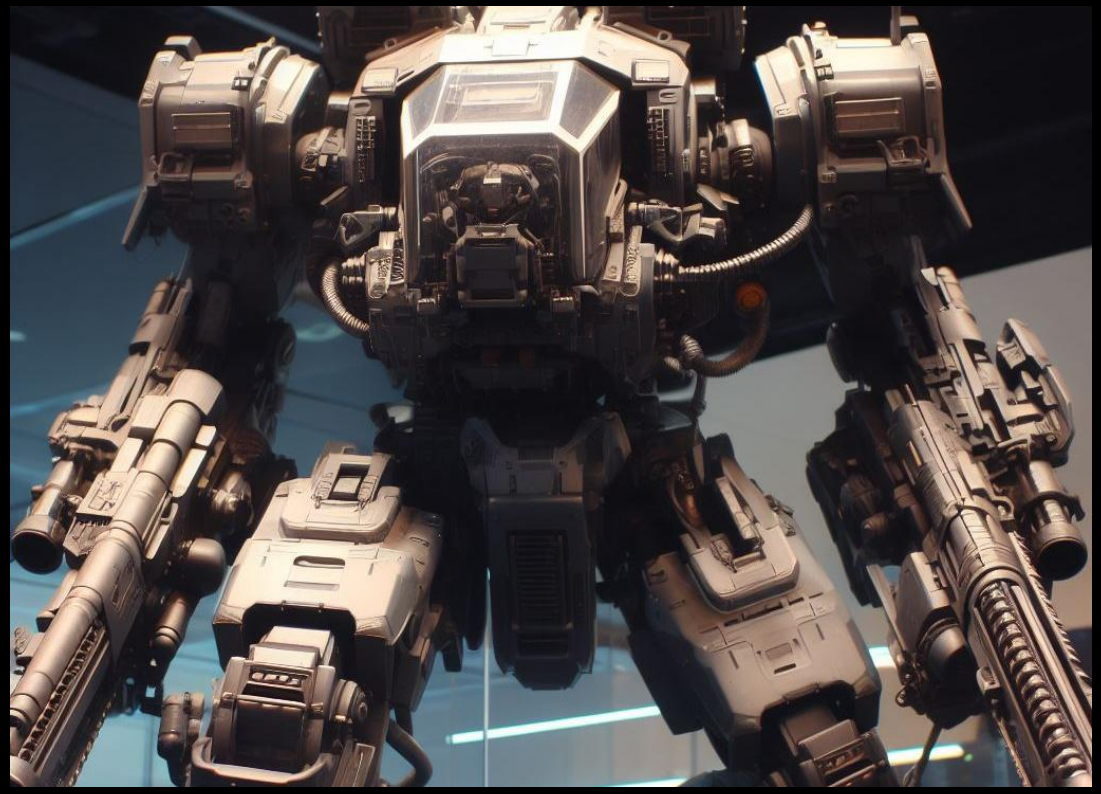
Call of the VOID
CPI 211

Grand Concept

Following the near-extinction of humanity following the escalation of international conflict in 1989. You pilot a derelict combat machine from before the conflict to scrounge resources from the desolate world for a chance to ascend with the best of humanity.

What is this game?



- Call of the VOID is a first person mech-based shooter where the player pilots a slow, mechanically complicated mech suit against AI opponents.
- The game will feature Virtual Reality support
- A strong narrative focus. Gameplay for a direct run will be 15-20 minutes, with plenty to do if you want to experience the mechanics.

Development Team

Dominick Trusko
Project Lead / Visual Asset Designer

Keenan Salik
Programming

Maguire Brady
Programming

Caiden McGregor
Programming

Andrew Turner
Level Design

Benjamin Celjo
Level Design

Tyler Johnson
Level Design

Background Setting

On August 9th, 1989. 4 Billion humans met their end following a devastating war of attrition. The only, and final, nuclear conflict of humanity.

Large-scale communication disruptions from electromagnetic pulses led to the collapse of intercity communication. Leading to a city-state system.

A collection of major cities with missile defense systems used their resources to flee the planet, occupying large space stations originally utilized as surveillance and launch platforms.

In the modern day, small individual city states scavenge resources to construct their own space-capable vehicles to reconnect with humanity, fighting over technology and resources to construct their transport vehicles

City states are entirely isolated, as communication between states often lead to interstate warfare using Radiological Dispersion Devices, which irradiate territory to maximize human loss while minimizing damage to valuable resources.

Minute to Minute Gameplay

- Pilot a slow-moving, heavy mech. Slow-mechanical movements define the combat, with positioning and preparation being integral to success on higher difficulties. Choosing ammo types, weapon types, and power distribution prior to combat engagements.
- Rebalancing power usage during and between combat engagements to repair your machine or decide which systems are necessary to either fight or flee an engagement.
- “Combat Mode” makes your mech more capable of fighting, but automatically redistributes power to combat systems and severely reduces visibility

Control Scheme (Traditional)

Leg Forward [W] and [S]
Leg Turn [A] and [D]

Leg Strafe Left [Z] and Right[C]

Recenter Cockpit [F]

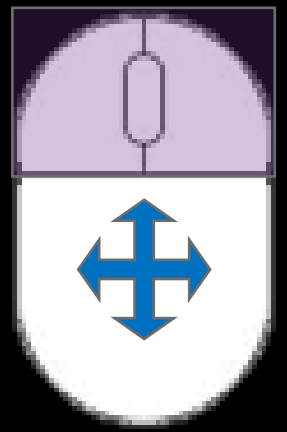
Left-Weapon Fire [LMB]
Right-Weapon Fire [RMB]

Cockpit Rotate Left [Q] and Right [E]

Power system distribution [1-6]

