G54GAM – Coursework 2 Design Documentation

1. Prototype Design and Specification

1.1 Core Game Play

1.1.1 Overview

The presented prototype game lies within the FPS genre, with heavy emphasis on weapon play and weapon generation. Containing progression of weapon types and quality (rarity) throughout the game. The game has a short section of a story flowing over two levels. The first highlighting a progression from no weapons or knowledge, low health, no shields, through to a single pistol, then an smg, and then better versions of these. Fighting enemies of different types, with their numbers increasing throughout the level.

The second level highlights a boss battle, with an additional weapon type; the assault rifle. The weapons found in this level are of high quality, building on the previous level. This comes to a head in the boss fight, which is detailed in section 1.4.5 and section 2.4 & 2.5. This boss fight presents a significant challenge to the player, testing their knowledge of the game up to this point, while also presenting some new mechanics unique to the boss.

Additional Note: Apart from the Low Poly Terrain Pack, Font and sounds, all other models, sprites etc. were made from scratch.

1.1.2 Weapons & Ammo

The prototype presents three base weapons available for the player to acquire. Further weapon detail outlined in section 1.1.3 & 1.1.4.

- Pistol
- SMG
- Assault Rifle

Brief Note:

- All of the weapons are animated, with draw animations, shooting animations and most importantly reloading animations.

The weapons operate using the following statistics:

- Damage – Damage done to Enemies
- Fire Rate – Shots per minute (RPM)
- Reload Speed – Seconds to reload
- Clip Size – Bullets in each clip
- Fire Mode – Full Auto, Burst, Single Shot
- First Shot Accuracy – Accuracy of the first bullet
- Accuracy – Base Accuracy (After sustained fire)
- Recoil – Rate at which accuracy decays from first shot accuracy to base accuracy

Additional notes:

- Accuracy determines the angle deviating away from the direction vector forward through the crosshair.
- Use of a quadratic function is employed so bullets clump around the crosshair more so than at the edges. As displayed in the figure below.
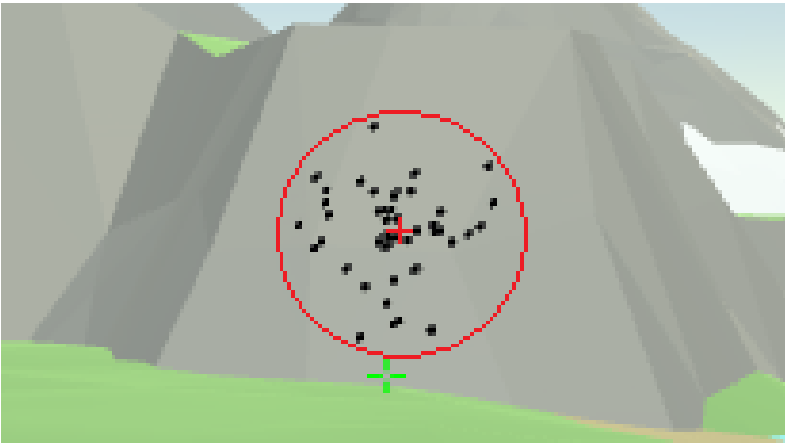
Note: Red Annotations not present in game

Each of these weapons uses a different ammo type, each of which is kept track of in the inventory. Each ammo type has a different maximum ammo quantity, this information is also conveyed in the inventory.

1.1.3 Weapon Generation & Weapon Boxes

Every weapon available to the player in the prototype is seeded, generated and spawned in weapon boxes placed through the levels. Each weapon box will contain a list of weapons it can possibly spawn and the quality of weapons it will spawn (implemented using a weighted random generation).

The quality of the weapon selects its rarity. Ranging through the following:

- Common (Grey)
- Uncommon (Green)
- Rare (Blue)
- Epic (Purple)
- Legendary (Gold/Yellow)

The rarity of the weapon outlines the number of points that weapon has to "work" with. These points determine how many and which extra attributes to assign to the weapon. These attributes also add a visual component to the weapon.

The following are each of the options and corresponding effects available to the weapons:

- Curtailed, Standard or Extended Magazine - (Less / Standard / Expanded Clip Size)
- Full-Auto, Burst Fire or Single Shot Fire Modes
- Short, Standard or Long Barrelled - (Less / Equal / Greater Accuracy)
- No Stock, Stock - (Less Recoil, Better Accuracy and First Shot Accuracy)
- Unsilenced, Silenced - (Different Sound & Aesthetic Only)
- Sluggish, Standard, Hasty - (Slower / Equal / Faster Reload Speed and Fire Rate)
- Weak, Standard, Strong, Powerful - (Lowered / Equal / Raised / Amplified Damage & Fire Rates)

Each of these have visual effects on the weapon model (except fire modes, which manifest when shot). Some of these effects are obvious (e.g. stock, silencer, extended mag), but some are not. The following contains the list of non-trivial visual effects applied to the weapon:

- Sluggish – Blockier element(s) on the side of the weapon
- Hasty – Many smaller elements on the side of the weapon
- Weak, Standard, Strong, Powerful – Increasing levels of detail on the gun model
- Rarity – Weapon rarity affects the colour a specific area of the gun model.

