

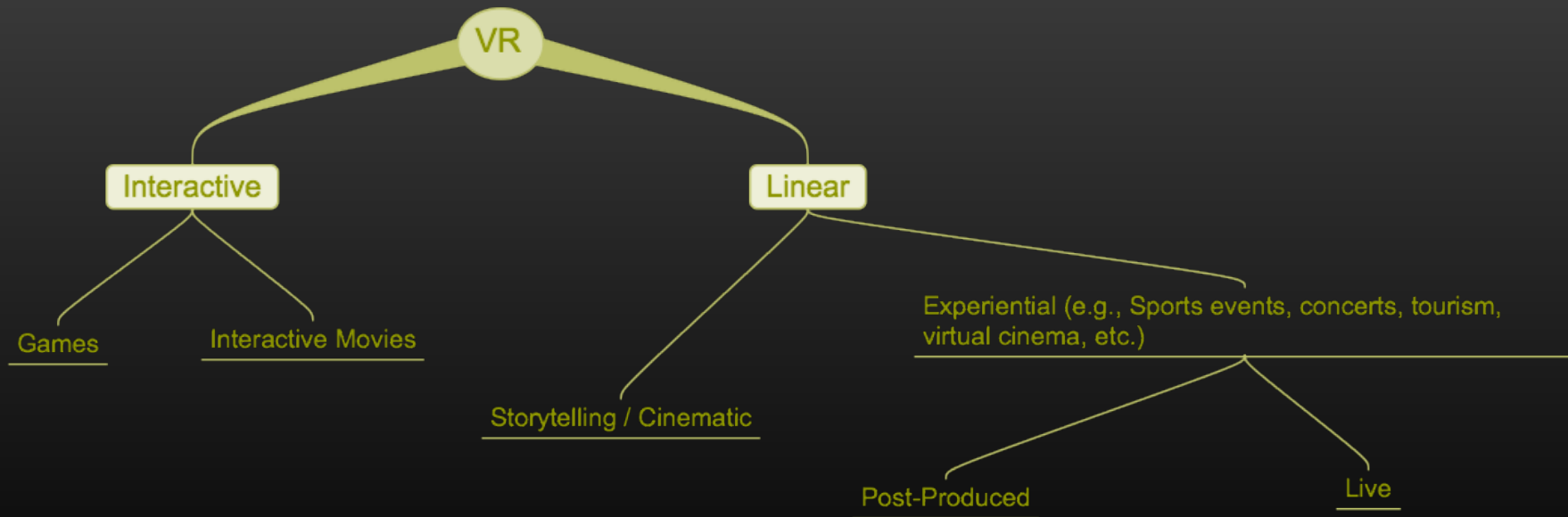


Immersive Audio for VR

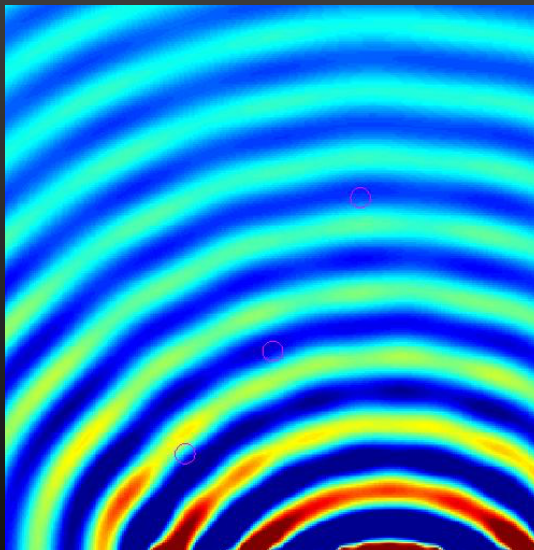
Nicolas Tsingos, Mike Assenti

Dolby Laboratories

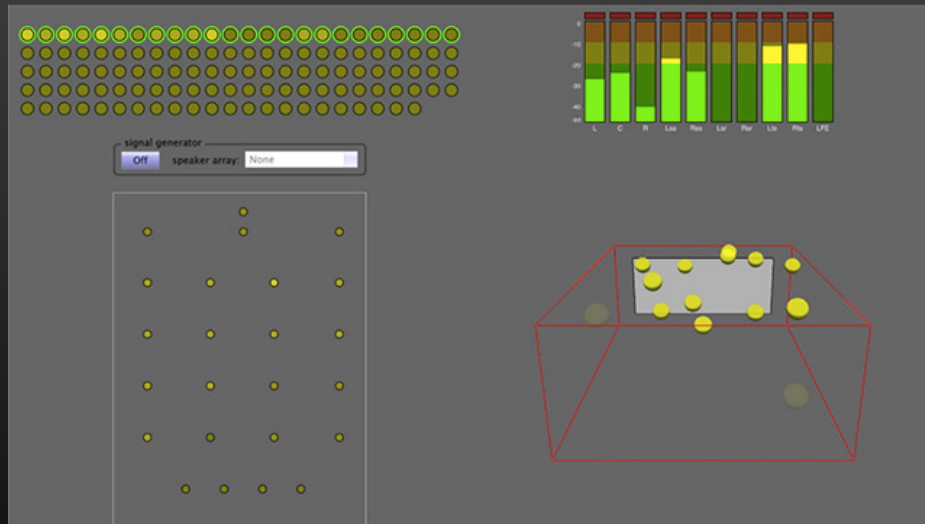
VR landscape



Soundfield and object-based representations



packaged product
channel-based, PCM only

