TANK GAME!

BY LUKE PIERSON AND AMY COOPER

CONTENTS

Game Overview 3

Game Concept 3

Game Objective 3

Genre 3

Art Style 3

Target Audience 3

Core Pillars of Design 4

Balanced Responsibility 4

Communication 4

Navigation 4

Simple/Intuitive 4

Bespoke Controllers 4

Systems and Mechanics 5

Tank Functions 5

Movement 5

Aiming / Firing 5

Environmental Hazards 5

Enemy Tanks 5

Landmines 5

Thick Fog 5

Network Interference 5

Informational Aids 6

Terrain Map (Map User) 6

Approx Enemy Location Map (Map User) 6

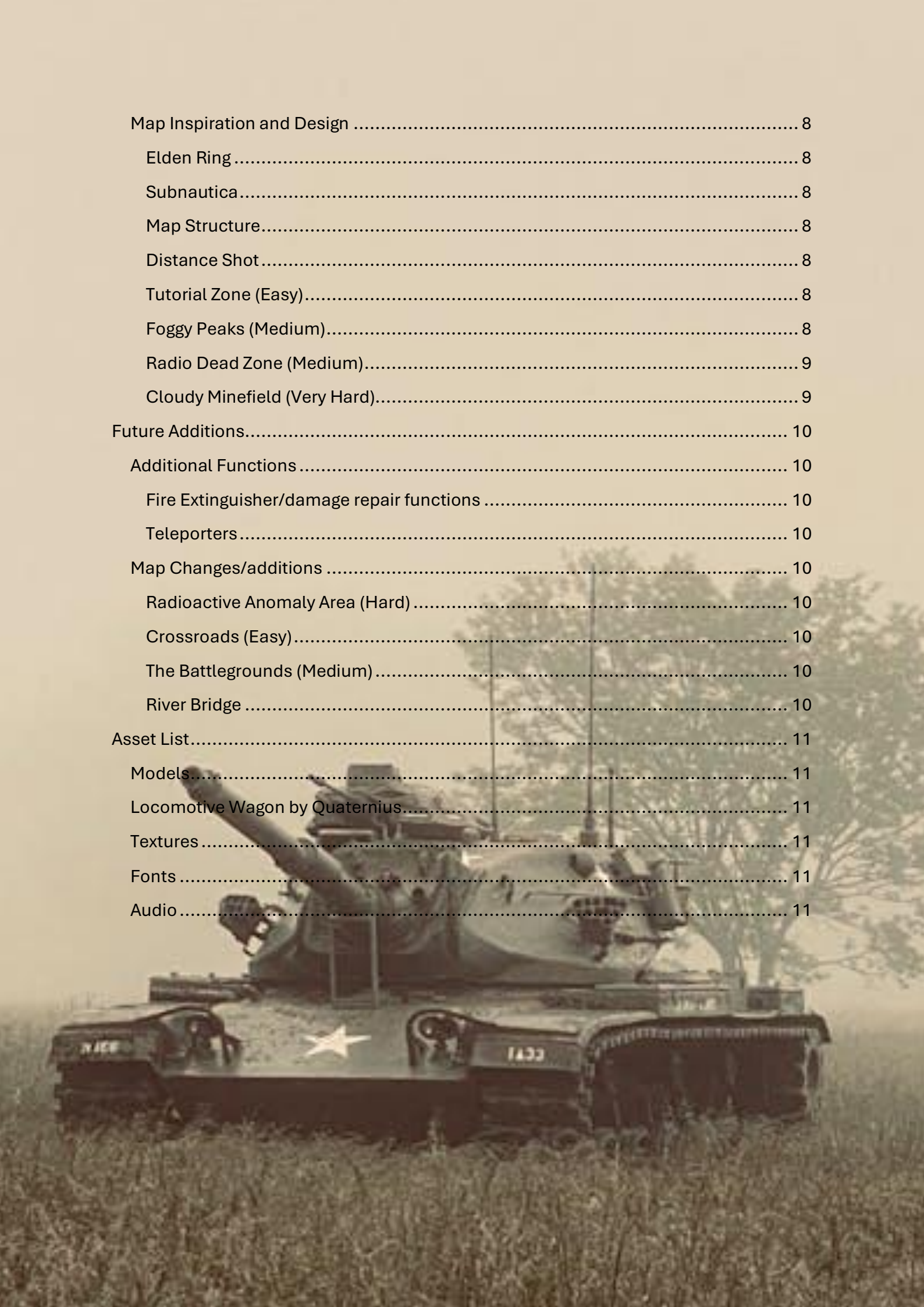
Co-ordinates GPS (Tank User) 6

Compass (Tank User) 6

Proximity Buzzer (Map User) 7

Arduino Functions 7

Map Inspiration and Design 8
Elden Ring 8
Subnautica 8
Map Structure 8
Distance Shot 8
Tutorial Zone (Easy) 8
Foggy Peaks (Medium) 8
Radio Dead Zone (Medium) 9
Cloudy Minefield (Very Hard) 9
Future Additions 10
Additional Functions 10
Fire Extinguisher/damage repair functions 10
Teleporters 10
Map Changes/additions 10
Radioactive Anomaly Area (Hard) 10
Crossroads (Easy) 10
The Battlegrounds (Medium) 10
River Bridge 10
Asset List 11
Models 11
Locomotive Wagon by Quaternius 11
Textures 11
Fonts 11
Audio 11



GAME OVERVIEW

GAME CONCEPT

Our game is an asymmetrical co-op game where the goal is to navigate a map and shoot at enemy tanks. There is a tank player that is using a VR headset to move and manage the tank in the game world, and a map player who is using a custom Arduino controller and map to guide the tank player. The players must use teamwork and communication to navigate and complete the objective in a record time.

GAME OBJECTIVE

Defeat all the enemy tanks in as fast a time as possible!

GENRE

Our game is a co-op action puzzle game taking inspiration from games such as Keep Talking and Nobody Explodes and Iron Lung.

ART STYLE

Due to time constraints, performance, and ease of access, we are using a low-poly aesthetic with low-resolution textures. Fog and Motion wind will also be added to give motion to the very still desert landscape. The map itself will adopt a radar style to mimic an HQ-style.

TARGET AUDIENCE

As this will be a smaller project, the aim will be to create a small arcade experience (similar to one-time convention games) rather than a fully-fledged replayable game. The overall aim is to create a bite-sized adventure that tests the teamwork of two players in a fun, low-stakes challenge. The game tailors towards any age demographic due to its minimal realistic violence and simple visuals. However, the game will be directed toward puzzle fanatics and friends who enjoy working teamwork experiences or simply want to have a good time!

