Game Proposal: A Drone in the Dark

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1. Game Description

Storyline

There was once a little planet. The landscape was of incredible beauty, the grounds were fertile and provided nutrition for all of its inhabitants. Since the beginning of time there were two tribes living on the planet. They peacefully co-existed side-by-side for a long time, both appreciating the wealth the planet provided them. But over the time their minds got poisoned and they got greedy. They wanted more. Of course, expansion and progress were only possible at the cost of the other tribe. A long lasting war started and no end was in sight. Over the centuries, the battles got more and more brutal, ending in a final war extinguishing the life they had known before and annihilating the paradise the planet once used to be.

Eternal darkness has fallen over the world. The people have to stay in subterranean bunkers since it is too dangerous on the planet's surface. Getting food is the main concern of the tribes of the planet. But instead of working together and trying to somehow make the best of the situation they are still fighting each other over nutrition.

To collect food, they use drones which explore the waste surface of the planet and try to find places fertile enough to grow plants and other things to eat. Choose your tribe and help it to discover a dangerous, condemned city full of danger and sadness.
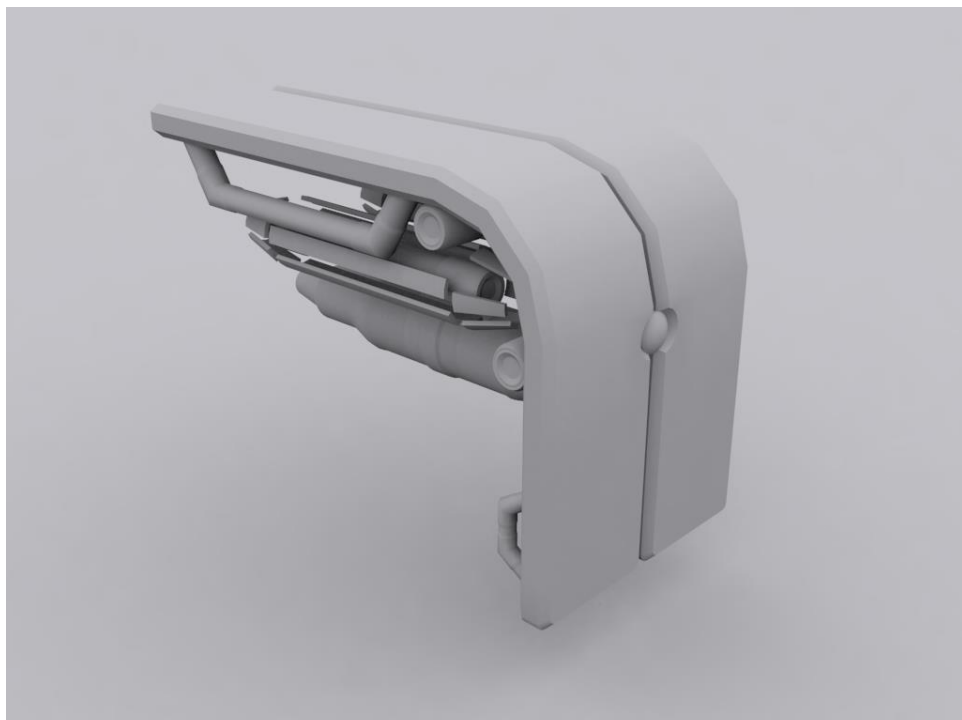
Figure 1.1. Tribe #1 drone
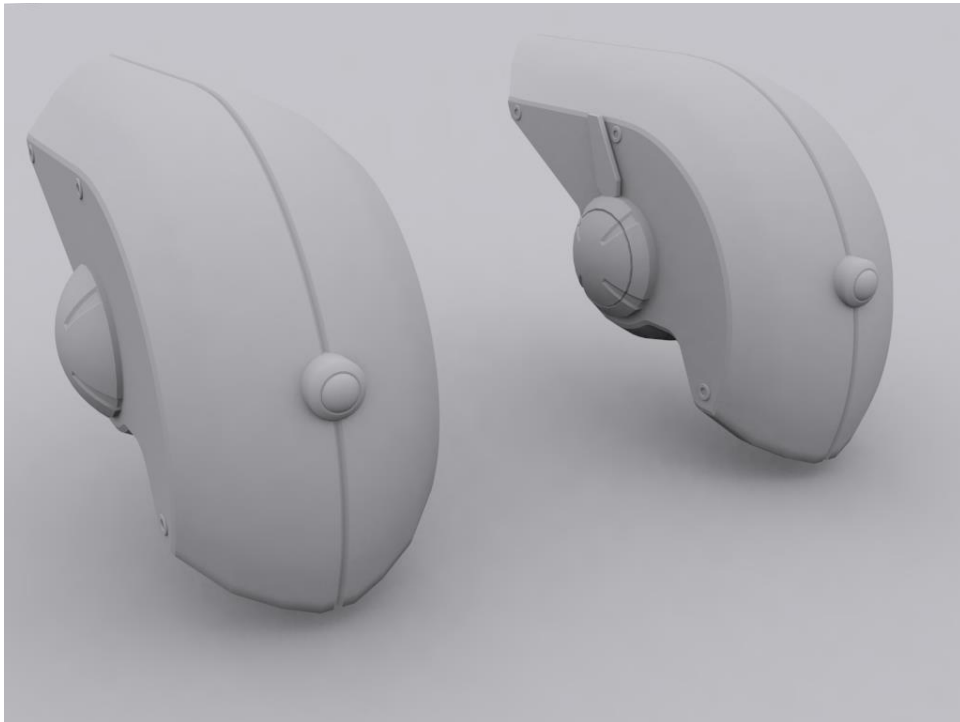
Figure 1.2. Tribe #2 drone