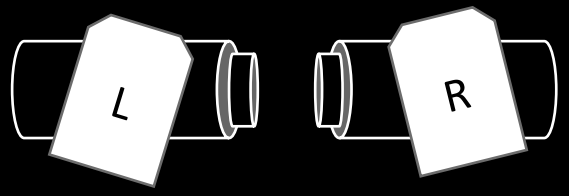
Reload Armaments [R]

Combat Mode [F]

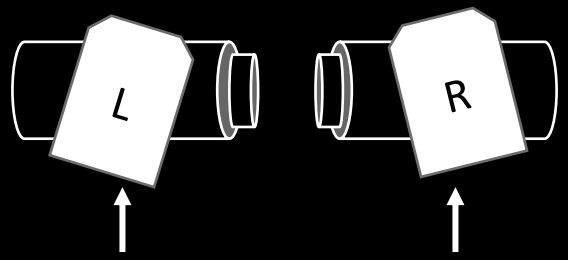


Aiming [M_x and M_y]

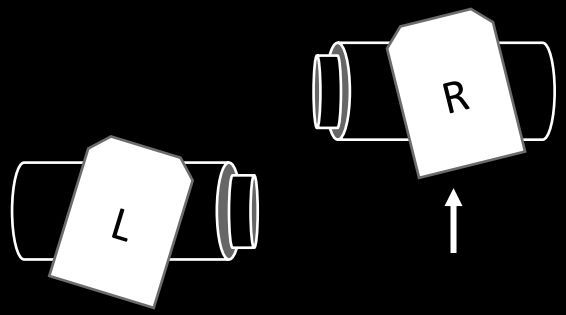
Control Scheme (Virtual Reality)



