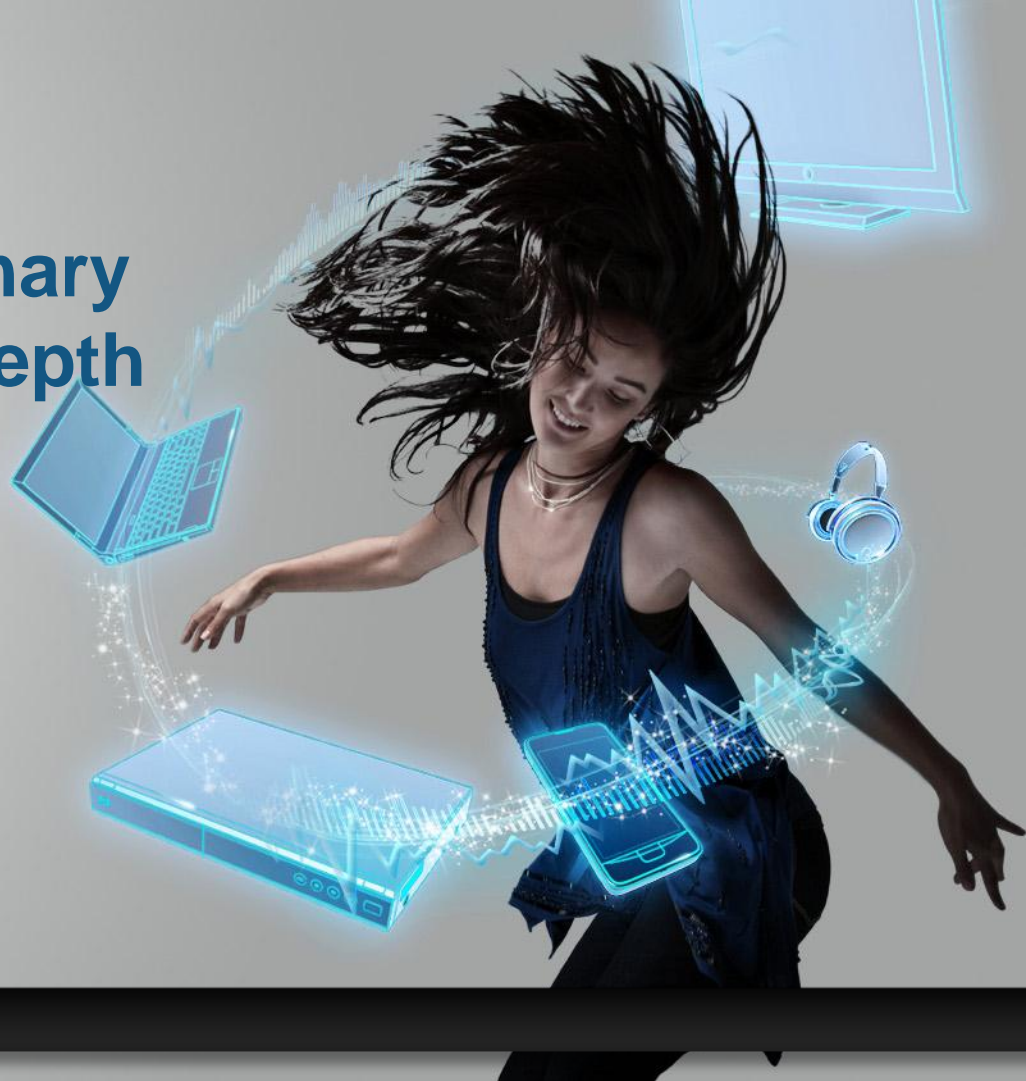# JCT3V-G0115: Preliminary Results of MFC plus Depth

Outline

- Motivation

- MFC compatible extension including depth (MFC+D)

- Preliminary results
    - Experiment setup
   - Simulation results

- Conclusion

Motivation

- Annex I in AVC:
  - Supports FC plus depth format (FC+D) and stereo video coding plus depth format.
  - Defines only one profile: Multiview Depth High Profile, backward compatible to stereo MVC High Profile.

