *The group reaction was similar to that for m16859 – and software will be provided for further study.*	Liquan Shen Zhaoyang Zhang Ping An Ran Ma Tao Yan
m16886	**Color Correction Preprocessing and Chrominance Reconstruction Postprocessing for Multiview video coding** *The proponent was not available to present this document. However, it is available to the group for study, and its study was encouraged.*	Feng Shao; Gangyi Jiang; Mei Yu; Zongju Peng; Yun Zhang; Zhidi Jiang; Fucui Li
m16888	**Basic Unit Layer Rate Control for MVC** *This contribution described bit rate allocation to various views based on correlation analysis with regard to reference pictures. Further information was requested regarding whether this allows specifying a target rate jointly for all views. If so, it would be valuable. The contributors will provide the source code to the group for further study.* *There is currently no rate control in the JMVC software at the moment.* *It was remarked that it has been desired to have a rate control that can achieve a target total rate for all views together - so if this proposal can achieve that, it would be desirable to further pursue the study of the proposed technique.*	yantaoshu@yahoo.com.cn anping@shu.edu.cn and Zhaoyang Zhang
m16893	**Vector field estimation and weighted disparity interpolation for MVC** *This contribution described exploiting the "loop constraints" of motion and disparity vectors between multiple views to encode them with a lower rate. A gain in PSNR between 0.2 and 0.4 dB was claimed.* *It was noted that this proposal would require normative change to the MVC standard - as it is a proposal of a new coding tool at the MB level.* *This would need to be considered in the context of adding new technology to the standard - which would be a substantial step.* *It should be studied in relation to the potential need for adding new normative tools. It was suggested that the performance measurement should include Bjontegaard delta rate measures, and results on the full data set of relevant test material. It was also suggested to consider the complexity impact of the bi-directional aspect of the proposal.*	Ping An Liquan Shen Suxing Liu Tao Yan Zhaoyang Zhang

m16899	**Perceptually Adaptive Illumination Compensation for Multi-View Video Coding** *This contribution proposed to improve the IC algorithm of JMVM by adding a JND filter before the transform, and modifying the ME algorithm. This proposal would need change of the macroblock-level decoder operation, which would not to be considered at this time unless new evidence of a compelling benefit were provided. The contribution basically proposed a non-normative quality enhancement of previously proposed normative feature that is not in the current standard. The contribution seems interesting for information purposes, but its application context would require a new standardization project, which would be a larger subject that would need a consensus for action.*	Yongfang wang An Ping Zhaoyang Zhang
m16900	**Color correction preprocessing for MVC** *This contribution described a non-normative pre-processing technique for application in the MVC encoding context. It would be interesting to consider the results on how it improves compression; however this would be difficult to measure as the reference is changed by the preprocessing operation. It was noted that there are sometimes color differences in source material, which might be correctable with such pre-processing. However it seems potentially difficult to compare compression performance because the application of the technique changes the input video data that is being encoded.*	Yongfang Wang Yi liu Ping An zhaoyang zhang
m16914	**PSB-frame for MVC** *This contribution proposed to extend the concept of SI/SP to B frames that are used as reference pictures for inter prediction ("primary SB framed"). It was noted that there is currently no use of the SI/SP concepts to B slices. The proposal would enable an SP/SI functionality at the location of B frames in the coded video stream. The technique could have an advantage in cases where only one specific dependent view is to be decoded, requiring a chain of references to be decoded before can be produced. It was also claimed that the performance in case of transcoding can be improved.* *The contribution was noted, but currently there is no place where to put this proposal into the standard without starting a larger new MVC enhancement effort, which has not been proven justifiable so far (and the prior SP/SI scheme has not been very widely embraced by industry).*	Yui-Lam Chan Chang-Hong Fu Wan-Chi Siu Wai-Lam Hui Yan-Ho Kam Yu Liu Ka-Man Cheng Yan Huo
m17022	**Status of MVC Reference Software and Conformance** *This contribution described the status of reference software and conformance testing development for MVC.*	Anthony Vetro Sehoon Yea Ying Chen Shinya Shimizu Purvin Pandit ChongSoon Lim
m17025	**Comments on the carriage of MVC over MPEG-2 Systems** *This contribution commented on issues relating to the carriage of MVC on MPEG-2 Systems. It was primarily addressed to the Systems sub-group, but is included in this report for information as it is specific to MVC content.*	Ying Chen Peisong Chen Marta Karczewicz
m17044	**Text improvements for MVC** *This contribution recommended several corrections to the text specification for MVC. It was agreed that this should be studied in detail and that a study of DCOR (N10918) should be produced to encourage this and to provide any additional clarifications and corrections suggested by the editors, including addressing these issues in particular.*	Jiancong Luo Wanrong Lin Dong Tian
m17069	**Meeting Report of the 31st JVT Meeting (28 June - 2 July 2009, London, UK)** *Reports the work of the London JVT meeting. No problems were identified in this report during the Xian meeting.*	Gary J. Sullivan Jens-Rainer Ohm Thomas Wiegand Ajay Luthra

Documents approved:

No.	Title	TBP	Available
10894	**Disposition of Comments on ISO/IEC 14496-4:2004/FPDAM 38**	**N**	**09/10/30**
10895	**Text of ISO/IEC 14496-4:2004/FDAM 38 MVC Conformance**	**N**	**09/12/15**

10896	**Disposition of Comments on ISO/IEC 14496-5:2001/FPDAM 15**	**N**	**09/10/30**
10897	**Text of ISO/IEC 14496-5:2001/FDAM 15 MVC Reference Software**	**N**	**09/12/15**
10898	**Study of ISO/IEC 14496-10:2009/DCOR 1**	**N**	**09/11/30**
10929	**Liaison statement to SCTE on 3D Video**	**N**	**09/10/30**

55.MPEG-7 Visual

55.1. MPEG-7 Visual related work

The MPEG-7 breakout group was active during the whole week. Input documents related to the Visual part in 15938-3 are listed in the table below.

m16805	**Summary of Voting on ISO/IEC TR 15938-8:2002/DAM 5**	JTC 1 Secretariat via SC 29 Secretariat
m16806	**Summary of Voting on ISO/IEC 15938-6:2003/FPDAM 3**	SC 29 Secretariat
m16813	**Summary of Voting on ISO/IEC 15938-3:2002/PDAM 4**	SC 29 Secretariat
m16974	**Proposal on MPEG-7 Visual API for MXM**	Paul Brasnett Ryoma Oami Stavros Paschalakis Kota Iwamoto
m16981	**Proposed text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools** *Proposal to introduce multiple signatures, as well as time stamp.* *No proof was established in a CE that this gives a benefit. In principle, both could be done using existing DS structures, but the direct embedding into VS descriptor may be more efficient. It was agreed to design CE activity for this and possibly include in a Study of FPDAM by the next meeting.*	Paul Brasnett Kota Iwamoto Stavros Paschalakis Ryoma Oami Miroslaw Bober
m16983	**Cross validation results of Video Signature**	Karol Wnukowicz
m16987	CE Results on Video Signature Tools (VCE-7) *This contribution proposed 3 changes to PDAM technology (one of which is normative, adding 40 "bags of words"). The proposal is estimated to improve performance by roughly 1%. However, there was no NB comment in the PDAM ballot results to support this. Conclusion: Adopt for XM, probably include in Study of FPDAM at the next meeting.*	Paul Brasnett Kota Iwamoto Stavros Paschalakis Ryoma Oami Miroslaw Bober
m16998	**Proposal on Video Signature Tools (VCE-7)** *Predictive coding of signatures starting from a key picture. Prediction matrix using modulo-3 arithmetic -> prediction vector, run-length encoding, exp-Golomb code for run-length values. Has the effect that 50 ternary values are compressed into 43 bits.* *It was planned to design CE study about binary compression, clarify relationship with traditional MPEG-7 structure (BiM), and also the use cases (would VS be used with only very lean systems layer?)*	Paul Brasnett Nikola Sprljan Stavros Paschalakis
m17053	**Video Test DB contribution for MPEG-7 Video Signature Standardization** *New data set, usage conditions not yet fully clear.*	Weon-Geun Oh Sang-Il Na Daeil Yoon Seungwu Han Hae-Kwang Kim Kyoung-Ho Choi
m17054	**Extended test results for Video Signature XM** *Results indicate inconsistent behavior of the XM: Worse for 2s and 10s clips, similar for 5s clips. Not clear yet whether the GT is clearly defined*	Weon-Genu Oh Sang-Il Na Daeil Yoon Seungwu Han Hae-Kwang Kim

m17057	**Test of VCE-7 XM software performance** *Informative contribution about possible remedy against the behaviour above, but both 17054 and 17057 need better understanding still.*	Weon-Geun Oh Ju-Kyong Jin Dong-Seok Jeong

The main decisions on these subjects were as follows:

- Video Signature Tools FPDAM4 (N10899/N10912) is progressed, with only editorial changes relative to the PDAM.
- MPEG-7 Visual XM 37 (N10913) will adopt changes proven by current Core Experiment (additional bags-of-words investigated), which show
  - Improved matching precision, > 95% average now

Those changes are planned to be incorporated into a study of FPDAM at next meeting after further careful examination of maturity.

- A new set of Core Experiments is set up in Video Signature Description development (N10914)
  - Investigating the advantage of modifying the video signature syntax to support multiple frame signatures, comparing the efficiency of a newly proposed method to the solution which is already possible with the existing Region DS
  - Investigating frame signature compression as newly proposed, and the relationship with BiM
- Image Signature Tools (previous Amd.3 of part 3)
  - Part 6: Reference Software FDAM3 (N10915/N10916)
    - NB comments were reviewed and accepted as reported in N10915
  - Part 7: Conformance Testing Study of FPDAM5 and Draft DoC (N10917/N10918)
    - The issue commented by JNB (tolerance of extraction) seems to be more difficult than expected, and it was agreed to request delay of FDAM by one meeting
  - Part 8: Technical Report AMD5 (N10919/N10920)
    - NB comments were reviewed and accepted as reported in N10919

55.2. Output documents related to MPEG-7 Visual

No.	Title	TBP	Available
	15938-3 Visual		
10899	**Disposition of Comments on ISO/IEC 15938-3/PDAM 4**	**N**	**09/10/30**
10912	**Text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools**	**N**	**09/11/30**
10913	**MPEG-7 Visual XM 37**	**N**	**09/10/30**
10914	**Description of Core Experiments in Video Signature Description development**	**N**	**09/10/30**

10915	**Disposition of Comments on ISO/IEC 15938-6/FPDAM 3**	**N**	**09/10/30**
10916	**Text of ISO/IEC 15938-6/FDAM 3 Reference Software for Image Signature Tools**	**N**	**09/11/30**
10917	**Draft Disposition of Comments on ISO/IEC 15938-7/FPDAM 5**	**N**	**09/10/30**
10918	**Study Text of ISO/IEC 15938-7/FPDAM 5 Conformance Testing for Image Signature Tools**	**N**	**09/12/31**
10919	**Disposition of Comments on ISO/IEC 15938-8/DAM 5**	**N**	**09/10/30**
10920	**Text of ISO/IEC 15938-8/AMD 5 Extraction and Matching of Image Signature Tools**	**N**	**09/11/30**

56.Reconfigurable Video Coding (RVC)

56.1. General status of work

The main part of RVC work during the week in Xi'an was devoted to improving understanding and text of the ongoing Amd.1 (software and conformance). This is rather important because in principle it establishes the normative reference of the tool library (unlike the textual description which cannot be precise enough for this purpose). A Study document was produced with

- Refinement based on extensive checking of consistency between text, software and conformance
- One inconsistency identified to be most probably at management FU level (where codec-level and FU-level conformance are combined). A preliminary solution found for this is likely to be compatible with the existing textual description, but this needs further checking.

It was decided that for future extensions there is an urgent need for the text, software and conformance elements of RVC standardization would be developed together in a synchronized fashion.

A new version of WD 6 of ISO/IEC 23002-4/Amd.2 was issued (Tools for AVC HP). It is planned to progress to PDAM by the 91st meeting. The RVC Work Plan (N10924) includes a demo plan for January (a showcase of AVC BP into HP evolution, and most probably more).

Further work was done to improve two promotional output documents of the last meeting, in particular

- RVC Vision (N10718)
    - RVC-enabled codec design and development
    - Reconfigurable bitstream syntax
    - On-the-fly decoder configuration
    - Transcoding

        - Combination of multimedia and telecommunication tools for next generation multimedia and network services (e.g., Digital Living Network Alliance)
        - Possibly encryption applications
- RVC Tutorial (N10719)
        - Overview of the Reconfigurable Video Coding framework
        - Underlying Model of Computation
        - Tools and Examples

56.2. Input contributions

Doc. No.	Title	Authors
m16846	Cross-check Result for RVC Conformance Testing: IS, IQ, and IDCT FU for MPEG-4 SP	Hyungyu Kim, Minsoo Park, Euee S. Jang
m16927	A Random Access Protocol for Configurable Video Coding	Yafan Zhao, Maja Bystrom, Sampath Kannangara , Iain Richardson, James Philp
m17058	Conformance testing for deblocking filter, fractional luma and chroma sample interpolation of AVC	Gwo Giun (Chris) Lee, He-Yuan Lin, Jia-Wei Liang
m16989	Extending RVC for Wireless Multimedia Sensor Networks and Cryptography Applications	Shujun Li, Junaid Jameel Ahmad, Ihab Amer, Marco Mattavelli
m16990	Conformance testing Report on the RVC MPEG-4 CBP decoder	Mickael Raulet
m17047	Case study of 3DMC implementation in RVC framework	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang
m17048	Problem report of parser implementation in RGC	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang

56.3. RVC Vision & Tutorial

The following actions and discussions relating to the RVC Vision and Tutorial information took place:

- RVC Vision
    - For RVC Vision document, the application scenario section needs to be updated.
    - The following items are identified with designated proposers of text:
        - RVC-enabled codec design and development (HwaSeon, Hyunok Oh)
        - Reconfigurable bitstream syntax (Euee)

- On-the-fly decoder (Euee)
- Transcoding (Kazuo-san)
- Combination of multimedia and telecommunication tools for next generation multimedia and network services (e.g., digital living network alliance) – (Chris)
- (Marco's contribution on WMSN and Encryption applications) – (Marco, Shujun Li)

- RVC Tutorial
  - The following items are identified with designated proposers of text:
    - Overview of the Reconfigurable Video Coding framework (Chris and Euee)

      The introduction seems too long. This is in the MPEG-B spec. It would be better if the first few pages were shortened to just be sufficient to express clearly the background information of RVC, and then jump directly into how to use the tools
    - The underlying Model of Computation (Marco)-More content is needed in this section.

      In the description of RVC-CAL languages, more descriptions may be needed as follows;
      - How to define input and/or output ports,
      - Execution order among priorities, state machine, guard, etc,
      - More detailed examples using some advanced features like array, and
      - Additionally, what is different between RVC-CAL and original CAL
    - Annex – Christophe, HyunGyu, Mathieu

      Perhaps should include design examples to help people learn to use the tools in RVC
    - BSDL2CAL (Christophe)

      In order to be more helpful to readers, the installation processes and how to use the each tools are described "in detail". The starting up of these supporting tools is not so easy for beginners. Therefore more intuitive descriptions should be supplied to help the beginner to use these tools on their own.

56.4. Conformance testing

Doc. No.	Title	Authors
m16846	Cross-check Result for RVC Conformance Testing: IS, IQ, and IDCT FU for MPEG-4 SP	Hyungyu Kim, Minsoo Park, Euee S. Jang
	Notes	🕐 Crosscheck results of three MPEG-4 SP Algo FUs. 🕐 For the IQ FU result, the comparison data is incomplete.
	Recommendations	🕐 Guidelines on FU-level conformance testing will be updated in the **Study** document. 🕐 Will adopt the FU conformance results in the **Study** document. 🕐 IQ FU will need some editing period to fix the early termination bug.
m16990	Conformance testing Report on the RVC MPEG-4 CBP decoder	Mickael Raulet
	Notes	🕐 Codec-level test is conducted to verify if the AVC CBP decoder works.
	Recommendations	🕐 Update the AVC FUs in **RSM**. 🕐 Some Algo FUs in VTL for AVC need to be renamed as Mgnt FUs. (➔ **Workplan**)
m17058	Conformance testing for deblocking filter, fractional luma and chroma sample interpolation of AVC	Gwo Giun (Chris) Lee, He-Yuan Lin, Jia-Wei Liang
	Notes	🕐 Conformance testing of deblocking filter and fractional sample interpolation FUs is provided.
	Recommendations	🕐 The changes in RSM will be checked by CE description editor (Hwa-Seon) 🕐 A regression test is necessary when there is a change in FU in RSM. 🕐 Will adopt the FU conformance results in the **Study** document.

56.5. New directions

Doc. No.	Title	Authors
m16927	A Random Access Protocol for Configurable Video Coding	Yafan Zhao, Maja Bystrom, Sampath Kannangara , Iain Richardson, James Philp
	Notes	🕐 Dynamic reconfiguration functionality suggested.
	Recommendations	🕐 Set up a **core experiment**.
m16989	Extending RVC for Wireless Multimedia Sensor Networks and Cryptography Applications	Shujun Li, Junaid Jameel Ahmad, Ihab Amer, Marco Mattavelli
	Notes	🕐 Nonnormative FUs in a toolbox are suggested for different applications such as wireless sensor networks and cryptography applications. 🕐 Need of reconfigurable video encoders is suggested. 🕐 A possibility to support 'royalty free toolbox'
	Recommendations	🕐 Reflect the suggested applications in **RVC Vision** document.

56.6. Reconfigurable Graphics Coding discussion

Doc. No.	Title	Authors
m17047	Case study of 3DMC implementation in RVC framework	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang
	Notes	🕐 An example implementation following the concept of theRVC framework is given
	Recommendations	🕐 EE is going to be continued.
m17048	Problem report of parser implementation in RGC	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang
	Notes	🕐 Necessity of extending syntax parser description is raised.
	Recommendations	🕐 The point of extending syntax parser is taken into **Workplan**.

56.7. RVC Demo plan

- Scenario: Profile extension from AVC CBP with additional tools belonging to AVC HP.
- Leader: Mickael Raulet

- Participants: INSA, EPFL, NCKU
- Work plan: (from Mickael Raulet)

Output Documents:

No.	Title	TBP	Available
10921	**Study of ISO/IEC 23002-4/FPDAM 1 Video Tool Library Conformance and Reference Software**	**N**	**09/12/07**
10922	**WD 6 of ISO/IEC 23002-4/Amd.2 (Tools for AVC HP)**	**N**	**09/11/30**
10923	**Description of Core Experiments in RVC**	**N**	**09/11/07**
10924	**RVC Work Plan**	**N**	**09/10/30**
10718	**RVC Vision (from 89th meeting)**	**Y**	**09/07/17**
10719	**RVC Tutorial (from 89th meeting)**	**Y**	**09/07/31**

57.Explorations – 3D Video

The goal of the current 3D video exploration work is to generate interpolated views from available videos of multiview camera configurations. The target application is mostly seen for upcoming generations of various (auto-) stereoscopic displays, either requiring multiple views internally or providing means for baseline adjustment. In the new format, only a low number (1-3) of video sequences would be transmitted, but rendering of additional views would be enabled by associated depth information.

In the exploration experiments preceding the Xi'an meeting, the most progress was made in performing video-plus-depth coding based on MVC for both, and performing view synthesis for the various cases of 2-view / 2x baseline and 3-view / 4x baseline. It was now possible to define useful data rate points for all the existing sequences.

There has been continuous improvement of (automatic, semi-automatic and manual) depth map generation, as well as view rendering. Interpolation is another action of the group, however no significant progress was made in that respect.

A major development was the donation of new and, in particular, difficult-to-encode multi-view test material (7 sequences in total), e.g. captured with moving camera rigs. It is expected that these sequences, along with the ones that are already available and have been used in the past experiments, give a sufficiently challenging set to proceed towards a CfP. The timeline would be as follows:

- Carry out color correction/rectification for 5 views on new test sequences (next weeks)
- Carry out DE and VS for new test sets, including early subjective tests to possibly improve depth (Jan. 2010)
- Finalize anchor coding for existing sequences (Jan. 2010)

- Reevaluate entire test set during 91st MPEG meeting
- Final depth maps + preliminary anchor coding for new sequences (April 2010)
- Final Anchor coding for new sequences (July 2010)
- Draft CfP (July 2010), Final CfP (Oct. 2010)

Further discussion was devoted to Applications and Requirements of 3D Video Coding (N11061) – in particular the issue of backward/forward compatibility with existing solutions for stereo video was extensively discussed (see requirements report). From the viewpoint of video standards development, the relationship between HVC and 3DV will need to be carefully considered.

A new set of Exploration Experiments in 3D Video Coding (N10925) was set up as follows:

- EE1: Depth map generation
  - Further improvement of depth maps for 3-view / 4x baseline case of old sequences
  - Generation of first version of depth maps for new sequences (as reported Wednesday
- EE4: Coding experiments
  - To provide reference anchors (MVC video + MVC depth + synthesis) for upcoming CfP
  - Improve data rates/combination points (video, depth) as suggested from study of subjective results for old material

(Note also the liaison letter N10929 that was sent to SCTE on the status of work on 3D video, as discussed above.)

