

# Preliminary Results on Motion Vector Prediction

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# Introduction / Goal

- Give some preliminary results on MV prediction in the TMuC
- Set up a TE on the subject



# Current MV Prediction in the TMuC

**JCT-VC-A205: provides the description of motion vector prediction**

**Current design includes:**

- Interleaved motion vector prediction (IMVP),
- Motion vector competition (MV-Comp), with median + collocated, applied on the vertical component.

**Current version of the software contains:**

- IMVP, enabled by default,
- MV-Comp (also called AMVP), disabled by default,  
uses up to 5 predictors applied on Inter and Skip blocks:  
1- left neighbor, 2- top neighbor, 3- either top-right, bottom-left  
or top-left neighbor, 4- median, 5- scaled collocated.



# Experimental Results (1)

**Reference: IMVP is enabled and MV-Competition is disabled**

- `#define HHI_AMVP_OFF` set to 1.
- MRG:1 and IMP:1 set in the configuration file

## Test 1: IMVP and MV-Competition enabled

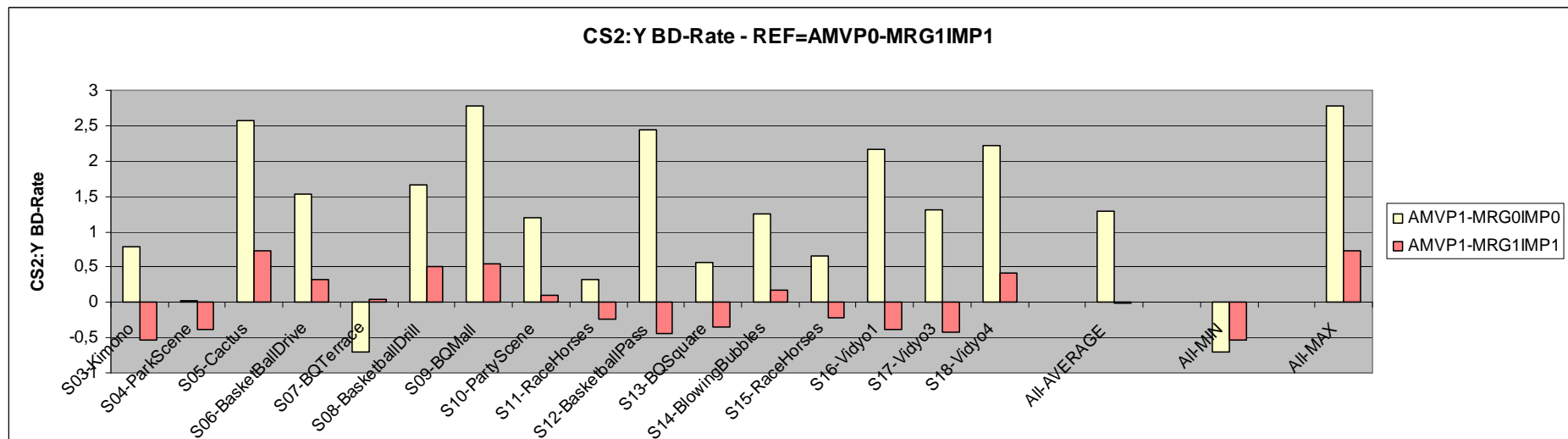
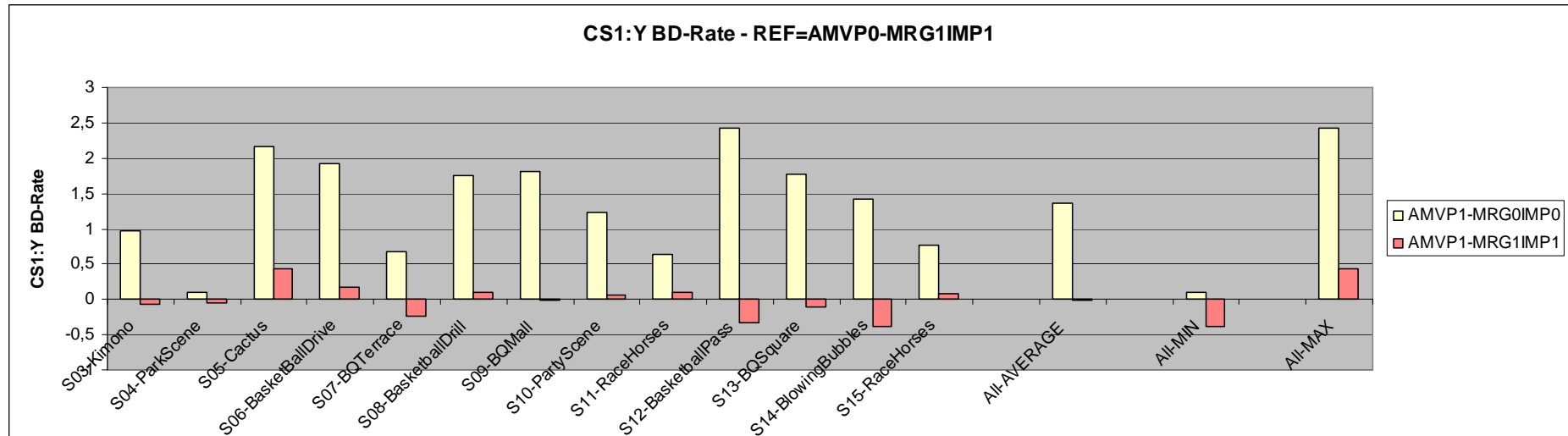
Motion vector competition with up to 5 predictors, and performed only on the vertical component of the motion vector. `#define HHI_AMVP_OFF` set to 0.