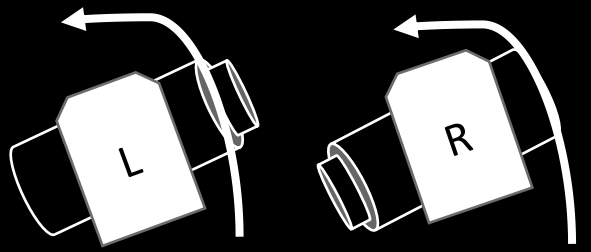
Not Moving



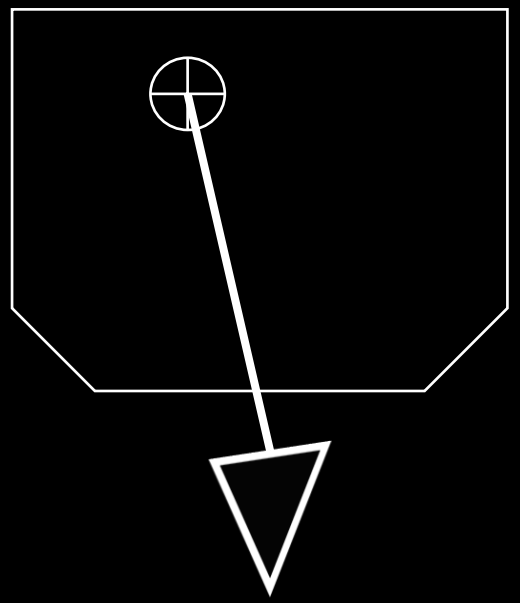
Forward



Left Body Turn

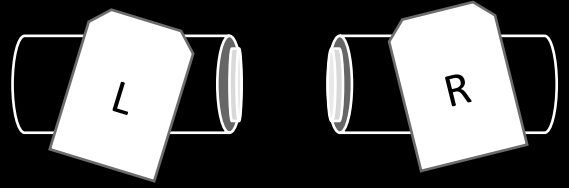


Left Cockpit Turn



Aiming dictated by head position

Limited by bounds of cockpit



Fire Left/Right Weapon

Physical Cockpit Buttons

Power distribution

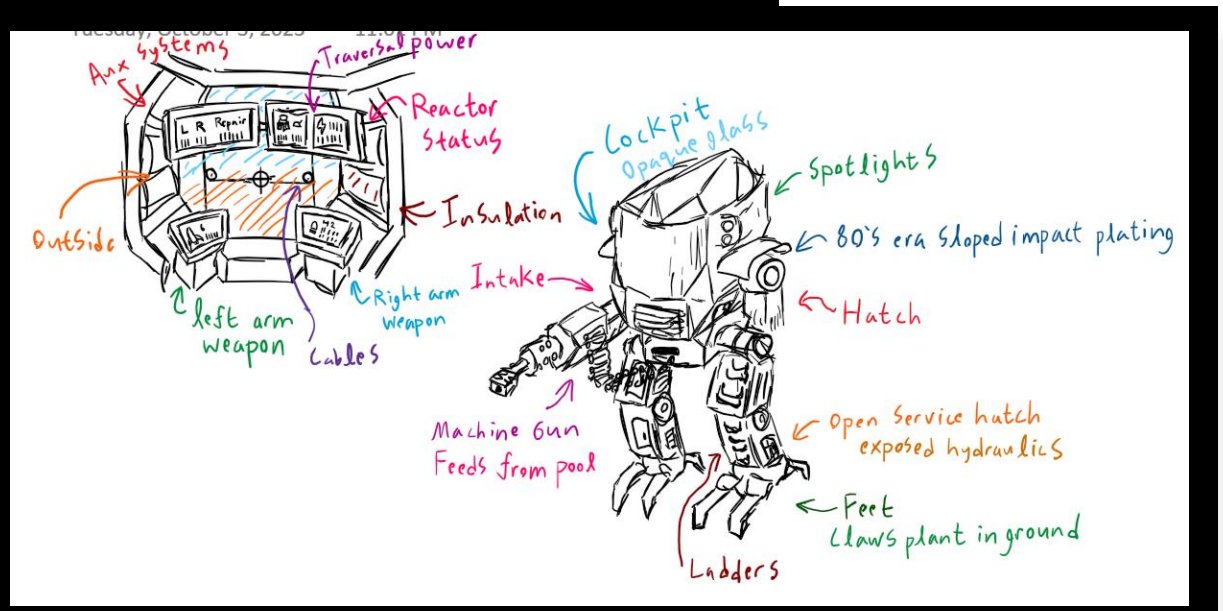
Weapon reloads

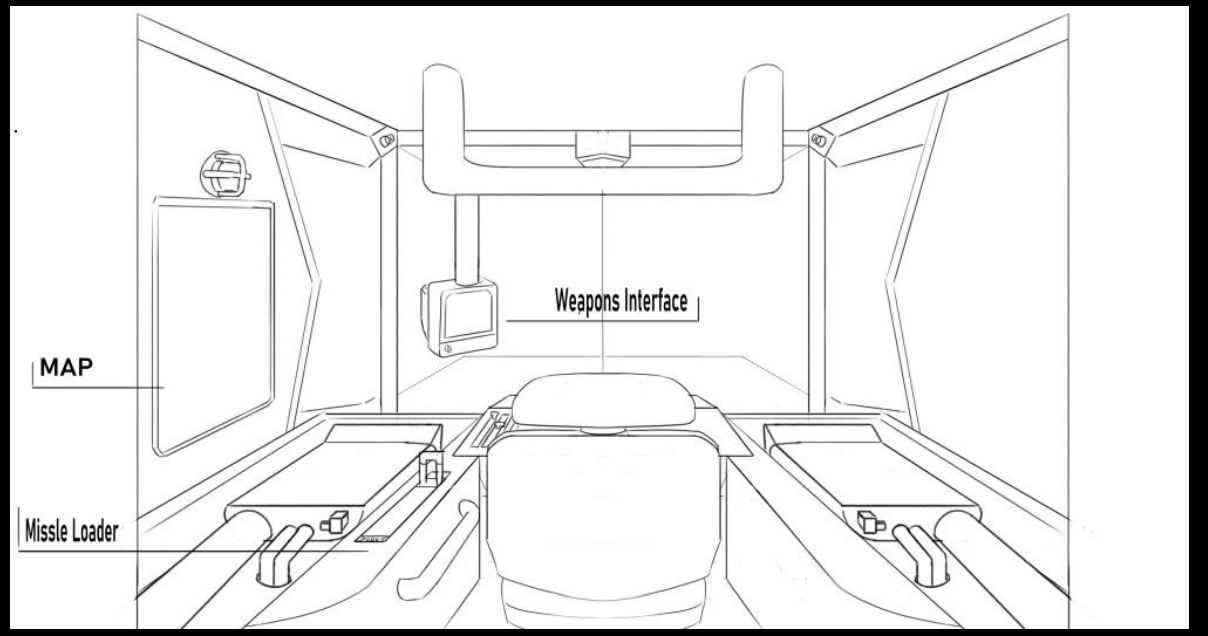
Combat Mode

Feature Overview

- ❑ Open-world mission structure
- ❑ 6 Weapon types
- ❑ 4 Ammo classifications (6 x 4 = 24 variations)
- ❑ Location based damage system
- ❑ Dynamic world events
- ❑ System-based health mechanics
- ❑ Cyclical gameplay loop, carry loadouts to future runs.

Features and Mechanics





Large Calibers Weapons

- Rocket Launcher
  - Slow moving, expensive projectiles. Do a lot of damage, but cannot accurately hit moving targets.
- Grenade Launcher
  - Physics-based explosive projectiles, higher total count at the cost of accuracy
- Gauss Rifle
  - Magnet-accelerated micro-projectile cannon. Charges to deal increased damage.

Medium Caliber Weapons

- Mini Gun
  - Low damage per round, but fires very fast. Must spin up to fire. Can overheat
- Heavy Machine Gun
  - Moderate damage, overheats. Heat dissipated very slowly, but if you overheat you can eject the barrel and replace it with a cooled barrel by reloading.
- Shotgun
  - Short range, low damage. The closer the target, the more damage inflicted

Ammo Types

Kinetic : High damage to vital components, low damage to armor plating. Basic type of ammunition

> .300 Blackout (Minigun)

> .50 BMG (Heavy Machine Gun)

> 1mmSPR (Gauss Rifle)

> 40 Gauge Shell (Shotgun)

Armor Penetrating : Ignores armor, but does severely reduced damage to vital components

> .300 Blackout (Minigun)

> .50 BMG (Heavy Machine Gun)

> 1mmSPR (Gauss Rifle)

Thermal : Heats armor, increasing the damage it takes. Same damage as Kinetic but has a reduced fire rate and overheats faster.

> .300 Blackout (Minigun)

> .50 BMG (Heavy Machine Gun)

> 40 Gauge Dragon-breath (Shotgun)

Explosive : High kinetic and thermal damage. Reduced direct damage to armor.

> 60mm Grenade (Grenade Launcher)

> Splinter Missile (Rocket Launcher)

Navigation Mode

- Power can be distributed to systems at user discretion
- Normal damage, high visibility

Combat Mode

- Forces power into weapons
- Closes combat visor, providing extra protection at cost of visibility

AI States

Patrolling -

This is the base state of the AI. The AI will move between set points laid out by the level designers. The AI will be checking if the player is within a set range and field of view. If the player is a RayCast will be used and if the player is hit the enemy will have detected the player. Enemies can also enter this state if the player gets too close or if the player begins to damage the enemy.

Detected-

Ai enters this state after it has detected where the player is. The AI will attempt to get close enough to the player in order to attack (this amount varies depending upon enemy type). Once the player is within the enemy's attack range the enemy will switch to its attacking state. The enemy can also exit this state and return to patrolling if the player gets far enough, or if the enemy cannot find the player for a set period of time while in this state.