Gameplay

In the beginning the player has to choose a tribe he wants to help. The skills of the drone do not depend on the tribe selected. Therefore, each player will have the same possibilities during the game. When the game starts the drone will be placed on the map surrounded by darkness. The only light is provided by a spotlight attached to the drone (Fig. 1.3) and a very small area around the drone itself.
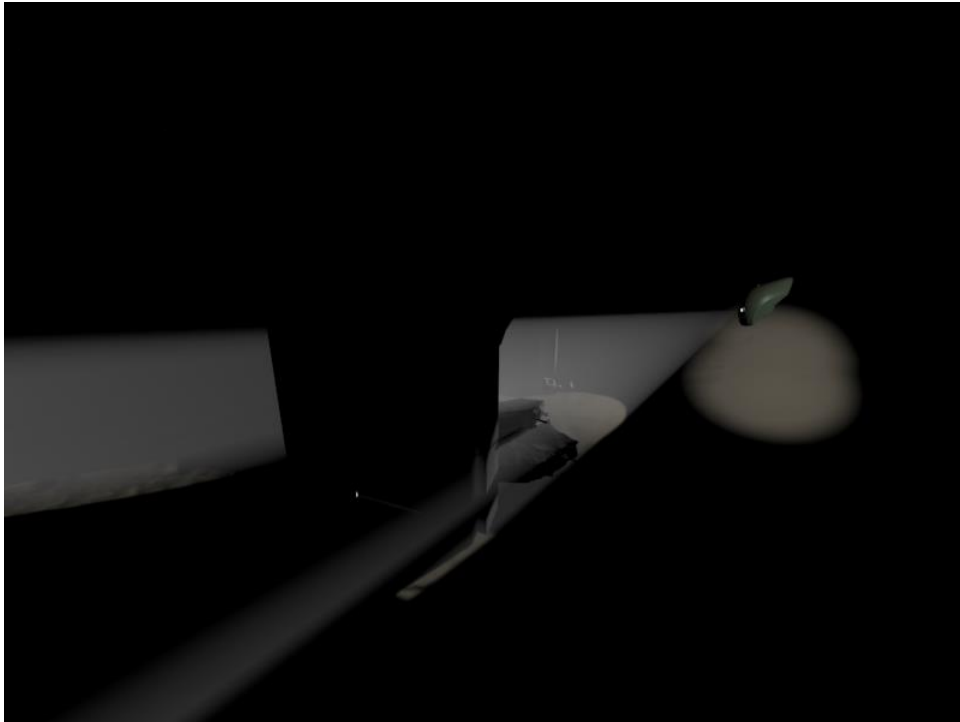
Figure. 1.3. Example of core gameplay mechanic

