

# GStreamer & VR

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# Open Source VR

Lots of apps and games



## SteamVR vs OpenXR





# OpenHMD

Simple drivers for accessing headset hardware

Legacy, no recent development

Rift CV1 branch

gst-plugins-vr





# Monado

Full OpenXR runtime + compositor

SteamVR driver

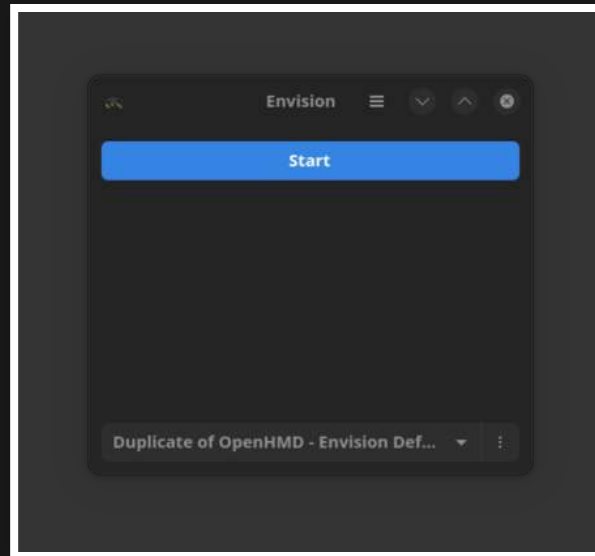
Can pull in OpenHMD drivers

SLAM, Hand tracking



# Envision

Build system for Monado and dependencies  
OpenComposite



# XR Desktops

xrdesktop  
wloverlay



StartdustXR



# Headset support

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Rift CV1, Rift S

WMR

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PS VR2

Quests (wivrn,  
Quest Link)

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Steam headsets (Vive,  
Index, Pimax etc)

North Star

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Rokid



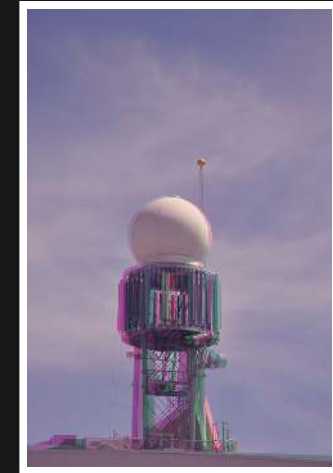
# Video in VR





# Stereoscopic

GStreamer Multiview extensions (2014)



# 360 Panoramic

Equirectangular Mono and Stereoscopic

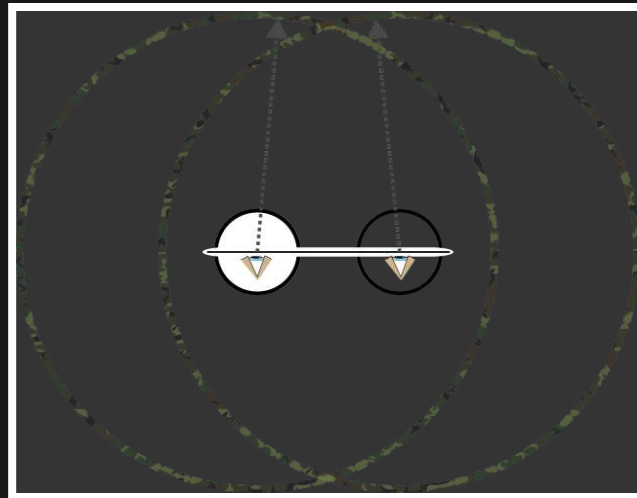
<https://github.com/google/spatial-media>

<https://gitlab.fdo/thaytan/gstreamer/> ...

