

Acheron 6

a solo burial at sea

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VR EXPERIENCE: ACHERON 6

a sound-driven immersive environment

Acheron 6 is set in a doomed Soviet submarine. You wake up there mysteriously and are prompted to interact with elements in your environment. Users have approximately 2 minutes and 25 seconds to attempt to escape the ill-fated vessel alive, soundtracked by the final noises the ship makes as it's swallowed by the sea.

FINAL ARTEFACTS

links to our final project



VIDEO OF EXPERIENCE

<https://www.youtube.com/watch?v=h1mh2uk0j0k>



PLAYABLE BUILD

<https://drive.google.com/open?id=1762cdc7gpeh9idygrj2dbysx2yausoi1>

INTERACTION DESIGN



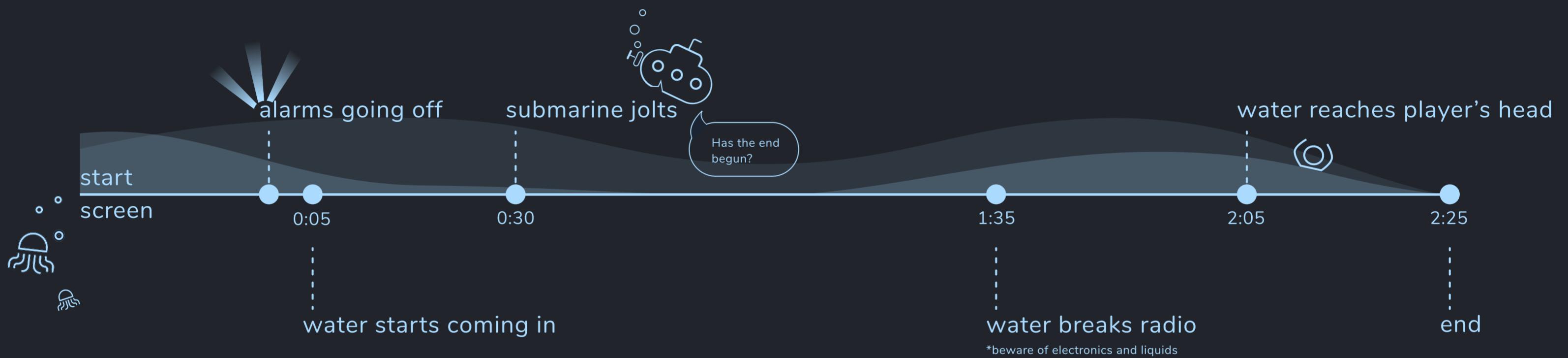
INTERACTION DESIGN

We used Oculus Rift and Unity to create our immersive environment. Our group has experience coding, 3D modeling, texturing, and creating stylized environments. We were thus confident in choosing to use this project stream.

The user will interact with our design using the Rift headset and its two controllers. We included hand animations to add more realism to how users interact with the objects.

THE USER EXPERIENCE

timeline of key interactions



user VS time-based

By mixing both time-based and user-based key interactions, we give users time to explore while also prompting them to interact with elements.

environment changes

At each key point on the timeline, there is a major environmental soundtrack change. These shifts may be added or removed sounds or changes in sound texture.

randomized sounds

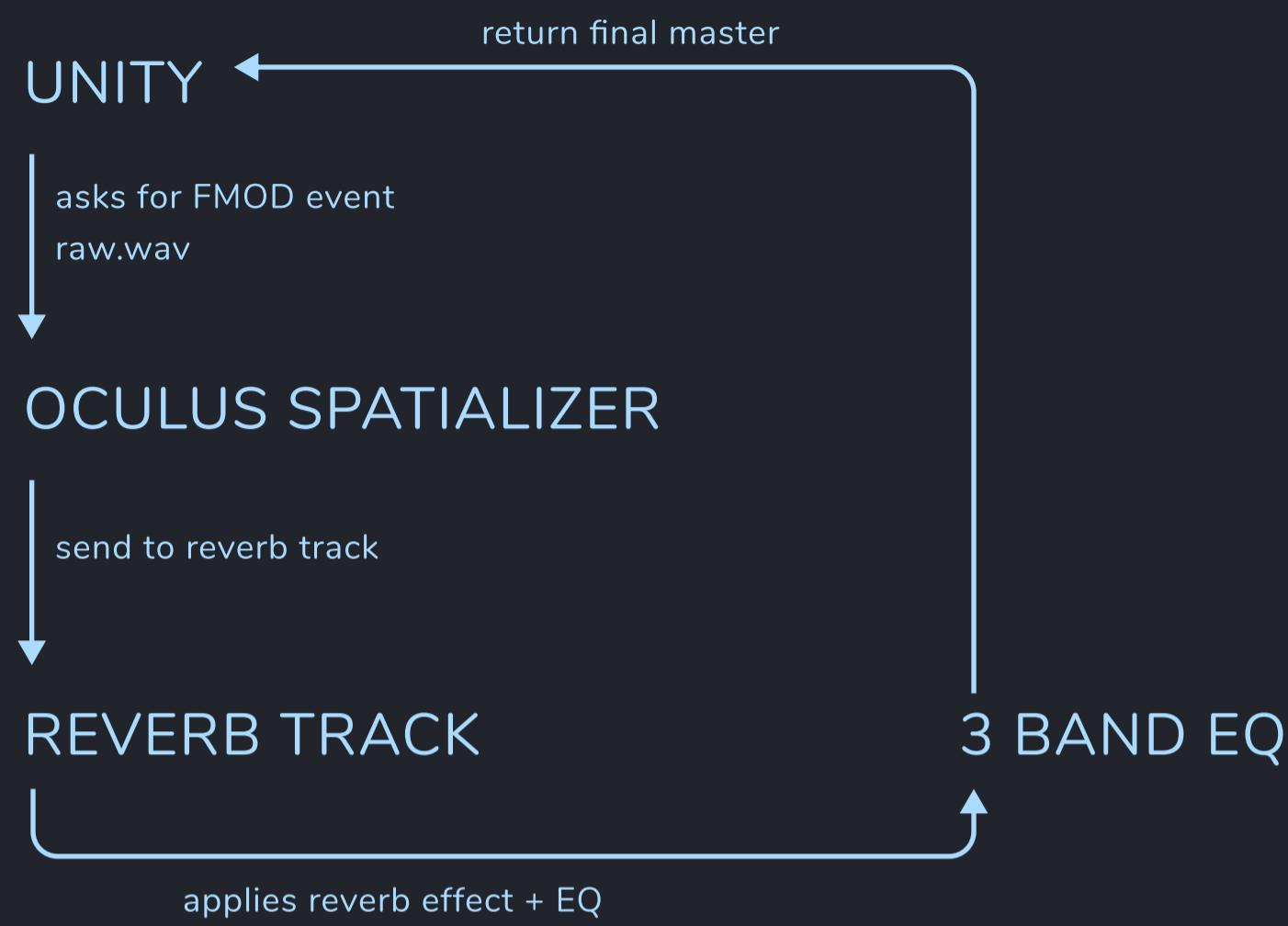
We use variations of certain sounds (e.g. the chain), which are randomized to increase the realism and variety of what the user hears. This also grants more control over how long the sounds last.



