

# Activities in AOMedia (outside CWG)

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**ALLIANCE FOR  
OPEN MEDIA**

# AOMedia Working Groups

Audio Codec (ACWG): efficient coding of digital audio data

Codec (CWG): next-generation video coding technology

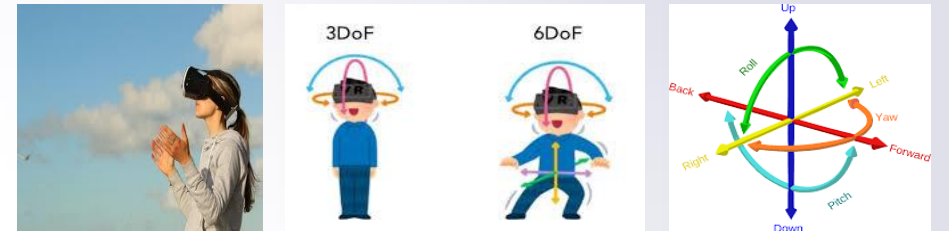
Software Implementation (SIWG): optimized SW implementations of AOM standards

Storage and Transport Formats (STF): storage and transport formats for media

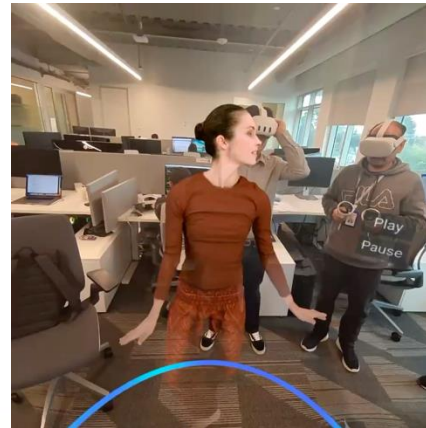
Volumetric Visual Media (VVM): efficient coding of immersive/volumetric visual media

# Volumetric Visual Media

- Established in February 2022.
- Develop and standardize technologies for efficient volumetric visual media coding and streaming.



- Use cases
  - AR/VR/XR applications
  - Gaming
  - Content and entertainment
  - 3D mapping
  - Autonomous driving
  - Cultural heritage ...

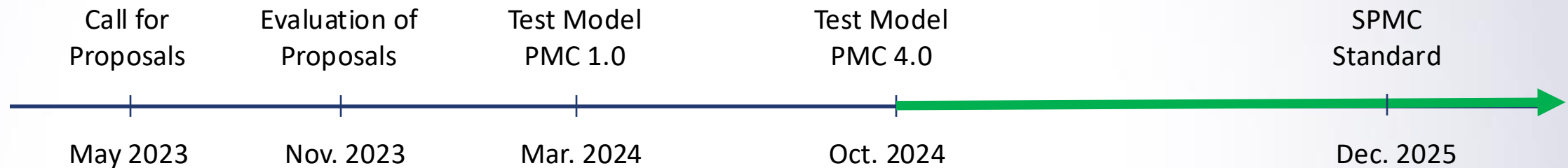


# Volumetric Visual Media

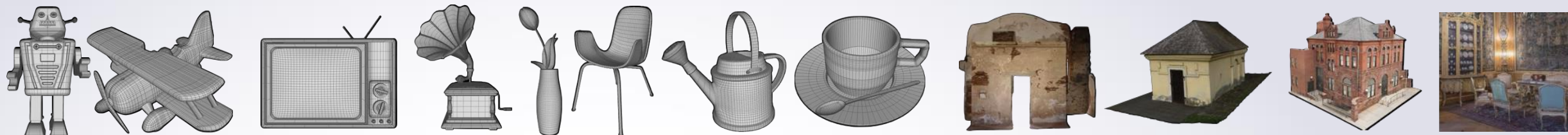
- Requirements

- Lossless & lossy compression
- Support any static 3D polygonal mesh
- Support vertex & corner attributes
- Low-complexity
- Parallel encoding/decoding
- Spatial and quality scalability
- Error resilience
- Minimize rendering calls