Only things within this spotlight can be seen by the player. There could be some additional light sources on the map (like fire places, torches) but they will only illuminate small, bounded areas. The task of the player is to find food on the map without getting killed by the other player or other dangers lurking on the map. The map will look like a city which was destroyed during the war. From time to time the drone should fly back to the home base. At the base the drone can unload the food, be upgraded or repair your drone. Only the food which was brought back to the base will be considered at the end to choose the winner.

When the game starts the drone will not have any weapon system, therefore the players can't fight against each other in the beginning. During the game the players have to use the light beam carefully since it will make them visible to the opponents but without it they can't see possible dangers and enemies. That opens up opportunities to use darkness either as a means of escape or to ambush the opponent.

Additionally, if there is enough time to implement it, there will be a tracking system, which will expose the location of a drone in case it was not moved for a certain amount of time. After predefined time the game will be over. The player who collected the most points will win.

Collecting food

There are two possible ways to collect food. The food will spawn randomly from time to time.

Grow plants: There will be special places of fertile ground on the map. At this places you can grow a plant using the spotlight of your drone (Fig. 1.4).
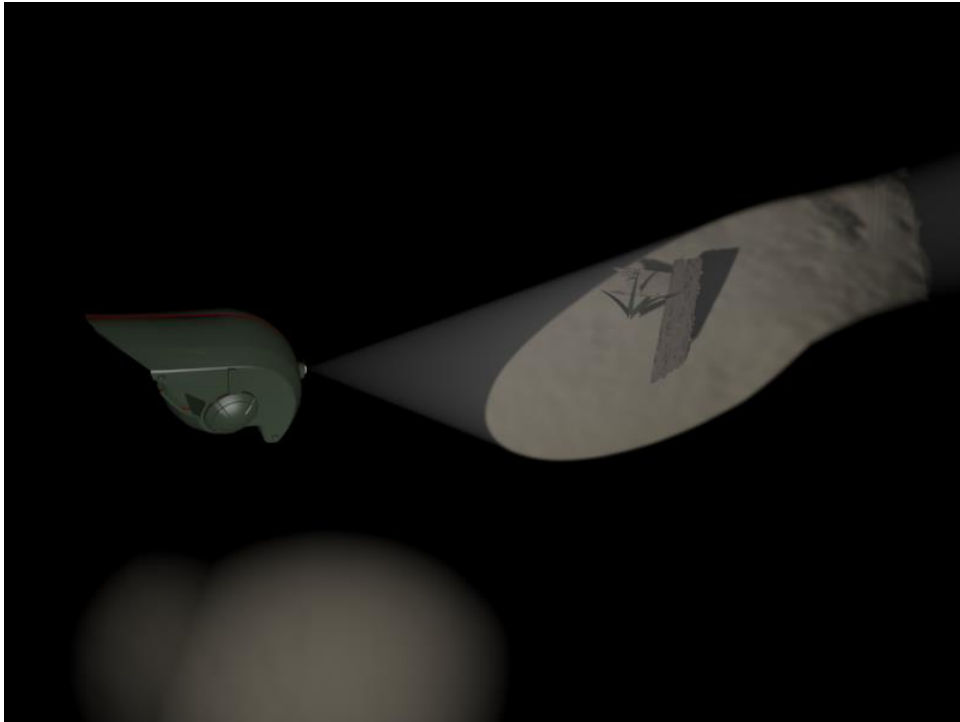
Figure. 1.4. Growing food

By pointing the spotlight on the special ground the growing process starts. After a short time a fully grown plant will drop some valuable nutrition for you. There are different plants with variable growth duration which provide different amount of food. The kind of plant which will be grown can be identified by the color of the soil.