Below is an Example weapon (SMG), it is has the following attributes:

- Rare

- Curtailed Clip
- Silenced
- Hasty
- Stock
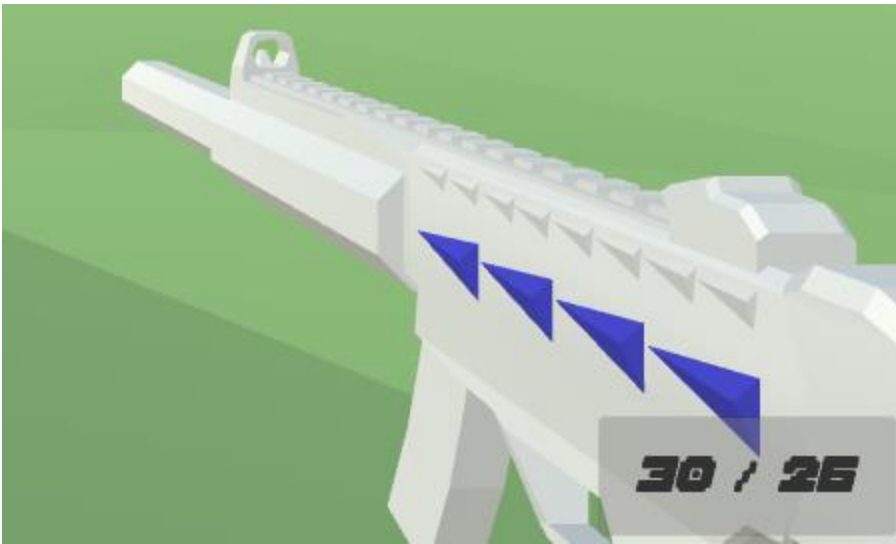
The final factor is that some weapon types do not support all attributes. E.g. Pistols do not have stocks, and are single fire weapons, SMG's are always full auto, etc. These caveats are taken into account upon weapon generation.

1.1.4 Weapon Comparison

Due to the amount of variance in weapon stats even within the same weapon type, it is important that information is conveyed to the player to inform decision making about weapon choice.

The following UI is used to convey this information.

UI is presented for both the weapon on the ground and the equipped weapon. Displaying each of their statistics and attributes, with icons indicating which is better at a glance.

1.1.5 Health and Shields

The player's survivability is determined by health and shields. Health is does not regenerate, and can be increased by picking up health packs throughout the levels. Shields do regenerate over time, if the player has not sustained damage for a time. However shield are not available to the player until discovered at the end of the first level.

1.1.6 Inventory & Slots

The player has an inventory and 3 weapon slots.

Weapon Slots:

- Slots 1 & 2 can hold primary weapons (all but pistols)
- Slot 3 can hold a side arm (pistol).

The inventory contains:

- The weapon slots above
- Capacity to store an amount of ammo for each type
- Readable Items (Data logs)
- The Shield Item

The inventory also keeps a list of items in range of pickup, these can be of any type of item. The closest item to the player is displayed in UI to the player.

PRESS F TO PICK UP UNCOMMON RAPIDE

1.1.7 Data Logs

The game makes use of data logs game objects to convey story, background information and context to player. These data logs are items that can be picked up and read through the inventory screen.
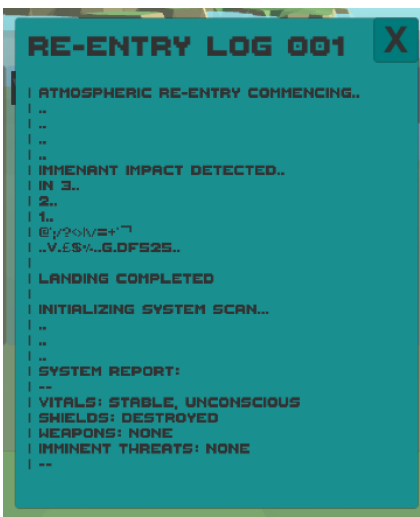
1.2 Game Flow

1.2.1 Difficulty Curve & Skill Gates

The games difficulty curve can be summed up with the following milestones that make up the curve

- Introduce player to controls and data logs
- Jumping between islands (Player movement)
- Enemies (visually & stealth)
- First weapon (pistol) that can be used on a singular nearby enemy

- Faster more numerous enemy types introduced to tackle or sneak
- Larger enemy types introduced, can be dealt with or avoided (After better weapons are provided)
- Larger groups of more numerous enemies
- Final Level, containing the final boss

Overall the curve starts of shallow, introducing the player to the game and its mechanics. Then increasing in difficulty to deal with the different enemy types. Finally peaking at the final boss where each of the learned mechanics up to that point will aid the player greatly, however they will also need to learn on the fly how to approach the new mechanics the boss fight provides. Likely multiple attempts required at the final boss.