Documents reviewed in AHG (see AHG report m16774)

m16850	Fast Block Based Virtual View Synthesis Method	Bo Zhu; Gangyi Jiang; Yun Zhang; Mei Yu;Feng Shao; Zongju Peng; Zhidi Jiang
m16852	Depth sequence coding based on a joint MVD scheme *(Contributors not present during AHG review.)*	Zongju Peng; Mei Yu; Gangy Jiang; Feng Shao; Yun Zhang; Zhidi Jiang; Fucui Li
m16850	Fast Block Based Virtual View Synthesis Method	Bo Zhu; Gangyi Jiang; Yun Zhang; Mei Yu; Feng Shao; Zongju Peng; Zhidi Jiang
m16852	Depth sequence coding based on a joint MVD scheme *(Contributors not present during AHG review.)*	Zongju Peng; Mei Yu; Gangy Jiang; Feng Shao; Yun Zhang; Zhidi Jiang; Fucui Li

m16868	3DV/FTV EE results of depth estimation and coding experiment on "lovebird1" sequence	Gun Bang Neung-joo Hwang Donggyu Sim Hyunho Jo Gi-Mun Um Won-Sik Cheong Namho Hur Jinwoong Kim
m16889	3DV EE4 Report on Book_arrival Sequences	Lu Yu Yin Zhao
m16890	PSPNR Tool 2.0	Lu Yu Yin Zhao
m16898	Report of 3DV Exploration Experiment with Champagne Tower	Takanori Senoh Kenji Yamamoto Ryutaro Oi Tomoyuki Mishina Taiichiro Kurita
m16922	Moving Multiview Camera Test Sequences for MPEG-FTV	Masayuki Tanimoto Toshiaki Fujii Mehrdad Panahpour Tehrani Menno Wildeboer Norishige Fukushima Hisayoshi Furihata
m16923	Depth Estimation Reference Software (DERS) 5.0	Masayuki Tanimoto Toshiaki Fujii Mehrdad Panahpour Tehrani Menno Wildeboer
m16924	3DV/FTV EE4 coding experiments on Champagne Tower sequence	Masayuki Tanimoto Toshiaki Fujii Mehrdad Panahpour Tehrani Menno Wildeboer
m16934	3DV EE Report on "Pantomime" Sequence	Shinya Shimizu Hideaki Kimata
m16946	Results of EE1 on "Pantomime" Sequence	Sang-Beom Lee Cheon Lee Yo-Sung Ho
m16947	Results of EE4 on "Pantomime" Sequence	Sang-Beom Lee Cheon Lee Yo-Sung Ho
m16949	3D Video Test Sequence and Camera Parameters	Yun-Suk Kang Eun-Kyung Lee Jae-Il Jung Jong-Ho Lee In-Yong Shin Yo-Sung Ho
m16950	Test Sequence for 3-D Video Coding	Eun-Kyung Lee Yo-Sung Ho
m16956	3DV Results of EE4 on Mobile	fons bruls
m16962	3D Video Coding Results of Exploration Experiments	Heribert Brust Gerhard Tech Karsten Müller
m16968	3DV EE4 Results on BeerGarden sequence	Patrick Lopez Dong Tian
m16977	3DTV Exploration Experiments (EE1 & EE4) on the Lovebird data set	Apostolos Georgakis Pravin Kumar Rana Ivana Radulovic

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Source **Ericsson**
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Title **3DTV Exploration Experiments (EE1 & EE4) on the *Lovebird 1* data set**
Author **Apostolos Georgakis (apostolos.georgakis@ericsson.com)**
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Introduction

This contribution describes the results to two sets of 3DTV exploration experiments undertaken by Ericsson using the *Lovebird 1* sequence defined in the last MPEG meeting in London (see w10720). These sets cover both EE1 for depth estimation and view synthesis and EE4 for coding efficiency.

Experimental set up

The exploration experiments describe a 2-view (views 6 and 8) and a 3-view (views 4, 6 and 8) configuration. In some cases a narrow baseline is used whereas in some other cases a median baseline is required. Specifically, in the 2-view case for depth estimation views 4, 6 and 8 generate depth 6 and view 6, 8 and 10 generate depth 8 (median baseline). Subsequently the generated depths and the corresponding views are used to synthesize view 7 (narrow baseline). The 3-views case is similar with the exception that multiple intermediate views are requested, synthesized views 4.5, 5, 5.5, 6.5, 7 and 7.5. Figure 1 depicts the 2-view EE1 experiment.

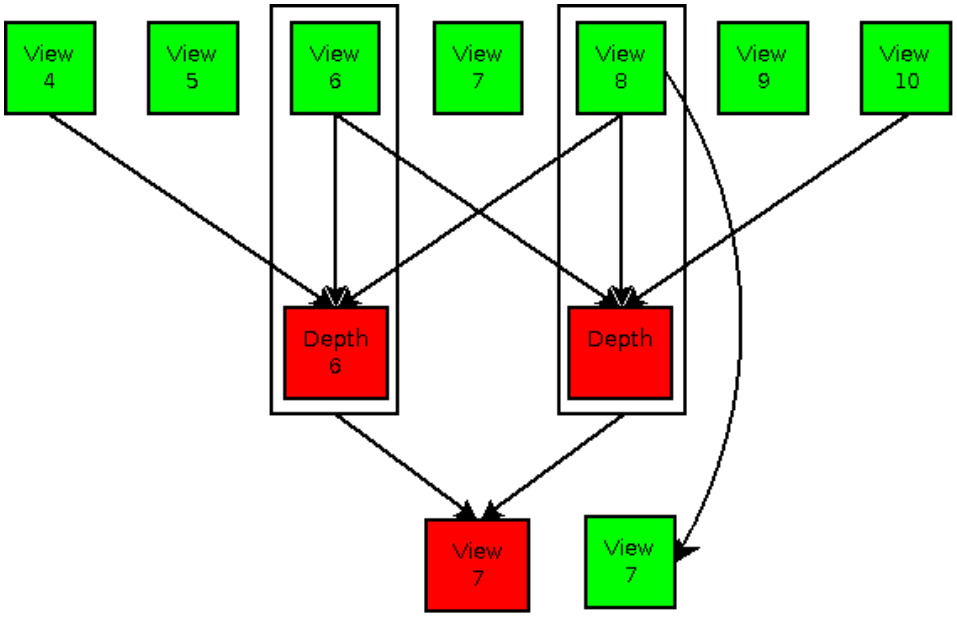


Figure 1: EE1 for the 2-view configuration.

The way the experiments were conducted is the following:

- Experimental Set 1 (ES1): Certain parameters for DE, VS and MVC were hand picked and both EE1 and EE4 were conducted using these parameters.
- Experimental Set 2 (ES2): A wide range of parameters were selected for DE, VS and MVC and an exhaustive search (brute-force approach) has been implemented.

What follows is the results for both ES1 and ES2.

Experimental Set 1 (ES1)

EE1: Depth map estimation

EE1 studied how the quality of estimated depth maps is affected by the "matching methods" in DERS4.9. In Set 1 we tested both with depth estimation mode *on* and *off*. First we will present the results without depth estimation mode and then we will proceed with each one of these modes (depth estimation mode = 1, 2 and 3). Table 1 shows the selected parameters along with the average PSNR values and Fig. 2 shows the PSNR over each frame. It should be noted here that in Tables 1-4 the blue line correspond to the best results from the perspective of PSNR and in Fig. 2-5 the curve denoted with a star (*) corresponds to that particular configuration.

Set	Smoothing Coefficients	Baseline Basis	Precision	Search Level	Filter	Matching Methods	Temporal Enhancement (ON) / Threshold	Depth Estimation Mode	Average Y-PSNR (dB)
1	**5.5**	**0**	**1**	**1**	**0**	**1**	**1.50**	**0**	**30.7307**
2	5.5	0	2	2	0	0	1.50	0	30.6321
3	5.5	0	2	2	0	1	1.50	0	30.6708
4	5.5	1	1	1	1	0	1.50	0	30.1099
5	5.5	1	1	1	1	1	1.50	0	30.1099
6	5.5	1	2	2	1	0	1.50	0	30.1099
7	5.5	1	2	2	1	1	1.50	0	30.1113
8	5.5	2	1	1	2	0	1.50	0	29.9214
9	5.5	2	1	1	2	1	1.50	0	29.9191
10	5.5	2	2	2	2	1	1.50	0	29.9503

Table 1: Depth estimation mode 0 (off)

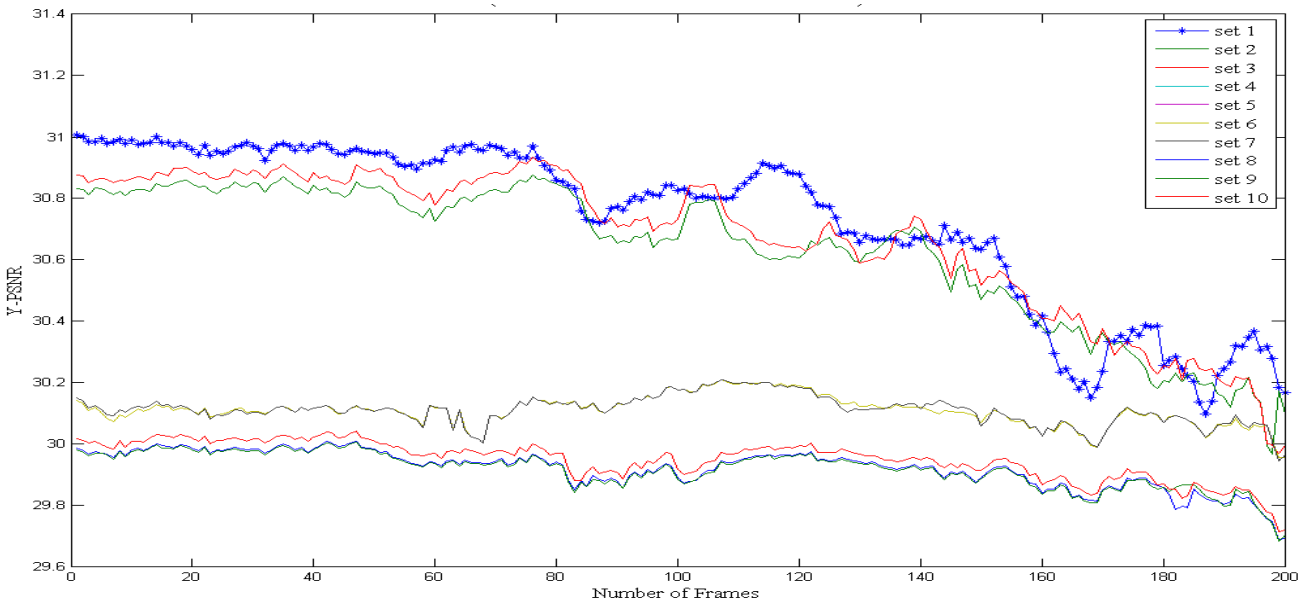


Figure 2: PSNR values of the synth view 7 without depth estimation

Table 2 shows the parameters used for depth map estimation using mode 1 and Fig. 3 shows the PSNR values for the synthesized view 7 again for depth estimation mode 1.

Set	Smoothing Coefficients	Baseline Basis	Precision	Search level	Filter	Matching Methods	Soft Segmentation				Depth Estimation Mode	Average Y-PSNR
							Soft Distance Coeff	Soft Color Coeff	Soft Block Width	Soft Block Height		
1	5.5	0	1	1	0	3	05	10	05	05	1	30.6945
2	**5.5**	**0**	**1**	**1**	**0**	**3**	**05**	**10**	**10**	**10**	**1**	**30.7409**
3	5.5	0	1	1	0	3	10	10	05	05	1	30.7111
4	5.5	0	1	1	0	3	10	10	10	10	1	30.6638
5	5.5	0	1	1	0	1	Ignored for Matching methods 0 and 1				1	30.6757
6	5.5	0	1	1	0	0					1	30.5990
7	5.5	2	1	1	2	1					1	30.0406

Table 2: Depth estimation mode 1

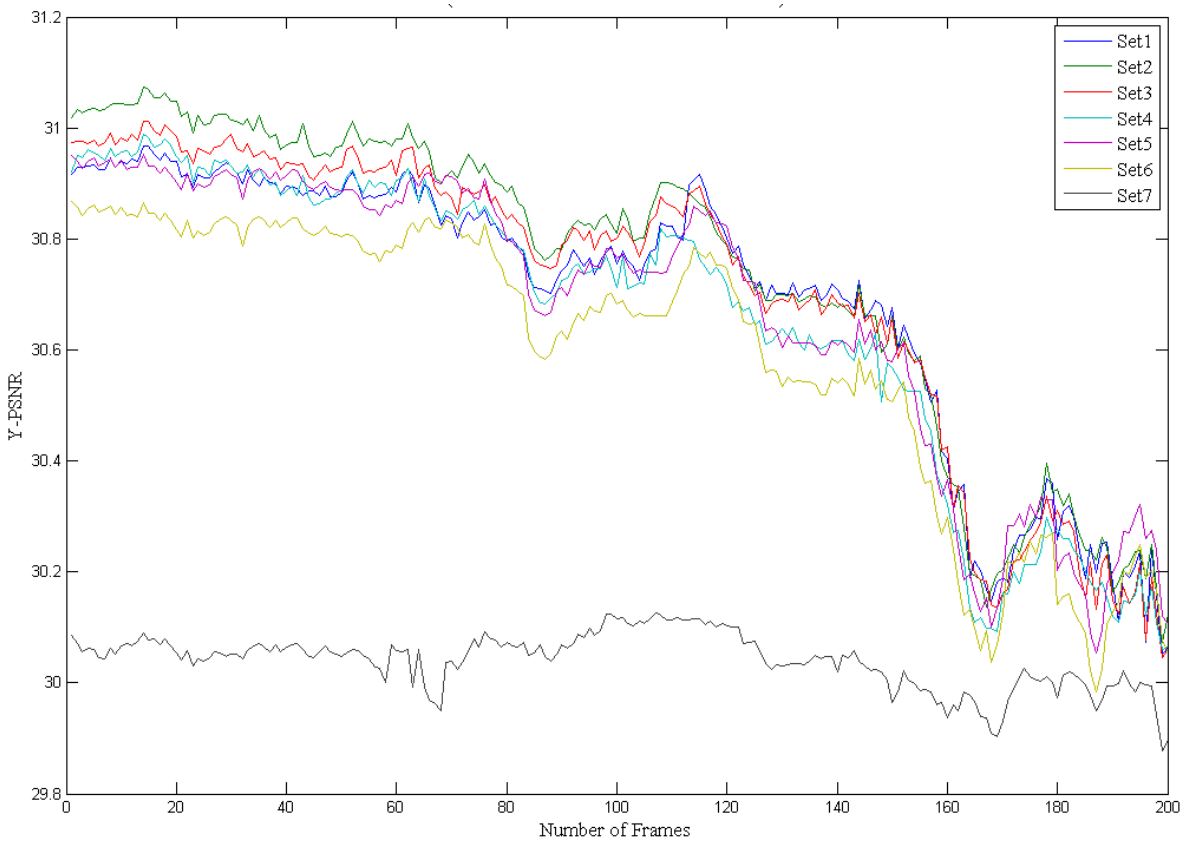


Figure 3: PSNR values of the synth view 7 and depth estimation mode 1

Following we present the results for depth estimation mode 2 (Table 3) along with the PSNR progression over all 200 frames of the sequence in Fig. 4.

Set	Smoothing Coefficients	Matching Methods	**Depth Estimation Mode = 2**			Average Y-PSNR (dB)
			Threshold Of Depth Difference	Moving Objects BSize	Motion Search BSize	
1	5.5	0	10	0	0	30.2520
2	5.5	0	10	0	1	30.2440
3	5.5	0	10	1	0	30.2524
4	5.5	0	10	1	1	30.2443
5	5.5	1	10	0	0	30.2538
6	5.5	1	10	0	1	30.2452
7	**5.5**	**1**	**10**	**1**	**0**	**30.2547**
8	5.5	1	10	1	1	30.2457
9	5.5	3	10	0	0	30.1378

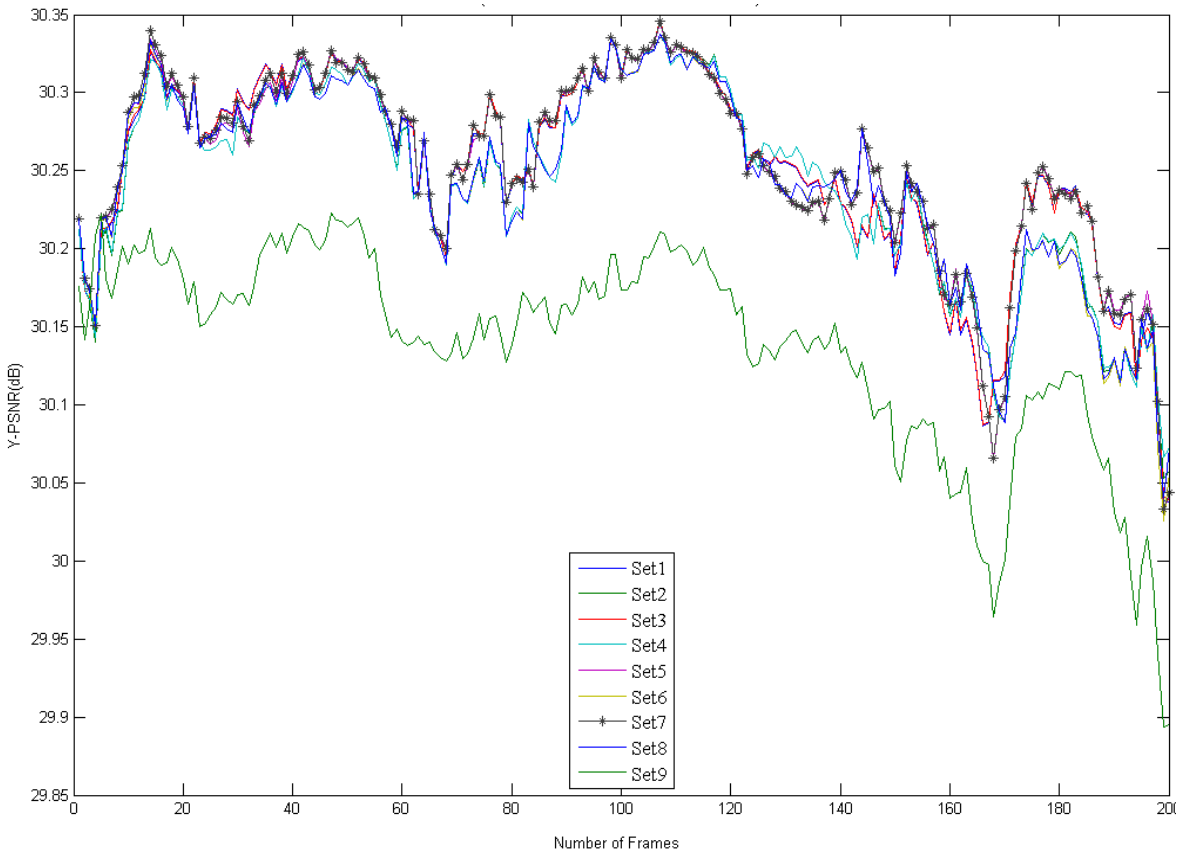


Figure 4: PSNR values of the synth view 7 and depth estimation mode 2

Finally we present results for depth estimation mode 3 using the supplementary data consisting of reference depth maps and camera position. The parameters selected and the average PSNR can be seen in Table 4 whereas the PSNR progression over all the frames are depicted in Fig. 5.

Set	Smoothing Coefficients	Baseline Basis	Precision	Search level	Filter	Matching Methods	Soft Segmentation				Depth Estimation Mode	Average Y-PSNR (dB)
							Soft Distance Coeff	Soft Color Coeff	Soft Block Width	Soft Block Height		
1	5.5	0	1	1	0	0	Ignored for Matching methods 0, 1, and 2				3	30.66601
2	5.5	1	1	1	1	0					3	30.75930
3	**5.5**	**2**	**1**	**1**	**2**	**0**					**3**	**30.76841**
4	5.5	0	1	1	0	1					3	30.67342
5	5.5	1	1	1	1	1					3	30.04774
6	5.5	2	1	1	2	1					3	30.04926
7	5.5	0	1	1	0	2					3	30.09371
8	5.5	1	1	1	1	2					3	30.02198
9	5.5	2	1	1	2	2					3	30.04774
10	5.5	0	1	1	0	3	10	20	11	11	3	30.04926
11	5.5	1	1	1	1	3	10	20	11	11	3	30.09371
12	5.5	2	1	1	2	3	10	20	11	11	3	30.09371

Table 4: Depth estimation mode 3

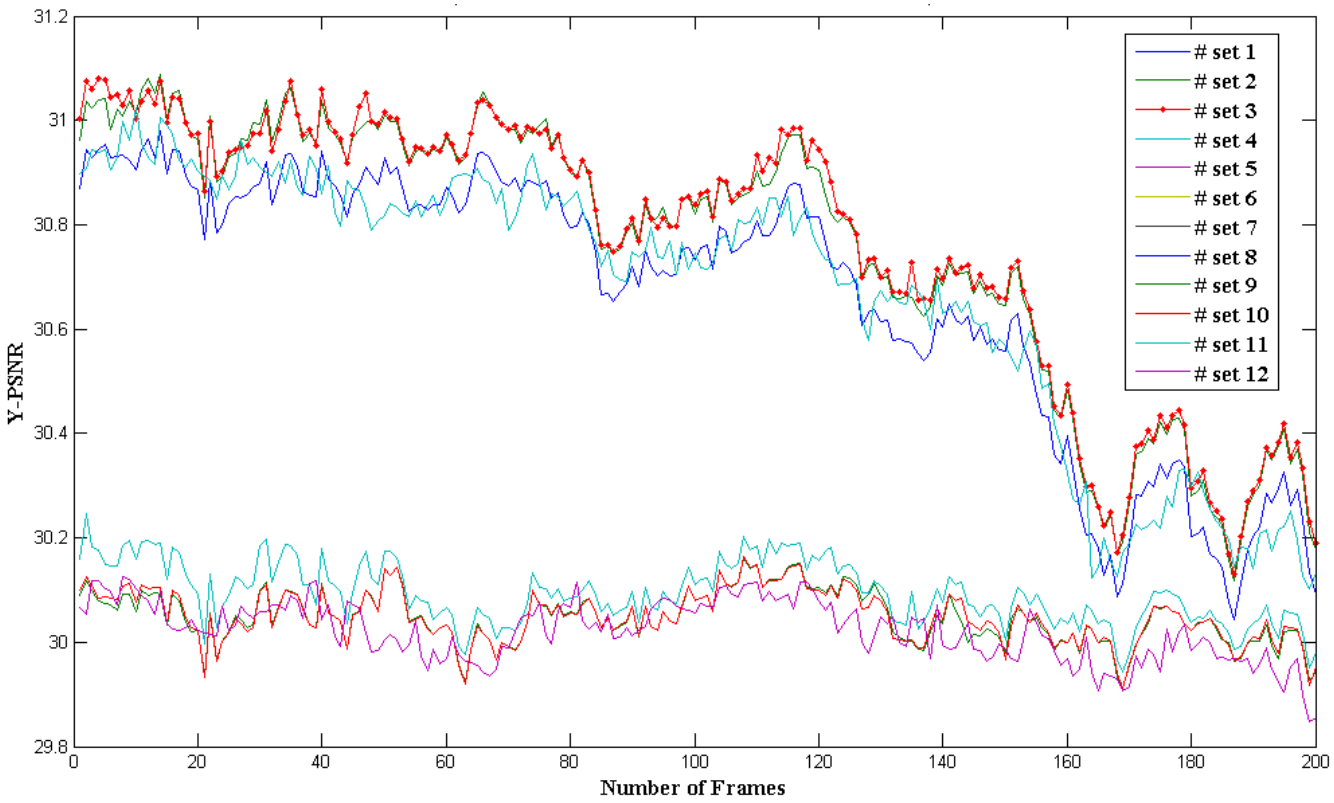


Figure 5: PSNR values of the synth view 7 and depth estimation mode 3

So in order to summarize the results for ES1 and EE1 we have:

Depth Estimation Mode	Set	Average Y-PSNR(dB)
0	1	**30.73070**
1	2	**30.74090**
2	7	**30.25470**
3	3	**30.76841**

EE1: Multi view coding

The goal of EE4 is to get insights on how the depth map coding affects the quality of synthesized views. In ES1 we used QPs {22, 24, 26, 28, 32, 34, 36, 38} for texture. For depth map coding, we use an extended QP range {22, 24, 26, 28, **30**, 32, 34, 36, 38}. We are encoding both texture and depth for the 2-view configuration. For depth maps we used the best overall results from the previous experiments, that is set 3 from depth estimation mode 3 (see Table 4). The following 3 tables (Table 5-7) will present our findings.

