

METARANGERS

GAME DESIGN DOCUMENT

By BGH Projects

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Executive Summary

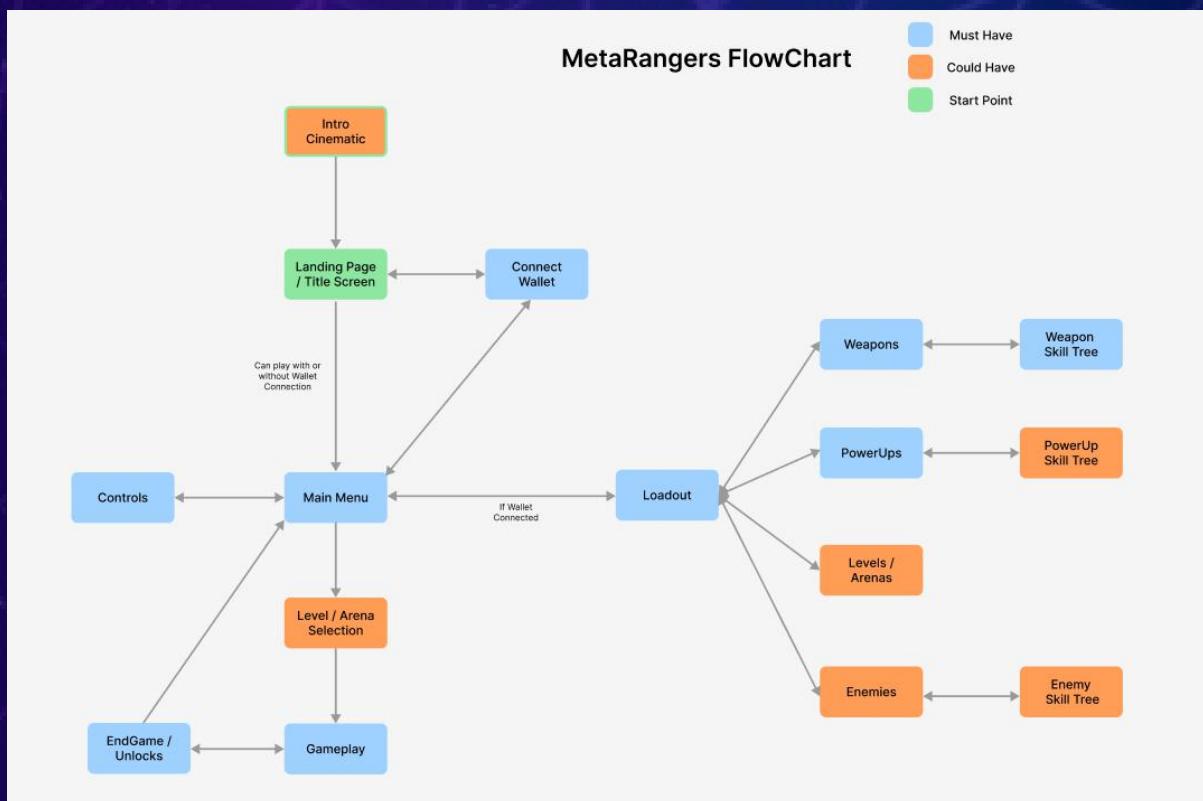
MetaRangers is a blockchain survival first-person shooter. The target audience is both fans of first-person shooters who are interested in exploring web3 gaming and web3 users looking for a test-network-based game to play. The main gameplay objective is to survive as long as you can against AI enemies to accrue the in-game currency, called METR, to spend on unlockable items that can be used to augment the gameplay experience and survive longer.

The game was conceived as a proof-of-concept to see how the use of decentralised tokens could be integrated into a video game. The shooter gameplay aspect of the game was built on top of the Unity FPS Microgame in order to bootstrap the game's development, as the primary focus was the integration of the web3 elements. The tokens used in the game take the form of weapons, weapon upgrades, powerups, and METR.

The smart contracts used for this project were deployed to a test network, in order to realise the benefits of using blockchain technology without having the player spend cryptocurrency with real world value to play the game.

Gameplay Design

When considering MetaRangers as a system, there are three main sections of the game that the player constantly cycles through. These sections are the Main Menu, Gameplay, and the Loadout. Below is a preliminary flow chart, made during the early design phase, of these main sections, along with other sections of the game that the player can visit and sections that did not make it into the final product:



As discussed in the Executive Summary, the main flow of the game that the player would take is to begin in the Main Menu, enter Gameplay to accrue METR, visit the Loadout via the Main Menu to unlock new items to use, then re-enter Gameplay via the Main Menu to continue playing the game.

The purpose of the Loadout and its contents is to empower the player with weapons and powerups that allow them to survive longer and become more successful within the game.