CORE PILLARS OF DESIGN

BALANCED RESPONSIBILITY

We want both players to have an equal amount of responsibility throughout the game to avoid the game being very one sided and to encourage as much communication as possible.

COMMUNICATION

Information is going to be shared between the 2 players, and they will have to communicate it to each other to play the game. Neither player will have all the information or controls to enforce mandatory communication.

NAVIGATION

Much of the game is going to be navigating through an open space, we want to design the environment to encourage communication between the players while also making navigating interesting enough to encourage constant engagement.

SIMPLE/INTUITIVE

We want this game to be accessible to a large audience, so we will be designing our systems to be easily readable and reduce complexity.

BESPOKE CONTROLLERS

We are creating an experimental game, and we are doing this by experimenting with using different input methods to create a unique co-operative experience.

SYSTEMS AND MECHANICS

TANK FUNCTIONS

MOVEMENT

The game's tank will have classic game tank controls where the player is able to move forwards and backwards and turn left and right but not be able to move sideways. This will be achieved in VR with a simple wheel to turn and a lever to push forward or backwards to move accordingly.

AIMING / FIRING

To attack, the tank will be given a cannon which can be turned around to aim in different directions and can aim upwards or downwards control the distance of the projectile. This will be controlled using a pair of potentiometers on the Arduino controller. Firing will be achieved by the Map user hitting the fire button.

ENVIRONMENTAL HAZARDS

ENEMY TANKS

Static or moving targets that will have an obscure location, the player's main objective is to locate and destroy the tanks. These tanks will have roam within 1 cell of the physical map, the map will have the cell marked in a different colour.

As each cell is very large, the players must communicate to find and aim at the precise Tank location. Encouraging teamwork further.