- Multi-view AS3D calls for an input of higher picture quality from video compression prior to multi-view rendering.
  - MFC improves performance of FC while maintaining backward compatibility.
  - Desirable to support the MFC+D format

Display   Data and compression format
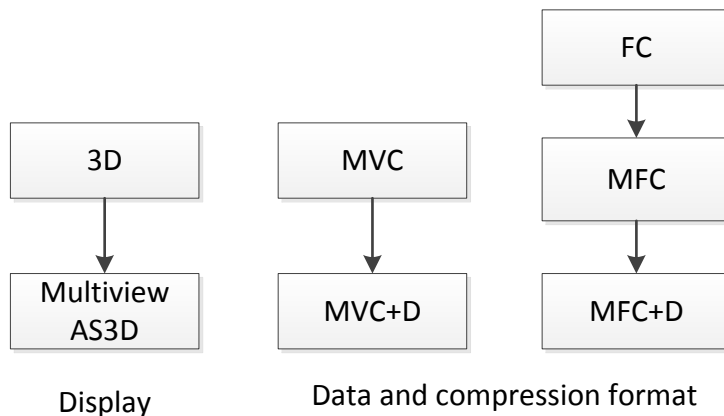
MFC Compatible Extension including Depth (MFC+D)

- Same philosophy as MVC+D: add a new profile MFC Depth High (profile_id 135) in Annex I.
  - Texture view coding is compatible with MFC high profile
  - Depth coding follows the same approach as defined in Annex I.

- Requires minimal changes in Annex I to support MFC Depth High Profile.
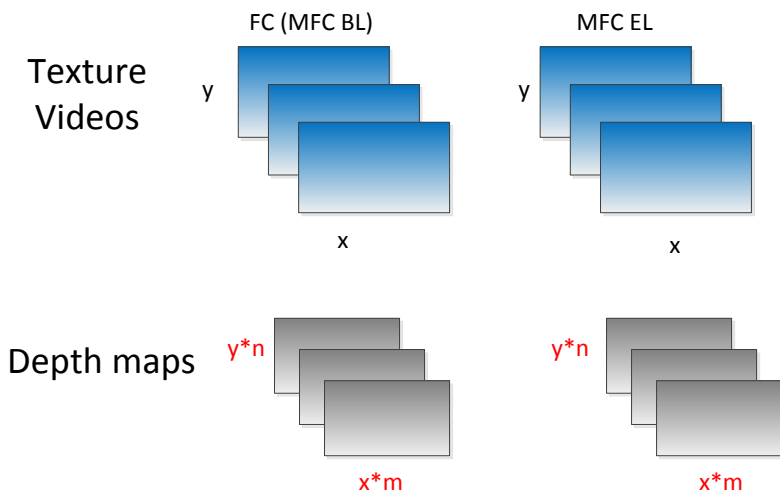
Proposed Text in Spec

- **I.10.1.2   MFC Depth High Profile**

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The sub-bitstream of stereoscopic texture bitstream as specified in clause I.8.5.5 shall obey all constraints of the MFC High profile specified in clause H.10.1.3 and all active MVC sequence parameter sets shall fulfill one of the following conditions:

–　　　　**profile_idc is equal to 134,**

–　　　　**profile_idc is equal to 100,**

–　　　　**profile_idc is equal to 77 or constraint_set1_flag is equal to 1.**

…..

Experiment Setup

- Goal: investigate gain for synthesized views comparing MFC+D with FC+D.

- Preliminary: no compression is involved.

- Informative: provides some upper bound on expected gain.

| Test cases	Video (texture views)	Depth
Reference	Original full resolution left/right views	Original full resolution left/right depths
FC+D	Upsampled FC left/right views	Original full resolution left/right depths
MFC+D	MFC reconstructed left/right views	Original full resolution left/right depths

Test Conditions

- Follow the 3DV common test conditions for 2-view case without compression

- 3 intermediate views (0.25, 0.5 and 0.75) are synthesized.

| Seq. ID	Test sequence	Number of frames to be encoded	2-view input	FC format
S01	Poznan_Hall2	200	7-6	SbS
S02	Poznan_Street	250	5-4	SbS
S03	Undo_Dancer	250	1-5	TaB
S04	GT_Fly	250	9-5	TaB
S05	Kendo	300	1-3	SbS
S06	Balloons	300	1-3	SbS
S08	Newspaper1	300	2-4	TaB
S10	Shark	300	1-5	TaB

Simulation Results Comparing MFC+D and FC+D

- Average Y-PSNR gain of synthesized views is in similar range to that of texture views.

- Expect less gain if view synthesis is performed on compressed data.