1.2.2 Background Music

Background music is used to set the tone of the area the player is in. E.g. the boss fight is has a tenser atmosphere while the first level tends to have more suspense.

1.3 Physics and Parameters

The majority of items that exist in the levels (data logs, weapons, etc.) make use of rigidbody physics. However this only plays a role when dropping a weapon or data log.

1.3.1 Player Controller

The player controller makes primary use of the CharacterController for movement.

- It has movement speed modifiers for crouching and sprinting (decrease and increase).
- The player also has the ability to control their velocity in the air, a decision made to give more control to the player.
- Damage done to the player first takes away from the shield, and the remaining damage spills over into the health.
- Shields regenerate over time, but only when the player hasn't recently taken damage.
- When the player takes damage this is visually conveyed to the player via blood splatters or blue shield strains overlaid under the HUD (for health damage and shield damage respectively).

1.4 Enemy AI Behaviour and Types

Each enemy spawned in the level will execute the following behaviours.

1.4.1 Patrolling

The patrolling behaviour is a simple behaviour in which the AI navigates the NavMesh to the next waypoint (The first waypoint is assigned upon creation). Each waypoint object contains a reference to another, allowing the AI to navigate a patrol route.

If the AI's target (the player) comes in range and in field of view the AI will move to the attacking behaviour.

1.4.2 Attacking

- The attacking behaviour is executed as long as the AI can see the target.
- The AI will move towards the target, and when in weapon range will fire upon the target.
- When the AI is half its weapon range away from the player it will halt and continue shooting.
- If the AI misses, it will then decide to once again move closer, stopping upon a successful hit.

Additional Note:

- The AI also contains an accuracy value, like the weapons, so the AI will sometimes miss.
- Upon first seeing the target, the AI will "signal" (section 1.4.4)

1.4.3 Searching

Either when the AI has lost sight of the target, when the AI has taken damage from the target or when signalled to the target it will search for the target.

- Searching is completed by navigating the last known position of the target
- If it reaches this position without finding the target, patrolling will resume from the nearest waypoint in the AI's route.

1.4.4 Misc. – Signalling

Signalling is the act of alerting all friendly AI within range of the last known position of the target.

Signalling is done in the following situations:

- When an AI takes damage from the target and cannot see it
- When the AI locates the target

This act allows for co-operation between the different nearby AI controllers.

1.4.5 Enemy Types

The game contains four different enemy types to offer different gameplay interactions:

Standard:

- Navy Blue – Base line enemy. Average damage, fire rate, accuracy and move speed – overall weak
- Green – Small and fast with low damage and health, but very strong in high numbers
- Cyan – Large, slow and high damage and health, formidable enemy.

Boss:

- Red – Very large, as fast as the player, Very high health. Damage done after a charge up phase in a fast volley, yielding high damage if hit. When sustaining heavy damage, it breaks down temporarily. It also spawns green enemies around it to aid it further. Very challenging.

1.5 Feature Revelation and Levels

The game contains two levels, which are linked in a geographical manner, the second picks up after unspecified amount time finding a passage way through the mountains, which the entrance of was discovered at the end of the first level. Other level specifics not already specified is provided in the walkthrough sections.

1.5.1 Weapon Types

As the player progresses through the levels, they gain access to an increasing number of weapon types. Firstly pistols, then smgs, and finally assault rifles before the final boss.

1.5.2 Weapon Rarity

As the player progresses through the levels, the quality of weapon boxes increases, increasing the odds of better and more rare weapons. This is tied together with weapon types. E.g. the first smg found is likely common or uncommon, where as they might find a rare or better pistol.

1.5.3 Enemy Types

As the player progresses through the levels, different enemy types are revealed to the player. These types are described in section 1.4.5.

Firstly the player comes across singular navy blue enemies, then a moderate pack of green enemies. These two are hard to avoid completely, encouraging the player to learn how to deal with each type.

The third type is revealed near the end of the first level, in a way that allows the player to get around them. As they are large and daunting, however the player can take them on if they are confident. This enemy type sets the stage for the even larger boss enemy type.