QP	View 6		View 8		Depth 6		Depth 8	
	Y-PSNR (dB)	Rate (kbps)	PSNR (dB)	Rate (kbps)	PSNR (dB)	Rate (kbps)	PSNR (dB)	Rate (kbps)
22	42.6576	3627.5616	41.9686	2854.0752	56.2562	153.5472	56.6704	153.5100
24	41.5154	2798.4384	40.9611	2005.9140	54.9718	119.2080	55.2945	118.7928
26	40.3647	2158.5408	39.8740	1405.7892	53.7112	90.4212	53.8529	89.7180
28	39.2506	1687.2156	38.7726	988.1952	52.5718	71.1720	52.0559	69.2580
30	-	-	-	-	51.4473	55.2960	51.3485	54.3648

32	36.9348	1022.8764	36.2147	449.4972	50.2149	44.1108	47.7454	43.6872
34	35.8620	810.3900	35.0653	305.3232	49.0041	37.1928	46.7678	35.3616
36	34.7115	613.2084	33.9686	205.9908	48.7988	31.9812	43.5245	30.4392
38	33.5162	476.1720	32.8927	146.1684	45.4275	26.7552	41.9470	24.5592

Table 5: Y-PSNR values and bitrates for various QPs

Depth QP	Video (QP22)	Video (QP24)	Video (QP26)	Video (QP28)	Video (QP32)	Video (QP34)	Video (QP36)	Video (QP38)
22	6788.6940	5111.4096	3871.3872	2982.4680	1779.4308	1467.7704	1126.25564	929.3976
24	6719.6376	5042.3532	3802.3308	2913.4116	1710.3744	1398.7140	1057.2000	860.3412
26	6661.7760	4984.4916	3744.4692	2855.5500	1652.5128	1340.8524	999.3384	802.4796
28	6622.0668	4944.7824	3704.7600	2815.8408	1612.8036	1301.1432	959.6292	762.7704
30	6591.2976	4914.0132	3673.9908	2785.0716	1582.0344	1270.3740	928.8600	732.0012
32	6569.4348	4892.1504	3652.1280	2763.2088	1560.1716	1248.5112	906.9972	710.1384
34	6554.1912	4876.9068	3636.8844	2747.9652	1544.9280	1233.2676	891.7536	694.8948
36	6544.0572	4866.7728	3626.7504	2737.8312	1534.7940	1223.1336	881.6196	684.7608
38	6532.9512	4855.6668	3615.6444	2726.7252	1523.6880	1212.0276	870.5136	673.6548

Table 6: Total bit rate spent on encoding video and depth for views 6, 8

Depth QP	Video (QP22)	Video (QP24)	Video (QP26)	Video (QP28)	Video (QP32)	Video (QP34)	Video (QP36)	Video (QP38)
22	31.0369	31.0240	30.9998	30.9530	30.7753	30.6313	30.4215	30.1152
24	31.0585	31.0413	31.0175	30.9718	30.7944	30.6478	30.4393	30.1357
26	31.0286	31.0167	30.9887	30.9432	30.7688	30.6351	-	30.1346
28	31.0027	30.9893	30.9627	30.9205	30.7463	30.6146	30.4147	30.1154
30	30.8884	30.8747	30.8534	30.8114	30.6455	30.5186	30.3260	30.0362
32	30.6958	30.6841	30.6649	30.6273	30.4772	30.3672	30.1925	29.9270
34	30.5125	30.5030	30.4865	30.4543	30.3102	30.2125	30.0369	29.7798
36	30.3615	30.3523	30.3345	30.3040	30.1759	30.0695	29.9217	29.6723
38	30.2417	30.2316	30.2185	30.1875	30.0647	29.9640	29.8207	29.5801

Table 7: Y-PSNR of view 7 reconstructed from the decoded texture and depth

Experimental Set 2 (ES2)

EE1: Depth map estimation

For the depth map generation in EE1 and ES2 again DERS was used. A series of parameters were tested using the 2-view setting. In ES2 the parameters were tested exhaustively (brute force). The parameters tested will be shown further down. It must be noted that due to very high computational complexity for such an approach the initial tests were run on a 10 frame sub-sampled version of the sequence and for both the 4-6 and 6-8 view combination and then the best parameters were used for the rest of the experiments. Sampling the sequence was selected as a course of action due to time constraints.

An example of a configuration file for DE for view 4 can be seen below:

```
DepthType                              1
SourceWidth                            1024
SourceHeight                           768
StartFrame                             0
TotalNumberOfFrames                    10
LeftCameraName                         param_loveb1_002
CenterCameraName                       param_loveb1_004
RightCameraName                        param_loveb1_006
MinimumValueOfDisparitySearchRange     1
MaximumValueOfDisparitySearchRange     70
MinimumValueOfDisparityRange           1
MaximumValueOfDisparityRange           70
SmoothingCoefficient                   1 #####
FileLeftViewImage                      lovebird1_cam02.yuv
FileCenterViewImage                    lovebird1_cam04.yuv
FileRightViewImage                     lovebird1_cam06.yuv
FileOutputDepthMapImage      lovebird1_cam04_depth_S1_M0_Mm0_T0_I0_Is0_SA0.yuv
FileCameraParameter                    cam_param_lovebird1.txt
BaselineBasis                          1
Precision                              4
SearchLevel                            2
Filter                                 1
MatchingMethod                         0 #####
TemporalEnhancement                    0 #####
Threshold                              1.5
MatchingBlock                          3
SoftDistanceCoeff                      0 #####
SoftColorCoeff                         0 #####
SoftBlockWidth                         11
SoftBlockHeight                        11
ImageSegmentation                      0 #####
SmoothingCoefficient2                  0 #####
SegmentationMethod                     3
MaxCluster                             32
DepthEstimationMode                    0 #####
FileCenterManual
ThresholdOfDepthDifference             10
MovingObjectsBSize                     1
MotionSearchBSize                      0
RefDepthCameraName
RefDepthFile
```

In the above configuration file the parameters that were tested are the following (marked with ##### in the configuration file):

Parameter name	***Variable name***	***Value***
SmoothingCoefficient	S	1, 2
MatchingMethod	M	0, 1, 2, 3
TemporalEnhancement	T	0, 1
SoftDistanceCoeff	Mm	0(=not used), 1 (10), 2 (20)
SoftColorCoeff	Mm	0(=not used), 1 (20), 2 (40)
ImageSegmentation	I	0, 1

SmoothingCoefficient2	Is	0, 2
DepthEstimationMode	SA	0, 1, 2, 3

The term "*variable name*" in the above matrix describes the codification for these parameters throughout all the experiments (both EE1 and EE4 for ES2). For example the depth map with file name: lovebird1_cam04_depth_S1_M0_Mm0_T0_I0_Is0_SA0.yuv (as it is mentioned in the above configuration file) corresponds to SmoothingCoefficient 1, MatchingMethod 0, etc. The presented results henceforth will make heavy use of the above codification without any more explanation. It should also be mentioned that there are some specific combinations of parameters that are not compatible with the available software tools. In such cases of parameter combinations the experiments were simply not performed. These combinations wont be mentioned here but can easily be deduced from the corresponding software manuals.

It is important to note here that for EE1 with view 4 the Semi-Automatic Depth Estimation (DepthEstimationMode; SA) was set to zero due to lack of manual input files for view 4 whereas all three values (SA0, SA1 and SA2) were tested for views 6 and 8.

The following figures (Fig. 8-12) will present depth maps for view 4 and frame #1.

Mm0 T0 I0 Is0

Mm0 T1 I0 Is0

Mm0 T1 I1 Is2

Figure 8: Depth maps for S1 and M0

Mm0 T0 I0 Is0

Mm0 T0 I1 Is2

Mm0 T1 I0 Is0

Mm0 T1 I1 Is2

Figure 9: Depth maps for S1 and M1

Mm0 T0 I0 Is0

Mm0 T0 I1 Is2

Mm0 T1 I0 Is0

Figure 10: Depth maps for S1 and M2

Figure 11: Depth maps for S1, M2 and Mm1

Figure 12: Depth maps for S1, M2 and Mm2

Similar results will be added here for views 6-8.

EE1: View synthesis

For the view synthesis part of EE1 VSRS was used. A sample configuration file for synth view 5 can be seen in the following:

```
DepthType                1
SourceWidth              1024
SourceHeight             768
StartFrame               0
TotalNumberOfFrames      10
LeftNearestDepthValue    9346.102154
LeftFarthestDepthValue   136662.003208
RightNearestDepthValue   9346.102154
RightFarthestDepthValue  136662.003208
CameraParameterFile      cam_param_lovebird1_original.txt
LeftCameraName           param_loveb1_004
VirtualCameraName        param_loveb1_005
RightCameraName          param_loveb1_006
LeftViewImageName        lovebird1_cam04.yuv
RightViewImageName       lovebird1_cam06.yuv
LeftDepthMapName         lovebird1_cam04_depth_S1_M0_Mm0_T0_I0_Is0_SA0.yuv
RightDepthMapName        lovebird1_cam06_depth_S1_M0_Mm0_T0_I0_Is0_SA0.yuv
OutputVirtualViewImageName 5f46_VSS0_VSB1_S1_M0_Mm0_T0_I0_Is0_SA0.yuv
SynthesisMode            0 #####
ColorSpace               0
Precision                2
Filter                   1
BoundaryNoiseRemoval     1 #####
ViewBlending             1
#SplattingOption         2
#BoundaryGrowth          40
#MergingOption           2
#DepthThreshold          75
#HoleCountThreshold      30
#TemporalImprovementOption 1
#WarpEnhancementOption   1
#CleanNoiseOption        1
```

In a similar manner to depth estimation, some parameters in the VSRS configuration files were tested for view synthesis. These are marked also with ##### and the actual values tested are the following:

Parameter name	***Variable name***	***Value***
SynthesisMode	VSS	0, 1
BoundaryNoiseRemoval	VSB	1, 2

After the synthesis of virtual views PSNR values between the original and the synthetic views were estimated. The following figures will present the PSNR values under different parameter configurations in an effort to isolate the most prominent parameter(s). It must be noted before we present the results that the best overall PSNR value was 30.8527dB and it was achieved for the following configuration: VSS0_VSB1_S2_M2_Mm0_T1_I1_Is2_SA0 which translates to:

Depth estimation:

- SmoothingCoefficient 2
- MatchingMethod 2
- TemporalEnhancement 1
- SoftDistanceCoeff not used
- SoftColorCoeff not used
- ImageSegmentation 1
- SmoothingCoefficient2 2
- DepthEstimationMode 0

View synthesis:

- SynthesisMode 0
- BoundaryNoiseRemoval 1

For the four possible combination of parameters in VSRS the average PSNR over all the resulted synthesized views are the following:

Mean VSS0_VSB1: 29.6694dB
Mean VSS1_VSB1: 21.4550dB
Mean VSS0_VSB2: 29.6694dB
Mean VSS1_VSB2: 29.6694dB

From the above results we can see that the parameters VSS1 and VSB1 result in very bad reconstructed views whereas the other three combinations don't have any statistically significant effect. It is also interesting to notice that the values are the same which is kind of curious.

Moreover, it is interesting to quantify the effect of various depth estimation parameters in the PSNR of the synthetic view. For that we will present average PSNR values for the parameters that were used in depth estimation. Since VSS1_VSB1 gave bad PSNR values we will exclude them from any further investigation. The following matrix contains mean and variance values for PSNR when a specific parameter is kept constant. We should note that M2 achieve the highest average PSNR and at the same time it delivered the lowest variance among all cases.

Parameter	Mean value (in dB)	Variance
S1	29.5594	0.3035
S2	29.8633	0.3981
M0	29.3083	0.1903
M1	29.3653	0.1727
M2	30.5656	0.0817
M3	29.5640	0.1481
Mm0	29.7317	0.4741
Mm1	29.4644	0.1498
Mm2	29.7883	0.0782
T0	29.7571	0.3802
T1	29.5765	0.3225
Is0	29.2846	0.3420
Is2	29.9260	0.2055
SA0	29.6694	0.3570

EE4 – MVC

During the MVC part of EE4 the best synthesized in terms of PSNR was used for coding. The following two figure (Fig. 13 and 14) depict the PSNR errors for different QP. The QP selected range from 20 until 40 in an interval of 2.

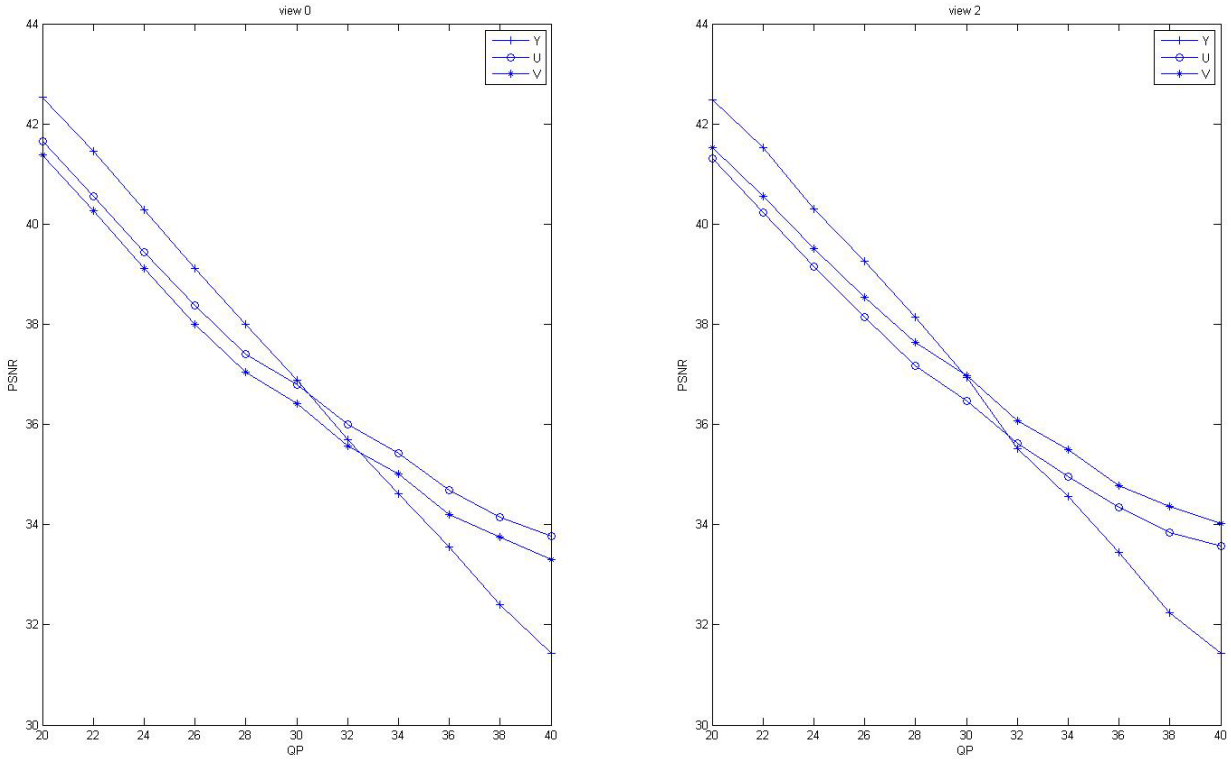


Figure 13: Average PSNR curve per channel and view for the 2 view configuration.

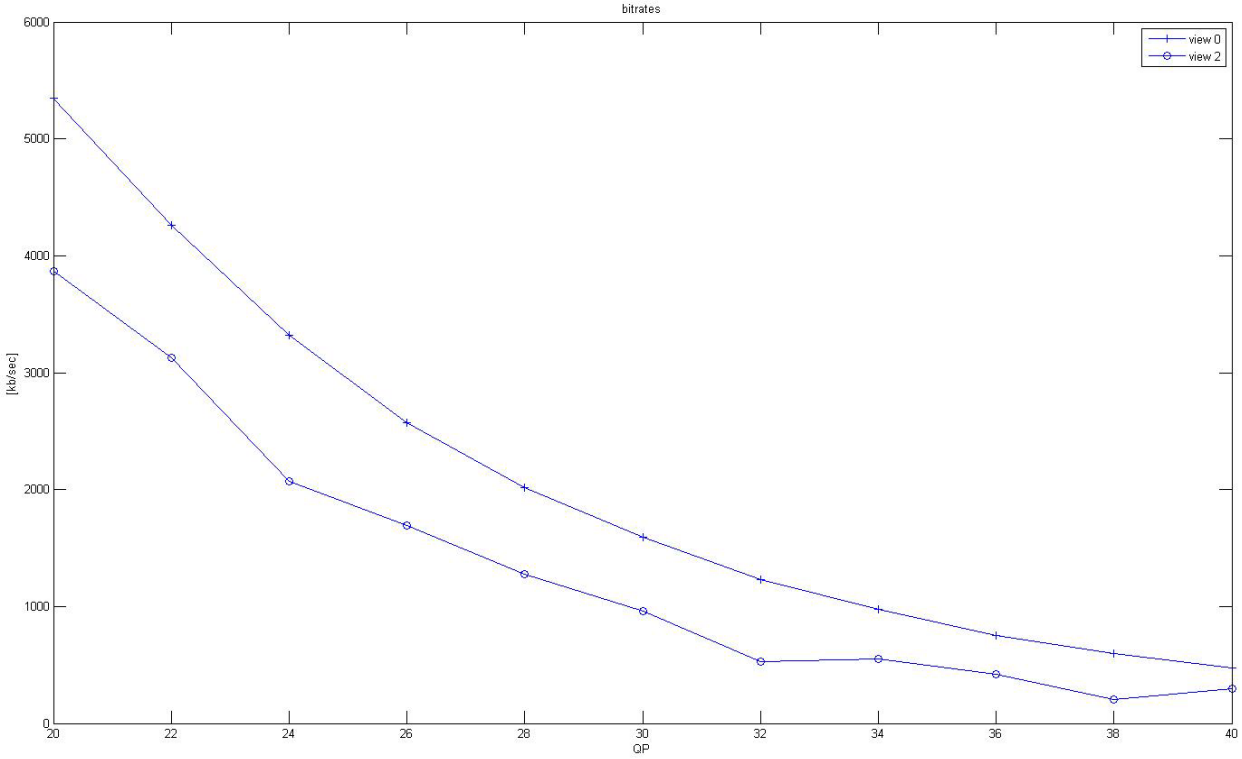


Figure 4: Average bit rate curve per view for the 2 view configuration.

m16982	Integrated 3D Video Coding Platform	Deliang Fu Yin Zhao Lu Yu
m17009	Results of EE4 on Mobile	Sehoon Yea Anthony Vetro
m17024	EE Results on BookArrival Test Sequence	Yong-Joon Jeon
m17026	Depth boundary filtering for DIBR	Byeong-Moon Jeon
m17028	3DV EE1 & EE4 Results on Newspaper sequence	Seok Lee Jaejoon Lee Du-Sik Park
m17040	3D Video Coding EE4 Results for Beergarden MVD2	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal
m17041	3D Video Coding EE4 Results for Newspaper MVD3	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal
m17043	A flexible virtual baseline calculation method of arc eight-sensors array	Wang He Zhang Yang Cheng Mingming Yan Tao An Ping Wang Guozhong Zhang Zhaoyang
m17049	A soft segmentation matching in Depth Estimation Reference Software (DERS) 5.0	Olgierd Stankiewicz Krzysztof Wegner Menno Wildeboer
m17050	Poznan Multiview Video Test Sequences and Camera Parameters	Marek Domanski Tomasz Grajek Krzysztof Klimaszewski Maciej Kurc Olgierd Stankiewicz Jakub Stankowski Krzysztof Wegner
m17051	Newspaper sequence - Results of 3DV/FTV Exploration Experiments with depths and view synthesis	Olgierd Stankiewicz Krzysztof Wegner Krzysztof Klimaszewski

Documents reviewed in video subgroup

m16852	Depth sequence coding based on a joint MVD scheme *(Contributors not present during AHG review.)*	Zongju Peng; Mei Yu; Gangy Jiang; Feng Shao; Yun Zhang; Zhidi Jiang; Fucui Li
m16854	USNB Contribution: Comments on 3D Video *Suggested timeline: CfP by end of 2010, start with case of enhanced stereo (baseline adapt) and put autostereoscopic to less relevance.*	Andy Tescher for USNB
m16871	Inpainting Based View Synthesis for FTV *Improvement over current view synthesis method in terms of PSNR. Question how it would look in video, e.g. temporal consistency? From still image examples, some inconsistencies appear in the pre-processed depth maps. No specific action taken.*	Qian Zhang Ping An Liquan SHEN Ran MA Zhaoyang Zhang
m16892	High quality virtual view rendering for FTV *Uses assumption of region surface angle to improve mapping of matching points between various cameras, and uses PCA to determine weighting parameters in superposition. No results shown with actual test set.*	Ping An Ran Ma Suxing Liu Qian Zhang Liquan Shen Zhaoyang Zhang
m16978	Requirements for 3D Video Coding *Additional requirement on view scalability (already existing?) and (from further explanation of the proponent but not explicitly stated in the document) also spatial/temporal scalability, to be usable in mobile applications with different-screensize devices. These modalities would be interesting both in terms of transmission rate and processing power. Also statement that backward compatibility with existing mono and stereo is important, as well as compatibility with future standards.*	Thomas Rusert Apostolos Georgakis Per Fröjdh
m17021	Requirements on 3D Video Format *Compatibility with "frame-compatibility(e.g. left-right in one frame) seems less important than compatibility with MVC; compatibility with future standards should be considered.*	Anthony Vetro Dong Tian Ying Chen

Output documents:

No.	Title	TBP	Available
11061	**Applications and Requirements of 3D Video Coding**	**N**	**09/10/30**
10925	**Description of Exploration Experiments in 3D Video Coding**	**N**	**09/10/30**

58.Explorations – High-Performance Video Coding

In HVC activity, the discussions were mainly related to the draft CfP. Some of the main issues were:

- definition and role of the AVC anchors, also from the background of definitions in BT.500x
- definition of data rates
- definition and organization of the subjective evaluation procedure
- timeline of the Call and subsequent standardization
- definition of further evaluation criteria, such as RD performance in terms of PSNR, complexity etc.

All these issues are now very clearly described in N10926.