`spatial-media-isomp4`

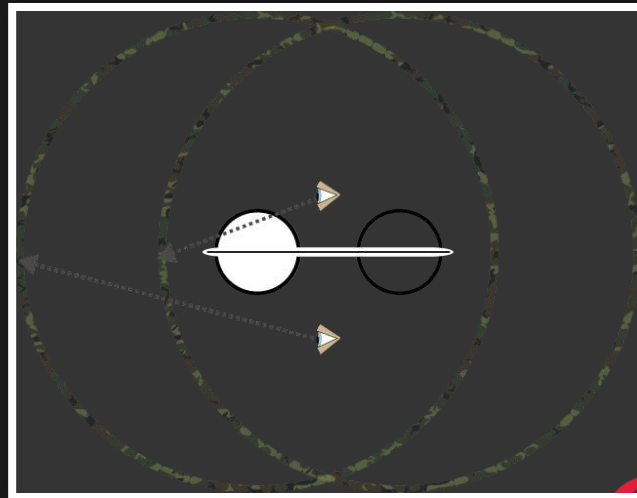


# 360 Panoramic Stereo Problem



# 360 Panoramic Stereo Problem

Decreasing parallax looking left and right



# Adding depth

RGBD Cameras

*Realsense, Azure Kinect, Orbbec Femto Bolt*

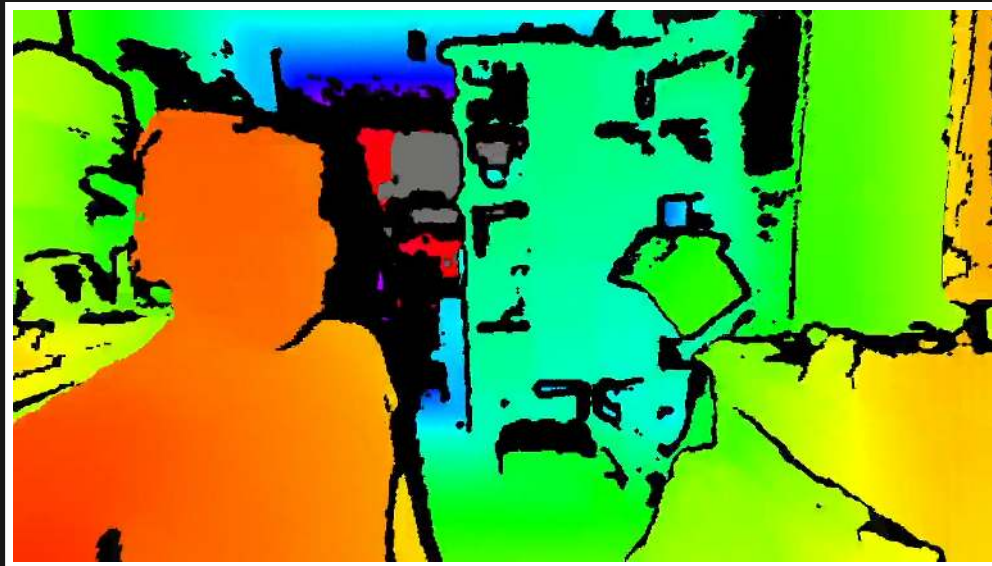


Aivero elements - k4asrc, realsensesrc,  
colorizer



# Stereoscopic from RGBD

Project 2 eye views from depth map  
Shadowed regions



# Volumetric

Meshes and textures

Point clouds / Voxel stream

Capturing camera setups

<https://vcl3d.github.io/VolumetricCapture/>



# Streaming Video

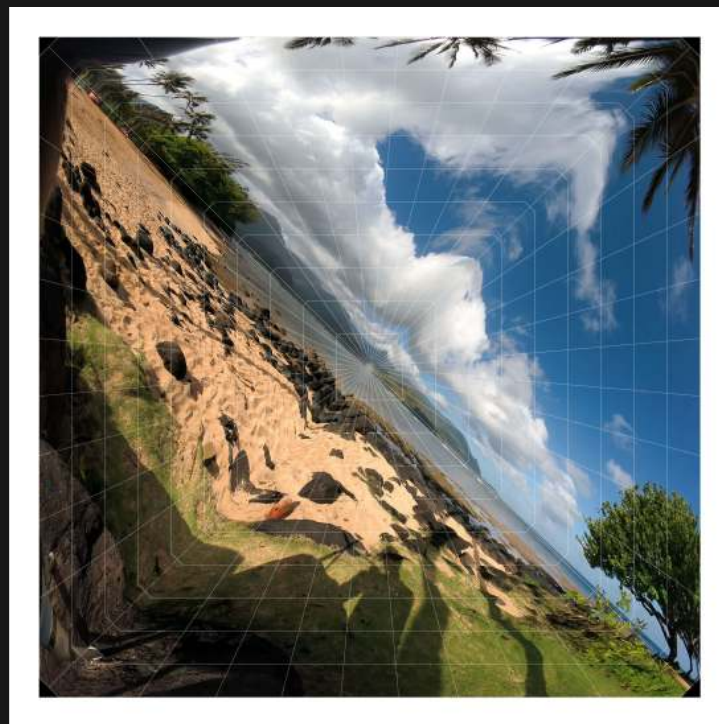
## Stereoscopic + 360°

Encode as usual  
or advanced inter-view prediction (H.264 MVC,  
MV-HEVC layering)