Weapons

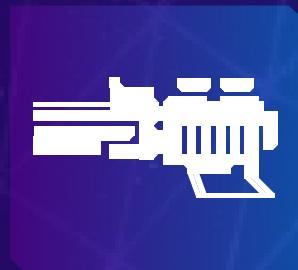
There are four weapons available for the player to use within the game, which are:



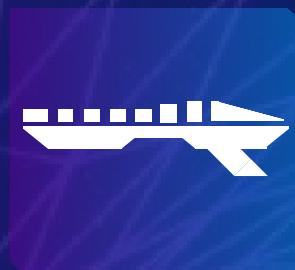
Blaster



Disc Launcher



Shotgun



Sniper

The Blaster is available to use immediately for the player, whilst the other three weapons can be purchased for METR in the Loadout. Each weapon has its own attributes, including range, rate of fire, damage per round, and others, which will be discussed in each weapons individual section. Each weapon also has upgrades which can also be purchased in the Loadout. Each upgrade can increase the effectiveness of the weapon's attributes or provide additional abilities to the weapon, depending on the upgrade. The following is a list of all the available upgrades, across all the different weapons:

	Stopping Power	Increases the damage inflicted per round.
	Accuracy	Increases the player's accuracy when firing the weapon.
	Rapid Fire	Increases the weapon's rate of fire.
	Speed While Aiming	Increases the player's running speed when aiming the weapon.
	Cooldown Time	Decreases the time required for the weapon to cool down when overheated.
	Spreadshot	Increases the spread angle of the round fired. Exclusive to the Shotgun.
	Extra Barrel	Provides an extra barrel, allowing another shot to be fired before overheating. Exclusive to the Shotgun.
	Disc Charge Time	Decreases the amount of time required to charge a disc to its maximum damage and range. Exclusive to the Disc Launcher.
	Extra Zoom	Enables the player to see further down the scope of the weapon. Exclusive to the Sniper.

Each weapon has its own set of upgrades that are available to purchase for it. The following is a brief description of each weapon, and the upgrades that are available for it.

Blaster



The Blaster is the standard issue weapon, available by default. It has an automatic rate of fire and modest range and damage per round. The weapon can be fired in a continuous burst until it overheats, during which it is inoperable until it cools down.

Disc Launcher



The Disc Launcher fires discs of different charges for impact and area of effect damage. The player can charge the disc before firing, increasing its range and damage. The weapon can also overheat depending on its usage, requiring a period of cool down.

Shotgun



The Shotgun is the choice weapon for close-quarter combat; dealing significant damage at close range with a spread shot of its projectile. Less effective at longer ranges. Allows two shots to be fired before the weapon overheats and requires a period of cool down.

Sniper



The Sniper is the choice weapon for long-range combat, dealing the most damage out of any weapon and allowing the user to deal damage to enemies from far away with its zoom-capable scope. The Sniper allows one shot before overheating and requiring a period of cool down.

PowerUps

In addition to the Weapons, there are four PowerUps available to be purchased and upgraded within the Loadout. They are:



Health



Armour



Shields



Jetpack

Health, Armour, and Shields all provide additional points of protection to the player. Each of the three is vulnerable to different Enemy projectiles, which will be discussed further in the Enemies section, in order to require a balance of the three to be maintained by the player. The Jetpack allows the player to temporarily fly for a short period of time, before requiring a period of cool down. Like the weapons, the Jetpack also has upgrades that can be purchased, which are as follows:



Flight Speed

Increases the speed at which the player travels through the air.



Duration

Increases the time which the Jetpack can be used before requiring a period of cool down.



Cooldown Time

Decreases the period of cool down required before reuse.

Enemies

There are various enemies that the player will face when playing MetaRangers. Each enemy has its own attributes, including rate of fire, hit points, and damage per round. This variance of enemy types is intended to diversify gameplay, by forcing the player to adapt their playing style to combat different combinations of enemy variations. The enemy variants are as follows:



Hoverbot



Swarmer



Roller



Spec Ops

Hoverbot

The Hoverbot is the most common enemy variant encountered in MetaRangers. It has an average rate of fire, movement speed, and damage. Its projectiles apply equal damage to Health, Armour, and Shields.

Swarmer

The Swarmer is the second most common enemy variant. The Swarmer has the fastest movement speed and rate of fire out of all enemy variants, pestering the player with quick barrages of damage. They also have the lowest hit point count of all enemy types, so they can be easily picked off by a player who can make their shots. The Armour PowerUp is resistant to the projectiles of the Swarmer.

Roller

The Roller is the largest enemy type in MetaRangers. It boasts the most hit points and deals the most damage per projectile, so it can present some problems for players that employ a stationary strategy. However it has the slowest movement speed and lowest rate of fire, so it can be out-manoeuvred by crafty players. The Armour PowerUp is resistant to the projectiles of the Roller.

Spec Ops

The Spec Ops enemy variant is the rarest of all within the game. They are faster and fire more frequently than the Roller, and possess more hit points than either the Hoverbot or the Swarmer, presenting themselves as the most dangerous opponent. The Shields Attribute is resistant to the projectiles of the Spec Ops enemy variant.

Arenas

The shooter gameplay aspect of MetaRangers takes place within the three available Arenas. The player chooses between one of the three Arenas to play within to commence gameplay. The Arenas are as follows:

