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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 90<sup>th</sup> meeting**

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## Report of 90<sup>th</sup> 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

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

##### **8.1.2. Scalable-complexity 3D mesh compression**

The following document was approved

<b>10888</b>	<b>Text of ISO/IEC 14496-25:2008/PDAM 1 Scalable Complexity 3D Mesh Coding for 3DG Compression Model</b>
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##### **8.1.3. Efficient representation of 3D meshes with multiple attributes**

The following documents were approved

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

#### **8.1.4. Open Font Format**

The following documents were approved

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

#### **8.1.5. Video Tool Library**

The following documents were approved

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

#### **8.1.6. Spatial Audio Object Coding**

The following documents were approved

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

#### **8.1.7. Unified Speech and Audio Coding**

The following documents were approved

<b>11040</b>	<b>WD5 of USAC</b>
<b>11041</b>	<b>Workplan for USAC CEs</b>
<b>11042</b>	<b>Workplan on MPEG USAC Reference Encoder</b>

#### **8.1.8. Media Context and Control – Control Information**

The following documents were approved

<b>10983</b>	<b>DoC on ISO/IEC CD 23005-2 Control Information</b>
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<b>10984</b>	<b>Text of ISO/IEC FCD 23005-2 Control Information</b>
<b>10985</b>	<b>WD for additional technologies for ISO/IEC 23005-2 Control Information</b>

#### **8.1.9. Media Context and Control – Sensory Information**

The following documents were approved

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

#### **8.1.10. Media Context and Control – Virtual World Object Characteristics**

The following documents were approved

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

#### **8.1.11. Data Formats for Interaction Devices**

The following documents were approved

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

#### **8.1.12. 3D Video Coding**

The following documents were approved

<b>11061</b>	<b>Applications and Requirements of 3D Video Coding</b>
<b>10925</b>	<b>Description of Exploration Experiments in 3D Video Coding</b>

#### **8.1.13. High-Performance Video Coding**

The following document was approved

<b>10926</b>	<b>Draft Call for Proposals on High Performance Video Coding</b>
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## **8.2. Composition coding**

### **8.2.1. BIFS ExtendedCore2D Profile**

The following documents were approved

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

### **8.2.2. Presentation and Modification of Structured Information**

The following documents were approved

<b>10953</b>	<b>DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI</b>
<b>10954</b>	<b>Text of ISO/IEC 14496-20:2008/FPDAM 3 PMSI</b>
<b>10955</b>	<b>Updated Workplan for service examples of LASER Adaptation &amp; PMSI</b>

## **8.3. Description coding**

### **8.3.1. Video Signature Descriptors**

The following documents were approved

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

### **8.3.2. Extraction and Matching of Image Signature Tools**

The following documents were approved

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

### **8.3.3. MPQF semantic enhancemen**

The following documents were approved

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

#### **8.3.4. Metadata driven post processing of audio signals**

The following document was approved

<b>11043</b>	<b>Report on the Performance of MPEG-2 AAC Dynamic Range Control</b>
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### **8.4. Systems support**

#### **8.4.1. MPEG-4 Systems 4th edition**

The following document was approved

<b>10943</b>	<b>Text of ISO/IEC 14496-1 4th Edition</b>
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#### **8.4.2. Registration Authority and Systems support**

The following document was approved

<b>10944</b>	<b>Text of ISO/IEC 14496-1:200X/FPDAM 1 Usage of LAsER in MPEG-4 systems and Registration Authority for MPEG-4 descriptors</b>
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### **8.5. Digital Item**

#### **8.5.1. Presentation of Digital Item**

The following documents were approved

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

### **8.6. Transport and File formats**

#### **8.6.1. Carriage of JPEG 2000 in MPEG-2 Systems**

The following documents were approved

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

### **8.6.2. MVC operation point descriptor**

The following documents were approved

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

### **8.6.3. AVC File Format**

The following document was approved

<b>10952</b>	<b>WD of ISO/IEC 14496-15 2nd edition</b>
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### **8.6.4. Sub-track selection & switching**

The following document was approved

<b>10951</b>	<b>WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection &amp; switching</b>
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### **8.6.5. MPEG Media Transport**

The following documents were approved

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

## **8.7. Multimedia architecture**

### **8.7.1. MXM Architecture and Technologies**

The following document was approved

<b>10972</b>	<b>Study Text of ISO/IEC FCD 23006-1 MXM Architecture and Technologies</b>
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### **8.7.2. MXM API**

The following document was approved

<b>10973</b>	<b>Study Text of ISO/IEC FCD 23006-2 MXM APIs</b>
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### 8.7.3. MXM Protocols

The following document was approved

<b>10975</b>	<b>Study Text of ISO/IEC FCD 23006-4 MXM Protocols</b>
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### 8.7.4. MPEG Rich Media UI

The following documents were approved

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

### 8.7.5. Media Context and Control - Architecture

The following documents were approved

<b>10981</b>	<b>DoC on ISO/IEC CD 23005-1 Architecture</b>
<b>10982</b>	<b>Text of ISO/IEC FCD 23005-1 Architecture</b>

### 8.7.6. Advanced IPTV Terminal

The following documents were approved

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

## 8.8. Application formats

### 8.8.1. Interactive Music Application Format

The following documents were approved



<b>10970</b>	<b>Study of ISO/IEC FCD 23000-12 Interactive Music AF</b>
<b>10971</b>	<b>Workplan for the Interactive Music AF Conformance &amp; Reference SW</b>

## **8.9. Reference implementation**

### **8.9.1. MVC Reference Software**

The following documents were approved

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

### **8.9.2. SC3DMC Reference Software**

The following documents were approved

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

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

The following documents were approved

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

### **8.9.4. Synthesized Texture Reference Software**

The following document was approved

<b>10947</b>	<b>Text of ISO/IEC 14496-5:2001/FDAM 23 Synthesized Texture Reference Software</b>
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### **8.9.5. Image Signature Tools Reference Software**

The following documents were approved

<b>10915</b>	<b>Disposition of Comments on ISO/IEC 15938-6/FPDAM 3</b>
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<b>10916</b>	<b>Text of ISO/IEC 15938-6/FDAM 3 Reference Software for Image Signature Tools</b>
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#### **8.9.6. MPQF Reference Software**

The following documents were approved

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

#### **8.9.7. Professional Archival AF Reference Software**

The following documents were approved

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

#### **8.9.8. DMB AF Reference Software**

The following document was approved

<b>10966</b>	<b>Workplan for DMB AF conformance &amp; reference software</b>
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#### **8.9.9. Stereoscopic video AF Reference Software**

The following documents were approved

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

#### **8.9.10. MXM Reference Software**

The following document was approved

<b>10974</b>	<b>Study Text of ISO/IEC FCD 23006-3 MXM Conf. &amp; Ref. SW</b>
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#### **8.9.11. MPEG Rich Media UI Reference Software**

The following document was approved

<b>10980</b>	<b>WD of ISO/IEC 23007-3 Conformance and Reference Software</b>
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#### **8.9.12. Media Context and Control – Reference Software**

The following document was approved

<b>10992</b>	<b>Workplan of Reference Software regarding ISO/IEC 23005-2 and 23005-4</b>
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### **8.10. Conformance**

#### **8.10.1. BSAC Conformance for Broadcasting**

The following documents were approved

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

#### **8.10.2. MVC Conformance**

The following documents were approved

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

#### **8.10.3. Scalable Complexity 3DMC Conformance**

The following document was approved

<b>10889</b>	<b>Text of ISO/IEC 14496-27:2009/FPDAM 2 Conformance for Scalable Complexity 3D Mesh Coding</b>
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#### **8.10.4. 3D Graphics Compression Model Conformance**

The following documents were approved

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

#### **8.10.5. Image Signature Tools Conformance**

The following documents were approved

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

#### **8.10.6. MPQF Conformance**

The following documents were approved

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

#### **8.10.7. Professional Archival AF Conformance**

The following documents were approved

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

#### **8.10.8. DMB AF Conformance**

The following document was approved

<b>10966</b>	<b>Workplan for DMB AF conformance &amp; reference software</b>
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#### **8.10.9. Stereoscopic video AF Conformance**

The following documents were approved

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

#### **8.10.10.MXM Conformance**

The following document was approved

<b>10974</b>	<b>Study Text of ISO/IEC FCD 23006-3 MXM Conf. &amp; Ref. SW</b>
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#### **8.10.11.MPEG Rich Media UI Conformance**

The following document was approved

<b>10980</b>	<b>WD of ISO/IEC 23007-3 Conformance and Reference Software</b>
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#### **8.11. Maintenance**

##### **8.11.1. Systems coding standards**

The following documents were approved

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

##### **8.11.2. Video coding standards**

The following documents were approved

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

##### **8.11.3. Audio coding standards**

The following documents were approved

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

##### **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)
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## 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 <ul style="list-style-type: none"> <li>• Audio for HVC</li> </ul>
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		4 <sup>th</sup> 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	2 <sup>nd</sup> 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

<b>10900</b>	<b>Terms of reference</b>
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### 10.2. Editors

The following document was approved

<b>10904</b>	<b>Editors of MPEG standards</b>
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### 10.3. Liaisons

#### 10.3.1. Liaisons sent

The following documents were approved

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

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

### **10.3.2. Statements of benefits**

The following documents were approved

<b>10930</b>	<b>Statement of benefits from establishing a category C liaison with the SCTE</b>
<b>11073</b>	<b>Statement of benefits from establishing a category C liaison with the VSF</b>

### **10.3.3. Lists of organisations in liaison**

The following document was approved

<b>10911</b>	<b>List of Organisations with which MPEG entertains liaisons</b>
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## **10.4. Responses to National Bodies**

The following documents were approved

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

## 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

<b>10905</b>	<b>Schema assets</b>
<b>10906</b>	<b>Software assets</b>
<b>10907</b>	<b>Conformance assets</b>
<b>10908</b>	<b>Content assets</b>
<b>10909</b>	<b>URI assets</b>

## 10.8. IPR management

The following document was approved

<b>10910</b>	<b>Standards under development for which a call for patent statements is issued</b>
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## 10.9. Work plan and time line

The following documents were approved

<b>10901</b>	<b>MPEG Standards</b>
<b>10902</b>	<b>Table of unpublished FDISs</b>
<b>10903</b>	<b>Work plan and time line</b>

## 11. Administrative matters

### 11.1. Schedule of future MPEG meetings

The following meeting schedule was approved

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

### 11.2. Promotional activities

### 11.3. Technical

The following documents were approved

<b>10994</b>	<b>Short descriptions</b>
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<b>10995</b>	<b>Overview of MPEG-V part 3</b>
<b>10996</b>	<b>Overview of MPEG-V part 4</b>
<b>10997</b>	<b>Overview of BIFS (Digital Radio Profile)</b>
<b>10998</b>	<b>Overview of Digital Item Presentation</b>
<b>10999</b>	<b>Overview of SVC File Format</b>
<b>11002</b>	<b>Overview of MVC File Format</b>
<b>11003</b>	<b>Overview of MPEG-U</b>
<b>11004</b>	<b>Overview of MXM part 1</b>
<b>11005</b>	<b>Overview of MXM part 2</b>
<b>11006</b>	<b>Overview of MXM part 3</b>
<b>11007</b>	<b>Overview of MXM part 4</b>
<b>11008</b>	<b>Overview of PA AF</b>
<b>11009</b>	<b>Overview of DMB AF</b>
<b>11010</b>	<b>Overview of VS AF</b>
<b>11011</b>	<b>Overview of Stereoscopic AF</b>
<b>11012</b>	<b>Overview of IM AF</b>
<b>11069</b>	<b>White paper on ISO Base Media File Format</b>

#### **11.4. Press release**

The following document was approved

<b>10878</b>	<b>Xi'an press release</b>
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#### **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**

<b>Name</b>	<b>Affiliation</b>	<b>Country</b>
Leonid Terentiev	Fraunhofer Institute for Integrated Circuits IIS	Germany
Joern Ostermann	Leibniz Universität Hannover	Germany
Bernhard Grill	Fraunhofer Institute for Integrated Circuits IIS	Germany
Miran Choi	ETRI	Korea
Dong-Seok Jeong	Inha University	Korea
Takuyo Kogure	Panasonic	Japan
Dale Stoltzka	Analog Devices, Inc.	USA
Jean H.A. Gelissen	Philips Research	Netherlands
Francisco Moran Burgos	Universidad Politécnica de Madrid	Spain
Ajay Luthra	Motorola Inc.	USA
Ralf Geiger	Fraunhofer IIS	Germany
Markus Multus	Fraunhofer Institut	Germany
Pablo Carballeira	Universidad Politecnica de Madrid	Spain
Pierrick Philippe	Orange Labs	France
Schuyler Quackenbush	Audio Research Labs	USA
Juergen Herre	Fraunhofer IIS	Germany
Gero Bäse	Siemens	Germany
Huan Zhou	Panasonic Singapore Laboratories	Singapore
Zhong Haishan	Panasonic Singapore Lab	Singapore
Leonardo Chiariglione	CEDEO.net	Italy
Mario Döller	University of Passau	Germany
Teruhiko Suzuki	Sony Corp.	Japan
Alexander Giladi	USNB	USA
Kazuo Sugimoto	Mitsubishi Electric Corporation	Japan
Shun-ichi Sekiguchi	Mitsubishi Electric Corporation	Japan
Tokumichi Murakami	Mitsubishi Electric Corporation	Japan
Kohtaro Asai	Mitsubishi Electric Corporation	Japan
Max Neuendorf	Fraunhofer Institut	Germany
Peisong Chen	Qualcomm Incorporated	USA
Takeshi Norimatsu	Panasonic	Japan