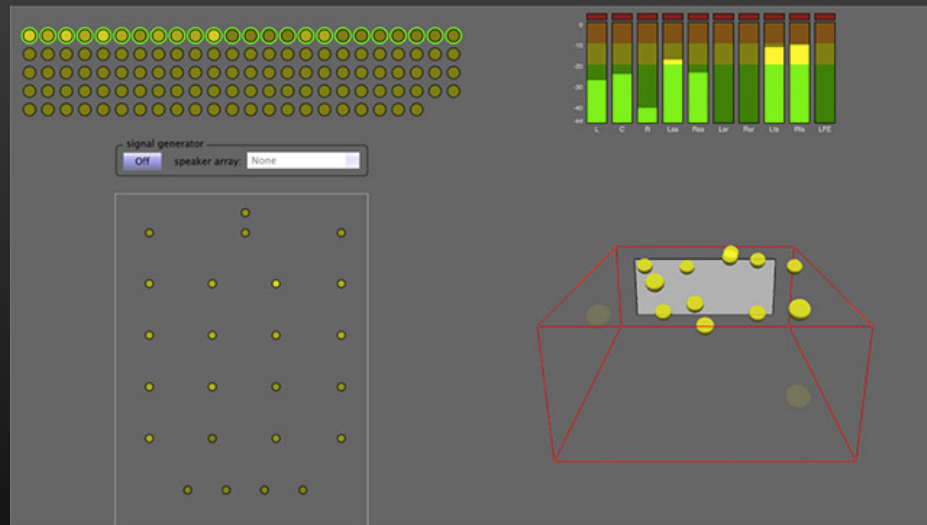


ingredients+instructions
PCM+metadata

Soundfield and object-based representations



Direct capture



Full artistic mix

Be cool, honey bunny



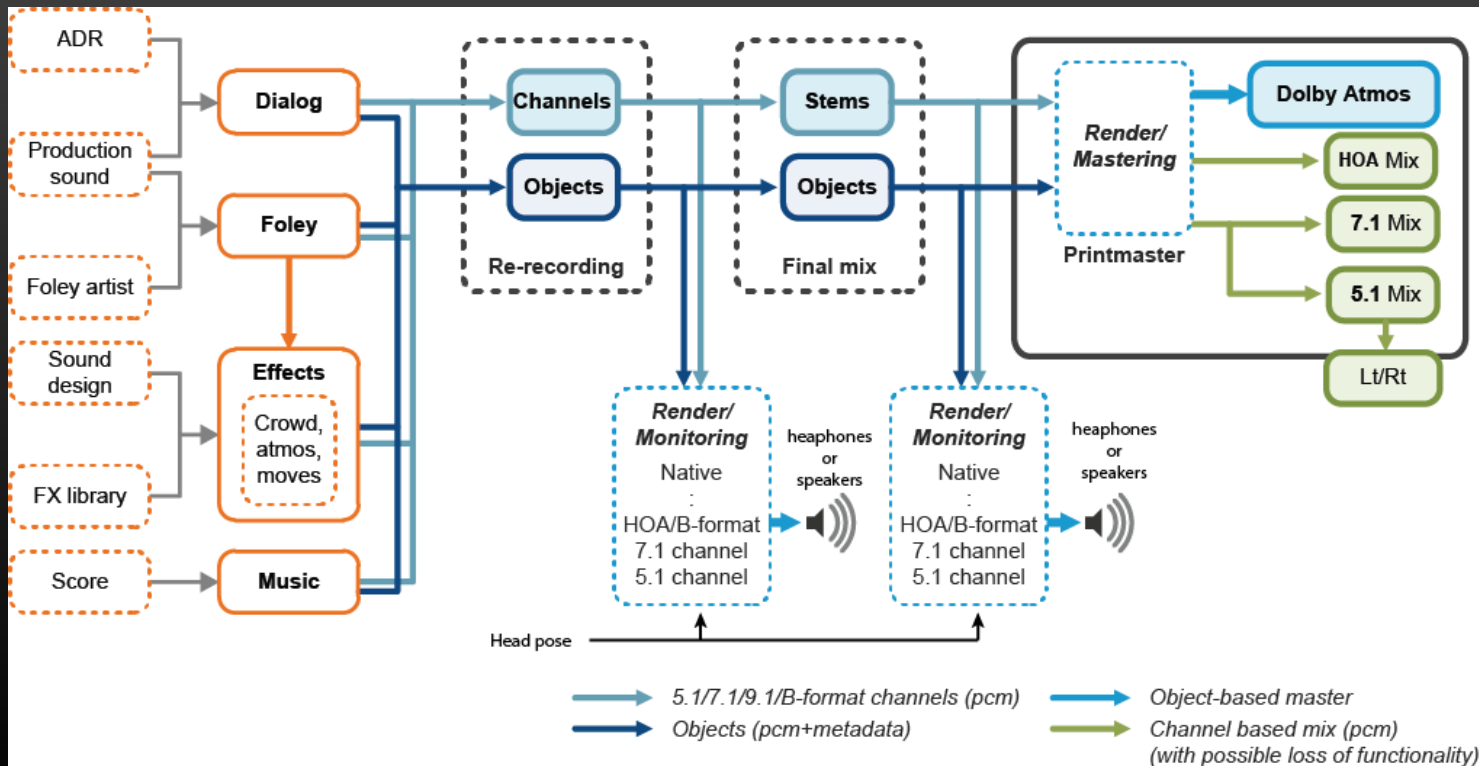
Strength In Numbers



Live and Let Die

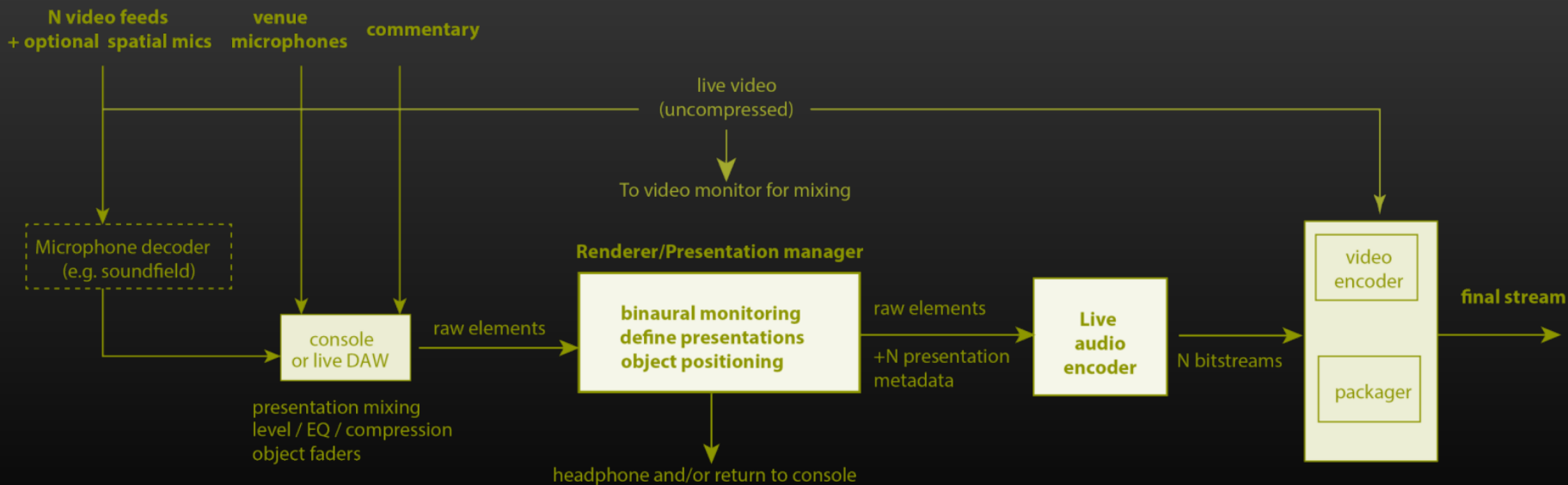


