

# **Hostile Worlds**

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## **Design Document**

**Marcel Koehler, Daniel Thiele, Nick Pruehs**

**July 26, 2010**

# Content

<b>Part 1: Game Design Document .....</b>	<b>9</b>
<b>1. Overview .....</b>	<b>9</b>
Abstract .....	9
Feature List .....	9
Quick Facts .....	9
<b>2. How To Read This Document.....</b>	<b>10</b>
<b>3. Focus &amp; Project Goals.....</b>	<b>11</b>
Focus.....	11
Project Goals .....	11
<b>4. Core Gameplay .....</b>	<b>12</b>
The Goal: Artifacts.....	12
Shards .....	13
Aliens .....	13
The Commander.....	14
Commander Abilities .....	14
Resurrecting The Commander.....	15
Squad Members .....	15
Rusher Abilities.....	16
Engineer Abilities.....	17
Hunter Abilities.....	17
Ability Type Breakdown.....	17
Ability Comparison .....	18
Conclusion .....	20
Gaining And Spending Shards .....	20
Unit Statistics.....	22
Alien Rage.....	23
Hostile Terrain .....	24

<b>5. Decisions, Information &amp; Opposition .....</b>	<b>25</b>
Decisions.....	25
Squad Composition .....	25
Strategic Decisions .....	25
Tactical Decisions .....	25
Spending Shards .....	25
Splitting the Squad .....	26
Crossing Hostile Terrain.....	26
Information.....	26
Scouting.....	26
Opposition .....	27
<b>6. World Design .....</b>	<b>28</b>
The Universe.....	28
The Races.....	28
Humans.....	28
Slics .....	31
Machines .....	31
Locations .....	31
Slics Planet.....	31
<b>7. Look and Feel.....</b>	<b>33</b>
<b>8. Level Design.....</b>	<b>34</b>
Gameplay.....	34
Damage Areas.....	34
Slow Areas .....	34
Watch Towers.....	34
The Descent.....	34
High Ground .....	34
Demo Map.....	35

Introduction.....	35
Level 2D .....	36
Look and Feel.....	37
<b>9. Screens .....</b>	<b>38</b>
Login Sequence.....	38
Main Menu .....	40
Play! .....	40
Replays.....	44
Options .....	45
Community .....	45
<b>10. User Interface .....</b>	<b>46</b>
Description .....	46
List of Elements .....	48
Allowing Different Screen Resolutions.....	48
<b>11. User Stories .....</b>	<b>49</b>
GUI Interaction .....	49
Genre Standards.....	49
Game-Specific.....	52
Spending Time .....	53
Gameplay Stories.....	54
<b>12. Strategies .....</b>	<b>60</b>
Getting Better.....	60
Rookie Mistakes .....	60
Mastering Hostile Worlds.....	60
Team Strategies.....	62
<b>13. Prototype .....</b>	<b>63</b>
Debugging.....	63
To Do .....	63

Known Issues .....	63
Change Log .....	64
Version 0.4 (2010-05-20).....	64
Version 0.3 (2010-05-16).....	64
Version 0.2 (2010-05-06).....	65
Version 0.1 (2010-05-05).....	66
<b>14. Ideas.....</b>	<b>67</b>
<b>15. Design History.....</b>	<b>68</b>
Version 0.1 (April 22, 2010).....	68
Version 0.2 (April 28, 2010).....	68
Version 0.3 (May 2, 2010) .....	68
Version 0.4 (July 8, 2010) .....	68
Inventory (May 17, 2010) .....	68
Cover, 1v1, Annihilation (June 5, 2010).....	68
Ability Levels (June 23, 2010) .....	69
Weapon & Armor Upgrades (June 30, 2010) .....	69
Formations (July 5, 2010) .....	69
<b>Part 2: Business Plan .....</b>	<b>70</b>
<b>16. Team .....</b>	<b>70</b>
Nick Pruehs: Lead Designer .....	70
Marcel Koehler: Lead Programmer .....	70
Daniel Thiele: Lead Artist .....	70
Externals .....	71
Possible Externals .....	71
<b>17. Target Group Analysis .....</b>	<b>72</b>
<b>18. Competitor Analysis.....</b>	<b>73</b>
StarCraft 2: Wings of Liberty .....	73
Features .....	73

Other similarities .....	74
Conclusion .....	74
Command & Conquer 4: Tiberian Twilight.....	74
Features.....	74
Other similarities .....	76
Conclusion .....	76
Dawn of War 2.....	76
Features.....	76
Other similarities .....	77
Conclusion .....	78
Worldshift.....	78
Features.....	79
Other similarities .....	79
Conclusion .....	80
<b>19. Cost Analysis.....</b>	<b>81</b>
References.....	82
<b>20. Milestones.....</b>	<b>83</b>
First Semester.....	83
Second Semester .....	84
Art Department .....	84
Programming Department .....	84
Third Semester .....	85
Art Department .....	85
Programming Department .....	85
<b>21. Marketing.....</b>	<b>86</b>
Homepage .....	86
Electronic Sports League (ESL).....	87
Development Forums .....	87

Twitter .....	87
Press .....	87
External Bloggers .....	88
Battle Reports .....	88
<b>Part 3: Technical Documentation .....</b>	<b>89</b>
<b>22. Technology .....</b>	<b>89</b>
Engine Comparison.....	89
Unreal Engine 3: Pros & Contras .....	90
Conclusion .....	91
Network Architecture.....	91
<b>23. Assets.....</b>	<b>93</b>
Technical Limits .....	93
Models & Animations.....	93
Icons .....	96
Minimap .....	96
In-Game GUI Buttons .....	96
Buffs.....	97
Status Window Icons .....	98
Cursors.....	98
Images .....	98
GUI Elements.....	99
Menus, Screens and Dialogs.....	99
In-Game Backgrounds and Borders.....	100
Shaders .....	101
Environments .....	102
Maps .....	102
Sounds .....	103
General .....	103

Weapons.....	103
Abilities.....	104
Ambient Sounds .....	104
Music .....	104
Speech .....	105
Interface .....	105
Units .....	105
Cinematics .....	106
<b>24. Processes.....</b>	<b>107</b>
Art.....	107
3D Assets .....	107
Web Design.....	107
Particle Effects.....	107
Level Design.....	108
Game Design & Balancing .....	108
Adding New Abilities .....	108
Removing Existing Abilities.....	108
Balancing Unit Statistics .....	109
<b>25. System Requirements .....</b>	<b>110</b>
Alien Breed .....	110
Tom Clancy's EndWar .....	111
<b>List of Tables .....</b>	<b>112</b>
<b>List of Figures .....</b>	<b>113</b>
<b>Bibliography.....</b>	<b>114</b>
<b>Index .....</b>	<b>116</b>

# Part 1: Game Design Document

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## 1. Overview

### Abstract

*Hostile Worlds* is a squad based real-time tactics multiplayer game. Two to eight players, divided into two teams, battle each other on a desolate alien world. Each team's goal is to collect a certain amount of alien artifacts while constantly being under attack by the opposing team and AI controlled aliens. *Hostile Worlds'* core experience consists of choosing your own tactic and play style by constantly customizing your squad during the game: Several unit types are available and each comes with a unique set of characteristic abilities which can be unlocked by leveling up. Each squad's backbone is the squad commander who provides crucial abilities like healing and cloaking.

### Feature List

- challenging tactical fights paired with role-playing elements
- customizable squad members with characteristic special abilities to best suit your play style
- "Chess king" commander: weak on offense but essential for victory
- new game mode: battle for artifacts
- AI controlled aliens
- dangerous terrain
- two to eight players via LAN or internet
- master server with in-game server browser
- unique graphics & visuals, powered by Unreal Engine 3

### Quick Facts

Genre:	3D real-time tactics
Setting:	end time, science fiction
Engine:	Unreal Engine 3
Platform:	PC
Number of Players:	1v1, 2v2, 4v4
Playing Time:	20 minutes per match
Target Group:	hardcore gamers

## 2. How To Read This Document

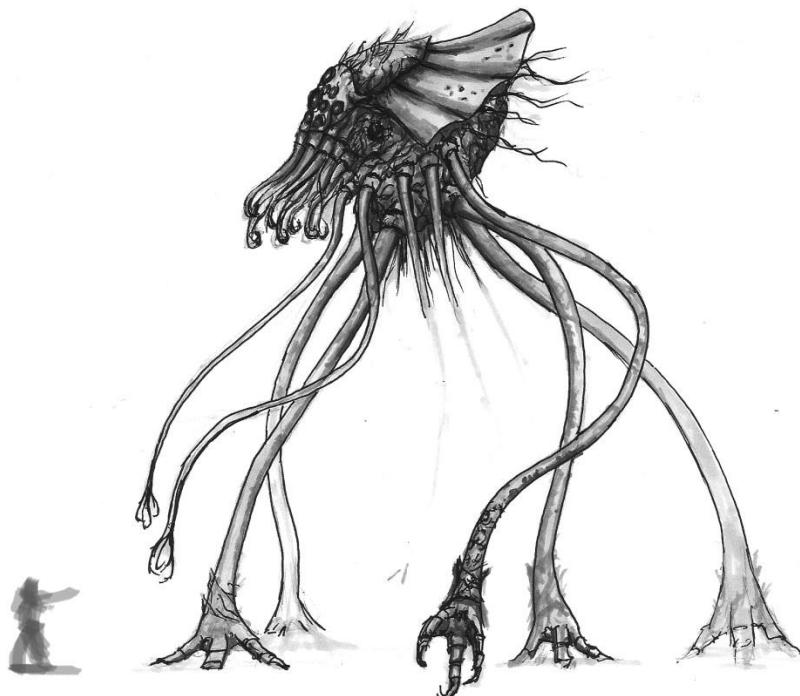
This document is organized into three parts:

1. The **Game Design Document** includes all important information on the game itself, such as core gameplay mechanics, level design or the screens the user interacts with.
2. The **Business Plan** introduces our team and includes analyses of our target group, our competitors and our costs. This part of the document covers our project management, too.
3. The **Technical Documentation** summarizes our development processes and includes the whole asset list as well.

Most features of our game are indispensable. However, throughout the document you'll find some aspects of the game prioritized, such as some screens or most assets. This is visualized by the following icons:

- Indispensable
- Important
- If Possible
- Rejected

Some terms are capitalized: These words refer to certain abilities, orders or assets; we have left out double quotes around these terms to increase the readability.



### 3. Focus & Project Goals

#### Focus



Figure 1: The focus of Hostile Worlds.

#### Project Goals

The goals of our project are prioritized as follows, most important things first:

1. smooth vertical slice
2. action-packed game
3. balancing
4. funny 1v1 matches
5. funny team matches
6. reward tactical decisions
7. nice graphical setting
8. develop weak commander

## 4. Core Gameplay

### The Goal: Artifacts

Every team scores points by successfully collecting artifacts. The team to score 2000 points first wins the match: Players that are much stronger than their opponents are able to win fast. Additionally, every match ends after 20 minutes of elapsed game time, the team with most artifacts wins: This prevents matches between weak players from taking centuries before they end.

Players can always find one or more artifacts on the field. Successfully collecting one of these artifacts makes the opening player score points which are the main objective of the game. The AI includes a *game director* which decides how many artifacts can be found, and where - this allows controlling the flow of each match. Players can always find out where to find artifacts by having a look at the minimap.

There is a fixed set of positions the artifacts can spawn at. After all artifacts have been collected, the game director decides where to put new ones. We don't want to make the artifacts spawn at random for two reasons: First, this would be much harder to balance. Second, this would make team-play less fun, because teams would be unable to arrange themselves and develop reusable strategies.

The artifacts never will disappear, unless any player collects them. Otherwise players would be frustrated seeing artifacts disappear just before their units are in range to collect them. This should be no problem, as we assume that the players *do* want to win and thus will collect the artifacts anyway.

New artifacts will appear immediately after the last one has been collected: The players always need an objective. The AI controlled game director allows controlling the game flow depending on the players' skills. Furthermore, the matches will differ and won't get boring as fast as without.

The number of victory points earned by successfully collecting an artifact depends on the total number of artifacts of the current round, ranging between 60 and 240 for four to one artifacts per round on our demo map: The more artifacts have been placed on the map, the fewer victory points a player gets for acquiring an artifact.

**Table 1:** Computation of the number of victory points per artifact.

<b>Victory points per match:</b>	2000
<b>Match duration [min]:</b>	20
<b>Time per round [min]:</b>	2.5
<b>Rounds per match:</b>	$20 / 2.5 = 8$
<b>Victory points per round:</b>	$2000 / 8 = 250$

As we may have one, two, three or four artifacts on the map, the number of total victory points per round should be a multiple of these numbers. The least common multiple of these numbers is 24; thus, the closest number to our original computation is 240.

Acquiring an artifact takes 7.5 seconds:

**Table 2:** Computation of the time required for acquiring an artifact.

<b>Match duration [min]:</b>	20
<b>Total time for acquiring artifacts per player [%]:</b>	0.05
<b>Total time for acquiring artifacts per player [min]:</b>	1
<b>Total artifacts (example for a demo map match):</b>	16
<b>Number of players (example for a demo map):</b>	2
<b>Number of artifacts per player:</b>	$16 / 2 = 8$
<b>Time for acquiring an artifact:</b>	$1 \text{ min} / 8 = 7.5 \text{ sec}$

Having two squad members collecting an artifact halves the time required, and so on. Acquiring artifacts is channeled, meaning that the acquiring squad members may not participate in battles and can be interrupted by grenades and knockback abilities (see section Squad Members below).

Artifacts are USP of *Hostile Worlds*.

## Shards

Small crystal shards are the main resource of Hostile Worlds. They are required for calling and promoting squad members, and for paying special commander abilities. Players are awarded shards for killing aliens and enemy squad members.

The race for the rare and very important artifacts and shards increases the feeling that the players struggle to survive, knowing that their opponents have exactly the same goals.

## Aliens

Lots of hostile aliens populate the world where the game takes place. They constantly threaten all players, emphasizing the feeling described by the game's title. Furthermore, they allow players to

make more interesting decisions, as described in the chapter Decisions, Information & Opposition, and there is almost always action on the battlefield.

There are two types of aliens: *Weak aliens* hang around in fixed camps and are hunted by players that want to improve the skills of their squad members. *Strong aliens* roam the battlefield in lanes. They are much harder to kill, but award more shards. The players know where to expect strong aliens by having a look at the minimap (see chapter User Interface below), but they never exactly know where these aliens are if do not scout well.

There are eight to twelve weak aliens per camp. As soon as one of them has been killed, a 30 seconds timer starts. Depending on the average alien rage (see section Alien Rage below), the alien camp is repopulated. Strong aliens respawn at the point on their lane that is nearest to an alien camp 30 seconds after they have been killed.

Aliens have their own *aggro table*, remembering how much damage a squad member has done to them, and will pick their targets according to this table. First, this will just feel right, as the aliens realize who the biggest threat is. Additionally, this feature makes tanking much easier: Experienced players are able to control which of their squad members is being attacked.

## The Commander

Each player's squad is led by a commander, the most important unit on the field. His abilities are crucial for the player's success, yet the commander is very weak in direct confrontations and should be protected at all costs, much like the king in Chess. At the beginning of each match, the commander is the only one who is able to acquire artifacts, and thus the only possibility players have to win the game.

Additionally, he has the following abilities:

### Commander Abilities

- **Call Squad Member.** *Costs shards.* Calls a new squad member of the chosen class, if the player does not already control eight squad members.
- **Dismiss Squad Member.** Dismisses the target squad member, returning  $0.8 \cdot \frac{HP_{current}}{HP_{max}}$  of its current shards.
- **Repair.** Restores some structure points of the targeted nearby squad member per second.
- **Air Strike.** *Costs shards.* Calls a helicopter squadron that attacks targets in an area chosen by the player.

- **Scan.** *Costs shards.* Connects to an orbiting satellite and reveals a target area.
- **Cloak.** *Costs shards.* The commander cloaks himself and nearby units immediately for 10 seconds. Cloaked units cannot be attacked or targeted, but are unable to attack or use abilities, too. They still take damage from area of effect abilities, but damage taken does not break the cloaking. After having uncloaked, all abilities are set on cooldown.

The most powerful commander abilities cost shards, always making the players decide whether to pay valuable resources and be able to resuscitate, or still stand the pressure.

The cloak ability is indispensable to allow players to retreat in case they are inferior. Common strategy games like StarCraft provide a base the players can fall back to - but in Hostile Worlds, there is no base. In Dawn of War 2, players can make their armies retreat automatically, and another idea would be to allow players to place a kind of mobile base on the map they can fall back to. But this could cause retreating squad members to engage aliens on their path. Let's try a third approach: An ability that allows skipping short distances, commonly referred to as Blink ability, could be abused by the winning player(s) to hunt the losers... Our Cloak ability cannot be used to backstab enemies that well, as all abilities are on cooldown after having uncloaked; however, players might want to use it to bypass alien camps.

## Resurrecting The Commander

You cannot lose a Hostile Worlds match by losing your squad members: We don't want matches to end after one minute just because some players decide to rush their opponents. Players will always be able to resurrect their commander and call new squad members 15 seconds after he has died: This is exactly twice the time you need for acquiring an artifact. Commanders may not enter the game within some fixed radius of artifacts, because players could try to deliberately kill their own commander and abuse this feature. While selecting the position of the resurrection, all enemy squad members are visible: The resurrecting player already has a disadvantage and won't want to spawn near an enemy squad.

## Squad Members

Every squad member of Hostile Worlds belongs to one of three classes. Every class provides unique powerful abilities, which can be countered by abilities of other classes. Most of these abilities are useful in fights against enemy squad members and aliens alike. Every class has at least one ability for cancelling channeled abilities, like the collection of artifacts. Additionally, all skills should give visual feedback, which is one reason for replacing buffs by channeled abilities. Initially, every squad member may learn one ability.

*Passive* abilities cannot be triggered but are always in effect after they have been learned.

*Channeled* abilities require the triggering squad member to stand still for the whole duration. If he moves or performs any other action, the ability is canceled.

The first four squad members are *always* free, squad members five to eight cost the average amount of shards of level two and three: They grant an additional skill point and a large amount of additional firepower. Thus, every player starts with four squad members. Additionally, a player that has lost everything and just has been waiting for his commander to revive does not have to wait any longer. The maximum number of squad members per player is eight.

By using shaders and knockback animations we achieve that all squad member abilities look and feel strong, for the players feel like they at least have a chance to stand all opposition.

## Rusher Abilities

Rushers are front-line squad members. They have strong shields, but their attacks have very limited range. Rushers are good tanks and average damage dealers.

- **Clap.** Melee attack, dealing damage in an area of effect to nearby enemy squad members and knocking them back.
- **Charge.** Charges target enemy squad member, greatly increasing movement speed, becoming immune to knockback effects and knocking back the target on hit.
- **Concussion Grenade.** Throws a concussion grenade which explodes two seconds after impact, dealing damage to all squad members within a fixed radius.
- **Target Engines.** The targeted enemy squad member is unable to move or charge, but may attack and use special abilities.
- **Focused Fire.** A shout that increases weapon damage of all nearby friendly squad members for 20 seconds.
- **Passive.** Increases armor.

## Engineer Abilities

Engineers support the squad at mid-range. Their attacks do small damage; their main task lies in using their different abilities.

- **Smoke Grenade.** *Throws* a smoke grenade which covers the targeted area with dense smoke for ten seconds. Unit within the area of effect can neither target nor be targeted. Cancels all abilities currently channeled by these squad members.
- **Call Artillery.** *Reinforcement*. Calls down an artillery, which fires ten shots at enemy squad members before it is sent back. Every hit knocks back its targets. Can attack ground.
- **Spring Gun.** *Reinforcement*. Constructs and places a spring gun that automatically attacks enemy squad members and aliens for 60 seconds.
- **Harvester.** This squad member may collect alien artifacts.
- **Recharge.** *Channeled*. Restores a small amount of shields points of a friendly squad member.
- **Passive.** Decreases the cooldown of all abilities.

## Hunter Abilities

Hunters form the back-line of the squad. They can't take much damage, but their attacks do much damage at long range. Hunters are often used as scouts or snipers due to their abilities.

- **Aimed Shot.** Ranged attack, dealing extra damage and knocking back the target.
- **Hack.** Controls the targeted enemy reinforcements unit.
- **EMP Grenade.** Throws an EMP grenade which blinds enemy squad members in the target area on impact, turning them unable to attack. Cancels all abilities currently channeled by these squad members.
- **Scout Drone.** *Reinforcement*. Constructs and starts a scout drone. Has fuel for 30 seconds.
- **Expose Weakness.** *Channeled*. Points with a laser at target enemy squad member, drastically reducing its armor.
- **Passive.** Increases attack range.

