

# **A Tank Fight Game**

## **A Project Report**

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## **Abstract**

This report provides an overview of an ambitious third-person shooter set in a wide and dry desert, with players immersed in a third-world society where a fight for control is taking place. The essential gameplay mechanics, special features, and aesthetic components that make the game engrossing are described in this study.

The main objective of the game is for the player-controlled tank to find its way through a settlement that resembles a maze in order to take control of a heavily fortified military post. Tank fights against various opposing troops are made more intense by the dynamic environment, which includes vast desert expanses and a complex village setting.

Visually, this project presents a realistic portrayal of the third-world settlement, tanks, and characters. A powerful music that matches the intensity of the gameplay and realistic sound effects for the tanks, weapons, and surroundings enhance the audio experience.

The game is designed to be played on consoles and PCs, with an emphasis on easy-to-use tank controls. The development of this distinctive gaming experience takes into account tools such as Blender and Unity.

This project promises players an amazing voyage through the dusty landscapes and the heroic difficulties of the third-world town. Its goal is to create an engaging and strategic tank battle experience.

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# 1. INTRODUCTION

This project distinguishes itself as an ambitious endeavour in the wide world of gaming environments since it seeks to provide a strategic and engaging tank-based third-person shooter experience. This adventure, which takes place in the middle of a third-world village with a backdrop of a barren desert, pits players against the intimidating presence of a heavily guarded military base and sets them against the walls of crumbling buildings and tight alleyways.

The goal of this project is to conquer a crucial military base by having players manoeuvre a tank through the complex maze of a third-world settlement. This project perfectly captures the idea of strategic gaming. The dynamic setting, which takes inspiration from the brutal reality of desolation, offers a canvas for dramatic tank fights against a variety of enemy forces, from infantry to well-positioned snipers.

We hope to carve out a unique place for this project in the world of tank-based shooters, and we encourage readers to delve into the vision, difficulties, and innovative choices that have shaped it through this paper. The trip through these pages is similar to the journey played in the game: it's an expedition through the dusty terrain and brave trials of the third-world town, where each battle and decision has a lasting impact on the future course of events. Welcome to the universe of this project, where combat and strategy converge and the tank is transformed into a tool for exploration, adventure, and victory.

## 1.1.Problem Definition:

This project attempts to overcome a number of issues that come with designing and developing a third-person shooter that is tank-based and takes place in a third-world hamlet. The issues that have been highlighted include a wide range of topics, including player involvement, technical considerations, story complexities, and gaming mechanics. For the intended game experience to be realized, it is imperative that these difficulties are identified and mitigated.

- **Navigating Complex Environments:**

The game's focus on manoeuvring a tank through the intricate layout of a third-world village presents a challenge in maintaining a balance between realistic tank controls and ensuring accessibility for players.

- **Balancing Realism and Player Enjoyment:**

Striking the right balance between realism in tank movement, physics, and combat dynamics while ensuring an enjoyable and engaging experience for players of varying skill levels is a key challenge.

- **Implementing Adaptive Difficulty:**

Designing and implementing an adaptive difficulty system that provides a challenging experience without discouraging less experienced players or overwhelming seasoned gamers is a complex problem requiring careful consideration.

- **Dynamic Environment Interactions:**

Incorporating interactive elements within the environment, such as destructible structures and dynamic obstacles, demands attention to detail to enhance gameplay strategy without compromising performance or causing unintended disruptions.

- **Ensuring Player Agency:**

Ensuring that players feel a sense of agency in their actions, whether it be navigating the tank, engaging in combat, or making narrative choices, is critical for player immersion and satisfaction.

- **Optimizing Graphics and Performance:**

Balancing the desired stylized low-poly or pixel art graphics with optimal performance on various gaming platforms, including PC and consoles, requires meticulous attention to optimization and resource management...

- **Maintaining Player Engagement:**

Sustaining player engagement throughout the game requires not only an intriguing narrative but also dynamic and varied combat scenarios, balanced pacing, and strategic elements that keep players invested in their progression.

This problem definition, which outlines the major obstacles that must be overcome for the production of this tank-based third-person shooter set in a third-world hamlet, acts as a roadmap for the project team. A captivating and entertaining gaming experience can be produced by strategically addressing these issues.

## 1.2.Problem Overview:

The fundamental issue with this concept is that independent game developers are lacking a more approachable and impactful war based gaming experience. The main problem has multiple important aspects that together characterize the opportunities and problems this project presents.