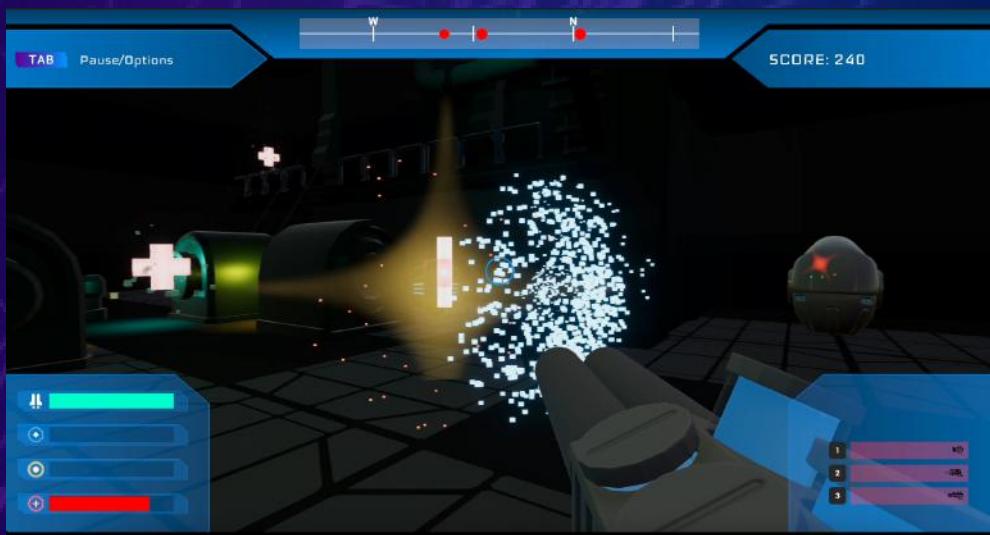
Plasma Refinery



Plasma Refinery Map Preview

The Plasma Refinery is a pre-built map made by Unity, that was chosen for the game because of its close-quartered nature. The low lighting and dense layout of objects and paraphernalia present a cramped atmosphere that the player must play in. The enemy spawn points are distributed across the map but feel close due to the map's smaller size, emanating a feeling of suffocation that the player must battle through. The low ceiling of the Arena negates the effectiveness of the Jetpack PowerUp, and the aforementioned dense layout reduces the Sniper weapon's contribution to the player's combat. Overall, this arena can lead to very fast-paced actions, with the player possibly finding themselves quickly surrounded if they do not pay attention and take their enemies seriously.

Plasma Refinery In-Game Screenshots



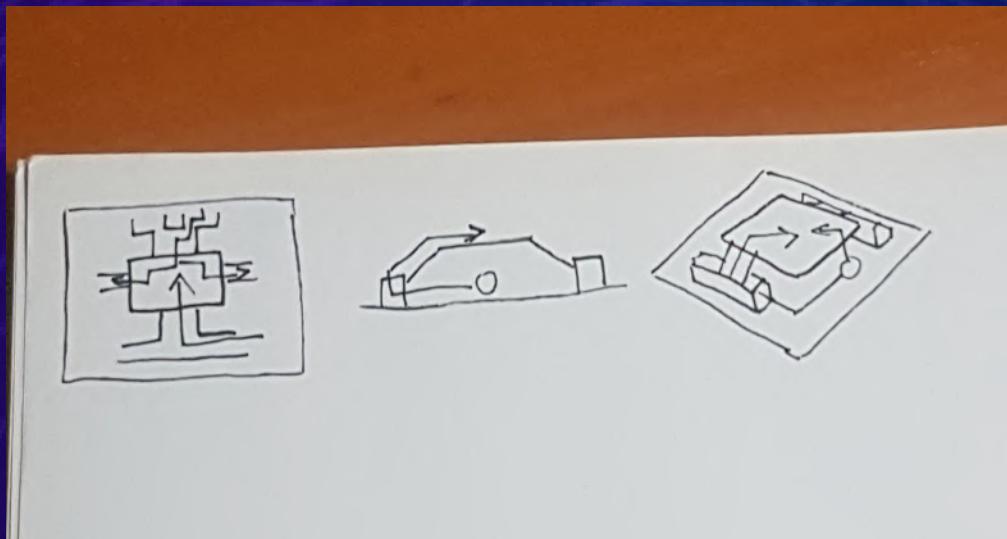
Hell Station



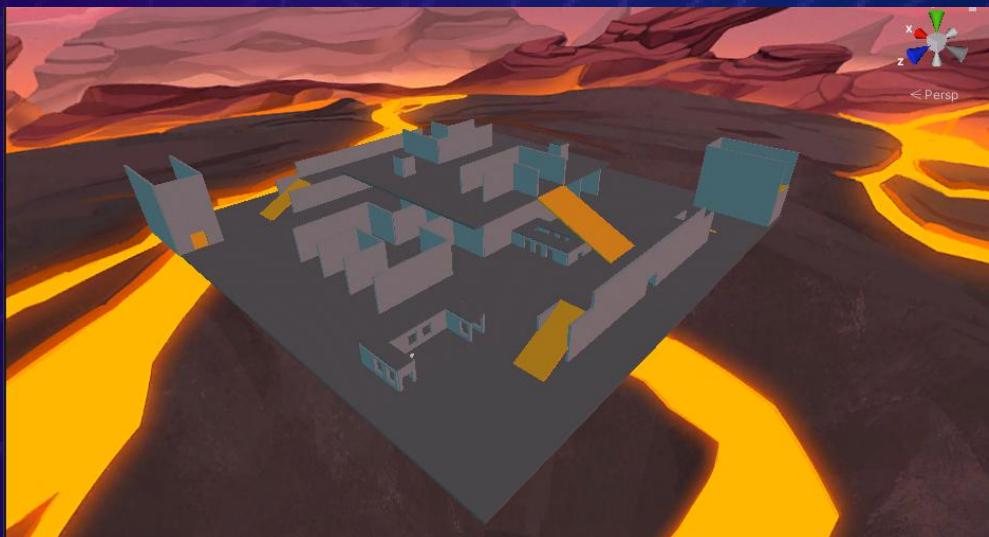
Hell Station Map Preview

Hell Station is the first custom-made arena in MetaRangers. In stark contrast to the Plasma Refinery, Hell Station is an open-space arena, featuring no ceiling and no outer walls, presenting the possibility of the player dying by falling off the surrounding edges. The map was designed to be spacious and encourage a high degree of mobility within gameplay. The arena is also around four times larger than the Plasma Refinery in terms of length and breadth, and contains a second level that the player can traverse to via symmetrical ramps or through the use of the Jetpack.