Mixing workflow for post-produced VR



Live VR workflows

- Mixing for multiple viewpoints



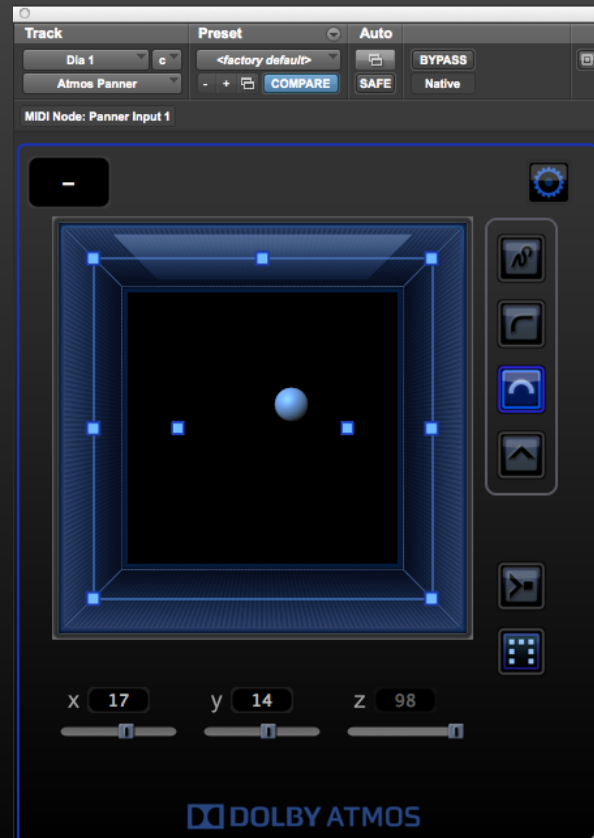


Artistic controls for VR audio

- Choose how each element behaves
 - Diegetic vs. non-diegetic; Effects, Dialog, Music, etc.
 - Headtracked vs. non-headtracked