Menno Wildeboer	Nagoya University	Japan
Mehrdad Panahpour Tehrani	Nagoya University	Japan
Ahn Jeong Hwan	Samsung Electronics Co. Ltd	Korea
Takahiro Nishi	Panasonic	Japan
Stefan Döhla	Fraunhofer Institut	Germany
Philippe Gournay	VoiceAge Corporation	Canada
Huifang Sun	Mitsubishi Electric Research Labs	USA
Anthony Vetro	Mitsubishi Electric	USA
Oliver Wuebbolt	Thomson	Germany
Oliver Hellmuth	Fraunhofer IIS	Germany
Masayuki Tanimoto	Nagoya University	Japan
Kyoungro Yoon	Konkuk University	Korea
Christian Timmerer	Klagenfurt University	Austria
Marc Guez Vucher	IFPI	France
Satoru Sakazume	JVC KENWOOD Holdings, Inc.	Japan
Li Te	Institute for Infocomm Research, A*STAR	Singapore
Marek Domanski	Poznan University of Technology	Poland
Krzysztof Wegner	Poznan University of Technology	Poland
Roch Lefebvre	Université de Sherbrooke	Canada
XIANGLIN WANG	Qualcomm Inc	USA
Haoping Yu	Huawei Technologies (USA)	USA
Ti Eu Chan	Institute For Infocomm Research (A*STAR)	Singapore
Yongwei Zhu	Institute for Infocomm Research	Singapore
TOMOO YAMAKAGE	TOSHIBA Corporation	Japan
TAKESHI CHUJOH	Toshiba Corporation	Japan
Dong Tian	Thomson Inc.	USA
Ken McCann	ZetaCast representing Samsung	United Kingdom
Lu Yu	Zhejiang University	China
MINJIE XIE	HUAWEI TECHNOLOGIES (USA)	USA
Xiaoan Lu	Thomson	USA
Vladimir Levantovsky	Monotype Imaging Inc.	USA



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TANIZAWA AKIYUKI	TOSHIBA Corporation	Japan
Keiichi Chono	NEC	Japan
Chuo Hao Yeo	Institute for Infocomm Research	Singapore
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Kota Iwamoto	NEC Corporation	Japan
Mickael Raulet	INSA of Rennes	France
Pengjun Huang	Qualcomm Inc.	USA
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Toshiaki Fujii	Tokyo Institute of Technology	Japan
Mitsuru Maeda	Canon Inc.	Japan
Hyunkook Lee	LG Electronics	Korea
Olivier DEFORGES	INSA Rennes	France
Per Fröjdh	Ericsson	Sweden
Bruno Bessette	VoiceAge	Canada

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Gary Sullivan	Microsoft Corp.	USA
JAEWON SUNG	LG Electronics	Korea
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ATSURO ICHIGAYA	NHK	Japan
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Walt Husak	Dolby Laboratories \ SMPTE	USA
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Jungdong Seo	Yonsei University	Korea
Jae-Joon Han	Samsung Electronics	Korea
Hyunok Oh	Hanyang University	Korea
Mohamad Raad	RaadTech Consulting	Australia
Faisal Ishtiaq	Motorola	USA
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JUNG WON KANG	ETRI	Korea
Kei Kikuri	NTT DOCOMO, INC.	Japan

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Peilin YANG	Huawei Technologies Co., Ltd	China
Hyuk Lee	Hanyang University	Korea
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Touvadj	EPFL	Switzerland
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EUN Seo Lee	ETRI	Korea
James D.K.Kim	SANSUNG AIT	Korea
Sanghyun Joo	ETRI	Korea
Wang Ting	Huawei	China
Wei XIAO	Huawei	China
He Yuan Lin	National Cheng kung University	Taiwan (P.R.China)
Zhang Dejun	Huawei	China
ShigetaKa Ogawa	ICT-Ling	Japan
YI-SHIN TUNG	MStar Semiconductor	USA
Jinwoong Kim	ETRI	Korea
Shawmin Lei	Media Tek	Taiwan (P.R.China)
Tianshu Qu	Peking University	China
SRIDHAR SRINIVASAN	MICROSOFT	China
LAOLARSKI	Skype	USA

## **B.**

## **– Agenda**

### Agenda item

- 1 Opening
- 2 Roll call of participants
- 3 Approval of agenda
- 4 Allocation of contributions
- 5 Communications from Convenor
- 6 Report of previous meeting
- 7 Processing of NB Position Papers
- 8 Work plan management
  - 8.1 Media coding
    - 8.1.1 AAC family of Profile
    - 8.1.2 960 frame length in MPEG-4 AAC
    - 8.1.3 ALS simple profile
    - 8.1.4 Constrained Baseline Profile and Stereo High Profile
    - 8.1.5 AFX 3rd edition
    - 8.1.6 Multiresolution profile
    - 8.1.7 Scalable-complexity 3D mesh compression
    - 8.1.8 Open Font Format
    - 8.1.9 Media Value Chain Ontology
    - 8.1.10 Codec Configuration Representation
    - 8.1.11 Video Tool Library
    - 8.1.12 Spatial Audio Object Coding
    - 8.1.13 Unified Speech and Audio Coding
    - 8.1.14 Media Context and Control – Control Information
    - 8.1.15 Media Context and Control – Sensory Information
    - 8.1.16 Media Context and Control – Avatar Information
    - 8.1.17 3D Video Coding
    - 8.1.18 High-Performance Video Coding
  - 8.2 Composition coding
    - 8.2.1 BIFS for Interactive Digital Radio
    - 8.2.2 LAsER Adaptation
    - 8.2.3 Presentation and Modification of Structured Information
    - 8.2.4 Advanced User Interaction
  - 8.3 Description coding
    - 8.3.1 Video Signature Descriptors
    - 8.3.2 Extraction and Matching of Image Signature Tools
    - 8.3.3 Enhanced MPEG-7 Query Format
    - 8.3.4 Metadata driven post processing of audio signals
  - 8.4 Systems support
    - 8.4.1 MPEG-4 Systems 4th edition
    - 8.4.2 Registration Authority and Systems support
  - 8.5 IPMP
    - 8.5.1 Protection of Presentation Element
  - 8.6 Digital Item
    - 8.6.1 Presentation of Digital Item

- 8.7 Transport and File formats
  - 8.7.1 SAOC transport
  - 8.7.2 Carriage of MVC in MPEG-2 Systems
  - 8.7.3 Miscellaneous additions to File Format
  - 8.7.4 Sub-track selection & switching
  - 8.7.5 Handling of MPEG-4 Audio enhancement layers
  - 38.7.6 MPEG Media Transport
- 8.8 Multimedia architecture
  - 8.8.1 Mesh codec for 3DGCM
  - 8.8.2 MXM Architecture and Technologies
  - 8.8.3 MXM API
  - 8.8.4 MXM Protocols
  - 8.8.5 MPEG Rich Media UI
  - 8.8.6 Media Context and Control - Architecture
  - 8.8.7 Advanced IPTV Terminal
- 8.9 Application formats
  - 8.9.1 Media Streaming AF
  - 8.9.2 DMB AF Harmonization of MPEG-2 TS storage
  - 8.9.3 Stereoscopic Video AF composition type
  - 8.9.4 Interactive Music Application Format
- 8.10 Reference implementation
  - 8.10.1 AAC-ELD Reference Software
  - 8.10.2 MVC Reference Software
  - 8.10.3 Stereo High Profile Reference Software
  - 8.10.4 File Format Reference Software
  - 8.10.5 Geometry and Shadow Reference Software
  - 8.10.6 SC3DMC Reference Software
  - 8.10.7 Scene Partitioning Reference Software
  - 8.10.8 Synthesized Texture Reference Software
  - 8.10.9 Image Signature Tools Reference Software
  - 8.10.10 Professional Archival AF Reference Software
  - 8.10.11 DMB AF Reference Software
  - 8.10.12 Video Surveillance AF Reference Software
  - 8.10.13 Stereoscopic video AF Reference Software
  - 8.10.14 Interactive Music AF Reference Software
  - 8.10.15 Video Tool Library Reference Software
  - 8.10.16 MXM Reference Software
  - 8.10.17 MPEG Rich Media UI Reference Software
  - 8.10.18 Media Context and Control – Reference Software
- 8.11 Conformance
  - 8.11.1 MPEG-4 Video bitstreams
  - 8.11.2 MPEG-4 Audio Conformance
  - 8.11.3 AAC-ELD, OAFI and additional AAC Conformance
  - 8.11.4 BSAC Conformance for Broadcasting
  - 8.11.5 MVC Conformance
  - 8.11.6 File Format Conformance
  - 8.11.7 3DG Conformance
  - 8.11.8 Scene Partitioning Conformance

- 8.11.9 Scalable Complexity 3DMC Conformance
- 8.11.10 3D Graphics Compression Model Conformance
- 8.11.11 Image Signature Tools Conformance
- 8.11.12 Photo Player AF Conformance
- 8.11.13 Musical Slide Show AF Conformance
- 8.11.14 Professional Archival AF Conformance
- 8.11.15 DMB AF Conformance
- 8.11.16 Video Surveillance AF Conformance
- 8.11.17 Stereoscopic video AF Conformance
- 8.11.18 Interactive Music AF Conformance
- 8.11.19 Video Tool Library Conformance
- 8.11.20 MXM Conformance
- 8.11.21 MPEG Rich Media UI Conformance
- 8.11.22 Media Context and Control – Conformance
- 8.12 Maintenance
  - 8.12.1 Systems coding standards
  - 8.12.2 Video coding standards
  - 8.12.3 Audio coding standards
  - 8.12.4 3D coding standards
  - 8.12.5 Systems description coding standards
  - 8.12.6 Visual description coding standards
  - 8.12.7 Audio description coding standards
  - 8.12.8 MPEG-21 standards
  - 8.12.9 MPEG-A standards
- 8.13 Work plan and time line
- 9 Organisation of this meeting
  - 9.1 Tasks for subgroups
  - 9.2 Joint meetings
- 10 WG management
  - 10.1 Terms of reference
  - 10.2 Officers
  - 10.3 Editors
  - 10.4 Liaisons
  - 10.5 Responses to National Bodies
  - 10.6 Work item assignment
  - 10.7 Ad hoc groups
  - 10.8 Asset management
    - 10.8.1 Reference software
    - 10.8.2 Conformance
    - 10.8.3 Test material
    - 10.8.4 URI
  - 10.9 IPR management
  - 10.10 Work plan and time line
- 11 Administrative matters
  - 11.1 Schedule of future MPEG meetings
  - 11.2 Promotional activities
- 12 Resolutions of this meeting
- 13 A.O.B.

## 14 Closing

**C.**

**– Input contributions**

<b>No.</b>	<b>Source</b>	<b>Title</b>
1677 0	Webmaster	Xian document register
1677 1	Yi-Shin Tung	Ad Hoc Group on Maintenance of MPEG-4 Visual related Documents, Reference Software and Conformance
1677 2	Euee S. Jang, Marco Mattavelli, Kazuo Sugimoto	Ad Hoc Group on Reconfigurable Video Coding
1677 3	Miroslaw Bober, Paul Brasnett, Ryoma Oami	Ad Hoc Group on MPEG-7 Visual
1677 4	Karsten Müller, Anthony Vetro	Ad Hoc Group on 3D Video Coding
1677 5	Jens-Rainer Ohm, Vittorio Baroncini, T.K. Tan	Ad Hoc Group on High-Performance Video Coding
1677 6	Francisco Morán Burgos	Ad Hoc Group on 3DGC documents, software maintenance and core experiments
1677 7	S. Quackenbush	Ad Hoc Group on Audio Standards Maintenance
1677 8	S. Quackenbush, Pierrick Philippe	Ad Hoc Group on SAOC, USAC and MetaData
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1678 3	Xin Wan, Young Kwon Lim	AHG on Advanced IPTV Terminal
1678 4	Filippo Chiariglione, Christian Timmerer, Victor Rodriguez, Marius Preda	Ad Hoc Group on MXM
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1701 5	Christian Timmerer Markus Walzl (on behalf of Austrian NB)	Austrian NB comments on ISO/IEC CD 23005-3
1701 6	Christian Timmerer Sang Kyun Kim Jeha Ryu Yeongmi Kim	Editor's Input on ISO/IEC CD 23005-3
1701 7	Christian Timmerer Lars-Erik Eriksson (on behalf of P2P-Next)	Comments on Advanced IPTV Terminal (AIT) Terminology
1701 8	Christian Timmerer (on behalf of P2P-Next)	Comments on Advanced IPTV Terminal (AIT) Requirements and candidate technologies

1701 9	Robert Cohen Sven Klomp Anthony Vetro Huifang Sun	Performance of Directional Transforms for Video Coding
1702 0	Max Neuendorf Bruno Bessette Ralf Geiger Philippe Gournay Roch Lefebvre	Proposal for Unification of USAC Windowing and Frame Transitions
1702 1	Anthony Vetro Dong Tian Ying Chen	Requirements on 3D Video Format
1702 2	Anthony Vetro Sehoon Yea Ying Chen Shinya Shimizu Purvin Pandit ChongSoon Lim	Status of MVC Reference Software and Conformance
1702 3	Xin Wang	Some Comments on the AIT Requirements and Terminology
1702 4	Jaewon Sung Byeong-Moon Jeon	EE Results on BookArrival Test Sequence
1702 5	Ying Chen Peisong Chen Marta Karczewicz	Comments on the carriage of MVC over MPEG-2 Systems
1702 6	Byeong-Moon Jeon	Depth boundary filtering for DIBR
1702 7	Miran Choi YeoChan Yoon Myung-Gil Jang	Basic Interpreter Module to MPEG QF Reference Software
1702 8	Seok Lee Jaejoon Lee Du-Sik Park	3DV EE1 & EE4 Results on Newspaper sequence
1702 9	TK Tan Y. Suzuki F. Bossen	Comments on Draft Call for Proposals on High-Performance Video Coding (HVC)
1703 0	Wen Gao Tiejun Huang	CNNB Contribution: Comments on HVC
1703 1	Woo-Jin Han JeongHoon Park Ken McCann	AVC Anchor Streams of Class-A for Call for Proposals on High-Performance Video Coding (HVC)

1703 2	Next Generation Broadcasting Forum (Korea)	Proposed Text of ISO/IEC 23000-11/FPDAM1 Stereoscopic Video AF Conformance and Reference Software
1703 3	Wang He Zhang Yang Cheng Mingming Yan Tao An Ping Wang Guozhong Zhang Zhaoyang	A flexible virtual baseline calculation method of arc eight-sensors array
1703 4	ISO/TC 46/SC 9 via SC 29 Secretariat	ISO/DIS 26324
1703 5	Ming LI Yilin CHANG Sixin LIN	Rate-Distortion Criterion Based Picture Padding for Arbitrary Resolution Video Coding
1703 6	Shun-ichi Sekiguchi Kazuo Sugimoto Kohtaro Asai Tokumichi Murakami	Additional performance evaluation on CfE technology
1703 7	Kazuo Sugimoto Shun-ichi Sekiguchi Kohtaro Asai Tokumichi Murakami	Comments on draft Call for Proposals on HVC
1703 8	Jae-Joon Han Seungju Han Hyunjeong Lee Wonchul Bang Jeonghwan Ahn James D. Kim	Proposal on Avatar information for Motion control
1703 9	Hyunjeong Lee Jae-Joon Han SeungJu Han Joonah Park	Proposal on Virtual object information
1704 0	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal	3D Video Coding EE4 Results for Beergarden MVD2
1704 1	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal	3D Video Coding EE4 Results for Newspaper MVD3