## Test 2: IMVP disabled, MV-Competition enabled

`#define HHI_AMVP_OFF` set to 0, MRG:0 and IMP:0 set in the configuration file.

	CS1			CS2		
Test	Avg	Min	Max	Avg	Min	Max
Test 1	-0.01%	-0.37%	+0.42%	-0.00%	-0.54%	+0.73%
Test 2	+1.35%	+0.10%	+2.42%	+1.29%	-0.69%	+2.77%

# Experimental Results (2)



# Conclusion

Neither the configuration provided in JCTVC-A205,  
nor the current implementation in the TMuC SW  
correspond to the best results so far

## **Proposition:**

Set up a Tool Experiment on MV prediction design

## **Goal of the TE:**

- Study MV-Prediction tools currently listed in the TMuC document
- Check how they can be efficiently used and configured
- Propose an adapted design for the TMuC at the next meeting in October



Thanks for your attention



# Test Conditions

- Software version: 32
- Configuration files based on "low complexity" variants
- Only approximately 1 second of each sequence was encoded (25, 33, 49 or 57 frames for 24Hz, 30Hz, 50Hz or 60Hz sequences, respectively).
- SymbolMode: 2 (pipe) is used, rather than 0 (cavlc).





# Test Conditions

## *IPP Example Encoder Output*

Real Format : 416x240 30Hz  
Internal Format : 416x240 30Hz  
Frame index : 0 - 32 (33 frames)  
Number of Ref. frames (P) : 2  
Number of Ref. frames (B\_L0) : 1  
Number of Ref. frames (B\_L1) : 1  
Number of Reference frames : 2  
CU size / depth : 64 / 4  
Transform depth (min / max) : 0 / 1  
Motion search range : 64  
Intra period : -1  
QP : 22.00  
GOP size : 1  
Rate GOP size : 1  
Max physical trans. size : 64  
Bit increment : 0  
Luma interpolation : TEN directional interpolation filter  
Chroma interpolation : TEN two-stage bi-linear filter  
Entropy coder : PIPE

TOOL CFG: ALF:0 IBD:0 HAD:1 SRD:1 RDQ:1 SQP:0 ASR:0  
PAD:0 LDC:1 NRF:1 BQP:0 QBO:0 GPB:0 FEN:1 RQT:1  
CIP:1 ROT:1 AIS:1 MRG:0 IMP:0

## *HB7 Example Encoder Output*

Real Format : 416x240 30Hz  
Internal Format : 416x240 30Hz  
Frame index : 0 - 32 (33 frames)  
Number of Ref. frames (P) : 2  
Number of Ref. frames (B\_L0) : 1  
Number of Ref. frames (B\_L1) : 1  
Number of Reference frames : 2  
CU size / depth : 64 / 4  
Transform depth (min / max) : 0 / 1  
Motion search range : 64  
Intra period : 32  
QP : 21.00  
GOP size : 8  
Rate GOP size : 8  
Max physical trans. size : 64  
Bit increment : 0  
Luma interpolation : TEN directional interpolation filter  
Chroma interpolation : TEN two-stage bi-linear filter  
Entropy coder : PIPE

TOOL CFG: ALF:0 IBD:0 HAD:1 SRD:1 RDQ:1 SQP:0 ASR:0  
PAD:0 LDC:0 NRF:1 BQP:0 QBO:0 GPB:0 FEN:1 RQT:1  
CIP:1 ROT:1 AIS:1 MRG:0 IMP:0