 - Rendering modes (stereo, binaural)
- Binaural processing impacts timbre
 - Stereo can be a good thing
- Interactivity
 - Gaze-based activation or emphasis

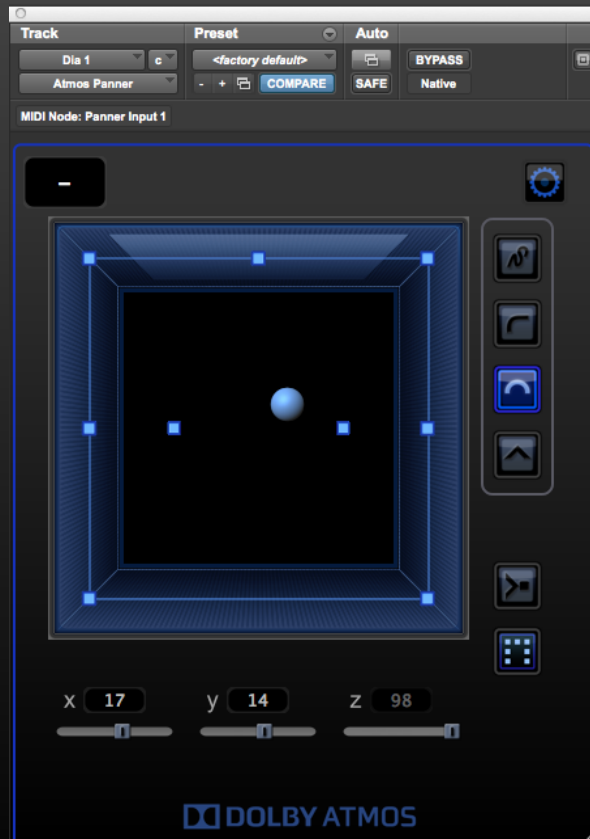
Panning interfaces for VR

- Matching the video/interaction space
 - Cartesian coordinate automation is good for room reference