TECHNICAL SETUP

TECHNICAL SETUP

the physical space + software



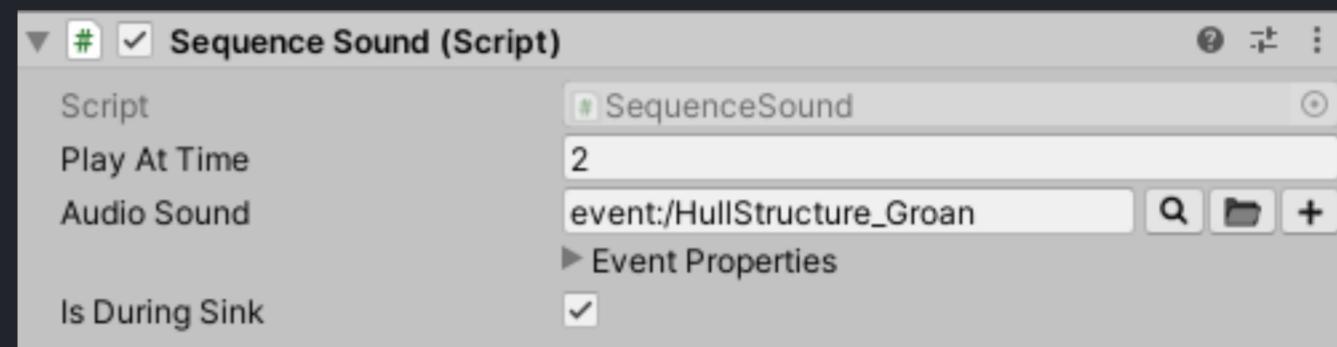
5x10 feet
a solo VR experience

CODE

our approach

modular components

Functionality such as agitation sounds, or pick-up script are all small modular scripts which run in tandem.



direct interface

Sound events are called directly in code using the FMODUnity interface library. Parameters, memory management, spatial attenuation are all done manually.

```
1 reference
private Ienumerator SoundTiming()
{
    if (isDuringSink) // If this is during a sink, wait...
    {
        while (GameManager.isCalm)
        {
            // While the submarine isn't sinking, just wait.
            yield return GameManager.WaitFrame;
        }
    }

    // Begin timer.
    yield return new WaitForSeconds(playAtTime / GameManager.timeMultiplier);

    // Play sound.
    soundInstance = FMODUnity.RuntimeManager.CreateInstance(audioSound);
    soundInstance.set3DAttributes(FMODUnity.RuntimeUtils.To3DAttributes(transform));
    soundInstance.start();
    soundInstance.release();
    yield break;
}
```

developer-friendly

All developed systems are made with non-coders in mind. Adding functions with specific sounds to an object is as simple as dragging and dropping.