In Scope	Out of Scope
Mesh Coding	Scene Description
Point Cloud Coding	Rendering
Animation Coding <ul style="list-style-type: none"><li>• Skeleton</li><li>• Blend shapes</li><li>• Vertex buffer</li></ul>	Content Protection



# Mesh Coding Evaluation Dataset



Apple AR dataset

Buildings and Rooms



Humans

Gaming

Fauna & Flora



Cultural Heritage

Class	Id (m-id)	Name (m-name)	Type	Creation process	Face count	Source texture resolution	C0 texture resolution
A1	1	gramophone	Quad	DCC	87384	-	-
	2	toy_bitplane	Quad	DCC	26496	-	-
	3	toy_car	Tri	DCC	29730	-	-
	4	toy_drummer	Quad	DCC	23370	-	-
	5	toy_robot_vintage	Quad	DCC	42212	-	-
	6	tv_retro	Quad	DCC	36640	-	-
A2	7	creature_box_squid	Tri	DCC	20140	4096x4096	4096x4096
	8	cyber_samurai	Tri-Quad	DCC	208944	12288x8192	4096x2730
	9	grey_knight	Poly	DCC	35771	4096x4096	4096x4096
	10	just_a_girl	Tri	DCC	77725	4096x3072	4096x3072
	11	mira_w_gun	Tri	DCC	77178	4096x6144	2730x4096
	12	winter_girl	Poly	DCC	92637	14338x12288	4096x3510
B	13	frederic_fr00001	Tri	3D Scan	49908	4096x4096	4096x4096
	14	levi_fr00000	Tri	3D Scan	40040	4096x4096	4096x4096
	15	mitch_fr00001	Tri	3D Scan	30000	4096x4096	4096x4096
	16	nathalie_fr00036	Tri	3D Scan	30000	4096x4096	4096x4096
	17	rafa_fr00001	Tri	3D Scan	40000	4096x4096	4096x4096
	18	thomas_fr00170	Tri	3D Scan	30000	4096x4096	4096x4096
C	19	chair_swan	Quad	DCC	24708	-	-
	20	cup_saucer_set	Quad	DCC	21396	-	-
	21	flower_tulip	Quad	DCC	62224	-	-
	22	motorcycle	Tri-Quad	DCC	30000	2048x3072	2048x3072
	23	teapot	Quad	DCC	103696	-	-
	24	wateringcan	Quad	DCC	36032	-	-
D1	25	apollo_11	Tri	3D Scan	721399	12288x8192	4096x2730
	26	apothecary_vase	Tri	3D Scan	60002	8192x8192	4096x4096
	27	orbiter_space_shutter	Tri	3D Scan	150000	4096x4096	4096x4096
	28	piggy_bank	Tri	3D Scan	127393	8192x8192	4096x4096
	29	ware_bowl	Tri	3D Scan	64000	4096x4096	4096x4096
	30	zakopane_chair	Tri	3D Scan	141569	4096x4096	4096x4096
	31	heliostat	Tri-Quad	3D Scan	325374	8192x8192	4096x4096
	32	hussar_on_horseback	Tri-Quad	3D Scan	412947	4096x6144	2730x4096
	33	violin	Tri-Quad	3D Scan	459874	4096x4096	4096x4096
	34	electrodynamic	Poly	3D Scan	255964	8192x16384	2048x4096
	35	marble_mortar	Tri-Quad	3D Scan	29654	8192x16384	2048x4096
D2	36	butterflies_collection	Tri-Quad	3D Scan	445915	12288x8192	4096x2730
	37	armillary_sphere_1771	Tri-Quad	3D Scan	308898	8192x4096	4096x2048
	38	wooden_gramophone	Tri-Quad	3D Scan	643464	16384x16384	4096x4096
	39	stereoscopic_cam	Tri-Quad	3D Scan	318100	8192x8192	4096x4096
	40	buste_cuirasse_de_marc_aurele_age	Quad	3D Scan	489920	2048x2048	2048x2048
	41	candle_stick	Quad	3D Scan	271800	4096x4096	4096x4096
E	42	promo_ashtay	Quad	3D Scan	54344	4096x4096	4096x4096
	43	dead_rose_smallCremoved	Tri	3D Scan	49940	8192x8192	4096x4096
	44	gree_tree_frog	Tri	3D Scan	1333419	8192x8192	4096x4096
	45	japanese_spiny_lobster	Tri	3D Scan	864576	4096x8912	2048x4096
	46	luna_lionfish	Tri	3D Scan	546363	4096x8192	2048x4096
	47	sakura_cherry_blossom	Tri	3D Scan	1067755	8192x8192	4096x4096
F	48	wiz_boots	Tri	3D Scan	300000	4096x8192	2048x4096
	49	cela_ruins_of_a_nuns_cell	Poly	3D Scan	709020	8192x8192	4096x4096
	50	heilig_grab_kapelle	Tri	3D Scan	555924	8192x8192	4096x4096
	51	police_station	Tri	3D Scan	1538567	8192x8192	4096x4096
	52	the_great_drawing_room	Tri	3D Scan	999999	8192x8192	4096x4096
	53	the_serving_room	Tri	3D Scan	999999	8192x8192	4096x4096