Organization of tests:

- Many subjects (no one to be involved in more than 2 test cases). 18 subjects per test case. Logistically, performing the tests right after Christmas would be possible.
- Mid to low levels of impairments expected: As test method, DSIS variant 1 was recommended as appropriate (with DSCQS reportedly not appropriate as it assumes overall high quality). If splitting into two different quality levels low/high is decided, DSIS variant 2 could potentially be used for the latter.
- Laboratory setup will be changed (calibrated LCD instead of CRT, use PC for playout); use 3 or 6 PCs in parallel, 3 viewers per display, D65 light behind monitor, very low ambient lighting
- Perform tests in two labs in parallel
- Initial assessment of effort based on number of submissions (expecting a number of average 2.5 submissions per proponent) [Note: The number of test sequence submissions increases compared to CfE, as now there are 5 classes and possibly 2 types random access and low-delay; so it can be up to 10 submissions by one proponent, and already the anchors will count as 10 submissions]
- With 50 submissions, conducting the tests within roughly 1 week would reportedly be possible
- The initial assessment of cost was discussed, and needs to be revised further

Issues raised in contribution, and discussions of specific comments as presented in the AHG prior to the meeting included the following:

- m16885: Content lacks variety (propose to exchange WVGA & WQVGA by some of the old sequences). Anchor type 2 should be modified to more (map with AVC HP, e.g. using CABAC)
- m16939: Require significant improvement in computational efficiency, require low-delay mode, consider 2-step timeline, unified codec for various applications will be success factor. Clarify target date
- m16957: Bit rates should reflect existing services; bit rates that reveal visual qualities should be used (specifically proposed higher rates for Parkjoy, Keiba, and Basketball 3); reduction of number of test cases could be envisaged with options: a) reduce number of sequences, b) reduce number of bit rates, c) combine both approaches
- Note: It would be desirable to have one bitrate setting for each class; if not possible, it may be useful to make compromises (e.g. in class A)
- m17029: Proposal to revise rates in some cases in particular for classes B, C, and D; for class A it may be necessary to make compromises; for class B, Wisley would be a candidate for removal. Pointed out that the class E sequences proposed may include compression effects in the original. It may be useful to reduce the ratio between rates (not 2 as usually); possibility to make class B and C mandatory (with type 1 anchor); to reduce number of test cases, it might be appropriate to not test any class with any anchor type (e.g. type 2 only with class E); suggest to re-consider timeline. Default Excel sheets could be provided to proponents instead of paper sheets; updated doc also includes proposal for updated CfP

- Note: It would also be a possibility to restrict only some classes to one type of anchor, e.g. A with type 1, E with type 2 only.
- m17037: Class A People on Street seems too short; for Class B, replace Wisley by Park Scene and re-consider Kimono1; the Highest point of class B is too good in quality.
- Issue of 4:4:4 material: the CfP is only using 4:2:0, but we should express in CfP that 4:4:4 is desirable in the context of development
- Note: Sequences could be made available also in 4:4:4 resolution, and proponents would have the freedom to decide whether they use it or not; in that case, also the original (upper anchor) should be displayed using 4:4:4; the 4:4:4 sequences need to be provided very soon (only ParkJoy is currently available in that form); if 4:2:0 is used, it should be mandatory to use the “official” version
- m17064: The standard should come in a timely manner; it was therefore suggested to stick with the current time line (January proposal evaluations), even if no negotiation with VCEG could be made in that case. The standard should be coherent (no substantially different versions of low/high complexity, but rather an "onion-shell" approach)

In addition, a number of input documents were related to technical developments in video compression (see category b below). These were presented during a video subgroup session.

During the Sunday AHG meeting, a 2-hour session dedicated to viewing anchor sequences was held. Further viewing sessions were performed during the week, and the rates, anchor settings and sets of sequences were decided based on the collection of subjective assessments by experts.

- Five test classes:
  - A: 2560x1600 cropped from 4Kx2K, 2 sequences
  - B: 1920x1080p 24/50-60 fps, 5 sequences
  - C: 832x480 WVGA, 4 sequences
  - D: 416x240 WQVGA, 4 sequences
  - E: 1280x720p 50-60 fps, 3 sequences
  - "A-D" as before, no new sequences (two removed)
  - Previously empty "E" with 3 new sequences, but only videoconferencing
- B,C,E will be used in subjective tests
- A and D PSNR criteria only
- Two constraint categories:
  - Random access (for classes A-D)
  - Low delay (for classes B-E)
- Mandatory submissions: Classes B, C and D each with both constraint categories, Class A with random access, Class E with low delay.
- Complexity assessment will be done independently, based on information requested by proponents

- 4:4:4 material could not be included due to current unavailability and reduction of tests

- Draft Call for Proposals (N10926)
- 21 expressions of interest received so far
- Test fee estimated 4000-5000 €
- Timeline:
  - 2009/11/05: Availability of all test materials
  - 2009/11/30: Availability of anchors
  - 2010/01/15: Final preliminary expression of interest
  - 2010/01/22: Final Call for Proposals
  - 2010/01/31: Deadline for Pre-registration (mandatory, possibly before meeting)
  - 2009/02/15: Formal registration and proof about payment of the fee
  - 2010/02/22: Coded test material available at the test site
  - 2010/03/15: Subjective assessment starts at latest
  - 2010/04/12: Registration of documents describing the proposals with Video Chair
  - 2010/04/13: Submission of documents to Video Chair
  - 2010/04/16: Cross-checking of bit streams and binary decoders
  - 2010/04/17-23: Evaluation of proposals

A liaison letter m16787 had been received from ITU-T Study Group 16 Working Party 3 on High Performance Video Coding Collaboration. It indicated that SG 16 Question 6 continued to support the establishment of a joint collaborative team for this work and was pleased to see further progress toward establishing such an arrangement. Proposed Terms of Reference (ToR) and Requirements documents were attached to the liaison letter, together with a number of comments on the draft CfP and an invitation to meet with Study Group 16 during 1-4 November 2009 at its meeting in Geneva towards jointly issuing a call for proposals.

An output liaison letter N10927 was produced and sent to ITU-T Study Group 16 (Question 6). After closing of the MPEG meeting, members of the AHG on HVC met with ITU-T Study Group 16 (in Question 6 "VCEG" sessions) in Geneva to discuss the potential for issuing a common text of a draft CfP (although issued separately by the two organizations rather than jointly, as a ToR agreement for establishing a joint effort has not been completed). This was successful, and the result is found in the output draft CfP (N10926), which was issued as a public document.

Input Documents:

a) Related to HVC CfP (reviewed in AHG)

m16787	Liaison Statement from ITU-T SG 16 [SC 29 N 10553] on High Performance Video Coding Collaboration	ITU-T SG 16 via SC 29 Secretariat
m16855	USNB Contribution: Comments on HVC	Andy Tescher for USNB

m16885	Comments on draft call for proposals on high-performance video coding	Marta Karczewicz Peisong Chen Xianglin Wang Rajan Joshi Rahul Panchal
m16894	Improvements of Excel macro for BD-gain computation	Stéphane Pateux
m16901	JNB comments on HVC	JNB
m16916	SGNB Comments on HVC	SGNB
m16918	AVC Anchor Streams of Class-B for Reference of Call for Proposals for High-Performance Video Coding (HVC)	Keiichi Chono Kenta Senzaki Hirofumi Aoki Junji Tajime Yuzo Senda
m16939	Comments on HVC development	Justin Ridge Arild Fuldseth Kenneth Andersson
m16941	French National Body Comments on HVC	Pierrick Philippe on behalf of the FRNB
m16948	AVC Anchor Streams for the CfP for High-Performance Video Coding (HVC): Classes C and D	Mathias Wien Steffen Kamp
m16957	Comments on the HVC draft CfP sequences and bitrates	Rickard Sjoberg
m17012	Finnish NB comment regarding "HVC" Call for Proposals	Finnish National Body
m17029	Comments on Draft Call for Proposals on High-Performance Video Coding (HVC)	TK Tan Y. Suzuki F. Bossen
m17030	CNNB Contribution: Comments on HVC	Wen Gao Tiejun Huang
m17031	AVC Anchor Streams of Class-A for Call for Proposals on High-Performance Video Coding (HVC)	Woo-Jin Han JeongHoon Park Ken McCann
m17036	Additional performance evaluation on CfE technology	Shun-ichi Sekiguchi Kazuo Sugimoto Kohtaro Asai Tokumichi Murakami
m17037	Comments on draft Call for Proposals on HVC	Kazuo Sugimoto Shun-ichi Sekiguchi Kohtaro Asai Tokumichi Murakami
m17045	On anchors for HVC	Justin Ridge Arild Fuldseth
m17064	Samsung Comments on HVC Development	JeongHoon Park Woo-Jin Han Jason Suh Ken McCann
m17065	Hierarchical P results for CfP and comments about type-2 scenario	Woo-Jin Han JeongHoon Park Ken McCann
m17080	JNB comments on Class A testing in HVC CfP (*Submitted later, during the meeting week.*)	Teruhiko Suzuki

b) Information documents on compression technology (reviewed in video subgroup)

m16861	**A new slice type for supporting lossless error resilient transcoding** *Proposed L-blocks are a kind of re-encoding a P-block into an I-block.The L-block can be re-transformed into a P-block, and in principle can be reconstructed with or without having the reference frame available.* *Note: This method cannot be implemented without syntax change (L block is like I block but motion information is needed in addition). Advantage seems to be that the L blocks are computed beforehand and only at time of transmission it is decided whether they are used.* *The relationship with SP frames would need to be clarified, might give similar performance in case of lossy transmission.*	Xiaopeng Fan Oscar Au Xing Wen Haitao Yang
m16862	**An efficient motion vector coding algorithm based on adaptive motion vector prediction** *Uses template matching for improved motion vector prediction. Reportedly achieves an average 2% BR reduction for CIF, and 2.5% for 720p. Preliminary information on enhanced method reporting approx. 5% gain for 720p. (Note: Most gain on Raven sequence which somehow biases this result).*	Jingjing Dai Oscar C. Au Wen Yang Yu Liu Xing Wen
m16887	**Consolidation of video syntax and entropy coders through HVC standard** *Entropy decoding becoming a crucial part of complexity for high-rate video decoding.* *High-level syntax is representation of block diagram of video codec, which is almost similar for most video coding standards. The generic principles used to encode at lower level are quite similar: Runlength, VLC, context-based etc. From this, it can be concluded that lossless transcoding of any existing content into new video format should be possible.* *Recommend not to put supplemental information into video layer, and view any existing and future solution within a unified framework.* *Could lead to lower implementation cost in the case of multi-standard devices. Has some similarity with RVC, but the latter one is said to be more costly due to the high level of flexibility.*	Chun-Jen Tsai Shau-Yin Tseng
m16891	**Block-Matching Translation and Zoom Motion Compensated Prediction** *Estimate translation/zoom motion model. Use KTA without additional tools, except 1/8 pel MC (needed for interpolation). BR saving roughly 4% on average. Most gain for sequences with zoom, e.g. BQSquare. Use first frame I frame, IBbBP structure, but only used in P slices. Note: Gain may be lower in combination with other tools.*	Lai-Man Po Ka-Man Wong Ka-Ho Ng Kwok-Wai Cheung Yu Liu Ka-Man Cheng Yan Huo
m16926	**Rate-Distortion Optimized Transform** *Scheme based on MDDT. Use multiple candidate transform matrices for each intra prediction mode. Overall BR reduction 1.5 % for RDOQ on, and 2.8 % for RDOQ off. (intra only) Note Transform bases was trained from a training set that contained the sequences under test.*	Xin Zhao Li Zhang Siwei Ma Wen Gao
m16969	**Macroblock-level Weighted Prediction** *Slice-level weigthed prediction is only efficient when picture level RD opt is turned on. This is not the case for MB level WP. MB WP parameters are predicted, difference is encoded. Rate reduction reported as 3.5% for class C, 4.4% for class B.*	Nikola Sprljan Leszek Cieplinski
m17019	**Performance of Directional Transforms for Video Coding** *Adds a bank of 8 directional transforms (both for intra and inter coding). Information signaled, no provision taken to utilize coherences with other parameters such as intra direction. Currently only used for 8x8 motion partitions. Gain between 1.6 and 4.6% on average for the different classes B-C, CIF (highest) and 720p.*	Robert Cohen Sven Klomp Anthony Vetro Huifang Sun
m17035	**Rate-Distortion Criterion Based Picture Padding for Arbitrary Resolution Video Coding** *Uses template matching and spatial extrapolation in padding at image boundaries instead of the JM methods. Experiments performed with CIF sequences which were cropped at the boundary (340x280). BR savings reported are explained by the fact that the boundary area is set to zero and padded.*	Ming Li Yilin Chang Sixin Lin

m17059	**Inter Prediction Based on Backward Motion Estimation** *Use least-squares solution based on neighborhood of 9 spatial neighbors and 9 temporal neighbors. Average BR reduction around 2.5% over a set of 8 CIF sequences, using IPPP coding. As ME needs to be performed both at decoder as well as encoder, complexity is increased.*	Hao Chen Ruimin Hu Zhongyuan Wang Dan Mao Jinhui Hu

Output documents:

No.	Title	TBP	Available
10926	**Draft Call for Proposals on High Performance Video Coding**	**Y**	**09/11/06**
10927	**Liaison statement to ITU-T SG16 Q6 on HVC Collaboration**	**N**	**09/10/30**

H. – Audio report

Source: Schuyler Quackenbush, Chair

1. Opening Audio Plenary

The MPEG Audio Subgroup meeting was held during the 90th meeting of WG11, October 26-30, 2009, Xi'an China. The list of participants is given in Annex A.

59. Administrative matters

59.1. Communications from the Chair

The Chair summarised the issues raised at the Sunday evening Chair's meeting, proposed task groups for the week, and proposed agenda items for discussion in Audio plenary.

59.2. Approval of agenda and allocation of contributions

The agenda and schedule for the meeting was discussed, edited and approved. It shows the documents contributed to this meeting and presented to the Audio Subgroup, either in the task groups or in Audio plenary. The Chair brought relevant documents from Requirements, Systems to the attention of the group. It was revised in the course of the week to reflect the progress of the meeting, and the final version is shown in Annex B.

59.3. Creation of Task Groups

Task groups were convened for the duration of the MPEG meeting, as shown in Annex C. Results of task group activities are reported below.

59.4. Approval of previous meeting report

The 89th Audio Subgroup meeting report was registered as a contribution, and was approved.

59.5. Review of AHG reports

There were no requests to review any of the AHG reports.

59.6. Joint meetings

The joint meetings held are shown below.

Groups	What	Where	Day	Time
Sys, Audio	MXM Audio API (m16857) Interactive Music AF file brands	Systems	Thu	0900-1000
Req, Audio	SAOC Profile	Audio	Thu	1630-1700

59.7. Received National Body Comments and Liaison matters

The NB Liaison statements generated at the meeting are as shown below.

No.	Title
11044	Liaison to IETF on MPEG Audio Codecs

59.8. Plenary Discussion

Pierrick Philippe, Orange Labs, presented

m16826	Information on the FlexCode IST project	Stefan Bruhn Harald Pobloth Adriana Vasilache Pasi Ojala Pierrick Philippe Stephane Ragot Catherine Colomes Bastiaan Kleijn Janusz Klejsa Minyue Li Peter Vary Laurent Schmalen Thomas Schlien

The contribution describes a European Project *FlexCode* whose goal is to create an adaptive, optimal system for joint source and channel coding of audio signals. For more information see
http://www.flexcode.rwth-aachen.de

59.9. Record of AhG meetings

59.9.1. AhG Meeting on USAC -- Sunday 0900-1800

Schuyler Quackenbush, Audio Research Labs, presented

m16870	Thoughts on the USAC CE Process	S. Quackenbush

The contribution presented several isues:

- Statistics
  - Sensitivity of MUSHRA differential statistic
  - Control of error when evaluating sets of hypothesis
- Presenting and evaluating CE performance
- Summary of CE performance
- USAC Reference Encoder

There was good discussion on all of these topics. The presenter noted that the points raised are information for the group, and are not intended as a basis for modifying the current CE process. However, they are points that could be considered when experts are asked to judge the merit of a CE proposal.

Anisse Taleb, Huawei, presented

m16999	On progressing USAC CE	Minjie Xie Anisse Taleb Herve Taddei

The contribution observed that in Video the MPEG source code is the reference quality encoder used in the CE and that since Audio does not have a source code reference quality encoder, then the points raised in the previous contribution (m16870) do not apply.

The presenter re-iterated that Huawei fully supports the MPEG Reverence Encoder project and urges other companies to contribute.

Hyunkook Lee, LG, presented

m16952	Thoughts on the CE evaluation method	Hyunkook Lee Sungyong Yoon

The contribution notes that the CE methodology requires that a CE tool that proposes increased compression must demonstrate “significant improvement” as determined by the consensus of the Audio subgroup.

USAC is a switched mode coder, and in certain operating modes a single coding mode may dominate. Hence, the contribution asserts that performance improvements of a single coding mode may be extremely relevant. It further proposes that, when appropriate, tools (e.g. FD-specialized tools) should be evaluated only on the basis of improvements for FD frames.

Kristofer Kjörling, Dolby, noted that the table in the presentation lists multiple content types, and that the reality in the marketplace is that content will be mixed. The Chair noted that it may be more appropriate to look at specific application scenarios, e.g. 64 kb/s rates in which FD mode dominates other modes.

Max Neuendorf, FhG, presented

m16996	Corrections to Reference Software and WD4 of USAC	Max Neuendorf Markus Multrus

The contribution

1. Changes affecting Reference Software
    1. Decode bitstreams without eSBR payloads. It is proposed to correct this during the AhG period
    2. Decode bitstreams containing frames with 1152 spectral coefficients

2. Changes affecting RM text and Reference Software
    - Wrong initialization of defaultCld[0]. It is currently set to full panning to the side, while it should be (as it is in MPEG Surround) set to panning to the center.

3. Further changes
    - Time alignment of the harmonic contributions
    - Modelling of bandpass filters in harmonic SBR
    - Calculation of maximum stretching factor in harmonic SBR
    - SBR limiter adjusted to the harmonic transposer crossover frequencies

Mohammed Raad, Raadtech, commented that it would be very helpful to have a history of how the bugs were discovered

It was the consensus of the group to accept the proposed changes in groups 1 and 2 (above) and to postpone decision on 3 until the relevant contributions have been discussed.

Pierrick Philippe, Orange Labs, presented

m16795	Quality assessment of the Bass Filter post processing correction	Pierrick Philippe

The contribution reports on a pair-wise comparative cross-check listening test on a bug reported at the London meeting. The results show that the bug correction did not have any negative impact on the quality of the RM system.

Philippe Gournay, VoiceAge, presented

m16825	VoiceAge Test Report for Bass-Postfilter Proposed Correction	Philippe Gournay Roch Lefebvre

The contribution reports on a MUSHRA cross-check listening test on a bug reported at the London meeting. The results show that the bug correction did not have any negative impact on the quality of the RM system.

The Chair noted that the AhG has already agreed to incorporate this bugfix into the RM4 reference software (in the mid-August time frame). The group re-affirmed this decision.

Wei Xiao, Huawei, presented

m16906	Huawei Listening Test Report on eSBR Patching Methods	Zhengzhong D Wei Xiao Hervé Taddei Minjie Xie

The contribution reports the cross-check subjective test results for the eSBR Patching CE. It noted that phi7 demonstrated a significant improvement at all three operating points with the SBR patching flexibility.

These results, and also listening test results from FhG and LG were posted to the AhG reflector in the mid-August time frame. There was considerable discussion in audio email reflector on how to drive consensus when results from different test sites did not corroborate for some individual test items. In the end the audio group understood that there was some uncertainty in subjective test results and reached agreement on this CE approximately one week after the results were posted.
Markus Multrus, FhG, presented

m16831	Informative Encoder Description for the Explicit Signaling of the eSBR Patching Method	Markus Multrus Max Neuendorf Jérémie Lecomte Frederik Nagel Stefan Bayer

The contribution describes how an encoder could be constructed to take advantage of the additional flexibility afforded by the eSBR patching CE. The basic encoder issue is to switch before or after stationary parts. For example:

- Couple SBR patching mode to the speech/music discriminator
  - FD => harmonic patching
  - LPD => regular SBR patching
- Do not switch during stationary signals. For example, switch
  - Before or after stationary part
  - In regions of relative silence
  - When transient signals occur

Pierrick Philippe, Orange Labs, asked wither a speech/music discriminator already exists in the reference encoder. It was confirmed that this module was contributed by Huawei. A transient detector algorithm is in the contribution. The Chair noted that if the presenter could make the transient detector available as code integrated into the reference encoder it would be a most welcome "bonus."
It was the consensus of the group that

- The contribution provides sufficient education, as mandated in the CE methodology
- That the text of the contribution be incorporated into the informative annex of RM5

Taejin Lee, ETRI, presented

m16896	Report on TCX window technology	Taejin Lee Seungkwon Beack Minje Kim Kyeongok Kang

The contribution presented objective and subjective performance information for ACELP to TCX and TCX to TCX transitions. ETRI proposes ACELP to TCX transitions via discarding the leading or trailing part of the TCX window that entails the TDAC.
Since ETRI is quite interested in these window transitions, ETRI has implemented the FAC as proposed by VoiceAge. The objective assessment measures SNR for an artificial window-transitions toggling mode. The objective data shows that FAC128 shows better segmental SNR than other window transitions methods. The subjective data shows that FAC128 has better subjective performance than other transition methods.
The contribution notes that ETRI's proposal of TCX40 and TCX80 window slopes needs further investigation, and ETRI will bring additional information at the next MPEG meeting. In addition, ETRI will investigate ACELP to TCX transitions using their discarding method. The presenter noted that the "toggline mode" ("intentional mode") can provide useful performance information.
Max Neuendorf, FhG, presented

m17020	Proposal for Unification of USAC Windowing and Frame Transitions	Max Neuendorf Bruno Bessette Ralf Geiger Philippe Gournay Roch Lefebvre

The contribution reviews the forward alias cancelling tool (FAC) proposed at the last meeting and presents a new tool, frequency-domain noise shaping (FDNS). It also reviews the current RM transition modes and notes that these transitions entail two classes of problems

- Time to Frequency domain (problem #1)
- Signal to LP residual domain (problem #2)

The FAC tool compensates for the missing TDAC data between FD and LP modes, and addressed "problem #1." Although it requires some side information, there is no need to "code and discard" data.

The FDNS tool permits the weighted LPC synthesis filtering to be performed in the frequency domain (i.e. MDCT coefficient domain). As a result, FD and TCX modes can share the IMDCT processing block. This permits the following

- ACELP windows are shifted left (advanced in time) by 64 samples. This permits the ACELP windows to be centered within the frame.
- Only two MDCT transform lengths are required: 1024 and 128.

Subjective listening test results are presented, which show that at 12 kb/s mono there is no difference between the FAC/FDNS and the RM4 systems at the 95% level of significance. At 16 kb/s mono, one items is better, but there is no evidence that FAC/FDNS in any way is degraded relative to RM4. A third listening test demonstrates that, at 16 kb/s mono the FAC/FDNS system is better than the RM4 system at the 95% level of significance.

The contribution finally notes that the unification of the coding operation (grid alignment and simplification of transform lengths) permits a greater flexibility in transitions between coding modes. It is expected that additional information on the performance of the proposed tool will be brought to the next meeting.

Seungkwon Beack, ETRI, asked how the proposed method will affect the LP interpolation step in the original (RM4) processing order. Anisse Taleb, Huawei, asked whether there could be any additional, e.g. objective SNR information on the performance of the system. He further asked whether the encoder and decoder diverge, with respect to the LPC state. Mohammed Raad, Raadtech, asked whether there is any performance information on the improvements provided by each tool (FAC and FDNS) separately. Kristofer Kjörling, Dolby, noted that the tools are "a means to an end," that being a very clean and simple structure for transitions between coding modes. Max Neuendorf, FhG, noted that RM4 "code and discard" does not provide the coding gain that FAC (e.g. "code and discard" allocates fewer "bits per spectral coefficient"). Anisse Taleb, Huawei, noted that it would be very helpful to have a thorough accounting of the complexity of the proposed system as compared to the RM4 system.

