



October 3, 2023

Call for Requirements: AR/VR Display Stream Compression

The next generation of AR/VR systems promises to revolutionize the way we interact, communicate, work, and live. However, there are specific AR/VR display technical challenges that need to be addressed to realize this potential.

The Display Stream Compression Task Group is investigating a new compression coding system, referred to here as VDC-X, to address these new AR/VR display systems and their unique requirements highlighted in this call.

While VESA DSC and VDC-M have been deployed within VR products either in a wired set interface from a host processor or embedded within a headset, some recent implementations do not conform well to several assumptions upon which these previous codecs are based.

VDC-X is intended to provide bounded variable rate encoding of sparse color component planes, and it is not intended to address all the use cases of DSC and VDC-M where color components for a pixel are transmitted together. Therefore, the compressed bit rate for visually lossless coding of non-sparse content is not anticipated to be as low as that which can be achieved for DSC. VESA will benchmark any new designs to the same visually lossless standard upheld by DSC and VDC-M.

The VESA DSC Task Group seeks input from VESA members, other standardization bodies, and potential OEMs who may deploy VDC-X in products regarding their specific applications and added requirements for a new intraframe coding standard.

Responses should indicate the applications envisioned for VDC-X, and specific requirements including:

- foveated display density functions
- Field-Sequential Displays (FSD) and their display characteristics
- mura
- display image sparsity
- compression protocol
- compressed bits per pixel (bpp) target
- real-time throughput measured by uncompressed pixels per clock

- preferred encoder and decoder power limit
- preferred encoder and decoder complexity in IC area and memory for buffering
- target resolution in active pixel count horizontal by vertical
- viewing resolution preferably specified in pixels per degree
- different viewing conditions or display usages
- uncompressed pixel formats
 - uncompressed pixel bits per component
 - number of components
 - component types, e.g., RGB, RGBW, RGBG, alternative pixel arrangements, Bayer pattern, etc.
 - chroma sampling and colorimetry
- color space
- support for independent slice architecture

Please include other relevant requirements or flexible control of the coding system not specifically mentioned above.

Similar to DSC and VDC-M, VESA's fundamental system goals are:

1. visually lossless coding at a bounded bit rate (bpp)
2. robust real-time encoding and decoding operation with practical, cost-effective encoders and decoders
3. intraframe coding
4. transport agnostic

Please comment on the desired transport layers:

- headset or headgear-embedded interconnect for AR/VR displays
- external wired AR/VR display interconnect for battery and AC powered systems

Picture quality assessment will rely on industry standards in display viewing and subjective evaluation defined by ISO 9241-303 and ISO/IEC DIS 29170-2, respectively, as well as other proprietary subjective evaluation techniques with either static or scrolling pictures and video clips. Test content for evaluating subjective quality is expected to include images or video with challenging text and graphics, continuous tone images and synthesized test materials.

VESA's standardization process order is:

1. Call for Requirements (this document)
2. Define Requirements
3. Call for Proposals, specifying the requirements
4. Evaluation of proposals
5. Selection of the technology baseline
6. Proposed standard draft
7. Task Group Review (ballot)
8. General Membership Review (ballot)
9. Publication (anticipated in 2024)

Please submit requirements to VESA before Friday November 17th , 17:00 US Pacific Standard Time to the VESA Moderator at moderator@vesa.org.

Questions regarding this Call for Requirements can be sent to the VESA Moderator at moderator@vesa.org and Dr. Greg Cook, Task Group Chairman, at gregory.c@samsung.com.