## Ability Type Breakdown

Knockbacks cancel channeled abilities. Hack counters reinforcements.

## Ability Comparison

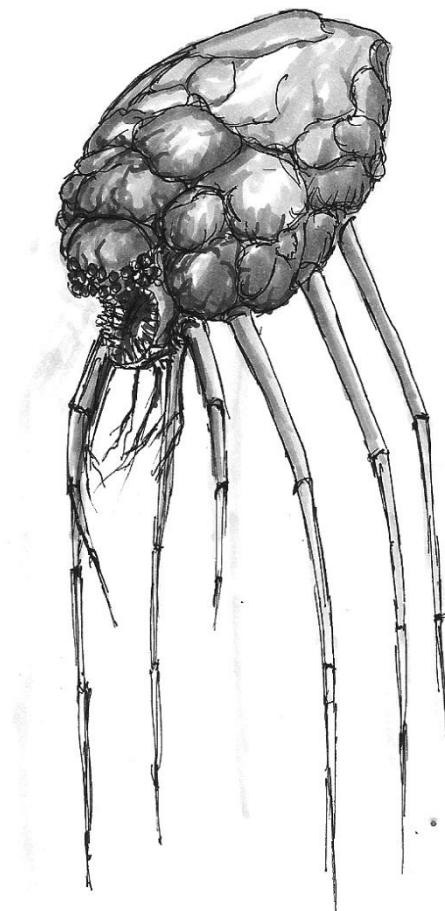
Passive abilities cannot be countered; squad members with passive abilities simply are stronger than without.

*Target Engines* does not counter any abilities, but rather prevents enemy squad members from attacking your Hunters.

*Harvest* is useless in combat, but the only ability that allows splitting your squad and collecting two artifacts simultaneously.

The *Scout Drone* cannot fight, but is crucial for gaining the information you need for adapting your ability set.

The table on the following page compares the remaining abilities to each other; for example, the Rusher ability Clap is neither superior nor inferior to the Rusher ability Charge, but the Hunter ability Hack counters the Artillery ability.



**Table 3: Class ability comparison.**

	Clap	Charge	Conc.	G.	Foc.	Fire	Smoke	Artillery	Sp.	Gun	Recharge	Aimed	Hack	EMP	Exp.	Weaken.	Total	Class Total
Rusher - Clap	o	-	o	+	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Rusher - Charge	o	+	o	-	-	-	-	-	-	-	o	o	o	o	o	++	++	0
Rusher - Concussion Grenade	+	-	+	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Rusher - Focussed Fire	o	+	+	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Engineer - Smoke Grenade	-	+	-	+	-	-	-	-	-	-	o	o	o	o	o	++	++	+
Engineer - Call Artillery	+	-	+	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Engineer - Spring Gun	+	+	-	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Engineer - Recharge	o	-	+	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Hunter - Aimed Shot	o	-	o	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Hunter - Hack	o	-	o	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-
Hunter - EMP Grenade	-	o	-	-	-	-	-	-	-	-	o	o	o	o	o	++	++	+
Hunter - Expose Weakness	o	+	-	-	-	-	-	-	-	-	o	o	o	o	o	-	-	-

## Conclusion

No ability is highly overpowered. Damage values, durations and cooldowns can compensate dominating and dominated abilities.

Additionally, no class has too many strong or weak abilities. Engineers, doing least combat damage, have the most useful abilities.

Abilities that turn out to be too strong in the early game could be restricted to higher squad member levels in later iterations.

## Gaining And Spending Shards

Players can *promote* their squad members by spending shards: The number of shards required for promoting a squad member increases with its level, so does the number of shards awarded for killing that squad member. The maximum level is six. Promoting a squad member awards him an additional ability point and improved statistics (see section Unit Statistics below).

Additionally, players may *dismiss* their squad members for gaining a part of the shards they spend on leveling that squad member. This allows them to adapt their strategies again and again.

The following tables illustrate the number of shards gained and required for these actions:

**Table 4: Number of shards required and gained for promoting, killing and dismissing squad members.**

Shards required for level-up at level n:	$XP_{req}(n) = 50n(n + 1)$
Shards gained for killing a level n squad member:	$XP_{gained}(n) = 20n + 80$
Dismiss squad member shard factor:	0.8

Level	Shards Required For Level-Up	Shards Gained For Kill	Shards Gained For Dismiss
1	100	100	0
2	300	120	80
3	600	140	240
4	1000	160	480
5	1500	180	800
6	n/a	200	1200

Furthermore, the most powerful commander abilities cost shards, too; their costs depend on the cost of leveling a new squad member:

**Table 5: Commander ability shard costs.**

<b>Air Strike shard factor:</b>	1
<b>Shards required for Air Strike:</b>	100
<b>Scan shard factor:</b>	0.3
<b>Shards required for Scan:</b>	30
<b>Cloak shard factor:</b>	3
<b>Shards required for Cloak:</b>	300

The easiest way to acquire shards is by farming alien camps. A single weak alien grants exactly 50 shards:

**Table 6: Computation of the number of shards gained per alien kill.**

<b>Time per match [min]:</b>	20
<b>Time spent fighting aliens per player [%]:</b>	35
<b>Alien camps on the demo map:</b>	6
<b>Alien camps per player:</b>	3
<b>Maximum number of aliens per camp:</b>	12
<b>Alien respawn time [min]:</b>	0.5
<b>Upper limit of aliens per player and match:</b>	480
<b>Optimum number of aliens per player and match (incl. squad movement):</b>	240
<b>Time spent fighting aliens per player [min]:</b>	7
<b>Alien kills per player and minute:</b>	34.2857
<b>Alien kills per player and second:</b>	0.57143
<b>Shards per weak alien:</b>	50
<b>Total shards earned per match without doing anything else, per player:</b>	12000
<b>Shards required for maximum level squad member:</b>	1500
<b>Squad members per player:</b>	8
<b>Shards required for maximum level squad:</b>	12000
<b>Shards per strong alien:</b>	250

If players do nothing else than farming aliens, they would probably be able to promote all squad members to their maximum level. They won't win a single match this way however, and they have to spend shards for dismissing and/or calling new squad members and commander abilities, too. On the other hand, as the squad grows stronger, they would be able to kill aliens faster; this effect is somehow compensated by Alien Rage (see section Alien Rage below). We can state that no player will be able to promote its entire squad to its maximum level - choosing a squad member to promote will always stay an interesting decision.

## Unit Statistics

Every unit of Hostile Worlds has a number of *structure points*. If the structure of a unit is reduced to zero or below, the unit is destroyed. Additionally, the squad members are protected by personal *shields*. Whenever a squad member is about to take damage, these shields are reduced by that amount of damage. If the shields are reduced to zero, all remaining and further damage is subtracted from the squad member's structure. Shields regenerate at a rate of 1 % per second. All squad members move with the same speed.

The attacks of all units are subject to *cooldown*: Every time a unit attacks, further attacks are delayed until the cooldown time has passed. By dividing a unit's attack damage by its cooldown time in seconds, we get the *damage per second (dps)* of that unit.

All attacks have limited range. Furthermore, all attack damage is reduced by the target's armor before it is applied. Currently all units have an armor value of zero, but this may change in later iterations.

The following table summarizes the statistics of all units. Squad members are getting stronger as they level up. Maybe the commander's structure and shields have to increase during a match because of the leveling squad members - we'll have to test this first.

We compute a rough indicator for the combat effectiveness of a unit by multiplying its damage per second with its total hitpoints. Please note that this index does not account for attack range or splash damage radius. Engineers have the lowest combat effectiveness but the strongest abilities.

**Table 7: Structure, shields, range, damage and cooldown of all Hostile Worlds units.**

Unit	Structure	Shields	Range	Damage	Cooldown [s]	DPS	Combat Effectiveness
Level 1 Rusher	200	200	250	14	0.5	28	11200
Level 2 Rusher	220	220		16		32	14080
Level 3 Rusher	240	240		18		36	17280
Level 4 Rusher	260	260		20		40	20800
Level 5 Rusher	280	280		22		44	24640
Level 6 Rusher	300	300		24		48	28800
Level 1 Engineer	150	150	750	10	0.5	20	6000
Level 2 Engineer	165	165		11		22	7260
Level 3 Engineer	180	180		12		24	8640
Level 4 Engineer	195	195		13		26	10140
Level 5 Engineer	210	210		14		28	11760
Level 6 Engineer	225	225		15		30	13500
Level 1 Hunter	100	100	1250	18	0.5	36	7200
Level 2 Hunter	110	110		21		42	9240
Level 3 Hunter	120	120		24		48	11520
Level 4 Hunter	130	130		27		54	14040
Level 5 Hunter	140	140		30		60	16800
Level 6 Hunter	150	150		33		66	19800
Level 1 Commander	125	125	1250	8	0.5	16	4000
Level 2 Commander	150	150		10		20	4800
Level 3 Commander	175	175		12		24	5600
Level 4 Commander	200	200		15		30	6400
Level 5 Commander	225	225		18		36	7200
Level 6 Commander	250	250		20		42	8000
Weak Alien	60	0	Melee	5	1.5	3.33333	200
Strong Alien	400	0	Melee	50	1	50	20000
Artillery	250	0	2000	20	2	10	2500
Spring Gun	100	0	750	15	0.5	30	3000

## Alien Rage

Hostile Worlds is subject to *slippery slope* (Boege 2010, p. 61): Players that have earned fewer shards than their opponents control weaker squad members with fewer abilities. Thus, these players need more time to kill aliens, increasing the gap between the level of their squad members and the ones of their opponents. Even more, in a confrontation they're more likely to lose their squad members, rewarding their opponents more shards, and increasing the gap again.

*Alien rage* reduces this effect as follows: The more shards and artifacts a player earns, the angrier the world becomes at him, increasing the attack damage of all aliens he or she is fighting. After having lost one or more squad members, the world gets *satisfied*, reducing the aliens' attack damage again. This way they never get too strong if a player needs a comeback.

Additionally, alien rage ensures that players equally acquire artifacts and kill aliens, as acquiring too many artifacts without hunting aliens would make the latter very difficult.

The players feel more and more threatened as the attack damage of the aliens increases during the match.

## Hostile Terrain

In Hostile Worlds, players don't have to face aggressive aliens and enemy players only. They have to deal with the hostile world itself! There are three types of interactive terrain: watchtowers, damage dealing terrain and swamps. See chapter Level Design for more information on these elements and how they influence the gameplay.



# 5. Decisions, Information & Opposition

*"A game is a form of art in which participants, termed players, make decisions in order to manage resources through game tokens in the pursuit of a goal." (Costikyan 1994)*

## Decisions

### Squad Composition

At the very beginning of each match, every player has to decide how to compose his or her squad, choosing the classes of each squad member. They'll want to find a composition that best suits their play style; after that, every player has to adapt their strategy to the ones of their opponents.

### Strategic Decisions

Players of Hostile Worlds always have to make the following top-level decision:

- collect an artifact to score points?
- attack aliens to earn shards?
- attack the enemy to prevent him or her from doing the two things above?

A player could decide to leave an artifact to his or her enemy, in order to be able to kill more aliens, gain more shards, and thus win the next confrontation and the next artifact for example.

Additionally, if the player should decide to attack aliens, he or she must decide whether to attack weak or strong aliens: Fighting strong aliens will award more shards, but expose the squad members to attacks of an enemy player.

### Tactical Decisions

During fights, the players have to pay most attention: They need to know exactly when to use which of their abilities, where to position their squad members and leverage terrain elements whenever possible.

### Spending Shards

After having killed enough aliens, the players of Hostile Worlds have to decide how to spend their resources: In most cases, promoting squad members will be a good choice. But players might want to save some resources to be able to use commander abilities like air strikes in critical encounters.

## Splitting the Squad

With each squad consisting of up to eight members, some of which being able to collect artifacts, players always have to decide whether to split their squads into two or more groups, or not: Splitting a squad allows a player to simultaneously collect artifacts and kill aliens, but temporarily weakens his or her position in encounters.

## Crossing Hostile Terrain

Often players have to decide whether to cross hostile terrain, taking damage, or not, accepting longer ways.

## Information

Information is key. All players have to collect and combine as much information as possible. Some important information is always available to the players, such as where to find artifacts, and how many victory points they have. But other information is much harder to acquire, and is crucial for making the right decisions:

A player always wants to know the average level of his or her opponent's squad members. If the opponent has collected more shards and controls stronger squad members, he or she is likely to have less artifacts and will try to provoke a confrontation the weaker player has to avoid. Not knowing the level of enemy squad members can make you take battles you cannot win.

Another important thing is the ability set of the enemy squad members. Players have to pay attention and remember the abilities they faced in order to be able to adapt their own strategy.

The position of the enemy squad members is the third thing you always want to know. It tells you whether you've even got a chance to reach an artifact spot before the enemy does, and if he or she is fighting strong aliens, being vulnerable to a surprise assault, or closing in to you and preparing for an attack. Based on this knowledge players make the most basic strategic decisions described above.

Finally, in order to waste as little time as possible, you'll always want to know which alien camps are cleared, and where the strong aliens hang around.

## Scouting

But how to get all this information? Collecting information is commonly referred to as *scouting*.

The easiest way to get information is the commander ability Scan. It reveals a small part of the map, but at the expense of shards.

If you don't have enough shards for scanning or want to save them for other purposes, you can use the hunter ability Scout Drone to fly around and get as much information as possible before it runs out of fuel.

In the case a player does not have access to this hunter ability or it is on cooldown, he or she still may split the squad and/or use other reinforcements like spring guns to increase the vision on the map.

Finally, all players should try to control as many watch towers as possible.

## Opposition

Our players have to deal with a lot of opposition: First of all, enemy players of course, who always will try to acquire artifacts faster, gain more shards to spend on their squad members and special abilities, who'll adapt their ability sets all the time and, last but not least, look for bloody battles in direct confrontations whenever they feel superior.

The players run a race for artifacts, and thus the time itself becomes an opponent: The first player to hit the score limit wins the match, and as soon as the time limit is hit, the player with most artifacts wins.

Additionally, all players have to face aliens, who even grow stronger and stronger as the players do! And as if this wasn't enough, the terrain itself opposes the players, slowing them or even dealing damage.

Finally, no matter how good the user interface is designed, all players play against themselves: They will get faster and faster performing the actions they want to, but they actually will never become perfect.

# 6. World Design

## The Universe

The universe of Hostile Worlds is an entirely fictional science fiction universe like StarCraft, Star Wars or Warhammer 40.000. The locations where the actual game takes place are influenced by the war between three different Races. The universe itself with all its physical conditions works like our real universe.

## The Races

There are three playable races in the game. The prototype will have one race fully implemented and balanced. The three cultures in our in game are highly advanced and exist for a very long time. They all are fighting for the same resources, but for different reasons. There are other races which do not have a part of the storyline.

### Humans

We were only meant to live on one planet. Millions of years of evolution... millions of years of trial and error, death and misery, survival of the fittest only, made us the greatest race for the environment for that one planet. But alas we threw away everything, our life, our home and our culture... just to feed our deadly appetite. Some saw what was coming but their cries went unheard. That was our first mistake. Global warming was slowed, eventually as the signs became less discrete. Yet by the time we fully realized what we had done nothing could stop the catastrophic effects that would destroy our planet; storms of such strength that they shook the Earth's plate triggering deadly earthquakes that toppled buildings like they were made of sand, the earthquakes resulting in volcanoes that drowned our birthplace in brimstone and fire. Our science let us escape the hell we had made with our lives and eventually we found other planets we could live on. But no planet was ever as beautiful or as joyful as Earth.

But at least something came out of the seemingly endless destruction. As thousands of ships left the dying Earth we, humanity, finally set aside our differences as we all knew that whatever faced us ahead without unity we would die. There was no religious or racial difference, because all those countries where all of those religions and races were born had been left behind. As one species we travelled space looking for a planet to settle on. After settling on our first planet, called New Earth, our leaders announced that our ever expanding population needed more planets to live on... unless we wanted New Earth to suffer the same fate as our old planet. United we cheered their decision

and many volunteered to join IASA - the intergalactic aeronautics and space administration in the search for more planets to live on. But their real reason was more selfish... we just wanted a better planet. We discovered strange and inviting places, like the planet Poseidon where every country was a floating island, or the planet Addraco where the organisms were oxygen based life forms, relying on combustion to survive. Not even Atlantis was good enough, wide vast planes, infested by strange creatures of the sky that looked ever so like dragons from high above. We just wanted another Earth. That was our second mistake. So we searched and searched. We found new planets and we prospered, people lived together and were happy with what they had, yet still we searched for a planet like Earth. We made machines with their own free will and a higher intelligence than our own to help us on our search. That was our third and fatal mistake. The machines were fed the same lie as we were that we needed to find livable planets to sustain our population. But being more intelligent they saw through the lies. When they found out that their whole purpose was for our simple comfort... they went berserk. Simultaneously every artificial intelligence took off and escaped in less than an hour... it wasn't very hard for them, most were in deep space anyway. We were worried... deeply worried. An arms race begun, we made ships designed for battle rather than long distances or comfort. We made chemical, physical, biological and pico-technical discoveries until we could shape the very atoms and the quarks around us to our desire.

Our new weapons, shown proudly every year at the annual Intergalactic Defense Display are genetic: We can enhance the mind and body, increase production of adrenaline, glucagon and glycogen so a man could run across a country without breaking, or aim, calibrate and fire a weapon within a mere second. The ammunition of our old projectile weapons was lightened and hardened and enhanced every projectile dependent weapon. The recoil of rifles from this along with other modifications was reduced to almost nothing, and the sights enabled a soldier to almost never miss. The rate of fire of machine guns went up to 5000 rounds per minute, when each round was 100 cal. The range of sniper rifles went from strength to strength until a soldier could sniper a pilot out the skies if they had enough skill and experience. A few snipers were made automatic, and although the rate of fire was not high, they were still deadly. Rail guns were improved to the point where we had rail pistols. Our projectile and non-projectile rifles had a variety of ammo... lightning, bullets that could trigger nuclear fission on impact, or CFC shot (based on another catalyst) which would slowly catalyze the breakdown of anything over an amount of time. Our bigger guns on ships could do this and more... fusion rockets were their favorite ammo, making controlled explosions that could be the size of a palm or the size of a sun. We even made more durable buildings, curved slanted and made of metal. They looked horrible but our leaders promised that they would survive any attack.

But our only limitation was the energy needed to do all of this... as we learnt the hard way as our rogue machines returned. We were ready... no one could deny that. Armadas charged at the first wave of machines, fission and fusion raging through their metallic ranks, turning danger into scrap metal.

Every human in the galaxy cheered. But the machines had a population vaster than we could have imagined, and death was no concern to them. They sent wave after wave of troops to be dispatched simply to waste our weapons. Soon we ran out of fission and fusion material. The fighting soon turned ugly as with only our rail and lightning technology waves of robots reached the surface of our planets. Soon our infantry were battling for every inch of rock in the galaxy and despite their adaptations the robots simply wore out their ammo yet again, until they were all but defenseless, as what can mere human fists do against reinforced metal?

We needed more energy... more energy to make our rail and lightning guns, more energy to reactivate our fusion weapons. It seemed that defeat and extermination was inevitable. It was then that Sir Alfred Reginer discovered salvation for humanity... and destruction for the rest of the universe. He called it the Terra-EMP. He had discovered that every atom in our universe has some degree of electricity due to the electrons in its outer shell. He discovered a way of temporarily disrupting every single form of electricity by causing a chain electrical reaction with these atoms for light years around, using wave particle duality he deduced that the Terra-EMP would travel as several billion high energy photons constantly being absorbed and remitted through matter or as a devastating wave through a vacuum... as long as it was given enough energy of course.

Grounding all of our forces and using all of our remaining energy we activated it. We thought that the destruction of earth was the worst thing we could ever possibly see, beaten only by the extermination of ourselves. We were wrong. In the space of a few minutes Terra-EMP ripped every machine in space like a rail gun blasts through paper, fantastic explosions were seen from above as entire armies fell in seconds. But the disruption of electricity had more consequences than we could have imagined. Storms of such terrifying strength shook every planet in our cosmos and the very skies above us turned red with hate. Billions of ions in the atmosphere were formed giving every planet a horrifying red sky and the disrupted poles of every planet meant that these planets could never be repaired, the ions clogging the stratospheres forever. We the humans got off easily, the ground in every planet earthed the electricity for us and although some died of heart attacks, most of us survived... although many wished they hadn't. United we cried out at the horror we had caused to our homes and the rest of the galaxy.