- Subjective comparison: synthesized views of MFC+D appear much sharper, contain more high frequencies and feel more pleasant.
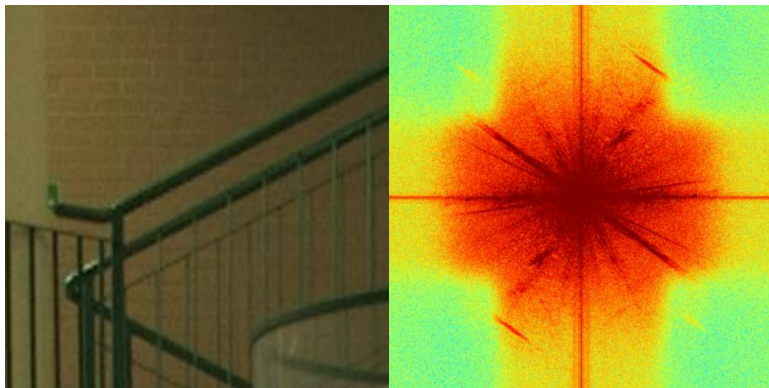
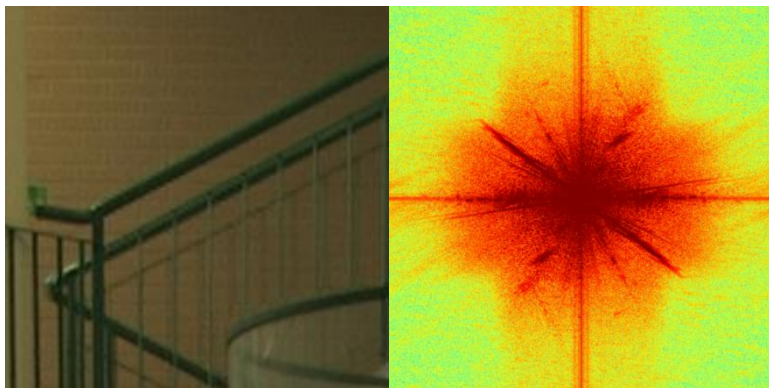| average	PSNR Difference: MFC-FC		
	Y (dB)	U (dB)	V (dB)
video 0	8.1966	4.0120	4.7480
video 1	8.2967	4.1403	4.6481
syn 0.25	7.8414	3.1639	3.8529
syn 0.50	8.0726	2.9808	3.4927
syn 0.75	7.7604	3.0484	3.5042
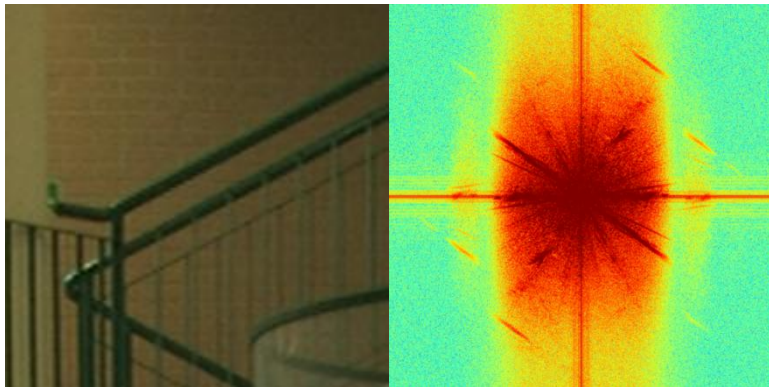
FC upsampled left view
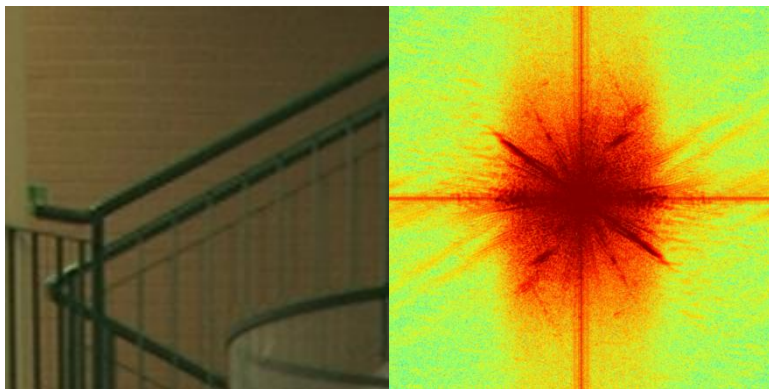
FC synthesized view: 0.5

MFC reconstructed left view

MFC synthesized view: 0.5

Conclusion

- Test results show the potential benefit of using MFC+D compared to FC+D.

- Propose to establish an AHG on further study of MFC+D in multi-view rendering.
    - Provide results with compression at the next meeting

- An informal viewing session may be provided to show the difference between MFC+D and FC+D using a 4K auto-stereoscopic display.

Acknowledgement

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