# Apple Vision Pro



<https://blog.mikeswanson.com/apples-mysterious-fisheye-projection/>



# Streaming Video

## RGBD

False Colour Depth

Depth resolution

Chroma Subsampling



# gst-plugins-vr

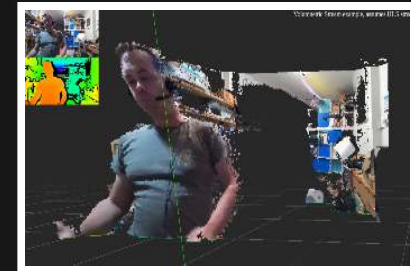
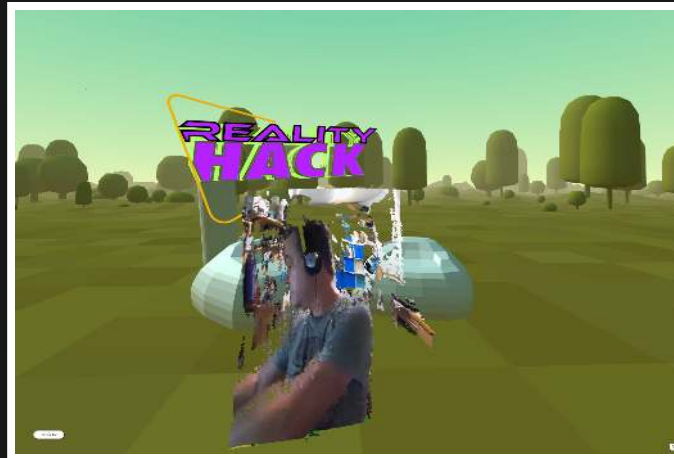
Old project from Lubosz for (monoscopic)  
equirectangular -> OpenHMD



