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CODING OF MOVING PICTURES AND AUDIO**

**ISO/IEC JTC 1/SC 29/WG 7 m64714**  
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**Title:** [V3C] ASPS MIV edition 2 extension  
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### **Abstract**

This proposal requests the ASPS extension for ISO/IEC 23090-12 *MPEG immersive video 2nd edition* to be added to the 3<sup>rd</sup> edition of ISO/IEC 23090-5 V3C + V-PCC. This proposal has a related WG 4 proposal (m64710).

[ver2 \(incl. suggestions from MIV AhG 2023-09-12\):](#)

- [corrected name of the ASPS MIV 2 extension syntax \(removed “common”\).](#)

## **1 Introduction**

Adding new functionality to the 2<sup>nd</sup> edition of MIV requires adding at least one new flag to the ASPS MIV extension. Unfortunately, there are no reserved flags in these extensions. Similarly, there were no reserved flags in the MIV VPS and CASPS extensions, as well as in the V-PCC ASPS and AAPS extensions.

This proposal together with a related proposal in WG 4 [m64710] addresses the MIV edition 2 problem by introducing an ASPS MIV edition 2 extension.

## **2 Summary of the WG 4 contribution**

In m63655 and m63656 the VPS and CASPS MIV edition 2 extensions were introduced. In this contribution, we propose to add also the ASPS MIV edition 2 extension. Such an addition will allow to adapt new tools which require per patch signalling (e.g., m64165)

The proposed ASPS MIV edition 2 extension is independent on ASPS MIV extension, and it is acceptable to signal both the ASPS MIV extension and the ASPS MIV edition 2 extension.

To prevent a similar problem when adding a flag to a hypothetical third edition of MIV, the proposed extension includes reserved zero bits for future ISO/IEC use.

### **8.3.2.10 ~~Common-a~~tlas sequence parameter set MIV edition 2 extension syntax**

	<b>Descriptor</b>
asps_miv_2_extension() {	
(...)	(...)
asme_reserved_zero_8bits	u(8)
}	

### 3 Proposed syntax changes

#### 8.3.6.1.1 General atlas sequence parameter set RBSP syntax

	Descriptor
atlas_sequence_parameter_set_rbsp() {	
<b>asps_atlas_sequence_parameter_set_id</b>	ue(v)
<b>asps_frame_width</b>	ue(v)
<b>asps_frame_height</b>	ue(v)
<b>asps_geometry_3d_bit_depth_minus1</b>	u(5)
<b>asps_geometry_2d_bit_depth_minus1</b>	u(5)
<b>asps_log2_max_atlas_frame_order_cnt_lsb_minus4</b>	ue(v)
<b>asps_max_dec_atlas_frame_buffering_minus1</b>	ue(v)
<b>asps_long_term_ref_atlas_frames_flag</b>	u(1)
<b>asps_num_ref_atlas_frame_lists_in_asps</b>	ue(v)
for( i = 0; i < asps_num_ref_atlas_frame_lists_in_asps; i++ )	
ref_list_struct( i )	
<b>asps_use_eight_orientations_flag</b>	u(1)
<b>asps_extended_projection_enabled_flag</b>	u(1)
if( asps_extended_projection_enabled_flag )	
<b>asps_max_number_projections_minus1</b>	ue(v)
<b>asps_normal_axis_limits_quantization_enabled_flag</b>	u(1)
<b>asps_normal_axis_max_delta_value_enabled_flag</b>	u(1)
<b>asps_patch_precedence_order_flag</b>	u(1)
<b>asps_log2_patch_packing_block_size</b>	u(3)
<b>asps_patch_size_quantizer_present_flag</b>	u(1)
<b>asps_map_count_minus1</b>	u(4)
<b>asps_pixel_deinterleaving_enabled_flag</b>	u(1)
if( asps_pixel_deinterleaving_enabled_flag )	
for( j = 0; j <= asps_map_count_minus1; j++ )	
<b>asps_map_pixel_deinterleaving_flag[ j ]</b>	u(1)
<b>asps_raw_patch_enabled_flag</b>	u(1)
<b>asps_eom_patch_enabled_flag</b>	u(1)
if( asps_eom_patch_enabled_flag && asps_map_count_minus1 == 0 )	
<b>asps_eom_fix_bit_count_minus1</b>	u(4)
if( asps_raw_patch_enabled_flag    asps_eom_patch_enabled_flag )	
<b>asps_auxiliary_video_enabled_flag</b>	u(1)
<b>asps_plr_enabled_flag</b>	u(1)
if( asps_plr_enabled_flag )	
asps_plr_information( asps_map_count_minus1 )	
<b>asps_vui_parameters_present_flag</b>	u(1)
if( asps_vui_parameters_present_flag )	
vui_parameters( )	
<b>asps_extension_present_flag</b>	u(1)
if( asps_extension_present_flag ) {	
<b>asps_vpcc_extension_present_flag</b>	u(1)
<b>asps_miv_extension_present_flag</b>	u(1)
<b>asps_miv_2_extension_present_flag</b>	u(1)

<b>asps_extension_5bits</b>	u(6)
}	
if( asps_vpcc_extension_present_flag )	
asps_vpcc_extension() /* Specified in Annex H */	
if( asps_miv_extension_present_flag )	
asps_miv_extension() /* Specified in ISO/IEC 23090-12 */	
if( asps_miv_2_extension_present_flag )	
asps_miv_2_extension() /* Specified in ISO/IEC 23090-12 */	
if( asps_extension_5bits )	
while( more_rbsp_data() )	
<b>asps_extension_data_flag</b>	u(1)
rbsp_trailing_bits()	
}	

## 4 Proposed semantics changes

### 8.4.6.13 General atlas sequence parameter set RBSP semantics

...