## Categories for lossless coding evaluation

Category	Description
C0	Lossless without input data constraints
C1	Lossless with input data constraints
C2	Lossless with single connectivity

## Quality levels for lossless coding evaluation

Quantization Level	Set of parameters	qp	qt	qn
L1	Lowest	9	8	6
L2	Lower	10	9	7
L3	Default	11	10	8
L4	High	13	12	9
L5	Highest	16	14	10

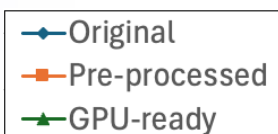
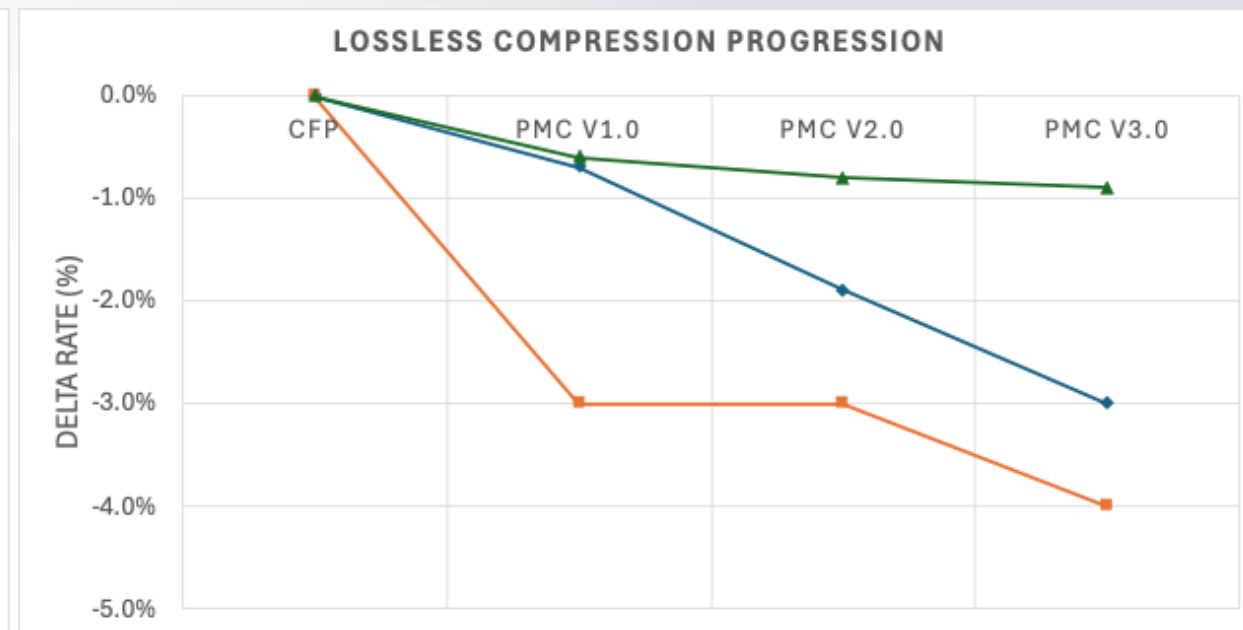
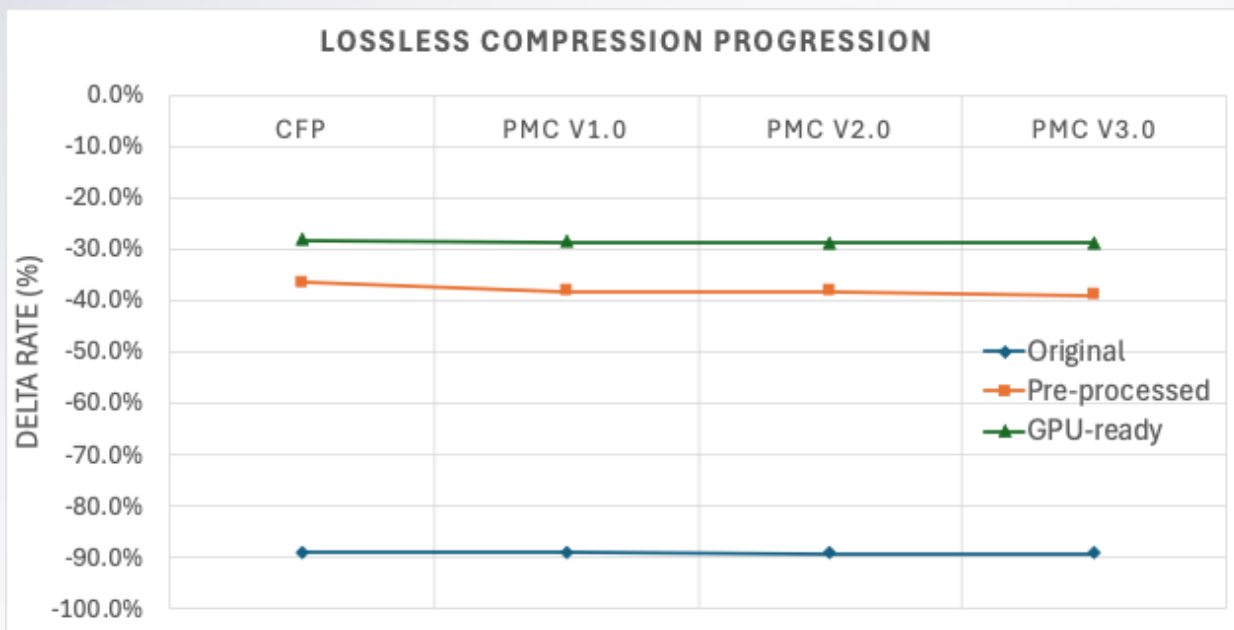
## Quality levels for lossy coding evaluation

Quality Level	Geometry Bit Depth	Texture Coordinate Bit Depth	Displacement Quantization Parameter	Texture map Quantization Parameter for AV1 (cq-level)
Q0	9	8	120	63
Q1	10	9	112	55
Q2	11	10	104	47
Q3	13	12	96	39