1704 2	Kenneth Vermeirsch on behalf of Belgian NB	Belgian NB Comment on Working Draft 1.0 of ISO/ IEC 13818-1:2007/Amd.5
1704 3	Wang He Zhang Yang Cheng Mingming Yan Tao An Ping Wang Guozhong Zhang Zhaoyang	A flexible virtual baseline calculation method of arc eight-sensors array
1704 4	Jiancong Luo Wanrong Lin Dong Tian	Text improvements for MVC
1704 5	Justin Ridge Arild Fuldseth	On anchors for HVC
1704 6	Sowon Kim Daiyong Kim Kyoungsoo Son Seungwook Lee Bonki Koo Euee S. Jang	A report on the implementation of SC3DMC for the 3DGCM
1704 7	Seungwook Lee Bonki Koo Ming-Xiao Chen Daiyong Kim Euee S. Jang	Case study of 3DMC implementation in RVC framework
1704 8	Seungwook Lee Bonki Koo Hyungyu Kim Ming-Xiao Chen Euee S. Jang	Problem report of parser implementation in RGC
1704 9	Olgierd Stankiewicz Krzysztof Wegner Menno Wildeboer	A soft ?segmentation matching in Depth Estimation Reference Software (DERS) 5.0
1705 0	Marek Doma?ski Tomasz Grajek Krzysztof Klimaszewski Maciej Kurc Olgierd Stankiewicz Jakub Stankowski Krzysztof Wegner	Poznan Multiview Video Test Sequences and Camera Parameters
1705 1	Olgierd Stankiewicz Krzysztof Wegner Krzysztof Klimaszewski	Newspaper sequence - Results of 3DV/FTV Exploration Experiments with depths and view synthesis

1705 2	Ken McCann	Liaison statement on MPEG Systems
1705 3	Weon-Geun Oh Sang-Il Na Daeil Yoon Seungwu Han Hae-Kwang Kim Kyoung-Ho Choi	Vide Test DB contribution for MPEG-7 Video Signature Standardization
1705 4	Weon-Genu Oh Sang-Il Na Daeil Yoon Seungwu Han Hae-Kwang Kim	Extended test results for Video Signature XM
1705 5	Cyril Concolato Jean Le Feuvre Jean-Claude Dufourd	Ideas on MPEG-U Reference Software
1705 6	Seo-Young Hwang	composition types of 23000-11
1705 7	Weon-Geun Oh Ju-Kyong Jin Ju-Hee Cho Dong-Seok Jeong	A new result of XM software performance
1705 8	Gwo Giun (Chris) Lee He-Yuan Lin Jia-Wei Liang Min-Shan Wu	Conformance testing for deblocking filter, fractional luma and chroma sample interpolation of AVC
1705 9	Hao Chen Ruimin Hu Zhongyuan Wang Dan Mao Jinhui Hu	Inter Prediction Based on Backward Motion Estimation
1706 0	Hyungyu Kim Hwa Seon Shin Yong-Hwan Kim Byeongho Choi Euee S. Jang	On the media identification in the MXM media framework engine
1706 1	Khaled MAMOU Titus Zaharia Marius Preda Françoise Prêteux	SC3DMC Reference Software Update

1706 2	Weizhong Chen Leonardo Chiariglione Riccardo Chiariglione Tiejun Huang Sergio Matone Andrea Pignatiello Martin Springer	Open Media Marketplace basics
1706 3	Weizhong Chen Leonardo Chiariglione Jinwoo Hong Tiejun Huang Stefano Quintarelli Martin Springer Christian Timmerer	Use case based testing of OMM Basic Services
1706 4	JeongHoon Park Woo-Jin Han Jason Suh Ken McCann	Samsung Comments on HVC Development
1706 5	Woo-Jin Han JeongHoon Park Ken McCann	Hierarchical P results for CfP and comments about type-2 scenario
1706 6	Mohamad Raad	Comment on ISO/IEC 21000-2 PDAM
1706 7	Miran Choi	Late KNB ballot comment on ISO/IEC 15938-12 PDAM
1706 8	Eunmi Oh	Comments on Unified Stereo
1706 9	Gary J. Sullivan Jens-Rainer Ohm Thomas Wiegand Ajay Luthra	Meeting Report of the 31st JVT Meeting (28 June - 2 July 2009, London, UK)
1707 0	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC FDIS 23000-11
1707 1	ITTF via SC 29 Secretariat	Table of Replies on ISO/IEC 14496-12:2008/FDAM 1
1707 2	KNB	Late KNB ballot comment on Text of ISO/IEC CD 23005-3 Sensory Information
1707 3	KNB	Late KNB ballot comment on Text of ISO/IEC CD 23005-2 Control Information
1707 4	Henney Oh	Thoughts on lossless parameter coding for SAOC

1707 5	Jean Le Feuvre	Late FNB Comment on ISO/IEC 14496-11
1707 6	Karsten Grüneberg Thomas Schierl	One-Pager on SVC File Format
1707 7	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"
1707 8	Jaejoon Han	Late KNB ballot comment on Text of ISO/IEC CD 23005-2 Control Information
1707 9	Jaejoon Han	Late KNB ballot comment on Text of ISO/IEC CD 23005-4 Avatar Information
1708 0	Teruhiko Suzuki	JNB comments on Class A testing in HVC CfP



**D.**

**– Output documents**

No.	Source	Title
1087 3	Convener	List of Documents from the 90th Meeting in Xian, China
1087 4	Convener	Resolutions of the 90th Meeting in Xian, China
1087 5	Convener	List of AHGs Established at the 90th Meeting in Xian, China
1087 6	Convener	Report of the 90th Meeting in Xian, China
1087 7	Convener	Guidelines for Electronic Distribution of MPEG M and N Documents
1087 8	Convener	Press Release of the 90th Meeting in Xian, China
1087 9	Convener	Meeting Notice of the 91st Meeting in Kyoto, Japan
1088 0	Convener	Guide for WG 11 Meeting Hosts
1088 1	3DGC	DoC on ISO/IEC 14496-5:2001/PDAM 27 Scalable Complexity 3D Mesh Coding reference Software
1088 2	3DGC	Text of ISO/IEC 14496-5:2001/FPDAM 27 Scalable Complexity 3D Mesh Coding reference Software
1088 3	3DGC	Request for ISO/IEC 14496-5:2001 AMD 26 (Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model)
1088 4	3DGC	Text of ISO/IEC 14496-5:2001/PDAM 26 (Reference Software for Scalable Complexity 3D Mesh Coding in 3DG Compression Model)
1088 5	3DGC	Description of 3DG CE
1088 6	3DGC	Request for ISO/IEC 14496-16:2009/AMD2 Efficient representation of 3D meshes with multiple attributes
1088 7	3DGC	WD 1.0 of ISO/IEC 14496-16:2009 AMD2 Efficient representation of 3D meshes with multiple attributes
1088 8	3DGC	Text of ISO/IEC 14496-25:2008/PDAM 1 Scalable Complexity 3D Mesh Coding for 3DG Compression Model
1088 9	3DGC	ISO/IEC 14496-27:200x/FPDAM 2 Conformance for Scalable Complexity 3D Mesh Coding Conformance
1089 0	3DGC	Request for ISO/IEC 14496-27:2009 AMD3 Conformance for Scalable Complexity 3D Mesh Coding Conformance

1089 1	3DGC	Text of ISO/IEC 14496-27:2009/PDAM3 Conformance for Scalable Complexity 3D Mesh Coding in 3DG Compression Model
1089 2	Convener	AHG on 3DGC documents, software maintenance and core experiments
1089 3	Video	Text of ISO/IEC 14496-2:2004/DCOR 4
1089 4	Video	Disposition of Comments on ISO/IEC 14496-4 :2004/FPDAM 38
1089 5	Video	Text of ISO/IEC 14496-4 :2004/FDAM 38 MVC Conformance
1089 6	Video	Disposition of Comments on ISO/IEC 14496-5 :2001/FPDAM 15
1089 7	Video	Text of ISO/IEC 14496-5 :2001/FDAM 15 MVC Reference Software
1089 8	Video	Study of ISO/IEC 14496-10:2009/DCOR 1
1089 9	Video	Disposition of Comments on ISO/IEC 15938-3/PDAM 4
1090 0	Convener	Terms of Reference
1090 1	Convener	MPEG Standards
1090 2	Convener	Unpublished standards at FDIS level
1090 3	Convener	MPEG work plan and time line
1090 4	Convener	MPEG Standard Editors
1090 5	Convener	Schema assets updates
1090 6	Convener	Software assets
1090 7	Convener	Conformance assets
1090 8	Convener	Content assets
1090 9	Convener	MPEG URIs and MIME Types

1091 0	Convener	Standards under development for which a call for patent statements is issued
1091 1	Convener	List of Organisations with which MPEG entertains liaisons
1091 2	Video	Text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools
1091 3	Video	MPEG-7 Visual XM 37
1091 4	Video	Description of Core Experiments in Video Signature Description development
1091 5	Video	Disposition of Comments on ISO/IEC 15938-6/FPDAM 3
1091 6	Video	Text of ISO/IEC 15938-6/FDAM 3 Reference Software for Image Signature Tools
1091 7	Video	Disposition of Comments on ISO/IEC 15938-7/FPDAM 5
1091 8	Video	Text of ISO/IEC 15938-7/FDAM 5 Conformance Testing for Image Signature Tools
1091 9	Video	Disposition of Comments on ISO/IEC TR 15938-8/DAM 5
1092 0	Video	Text of ISO/IEC TR 15938-8/Amd.5 Extraction and matching of image signature tools
1092 1	Video	Study of ISO/IEC 23002-4/FPDAM 1 Video Tool Library Conformance and Reference Software
1092 2	Video	WD 6 of ISO/IEC 23002-4/Amd.2 (Tools for AVC HP)
1092 3	Video	Description of Core Experiments in RVC
1092 4	Video	RVC Work Plan
1092 5	Video	Description of Exploration Experiments in 3D Video Coding
1092 6	Video	Draft Call for Proposals on High Performance Video Coding
1092 7	Convener	Liaison statement to ITU-T SG16 Q6 on HVC Collaboration
1092 8	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

1094 8	Systems	DoC on ISO/IEC 14496-11:2005/FPDAM 7 ExtendedCore2D Profile
1094 9	Systems	Text of ISO/IEC 14496-11:2005/FPDAM 7 ExtendedCore2D Profile
1095 0	Systems	Items under Consideration for further improvements of BIFS
1095 1	Systems	WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection & switching
1095 2	Systems	WD of ISO/IEC 14496-15 2nd edition
1095 3	Systems	DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI
1095 4	Systems	Text of ISO/IEC 14496-20:2008/FDAM 3 PMSI
1095 5	Systems	Updated Workplan for service examples of LAsER Adaptation & PMSI
1095 6	Systems	Text of ISO/IEC 14496-22:2009/FPDAM 1 Support for many-to-one range mappings
1095 7	Systems	Summary and description of Composite Font Format
1095 8	Systems	Draft request for the Fonts as top level MIME type
1095 9	Systems	Text of ISO/IEC 15938-12:2008/COR 2 MPQF (missing semantics)
1096 0	Systems	DoC on ISO/IEC 15938-12:2008/PDAM 1 MPQF Conf. and Ref. SW
1096 1	Systems	Text of ISO/IEC 15938-12:2008/FPDAM 1 MPQF Conf. and Ref. SW
1096 2	Systems	Request for ISO/IEC15938-12:2008 AMD 2 MPQF semantic enhancement
1096 3	Systems	Text of ISO/IEC15938-12:2008 PDAM 2 MPQF semantic enhancement
1096 4	Systems	DoC on ISO/IEC 23000-6:2009/FPDAM 1 Conformance and Reference Software for Professional Archival AF
1096 5	Systems	Text of ISO/IEC 23000-6:2009/FDAM 1 Conformance and Reference Software for Professional Archival AF
1096 6	Systems	Workplan for DMB AF conformance & reference software

1096 7	Systems	DoC on ISO/IEC 23000-11/PDAM 1 Stereoscopic Video AF Ref. Soft and Conf.
1096 8	Systems	Text of ISO/IEC 23000-11/FPDAM 1 Stereoscopic Video AF Ref. Soft and Conf.
1096 9	Systems	Updated workplan for Stereoscopic Video AF Ref. Soft. and Conf.
1097 0	Systems	Study of ISO/IEC FCD 23000-12 Interactive Music AF
1097 1	Systems	Workplan for the Interactive Music AF Conformance & Reference Software
1097 2	Systems	Study Text ISO/IEC FCD 23006-1 MXM Architecture and Technologies
1097 3	Systems	Study Text of ISO/IEC FCD 23006-2 MXM APIs
1097 4	Systems	Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW
1097 5	Systems	Study Text of ISO/IEC FCD 23006-4 MXM Protocols
1097 6	Systems	DoC on ISO/IEC CD 23007-1 Widgets
1097 7	Systems	Text of ISO/IEC FCD 23007-1 Widgets
1097 8	Systems	White paper on MPEG Rich Media Widgets
1097 9	Systems	Ideas on Advanced User Interaction Interface in MPEG-U
1098 0	Systems	WD of ISO/IEC 23007-3 Conformance and Reference Software
1098 1	Systems	DoC on ISO/IEC CD 23005-1 Architecture
1098 2	Systems	Text of ISO/IEC FCD 23005-1 Architecture
1098 3	Systems	DoC on ISO/IEC CD 23005-2 Control Information
1098 4	Systems	Text of ISO/IEC FCD 23005-2 Control Information
1098 5	Systems	WD for additional technologies for ISO/IEC 23005-2 Control Information