Oh we still search for our planets. But no matter how far we run, we cannot hide from the destruction we have done... the damage shown on some planets more than others, some skies almost clear, some planets now lifeless because of what we've done. And we are sure the machines have survived, somewhere far, far away, rebuilding their numbers. Still united all that we can hope for is that someone finds a truly renewable source of energy so we never ever have to use that horrible weapon again. Because I for one would rather let our race die.

## Slics

The Slics are a live form based on Silicide. They are a race one could refer to as biomechs. Flora and fauna look like some kind of mechanical structures but they are living creatures. They are a peaceful race who managed to survive in peace with their environment. The sunlight once was their main energy resource, but these live forms managed to create some kind of energy crystals which are so powerful that the humans want to have it. They think if they can reconstruct this kind of resource, they can do anything.

## Machines

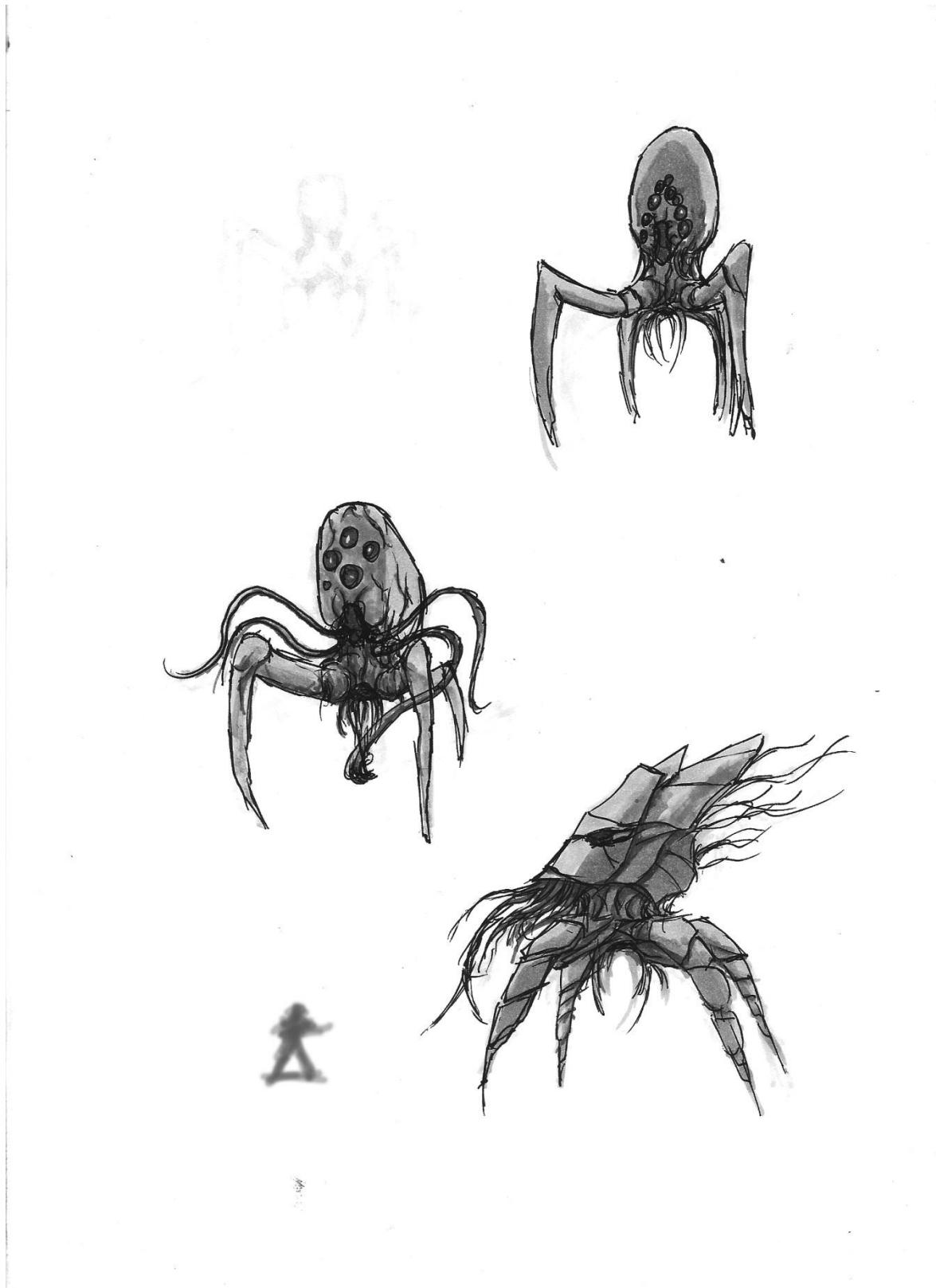
The artificial intelligence of the machines created by men became too smart and developed a conscience of their own. They split themselves from the humans because they feel like they are the superior race. They think that they have to destroy the other races if they can't assimilate them. They hate the humans because the humans tried to fool and abuse them. The machines have become so different, if a human would stand next to a machine he would suffer from the radiation the machine is sending out. They made so much progress that they don't need the energy crystals of the Slics, but they try to get them before the humans do. Also they want to assimilate technology of the Slics, but the reason why the Machines try to destroy the Slics too is based on a misunderstanding right now at this moment. The Slics thought that the machines are humans too who try to destroy their environment - the Machines just don't care, because they think that they are the superior race. Maybe they just don't know what real friendship is.

## Locations

### Slics Planet

The planet for the demo map is an outpost of the Slics. It is a Mars like planet with red sand and stone deserts, but with a denser atmosphere. There are plants and architecture which come from the home base of the Slics.

Other creatures that live there breed and feed in caves. They are inspired by the Zerg from StarCraft, but they are in another evolutional state. They are dangerous, because they are roaming, wild animals who feel threatened by everyone who intrudes their territory.



## 7. Look and Feel

The main visual style is semi-realistic with high quality hand painted textures and low-poly models like in StarCraft 2 and Dawn of War 2. The color scheme for each level is not very rich but saturated and contrasted with a lot of black. All units the player can interact with are distinguished from the background. This way we are going to achieve a very dark, mysterious, dreary, haunting and dangerous atmosphere.

The demo level shows a red planet with a very bright sun. The color scheme is mostly yellow and red. It feels like a dusty desert where a human cannot survive without protection. The dark plants and architectural structures create an even more dangerous feeling. There is not much architecture on top of the surface, because this is more of an outpost for the Slics and all life forms live under the surface or in caves.

For more information about the look and feel of the game please refer to the chapter User Interface.

# 8. Level Design

This chapter describes the gameplay elements of Hostile Worlds maps and features an example map that will be implemented first.

## Gameplay

### Damage Areas

Damage areas are causing damage to all units passing it. These units lose 2% of their maximum structure points per second - spending half a minute in the damage area causes a squad member to lose more than half their structure points. The player might still want to walk through them in order to get to an artifact spot fast.

### Slow Areas

Slow areas slow the units, reducing their movement speed to 70%. One might want to avoid this terrain because strong aliens and/or other players might attack in that very moment.

### Watch Towers

Conquering a watch tower immediately reveals a large area of the map and thus provides a lot of important information, for example where the strong aliens are at the moment. Depending on the current situation, this may enforce the feeling of being in danger or cause the player to respire.

Conquering a tower takes three seconds and is channeled, much like collecting artifacts - we don't want players to stand around for too long. Every squad member is able to conquer a tower, but they not help each other to decrease the time required, as it is already short enough. A tower retains its controller until another player conquers it: This way, players may want to spend some additional time conquering their enemy's tower.

### The Descent

The Descent is part of the hostile terrain in Hostile Worlds, too. Units can fall into it and die when they're knocked back. Losing a squad member like this really hurts; every player will want to avoid this! If jump packs are available in later iterations, the player should be able to jump over it.

### High Ground

In Hostile Worlds, units on high ground being attacked from below receive 50% less attack damage.

# Demo Map

## Introduction

This section describes the demo map which includes all important aspects of the multiplayer part of Hostile Worlds.

In this 1v1 map with five positions for artifacts the players have several decisions to make. They can decide if they want to fight the aliens or move through the hostile environment in order to capture the next artifact. However, an alien lane runs through each slow area on our demo map. There are also a few tactically important spots in the map like the plateaus for artilleries and the two towers on top of the plateaus for a good view at the roaming aliens. The three bridges are dangerous because the players might fall off them into the Descent!

The starting points are going to be used as artifact spots, too. The four artifacts spots on the outer corners of the level are surrounded by hostile terrain and aliens, while the spot in the middle is going to be hard to conquer because it is in the middle of a bridge the players can fall off. This spot is also going to be used to force encounters between the players.

There are six alien camps on the map. Each spot has its own lane for the bigger aliens. Two of the lanes are leading around a plateau with a watch tower.

The plateaus are nice to use for tactical moves. The player can place an artillery vehicle on top of the plateau for example. The other player has to fight the aliens before he or she can move up the plateau.

The two extra bridges on to the sides help the player to avoid and surround their enemy.

The map is mirrored. The players have equal chances right from the start.

Crossing the canonical (square) real-time strategy map "Lost Temple" takes about 40 seconds. Thus, with a standard movement speed of 1.6 meters per second, each side of a square map should have a length of about 64 meters.

## Level 2D

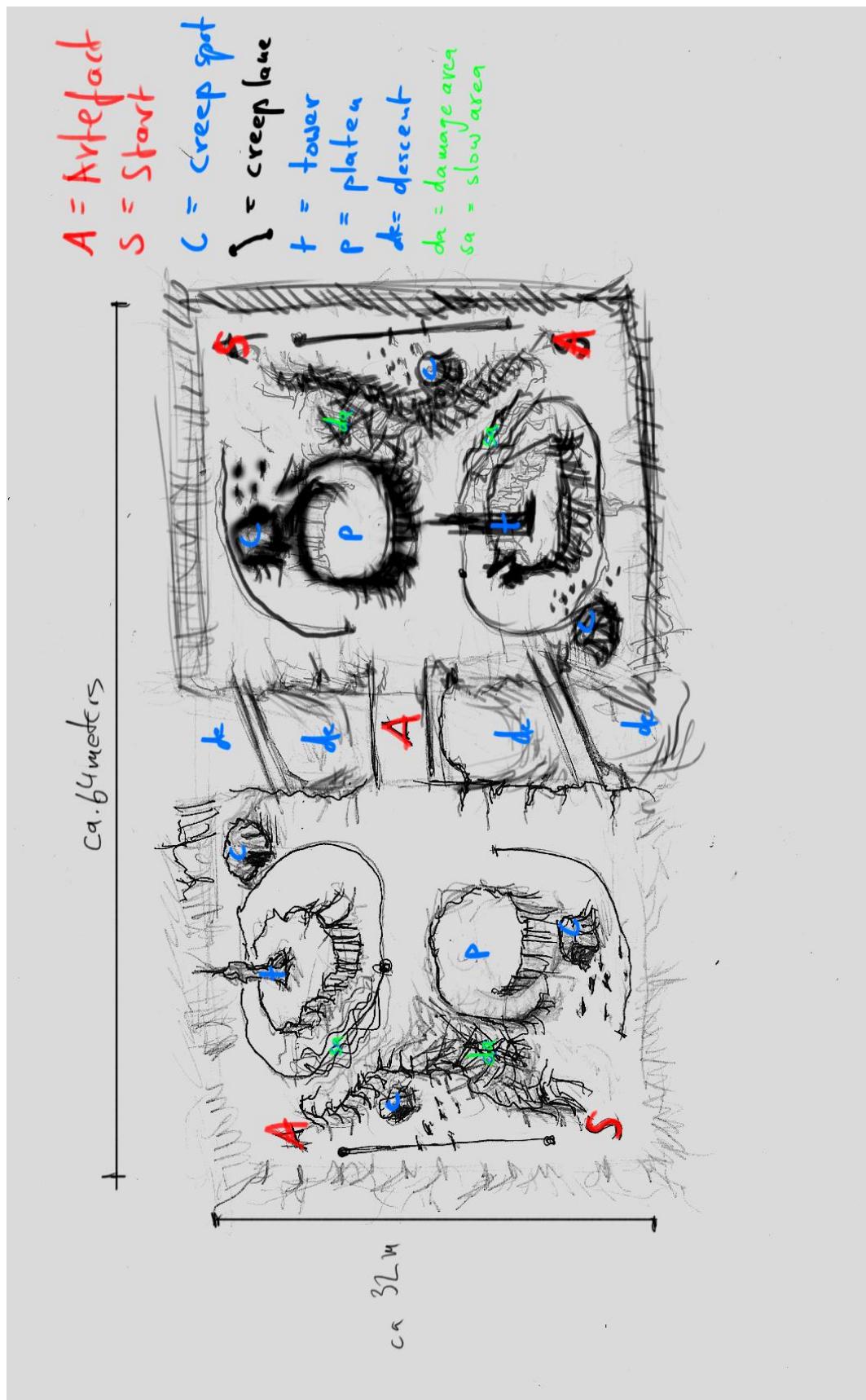


Figure 2: An overview of the demo map of Hostile Worlds.

## Look and Feel

The map looks like in the concept arts. For more information please refer to the chapter Look and Feel. The setting is based on the Slics race and it is supposed to be a planet in their solar system. Like in StarCraft and most other PvP modes there is no real story behind the multiplayer mode.

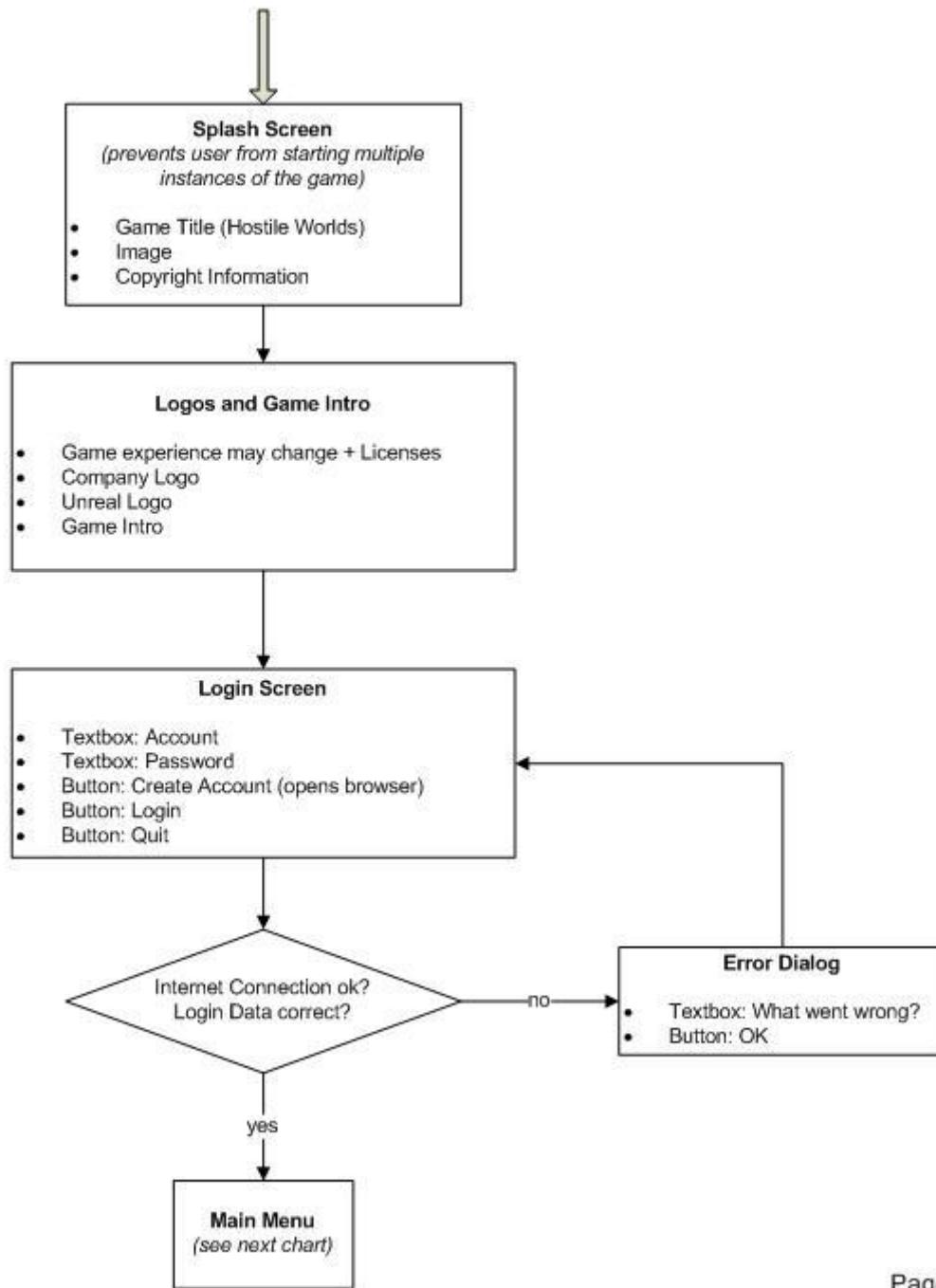


## 9. Screens

### ✓ Login Sequence

#### Hostile Worlds – Login Sequence

Thursday, June 24, 2010



Page 1

Figure 3: The login sequence of Hostile Worlds.

After having started the game, by double-clicking its desktop icon for example, Hostile Worlds shows a splash screen for the user knows the game is loading now.



Figure 4: The splash screen of Unreal Tournament 3.

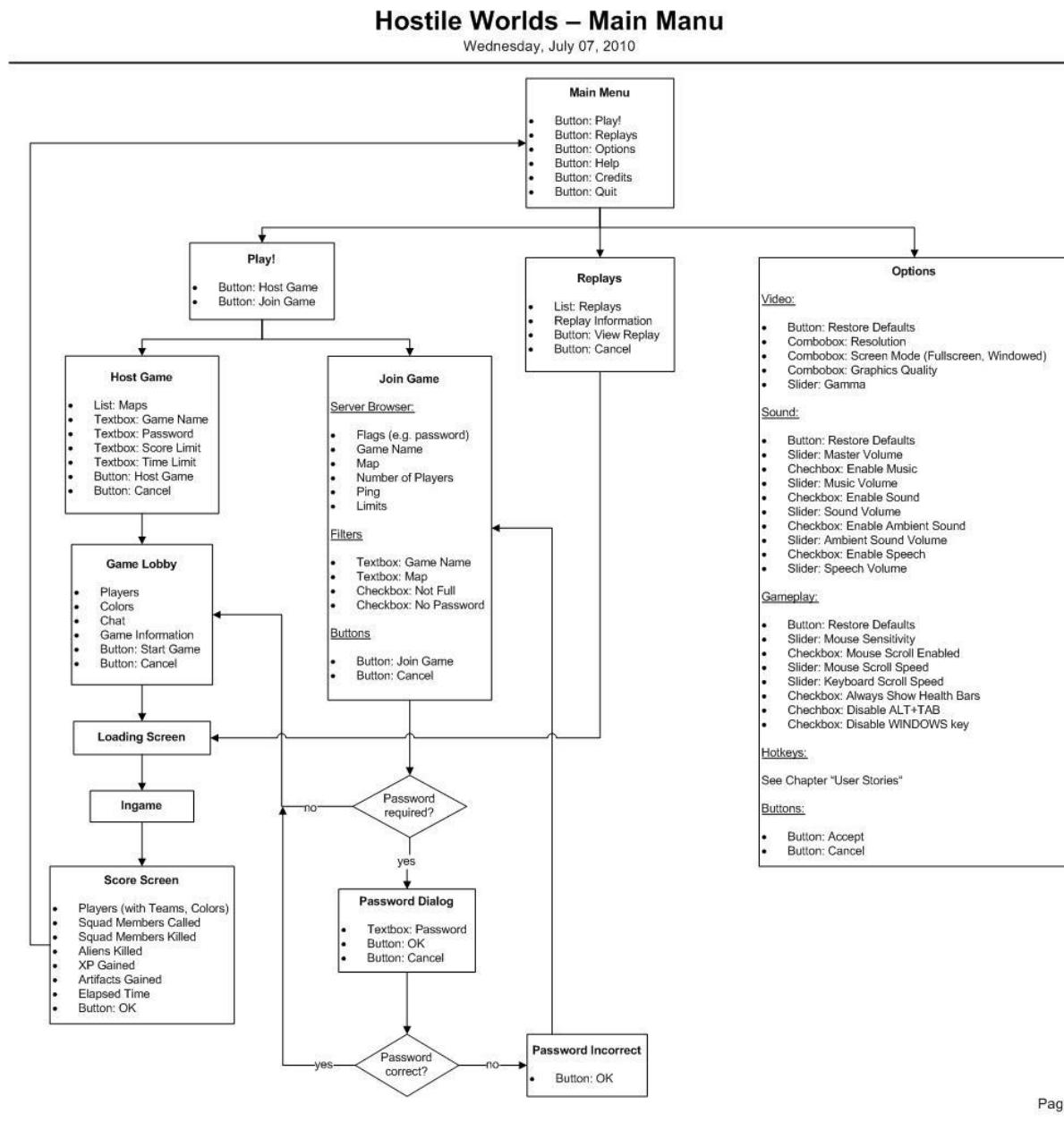
After the user has seen or skipped all logos and the game intro, the user can log in if he provides the correct data and his internet connection is working.