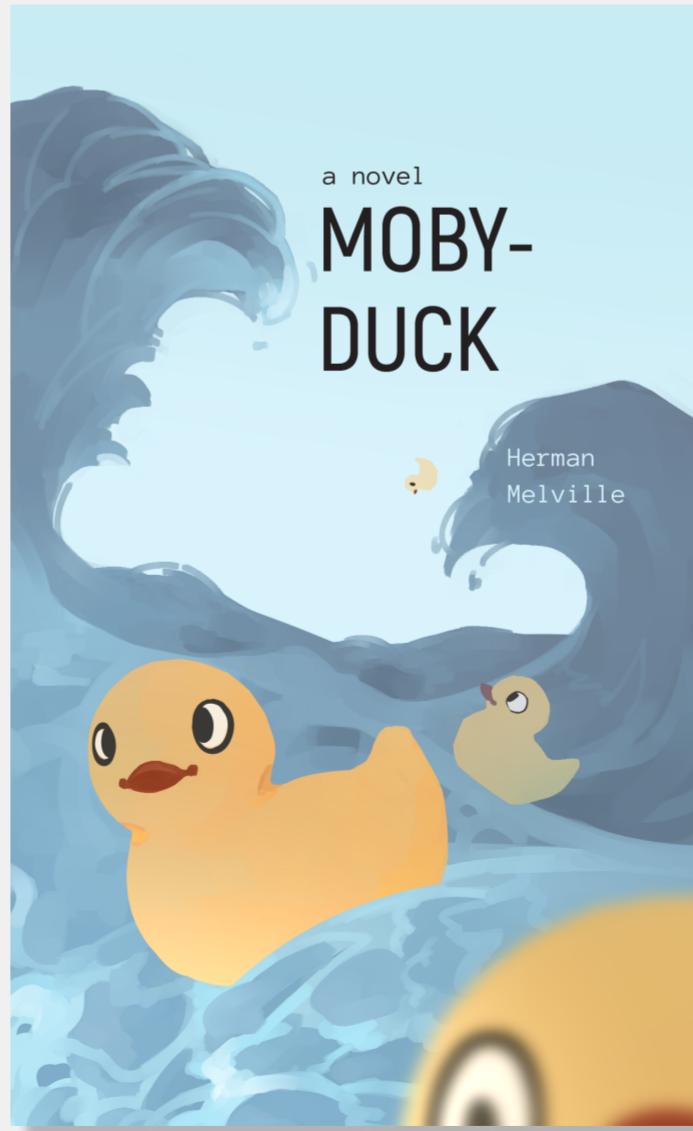
ART DIRECTION

THE ART IN THE ENVIRONMENT

posters + book covers

humour

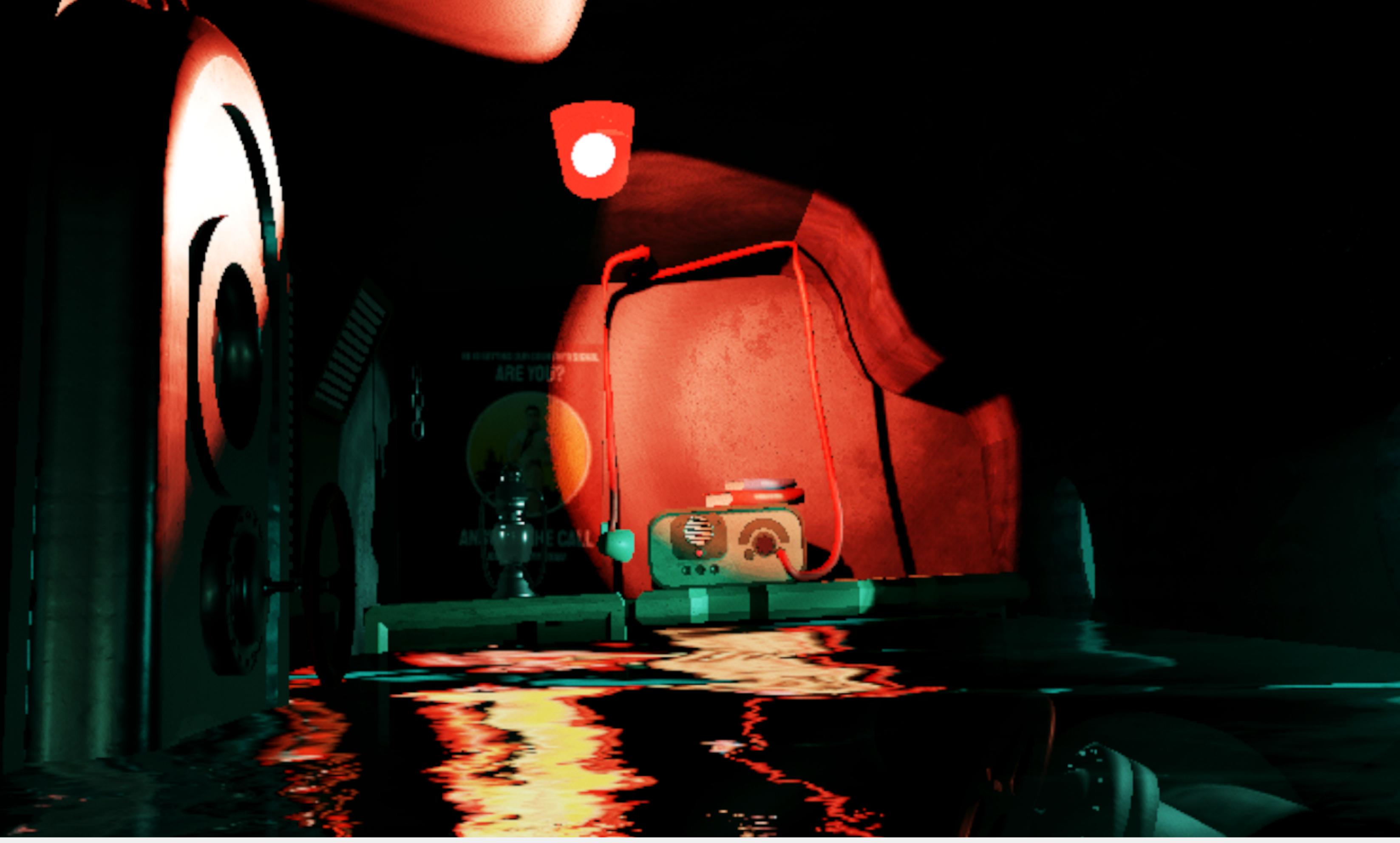
We added elements of humour to the environment such as these book covers, for comedic relief.



interaction prompts

The posters, on the other hand, work to establish the setting as well as prompt user interaction. For instance, “answer the call” is by the radio and is meant to draw users to the mic.





VIBE CHECK

the mood in the submarine

The mood we aimed for is oppressive. We used a dark and foreboding atmosphere to evoke a sense of urgency.

SOUND DESIGN

SOUND DESIGN METHODS

our foley experience

finding sounds

Finding sounds was one of the most enjoyable parts of foley. We created many of the ambient soundtrack using a grand piano and the reverb it created. Other sounds were more literal, such as water sounds using liquids.

adding new interactions

Along the way, we added new interactions or forgot to add certain sounds. For example, we added books, a swinging chain, and a mic to the environment. We had to get creative as leaving the house was no longer viable, but thankfully we all had our own mics at home.