# Progress: Lossless Performance

## PMC vs. Anchors

## PMC vs. CfP



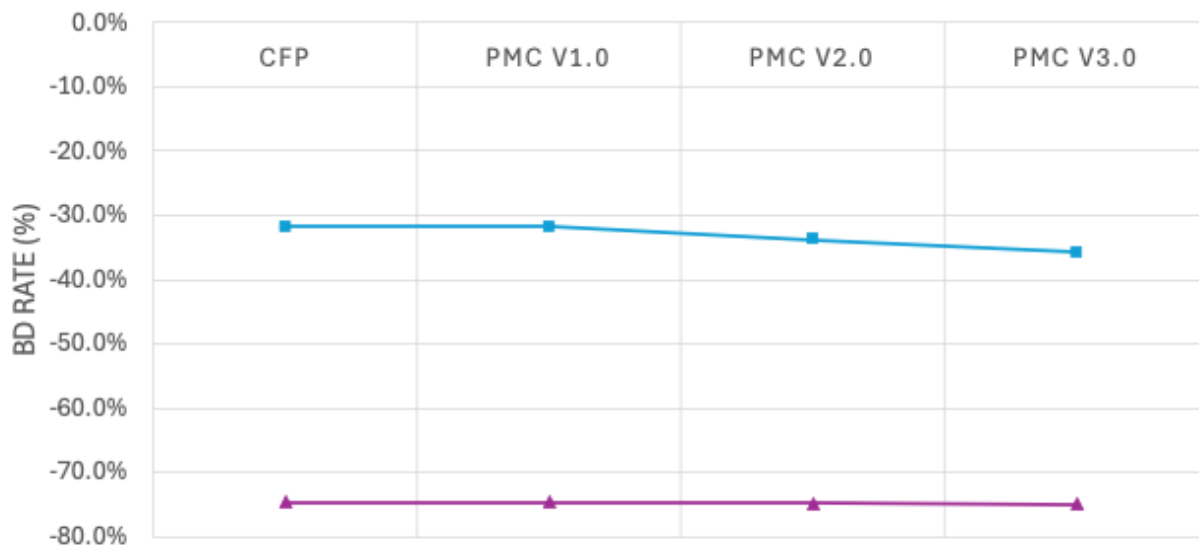
Category	Anchor
Original (e.g., non-manifold...)	Zlib
Pre-processed (e.g., manifold...)	Draco
GPU ready (Index-unified buffer)	Draco

# Progress: Lossy Performance

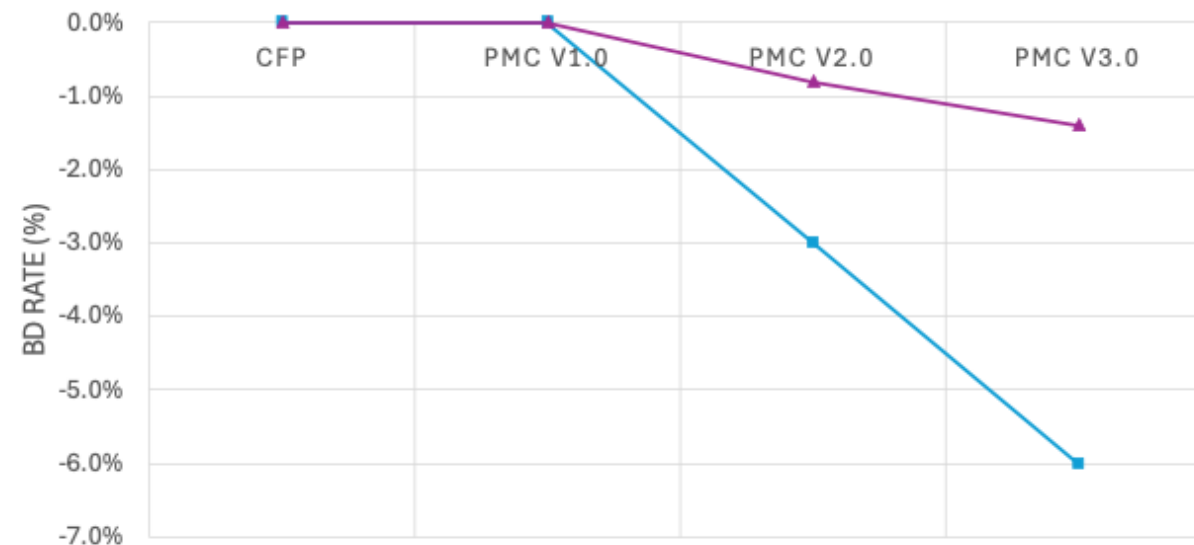
## PMC vs. Anchors

## PMC vs. CfP

LOSSY COMPRESSION PROGRESSION



LOSSY COMPRESSION PROGRESSION

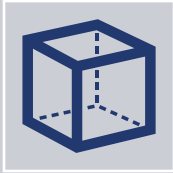


- Geometry (D2-PSNR)
- ▲— Texture (Y-PSNR)