Panning interfaces for VR

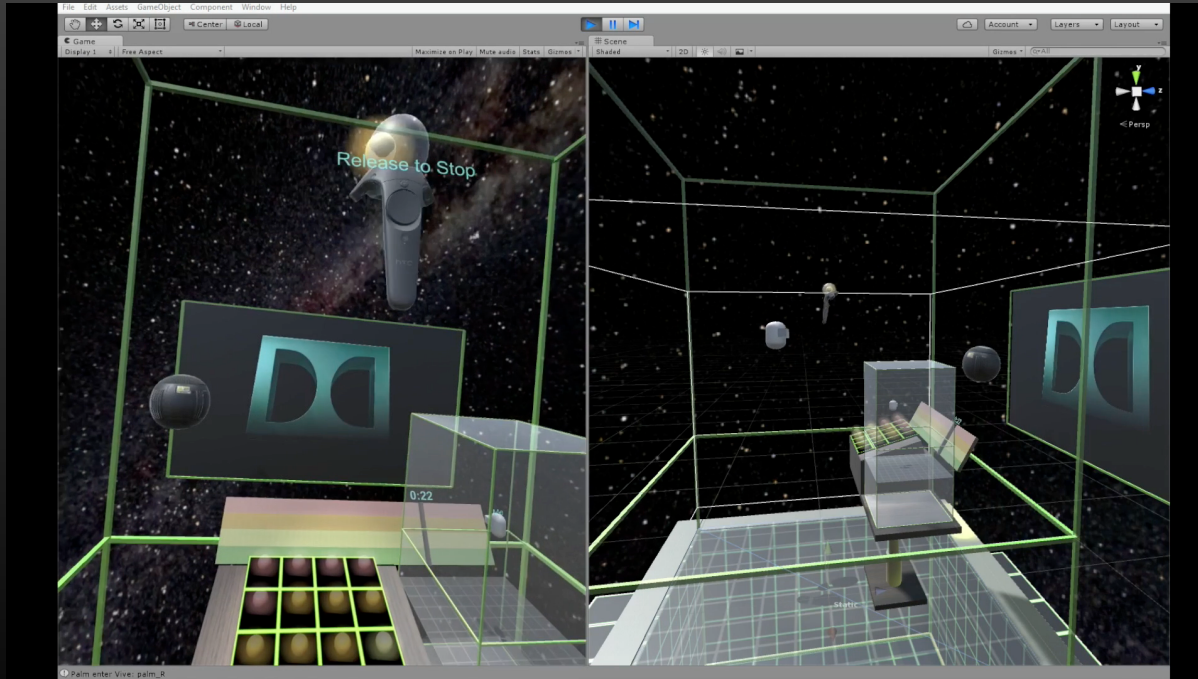
- Matching the video/interaction space
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Automated panning



Mixing VR in VR ?