Attacking-

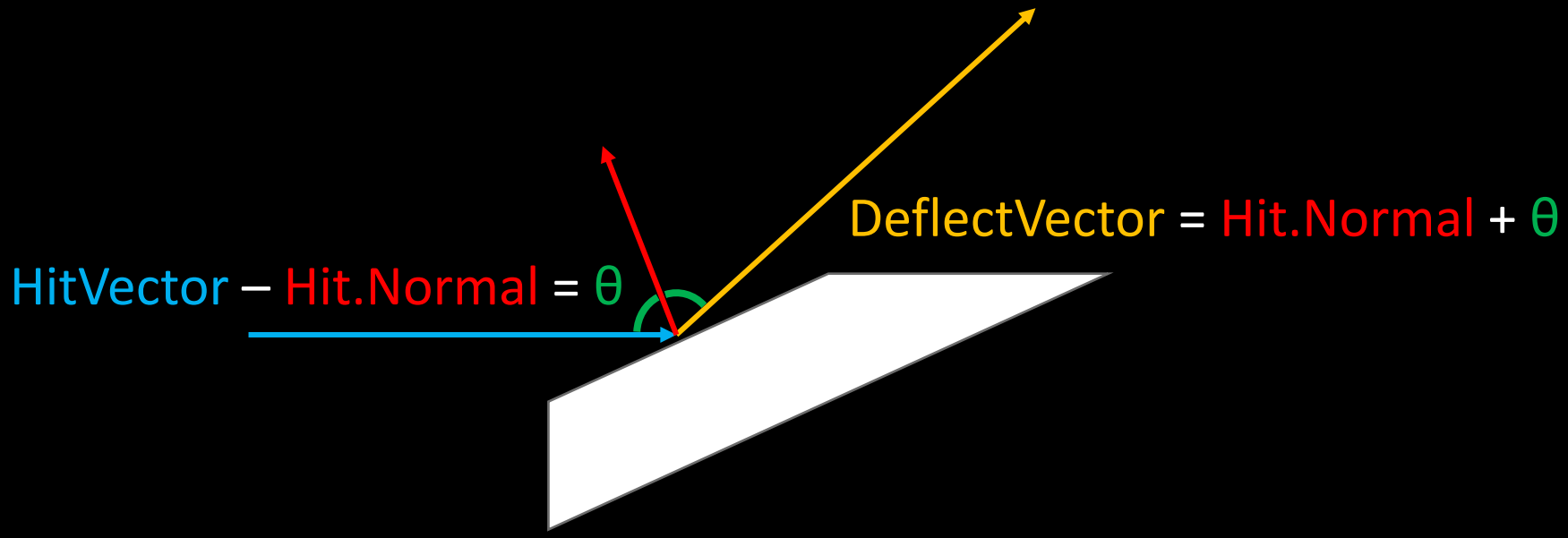
While in this state the enemy will actively try to fight the player. They will shoot, attack to keep some distance depending on the enemy do minor strafing to avoid being hit. If a player leaves the attack range the AI will go back to it's detecting state. If the AI cannot find the player for a set period of time while in this state it will return to its patrolling state

Armor Deflection System

> Purely cosmetic armor deflection system

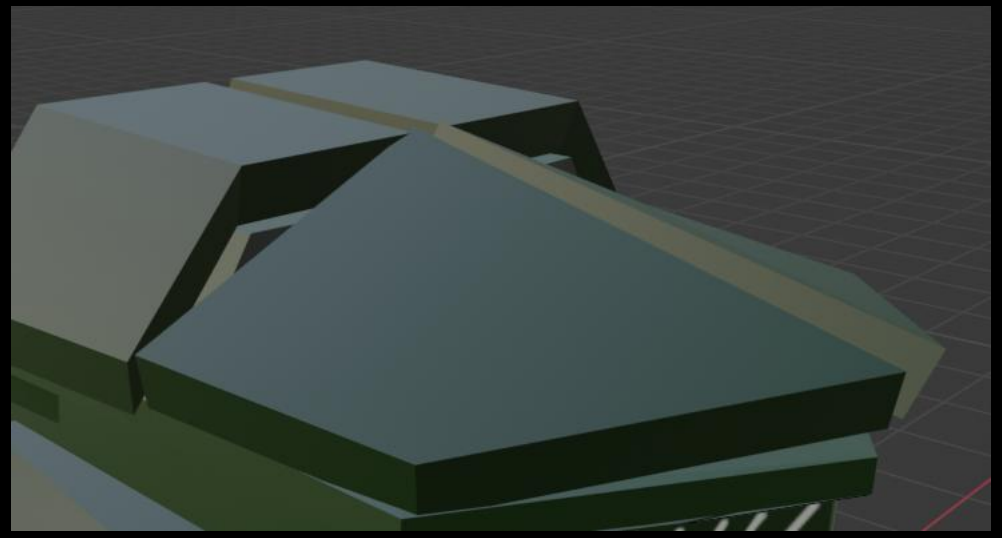
> Indicates to the player that a shot ricochets and does reduced damage