Category	Anchor
Original (e.g., non-manifold...)	Simplification + Draco



# Current and Future Plans



## Volumetric Visual Media Coding Technologies



## Static Polygonal Mesh Coding

State-of-the-art coding performance

Standard Finalized by Dec. 2025

Integration with Universal Scene Description Format



## Other volumetric representation

Animations

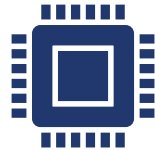
Point Cloud Coding

Gaussian Splatting Coding

# Join Us



**Influence the next  
volumetric media coding  
industry standards**



**Access to VVM Resources**

Software and Specifications,  
contributions, Datasets, computation  
resources...



**Minimal membership fees  
for academic partners**



**Contact us**  
[wg-vvm-chair@aomedia.org](mailto:wg-vvm-chair@aomedia.org)

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Codec (CWG): next-generation video coding technology

Software Implementation (SIWG): optimized SW implementations of AOM standards

Storage and Transport Formats (STF): storage and transport formats for media

Volumetric Visual Media (VVM): efficient coding of immersive/volumetric visual media

# Active Participants

- Google
- Netflix
- Samsung
- Meta
- Tencent
- Vimeo

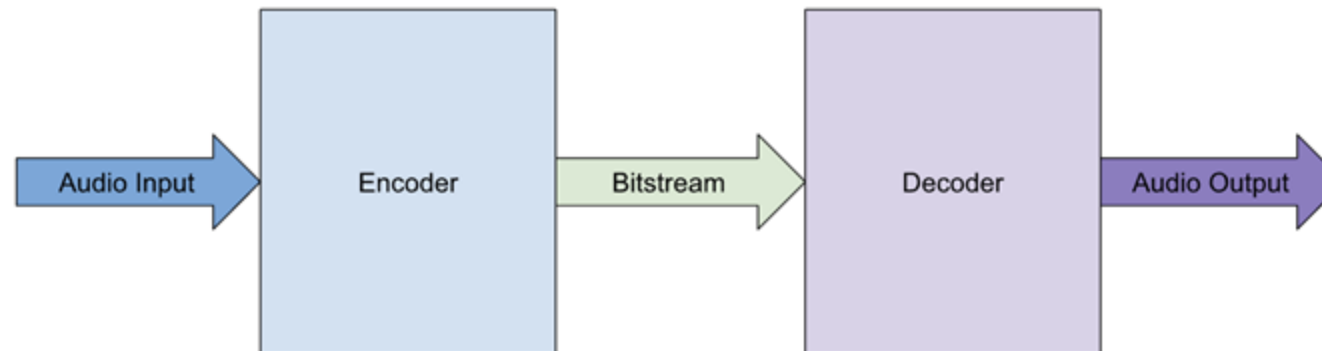


# Requirements for Next Gen Audio Codec

- General highlights:
  - Improved coding efficiency
  - High efficiency audio object compression
  - Support seamless user experience
  - Quality Scaling
  - Loudness Management
  - Variable Latency Encoding
  - Variable Bitrate Encoding
- Use case specific requirements for VOD & Live Streaming and low latency RTC
- No lossless mode

# High Level Codec Design

- Aiming to ingest [IAMF](#), including
  - Channel based content
  - Ambisonic content
  - Object-based content
- Interest in low complexity encoder for mobile devices



# Call to Action / Help Required

- Call for more participants
  - Audio compression experts
- Test material + Listening tests

Contact: [wg-ac-chair@aomedia.org](mailto:wg-ac-chair@aomedia.org)

Thank You.