In regards to layout, Hell Station utilises a series of maze like wall combinations to occlude specific aspects of the arena, such as enemy spawn points and health packs, to surprise the player. The layout was also designed to facilitate a series of different circuits that the player can traverse, allowing them to shepherd enemies and further the encouragement of movement. The addition of the second level was intended to add a sense of verticality to gameplay, and to greatly increase the sense of range that the player can employ in combat.



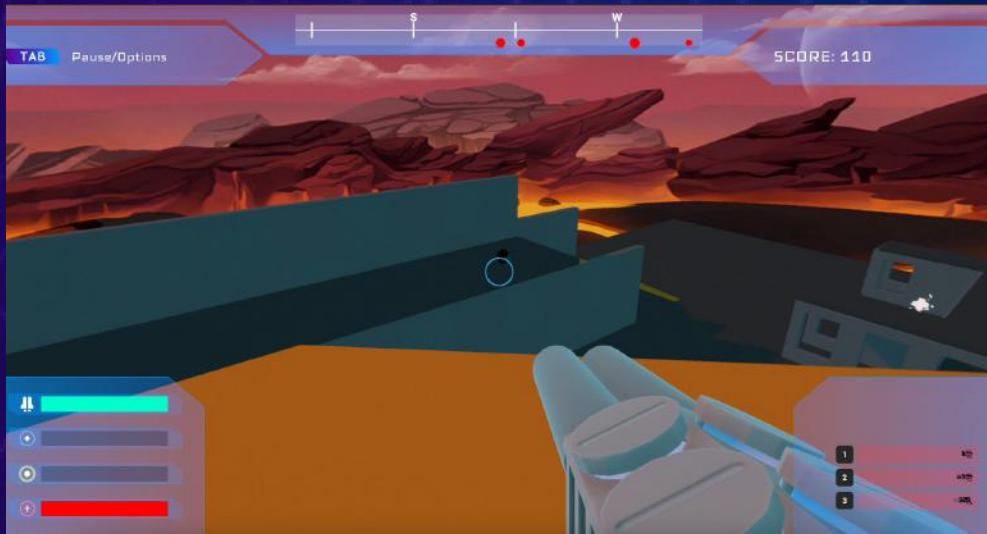
Early Concept / Layout Designs



Final Map Layout



Hell Station Arena Gameplay



Gameplay from the Arena's second level

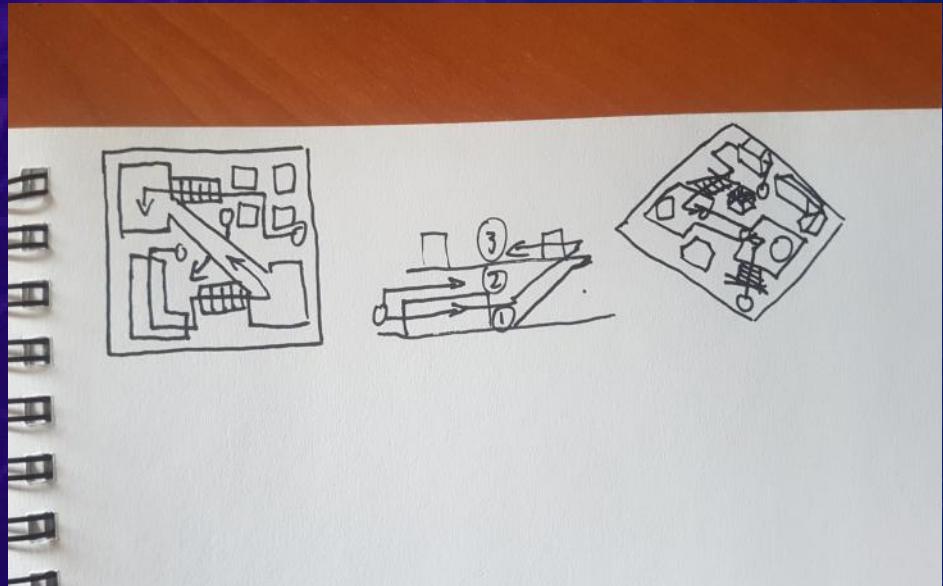
Sunset Outpost



Sunset Outpost Map Preview

Sunset Outpost is the second custom-made arena in MetaRangers. It possesses many of the same qualities as the Hell Station arena, including an open setting and a second layer that can be reached by ramp or by Jetpack. Sunset Outpost differentiates itself by having a series of corridors that the player can traverse through. These represent a double-edged sword in gameplay, either enabling the player to shepherd enemies away from them or to get cornered by them.

The size of the arena is smaller than Hell Station, yet the fact that the corridors themselves can be walked on top of by the player, and by enemies, itself represents a third in-between level that can be occupied for gameplay purposes. The positions of the health packs on the map are located closely to enemy spawn points to induce risky gameplay. Overall the map provides a good balance between close-quarters and long-distance combat, offering several avenues of traversal for the player and inviting many different strategies for gameplay.