Spotting Log

Default View ▾		A Name	Notes	Status	Assignee(s)	Iteration
Ambient	Periodic	Circulator Fan		Finished	Matt Gray	fan_near.wav fan_further.wav
Ambient	Aperiodic	Hull Creaking	Plays every 10-20 seconds? Metal strain sounds.	Finished	Matt Gray	hull_creaking_te...
Ambient	Aperiodic	Hull Squeaks (Dolphin Noises)	Similar to Hull Creaking...	Fine-tuning		Water-Groans.zip
Ambient	Aperiodic	Lantern Squeak	Plays randomly or (ideally) when chain swings.	Processing		
Ambient	Periodic	Ocean Rumble	Constant low rumble. Supplemented by other ambient effects.	Fine-tuning	Matt Gray	underwater_ru... underwater_ru...
Ambient	Aperiodic	Ocean Whale	Plays once or twice throughout the experience?	Finished		whale_song.wav
Ambient	Periodic	Radio Static (White Noise)		Backlog		
Ambient	Periodic	Steam From Pipes	Hissing of steam as it rushes through pipes on the walls. Perhaps triggered after the sub has been sinking for a while.	Processing	Issaca Tsang	
Ambient	Aperiodic	Water Drip	Bathtub drops. Easy to record.	Processing	Issaca Tsang	Water-Dripping...
Ambient	Periodic	Water Spray	Bathtub filling for about 1:30. Remove some of the low freq.	Processing	Noah Burkholder	Water-Spray_01...
Collision	Aperiodic	Book Thumps		Finished	Matt Gray	book_sounds.zip
Collision	Aperiodic	Chain Clanking		Finished		
Collision	Aperiodic	Hull Jolting	The sound of the submarine jolting and re-settling on the rocks.	Finished	Matt Gray	
Collision	Aperiodic	Lantern Collision	Sound of lantern body resonating. Hard and tin-y sounding?	Finished	Matt Gray	
Collision	Periodic	Valve Busting	Metallic bar of some sort?	Processing	Noah Burkholder	
Collision	Aperiodic	Water Splash	Could be used for player footsteps, and objects dropped on the floor.	Processing		Water-PlopsSwi... bigger_splash...
Misc	Periodic	Footsteps (Metal)	Plate metal banging from desk.	Fine-tuning	Noah Burkholder	

planning sessions

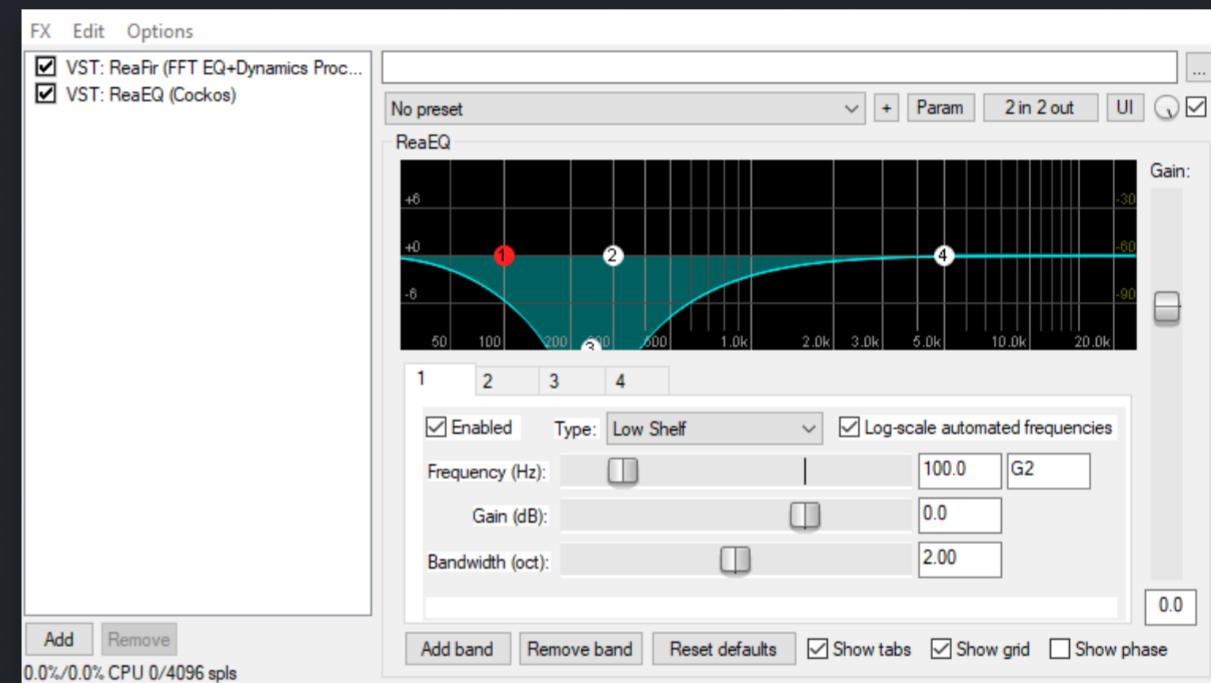
We started foley by creating a spotting log of all the sounds we could possibly use in our VR interactions. We listed them along with notes describing what sorts of sounds they were. Due to COVID-19, we were only able to have one in-person session with all three of us, however we were still able to get most of the sounds we needed.