1098 6	Systems	DoC on ISO/IEC CD 23005-3 Sensory Information
1098 7	Systems	Text of ISO/IEC FCD 23005-3 Sensory Information
1098 8	Systems	DoC on ISO/IEC CD 23005-4 Virtual World Object Characteristics
1098 9	Systems	Text of ISO/IEC FCD 23005-4 Virtual World Object Characteristics
1099 0	Systems	Request for subdivision of ISO/IEC FCD 23005-5 Data Formats for Interaction Device
1099 1	Systems	Text of ISO/IEC FCD 23005-5 Data Formats for Interaction Device
1099 2	Systems	Workplan of Reference Software regarding ISO/IEC 23005-2
1099 3	Systems	Guide to the MPEG Subversion Repository
1099 4	Systems	Short descriptions
1099 5	Systems	Overview of MPEG-V part 3
1099 6	Systems	Overview of MPEG-V part 4
1099 7	Systems	Overview of BIFS (Digital Radio Profile)
1099 8	Systems	Overview of Digital Item Presentation
1099 9	Systems	Overview of SVC File Format
1100 2	Systems	Overview of MVC File Format
1100 3	Systems	Overview of MPEG-U
1100 4	Systems	Overview of MXM part 1
1100 5	Systems	Overview of MXM part 2
1100 6	Systems	Overview of MXM part 3



1100 7	Systems	Overview of MXM part 4
1100 8	Systems	Overview of PA AF
1100 9	Systems	Overview of DMB AF
1101 0	Systems	Overview of VS AF
1101 1	Systems	Overview of Stereoscopic AF
1101 2	Systems	Overview of IM AF
1101 3	Systems	DoC on ISO/IEC 21000-2:2005/PDAM 1 Presentation of digital item
1101 4	Convener	Liaison statement to SC 29/WG 1 on ColorInformationBox
1101 5	Convener	Liaison statement to SC 29/WG 1 on JPEG2000 over MPEG-2 TS
1101 6	Convener	Liaison statement to SCTE on signaling of MVC operation points
1101 7	Convener	Liaison statement to SC 34/WG 2 on Open Font Format Reference Software
1101 8	Convener	Liaison statement to SC 27/WG 4 on WD 27037 - Digital Evidence
1101 9	Convener	Liaison statement to ISO/TC 223/AH 3 on WD 22311 - Videosurveillance Format
1102 0	Systems	Possible alternative solutions to support presentation in digital item
1102 1	Convener	Liaison statement to SGDCMP
1102 2	Convener	Liaison statement to IEC TC 100 on DLNA link protection
1102 3	Convener	Liaison statement to ISO/TC 46/SC 9 on Digital Object Identifier
1102 4	Convener	Liaison statement to DVB TM AVC on signalling of AVC video with 3D
1102 5	Convener	Liaison statement template on AIT

1102 6	Convener	Liaison statement template on MMT
1102 7	Convener	Liaison statement to ISO TC 20 and SC 13 on PA- AF
1102 8	Convener	Liaison statement to IEC TC 100 and ITU-T SG 16 on REL profile
1102 9	Audio	DoC on ISO/IEC 14496-3:2009/DCOR 1 Byte Alignment
1103 0	Audio	ISO/IEC 14496-3:2009/Cor.1 Byte Alignment
1103 1	Audio	DoC on ISO/IEC 14496-3:2009/PDAM 2, ALS Simple Profile and Transport of SAOC
1103 2	Audio	ISO/IEC 14496-3:2009/FPDAM 2, ALS Simple Profile and Transport of SAOC
1103 3	Audio	ISO/IEC 14496-5:2001/AMD 10:2007/DCOR 4 SLS
1103 4	Audio	DoC ISO/IEC 14496-26:2009/PDAM 2, BSAC Conformance for Broadcasting
1103 5	Audio	ISO/IEC 14496-26:2009/FPDAM 2, BSAC Conformance for Broadcasting
1103 6	Audio	Defect Report on the MPEG Surround conformance and reference software.
1103 7	Audio	Study on ISO/IEC FCD 23003-2:200x, Spatial Audio Object Coding
1103 8	Audio	Workplan on SAOC
1103 9	Audio	Report on Performance of MPEG SAOC Technology
1104 0	Audio	WD5 of USAC
1104 1	Audio	Workplan for USAC CEs
1104 2	Audio	Workplan on MPEG USAC Reference Encoder
1104 3	Audio	Report on the Performance of MPEG-2 AAC Dynamic Range Control
1104 4	Convener	Liaison to IETF on MPEG Audio Codecs

1104 5	Convener	AHG on Audio Standards Maintenance
1104 6	Convener	AHG on SAOC, USAC and MetaData
1104 7	Convener	Responses to National Bodies on video issues
1104 8	Convener	AHG on Scene Representation
1104 9	Convener	AHG on MPEG File Formats
1105 0	Convener	AHG on Application Format
1105 1	Convener	AHG on Font Format Representation
1105 2	Convener	AHG on Advanced IPTV Terminal
1105 3	Convener	AHG on MXM
1105 4	Convener	AHG on MPEG-V
1105 5	Requirements	Rich Media UI Framework Requirements
1105 6	Requirements	Draft Use Cases and Requirements for MMT (Modern Media Transport)
1105 7	Requirements	Draft Call for Proposals on MMT
1105 8	Requirements	Modern Media Transport (MMT) Context and Objectives
1105 9	Convener	Adhoc on MPEG Modern Transport (MMT)
1106 0	Requirements	Workshop on MMT (MPEG Modern Transport) - Call for Contributions
1106 1	Requirements	Applications and Requirements for 3D Video Coding
1106 2	Convener	Draft Use Cases for MMT
1106 3	Requirements	Advanced IPTV Terminal (AIT): Requirements and candidate technologies

1106 4	Requirements	Draft Call for Proposals on Advanced IPTV Terminal (AIT)
1106 5	Requirements	Responses to CNNB position statement on more friendly IPR policy
1106 6	Requirements	Call for Comments on Possible Future activities on 'Royalty-free' Standardization by MPEG
1106 7	Requirements	Summary of Issues and question from the 90th MPEG Meeting In connection with CNNB input document (M16903)
1106 8	Convener	AHG on MPEG Media Transport (MMT)
1106 9	Systems	White paper on ISO Base Media File Format
1107 0	Requirements	Context and Objectives for Advanced IPTV Terminal (AIT)
1107 1	Requirements	Ideas on protocols supporting AIT services
1107 2	Requirements	Use case based testing of AIT basic services
1107 3	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**

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

### **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

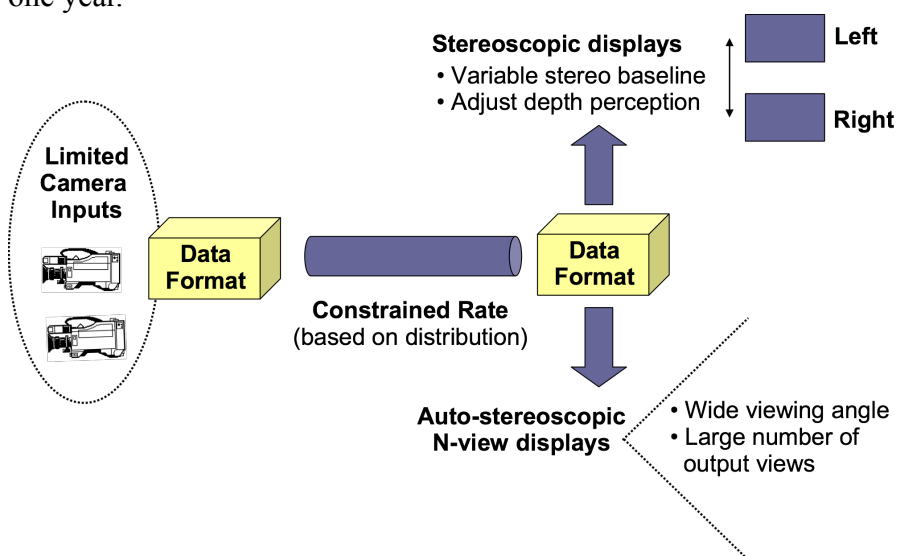
From a requirements perspective, the current MPEG Font Formats activity is not well defined. The active people did not attend a scheduled requirements meeting in order to explain requirements, work plan or time table.

## 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)

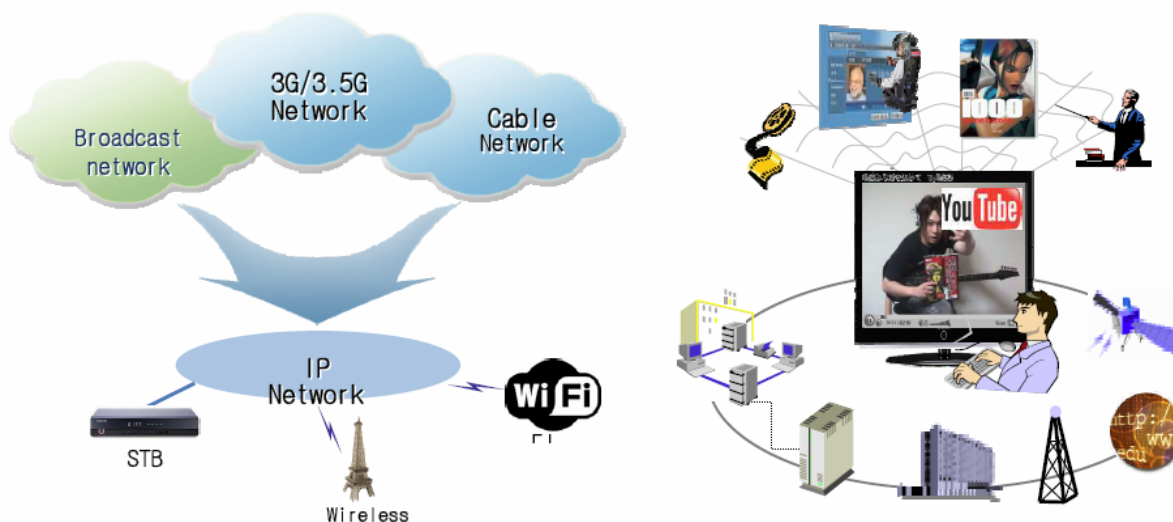
More than 15 input documents on AIT were received showing strong support for this activity. MPEG updated its time table for the standardization of AIT. A Draft Call for Proposals is now envisioned for April 2010. This will have no major impact on the time line for finalizing the standard. N11064 *Draft 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 planned 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,

<b>1.</b>	<b>List of Output Documents</b>
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No.	Title	TBP	Available
	<i>13818-1 MPEG-2 Systems</i>		
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
	<i>14496-1 MPEG-4 Systems</i>		
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
	<i>14496-5 Reference software</i>		
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
	<i>14496-11 Scene description and application engine</i>		
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
	<i>14496-12 ISO File Format</i>		
10951	WD of ISO/IEC 14496-12:2008/AMD 2 Sub-track selection & switching	No	09/11/20
	<i>14496-15 AVC File Format</i>		
10952	WD of ISO/IEC 14496-15 2nd edition	No	09/10/30
	<i>14496-20 LAsER&amp; SAF</i>		
10953	DoC on ISO/IEC 14496-20:2008/FPDAM 3 PMSI	No	09/10/30
10954	Text of ISO/IEC 14496-20:2008/FPDAM 3 PMSI	No	09/10/30
10955	Updated Workplan for service example of LAsER Adaptation & PMSI	No	09/10/30
	<i>14496-22 Open Font Format</i>		
10956	Text of ISO/IEC 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
	<i>15938-12 MPEG Query Format</i>		
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 enhancement	No	09/10/30
10963	Text of ISO/IEC15938-12:2008 PDAM 2 MPQF semantic enhancement	No	09/10/30
	<i>21000-2 Digital Item Declaration</i>		
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
	<i>23000-6 Professional Archival MAF</i>		

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
	<i>23000-9 Digital Multimedia Broadcasting Application Format</i>		
10966	Workplan for DMB AF conformance & reference software	No	09/10/30
	<i>23000-11 Stereoscopic Video Application Format</i>		
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
	<i>23000-12 Interactive Music AF</i>		
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
	<i>23006-1 – MXM Architecture and Technologies</i>		
10972	Study Text ISO/IEC FCD 23006-1 MxM Architecture and Technologies	Yes	09/11/27
	<i>23006-2 – MXM APIs</i>		
10973	Study Text of ISO/IEC FCD 23006-2 MXM APIs	Yes	09/11/27
	<i>23006-3 – MXM Conf. &amp; Ref. SW</i>		
10974	Study Text of ISO/IEC FCD 23006-3 MXM Conf. & Ref. SW	Yes	09/11/27
	<i>23006-4 – MPEG eXtensible Middleware Protocols</i>		
10975	Study Text of ISO/IEC FCD 23006-4 MXM Protocols	Yes	09/11/27
	<i>23007-1– MPEG-U Widgets</i>		
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
	<i>23007-2–Advanced User Interaction Interface</i>		
10979	Ideas on Advanced User Interaction Interface in MPEG-U	No	09/12/11
	<i>23007-3– MPEG-U Conformance and Reference Software</i>		

10980	WD of ISO/IEC 23007-3 Conformance and Reference Software	No	09/10/30
	<i>23005-1 Media context and control - Architecture</i>		
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
	<i>23005-2 Media context and control – Control Information</i>		
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
	<i>23005-3 Media context and control – Sensory Information</i>		
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
	<i>23005-4 Media context and control – Virtual World Object Characteristics</i>		
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
	<i>23005-5 Data Formats for Interaction Devices</i>		
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
	<i>23005-6 Media context and control – Reference Software</i>		
10992	Workplan of Reference Software regarding ISO/IEC 23005-2	No	09/10/30
	<i>Assets and Standing Documents</i>		
10905	Schema assets updates	No	09/10/30
10909	MPEG URIs and MIME Types	No	09/10/30
	<i>SVN support</i>		
10993	Guide to the MPEG Subversion Repository	No	09/10/30
	<i>Liaison</i>		
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
	<i>Promotion</i>		
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

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

## 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
<b>MPEG-2</b>	<b>m16809</b>	Summary of Voting on ISO/IEC 13818-1:2007/DCOR 3	SC 29 Secretariat	
<b>MPEG-2</b>	<b>m16853</b>	USNB Contribution: Carriage of MVC over MPEG-2 Systems	Andy Tescher	
<b>MPEG-2</b>	<b>m17025</b>	Comments on the carriage of MVC over MPEG-2 Systems	Ying Chen Peisong Chen Marta Karczewicz	
<b>MPEG-2</b>	<b>m17042</b>	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