Early Concept / Layout Designs



Final Map Layout



Gameplay from the lower level,
including a view of a corridor



Upper level gameplay, using
the Disc Launcher

UI / UX Design

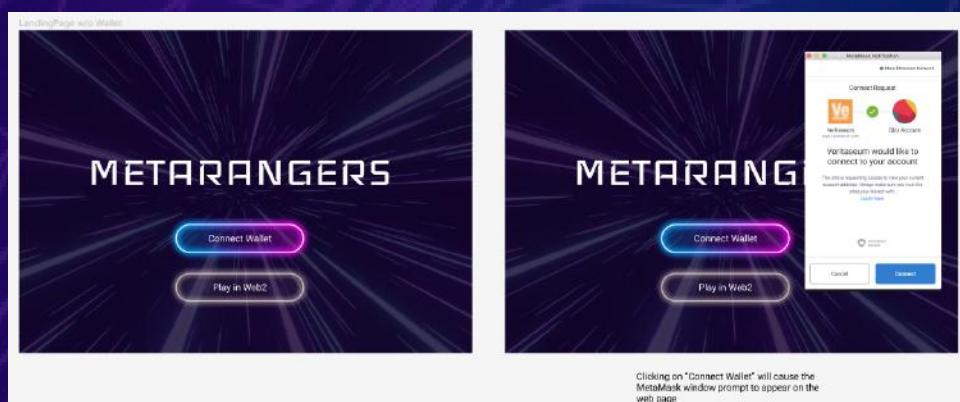
Theme and Styling

The theme for MetaRangers was influenced by the current interpretation and styling for the metaverse, as the metaverse was the primary inspiration for the game due to the game incorporating web3 elements. In accordance with this, the colour theme featured primarily shades of blue, pink, and purple:



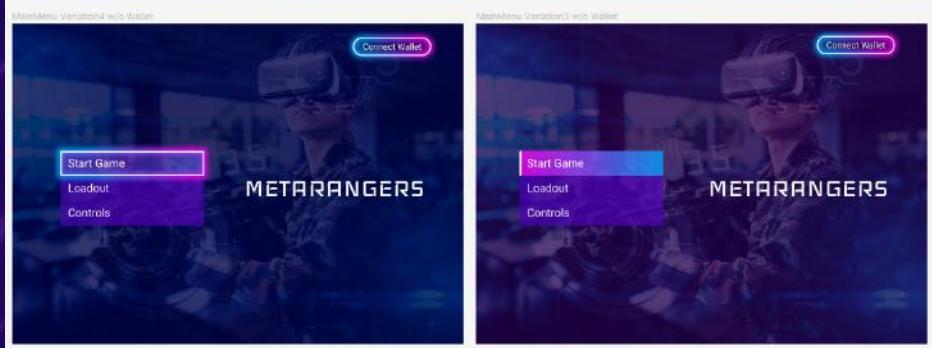
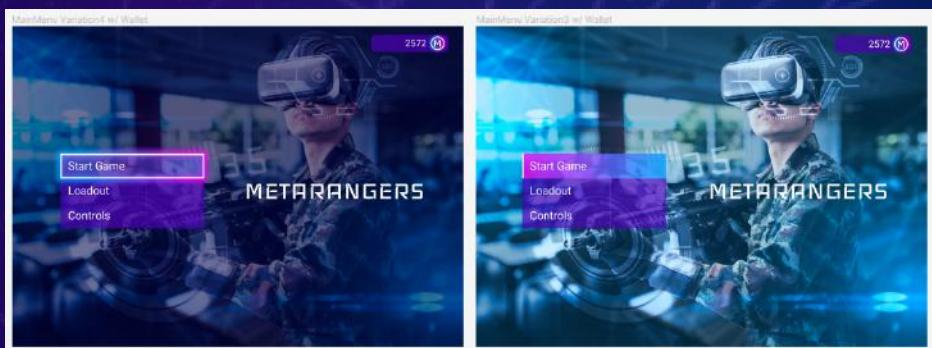
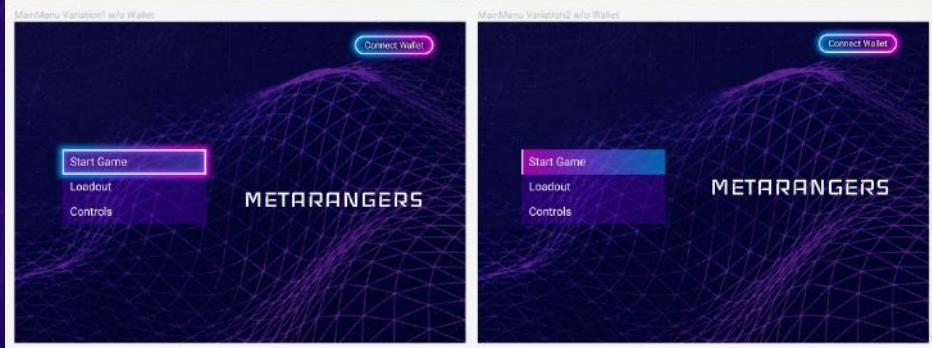
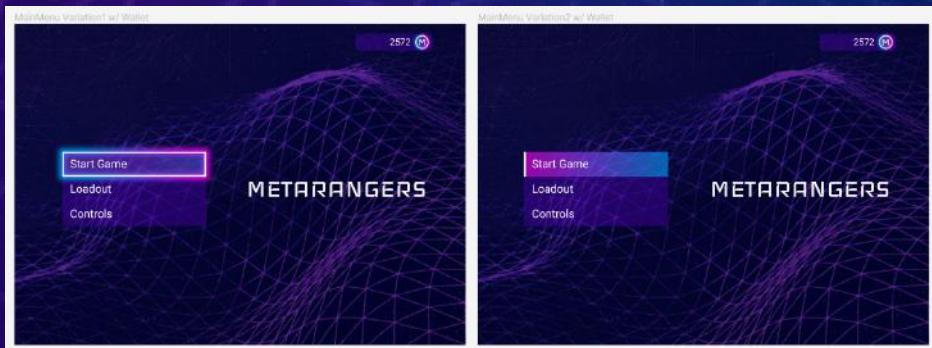
Colour Palette