Open Cans/Barrels: Before the apocalypse the people of the planet used to preserve their food in cans and barrels. If you find such an item your drone can open it. Opening it will take some time and emits a noise which might attract enemies. The amount of food in a can/barrel depends on their size but so does the time it takes to open it.

Fighting/Random Events

The drones will have some health. During the exploration of the map the drone might get attacked by another player or what is called a random event. These attacks will decrease the health of the drone. If the there is no health left the drone will be destroyed.

Fighting:

The drone can be equipped with a weapon system. It will then be able to shoot projectiles. Hitting enemies with projectiles will decrease their health and possibly destroy them. If you destroy the drone of the other player the food he was carrying can be claimed.

Random Events:

Random events occur during the game and therefore cannot be foreseen by the player. Some of the events might damage the drone while others just change the environment or provide some new information:

- **Lightning:** A big lightning illuminates the whole map for a brief period of time. During this, the player can see what's hidden in the dark.
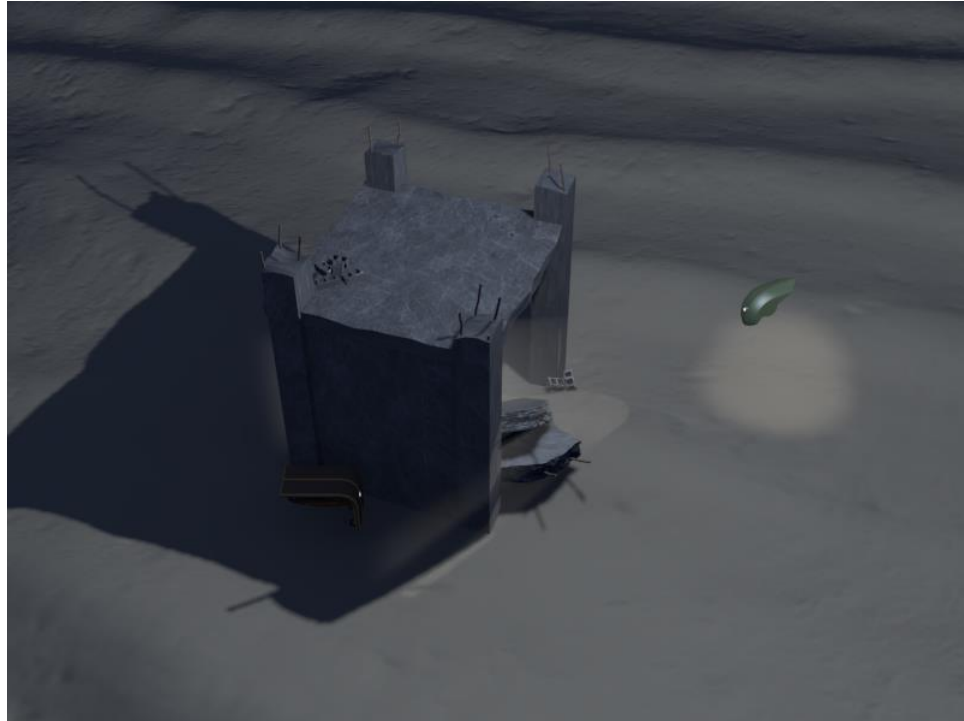
Figure 1.5. Random event: lightning

- **Reactivation of old weapon systems**: Some of the automatic weapon systems used in the war are still on the map. They might reactivate from time to time attacking the drones.

Destroyed drone:

When your drone gets destroyed it will be respawn after short time somewhere on the map. But you will lose all the food you were transporting.

Temporary Power-ups

The drone is powered by a special engine whose performance can be temporarily improved using bio-fuel. This bio-fuel will be produced out of the nutrition carried by the drone. Therefore, the player has to decide if he wants to get a temporary advantage at the cost of bringing back less food to the base.

The list of power-ups include:

- ***Speed:*** Makes your drone move faster

- ***Stronger light:*** Let the plants grow faster

- ***Bigger projectiles:*** Increases the damage caused by your weapon system

- ***Shield:*** Makes you more resistant against attacks

When a power-up is active, the food supplies will deplete at a constant rate (since it will be used as bio-fuel). Using power-ups is therefore only possible if your drone is actually carrying food.