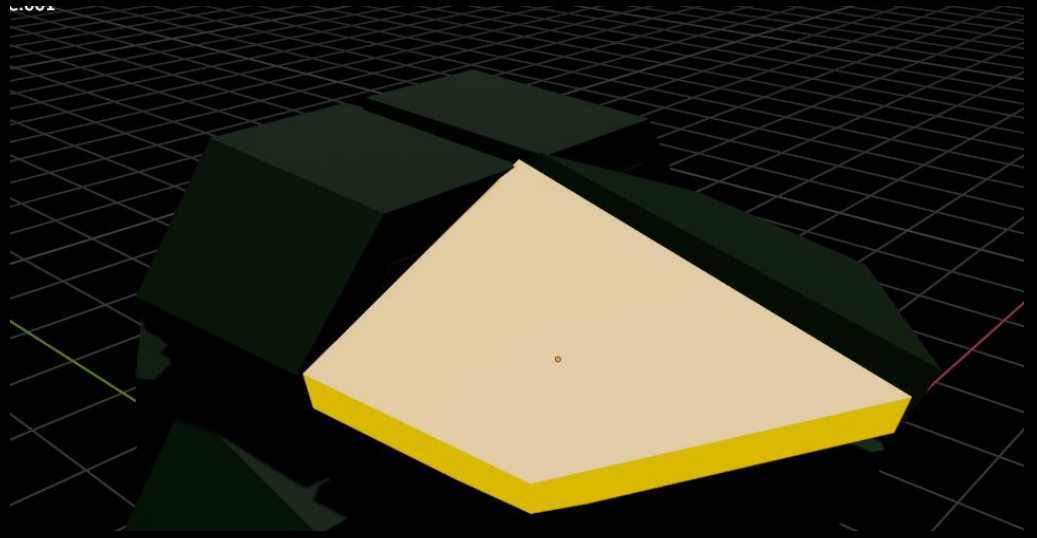
> Only applies if θ is above certain value



Armor Temperature System

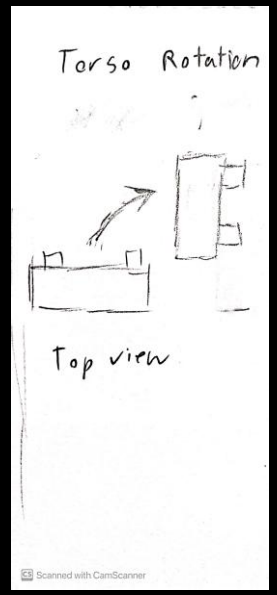
- Thermal rounds heat armor plating
- Hot armor plates glow based on temperature
  - Provides clear visual indicator that the plates are weakened
- Heated plates take increased damage from other sources
- Heated plates have a decreased deflection angle

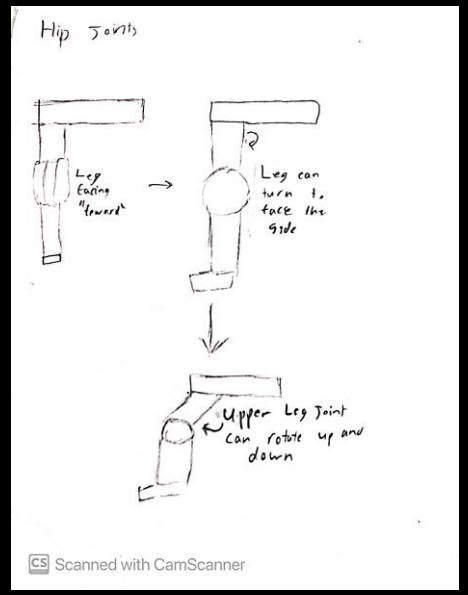


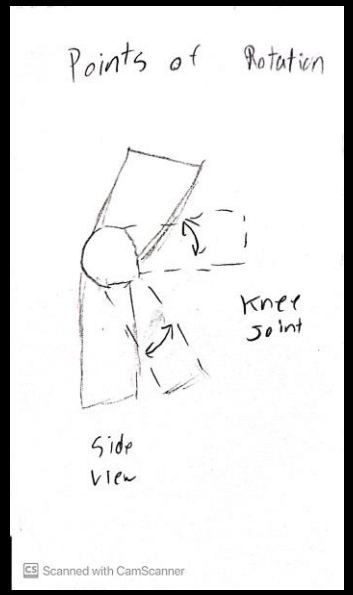


Mech Leg Inverse Kinematics

Mech Leg Points of Rotation

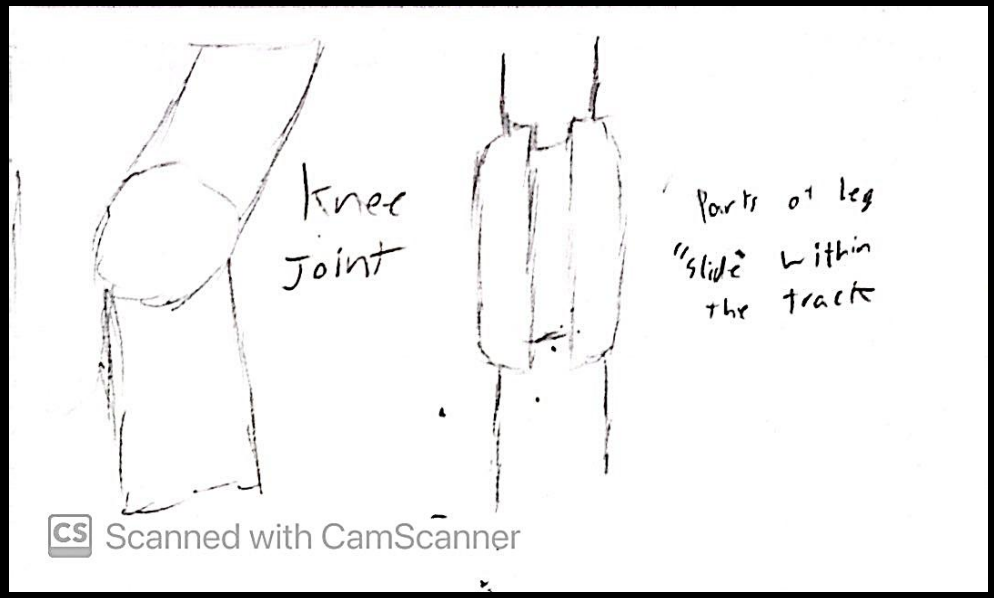






The mech legs have several key points of rotations. One at the torso, another at a knee joint, and a third where it's hip would be.