Figure 5: The login screen of Unreal Tournament 3.

If he successfully logs in, the main menu is shown.

## ✓ Main Menu



Page 2

**Figure 6: Screen transitions of Hostile Worlds.**

The main menu contains buttons that allow start playing, change options or quit the game, for example. Each button of the main menu leads to a different screen.

## ✓ Play!

The user can host a new game or join an existing one. For hosting a new game, he or she must specify the map to be played, a game name and a score and/or time limit. To join a game, the user may filter available games by name or by map, for example.

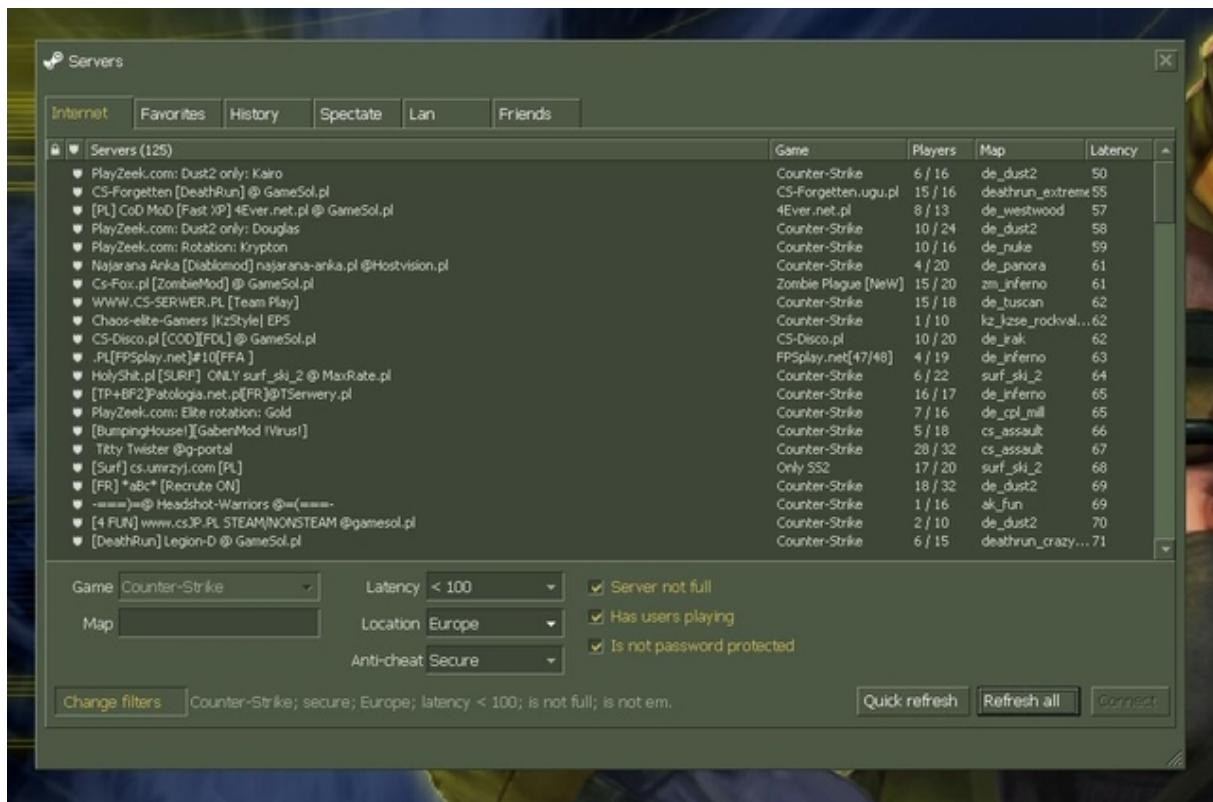


Figure 7: The server browser of Counter-Strike 1.6.

The game lobby provides a simple chat, as well as information on the game and its players.



Figure 8: The pre-match lobby of WarCraft III: The Frozen Throne.

As soon as the host starts the game, a loading screen appears, displaying in two columns how much each player has loaded yet.



Figure 9: The loading screen of WarCraft III: The Frozen Throne.

While playing, the users have access to an in-game menu that allows changing options or showing a manual.

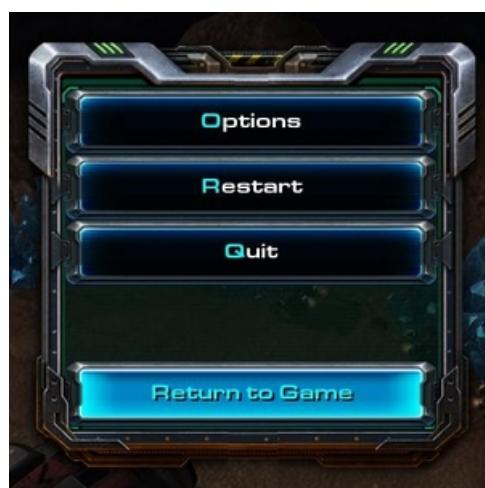


Figure 10: The in-game menu of the StarCraft II Beta client.

If one or more players miss packets or didn't send their game state updates in time, a lag screen with two columns appears, displaying how much time each lagging player has left, counting down from 60 seconds on.

After every match, a score screen tells the players about their performance.



Figure 11: The post-match score screen of Warcraft III: The Frozen Throne.

## ! Replays

Hostile Worlds has got an in-game replay browser: The user may choose the replay he or she wants to see from a list and gets important information on that replay.



Figure 12: The replay browser of Warcraft III: The Frozen Throne.

## ! Options

Users may change a lot of video, sound and gameplay options, such as the resolution, the volume or mouse sensitivity. Additionally they may change the in-game shortcuts, called hotkeys.



Figure 13: The gameplay options screen of the StarCraft II Beta client.

## ? Community

Community features such as an user profile, a friends list or ladders have low priority and won't be accessible in-game in our first builds - players might want to join the Electronic Sports League<sup>1</sup> in order to enjoy there features.

<sup>1</sup> <http://www.esl.eu>

# 10. User Interface

## Description

The in-game user interface always shows a part of the actual environment where the game takes place and where the player can select units to give those orders.

Every unit has its own sight radius. The *fog of war* occludes areas the player's units cannot see: These areas are greyed out so the player still can see the environment but is unable to see enemy units. The player's camera is moved in isometric perspective by scrolling like in StarCraft.

The *minimap* to the bottom-left shows a small version of the map with all important landmarks, artifacts and alien camps for example, and units that are visible to the player. The bottom-center *status window* shows information about the selected units:

- name, level and shards
- structure, shields and armor
- damage, range and cooldown
- buffs and effects

To the bottom-right, the user has access to commands and abilities via the buttons of the *command window*. Tooltips appear when the player moves the mouse cursor over the buttons. *Portraits* along with small ability buttons on the right side of the interface allow the players to make use of units and abilities in a fast and efficient way. The top-right info bar shows information match information, such as the remaining match time, collected shards and the number of squad members. The amount of victory points of both players is displayed in form of two bars at the top-center. For accessing the menu, the message log and a help dialog, the interface provides three buttons in the top-left corner. Finally, to the left, the user may switch between three *submenus* for tactical abilities, calling and resurrecting squad members.

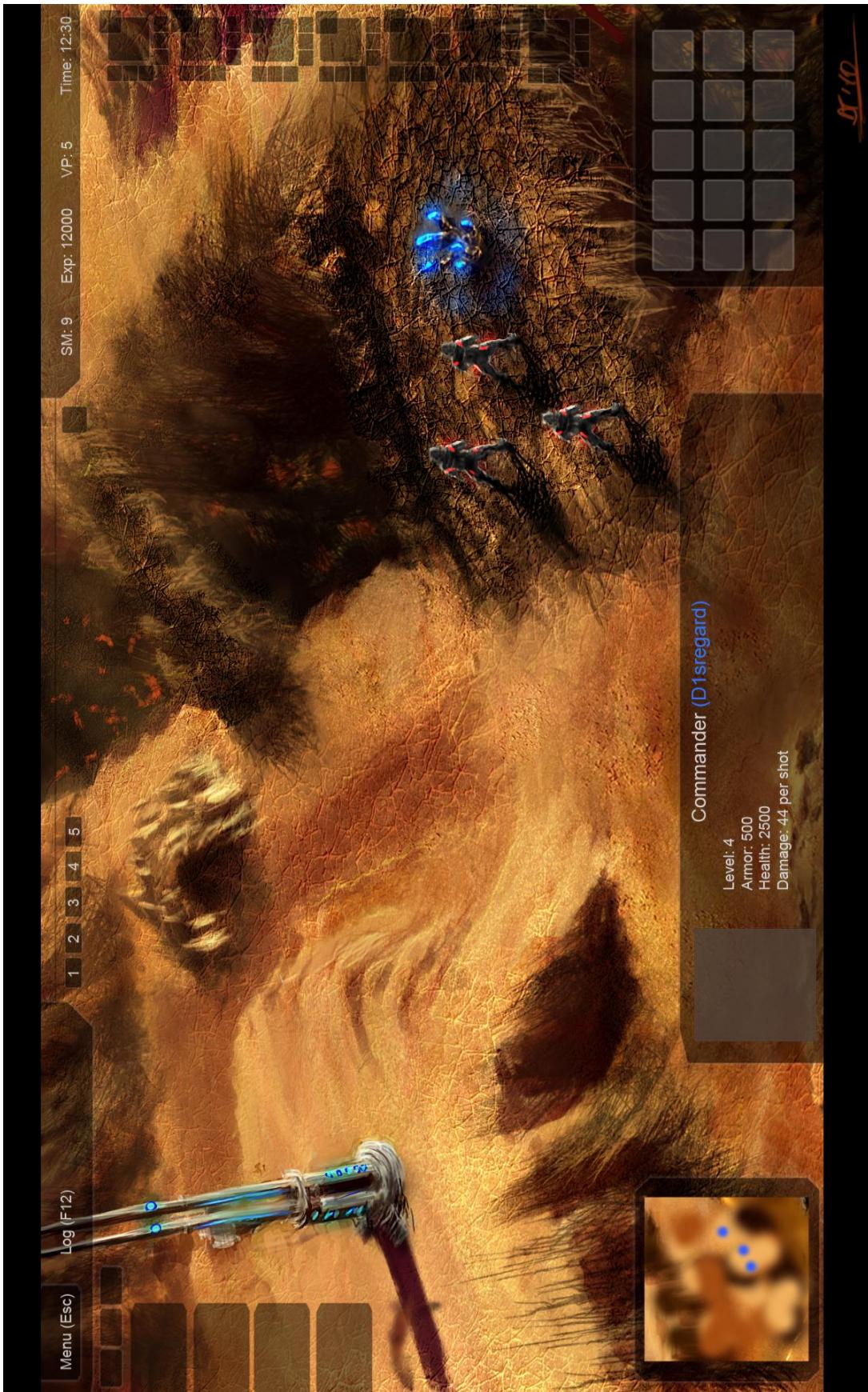


Figure 14: A pre-vis of the Hostile Worlds in-game user interface.

## List of Elements

1. Minimap
2. Status Window
3. Command Window
4. Squad Member Portraits and Ability Buttons
  - a. Info Bar
  - b. Resources (Shards)
  - c. Time Remaining
5. Squad Members
6. Victory Point Bars
7. Buttons
  - a. Menu
  - b. Log
  - c. Help
8. Submenu Selection Buttons
9. Submenu Buttons

## Allowing Different Screen Resolutions

Hostile Worlds handles different aspect ratios just like StarCraft II: We'll use repeatable graphics for interface and sub-window borders, much like in traditional web design.

# 11. User Stories

This chapter summarizes all ways our users may interact with our game.

## GUI Interaction

### Genre Standards

#### *Camera Movement*

The user can change the part of the map that is displayed in the main screen by moving the mouse to a screen edge: Moving the mouse to the left edge of the screen causes the view to scroll left if possible, for example.

#### *Unit Selection*

By left-clicking a squad member, an alien or any other game object such as a watchtower, the clicked object becomes selected. The status window shows important attributes of that game object. If the user controls the selected object, such as an own squad member or a reinforcement unit, the command window shows all orders that can be issued. If the selected unit is a squad member, its portrait and abilities are shown on the top right. The appropriate Selected sound is played.

#### *Group Selection*

It's possible to select several units at once by left clicking on a location above the unit which is at the furthermost position to the north-west of all other units. Holding the left mouse button and moving the cursor down and to the right, the user can than draw a rectangle to encompass the wanted units. Releasing the left mouse button selects all the encompassed units.

The status window shows statistics of the strongest selected unit, with the following precedence: If there is more than one unit with the same level, their classes are imposed the following order on:

Commander > Rusher > Engineer > Hunter

If there is more than one squad member of the same class and the same level, the one which has been called first, in terms of game time, is shown. On the top right, their portraits and abilities are shown. As long as a squad member has unspent ability points, learned abilities are highlighted in green, and the Promote Squad Member icon is shown at the top right of the portrait. Abilities on cooldown are highlighted in light red, unavailable abilities are highlighted in grey.

The Selected sound of the strongest unit is played, with the same precedence as above.

### ***Right-click***

If one or more units are selected, right-clicking the ground issues a move order. The Order Confirmed sound of the strongest selected unit is played.

Right-clicking an alien or enemy squad member issues an attack order. In this case, the Attack Order Confirmed sound is played instead.

The appropriate animations are played for the selected unit(s).

### ***Errors***

If the user picks an illegal target or does not have enough resources for an action, an error occurs. In this case, a short message is displayed above the status window and an error sound is played. The game state does not change, and other GUI elements like the status window, the portraits or the cursor remain unchanged, too.

### ***Choosing A Target***

Some actions require a target. If such an action is about to be triggered, a small text is drawn right above the status window: "Choose a target!" All buttons of the bottom-right Command Window disappear, and the Cancel button is shown. The cursor changes to the Choose Target cursor. Left-clicking an eligible target finally triggers the action or ability, plays the appropriate animation of the selected unit(s), restores the command window buttons and the cursor, plays the appropriate sound, and highlights the ability button as it is on cooldown now or decreases the number of shards if necessary. If the target is not legal, an error occurs instead. The user may try to pick another target or hit the Cancel button or hotkey to cancel the ability. In the latter case, the command window and the cursor are restored, too.

### ***Issuing Orders***

The bottom-right command window offers buttons for all standard and advanced orders. Move, Attack, Stop and Hold Position are standard orders and are available to all units. Clicking on the move or attack button prompts the user to choose a target, clicking stop or hold position issues that order immediately. Attack Ground, Harvest, Repair and Dismiss Squad Member are advanced orders and available to few units only. All three require a target.

If an order is issued, the appropriate animation is played, and the Order Confirmed or Attack Order Confirmed sound is played.

### ***Minimap Interaction***

Left-clicking on the minimap changes the current camera position, centering the clicked point of the map. Additionally, one may right-click the minimap or choose targets by left-clicking on the minimap just like in the main screen.

Left-clicking the minimap ping button just next to the minimap or pressing the appropriate hotkey prompts the user to choose a target. A left-click at the minimap or the main screen causes the Minimap Ping effect to be shown and sound to be played for all players of the same team.

### ***Using Hotkeys***

Many actions, such as opening the in-game menu, moving the camera, pinging on the minimap, issuing orders or triggering abilities can be accessed via hotkeys, too. Pressing the appropriate hotkey makes the interface behave exactly as if the user has pressed the button. However, players can save much time by using hotkeys, as they don't have to move the mouse at all.

Table 8: Keyboard layout.

Action	Hotkey	Description
Turn Music On/Off	CTRL + M	Turns the music on or off.
Turn Sound On/Off	CTRL + S	Turns the sound on or off.
Menu	F10	Shows the in-game menu.
Message Log	F11	Shows all past chat messages.
Help	F12	Shows the help dialog.
Alert Recall	Space	Moves camera to last alert.
Camera Move Up	Up	Moves camera up a bit.
Camera Move Down	Down	Moves camera down a bit.
Camera Move Left	Left	Moves camera left a bit.
Camera Move Right	Right	Moves camera right a bit.
Chat	Enter	Opens the chat window. (in 1v1: message to enemy, in team games: message to team)
Chat All (in team games)	Shift + Enter	Opens the chat window. (in 1v1: message to enemy, in team games: message to all)
Control Group Assign	CTRL + [0..9]	Assigns the selected unit group to a number.
Control Group Recall	[0..9]	Selects the assigned unit group.
Minimap Ping	ALT + G	Shows team a minimap ping.
Switch Minimap Team Colors	ALT + F	Switches between player and team colors.
Switch Minimap Alien Lanes	ALT + H	Shows or hides alien lanes on minimap.
Replay Pause/Play	P	Pauses or resumes the replay.
Replay Speed Up	+	Increases replay playback speed.
Replay Speed Down	-	Decreases replay playback speed.
Screenshot	Print	Writes a screenshot to disk.
Show/Hide Health Bars	TAB	Shows or hides all health bars.
Subgroup Next	TAB	Switches to the next unit subgroup.
Subgroup Previous	SHIFT + TAB	Switches to the previous unit subgroup.
Command Grid [0, 0] .. [4, 0]	Q..T	Triggers buttons of the 1st command row.
Command Grid [0, 1] .. [4, 1]	A..G	Triggers buttons of the 2nd command row.
Command Grid [0, 2] .. [4, 2]	Y..B	Triggers buttons of the 3rd command row.
Camera Save	CTRL + [F5..F8]	Assigns the camera position to a number.

Action	Hotkey	Description
Camera Recall	[F5..F8]	Moves the camera to the assigned position.
Show Attack Radius	Z	Shows the selected unit's attack radius.
Show Submenu	CTRL + [F1..F3]	Shows the appropriate top-left submenu.
Trigger Submenu Button	[F1..F4]	Triggers the appropriate submenu button.

## Game-Specific

### *Calling Squad Members*

Clicking the *Call Squad Members* button, which is one of the three buttons just underneath the Menu button, opens the unit menu on the left side which allows calling new squad members: Three new buttons appear which are aligned vertically parallel to the left display border. Each of these buttons stands for one of the three unit types to choose from: Rusher, Engineer and Hunter. Hovering over a unit button shows an info message which explains the unit type's pros, contras and abilities. Clicking on a unit button calls the corresponding unit type, if the player does not already control the maximum number of squad members: A drop pod falls from the sky and crashes right next to the commander's location. The selected unit appears and the drop pod disappears. The Drop Pod sound is played, as well as the Selected sound of the called squad member. The squad member count on the top-right increases, and if this was the fifth to eighth squad member, the number of shards decreases.

If the player has not enough shards or too many squad members, an error occurs.

### *Learning & Using Squad Member Abilities*

On the right side, there are eight slots reserved for squad member portraits with some buttons nearby. If the user has selected one or more own squad members, these buttons show the icons of the squad member's abilities. If the squad member has learned an ability, clicking that icon triggers it, prompting the user to choose a target if necessary; if not, clicking that icon will cause the squad member to learn that ability, if he has unspent ability points. In case the user tries to use an ability that is on cooldown, an error occurs.

### *Using Commander Abilities*

Clicking the *Commander Abilities* button, which is another button just underneath the Menu button opens the appropriate menu on the left side. This menu contains buttons for all commander abilities. Clicking one of these icons makes the game check if the user has enough shards. If not, this causes an error. In case the chosen ability requires a target, the user is prompted to do so.

### **Promoting Squad Members**

In order to promote a squad member, the user has to select it and click on the small Promote button near its portrait on the top-right. If the user has enough shards, the Level-Up shader is shown and the status window is updated. The unlearned ability buttons near the portrait are highlighted, and the Level-Up sound is played. The number of shards decreases. If the player has not enough shards, an error occurs.

### **Resurrecting Squad Members**

Clicking the *Resurrect Squad Members* button which is the third button just underneath the Menu button opens the resurrection menu on the left side. This menu allows calling squad members with the same level and ability set as died squad members had, and it provides a button for calling a new commander. Again, each of these buttons stands for one of the three unit types; the system remembers only the latest configuration per type. Clicking on a unit button calls the corresponding squad member if the user has enough shards and not too many squad members. Sounds are played just as if a new squad member has been called, and the squad member count on the top-right increases, the number of shards decreases. If the player has not enough shards or too many squad members, an error occurs.