The Isolator

By HUGO GERNSBACK

MEMBER AMERICAN PHYSICAL SOCIETY

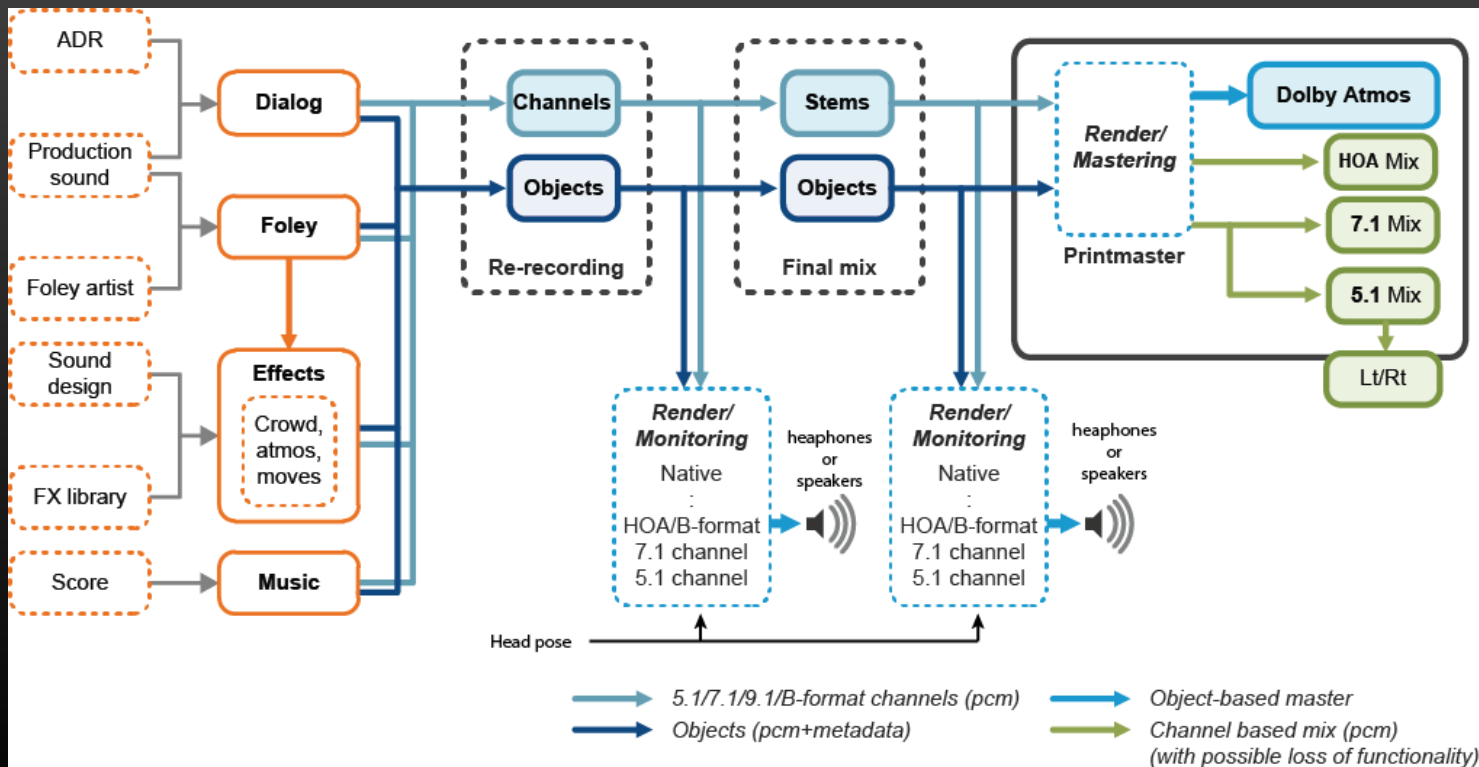


The author at work in his private study aided by the Isolator. Outside noises being eliminated, the worker can concentrate with ease upon the subject at hand.