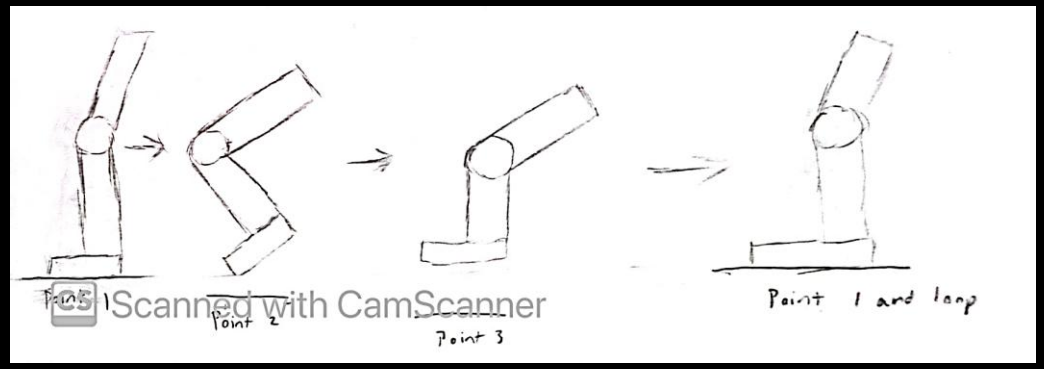
Mech Leg Knee Joint



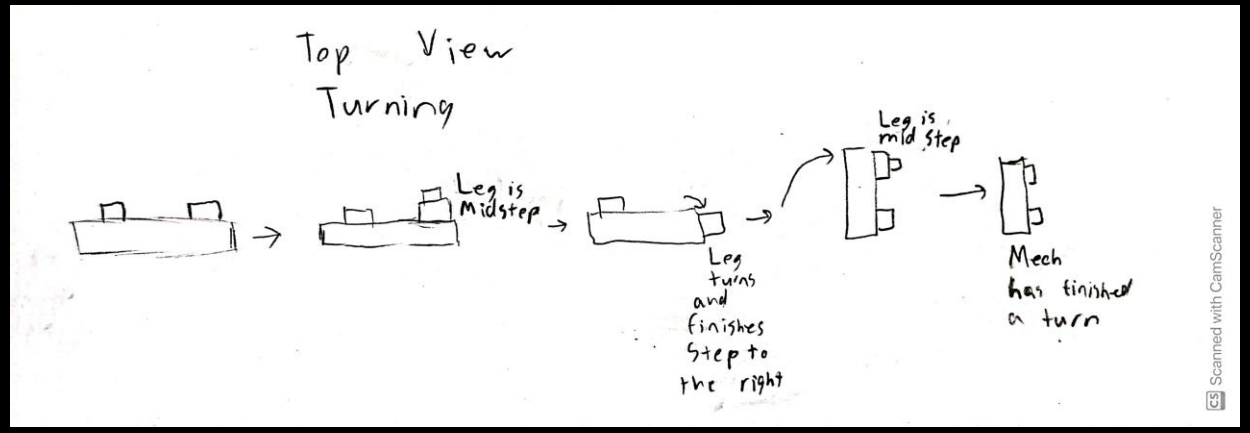
A key point of the mech's leg movement is it's knee joint. The position that the bottom part of the leg rotates around will be this joint.

Mech Leg Inverse Kinematics pt.2

Basic Leg Step Cycle



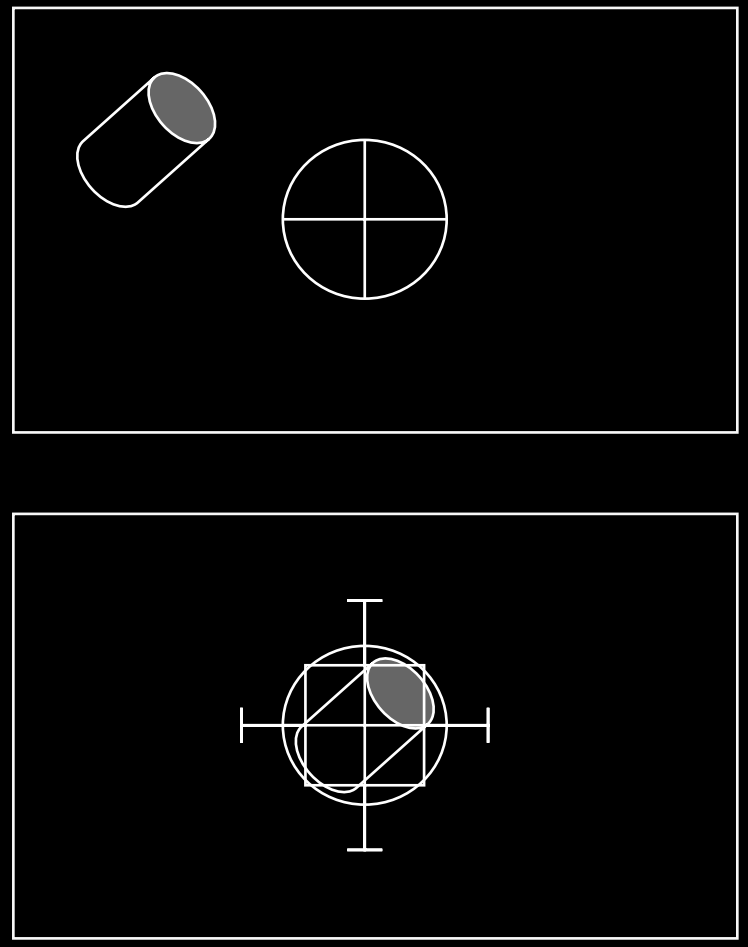
The leg step cycle consists of three key points. The individual parts of the leg will be made to move towards these three points in sequence giving the appearance of the mech taking a step. The mech will raise its leg, stick out it's foot, and then step down. This process would be repeated for several steps done in a row.