### **Collecting Artifacts**

In order to collect an artifact, the player may issue a harvest order just like described above. Right-clicking an artifact while a harvester is selected issues that order, too. As soon as the artifact has been successfully harvested, the player's artifact bar at the top-center grows.

## **Spending Time**

The standard time limit in Hostile Worlds is 20 minutes per match. Players will spend their time according to the following table:

**Table 9: Match time spent per action, in %.**

<b>Player vs. Player Encounters:</b>	50 %
<b>Fighting Aliens:</b>	35 %
<b>Collecting Artifacts:</b>	5 %
<b>Squad Management (spending ability points, calling and reviving squad members):</b>	5 %
<b>Crossing The Map (without fighting):</b>	5 %

# Gameplay Stories

This section describes an example match on our demo map between a new player and an experienced one.

## *Game Start & Initial Unit Selection*

Player "Ugluk" has already used the server browser to find a 1vs1 game; he now clicked on the "Start" button to start the Game versus his opponent "d1sReGard". The loading screen appears featuring screenshots in in-game graphic underlined with helpful gameplay tips. Several of these help screens appear until the game has finished loading. A typical "Loading..." bar is shown at the bottom which indicates the progress. The load process has finished now, the loading screen fades away and the in-game user interface appears. The camera points to player Ugluk's start zone at the bottom left corner of the map, which is a wide and clear area. Immediately the screen starts to shake a bit, a loud "whoosh" noise appears and a drop pod falls from the sky crashing right into the center of the shown area. The commander appears from the drop pod and an info message appears which states "Call your squad members! Use the unit menu on the left!" (see subsection Calling Squad Members). Ugluk chooses a Rusher and immediately another drop pod crashes next to the commander and the chosen squad member drops out of it. After that, Ugluk chooses one Engineer and two Hunters to complete the initial squad. Five seconds after the last text message an info message appears which states "Collect the alien artifacts to gain victory points! Use the minimap to find their location!" This small time window prevents new players from having a disadvantage just because they need more time for choosing their squad members. The location of the three existing artifacts is now highlighted on the minimap: one artifact for each player on his opposing corner (**Artifact-TopLeft (A-TL)** for Ugluk, **Artifact-BottomRight (A-BR)** for d1sReGard) and one on the bridge at the map's center (**Artifact-Center (A-C)**). These three artifacts provide a total amount of 240 points ( $3 \cdot 80$ , see section The Goal: Artifacts). Ugluk can now control his units and the game commences!

## *1st Artifact Round*

### *First Alien Fight & Level Up*

The only thing Ugluk knows right now is that he's at the bottom left corner of the map and that he must move to the top left corner or to the right side to reach an artifact. The minimap shows the general terrain layout of the map covered by fog of war. No imminent threat is visible in the immediate area around the squad within their sight radius which is clear from fog of war. Ugluk sees that two possible paths are available: One to the north leading straight up to the A-TL and one to the east leading onto a slope which further leads towards the map's center. Ugluk decides to move his units as a single squad to the north in order to collect the A-TL. Since Ugluk is not a totally new player

he knows about the genre standard of *group selection* and *right-click* and therefore group selects all his units and orders them to move to the north by right clicking on a position near the top screen border. After approximately seven seconds, having moved almost half the distance to the A-TL, Ugluk spots the first alien camp, surrounded by eight weak aliens (see section Aliens). Ugluk immediately stops his squad; the aliens don't attack since their acquisition range is less than the one of Ugluk's units. Ugluk selects his only Rusher and orders it to attack the aliens by right clicking on the nearest one. Since the Rusher is a melee unit he moves right towards the alien, entering their acquisition range and drawing their attention. All eight aliens are alerted and they attack the Rusher. Ugluk orders all remaining units to focus their ranged attacks on the alien attacked by the Rusher by group selecting them and right clicking on it. Since all units have different attack ranges the following default formation is obtained: Rusher on the front, Engineer and Commander some distance behind in the middle and Hunters the behind. The aliens are no match for Ugluk's squad: They focus their attacks on the Rusher but can't break his shield fast enough before they are picked off one by one by the focused ranged damage. The fight lasted around six seconds, the eight aliens dropped a total amount of 400 shards, which is exactly enough to level up all four squad members (see section Gaining And Spending Shards). As described above (see subsection Learning & Using Squad Member Abilities). Ugluk chooses the following abilities: Rusher - Clap, Engineer - Smoke Grenade, Hunter 1 - Aimed Shot, and Hunter 2 - Hack.

### Unexpected Fight Against Strong Alien

Ugluk now continues moving his squad to the north and encounters a single strong alien which was moving to the south on his lane. Since the strong alien has the same sight radius as Ugluk's units he immediately runs towards the first unit which again is the Rusher since he was leading the squad's formation. Ugluk's units auto attack the strong alien, but he doesn't drop that easy and manages to reduce the Rusher's shield almost completely since it was still recovering from the last battle. Ugluk decides to use the Rusher's Clap ability which knocks down the alien and it dies soon after, dropping another 250 shards. This amount isn't enough though to level up another member; Ugluk currently has exactly these 250 shards. The fight took about four seconds.



### First Artifact

Ugluk's squad then continues to the north, after moving for about ten more seconds he arrives at the A-TL without another encounter. At the same moment he sees at the top right of the UI that d1sReGard's artifact count goes up by one. d1sReGard managed to reach his artifact faster by avoiding the strong alien on his lane. Ugluk now orders his complete squad to collect the artifact which takes exactly seven-and-a-half seconds as the commander collects it alone: Ugluk's Engineer has not learned the Harvester ability.

**Score:** Ugluk 80 - 80 d1sReGard

### Unexpected Obstacle & Fight Against Strong Alien

Afterwards he decides to take the only viable path to the east in order to reach the A-C, which leads up a slope. Reaching the top he encounters a hill and chooses to move around it from the south. In lack of knowledge about the full map layout he didn't consider the slow area (see chapter Level Design) which now blocks his path. Since retreating would take even more time he decides to move through it. Unfortunately for him another strong alien chooses this very right moment to cross his squad's path. Luckily though the Rusher's shields have been fully regenerated in the meantime and his Clap ability is available again. He starts the attack with the Rusher's Clap ability and quickly can dispatch the alien. Ugluk now has 500 shards, which is enough to level up another unit: He chooses Hunter 2 and selects the Aimed Shot ability, leaving him with 200 shards. All this took its fair amount of time though and Ugluk now has to hurry in order to reach the A-C before d1sReGard or at least be able to prevent him from capturing it.

### First Player Fight

Ugluk's squad now moves towards the center bridge to the east, but as he comes closer to the A-C, d1sReGard's two Rushers and two Hunters start attacking him, while d1sReGard's commander is already capturing the A-C. One of d1sReGard's Rushers (D-R1) runs towards Ugluk's Rusher (U-R1) and starts to attack him while the other one (D-R2) runs directly towards his remaining units (U-E1, U-H1, U-H2 and U-C). The moment before Ugluk could trigger U-R1's Clap ability in order to knock down D-R1, U-R1 is hit by an Aimed Shot coming from one of d1sReGard's Hunters (D-H1), then all three units (D-R1, D-H1, D-H2) start focusing their attacks on him, quickly lowering his shield and soon doing damage to his structure. Meanwhile D-R2 has reached Ugluk's remaining units and starts attacking U-E1, forcing Ugluk to deal with him rather than helping out U-R1. Ugluk manages to use one Hunter's Aimed Shot ability on D-R2 and knocks him down. This moment U-R1 dies and all of his attackers move forward to enter the fight with Ugluk's remaining units.

### First Defeat

Ugluk's last chance would be to quickly kill D-R2 whose shield is almost down, but he already recovered from his knockdown and now triggers his Clap ability in response, knocking down U-E1 in turn. Since now D-H1 and D-H2 start firing on U-E1 and D-R2 is about to attack him too, Ugluk decides to sacrifice U-E1 to save what's left of his army. He group selects the remaining units and orders them to move to the west running away from the bridge. Ugluk realizes though that U-E1 is severely damaged but still alive after he recovered from the knockdown and triggers his Smoke Grenade, which prevents him from being killed by the still attacking enemy units. He orders U-E1 to move away under the dense cover of the smoke in the same direction the other units fled. d1sReGard decides to not persecute Ugluk's units but rather go for one of the two new artifacts which spawned on the bottom left (A-BL) and top right (A-TR) corners ( $2 \cdot 120$  points) after his commander successfully collected the last one. The fight lasted about 20 seconds.

**Score:** Ugluk 80 - 160 d1sReGard

### 2nd Artifact Round

#### Calling Lost Squad Members

Ugluk managed to retreat his units to a save spot to the west on the plateau's border. He orders his Commander to use his Repair ability on U-E1 in order to regenerate some of his lost structure points. Then Ugluk calls a new level one Rusher for free (see section Squad Members), using the unit menu on the left. Since he still has 200 shards left he immediately levels him up to level two and again selects the Clap ability, having 100 shards remaining. After U-E1's structure points are completely regenerated, Ugluk decides to farm some aliens on his way to A-BL. Moving around the bottom left hill through the damage area he manages to kill the roaming strong alien and clear the nearby camp without any losses. He received a total amount of 650 shards which are enough level up U-R1 to level three choosing the Focused Fire ability. Ugluk's squad now consists of the following units again: one Commander (U-C), one level 3 Rusher with Clap and Focused Fire (U-R1), one level 2 Engineer with Smoke Grenade (U-E1), one level 2 Hunter with Aimed Shot (U-H1) and one level 3 Hunter with Aimed Shot and Hack (U-H2). Afterwards he collects his artifact (A-BL), but again d1sReGard manages to collect his artifact (A-TR) some time before.

**Score:** Ugluk 200 - 280 d1sReGard

### 3rd Artifact Round

#### Unexpected Artifact Theft

The AI controlled game director decides that round three is kind of a free round, in order to give both players some more time to prepare for the next confrontation by farming some shards, leveling up their units and both obtain an artifact: Therefore two new artifacts spawned easily accessible for each player at A-TL and A-BR ( $2 \cdot 120$  points). Similar to round one Ugluk moves to the north in order to reach A-TL, he encounters the same alien camp and roaming strong alien as before and again dispatches them without any losses, gaining 650 shards. He now has 750 shards and spends 450 shards to call a 5th squad member, another Rusher (U-R2), and 100 shards to level him up and select the Charge ability. He has 200 shards left now. Then he moves further to the north in order to collect the artifact at A-TL. As Ugluk comes closer, his U-R1, moving at the frontline, suddenly is hit by an Aimed Shot. d1sReGard is already collecting "his" A-TL! Ugluk immediately orders U-E1 to throw his smoke grenade on top of his squad to prevent further targeted attacks from d1sReGard's units. Ugluk didn't notice d1sReGard's Artillery though, which is located east of his squad on top of the slope and now starts to fire its untargeted artillery strikes right into the smoke covered area, damaging and knocking around Ugluk's units. Again Ugluk is at a disadvantage, he decides to retreat and now try to steal d1sReGard's presumably unattended A-BR. Since the smoke is still covering the area, Ugluk manages to fall back with all his squad members alive, who only took slight damage to their shields. d1sReGard again decides to not persecute Ugluk's squad and collects the A-TL.

**Score:** Ugluk 200 - 400 d1sReGard

#### Information Is Key

Ugluk's squad is now moving back down to the south where it came from, the previously killed aliens haven't spawned back yet. After reaching the bottom left corner, his squad moves again up the slope going to the east, right through the alien camp under the bottom left hill without paying any attention to the attacking aliens. After moving further to the east the aliens stop attacking and retreat to their camp. As Ugluk's squad has almost reached the bottom most bridge he sees a Scout Drone on it, which immediately flies away to the east. Ugluk keeps on moving to the east, but as soon as his squad is halfway across the bridge d1sReGard's artifact count goes up again, the A-BR disappears from the minimap and a new artifact appears instead. d1sReGard managed to additionally capture the A-BR by sending a single Engineer unit with the Harvester ability enabled. Moreover he obtained knowledge about Ugluk's squad's whereabouts after their last encounter and now can move his D-E1 to a safe location without running into it.

**Score:** Ugluk 200 - 520 d1sReGard

#### **4th Artifact Round**

##### **Heavy Fight & Comeback**

In order to lead both players to a massive confrontation, a single artifact is spawned at the map's center now (240 points). Ugluk's squad moves north now, trying to reach the artifact coming from the right side. This time Ugluk reaches the bridge's center and the artifact at the same time as d1sReGard, whose squad consists of the following units: one level 2 Rusher with Charge and Clap (D-R1), one level 2 Rusher with Focused Fire and Concussion Grenade (D-R2), one level 3 Hunter with Aimed Shot, EMP Grenade and Passive - Increased attack range (D-H1), one level 3 Hunter with Aimed Shot, Scout Drone and Hack (D-H2). d1sReGard's squad is reinforced by one Artillery unit (D-A) which has still four strikes left. His 5th squad member is the level 2 Engineer (D-E1) which collected the last artifact and is closing in from behind. His skills are Call Artillery (which is on cooldown though) and Harvester.

Both players start the fight by knocking down one of each other's Rushers, U-R1 and D-R1, with an Aimed Shot from D-H1 and U-H1 respectively. Ugluk then tries to place another Aimed Shot on D-R2, but it is canceled as d1sReGard already triggered Charge on his D-R2, who now charges in and knocks down U-R2 instead. In order to prevent the incoming long range fire on his Rushers, U-E1 throws a Smoke Grenade on d1sReGard's ranged units. d1sReGard in turn starts using his Artillery to fire on Ugluk's ranged units, but only manages to release one shot before Ugluk's U-H2 uses his Hack ability to conquer it and use it to fire into the smoke covered area. Meanwhile both sides' Rushers are attacking each other at the bridge's center, lowering their shields. d1sReGard manages to trigger a Clap ability first, knocking down both U-R1 and U-R2. His long ranged units are still trying to leave the smoke covered area in order to start attacking again, but are impeded by the artillery strikes which knock them down again. Because of this Ugluk is now at a slight advantage, he focuses his ranged attacks on D-R1 and manages to kill him before the smoke disappears and the artillery fires its last shot and vanishes. As both of Ugluk's Rushers and all of his ranged units start focusing their attacks on D-R2 now, d1sReGard tries to retreat him. Ugluk tries to stop this by triggering U-R1's Clap ability and very luckily knocks back D-R2 right into the descent next to the bridge. This is too much for d1sReGard who triggers his Commander's Cloak ability and runs away with his remaining units, forfeiting the artifact. He also retreats his D-E1 who was firing at Ugluk's units from behind without him even noticing it. Ugluk can now collect the artifact without being disturbed and feels really good about this little victory...

**Score:** Ugluk 440 - 520 d1sReGard

# 12. Strategies

## Getting Better

Hostile Worlds provides a very intuitive interface most players will understand very fast. New players can jump right into the game and have fun; however, there are a lot of things to master in Hostile Worlds. This section describes rookie mistakes new players are to avoid, and game aspects experienced players will get better and better in.

### Rookie Mistakes

#### *Not Spending Resources*

Don't stockpile the resources you receive by killing aliens: Leveling up your squad members or using commander abilities allows you to kill aliens faster or even to beat your opponents; not spending your resources does not give you any advantage.

#### *Not Spending Squad Member Skill Points*

After having one of your squad members level up, do not forget to learn a new ability!

#### *Losing Squad Members Facing Aliens*

Try not to lose any squad members while fighting AI controlled aliens. Avoid facing strong aliens unless you feel like you can beat 'em.

#### *Losing Squad Members Passing Hostile Terrain*

Try not to lose any squad members to hostile terrain, check your structure points before.

#### *Doing Nothing*

Avoid hanging around: Just do anything useful all time, like killing aliens, moving to the next artifact or healing your squad members.

## Mastering Hostile Worlds

#### *Learn The Hotkeys*

By using hotkeys for activating special abilities, you'll be able to save much time to spend on other aspects of the game.

#### *Superiority*

Gaining more and more game experience, you'll learn when to stay and when to run away. If you know you are inferior, don't be silly and stand your ground, run away!

### ***Use Terrain Advantages***

Use high ground and hostile terrain for your advantage whenever possible.

### ***Focus Enemy Squad Members***

Try to focus an enemy squad member with your attacks and special abilities. Reducing the total number of enemy squad members drastically reduces their firepower.

### ***Distract Enemy Squad Members***

If your enemy is focusing one of your squad members, send him back - this will make your enemy's squad members follow him, wasting much of his or her firepower.

### ***Dodge Enemy Splash Damage Abilities***

Whenever your enemy throws in a grenade or an air strike, move away. The less damage you take the better.

### ***Timing***

Learn when to collect an artifact, when to kill aliens to gain more shards, and when to attack your enemy. Never attack your enemy if your squad members have fewer shards; try to kill aliens instead to reduce your disadvantage.

### ***Countering Abilities***

Most abilities are very strong if you cannot counter them; retreat and unlearn your abilities instead of losing the match.

### ***Scouting***

Information is key! (See chapter Decisions, Information & Opposition.) Try to use scans, scout drones and watch towers as much as possible.

### ***Doing Stuff Simultaneously***

Try and do as many things simultaneously as you're able to. Spend your skill points while you are fighting, or use a scout drone while moving to the next artifact spot. Again, knowing the hotkeys will help.

## Team Strategies

In team games, the players need to coordinate their actions in order to win. They will discuss who...

- ...tries to collect an artifact,
- ...is bluffing, making the enemy team think that the whole team is at a specific position,
- ...scouts to check out what the enemy team is doing,
- ...will take which position in order to improve the team's performance as soon as new artifacts spawn.

Furthermore they'll want to develop a strong ability set for their respective squad members.



# 13. Prototype

There is a WarCraft III map that serves as prototype for Hostile Worlds. This chapter explains how to use it and summarizes all changes that have been made.

## Debugging

The prototype provides debug commands that allow systematic testing. To enter debug mode, open the console by pressing the ENTER key and type –debug.

Currently the prototype allows the following commands:

Table 10: Prototype debug commands.

<b>-debug</b>	Enters or leaves the debug mode. Other commands require the debug mode to be active. As long as it is activated, all aliens share vision with player one.
<b>-help</b>	Shows a list of available commands.
<b>-gameover</b>	Immediately ends the current match. The player with most victory points wins.
<b>-artifacts</b>	Adds 10.000 shards to player one's pool.
<b>-pc</b>	Promotes the commander.
<b>-pba</b>	Promotes the strong alien.

## To Do

The following aspects are still to be added to the prototype:

- resurrecting squad members
- resurrecting the commander
- commander ability *Air Strike*

## Known Issues

- The Accomplice ability *Hardened Shields* is unable to acquire any target.

# Change Log

## Version 0.4 (2010-05-20)

### *General Changes*

- Loading screen shows the correct version number of the prototype now.
- First player hitting 1800 victory points immediately wins the match.

### *Commander and Squad Members*

- Squad members automatically activate their shields after having been revived.
- Tripled the hitpoints, the shield points and the shield regeneration rate of all squad members.

### *Aliens*

- Tripled the hitpoints, the shield points and the shield regeneration rate of the boss alien.

## Version 0.3 (2010-05-16)

### *General Changes*

- Squad members are now called down by the Landing Zone, as the Commander had too many abilities to be displayed by the game interface. The ability buttons of the Commander have been rearranged.
- Reduced the number of alien pubs spawned every 20 seconds from 3 per camp to 2 per camp.
- Increased the camera distance from the battlefield from 350 to 600.

### *Commander and Squad Members*

- Added the Hunter abilities *Supercharge Reactors*, *Aimed Shot* and *Study Prey*.
- Added the Commander abilities *Repair* and *Scan*.

## Version 0.2 (2010-05-06)

### General Changes

- Changed the camera distance to give all players a better map overview.
- Changed the UI in the top right corner to reflect the number of artifacts gained, the number of aliens killed and the number of squad members.
- Added a loading screen to the map.

### Commander and Squad Members

- Balanced the structure and shield points, attack range, damage and cooldown of the commander and all squad members.
- Set the shield regeneration of all squad members to 1% of their maximum shield points.
- Balanced the XP required for reaching the next level and the XP gained by killing the alien boss and enemy squad members.
- The squad members had different movement speeds and lines of sight - this was not intended to be and has been corrected.
- Adjusted the hotkeys and tooltips of all abilities.
- Added the Rusher abilities *Jump Packs*, *Target Their Engines!* and *Improved Cooling Circuit*.
- Added the Accomplice abilities *Grenade Launcher* and *Stop it!* Note that the ability *Hardened Shields* does not work as intended yet.