SOUND PROCESSING

reaper + audition

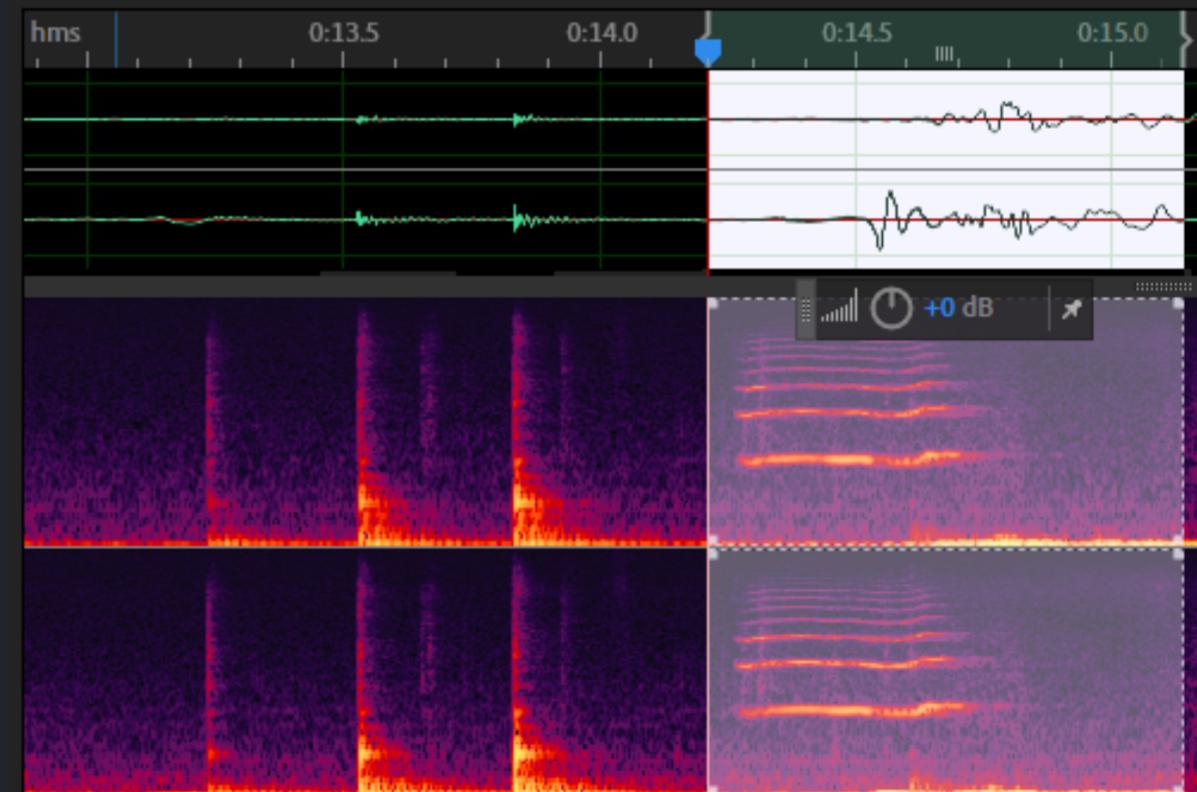
noise removal

Every recorded sound had a noise removal filter applied to it, to eliminate room tone and other unwanted background noises.



eq + stretch

We used parametric EQ filters to alter the characteristics of certain sounds. We also used them to cut undesirable frequencies and artifacts that slipped past noise removal.



SOUND PROCESSING

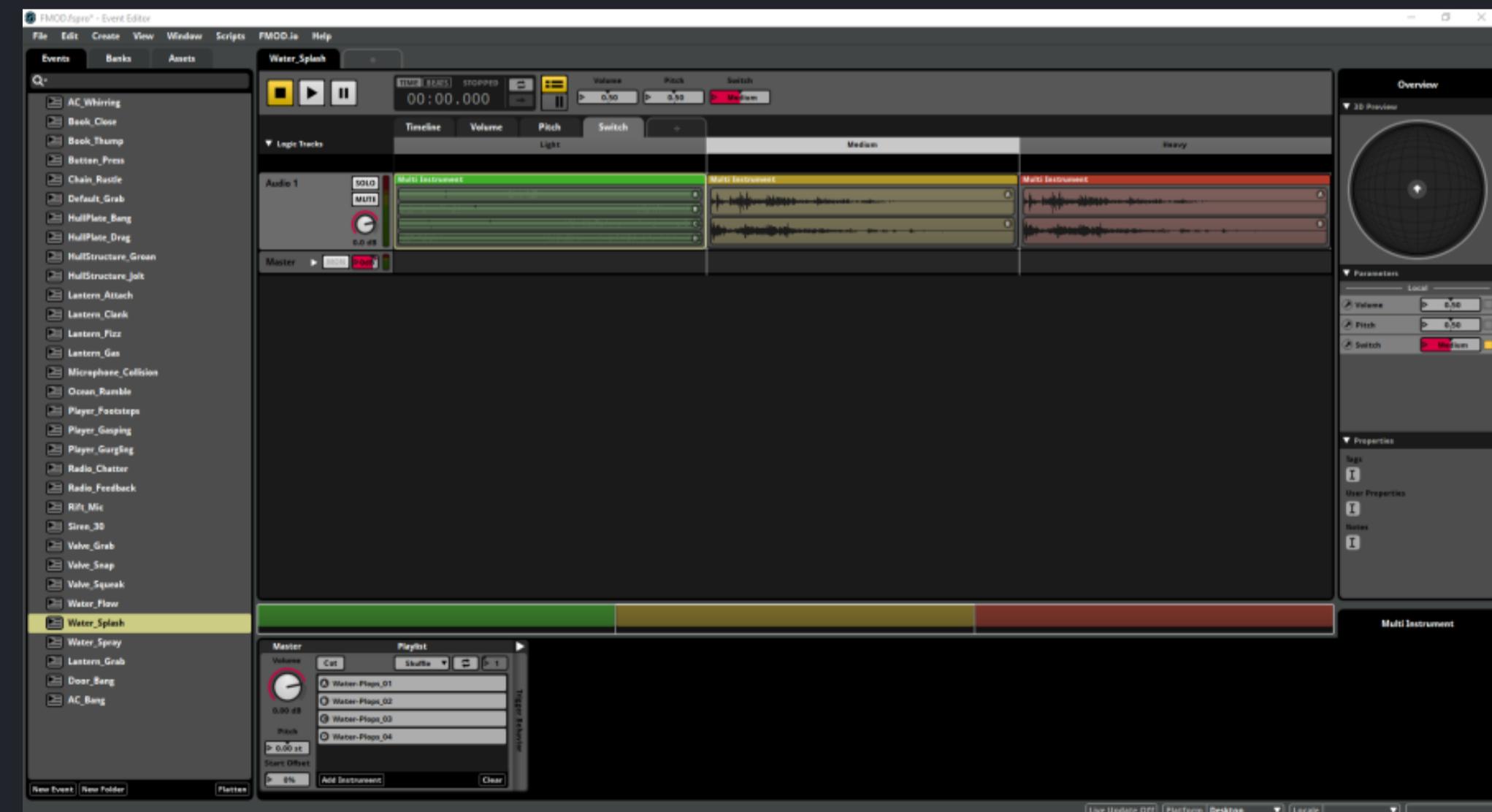
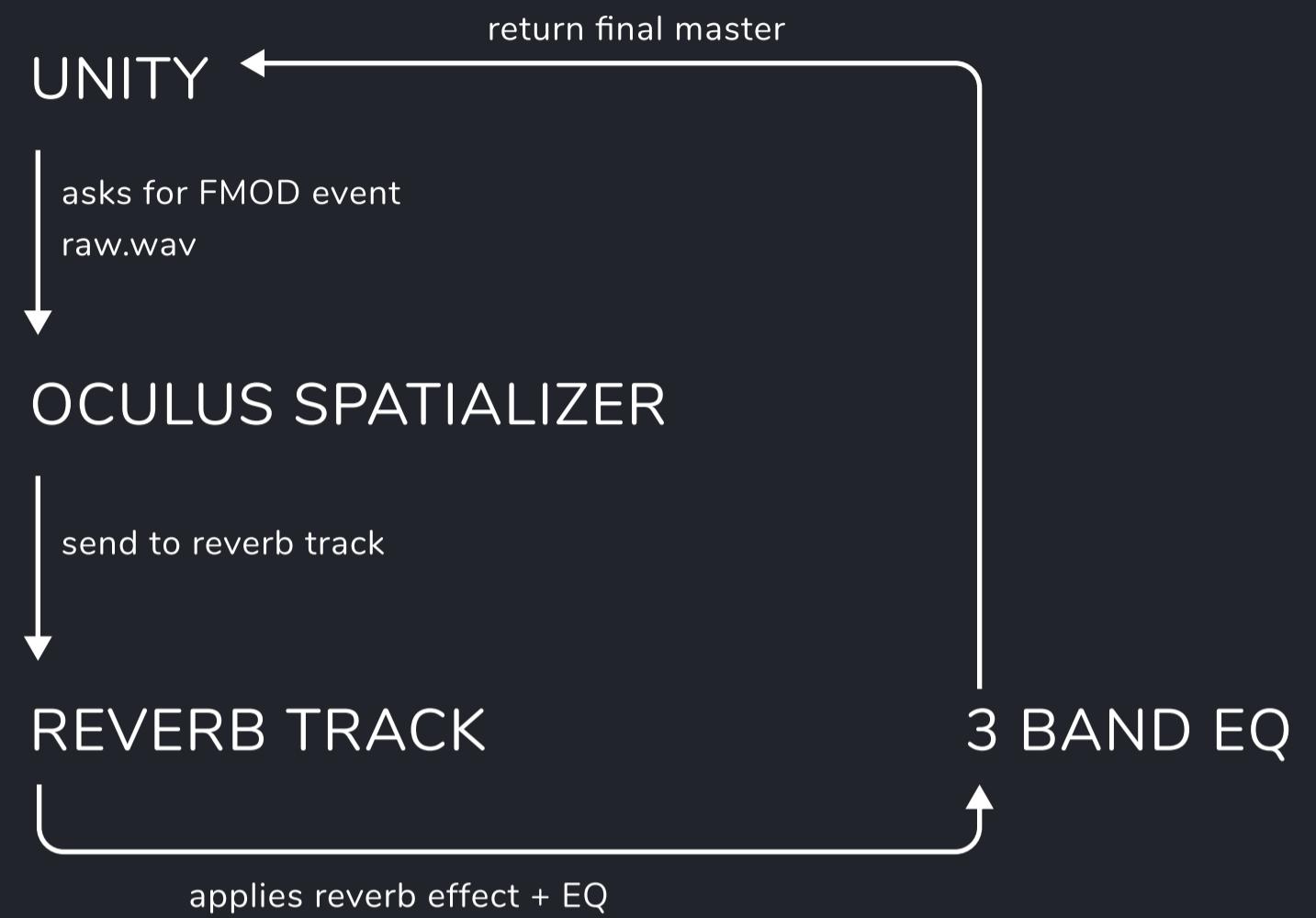
fmod studio integration