Pierrick Philippe, Orange Labs, presented

m16851	Cross check of the Unified Stereo Coding CE	Pierrick Philippe

This contribution presents listening test results for the CE technology operating at 48 kb/s stereo. The test indicates that the mean performance of the CE technology is better than RM4 at the 95% level of significance. Concerning the performance for individual items, improvements can be as large as nearly 50 MUSHRA points, although there are depredations as large as 10 MUSHRA points. The average performance is better by 8 MUSHRA points.

Jeff Huang, Qualcomm, presented

m16884	Crosscheck listening test report for USAC on unified stereo coding	Jeff Huang

This contribution presents two listening test results for the CE technology: 48 kb/s stereo and 64 kb/s stereo. The 48 kb/s test indicates that no items experience degradation, several items show improvement at the 95% level of significance and the average performance is better at the 95% level of significance. . Similarly, the 64 kb/s test indicates that no items experience degradation, several items show improvement at the 95% level of significance and the average performance is better at the 95% level of significance.

Taejin Lee, ETRI, presented

m16897	ETRI listening test result for USAC CE on Unified Stereo Coding	Taejin Lee Seungkwon Beack Minje Kim Kyeongok Kang

This contribution presents listening test results for the CE technology at 64 kb/s stereo. The test indicates that no items experience degradation and one items show improvement at the 95% level of significance.

Jeongook Song, LG, presented

m16928	Listening test report for CE on USAC Unified Stereo Coding	Jeongook Song Henney Oh

This contribution presents listening test results for the CE technology at 48 kb/s stereo. test indicates that no items experience degradation, several items show improvement at the 95% level of significance and the average performance is better at the 95% level of significance.

Julien Robilliard, FhG, presented

m16943	Fraunhofer IIS listening test results on Unified Stereo for USAC	Julien Robilliard Matthias Neusinger Johannes Hilpert

This contribution presents two listening test results for the CE technology: 48 kb/s stereo and 64 kb/s stereo. The 48 kb/s test indicates that no items experience degradation and two items show improvement at the 95% level of significance. The 64 kb/s test indicates that no items experience degradation and three items show improvement at the 95% level of significance.

On behalf of Werner Oomen, Philips, Heiko Purnhagen, Dolby, presented

m16925	Philips test results on Unified Stereo Coding CE in USAC	Jeroen Koppens Werner Oomen Erik Schuijers

The contribution presented a listening test at 48 kb/s stereo. The results showed that 4 items are better and the mean score is better at the 95% level of significance. It further noted that some items experienced improvements of up to 40 MUSHRA points. These items were those for which RM3 did not perform well, so that the CE technology improved the “worst case” RM3 performance.

Heiko Purnhagen, Dolby, presented

m16986	Dolby listening test results for CE on Unified Stereo Coding in USAC	Heiko Purnhagen

The contribution presented two listening test results: 48 kb/s stereo and 64 kb/s stereo. The 48 kb/s results showed that 4 items are better and the mean score is better at the 95% level of significance. The 64 kb/s results showed that 4 items are better and the mean score is better at the 95% level of significance. It noted that several other items (e.g. music1) were very much improved in the mean, although not at the 95% level of significance. Finally, it noted that the CE technology brought the performance of all items into the “good to excellent” range.

Eunmi Oh, Samsung, presented

m16911	Listening test results on Unified stereo for USAC	Junghoe Kim Eunmi Oh

The contribution presented two listening test results: 48 kb/s stereo and 64 kb/s stereo. The 48 kb/s results showed that 1 item is better and the mean score is better at the 95% level of significance. The 64 kb/s results showed that 3 items are better and the mean score is better at the 95% level of significance.
Eunmi Oh, Samsung, presented

m17068	Comments on Unified Stereo CE for USAC	Eunmi Oh

The contribution notes that the CE on USAC proposes a new tree structure (2-1-2) for MPEG Surround. It notes that the current USAC specification permits phase coding to be used with residual coding, and requests that the performance of 2-1-2 mode with residual coding be tested.
Kristofer Kjörling and Heiko Purnhagen, Dolby, disagreed, saying that they do not believe the formula cited in the contribution is in the USAC specification.
The Chair noted that there appear to be two issues:

- Is the formula cited in the contribution a valid mode in the USAC specification
- If so, how shall the performance of the mode specified by the formula be tested?

Heiko Purnhagen, Dolby, presented

m16921	Technical description of proposed Unified Stereo Coding in USAC	Heiko Purnhagen Pontus Carlsson Leif Sehlstrom Erik Schuijers Werner Oomen

The contribution reviews the CE technology. The primary advantage of the CE technology is that it removes the hard decision between parametric stereo and M/S stereo coding. It notes that, in parametric stereo, the ability of the decorreletor to create a realistic stereo signal from a mono core coder residual is limited such that no further performance improvement is observed beyond e.g. 32 kb/s for the total bitrate.
The CE proposal gives the option using a residual signal for the lower region of the spectrum and a decorrelated signal for the higher spectral region. The residual signal is encoded using a stereo core coder.
The presenter summarized all subjective test results for this CE (at the 5% level of significance):

At 48 kHz stereo: performance better for 5 individual items and mean performance over all items better.

At 64 kHz stereo: performance better for 4 individual items and mean performance over all items better

Contribution notes that this is a full CE proposal, that there is clear evidence of improved performance and requests that the group adopt the CE technology into USAC WD5.
Pierrick Philippe, Orange Labs, requested that an analysis of performance of the CE as diff scores be made available to the group for discussion during the MPEG week.
The Chair presented

m16778	Ad Hoc Group on SAOC, USAC and MetaData	S. Quackenbush, Pierrick Philippe

The group clarified aspect of the work done in metadata and the report was approved.

60. Task group activities

60.1. Joint meetings

60.1.1. Joint with Systems on MXM and IMAF

Schuyler Quackenbush, Audio Research Labs, presented

m16857	MPEG-4 Audio API for MXM	S. Quackenbush

The contribution defines an MXM style API for using Audio resources. The API supports

- Encoding functions
  - Creating an audio encoder object
  - Initializing the object private data (
  - Encoding a waveform segment (i.e. frame) into an accessUnit
  - Destroying the audio encoder object
- Decoding functions
  - Creating an audio decoder object and initializing the object private data
  - Decoding an accessUnit to produce a waveform segment (i.e. frame)
  - Destroying the audio decoder object

As a next step, the presenter will post the API header file to the Systems reflector and get feedback on integrating the API into the MXM framework and namespace.
The presenter hopes to show a more complete example implementation at the next meeting.

Inseon Jang, ETRI and Laurent Primau, iKlax,, presented

M16935	Brands for Interactive Music AF	Inseon Jang Jeongil Seo Hui Yong Kim Kyeongok Kang
m16960	IM AF Brands Proposal from iKlax Media	Emmanuel Bouix Laurent Primaux Owen Lagadec

The two documents present two different proposals for branding IMAF. After the presentations, a harmonized branding proposal was presented. There was some discussion after which it was agreed to adopt the harmonized brand table.

60.1.2. Joint with Requirements on SAOC Profile

Requirements reviewed the proposed SAOC profile and the level of industry support. The proposed profile was approved and will incorporated into the Study on SAOC FCD document.

60.2. Task Group discussions

60.2.1. MPEG-2, MPEG-4, Audio Conformance, Reference Software, MPEG Surround

MPEG-4

Heiko Purnhagen, Dolby, presented

m16984	Proposal for signaling and transport of SAOC, LD-SAOC, and LD-MPS in MPEG-4 Audio	Heiko Purnhagen Frans de Bont Stefan Döhla Markus Schnell

Please see discussion under the SAOC task group.
Ralf Geiger presented

m17004	Bugfixes to MPEG-4 SLS Reference Software	Fabian Haussel Ralf Geiger Virgilio Bacigalupo

This document proposes several bugfixes for the MPEG-4 SLS reference software. It was agreed to issue a draft corrigendum on the MPEG-4 SLS reference software.

MPEG Surround

Heiko Purnhagen presented

M16985	Correction of time-alignment in MPEG Surround reference software and conformance	Heiko Purnhagen, Leif Sehlström, Ferenc Krämer, (Dolby) Claus-Christian Spenger (Fraunhofer IIS)

This document proposes to fix a bug in the MPEG Surround reference software. A wrong offset occurs in the case of combining HE-AAC and MPEG Surround. It was agreed to issue a proposed draft corrigendum on the MPEG Surround reference software and conformance.

60.2.2. MPEG-D Spatial Audio Object Coding

Oliver Hellmuth, FhG, presented

m16992	Additional Information on SAOC Profiles	Jonas Engdegard Oliver Hellmuth Juergen Herre Johannes Hilpert Werner Oomen Heiko Purnhagen Jeongil Seo Leonid Terentiev

The contribution proposes an additional level 3 in the Low Delay profile that mandates that decoders support the MPEG Surround tool. In addition, the profile definition table has an addition line that mandates the minimum number of rendered output channels. For Low Delay level 3 the minimum number is 5.

It was the consensus of the group to adopt the proposed profile changes into the Study on FCD text.

Leonid Terentiev, FhG, presented

m16970	Status and progress overview of SAOC workplan items	Oliver Hellmuth Jürgen Herre Andreas Hölzer Werner Oomen Heiko Purnhagen Leonid Terentiev Cornelia Falch

The contribution gives the status of the SAOC work and an overview of the contents of each SAOC contribution.

Leonid Terentiev, FhG, presented

m16971	Changes for editorial consistency of the MPEG SAOC FCD text	Jonas Engdegård Heiko Purnhagen Leonid Terentiev Cornelia Falch Andreas Hölzer Oliver Hellmuth Jeroen Koppens

The contribution proposes a number of editorial corrections to the SAOC specification

- General corrections and proposed "beautifications"
  - Use the correct ISO template formatting
  - Use capital letters for the subclause names
  - Correct minor spelling errors
- Correct errors in the technical description
  - Parameter interface between the SAOC transcoder and MPS decoder
  - Calculation of the inverse of the downmix matrix for the enhanced SAOC mode
  - Default values for SAOC parameters
  - Corrections in SAOC bitstream syntax
  - P1 matrix preprocessing block
  - Settings for MPS TTT unit configuration for SAOC transcoding mode

- Calculation of ICCTTT parameters for TTT box for stereo transcoding
- Missing text of accepted proposals

It was the consensus of the group to adopt the proposed changes into the Study on FCD text.

Leonid Terentiev, FhG, presented

m16972	Report on corrections for MPEG SAOC	Jonas Engdegård Heiko Purnhagen Leonid Terentiev Cornelia Falch Andreas Hölzer Oliver Hellmuth Jeroen Koppens

The contribution proposes the following technical corrections

- Corrections for MPEG SAOC system
  - Arbitrary downmix gains calculation
  - Quantization precision of the rendering matrix for presets
  - Equation for estimation of the covariance matrix
  - Variable range of saocTimeAlign
- Proposals for MPEG SAOC system
  - Time-variant metadata
  - "Skip"-mechanism for empty extension containers

It was the consensus of the group to adopt the proposed changes into the Study on FCD text.

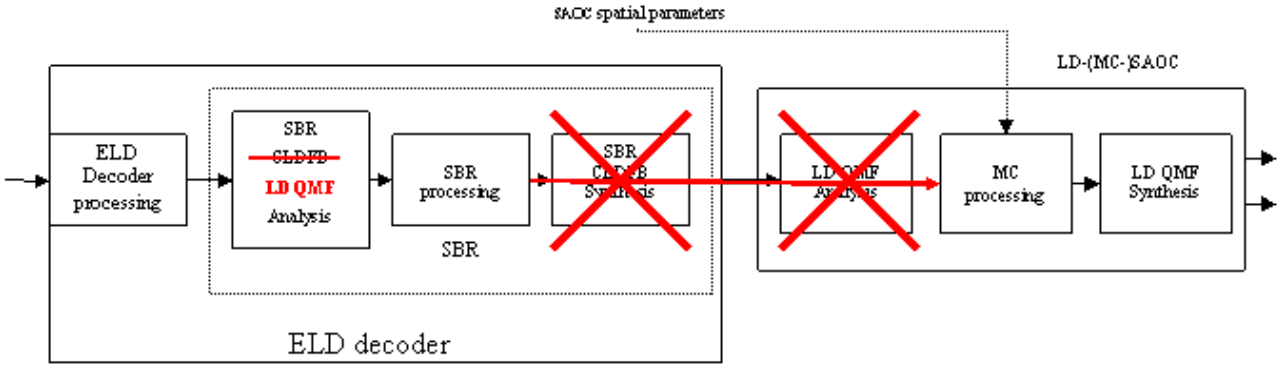
Jürgen Herre, FhG, presented

m16973	Technical provisions for low-delay multi-channel rendering	Jonas Engdegård Heiko Purnhagen Jürgen Herre Johannes Hilpert María Luis Valero Markus Schnell Oliver Hellmuth Leonid Terentiev Andreas Hölzer Jeroen Koppens

The contribution describes the technology in the proposed low-delay multi-channel SAOC system. The algorithmic changes can be summarized as:

- replacement of the QMF bank by a Low Delay QMF
- omission of the Nyquist filterbank
- reduction of the number of processing bands
- adaptation of the decorrelator filters

The contribution notes that using AAC-ELD as a core coder has significant advantages. The figure below illustrates the issues that arise in constructing a communication system and how the proposal deals with them.



In particular, it notes that

- The AAC-ELD filterbank is not the same as the LD-SAOC filterbank, and hence it proposes signalling to permit the AAC-ELD to switch to a LD-QMF filterbank in the LD-SAOC context.
- The AAC-ELD SBR synthesis filter and the LD-SAOC analysis filter for an identity system, and so it proposes a normative interface of the two modules in the time/frequency domain.
- The MPEG Surround tool currently uses the QMF filterbank, and it proposes to use the same low-delay filterbank as is used in LD-SAOC in the LD-SAOC context.

The proposed architecture has the following desirable features:

- 30% reduction in complexity (due to omitting the calculations for SBR synthesis and SAOC analysis filters)
- 37.7 ms one-way latency (as compared to 39 ms if AAC-ELD and LD-SAOC interface is in time domain)

The contribution presents a series of listening test results that assess components of the proposed system.

- The first listening test results show that over all items the perceptible audio quality of the LD-MPS 2-1-2 configuration at 32 kbps is significantly better than the quality of stereo AAC ELD with SBR at 32 kpbs
- The second listening test compares LD-MPS against high-quality MPS for the 5-2-5 configuration. For all items both versions obtained similar MUSHRA scores, and the mean scores averaged over all items were not different at the 95% level of significance.
- The third listening test results show that, at the 95% level of significance, there is no difference between low delay SAOC multichannel rendering and the regular high quality version (i.e. SAOC transcoded and post-processed by MPEG Surround) in terms of average performance.

Laurent Primau, iKlax, presented

m16959	Comments on SAOC Profiles	Emmanuel Boui Laurent Primau Owen Lagadec PHILIPPE Pierrick

The presentation makes the following points:

- Please include additional text that further clarifies the application scenarios for each profile, particularly the possible scenarios for Baseline Profile.
- Please include text indicating that ISO/IEC 23000-12, "Interactive Music Application Format" conforms to the Baseline Profile.

The Chair noted that if might be good to add a sentence that clearly states that the two profiles are not hierarchical.

It was the consensus of the group to adopt the proposed changes into the Study on FCD text.

Continued Discussion of LD-SAOC proposal (m16973)

Heiko Purnhagen, Dolby, presented

m16984	Proposal for signaling and transport of SAOC, LD-SAOC, and LD-MPS in MPEG-4 Audio	Heiko Purnhagen Frans de Bont Stefan Döhla Markus Schnell

The contribution reviews current signalling and carriage of SAOC and MPEG Surround in MPEG-4 Audio. It proposes a new Audio Object Type for the Low Delay MPEG Surround capability in SAOC.

AOT 44 LD MPEG Surround

The AOT is carried in a syntax structure that is found at the end of the core coder audioSpecificConfig. As a future exercise, it may be interesting to express the sequence of syntax constructs with a "while loop" structure.

The LD-SAOC and LD-MPEG Surround data is carried in the core coder "fill element" in the same way as SAOC and MPEG Surround is carried. SAOC config contains a "low delay SAOC" flag bit, but MPEG Surround does not, and so LD MPEG Surround requires its own extension type.

Furthermore, the signalling specifies that the SBR data should be delayed 48 samples if

ELD_EXTSAOC is signalled (the "low delay SAOC" flag will be set, but is redundant)

or

ELD_EXTLDSAC (i.e. MPEG Surround) is present

The Chair asked if the following could be made available:

- audio samples of correctly aligned and 48-sample "mis-aligned" SBR decoding could be made available.
- Precise numbers for the "30% reduction in complexity" provided by the frequency domain connection of the AAC-ELD and LD-SAOC processing.

Kristofer Kjörling, Dolby, noted that the SBR envelope adjustment is on a 2 subband sample granularity, which corresponds to a 128 sample granularity in the decoded signal domain. Juergen Herre, FhG, noted that the LD-QMF provides greater selectivity (i.e. lower sidebands) than CLDFB. There was considerable additional discussion on the signalling and the SBR side information delay.

The discussion will be continued tomorrow (Thusday) to allow for reviewing the additional information.

Oliver Hellmuth, FhG, presented

m16976	Technical provisions for efficient operation of the SAOC codec using signals with a high inter-object correlation	Heiko Purnhagen Jonas Engdegård Andreas Hölzer Oliver Hellmuth Johannes Hilpert

In the case of correlated objects, e.g. due to open microphones with considerable cross-talk in a teleconferencing room, there are three options:
Correlation matrix between objects. Matirx entries are vectors, specifying correlation in frequency bands. Diagonal is object energy, off-diagonal is correlation between objects. Currently, there are two means of filling in the matrix in the decoder:

- “No IOC” Entries are set to a default value
- “Full IOC” Transmit the correlation vector for each entry for each frame for.

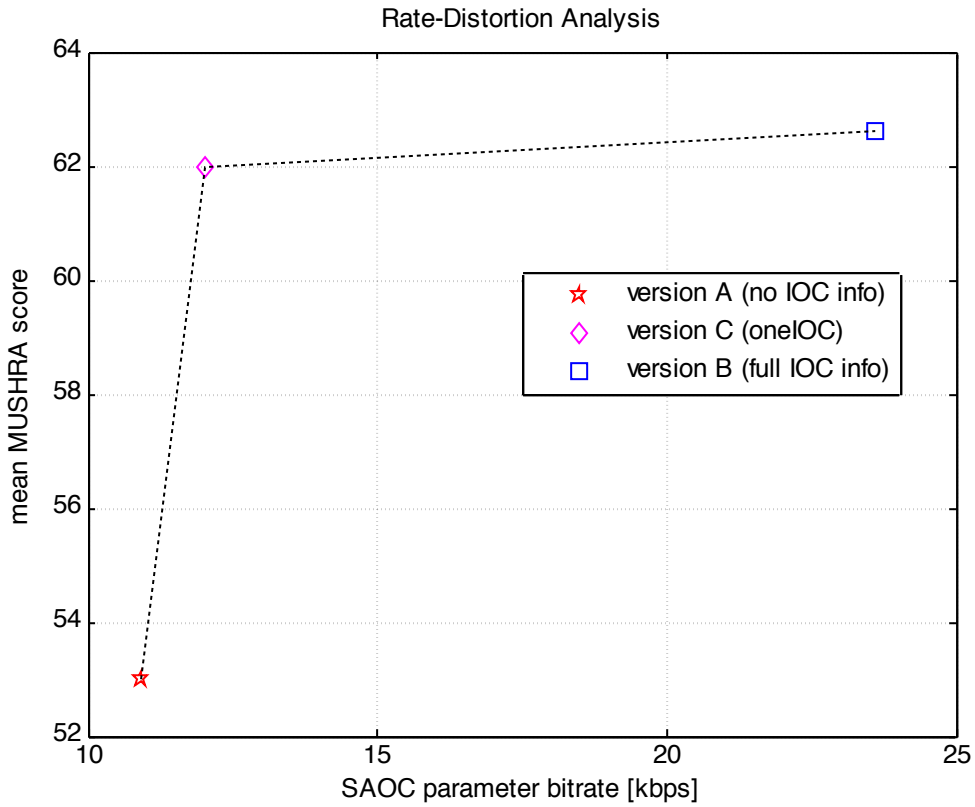
The contribution proposes to add an additional method

- “One IOC” Transmit a single correlation vector for each frame that is uses for all objects that are signalled as “related to.”

The cost (in kb/s) and performance (as MUSHRA score for each solution is shown in the following table:

Label	Solution	SAOC payload rate	MUSHRA score
A	“No IOC”	10.909 kb/s	mean score worse than from “Full IOC” at 95% level of significance
B	“Full IOC”	23.603 kb/s	
C	“One IOC”	12.020 kb/s	mean score not different from “Full IOC” at 95% level of significance

This information can be displayed in a “rate-distortion” curve as follows:



The contribution proposes to add "One IOC" signalling and sematics to the Study on FCD text.

Henney Oh, LG, presented

m16930	Listening test result on realistic microphone signal optimization for SAOC	Henney Oh Jeongil Seo

The contribution shows a listening test cross-check on the technology of the previous contribution. While the performance across individual items was somewhat inconsistent, there was agreement in the the mean performance of the systems A, B, C.

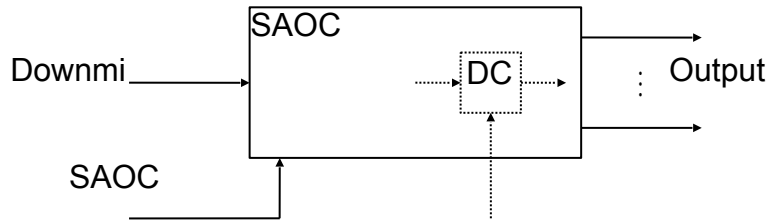
It was the consensus of the group to adopt the technology proposed in m16976 into the Study on FCD text.

Jürgen Herre, FhG, presented

m16975	Technical provisions for limiting perceptible distortions in SAOC	Jürgen Herre Cornelia Falch Oliver Hellmuth Leonid Terentiev Andreas Hölzer

In the context of using SAOC in a "Music 2.0" or Interactive Audio Application Format application, the contribution observes that a user could set object "gain sliders" to their extremes and experience very "low quality" results! This has already been observed, in that the "mute object" and "solo object" capability in SAOC require residual signals to achieve acceptable results.

The contribution proposes an architecture for limiting the possible modification of the downmix signal during the SAOC rendering process, which is schematically shown in the following figure, where DCU is the distortion control unit, T is the downmix Transcoding Coefficient, $\tilde{T}$ is the limited Transcoding Coefficient and Λ is the distortion control factor.