**asps\_extension\_present\_flag** equal to 1 specifies that the syntax elements **asps\_vpcc\_extension\_present\_flag**, **asps\_miv\_extension\_present\_flag**, **asps\_miv\_2\_extension\_present\_flag**, and **asps\_extension\_5bits** are present in the `atlas_sequence_parameter_set_rbsp()` syntax structure. **asps\_extension\_present\_flag** equal to 0 specifies that the syntax elements **asps\_vpcc\_extension\_present\_flag**, **asps\_miv\_extension\_present\_flag**, **asps\_miv\_2\_extension\_present\_flag**, and **asps\_extension\_5bits** are not present.

**asps\_vpcc\_extension\_present\_flag** equal to 1 specifies that the `asps_vpcc_extension()` syntax structure is present in the `atlas_sequence_parameter_set_rbsp()` syntax structure. **asps\_vpcc\_extension\_present\_flag** equal to 0 specifies that this syntax structure is not present. When not present, the value of **asps\_vpcc\_extension\_present\_flag** is inferred to be equal to 0.

**asps\_miv\_extension\_present\_flag** equal to 1 specifies that the `asps_miv_extension()` syntax structure is present in the `atlas_sequence_parameter_set_rbsp()` syntax structure. **asps\_miv\_extension\_present\_flag** equal to 0 specifies that this syntax structure is not present. When not present, the value of **asps\_miv\_extension\_present\_flag** is inferred to be equal to 0.

**asps\_miv\_2\_extension\_present\_flag** equal to 1 specifies that the `asps_miv_2_extension()` syntax structure is present in the `atlas_sequence_parameter_set_rbsp()` syntax structure. **asps\_miv\_2\_extension\_present\_flag** equal to 0 specifies that this syntax structure is not present. When not present, the value of **asps\_miv\_2\_extension\_present\_flag** is inferred to be equal to 0.

**asps\_extension\_5bits** equal to 0 specifies that no **asps\_extension\_data\_flag** syntax elements are present in the ASPS RBSP syntax structure. When present, **asps\_extension\_5bits** shall be equal to 0 in bitstreams conforming to this version of this document. Values of **asps\_extension\_5bits** not equal to 0 are reserved for future use by ISO/IEC. Decoders shall allow the value of **asps\_extension\_5bits** to be not equal to 0 and shall ignore all **asps\_extension\_data\_flag** syntax elements in an ASPS NAL unit. When not present, the value of **asps\_extension\_5bits** is inferred to be equal to 0.

**asps\_extension\_data\_flag** may have any value. Its presence and value do not affect decoder conformance to profiles specified in this version of this document. Decoders conforming to this version of this document shall ignore all **asps\_extension\_data\_flag** syntax elements.

**Table H-13 – Max allowed syntax element values for the V-PCC toolset profile components**

Syntax element	Profile name			
	V-PCC Basic	V-PCC Basic Still	V-PCC Extended	V-PCC Extended Still
ptl_profile_toolset_idc	0	0	1	1
ptc_one_v3c_frame_only_flag	–	1	–	1
asps_eom_patch_enabled_flag	0		–	
asps_map_count_minus1	Min( 1, LevelMapCount – 1 )		LevelMapCount – 1	
vps_multiple_map_streams_present_flag (when vps_map_count_minus1 > 0)	when present, 1		–	
vps_atlas_count_minus1	0		0	
asps_plr_enabled_flag	0		–	
ai_attribute_dimension_minus1	2		–	
ai_attribute_dimension_partitions_minus1	0		–	
ai_attribute_partition_channels_minus1	–		2	
asps_use_eight_orientations_flag	0		–	
asps_extended_projection_enabled_flag	0		–	
vps_auxiliary_video_present_flag	–		–	
vps_occupancy_video_present_flag	1		1	
vps_geometry_video_present_flag	1		1	
vps_attribute_video_present_flag	–		–	
vps_extension_present_flag	0		0	
VpsPackingInformationPresentFlag	0		0	
VpsMivExtensionPresentFlag	0		0	
VpsMiv2ExtensionPresentFlag	0		0	
afps_miv_extension_present_flag	0		0	
asps_miv_extension_present_flag	0		0	
<b>asps_miv_2_extension_present_flag</b>	<b>0</b>		<b>0</b>	
casps_extension_present_flag	0		0	
casps_miv_extension_present_flag	0		0	
casps_miv_2_extension_present_flag	0		0	
caf_extension_present_flag	0		0	

caf_miv_extension_present_flag	0	0
vuh_unit_type	V3C_VPS, V3C_AD, V3C_OVD, V3C_GVD, or V3C_AVD	V3C_VPS, V3C_AD, V3C_OVD, V3C_GVD, or V3C_AVD

## 5 Conclusions

The proposed specification change enables further development of MIV edition 2.

The proponent recommends adopting this proposal into ISO/IEC 23090-5.