### Aliens

- Balanced the structure and shield points, attack range, damage and cooldown of the alien pups and the boss alien.
- The boss alien now gains XP from killed alien pups and gets stronger the more alien pups are defeated.
- All alien pups now give a constant number of artifacts per kill.

### Debug Commands

- Added several debug commands. Debug mode can be entered and left by typing `-debug`. Player shares vision with all aliens in debug mode.
- New debug command: `-help` - Shows a list of available debug commands.
- New debug command: `-gameover` - Match ends immediately.
- New debug command: `-artifacts` - Adds 10.000 artifacts to your pool.

- New debug command: -pc - Promotes the commander.
- New debug command: -pba - Promotes the Boss Alien.

## Version 0.1 (2010-05-05)

Initial version.

### *Commander and Squad Members*

- The commander is able to call additional squad members.
- The commander and its squad members are protected by energy shields.
- The commander levels automatically.

### *Control Points*

- Conquered control points add 10 victory points per 5 seconds each.
- Match ends after 20 minutes, player with most victory points wins.
- Conquered control points increase the damage dealt by nearby friendly squad members.

### *Aliens*

- Aliens roam the map and respawn every 20 seconds.
- Killed aliens award artifacts which are required for leveling squad members.

## 14. Ideas

This is a list of ideas that have either a very low priority and/or could be tested in future builds.

- shards flow back to the player, like resources in World in Conflict or BattleForge
- customization by choosing colors, names and a starting squad
- alternate game mode: boss alien and sub-bosses
- tutorial and training maps
- video and audio interferences
- squad play: combine abilities to create tactical combos (emphasizes squad feeling by concerted actions)
- hostile environment like in Dune: stone ground is safe, on sand there exists the possibility of a sandworm attack (causes decision: use safe long road or risky short cut?)
- enslave aliens to reinforce army
- get back shards from fallen units by harvesting their gene seed (channeled ability, takes time under which the weakened squad is still under fire)
- commander ability: Interferences. Disables the minimap of all opposing players.
- detonate scout drone for area of effect damage

# 15. Design History

## Version 0.1 (April 22, 2010)

Initial version. Results of the first presentation and many open questions found in the forum and in several discussions.

## Version 0.2 (April 28, 2010)

Basis for the discussion with Sirko on April 30. Some open questions have been answered, including questions concerning the victory condition and the role of the commander. New open questions and ideas have been added, as well as the focus and our prioritized project goals.

## Version 0.3 (May 2, 2010)

Results of the discussion on April 30.

☒ There are no *tactic points* anymore, reducing the complexity of the resource system: The abilities of the commanders are paid with the same points required for increasing the level of a squad member.

Most open questions have been answered, allowing the production of a simple prototype. The resource system, the cover system, the behavior of the aliens and resurrecting the commander and his squad members have been written down, so has the combat system, including the classes and abilities of the squad members.

## Version 0.4 (July 8, 2010)

Basis for the final presentation on July 9. The following minor changes have been made that are not visible within the rest of the document:

### Inventory (May 17, 2010)

☒ Hostile Worlds will never include an *inventory*: The game would become much too complex.

### Cover, 1v1, Annihilation (June 5, 2010)

☒ *Cover* has been removed from the game, too. It does not fit the game concept which focuses mainly on fast action. Additionally, as there are no fixed control points anymore, there is no need for a cover system which in turn would increase the number of features again.

✓ We decided to mainly focus on *1v1 matches*, as these can be tested much easier than matches with eight or more players. Furthermore, this increases the range of the game, allowing more players to enjoy Hostile Worlds.

! 4v4 is still possible, of course, and still provides a unique game experience to professional players due to the game director and the artifacts.

The only possibility of winning the game is by collecting enough artifacts; eliminating enemy players is not possible anymore, thus all players can fight for their team until the bitter end in 4v4 matches.

## Ability Levels (June 23, 2010)

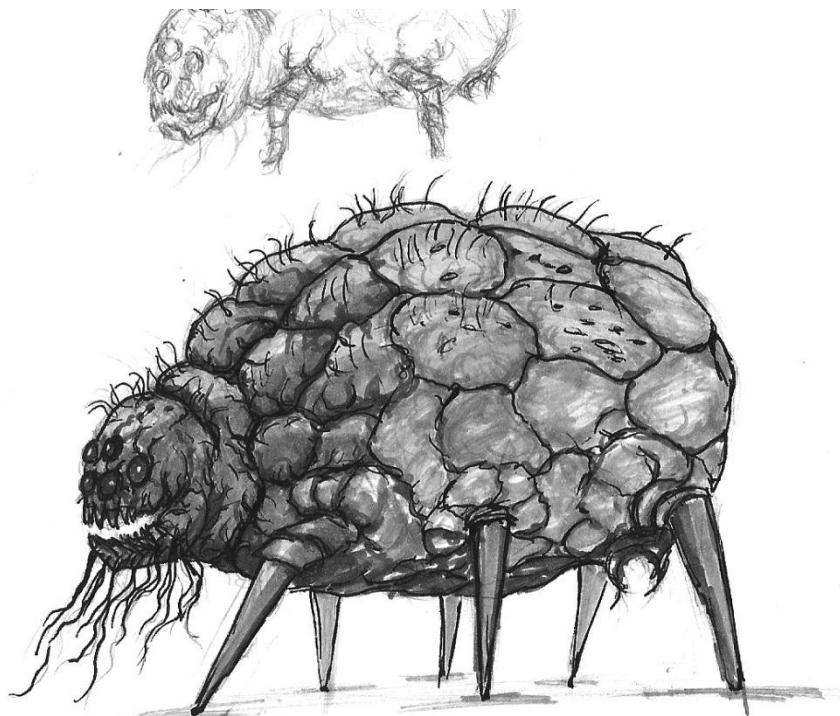
✗ There are no *different ability levels*, as this would require many, many mouse clicks for six abilities times eight squad members.

## Weapon & Armor Upgrades (June 30, 2010)

? Currently, there are no *weapon and armor upgrades*, as we didn't want to throw in too many gameplay elements.

## Formations (July 5, 2010)

? There will be no formation AI at first, as this takes quite a bit to develop and professional players always turn it off in similar games anyway.



## Part 2: Business Plan

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### 16. Team

#### Nick Pruehs: Lead Designer

- Game Design
- Input Handling
- AI
- Command Interpreter
- Resource Management

#### Marcel Koehler: Lead Programmer

- Graphics
- Network
- Events
- Collision
- Multi-threading

#### Daniel Thiele: Lead Artist

- Concept Art
- Models
- Animations
- Special Effects
- Cinematics
- Level Design
- GUI and Menu (Art)
- Web Graphics
- World Design

## Externals

- Henning Rietz: Sound Designer
- Peter Aldred: Environmental Artist
- Brian "theirskills" Montana: Web Programmer
- Sebastian Timm: Marketing Expert
- Pat "Zen" Saweit: Creature Artist (Models and Rigs)
- Stephen K.: Background Story Writer and World Designer
- Moritz Sterzinger: Balance Designer
- Alexander Graefenstein: Shader Programmer
- Aitana van Mourik: Icons, Fonts and CI

## Possible Externals

- Hannes Riedesser (Alien Voice)
- Simon Gluecklich (Sound)
- Blake Mitchell (3D Artist)
- Christoph Soyere (3D Artist)

## 17. Target Group Analysis

The target group of Hostile Worlds consists of competitive hardcore or pro gamers in the age of 16 to 30 with an affinity for real-time strategy or real-time tactics games. Hostile Worlds tries to penetrate the real-time strategy market as a low price "indie" game which offers the target group a cheap and refreshing alternative to the established games. The targeted rating is M (ESRB) or 16 (PEGI & USK).

Similar competitor games like World in Conflict or Dawn of War 2 are played by 500 to 5000 users at the Electronic Sports League (ESL) Europe<sup>2</sup>.

According to the Bartle Test of Gamer Psychology (Bartle 1996), the characteristical player of Hostile Worlds is a *killer*: They want to win duels with other players, and, in case they lose, try to find out why. Our players like deadly battles and statistics about how many matches they win and how they perform in comparison to others. Their goal: Having the best statistics on the list. For this reason, game mechanics are more important than the environment, and we need to provide enough opponents to compete with, for example through the ESL. Members of our target group want to play a competitive game; they want to feel the adrenaline while challenging real people.

Other characteristics of our target group include a high technological affinity and a better than average education. In contrast to casual gamers, they have a high commitment and spend much time on improving their strategies and team maneuvers to blow away all opposition. Hostile Worlds' players are rather male. We rely on few opinion leaders to draw and bind the attention of more and more players.

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<sup>2</sup> <http://www.esl.eu>

# 18. Competitor Analysis

Here's how Hostile Worlds performs in comparison to the most important and established competitors in the real-time tactics and strategy games genre and how it compares to some similar exotic alternatives. Only the multiplayer mode of each game has been considered for this evaluation.

## StarCraft 2: Wings of Liberty

Developer: Blizzard Entertainment

Release date: July 27, 2010

Metacritic<sup>3</sup> score (StarCraft 1): 88

Being the sequel to one of the most important real-time strategy games which defined the genre, StarCraft 2 doesn't provide many new features that depart from its well established and proven gameplay formula. Genre standards like base building, resource gathering, the tradeoff decision between tech and unit numbers and the Rock, Paper, Scissors approach still prevail. Improvements that distinguish StarCraft 2 from its prequel are: graphics, micromanagement usability (e.g. smart casting), new units and abilities, and faction balancing. The only really new features are the new interactive map elements: Observatories, destructible rocks, high ground and high-yield mineral fields. Also several units now can ignore terrain height differences to faster reach the higher area. Since StarCraft 1 is the most successful and dominant real-time strategy game in professional gaming leagues all around the world and was highly valued by almost all reviews, it is to be expected that the sequel achieves a similar level of real-time strategy gaming perfection.

## Features

- Observatories: Key contributors to map control and scouting
  - *Hostile Worlds' Watch Towers are the same as Observatories. Scouting is even more important in Hostile Worlds since the players do not have a fixed base, but constantly move their units around the map.*
- High Ground (four levels): Only units on higher ground can see and attack units below
  - *Hostile Worlds also provides the High Ground element, but only with two levels (three terrain heights). Opposed to StarCraft 2, Hostile Worlds' High Ground only causes higher units to sustain less damage.*

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<sup>3</sup> (CBS Interactive Inc. 2010)

- High-yield mineral fields: Placed at high traffic areas which are difficult to protect
  - *In Hostile Worlds, there are strong aliens that are harder to defeat but award more resources. Additionally, single artifacts provide up to four times as much victory points as artifacts that are spawned in groups and therefore attract attention from all players and cause them to confront each other (see section The Goal: Artifacts).*

## Other similarities

- Sci-Fi setting

## Conclusion

Hostile Worlds doesn't compete with StarCraft 2 directly since it is a very different game. We believe that Hostile Worlds can peacefully coexist besides StarCraft 2 as an alternative that offers real-time strategy hardcore gamers some new interesting challenges.

# Command & Conquer 4: Tiberian Twilight

Developer: EA LA

Release date: March 16, 2010

Metacritic score: 64

Command & Conquer 4 supposedly concludes the Command & Conquer Tiberian series. It breaks with several genre and series standards (e.g. no base building, no resources) and tries to introduce some new aspects: A mobile main base constructs units, restricted by a unit cap only. The main base itself can be rebuilt, and players gain experience for multiplayer matches and thus can unlock new units. The game mode is Domination. The game's multiplayer mode was sparsely praised for its fast paced, action oriented gameplay, but criticized for its lack of tactical depth and the broken balance for beginners caused by the player progression system.

## Features

- Persistent player progression: Unlocking new units, powers, and upgrades by completing matches
  - *In order to extend its replayability, Hostile Worlds focuses on a well-balanced and rewarding gameplay experience consisting of few but significant and characteristic elements. Instead of relying on a meta game layer, which provides additional content on top to prolong the longevity of a game; Hostile Worlds aims to polish its core*

*gameplay aspects instead. Additionally, Hostile Worlds wants to avoid the balancing issues caused by the persistent player progression feature criticized in several reviews (Horner 2010).*

- Mobile Crawler: Mobile all-in-one base which constructs units
  - *This feature was labeled interesting in most reviews because it provides some new and refreshing aspects but it also was criticized as it lowers the tactical depth of the game. The crawler is mainly the cause for the very fast paced and hectic gameplay as it can constantly produce units close to the battle lines (Onyett 2010). Since units can be rebuild in a very short period of time it's less effective to micromanage them correctly by using their abilities as just heedlessly spamming them out. The Commander unit in Hostile Worlds is similar to the Mobile Crawler but will be more useful: Instead of just being able to construct units, the Commander has different abilities whose application must be well thought of and are critical to win the game. Also the commander can't spam units nearly as fast as the crawler, more so as units cost shards which must be spent carefully. Overall Hostile Worlds aims for a gameplay with more tactical depth and a less exhausting but more rewarding combat flow.*
- Two factions (GDI, NOD) with three classes (Offensive, Defensive, Support) where each class represents a full real-time strategy faction
  - *Our prototype of Hostile Worlds only includes one faction, although in story terms each team represents a different corporation. Each player shall have access to the same arsenal of units, but customizes his army by selecting from a wide range of unit abilities. This eases the balancing as it gives all players the same range of options. Much like World in Conflict, Command & Conquer 4 mainly focuses on the Rock, Paper, Scissors based teamwork in multiplayer matches: Each faction is especially effective against one of the other two factions and vulnerable against the third one. Because of this the team members must constantly act together to exploit their strengths and minimize their weaknesses. Because a player can select a new class after his Crawler has been killed, the teams must also constantly adapt to their enemies' changing play style and tactic. Hostile Worlds accomplishes something similar through the squad member abilities: Each player chooses his squads' focus according to the team's tactical plan to adapt to the enemy's decisions. Our game tries to lessen the importance of the rock, paper, scissors model though by making it possible to re-customize a squad more easily (see subsection Commander Abilities)*

*and by giving each squad build a realistic fighting chance if the micromanagement is done right.*

- 5v5 objective-based battles with Domination mode
  - *Several reviews criticize that the 1v1 mode isn't playable in C&C4 as it lacks the over important team interaction (Erazo 2010) (Biessener 2010) or that the maps aren't suitable for it (Graf 2010). Hostile Worlds aims to be playable just as well on 1v1 player matches as with more players.*

## Other similarities

- Sci-Fi setting

## Conclusion

We believe that Hostile Worlds has a fair chance to compete with C&C4 on a gameplay level in order to intrigue hardcore players, as it provides more tactical depth, more relevant micromanagement and overall a more meaningful and less exhausting gameplay.

## Dawn of War 2

Developer: Relic Entertainment

Release date: February 19, 2009

Metacritic score: 85

Dawn of War 2 is probably the game which best succeeded in combining real-time strategy and role-playing elements, it was one of the first ones to break with several genre standards (e.g. no base building, no resources) and introduces new elements (e.g. squads, environmental cover). It's the first real-time strategy game which successfully introduced a new game mode along the usual Annihilation mode: Domination. Overall Dawn of War 2's multiplayer mode was praised for its refreshing and successful blend of intense and fast paced combat, tactics, micromanagement and role-playing elements.

## Features

- Environmental cover & destructible environment
  - *Both these features are very important in Dawn of War 2 as they provide means to gain territorial control for yourself (units in cover take less damage) and withdraw it from your enemy (all cover can be destroyed). Environmental cover is an important*

*feature to emphasize a map's identity since its layout influences the gameplay and combat flow. Hostile Worlds provides other features to enable territorial control: High Ground and Watch Towers (see chapter Level Design). Slow Areas, Damage Areas and The Descent are additional features in Hostile Worlds which characterize a map and affect its gameplay and combat flow.*

- Four different races
  - *Hostile Worlds only has one race (see section Command & Conquer 4: Tiberian Twilight above)*
- Persistent Player Progression: new items and visuals for the squad
  - *We want to avoid the balancing issues caused by persistent player progression (see section Command & Conquer 4: Tiberian Twilight above)*

## Other similarities

- Sci-Fi setting
- Squads
  - *Hostile Worlds only has eight units and one Commander. This reasonably only allows for two to three squads. Our game focuses on few units thus trying to emphasize their tactical and sentimental importance to the player.*
- Hero
  - *Hostile Worlds' Commander differs from the Hero in Dawn of War as he doesn't have strong offensive abilities and therefore doesn't fight on the frontline. He rather must be protected in order to fulfill his support functionality at its best and he is crucial to win the game (see section The Commander). He also acts as a mobile main base from where the other units can be called.*
- Global Abilities (cost Zeal points which are obtained by killing enemy units and losing own units)
  - *Global Abilities in Hostile Worlds are similar to those in Dawn of War 2 in terms of availability and functionality: They are rarely used but then provide a massive advantage. Opposed to our competitor, in whom Global Abilities feel more like a reward for having fought a lot since Zeal can only be spent on them, Global Abilities in Hostile Worlds infer a deeper tradeoff decision since they cost shards which also can be used to promote squad members.*
- Unit Abilities
  - *Unit Abilities in Hostile Worlds are very similar to those in Dawn of War 2: Each unit has a unique look and feel and this sensation mainly is created by a characteristic set*

*of abilities. Hostile Worlds should try to accomplish a similar identification of the player with the different unit types to emphasize each unit's uniqueness. This is even more important since a player controls fewer units in Hostile Worlds than in Dawn of War 2. Furthermore, the Unit Abilities of Dawn of War are very well balanced; investigating their synergies will be of great help to balance the abilities of Hostile Worlds.*

## Conclusion

Dawn of War 2 is probably Hostile Worlds' toughest match up. Hostile Worlds' USPs that set it apart from its competitor are the aliens and the new game objective. Both provide a feeling that is similar to action role-playing games like Diablo. Also the dangerous environment theme provides game mechanics which lead to a different gameplay experience than in Dawn of War 2. We believe that the squad theme, a group of battle hardened soldiers carefully composed by the player, is more prominent in Hostile Worlds due to the smaller number of units and the more distinctive leveling system with more extensive ability customization options.

## Worldshift

Developer: Black Sea Studios

Release date: November 11, 2009

Metacritic score: 63

Worldshift offers a very innovative and weird mix of real-time strategy and role-playing elements. Like in Command & Conquer 4 and Dawn of War 2 some genre standards were removed (e.g. no base building) and some role-playing elements were introduced (e.g. leveling of units, Commander & Officers). Worldshift also provides persistent player progression which causes balancing issues though as the matchmaking isn't skill based. Reviews acknowledged the innovative role-playing ideas of Worldshift but criticized it mainly for its inadequate micromanagement capabilities, several major game design flaws (e.g. missing collision detection, units can shoot through obstacles) and its simplistic and conservative gameplay (Matschijewsky 2008).