Drone upgrades

If you have collected enough food you can upgrade your drone at your home base. Upgrading to a higher level will cost some food but it will make your ship better for the rest of the game. There are multiple upgrades available. The upgrade cost may vary.

Possible upgrades are:

- ***Speed:*** Makes your drone move faster

- ***Weapon System:*** Let your drone attack enemies

- ***Shield:*** Makes you more resistant against attacks

- ***Health:*** Increases the health of your drone

- ***Stronger light:*** Let the plants grow faster

- **Food detector (very expensive)**: A radar system which discovers food which is near you

2. Technical Achievement

The major technical achievement is going to be 2 player LAN. It will be a technical challenge as it needs to be performant yet still keep all events in the game synchronized among the players. Therefore, it is necessary to consider packet losses, reordering and duplication of packets. If possible within the given time frame, some anti-cheating mechanisms should be implemented so events that should not be possible won't be accepted by the game.

Furthermore, as the game will focus on exploring a sinister and decayed world, we will invest heavily in lighting and shadow effects. This way it will be possible for players to hide in complete darkness and use the headlight of their drone to find and grow resources.

Thus, one of the challenges that must be tackled in order to achieve this goal will be to keep the game's performance high while still computing the lighting and shadows for a great number of objects on a large map. Moreover, some of the objects on the map might occlude the drones. Consequently, there must be a way to render the drone even if it is not directly visible from the camera, e.g., simply rendering the outline (Fig. 1.6).
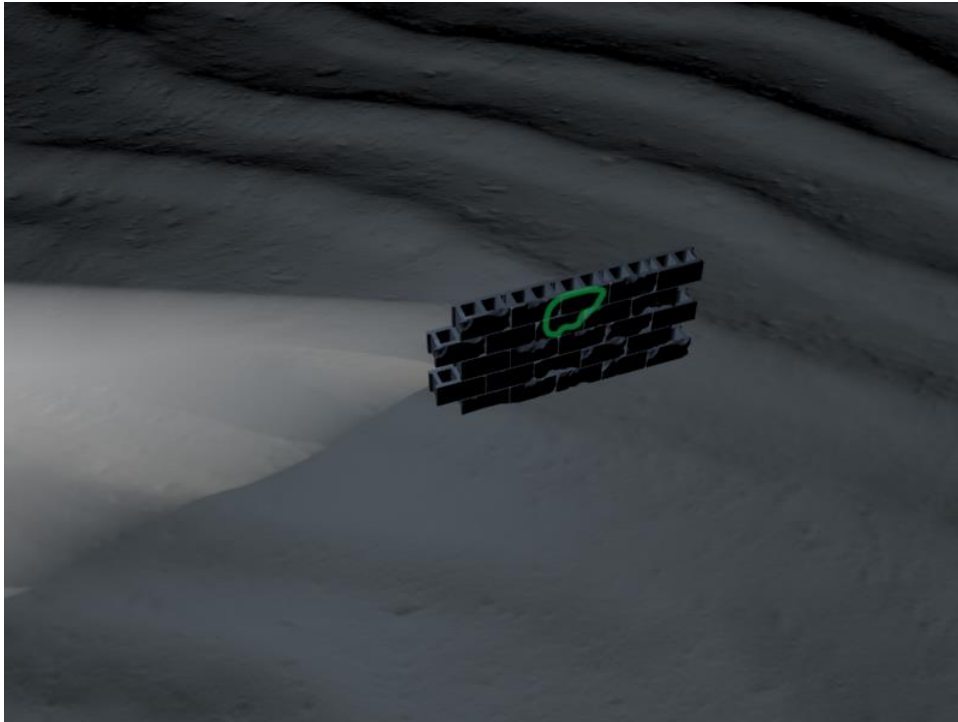
Figure 1.6. Outline of the drone

3. Big Idea

The main idea behind the game is challenging players to use light strategically in dark environment to fight their enemy and outperform him in collecting food. It is up to the player whether he chooses aggressive tactics focusing on fighting and ambushing or taking a pacific approach collecting and growing food in the shadows and using boosts to escape enemy encounters.