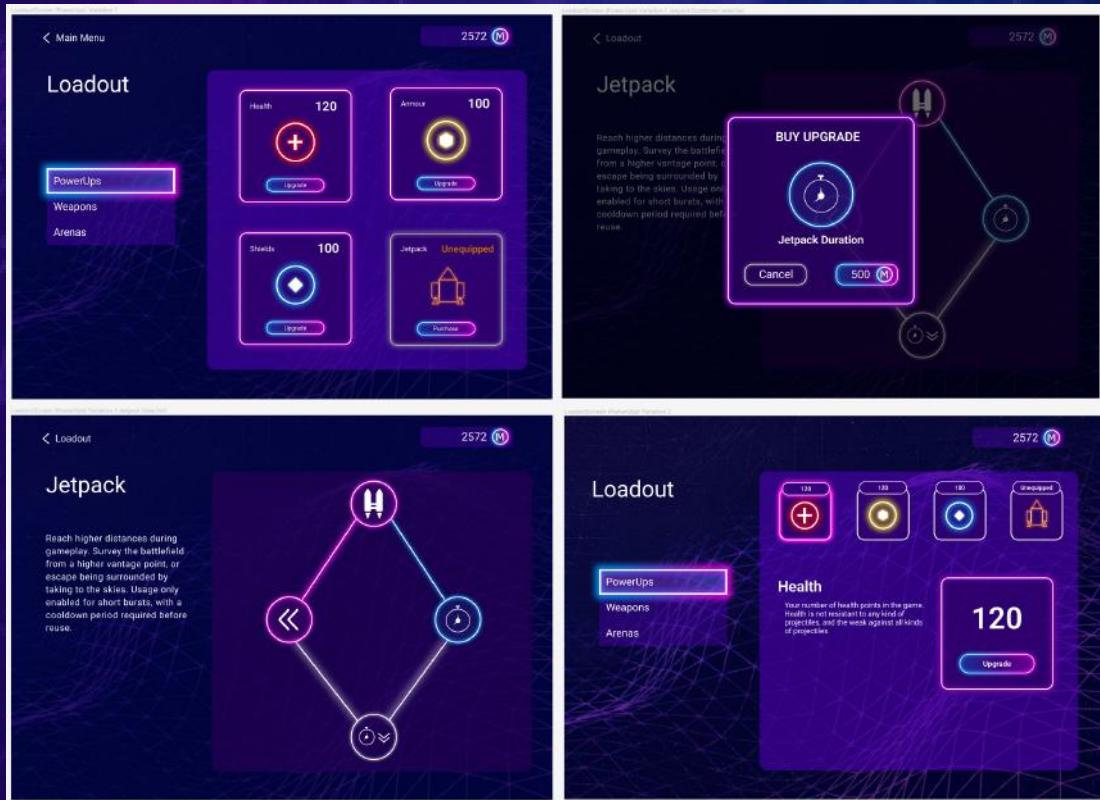
The early design iterations for various UI elements and components used in the game was inspired by glowing effects and simplistic font-faces, in alignment with the current industry interpretation of metaverse/web3 related user interfaces. Glowing effects and gradient patterns were utilised to differentiate focussed and unfocussed fields. Primary call to actions and other buttons were aligned to the left, or utilised curved borders, in order to establish a pattern of affordances for the user. Signifiers primarily took the form of text content.