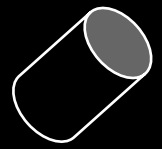
Mech Turn Method

The mech will turn first by beginning to take a step and then rotating it's leg the direction of the turn. It will then begin the step with its other leg during which the mechs torso will rotate to face the direction of the turn. The second step will finish and the turn will be complete.

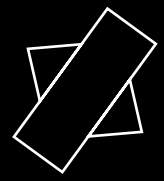
Collectable Crane



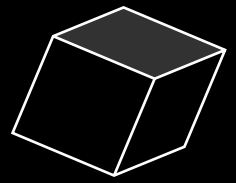
- Low-complexity representation of position under mech.
- Must line up machine with pickup, then deploy winch to grab object
- Prevents players from prioritizing looting during combat
  - In-combat looting reserved for skilled players who can do rapid pickups.



Health Pickup



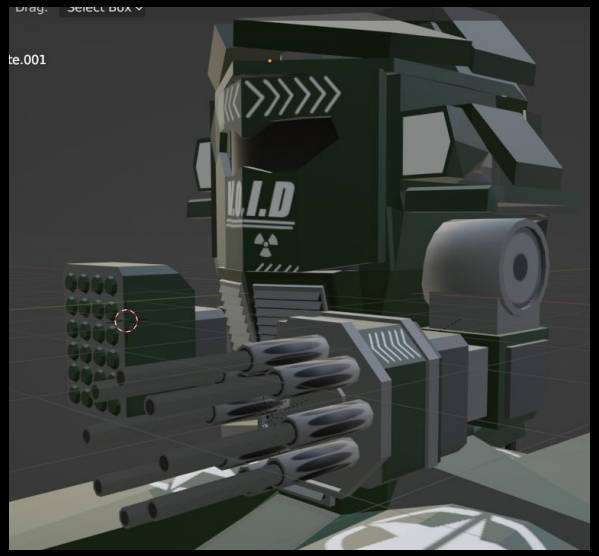
Weapon Pickup

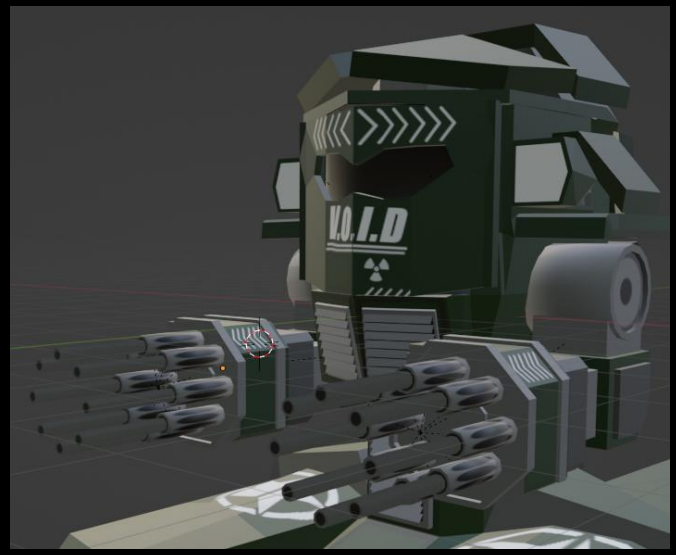


Mission Objective

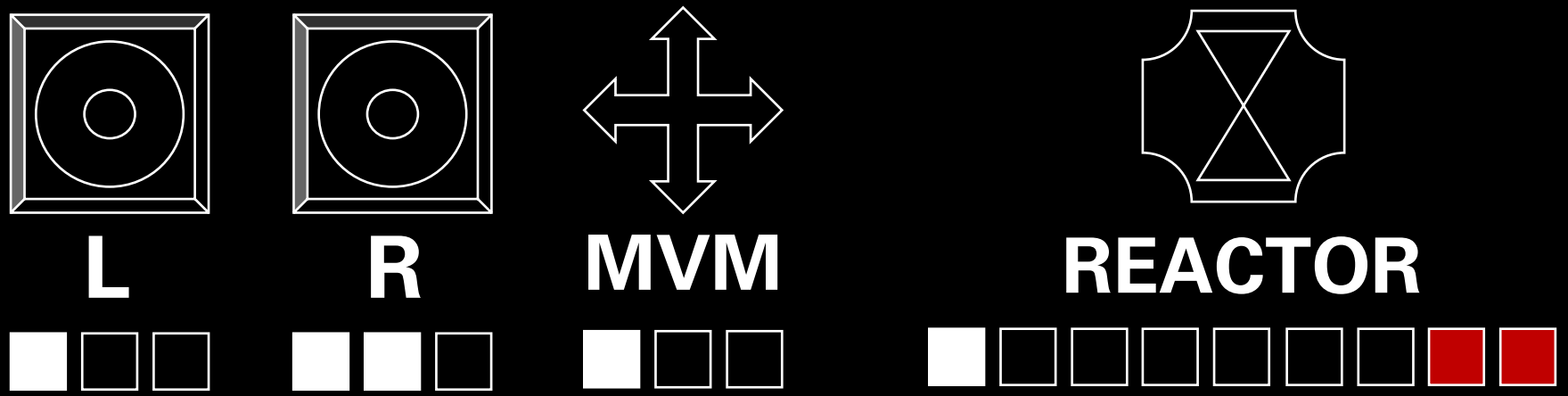
Swappable Weapons

- 2 Weapon slots, one for each arm
- Any weapon can go on either arm
- Weapons are collected from enemies, as well as are scattered around the world





Power Management



- Your total health determines reactor output pips
- Power is distributed among systems
- Powered down systems do not function
- Powered up systems reduce charge time, increase speed, and reduce heat buildup
- If reactor his zero, the player is defeated

Narrative Delivery

The player is a newly selected Void Pilot. Your task as an operator is to travel from the relative safety of your enclave out into the greater metropolitan area of Seattle to recover technology required to construct a rocket. There will be three parts to collect, and they are in three different regions.