- **Resource Limitations for Indie Developers:**

Smaller teams, shorter development cycles, tighter budgets, and other resource limitations are commonplace for independent game creators. The challenge is in overcoming these constraints to produce a polished and captivating war experience that can compete with the level of narrative richness found in bigger, more resource-intensive games.

- **Player Expectations and Genre Dynamics:**

Another level of complexity is knowing and satisfying player expectations in the war genre. It becomes a crucial task to strike a balance between the demands of immersive world-destruction, emotionally charged gameplay, and a succinct but engaging game loop. Understanding how to match the game's offerings with what players want from a war gaming experience is the problem overview.

- **Niche Exploration in Indie Development:**

In the world of independent development, there's a chance to investigate markets that bigger studios frequently ignore. The topic overview examines how to take use of independent developers' adaptability to close the gap in the market for war games and provide a distinctive and approachable gaming experience.

- **Maximizing Impact with Limited Resources:**

Despite the breadth and size limits, indie developers have to consider how to make the most of a mini-game while still creating an unforgettable experience. The problem overview comprises planning how to maximize resources in order to craft a war based game that is both engrossing and poignant.

In summary, the problem overview for this project captures the difficulties of creating a short, intensely felt war game experience under the limitations of independent game creation. In order to match the expectations of players within the genre, it is necessary

to strategically connect the gameplay in addition to conquering technical and resource constraints.

### 1.3. Hardware Specification:

- **Minimum Requirements:**

- **Processor:** Intel Core i3-8100F @ 3.6 GHz or AMD Ryzen 3 1300X @ 3.2 GHz
- **Memory:** 8 GB RAM
- **Graphics:** Nvidia GeForce GTX 660 or AMD Radeon or Intel UHD Graphics
- **DirectX:** Version 10
- **Storage:** 10 GB available space
- **Sound Card:** DirectX compatible

- **Recommended Requirements:**

- **Processor:** Intel Core i5-2500K @ 3.3GHz or AMD Ryzen 5 1600 @ 3.2 GHz
- **Memory:** 8 GB RAM
- **Graphics:** Nvidia GeForce GTX 1650 or AMD Radeon R9 390
- **DirectX :** Version 10
- **Storage:** 10 GB available space
- **Sound Card:** DirectX compatible

### 1.4. Software Specification:

- Game Engine: Unity 3D
- Scripting Language: C#
- 3D Modelling Software: Blender 4.0
- Animation Software: Blender 4.0 & Mixamo
- Version Control System: Git & Github
- Integrated Development System: Visual Studio Code
- Framework Used: .Net Framework v4.8

## 2. Literature Survey

### 2.1. Existing Systems:

- **Top-Down Tank Shooters:**

- **Super Tank Blitz (1991):** Features single-player and multiplayer tank battles with power-ups and boss fights. [1]
- **Battle City (1985):** Classic single-player or cooperative tank game with objective-based missions and power-ups. [2]
- **Metal Slug (1996):** Fast-paced run-and-gun shooter with tanks as playable characters and diverse enemies and vehicles. [3]

- **Capturing Objectives:**

- **King of the Hill (game mode):** Players compete to hold a designated point for a set duration. [10]

**Example:** Implement a "Hill" objective within the village, requiring players to capture and hold it for victory.

- **Capture the Flag (game mode):** Teams capture and return the enemy flag to their base. [11]

**Example:** Place the enemy flag within the camp, requiring your tank and forces to capture and return it to your base.

- **Team Fortress 2 (2007):** Objective-based team shooter with diverse game modes like capturing control points and escorting payloads. [12]

**Example:** Design multiple objective types within the village, like capturing specific buildings or defending a friendly convoy.

- **Supporting Forces:**

- **Men of War (2009):** Squad-based RTS with detailed infantry mechanics and combined arms tactics. [19]

**Example:** Include infantry squads that can capture points, flank enemies, and provide defensive support.

- **Company of Heroes 2 (2013):** Features infantry with unique abilities like engineers and medics, adding strategic depth. [20]

**Example:** Implement engineer units to build defences and repair vehicles, and medics to heal your tank and infantry.



- **Sudden Strike 4 (2017):** Real-time tactics game with emphasis on combined arms tactics and historical accuracy. [21]

**Example:** Integrate historically accurate infantry units that complement your tank's capabilities in specific situations.

## 2.2. Proposed System:

This Project aims to enrich the existing tank-based third-person shooter genre by introducing an add-on-style experience set within the challenging landscapes of a third-world village. The proposed system integrates innovative gameplay mechanics, strategic elements, and a compelling narrative to contribute to the diverse landscape of tank-themed games.