The proposal supports a tradeoff between distortion and separation. At the extremes of the user controls where the technology imposes limits, typically there will not be the full level of desired modification and there will be some, hopefully small, level of distortion.
The contribution presents a listening test that show that the proposed technology was preferred relative to SAOC without and limitation mechanism, as expressed by the mean score over all listeners and all items at the 95% level of significance. The presenter noted that the "degree of control" set for the listening test was "moderate" and the "user controls" were set to the extremes such that some very small level of distortion was perceivable.
The contribution requests that there be a cross-check of this work during the AhG period (i.e. prior to November 23) and if the cross-check is positive that the technology be incorporated into the Study on FCD text.
Dolby, ETRI and LG volunteered to perform the cross-check.
If was the consensus of the Audio Subgroup to accept the technology in m16975 subject to executing the following steps (which will be in included in a workplan)

1. The CE proponent makes the listening test signals available
1. The test sites conduct the listening tests and post the results to the reflector
2. Results are discussed and a consensus position formed
3. If the cross-check is positive, CE proponent posts to the reflector exact text for inclusion in Study on FCD document.
4. Text is reviewed and comments posted to reflector
5. The text is incorporated into the Study on FCD text, which is uploaded prior to the end of the editing period.

Kristofer Kjörling, Dolby, presented

m16919	Information on efficiency of lossless parameter coding for SAOC	Werner Oomen Heiko Purnhagen María Luis Valero Bernhard Grill

The contribution carries out the mandate of the SAOC workplan from the 89th meeting, to

- Check the coding efficiency of MPEG Surround inherited lossless parameter coding for SAOC

The bitstream elements considered were

- Time slot position coding
- Pilot Coding

Tool	**Bit Savings**

Time Slot Coding	Not activated in current reference quality bitstreams Theoretical savings of 20 bits/second 0.03% of total bit rate (assuming 64 kb/s total rate)
Pilot Coding	1% of side information rate 0.2% of total bit rate (assuming 64 kb/s total rate)

The contribution proposes to remove Time Slot Coding and Pilot Coding from SAOC (which also implies removing them from LD-SAOC).
Henney Oh, LG, presented

m17074	Thoughts on lossless parameter coding for SAOC	Henney Oh

The contribution noted that there are many lossess coding tools in SAOC: grouped PCM coding, pilot-based coding, frequency differential coding, forward time-differential coding and backward time-differential coding. It requested that the performance of all lossless coding tools be investigated. It further noted that complexity of the tools should be measured and considered when assessing the performance of the tool. Finally, bitrates higher than or lower than 64 kb/s are relevant and should be assessed.
Juergen Herre, FhG, noted that the timeline for the LD-SAOC was very aggressive, while at the same time the re was a clear mandate to investigate the performance of tools inherited from MPEG Surround.
LD-MPEG Surround is different from MPS in that there are modifications that facilitate low delay, such as

- Fewer time slots per frame
- Because there is no Nyquist filterbank, there are 15 parameter bands rather than 20

Bernhard Grill, FhG, noted that MPEG-2 AAC and the “pulse coding flag” provides an example of a tool that demonstated a performance at one point in the standardization development, but provided no advantage after additional tools were added later in the standardization process.
Kristofer Kjörling, Dolby, noted that everyone could have joined in executing the workplan of assessing the tools to be included in LD-MPEG Surround.
Mohammed Raad, Raadtech, noted that interested parties can assess the various lossless coding tools prior to the close of the SAOC FCD ballot. Heiko Purnhagen, Dolby, noted that assessment of lossless coding tools can be done with only bitstreams and decoders.
It was the consensus of the Audio Subgroup to remove Time Slot Coding and Pilot Coding from SAOC (and hence LD-SAOC). It is also the consensus to draft a workplan to make the appropriate SAOC reference quality bitstreams available such that any interested party can conduct experiments to assess the performance of losselss coding tools in SAOC.
Oliver Hellmuth, FhG, presented

m16993	Draft Outline for a Report on Performance of MPEG SAOC Technology	Jonas Engdegard Cornelia Falch Oliver Hellmuth Juergen Herre Johannes Hilpert Werner Oomen Heiko Purnhagen Leonid Terentiev

The contribution describes two listening tests that could be used to characterize the performance of SAOC. The intention of the test is to make the report available prior to the close of the SAOC FCD ballot (12-24-2009).
Test 1 is exactly “test 3” from m16973, “Technical provisions for low-delay multi-channel rendering” which characterizes the performance of the full AAC-ELD, LD-SAOC multichannel system

Test 2 is intended to show the virtue of SAOC in a teleconferencing scenario, in that it can disambiguate simultaneous talkers by rendering them to different parts of the multichannel sound stage.
Mohamad Raad, Raadtech, requested that the MPEG Audio subgroup provide a reason or justification for the delay of the SAOC Verification Test, and that this reason be in the introduction of the "Report on Performance of MPEG SAOC Technology." Jeff Huang, Qualcomm, noted that he would prefer to have formal verification test prior to casting his ballot within the national body. The Chair noted that there is ample precedent in the Audio Subgroup for delivering the Verification Test after the work item has progressed to FDIS, however this respect its role as publicizing the standard to the world is not diminished. It was decided to have a breakout group to edit the "Report on Performance of MPEG SAOC Technology" document so as to address the concerned raised.

Continued Discussion

Juergen Herre, FhG, reviewed additional information on LD-SAOC that was made available to the group on Thursday morning.
Concerning the SBR alignment in legacy AAC-ELD decoders

- 21 test items with and without SBR alignment were made available
- Listening test result for 8 listeners doing headphones listening showed that, in the mean for absolute MUSHRA scores, there is no difference at the 95% level of significance. When doing difference score analysis, sio2 (castanets) showed a degradation in the decoded signal with mis-aligned SBR parameters, as would be expected. However, in the mean, there is no difference at the 95% level of significance.

Complexity information was presented:

- Mono downmix: from 13.0 to 10.0 MOPS (approx 25% reduction)
- Stereo downmix: from 21.0 to 15.0 MOPS (approx 30% reduction)

It was the consensus of the Audio Subgroup to adopt the technology proposed in m16973, "Technical provisions for low-delay multi-channel rendering" into the Study on SAOC FCD text.

60.2.3. MPEG-D Unified Speech and Audio Coding

CE on improved noiseless coding of spectral coefficients

Wei Xiao. Hauwei, presented

m16908	Huawei progress report on the CE for the spectral lossless coding	Wei Xiao Fuwei Ma Hervé Taddei Minjie Xie

Hauwei declared its interest in participating in the CE, either as a proponent or cross-check. However they were not able to cross-check the current CEs for presentation at this meeting. They would be interested in the opportunity to do a cross-check at the next meeting.
Eunmi Oh, Samsung, presented

m16913	Crosscheck Report on the Spectral Noiseless Coding for USAC	Kihyun Choo Eunmi Oh

The contribution contains a cross-check of Thomson and FhG technology. It noted that the Thomson and FhG proposals counted the bytes in the accessUnits, without regard to the number of possible fill bits in the last byte.
The global compression efficiency for Thomson and FhG proposals is shown in the following table. A negative value indicates compression gain.

Operating mode	Thomson Difference after transcoding (% of total bitrate)	FhG Difference after transcoding (% of total bitrate)
Test 1, 64kbps stereo	0.93%	-1.04%
Test 2, 32kbps stereo	-1.08%	-1.05%
Test 3, 24kbps stereo	-0.88%	-1.11%
Test 4, 20kbps stereo	-1.08%	-1.11%
Test 5, 16kbps stereo	-1.21%	-1.10%
Test 6, 24kbps mono	-1.08%	-1.32%
Test 7, 20kbps mono	-1.30%	-1.39%
Test 8, 16kbps mono	-1.37%	-1.31%
Test 9, 12kbps mono	-1.20%	-1.19%

The contribution notes that the Thomson technology failed the buffer requirement constraint at several operating points. In addition, it notes that there remains some uncertainty in the cross-check due to issues such as fill bits and/or byte alignment and the fact that some proponents proving bitstreams and others providing transcoding decoders

Oliver Wuebbolt, Thomson, presented the following two contributions

m16954	Spectral Noiseless Coding CE: Crosscheck report for Fraunhofer IIS proposal	Oliver Wuebbolt
m16955	Spectral Noiseless Coding CE: Crosscheck report for Samsung proposal	Oliver Wuebbolt

The contributions present the results of a cross-check on the FhG and Samsung CE proposals. The global compression efficiency reported by Samsung is shown in the following table. A negative value indicates compression gain. The presenter noted that these numbers exactly agree with those presented by Samsung

Operating mode	FhG Difference after transcoding (% of total bitrate)	Samsung Difference after transcoding (% of total bitrate)
Test 1, 64kbps stereo	-1.04	-2.11
Test 2, 32kbps stereo	-1.05	-1.49
Test 3, 24kbps stereo	-1.11	-1.54
Test 4, 20kbps stereo	-1.11	-1.58
Test 5, 16kbps stereo	-1.10	-1.70
Test 6, 24kbps mono	-1.32	-1.65

Test 7, 20kbps mono	-1.39	-1.75
Test 8, 16kbps mono	-1.31	-1.84
Test 9, 12kbps mono	-1.19	-2.00

Markus Multrus, FhG, presented the following two contributions

m17000	Crosscheck Report for CE on Improved Noiseless Coding: Thomson Proposal	Markus Multrus
m17001	Crosscheck Report for CE on Improved Noiseless Coding: Samsung Proposal	Markus Multrus

The contributions present the results of a cross-check on the Thomson and Samsung CE proposals. The global compression efficiency reported by Samsung is shown in the following table. A negative value indicates compression gain.

Operating mode	Thomson Difference after transcoding (% of total bitrate)	Samsung Difference after transcoding (% of total bitrate)
Test 1, 64kbps stereo	0.93	-2.11
Test 2, 32kbps stereo	-1.08	-1.49
Test 3, 24kbps stereo	-0.88	-1.54
Test 4, 20kbps stereo	-1.08	-1.58
Test 5, 16kbps stereo	-1.21	-1.70
Test 6, 24kbps mono	-1.08	-1.65
Test 7, 20kbps mono	-1.30	-1.75
Test 8, 16kbps mono	-1.37	-1.84
Test 9, 12kbps mono	-1.20	-2.00

The contribution notes that the Thomson technology failed the buffer requirement constraint at several operating points.

Discussion

All cross-checks agreed in the figures for overall compression efficiency (as listed in the tables above).

Oliver Wuebbolt, Thomson, noted that when the CE compression efficiency is worse than the WD it is not possible to do lossless transcoding and satisfy the bit buffer requirements since buffer underflow occurs. He further noted that the worst case underflow in any one accessUnit does not occur in a single accessUnit, but typically accumulates over many accessUnits.

Eunmi Oh, Samsung, noted that the CE is about lossless coding, and that the Thomson proposal does not achieve lossless coding. Hence the Thomson CE might affect sound quality.

Markus Multrus, FhG, presented

m17002	Fraunhofer IIS Proposal for CE on Improved Spectral Noiseless Coding	Guillaume Fuchs Markus Multrus Nikolaus Rettelbach

The contribution gives a technical description of the FhG proposal. It notes that the main goal of the proposal was reduction of storage requirements, both read-only memory and read-write memory. Nevertheless, it also achieves an increase in compression efficiency.
WD4 codes 4-tuples as a token and uses 4-tuples as context. The CE proposal uses 1-tuples (i.e. scalars) as tokens to be coded and also as context.
The contribution noted that WD4 noiseless coding causes problems in practical implementations, in that many computing chips appropriate for portable have a limited cache size. In this case it asserts that, with the large tables in WD4, the processor might spend most of its time stalled waiting for a cache line to fill.
Since the context is based on scalars, the CE increases the number of contexts from 4 to 7. The reduced alphabet size (4-tuple to 1-tuple) permits the CE technology to reduce arithmetic coding table size from 16895 words to 900 words. When considering the entire USAC coder, the CE reduces table size from 37000 words to 21000 words, or 43% reduction.
It notes that the CE proposal achieves between 1.04% and 1.39% increase in coding efficiency.
Finally, it notes that the technology is scalable, in that if the size of the arithmetic coding tables is increased, an additional increase in coding efficiency is realized.
In summary, the CE proposal gives the following improvements relative to WD4:

- 900 words ROM (reduced from 16,900 words)
- 21,000 total ROM (reduced from 37,000 words)
- Gain in coding efficiency of 1.0% to 1.4% (total bitrate)

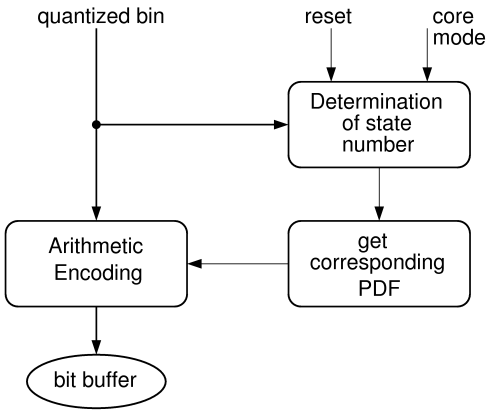
The CE proposal used a training set of approximately 1 hour each of speech, music and mixed content. The 15 test items were not included in the training database.
Kihyun Choo, Samsung, asked about the LSB coding method used in the CE. It was confirmed that it is that same as that in WD4. Eunmi Oh, Samsung, asked how the CE total table storage compares to the estimated WD4 program storage needs. Oliver Wuebbolt, Thomson, noted that the information is available in an email from FhG (Fri, Oct 9, 2009 at 4:08 PM) in which it was estimated that USAC storage requirements are:

- Data ROM demand: approx. 148 kByte (37 kWord)
- Program code ROM demand: approx. 150 – 200 kByte (38 – 50 kWord)
- Static RAM demand: approx. 41 – 68 kByte (10 – 17 kWord, dependent on application scenario)
- Volatile RAM demand: approx. 20 kByte (5 kWord)

Markus Multrus, FhG, noted that the operating point chosen (900 words arithmetic table size) is nearly the same as the Huffman coding table size found in HE-AAC, which is has been successfully implements on processors used in many portable device platforms.
Eunmi Oh, Samsung, noted that it is not clear to her what is the best figure of merit (that would dictate a table size/compression efficiency operating point) for this CE. Mohammed Raad, Raadtech, noted that many currently deployed cellular handset DSPs have 32 kByte cache sizes.
Oliver Wuebbolt, Thomson, presented

m16953	Spectral Noiseless Coding CE: Thomson proposal	Oliver Wuebbolt

The contribution gives technical details of the CE proposal. The basic encoding architecture is as show in the following figure:



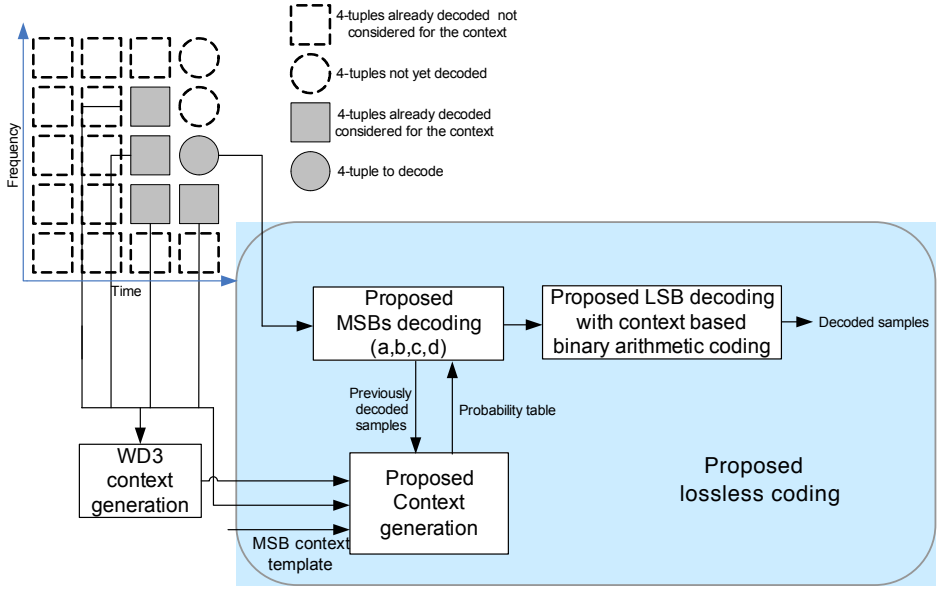
The proposal is similar to the FhG proposal in that it uses 1-tuples (scalars) as both the token to be coded and the contexts. It uses 7 contexts in FD and 13 contexts in LP TCX mode. Tokens can be between -15 and +15 without the need for escape coding. When escape coding is used, the LSBs are coded using a uniform probability quanitzer. It was noted that the Thomson proposal would use escape coding less often than the FhG proposal (in which tokens are between -4 and +3).
In summary, the CE proposal gives the following improvements relative to WD4:

- 1231 words ROM (reduced from 16,894 words)
- ~ 20% reduction in ROM (considering program code and tables)
- Gain in coding efficiency of 0.9% to 1.4%, but a loss of coding 0.9% (total bitrate)

Concerning computation complexity, the contribution estimates that the WD spectral noiseless coding requires less than 10% of overall USAC complexity, and that the CE spectral noiseless coding complexity is comparable to the WD complexity.
Max Nuendorf, FhG, asked whether the LP and FD coding modes use the same probability tables. It was confirmed that they do.
Kihyun Choo, Samsung, presented

m16912	CE Report on the Spectral Noiseless Coding for USAC	Kihyun Choo Junghoe Kim Eunmi Oh

The proposal uses the same MSB coding as in RM3, but an additional MSB context. Also, the CE proposal uses binary arithmetic coding for LSB coding, where contexts are sign of MSB and bit-depth of LSBs. A block diagram of the decoding engine is shown here:



The CE technology used a training corpus of 49 minutes of mixed content.

The advantages of the CE proposal, relative to WD4, can be summarized as follows:

- 12 kWords ROM (reduced from 16,894 words)
- 32,000 total ROM (reduced from 37,000 words)
- Gain in coding efficiency of 1.49% to 2.11% (total bitrate)

Discussion

Eunmi Oh, Samsung, noted that there is a cross-check on coding efficiency but not on memory usage. She further noted that coding efficiency is typically the paramount figure of merit for CEs.
Juergen Herre, FhG, noted that the actual subjective impact of an increase in compression efficiency of 1% may not have a discernable impact on subjective quality performance.
Experts will gather more information, consider all issues raised and continue the discussion later in the week.
Hyunkook Lee, LG, presented

m16951	Report on the arithmetic coding CE for USAC	Hyunkook Lee Sungyong Yoon

The contribution presents new information on this CE. Specifically, it proposes that the scale factors and the spectral coefficients be coded as separate arithmetic code sequences. Additionally, there is a “reset flag” such that

Reset	**Action**
0	absolute coding of global gain
1	differential coding of global gain

In the proposal the reset follows the reset flag in the RM3 reference quality bitstreams. It was clarified that the RM3 bitstream reset occurs whenever it provides an advantage, in terms of compression efficiency, or at least every 25 frames.
On average the proposal provides an increase in compression of 0.41%. For this operating point the CE uses 975 words for arithmetic coding tables. However, it provides a trade-off in table size versus compression as follows:

Number of context	Memory (words of 32 bits)	Saving for FD frames (%)	Saving for FD and LPD frames (%)
5	491	0.64	0.35
7	612	0.68	0.37
9	733	0.72	0.39
11	854	0.74	0.40
13	975	0.75	0.41

The Chair noted that there is not an adequate framework for assessing this CE, in that the frequency of reset is mandated as part of the encoding process in core experiments.
Max Nuendorf, FhG, noted that, for the proposed operating point, the scale factor arithmetic coding tables are equal in size to the arithmetic coding tables proposed in the FhG spectral arithmetic coding CE.

Kristofer Kjörling, Dolby, noted that what matters is compression over the mix of content types as represented by the test items, and that additional compression for one type of item may not be relevant.
Anisse Taleb, Hauwei, noted that it may still be advantageous to optimize one branch of a switch mode codec.
The Chair summarized the relevant points raised

- Consider reset or re-entry points
- 0.41% average improvement in compression comes with 975 words of storage, as compared to (at most) 121 words for the WD4 Huffman scale factor coding table.