Early Main Menu designs

Further Early Main Menu Design Prototyping



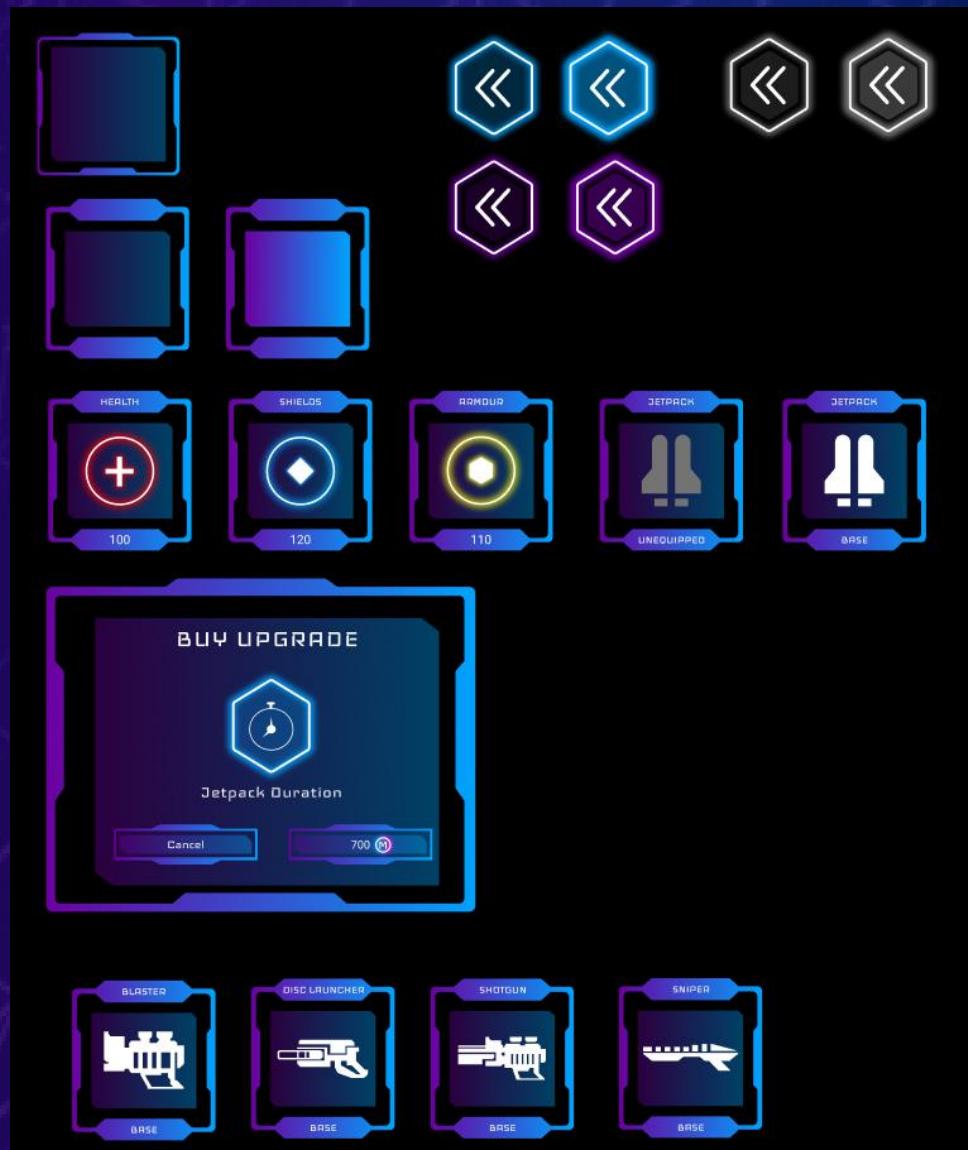


Early Loadout Prototyping

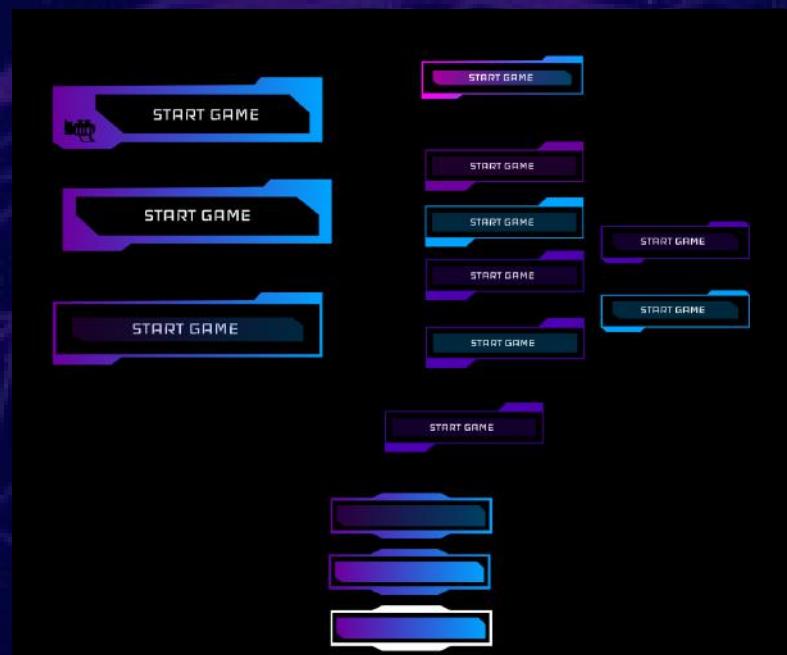


Early UI Component
Prototyping

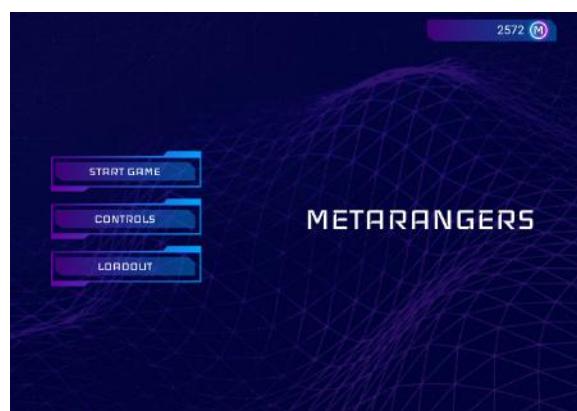
These initial designs were ultimately deemed unsatisfactory, on the grounds that they felt too generic and appeared to be more visually similar to a web application than a sci-fi first-person shooter. The font face was subsequently changed to Iceland to present a more sci-fi style. The UI components within the respective menus were also overhauled to include sharper, angled frames along with elongated tabs within these frames to resemble more of a sci-fi HUD or dashboard. The redesign was well-received, and was acknowledged to align more closely with the overall theme of the game.