LANDMINES

Static hazards that the exact location will be given to the Arduino player but will be completely hidden to the VR player, The players must navigate around the landmines to avoid tripping them and losing score/time.

THICK FOG

An area of the map will be covered in a thick fog, reducing the visibility greatly of the player in the Tank, meaning they must rely more on the map-user for concrete directions.

NETWORK INTERFERENCE

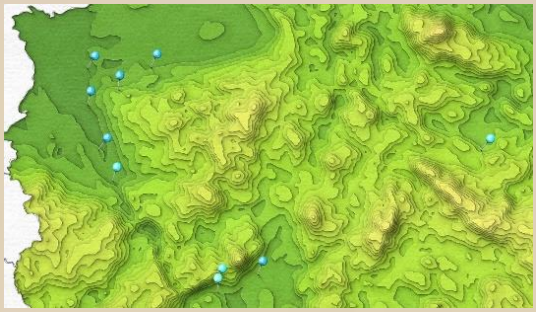
The Co-ordinates GPS goes offline in this area meaning the Map-User cannot access a firm coordinate position. This encourages the Tank user to communicate visual landmarks to support navigating the area.

INFORMATIONAL AIDS

Much of the game will be about sharing information, balancing what information is given to which player will be the focus of testing. Below is a listing of information that can be given to the players will help us test the different possibilities.

TERRAIN MAP (MAP USER)

A top-down map that describes the terrain of the world, this can be used to visualize the rough shape of the world the tank is in. This can be used to guide the driver through the layout of the map



APPROX ENEMY LOCATION MAP (MAP USER)

A grid with coloured squares that represent a rough area where an enemy tank can be found, this can be used to initiate searches around the different areas that enemies can be found.

CO-ORDINATES GPS (TANK USER)

A grid or display that shows where the player tank is currently. This can be used to reference against the terrain map and enemy map to guide the player to objectives. The grid is split into numbers and letters to make communication fluid and make each coordinate scale distinguishable.

COMPASS (TANK USER)

A dial that points in the direction the tank is moving. This can be used in combination with the terrain map to reference roughly where the player is heading if they also know where the player tank is.

The compass always points North meaning the player must discern what way they are facing akin to an actual compass.

PROXIMITY BUZZER (MAP USER)