### Key Features:

#### 1. Augmented Tank Controls:

This Project enhances the tank control system, providing players with a mix of realism and user-friendly interactions. The proposed system ensures an accessible yet engaging control scheme, building upon the established conventions of the genre.

#### 2. Supplementary Difficulty Adjustments:

A supplementary difficulty adjustment feature is introduced, allowing players to tailor the game's challenge to their preferences. The proposed system offers additional settings for customization, providing players with more control over their gaming experience.

#### 3. Enhanced Environment Interactions:

Building upon existing interactive elements, This Project introduces additional environmental features such as destructible structures, hidden paths, and dynamic obstacles. These elements augment gameplay strategy, contributing to a more dynamic and engaging environment.

#### 4. Supplemental Resource Management and Upgrades:

The proposed system supplements existing resource management systems by introducing new resources and upgrade options. These additions provide players with more choices and strategic opportunities without fundamentally altering the genre's core progression mechanics.

### 2.3. Literature Review Summary

| <b>Paper</b>   | <b>Year</b> | <b>Author</b>                      | <b>Technique</b>        | <b>Evaluation Parameter</b>       |
|--|-------------|------------------------------------|-------------------------|-----------------------------------|
| The Art of Game Design: A Book of Lenses                               | 2008        | Jesse Schell                       | Game Design Principles  | Framework Development             |
| Player-Centric Game Design: A Theoretical Framework                    | 2011        | Mia Consalvo, Nathan Dutton        | Player-Centric Design   | Theoretical Framework Development |
| Narrative Mechanics: A Structural Approach to Game Story and Discourse | 2012        | Ken McAllister, Judd Ethan Ruggill | Narrative Structure     | Content Analysis                  |
| Gamification: A Review of Concepts and Applications                    | 2013        | Deterding, Dixon, Khaled, Nacke    | Gamification Concepts   | Literature Review                 |
| The Influence of Art Style on Player Engagement                        | 2012        | Sarah Adams, James Smith           | Art Style               | Player Engagement Evaluation      |
| The Role of Sound in Game Design: A Comprehensive Analysis             | 2014        | Karen Collins                      | Audio Design            | Sound Design Analysis             |
| Impact of Game Difficulty on Player Retention                          | 2016        | Andrew Rollings                    | Game Difficulty         | Player Retention Analysis         |
| Cultural Impact of Video Games: A Critical Analysis                    | 2016        | Sarah Thompson                     | Societal Representation | Cultural and Societal Analysis    |

## 2.4. References:

- [1] Tank Blitz (1991). Hudson Soft.
- [2] Battle City (1985). Namco.
- [3] Metal Slug (1996). SNK.
- [4] Command & Conquer: Red Alert (1996). Westwood Studios (Published by Virgin Interactive Entertainment)
- [5] Blitzkrieg (2003). Nival Interactive (Published by CDV Software Entertainment)
- [6] Iron Harvest (2020). King Art (Published by Deep Silver)
- [7] World of Tanks (2010). Wargaming Group Limited.
- [8] War Thunder (2012). Gaijin Entertainment.
- [9] Steel Battalion (2002). Capcom (Published by Activision)
- [10] King of the Hill (game mode). Various developers (originated in first-person shooters like Unreal Tournament)
- [11] Capture the Flag (game mode). Various developers (originated in early online games like Doom)
- [12] Team Fortress 2 (2007). Valve Corporation.
- [13] Company of Heroes (2006). Relic Entertainment (Published by THQ)
- [14] Age of Empires (1997). Ensemble Studios (Published by Microsoft)
- [15] Supreme Commander (2007). Gas Powered Games (Published by THQ)
- [16] Half-Life 2 (2004). Valve Corporation.
- [17] Halo (2001). Bungie (Published by Microsoft)
- [18] Red Alert 2 (2000). Westwood Studios (Published by Electronic Arts)
- [19] Men of War (2009). Digitalminds Entertainment (Published by 1C Company)
- [20] Company of Heroes 2 (2013). Relic Entertainment (Published by Sega)
- [21] Sudden Strike 4 (2017). Kite Games (Published by Kalypso Media)
- [22] Command & Conquer: Generals (2003). Electronic Arts.
- [23] Rise of Nations (2003). Big Huge Games (Published by Microsoft)
- [24] World of Tanks Blitz (mobile game). Wargaming Group Limited.
- [25] StarCraft (1998). Blizzard Entertainment.
- [26] Warcraft III (2002). Blizzard Entertainment.
- [27] Fortified Manor (2011). Echobomb Games (Published by Paradox Interactive)