UI Redesign Prototyping



UI Button Redesign Iterations



Menu Redesigns

Loadout Menu Trees

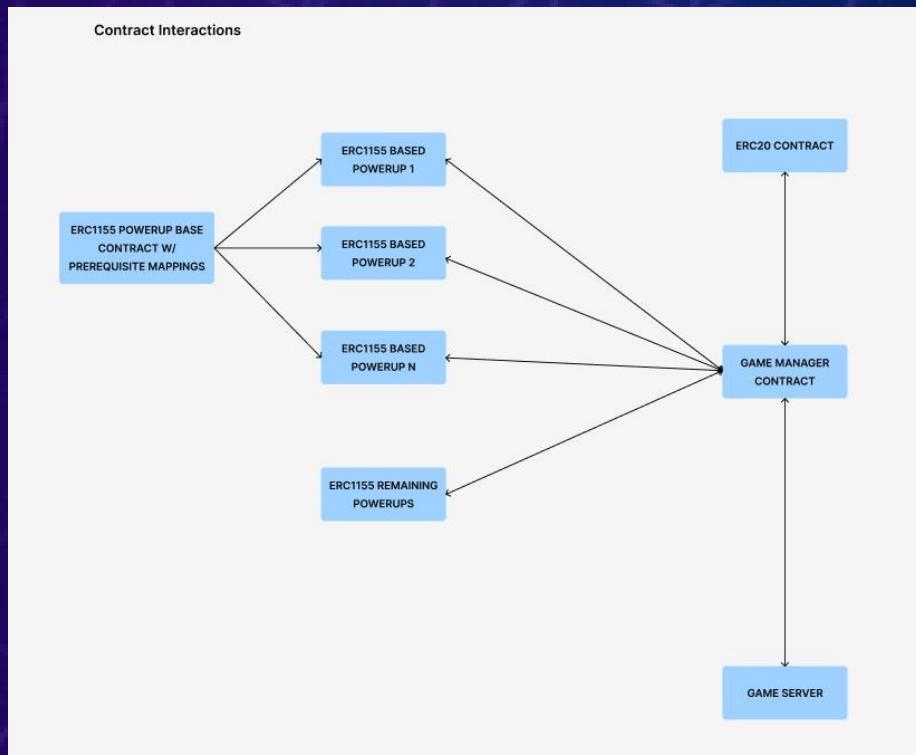
The trees used in the Loadout menu are another example of key UI/UX design. As discussed previously, the weapons and Jetpack have upgrades available to be purchased by the player. What upgrades are available is presented to the player in the form of a tree within the Loadout menu. The use of the tree visually demonstrates the hierarchy present for each of the upgrades, and more specifically which upgrades are prerequisites for further upgrades. The upgrades are also colour-coded, with purple upgrades representing what the item already possesses, blue upgrades representing what is available to purchase for the item, and grey upgrades representing what is unavailable to be purchased. The upgrade tree for the Blaster as displayed in the Loadout menu is displayed below:



Blaster Upgrade Tree

Web3

The key aspect of MetaRangers was its incorporation of decentralisation through the use of blockchain technology. This was my first game that includes the use of web3 technology, and I was excited to see how it would fit into the design of the game. The web3 aspect of MetaRangers involves the use of in-game items being represented as semi-fungible tokens, which can be purchased with the in-game METR currency. A visualisation of the web3 system incorporated into MetaRangers can be seen below:



The rationale behind this inclusion is that the players themselves own the game items instead of the game developers. This allows them to do whatever they want with the tokens, including trading them outside of the context of the game. It also makes ownership of the tokens resistant to any data breaches or deletions of a traditional web2 database, or any counter-community actions undertaken by the developers, such as shutting down the game servers and rendering the game items lost.

In-Game Currency Token

The economy of MetaRangers is powered by its in-game currency, METR. It is a fungible token, meaning any instance of the METR token is equivalent to any other token. The token is inherently inflationary, as there is no cap on the total supply. The only barrier to this inflationary basis is the time that it takes to accrue to the token, which can only be achieved by playing the game. More specifically, the token is accrued based on how many points the player scored during a game, with points being scored by defeating enemies.

These tokens can be spent in the game's Loadout menu, to purchase additional weapons, powerups, and upgrades to be used in the game. Additionally, since the token is a valid ERC20 token on the Polygon Mumbai blockchain, the token can also be exchanged in any ecosystem compatible with that chain. Beyond this, since the player's token balance is listed against their address, they own the tokens and can do with them as they please outside of the context of the game.

Game Item Tokens

As discussed previously, the various weapons, powerups, and upgrades are available to be purchased by the player as semi-fungible tokens. They are semi-fungible because tokens of the same type are equivalent (e.g. Health tokens are equivalent to other health tokens, Blaster Accuracy Upgrade tokens are equivalent to other Blaster Accuracy Upgrade tokens etc.), but different types are not equivalent (e.g. a Shield token is not interchangeable for a Armour token). Due to the power of the blockchain, these tokens can either be bought within the game's Loadout, or acquired from other players through trading outside of the context of the game. Regardless of how they were acquired, in-game tokens that the player owns will operate the same way, enabling true ownership of the items.