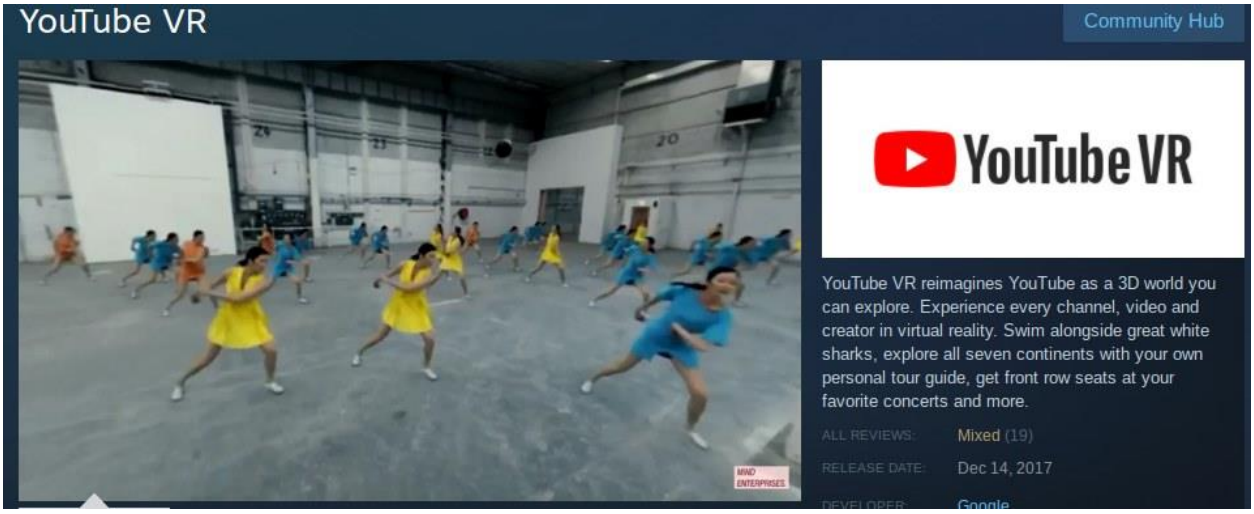


Week 9 - Exporting VR with Spatial Audio

Ambisonic audio is a useful format for VR as, once encoded, it can still be manipulated/rotated without having to have access to all the audio source tracks individually. This is great for applications that need to steer the audio render in real time, like watching 360 videos or playing 3D games. The Ambisonic signals can be decoded to multiple loudspeakers or, for easy listening, to headphones using binaural playback.

Reviewing Audio in 360 Videos

VR videos on YouTube, and other platforms, can use a variety of audio formats and with varying degrees of success.

Audio might be stationary stereo, stereo encoded as spatial that rotates in 2D with the video, or ambisonic that tracks with video movements in 3D.