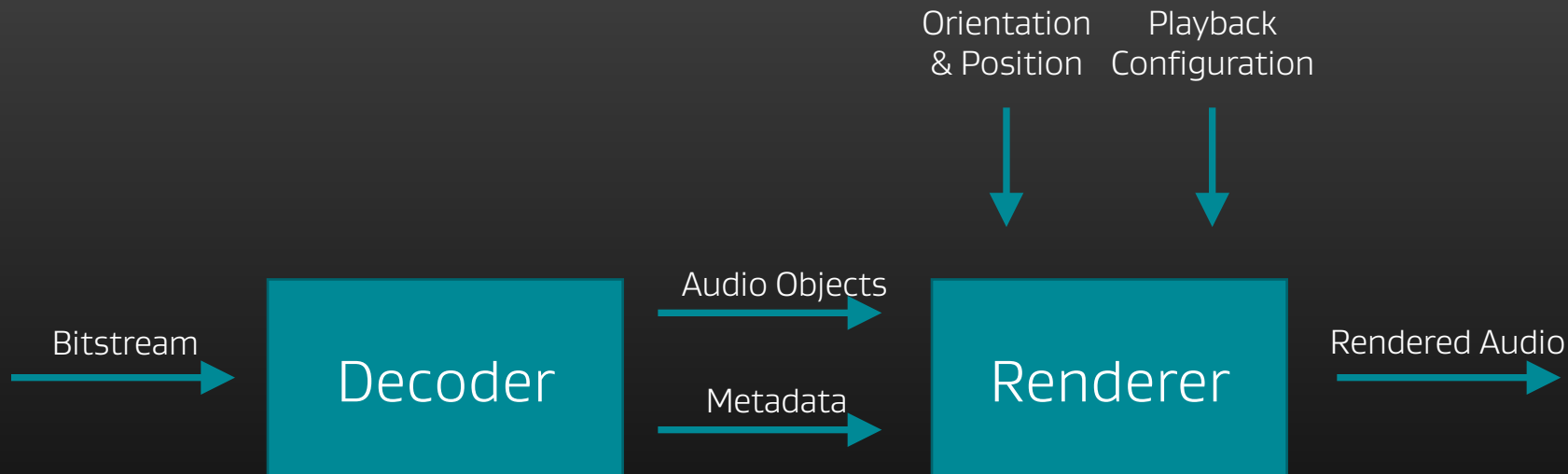
VR Object Audio on the Web

- Web Audio v1 is incredibly powerful. . .
- . . .but it's missing some integration with delivery mechanisms
- Consider a Linear content stream
 - 360 Video bitstream
 - Object Audio bitstream
- How do we actually render this packaged object audio?