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**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

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

<b>21. MPEG-4 System (14496-1)</b>
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#### 21.1. Topics

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**21.1.1. ISO/IEC 14496-1:200X 4<sup>th</sup> edition**

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

#### 21.2. Contributions

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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

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**m16823** Passed the ballot without comments

**m16964** Accepted as a base text for the output document

### 21.4. Action Points

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<b>22.</b>	<b>MPEG-4 Conformance (14496-4)</b>
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**22.1. Topics**

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**22.2. Contributions**

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None

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**22.3. Summary of discussions**

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**22.4. Action Points**

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

<b>23.</b>	<b>MPEG-4 Reference Software (14496-5)</b>
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**23.1. Topics**

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**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**

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**23.2. Contributions**

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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	

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**23.3. Summary of discussions**

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**m16729** Passed the ballot without comments

**m16814** Passed the ballot without comments

## 23.4. Action Points

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### 24. MPEG-4 BIFS (14496-11)

#### 24.1. Topics

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##### 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

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Session	Number	Title	Source	Disposition
Scene	m1681 1	Summary of Voting on ISO/IEC 14496-11:2005/PDAM 7	SC 29 Secretariat	
Scene	m1696 3	Input on ISO/IEC 14496-11 PDAM7	Jean Le Feuvre	
Scene	m1688 2	BiFS vs. LAsER remote display solutions for mobile thin clients	Bojan JOVESKI Mihai MITREA Françoise PRETEUX Iain-James MARSHALL Pieter SIMOENS Bart DHOEDT	
Scene	m1688 3	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

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##### 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 create 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**

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<b>25. MPEG-4 ISO Base File Format (14496-12)</b>
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#### **25.1. Topics**

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##### **25.1.1. Exploration**

1. Subtrack selection and switching
2. Adaptive progressive download

## 25.2. Contributions

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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

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**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

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

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

### 26.1. Topics

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

### 26.2. Contributions

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

### 26.3. Summary of discussions

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**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

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

<b>27. MPEG-4 AVC File Format (14496-15)</b>
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#### 27.1. Topics

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27.1.1.

#### 27.2. Contributions

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

### 27.3. Summary of discussions

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**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

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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	m1687 6	Proposed text for WD of 14496-20 LAsER AMD2 Reference SW	Seo-Young Hwang	
Scene	m1680 3	Summary of Voting on ISO/IEC 14496-20:2008/FPDAM 3	SC 29 Secretariat	
Scene	m1693 1	Proposed text of ISO/IEC 14496-20:2008 FDAM3 (PMSI)	Jihun Cha Injae Lee Young-Kwon Lim	
Scene	m1687 8	Updated service example and workplan of LAsER Adaptation & PMSI	Seo-Young Hwang	
Scene	m1693 2	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**

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## **29. Open Font Format (14496-22)**

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### **29.1. Topics**

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

### **29.2. Contributions**

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

### **29.3. Summary of discussions**

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**m16793** Passed the ballot without comments

### **29.4. Action Points**

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1.

## **30. MPEG Query Format (15938-12)**

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### **30.1. Topics**

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#### **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 ISO/IEC 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	

<b>MPEG-21</b>	<b>m17066</b>	Comment on ISO/IEC 21000-2 PDAM	Mohamad Raad
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### 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
<b>MPEG-21</b>	<b>m16801</b>	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

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Session	Number	Title	Source	Disposition
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### 33.3. Summary of discussions

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### 33.4. Action Points

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2. FCD ballot until 2009-11-18

## 34. Musical Slide Show AF (23000-4)

### 34.1. Topics

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

### 34.2. Contributions

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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

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m16802 Approved

### 34.4. Action Points

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## 35. Media Streaming AF (23000-5)

### 35.1. Topics

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#### 35.1.1. ISO/IEC 23000-5 2<sup>nd</sup> edition

### 35.2. Contributions

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Session	Number	Title	Source	Disposition
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MAF	m1680 4	Summary of Voting on ISO/ IEC CD 23000-5 [2nd Edition]	SC 29 Secretariat
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### 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	m1692 0	Editor's update to ISO/IEC 23000-6/FDAM 1 (PA-AF)	Noboru Harada Houari Hendry <u>Takehiro Moriya</u> 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

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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

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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 output doc.

### 37.4. Action Points

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

## 38. Video Surveillance AF (23000-10)

### 38.1. Topics

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#### 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

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None.

### 38.3. Summary of discussions

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### 38.4. Action Points

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

## 39. Stereoscopic Video AF (23000-11)

### 39.1. Topics

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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

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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

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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

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2. FCD ballot until 2009-11-05

### 41. MPEG-V Architecture (23005-1)

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#### 41.1. Topics

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

##### 41.1.2. Exploration on Haptics

#### 41.2. Contributions

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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 Walzl (on behalf of Austrian NB)	

#### 41.3. Summary of discussions

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**m16815** Approved without comments.

**m17013** All comments are disposed appropriately.

#### 41.4. Action Points

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### 42. Control Information (23005-2)

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#### 42.1. Topics

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##### 42.1.1. ISO/IEC 23005-2 Control Information

#### 42.2. Contributions

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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 Walzl (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

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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

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### 43. Sensory Information (23005-3)

#### 43.1. Topics

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##### 43.1.1. ISO/IEC 23005-3 Sensory Information

#### 43.2. Contributions

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

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

### 43.3. Summary of discussions

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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 kind 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

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## 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	m1681 9	Summary of Voting on ISO/ IEC CD 23005-4	SC 29 Secretariat	
MPEG-V	m1703 8	Proposal on Avatar information for Motion control	Jae-Joon Han Seungju Han Hyunjeong Lee Wonchul Bang Dokyun Kim	
MPEG-V	m1703 9	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

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### 45. MXM Architecture (23006-1)

#### 45.1. Topics

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

#### 45.2. Contributions

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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

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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

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

### 46. MXM APIs (23006-2)

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#### 46.1. Topics

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##### 46.1.1. ISO/IEC 23006-2 MXM APIs

#### 46.2. Contributions

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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 <u>Kota Iwamoto</u>	
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

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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

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3. FCD ballot until 2010-01-09

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

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#### 47.1. Topics

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

#### 47.2. Contributions

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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

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m16997

Accepted as a base text for study of FCD.

#### 47.4. Action Points

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

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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

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#### 50.1.1. Conformance and Reference Software

### 50.2. Contributions

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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

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- **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

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## 51. Exploration – Advanced IPTV Terminal

### 51.1. Topics

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#### 51.1.1. Context and Objectives

#### 51.1.2. Requirement and candidate technologies

#### 51.1.3. Terminologies

### 51.2. Contributions

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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	m1683 8	Context and Objectives for Advanced IPTV Terminal	AHG on AIT
AIT	m1683 9	Advanced IPTV Terminal (AIT): Requirements and candidate technologies	AHG on AIT
AIT	m1684 0	Advanced IPTV Terminal (AIT) Terminology	AHG on AIT
AIT	m1691 5	Comments on Advanced IPTV Terminal (AIT): Requirements and candidate technologies	Jin Young Lee
AIT	m1691 7	Comments on Advanced IPTV Terminal (AIT) Terminology	Jin Young Lee
AIT	m1696 6	Proposed Updates to MPEG AIT Requirements	Truong Cong Thang Jung Won Kang Jeong-Ju Yoo
AIT	m1698 0	Proposed AIT requirements and candidate technologies	Leonardo Chiariglione
AIT	m1701 7	Comments on Advanced IPTV Terminal (AIT) Terminology	Christian Timmerer Lars-Erik Eriksson (on behalf of P2P-Next)
AIT	m1701 8	Comments on Advanced IPTV Terminal (AIT) Requirements and candidate technologies	Christian Timmerer (on behalf of P2P-Next)
AIT	m1702 3	Some Comments on the AIT Requirements and Terminology	Xin Wang
AIT	m1706 2	Open Media Marketplace basics	Weizhong Chen Leonardo Chiariglione Riccardo Chiariglione Tiejun Huang Sergio Matone Andrea Pignatiello Martin Springer

AIT	m1706 3	Use case based testing of OMM Basic Services	Weizhong Chen Leonardo Chiariglione Jinwoo Hong Tiejun Huang Stefano Quintarelli Martin Springer Christian Timmerer
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### 51.3. Summary of discussions

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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

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

## 52. Exploration – MMT

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### 52.1. Topics

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- 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

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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)	Yongll 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**

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#### **52.4. Action Points**

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<b>53.</b>	<b>References</b>
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<b>53.1.</b>	<b>Program of work</b>
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1. Refer “Program of Work” section in SC29 Web Site : <http://www.itsecj.ipsj.or.jp/sc29/>



## **53.2. Timeline of standards under development**

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Pr	Pt	Edit.	Project	Description	CfP	WD	CD	FCD	FDI S
2	1	2007	AMD4	Transport of MVC			08/1 0	09/0 2	09/0 7
2	1	2007	COR3	Miscellaneous			09/0 7		09/1 0
2	1	2007	AMD5	Carriage of JPEG2000		09/0 7	09/1 0	10/0 4	10/1 0
4	1	2004	AMD4	LASer in MPEG-4 systems & RA			09/0 7	09/1 0	10/0 4
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			09/0 7		09/1 0
4	5	2001	AMD23	Synth. Texture Ref. Soft			08/0 4	09/0 4	09/1 0
4	11	2005	AMD7	Digital Radio BIFS Profile		09/0 2	09/0 7	09/1 0	10/0 4
4	14	2003	AMD1	Handling of MPEG-4 audio enhancement layers			09/0 2	09/0 7	10/0 1
4	20	200X	AMD3	PMSI		08/0 7	08/1 0	09/0 4	09/1 0
4	22	2008	AMD1.	Support for many-to-one range mappings			09/0 4	09/1 0	10/0 4
7	12	2008	COR2	Missing semantics			09/0 7		09/1 0
7	12	2008	AMD1.	MPQF reference software			09/0 7	09/1 0	10/0 4
7	12	2008	AMD2	Semantic enhancement		09/0 7	09/1 0	10/0 4	10/1 0
21	2	2002	AMD1.	Presentation element		08/1 0	09/0 4	09/1 0	10/0 4
21	4	2006	AMD2.	Protection of Presentation Information		08/1 0	09/0 4	09/1 0	10/0 4

21	19	200x	1 <sup>st</sup> Ed.	Media Value Chain Ontology		08/07	08/10	09/07	10/01
A	5	200x	2 <sup>nd</sup> 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	1 <sup>st</sup> 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	1 <sup>st</sup> ed.	MxM Architecture		08/07	09/02	09/07	10/01
M	2	200x	1 <sup>st</sup> ed.	MxM APIs		08/07	09/02	09/07	10/01
M	3	200x	1 <sup>st</sup> ed.	MxM Conf. & Ref. SW		08/07	09/02	09/07	10/01
M	4	200x	2 <sup>nd</sup> Ed.	MxM Protocols			09/02	09/07	10/01

U	1	200x	1 <sup>st</sup> ed.	Package, Delivery and Presentation of Widget	08/10	09/04	09/07	09/10	10/04
U	2	200x	1 <sup>st</sup> 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	<b>N7509</b>	05/07 Poznan
7	1	MPEG-7 White Paper – Terminal Architecture	<b>N8151</b>	06/04 Montreux
21	9	MPEG-21 White Paper – MPEG-21 File Format	<b>N7925</b>	06/01 Bangkok
A	X	MPEG Application Format Overview	<b>N9421</b>	07/10 Shenzhen
A	X	MAF Overview Document	<b>N9840</b>	08/04 Archamps
A	X	MAF Overview Presentation	<b>N9841</b>	08/04 Archamps
B	X	MPEG-B White Paper – BinXML	<b>N7922</b>	06/01 Bangkok
E	X	MPEG Multimedia Middleware Context and Objectives	<b>N6335</b>	04/03 München
E	X	1st M3W White paper	<b>N7510</b>	05/07 Poznan
E	X	2nd M3W White Paper : Architecture	<b>N8152</b>	06/04 Montreux
E	X	Tutorial on M3W	<b>N8153</b>	06/04 Monreux
E	X	M3W White Paper : Multimedia Middleware Architecture	<b>N8687</b>	06/10 Hanzhou
E	X	M3W White Paper : Multimedia API	<b>N8688</b>	06/10 Hanzhou
E	X	M3W White Paper : Component Model	<b>N8689</b>	06/10 Hanzhou
E	X	M3W White Paper : Resource and Quality Management	<b>N8690</b>	06/10 Hanzhou
E	X	M3W White Paper : Component Download	<b>N8691</b>	06/10 Hanzhou
E	X	M3W White Paper : Fault Management	<b>N8692</b>	06/10 Hanzhou
E	X	M3W White Paper : System Integrity Management	<b>N8693</b>	06/10 Hanzhou

### 53.4. Mailing Lists Reminder

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

<p><b>MXM</b></p>	<p>Reflector: <a href="mailto:mxm@lists.uni-klu.ac.at">mxm@lists.uni-klu.ac.at</a>  Subscribe: <a href="http://lists.uni-klu.ac.at/mailman/listinfo/mxm">http://lists.uni-klu.ac.at/mailman/listinfo/mxm</a>  Archive: <a href="http://lists.uni-klu.ac.at/mailman/listinfo/mxm">http://lists.uni-klu.ac.at/mailman/listinfo/mxm</a></p>	<p><b>Klagenfurt University</b></p>
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## 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:

<a href="#">m16865</a>	Defect report of MPEG-4 studio profile	Teruhiko Suzuki
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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:

<a href="#">m16844</a>	<b>Liaison Statement from SCTE - DVS</b>	SCTE - DVS via SC 29 Secretariat
<a href="#">m16859</a>	<p><b>Selective disparity estimation for MVC</b></p> <p><i>This contribution set up rules for skipping disparity estimation, resulting in a reported reduction in computation by 25%.</i></p> <p><i>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:</i></p> <p><i>1) determine whether motion is homogeneous or not</i></p> <p><i>2) when motion is homogeneous, don't bother performing disparity estimation.</i></p> <p><i>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.</i></p> <p><i>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</i></p>	Liquan Shen Ping An Ran Ma Zhaoyang Zhang Tao Yan
<a href="#">m16860</a>	<p><b>Early Skip Mode decision for MVC Using Inter-view Correlation</b></p> <p><i>This contribution involved making a decision to use skip mode if the corresponding MB from neighbor views are also in skip mode.</i></p> <p><i>The described technique is non-normative – an encoder speed-up to recognize when the use of the skip mode is highly likely.</i></p> <p><i>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.</i></p> <p><i>It was asked whether we have an early skip decision in the software already. Further study appeared to be desirable.</i></p> <p><i>The group reaction was similar to that for m16859 – and software will be provided for further study.</i></p>	Liquan Shen Zhaoyang Zhang Ping An Ran Ma Tao Yan
<a href="#">m16886</a>	<p><b>Color Correction Preprocessing and Chrominance Reconstruction Postprocessing for Multiview video coding</b></p> <p><i>The proponent was not available to present this document. However, it is available to the group for study, and its study was encouraged.</i></p>	Feng Shao; Gangyi Jiang; Mei Yu; Zongju Peng; Yun Zhang; Zhidi Jiang; Fucui Li
<a href="#">m16888</a>	<p><b>Basic Unit Layer Rate Control for MVC</b></p> <p><i>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.</i></p> <p><i>There is currently no rate control in the JMVC software at the moment.</i></p> <p><i>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.</i></p>	yantaoshu@yahoo.com.cn anping@shu.edu.cn and Zhaoyang Zhang
<a href="#">m16893</a>	<p><b>Vector field estimation and weighted disparity interpolation for MVC</b></p> <p><i>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.</i></p> <p><i>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.</i></p> <p><i>This would need to be considered in the context of adding new technology to the standard - which would be a substantial step.</i></p> <p><i>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.</i></p>	Ping An Liquan Shen Suxing Liu Tao Yan Zhaoyang Zhang

<a href="#">m16899</a>	<b>Perceptually Adaptive Illumination Compensation for Multi-View Video Coding</b> <i>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.</i>	Yongfang wang An Ping Zhaoyang Zhang
<a href="#">m16900</a>	<b>Color correction preprocessing for MVC</b> <i>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.</i>	Yongfang Wang Yi liu Ping An zhaoyang zhang
<a href="#">m16914</a>	<b>PSB-frame for MVC</b> <i>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).</i>	Yui-Lam Chan Chang-Hong Fu Wan-Chi Siu Wai-Lam Hui Yan-Ho Kam Yu Liu Ka-Man Cheng Yan Huo
<a href="#">m17022</a>	<b>Status of MVC Reference Software and Conformance</b> <i>This contribution described the status of reference software and conformance testing development for MVC.</i>	Anthony Vetro Sehoon Yea Ying Chen Shinya Shimizu Purvin Pandit ChongSoon Lim
<a href="#">m17025</a>	<b>Comments on the carriage of MVC over MPEG-2 Systems</b> <i>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.</i>	Ying Chen Peisong Chen Marta Karczewicz
<a href="#">m17044</a>	<b>Text improvements for MVC</b> <i>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.</i>	Jiancong Luo Wanrong Lin Dong Tian
<a href="#">m17069</a>	<b>Meeting Report of the 31st JVT Meeting (28 June - 2 July 2009, London, UK)</b> <i>Reports the work of the London JVT meeting. No problems were identified in this report during the Xian meeting.</i>	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

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

## 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.

<a href="#">m16805</a>	<b>Summary of Voting on ISO/IEC TR 15938-8:2002/DAM 5</b>	JTC 1 Secretariat via SC 29 Secretariat
<a href="#">m16806</a>	<b>Summary of Voting on ISO/IEC 15938-6:2003/FPDAM 3</b>	SC 29 Secretariat
<a href="#">m16813</a>	<b>Summary of Voting on ISO/IEC 15938-3:2002/PDAM 4</b>	SC 29 Secretariat
<a href="#">m16974</a>	<b>Proposal on MPEG-7 Visual API for MXM</b>	Paul Brasnett Ryoma Oami Stavros Paschalakis Kota Iwamoto
<a href="#">m16981</a>	<b>Proposed text of ISO/IEC 15938-3/FPDAM 4 Video Signature Tools</b> <i>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.</i>	Paul Brasnett Kota Iwamoto Stavros Paschalakis Ryoma Oami Miroslaw Bober
<a href="#">m16983</a>	<b>Cross validation results of Video Signature</b>	Karol Wnukowicz
<a href="#">m16987</a>	<b>CE Results on Video Signature Tools (VCE-7)</b> <i>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.</i>	Paul Brasnett Kota Iwamoto Stavros Paschalakis Ryoma Oami Miroslaw Bober
<a href="#">m16998</a>	<b>Proposal on Video Signature Tools (VCE-7)</b> <i>Predictive coding of signatures starting from a key picture. Prediction matrix using modulo-3 arithmetic -&gt; 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?)</i>	Paul Brasnett Nikola Sprijan Stavros Paschalakis
<a href="#">m17053</a>	<b>Video Test DB contribution for MPEG-7 Video Signature Standardization</b> <i>New data set, usage conditions not yet fully clear.</i>	Weon-Geun Oh Sang-II Na Daeil Yoon Seungwu Han Hae-Kwang Kim Kyoung-Ho Choi
<a href="#">m17054</a>	<b>Extended test results for Video Signature XM</b> <i>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</i>	Weon-Genu Oh Sang-II Na Daeil Yoon Seungwu Han Hae-Kwang Kim

<a href="#">m17057</a>	<b>Test of VCE-7 XM software performance</b> <i>Informative contribution about possible remedy against the behaviour above, but both 17054 and 17057 need better understanding still.</i>	Weon-Geun Oh Ju-Kyong Jin Dong-Seok Jeong
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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
	<i>15938-3 Visual</i>		
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

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

## **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 91<sup>st</sup> 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
<a href="#">m16846</a>	Cross-check Result for RVC Conformance Testing: IS, IQ, and IDCT FU for MPEG-4 SP	Hyungyu Kim, Minsoo Park, <a href="#">Euee S. Jang</a>
<a href="#">m16927</a>	A Random Access Protocol for Configurable Video Coding	<a href="#">Yafan Zhao</a> , <a href="#">Maja Bystrom</a> , <a href="#">Sampath Kannangara</a> , <a href="#">Iain Richardson</a> , <a href="#">James Philp</a>
<a href="#">m17058</a>	Conformance testing for deblocking filter, fractional luma and chroma sample interpolation of AVC	<a href="#">Gwo Giun (Chris) Lee</a> , <a href="#">He-Yuan Lin</a> , <a href="#">Jia-Wei Liang</a>
<a href="#">m16989</a>	Extending RVC for Wireless Multimedia Sensor Networks and Cryptography Applications	<a href="#">Shujun Li</a> , <a href="#">Junaid Jameel Ahmad</a> , <a href="#">Ihab Amer</a> , <a href="#">Marco Mattavelli</a>
<a href="#">m16990</a>	Conformance testing Report on the RVC MPEG-4 CBP decoder	<a href="#">Mickael Raulet</a>
<a href="#">m17047</a>	Case study of 3DMC implementation in RVC framework	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, <a href="#">Euee S. Jang</a>
<a href="#">m17048</a>	Problem report of parser implementation in RGC	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, <a href="#">Euee S. Jang</a>

## 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
<a href="#">m16846</a>	Cross-check Result for RVC Conformance Testing: IS, IQ, and IDCT FU for MPEG-4 SP		Hyungyu Kim, Minsoo Park, <a href="#">Euee S. Jang</a>
	<b>Notes</b>	<ul style="list-style-type: none"> <li>⌚ Crosscheck results of three MPEG-4 SP Algo FUs.</li> <li>⌚ For the IQ FU result, the comparison data is incomplete.</li> </ul>	
	<b>Recommendations</b>	<ul style="list-style-type: none"> <li>⌚ Guidelines on FU-level conformance testing will be updated in the <b>Study</b> document.</li> <li>⌚ Will adopt the FU conformance results in the <b>Study</b> document.</li> <li>⌚ IQ FU will need some editing period to fix the early termination bug.</li> </ul>	
<a href="#">m16990</a>	Conformance testing Report on the RVC MPEG-4 CBP decoder		<a href="#">Mickael Raulet</a>
	<b>Notes</b>	<ul style="list-style-type: none"> <li>⌚ Codec-level test is conducted to verify if the AVC CBP decoder works.</li> </ul>	
	<b>Recommendations</b>	<ul style="list-style-type: none"> <li>⌚ Update the AVC FUs in <b>RSM</b>.</li> <li>⌚ Some Algo FUs in VTL for AVC need to be renamed as Mgnt FUs. (→ <b>Workplan</b>)</li> </ul>	
<a href="#">m17058</a>	Conformance testing for deblocking filter, fractional luma and chroma sample interpolation of AVC		<a href="#">Gwo Giun (Chris) Lee</a> , <a href="#">He-Yuan Lin</a> , <a href="#">Jia-Wei Liang</a>
	<b>Notes</b>	<ul style="list-style-type: none"> <li>⌚ Conformance testing of deblocking filter and fractional sample interpolation FUs is provided.</li> </ul>	
	<b>Recommendations</b>	<ul style="list-style-type: none"> <li>⌚ The changes in RSM will be checked by CE description editor (Hwa-Seon)</li> <li>⌚ A regression test is necessary when there is a change in FU in RSM.</li> <li>⌚ Will adopt the FU conformance results in the <b>Study</b> document.</li> </ul>	



## 56.5. New directions

Doc. No.	Title	Authors
<a href="#">m16927</a>	A Random Access Protocol for Configurable Video Coding	<a href="#">Yafan Zhao</a> , <a href="#">Maja Bystrom</a> , <a href="#">Sampath Kannangara</a> , <a href="#">Iain Richardson</a> , <a href="#">James Philp</a>
	Notes	⌚ Dynamic reconfiguration functionality suggested.
	Recommendations	⌚ Set up a <b>core experiment</b> .
<a href="#">m16989</a>	Extending RVC for Wireless Multimedia Sensor Networks and Cryptography Applications	<a href="#">Shujun Li</a> , <a href="#">Junaide Jameel Ahmad</a> , <a href="#">Ihab Amer</a> , <a href="#">Marco Mattavelli</a>
	Notes	<ul style="list-style-type: none"> <li>⌚ Nonnormative FUs in a toolbox are suggested for different applications such as wireless sensor networks and cryptography applications.</li> <li>⌚ Need of reconfigurable video encoders is suggested.</li> <li>⌚ A possibility to support ‘royalty free toolbox’</li> </ul>
	Recommendations	⌚ Reflect the suggested applications in <b>RVC Vision</b> document.

## 56.6. Reconfigurable Graphics Coding discussion

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

## 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 89 <sup>th</sup> meeting)	Y	09/07/17
10719	RVC Tutorial (from 89 <sup>th</sup> 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/composition 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)*

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

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

<a href="#">m16982</a>	Integrated 3D Video Coding Platform	Deliang Fu Yin Zhao Lu Yu
<a href="#">m17009</a>	Results of EE4 on Mobile	Sehoon Yea Anthony Vetro
<a href="#">m17024</a>	EE Results on BookArrival Test Sequence	Yong-Joon Jeon
<a href="#">m17026</a>	Depth boundary filtering for DIBR	Byeong-Moon Jeon
<a href="#">m17028</a>	3DV EE1 & EE4 Results on Newspaper sequence	Seok Lee Jaejoon Lee Du-Sik Park
<a href="#">m17040</a>	3D Video Coding EE4 Results for Beergarden MVD2	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal
<a href="#">m17041</a>	3D Video Coding EE4 Results for Newspaper MVD3	Pablo Carballeira Julián Cabrera Gianluca Cernigliaro Juan Casal
<a href="#">m17043</a>	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
<a href="#">m17049</a>	A soft segmentation matching in Depth Estimation Reference Software (DERS) 5.0	Olgierd Stankiewicz Krzysztof Wegner Menno Wildeboer
<a href="#">m17050</a>	Poznan Multiview Video Test Sequences and Camera Parameters	Marek Domanski Tomasz Grajek Krzysztof Klimaszewski Maciej Kurc Olgierd Stankiewicz Jakub Stankowski Krzysztof Wegner
<a href="#">m17051</a>	Newspaper sequence - Results of 3DV/FTV Exploration Experiments with depths and view synthesis	Olgierd Stankiewicz Krzysztof Wegner Krzysztof Klimaszewski

### Documents reviewed in video subgroup

<a href="#">m16852</a>	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
<a href="#">m16854</a>	USNB Contribution: Comments on 3D Video <i>Suggested timeline: CfP by end of 2010, start with case of enhanced stereo (baseline adapt) and put autostereoscopic to less relevance.</i>	Andy Tescher for USNB
<a href="#">m16871</a>	Inpainting Based View Synthesis for FTV <i>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.</i>	Qian Zhang Ping An Liquan SHEN Ran MA Zhaoyang Zhang
<a href="#">m16892</a>	High quality virtual view rendering for FTV <i>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.</i>	Ping An Ran Ma Suxing Liu Qian Zhang Liquan Shen Zhaoyang Zhang
<a href="#">m16978</a>	Requirements for 3D Video Coding <i>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.</i>	Thomas Ruset Apostolos Georgakis Per Fröjdh
<a href="#">m17021</a>	Requirements on 3D Video Format <i>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.</i>	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)

<a href="#">m16787</a>	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
<a href="#">m16855</a>	USNB Contribution: Comments on HVC	Andy Tescher for USNB

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

<a href="#">m16861</a>	<p><b>A new slice type for supporting lossless error resilient transcoding</b>  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.</p>	<p>Xiaopeng Fan  Oscar Au  Xing Wen  Haitao Yang</p>
<a href="#">m16862</a>	<p><b>An efficient motion vector coding algorithm based on adaptive motion vector prediction</b>  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).</p>	<p>Jingjing Dai  Oscar C. Au  Wen Yang  Yu Liu  Xing Wen</p>
<a href="#">m16887</a>	<p><b>Consolidation of video syntax and entropy coders through HVC standard</b>  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.</p>	<p>Chun-Jen Tsai  Shau-Yin Tseng</p>
<a href="#">m16891</a>	<p><b>Block-Matching Translation and Zoom Motion Compensated Prediction</b>  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.</p>	<p>Lai-Man Po  Ka-Man Wong  Ka-Ho Ng  Kwok-Wai Cheung  Yu Liu  Ka-Man Cheng  Yan Huo</p>
<a href="#">m16926</a>	<p><b>Rate-Distortion Optimized Transform</b>  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.</p>	<p>Xin Zhao  Li Zhang  Siwei Ma  Wen Gao</p>
<a href="#">m16969</a>	<p><b>Macroblock-level Weighted Prediction</b>  Slice-level weighed 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.</p>	<p>Nikola Sprljan  Leszek Cieplinski</p>
<a href="#">m17019</a>	<p><b>Performance of Directional Transforms for Video Coding</b>  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.</p>	<p>Robert Cohen  Sven Klomp  Anthony Vetro  Huifang Sun</p>
<a href="#">m17035</a>	<p><b>Rate-Distortion Criterion Based Picture Padding for Arbitrary Resolution Video Coding</b>  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.</p>	<p>Ming Li  Yilin Chang  Sixin Lin</p>

<a href="#">m17059</a>	<b>Inter Prediction Based on Backward Motion Estimation</b> <i>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.</i>	Hao Chen Ruimin Hu Zhongyuan Wang Dan Mao Jinhui Hu
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*Output documents:*

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

## H.

## – Audio report

Source: Schuyler Quackenbush, Chair



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## **1. Opening Audio Plenary**

The MPEG Audio Subgroup meeting was held during the 90<sup>th</sup> 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 89<sup>th</sup> 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.