Ralf Geiger, FhG, presented

m17003	Thoughts on coding of global gain	Ralf Geiger Guillaume Fuchs

The contribution noted that the level of AAC decoded output can be changed by over-writing the 8-bit global gain field. There exists “freeware” that implements such level change.
It notes that in USAC there are “global gain” elements in very coding branch:

- In FD there is an 8-bit “global gain” that occurs every frame (1024 samples)
- In TCX there is a 7-bit “global gain” every 256 samples
- In ACELP there is a 2-bit “global gain” every 256 samples

The increment in level provided by each step in the various “global gain” values was not stated.
The contribution notes that the various “global gains” could be harmonized to give a uniform means of level adjustment.
Kristofer Kjörling, Dolby, presented

m16940	Report on cross-check listening test for the USAC CE on eTES	Kristofer Kjörling

The contribution presents a listening test on the performance of eTES. The results can be summarized as follows (all results at the 95% level of significance):

Rate	**Absolute MUSHRA score**	**Differential MUSHRA score**
16 kb/s	no single item different mean score not different	2 items worse for CE mean score not different
24 kb/s	no single item different mean score not different	no single item different mean score not different

Max Neuendorf, FhG, presented

m16994	Crosscheck Report Regarding Enhanced Temporal Envelope Shaping in USAC	Max Neuendorf

The contribution presents a listening test on the performance of eTES. The results can be summarized as follows (all results at the 95% level of significance):

Rate	**Absolute MUSHRA score**	**Differential MUSHRA score**
16 kb/s	no single item different mean score not different	2 items better for CE 1 item worse for CE mean score not different

24 kb/s	no single item different mean score not different	no single item different mean score not different

Kei Kikuiri, DOCOMO, presented

m16942	Report on Enhanced Temporal Envelope Shaping CE for USAC	Kei Kikuiri Kosuke Tsujino Nobuhiko Naka

The contribution describes a revised technology proposal and presents computation complexity and listening test results.The revisions are

- A new gain value for the inter-TES (i.e. processing across time dimension)
- A new table for **bs_temp_shape_mode**

The computational complexity is

24 kb/s mono	0.041 MOPS
16 kb/s mono	0.018 MOPS

The storage requirements are: ROM 24 bytes and RAM 764 bytes.
The results can be summarized as follows (all results at the 95% level of significance):

Rate	**Absolute MUSHRA score**	**Differential MUSHRA score**
16 kb/s	no single item different mean score not different	1 item better for CE mean score not different
24 kb/s	no single item different mean score not different	no single item different mean score not different

When all results from this test and the cross-check tests of the two previous documents are pooled:

Rate	**Absolute MUSHRA score**	**Differential MUSHRA score**
16 kb/s	no single item different mean score not different	1 item better for CE mean score not different
24 kb/s	no single item different mean score not different	2 items better for CE the CE mean score is better

The mechanism by which eTES provides an advantage for transient signal intervals is discussed. Plots in the contribution indicate that eTES is able to shape the SBR signal and noise envelopes in a way that they more closely follow that of the original signal.
The Chair noted that the pooled test scores at 24 kb/s at the 95% level of significance show a mean score that is better and also shows 2 items better. KK expressed a concern that the tool gives a small improvement on the MUSHRA scale (i.e. 1 MUSHRA point for the average score, even though it is significant at the 95% level of significance).
Dejun Zhang, Huawei, presented

m16910	Improved Pulse indexing for ACELP fixed codeword	Hervé Taddei Dejun Zhang Fuwei Ma Minjie Xie

The contribution describes improved technology for the ACELP pulse indexing CE. It notes that the proposal is noiseless with respect to the WD. The tool provides an increase in compression efficiency as follows

Operating Mode	**Improvement**
20 kb/s mono	0.38%

For some operating modes the new tool is less complex that the WD technology, for others it is more complex.
Minjie Xie, Hauwei, presented

m16909	Pitch Estimator for USAC reference encoder	Zhengzhong Du Hongqiang Dang Yujie Dun Guizhong Liu Yixin Gao Minjie Xie Hervé Taddei

This contribution proposes a description of a pitch estimator to be used for the time warping tool of the FD mode. The pitch estimator is based on a pitch period estimation, followed by warp curves generation, merged so as to derive the warping parameters. This contribution contains some text for the informative working draft.
It was the consensus of the Audio Subgroup to incorporate this text as an informative annex to the USAC working draft under the supervision of the editor. The source code will be delivered shortly after the 90th MPEG meeting for integration on the MPEG SVN server.
Pierrick Philippe, Orange Labs, presented

m16991	Proposed contribution to USAC	Pierrick Philippe

In this contribution Orange Labs commits to deliver source code for the USAC reference encoder. The noise filling module, as mentioned in task #9 of N10869 "Workplan on MPEG USAC Reference Encoder" will be improved by the 91st MPEG meeting (Kyoto). Contribution to the informative text and reference software will be provided then.
Kristofer Kjörling, Dolby, presented

m16988	Finalization of the CE on harmonic transposer for the USAC work item	Per Ekstrand Lars Villemoes Kristofer Kjörling Frederik Nagel Sascha Disch Stephan Wilde Max Neuendorf

The contribution proposes corrections (i.e. bug-fixes):

- Changes that affect only the reference software
  - Time alignment of the different harmonic contributions
  - Modeling of bandpass filters in harmonic SBR
- Changes that affect both the reference software and the WD description
  - Calculation of the maximum stretching factor in harmonic SBR
  - SBR limiter adjusted to harmonic transposer crossover frequencies

The contribution also proposes a new method for harmonic transposition in SBR, whose primary value is a reduction in complexity. The harmonic transposer uses oversampling to insure that the harmonic transposition does not result in aliased components. The oversampling is enabled only for

transient portions of the SBR time/frequency space. The contribution presents complexity information, which shows that the proposed transposer always has lower complexity than the one in WD4.
The listening test data was preseted. Concerning the proposed bug-fixes, test results show that, when analyzing differential MUSHRA score, the bug-fixed system is better than the WD4 system for two items and not different in the mean at the 95% level of confidence.
Concerning the new harmonic transposer, test results show that, when analyzing differential MUSHRA score, the new harmonic transposer system is better than the WD4 system for 5 items and the mean is better at the 95% level of significance.
It was the consensus of the Audio Subgroup to incorporate the proposed "bug-fixes" into the WD5 text and reference software.
A cross-check is expected at the next meeting. Orange Labs, Huawei and DOCOMO volunteered to perform a cross-check on both the bug-fix and the proposed technology.
Wei Xiao, Huawei, presented

m16907	Progress report on the improved indexing of the AVQ-based LPC quantization for USAC LPD mode	Wei Xiao Fuwei Ma Hervé Taddei Minjie Xie

The contribution reports on an improved method for AVQ-based LPC quantization

- Reduces ROM requirements by an addition 43% with respect to WD4. Specifically, ROM is reduced from 2.6 Kbytes to 1.5 Kbytes
- Using analytical methods, it was estimated that complexity is reduced by approximately 25% with respect to WD4.

The proposed method is bit-exact with respect to the WD4 decoded output.
The Chair asked for ROM and MIPS complexity information with respect to the entire USAC decoder. Bruno Bessette, VoiceAge, asked to know the number of table accesses per superframe. It was noted that a cross-check on the information would also be helpful.
Zhou Huan, Panasonic, presented

m16933	Core Experiment on the eSBR module of USAC	Zhou Huan Chong Kok Seng Zhong Haishan Takeshi Norimatsu Tomokazu Ishikawa Neo Sua Hong

The contribution proposes a QMF-based phase vocoder for time stretching and pitch shifting in the SBR tool which provides a lower complexity method that the current STFFT method. It is reported that the proposed method is 15% of the complexity of the current time stretching and pitch shifting tool.
A listening test shows that at 12 kb/s mono, 16 kb/s mono and 16 kb/s stereo using differential MUSHRA scores, mean performance of the proposed technology is not different from the current WD technology at the 95% level of significance.
It was noted that the subjective test results were reported only for the test items where harmonic patching was active. Dolby and FhG expressed an interest in doing a cross-check.
Zhong Haishan, Panasonic, presented

m16938	Core experiment on time warping coding of USAC	Zhong Haishan Chong Kok Seng Zhou Huan Takeshi Norimatsu Tomokazu Ishikawa Neo Sua Hong

The contribution proposes a time warping method that improves sound quality. It proposes

- Use the M/S flag to signal whether one (shared) or two (L and R) sets of time warping parameters are transmitted in a given scale factor band.
- It notes that tw_ratio typically has the value of 1, and proposes a coding method that more closely matches the entropy of this token.

Listening test results are presented that show that the performance of the proposed technology is better than the WD system, when averaged over all items and at the 95% level of significance.
The proponents expect to bring cross-check information to the next MPEG meting.
Heiko Purnhagen, Dolby, presented

m16929	Proposed improvements for low bitrate stereo in USAC	Heiko Purnhagen Pontus Carlsson Erik Schuijers Werner Oomen

The contribution notes problems with downmix in MPEG Surround 2-1-2, the problem being the occurrence of phase cancellation in downmix created by the encoder. The proposed solution comprises the following:

- Modified downmix for MPS 212 to reduce phase calcellation
- Upmix scheme adapted to modified downmix
- Parameterization (CLD, ICC, IPD) not affected

Listening test results show

Changes wrt RM3	**Result**
New downmix	improvement in the mean
New downmix with adapted upmix	significant improvement in the mean
Adapted upmix only	no improvement (nearly identical mean scores)

The presenter anticipates bringing additional information to the next meeting.

Additional Discussion on Unified Stereo

Heiko Purnhagen, Dolby, reviewed some modifications to what was presented in m16921 “Technical description of proposed Unified Stereo Coding in USAC.” They consist of changes to the following syntax elements and changes to the corresponding decoding semantics:

- Change in USACSpecificConfig()
- Change in Spatial SpecificConfig()

It was the consensus of the Audio Subgroup to incorporate the this technology into USAC WD5 text and reference software.

A workplan will be drafted for interested parties to cross-check the decoding of the CE technology bitstreams.

Additional information on Pulse Indexing

Anise Taleb, Huawei, presented the information on Huawei’s Pluse Indexing CE. Show below is the increase in compression efficiency at four bit rates for the three content types and overall:

	20 kb/s	**24 kb/s**	**30 kb/s**	**32 kb/s**
Speech	1.14%	2.04%	1.71%	1.38%
Music	0.02%	0.03%	0.02%	0.01%
Mixed	0.44%	0.77%	0.85%	0.69%

Total	0.53%	0.95%	0.86%	0.69%

The presenter noted that the gains in compression efficiency come with virtually zero complexity. Roch Lefebvre, VoiceAge Corp./Univ. of Sherbrooke, requested performance of this tool on speech with background noise. Bruno Bessette, VoiceAge, noted that it is currently not possible to use the potential bits saved in ACELP mode for increasing quality, since it must jump to the next higher ACELP coding rate. Bernhard Grill, FhG, expressed concern for adding a tool that is unable to show quality improvement, for example in fixed-rate operation modes. Mohammed Raad, Raadtech, noted that many tools with small improvement may together make a significant difference in performance. Max Nuendorf, FhG, noted that an improvement in subjective quality, either in the mean or as worst case improvement is very compelling. Pieriek Philippe, Oragne Labs, noted that the ACELP architecture is quite stable and the signal processing well know, such that it is time to optimize remaining aspects of the tool.

Discussion on Timeline for Progression to CD

Mohammed Raad, Raadtech, noted that since major components of the work are still in flux (e.g. the window transition CE), he would strongly suggest to progress to CE no earlier than April, 2010. Chair confirmed that progressing to CD in April, 2010 would not affect the date at which it progressed to FDIS:

Mtg	Date	Status
92	19-Apr-10	CD
93	26-Jul-10	FCD
94	11-Oct-10	
95	24-Jan-11	FDIS

60.2.4. Exploration: Meta-Data

Stephan Schreiner, FhG, presented

m16965	List of standards mandating MPEG-2/4 AAC DRC	Stephan Schreiner Arne Borsum

The contribution presents a list of standards or application areas that specify use of MPEG-2/4 AAC Dynamic Range Control. The standards noted are:

- ETSI TS 101 154 V1.8.1 (2007-07):
  - Digital video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream
- ETSI TS 102 428 V1.2.1 (2009-04):
  - Digital Audio Broadcasting (DAB); DMB video service; User Application Specification
- ETSI TS 102 563 V1.1.1 (2007-02)
  - Digital Audio Broadcasting (DAB); Transport of Advanced Audio Coding (AAC) audio
- AES41
  - AES standard for digital audio – Recoding data set for bit-rate reduction

The contribution further notes the countries that have adopted the standards listed above.
Stephan Schreiner, FhG, presented

m16967	Quality Assessment of MPEG-2/4 AAC Dynamic Range Control (DRC)	Stephan Schreiner Sebastian Scharrer Jürgen Herre Wolfgang Fiesel

The contribution represents continued work based on the N10850, “Draft Report on the Performance of MPEG-2 AAC Dynamic Range Control” from the London MPEG meeting. The addition work done was to add 7 additional listeners to the test reported in N10850.
Results of extended test show that there is no difference in subjective quality between the AC3-based DRC and the AAC-based DRC at the 95% level of significance.
Kristofer Kjörling, Dolby, noted that the DRC settings used in the test are not typical of what would be used in the broadcast community, and that the report should acknowledge that the settings are “atypical” or “aggressive” and explain why such settings were chosen (i.e. so that the systems under test differentiate and the hidden reference display different subjective performance).
It was the consensus of Audio Subgroup to take the contents of the contribution as the basis of a public output document with an editing period to progress the text such that the concerns raised are addressed.

61. Meeting deliverables

61.1. Responses to Liaison and NB comments

Liaison statements generated by Audio were presented and approved.

61.2. Recommendations for final plenary

The Audio recommendations were presented and approved.

61.3. Establishment of Ad-hoc Groups

The ad-hoc groups shown in the following table were established by the Audio subgroup. Unless otherwise indicated, Ad Hoc group meetings will be held at the location of the next MPEG meeting on the weekend preceding that meeting.

No.	Title	Mtg
11045	AHG on Audio Standards Maintenance	No
11046	AHG on Unified Speech and Audio Coding and Spatial Audio Object Coding	Yes

61.4. Approval of output documents

All output documents, shown in Annex D, were presented in Audio plenary and were approved.

61.5. Press statement

There was no Audio contribution to the press statement.

61.6. Agenda for next meeting

The agenda for the next MPEG meeting is shown in Annex F.

61.7. All other business

There was none.

61.8. Closing of the meeting

The 90th Audio Subgroup meeting was adjourned Friday at 13:50

A. Participants

First Name	Last Name	Country	Affiliation
Seungkwon	Beack	KR	ETRI
Bruno	Bessette	CA	Voiceage Corporation
Ti Eu	Chan	SG	I2R
Guoming	Chen	CN	ZTE Corp.
Kihyun	Choo	KR	Samsung
Yujie	Dun	CN	XJTU
Ralf	Geiger	DE	Fraunhofer IIS
Philippe	Gournay	Canada	VoiceAge Corp. / Univ. of Sherbrooke
Bernhard	Grill	DE	Fraunhofer IIS
Chenchen	Gu	CN	Tencent
Minsoo	Hahn	KR	Korea Advanced Institute of Science and Technology
Oliver	Hellmuth	DE	Fraunhofer IIS
Jürgen	Herre	DE	Fraunhofer IIS
Jeff	Huang	USA	Qualcomm Inc.
Kyeong Ok	Kang	Korea	ETRI
Kei	Kikuiri	JP	NTT DOCOMO
Kwangki	Kim	KR	Korea Advanced Institute of Science and Technology.
Kristofer	Kjörling	SE	Dolby
Ferenc	Krämer	DE	Dolby
Hyunkook	Lee	KR	LG electronics
Taejin	Lee	KR	ETRI
Roch	Lefebvre	Canada	VoiceAge Corp. / Univ. of Sherbrooke
Te	Li	SG	I2R
Takehiro	Moriya	JP	NTT
Markus	Multrus	DE	Fraunhofer IIS
Nobuhiko	Naka	JP	NTT DOCOMO
Yasushige	Nakayama	JP	NHK
Max	Neuendorf	DE	Fraunhofer IIS
Takeshi	Norimatsu	JP	Panasonic
Eunmi	Oh	KR	Samsung
Henney	Oh	KR	LG Electronics
Pierrick	Philippe	FR	Orange Labs
Heiko	Purnhagen	SE	Dolby
Schuyler	Quackenbush	USA	ARL
Mohamad	Raad	Australia	RaadTech Consulting
Julien	Robilliard	DE	Fraunhofer IIS
Stephan	Schreiner	Germany	Fraunhofer IIS

Jeongil	Seo	KR	ETRI
Haiyan	SHU	Singapore	I2R
Jeongook	Song	KR	Yonsei University
Anisse	Taleb	CN	Huawei Technlogies
Leonid	Terentiev	DE	Fraunhofer IIS
Oliver	Wuebbolt	DE	Thomson
Wei	Xiao	CN	Huawei Technologies
Minjie	Xie	USA	Huawei
Jianxin	Yan	CN	NELAT
Dejun	Zhang	CN	Huawei
Qing	Zhang	CN	Huawei Technologies
Hai Shan	Zhong	Singapore	Panasonic Singapore Laboratories
Huan	Zhou	SG	Panasonic Singapore Laboratories

B. Audio Contributions and Schedule

Sunday		
0900-1800	**AhG on USAC**	
	General	
m16870	Thoughts on the USAC CE Process	S. Quackenbush
m16999	On progressing USAC CE	Minjie Xie Anisse Taleb Herve Taddei
m16952	Thoughts on the CE evaluation method	Hyunkook Lee Sungyong Yoon
m16996	Corrections to Reference Software and WD4 of USAC	Max Neuendorf Markus Multrus
	CEs concluded in AhG period	
m16795	Quality assessment of the Bass Filter post processing correction	Pierrick Philippe
m16825	VoiceAge Test Report for Bass-Postfilter Proposed Correction	Philippe Gournay Roch Lefebvre
m16906	Huawei Listening Test Report on eSBR Patching Methods	Zhengzhong D Wei Xiao Hervé Taddei Minjie Xie
m16831	Informative Encoder Description for the Explicit Signaling of the eSBR Patching Method	Markus Multrus Max Neuendorf Jérémie Lecomte Frederik Nagel Stefan Bayer
	Window transitions	
m16896	Report on TCX window technology	Taejin Lee Seungkwon Beack Minje Kim Kyeongok Kang
m17020	Proposal for Unification of USAC Windowing and Frame Transitions	Max Neuendorf Bruno Bessette Ralf Geiger Philippe Gournay Roch Lefebvre
	Unified Stereo Coding	
m16851	Cross check of the Unified Stereo Coding CE	Pierrick Philippe
m16884	Crosscheck listening test report for USAC on unified stereo coding	Jeff Huang
m16897	ETRI listening test result for USAC CE on Unified Stereo Coding	Taejin Lee Seungkwon Beack Minje Kim Kyeongok Kang
m16928	Listening test report for CE on USAC Unified Stereo Coding	Jeongook Song Henney Oh
m16943	Fraunhofer IIS listening test results on Unified Stereo for USAC	Julien Robilliard Matthias Neusinger Johannes Hilpert
m16986	Dolby listening test results for CE on Unified Stereo Coding in USAC	Heiko Purnhagen

m16925	Philips test results on Unified Stereo Coding CE in USAC	Jeroen Koppens Werner Oomen Erik Schuijers
m16911	Listening test results on Unified stereo for USAC	Junghoe Kim Eunmi Oh
m17068	Comments on Unified Stereo CE for USAC	Eunmi Oh
m16921	Technical description of proposed Unified Stereo Coding in USAC	Heiko Purnhagen Pontus Carlsson Leif Sehlstrom Erik Schuijers Werner Oomen
	Review of AhG Report	
1800-	**Chairs Meeting**	
Monday		
0900-1300	**MPEG Plenary**	
1300-1400	**Lunch**	
1400-1500	**Audio Plenary**	
	Welcome	
	Report on Sunday Chairs meeting	
	Review main tasks for the week SAOC Review contributions Draft Study on FCD USAC Ongoing and new CEs USAC Reference Encoder Metadata Report on AAC DRC Maintenance Profiles and 960/1024 block length MPEG-4 profileandlevelindication Normative start-up and shut-down	
	General Documents	
m16858	89th MPEG Audio Report	S. Quackenbush
m16777	Ad Hoc Group on Audio Standards Maintenance	S. Quackenbush
m16778	Ad Hoc Group on SAOC, USAC and MetaData	S. Quackenbush, Pierrick Philippe
m16826	Information on the FlexCode IST project	Stefan Bruhn Harald Pobloth Adriana Vasilache Pasi Ojala Pierrick Philippe Stephane Ragot Catherine Colomes Bastiaan Kleijn Janusz Klejsa Minyue Li Peter Vary Laurent Schmalen Thomas Schlien
1500-1800	**SAOC**	

m16992	Additional Information on SAOC Profiles	Jonas Engdegard Oliver Hellmuth Juergen Herre Johannes Hilpert Werner Oomen Heiko Purnhagen Jeongil Seo Leonid Terentiev
m16970	Status and progress overview of SAOC workplan items	Oliver Hellmuth Jürgen Herre Andreas Hölzer Werner Oomen Heiko Purnhagen Leonid Terentiev Cornelia Falch
m16971	Changes for editorial consistency of the MPEG SAOC FCD text	Jonas Engdegård Heiko Purnhagen Leonid Terentiev Cornelia Falch Andreas Hölzer Oliver Hellmuth Jeroen Koppens
m16972	Report on corrections for MPEG SAOC	Jonas Engdegård Heiko Purnhagen Leonid Terentiev Cornelia Falch Andreas Hölzer Oliver Hellmuth Jeroen Koppens
m16973	Technical provisions for low-delay multi-channel rendering	Jonas Engdegård Heiko Purnhagen Jürgen Herre Johannes Hilpert María Luis Valero Markus Schnell Oliver Hellmuth Leonid Terentiev Andreas Hölzer Jeroen Koppens
1800-	**HOD meeting**	
Tuesday		
0900-1300	**USAC**	
	Spectral lossless coding	
m16908	Huawei progress report on the CE for the spectral lossless coding	Wei Xiao Fuwei Ma Hervé Taddei Minjie Xie
m16913	Crosscheck Report on the Spectral Noiseless Coding for USAC	Kihyun Choo Eunmi Oh
m16954	Spectral Noiseless Coding CE: Crosscheck report for Fraunhofer IIS proposal	Oliver Wuebbolt
m16955	Spectral Noiseless Coding CE: Crosscheck report for Samsung proposal	Oliver Wuebbolt
m17000	Crosscheck Report for CE on Improved Noiseless Coding: Thomson Proposal	Markus Multrus
m17001	Crosscheck Report for CE on Improved Noiseless Coding: Samsung Proposal	Markus Multrus

m17002	Fraunhofer IIS Proposal for CE on Improved Spectral Noiseless Coding	Guillaume Fuchs Markus Multrus Nikolaus Rettelbach
m16953	Spectral Noiseless Coding CE: Thomson proposal	Oliver Wuebbolt
m16912	CE Report on the Spectral Noiseless Coding for USAC	Kihyun Choo Junghoe Kim Eunmi Oh
1300-1400	**Lunch**	
	Arithmetic coding of scale factors	
m16951	Report on the arithmetic coding CE for USAC	Hyunkook Lee Sungyong Yoon
m17003	Thoughts on coding of global gain	Ralf Geiger Guillaume Fuchs
	Enhanced TES	
m16940	Report on cross-check listening test for the USAC CE on eTES	Kristofer Kjörling
m16994	Crosscheck Report Regarding Enhanced Temporal Envelope Shaping in USAC	Max Neuendorf
m16942	Report on Enhanced Temporal Envelope Shaping CE for USAC	Kei Kikuiri Kosuke Tsujino Nobuhiko Naka
	Other CEs	
m16910	Improved Pulse indexing for ACELP fixed codeword	Hervé Taddei Dejun Zhang Fuwei Ma Minjie Xie
	Reference Encoder Software	
m16909	Pitch Estimator for USAC reference encoder	Zhengzhong Du Hongqiang Dang Yujie Dun Guizhong Liu Yixin Gao Minjie Xie Hervé Taddei
m16991	Proposed contribution to USAC	Pierrick Philippe
1800-	**Chairs meeting**	
Wednesday		
0900-1100	**MPEG Plenary**	
1130-1200	**SAOC**	
m16959	Comments on SAOC Profiles	Emmanuel Boui Laurent Primau Owen Lagadec PHILIPPE Pierrick
1200-1300	**Lunch**	
1300-1400	**MPEG-4 / SAOC**	
m16984	Proposal for signaling and transport of SAOC, LD-SAOC, and LD-MPS in MPEG-4 Audio	Heiko Purnhagen Frans de Bont Stefan Döhla Markus Schnell
	Continued discussion of Technical provisions for low-delay multi-channel rendering	