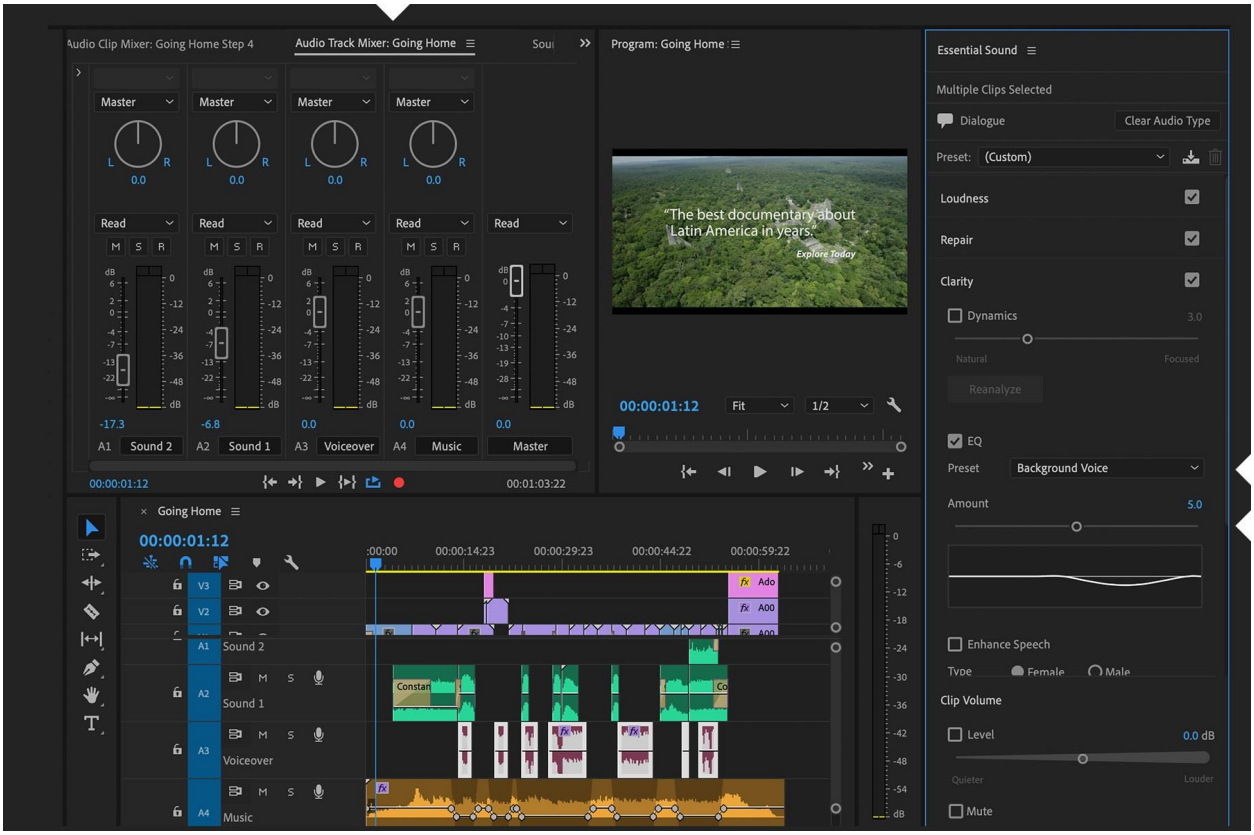
Listen to this example to hear how ambisonic sound should appear when panned correctly.

This example of the ocean pans with the video and includes elevation.

Listen to audio on the 360 video examples provided earlier in this course and note :

1. How spatial is the audio? Stationary stereo, 2D or 3D?
2. How complex is the sound design? A single audio track or multiple sounds mixed together?
3. How is audio used to complement the video? Is it simply background ambience, added music track, dialogue, sound effects, or a combination of these?
4. Does audio play a role in navigation (alerting viewers to actions in particular spatial locations), add to the narrative with off-screen cues, use sounds to anticipate on screen actions, or enhance the mood of the scene?