<b>Groups</b>	<b>What</b>	<b>Where</b>	<b>Day</b>	<b>Time</b>
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.

<b>No.</b>	<b>Title</b>
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
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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
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The contribution presented several issues:

- 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
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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 Reference Encoder project and urges other companies to contribute.

Hyunkook Lee, LG, presented

m16952	Thoughts on the CE evaluation method	Hyunkook Lee Sungyong Yoon
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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 Multus
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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
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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
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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
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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

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:

Pierrick Philippe, Orange Labs, asked whether 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.”

- 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

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.

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 "togglene 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
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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 item 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.

Seungkwan 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
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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
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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
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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
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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
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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
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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
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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
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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
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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
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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 decorrelator 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
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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
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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 be 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
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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
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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)
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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
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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

<a href="#">m16970</a>	Status and progress overview of SAOC workplan items	Oliver Hellmuth Jürgen Herre Andreas Hölzer Werner Oomen Heiko Purnhagen Leonid Terentiev Cornelia Falch
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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
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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
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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.

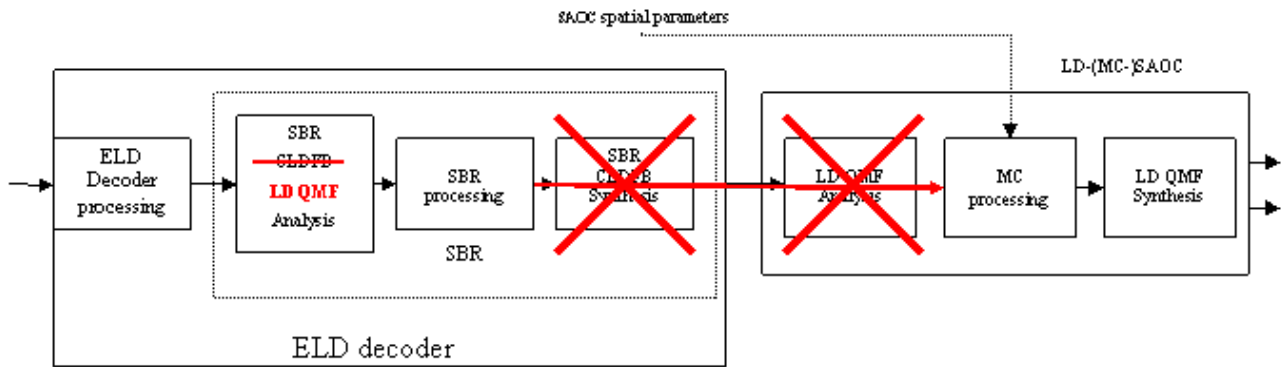
Jürgen Herre, FhG, presented

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
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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 kbps
- 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 Primaud, iKlax, presented



m16959	Comments on SAOC Profiles	Emmanuel Boui Laurent Primaud Owen Lagadec PHILIPPE Pierrick
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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 it 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
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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 (Thursday) 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
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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. Matrix 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.

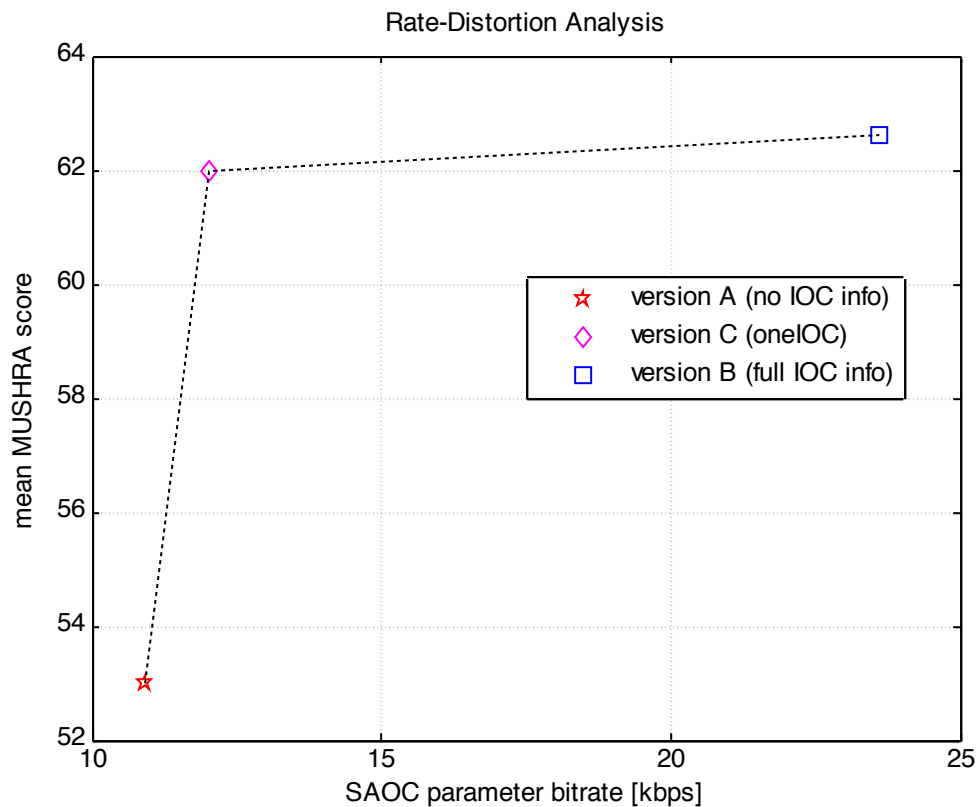
The contribution proposes to add an additional method

- “One IOC” Transmit a single correlation vector for each frame that is used 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 semantics 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
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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.

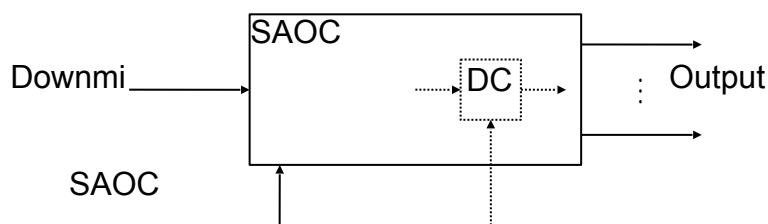
It was the consensus of the group to adopt the technology proposed in m16976 into the Study on FCD text.

Jürgen Herre, FhG, presented

m16975	Technical provisions for limiting perceptible distortions in SAOC	Jürgen Herre Cornelia Falch Oliver Hellmuth Leonid Terentiev Andreas Hölzer
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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  $\Lambda$  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 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
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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
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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
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The contribution noted that there are many lossless 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 there 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 demonstrated 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 lossless 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
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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 concerns 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, Huawei, presented

m16908	Huawei progress report on the CE for the spectral lossless coding	Wei Xiao Fuwei Ma Hervé Taddei Minjie Xie
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Huawei 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
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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 providing 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 Multus, FhG, presented the following two contributions

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

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 Multus, FhG, presented

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

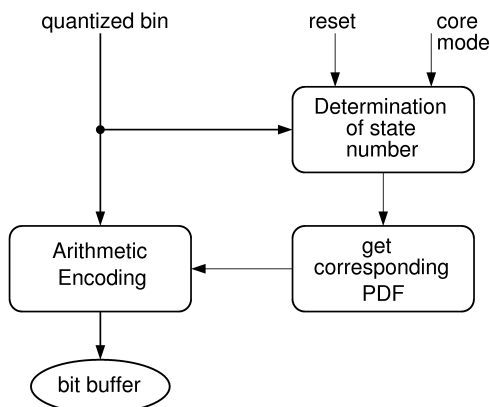
- Data ROM demand: approx. 148 kByte (37 kWord)
- Program code ROM demand: approx. 150 – 200 kByte (38 – 50 kWord)
- Static RAM demand: approx. 41 – 68 kByte (10 – 17 kWord, dependent on application scenario)
- Volatile RAM demand: approx. 20 kByte (5 kWord)

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
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The contribution gives technical details of the CE proposal. The basic encoding architecture is 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 quantizer. 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)

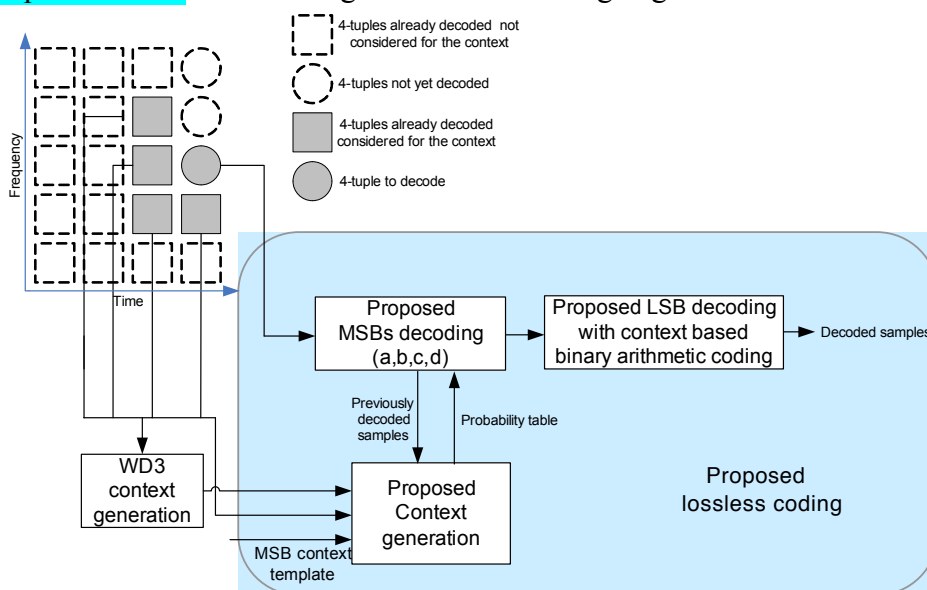
Concerning computation complexity, the contribution estimates that the WD spectral noiseless coding requires less than 10% of overall USAC complexity, and that the CE spectral noiseless coding complexity is comparable to the WD complexity.

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
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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
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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
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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
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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
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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
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Kei Kikuri, DOCOMO, presented

m16942	Report on Enhanced Temporal Envelope Shaping CE for USAC	Kei Kikuri Kosuke Tsujino Nobuhiko Naka
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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
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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 than the WD technology, for others it is more complex.

Minjie Xie, Huawei, presented

m16909	Pitch Estimator for USAC reference encoder	Zhengzhong Du Hongqiang Dang Yujie Dun Guizhong Liu Yixin Gao Minjie Xie Hervé Taddei
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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
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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
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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 preset. 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
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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
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The contribution proposes a QMF-based phase vocoder for time stretching and pitch shifting in the SBR tool which provides a lower complexity method than 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
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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 meeting.

Heiko Purnhagen, Dolby, presented

m16929	Proposed improvements for low bitrate stereo in USAC	Heiko Purnhagen Pontus Carlsson Erik Schuijers Werner Oomen
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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 cancellation
- 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 Pulse 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
<b>Speech</b>	1.14%	2.04%	1.71%	1.38%
<b>Music</b>	0.02%	0.03%	0.02%	0.01%
<b>Mixed</b>	0.44%	0.77%	0.85%	0.69%



<b>Total</b>	0.53%	0.95%	0.86%	0.69%
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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 known, 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:

<b>Mtg</b>	<b>Date</b>	<b>Status</b>
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
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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
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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.