Due to the lack of radio signals, radio communication is essentially a death sentence. Broadcasting on artificial frequencies exposes the broadcaster to an onslaught of individual groups seeking their functional technology and resources. Therefore, all messages are delivered over landlines and dead drops.

Much of our narrative and cosmetic design are dictated by development time/skill constraints.
Much is subject to change, but the rough outline of the narrative is shown here.

Introduction:

The game starts on an elevator, ascending from the base. This elevator loops indefinitely until the player starts the game. This also serves as the main menu screen, and gives the game time to load required assets, including the tutorial scene.

The menus are on the screens of the mech. All vehicular motion is disabled, but you can still navigate the screens either using the mouse to make selections or pressing the power distribution buttons when playing the game in Virtual Reality.

Tutorial:

The tutorial begins with a voiceover, delivered by stepping on weighted plates throughout the test area. The test area is the arrival point of the elevator. It is outside, and the area is relatively peaceful. The environment is snowy, and surrounded by obstacles to prevent the player from wandering off. It goes through a series of control tutorials under the guise of a “Preflight check”, having you test each system. If the player choses though, they are able to ignore the messages and walk straight through.

You start with a pre-defined kit, but the final task before moving on to the game is to “disable a defunct mech” by destroying the expensive life support tanks located on the back of the machine. This will give the players the ability to shoot at an “enemy” to try out the mechanics, as well as give the player access to two more weapon types to modify their loadout before beginning. These tanks contain volatile chemicals that could leak into the base’s groundwater supplies and must be destroyed.

Regions

The City

Contains first component and is intro area. Close sightlines keep combat well within perception range, plentiful resources to allow you to set your build up early. The part you are collecting here is a fuel distribution component. The streets are wide, and sightlines are obscured by destroyed buildings. The Space Needle is the landmark that directs you toward your objective and will be visible from the beginning to direct the player.

The Mine

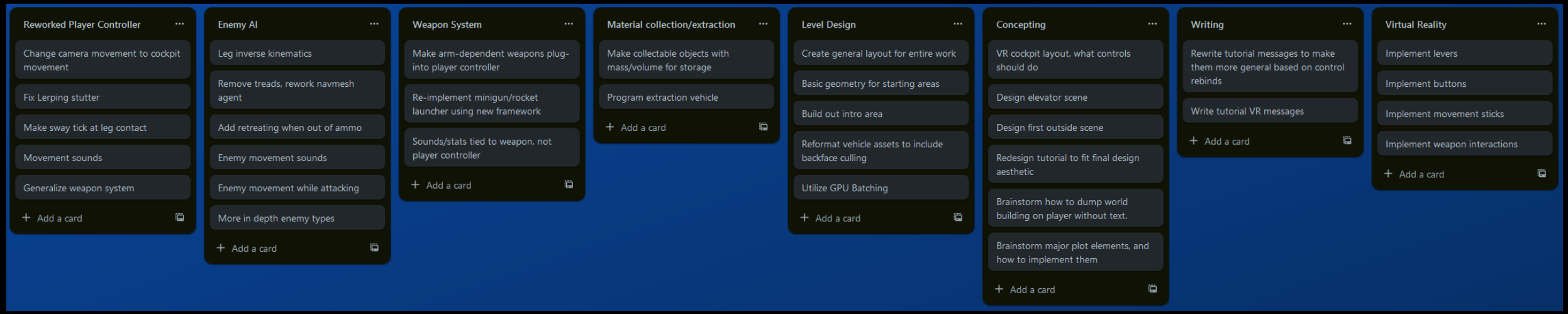
Abandoned open-pit rare earth metal mining operation. The player fights their way down the winding paths. A collapsed bucket excavator bridges parts of the mine and obscures sightlines, allowing the player to ascend and descend off-path, letting you engage enemies from various angles. The part to acquire here is a mineral sensor, but the hole also enables the player to continue to the final region

Final Area

The Tower
Encased within a geological depression, this town is almost entirely untouched by the war. Clear signs of current habitation, such as assembled vehicles and functional roads, torn apart by a sudden opening provided by the destruction of the underground base in the second level. Fight your way to the radio tower before completing the objective and returning back to the base [Narratively, you do not actually have to walk all the way back]. The part collected here is communication equipment, not being a concern wh

Timeframe:

The timeframe for development has not been locked down yet. We are expecting to have most basic non-VR functionality working by the initial progress check. Implementing the VR mechanics will occur later in the project, but all current implementations are being designed around the VR implementations later down the line.



Concept images

For concept imagery on slides 1,2,3,4,6,26, and 27 were produced utilizing the Dall-E 3 deep learning image generator provided by OpenAI.

According to OpenAI, all images generated through their platform are owned by the prompter and do not require crediting, but we deemed it morally correct to notify the reader that those pieces of art were not generated internally by our concept team, but instead relied on deep learning tools.

3D Art and Sketches

All 3d models and sketched concepts were produced internally utilizing either pen and paper, Gimp, CorelDraw, or Blender. *No AI art assets will be used in the final development*, and only exist within the presentation to provide consistent theming and help provide context to our vision.

I hope you look forward to playing our game!