The final level concludes with the boss fight, this boss fight has additional features not seen yet. These features are include:

- Spawning green enemies around itself.
- Charging up its weapon systems
- Firing the weapons in large burst
- Ability to see the player in a 360 FOV instead of the standard cone (~140 FOV)
- Upon taking sustained damage, breaking down temporarily.
- Health bar and status displayed to the player via the HUD.

1.5.4 Shields

The player is told at the beginning of the game that their shields were destroyed upon landing, and the UI also reads 0 shields, the player is rewarded at the end of the first level with shields. In terms of progression it is key, as the next encounter is on the next level, against the boss.

2. Prototype Instructions

2.1 Walkthrough - Beginnings:

You start the first level on a small island, slightly out to sea. Pick up the first two data logs and health packs in front of you. Press E to open the inventory, and then open on each data log.

After reading the re-entry log, you gain the knowledge that you've re-entered the atmosphere, survived the landing, but in an unconscious state. The other data log will inform the player of the control scheme.

Make your way along the island, and you will find another data log and an ammo box, take the ammo. This data log is different, it is a message from Karen, the person you re-entered and landed with. She outlines in the log, that she had to go on ahead as you were unconscious, and that you can expect more logs ahead.

Next move towards land, jumping between the islands, careful not to end up in the water. Just inland, in sight is another data log. This data log drawing the player's attention to the robot ahead and to the right of you, and telling the player that they have limited awareness. It also says there is a weapon on the hill in front, as the player is yet to acquire any tools to defend themselves. Navigate up this hill, staying left, at the top is a weapon crate. It will contain a pistol.

2.2 Walkthrough – Surviving:

Upon acquiring this weapon, a large structure will now be in view, and an enemy between it and you. From the hill carefully shoot the enemy, it is likely not a great pistol, so it may take a good few hits to kill. Sneaking past is also an option.

This building contains a good view on our current area and things to come, however it also has another data log, read it. It warns of multiple different types of enemy. These can be seen by looking through the window. The weapon box in this building may also give you a needed pistol upgrade.

The next step is follow the mountain around to the area you could see through the window, the other enemies nearby to the building can be ignored.

As the river makes a left turn be careful, a new type of enemy is here. Fast but easy to take down, don't let them swarm you. It is possible to sneak past.

Hugging the mountain around will lead you to a camp with another weapon box and data log. However this time it contains an SMG, a tool very useful against the enemies you just fought.

2.3 Walkthrough – Getting Stronger:

Now with an SMG you will be quite formidable. The next step will be to look for more weapons and upgrade your gear further, while also still being careful, as your survivability is still limited.

Follow the river around, being careful for another hoard of green enemy robots, more than the previous pack. Keep lookout for more weapon crates, and health packs.

Steer clear of the large cyan enemies, unless you've got good quality weapons and are confident.

Once the island in the centre of the lake is revealed to you, try to head round to it. Dispatching of the green robots in the way, same precautions as before.

On this island is a shield generator, pick this up and watch your shield refill. Open the weapon crates and take the best options. This data log is a final message from Karen as she's given herself the task of finding out what and where these robots came from. She also explains there is a passage through the mountain almost directly in line with the bridge. Go through it and eventually the second level will begin.

2.4 Walkthrough – Boss Prep

The second level starts in a snowy valley, open the weapon crate in front of you. You will find an assault rifle. A tool you will need later.

Follow the snowy path to the right, this path leads up and around this mountain. Eventually opening out into a larger area.

You should be able to see a large red shaded robot, this is the boss in question.

Move down the slope, to where there is a small camp. This area has many weapon crates and ammo crates. I recommend one assault rifle, one SMG, and a pistol.

2.5 Walkthrough – Boss Battle

To defeat the boss you will need to deal with the bosses green robot minions while also getting damage in on the boss. The boss's current status will be displayed at the top of the screen once the fight begins.

TIPS:

Once the boss sustains a large amount of damage it will break down temporarily, use this time to reposition away, deal with the minions and reload you weapons

Dealing with the minions is top priority, as they are weak but their damage adds up.

Make sure to pick up the health packs around the rim of the centre if you need health.

Ammo packs can also be found in the centre, along with backup weapons.

2.6 Walkthrough - End

Congratulations, you defeated the boss. After a 60 second countdown the game will restart. Thanks for playing.

3. Assets Used

List of Third Party Assets used – each under license.

- Low Poly Modular Terrain Pack – Asset Store
- Thaleah Pixel Font – Asset Store
- Post Apocalypse Guns Demo - (Sounds) – Asset Store
- Gun Sounds Pack 2.0 – SweetSoundEffects.com
- The Way (Synth) - https://soundcloud.com/user-602857531/the-way-original
- Eva – 失望した [Synthwave] from Royalty Free Planet™ - Youtube.com