mixing happens FMOD-side

parameters are changed in-engine

snapshots modulate effect parameters

trigger FMOD Studio events in Unity



ITERATIVE PROCESS



ITERATIVE PROCESS

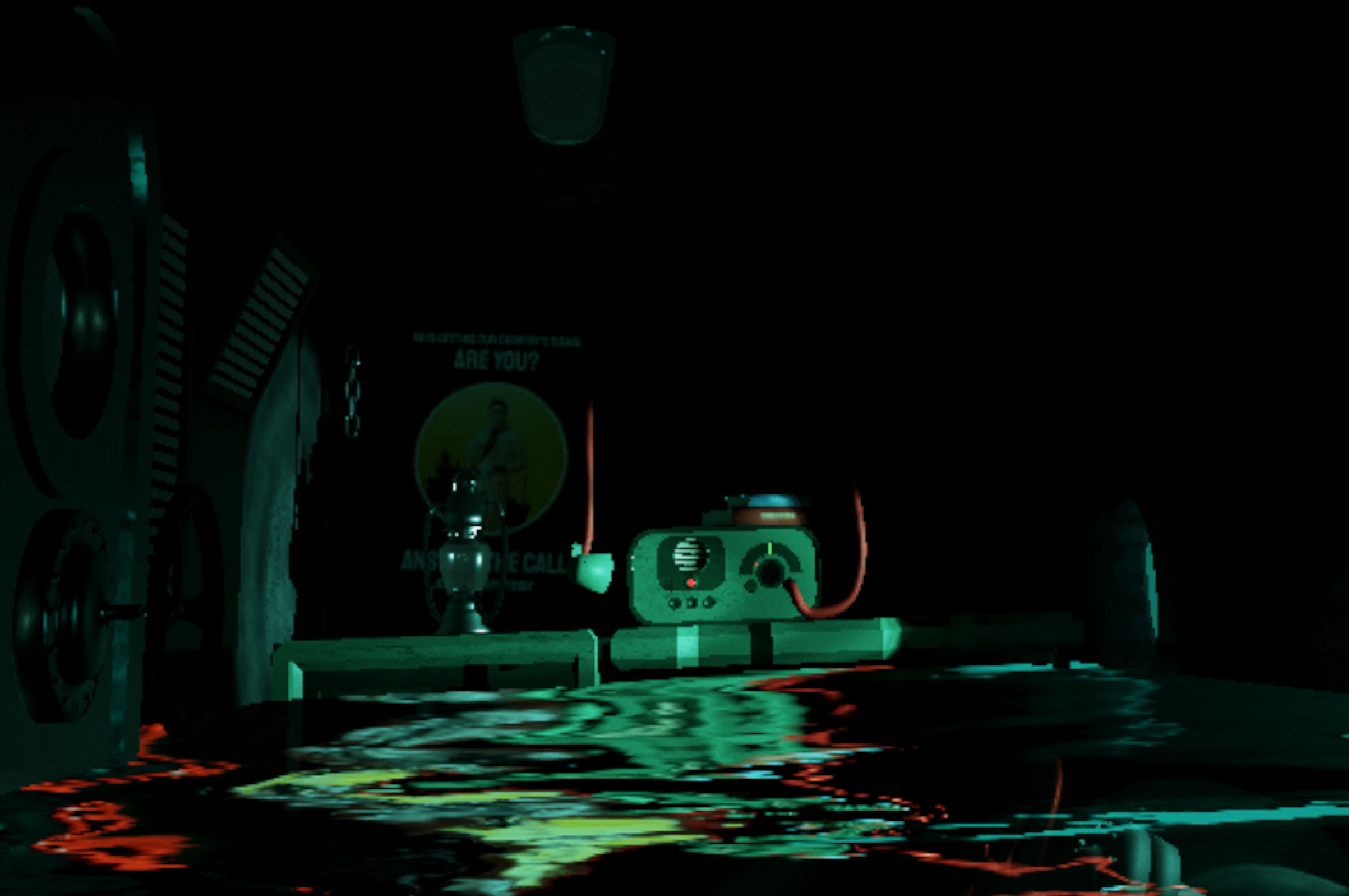