# Mirror portals

MIT Reality Hack 2022

<https://devpost.com/software/mirror-portals>



# Streaming Video

## Volumetric

Meshes + Texture stream

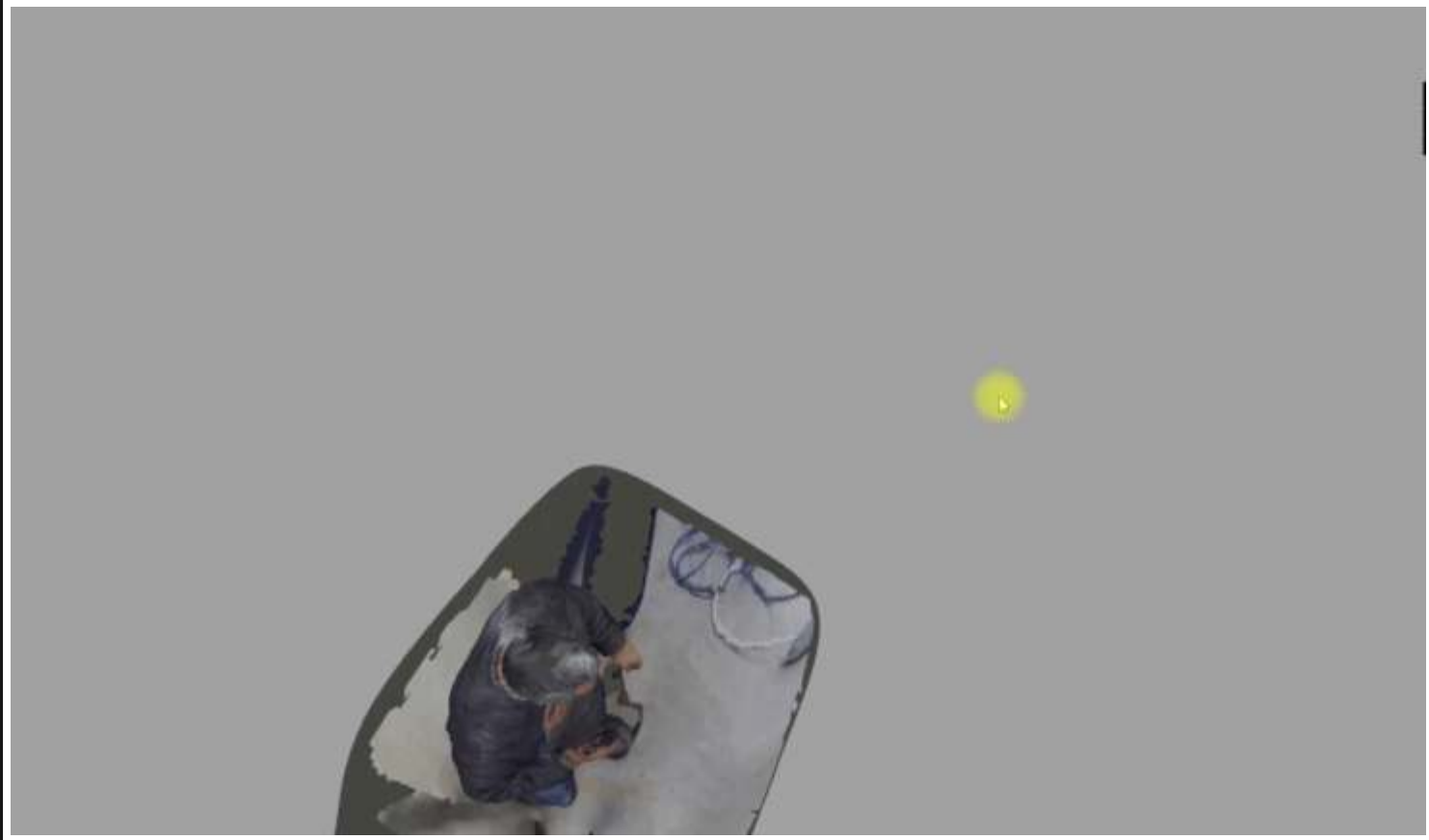
NeRF

Point Clouds

No FOSS yet? <https://www.ietf.org/archive/id/draft-habib-voxelvideo-00.html>

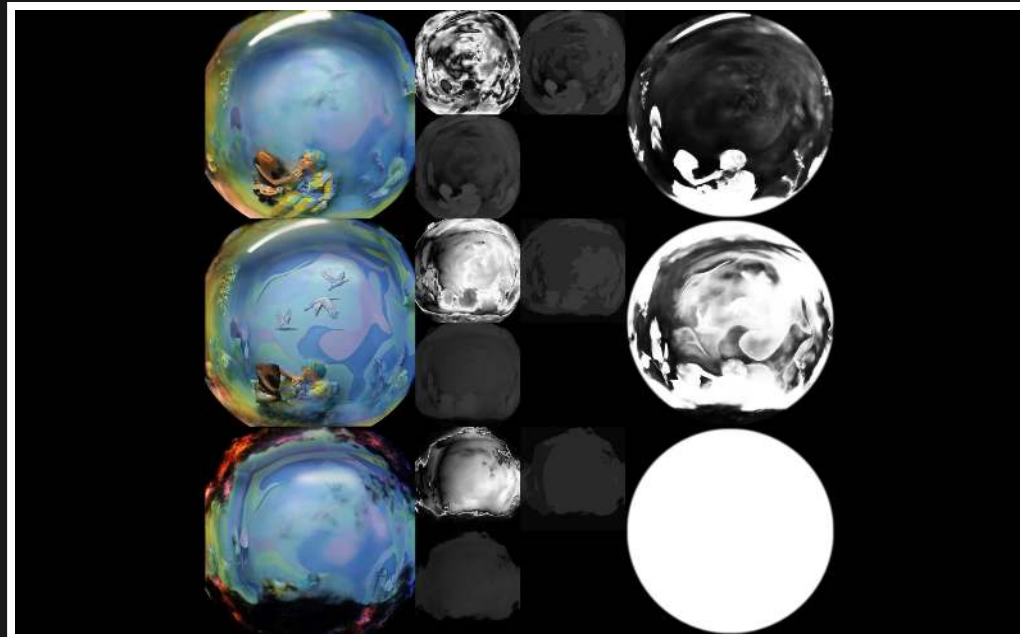


# Ant Media Spaceport



# lifecast.ai

LDI3 encoded layered NeRF



# Thank You!

Questions?