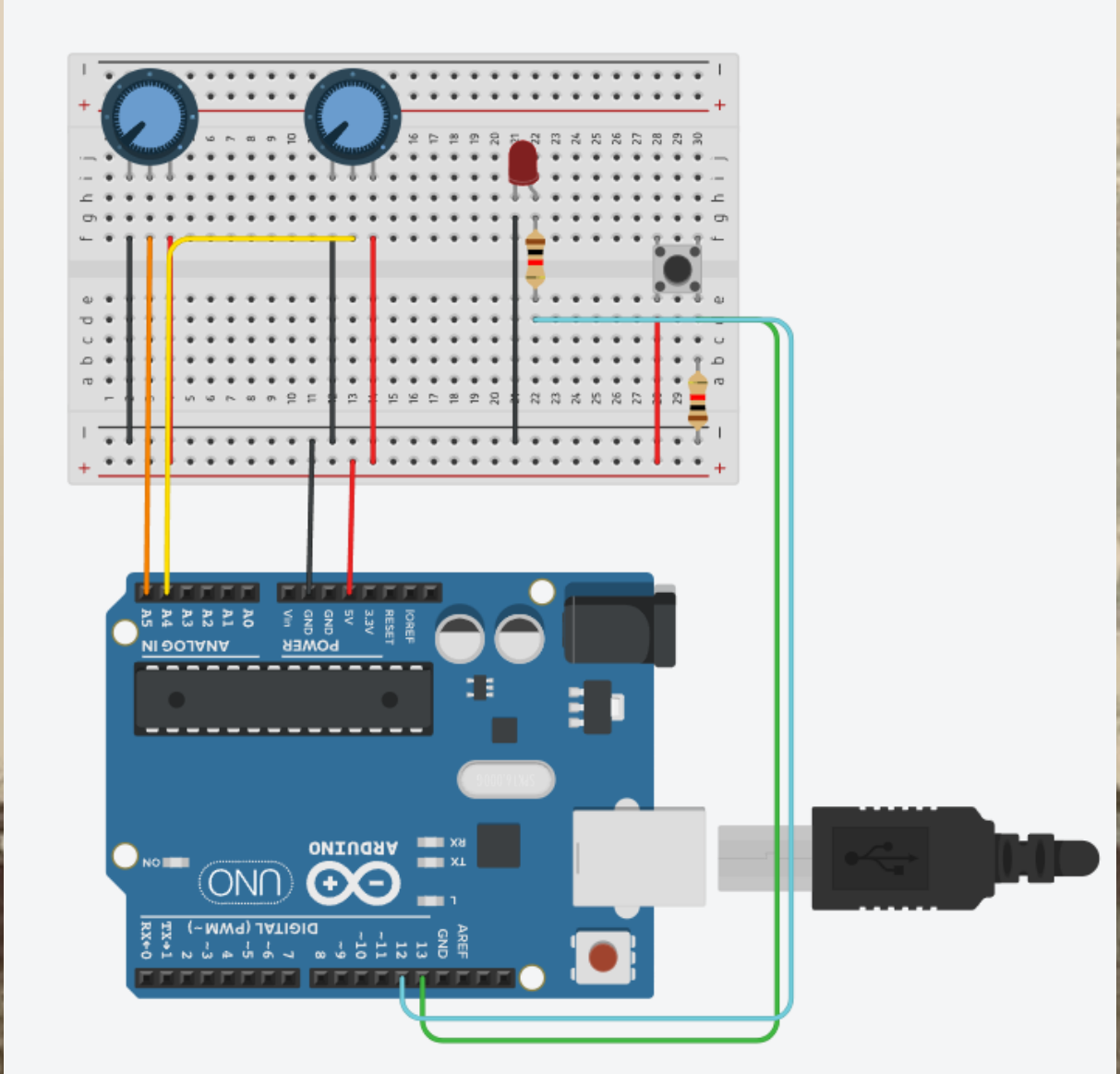
A buzzer or light that flashes different speeds depending on the distance of the tank to a landmine, can be used as a supporting aid for navigating complex landmine areas

ARDUINO FUNCTIONS

The Arduino will contain the following elements in the current build:

- Potentiometer (horizontal Aim)
- Potentiometer (Vertical Aim)
- Blinking LED (Proximity Buzzer)
- Button (Fire Button)

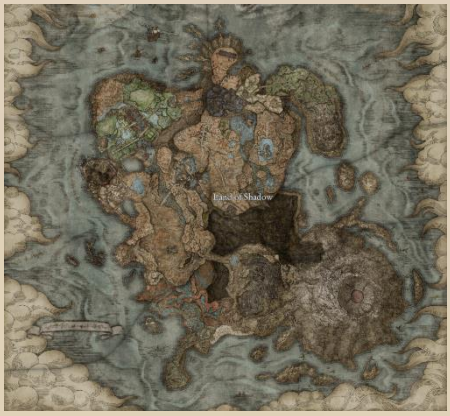
These will be configured to keep all components segregated and clear to the Player. To minimise the player feeling overwhelmed, all inputs are kept to one side of the breadboard. The potentiometers used will also be facing away from the wires to avoid difficulty interacting with them.

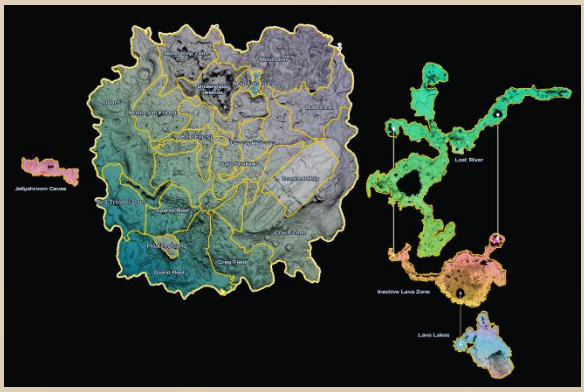


MAP INSPIRATION AND DESIGN

ELDEN RING

In Elden Ring, the map is structured with core biomes/areas that are separated by choke points that require game progression to pass. This is especially noticeable in the Shadow of the Erdtree DLC where the sections are clearly defined by large cliffs.