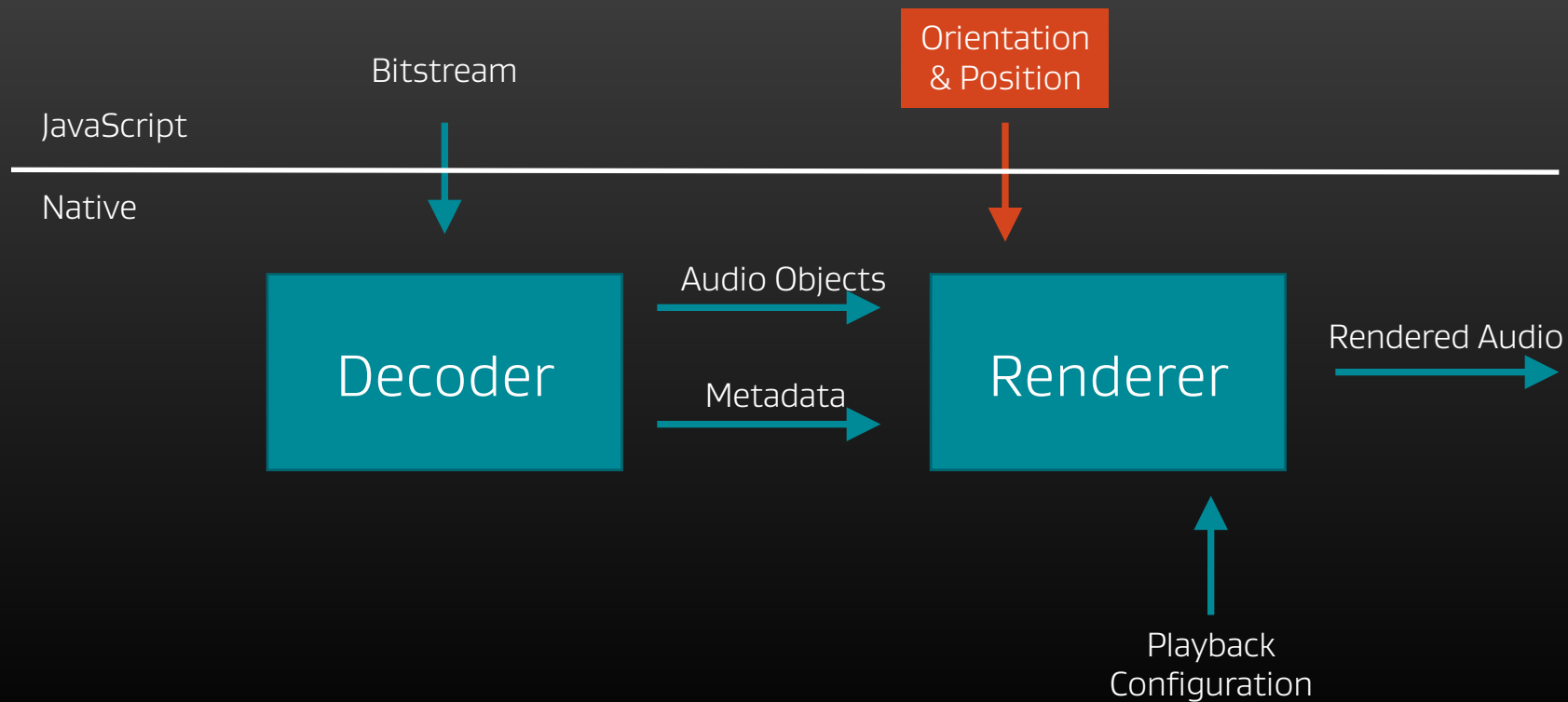
Mixing workflow for post-produced VR



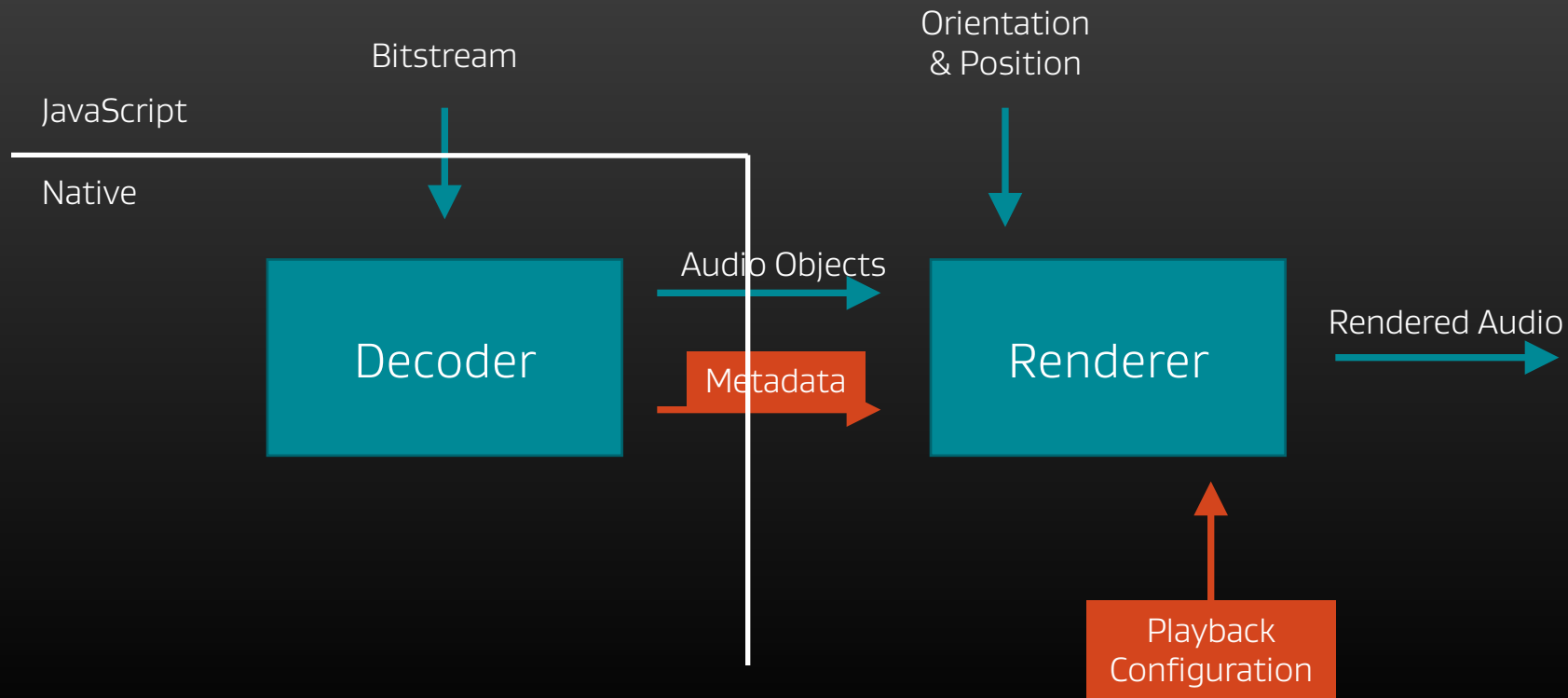
Components of VR Object Audio Playback



Render at decoder



Render in Web Audio



Conclusions

- VR audio is more than head-tracked spatialization over headphones
- Physically-based audio is great but audio production is also art

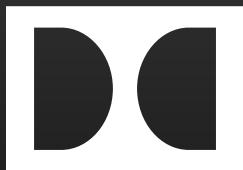
Conclusions

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- Ego-centric, single-point, audio capture and delivery can be limiting.
- Creating compelling VR experiences requires realism , NOT reality

Conclusions

- VR audio is more than head-tracked spatialization over headphones
- Physically-based audio is great but audio production is also art
- Ego-centric, single-point, audio capture and delivery can be limiting.
- Creating compelling VR experiences requires realism , NOT reality
- Web Audio v1 gets us very close to streaming delivery of linear VR
- Looking forward to making further steps with v.next!

Thank you !



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