To achieve a thrilling experience, lighting and shadows, as well as the design of the maps need to perform well on a technical level and have to be constructed in a way that allows well-balanced and tactical gameplay.

4. Development Schedule

4.1. Layered Task Breakdown

Functional minimum:
- Singleplayer game without fighting
- Collect as much food as possible within given time period
- Premade single map

Low target:
- LAN

- Lightsystem
- Improved Design

Desirable target:
- Advanced food collection: growing food, opening containers
- Fighting system
- Sound effects
- Advanced GUI

High target:
- Environment danger: i.e., turrets, mines
- Level system: level up in the base (uses food), e.g.:
  - First level: no weapons
  - Second level: install weapons or increase speed
  - Third level: stronger UV-lamp or shields
- Soundtrack / additional sound effects

Extras:
- Enemy AI for singleplayer model
- Random events (lightning)
- Explorable houses
  - Hiding system
- Multiple rounds
- Warning system

4.2. Timeline

Task description	hrs	29.2 W1	7.3 W2	14.3 W3	21.3 W4	28.3 W5	4.4 W6	11.4 W7	18.4 W8	25.4 W9	2.5 W10	9.5 W11	16.5 W12	23.5 W13	30.5 W14	3.6 W15
General																
Brainstorming	20	All														
Testing/Fixing	N/A															
Assignments																
Project proposal draft	10		All													
Finalizing project proposal	7			All												
Game prototype chapter	6				All											
Interim report chapter	6									All						
Alpha release chapter	6											All				
Playtesting chapter	6												All			
Conclusion	6															All
Final digital video	5															All
Presentations																
Formal game proposal and physical prototype	15				All											
First playable demo	2						All									
Interim demos	2									All						
Alpha release demos	2											All				
Playtest results	2												All			
Final presentation	5														All	
Layered task breakdown																
Functional minimum																

Game engine components:																
Render queue	10				B/R											
Basic shading	15			All												
Collision system	20				B/L											
Camera	10	B														
Basic UI	5				R											
Game design:																
Basic 3D models	5	R														
Basic static level	10					B/R										
Basic GUI	7.5	B														
Game mechanics:																
Input and controls	5				L											
Basic food collection	5				L											
Low target																
Game engine components:																
Lighting and shadows	40					B/R										
LAN	50			L/R												
Game design:																
Improved 3D assets	15					B/R										
Improved map design	15					B/R										
Desirable																
Game Engine components:																
Sound effects	5								All							
Game mechanics:																
Advanced food collection	7.5								L/R							
Fighting system	25								All							
Game design:																
Improved GUI	7.5								B/R							
High Target																
Game mechanics:																
Environment danger/ obstacles	15														L/R	
Level system	12.5														B/R	
Game design:																
Soundtrack/additional sound effects	7.5															All
Extras																
Game design:																
Additional models	N/A															
Game mechanics:																
Enemy AI for SP-mode	40															
Explorable houses	10															
Multiple rounds	10															
Random events (lightning)	15															
Warning system	15															

Table 4.2.1. Timeline

L = Luca, B = Benjamin, R = Rastislav

5. Assessment

The game will deliver thrilling experience of choosing the right strategy to collect more food than an opponent in a dark and unforgiving environment. Both fast tactical decisions and a long-term game plan are needed to gain an edge against the enemy played by another player over the network.

The target audience of our game loves tactical gameplay, RTS games and suspenseful conflicts against other players. The game offers the right tools for every play style. Fighting the enemy drone and taking its food allows for aggressive and action-packed gameplay, whereas pacific players might want to collect and grow food on their own avoiding conflict. In addition, the game offers temporary power-

ups and long-term upgrades giving a player an advantage over his opponent at the cost of using up the food he collected.

If no internet connection or no other players are available, the game offers a single-player mode that allows the player to gather as much food as possible within a certain timeframe. High scores are stored and motivate players to find the best strategy to beat their own records and train for their next multiplayer match.