	SAOC	
m16976	Technical provisions for efficient operation of the SAOC codec using signals with a high inter-object correlation	Heiko Purnhagen Jonas Engdegård Andreas Hölzer Oliver Hellmuth Johannes Hilpert
m16930	Listening test result on realistic microphone signal optimization for SAOC	Henney Oh Jeongil Seo
m16975	Technical provisions for limiting perceptible distortions in SAOC	Jürgen Herre Cornelia Falch Oliver Hellmuth Leonid Terentiev Andreas Hölzer
m16919	Information on efficiency of lossless parameter coding for SAOC	Werner Oomen Heiko Purnhagen María Luis Valero Bernhard Grill
m17074	Thoughts on lossless parameter coding for SAOC	Henney Oh
m16993	Draft Outline for a Report on Performance of MPEG SAOC Technology	Jonas Engdegard Cornelia Falch Oliver Hellmuth Juergen Herre Johannes Hilpert Werner Oomen Heiko Purnhagen Leonid Terentiev
1900-	**Social** (meet at 7:30pm)	
Thursday		
0900-1000	At Systems BO 2	
m16857	MPEG-4 Audio API for MXM	S. Quackenbush
	Interactive Music m16935 and m16960 on IM AF brands	
0900-1000	**MPEG-4**	
m17004	Bugfixes to MPEG-4 SLS Reference Software	Fabian Haussel Ralf Geiger Virgilio Bacigalupo
	MPEG Surround	
M16985	Correction of time-alignment in MPEG Surround reference software and conformance	Heiko Purnhagen, Leif Sehlström, Ferenc Krämer, (Dolby) Claus-Christian Spenger (Fraunhofer IIS)
1000-1100	**Metadata**	
m16965	List of standards mandating MPEG-2/4 AAC DRC	Stephan Schreiner Arne Borsum
m16967	Quality Assessment of MPEG-2/4 AAC Dynamic Range Control (DRC)	Stephan Schreiner Sebastian Scharrer Jürgen Herre Wolfgang Fiesel
1100-1200	Breakout work / Evaluate LD-SAOC information	
1200-1300	Lunch	
1300-1800	**Unified Stereo**	

m16988	Finalization of the CE on harmonic transposer for the USAC work item	Per Ekstrand Lars Villemoes Kristofer Kjörling Frederik Nagel Sascha Disch Stephan Wilde Max Neuendorf
m16907	Progress report on the improved indexing of the AVQ-based LPC quantization for USAC LPD mode	Wei Xiao Fuwei Ma Hervé Taddei Minjie Xie
	New CEs	
m16933	Core Experiment on the eSBR module of USAC	Zhou Huan Chong Kok Seng Zhong Haishan Takeshi Norimatsu Tomokazu Ishikawa Neo Sua Hong
m16938	Core experiment on time warping coding of USAC	Zhong Haishan Chong Kok Seng Zhou Huan Takeshi Norimatsu Tomokazu Ishikawa Neo Sua Hong
m16929	Proposed improvements for low bitrate stereo in USAC	Heiko Purnhagen Pontus Carlsson Erik Schuijers Werner Oomen
1630-1700	Joint with Requirements on SAOC profile	
1800-	**Chairs meeting**	
Friday		
0900-1300	**Audio Plenary**	
	Report on Thursday Chairs meeting	
	Recommendations for final plenary	
	Establishment Ad-hoc groups and review AhG Mandates	
1000	Get document numbers	
1030	Submit AhG Mandates and Resolutions	
	Approve Responses to NB comments and Liaison	
	Approval of output documents Title: N10xxx File: w10xxx (short title).doc (NOT *.docx!) Zip: w10xxx.zip	
	Agenda for next meeting	
	Review of Audio presentation to MPEG plenary	
	A.O.B.	
	Closing of the Audio meeting	
1300-1400	**Lunch**	
1400-	**MPEG Plenary**	

C. Task Groups

1. MPEG-2 and MPEG-4 Audio, MPEG Audio Conformance, MPEG reference software, MPEG Surround
2. MPEG-D Spatial Audio Object Coding
3. MPEG-D Unified Speech and Audio Coding
4. Exploration: Meta-Data

D. Output Documents

No.	Title	TBP	Available
	14496-3 Audio		
11029	DoC on ISO/IEC 14496-3:2009/DCOR 1 Byte Alignment	No	09/10/30
11030	ISO/IEC 14496-3:2009/Cor.1 Byte Alignment	No	09/10/30
11031	DoC on ISO/IEC 14496-3:2009/PDAM 2, ALS Simple Profile and Transport of SAOC	No	09/10/30
11032	ISO/IEC 14496-3:2009/FPDAM 2, ALS Simple Profile and Transport of SAOC	No	09/10/30
	14496-5 Reference Software		
11033	ISO/IEC 14496-5:2001/AMD 10:2007/DCOR 4 SLS	No	09/10/30
	14496-26 Audio Conformance		
11034	DoC ISO/IEC 14496-26:2009/PDAM 2, BSAC Conformance for Broadcasting	No	09/10/30
11035	ISO/IEC 14496-26:2009/FPDAM 2, BSAC Conformance for Broadcasting	No	09/10/30
11036	Defect Report on the MPEG Surround conformance and reference software.	No	09/12/11
	23003-2 SAOC		
11037	Study on ISO/IEC FCD 23003-2:200x, Spatial Audio Object Coding	No	09/11/30
11038	Workplan on SAOC	No	09/10/30
11039	Report on Performance of MPEG SAOC Technology	No	09/11/30
	23003-3 Unified Speech and Audio Coding		
11040	WD5 of USAC	No	09/11/30
11041	Workplan for USAC CEs	No	09/10/30
11042	Workplan on MPEG USAC Reference Encoder	No	09/10/30

	Exploration – Audio Metadata		
11043	**Report on the Performance of MPEG-2 AAC Dynamic Range Control**	**Yes**	**09/11/30**
	Liaison Statements		
11044	**Liaison to IETF on MPEG Audio Codecs**	**No**	**09/10/30**

E. Agenda for the 91st MPEG Audio Meeting

Agenda Item

1. Opening of the meeting
2. Administrative matters
   - 2.1. Communications from the Chair
   - 2.2. Approval of agenda and allocation of contributions
   - 2.3. Review of task groups and mandates
   - 2.4. Approval of previous meeting report
   - 2.5. Review of AhG reports
   - 2.6. Joint meetings
   - 2.7. Received national body comments and liaison matters
3. Plenary issues
4. Task group activities
   - 4.1. MPEG-1, MPEG-2, MPEG-4, and MPEG Surround
   - 4.2. Spatial Audio Object Coding
   - 4.3. Unified Speech and Audio Coding
   - 4.4. Exploration: Meta-Data
5. Discussion of unallocated contributions
6. Meeting deliverables
   - 6.1. Responses to Liaison and NB comments
   - 6.2. Recommendations for final plenary
   - 6.3. Establishment of new Ad-hoc groups
   - 6.4. Approval of output documents
   - 6.5. Press statement
7. Future activities
8. Agenda for next meeting
9. A.O.B
10. Closing of the meeting

I. – 3DG report

Source: Marius Preda, Chair

Opening of the meeting
Approval of the agenda
The agenda is approved.

Goals for the week
The goals of this week are:
Review SC-3DMC contributions and issue the associated Study of FPDAM as well as the CE document
Discuss the software and conformance status for SC-3DMC
Status of software implementation for MP25 AMD1
Status of conformance for MP25 AMD1
Review contributions related to 3D graphics engines in MXM
Review contributions related to 3D graphics aspects of MPEG-V
Investigate future developments of MPEG 3D Graphics Compression
Review new representation (IndexedRegionSet)
Review RGC (reconfigurable graphics codec) contribution
Review Liaisons
Review the votes

Standards from 3DGC

4	5	2001	Amd.27	Scalable compl. 3DMC RS			09/02	09/10	10/04	3
4	16	200x	Amd.1	Scalable complexity 3D mesh coding	08/01	08/10	09/02	09/07	10/01	3
4	16	200x	Amd.2	Mesh representation with multiple attributes		09/10	10/04	10/10	11/04	3
4	25	2009	Amd.1	Codec for 3DG compression model		09/07	09/10	10/04	10/09	3
4	27	200x	Amd.2	Scalable compl. 3DMC conformance			09/02	09/10	10/04	3

Room allocation
3DGC: Dynasty VI

Allocation of contributions

• No	• Title			• Schedule	• Observation
• D1	• **Monday**			**D1**	
	• **MPEG Plenary**			09:00~11:30	
	• Lunch Break			13:00~14:00	
	• **3DG Plenary**	• Roll call, Agenda, Goals, FAQ, etc.,	Marius Preda	14:00~15:00	
		• **m16776** Report of AHG on 3DGC documents, experiments and software maintenance	Francisco Moran		
		• Results of voting	Marius Preda		
	• Coffee Break			15:00~15:30	
	Scalable Complexity 3D Mesh Coding (SC-3DMC)	**m17046** A report on the implementation of SC3DMC for the 3DGCM	Sowon Kim, Daiyong Kim, Kyoungsoo Son, Seungwook Lee, Bonki Koo, Euee S. Jang	15:30 – 17:30	
		m17061 SC3DMC Reference Software Update	Khaled MAMOU Titus Zaharia Marius Preda Françoise Prêteux		
		Player for SC3DMC	All		
	Explorations	**m16869** A Consideration of High Performance 3D Graphics Coding for New Applications	Minsu Ahn Jeong-Hwan Ahn James D.K Kim	17:30 – 18:00	
• D2	• **Tuesday**			**D2**	

• No	• Title			• Schedule	• Observation
	MPEG-V	Part 3 review Part 1 review Part 2 review Part 4 review		09:00 – 13:00	Joint with S
	• Lunch Break			13:00~ 14:00	
	• **MPEG-V**	• Wrap-up and planning for MPEG-V		14:00~ 15:00	Joint with S
	• **Explorations**	• **m16849** Implementation of IndexedRegionSet node support in MPEG-4 reference software	Sergio Arnaldo, Francisco Morán	15:30~ 15:45	
	• **MPEG-4 Part 27**	• **Status on the AFX conformance**	Francisco Morán	15:45~ 16:00	
	• **Reconfigurable Graphics Coding**	**m17047** Case study of 3DMC implementation in RVC framework •	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang	16:00~ 18:00	Joint with V
		m17048 Problem report of parser implementation in RGC	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang		
• **D 3**	• **Wednesday**			**D3**	
	• **MPEG Plenary**			09:00~ 11:00	
	• **MPEG-V**	• Haptic in BIFS		11:00~ 12:00	Joint with S
	• Lunch Break			12:00~ 14:00	

	MPEG-V	Part 3 review Part 2 review Part 4 review Software plan		14:00 – 18:00	Joint with S
• **D 4**	• **Thursday**				
	• **3DG Plenary**	Preparation for output documents related to MPEG-4 Parts 16, 25 and 27		9:30~13:00	
• **D 5**	• **Friday**			**D5**	
	• **3DG Plenary**	Review 3DG output documents, AhGs and resolutions		09:30~ 12:00	
	• Lunch Break			12:00~ 14:00	
	• **MPEG Plenary**			14:00~	

Attendance list

Name	Country	Company
Marius Preda	France	Institut TELECOM
Francisco Morán Burgos	Spain	UPM
Seung Wook Lee	Korea	ETRI
Euee S. Jang	Korea	Hanyang Univ.
Byoungjun Kim	Korea	Hanyang Univ.
D.Y. Kim	Korea	Hanyang Univ.
Jeong-Hwan Ahn	Korea	Samsung
Leon Denis	Belgium	VUB
Jerome Royan	France	OrangeLab

General issues

General discussion

Reference Software

It is recalled that the source code of both decoder AND encoder should be provided as part of the Reference Software for all technologies to be adopted in MPEG standards. Moreover, not providing the complete software for a published technology shall conduct to the removal of the corresponding technical specification from the standard.

Currently all the AFX tools published in the third edition are supported by both encoder and decoder implementation.

Web site

OrangeLabs announced interrupting the maintenance of the group web-site. A call for volunteers is now issued. In the meantime 3DGC contributors are asked to check the web-site and provide comments on the current version of the web-site.

Current Voting

J.Document title	**K.DoC**	**L.Editor of DoC**

General 3DG related activities

AhG on 3DG activities

Title	Report of AHG on 3DGC documents, experiments and software maintenance
Authors	Francisco Moran
Summary	See AhG report
Resolution	Accepted

Promotions
Web Site

Title	**Status of www.mpeg-3dgc.com**
Authors	
Summary	The web site is not more maintained by OrangeLab.
Resolution	**Action Point**: Transfer the web-site to other location and call for volunteers for maintenance.

Joint activities
MPEG-V - Information Exchange with Virtual Worlds (formally Metaverse)

Several joints meetings were carried out during the week related to MPEG-V. The 3DG interests were related to avatar characteristics, virtual object characteristics, manners to control the avatar by using real devices and manners to attach haptic properties on virtual objects. However, all the 4 parts of MPEG-V were extensively reviewed during several joint meetings between 3DG and Systems.

The extensive summary of these activities is provided in MPEG-V AhG Report (m16512) and Systems final report as well as in the Disposition of Comments Reports related to MPEG-V outputted from this meeting.

Title	**Part 3 Review**
Authors	All

Actions	The presentation of the DoC for ANB and KNB - the possibility to have n-dimensional effect. How to use the intensity in this case? - we put the intensity out of the abstract class - put a note saying that the attributes of the effect are global. - change the "position" to "location" - change the "water sprayer effect" in spraying effect - add a type called "water" and let the list open Kinesthetic effect - agreed on having a passivekinestetictype defined either by a motion type (with the possibility to represent the 6DoF) or a type including force and torque. Agreed on having a activekinesthetictype defined as a vector of forces and a vector of torques. Tactile effect - add the range of the ArrayIntensity (add the range for all the intensities) - add preferred list of actuators - add a clarification about the TactileVideo that only the images are used and not the timestamp or frequency. Motion sensory effects The MoveTowardsType was introduced. Uses only the DirectionX, DirectionY, DirectionZ and the choice between speed and acceleration. - add a new type called RigidObjectMotion - update the shake, wave and the others as extensions of baseType

Title	**Part 1 Review**
Authors	All
Actions	Add new use case for virtual objects Update the Figure 1

Title	**Part 4 Review**
Authors	All
Action	- Include the proposed VO related types - include the calibration types - include the feature points for face and body (use several resolutions for OutlineType)

Title	**Part 2 Review**
Authors	

Action	-include motion sensors and actuators - do not include UserPreferance for sensors. - include UserPreferance for actuators - SensorCapability, IndividualSensorsCapabilities are accepted - SensedInformation is accepted.

MXM

Title	No MXM related activity carried on by 3DG participants
Authors	
Summary	

Reconfigurable Graphics Coding

Title	**m17047** Case study of 3DMC implementation in RVC framework
Authors	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang
Summary	Syntax parsing process is dependent on the decoding algorithm. Proposal for separating syntax parsing process from decoding algorithm. The advantage is that FUs are independent, alterable and re-usable. Some tests results are already available, some more tests have to be done. There is an intention of making available the code to the 3DG group.
Resolution	Continue the exploration experiment with the IC. Work on analyzing and implementing the common FUs. Update the CE document to include these new goals.

Title	**m17048** Problem report of parser implementation in RGC
Authors	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang
Summary	The parser is not allowing to have several inputs but we need to feedback some data from the FUs to the parser. The proposed solution is to allow any kind of input ports on the SynP FU. It can also be used for multiple video codec.
Resolution	No resolution yet.

Explorations

Title	**m16849** Implementation of IndexedRegionSet node support in MPEG-4 reference software

Authors	Sergio Arnaldo, Francisco Morán
Summary	This contribution contains the software implementation of IRS is done in IM1, a tool that was previously presented (meetings 88 and 89)
Resolution	Open a new standardization activity as an AMD of Part 16 on efficient representation of meshes with multiple textures or attributes per vertex.

Title	**m16869** A Consideration of High Performance 3D Graphics Coding for New Applications
Authors	Minsu Ahn, Jeong-Hwan Ahn, James D.K Kim
Summary	Technologies for 3D capturing and rendering/display become mature. Also virtual worlds in 3D are more and more deployed. Computer become powerful enough to support photo-realistic rendering (several millions of triangles – 100 times more than current virtual worlds). The requirements to cover this are progressive transmission and high performance coding. Analysis of existing tools with respect to compression ration and support for progressivity is presented. Proposal of a new codec based on mesh simplification, prediction of the removed vertices from the simplified ones, segmentation of the mesh in regions, transformation of the residual error by frequency domain, entropy coding. Comparison of the proposed codec with TFAN, distortion measured by METRO. The experimental results show better compression results than existent methods.
Resolution	Start an exploration activity on Multi Resolution 3D Mesh Compression. Edit the exploration experiment description clearly indicating the mandates with respect to the benchmarking. Add a mandate in the AhG on new activity.

AFX (14496-16) related activities

Scalable Complexity 3D Mesh Compression (14496-16 Amd.4 -> become 14496-16:2009 Amd. 1)

Title	**m17046** A report on the implementation of SC3DMC for the 3DGCM
Authors	Sowon Kim, Daiyong Kim, Kyoungsoo Son, Seungwook Lee, Bonki Koo, Euee S. Jang
Summary	The paper presents the integration of the three codecs from SC3DMC (QBCR, SVA and TFAN) in the reference software of MPEG-4 Part 25. Both the encoder and decoder are implemented. The GUI was updated as well.
Resolution	Accept the software as the reference software of Part 25 AMD1. Start a new AMD for RefSoft and conformance. Appoint the editors.

Title	**m17061** SC3DMC Reference Software Update
Authors	Khaled MAMOU, Titus Zaharia, Marius Preda, Françoise Prêteux

Summary	The paper presents three contributions: (1) bug fixes for texCoordIndex encoding in QBCR and SVA and for no explicit vertex indices for TFAN (2) alignment of quatization methods between QBCR/SVA and TFAN and (3) implementation of dependency between parameters of the arithmetic encoder allowing to speed up the encoder by 97%.
Resolution	Accept the new implementation as part of the reference software.

Title	**Player for SC3DMC**
Authors	Open discussion
Summary	Currently the SC3DMC reference software consists in an encoder and decoder of the elementary streams as well as the encoder/decoder for Part 25. The discussion is about finding the acceptable solution for generating MP4 formatted files and a good solution for demonstrating the rendering for SC3DMC. MXM can be used for the latter since there is a demonstration available for rendering 3D graphics in Ogre.
Resolution	- use IM1 for obtaining MP4 formatted file - regenerate the conformance file with different encoding combination - use files that contains the maximum number of attribute types and play with the compression settings - use files with different number of vertices to cover low and high resolution content - start the integration of SC3DMC encoder/decoder in MXM and validate the integration by rendering SC3DMC content in Ogre.

Maintenance

Reference Software

All the AFX tools have associated encoder and decoder implementations available on the SVN.

Title	MPEG-4 reference software
Authors	Francisco Morán
Summary	The reference software was cleaned up, "readme.txt" documents were added.
Resolution	Accept the new version

FAMC Conformance and Reference Software

FNB reports on a problem related to FAMC reference software, namely the usage of little endian convention when writing the bitstream. This conducts to errors in parsing the FAMC bitstream when encapsulated in MP4. Resolution: issue a corrigendum on FAMC ref soft and conformance and ask the contributors to update the software and regenerate the bitstreams.

AFX Conformance

Title	MPEG-4 conformance
Authors	Francisco Morán
Summary	The text was finalized by the assigned editors and was sent to the ISO editors. They returned with a small amount of comments that are to be considered by the assigned editors.
Resolution	Nothing to do.

Dataset and benchmarking

For the new activity dealing with Multi-resolution 3D mesh coding, the www.MyMultimediaWorld.com will be used for benchmarking.

3D Graphics Compression Model (14496-25) activities

Amendment 1

Title	**Promoting AMD1**
Authors	All
Summary	The content of AMD1 of ISO/IEC 14496-25 is mature
Resolution	Promote it as PDAM1

Software and conformance

Title	**MPEG-4 Part 25 Software implementation**
Authors	Open discussion
Summary	A demonstration of SC3DMC codec integrated in ISO/IEC 14496-25 was performed showing both encoder and decoder.
Resolution	Initiate a new AMD for RefSoft and one AMD for Conformance addressing the SC3DMC integration in ISO/IEC 14496-25.

Liaison

Title	No input/output liaison issued this meeting
Authors	
Summary	
Resolution	

Output documents and Resolutions of 3DGC

Part 5 Reference Software

The 3DG subgroup recommends approval of the following documents

No.	Title	TBP	Available
	14496-5 Reference Software		
10881	DoC on ISO/IEC 14496-5:2001/PDAM 27 Reference Software for Scalable Complexity 3D Mesh Coding	No	09/10/30
10882	Text of ISO/IEC 14496-5:2001/FPDAM 27 Reference Software for Scalable Complexity 3D Mesh Coding	No	09/11/15
10883	Request for ISO/IEC 14496-5:2001 AMD 26 Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model	No	09/10/30
10884	Text of ISO/IEC 14496-5:2001/PDAM 26 Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model	No	09/11/15

The 3DG subgroup would like to thank the FNB for the comments on ISO/IEC 14496-5:2001/ PDAM27.

The 3DG subgroup recommends appointing Seung Wook Lee (ETRI) as editor of ISO/IEC 14496-5:2001/PDAM26.

Part 16 Animation Framework eXtension (AFX)

The 3DG subgroup recommends approval of the following documents

No.	Title	TBP	Available
	14496-16 Animation Framework eXtension (AFX)		
10885	Description of 3DG Core Experiments	No	09/10/30
10886	Request for ISO/IEC 14496-16:2009/AMD2 Efficient representation of 3D meshes with multiple attributes	No	09/10/30
10887	WD 1.0 of ISO/IEC 14496-16:2009 AMD2 Efficient representation of 3D meshes with multiple attributes	No	09/11/15

The 3DG subgroup recommends appointing Francisco Moran Burgos (UPM) as editor of ISO/ IEC 14496-16:2009/AMD2.

Part 25 3D Graphics Compression Model

The 3DG subgroup recommends approval of the following documents

No.	Title	TBP	Available
	14496-25 3D Graphics Compression Model		
10888	Text of ISO/IEC 14496-25:2008/PDAM 1 Scalable Complexity 3D Mesh Coding for 3DG Compression Model	No	09/10/30

Part 27 3DG Conformance

The 3DG subgroup recommends approval of the following documents

No.	Title	TBP	Available
	14496-27 3DG Conformance		

10889	**Text of ISO/IEC 14496-27:2009/FPDAM 2 Conformance for Scalable Complexity 3D Mesh Coding**	**No**	**09/11/15**
10890	**Request for ISO/IEC 14496-27:2009 AMD3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**	**No**	**09/10/30**
10891	**Text of ISO/IEC 14496-27:2009/PDAM3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model**	**No**	**09/11/15**

The 3DG subgroup recommends appointing Seung Wook Lee (ETRI) as editor of ISO/IEC 14496-27:2009/PDAM3.

Establishment of 3DG Ad-Hoc Groups

10892	**AHG on 3DG documents, software maintenance and core experiments**
Mandate:	1. Conduct the experiments on efficient representation of 3D meshes with multiple attributes 2. Conduct the experiments on Reconfigurable Graphics Coding 3. Conduct the experiments on Multi-resolution 3D Mesh Compression 4. Maintain and edit 3DG documents 5. Coordinate 3DG related conformance and reference software 6. Coordinate editing of the www.mpeg-3dgc.com web site
Chairman:	Francisco Morán Burgos
Duration:	Until 91st Meeting
Meetings	Sunday before 91st meeting
Reflector:	mpeg-3dgc AT gti. ssr. upm. es
Subscribe:	https://mx.gti.ssr.upm.es/mailman/listinfo/mpeg-3dgc

Closing of the Meeting
See you in Kyoto.