## Features

- Thousands of items and powerful relics to collect: Relics are also called artifacts. They are obtained in-game and can be used to either extract items from which provide bonuses to the whole faction or recycle them to obtain Xenos shards which unlock faction specializations on a skill tree.
  - *Hostile Worlds doesn't provide a similar meta game role-playing feature, but play session based role-playing elements like promoting units and unlocking their abilities.*
- Use items and relics to build your own tactics
  - *Hostile Worlds does something very similar to provide tactical customization: Unit abilities and squad customization. These features are only available during a play session though.*
- Random maps for infinite exploration
  - *Hostile Worlds will only feature few custom made maps but with very different and characteristic layouts. Instead of generating random maps in order to support an exploration theme, Hostile Worlds focuses on the replayability of each map and its balancing.*
- Unique blend of post-apocalyptic, hi-tech and primitive settings
  - *Same for Hostile Worlds.*
- Three playable races
  - *Hostile Worlds only has one race (see section Command & Conquer 4: Tiberian Twilight above)*

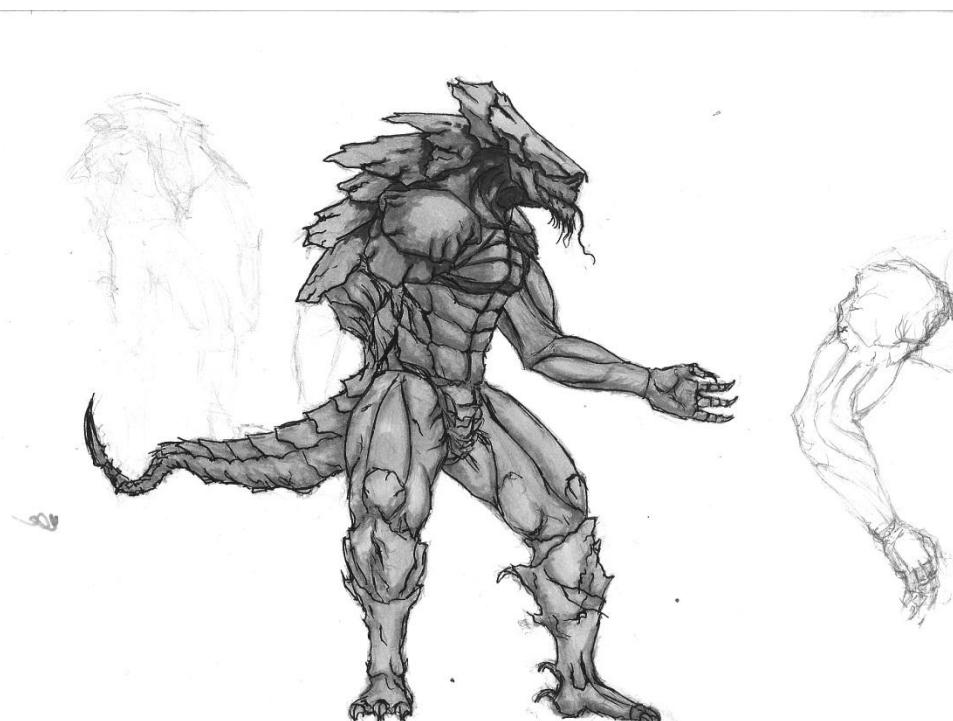
## Other similarities

- Sci-Fi setting
- Commander, Officers and base units
  - *Hostile Worlds also features a Commander and Officers (squad members), but no base units. Instead of crowding the game with many dispensable units, Hostile Worlds emphasizes on the importance of each single unit and therefore only provides a very limited number of them. Promoting these few units and keeping them alive is vital for victory. Due to the fewer units and their own characteristic abilities, Hostile Worlds also strongly encourages and supports the micromanagement aspect, which we believe to be crucial for a good competitive real-time strategy game.*

- Limited amount of unit points to select a mix of officers at startup. The total of five Officer slots can be filled up during the game.
  - *Hostile Worlds does something similar, the player can select up to four units at the beginning of each match. During the game it is possible to call up to four additional units and even to change unit types.*

## Conclusion

Worldshift suffers from several game design flaws: It's usually the best option to group all units and control them as a single squad. Because of the missing collision detection and formation system all units move in an entangled bulk then, which makes micromanagement impossible. Using the few special abilities neither requires much micromanagement since all abilities and their cooldown times are displayed as icons on the UI and can be accessed very easily. Overall the action is quite static and boring: The attack animations fail to create a satisfying combat sensation, units just stoically take their beating until they drop dead. Since Worldshift doesn't provide any environmental game play mechanics like cover or height, the maps don't have a meaningful level design and are just open fields on which no real strategy can evolve. We believe that Hostile Worlds can take off where Worldshift stopped: Several reviews moaned over its unfulfilled potential (Zoss 2009), as it introduced new and innovative RPG aspects but failed to deliver a worthwhile game. Hostile Worlds therefore focuses on providing a tactical deep and rewarding gameplay with adequate and well integrated innovative ideas.



# 19. Cost Analysis

Table 11: Cost analysis of Hostile Worlds.

<b>Team Costs</b>	Number of Team Members:	11
	Net Annual Salary per Team Member:	-42,000 €
	Payroll Related Cost Factor:	0.7
	Gross Annual Salary per Team Member:	-71,400 €
	Gross Annual Salary:	-785,400 €
	Number of Months:	18
	Total Salary:	-1,178,100 €
	Current Costs (Phone, Printing, Power), per Team Member and Month:	-15 €
	Current Costs Total:	-2,970 €
	Total Development Team Costs:	-1,181,070 €
	Assumed Rate of Interest:	5%
	Average Interest Expenses:	-29,526.75 €
	<b>Total:</b>	<b>-1,210,597 €</b>
<b>Fixed Costs</b>	Unreal Development Kit (UDK) One Time Royalty [\$]:	-\$99.00
	Euro Conversion Rate:	0.8
	Unreal Development Kit (UDK) One Time Royalty [€]:	-79.20 €
	Marketing (Internet Presence, Press Releases, Google Ad Words):	-50,000.00 €
	<b>Total:</b>	<b>-50,079.20 €</b>
<b>Earnings</b>	Expected Units Sold:	5000
	Net Price per Unit:	\$10.00
	VAT Rate:	19%
	Gross Price per Unit:	\$11.90
	Total Revenue:	\$50,000
	Steamworks Revenue Share:	10%
	Steamworks Revenue Share Total:	-\$5,000
	Revenue Remaining:	\$45,000
	UDK Revenue Share:	25%
	UDK Revenue Share Neutral Margin:	\$5,000
	UDK Revenue Share Relevant Revenue:	\$40,000
	UDK Revenue Share Total:	-\$10,000
	Earnings Made From Sold Units [\$]:	\$35,000
	Earnings Made From Sold Units [€]:	28,000 €
	Total Costs:	-1,260,675.95 €
	<b>Total Earnings:</b>	<b>-1,232,675.95 €</b>

## References

1. Exclusive: XNA Community Games Sales Figures Revealed (Langley and Remo 2009)
2. Steam's Finances (Edwards 2005)
3. UDK Commercial Terms (Epic Games, Inc. 2010)

# 20. Milestones

## First Semester

**Table 12: Milestones of the first semester.**

Deadline	Marcel's Task	Daniel's Task	Nick's Task
Friday, April 30	learn UDK	learn 3DSMax, concept art	combat system, GDD version 0.2
Friday, May 7	learn UDK, technology	speed painting, sketches & thumbnails, learn 3DSMax	prototyping
Friday, May 14	learn UDK	learn 3DSMax, concept art	prototyping, game interface
Friday, May 21	learn UDK, technology	learn 3DSMax, game interface, concept art	prototyping, migrating the GDD
Friday, May 28	prepare presentation	prepare presentation	prepare presentation
Friday, June 4	learn UDK, technology	learn 3DSMax, concept art	game design
Friday, June 11	look and feel, abstract, game features	story	decisions, goals, opposition, resources, tokens, information
Friday, June 18	technology	GUI	user stories, how to win a match, list of game assets
Friday, June 25	target group analysis	level design	list of game assets
Friday, July 2	competitor analysis	concept art	prototyping
Friday, July 9	prepare presentation	prepare presentation	prepare presentation

The whole team writes down their current and future processes. Marcel's girlfriend creates a logo, a corporate identity and four small tag icons.

## Second Semester

### Art Department

**Table 13: Milestones of the second semester, for the art department.**

Priority:	1	1	3	1
Deadline	Concept Art	Level Design	Particles	Web Design
1st Month	Squad Members, Aliens, Weapons	Prototype		Home, Forum
2nd Month	Props			
3rd Month	Logos/Signs	AI	Textures (if required)	Gallery, Dev Blog

Priority:	1	2	2	1
Deadline	Environmental Art	Squad Members	Aliens	Sound
1st Month	Watchtower, Crystals, Caves, Bridges, Plants, Low Priority Objects, Terrain Textures	Modeling	Modeling	Concept
2nd Month	Watchtower, Crystals, Bridges, Plants, Low Priority Objects, Terrain Textures	Texturing	Texturing	FX
3rd Month	Watchtower, Crystals, Bridges, Plants, Low Priority Objects, Terrain Textures	Animation	Animation	Voice

### Programming Department

**Table 14: Milestones of the second semester, for the programming department.**

Deadline	Marcel's Task	Nick's Task
1st Month	Prepare code base in order to allow: automated builds, resource management, game initialization, main loop & shutdown, options, localization	
2nd Month	Game State & Data Structures, Events, Network	Game State & Data Structures, Command Interpreter, Input Handling
3rd Month	Collision & Physics, Multi-threading	Basic AI, Game Audio

## Third Semester

### Art Department

**Table 15: Milestones of the third semester, for the art department.**

Priority:	1	1	3	1	3
Deadline	Concept Art	Level Design	Particles	Web Design	GUI
1st Month	Other Props, FX	Final Map Assets, Height Map		FAQ, other	HUD
2nd Month		Lighting	Start here		Menu
3rd Month	Wallpapers	Polishing			Intro

Priority:	1	3	1
Deadline	Environmental Art	Other Props	Sound
1st Month	Low Priority Objects, Machines	Start here	Music
2nd Month			GUI, Menu
3rd Month			

### Programming Department

**Table 16: Milestones of the third semester, for the programming department.**

Deadline	Task
1st Month	Complete rudimental demo
2nd Month	alpha testing & debugging
3rd Month	beta testing & debugging

During the third semester, we will include the community in our beta tests, led by Moritz Sterzinger.

Finally the game will be released on Steam.

## 21. Marketing

In order to increase the market penetration of Hostile Worlds, we'll use a handful of different communication channels:

### Homepage

The project will have an own homepage of course, that consists of the following sections, as recommended by Gerald Koehler (Koehler 2005):

- News
- Screenshots
- Team
  - About Us
  - Portraits
  - Interviews
  - Making Of
- Developer Blog (explaining new and rejected features)
- Downloads
  - Music
  - Wallpapers
  - Artwork
- Forum
- Gameplay (units, abilities, strategies)
- Links (to fan sites)
- FAQ
- Polls

We want to release periodical updates:

- once a week:
  - new screenshots
  - a new official discussion thread
- every two weeks:
  - profile of a team member
  - interview

- every four weeks:
  - a new dev blog entry
- twice before release:
  - music
  - wallpapers
- once before release (three months before):
  - forum
- whenever possible:
  - introducing new fan sites
  - presenting press articles

## **Electronic Sports League (ESL)**

The ESL is interested in our concept and could get one of our most important partners, as they would provide an own sub site, writing their own news, featuring upcoming events and matches and providing a platform with an own league and matchmaking system.

## **Development Forums**

The team will periodically ask and answer questions in development forums, such as

- DeviantArt
- Epic Games

This way, the community will realize that we are active, visit our blog and/or our homepage, and tell their friends about our project.

## **Twitter**

All homepage updates will be published via Twitter.

## **Press**

We want to tell on- and offline press like 4Players and GameStar about our project in order to increase the overall awareness.

## ?

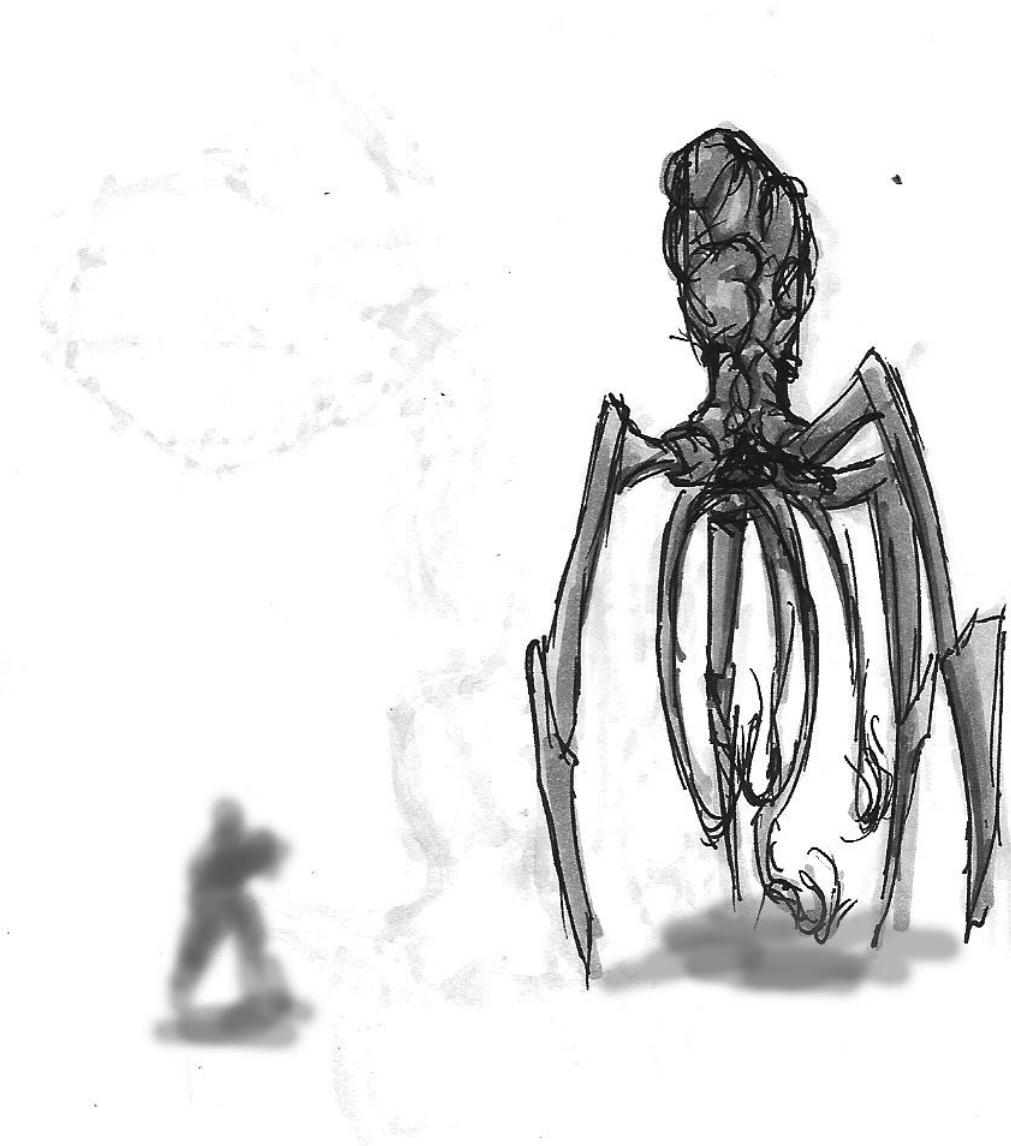
## External Bloggers

Our team intends to invite external bloggers who will play and test our game, and add entries to their blogs afterwards.

## ?

## Battle Reports

As soon as the game goes alpha, we want to publish *battle reports*. A battle report, inspired by StarCraft II, is a video that presents a whole match between two players or teams, casted by members of the Hostile Worlds team and maybe of the community. This makes it very easy to introduce new features and explain design decisions, and everybody gets an impression of how the game feels like. These videos will be streamed via [livestream.com](http://livestream.com) and are available after the live shows, too, of course.



# Part 3: Technical Documentation

## 22. Technology

### Engine Comparison

Table 17: Comparison of the UDK and the Vision, OGRE, Torque and Unity 3 game engines.

Engine	General Language	Editors / Editor Features				Graphics Particle Systems	
		Map / Terrain	AI	Sound	GUI	Shaders	
UDK	UnrealScript	yes	yes	yes	with Scaleform	yes	yes
Vision	C++	no	no	no	no	yes	yes
OGRE	C++	no	no	no	no	yes	yes
Torque	C++ Script	yes	no	no	yes	no	yes
Unity 3	C#, JavaScript	yes	no	no	no	yes	yes

Engine	Pathfinding	AI Decision Making	Team Based	Physics			
				Built in	CD	Rag Doll	Dism. Objects
UDK	yes	yes	yes	yes	yes	yes	yes
Vision	no	no	no	yes	yes	no	no
OGRE	no	no	no	yes	yes	with OgreODE	no
Torque	no	no	no	yes	yes	yes	no
Unity 3	no	no	no	yes	yes	yes	no

Engine	Client – Server	p2p	Network			Source Access
			Master Server	Protocol		
UDK	yes	no	with Steam	(Reliable) UDP		no
Vision	no	no	no	no		yes
OGRE	no	no	no	no		yes
Torque	yes	no	no	UDP / TCP		yes
Unity 3	yes	no	yes	Reliable UDP		no

## Unreal Engine 3: Pros & Contras

- Not for small teams?
  - Several small teams developed new games and mods during the 2008-2009 "Make Something Unreal Contest". Their team sizes vary between three and eight members (Epic Games, Inc. 2009):
    - Sanctum
      - 3 Programmers
      - 3 Game Designers
      - 2 Graphic Artists
    - The Haunted
      - 1 Programmer
      - 1 Game Designer
      - 3 Graphic Artists
    - The Ball
      - 1 Programmer
      - 1 Game Designer
      - 1 Graphic Artist
- High entry level due to UnrealScript and the many components and editors?
  - UnrealScript is a full object-oriented programming language based on C++ and Java. Since both our coders have a good knowledge of both languages we consider the initial syntax familiarization as minimal. Getting to know the Unreal API will likely take the same amount of time as getting to know any other engine's API. As to getting familiar with the many components and editors, this sure will be overwhelming and likely delay our project at first, but will provide us many advantages later on, since no other engine offers the same amount of features that are useful to us. The following build-in components and provided editors will be especially helpful: the client-server network architecture, the AI & Pathfinding framework, the Terrain and Level editor and maybe the new Flash based UI system.
- For First Person Shooters only?
  - As UDK includes "Unreal Tournament" as example project, it surely simplifies the development of an FPS game. The UT classes only act as guidelines though on how to solve typical (FPS) game programming problems. It is possible to develop any game

type with UDK, even RTS games, as proven by the community project Uskaarj<sup>4</sup> and the commercial game EndWar<sup>5</sup>.

## Conclusion

The Unreal Engine 3 offers the most features of all found engines that are relevant for us. The compatibility of these features is thoroughly proven by the community; we don't run the risk of having to use unverified and unpredictable 3rd party components. Moreover Unreal has a very big community and offers a wealth of knowledge we can rely on. Even if the Unreal Engine 3 might be cumbersome at first, we see this as a great opportunity to really get to know this state of the art game engine and explore it to its core. Another point not to neglect is UDK's revenue share model, which provides us free access to this great game engine on development - we only have to pay if we have financial success later on.

## Network Architecture

As Hostile Worlds is a competitive online real-time tactics game, we have to assure a clean, faultless online game experience. A player mustn't get any advantages due to latency, for example, and we have to prevent all players from cheating. We have two ideas how to achieve this:

1. Unreal Engine 3 Replication (Sweeney, Polge and Nalezynski 2010): Unreal Engine 3 provides a client-server architecture with an *authoritative server*. Clients do *local prediction* in order to predict the movement of distant objects. UnrealScript provides two properties `Role` and `RemoteRole` that allow configuring how objects, variables and methods are replicated between client and server. The native C++ layer is responsible for sending the data.
2. 1500 Archers on a 28.8: Network Programming in Age of Empires and Beyond (Bettner and Terrano 2001): In case Unreal Engine 3 Replication is not applicable for our project, we have to fall back to an approved RTS network architecture concept. That peer-to-peer approach subdivides the match into small timing windows, called *turns*. Instead of exchanging all game object data such as position or velocity, we just send all user commands. A single command, "move unit u to point (x, y)" for example, is not applied to the user's client immediately, but two turns later instead. That command is sent to all other peers. Let the *round trip time* denote the time a packet requires for being delivered from the sender to the recipient and back. As one turn is as long as the average round trip time, a single command has enough time to be delivered to all other clients. Every client has to wait until it has received all user

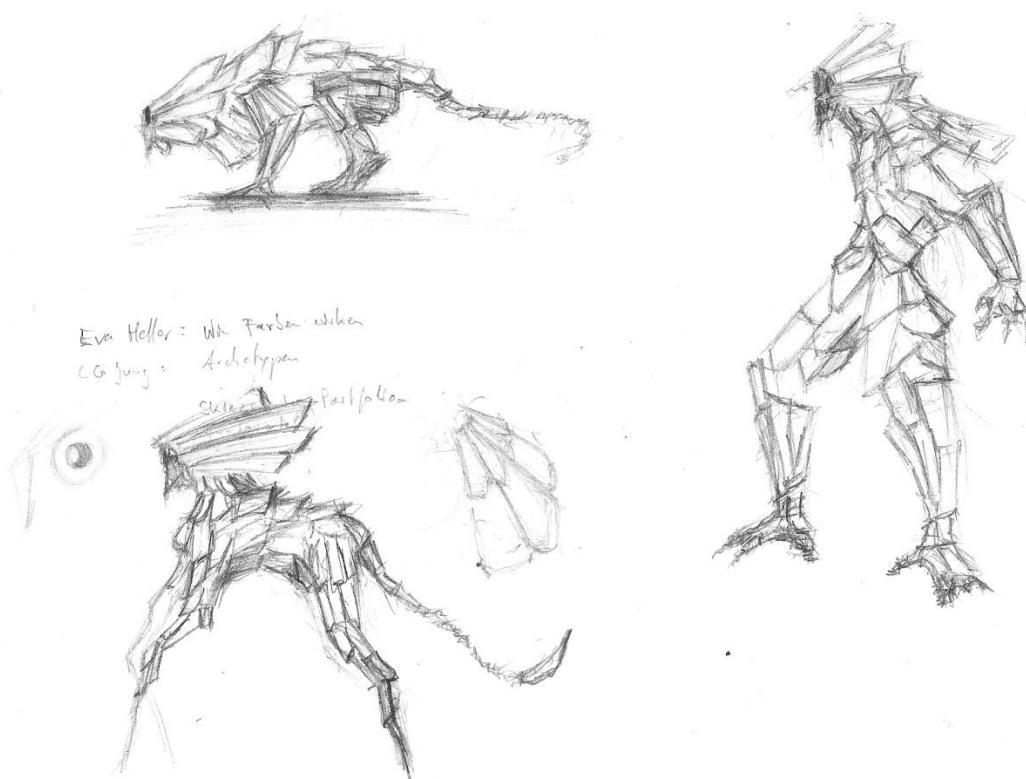
---

<sup>4</sup> <http://www.uskaarj.beyondunreal.com/>

<sup>5</sup> <http://endwargame.de.ubi.com/>

commands of the current turn before updating its game logic. As all peers always have all information about the current distributed game state, user commands can be independently applied by all peers. This in turn implies cheat protection.