first iteration



ITERATIVE PROCESS
prototype

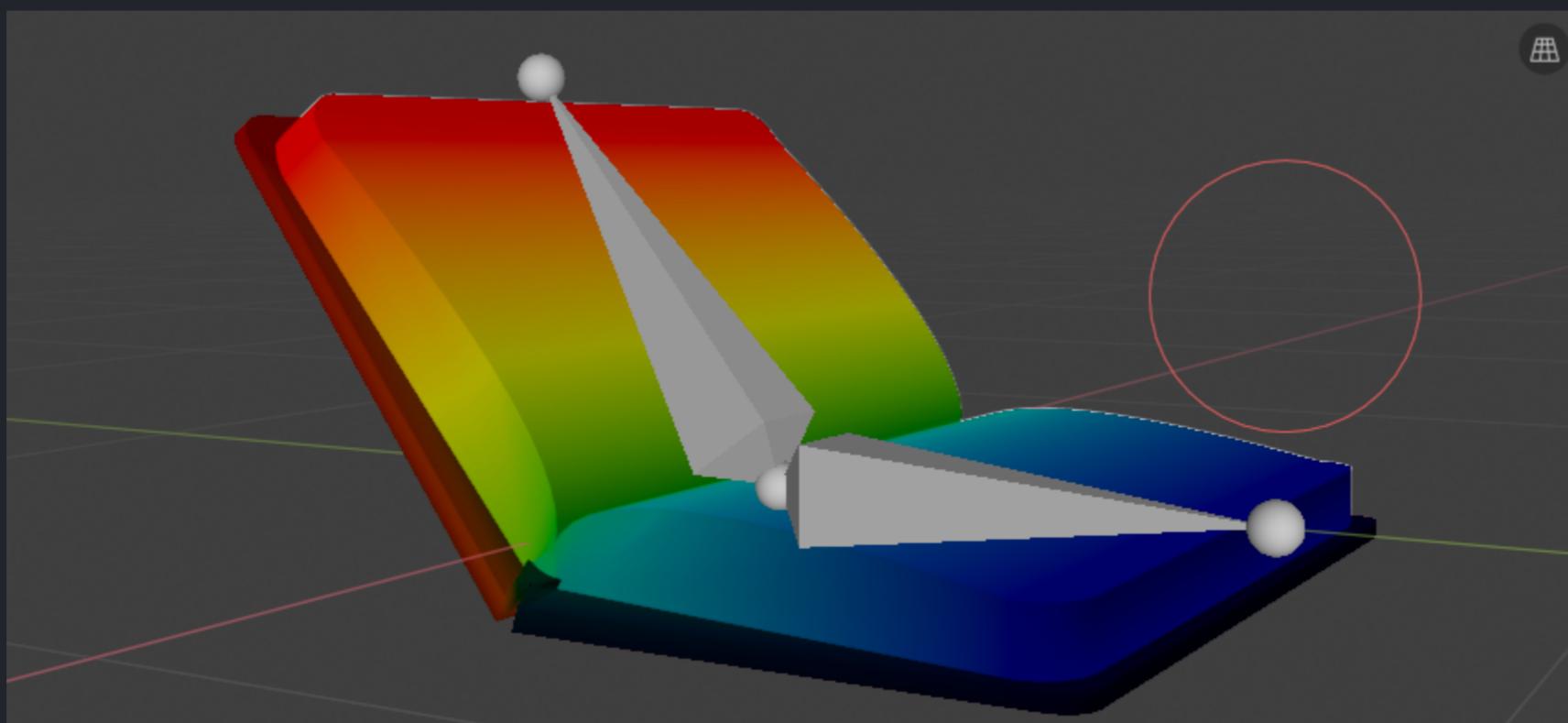
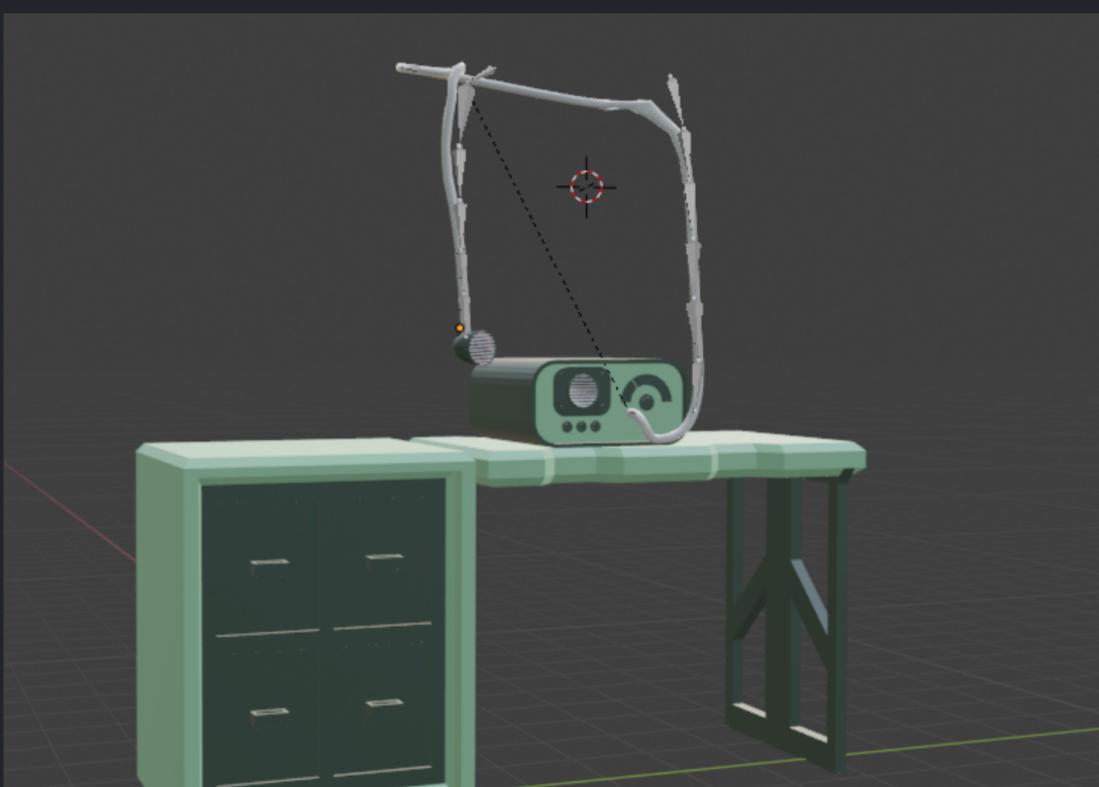
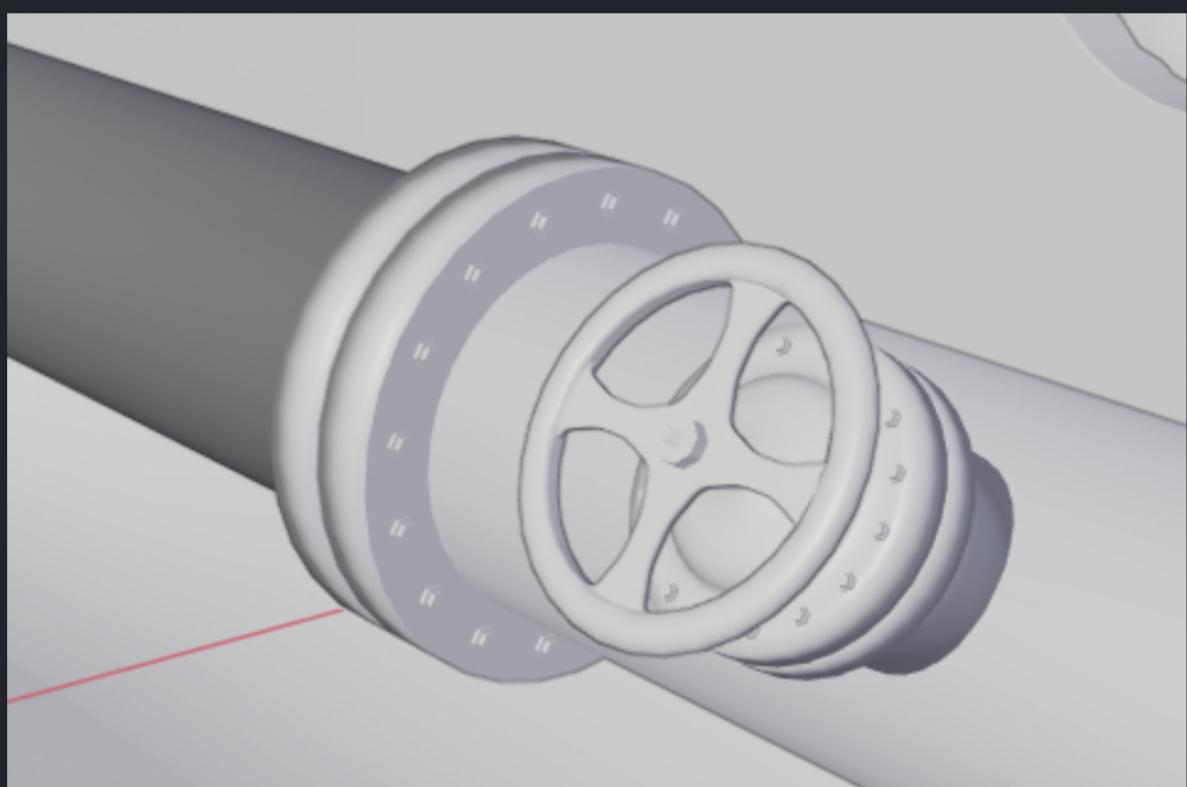
ITERATIVE PROCESS

