

# A New Uniform Format for 360 VR Videos

Supplementary Results  
(paper #1010)

Recent breakthroughs in VR technologies, especially in economic VR headsets and massive smartphones are creating a fast-growing demand for 3D immersive VR content. 360 VR videos record a surrounding environment in every direction and give users a fully immersive experience. Thanks to a ton of 360 cameras that launched in the past years, 360 video content creation is exploding and 360 VR videos are becoming a new video standard in the digital industry. When ERP and CMP are perhaps the most prevalent projection and packing layout for storing 360 VR videos, they have severe projection distortion, internal discontinuous seams or disadvantages in aspect ratio. We introduce a new format for packing and storing 360 VR videos using two stage mappings. Hemispheres are uniformly mapped onto squares. Two respective squares are stitched to form a rectangle with the aspect ratio 2 : 1. Our approach is able to avoid internal discontinuity and generate uniform pixel distribution, while keeping the aspect ratio close to the majority standard aspect ratio of 16 : 9. In our manuscript, we demonstrate some experimental results. In Section 6, we design a spherical surface where its latitude and longitude lines are evenly distributed, and there are a few red disks with the same area spreading on the surface. We have demonstrate that CMP/EAC, COHP, and CISP all have variance with disk's areas at different regions after projection (see Figure 12). Their discontinuous seams can be clearly observed. Our results exhibit better performance against other methods. From Figure 13 to Figure 15, we show three different 360 video scenarios: buildings with regular and structured textures, aquarium with unstructured texture and indoor conference with dense crowd.

However, due to the space limit, there are many more results that we could not include in the submission. We include these results in this separate document. The commonly used projections and packing layouts are compared.



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

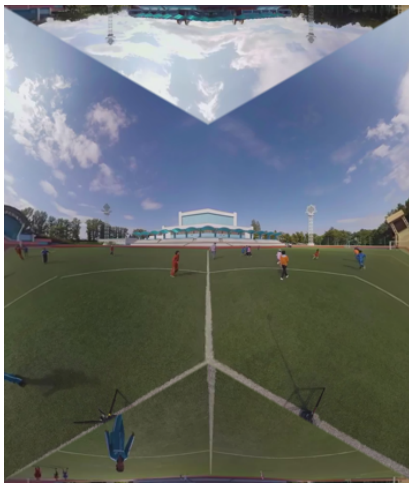
Figure 1: Roadcross



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

Figure 2: Football Field



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

Figure 3: Library



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

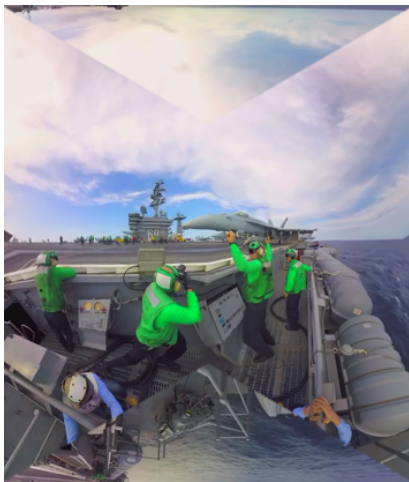
Figure 4: Flight



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

Figure 5: Aircraft Takeoff



CMP 3x2



EAC 3x2



OHP



ISP



ERP



Ours

Figure 6: Dubai