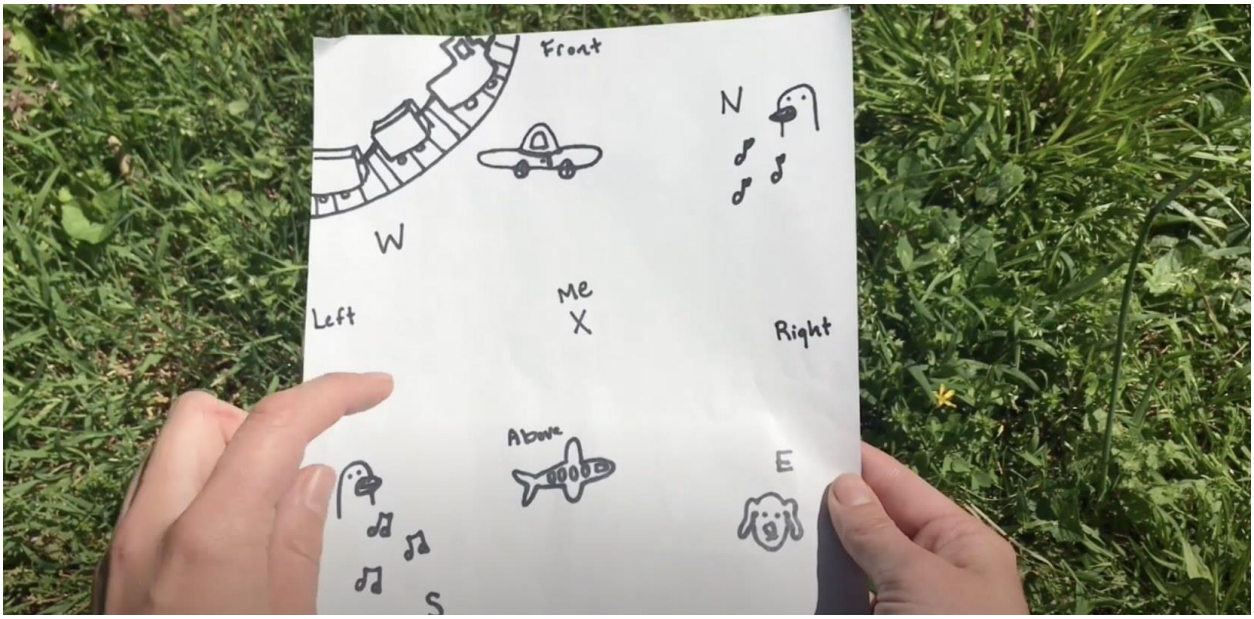
Arranging sounds on the timeline



After recording the sounds you need for your project, each in ambisonic format, lay them out over time using the markers you added to align with the video.

1. Import the audio recordings into Premiere Pro
2. Create as many new audio tracks as you need, making sure they are each set up for adaptive audio.
3. Add recordings to tracks and name the tracks for easy reference as you are editing.
4. Clean up the audio clips by deleting unwanted sections, especially at the start and end of recordings, and add effects as required.
5. Adjust clip volume gain to get decent levels for each sound element.
6. Position the clips at the appropriate location on the timeline to match the video.
7. Adjust each sound's/track's level and location (see below)

Automating sound direction and distance



We hear sound differently when it is close or from a particular direction. The Ambisonic Panner will allow us to change the apparent direction the sound comes from, and we can use effects to alter the sound character (timbre) to give an illusion of distance.

If we need sounds to move over time, we can automate changes in these parameters in Premiere Pro.

Effects to Use

For direction:

- Ambisonic Panner: Adjust the Pan parameter

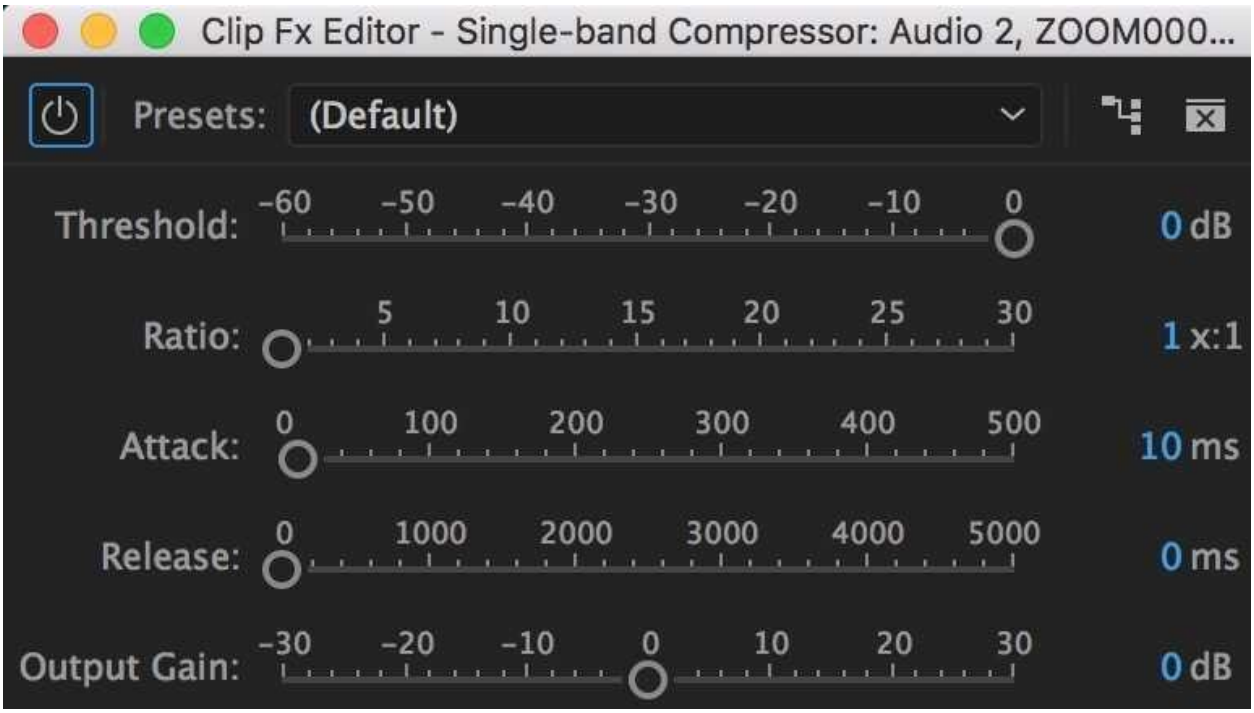
For Distance

- Volume: Adjust the Gain parameter (softer = more distant)
- EQ (equaliser): Adjust low frequency gain (less = more distant)
- Reverb: Adjust the Dry signal level (less = more distant)

For Automation (revision)

- Expand the audio tracks in the sequence timeline to show waveform for the audio elements.
- An parameter level line should appear in the middle of the element.
- Click the first icon, Show Keyframes, to reveal a drop down menu. It will include volume, panning and an item for any plugin on the track. Select the parameter you want to automate from the list. The 'line' through the track will now represent that parameter.
- Command (Ctrl)-click the line to add break-points that can be dragged to change the paramter value curve over time.

Adding Compression to the Mix



Compression reduces the dynamic range of audio, constraining the difference between soft and loud sounds in the mix.

A small amount of compression on the final mix can prevent unwanted loud or soft moments in the audio mix, and provide a stronger sense of cohesion. Too much compression can suck the life out a mix, so use modestly.

4 Ch Compressor in Premiere Pro

- Add a single band compressor plugin to the Mix track.

- Open the Compression plugin GUI by double clicking on the Compressor plugin name in the track.
- Adjust the threshold and ratio parameters.
    - Lower the threshold so that some of the louder parts of the audio are above it. Typically about 60 to 70 percent of the fader value.
    - Increase the ratio to add more or less compression to the audio above the threshold. Typically, a ratio of 4 - 8 is plenty.
- If the audio is noticeably quieter as a result of compressing, then increase the gain compensation in the compressor to restore the volume.

Exporting VR with Ambisonic Audio

1. Turn off the Binauralizer plugin!
2. Select Sequence, then File -- Export -- Media to get to the Export Tab.
3. From the Format menu select "HEVC (H.265)"
4. Open the Video settings section and click the "more..." button
5. Scroll down to the VR section and check the tick box "Video is VR", make sure "Monoscopic" is selected.
6. Open the Audio settings section

7. Check for AAC, 48000kHz, and Channels are 4.0.
8. Click the "more..." button Check the tick box "Audio is Ambisonics"
9. Select the range to be rendered.
10. Press export to save the file.
11. Locate the file on your hard drive.
12. Upload the file to YouTube. It may take up to an hour for YouTube to process the audio into Ambisonic playback. In the meantime, it will play in stereo.

Recording audio and video together

- Position camera and audio recorder at the same location
- Ensure they both face forwards in the same direction, or be ready to pan the sound in Premiere to correct if not.
- Keep the audio recorder below the camera to hide it in the vision
- Use a clap or other audio-visual cue to enable post-production syncing of the audio and video

- If the audio recorder is upside down (as in photo above) remember to rotate the panning after importing into Premiere Pro to re-invert the audio image