The first approach works well for First Person Shooters, but our real-time tactics game may include too many objects that have to be replicated. Anyway, we'll try this first, as this approach is much easier to implement, and Senior Member Makaze stated in the Epic Games UDK Forums: "*Yes, it is possible to do that. While there is a limit of 64 players in a UDK game you can certainly have 100 or more pawns being controlled by a single player.*" (Makaze 2010)



## 23. Assets

### Technical Limits

According to the StarCraft II Editor, the models of standard units consist of about 1500 to 5000 polygons. The standard texture size is 1024x1024. We target similar values.

### Models & Animations

The following models are the main actors of Hostile Worlds. Each one has a list of animations it has to support. The models of the commander and the three squad members could reflect their selected abilities (low priority).

Commander (must support different player colors)

- Stand
- Walk
- Attack
- Die
-  Being Knocked Back
-  Collect Artifacts
-  Repair Squad Member

Squad Member: Rusher (must support different player colors)

- Stand
- Walk
- Attack
- Die
-  Being Knocked Back
-  Throw Grenade
-  Clap

- Squad Member: Engineer (must support different player colors)
  - Stand
  - Walk
  - Attack
  - Die
  - Being Knocked Back
  - Throw Grenade
  - Place Spring Gun
  - Collect Artifacts
- Squad Member: Hunter (must support different player colors)
  - Stand
  - Walk
  - Attack
  - Die
  - Being Knocked Back
  - Throw Grenade
- Artifact Marker with Artifact (energy crystal growing from some alien structure; available artifact needs to be obvious)
- Weak Alien
  - Stand
  - Walk
  - Attack
  - Die
  - Being Knocked Back
- Strong Alien
  - Stand
  - Walk
  - Attack
  - Die
  - Being Knocked Back

- Helicopter (must support different player colors)
  - Stand
  - Walk
  - Attack
  - Die
- Artillery (must support different player colors)
  - Stand
  - Attack
  - Die
- Spring Gun (must support different player colors)
  - Stand
  - Attack
  - Die
- Scout Drone (must support different player colors)
  - Stand
  - Walk
  - Die
- Control Tower (human architecture, must support different player colors)
- Concussion Grenade
- Smoke Grenade
- EMP Grenade
- Alien Camp (stone cave entrance into the ground or into the wall)
- Drop Pod (crushes down whenever a new squad member is called)

The following projectiles maybe can be replaced by shaders.

- Projectile: Commander Attack
- Projectile: Rusher Attack
- Projectile: Engineer Attack
- Projectile: Hunter Attack
- Projectile: Helicopter Attack
- Projectile: Artillery Attack
- Projectile: Spring Gun Attack

# Icons

## Minimap

Minimap icons are drawn on top of the terrain and units displayed.

- Empty Artifact Spot
- Artifact
- Alien Camp
- Strong Alien Lane

## In-Game GUI Buttons

Every active button of the in-game interface should have an icon.

- Command: Attack
- Command: Attack Ground (for artillery)
- Command: Move
- Command: Stop
- Command: Hold Position
- Command: Cancel
- Command: Harvest (artifacts)
- Rusher
- Engineer
- Hunter
- Commander
- Promote Squad Member
- Ability, Commander: Dismiss Squad Member
- Ability, Commander: Repair Squad Member
- Ability, Commander: Air Strike
- Ability, Commander: Scan
- Ability, Commander: Cloak
- Ability, Rusher: Clap
- Ability, Rusher: Charge
- Ability, Rusher: Concussion Grenade
- Ability, Rusher: Target Engines
- Ability, Rusher: Focused Fire
- Ability, Rusher: Increased Armor

- Ability, Engineer: Smoke Grenade
- Ability, Engineer: Call Artillery
- Ability, Engineer: Spring Gun
- Ability, Engineer: Harvester
- Ability, Engineer: Recharge
- Ability, Engineer: Reduced Cooldowns
- Ability, Hunter: Aimed Shot
- Ability, Hunter: Hack
- Ability, Hunter: EMP Grenade
- Ability, Hunter: Scout Drone
- Ability, Hunter: Expose Weakness
- Ability, Hunter: Increased Attack Range
-  Submenu Button: Commander Abilities
-  Submenu Button: Call Squad Members
-  Submenu Button: Resurrect Squad Members
-  Minimap Button: Ping
-  Minimap Button: Switch Player Colors
-  Minimap Button: Show/Hide Alien Lanes
-  Pause Button (for replays)
-  Restart Button (for replays)
-  Speed Up Button (for replays)
-  Speed Down Button (for replays)

## Buffs

Icons for buffs are displayed in the status window of the selected unit and usually are the same as the ones for GUI buttons, just smaller.

-  Knocked Back
-  Ability, Commander: Cloak
-  Ability, Rusher: Target Engines
-  Ability, Rusher: Focused Fire
-  Ability, Engineer: Smoke Grenade
-  Ability, Engineer: Recharge
-  Ability, Hunter: EMP Grenade
-  Ability, Hunter: Expose Weakness

## Status Window Icons

The status window shows all important information on the selected unit. Every value has a small icon associated:

-  Structure
-  Shields
-  Armor
-  Damage
-  Range
-  Cooldown

## Cursors

Hostile Worlds has its own mouse cursors which are drawn depending on the current game state:

-  Standard
-  Select Target

## Images

Some screens may share a background.

-  Screen Background: Login Screen
-  Screen Background: Main Menu
-  Screen Background: Host Game
-  Screen Background: Server Browser
-  Screen Background: Game Lobby
-  Screen Background: Loading Screen
-  Screen Background: Lag Screen
-  Screen Background: Score Screen
-  Screen Background: Help Screen
-  Screen Background: Credits Screen
-  Game Start-Up Splash (including title and copyright information)
-  Screen Background: Replay Browser
-  Screen Background: Options Screen

# GUI Elements

## Menus, Screens and Dialogs

The main menu, the options menu, the server browser and other non-in-game screens require a handful of flexible interface elements. The following elements are well-known to most users and should be similar to Windows Forms, for example.

-  Textbox
-  Button (OK, Cancel, Start)
-  Dialogue Box
-  Main Menu Button (Play!, Replays, Options, Help, Credits, Quit)
-  List Box (for map list, server list)
-  Vertical Scroll Bar (for map list, server list)
-  Checkbox (checked)
-  Checkbox (unchecked)
-  Combo Box
-  Slider
-  Tabs (for options screen, score screen)

## In-Game Backgrounds and Borders

The following elements of the in-game interface should at least have a nice background and/or border.

- Status Window (including a possible progress bar: shards required for squad members, shots remaining for artillery, time remaining for scout drone)
- Top-right (resources, time, squad members) Display, including small icons
- Top-center victory points bars (one for each team)
- Minimap
- Squad Member Portraits
- Buttons for Squad Member Abilities
- Top-left Commander Abilities
- Bottom-right Command Window
- Menu Button
- Help Button
- Log Button
- Tooltip Box
- Minimap Buttons
- Menu Bar
- Alien Rage Bar
- Chat Textbox (just one line of text, to show after a user has pressed the ENTER key)
- Health Bar
- Progress Bar (for acquiring artifacts)
- Replay Buttons (just above bottom-right Command Window)

## Shaders

Shaders are required for drawing nice effects that are triggered by the game logic.

- Selection Circle (around selected units)
- Right-click Feedback
- Level Up
- Ability, Commander: Dismiss Squad Member (disappear somehow)
- Ability, Commander: Scan
- Ability, Commander: Cloak
- Ability, Rusher: Clap
- Ability, Rusher: Concussion Grenade Explosion
- Ability, Rusher: Target Engines Explosion
- Ability, Rusher: Focused Fire
- Ability, Engineer: Smoke Grenade Smoke
- Ability, Engineer: Recharge
- Ability, Hunter: EMP Grenade Wave
- Ability, Hunter: Expose Weakness Laser
- Fog of War
- Commander Resurrection Restricted Area Radius
- Attack Radius
- Ability Radius
- Minimap Alert

## Environments

Environmental assets cannot be interacted with by the user; they are placed by the map designer.

- Small Bridge (human architecture; narrow for 2 players next to each other)
- Large Bridge (human architecture; wide enough for three to 4 player standing next to each other in a row)
- Texture: Ground
- Plateau (if necessary this should be a simple plateau made out of rock)
- Objects for slow and damage areas
  - Slow Area = fluid or mud
  - Damage Area = alien plants
- Texture: Alien lane
- Descent Objects (Slick architecture inside the Decent)
- Alien Architecture (2-3 objects: houses, towers)
- 2-3 objects inside of the descent
- Plants, rocks, crashed UFO, crashed satellite, junk, skulls
- Sky Dome (with sky texture)
- Particle System: Dust Bowls
- Particle System: Fog (in the descent)

## Maps

- We'll start with a single demo map which includes all gameplay elements.
- A team play map should follow.

# Sounds

## General

General sounds are played whenever the user interacts with the user interface or should be notified of important events.

- Error
- Commander Health Critical
- Level-Up
-  Mouse Click
-  Button Clicked
-  Minimap Ping
-  In-game Chat Message
-  Server Joined
-  Server Left
-  Screen Transition
-  Hint

## Weapons

All weapon sounds should consist of at least two sound files: Attack and Hit. Variations are welcome.

- Attack: Commander
- Attack: Rusher
- Attack: Engineer
- Attack: Hunter
- Attack: Weak Alien
- Attack: Strong Alien
- Attack: Helicopter
- Attack: Artillery
- Attack: Spring Gun

## Abilities

Ability sounds are played whenever a player uses an ability or sees an ability that is being used.

- Collect Artifacts
- Ability, Commander: Scan
- Ability, Commander: Cloak
- Ability, Rusher: Clap
- Ability, Rusher: Charge
- Ability, Rusher: Concussion Grenade Explosion
- Ability, Rusher: Target Engines Explosion
- Ability, Rusher: Focused Fire Shout
- Ability, Engineer: Smoke Grenade Smoke
- Ability, Engineer: Call Artillery
- Ability, Engineer: Place Spring Gun
- Ability, Engineer: Recharge
- Ability, Hunter: Hack
- Ability, Hunter: EMP Grenade Wave
- Ability, Hunter: Scout Drone Released
-  Drop Pod (of called squad members)
-  Ability, Commander: Dismiss Squad Member

## Ambient Sounds

- There should be at least one ambient sound that can be looped during a match.

## Music

Music is supposed to be looped at different screens.

-  Main Menu
-  In-game
-  Credits

# Speech

## Interface

The user is notified of very important events.

- units under attack
- not enough resources
- allies under attack
- allied commander has fallen

## Units

Player controlled units give feedback when selected or ordered. Aliens cry while charging and attacking the player squads.

- Commander
  - Selected
  - Order Confirmed
  - Attack Order Confirmed
  - Dies
- Rusher
  - Selected
  - Order Confirmed
  - Attack Order Confirmed
  - Dies
  - Dismissed
- Engineer
  - Selected
  - Order Confirmed
  - Attack Order Confirmed
  - Dies
  - Dismissed

- Hunter
  - Selected
  - Order Confirmed
  - Attack Order Confirmed
  - Dies
  -  Dismissed
- Weak Alien
  - Battle Cry
  - Dies
- Strong Alien
  - Battle Cry
  - Dies
- Helicopter
  -  Dies
  -  Selected
- Artillery
  -  Dies
  -  Selected
  -  Attack Order Confirmed
- Spring Gun
  -  Dies
  -  Selected
  -  Attack Order Confirmed
- Scout Drone
  -  Dies
  -  Selected
  -  Order Confirmed

Pissed sounds are welcome (played whenever a unit is clicked more than twice).

## Cinematics

-  Game Intro

# 24. Processes

## Art

### 3D Assets

Basically all art assets are going to be produced after the game design gave an approved asset list (including object a description and references if necessary) to the art department.

1. GD hands out object description
2. Concept
3. Model
4. Textures
5. Rig
6. Animation
7. Polishing (plus extras)

After each step the 3D asset is going to be checked for errors inside the UDK and approved by the lead artist.

Software used: 3DS Max, ZBrush, Photoshop, and Crazy Bump

### Web Design

1. 2D Concept
2. Programming
3. Polishing
4. Flash

Software used: Photoshop (plus external)

### Particle Effects

1. GD hands out asset list
2. Concept (if necessary)
3. UDK
4. Photoshop for textures
5. Hand over to programming

## Level Design

1. Concept including asset list
2. Blocking out test map
3. Testing AI paths, aliens
4. Building detailed map
5. Polishing

The map is going to be tested after each step, with the game design department and with the programming department.

## Game Design & Balancing

### Adding New Abilities

Whenever we test the current build and realize that we need a new ability, for example because the game's feeling is just not right or an existing ability needs to be countered, we implement a new ability as follows:

1. Propose a new ability.
2. Assign the ability to the squad member class it fits best.
3. Check the ability comparison, and iterate if necessary.
4. Design placeholder assets: Simple icon and visualization.
5. Implement the ability.
6. Test and iterate.
7. Design final assets.

### Removing Existing Abilities

Sometimes we'll find out that an existing ability is very rarely used. In this case, we'll remove that ability and perhaps replace it with another one:

1. Remove the ability from the current build.
2. Check the ability comparison, and add a new one, if necessary.
3. Test and iterate.

## Balancing Unit Statistics

We collect rich information on the played matches, like common squad compositions and ability sets.

Additionally, we listen to the community in our forums and polls and in external forums.

If we feel like any squad member or alien is too strong or weak in numbers or an ability or level-up costs too much shards, we change some values:

1. Process automatically gathered data.
2. Modify one or more values in the Excel sheets, and iterate if necessary. Prefer changing the costs of units or abilities to changing their strength, as this preserves the design intentions and saves time. (Boege 2010, p. 51)
3. Implement the new values, and do internal tests. Iterate if necessary.
4. Release the new version.



## 25. System Requirements

This chapter contains system requirements of similar games.

### Alien Breed<sup>6</sup>

#### *Minimum:*

- OS: Windows® XP SP2 or later
- Processor: 2.0+ GHZ Single Core Processor
- Memory: 1 GB RAM
- Graphics: NVIDIA GeForce 6800+ or ATI Radeon X700+ Video Card
- DirectX®: 9.0c
- Hard Drive: 1.5 GB
- Sound: Windows Supported Sound Card
- Other Requirements: Internet Connection

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<sup>6</sup> <http://store.steampowered.com/app/22610/>

## Tom Clancy's EndWar<sup>7</sup>

### **Minimum:**

- OS: Windows® XP SP2 or Windows Vista® SP1
- Processor: Intel® Core® 2 Duo E4400 2.0 GHz or 3.0 GHz AMD Athlon™ 64 X2 Dual Core 6000+ or better
- Memory: 1 GB Windows XP / 2 GB Windows Vista
- Graphics: 256 MB DirectX® 9.0c-compliant video card with Shader Model 3.0 or higher
- Hard Drive: 10 GB
- Sound: DirectX 9.0c-compatible sound card
- Network: Broadband connection with 256 kbps upstream or faster and service required for multiplayer mode
- Peripherals: Windows-compatible mouse

### **Recommended:**

- Processor: Intel® Core® 2 Duo E6600 2.4GHz, Intel® Core® 2 Quad Q6600 2.4GHz, or 2.5 GHz AMD Quad-Core Phenom™ X4 9850 or better
- Memory: 2 GB
- Graphics: 512 MB DirectX® 9.0c-compliant video card with Shader Model 3.0 or higher



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<sup>7</sup> <http://store.steampowered.com/app/21800/>

# List of Tables

Table 1: Computation of the number of victory points per artifact. ....	13
Table 2: Computation of the time required for acquiring an artifact. ....	13
Table 3: Class ability comparison. ....	19
Table 4: Number of shards required and gained for promoting, killing and dismissing squad members. .....	20
Table 5: Commander ability shard costs. ....	21
Table 6: Computation of the number of shards gained per alien kill....	21
Table 7: Structure, shields, range, damage and cooldown of all Hostile Worlds units.....	23
Table 8: Keyboard layout.....	51
Table 9: Match time spent per action, in %. ....	53
Table 10: Prototype debug commands. ....	63
Table 11: Cost analysis of Hostile Worlds.....	81
Table 12: Milestones of the first semester.....	83
Table 13: Milestones of the second semester, for the art department.....	84
Table 14: Milestones of the second semester, for the programming department. ....	84
Table 15: Milestones of the third semester, for the art department. ....	85
Table 16: Milestones of the third semester, for the programming department. ....	85
Table 17: Comparison of the UDK and the Vision, OGRE, Torque and Unity 3 game engines.....	89

# List of Figures

Figure 1: The focus of Hostile Worlds. ....	11
Figure 2: An overview of the demo map of Hostile Worlds. ....	36
Figure 3: The login sequence of Hostile Worlds. ....	38
Figure 4: The splash screen of Unreal Tournament 3. ....	39
Figure 5: The login screen of Unreal Tournament 3. ....	39
Figure 6: Screen transitions of Hostile Worlds. ....	40
Figure 7: The server browser of Counter-Strike 1.6. ....	41
Figure 8: The pre-match lobby of WarCraft III: The Frozen Throne. ....	41
Figure 9: The loading screen of WarCraft III: The Frozen Throne. ....	42
Figure 10: The in-game menu of the StarCraft II Beta client. ....	42
Figure 11: The post-match score screen of WarCraft III: The Frozen Throne. ....	43
Figure 12: The replay browser of WarCraft III: The Frozen Throne. ....	44
Figure 13: The gameplay options screen of the StarCraft II Beta client. ....	45
Figure 14: A pre-vis of the Hostile Worlds in-game user interface. ....	47

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# Index

ability 25, 26  
channeled 16  
commander 14, 52  
engineer 17  
hunter 17  
passive 16  
rusher 16  
ability button 46, 49, 52, 53  
alien 13, 21, 27, 35  
    strong 14, 25  
    weak 14, 25  
alien aggro table 14  
alien camp 14, 35  
alien lane 14, 35  
alien rage 23  
area  
    damage 34  
    slow 34, 35  
armor 22  
artifact 12, 25, 27, 35, 53  
attack range 22  
call 14, 52  
cloak 15  
commander 14  
cooldown 22  
cursor 50  
Descent 34, 35  
dismiss 14, 20  
error 50  
fog of war 46  
game director 12  
game lobby 41  
grenade  
    concussion 16  
    EMP 17  
    smoke 17  
high ground 34  
host 40  
hotkey 45, 51  
info bar 46  
ingame menu 42  
join 40  
login 39  
main menu 40  
minimap 46, 51  
minimap ping 51  
movement speed 22  
options 45  
order 50  
    attack 50  
    attack ground 50  
    dismiss squad member 50  
    harvest 50  
    hold position 50  
    move 50  
    repair 50  
    stop 50  
portrait 46, 49  
promote 20, 53  
reinforcement 17  
replay 44  
resurrect 15, 53  
right-click 50  
scan 15, 26  
scouting 26  
screen  
    lagg 43  
    loading 42  
    splash 39  
    scroll 49  
    select 49  
    shard 13, 20, 21, 25  
    shields 22  
    Slics 31  
    sound  
        Attack Order Confirmed 50  
        Drop Pod 52  
        Error 50  
        Level-Up 53  
        Order Confirmed 50  
        Selected 49, 52  
structure 22  
submenu 46  
    Call Squad Members 52  
    Commander Abilities 52  
    Resurrect Squad Members 53  
terrain 24, 26, 27, 34, 35  
watch tower 27, 34, 35  
window  
    command 46, 49, 50  
    status 46, 49, 53