SUBNAUTICA

The map of Subnautica is divided into biomes that become more dangerous as the player moves away from the start of the game in the centre of the map. The placement of the player spawn is done to make the ocean world feel more open.

MAP STRUCTURE

For our game we will divide the map into areas that provide unique challenges through the terrain or by hiding player information. The areas will generally be non-linear, and the player will have multiple choices of where to go next. The map will interconnect as a circle to minimise backtracking.

DISTANCE SHOT

An enemy tank is found at an unreachable spot, meaning the player in the tank must help the map user aim the canon using Arduino.

TUTORIAL ZONE (EASY)

A small arena with a couple of easily reachable tanks and avoidable landmines to guide the players how to play the game in a contained area before reaching harder areas.

FOGGY PEAKS (MEDIUM)

A mountainous landscape covered in fog. The tank will have to rely more on what the map player an see on the map to navigate the area.

RADIO DEAD ZONE (MEDIUM)

Plain field with heavy network interference meaning the tank and map player must communicate key landmarks to figure out where they are going.

CLOUDY MINEFIELD (VERY HARD)

The players must venture into an area containing thick fog, Network Interference and many landmines. The players must rely on their limited map knowledge (Terrain Map and proximity buzzer) to navigate slowly through this dangerous area.

FUTURE ADDITIONS

While we only have so much time to create this prototype, there are many ideas we have that could build this game into a full release.

ADDITIONAL FUNCTIONS

FIRE EXTINGUISHER/DAMAGE REPAIR FUNCTIONS

Certain threats can cause the Tank to get small fires (causing the players time to increase twofold), using the instructions given by the Map user, the fire can be extinguished!

Example Repair Function

The fire extinguisher is locked behind a code, printed on the Map user's map in a safety section

TELEPORTERS

A hazard that will move the player tank to a random area of the map. This will be used to confuse the player and allow them to reach otherwise inaccessible areas of the map.

MAP CHANGES/ADDITIONS

In a full release we could have a series of maps or have a much bigger map with much more areas.

RADIOACTIVE ANOMALY AREA (HARD)

A desolate area that the players must traverse through with network interference and teleportation anomalies that misdirect the players leading them to need to use notable landmarks on the map to figure out where they could be heading.

CROSSROADS (EASY)

A series of mountains navigated by a maze of forking paths. Extra communication is required to guide the tank through the maze.

THE BATTLEGROUNDS (MEDIUM)

A plain area dense with landmines that the players will have to take extra caution to avoid.

RIVER BRIDGE

Throughout the level, there is a river that is obscuring the Tank from making progress but is easily missed on the map. The map-user must determine where the bridge across is.

ASSET LIST

MODELS

Tank by KolosStudios via Poly Pizza
Temple of Prophecy: Ruined by Duncan Anderson via Poly Pizza
Dead tree by Poly by Google via Poly Pizza
Large Bone by Quaternius via Poly Pizza

tower by Jie gu [CC-BY] via Poly Pizza

Pyramid by Poly by Google [CC-BY] via Poly Pizza

Statue by Zsky [CC-BY] via Poly Pizza

Palm Tree by Quaternius

Cactus by Poly by Google [CC-BY] via Poly Pizza

Cactus by Poly by Google [CC-BY] via Poly Pizza

Locomotive Wagon by Quaternius

Gravestone by Kay Lousberg

Statue by Zsky [CC-BY] via Poly Pizza

Rock Large by Quaternius

TEXTURES

Mine Rock Wall by Quixel via Fab
Wild Grass by Quixel via Fab
Rocky Ground by Quixel via Fab
Leakage by Quixel via Fab
Cancel icon by sbed via Game-icons.net

FONTS

Digital Display by zanatlija via dafont.com

AUDIO

Motorcycle Engine_50Km/h by Cmart94 via freesound.org
engine-idle by gthall via freesound.org
Slips air release v2 by mcpable via freesound.org
explosion12 by V-ktor via freesound.org

Medium Explosion by JohanDeecke via freesound.org
Cannon3 by Isaac200000 via freesound.org