<b>No.</b>	<b>Title</b>	<b>Mtg</b>
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 90<sup>th</sup> Audio Subgroup meeting was adjourned Friday at 13:50

# A.

## Participants

First Name	Last Name	Country	Affiliation
Seungkwon	Beack	KR	ETRI
Bruno	Besette	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	Kikuri	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 Technologies
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

<b>Sunday</b>		
<b>0900-1800</b>	<b>AhG on USAC</b>	
	<b>General</b>	
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 Multus
	<b>CEs concluded in AhG period</b>	
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 Multus Max Neuendorf Jérémie Lecomte Frederik Nagel Stefan Bayer
	<b>Window transitions</b>	
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
	<b>Unified Stereo Coding</b>	
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	
<b>1800-</b>	<b>Chairs Meeting</b>	
<b>Monday</b>		
<b>0900-1300</b>	<b>MPEG Plenary</b>	
<b>1300-1400</b>	<b>Lunch</b>	
<b>1400-1500</b>	<b>Audio Plenary</b>	
	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 profile and level indication Normative start-up and shut-down	
	<b>General Documents</b>	
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
<b>1500-1800</b>	<b>SAOC</b>	

m16992	Additional Information on SAOC Profiles	Jonas Engdegard Oliver Hellmuth Juergen Herre Johannes Hilpert Werner Oomen Heiko Purnhagen Jeongil Seo Leonid Terentiev
<a href="#">m16970</a>	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
<b>1800-</b>	<b>HOD meeting</b>	
<b>Tuesday</b>		
<b>0900-1300</b>	<b>USAC</b>	
	<b>Spectral lossless coding</b>	
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 Multus
m17001	Crosscheck Report for CE on Improved Noiseless Coding: Samsung Proposal	Markus Multus



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
<b>1300-1400</b>	<b>Lunch</b>	
	<b>Arithmetic coding of scale factors</b>	
m16951	Report on the arithmetic coding CE for USAC	Hyunkook Lee Sungyong Yoon
m17003	Thoughts on coding of global gain	Ralf Geiger Guillaume Fuchs
	<b>Enhanced TES</b>	
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 Kikuri Kosuke Tsujino Nobuhiko Naka
	<b>Other CEs</b>	
m16910	Improved Pulse indexing for ACELP fixed codeword	Hervé Taddei Dejun Zhang Fuwei Ma Minjie Xie
	<b>Reference Encoder Software</b>	
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
<b>1800-</b>	<b>Chairs meeting</b>	
<b>Wednesday</b>		
<b>0900-1100</b>	<b>MPEG Plenary</b>	
<b>1130-1200</b>	<b>SAOC</b>	
m16959	Comments on SAOC Profiles	Emmanuel Boui Laurent Primaud Owen Lagadec PHILIPPE Pierrick
<b>1200-1300</b>	<b>Lunch</b>	
<b>1300-1400</b>	<b>MPEG-4 / SAOC</b>	
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	

	<b>SAOC</b>	
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
<b>1900-</b>	<b>Social</b> (meet at 7:30pm)	
<b>Thursday</b>		
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	<b>MPEG-4</b>	
m17004	Bugfixes to MPEG-4 SLS Reference Software	Fabian Haussel Ralf Geiger Virgilio Bacigalupo
	<b>MPEG Surround</b>	
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	<b>Metadata</b>	
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	<b>Unified Stereo</b>	

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
	<b>New CEs</b>	
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	
<b>1800-</b>	<b>Chairs meeting</b>	
<b>Friday</b>		
<b>0900-1300</b>	<b>Audio Plenary</b>	
	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	
<b>1300-1400</b>	<b>Lunch</b>	
<b>1400-</b>	<b>MPEG Plenary</b>	



## 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
<i>14496-3 Audio</i>			
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/PPAM 2, ALS Simple Profile and Transport of SAOC	No	09/10/30
11032	ISO/IEC 14496-3:2009/PPAM 2, ALS Simple Profile and Transport of SAOC	No	09/10/30
<i>14496-5 Reference Software</i>			
11033	ISO/IEC 14496-5:2001/AMD 10:2007/DCOR 4 SLS	No	09/10/30
<i>14496-26 Audio Conformance</i>			
11034	DoC ISO/IEC 14496-26:2009/PPAM 2, BSAC Conformance for Broadcasting	No	09/10/30
11035	ISO/IEC 14496-26:2009/PPAM 2, BSAC Conformance for Broadcasting	No	09/10/30
11036	Defect Report on the MPEG Surround conformance and reference software.	No	09/12/11
<i>23003-2 SAOC</i>			
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
<i>23003-3 Unified Speech and Audio Coding</i>			
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

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

## **E. Agenda for the 91<sup>st</sup> 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

• N o	• Title		• Sch edu le	• Obser vation
• D 1	• Monday		D1	
	• MPEG Plenary		09:00~ 11:30	
	• Lunch Break		13:00~ 14:00	
	• 3DG Plena ry	<ul style="list-style-type: none"> <li>Roll call, Agenda, Goals, FAQ, etc.,</li> <li>m16776 Report of AHG on 3DGC documents, experiments and software maintenance</li> <li>Results of voting</li> </ul>	Marius Preda  Francisco Moran  Marius Preda	14:00~ 15:00
	• Coffee Break		15:00~ 15:30	
	Scalable Complex ity 3D Mesh Coding (SC-3D MC)	m17046 A report on the implementation of SC3DMC for the 3DGCM  m17061 SC3DMC Reference Software Update  Player for SC3DMC	Sowon Kim, Daiyong Kim, Kyoungsoo Son, Seungwook Lee, Bonki Koo, Euee S. Jang  Khaled MAMOU Titus Zaharia Marius Preda Françoise Prêteux  All	15:30 – 17:30
	Explorat ions	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
• D 2	• Tuesday		D2	

• N o	• Title		• Sch edu le	• Obser vation
	<b>MPEG-V</b>	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	
	• <b>MPEG-V</b>	• Wrap-up and planning for MPEG-V	14:00~ 15:00	Joint with S
	• <b>Explorations</b>	• <b>m16849</b> Implementation of IndexedRegionSet node support in MPEG-4 reference software	Sergio Arnaldo, Francisco Morán 15:30~ 15:45	
	• <b>MPEG-4 Part 27</b>	• <b>Status on the AFX conformance</b>	Francisco Morán 15:45~ 16:00	
	• <b>Reconfigurable Graphics Coding</b>	<b>m17047</b> Case study of 3DMC implementation in RVC framework • <b>m17048</b> Problem report of parser implementation in RGC	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang 16:00~ 18:00 Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang	Joint with V
• <b>D3</b>	• <b>Wednesday</b>		<b>D3</b>	
	• <b>MPEG Plenary</b>		09:00~ 11:00	
	• <b>MPEG-V</b>	• Haptic in BIFS	11:00~ 12:00	Joint with S
	• Lunch Break		12:00~ 14:00	

	<b>MPEG-V</b>	Part 3 review Part 2 review Part 4 review Software plan		14:00 – 18:00	Joint with S
• <b>D 4</b>	• <b>Thurs day</b>				
	• <b>3DG Plenary</b>	Preparation for output documents related to MPEG-4 Parts 16, 25 and 27		9:30~1 3:00	
• <b>D 5</b>	• <b>Frida y</b>			<b>D5</b>	
	• <b>3DG Plenary</b>	Review 3DG output documents, AhGs and resolutions		09:30~ 12:00	
	• <b>Lunch Break</b>			12:00~ 14:00	
	• <b>MPE G Plenary</b>			14:00~	

**Attendance list**

Name	Countr y	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	Belgiu m	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**

<b>J.Document title</b>	<b>K.DoC</b>	<b>L.Editor of DoC</b>

**General 3DG related activities****AhG on 3DG activities**

<b>Title</b>	Report of AHG on 3DGC documents, experiments and software maintenance
<b>Authors</b>	Francisco Moran
<b>Summary</b>	See AhG report
<b>Resolutio n</b>	Accepted

## Promotions

### Web Site

<b>Title</b>	Status of <a href="http://www.mpeg-3dgc.com">www.mpeg-3dgc.com</a>
<b>Authors</b>	
<b>Summary</b>	The web site is not more maintained by OrangeLab.
<b>Resolution</b>	<b>Action Point:</b> 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.

<b>Title</b>	<b>Part 3 Review</b>
<b>Authors</b>	All

<b>Actions</b>	<p>The presentation of the DoC for ANB and KNB</p> <ul style="list-style-type: none"> <li>- the possibility to have n-dimensional effect. How to use the intensity in this case?</li> <li>- we put the intensity out of the abstract class</li> <li>- put a note saying that the attributes of the effect are global.</li> <li>- change the "position" to "location"</li> <li>- change the "water sprayer effect" in spraying effect</li> <li>- add a type called "water" and let the list open</li> </ul> <p>Kinesthetic effect</p> <ul style="list-style-type: none"> <li>- agreed on having a passivekinesteticitytype defined either by a motion type (with the possibility to represent the 6DoF) or a type including force and torque.</li> </ul> <p>Agreed on having a activekinesthetictype defined as a vector of forces and a vector of torques.</p> <p>Tactile effect</p> <ul style="list-style-type: none"> <li>- add the range of the ArrayIntensity (add the range for all the intensities)</li> <li>- add preferred list of actuators</li> <li>- add a clarification about the TactileVideo that only the images are used and not the timestamp or frequency.</li> </ul> <p>Motion sensory effects</p> <p>The MoveTowardsType was introduced.</p> <p>Uses only the DirectionX, DirectionY, DirectionZ and the choice between speed and acceleration.</p> <ul style="list-style-type: none"> <li>- add a new type called RigidObjectMotion</li> <li>- update the shake, wave and the others as extensions of baseType</li> </ul>
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<b>Title</b>	<b>Part 1 Review</b>
<b>Authors</b>	All
<b>Actions</b>	<p>Add new use case for virtual objects</p> <p>Update the Figure 1</p>

<b>Title</b>	<b>Part 4 Review</b>
<b>Authors</b>	All
<b>Action</b>	<ul style="list-style-type: none"> <li>- Include the proposed VO related types</li> <li>- include the calibration types</li> <li>- include the feature points for face and body (use several resolutions for OutlineType)</li> </ul>

<b>Title</b>	<b>Part 2 Review</b>
<b>Authors</b>	

<b>Action</b>	<ul style="list-style-type: none"> <li>-include motion sensors and actuators</li> <li>- do not include UserPreference for sensors.</li> <li>- include UserPreference for actuators</li> <li>- SensorCapability, IndividualSensorsCapabilities are accepted</li> <li>- SensedInformation is accepted.</li> </ul>
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## MXM

<b>Title</b>	No MXM related activity carried on by 3DG participants
<b>Authors</b>	
<b>Summary</b>	

## Reconfigurable Graphics Coding

<b>Title</b>	<b>m17047</b> Case study of 3DMC implementation in RVC framework
<b>Authors</b>	Seungwook Lee, Bonki Koo, Ming-Xiao Chen, Daiyong Kim, Euee S. Jang
<b>Summary</b>	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.
<b>Resolution</b>	Continue the exploration experiment with the IC. Work on analyzing and implementing the common FUs. Update the CE document to include these new goals.

<b>Title</b>	<b>m17048</b> Problem report of parser implementation in RGC
<b>Authors</b>	Seungwook Lee, Bonki Koo, Hyungyu Kim, Ming-Xiao Chen, Euee S. Jang
<b>Summary</b>	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.
<b>Resolution</b>	No resolution yet.

## Explorations

<b>Title</b>	<b>m16849</b> Implementation of IndexedRegionSet node support in MPEG-4 reference software
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<b>Authors</b>	Sergio Arnaldo, Francisco Morán
<b>Summary</b>	This contribution contains the software implementation of IRS is done in IM1, a tool that was previously presented (meetings 88 and 89)
<b>Resolution</b>	Open a new standardization activity as an AMD of Part 16 on efficient representation of meshes with multiple textures or attributes per vertex.

<b>Title</b>	<b>m16869</b> A Consideration of High Performance 3D Graphics Coding for New Applications
<b>Authors</b>	Minsu Ahn, Jeong-Hwan Ahn, James D.K Kim
<b>Summary</b>	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.
<b>Resolution</b>	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)**

<b>Title</b>	<b>m17046</b> A report on the implementation of SC3DMC for the 3DGCM
<b>Authors</b>	Sowon Kim, Daiyong Kim, Kyoungsoo Son, Seungwook Lee, Bonki Koo, Euee S. Jang
<b>Summary</b>	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.
<b>Resolution</b>	Accept the software as the reference software of Part 25 AMD1. Start a new AMD for RefSoft and conformance. Appoint the editors.

<b>Title</b>	<b>m17061</b> SC3DMC Reference Software Update
<b>Authors</b>	Khaled MAMOU, Titus Zaharia, Marius Preda, Françoise Prêteux



<b>Summary</b>	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 quantization 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%.
<b>Resolution</b>	Accept the new implementation as part of the reference software.

<b>Title</b>	<b>Player for SC3DMC</b>
<b>Authors</b>	Open discussion
<b>Summary</b>	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.
<b>Resolution</b>	<ul style="list-style-type: none"> <li>- use IM1 for obtaining MP4 formatted file</li> <li>- regenerate the conformance file with different encoding combination</li> <li>- use files that contains the maximum number of attribute types and play with the compression settings</li> <li>- use files with different number of vertices to cover low and high resolution content</li> <li>- start the integration of SC3DMC encoder/decoder in MXM and validate the integration by rendering SC3DMC content in Ogre.</li> </ul>

## **Maintenance**

### **Reference Software**

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

<b>Title</b>	MPEG-4 reference software
<b>Authors</b>	Francisco Morán
<b>Summary</b>	The reference software was cleaned up, "readme.txt" documents were added.
<b>Resolution</b>	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**

<b>Title</b>	MPEG-4 conformance
<b>Authors</b>	Francisco Morán
<b>Summary</b>	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.
<b>Resolution</b>	Nothing to do.

### Dataset and benchmarking

For the new activity dealing with Multi-resolution 3D mesh coding, the [www.MyMultimediaWorld.com](http://www.MyMultimediaWorld.com) will be used for benchmarking.

### 3D Graphics Compression Model (14496-25) activities Amendment 1

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

### Software and conformance

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

### Liaison

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

### Output documents and Resolutions of 3DGC

### Part 5 Reference Software

The 3DG subgroup recommends approval of the following documents

No.	Title	TBP	Available
	<i>14496-5 Reference Software</i>		
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
	<i>14496-16 Animation Framework eXtension (AFX)</i>		
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
	<i>14496-25 3D Graphics Compression Model</i>		
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
	<i>14496-27 3DG Conformance</i>		

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	<b>AHG on 3DG documents, software maintenance and core experiments</b>
<b>Mandate:</b>	<ol style="list-style-type: none"> <li>1. Conduct the experiments on efficient representation of 3D meshes with multiple attributes</li> <li>2. Conduct the experiments on Reconfigurable Graphics Coding</li> <li>3. Conduct the experiments on Multi-resolution 3D Mesh Compression</li> <li>4. Maintain and edit 3DG documents</li> <li>5. Coordinate 3DG related conformance and reference software</li> <li>6. Coordinate editing of the <a href="http://www.mpeg-3dgc.com">www.mpeg-3dgc.com</a> web site</li> </ol>
<b>Chairman:</b>	Francisco Morán Burgos
<b>Duration:</b>	Until 91 <sup>st</sup> Meeting
<b>Meetings</b>	Sunday before 91 <sup>st</sup> meeting
<b>Reflector:</b>	mpeg-3dgc AT gti. ssr. upm. es
<b>Subscribe:</b>	<a href="https://mx.gti.ssr.upm.es/mailman/listinfo/mpeg-3dgc">https://mx.gti.ssr.upm.es/mailman/listinfo/mpeg-3dgc</a>

#### Closing of the Meeting

See you in Kyoto.