final form



DEVELOPMENT

modeling + texturing + uv maps



OUR STRUGGLES

physical + technical

covid-19

The ongoing coronavirus pandemic prevented us from doing in-person recording sessions for most of the semester. As a result, we recorded and edited many sounds individually before collectively adding them to the game and testing them in FMOD.

For the sake of cohesion, we shared our sounds and feedback to each other online, and used a Kanban board to track the status of each sound.

This also made it difficult for us to playtest our VR experience. Our solution to this was livestreaming it instead.

physics intricacies

Using built-in physics from Unity provides interesting challenges surrounding how to detect when certain sounds should play.

Physics objects which were difficult include the chains, valves, and books. These are compound physics objects with inter-collision and certain physical properties which players will expect from real-life experiences.

The book needs to make a clap when closed, chains need to rattle without strictly being collided with, and the valves need to groan and squeak depending on the speed it is turned. All required specific solutions.

REFERENCES

A couple of sounds (i.e. those coming from the radio) and textures were taken from online sources:

Female voice speaking Russian over radio

<https://librivox.org/universal-declaration-of-human-rights-by-united-nations-volume-02/>

Russian single-letter beacons

<http://priyom.org/military-stations/russia/single-letter-beacons>

Various textures created by dbszabo1

<https://www.deviantart.com/dbszabo1/art/waterfall-end-spray-png-305730041>



THE END